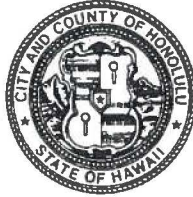


DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honolulu.gov • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR



GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2014/ELOG-1094 (ts)

June 25, 2014

Ms. Jessica Wooley, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

FILE COPY

JUL 08 2014

Dear Ms. Wooley:

Subject: Chapter 343, Hawaii Revised Statutes
Draft Environmental Impact Statement
Hoakalei Master Plan Update

Please publish appropriate notice of the Hoakalei Master Plan Update project (Tax Map Keys: 9-1-134: 7, 22 [por.], 25-27, 28 [por.], and 29 [por.]), located in Ewa, City and County of Honolulu, in your next issue of the Environmental Notice for public review and comment during the statutory 45-day consultation period.

We are the approving authority for this project. This Draft Environmental Impact Statement (DEIS) is being issued pursuant to the project Environmental Impact Statement Preparation Notice listed in the October 23, 2013 issue of the Environmental Notice.

One hard copy and one CD of the DEIS for the above project are attached. We have also included the OEQC publication form on the CD, as per your website's instructions.

If there are any questions, please contact Tim Streitz of our staff at 768-8042 or tstreitz@honolulu.gov.

Very truly yours,

A handwritten signature in blue ink, appearing to read "George I. Atta".

George I. Atta, FAICP
Director

GIA:bkg
1155924

Enclosures: DEIS
OEQC Publication Form
DEIS Distribution List
CD of DEIS and OEQC Publication Form

cc w/out attachments: Haseko
Planning Solutions, Inc.

**APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JANUARY 2013 REVISION)**

Project Name: Hoakalei Master Plan Update

Island: O'ahu

District: 'Ewa

TMK: 9-1-134:025, 9-1-134:026, 9-1-134:027, 9-1-134:028 (por.), 9-1-134:029 (por.), 9-1-134:007, 9-1-134:022 (por.)

Permits: Special Management Area Use Permit (Major), Zoning Change, Shoreline Setback Variance, National Pollutant Discharge Elimination System – Notice of Intent [Construction] (NPDES-NOI[C]), Grubbing, Grading, and Building Permits

Approving Agency:

Department of Planning and Permitting,
650 South King St., Honolulu, Hawaii 96813
Timothy Streitz, (808) 768-8042

Applicant:

Haseko ('Ewa), Inc.
91-1001 Kaimālie St., Suite 205
'Ewa Beach, Hawai'i 96706-5005
Raymond Kanna, (808) 689-7772

Consultant:

Planning Solutions, Inc.
210 Ward Avenue, Suite 330, Honolulu, Hawaii 96814
Perry White, (808) 550-4483

Status (check one only):

- ☐ **DEA-AFNSI** Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.
- ☐ **FEA-FONSI** Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.
- ☐ **FEA-EISPN** Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.
- ☐ **Act 172-12 EISPN** Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
- ☒ **DEIS** The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
- ☐ **FEIS** The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
- ☐ **Section 11-200-23 Determination** The approving agency simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin.
- ☐ **Statutory hammer Acceptance** The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.
- ☐ **Section 11-200-27**

Determination

The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

___Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

Haseko ('Ewa), Inc. is seeking a zone change for approximately 80 acres of the 1,100 acre Ocean Pointe-Hoakalei development to accommodate a change in its master plan for the Hoakalei portion of the development. The Hoakalei Master Plan Update (HMPU) features a recreational lagoon as the focal point in place of the previously-planned marina. The rezoning request calls for rearrangement of the zoning district boundaries, but only modest shifts in the total acreage devoted to each type of land use. It would not increase the development density or the total number of residential and visitor accommodation units. The land to be rezoned is located within the last undeveloped phase of the project. If the requested zone change and other required permits and approvals are granted, including a Special Management Area (SMA) Use Permit, Haseko will seek to complete the Ocean Pointe-Hoakalei development in accord with the updated plan.



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Department of Health
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813
Telephone: (808) 586-4185
Facsimile: (808) 586-4186
Email: oeq@hawaii.gov

June 30, 2014

Mr. George Atta, FAICP, Director
Attention: Tim Streitz
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Subject: Chapter 343, Hawaii Revised Statutes
Draft Environmental Impact Statement
Hoakalei Master Plan Update

Dear Mr. Atta:

The Office of Environmental Quality Control is in receipt of your June 25, 2014, transmittal letter and attachments regarding the subject project. Among the materials submitted was a distribution listing of the parties that are to receive an electronic or hard copy of the draft environmental impact statement, on or before the start of the public comment period on July 8, 2014.

Pursuant to Section 11-200-21, Hawaii Administrative Rules, the Office of Environmental Quality Control verifies the accuracy of the above distribution list.

If there are any questions, please call me at (808) 586-4185.

Sincerely,


Herman Tuiolosega
Senior Planner

c: Haseko Planning Solutions

CHAPTER 9 DISTRIBUTION

Haseko will distribute this DEIS to the individuals and organizations listed in Table 9.1 and request their comments on the report. It will provide a limited number of loan copies to libraries.

Table 9.1 EIS Distribution List

State Organizations	CCH
Department of Agriculture ✓	Board of Water Supply ✓
Department of Accounting and General Services ✓	Department of Customer Services ✓
Dept. of Business, Economic Development & Tourism ✓	Department of Community Services, Municipal Library ✓
DBEDT - Research Division Library ✓	Department of Design and Construction ✓
DBEDT- Strategic Industries Division ✓	Department of Environmental Services ✓
DBEDT - Office of Planning ✓	Department of Facility Maintenance ✓
Department of Defense ✓	Fire Department ✓
Dept. of Education ✓	Department of Planning & Permitting (2 copies) ✓
Dept. of Education-Hawai'i State Library Documents Center ✓	Department of Parks and Recreation ✓
Dept. of Education-Kaimukī Regional Library ✓	Police Department ✓
Dept. of Education-Kane'ohe Regional Library ✓	Department of Transportation Services ✓
Dept. of Education-Pearl City Regional Library ✓	Department of Emergency Management ✓
Dept. of Education-Hawai'i Kai Regional Library ✓	Kapolei Hale (Satellite City Hall)
Dept. of Education-Hilo Regional Library ✓	Federal Agencies
Dept. of Education-Kahului Regional Library ✓	U.S. Geological Survey ✓
Dept. of Education-Līhu'e Regional Library ✓	U.S. Fish and Wildlife Service, Pacific Islands Office ✓
Department of Hawaiian Homelands ✓	U.S. National Marine Fisheries Service ✓
Dept. of Health - Environmental Health Admin. ✓	U.S. National Parks Service ✓
Dept. of Health - Clean Water Branch ✓	U.S. Natural Resources Conservation Service ✓
Dept. of Health - Environmental Office of Planning ✓	U.S. Army Corps of Engineers ✓
DLNR (5 copies) ✓	U.S. Department of the Navy ✓
DLNR - Historic Preservation Division ✓	U.S. Federal Aviation Administration ✓
Department of Transportation – Highways Division ✓	U.S. Federal Transit Administration ✓
UH Water Resources Research Center ✓	U.S. Coast Guard ✓
UH Environmental Center ✓	U.S. EPA – Pacific Islands Office ✓
UH Marine Option Program ✓	
UH Hamilton Library ✓	Libraries and Depositories (Nearest Public Library)
UH at Hilo-Mo'okini Library ✓	'Ewa Beach Public Library ✓
UH Maui College Library ✓	Kapolei Public Library ✓
UH Kaua'i Community College Library ✓	UH West O'ahu Library ✓
Office of Hawaiian Affairs	
Legislative Reference Bureau Library ✓	Media
Hawaii Community Development Authority - Kalaeloa ✓	Honolulu Star Advertiser ✓
Land Use Commission ✓	Honolulu Civil Beat ✓
Department of Human Services ✓	

Oahu Metropolitan Planning Organization	
Elected & Other Officials	Other Parties
U.S. Senator Brian Schatz ✓	‘Ewa Beach Lions Club ✓
U.S. Senator Mazie Hirono ✓	‘Ewa Beach Elementary School ✓
U.S. Representative Colleen Hanabusa ✓	‘Ewa Makai Middle School ✓
State Senator Will Espero (District 19) ✓	‘Ewa-Pu‘uloa Hawaiian Civic Club ✓
State Senator Mike Gabbard, (District 20) ✓	Boys & Girls Club Hale Pono ‘Ewa Beach Clubhouse ✓
Representative Bob McDermott (District 40) ✓	Cates International, Inc. ✓
Representative Rida Cabanilla (District 41) ✓	Glenn J. Oamilda ✓
Representative Sharon E. Har (District 42) ✓	Hoakalei Cultural Foundation ✓
Representative Karen Awana (District 43) ✓	Hoakalei Resort Community Association ✓
City Councilmember Ernest Y. Martin-City Council Chair ✓	Ilima Intermediate School ✓
City Councilmember. Kymberly Marcos Pine (District 1) ✓	James Campbell High School ✓
City Councilmember Ron Menor (District 9) ✓	Kapolei Hawaiian Civic Club ✓
City Councilmember Ikaika Anderson-Planning & Zoning Committee Chair ✓	Keone‘ula Elementary School ✓
City Councilmember Ann Kobayashi-Budget Committee Chair ✓	Land Use Research Foundation ✓
City Councilmember Breene Harimoto-Transportation Committee Chair ✓	O‘ahu Hawaiian Canoe Racing Association ✓
Chairperson Kevin Rathbun, ‘Ewa Neighborhood Board ✓	Ocean Pointe Residential Community Association ✓
Chairperson Evelyn Souza, Makakilo/Kapolei/Honokai Hale Neighborhood Board ✓	‘Ewa Pu‘uloa Outrigger Canoe Club ✓
	Seagull Schools at ‘Ewa Beach (Ocean Pointe) ✓
	Uncle Henry Chang Wo, Kupuna ✓
Local Utilities	West O‘ahu Economic Development Association ✓
Hawaiian Electric Company, Inc. ✓	Sierra Club Hawaii Chapter ✓
Hawaiian Telcom ✓	Native Hawaiian Legal Corporation ✓
Hawai‘i Gas ✓	Hawaii’s Thousand Friends ✓
Oceanic Time Warner Cable ✓	The Outdoor Circle ✓
	‘Ewa by Gentry Community Association ✓
	West Loch Estates Homeowners Association ✓
	West Loch Fairways Homeowners Association ✓
	Hawaii Wildlife Center ✓
	Waianae Boat Fishing Club ✓
Source: Compiled by Planning Solutions, Inc. (2014)	

***Draft Environmental Impact Statement
Volume 1***

**HOAKALEI MASTER PLAN UPDATE
‘EWA, O‘AHU, HAWAI‘I**

**PREPARED FOR:
Haseko (‘Ewa), Inc.**



PREPARED BY:

**P L A N N I N G
S O L U T I O N S**

JUNE 2014

SUMMARY

<i>Project:</i>	<i>Hoakalei Master Plan Update Project</i>
Proposing Entity:	Haseko (‘Ewa), Inc. 91-1001 Kaimālie Street, Suite 205 ‘Ewa Beach, Hawai‘i 96706-5005 Contact: Raymond Kanna (808) 689-7772
Approving Agency:	Department of Planning and Permitting City and County of Honolulu 650 South King Street Honolulu, Hawai‘i 96813 Contact: Timothy Streitz (808) 768-8042
Location:	‘Ewa Beach, O‘ahu, Hawai‘i
Proposed Action:	Hoakalei Master Plan Update, including the rezoning of approximately 80 acres of the 1,100-acre Ocean Pointe-Hoakalei development. Rezoning triggers Hawai‘i Revised Statutes, Chapter 343 review. If the zoning change is granted, the project will include use of the existing ~50-acre inland water body on the property as a recreational lagoon, without connection to the ocean. The updated plan also calls for construction of a swimming cove and other improvements to optimize the area as a resort and outdoor recreation area.
Tax Map Key:	9-1-134:025, 9-1-134:026, 9-1-134:027, 9-1-134:028 (por.), 9-1-134:029 (por.), 9-1-134:007, 9-1-134:022 (por.) (See Figure S-1)
Area to be Rezoned:	80 acres
Judicial District:	‘Ewa
State Land Use District:	Urban
County Zoning:	A-2, BMX-3, I-3, P-2, and Resort
Required Permits & Approvals:	Special Management Area Permit, Zoning Change, Shoreline Setback Variance, NPDES-NOI(C), Grubbing and Grading Permits, Building Permits
Determination:	Completion of an Environmental Impact Statement
Parties Consulted:	See Chapter 9
Consultant:	Planning Solutions, Inc. 210 Ward Avenue, Suite 330 Honolulu, HI 96814 Contact: Perry White (808) 550-4483

Haseko ('Ewa), Inc. ("Haseko") is the developer of the 1,100-acre Ocean Pointe-Hoakalei master planned development (referred to throughout this document as "Ocean Pointe-Hoakalei development" or "the development") located in 'Ewa, O'ahu, Hawai'i. The land was urbanized, and substantially all development permits were obtained for the entire 1,100-acre development by 1997 (see Figure 1.6). The original zoning obtained for the development was intended to accommodate a master planned project focused on a man-made marina with a maritime commercial complex that included light industrial, commercial, and retail facilities. Also featured in the master plan was a golf course, a 20-acre district park with child care facility, an expanded One'ula Beach Park, an elementary school, fire station, a maximum of 950 visitor accommodation units, and a maximum of 4,850 residential units.

Construction of the Ocean Pointe-Hoakalei community began in 1997 with the first residential neighborhood located along the eastern end of the development. In conjunction with this initial development, Haseko began excavating material from the area planned for the marina, using it as fill to create good drainage for the developing residential neighborhoods. From the closing of the sale of the first home in the community in 1998 to the present, development of Ocean Pointe-Hoakalei has continued uninterrupted moving generally from east to west across the 1,100-acre development with approximately 70% (3,412 out of 4,850) of the planned single family and townhome residences completed. From 1997 to date, the marina basin has been constructed, and an 18-hole golf course incorporating extensive drainage infrastructure has been largely completed along with most of the remaining planned infrastructure for the development (e.g. roadways, drainage, sewer, and water). Also during this time, many of the other existing zoning conditions have been satisfied including the provision of lands for a child care center, elementary school, and fire station.

Haseko is seeking a zoning change (henceforth referred to as the "Proposed Action") from the City and County of Honolulu ("CCH") for approximately 80 acres within the last undeveloped phase of the 1,100-acre development. For the purpose of this Environmental Impact Statement ("EIS") document, the term "Project Area" refers to the undeveloped phase, including the 80 acres that is the subject of the zoning change.

The purpose of the zoning change is to accommodate changes to the master plan for the development that will best allow Haseko to respond to current and projected economic conditions. As documented in the Hoakalei Master Plan Update ("HMPU"), the central change to the master plan is the completion of the existing basin as a recreational lagoon instead of as a marina. If the requested zone change and other required permits and approvals are granted, Haseko will seek to complete Ocean Pointe-Hoakalei in accord with the HMPU (see Figure 1.7). This would entail:

- Completing the development at Ocean Pointe-Hoakalei by using the existing basin as a recreational lagoon surrounded by a combination of resort, residential, commercial, light industrial and public open space rather than converting it into a small boat marina.
- Eliminating the marina-related industrial use and seven-lane boat launch ramp facility that had been proposed for the land adjacent to the western side of the basin.
- Adding areas zoned for light industrial use that will accommodate uses that are compatible with a mixed-use development featuring a recreational lagoon as a focal point.
- Constructing a protected public swimming cove on the northwest corner of the proposed lagoon.
- Redesigning infrastructure (e.g., water, sewer, electrical, etc.) in areas surrounding the basin as needed to support its use as a recreational lagoon.
- Installing multiple storm water quality treatment structures, associated grading of the area, and constructing drainage structures. The storm water quality treatment structures and site grading will be designed to collect and retain the vast majority of storm water runoff from areas around the basin.

- Constructing an activity center along the western shoreline of the lagoon which could include a cultural center, parking lot, comfort station, and sandy area suitable for launching canoes, kayaks, and other human-powered vessels.
- Developing resort, residential, light industrial, commercial, and other uses as allowed by the zoning and described elsewhere in this report.
- Creating features between the ocean and the southern edge of the lagoon, landscaped with native Hawaiian plants, that would enhance the vehicular barriers already installed by the State of Hawai‘i.

The HMPU seeks to realize as much of the existing land use plan and intent as possible in the absence of the marina. The lagoon will be the visual and activity focal point of the development. Public pedestrian movement along the shoreline is facilitated by the elimination of the entrance channel break that is a necessary part of the marina plan. Public open space is similar to what had been previously proposed. The public swimming cove planned for the northwestern corner of the lagoon provides recreational opportunities for a wider range of people than would the marina, and the resort areas contemplated around the lagoon’s edge will enhance the area’s attractiveness and economic viability consistent with the vision, policies, and guidelines of the ‘Ewa Development Plan (EDP).

The primary purpose of the zoning changes is to adjust land uses in the area to be compatible with completing the basin as a recreational lagoon. Accordingly, Haseko’s rezoning request calls for rearrangement of the zoning district boundaries, but only modest shifts in the total acreage devoted to each type of land use. Only approximately 80 acres will be subject to a change in zoning out of the entire 1,100-acre development. Haseko’s HMPU does not call for any increase in development density or in the total number of residential and visitor accommodation units. The most significant shift in acreage is the redistribution of lands currently in the I-3 Waterfront Industrial zone. Without the marina, there is little need for waterfront industrial development. Haseko proposes to shift those lands into IMX-1 Industrial-Commercial Mixed Use, B-1 Neighborhood Business, BMX-3 Commercial Business Mixed Use, Resort, and P-2 General Preservation zones. If Haseko’s rezoning request is granted, other permits and approvals may be required, such as:

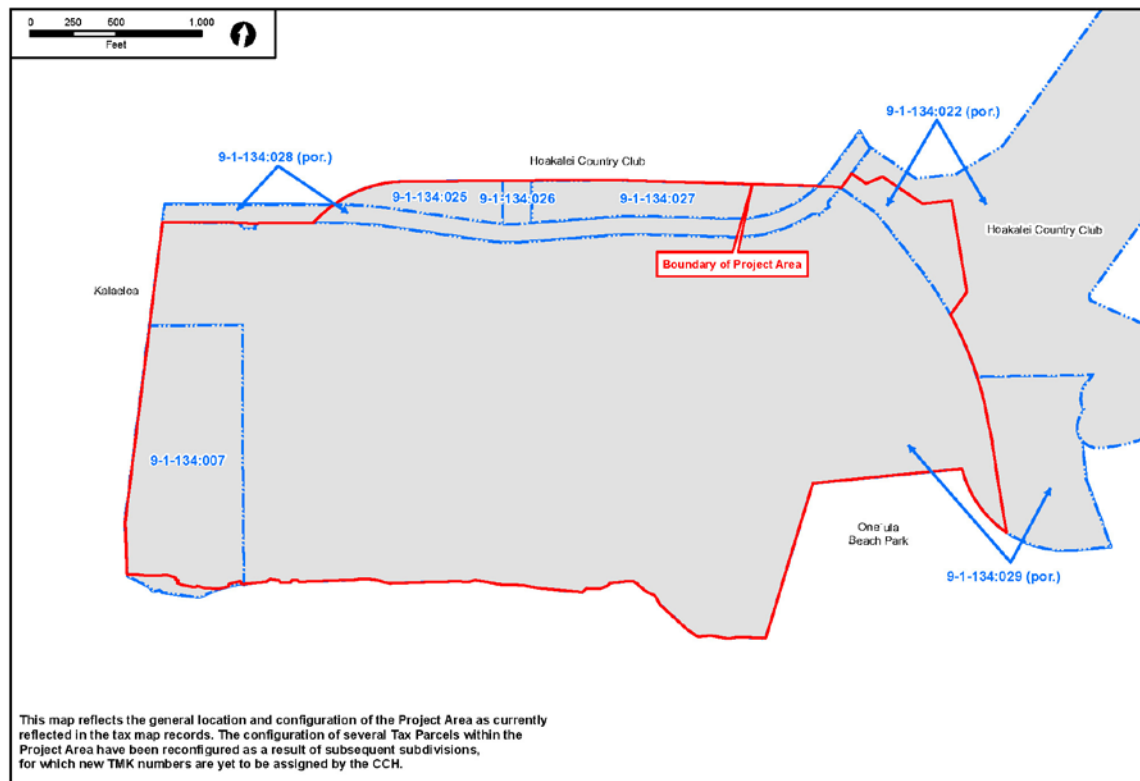
- Special Management Area (“SMA”) Permit;
- Shoreline Setback Variance (“SSV”);
- SMA Boundary Contraction;
- Conditional Use Permit(s);
- National Pollutant Discharge Elimination System Notice of Intent (NPDES-NOI-C)
- Grubbing and Grading Permit; and
- Building Permit(s).

This document describes the environmental effects likely to occur if Haseko completes the work needed to implement Haseko’s HMPU, which this report refers to as Alternative 1 or the “Preferred Alternative”. It also describes the potential effects of three additional alternatives.

- The first of these, Alternative 2, also entails completion of the existing basin as a lagoon with surrounding uses similar to those in Haseko’s HMPU, but with a different arrangement of resort, commercial, and light industrial land uses around the northern and western sides of the lagoon. This alternative concentrates resort development on the *mauka* side of the lagoon, well away from the coastline, but is otherwise similar to the Preferred Alternative, and would require the same permits and approvals. Like Alternative 1, the lack of an entrance channel connecting the basin to the ocean eliminates the need for the seven-lane boat launch ramp facility called for in the marina-based plan. Singular launch ramps are planned around the basin to allow permitted watercraft (ie canoes, kayaks, stand-up paddleboards, etc.) to be used in the lagoon.

- Alternative 3 involves completing the existing basin as a marina with surrounding land uses constructed in accord with the existing zoning. The marina industrial areas would include a seven-lane boat launch ramp facility, vehicle and boat trailer parking, a harbormaster building, possible dry-stack boat storage, and other boat servicing and maintenance facilities. The mixed-use business areas could include a shopping center with restaurants, retail businesses, upstairs studio and office space, and the permanent Hoakalei Country Club clubhouse. The Resort-zoned area could include up to a maximum of 950 visitor accommodations, shops and restaurants. This is a course of action that Haseko has concluded it is unable to implement due to litigation and economic factors described in this Draft Environmental Impact Statement (“DEIS”).
- Alternative 4, also referred to as the “no action alternative” (i.e. no zoning changes), entails constructing only the development that Haseko would be able to complete under the existing zoning and which market conditions make viable. Under this Alternative, Haseko would develop lands adjacent to the existing golf course (the Hoakalei Country Club), including the apartment-zoned area to the east of the basin, and such light industrial, resort, and other uses for which a viable market exists. It would leave for future developers the task of making productive use of the existing basin and adjacent areas. Without either a recreational lagoon or marina anchoring the development, it is less likely that Haseko will be able to pursue financing, attract purchasers, or create an equitable distribution of maintenance fees for interested parties for all of the uses that are theoretically possible under the existing zoning. Further, it is unlikely that there would be any demand for resort, industrial, or commercial activities near an unused basin with few public amenities and undeterminable maintenance costs and obligations.

Figure S-1 Project Area TMK Numbers



Source: City and County of Honolulu GIS (2014)

Comparison of Impacts

The tabulation below provides a comparison of impacts for each of the four alternatives considered in this EIS document:

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
4.1	Topography	Minor (+/- 3 feet relative to Existing Grade)	Same as (1)	Same as (1) plus break in shoreline for marina entrance channel.	Similar to (1)
4.2	Storm Water Drainage	Most rainfall events retained in water quality features. Discharge into ocean from 100-year rainfall event.	Same as (1)	Storm water from events in excess of 10-year, 1-hour reaches ocean.	Similar to (1)
4.3	Climate	No substantial effect.	Same as (1)	Same as (1)	Same as (1)
4.4	Air Quality	BMPs avoid significant construction emissions. Proposed facilities do not have substantial on-site emissions.	Same as (1)	On-shore construction effects similar to (1). Additional emissions from dredging channel and on-land dredged spoils disposal.	Reduced construction activity would result in effects slightly less than (1)
4.5	Basin & Swimming Cove Water Quality	Creates good swimming environment in cove and provides in-water recreational opportunities not now available in area. Maintains good water quality in basin.	Same as (1)	Most of the time the marina water would consist of coastal sea water with low levels of contaminants from normal marina activities, but compliant with State of Hawai'i water quality standards.	Not Applicable.
4.6	Water Quality Lake Waters	Water quality lakes will intercept, retain, and provide treatment for runoff, discharging to the lagoon. BMPs will ensure minimum transfer of suspended sediments and other contaminants. Haseko will stock the lakes with fish species known to help control aquatic plants and will initiate a program of water quality maintenance. Water in the lakes to conform with applicable water quality standards.	Same as (1)	Same as (1)	Same as (1)

SUMMARY

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
4.7	Wetland Waters	No outside rainfall runoff entry into the Wetland Preservation Area (WPA). Thus, there should no impacts to wetland waters.	Same as (1)	Same as (1)	Same as (1)
4.8	Nearshore Marine Waters	Plan eliminates storm water runoff into the ocean except under the most extreme (i.e., occurring less than once every 100 years) storm conditions.	Same as (1)	Dredging of entrance channel will temporarily increase turbidity in nearby water. Marina water entering coastal waters would not lead to the violation of State Water Quality Standards, but suspended sediment would inevitably reach the ocean.	Same as (1)
4.9	Groundwater Resources	Groundwater flows have already adjusted to the existence of the excavated basin, and its use as a recreational lagoon will not alter groundwater quality. Best management practices will be used during construction and ongoing operations to ensure minimal introduction of nutrients and other pollutants into groundwater.	Same as (1)	Groundwater flux currently entering the ocean along the shoreline directly <i>makai</i> of the lagoon would be halted and replaced by the flow of marina water through the entrance channel. This would be a noticeable local effect.	Same as (1)
4.10	Natural Hazards	The Project Area is not exposed to natural hazards other than those common along the shoreline, and all facilities have been designed to provide adequate protection against these, including sea level rise.	Same as (1)	Same as (1)	Same as (1)
5.1	Terrestrial & Avian Biota	Completion of the Ocean Pointe-Hoakalei development in accordance with the HMPU would not adversely affect protected flora or fauna, including avian species.	Same as (1)	Same as (1)	Same as (1)
5.2	Lagoon Biota	Careful management of uses in and around the lagoon will maximize the health of the lagoon ecosystem. The limu and fish communities are likely to continue to be relatively stable, while the plankton community will respond to seasonal and weather-related changes.	Same as (1)	Not applicable, as the basin will be open to the ocean.	Same as (1)

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
5.3	Nearshore Marine Biota	No effect as the basin will remain separated from the ocean.	Same as (1)	Construction of a marina entrance channel would remove 300,000 cubic yards of coralline limestone, sand, and other material and destroy all of the sessile or slow-moving benthic flora and fauna within the alignment. Water exiting the marina through the channel is likely to contain slightly elevated levels of organic materials and potentially lead to a localized, small increase in the densities of intertidal fauna such as snails and other invertebrates very near to the channel opening. Boats based at the marina could increase pressure on the fishes that are present in offshore areas near the marina.	Same as (1)
5.4	Noise	Construction noise would not exceed limits set by Hawai'i Administrative Rules ("HAR" §11-46). Aircraft noise will not exceed 55 Ldn in residential areas. Once in operation, the lagoon, swimming cove, pedestrian pathways and other elements in the Project Area will not draw activities which are generally considered a source of nuisance noise. Likewise, the resort, commercial, and residential uses which Haseko is seeking in areas around the lagoon will not produce nuisance noise exceeding the 65 Ldn-limit.	Same as (1)	Same as (1)	Same as (1)
5.5	Historical & Archaeological Resources	The proposed zone change has no potential impacts to historic properties located in the Project Area. The existing Memorandum of Agreement ("MOA") and Condition 26 of the Conservation District Use Permit ("CDUP") OA-2670 will remain in force. No additional mitigation measures are required.	Same as (1)	Same as (1)	Same as (1)

SUMMARY

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
5.6	Cultural Resources	The HMPU balances the development of residential, commercial, light-industrial and resort uses in the area with the need to protect cultural resources and seeks to promote the causes of concern to the native people of Honouliuli and minimize adverse impacts to the cultural history, resources, and practices which are part of this area's heritage.	Same as (1)	Same as (1)	Same as (1)
5.7	Recreation & Shoreline Access	Implementation of the HMPU would: (i) provide a variety of aquatic recreational opportunities not now available (e.g., enhanced swimming opportunities in the cove and the chance to paddle, sail, kayak, canoe, pedal-boat) and conduct other recreational activities not previously possible in the fully protected waters of the new lagoon and (ii) create a recreational focal point for local and visitor communities that is now lacking in the 'Ewa region. None of the facilities, activities or development associated with the HMPU will prohibit, limit access, or detract from existing recreational activities and resources.	Same as (1)	The entrance channel will interrupt continuous lateral access along the shoreline between One'ula Beach Park and White Plains Beach Park, but increase access to ocean recreational opportunities. Boat launching ramps and marina slips are also likely to increase accessibility to nearby fishing areas.	Some effects similar to (1), but recreational use of the lagoon will be substantially reduced and it will not be possible to construct or operate the swimming cove and/or other recreational amenities.
5.8	Land Use	As discussed in Chapter 6, the HMPU is consistent with state and county land use plans and policies for the region. The change in zoning Haseko is requesting will allow the company to fulfill its original intent of creating a water-oriented community featuring resort, commercial, and residential uses that generate jobs and provide recreational opportunities for the region. Because the land surrounding the Project Area has been developed in anticipation of the kinds of uses contained in the HMPU, the Preferred Alternative is compatible with the surrounding land uses.	Same as (1)	The one way the Preferred Alternative would promote a different land use pattern is in the absence of the maritime uses that were expected in conjunction with development of a small boat harbor with access to the open ocean. As this alternative is not economically viable at the present time, it is highly likely that this core area could not be constructed for an indefinite period of time, adversely affecting surrounding land uses.	Without either a recreational lagoon or marina anchoring the development, it is less likely that Haseko will be able to pursue financing, attract purchasers, or create an equitable distribution of maintenance fees for interested parties for all of the uses that are theoretically possible under the existing zoning. Haseko would be compelled to complete only those areas which it felt were consistent with the present zoning and economically viable.

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
5.9	Economic Impacts	Construction outlays of about \$720 million are expected to have a total economy-wide impact of over \$1.4 billion, generating over \$81 million in State of Hawai‘i tax revenue and creating more than 8,500 job-years of employment. The proposed rezoning will accommodate land uses that more ably support business diversification and enterprise for long-term economic resilience.	Same as (1)	If there were to be a market for the marina facilities, its economic effects would be quite similar to those of the lagoon. However, if one considers the much greater uncertainty associated with the hypothesized income from the marina, both of the Lagoon Alternatives are superior to the marina alternative with respect to their likely economic benefits to the community.	Much of the development-related economic activity from the other alternatives would be absent. Not finishing the resort/ commercial portion of the 1,100-acre master planned community would negatively affect the valuation of existing properties surrounding the incomplete Project Area.
5.10	Scenic & Aesthetic Resources	Construction within the Project Area will alter the landscape, but the continuation of the expansive views across the open water and low-lying <i>makai</i> area will provide a gracious sense of openness. Because most of the area around the lagoon will be dedicated open space that the public will be encouraged to use, the open space and views across the Project Area will continue to be accessible. The lagoon and surrounding development will be visible from the shoreline and public spaces surrounding the basin. The <i>makai</i> portions of the Preferred Alternative development may also be visible from the western end of One‘ula Beach Park, but the extent of that visibility will depend upon the plantings that grow out within the park and immediately surrounding areas.	Similar to (1) except absence of resort development adjacent to the western end of the basin and a consequent increase in development density along the <i>mauka</i> side of the lagoon.	The visual and aesthetic effects of this alternative are similar to those discussed for Alternatives 1 & 2. However, the marina and support facilities associated with this alternative would occupy much of the open water area within the basin. The docks associated with the marina would support several hundred vessels. As a result, the marina basin would have a substantially different character than that of the recreational lagoon that is proposed.	If market forces allowed, structures of approximately the same size as would occur in Alternative 2 and the visual and aesthetic effects of this would be comparable to those produced by that alternative. Given the current state of the economy, it is likely that only the residential development in the Resort and A-2 zoning along the northeastern portion of the Project Area (see Figure 3.4) and the permanent clubhouse for Hoakalei Country Club in the <i>mauka</i> BMX-3 parcel would proceed. Some amenities that would enhance the visual environment might not be constructed.

SUMMARY

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
5.11	Transportation	Because the HMPU will not increase the amount of residential, commercial, resort, or other development from the level now planned, it will not impact the level of service on existing or planned roadways. Similarly, because the land uses that could occur in the rezoned area are the same as those already approved for the property, approval of the rezoning would not alter the load on State airports or harbors.	Same as (1)	Similar to (1), but with additional traffic traveling to and from launch ramps and boat slips.	With equal or slightly reduced traffic volumes in some areas, the level of service would be higher. The conclusions reached with respect to potential effects on airports and harbors are the same for this alternative as for Alternative 1.
5.12	Public Infrastructure	Presently there are no water, electrical, gas, sewer, or communications lines in the Project Area. However, with the exception of gas, these are present in the already developed portion of Ocean Pointe-Hoakalei, and the lines passing through those areas leading up to the Project Area have been sized with the expectation that the Project Area would be developed in accordance with the existing master plan and marina-based zoning. Because of this, no new facilities would need to be installed in those areas, and the additional loads imposed by the ongoing development will not in any way degrade the level of service provided to existing residents of Ocean Pointe-Hoakalei or its neighbors.	Same as (1)	Same as (1)	Same as (1)
5.13	Public Services	The police, fire, emergency medical services, solid waste collection and disposal services, and schools that serve Ocean Pointe-Hoakalei have been planned and constructed to support the growth that the CCH and State have directed onto the 'Ewa Plain. They are adequate for the full project build-out.	Same as (1)	Same as (1)	Same as (1)
6.0	Consistency with Land Use Plans & Policies	The HMPU is consistent with the overall land use plans and policies for the area. A change in the CCH zoning for 80 acres is required, however.	Same as (1) except for slightly different CCH rezoning.	Fully consistent with the overall land use plans and policies for the area.	Inconsistent with the EDP only to the extent that the project will not include either a completed lagoon or marina.

<i>Section</i>	<i>Impact Topic</i>	<i>(1) Preferred Alternative</i>	<i>(2) All-Mauka Resort Alternative</i>	<i>(3) Marina Alternative</i>	<i>(4) No Action Alternative</i>
7.0	Unresolved Issues	<p>The major unresolved issues are:</p> <p>(i) Whether or not the Honolulu City Council will approve or deny Haseko's request for rezoning of the Project Area.</p> <p>(ii) The extent to which any permit condition(s) that may be imposed will require an adjustment in the plan or affect the way in which it is implemented.</p> <p>(iii) The manner in which the avigation easement related to the former NASBP may affect the design, operation, and maintenance of the areas that it covers.</p>	Same as (1)	<p>Should the marina alternative be pursued in the future, clarification from EPA on it's unofficial stance questioning its previous formal position supporting disposal of dredging material from the entrance channel in the South O'ahu Dredge Spoils Disposal Area will need to be resolved.</p>	<p>The extent and exact nature of the development that will be possible within the Project Area with the limitations of the existing land use zoning.</p>

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CHAPTER 1 INTRODUCTION

1.1 STATEMENT OF PURPOSE

Haseko (‘Ewa), Inc. (“Haseko”) is the developer of an 1,100-acre Ocean Pointe-Hoakalei master planned development (referred to throughout this document as the “Ocean Pointe-Hoakalei development” or “the development”), located in ‘Ewa, O‘ahu, Hawai‘i (see Figure 1.1 for general project location). From its inception, the project has been envisioned as a mixed use development with residential, commercial, industrial, and resort uses, with a man-made marina serving as the focal point of the project. Haseko is seeking a zoning change (henceforth referred to as the “Proposed Action”) from the City and County of Honolulu (“CCH”) for approximately 80 acres within the last undeveloped phase of the 1,100-acre development. For the purpose of this Environmental Impact Statement (“EIS”) document, the term “Project Area” refers to the undeveloped phase, including the 80 acres that is the subject of the zoning change.

The purpose of the zoning change is to accommodate changes to the master plan for the development that will best allow Haseko to respond to current and projected economic conditions. As documented in the Hoakalei Master Plan Update (“HMPU”), the central change to the master plan is the completion of the basin as a recreational lagoon as the focal point of the development instead of as a marina (see Figure 1.2 for location).

This document evaluates the environmental effects that would occur if Haseko completes the work needed to implement Haseko’s HMPU, which this report refers to as Alternative 1 or the “Preferred Alternative”. It also describes the potential effects of three other alternatives. The first of these, Alternative 2, also entails completion of the existing basin as a lagoon with surrounding uses similar to those in Haseko’s HMPU; however, it differs from Haseko’s Preferred Alternative in that the resort uses are all on the *mauka* side of the basin. Alternative 3 involves completing the existing basin as a marina with surrounding land uses consistent with the marina-based existing zoning. Alternative 4, also referred to as the “no action alternative”, entails no zoning changes and calls for constructing only the development that Haseko is able to complete under the existing zoning without development of the marina, and which market conditions make viable. Overall, the report is intended to inform the public and agency decision-making with respect to Haseko’s rezoning request.

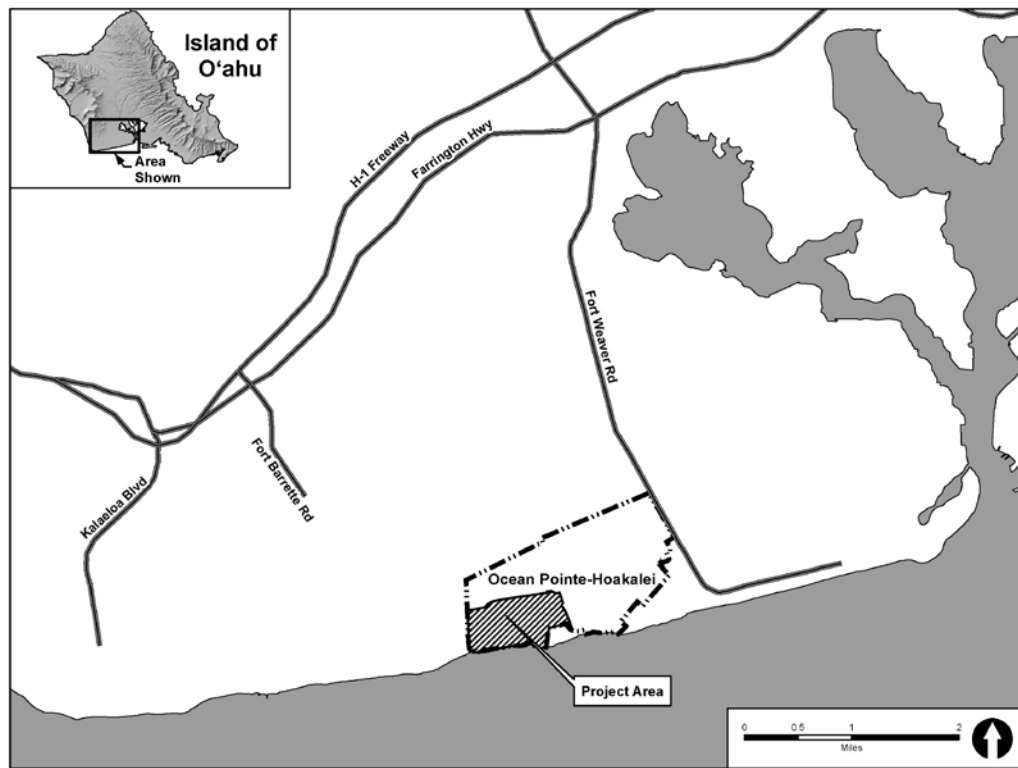
1.2 UPDATED HOAKALEI MASTER PLAN

1.2.1 DEVELOPMENT UNDER EXISTING MASTER PLAN

In 1988, Haseko purchased approximately 1,100 acres of land on the ‘Ewa Plain for development of what was then referred to as the ‘Ewa Marina Project.¹ The land was urbanized and substantially all development permits were obtained for the entire 1,100-acre development by 1997. The original zoning obtained for the development was intended to accommodate a master planned project focused on a man-made marina with a maritime commercial complex that included light industrial, commercial, and retail facilities. Also featured in the master plan was a golf course, a 20-acre district park with child care facility, an expanded One‘ula Beach Park, an elementary school, fire station, a maximum of 950 visitor accommodation units, and a maximum of 4,850 residential units.

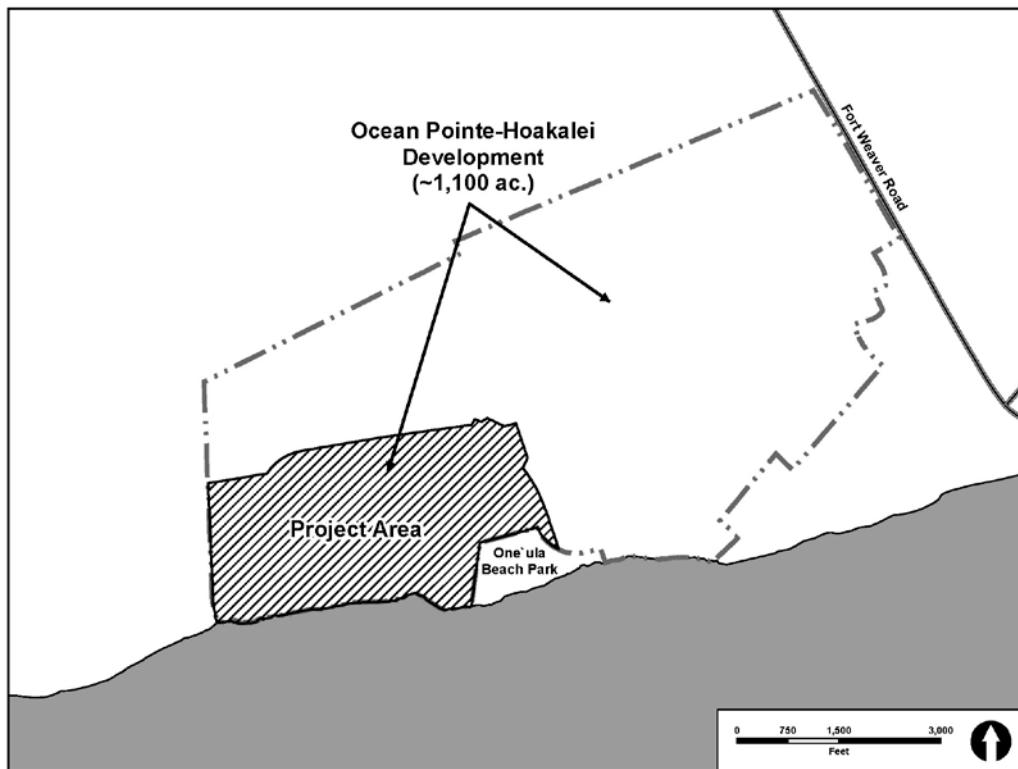
¹ Originally referring to the entire area simply as the ‘Ewa Marina project, in 2008 Haseko began differentiating between the residential portion east of Kalo‘i Gulch, which it named “Ocean Pointe”, and the western portion, containing the planned marina, a golf course, and planned resort and residential development, which it christened “Hoakalei”. The entire 1,100-acre project is sometimes referred to in this document as the “Ocean Pointe-Hoakalei development” or “development”. The term “Project Area” is used in this document to refer to the last undeveloped phase of the development, including the 80 acres that is the subject of the zoning change.

Figure 1.1 Location Map



Sources: Haseko ('Ewa), Inc.: Honolulu GIS

Figure 1.2 Vicinity Map



Construction of the Ocean Pointe-Hoakalei community began in 1997 with the first residential neighborhood located along the eastern end of the development. In conjunction with this initial development, Haseko began excavating material from the area planned for the marina, using it as fill to create good drainage for the developing residential neighborhoods. From the closing of the sale of the first home in the community in 1998 to the present, development of Ocean Pointe-Hoakalei has continued uninterrupted moving generally from east to west across the 1,100-acre development with approximately 70% (3,412 out of 4,850) of the planned single family and townhome residences completed (including affordable housing units).

From 1997 to date, the marina basin has been constructed, and an 18-hole golf course incorporating extensive drainage infrastructure has been largely completed along with most of the remaining planned infrastructure for the development (e.g. roadways, drainage, sewer, and water). Also during this time, many of the other existing zoning conditions have been satisfied including the provision of lands for a child care center, elementary school, and fire station. Additionally, open space requirements have been met throughout the development process including the development of private parks, and the pending dedication of the district park and the shoreline parcels that will expand One‘ula Beach Park. Although negotiations are underway for a portion of the resort-zoned land, no resort development has yet begun. Finally, the growth of the Ocean Pointe-Hoakalei community has also coincided with Haseko’s steady commitment of both manpower and monetary resources to a wide range of charitable causes benefitting the wider ‘Ewa community.

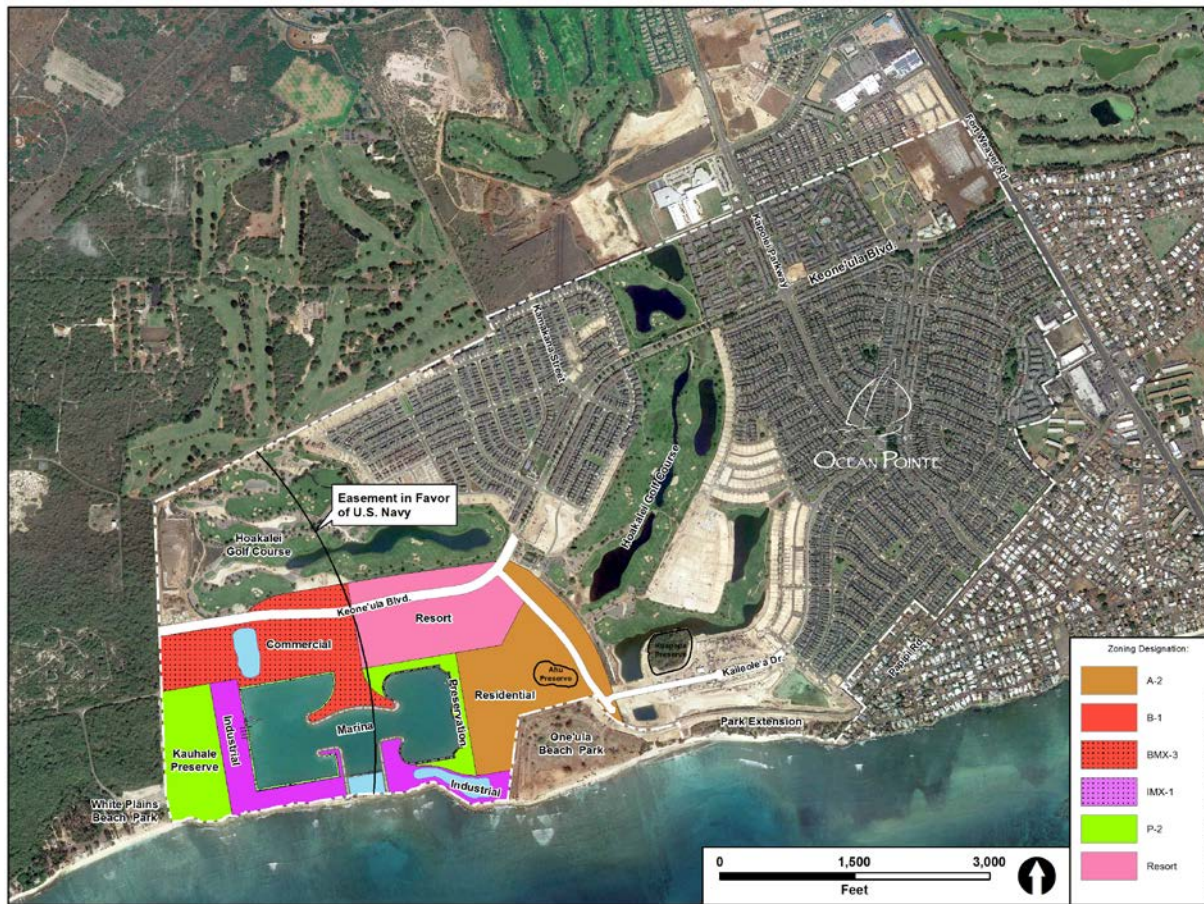
As development of Ocean Pointe-Hoakalei has proceeded over time, plans for the marina basin continued to evolve, shrinking somewhat over the years, with the greatest change occurring after it was decided that the Honouliuli Wastewater Treatment Plant outfall crossing of Kalo‘i Gulch would not be modified. Yet while the details changed over time resulting in minor adjustments in the master plan, the fundamental vision of Ocean Pointe-Hoakalei as a vibrant master planned mixed use community has remained unchanged.

Today, the last remaining undeveloped phase of the Ocean Pointe-Hoakalei community consists of the basin and the lands immediately surrounding the basin. Under the marina-based master plan, this area includes marina, resort, light industrial, commercial, residential, and preservation uses. The existing marina-based master plan for Ocean Pointe-Hoakalei showing the proposed uses in the last undeveloped phase is depicted in Figure 1.3.

1.2.2 UPDATED OCEAN POINTE-HOAKALEI MASTER PLAN

Haseko completed the existing basin in 2008, including placing the stone revetments along its banks, in anticipation of opening the basin to the ocean. Only the removal of a narrow plug of land separating the basin from the ocean and construction of the planned 3,000-foot-long marina entrance channel were left unfinished, with the imported revetment stone needed to complete the small amount of remaining work stockpiled onsite. Figure 1.4 shows the area as it currently exists.

Figure 1.3 Existing Ocean Pointe-Hoakalei Master Plan



Source: Haseko ('Ewa), Inc.

A series of events beginning in 2006 hindered Haseko's efforts to complete the marina and eventually caused it to reevaluate its vision for the development: (i) legal challenges delayed permits Haseko required for its work; (ii) the U.S. Environmental Protection Agency ("EPA") questioned its previous position supporting Haseko's disposal of dredge material from the entrance channel in the South O'ahu Dredge Spoils Disposal Area as had been authorized in its approved Department of the Army permit; and (iii) the 2008 economic crisis and ensuing recession reduced demand for marina slips while the "per slip" cost of construction continued to rise. The recession also made financial institutions much more cautious in providing credit needed to complete the long-planned marina, and the uncertain viability of a marina operation made it unattractive to potential development partners that Haseko had expected to help finance its construction and operation.

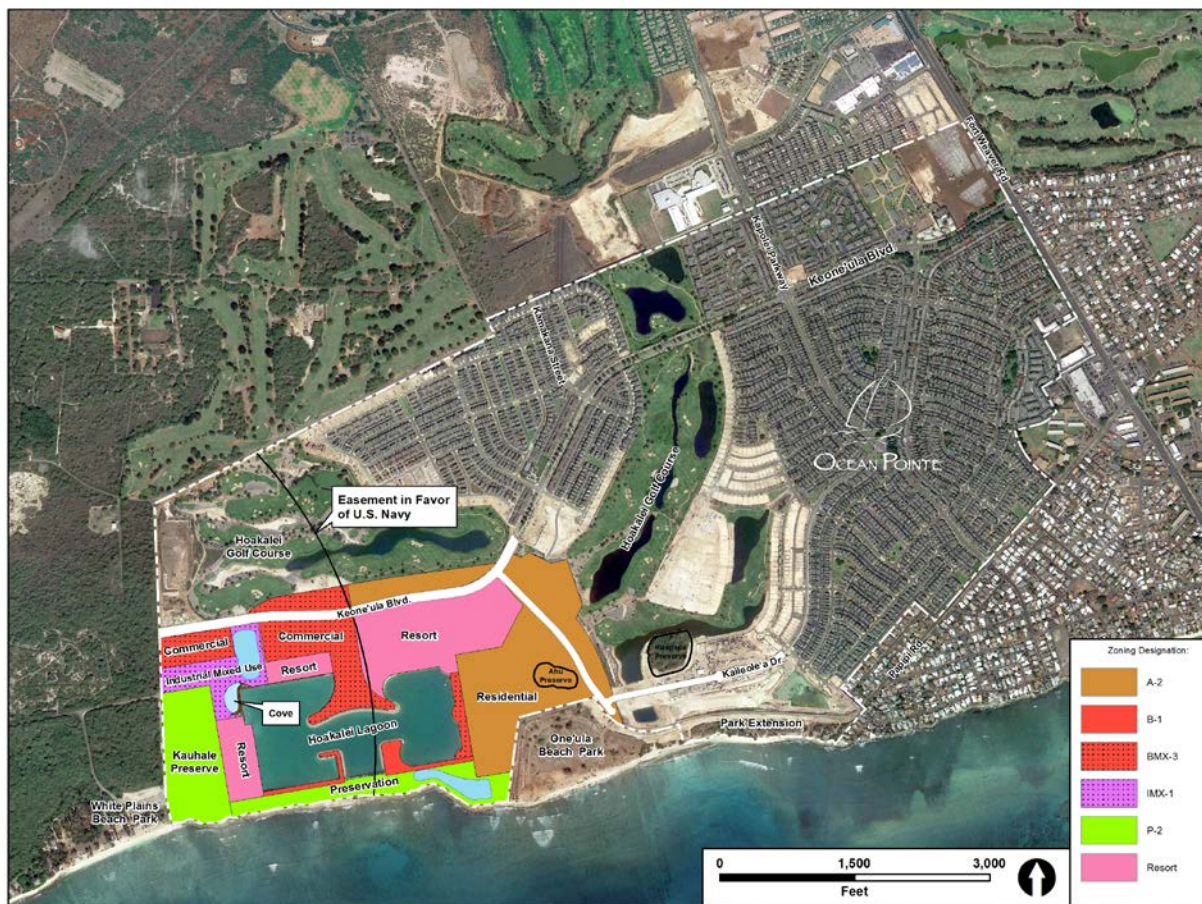
Figure 1.4 Existing Conditions within the Project Area

	
<p><i>View along the sloping western edge of the basin looking north. Note: view does not reflect tidal changes, which varies by +/- 6"</i></p>	<p><i>View along the western side of the basin. The Wetland Preservation Area ("WPA") is to the left.</i></p>
	
<p><i>View toward One'ula Beach Park along makai side of lagoon.</i></p>	<p><i>View westward along makai side of lagoon toward the WPA and Kalaeloa. Three piles of unused revetment stone shown.</i></p>
	
<p><i>View east from northwestern side of project area along Keone'ula Blvd. route.</i></p>	<p><i>View across lagoon toward southwest from resort-zoned area, showing lagoon edge and waterline.</i></p>
<p>Source: All photos by Planning Solutions, Inc. (2014)</p>	

Despite these obstacles, Haseko held fast to the original plan for a number of years. However, as time passed and the permit and financial deadlines for completing the development loomed ever-closer, it began to explore fallback alternatives. By October 2011 Haseko concluded that completion of the marina as originally planned was unlikely to be a viable path forward for the foreseeable future and that the time for moving the development forward in a different direction had arrived. Accordingly, Haseko set about updating its Master Plan for the southwestern portion of the 1,100-acre development.

Consulting with planners, prospective financial backers, government agency representatives, members of the community and other stakeholders, Haseko has prepared an updated master plan for the Ocean Pointe-Hoakalei development. The HMPU, showing the proposed uses in the last undeveloped phase of Ocean Pointe-Hoakalei is depicted in Figure 1.5.

Figure 1.5 Hoakalei Master Plan Update



Source: Haseko (2014)

Haseko's HMPU adjusts the land uses (and zoning districts) for the area surrounding the basin to accommodate the change from a marina to a recreational lagoon, while maintaining many of the key benefits of a marina-based master plan (i.e., a vibrant waterfront area, scenic pedestrian pathways, restaurants, cafés, and shops). The anticipated zone changes affect approximately 80 acres out of the 1,100-acre development and is largely consistent with the current zoning. For example, there will be no net increase in the maximum 950 visitor accommodation units and 4,850 residential units permitted under the existing zoning. Thus, while the vision to create a vibrant mixed-use community

featuring residential, commercial, and resort uses centered around a recreational amenity has never varied, the means for realizing that vision have changed with the decision to complete the basin as a recreational lagoon instead of as a marina.

Later sections in this report discuss the major features of the plan in more detail and describe the manner in which the HMPU supports the vision, policies, and guidelines of the O‘ahu General Plan (“GP”) and the EDP. The discussion addresses site analysis, land uses, and the intended relationship between zoning districts, open space, circulation patterns, design themes, and other development issues.

1.3 REQUESTED ZONING CHANGE (PROPOSED ACTION)

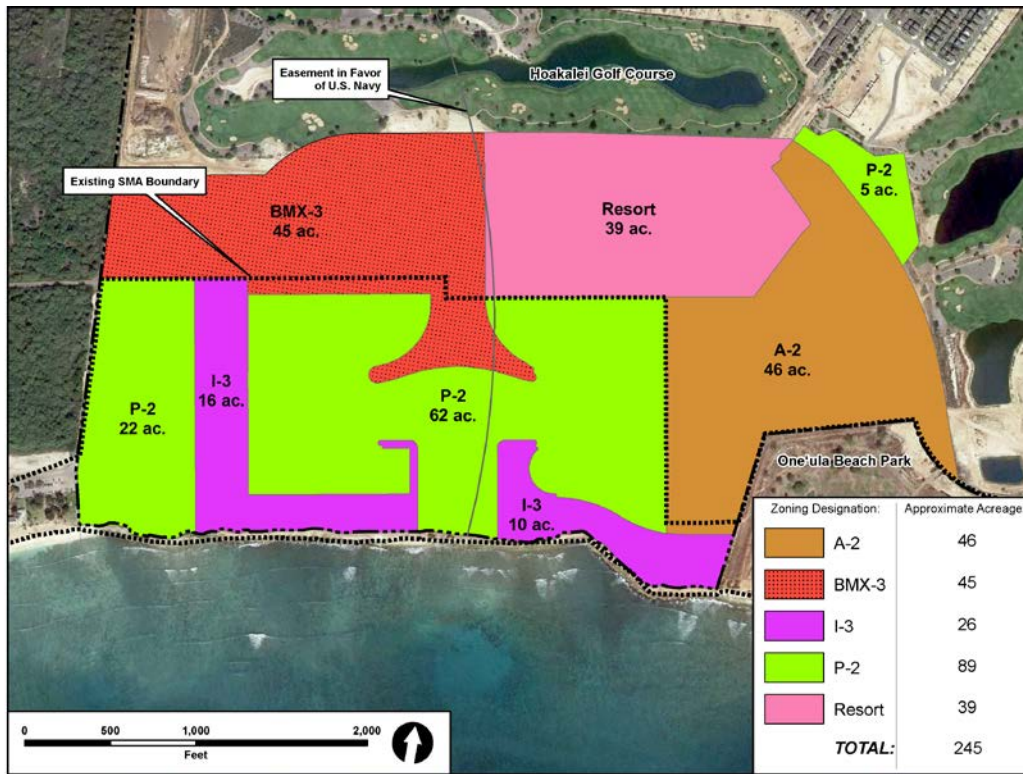
Many of the land uses in the HMPU are possible with the existing zoning, but some are not. In order to implement its updated plan, Haseko is requesting that the zoning be changed from the existing configuration of the undeveloped phase of the development shown in Figure 1.6 to the proposed configuration for this undeveloped phase as delineated in Figure 1.7.

As can be seen from the drawings and the acreage comparisons in Table 1.1, Haseko’s rezoning request calls for rearrangement of the zoning district boundaries, but only modest shifts in the total acreage devoted to each type of land use (i.e., only approximately 80 acres will be subject to a change in zoning out of the entire 1,100-acre development). The primary purpose of the zoning changes is to adjust land uses in the area to be compatible with completing the basin as a recreational lagoon. Thus, Haseko’s HMPU does not call for any increase in development density or in the total number of residential and visitor accommodation units. The most significant shift in acreage is the redistribution of lands currently in the I-3 Waterfront Industrial District. Without the marina, there is little need for waterfront industrial development. Haseko proposes to shift those lands into IMX-1 Industrial-Commercial Mixed Use, B-1 Neighborhood Business, BMX-3 Commercial Business Mixed Use, Resort, and P-2 General Preservation zones. The mix of uses creates more opportunities for business diversification and small business enterprise, which supports the long-term objectives of economic flexibility and resilience.

Table 1.1 Approximate Change between Existing and Preliminary Proposed Zoning

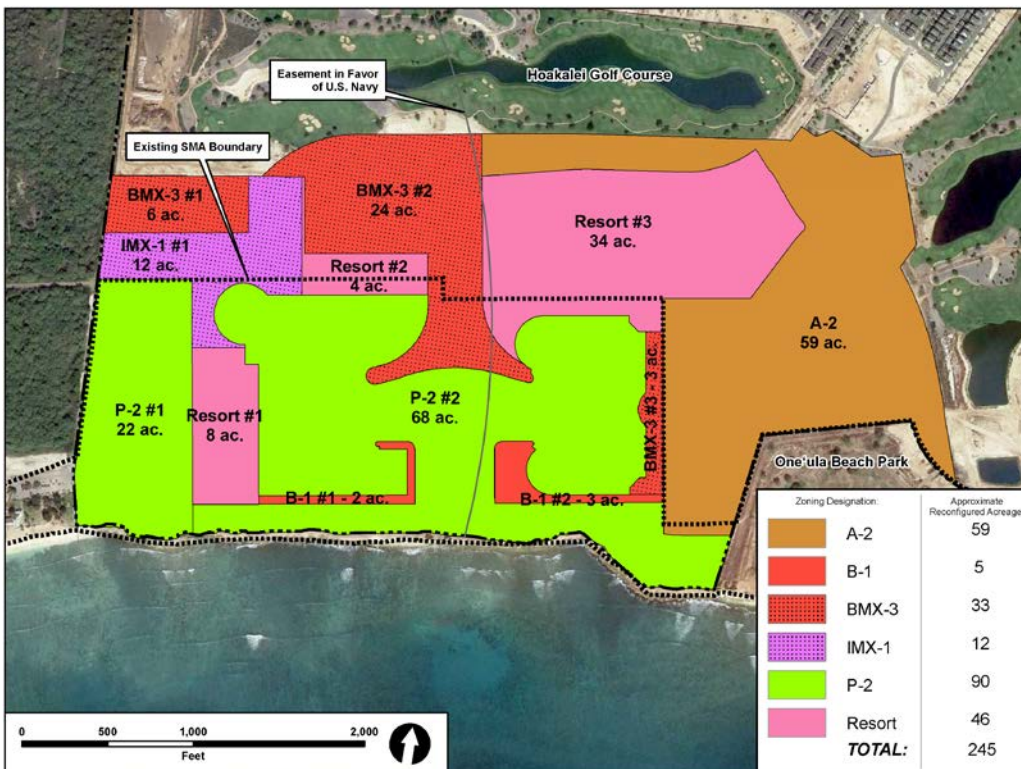
<i>Zoning District</i>	<i>Current Zoning</i>	<i>Proposed</i>	<i>Approximate Change in Zoning (in acres)</i>
P-2 General Preservation	371	372	+1
R-5 Residential	409	409	0
A-1 Low Density Apartment	134	134	0
A-2 Medium Density Apartment	78	95	+17
Resort	38	46	+8
BMX-3 Community Business Mixed Use	45	33	-12
IMX-1 Industrial-Commercial Mixed Use	0	12	+12
B-1 Neighborhood Business	3	7	+4
B-2 Community Business	3	3	0
I-3 Waterfront Industrial	26	0	-26
<i>TOTAL</i>	1,107	1,111	80
Note: ¹ Preliminary estimates of proposed areas for zoning changes, subject to change during consultation with DPP.			
² The discrepancy in total acreage between existing zoning and proposed is a result of rounding to the nearest whole acre. There will be no increase in actual total acreage.			
Source: ¹ CCCH GIS; load date 4/28/2014.			
² Compiled by Planning Solutions, Inc. using information from Haseko (April 28, 2014).			

Figure 1.6 Existing Zoning (Undeveloped Phase)



Source: Haseko (2014)

Figure 1.7 Proposed Zoning (Undeveloped Phase)



Source: Haseko (2014)

1.4 PURPOSE, NEED, AND OBJECTIVES

1.4.1 PURPOSE OF THE ENVIRONMENTAL IMPACT STATEMENT

In accordance with Section 5, Chapter 343, Hawai‘i Revised Statutes (“HRS”), this Project involves the following actions that require the preparation of an EIS:

(3) Propose any use within a shoreline area as defined in Section 205A-41 (HRS).

In accordance with the Revised Ordinances of Honolulu (“ROH”) Section 24-3, preparation of an EIS is required for any “significant zone change”, defined in Section 24-3.1 as:

(1) Any change in zoning of 25 or more acres of land to any zoning district or combination of districts (except preservation or agricultural districts);

(3) Any change in zoning of more than 5 acres to an apartment, resort, commercial, industrial, or mixed use zoning district; or

(4) Any development which would have a major social, environmental, or policy impact, or major cumulative impacts due to a series of applications in the same area.

In accordance with Section 5, Chapter 343, HRS, the accepting authority is the CCH, Department of Planning & Permitting (DPP).

1.4.2 PURPOSE AND NEED

The purpose of Haseko’s planned mixed-use development is to provide economically viable residential, recreational, commercial, light industrial and resort opportunities to meet the needs of O‘ahu’s people, particularly existing residents of the ‘Ewa Plain. Haseko’s purpose in seeking rezoning is to make it possible for it to implement its HMPU for the Hoakalei portion of the 1,100-acre development. Haseko needed to find an alternate way (i.e., implementation of the HMPU) to provide for economic activity and job creation in lieu of the original marina plan because of the factors beyond its control that make it impractical for Haseko to implement its marina-based plan.

1.4.3 MASTER PLAN UPDATE OBJECTIVES

The overarching objective of Haseko’s HMPU is to create an economically viable use for the basin and surrounding land by completing the basin as a recreational lagoon in order to ensure that the HMPU remains consistent with the vision, policies, and guidelines of the EDP. Ancillary objectives are listed in Table 1.2 below. Four alternatives are described and evaluated in this document, including the zone change for the HMPU that Haseko is seeking to have approved. Chapter 2 discusses major features of the HMPU in greater detail.

1.5 OTHER REQUIRED DISCRETIONARY APPROVALS

In addition to this zoning change, Haseko will seek three additional discretionary land use approvals in order to implement its HMPU. The first is a SMA permit that addresses features that are part of the lagoon plan that were not included in the existing SMA permit for the marina. The second is a SSV that will allow it to install pathways, landscaping, and other similar amenities within the shoreline setback area. The third is a change in the location of the SMA boundary within the area covered by its rezoning request. These are discussed briefly below and in more detail in Chapter 6 of this report.

Table 1.2 Objectives of the Hoakalei Master Plan Update

<ul style="list-style-type: none">• Reconfigure the resort, residential, preservation, light industrial, and commercial land uses on the property surrounding the basin to support its use as a recreational lagoon.
<ul style="list-style-type: none">• Provide for infrastructure compatible with the reconfigured zoning and use of the basin as a recreational lagoon.
<ul style="list-style-type: none">• Continue to comply with the still-applicable conditions of all existing permits and approvals.
<ul style="list-style-type: none">• Provide a similar level of protection for natural and cultural resources, especially water quality, as the existing master plan.
<ul style="list-style-type: none">• Provide community benefits that appeal to a broader segment of the population than was offered under the existing master plan, thereby serving as a catalyst for increased social and economic activity.
<ul style="list-style-type: none">• Assure ongoing protection of the resources in the WPA and the various archaeological/cultural preserves.
<ul style="list-style-type: none">• Arrange development in such a way as to maintain the potential for future marina development by others in the event such use is desired and becomes economically viable.

1.5.1 SPECIAL MANAGEMENT AREA PERMIT

The City Council approved the development called for in the existing Ocean Pointe-Hoakalei master plan on December 1, 1993 when it adopted Resolution 93-286. That Resolution requires that a new permit be obtained for any part of the project that is sufficiently different from the approved plans. While the development called for in Haseko's HMPU in some ways is similar to the development for which the existing SMA permit was issued, there are differences that affect the impact that the project could have on the coastal resources that the SMA regulations were designed to protect. Because of this, Haseko expects to seek a new SMA Permit for the development arrangement called for in the HMPU along with the SMA boundary adjustment, discussed below. These will be sought in conjunction with its rezoning request.

1.5.2 SHORELINE SETBACK VARIANCE (SSV)

Per the requirements of HRS Chapters 205A and 343, and the ROH, Chapter 23, a variance is required for all structures and activities in the shoreline setback area which varies in depth along the portion of the shoreline that fronts the Project Area. While Haseko does not envision the construction of permanent buildings within the setback area, the provision of public shoreline access through this area that is an inherent part of all of the plans under consideration may require work that could not be undertaken without a SSV. Haseko will pursue the appropriate SSV approval for the planned improvements in consultation with DPP in conjunction with its SMP request.

1.5.3 SMA BOUNDARY ADJUSTMENT REQUEST

Haseko is proposing to amend a portion of the SMA boundary for the development of the HMPU improvements. The current boundary is based on the current marina configuration because when the shoreline is breached, the marina walls essentially act as the new shoreline. Haseko proposes to contract the boundary to 50 feet *makai* of the lagoon's water edge, except around the Kauhale Preserve, which will remain within the SMA. Although HRS Chapter 205A stipulates that approval of this adjustment request does not require compliance with the requirements of HRS Chapter 343, it is listed here and discussed in more detail in Chapter 6.

1.6 EASEMENTS

The HMPU takes into account existing easements and other commitments. These include, but are not limited to, sewer easements, access to One‘ula Beach Park, and an avigation easement.

- Access to One‘ula Beach Park. The Ocean Pointe-Hoakalei development has been master-planned to ensure public vehicular access to One‘ula Beach Park from Fort Weaver Road and Pāpipi Road. Haseko has completed a new access driveway from Pāpipi Road to the beach park, and is in the process of conveying the driveway and adjacent oceanfront land to the CCH to expand the beach park. Public vehicular access to One‘ula Beach Park is the same under all four alternatives.
- Sewer Easement. A sewer easement crosses the Ocean Pointe-Hoakalei development through various zoning districts and planned uses. Pursuant to Haseko’s Grant of Sewer Easement, as well as its Unilateral Agreement, no structures other than fences, roads, and other such appurtenances shall be built over, and no trees shall be planted in or near the 50-foot wide sewer easement without having first been approved by the City. The landscaping and improvements over and immediately adjacent to the area covered by the *mauka* portion of the sewer easement will complement adjacent areas and blend in with the surrounding design elements. The *makai* portion of the sewer easement lies within the golf course along the eastern edge of the Project Area.
- Navy Avigation Easement (Unresolved). An easement in favor of the U.S. Navy covers approximately 80 acres of the western portion of the Ocean Pointe-Hoakalei development. The easement restricts residential and/or visitor accommodation units, as well as “live-aboard” accommodations for any boats that may be berthed in the western half of the basin. The easement includes a reversion clause which states, “if Naval Air Station Barbers Point (NASBP) ceases to be used as a military air station, the restrictive easement shall terminate.” With the July 1, 1999 closure of NASBP, Haseko believes that the easement automatically terminated. However, this termination is in dispute. Until the issue is resolved, Haseko understands that the development of residential or visitor accommodation units on the 80 acres covered by the easement remains problematic, but is hopeful that it will be resolved in the coming years, and is proceeding with the HMPU with that in mind.
- Noise Exposure Levels. The Project Area is subject to noise associated with aircraft utilizing the runways of Honolulu International Airport and Kalaeloa Airport (formerly NASBP). Based on the closure of the Naval Air Station, a redevelopment plan was prepared by the State of Hawai‘i and CCH to study reuse of a portion of the base for a reliever airport. In February 1999, the Navy published the Final Environmental Impact Statement (“FEIS”) for the Disposal of NASBP, which evaluates noise impacts related to several reuse alternatives. The evaluation determined that the significant noise level of 60 L_{dn} would not affect nearby residential or other noise-sensitive areas.² Except for a small area located within the Kauhale Preserve, none of the forecast noise levels equal or exceed 60 L_{dn} outside of the former base property boundaries.

1.7 REPORT ORGANIZATION

The remainder of this document is organized as follows:

- Chapter 2 describes the preferred alternative which Haseko proposes to develop.
- Chapter 3 describes four alternatives in detail, and it also discusses alternatives which have been considered and eliminated from further consideration.

² The day-night average sound level, abbreviated as “L_{dn}” is the average noise level over a 24-hour period.

INTRODUCTION

- Chapter 4 provides description of the existing physical environment and the effects that each of the alternatives is likely to have on it.³
- Chapter 5 identifies the kinds of biological, cultural, and socioeconomic effects each of the alternatives is likely to have.
- Chapter 6 discusses the relationship that the proposed action has to land use plans, policies, and control, indicating the extent to which each is consistent with this guidance and/or would contribute to the achievement of the objectives that they express.
- Chapter 7 discusses other topics that are required content in Chapter 343 documents. These include irretrievable and irreversible commitments of resources, the mitigation measures to which the applicant is committing, and the tradeoffs (if any) between short-term gains and long-term benefits.
- Chapter 8 and 9 list the parties that have been consulted during preparation of this report and includes the preliminary DEIS distribution list, respectively.
- Chapter 10 lists the references used during the preparation of this report.

³ Consistent with modern EIS drafting guidance, we have kept the descriptions of the existing environment together with the discussion of potential effects. In order to avoid an overly long chapter, we have split the discussion into two parts. Chapter 4 addresses the physical and chemical effects. Chapter 5 discusses biological and socio-cultural topics.

CHAPTER 2 PROJECT DESCRIPTION

2.1 HOAKALEI MASTER PLAN UPDATE (HMPU)

If the requested zone change and other required permits and approvals are granted, Haseko will seek to complete development of the Project Area in accord with the HMPU shown in Figure 1.5. This would entail:

- Completing the development at Ocean Pointe-Hoakalei by using the existing basin as a recreational lagoon surrounded by a combination of resort, residential, commercial, light industrial and public open space rather than converting it into a small boat marina. This in turn, involves Haseko foregoing its plans to open the basin to the ocean, constructing a 3,000-foot-long entrance channel and installing boat slips and support facilities (such as a refueling dock).
- Eliminating the marina-related industrial use and seven-lane boat launch ramp facility that had been proposed for the land adjacent to the western side of the basin.
- Adding areas zoned for light industrial use that will accommodate uses that are compatible with a mixed use project featuring a recreational lagoon as a focal point.
- Constructing a protected public swimming cove on the northwest corner of the proposed lagoon.
- Redesigning infrastructure (e.g., water, sewer, electrical, etc.) in areas surrounding the basin as needed to support its use as a recreational lagoon.
- Installing multiple storm water quality treatment structures, associated grading of the area, and constructing drainage structures. The storm water quality treatment structures and site grading will be designed to collect and retain the vast majority of storm water runoff from areas around the basin.
- Constructing an activity center along the western shoreline of the lagoon which could include a cultural center, parking lot, comfort station, and sandy area suitable for launching canoes, kayaks, and other human-powered vessels.
- Developing resort, residential, light industrial, commercial, and other uses as allowed by the zoning and described elsewhere in this report.
- Creating features between the ocean and the southern edge of the lagoon, landscaped with native Hawaiian plants, that would enhance the vehicular barriers already installed by the State of Hawai'i. The stone monuments would be owned by the DLNR-Land Division and be landward from the certified shoreline but within the shoreline setback area. They would prevent non-pedestrian traffic accessing the project shoreline from One'ula Beach Park and White Plains Beach.
- Enhancing the existing WPA by: (i) lowering the grade in several areas to below the water table; (ii) creating isolated islands within the flooded area to provide additional bird nesting areas; (iii) widening and enlarging the protective moat; and (iv) installing predator barriers, all for the benefit of endangered water birds using the area.

The HMPU seeks to realize as much of the existing land use plan and intent as possible in the absence of the marina. The basin remains the visual and activity focal point of the Ocean Pointe-Hoakalei development. However, public pedestrian movement along the shoreline is improved by the absence of a shoreline break that would be created by the entrance channel required for the marina plan. Public open space is similar to what had been previously proposed. The public swimming cove planned for the northwestern corner of the lagoon provides recreational opportunities for a wider range of people than did the marina, and the resort areas contemplated around the lagoon's edge will enhance the area's attractiveness and economic viability consistent with the vision, policies, and guidelines of the EDP.

Towards this end, Haseko believes that the land uses provided for in its HMPU have the potential to provide jobs and economic opportunities comparable to those envisioned under the previously approved master plan. The HMPU allows Haseko to fulfill all of its commitments to create and diligently monitor its archaeological and wetland preserves. Until it is settled, the unresolved issue of the avigation easement may affect what can be built in those areas. The way in which the easement issue could affect the HMPU is included in the description of each alternative.

2.2 GENERAL DESIGN CONSIDERATIONS

The process of developing the HMPU was guided by the vision of Ocean Pointe-Hoakalei as a regional economic generator and recreational destination, with the natural and human environments working in harmony to create a community where people will want to live, work and play, as articulated in the EDP. Towards that goal, Haseko has identified four key design principles:

- Minimize to the extent possible the need to modify zoning district acreages.
- Provide a similar level of public open space as in the previous master plan.
- Promote freedom of pedestrian movement along the shoreline and throughout the Project Area.
- Create a broad array of recreational opportunities fostering community visitation and participation.

Haseko's vision for the public areas surrounding the proposed lagoon as a vibrant gathering place for recreational and commercial activity remains the same, as does its commitment to preserve and enhance the natural and cultural resources in the area. Haseko believes that its HMPU, with a recreational lagoon as its focal point, will enhance the appeal of the area, provide greater connectivity between inland and shoreline areas, and benefit a broad number of *kama'āina* and visitors. The considerations that affected the design of different aspects of the master plan are outlined below.

2.2.1 THE LAGOON

The goal of the HMPU is to create a destination for the 'Ewa region and beyond. By converting the central basin into a recreational lagoon connected by pedestrian pathways to surrounding residential, commercial, light industrial and resort development, Haseko hopes to foster job creation and economic growth, drawing people and commerce to the area. In order to accomplish this, Haseko's plan seeks to encourage both private investment and public patronage by creating an exciting and attractive place for commercial and recreational activity. The lagoon and adjacent swimming cove (see Section 2.2.3) are keys to Haseko's vision for the Ocean Pointe-Hoakalei development and are planned as privately owned venues with regulated public access, drawing patrons and revenue to the area, which will in turn support management measures that allow these amenities to be sustainable for the foreseeable future.

Towards this end, in designing the proposed lagoon, engineers adhered to the following design principles:

- Avoid or minimize changes to the shoreline of the existing water body. The lagoon incorporates existing constraints on the site such as the current physical configuration of the basin, bank elevations and depth.
- Provide design features that draw people to the area to relax and recreate, providing diverse opportunities to residents and visitors.
- Make the lagoon amenable for regulated use by canoes, kayaks, and other small, non-motorized recreational crafts. Swimming would be contained in the swimming cove dedicated to that purpose where no boating would be permitted.
- Ensure that the water within the central basin continues to meet applicable inland water quality standards without mechanical mixing or other interventions.

- Provide for the monitoring and control of aquatic plant growth within the basin to ensure that it remains an attractive, trouble-free ecosystem.
- Avoid locating major uses in the area that would be needed for a marina entrance channel, thereby maintaining the opportunity for one to be constructed if future changes in community needs and market demand make it appropriate to convert a portion of the basin into a marina.

In addition to functional considerations, Haseko's planners also aim to create an amenity that would act as an attractive visual focal point for the area. By completing the basin as a recreational lagoon, unencumbered by piers, docks, haul-out facilities, and light industrial support uses called for under the marina option, Haseko believes that its HMPU will afford visitors and residents a superior visual environment.

2.2.2 SURROUNDING LAND USE

The HMPU has many similarities to the original plan, but has been reformulated to take advantage of attributes that are present in an enclosed lagoon free of motorized boat traffic. At the same time, it attempts to remain true to the types of public benefits that Haseko has committed to over the years. While detailed plans for the surrounding land uses will, to some extent, depend on the future purchaser and/or developer of these lands, all land uses will be consistent with the mixture of commercial, preservation residential, resort, light industrial and mixed-use uses included in the HMPU. In addition, an existing shoreline trail as well as a publicly-accessible pedestrian pathway closer to the basin will ensure public pedestrian access all the way around the lagoon, regardless of land use. This connectivity is key to supporting the commercial enterprises intended to create jobs and generate economic activity within the Project Area.

All project height limits will conform to the limits established by the DPP's zoning maps and all development densities will comply with the provisions of the LUO.

- Residential apartment (A-2) uses will consist mainly of multifamily homes and will be located such that they will be able to capitalize on the proximity of visually attractive open space that is provided by the lagoon to the west, the shoreline area and the parks to the south and west, and the golf course to the east.
- Areas zoned BMX-3 Business Mixed Use are intended to include the residents' club (residential association-based amenity) as well as a variety of commercial and business activities/uses that support the economic viability of the development. Such uses and activities could include a commercial shopping center with various restaurants, shops and other retail operations, offices, wellness center, golf clubhouse, and possible multi-family units.
- In keeping with the intent of the IMX-1 zoning to provide areas for a viable mix of light industrial and commercial uses, uses in IMX-1 zoned portions of the Project Area are currently envisioned to include: a cultural center, lagoon/public cove support services, comfort station and showers, parking for the public cove, and may include other complementary uses such as a native plants nursery, watercraft maintenance/sales, meeting facility, waterman's academy, food shops or kiosks, and possibly additional off-site parking for other land uses.
- Portions of the Project Area zoned Resort could be developed with a variety of visitor accommodation unit types with typical accompanying amenities (pools, spas, restaurants and retail shops). It is envisioned that because the lagoon presents a unique design opportunity, Resort facilities could employ distinctive architectural features not typically found in resort projects located near the ocean. Other uses in Resort-zoned areas could include waterfront restaurants and additional commercial and retail operations, as well as attendant support services.
- If Haseko cannot resolve the avigation easement issue (see Section 1.6) in a timely fashion, all residential and resort accommodation units would be concentrated to the east of the easement. If the easement issue is resolved, Haseko would distribute the visitor accommodation units in the three Resort-zoned areas around the lagoon; potentially some residential units could also be

developed within the BMX-3 areas within the extinguished easement boundary. Haseko would sequence its development of lands surrounding the lagoon to allow it the greatest possible latitude in resolving the easement issue.

- The P-2 General Preservation-zoned areas of the Project Area will include the lagoon and swimming cove, and will help maintain and promote access along the natural shoreline, and provide additional access through a developed pathway system that would run closer to the *makai* edge of the lagoon. Other intended uses in P-2 zoned areas include public gathering spaces, a fitness/exercise zone, potential event space, and possible use of a three-acre lake, planned for protection of the lagoon's water quality and for potential recreational fishing use.
- Portions of the Project Area zoned B-1 Neighborhood Business could offer a variety of minor retail goods and services to people recreating along the shoreline; including a possible small rental hall/meeting facility. Extremely limited vehicular access will constrain the types of commercial operations that would be viable in certain B-1 zoned areas.

2.2.3 PUBLIC SWIMMING COVE

In lieu of the recreational boating opportunities provided by the marina, Haseko now plans to develop a swimming cove adjacent to the northwest corner of the main basin that would provide a recreational amenity (swimming in calm, shallow waters) not available elsewhere in 'Ewa/'Ewa Beach. Conceptual renderings of the swimming cove are shown in Figure 2.1. This cove is currently envisioned as a community association-owned venue with regulated public access. While the overall management plan for the cove is still being developed, it is certain that it will include some means of collecting revenue to sustain the cove over time; this could include paid parking, commercial concessions associated with use of the cove, and other similar funding streams.

The public swimming cove will be located entirely outside the area occupied by the existing basin. Under current plans, the cove will be created by excavating fast land immediately adjacent to the existing basin; a strip of limestone will be left in place between the cove and the lagoon basin to create a physical barrier separating the two bodies of water. The bottom of the public swimming cove will be above the water table and lined with an impermeable membrane topped by a layer of clean sand. The sand layer will extend above water to a seat wall that will be constructed to separate the sand from the adjacent lawns and walkways. The plans for the swimming cove call for beach slopes of 1:10 or about 10 percent.

Haseko anticipates that other swimming coves may be developed adjacent to the lagoon. However, these additional coves would be developed and maintained by the purchasers or developers of resort, commercial, light industrial and residential facilities planned for the adjacent land rather than by Haseko itself. Hence, it is not possible to confirm their development or design at this time.

The public swimming cove will have a sandy area (i.e., area above the normal water line) of approximately 1 acre. The water depth will range from 0 feet at the shoreline to a maximum of approximately 5 feet at the deepest point. Shower and restroom facilities will be constructed adjacent to the public cove. Paid parking, open to the public, will be provided nearby. To ensure that the water quality within the public swimming cove remains at a high level, Haseko will construct a pumping system able to exchange the cove water approximately four times daily. The water for the swimming cove will be obtained using wells tapping the saline caprock aquifer that underlies the site. Any additional coves—if built—are likely to use similar supply systems. Haseko will construct inlet features (such as waterfalls or waterslides) for the cove to aerate and warm the water prior to its entry into the cove itself. Water exiting the swimming coves will flow into injection wells that return the water to depths that are hydrologically separated from the water used for the supply. By ensuring complete hydrologic separation and a rapid water turnover within cove, the design ensures that water quality requisite for swimming can be maintained.

Figure 2.1 Conceptual Rendering of Public Swimming Cove

Plan view rendering showing principal features of proposed public swimming cove.



Bird's eye view of public swimming cove in the northwest corner of the lagoon.

Source: Dix.Hite+Partners (2014)

2.2.4 PUBLIC ACCESS

The goal for Hoakalei of creating a vibrant mixture of resort, residential, light industrial and commercial uses centered on a recreational lagoon is intended to draw the public to the area. The combination of well-managed amenities set near the scenic beauty of a recreational lagoon and the shore could produce a synergistic effect where recreational activities, economic opportunities, and the place itself work together to create jobs and generate revenue consistent with the vision of the EDP. A key aspect in realizing this vision for the area is balancing this enhanced public access with the needs of a private, mixed-use community. Haseko believes that its HMPU will provide the public with an improved level of access both to the Project Area and adjacent natural and recreational resources such as the One‘ula-Honouliuli shoreline fronting the Project Area, in addition to providing new recreational opportunities that were not possible under the previous, marina-based master plan. Specific features of the HMPU to which the public will have managed access include: (i) the shoreline interpretive trail, (ii) the pedestrian pathway to and around the lagoon, (iii) the public swimming cove, and (iv) the recreational lagoon.

Haseko’s plan for the shoreline has several dimensions intended to improve access and recreational value. First, public access to the shoreline and One‘ula Beach Park will be improved with the conveyance of approximately nine acres (less natural erosion) of oceanfront land to the CCH (see “park extension” in Figure 1.5 for the location). This will result in a doubling of the lineal beachfront footage of One‘ula Beach Park and will provide a public gathering place comparable in size to Ala Moana Beach Park in urban Honolulu. The CCH’s One‘ula Beach Park Master Plan includes construction of additional parking lots within the expanded beach park. Second, eliminating the need for a channel entrance associated with the previously-planned marina allows for the continued use of an existing uninterrupted trail along the natural shoreline, providing the public with pedestrian access along the shoreline from One‘ula Beach Park in the east to White Plains Beach in the west, which also has a public parking lot. This distance is roughly equivalent to the combined shoreline frontage of Ala Moana Beach Park and Kailua Beach Park.

In addition to the improved opportunities for access and recreation along the natural shoreline, Haseko will also create a system of publicly-accessible pathways around the lagoon with meandering path connections to points of interest (e.g., through the Kauhale Preserve). This pathway system, estimated to be approximately 1.5 miles in length, will offer a variety of experiences to residents and visitors including cultural interpretive displays, educational signage and kiosks, scenic viewpoints, benches, and other amenities intended to appeal to a wide range of interests.

Along with the pathways intended to promote public access to the site, two other recreational features of the HMPU will attract public visitation. The first of these is the public swimming cove that will provide visitors with swimming and sunbathing opportunities in a sheltered environment; this cove was not part of the original marina master plan. It is expected that this feature will attract a much broader demographic than the marina would have done. Haseko has committed to providing a 200-stall paid parking lot adjacent to the swim cove (revenue from the parking lot will help fund maintenance of public amenities such as the swim cove and pathways). Haseko believes that the public pathways and swimming cove will be self-limiting in their carrying capacity; if at times the density becomes too high people will seek recreational opportunities in adjacent areas of the lagoon, area parks, or along the natural shoreline.

The second new feature is the recreational lagoon itself, which will allow for the use of non-motorized watercraft in a sheltered environment. In order to maintain the lagoon as an attractive amenity, Haseko anticipates that some capacity limitation will be imposed through the implementation of a permit system, whereby a fixed number of permits for watercraft will be allocated among user groups. At present, those groups include: (i) Hoakalei homeowners, (ii) Hoakalei resort operators, (iii) business operators (e.g., watercraft rentals), (iv) cultural activity groups, and (v) the general public. The availability and proportional allocation of permits for

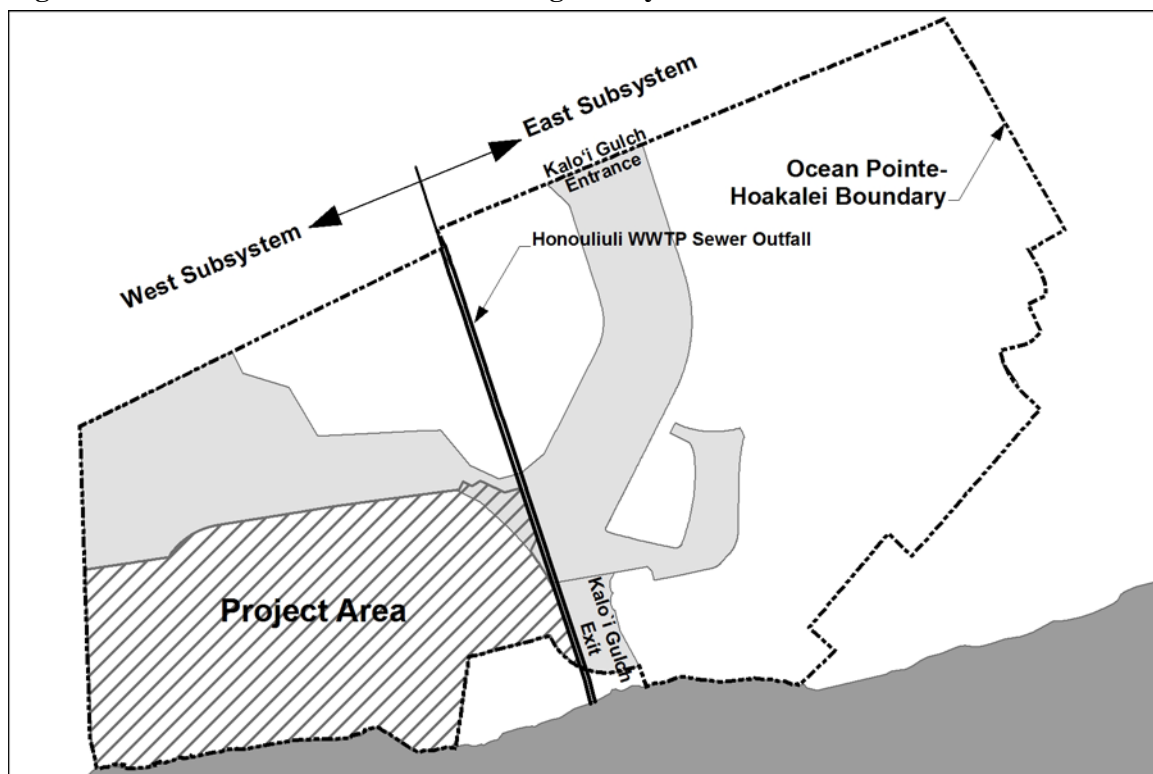
watercraft will be subject to the carrying capacity of the lagoon and the details of the permanent permitting program are currently in the early stages of development.

2.2.5 STORM WATER DRAINAGE

As shown in Figure 2.2, drainage within the entire 1,100-acre Ocean Pointe-Hoakalei property consists of two distinct subsystems separated from each other by the Honouliuli Wastewater Treatment Plant (WWTP) sewer ocean outfall.⁴ As shown in that drawing, the Project Area lies completely within the West Subsystem. It is entirely outside, and is not directly affected by, the drainage through the Kalo'i Gulch.

Currently, storm water runoff from the development generally flows into the existing basin. Proposed runoff control measures including retention lakes, swales, and other water quality treatment structures will keep storm water runoff into the lagoon very low and virtually eliminate storm water drainage into the ocean. Drainage is discussed in more detail in Section 4.2.

Figure 2.2 Ocean Pointe-Hoakalei Drainage Subsystems



Source: R.M. Towill (2012)

2.2.6 PRESERVATION AND INTERPRETATION: KAUALE PRESERVE AND AHU PRESERVE

Haseko has worked with archaeologists and Hawaiian cultural resource specialists to prepare and periodically update implementation plans for the preservation and interpretation of the features in the three preserves that have been established within its property pursuant to the State Historic Preservation Division (SHPD)-approved *Archaeological Preservation Plan* for the property. The

⁴ On December 7, 2012 the City and County accepted Haseko's *Ocean Pointe Revised Drainage Master Plan* (R.M. Towill 2012), which describes the drainage system serving Ocean Pointe-Hoakalei and regional flows from the Kalo'i watershed.

Kauhale Preserve (which encompasses three sites in the State Inventory of Historic Places (SIHP) [Site Nos. 50-80-14-3201, -3202, and -3205] at the far western end of Haseko's property) and the Ahu Preserve [SIHP Site No. 50-80-14-3209] located immediately north of One'ula Beach Park are both within the Project Area, however, they are not within the lands subject to the rezoning request. Haseko's plans for these two preservation areas are discussed in Section 5.5. The third preserve (Kuapapa) which encompasses SIHP Site Nos. 50-80-14-4277 and -4278, lies to the east of Kalo'i Gulch and is outside of the Project Area.

2.2.7 LAGOON PEDESTRIAN PATHWAY AND SHORELINE INTERPRETIVE TRAIL

As part of the zone change necessary to pursue its HMPU, Haseko has requested that the areas along the shoreline currently zoned I-3 Waterfront Industrial be shifted to P-2 Preservation. Instead of the previously planned parking areas, Haseko plans to create two pedestrian accessways in this area, *makai* of the proposed recreational lagoon: (i) a natural shoreline historic trail, and (ii) a public pathway further inland, closer to the edge of the lagoon. These two accessways would provide a varied experience and provide greater access to/and from these scenic areas.

Between the lagoon pathway and the shoreline trail, Haseko plans to create sandy areas and landscaping where people can engage in waterside recreation activities or enjoy scenic views of the lagoon and the One'ula-Honouliuli shoreline, with additional seating areas devoted to art of cultural relevance and historic-interpretive materials. Off the main shoreline historic and lagoon pathways will consist of smaller trails heading *mauka*, alongside and around the lagoon, connecting this area to points inland. By allowing foot traffic to circulate through the Project Area, this connectivity is intended to foster a synergistic effect where the recreational, natural, and historic resources of the area are joined with new commercial, resort, light industrial and residential opportunities, with the recreational lagoon acting as a physical and visual focal point.

2.2.8 WETLAND ENHANCEMENT

Haseko is considering a number of habitat improvements within the WPA located within the Kauhale Preserve. The improvements would enhance the WPA's value as a wildlife habitat for Hawaiian Stilts (*Himantopus mexicanus knudseni*), the avian species for which the WPA was established. Any such improvements would in all probability provide usable resources for two other endangered waterbirds, the Hawaiian Coot (*Fulica alai*) and the Hawaiian Duck (*Anas wyvilliana*), known to be present in the area. Any such habitat enhancement would also benefit at least three regularly occurring indigenous migratory shorebird species [Pacific Golden-Plover (*Pluvialis fulva*), Wandering Tattler (*Heteroscelus incanus*) and Ruddy Turnstone (*Arenaria interpres*)], as well as a diverse set of regular and extralimital migratory waterfowl and shorebird species, that winter on O'ahu. While the WPA is not within the lands that will be subject to rezoning, a detailed description of the enhancement measures proposed is included in Section 4.7.

2.3 ANTICIPATED CONSTRUCTION METHODS, SCHEDULE, AND COST

2.3.1 CONSTRUCTION METHODS

Project Area construction would consist of three primary tasks: (i) completion of the lagoon edge; (ii) the swimming cove; and (iii) the infrastructure and amenities on surrounding land including activity center, Kauhale Preserve, shoreline interpretive trail, and roadways. The work would be carried out using a wide variety of combustion engine-powered equipment, including bulldozers, backhoes, cranes, front-end loaders, water trucks, dump trucks, excavators, scrapers, graders, earth compactors, heavy and light utility vehicles, pick-up trucks, electrical generators, and similar equipment. The kinds of construction activities that are anticipated are summarized in the following subsections.

Mass Grading. Haseko's contractors will design, permit, and construct a water quality treatment feature *mauka* of the northwestern corner of the lagoon. A swale capable of carrying overflow from

the *mauka* water quality lake to the lagoon basin will also be built at this time. The work will involve heavy equipment, including excavators, earthmovers, and bulldozers. Following construction of the northwest water quality treatment lake and associated swale, this phase of work will also involve shaving down the *makai* bank of the lagoon to the planned grade. After the storm water quality treatment feature in the northwest corner of the lagoon is complete, additional similar storm water features will be built *makai* of the southeast corners of the existing basin. The design provides for emergency overflow from the lagoon to the ocean, but overflow is anticipated only under truly exceptional circumstances as engineering calculations indicate that the lagoon is capable of accommodating water from a rainfall event with a recurrence interval in excess of 100 years.

Swimming Cove. Construction of the proposed swimming cove (depicted in Figure 2.1) will entail excavation of approximately 20,000 cubic yards of limestone landward from the lagoon's northwestern corner. This work will take place entirely outside of the existing basin and above the groundwater table, and the excavated material will be used as fill elsewhere at Ocean Pointe-Hoakalei. A strip of existing limestone will be left in place between the edge of the lagoon and the swimming cove. The cove is designed to provide a maximum water depth of up to 5 feet; the plan calls for beach slopes of 1:20 (vertical to horizontal ratio) or 5 percent grade above the normal water line and 1:10 or 10 percent grade below the normal water line.

Once the excavation is completed, workers will install an impermeable liner and place approximately 13,000 cubic yards of commercially available sand on top of the liner between the water's edge and a low, flat-topped wall (i.e., a "seat wall") around the inland perimeter of the swimming cove.⁵ This wall will separate the sand from the adjacent landscaped area and walkways. Pumps, pipes, and other equipment needed to supply water to the coves would be installed at this time, as well as one or more discharge features to introduce and circulate pumped water.⁶

The proposed system will pump saline groundwater from the underlying aquifer into the swimming cove to maintain a water turnover rate of at least four times per day, which is sufficient to ensure suitable water quality in the cove. It is anticipated that water will be discharged into the cove using discharge features, such as waterfalls or waterslides, to provide good aeration. Water will flow by gravity out of the cove into two disposal wells.

Personal Watercraft Launch Areas. Haseko's contractors have completed the first of at least three planned launch areas for personal watercraft to enter the lagoon. The first is located in the northeast corner of the lagoon, with a second launch area planned midway along the eastern shore of the lagoon, and a third launch area planned *makai* of the public swimming cove on the west side of the lagoon. More may be added by future resort/commercial operators. Construction of each such ramp will entail excavation of approximately 95 cubic yards of limestone from the lagoon's edge landward. Each ramp will be approximately 50 feet long with a longitudinal slope of 15 percent and side slopes of 2:1 (horizontal to vertical ratio). At the lagoon's edge, each ramp will be 3 feet below mean sea level ("MSL"). The excavated material will be used as fill elsewhere at Ocean Pointe-Hoakalei.

Roadway and Utilities Extensions. Construction of the Keone'ula Boulevard extension and attendant utility infrastructure (water, electrical power, communication, etc.), and drainage system (including water quality treatment structures) serving the area proposed for rezoning will involve the use of heavy, combustion-engine powered equipment, including (but not limited to) excavators, earthmovers, dozers, all-terrain forklifts, vibratory soil compactors, pavers, asphalt and concrete trucks, and utility vehicles. Work will begin with the continuation of Keone'ula Boulevard from its present terminus to the western edge of the property. Road building will also include a lagoon access

⁵ For the purposes of this document, the landward limit of the swimming coves is assumed to be the slope intercept at, or a short distance landward of, the edge of the sand treatment. Where the top of the sand edge treatment is below existing grade, it is assumed that a 2:1 horizontal to vertical slope will be constructed to transition to existing grade.

⁶ Several different means of accomplishing this are still under consideration. These alternatives, as well as the potential that each has to affect the environment, will be discussed in the impact section of the environmental documentation.

road, running north-south along the western edge of the lagoon and a final overflow channel, including a box culvert, which will carry storm water under the road from the golf course to the water quality lake north of the lagoon. The roadway right-of-way has been previously cleared, grubbed, and graded thus completion of the roadway will involve only minor clearing of any brush or debris that has accumulated in the interim. Once the alignment is cleared, the contractor will conduct any earthwork necessary to emplace the culvert and sewer main, using excavation and compacting equipment to create the required slope and complete subgrade operations. The culvert will be constructed of steel-reinforced concrete, either prefabricated or cast on-site.

Residential, Resort, Light Industrial and Commercial Construction. Build-out of the residential, resort, light industrial and commercial facilities that would be developed within the area covered by the rezoning application would involve construction activities similar to those already described. This, in turn, will entail the use of the same types of construction equipment as noted above (e.g., combustion-engine powered equipment, such as excavators, earthmovers, dozers, all-terrain forklifts, vibratory soil compactors, pavers, asphalt and concrete trucks, and utility vehicles). Haseko would primarily be responsible for construction of infrastructure, but the entities that actually develop the resort, commercial, and other facilities that are part of the overall plan would be responsible for the remaining, primarily vertical work.

Preserve and Shoreline Interpretive Trail Construction. Most of the work that is planned for the Kauhale Preserve is completed, but low-level activity will continue as the preservation sites are made available to the public. A limited amount of construction work within the Ahu Preserve is needed as well. In both cases virtually all of this will be done using hand tools, but erection of fencing may entail the use of some mechanical equipment. Haseko is also supporting the restoration of an interpretive shoreline trail with marker monuments and native vegetation. As with the Kauhale Preserve, the initial steps involve the continuing removal of invasive vegetation and the accumulated refuse from years of illegal camping, vehicular access, and neglect. Much of this clearing and cleanup work has already been completed by the community program organized by the Hoakalei Cultural Foundation. The Foundation's present plans call for creation of a *puka pā* gateway monument adjacent to the trail at the property boundaries with One'ula Beach Park to the east and White Plains Beach to the west.

2.3.2 SCHEDULE AND ANTICIPATED COSTS

Upon obtaining required permits and approvals, the development of the Project Area is estimated to have a ten to fifteen year build-out period. The estimated construction cost of each major component of the HMPU and three other alternatives is shown in Table 2.1 below.

Table 2.1 Breakdown of Anticipated Costs

<i>Item</i>	<i>Estimated Cost*</i>		
	<i>Alternatives 1&2</i>	<i>Alternative 3 (Marina)</i>	<i>Alternative 4 (No-Action)</i>
Keone'ula Boulevard Extension & Utilities	\$21.2	\$21.2	\$21.2
Area 6 Road	\$6.7	\$6.7	-
West Marina/Lagoon Road	\$1.4	\$1.4	-
Parking	\$1.1	\$1.1	-
Kauhale Preserve: Required Preservation	\$8.3	\$8.3	\$8.3
Kauhale Preserve: Additional Improvements	\$2.2	-	-
Shoreline Interpretive Trail	\$6.3	-	-
Northwest Water Quality Lake	\$2.7	\$2.7	\$2.7
Southeast Water Quality Lake	\$2.7	\$2.7	\$2.7
Lagoon Circulation System	\$13.3	-	-
Pedestrian Pathway	\$1.0	\$1.0	-
Wai Kai Hale Club (Residential Club)	\$6.4	-	\$2.9
Lagoon Structure	\$3.6	-	-
Public Cove & Amenities	\$7.1	-	-
Sewer Lift Station	\$0.5	\$0.5	\$0.5
Comfort Station Facilities	\$2.0	\$2.0	\$2.0
Sewage Pump out Facilities	-	\$0.6	-
Dredging Entrance Channel	-	\$27.0	-
Personal Watercraft/Boat Launch Ramp	\$0.45	\$2.2	-
Harbor Master Building	-	\$1.3	-
Boat Hoist Bay	-	\$1.0	-
Public Fishing Pier w/ Handicap Access	-	\$0.5	-
<i>TOTAL</i>	\$86.95	\$80.2	\$40.3
Source: Haseko (2014)			

*Reported in Millions of Dollars.

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CHAPTER 3 PROJECT ALTERNATIVES

3.1 FRAMEWORK FOR CONSIDERATION OF ALTERNATIVES

Hawai'i Administrative Rules ("HAR") §11-200-17, a section of the Office of Environmental Quality Control's content requirements for Environmental Impact Statements, requires that draft and final environmental impact statements address alternatives as well. Specifically, subsection 11-200-17(f) states:

(f) The draft EIS shall describe in a separate and distinct section alternatives which could attain the objectives of the action, regardless of cost, in sufficient detail to explain why they were rejected. The section shall include a rigorous exploration of the environmental impacts of all such alternative actions. Particular attention shall be given to alternatives that might enhance environmental quality or avoid, reduce, or minimize some or all of the adverse environmental effects, costs, or risks. Examples of alternatives include:

- (1) The alternative of no action;*
- (2) Alternatives requiring actions of a significantly different nature which could provide similar benefits with different environmental impacts;*
- (3) Alternatives related to different designs or details of the proposed action which would present different environmental impacts;*
- (4) The alternative of postponing action pending further study; and*
- (5) Alternative locations for the proposed project.*

In each case the analysis shall be sufficiently detailed to allow a comparative evaluation of the environmental benefits, costs, and risks of the proposed action and each reasonable alternative.

3.2 ALTERNATIVES EVALUATED IN DETAIL IN THE EIS

Haseko's "Preferred Alternative" (which is also referred to in this report as "Alternative 1") is described in detail in Chapter 2 and summarized in Section 3.2.1 below. In developing its Preferred Alternative, Haseko worked with designers, engineers, and planners to consider different design alternatives for specific components of the Project Area (e.g., the swimming cove). It believes the concept that it is now proposing is the best balance between function, cost, and aesthetic factors. Where different approaches that have the potential to result in substantially different effects were considered, these are discussed as minimization and/or mitigation measures in various parts of the report, rather than as entirely separate project alternatives. Haseko used HAR §11-200 guidance above and the general objectives listed in Table 1.2 to inform its formulation and selection of the three additional alternatives which are considered in detail in this DEIS. The evaluated alternatives are:

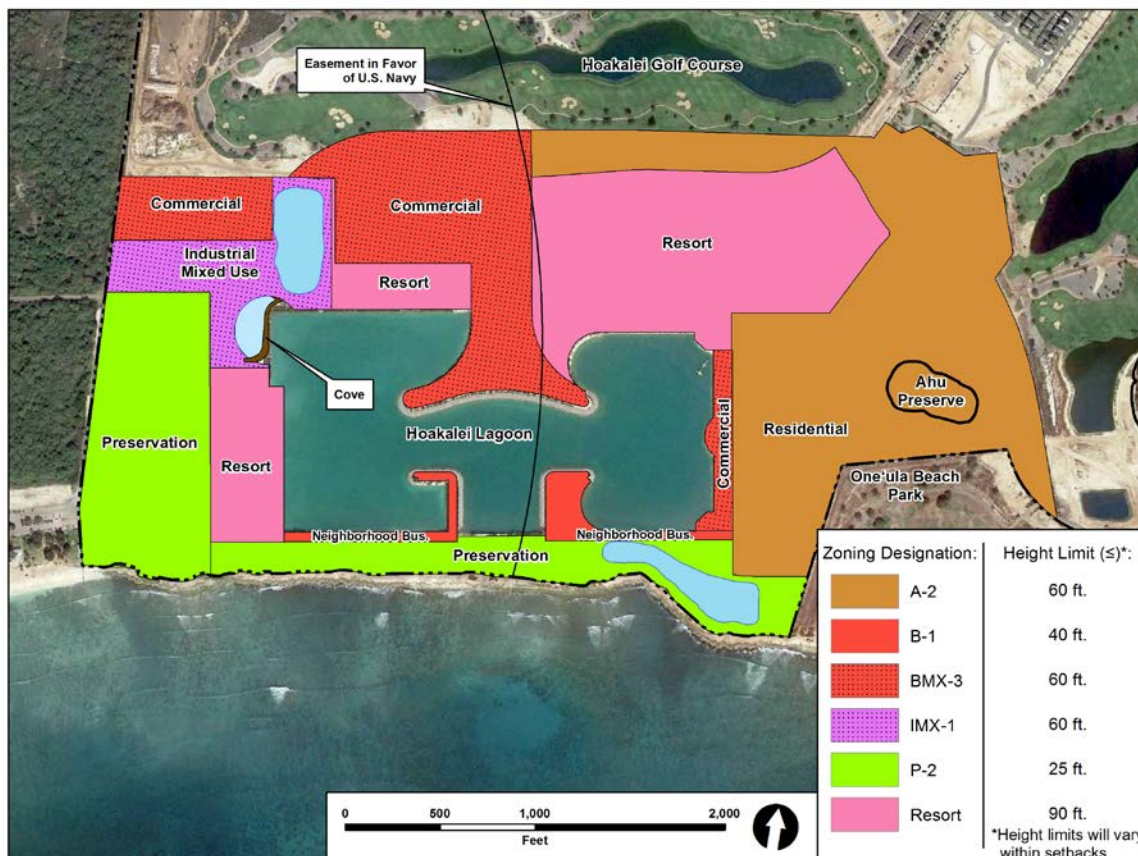
- Alternative 2 – the "All-Mauka Resort Alternative" – concentrates Resort zoning on the *mauka* side of the lagoon well away from the shoreline, but is similar in other respects to Alternative 1. Section 3.2.2 describes the All-Mauka Resort Alternative.
- Alternative 3 – the "Marina Alternative" consists of completion of the existing basin as a marina, as was originally planned. Section 3.2.3 describes the Marina Alternative;
- Alternative 4 – the "No Action Alternative" mandated by HAR §11-200-17(f) is described in Section 3.2.4.

Section 3.3 describes other alternative courses of action that were considered, but ultimately eliminated from detailed consideration.

3.2.1 ALTERNATIVE 1: HASEKO'S PREFERRED PLAN

As described in Chapter 2, Haseko has updated its master plan for the undeveloped portion of the 1,100-acre Ocean Pointe-Hoakalei development in the HMPU (See Figure 3.1). Instead of completing the existing basin as a marina, it now proposes to complete the basin as an inland recreational lagoon. The existing basin would remain largely unchanged, but the size and location of the residential, commercial, light industrial, and resort uses surrounding the lagoon would be modified to better suit the needs of a recreational lagoon. In particular, it believes that distributing the resort zoning in three areas around the lagoon offers unique advantages over other alternatives, including greater seclusion and access to scenic vistas of the lagoon and coastline. Proposed height limits for each zoning district in the HMPU are intended to remain consistent with limitations imposed by the existing marina-based zoning, as specified in UA 93-94. If the change to the existing zoning that Haseko is requesting for the HMPU is granted by the Honolulu City Council and Haseko is able to obtain the other necessary approvals, it plans to proceed with this alternative, creating a recreational lagoon with complementary land uses on surrounding lands. Haseko acknowledges that the aviation easement issue could restrict residential and visitor accommodation development until it is resolved, but the flexibility of resort zoning will allow for economic activity and commercial uses now during the interim period, while preserving the possibility to complete the HMPU with residential and/or visitor accommodation units on parcels under the easement in the future once the issue is settled. Haseko believes that Alternative 1 best fulfills the objectives outlined in Table 1.2, and as such has selected it as its preferred course of action.

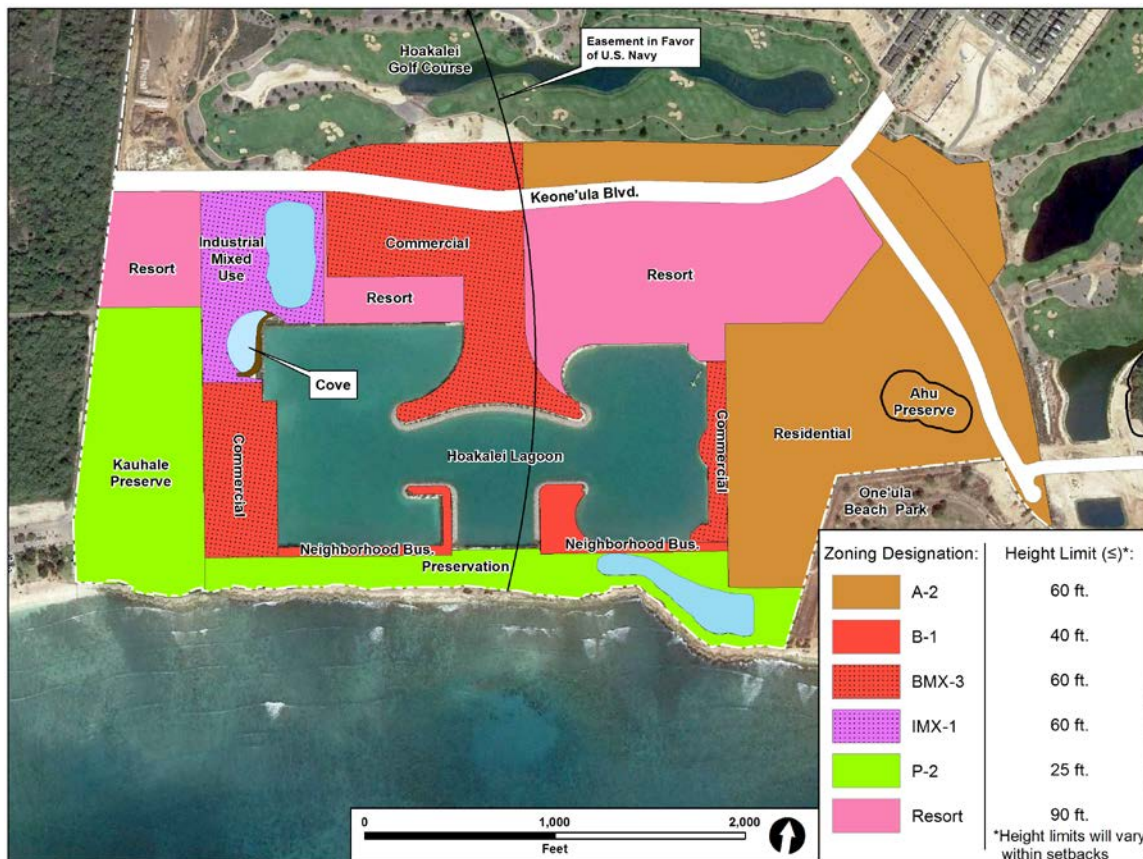
Figure 3.1 Alternative 1: Preferred Alternative



3.2.2 ALTERNATIVE 2: ALL-MAUKA RESORT ALTERNATIVE

The All-Mauka Resort Alternative (see Figure 3.2 below) has essentially the same uses as Alternative 1, but with a different arrangement of resort, commercial, and light industrial land uses around the northern and western sides of the lagoon. With the exception of the slightly different configuration of uses on the *mauka* and western sides of the lagoon, all other aspects of this All-Mauka Resort Alternative are identical to Alternative 1. Haseko has developed this alternative subsequent to issuance of the *Hoakalei Master Plan Update EISPN*, in response to comments from some community members who expressed support for the lagoon concept but were opposed to resort development on the southwest side of the lagoon near the shore. It is important to note that the overall limitations on the number of residential and visitor accommodation units as well as maximum building heights by zoning districts would be the same for both Alternative 1 and 2.

Figure 3.2 Alternative 2: All-Mauka Resort Master Plan



Alternative 2 concentrates resort development on the *mauka* side of the lagoon, well away from the coastline; it is otherwise similar to Alternative 1 and would require the same series of approvals and permits. If Haseko is able to resolve the avigation easement issue in a timely fashion, the resort developments on the western side of the Project Area and adjacent to the northwestern edge of the lagoon would include visitor accommodations. If the avigation easement remains, the resort-zoned areas within the easement boundary would not include visitor accommodation or residential units, and instead would be used for other commercial purposes to generate economic activity in the interim period. In Alternative 2, the area where the west-end resort complex that is part of Alternative 1 was sited would instead be used for mixed-use developments combining commercial space possibly with residential units (once the avigation easement issue is resolved). Like Haseko's preferred alternative,

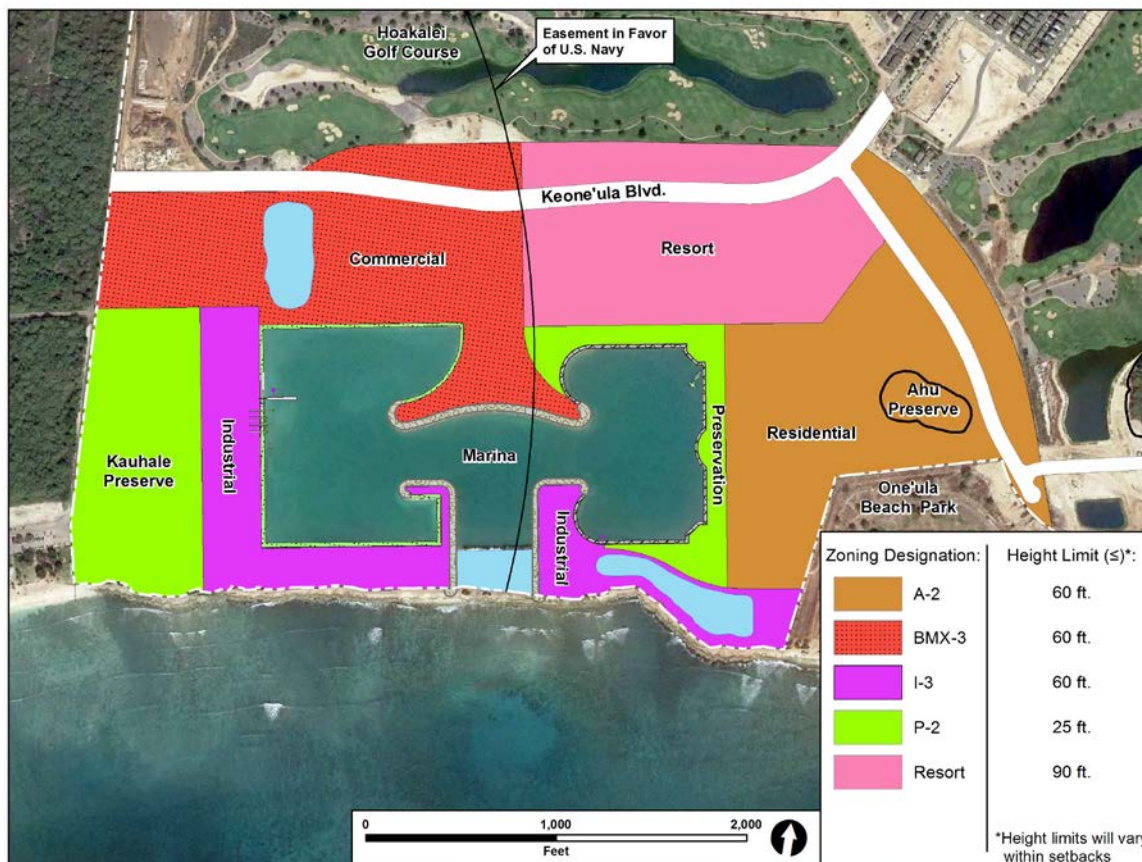
Alternative 2 includes use of the existing basin as a recreational lagoon, with a combination of residential, commercial, light industrial and resort uses on surrounding lands.

If this rezoning configuration is approved, Haseko would construct the public swimming cove, realigned access roads, pedestrian walkways, cultural activity features, water quality treatment lakes and enhance the shoreline interpretive trail similar to those in Alternative 1. Haseko believes that Alternative 1 is superior, because it distributes the different land uses more widely across the Project Area, allowing for lower overall densities of residential and visitor accommodation units.

3.2.3 ALTERNATIVE 3: MARINA-BASED PLAN

Alternative 3 (see Figure 3.3) assumes the marina-based plan on which the existing zoning is based would be fully implemented, a course of action that Haseko has concluded it is unforeseeably able to implement due to litigation and economic factors described elsewhere in this report. It is included solely because it represents a vision of the likely effects of the development that was originally approved for the area covered by the rezoning request. In other words, this Alternative 3 (the approved marina-based plan) constitutes a “baseline” against which to measure the relative impacts of the other alternatives. Alternative 3 is completely consistent with the current zoning boundaries within the Project Area (which were adopted to accommodate the planned marina) and does not, therefore, require the rezoning Haseko is presently seeking.

Figure 3.3 Alternative 3: Marina Based Plan with Existing Zoning



The marine industrial areas (I-3 Waterfront Industrial District) would include a seven-lane boat launch ramp facility, vehicle and boat trailer parking, a harbor master building, possibly dry-stack boat storage, and other boat servicing and maintenance facilities up to 60 feet tall. The mixed-use business areas (zone BMX-3) would include a shopping center with restaurants, retail businesses, upstairs studio or office spaces, the permanent Hoakalei Country Club clubhouse, and buildings up to 60 feet in height. The residential areas (zoned A-2) would include multi-family homes and buildings up to 60 feet high. The single area zoned Resort would include up to 950 visitor accommodations, shops, restaurants, and building heights up to 90 feet.

Because Alternative 3 was for many years the preferred plan, this alternative has been the subject of a number of completed and approved environmental documents over the years, and these are listed in Table 3.1.

As discussed in detail in Chapters 4 and 5, most of the environmental impacts related to the lands to be used for residential and visitor accommodations would be similar for this Alternative as to those caused by Alternatives 1 and 2. However, impacts to the coastline and nearshore environments would be significantly different (and more substantial) for this alternative than any of the others. As previously noted, development of Alternative 3 will remain unrealistic for an undetermined period of time due to the ongoing litigation (see Table 5.10). Without the ability to provide a firm marina completion date, commercial and resort developers are not willing to risk investing in Hoakalei; thus, no resort or commercial development would occur under this Marina Alternative, at least until the litigation ends.

Table 3.1 Existing Environmental Documents Related to Alternative 3

<i>No.</i>	<i>Title</i>	<i>Chapter 343 or NEPA</i>	<i>Date of Acceptance</i>
1	‘Ewa Marina Phase I (including Increments 1 and 2) Environmental Impact Statement	Ch. 343	2/20/81
2	‘Ewa Marina Phase I, Increment 1 Supplemental Environmental Impact Statement	Ch. 343	4/16/84
3	‘Ewa Marina Phase I, Increment 2 Supplemental Environmental Impact Statement	Ch. 343	4/16/84
4	‘Ewa Marina Phase II Environmental Impact Statement	Ch. 343	5/14/91
5	‘Ewa Marina Phase 1, Increment 2 Supplemental Environmental Impact Statement	Ch. 343	5/8/92
6	Final Environmental Impact Statement, Proposed ‘Ewa Marina, ‘Ewa Beach, O‘ahu, Hawai‘i [NEPA]	NEPA	April 1993
Note: The CCH Department of Land Utilization accepted this "programmatic" EIS subject to the requirement that more detailed supplements to the EIS be prepared for specific increments as firmer and more detailed development concepts became available.			
Source: Compiled by Planning Solutions, Inc. (2014)			

The Marina Alternative entails:

- Constructing a 3,000-foot-long, 300-foot wide entrance channel extending seaward from the existing shoreline and disposing of approximately 175,000 cubic yards of dredged spoils.
- Removing the remaining limestone “plug” (approximately 400 feet wide by 200 feet across by 30 feet deep) needed to connect the existing basin to the new entrance channel.

- Building a marina-related industrial area in the I-3 Waterfront Industrial District along the western edge of the marina, including a boat maintenance area, seven-lane boat launch ramp facility, and an adjacent harbor master facility.
- Constructing marina-related vehicle parking along the *makai* side of the western basin to serve the boats that would be based in the marina.
- Creating the necessary infrastructure, including drainage features, roadways, sewers, and utility connections necessary for the marina and related land uses.
- Developing commercial, resort, and residential multi-family units around the marina.

There is one significant potential change in the scope of this alternative from what was originally planned and permitted by Haseko. Construction of the entrance channel would require the disposal of approximately 175,000 cubic yards of dredged spoils, originally intended for the South O‘ahu Dredge Spoils Disposal Area, as authorized by Haseko’s approved Department of the Army permit which expires in 2020. Subsequently, the EPA has questioned its previous position supporting Haseko’s disposal of dredging material from the entrance channel in the South O‘ahu Dredge Spoils Disposal Area. To date, the EPA’s position is not final and has only been expressed informally based upon their concern that the quality of the dredge spoils might actually encourage the development of unwanted habitats in the disposal area. The EPA’s position does not affect the validity or viability of the DOA permit. However, EPA’s position (if it remains unchanged) could require Haseko to identify an alternate inland disposal area. No such alternative disposal site has been identified to date and this remains an unresolved issue.

Key differences between the types of development that Haseko would pursue under the Alternatives 1 and 2, as compared with the Alternative 3 (i.e., the Marina Alternative) are:

- The use within the existing basin is different. Under the Marina Alternative, the area is reserved for use as a marina, with slips for private watercraft, whereas under Alternatives 1 and 2 the space would be used as a recreational lagoon that benefits a larger number of people than a marina.
- Alternatives 1 and 2 include a public swimming cove, with the option for additional coves, along the lagoon’s edge where no such use is contemplated under the Marina Alternative.
- Alternatives 1 and 2 devote the *makai* side of the lagoon to open space, reflecting its desired designation as zoning in the P-2 Preservation District. Under the Marina Alternative, this area could be used for parking and a wide variety of other uses with structures up to 60 feet in height consistent with the area’s zoning in the I-3 Waterfront Industrial District.
- Under Alternatives 1 and 2, there would be uninterrupted lateral shoreline access, whereas with the Marina Alternative the entrance channel would obstruct lateral access and redirect pedestrian traffic around the marina basin.
- The unresolved avigation easement issue has no effect on the Marina Alternative.

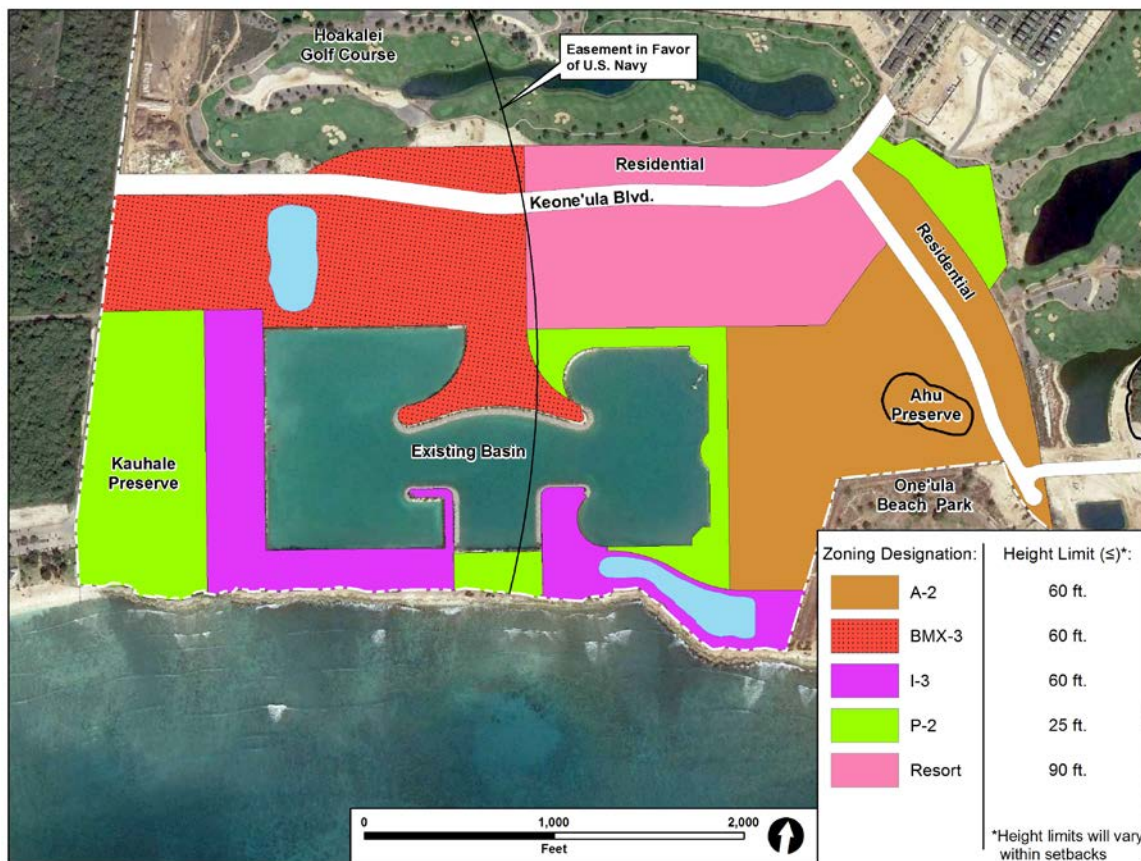
3.2.4 ALTERNATIVE 4: NO ACTION (DENIAL OF THE REZONING REQUEST)

As noted in Section 1.3, the “Action” that is the subject of this report is the CCH granting Haseko’s request for a change to the zoning in the Project Area. HAR 11-200-17(f) requires the analysis of environmental impacts of “No Action” as a potential alternative to the Proposed Action. Thus, from the point of view of the CCH, “No Action” represents the case where it does not grant the zone change and/or the other discretionary approvals (i.e., SMP and SSV) that Haseko needs in order to pursue its Preferred Alternative.

“No Action” (i.e., denial of the rezoning request) would not necessitate a halt to all development, but in practice it would severely limit Haseko’s ability to successfully develop much of the Project Area. This scenario would limit Haseko and any potential purchaser/developer to the uses that conform to the existing zoning. The reasons for this are straightforward.

Over the long term, the amenities within the Project Area must be sustainable. The proposed zoning is the best way to achieve this objective. By offering a range of uses that complement the lagoon use, the proposed zoning offers the best opportunity to maximize the recreational and commercial potential of the lagoon amenity. The prospect of realizing this potential is ultimately what will attract resort and commercial developers to the project who will contribute their fair share towards the maintenance of the lagoon and related facilities. This in turn will justify the substantial investment necessary on the part of Haseko to complete the lagoon and related amenities within the Project Area. The land side uses under the proposed rezoning are essentially what transforms the basin into a functioning and vibrant recreational amenity. Without these uses there is no lagoon per se, but only a hole in the ground filled with water. In short, without either a recreational lagoon or marina anchoring the development, it is less likely that Haseko will be able to pursue financing, attract purchasers, or create an equitable distribution of maintenance fees among all interested parties for all of the uses that are theoretically possible under the existing zoning (see Section 5.8.2.4 and Section 5.9.2.4 for additional discussion). Further, it is unlikely that there would be any demand for resort, industrial, or commercial activities near an unused basin with few public amenities and undeterminable maintenance costs and obligations.

Figure 3.4 Alternative 4: No Action (i.e., No Rezoning) Master Plan



Because it would be difficult and perhaps even impossible to attract developers interested in investing and building at Hoakalei without a recreational lagoon or marina as an aesthetic and recreational focal point, Haseko would be compelled to complete only those areas which it felt were consistent with the present zoning and economically viable. In all likelihood, this would be limited to those areas bordering the Hoakalei Golf Course, including: (i) the Hoakalei Country Club clubhouse, in the BMX-3 District north of Keone'ula Boulevard, (ii) housing in the Resort District north of Keone'ula

Boulevard, and (iii) housing in the A-2 Medium Density Residential District in the far east portion of the Project Area. Figure 3.4 illustrates this alternative.

For the purposes of this DEIS, we have assumed that the areas identified above would be developed under the No Action Alternative, but that other portions of the Project Area would be left undeveloped. Because development under this alternative would likely be limited to the clubhouse and residential areas near the golf course, many of the amenities anticipated under other alternatives would not be included. Without the revenue necessary to support them, there would be little or no public access around the basin, recreational amenities, or other public benefits included under the Preferred Alternative. The unresolved avigation easement issue would have no effect on the No Action Alternative.

All of the potential development in Alternative 4 corresponds to the current zoning. In general, this would be accomplished by:

- Leaving the zoning for the acreage that it has proposed moving from I-3 to P-2 unchanged, and looking for opportunities to foster allowable uses in the I-3 District which would not preclude future development of the basin as a marina.
- Foregoing development of the public swimming cove (as it is not an allowable use within the existing I-3 District).
- Adjusting its detailed infrastructure plans (for roads, water, sewer, and drainage) and land uses within the area to reflect the inability to adjust layouts.⁷
- Revising, or abandoning, its plans for a number of the amenities it has long planned to undertake (e.g., the shoreline interpretive trail, the WPA enhancement, the cultural facilities and programs, etc.) whose costs would be paid for using income derived from the development that is foregone relative to the Preferred Alternative.

While both Alternatives 3 and 4 are scenarios that do not require that a zone change be granted by the CCH, there are important differences in the type of development that Haseko would pursue under Alternative 3 (Marina Alternative) compared with Alternative 4 (No Action). Key differences between the Marina Alternative (Alternative 3) and this No Action Alternative are:

- The Marina Alternative includes an ocean outlet, whereas the No Action Alternative would not be connected to the ocean. This also means that the No Action Alternative allows for the continued use of an existing natural pedestrian shoreline pathway versus the necessary interruption of a marina outlet channel required by Alternative 3.
- The use within the basin is different. Under the Marina Alternative the area is reserved as a small boat harbor, whereas under the No Action Alternative the excavated basin would not see use at all. Instead, Haseko would have to market the area to potential buyers for alternate uses, such as a reserve.

From a regulatory standpoint, for this No Action Alternative, Haseko would proceed under its existing permits and approvals, insofar as is practicable and economically viable in developing lands around the already excavated basin. Haseko would continue some limited work on its Hoakalei Resort development under these existing approvals, within reasonable limits; however, it would not construct any of the infrastructure related to use of the basin as a marina such as the seven-lane boat launch ramp facility, public boat slips, or an ocean outlet. Under the No Action Alternative it is unlikely that Haseko would be able to successfully market the Resort-zoned land as a hospitality-industry oriented complex, as originally envisioned. To the extent that this would reduce the financial

⁷ In many cases this would entail nothing more than reverting to plans that had been developed (and in many cases approved) prior to Haseko's decision to complete the project as a lagoon rather than a marina. In other cases, plans would have to be adjusted because no service would be required to an area where development had previously been envisioned.

resources that Haseko has available to develop other public areas, this could have detrimental effects which would carry over into other portions of the Ocean Pointe-Hoakalei development.

3.3 ALTERNATIVES EVALUATED & ELIMINATED

Since October 2011, when Haseko first concluded that it might be unable to complete the Marina Alternative, it has conceptualized and evaluated a number of other alternatives that have ultimately been eliminated from detailed consideration. These alternatives and the reasons for their elimination from further, more detailed, environmental impact analysis are summarized below.

3.3.1 REDUCED-SCALE DEVELOPMENT

A “reduced scale” alternative would consist of the Honolulu City Council approving only a portion of Haseko’s rezoning request. This alternative would divide the Project Area into two categories: (i) rezoned areas and (ii) areas where the existing zoning remains in effect. The amount and type of development that would actually occur under this reduced-scale alternative would depend upon the exact configuration of land uses that emerged from the City Council’s rezoning determination.

The likely outcome of this reduced-scale approval would be that some of the property would remain undeveloped or would be developed with uses and densities whose value would not be able to sustain the cost of the public infrastructure that Haseko is required to provide. This could be financially disastrous for Haseko, forcing it into bankruptcy and leaving commitments unfulfilled or needing to be fulfilled by government. In view of the likely outcome of this scenario, Haseko does not believe that development of the Project Area on a smaller scale than it is currently proposing would achieve the objectives identified in Table 1.2, and therefore does not consider this a viable alternative.

3.3.2 DELAYED ACTION

In 1997, when it began excavating the present basin, Haseko expected that it would begin construction of the entrance channel in 2007 and would be ready to open the basin to the ocean within 18 months of that date. As discussed in Section 1.2, the economic downturn that occurred at that time has so fundamentally altered the effective demand for boating facilities that Haseko believes the need that drove planning of the development for two decades no longer exists and is not likely to return in the foreseeable future.

Despite the ongoing litigation that has thus far prevented development of the marina (see Table 5.10), Haseko had hoped that social and economic conditions would once again allow for a financially viable marina development, as called for under the original plan for the existing basin. However, there is no evidence that the market for space within the marina has rebounded, or is soon likely to rebound, to the extent needed to allow Haseko to find a partner willing to assume long-term responsibility for its operation and maintenance. Because of this, delaying development of the Project Area with the expectation that it could be developed in accordance with the existing plan and zoning is too costly and would not achieve the objectives of the HMPU identified in Table 1.2, or even the original objectives outlined in support of a marina. For these reasons, Haseko has eliminated this alternative from further consideration.

3.3.3 ALTERNATE LOCATIONS

The area covered by Haseko’s request for a zone change is unique in terms of both physical characteristics and property ownership. There is no other place on the island with the same physical characteristics, and there is no other land that Haseko could develop for an equivalent purpose. In view of this, alternate locations for the marina or lagoon development are no longer a viable consideration and no other locations are being considered.

3.3.4 ALTERNATE LAGOON AND COVE DESIGNS

The existing basin was completed in 2008, now more than half a decade ago. Its considerable depth means that making it larger (by digging into fast lands) or making it smaller (by filling a portion of the existing basin) or reconfiguring it (which would require a combination of digging and filling) would entail large amounts of costly earthwork. Such a reconfiguration would add cost and potential environmental impacts without producing clear public benefits or income to offset the cost. Consequently, it is not a viable option.

CHAPTER 4 AFFECTED ENVIRONMENT & POTENTIAL IMPACTS: PHYSICAL ENVIRONMENT

This chapter describes the effects that each of the alternatives would have on the physical environment. Chapter 5 addresses the relevant biological, cultural, and socioeconomic topics. The discussion is divided into the following parts:

- Section 4.1 covers changes to topography, geology and soils associated with each alternative.
- Section 4.2 discusses the effects that the various alternatives would have on drainage patterns.
- Section 4.3 reviews potential effects on climate/microclimate, while Section 4.4 discusses the air quality effects of each alternative.
- Sections 4.5, 4.6, 4.7, and 4.8 contain a detailed discussion of the lagoon, water quality lakes, wetland, and nearshore ocean waters impacts that can be expected to result from each alternative.
- Section 4.9 discusses the effects that the four alternatives would have on groundwater flows and groundwater quality.
- Section 4.10 discusses the natural hazards to which the area is exposed and the way that these vary between the different alternatives.

4.1 TOPOGRAPHY, GEOLOGY, AND SOILS

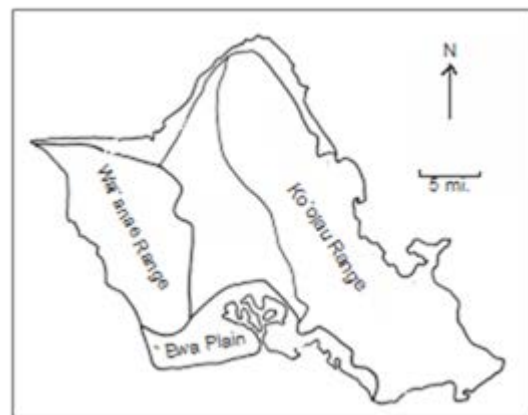
4.1.1 AFFECTED ENVIRONMENT

4.1.1.1 Topography and Geology

The area to be rezoned is located within the last undeveloped phase of the 1,100-acre Ocean Pointe-Hoakalei master planned community. Haseko is seeking to rezone 80 acres surrounding the basin in the southwestern portion of the property to better accommodate and support the lagoon development option specified in the EDP. With the exceptions of the shoreline zone and the Kauhale and Ahu Preserves, the area has been graded extensively, including the excavation of the lagoon and the grading of the surrounding lands to accommodate planned development activities. As shown in Figure 4.2, the area topography ranges between about 20 feet below MSL to 20 feet above MSL. Currently, the slopes around the excavation direct rainfall runoff into the excavated basin. The shoreline consists primarily of eroded limestone and limited beach sands that extend from below sea level to approximately 5 feet above MSL.

O'ahu is the eroded remnant of the Wai'anae and Ko'olau Volcanoes (see Figure 4.1 to the right adapted from Stearns and Chamberlain 1967). Basaltic lava flows from the western flank of the Ko'olau Volcano banked against the eastern flanks of the older Wai'anae Volcano to form the gently sloping surface of the Schofield Plateau between the two. Doell and Dalrymple (1973) estimate that the final island-building lava flows from the Ko'olau Volcano occurred about 1.8 million years ago.

Figure 4.1 Wai'anae and Ko'olau Volcanoes



Source: Stearns and Chamberlain (1967)

Figure 4.2 Existing Topography in the Project Area

The 'Ewa Plain, which hosts the Project Area, is composed of emerged coral reefs and alluvial deposits that have developed along the southern side of the island. The oldest known of the reef deposits comprising the 'Ewa Plain are estimated to have formed in shallow water off the island more than 300,000 years ago (Easton and Ku 1981). Stearns and Chamberlain (1967) examined rocks and sediments retrieved from deep drilling into the Plain at two sites, one located in 'Ewa Beach about 2 miles east of the Project Area and 200 yards from the beach (Ewa No. 1) and another located two miles inland from this drill hole (Ewa No. 2). Both holes were drilled approximately at longitude 158° W. Ewa No. 1 penetrated 1,072 feet into interbedded corals, muds, sands and soils before reaching the basaltic core of the island; Ewa No. 2 penetrated 517 feet before reaching in-place basalt. Resig (1969) examined the core recoveries from these drill holes and estimated that at least eight episodes of sea water inundation and subsequent re-emergence have taken place during the period when these sediments and coral reefs were formed.

4.1.1.2 Soil Types in the Project Area

The current surface expression of the 'Ewa Plain consists primarily of coralline material and thin layers of soil. The nature of these is summarized below.

Coralline Deposits. As noted above, much of the 'Ewa Plain consists of the remnants of coral reefs that currently lie above sea level. Coral consists primarily of calcium carbonate, which is vulnerable to chemical attack from rainwater (whose slight acidity makes it capable of dissolving carbonate rocks). When trapped in surface depressions of consolidated coralline rock, rainwater gradually dissolves the rock, leading to the creation of roughly circular sinkholes and grooved channels (MacDonald, Abbott and Peterson 1983, p. 178). These occur in several locations on the 'Ewa Plain, including portions of the development. For example, the WPA within the Kauhale Preserve contains

a large sinkhole that has been mostly filled in by mud deposits. Also, Ordy Pond, located just to the west of Ocean Pointe-Hoakalei, is a large sinkhole, with a diameter of about 230 feet and a maximum water depth of 18 feet (Athens et al. 2002).

While large numbers of small sinkholes have been identified within the development, years of grading and miles of trenching work at Ocean Pointe-Hoakalei have exposed only a limited number of extended solution channels. Most of the channels generally extended much greater vertically than horizontally, but were typically less than about 15 feet in vertical dimension; a few were followed out to a depth of 20 feet or so vertically. Often the original channel was discovered filled or partly filled with loose sediment. Lateral channel dimensions were usually less than a few feet (Stewart Engineering, Ken Stewart, personal communication to Dr. Charles Morgan, August 19, 2013).

No evidence exists to suggest the existence of extensive subterranean stream channels or caverns, particularly near the shoreline, where the water table is in most places just a few feet beneath the ground surface and consists of brackish to saline water. This is to be expected because, unlike freshwater, brackish to saline water is alkaline and will not dissolve the carbonate minerals.

Soils. On the basis of work done in the 1960s, the U.S. Soil Conservation Service (“SCS”, see Foote et al, August 1972) identified undisturbed soils directly adjacent to the proposed lagoon as being “Coral Outcrop”. Coral Outcrop consists of exposed cemented calcareous sand and coral. Thin layers of red, friable soil material (similar to soils in the Māmala Series) fill surface cracks and depressions in the coral outcrop area. Both the SCS and the Land Study Bureau indicate that coral outcrop is unsuitable for agricultural purposes. According to the Agricultural Lands of Importance to the State of Hawai‘i (ALISH) map that was developed using data from that survey, none of these soils were defined as “prime” or “unique” by the State. The grading that has taken place as part of Haseko’s on-going development has removed nearly all of the soil that was present at the time of the soil survey. Today it is comprised almost entirely of unconsolidated coralline limestone material, much of it already disturbed by heavy construction equipment. Except within the preservation areas, very little of the soils present at the time of the survey are still present.

4.1.2 POTENTIAL IMPACTS

4.1.2.1 Alternative 1: Preferred Alternative

As explained above, the 80 acres that is the subject of the rezoning application has always had thin soils poorly suited to agricultural uses. The extensive mass-grading carried out as part of the implementation of the existing, approved master plan has removed virtually all of the topsoil outside the preservation areas, with little vegetative cover and a low potential to support significant re-growth of vegetation. In addition to nearly the same amount of development and accompanying landscaping as the existing master plan, the HMPU calls for the excavation of two additional water quality control lakes in the Project Area and the re-grading of the land surrounding the basin to direct runoff into the lakes instead of into the recreational lagoon basin. These improvements would have a positive impact by retaining suspended sediments and potentially other contaminants and keeping them from reaching the lagoon or the ocean, except during extreme weather events. The proposed HMPU calls for all the existing bare areas to be developed and landscaped.

When this is completed, very little of the original soil will remain. Instead, the landscaped areas will be covered with topsoil made onsite using processed grubbed and graded material generated during the clearing and grading of the area, and vegetation that will retain the soil to a greater extent than is now the case. These improvements will constitute positive impacts to the area, minimizing soil loss. Haseko will implement best management practices in the design and construction of drainage systems, including grassed swales, runoff treatment structures, and other measures to minimize erosion and introduction of suspended sediments and other contaminants into storm water.

4.1.2.2 Alternative 2: All-Mauka Resort Alternative

The All-Mauka Resort Alternative would have nearly identical impacts on area topography and soils as the Preferred Alternative. As with Alternative 1, Haseko would construct two water quality control lakes in the Project Area, and re-grade surrounding areas, allowing storm water from surrounding lands to flow into the lakes rather than into the recreational lagoon. These improvements would have a positive impact by directing runoff and any sediment it carried away from the lagoon into the lakes and creating opportunities for recreational activities in the lagoon and swimming cove which would not otherwise be possible. As with all other alternatives, all work would be designed and conducted in accordance with best management practices to minimize erosion and fugitive dust due to the effects of wind and rain.

4.1.2.3 Alternative 3: Marina Alternative

In most respects, this alternative would have the same soils-related effects as the alternatives already discussed. However, approximately 25,000 cubic yards of material, consisting mostly of hard, limestone reef rock, would have to be removed from fast lands to open the basin to the ocean, and this would alter the shoreline topography in a way that the other alternatives would not (see Figure 4.3). The FEIS completed for Haseko's original marina project (COE, April 1993) concluded that the excavation of this portion of the entrance channel would force visitors to the shoreline to walk around the basin to continue along the coast.

The other difference between the marina alternative and the others discussed in this report has to do with the U.S. Environmental Protection Agency's (EPA) questioning of its original position supporting the disposal of dredge spoils in the approved South O'ahu Dredge Spoils Disposal Area on the basis that the quality of the spoils might essentially be too "good" and thereby encourage the development of new unwanted habitats at the Disposal Site. If the approximately 150,000 cubic yards of material that would be dredged from offshore must be brought to land and disposed of there, such disposal would be not only costly, but technically challenging as there will be a need to find a way of placing dredge spoils removed from the salt water environment and placed on the ground surface in a way that allows it to be converted into productive soils.

4.1.2.4 Alternative 4: No Action Alternative

This Alternative would cause negligible impacts to topography, since the existing mass grading would not be changed at the Project Area for Haseko to complete the developments planned with the existing zoning. As with the other Alternatives, Haseko would employ best management practices to conserve soils and minimize runoff contamination, but the area to be developed would likely be smaller than the other Alternatives. An unresolved question is how to manage areas that have already been mass-graded but that would not be used under the No Action Alternative.

4.2 STORM WATER DRAINAGE

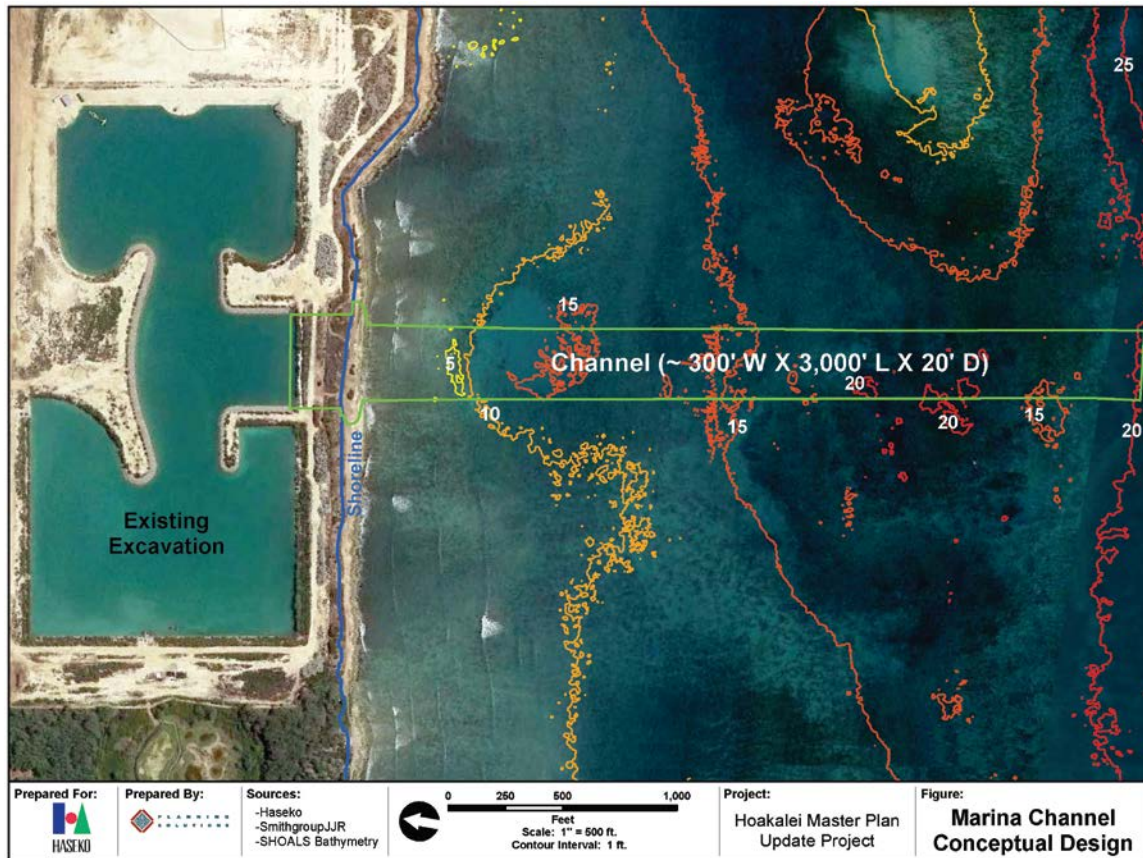
4.2.1 EXISTING DRAINAGE PATTERN

As described in the approved *Ocean Pointe Drainage Master Plan* (R.M. Towill Corporation, November 30, 2012), the storm water drainage system serving the 1,100-acre Ocean Pointe-Hoakalei development is separated generally into two subsystems (see Figure 2.2). The East Drainage Subsystem serves the area located east of the existing Honouliuli Wastewater Treatment Plant sewer outfall; the West Subsystem serves the area to the west of the outfall. All of the area covered by the rezoning application is within the West Drainage Subsystem, which covers 445 acres.⁸ An additional 352 acres of off-site area contributes to the West Drainage Subsystem from the adjacent Kalaeloa property. According to the *Hawai'i Stream Assessment* (State of Hawai'i, 1990), there are no

⁸ This includes approximately 117 acres for the golf course, 113 acres, for Area IV and the portions of the resort parcels, 144 acres for Area VI and the remaining resort, commercial and industrial parcels, 19 acres for the wetland preserve, and 52 acres for the lagoon basin.

perennial streams within the Project Area. Land use within the tributary area consists of a mixture of agricultural, residential, golf courses, and open space.

Figure 4.3 Alternative 3 Marina Channel Excavation



During the present interim period before the final overflow facilities from the west golf course and lagoon basin are constructed, runoff from the West Subsystem and off-site Kalaeloa area are being stored and disposed of in the golf course and in the basin. Drain outlets from the Ocean Pointe-Hoakalei development (west of the sewer outfall and located *mauka* of Keone‘ula Boulevard as shown in Figure 2.2) will enter the golf course for retention and disposal of the 10-year, 24-hour storm runoff. Areas surrounding the basin and *makai* of Keone‘ula Boulevard will drain into the basin for retention and disposal of the 100-year, 24-hour storm runoff. An interim emergency overflow channel has been provided from the golf course to the basin for storm events larger than the 100-year, 24-hour storm. In accordance with the approved drainage master plan, the invert of the interim overflow channel is set at an elevation sufficient to ensure that the ponding level within the golf course will not exceed the lowest grade of the adjacent development parcels. The engineering analysis for the system indicates that the West Drainage Subsystem will be able to contain the 100-year, 24-hour storm with no discharge to the ocean.

4.2.2 POTENTIAL IMPACTS ON STORM WATER DRAINAGE

4.2.2.1 Final Drainage Plan and Water Quality Control Plan

The final drainage (flood control) plan will be implemented once the remaining segment of the Kalo‘i Drainageway through Ocean Pointe-Hoakalei has been completed and capacity improvements have been made in One‘ula Beach Park. Essentially the same plan would be followed for Alternatives 1, 2, and 4. The drainage plan for Alternative 3 (which includes the marina) would be similar, but as it

would allow water from the basin to move freely into the ocean rather than being contained, would differ some with respect to flood elevations and the ultimate effect on receiving waters.

The final design criteria and considerations for the West (Kalaeloa) Subsystem include:

- Accommodating an estimated 100-year flow estimated (per the City 2010 amended Drainage Standards) at 2,050 cfs at the bottom of the Kalaeloa watershed;
- Accommodating sheet flow runoff from contributing portions of Kalaeloa into Ocean Pointe-Hoakalei;
- Providing for flood control and storm water quality treatment in accordance with the CCH Storm Drainage Standards;
- Accommodating Ocean Pointe-Hoakalei runoff based on the hydrologic criteria listed in Table 4.1.

Table 4.1. Hydrologic Criteria Used in Storm Water Drainage System Design

	<i>Residential Areas</i>	<i>Resort, Commercial, and Industrial Areas</i>	<i>Golf Course and Park</i>
<i>Areas developed prior to the April 6, 2011 Drainage Standards amendment</i>			
For Drainage Areas Less than 100 Acres:			
Q10 =	2.4 cfs/acre	2.9 cfs/acre	1.7 cfs/acre
Q50 =	3.0 cfs/acre	3.6 cfs/acre	2.0 cfs/acre
<i>For Drainage Areas 100 Acres or Greater:</i>			
Q _{loci} = Plate 6 peak flow per 2000 City Drainage Standards			
<i>Areas developed after April 6, 2011</i>			
For Drainage Areas Less than 100 Acres:			
Q10 =	2.7 cfs/acre	3.2 cfs/acre	1.9 cfs/acre
Q50 =	3.7 cfs/acre	4.4 cfs/acre	2.6 cfs/acre
For Drainage Areas 100 Acres or Greater:			
Q _{loci} = Plate 6 peak flow per 2000 City Drainage Standards			
Source: R.M. Towill Corporation (November 30, 2012)			

The final drainage condition will include construction of the final overflow facilities from the golf course and basin. The system will be designed to retain and dispose of runoff from the NRCS⁹ 100-year, 24-hour storm with no discharge to the ocean. In addition, the emergency overflow capacity will be sufficient to convey up to the maximum shown in Plate 6 of the CCH's Storm Drainage Standards while maintaining a minimum 1 foot hydraulic freeboard within the subdivision developments.

The most recent design for the final overflow facilities from the golf course to the basin will consist of five 14.4' x 7' concrete box culverts across Keone'ula Boulevard. Discharges from the golf course will be controlled by a spillway located just upstream of the Keone'ula Boulevard culverts. The parcels *makai* of Keone'ula Boulevard within the Project Area will drain into two lakes before

⁹ Natural Resources Conservation Service, Formerly the U.S. Soil Conservation Service

overflowing into the basin. These two lakes (referred to as the *Mauka* and *Makai* Lakes) will be used for flood control and storm water quality treatment prior to discharge into the basin. Haseko will construct the water quality treatment facilities.

- The *Mauka* Lake will receive runoff from the resort, commercial and industrial parcels surrounding the western portion of the basin and also serve as a pass-through for conveyance of flood overflows from the golf course.
- The *Makai* Lake will receive runoff from the residential and industrial parcels in the Project Area surrounding the east portion of the basin.

Each lake will be approximately 3 acres in size and 20 feet deep. Smaller pockets surrounding the basin that cannot drain into either lake will flow directly into the basin through separate water quality treatment facilities. Drainage from the WPA will be contained within that parcel and will not flow to the basin.

The final overflow from the basin to the ocean consists of a broadly graded area between the *makai* edge of the basin and the certified shoreline and with an aggregate width of 1,500 feet. About 500 feet of this width will be graded to an elevation of approximately +7.5 feet MSL; the remainder (1,100 feet) will be graded to an elevation of +8 feet MSL. This overflow area will be located in an area that is currently subjected to coastal flooding and tsunami wave run-up. As can be seen from the computed flood elevations shown in Table 4.2, the results indicate that the drainage system will be able to convey the Plate 6 100-year storm flow while meeting the design HGLs to provide a minimum 1 foot hydraulic freeboard in the subdivision drainage systems.

Table 4.2. Computed Flood Elevations for West Subsystem

	<i>NRCS 100-Year Flood¹</i>	<i>Basins Full Flood</i>	<i>City Plate 6 Flood</i>	<i>Subdivision Design</i>
Golf Course (Area IV, Keone‘ula Blvd)	7.7	9.0	9.0	9.0
Golf Course (Interceptor above Area IV)	19.8	19.8	20.3	22.3
<i>Mauka</i> Lake	6.5	8.4	8.8	9.0
<i>Makai</i> Lake	6.5	8.4	8.8	9.0
Existing Basin	4.1	8.3	8.7	9.0
¹ Using NRCS reservoir routing analysis.				
² Using HEC-RAS backwater analysis				
³ Allows for 1 foot minimum freeboard in the subdivision drainage system				
Source: R.M. Towill Corporation (November 30, 2012 Table 10)				

The storm water quality control measures that are part of the approved drainage master plan meet the storm water quality treatment requirements of the CCH Storm Drainage Standards (R.M. Towill Corporation, November 30, 2012, Section 3.4). The West Subsystem uses lakes in the golf course and on both sides of the basin (*Mauka* Lake and *Makai* Lake) as wet ponds for water quality treatment of runoff prior to discharge into the basin. The golf course will provide water quality treatment for the *mauka* residential area west of the sewer outfall outside the Project Area, the resort parcels along the golf course *mauka* of Keone‘ula Boulevard and off-site areas from Kalaeloa. The *Mauka* Lake will provide treatment for the resort, commercial and industrial parcels surrounding the western portion of the basin. The *Makai* Lake will provide treatment for parcels in the Project Area surrounding the east portion of the basin.

The golf course and *Mauka/Makai* lakes will provide retention for the 2-year, 24-hour storm volume (more than the City water quality volume). A 10-year, 24-hour storm volume can be accommodated with the inclusion of percolation through the lake bottoms for runoff disposal. Smaller pockets surrounding the basin that are not practical to drain into the lakes will flow directly into the basin through separate water quality treatment facilities (to be constructed by Haseko or later owners of the lagoon waterfront as development of the area proceeds). Sizing of the wet pond includes the water quality design volume (WQDV) for both on-site and off-site areas. The sediment entrainment analysis performed to check for adequate sizing of the wet ponds to minimize sediment re-entrainment during the Plate 6 design flow showed that shear stresses in the golf course and *Mauka/Makai* lakes would be less than the critical shear stress of 0.003 lbs per square foot. Shear stresses in the basin as a result of storm drainage flows were much less than those in the golf course and *Mauka/Makai* lakes due to the depth and width of the basin. The wet ponds were found to be adequate for minimizing re-entrainment of pollutants during the design flow.

4.2.2.2 Impact of Alternatives 1, 2, and 4 on Storm Water Drainage

As noted above, only the West Drainage Subsystem would be affected in any substantial way by Alternatives 1, 2, and 4. Storm water routing would be very much as it is today in the interim situation. Parcels surrounding the basin will continue to drain into the basin, but the routing would be through water quality treatment structures, and then into the basin. The drainage master plan calls for the area *makai* of the eastern basin to be slightly lower in elevation than other areas around the basin. Should an extreme rainfall event (e.g., recurrence interval of 100 years or greater) cause the volume of runoff entering the basin to exceed its capacity, the water would overtop in this location and flow slowly into the ocean. Drainage from the wetland will be contained within that area.

Currently, nearly all of the land in the Project Area has either been mass-graded or otherwise altered in some way. Because the Marina Alternative was formerly the Preferred Project, much of the drainage infrastructure necessary to support this alternative is already in place. As noted above, Ocean Pointe-Hoakalei has an overall drainage master plan which is bifurcated into two distinct subsystems, East and West. The Project Area is entirely within the West Drainage Subsystem. Within the West Subsystem, the following drainage infrastructure has already been built under existing approvals (see Figure 2.2):

- The adjacent golf course (not in the Project Area) provides flood control and water quality control for *mauka* residential areas west of the sewer outfall outside the Project Area, and for the resort, commercial and industrial areas within the Project Area between Keone'ula Boulevard and;
- The existing basin, which receives overflow from the golf course and provides flood and water quality control for the residential area east of the basin, which encompasses most of the remaining Project Area; and
- A temporary channel which carries emergency overflow through the area currently zoned Resort, from the golf course to the basin. If Haseko were to pursue the Marina Alternative, the temporary channel noted above would be turned into a permanent box culvert to carry storm water from the golf course to the basin.

4.2.2.3 Impact of Alternative 3 on Storm Water Drainage

Under the Marina Alternative, storm water from areas *mauka* of the project would flow into the golf course, which has been designed to accommodate this flow. Overflow from the golf course would flow through a permanent drainage structure, through water quality treatment structures, and then into the existing basin. Parcels surrounding the basin would discharge via water quality treatment structures. All of this is similar to the pattern described for Alternatives 1, 2, and 4.

The Marina Alternative differs from the others in that rather than retaining the storm water that enters the basin, once the storm water enters the basin it would migrate through the feature, ultimately reaching the Pacific Ocean. The State Department of Health certified that the original marina alternative is consistent with existing State Water Quality standards (HAR §11-54). A recent

modeling study predicted that during extreme storm events, runoff rainwater could lower the salinity of the marina water to about 30 ppt with suspended sediment levels as high as 600 mg/L. However, the study did not include the planned water quality lakes that would remove most of the suspended sediments. Most of the time the marina water would consist of coastal sea water with low levels of contaminants from normal marina activities, but compliant with State of Hawai'i water quality standards.

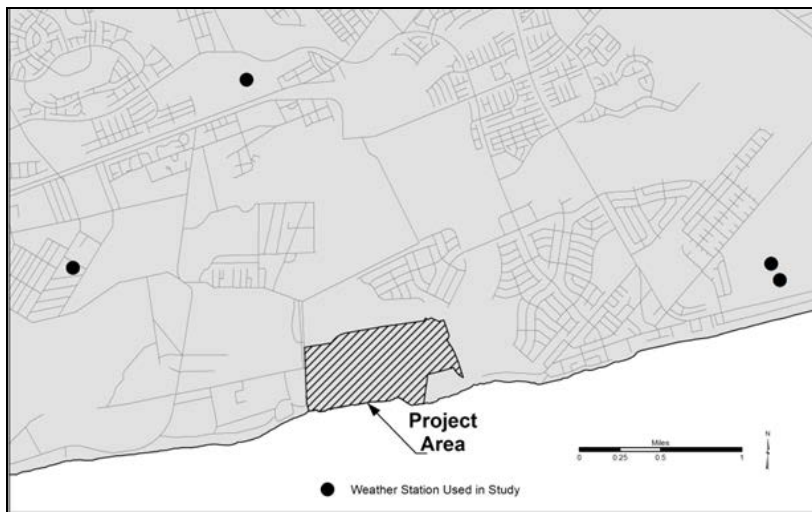
4.3 CLIMATE

4.3.1 AFFECTED ENVIRONMENT

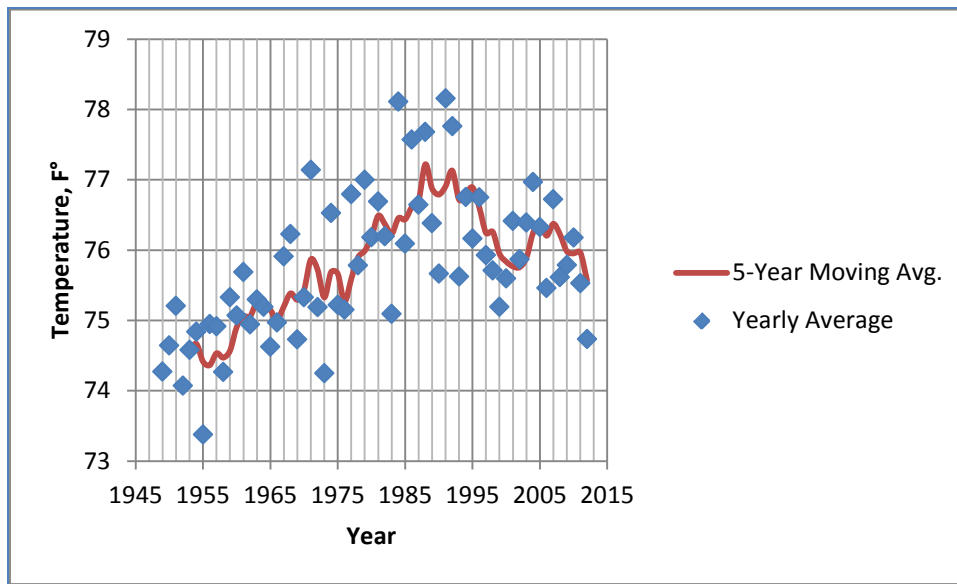
4.3.1.1 Temperature

Due to the tempering influence of the Pacific Ocean and their low-latitude location, the Hawaiian Islands experience extremely small diurnal and seasonal variations in ambient temperature. Weather stations at four locations near to the project have been collecting temperature, rainfall, and wind data since 1945 (see Figure 4.4). The temperature and rainfall data from these stations and the station names are summarized in Table 4.3. The long-term trend for the annual temperature average is shown in Figure 4.5. As shown in this figure, the average annual temperature appeared to peak between 1985 and 1992 and has decreased slightly since then.

Figure 4.4 Locations of Weather Stations Used in this Report



Source: Compiled by Planning Solutions, Inc. (2014)

Figure 4.5 Average Annual Temperature Long-term Trend

Source: Compiled by Planning Solutions, Inc. based on data summarized in Table 4.3. (2014)

4.3.1.2 Rainfall and Humidity

The terrain on O‘ahu is influential in determining the amount of rainfall. While rainfall near the top of the Ko‘olau Range on the windward side of O‘ahu averages nearly 250 inches per year, annual rainfall at Ocean Pointe-Hoakalei development has averaged 18.3 inches per year (1947-2012), more than an order-of- magnitude less. As shown in Table 4.3, on average, more than 80% of the annual rainfall occurs between October and April; from May through September it averages less than 1 inch per month. As shown in Figure 4.6, the annual rainfall is highly variable. Between 1947 and 2012 it ranged from a maximum of 37.4 inches in 1965 to a minimum of 2.97 inches in 1998. The 5-year running average presented in this figure suggests that the average annual rainfall has been slowly decreasing during this 65-year period. The maximum daily (24-hour) rainfall that occurred during this period was 10.51 inches, which fell on March 5, 1958. The average daily humidity typically ranges from the mid-60s to the mid-70s, but it can be in the 80s and 90s for periods of days at a time under unusual circumstances.

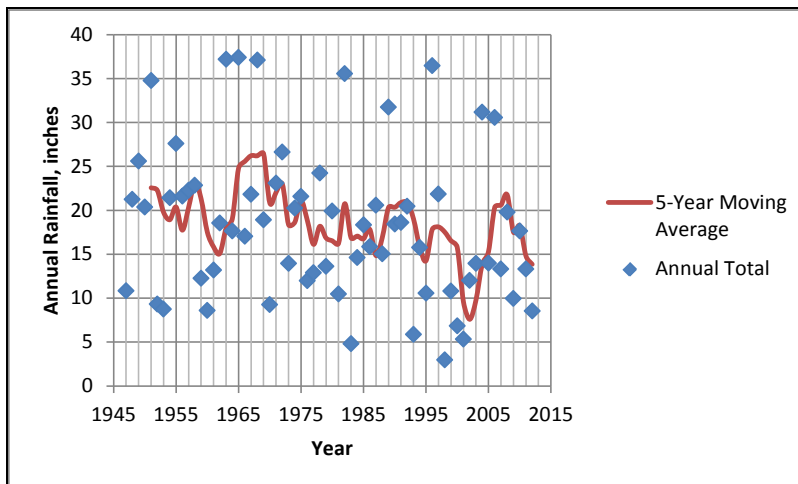
While average rainfall is relatively low, intense rainfall events do occur. During the first 15 days of November 1996, for example, record-breaking rainfall occurred along the leeward coast of the island. In Wai‘anae, 21 inches fell in an area where the average annual rainfall is 2 inches. At Kalaeloa Airport during this period 20.2 inches of rain fell, with 7.48 inches falling during a single day, November 5.

Table 4.3 Average Monthly Temperature, Rainfall, and Humidity

Month	Air Temperatures, F° (Jan 1949-June 2013)			Monthly Rainfall, inches (April 1945-June, 2013)			Average Relative Humidity (%)
	Min.	Average	Max.	Min.	Average	Max.	
January	50.0	72.3	89.1	0.09	3.14	14.22	71.7
February	52.0	72.2	89.1	0.00	2.19	10.06	69.1
March	52.0	73.0	91.9	0.03	2.11	17.42	67.9
April	55.9	74.2	91.9	0.01	1.07	12.13	67.5
May	59.0	75.7	91.9	0.00	0.89	8.52	65.5
June	61.0	77.7	96.1	0.00	0.31	2.09	62.6
July	62.1	78.7	98.7	0.00	0.35	2.57	62.0
August	64.9	79.2	96.1	0.00	0.40	2.96	61.8
September	64.0	79.0	93.9	0.02	0.49	2.72	63.8
October	54.0	77.8	93.9	0.00	1.65	13.57	70.6
November	55.9	75.8	96.8	0.01	2.24	22.43	69.4
December	55.0	73.6	91.9	0.00	2.80	12.30	70.8

Note: Temperatures calculated from hourly observations

Sources: National Climate Data Center, <http://www.ncdc.noaa.gov/cdo-web/> Met. Stations: Kalaeloa Airport (USW00022514, 1949-1998; USW00022551, 1999-2013) Honolulu Observatory 702.2 (USC00518806, 1960-8/1962; USC00511918, 9/1962-2013) Ewa MCAS (USW00022515, 1945-1949)

Figure 4.6 Long-Term Annual Rainfall Trend (1947-2012)

Sources: Planning Solutions, Inc. based on data from National Climate Data Center.

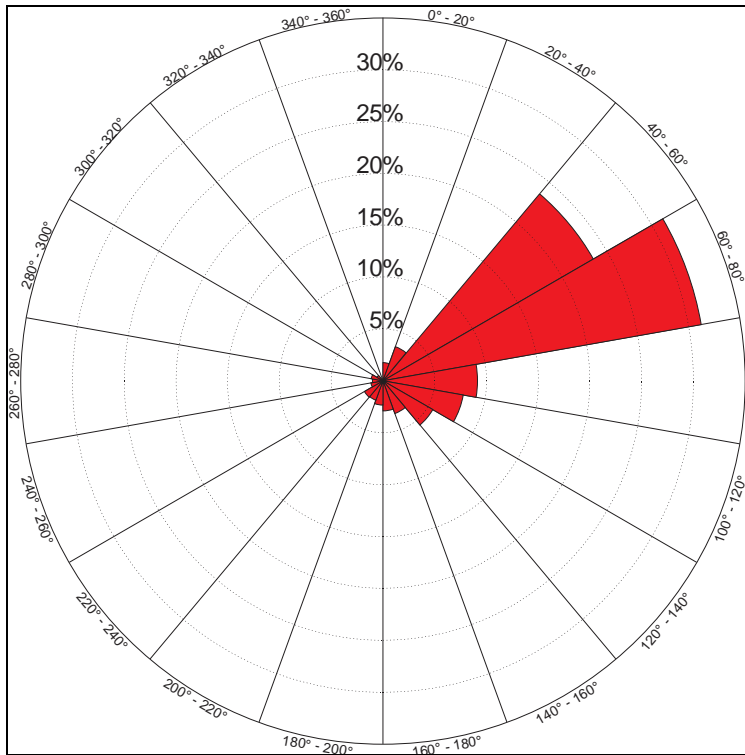
4.3.1.3 Wind Patterns

As shown in Figure 4.7, northeasterly trade winds dominate in the Project Area. Trade winds are produced by the outflow of air from the Pacific Anticyclone, also known as the Pacific High. The center of this system is usually located well north and east of the Hawaiian chain and moves to the north and south seasonally. Average wind speeds (see Table 4.4) are moderate, ranging between 7 miles/hour (mph) in October and 8.1 mph in April. Maximum recorded gusts range between 22.6 mph (Jan. and Oct.) and 24.9 mph (July).

Table 4.4 Project Area Average Wind Speeds by Month

<i>Month</i>	<i>Wind Speed Monthly Averages (miles per hour)</i>			
	<i>Average¹</i>	<i>Maximum 2- Minute Gust²</i>	<i>Maximum 5- Second Gust²</i>	<i>Maximum Recorded Gust³</i>
January	7.6	16.2	20.6	22.6
February	7.4	15.5	19.7	23.3
March	8.0	16.3	21.5	24.1
April	8.1	16.0	21.8	24.5
May	7.8	15.4	20.2	24.0
June	7.9	15.8	21.3	24.7
July	7.9	15.7	21.9	24.9
August	7.6	15.8	22.1	24.3
September	7.2	15.3	20.9	22.8
October	7.0	15.1	20.4	22.6
November	7.2	14.8	19.9	23.5
December	7.4	15.6	20.1	23.3
Overall	7.6	15.6	20.8	23.7
Notes: ¹ 1986 – 2011; ² 1999 – 2011; ³ 1949 - 1998				
Source: <i>Kalaeloa Airport</i> (National Climate Data Center, http://www.ncdc.noaa.gov/cdo-web/)				

The principal exceptions to these mild wind conditions take place when hurricanes pass near to the Hawaiian Islands. The highest wind speed recorded at the Kalaeloa Airport station was 70.2 mph, which occurred on November 23, 1982 as Hurricane 'Iwa produced its maximum winds (sustained winds of 80 – 90 mph) on the Island of Kaua'i. Hurricane Iniki, which passed directly over Kaua'i causing extensive damage, produced a maximum gust at Kalaeloa Airport of 51.7 mph on September 11, 1992.

Figure 4.7 Wind Rose (Kalaeloa Airport, 1999 – 2012)

Source: Kalaeloa Airport (National Climate Data Center, <http://www.ncdc.noaa.gov/cdo-web/>)

4.3.2 POTENTIAL IMPACTS ON CLIMATE AND MICROCLIMATE

The proposed lagoon, swimming cove(s), and other project-related facilities do not involve construction activities or changes in land use that would lead to the release of substantial amounts of greenhouse gases or that would alter other factors that might affect climate. The same is true for all alternatives considered in this EIS document.

All of the alternatives maintain water in the existing basin, and the effect of the continuing presence of this large water body will temper most of the microclimatic effects that might occur in the Project Area. To a slightly greater or lesser extent, all of these alternatives would increase the amount of irrigation water that is applied to the Project Area and would, other things being equal, slightly increase evapotranspiration and, therefore, humidity. This would be at least partially offset by the cooling effect brought about by the increased shading from landscaping. Very localized changes in wind direction and velocity would occur as well as the existing winds moving around the structures that are constructed. But the relatively low height and generous spacing of the structures, as well as the continuing presence of the unobstructed lagoon water surface, means that these changes are likely to be slight compared to those experienced in more densely developed portions of the city where taller/bulkier structures are present.

4.4 AIR QUALITY

4.4.1 AFFECTED ENVIRONMENT

4.4.1.1 Applicable Air Quality Standards

The EPA has set national ambient air quality standards (“NAAQS”) for ozone (“O₃”), nitrogen dioxide (“NO₂”), carbon monoxide (“CO”), sulfur dioxide (“SO₂”), 2.5-micron and 10-micron particulate matter (“PM_{2.5}” and “PM₁₀”), and airborne lead (“Pb”). These ambient air quality standards establish the maximum concentrations of pollution considered acceptable, with an adequate margin of safety, to protect the public health and welfare. The State of Hawai‘i has also adopted ambient air quality standards (“SAAQS”) for some pollutants. At present, the State has set standards for five of the criteria pollutants (excluding PM_{2.5}) in addition to hydrogen sulfide (“H₂S”) (DOH 2010).

4.4.1.2 Existing Air Quality

The State of Hawai‘i Department of Health monitors ambient air quality on O‘ahu using a system of monitoring stations. The primary purpose of the monitoring network is to measure ambient air concentrations of the six criteria pollutants. These are PM_{2.5} and PM₁₀, SO₂, NO₂, CO, and O₃.

Both NAAQS and SAAQS consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is measured. The allowable concentrations are based on studies of the effects of the pollutants on human health, crops, and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposure to a high concentration for a short time (one hour, for instance), or to a lower average concentration over a longer period (8 hours, 24 hours, or one month). For some pollutants there is more than one air quality standard, reflecting both its short-term and long-term effects. Table 4.5 lists the NAAQS and SAAQS for selected pollutants.

The 2013 air quality measurements at the monitoring site closest to the Project Area (Kapolei) are summarized in Table 4.6. As shown by these data, air quality in the area during this year never exceeded the short-term or long-term State or National standards for the five pollutants measured [PM_{2.5} and PM₁₀, NO₂, SO₂, CO].

4.4.2 POTENTIAL IMPACTS

4.4.2.1 Alternatives 1, 2, and 4

Construction Period. The heavy construction equipment that will be used to construct the facilities that make up these three alternatives (e.g., bulldozers, dump trucks, etc.) will be powered by internal combustion engines that emit a variety of airborne pollutants, all in small quantities and over a relatively limited period of time, measured in months.¹⁰ None of these equipment emissions will add substantially to existing area sources of these pollutants, which consists principally of emissions from aircraft at the adjacent Kalaeloa Airport and vehicles travelling area roadways.

Most of the grubbing and mass-grading of the Project Area has already been conducted; however, heavy construction activities such as those needed to prepare individual building sites can result in fugitive dust emissions from earth-moving activities, use of unpaved haul-roads, etc. The grading that will be needed to create the necessary drainage and flood-control facilities and prepare the site for future development has the potential to lead to substantial amounts of airborne particulates (i.e., dust) unless carefully implemented. Alternatives 1 and 2 are virtually identical in this regard; and

¹⁰ Construction equipment emissions result from the following sources activities: (i) construction equipment engine exhaust; (ii) motor vehicle exhaust, brake, and tire wear; (iii) entrained dust from material delivery trucks; (iv) entrained dust from roadways; (v) entrained dust from construction worker vehicles; (vi) fugitive dust from bulldozing, grading, and scraping, and from the handling of excavated material, such as depositing material into haul trucks; and (vii) fugitive dust from wind erosion of disturbed areas.

with most of the same drainage improvements being installed for Alternative 4, it would have only slightly lesser potential for construction-related particulates.

Table 4.5 National and State Ambient Air Quality Standards

<i>Pollutant</i>	<i>Unit</i>	<i>Averaging Period</i>	<i>NAAQS</i>	<i>SAAQS</i>
SO ₂	ppm	3-hour	0.5 ^a	0.5
		24-hour	0.14 ^b	0.14
		Annual	0.03 ^c	0.03
NO ₂	ppm	Annual	0.053 ^c	0.04
PM ₁₀	μg/m ³	24-hour	150 ^d	150
		Annual	None ^e	50
PM _{2.5}	μg/m ³	24-hour	35	None
		Annual	15 ^f	None
CO	ppm	1-hour	35 ^b	9
		8-hour	9 ^b	4.4
O ₃	ppm	8-hour	0.08 ^g	0.08
H ₂ S	ppm	1-hour	None	0.025
Pb	μg/m ³	Quarterly	1.5 ^h	1.5
Notes: a. Federal Secondary Standard. b. Not to be exceeded more than once per year. c. Average of all 1-hour values in the year may not exceed the level of the standard. d. May not be exceeded more than one day per year. e. EPA revoked the annual PM ₁₀ standard effective December 17, 2006 due to a lack of evidence linking health problems to long-term exposure. The State still has an annual standard. f. The 3-year average of 24-hour values must not exceed the level of the standard. g. The 3-year average of the fourth highest daily maximum value must not exceed the level of the standard. h. Average of all 24-hour values in any calendar quarter may not exceed the level of the standard.				
Source: State of Hawai'i Department of Health, September 2013				

Table 4.6 Kapolei Air Quality, 2013

<i>Pollutant</i>	<i>Averaging Period</i>	<i>Minimum</i>	<i>Mean</i>	<i>Maximum</i>
SO ₂ (ppm)	3-hour	ND	0.0019	0.014
	24-hour	ND	0.0019	0.008
	Annual	-	0.0019	-
NO ₂ (ppm)	Annual	-	0.002	-
PM ₁₀ (μg/m ³)	24-hour	2.85	15.0	40.3
	Annual	-	15.0	-
PM _{2.5} (μg/m ³)	24-hour	ND	2.8	22.0
	Annual	-	2.7	-
CO (ppm)	1-hour	0.20	0.62	1.20
	8-hour	0.30	0.62	1.05
Source: State of Hawai'i Department of Health Database. URL: http://emdweb.doh.hawaii.gov/air-quality/ ND: Not Detected				

Site preparation activities will involve the use of large, diesel-fired construction equipment. Whether considered individually or cumulatively, the number of pieces of equipment is too low, and their distance from sensitive receptors (e.g., a residential neighborhood or school) is too great, for combustion engine emissions from this equipment (e.g., NO_x and diesel particulate matter) to have a significant effect on local air quality. Much more importantly, the soil disturbance caused by vegetation removal, re-grading of drainage ways, and other construction activities is likely to have a more substantial, albeit temporary, effect on air quality than emissions from equipment engines due to windborne dust from construction activities and entrained vehicle dust. The potential for adverse effect continues until the planned development or landscaping is placed over the exposed substrate. Once in place, the development or landscaping will require regular maintenance to prevent the emergence of bare soil which could lead to an increase in Aeolian soil erosion and airborne particulate matter. The landscaping and development will have the secondary effect of ensuring that there is sufficient groundcover to minimize the potential for this type of occurrence.

The specific construction equipment (i.e., make, model, and year) are not currently available; however, overall construction emissions were estimated using screening emission rates and procedures recommended in the most recent edition of the *Air Quality Handbook: A Guide for Assessing the Air Quality Impacts for Projects Subject to CEQA* (San Luis Obispo Air Quality Control District, December 2009). The results of the calculations are shown in Table 4.7 below.

Table 4.7 Screening Emissions Rates for Construction Operations

<i>Pollutant</i>	<i>grams/Yds³ of Material Moved</i>	<i>Lbs/ Yds³ of Material Moved</i>	<i>Yds³ of Material Moved</i>	<i>Total Project Emissions (lbs)</i>
Diesel PM	2.2	0.0049	245,000-800,000	1,200- 3,900
Carbon Monoxide (CO)	138.0	0.304	245,000-800,000	75,000 – 243,000
Reactive Organic Gases	9.2	0.0203	245,000-800,000	5,000 – 16,200 lbs
Oxides of Nitrogen (NO _x)	42.4	0.0935	245,000-800,000	22,900 – 74,700 lbs
Sulfur Oxides (SO _x)	4.6	0.010	245,000-800,000	2,500 – 8,000 lbs
Fugitive Dust (PM ₁₀)	0.75 tons/acre-mo. of Constr.		170 - 495 acre-months	130-370 tons
Note: These rates assume an average of 0.27 gallons of diesel fuel is burned for each cubic yard of earth moved.				
Sources: <i>CEQA Air Quality Handbook, A Guide for Assessing the Air Quality Impacts for Projects Subject to CEQA Review</i> , December 2009 - April 1996, and EPA-AP 42.				

The emission standards from Table 4.5 were then used together with the fuel use estimate presented above to assess whether or not mitigation might be appropriate.¹¹ Table 4.8 shows the approximate level of construction activity that would require mitigation for each pollutant of concern and compares these with the estimated emission from the development of the Preferred Alternative. The results indicate that special mitigation is not needed for the construction phase except in the case of PM₁₀. In the case of this airborne particulate matter, the fact that the planned construction activities are of such a large scale means that the project automatically exceeds the 4.0-acre threshold.¹²

¹¹ Guidance from San Luis Obispo, CA. Because it is a “non-attainment area” with respect to national and State ambient air-quality standards, the emission limits there are quite restrictive and therefore provide a conservative benchmark against which to judge the Hoakalei Master Plan Update.

¹² Readers should note that the California threshold is not a regulatory one in the State of Hawai‘i. It does, however, provide a means of judging the extent to which project-related activity deserves attention when developing detailed construction plans and developing pollution minimization and mitigation measures.

Table 4.8 Level of Construction Activities Where Mitigation May be Appropriate

Pollutant of Concern	Thresholds ⁽¹⁾		Amount of Material Moved		Threshold Exceeded
	Tons/Qtr.	Lbs/Day	Cu. Yds./Qtr.	Cu. Yds./Qtr.	
Reactive Organic Gasses	2.5	185	247,000	9,100	No
	6.0	185	593,000	9,100	No
NO _x	2.5	185	53,500	2,000	No
	6.0	185	129,000	2,000	No
PM ₁₀	2.5	n/a	Any project with grading area greater than 4.0 acres of continuously worked area will exceed the 2.5-ton PM ₁₀ threshold.		Yes
Note: Thresholds were approximated using the screening level emission rates from Table 4.7. Daily emissions thresholds are based upon the level of daily emissions that may result in a short-term exceedance of the ozone standard.					
Source: Planning Solutions, Inc. (2014)					

4.4.2.1.1 Construction Period Mitigation Measures

Haseko will require its contractor to implement the following standard airborne pollutant minimization measures, as well as whatever additional measures may be required by the grading and grubbing permit(s) that the contractor must obtain from the CCH.

- Maintain all construction equipment in proper tune according to manufacturer's specifications;
- Fuel all off-road and portable diesel powered equipment, including but not limited to bulldozers, graders, cranes, loaders, scrapers, backhoes, generator sets, compressors, auxiliary power units, with motor vehicle diesel fuel.
- Maximize, to the extent feasible, the use of diesel construction equipment meeting the latest certification standards for off-road heavy-duty diesel engines.
- Minimize, to the extent possible, the area disturbed.
- Use water trucks, or sprinkler system, in sufficient quantities to minimize the amount of airborne dust leaving the site.
- Implement permanent dust control measures identified in the landscaping plans as soon as possible following completion of any soil-disturbing activities.
- Stabilize all areas of disturbed soil not subject to landscaping, paving, or development using approved chemical soil binders, geotextiles, or other methods.
- Pave all roadways, driveways, sidewalks, and other pathways as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
- Limit vehicle speed for all construction vehicles moving on any unpaved surface in the Project Area to 15 mph or less.
- Cover all trucks hauling dirt, sand, soil, or other loose material off site.

Operations and Maintenance Period Impacts. Once the uses within the rezoned areas are in operation, they will generate emissions typical of urban areas elsewhere on the island. With its proposed network of roadways, traffic flow in the Project Area should be sufficiently uncongested that air quality in and around these roadways is expected to remain high. No significant sources of

airborne emissions are part of the planned improvements. Off-site emissions of air pollutants resulting from such things as generation of electrical power that will be consumed by facilities within the Project Area have been evaluated and determined to not result in significant adverse effects.

4.4.2.2 Alternative 3: Marina Alternative

Construction Period. While no detailed air quality impact analysis was done for the marina, most of the likely construction period impacts are identical to those for the three alternatives described in Section 4.4.2.1, including earthmoving, entrained dust from construction and worker vehicles, and emissions from construction vehicles and equipment.

However, this alternative also requires onshore and marine excavation of the shoreline which currently separates the extant basin from the Pacific Ocean. Heavy, diesel-powered equipment would be used to excavate this “plug” of fast land, producing airborne emissions and dust. While some of the material excavated in the process of the marina entrance channel construction will be saturated with groundwater or seawater, this will not always be the case.¹³ Further, as the material dries out prior to removal, the potential for fugitive dust increases. In this respect, the location of much of the work in offshore areas and the direction of prevailing winds are favorable factors, tending to carry fugitive dust away from residential areas.

By far the greatest potential for adverse air quality impacts associated with the marina alternative is associated with the EPA’s questioning of its previous position supporting Haseko’s disposal of dredging material excavated during construction of the marina entrance channel at the South O’ahu Dredge Spoils Disposal Area as allowed by the approved Department of the Army permit (see Section 3.2.3). If the EPA were to instead require upland disposal of those dredge spoils, approximately 150,000 cubic yards of material excavated from offshore would have to be trucked from some as-yet unidentified landing site to one or more areas where the material would be emplaced. While all of the minimization measures described for the other three alternatives would be employed for this alternative as well, the vastly larger amount of material that would need to be handled out of the water would substantially increase fugitive dust emissions from the disposal site and emissions from the internal combustion engines used by the trucks needed to transport the material to the disposal site(s) would further affect air quality.

Operations and Maintenance Period Impacts. The principal source of emissions in the Project Area, once construction is complete, will be as a result of passenger and service vehicles entering and leaving the area, and the diesel engines of watercraft berthed at the marina. The increased on-site emissions associated with the marina use is not anticipated to lead to a violation in ambient air quality standards in the Project Area.

4.5 LAGOON/MARINA AND SWIMMING COVE WATER QUALITY

This section describes the applicable water quality standards within the basin, existing conditions and the likely impacts of the proposed HMPU improvements and the evaluated alternatives.

4.5.1 AFFECTED ENVIRONMENT

4.5.1.1 Applicable Water Quality Standards

The existing basin is an active construction area; as such it does not presently fall into any of the classes of water delineated in the State of Hawai‘i Department of Health Water Quality Standards (HAR §11-54). Once the basin is completed as a recreational lagoon it will be subject to the basic water quality criteria laid out in HAR §11-54-4 (which are applicable to all State waters) plus the specific criteria for inland recreational waters contained in HAR §11-54-8.

¹³ EPA studies on fugitive dust emissions from construction sites (EPA 1985) indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (i.e., 30 percent), and precipitation/evaporation index of 50.

The criteria require that all waters be free of substances attributable to domestic, industrial, or other controllable sources of pollutants. These include: (i) materials that will settle to form objectionable sludge or bottom deposits; (ii) floating debris, oil, grease, scum, or other floating materials; (iii) substances in amounts sufficient to produce taste in the water or detectable off-flavor in the flesh of fish, or in amounts sufficient to produce objectionable color, turbidity or other conditions in the receiving waters; (iv) high or low temperatures, biocides, pathogenic organisms, toxic, radioactive, corrosive, or other deleterious substances at levels or in combinations sufficient to be toxic or harmful to human, animal, plant, or aquatic life, or in amounts sufficient to interfere with any beneficial use of the water; (v) substances or conditions which produce undesirable aquatic life; and (vi) soil particles resulting from erosion on land involved in earthwork, such as the construction of public works; highways; subdivisions; recreational, commercial, or industrial developments; or the cultivation and management of agricultural lands.

In addition to the basic water quality criteria, the completed lagoon would also have to meet the specific criteria for inland recreational waters set forth in HAR §11-54-8(a). These provide that (1) *Enterococcus* content may not exceed a geometric mean of 33 per one hundred milliliters in not less than five samples which shall be spaced to cover a period between 25 and 30 days. No single sample may exceed the single sample maximum of 89 colony-forming units (CFU) per 100 milliliters or the site-specific one-sided 82 per cent confidence limit.¹⁴ Finally, the regulations forbid the presence of raw or inadequately treated sewage or other pollutants of public health significance in natural public swimming, bathing or wading areas.

4.5.1.2 Existing Water Quality: Nutrients and Chemical Components

Haseko initiated excavation of the existing basin in 2003; the work was completed in 2008. Haseko began testing the physical and chemical water quality of the lagoon in April 2005 and has continued monitoring since then, periodically collecting surface and near-bottom samples from the sample stations shown in Figure 4.8. While the basin excavation activities were ongoing, monitoring results showed that the water within it was relatively turbid and showed several other characteristics consistent with elevated levels of suspended sediments from the excavation activities. The monitoring results show that since completion of the excavation, the water composition within the basin has stabilized and is of relatively high quality (see Table 4.9).

Recent data demonstrate that the water in the basin is composed primarily of brackish water from the caprock aquifer that flows through the ground to the ocean through the 'Ewa Plain and enters and exits through the banks of the lagoon.¹⁵ The data show that the water in the basin is generally intermediate in salinity between ocean water and the surrounding brackish groundwater.

Table 4.9 summarizes the levels of the water quality variables measured since April 2010. The methods used to measure these parameters are described in Appendix B. The data show how major rainfall events (>3 inches during one week indicated in this figure) can temporarily lower the salinity by 1 part per thousand or more (see Figure 4.9).

¹⁴Other parts of this section also provide that inland recreational waters in which *enterococcus* content does not exceed the standard shall not be lowered in quality and specify limits for areas where the sampling is less frequent.

¹⁵The estimated pan evaporation rate is 85 inches per year and rainfall averages 20 inches per year. These amount to an average of 329,00 gallons per day and 77,000 gallons per day, respectively. These represent such a small fraction of the groundwater throughput of 3MGD that ignoring them does not alter the conclusions. Major rainfall events can have measurable temporary effects on such things as salinity, but the water returns to its more typical condition within a few months.

Figure 4.8 WQ Monitoring Stations

Source: Marine Research Consultants, Inc. (2005)

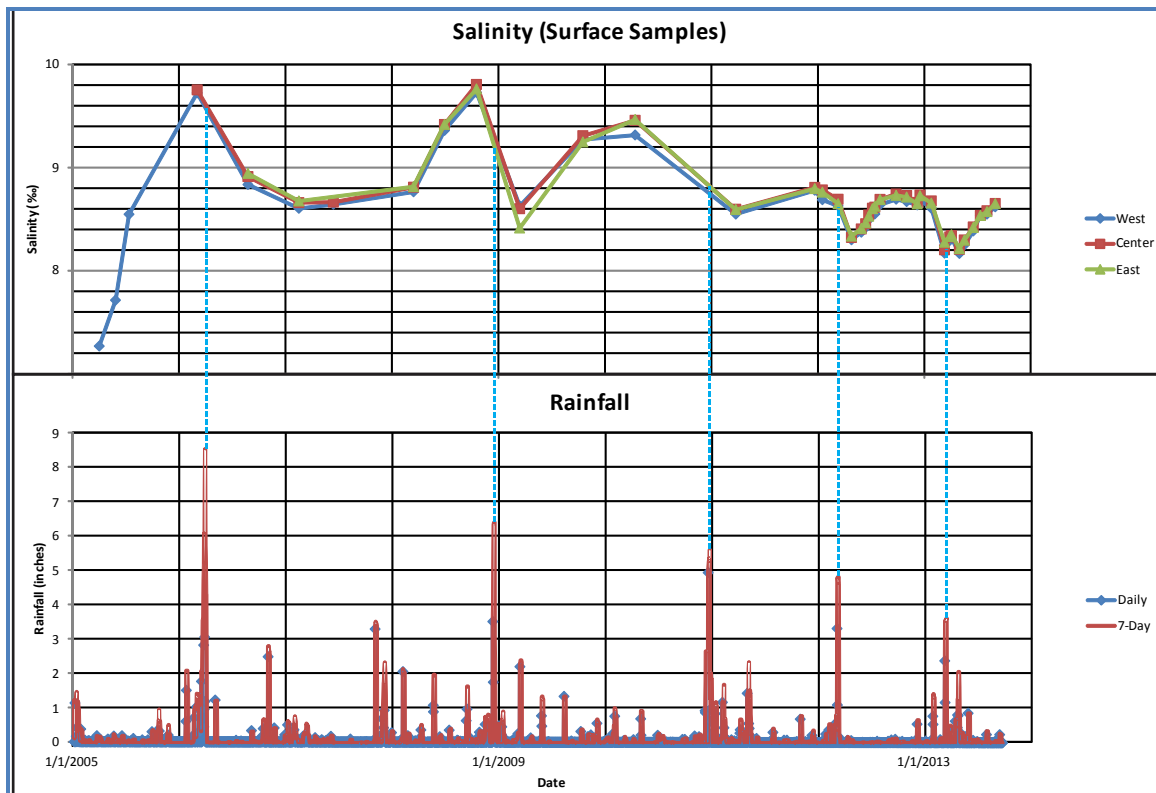
Table 4.9 Summary of Water Quality in Hoakalei Lagoon (Apr. 2010-Sept. 2013)

<i>Variable</i>	<i>Units</i>	<i>N</i>	<i>Min.</i>	<i>Max.</i>	<i>Median</i>	<i>Arith. Mean</i>	<i>Geo. Mean</i>	<i>Std. Dev.</i>
<i>Salinity</i>	‰	532	6.36	9.47	8.58	8.57	8.56	0.26
<i>pH</i>	-	532	7.89	8.54	8.29	8.26	8.26	0.14
<i>PO₄³⁻</i>	μM	528	0.01	1.38	0.12	0.19	0.11	0.17
<i>Organic P</i>	μM	122	0.130	0.960	0.24	0.310	0.269	0.181
<i>Total P</i>	μM	532	0.120	1.600	0.35	0.431	0.380	0.213
<i>NO₃⁻+NO₂⁻</i>	μM	532	5.5	79.0	38.70	32.4	25.3	19.1
<i>NH₄⁺</i>	μM	531	0.02	8.20	1.22	1.43	1.05	1.04
<i>Organic N</i>	μM	122	0.04	26.00	15.38	14.50	12.96	4.74
<i>Total N</i>	μM	508	14.8	87.5	55.00	50.5	45.7	19.8
<i>Silicate</i>	μM	532	370	577	410.00	444	441	55
<i>Chlor.-a</i>	μg/L	532	0.06	5.22	0.48	0.71	0.52	0.77
<i>Turbidity</i>	NTU	532	0.4	8.2	1.50	1.7	1.5	1.1
<i>T. Susp. Sed.</i>	mg/L	262	0.4	41.0	2.00	2.9	2.2	3.9
<i>Temperature</i>	Deg.-C	126	23.52	27.32	26.40	25.59	25.54	1.49
<i>Oxygen</i>	% Sat.	124	90.00	139.00	100.00	104	103	10

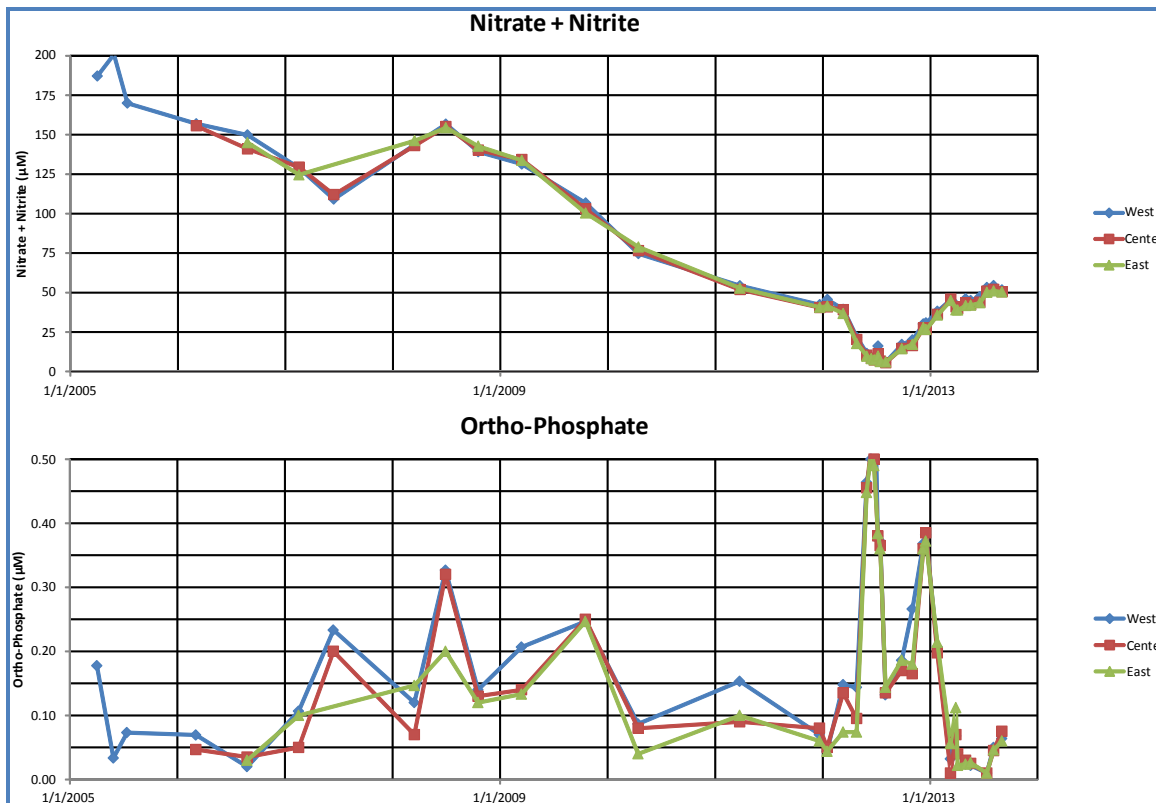
Source: Marine Research Consultants, Inc. data compiled by Planning Solutions, Inc. (2013)

Figure 4.10 shows a systematic decrease in dissolved inorganic nitrogen concentration (nitrates + nitrites) in the lagoon starting in mid-2008 until it approached zero in 2012 before recovering to about 50 μM in 2013. This figure also shows very low levels of dissolved phosphates throughout the monitoring period. Some of the fluctuation of phosphate levels shown in this figure may not be significant, since the analytical precision of the phosphate determination is a significant fraction of the measured levels.¹⁶

¹⁶ This analytical uncertainty is between 0.04 (Hager et al. 1972) and 0.08 μM (Strickland and Parsons, 1972, p. 49)

Figure 4.9 Time Series for Salinity and Rainfall

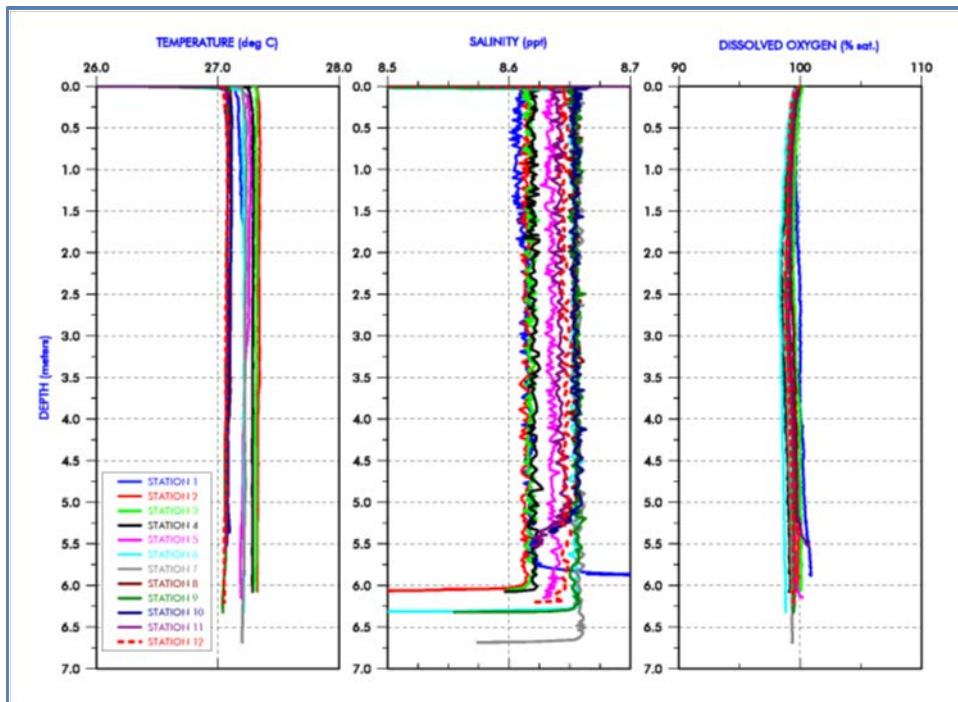
Source: Marine Research Consultants, Inc. (2013)

Figure 4.10 Time Series for Surface Nitrogen and Phosphorus Inorganic Nutrients

Source: Marine Research Consultants, Inc. data compiled by Planning Solutions, Inc. (2013)

Vertical profiles collecting continuous estimates of salinity, temperature, oxygen saturation, and water depth are also collected at each station where the water samples are recovered. These profiles (e.g. Figure 4.11) indicate a very well-mixed water body throughout the lagoon, with no indications of surface thermoclines or oxygen depletion in bottom water.

Figure 4.11 Vertical Profiles in Hoakalei Lagoon (Sept. 1, 2013)



Source: Marine Research Consultants, Inc. data compiled by Planning Solutions, Inc. (2013)

As evidenced by these data, the water quality in the basin has remained very good to date. The inputs of groundwater and ocean water, when combined with the mixing caused by the wind, have resulted in a well-oxygenated, well-mixed body of water. Currently, there are no significant place-to-place differences in water quality within the lagoon and no indications of stagnation.

Temperature remains relatively constant between the surface and bottom of the basin; the water in the lagoon is well mixed by wind action and usually does not form any stratification due to temperature differential. The water is brackish, approximately one-third the salinity levels of adjacent sea water in the near shore environment and well saturated with dissolved oxygen.

As discussed in Section 5.2, a common local species of green algae (*Chara zeylanica*) covers large portions of the basin floor and, as discussed below, is probably responsible for the observed low levels of nutrients in the water (inorganic phosphorus and nitrogen) because it consumes these, and for the high levels of oxygen (because the algae produces it). The following section describes the results of monitoring tests for bacterial contamination.

4.5.1.3 Existing Water Quality: Bacterial Concentrations

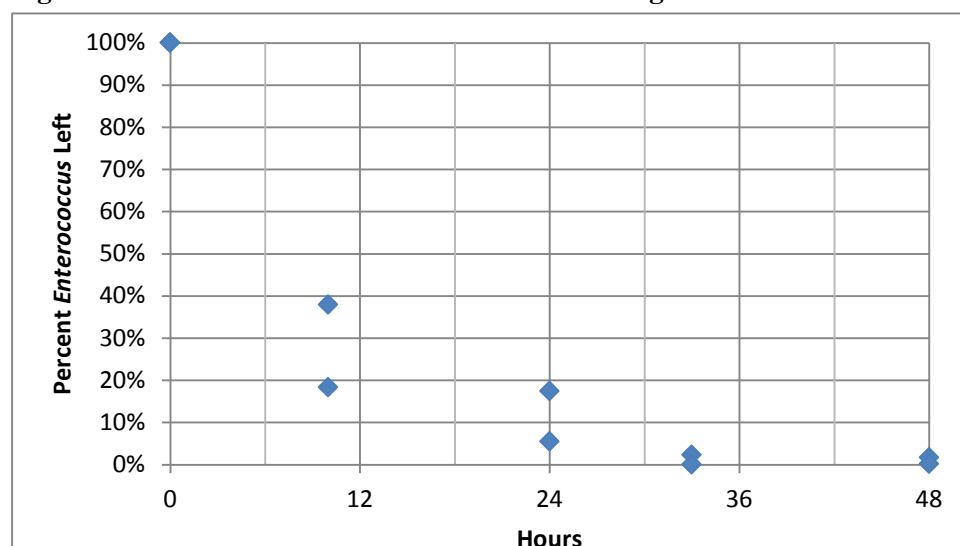
Since 2012 Haseko has hosted many private events at the lagoon, with many people using non-motorized water crafts such as canoes and paddle boards. For example, between January and November of 2013 Haseko recorded hosting 72 events at the lagoon, with between 5 and 100 people using the lagoon at any one time (the event average was 25 persons) (Sharene Tam, personal

communication to Dr. Charles Morgan, November 27, 2013). During this period, Haseko periodically tested the lagoon water for *Enterococcus* contamination. *Enterococcus* bacteria are commonly found in the feces of humans and other warm-blooded animals. Because *Enterococcus* bacteria share a common source with many human pathogens and display decay rates that are understood to mirror those of specific human pathogens, the state water quality standards use *Enterococcus* as an indication of health hazard (see Section 4.5.1.1). As shown in Table 4.10, the lagoon has remained generally free of bacterial contamination throughout this period. The only notable exceptions are one occasion in the eastern and central part of the lagoon on May 2, 2013 and another in the eastern part of the lagoon on September 1, 2013. No events were held at the lagoon at the time of either event, and no specific causes for these two spikes have been determined.

Table 4.10 *Enterococcus* Levels in Hoakalei Lagoon: August 2011 – November 2013

Date	Lab	Station											
		1	2	3	4	5	6	7	8	9	10	11	12
08/01/11	HFWT ¹	1	0	0	1	2							
05/30/12	HFWT	1	0	0	0	0	0	0	1	0	0	0	0
05/30/12	HFWT	1	0	0	0	0	0	0	1	0	0	0	0
06/14/12	HFWT	1	1	0	0	1	1	0	1	0	1	1	0
08/02/12	HFWT	1	1	2	1	1	2	1	0	1	0	0	1
09/26/12	HFWT	0	0	0	0	0	0	0	0	0	0	0	0
03/28/13	ASI ²	0	0	0	2	0	0	1	2	1	0	0	0
05/02/13	ASI	27	32	4	0	48	0	186	440	0	0	0	0
07/12/13	ASI	0	0	0	0	0	0	1	0	0	0	0	0
08/04/13	ASI	0	0	1	0	0	0	0	0	0	0	0	0
09/01/13	ASI	1	1	1	2	0	0	5	0	30	2	70	26
10/06/13	ASI	0	0	3	1	0	1	0	0	0	0	0	0
11/10/13	ASI	0	0	0	2	0	0	3	0	0	0	4	10
Geometric Mean		0.2	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.1	0.1
Note: Zero values assigned value of 0.01 to permit calculation of geometric mean. HFWT = Hawaii Food & Water Testing, Inc.; ASI=Analytical Services, Inc. Geometric mean is of all values shown; if it were calculated only for the most recent five samples per the State Water Quality Standards, the geometric means would be even lower.													
Source: Marine Research Consultants, Inc. (2013)													

Enterococcus tends to die off very quickly in saline environments such as the ocean, but is much more persistent in freshwater. The exact relationship between increasing salinity and decreasing *Enterococcus* survival has been studied on the Mainland in a few locations, but has not been the subject of extensive study here. Because of this, Haseko commissioned Analytical Services, Inc. to conduct an *in situ* experiment to determine the viability of *Enterococcus* contamination in the existing basin. The complete results of this study are presented in Appendix C. The key results for lagoon surface water are shown in Figure 4.12. As shown in this figure, 90 percent of the bacteria present in the basin's surface water die off between 18 and 24 hours after their introduction to the surface water. Thus, any contamination introduced by swimmers or spills of contaminated water into the basin will likely not persist for more than a few days at most.

Figure 4.12 Die Off of *Enterococcus* Bacteria in Lagoon Surface Water

Source: Analytical Services, Inc. (2013) – See Appendix C

4.5.2 POTENTIAL IMPACTS AND SAFETY CONSIDERATIONS

4.5.2.1 Alternatives 1 and 2 (Preferred Alternative and All-Mauka Resort Alternative)

Because these two alternatives differ only in the exact arrangement of the uses, they are nearly identical with respect to potential effects on the quality of the water that would be maintained within the basin. As discussed in Sections 2.2.1 and 2.2.3, Haseko is planning for two basic kinds of aquatic activities in the Project Area. The first type of recreational activity will take place in the relatively deep (in excess of 20 feet) waters of the lagoon. Because the water will be calm and not used by motorized boats, it will provide a venue for many types of small watercraft, such as outrigger canoes, kayaks, peddle boats, paddle boards, and many other types of small floating craft. Currently, outrigger canoes and paddle boards have used the lagoon with great success. These and other activities using non-motorized watercraft would be greatly expanded by the improvements Haseko is proposing under these alternatives.

The second type of in-water recreational activity will take place in the public swimming cove that Haseko proposes to construct on fast land adjacent to the northwestern corner of the lagoon.¹⁷ The gently sloping, sandy bottom (maximum depth 5 feet) that will be constructed for the cove will provide a place for people of all ages to wade and swim. Such opportunities are not available to residents of the area at the present time.

4.5.2.1.1 Lagoon

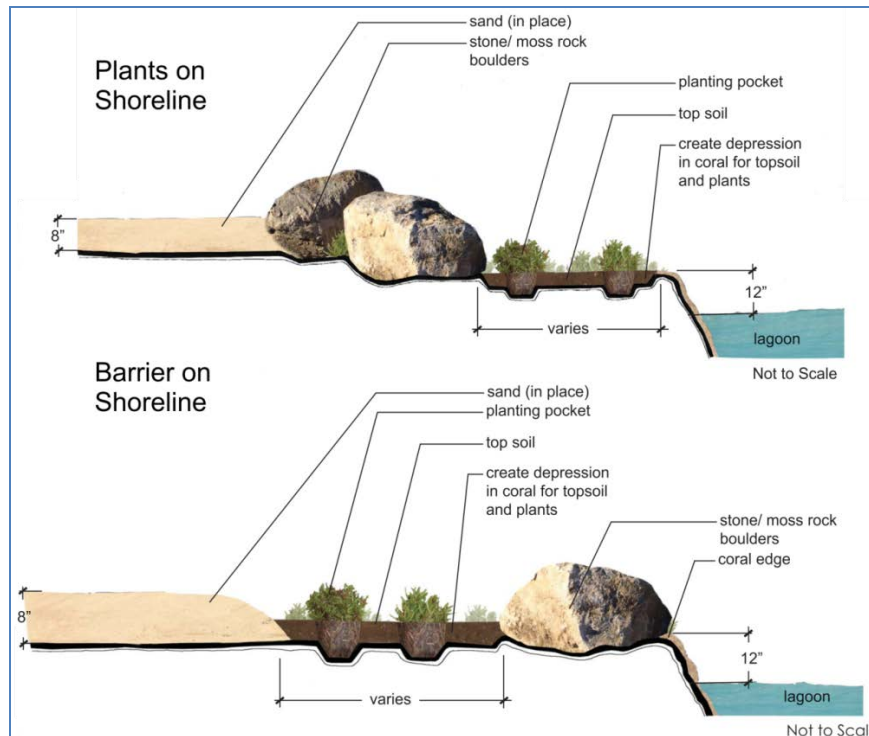
As indicated by the water quality monitoring work described above (Section 4.5.1.2), the physical and chemical characteristics of the lagoon appear to be fairly stable and well mixed, with small changes occurring in response to extreme rainfall events and possibly to seasonal changes in sunlight and wind conditions. If the planned changes in grading are carried out to minimize runoff into the lagoon from the surrounding lands (see Section 2.2.5), this stability is likely to persist as development continues. If usage of the lagoon itself is managed to control the numbers of users, then bacterial contamination is not likely to be problem. However, the long turnover rate of the lagoon water (approximately 150 days for the entire volume to be replaced by new groundwater) will be a continuing concern both for

¹⁷ In the future, additional swimming coves may be constructed in the fast lands adjacent to the eastern basin. The decision whether or not to construct these additional swimming coves will be made by the ultimate developers of these areas.

the stability of the system and for the potential for contamination. These concerns are examined below.

To mitigate the potential impacts to lagoon water quality that could be caused by irrigation and fertilization of landscaping along the lagoon shoreline, native and hardy, drought-resistant ornamental plant material will be used along the lagoon edge. Fertilizer will be applied in the first year per industry standards for the establishment of the plants, and then minimal fertilization will be applied only as needed following the grow-in period. Drip irrigation will be used to water the plants initially, but will be minimized after they have grown in. Plantings and barrier materials will be installed to minimize runoff of irrigation water into the lagoon (see Figure 4.13).

Figure 4.13 Lagoon Edge Landscaping



Source: Dix.Hite + Partners, February 25, 2014.

In order to assure itself that water quality in the lagoon would remain satisfactory over the long term, Haseko retained Professor Kenneth Coale, Director of the Moss Landing Marine Laboratory in California, to evaluate the stability of the lagoon water quality. Prof. Coale reviewed the water chemistry data and hydrological modeling results produced for the lagoon and concluded that the long residence time of the lagoon water makes it susceptible to sudden changes in water chemistry that could be caused by a number of factors, such as a tsunami introducing seawater and raising the lagoon water salinity, changes in the salinity of the groundwater entering the lagoon, or changes in the plankton community that could lead to a rapid growth of some invasive species.

In particular, as discussed in Section 5.2.2.1, a significant increase in the lagoon salinity could lead to the rapid die-off of the dominant lagoon flora, *Chara zeylanica*, and consequent increases in phytoplankton densities and potentially other undesirable changes to the lagoon water quality. In light of this Prof. Coale recommended continued monitoring of the lagoon chemistry and biology to permit early identification of potential threats to the lagoon water quality and the development of a plan to increase the turn-over rate of the lagoon water that could be implemented if any of these threats materialize.

The lagoon water composition, and particularly its salinity, has been quite stable for more than five years and every indication is that it will remain so. Nevertheless, Haseko has developed a contingency plan that could be implemented if changes in lagoon water quality ever show that this is needed. The details of this plan and its potential impacts to groundwater are presented in Appendix E. The plan consists of the introduction of approximately 50 million gallons per day (“MGD”) of saline groundwater from saline wells into the lagoon, which would (i) reduce the residence time of lagoon water to less than 1 week; (ii) increase the salinity nearly to seawater levels, resulting in a considerable increase of the die-off rates of any bacterial contamination; and (iii) raise the water level in the lagoon by 1.5 to 2 feet, which would hydraulically isolate the lagoon from any introduction of nutrient-rich, shallow groundwater. The clear, sterile water pumped into the lagoon would exit through all sides of the very permeable materials constituting the lagoon sides before rejoining the groundwater flow into the ocean. Appendix E discusses the likely impacts to groundwater in more detail. Operation of such a pumping system would not be expensive, because the water would be pumped only a few feet vertically, and would come from a virtually limitless saline aquifer.

Prior to implementation of this plan it would be important to remove the flora and fauna in the lagoon (see Section 5.2.2.1). Haseko has reserved the sites for the required wells and piping and plans to drill them in the near future. This will permit rapid implementation of this contingency plan, should it become necessary at some future date.

In summary, maintaining water quality in the lagoon is a high priority for Haseko, and it has expended significant resources to ensure that it will continue to be appropriate to use the lagoon as a recreational water body. Haseko and its successors at Hoakalei will continue to monitor the key physical, chemical, and biological aspects relevant to water quality to develop an ever increasing understanding of the factors that influence it. This monitoring program and the other measures adopted to protect the lagoon water quality (i.e. grading to minimize surface water runoff into the lagoon, control of lagoon usage to minimize the potential for contamination, and exclusion of fossil-fuel powered water craft) are expected to minimize the potential for significant impacts to water quality, and the contingency plan Haseko has put in place will ensure that the lagoon will continue to be suitable as a recreational water body should some unforeseen impact threaten water quality.

4.5.2.1.2 Public Swimming Cove

Haseko will design and construct the public swimming cove such that the cove water will not mix with the lagoon water and does not have the potential to affect lagoon water quality in any direct and measurable way. The cove will be lined with an impermeable plastic material and its bottom will be perched above the water table. Grading of the adjacent lands around the cove will be designed to minimize any rainwater runoff into the cove. Inlet water to the cove will be supplied by a groundwater well cased to a depth well below the bottom elevation of the lagoon. This water is essentially sterile and free of suspended sediments. A similar method is currently being used very effectively in the Duke Kahanamoku Lagoon at the Hilton Hawaiian Village in Waikīkī. Outlet water will be injected into disposal wells to depths that ensure no mixing of the inlet and outlet water aquifers and no potential for discharge into nearshore waters. To obtain proper approval for this operation, Haseko has applied for an Underground Injection Control permit to the Safe Drinking Water Branch of the State Department of Health. By replacing the entire swimming cove water volume about four times a day, clean, contamination-free water for swimming will be ensured. Because of these measures, the impacts of public usage of the cove and public and commercial usage of the adjacent lands should have a minimal impact on the water quality in the cove.

4.5.2.2 Alternative 3: Marina Alternative

If the excavated basin is opened to the ocean through an entrance channel, the water in the basin will essentially consist of seawater. Sea Engineering, Inc. (SEI 2011) used a state-of-the-art computer model to estimate the exchange characteristics and expected water quality conditions associated with the marina alternative. The study predicted an average residence time of water leaving the marina of about 4 days. The results of the water quality model analysis also determined that chlorophyll-a

concentration (a measure of phytoplankton productivity) would not be affected by the proposed marina. Surface water flowing out of the marina into the ocean during the peak of 10-year, 1-hour storm is predicted by the model to have salinity of approximately 30 ppt, and TSS content of 600 mg/L. However, because the model does not include the presence of the water quality lakes that would be in place if this alternative is ever implemented, actual sediment loads caused by such a storm would be much less. Rainfall in upland portions of the Kalo'i Gulch watershed would not generate storm water runoff into the marina. However, during extreme storm events water from upland areas west of the Honouliuli sewer outfall pipe will collect in the west golf course and could overflow into the marina.

Sedimentation basins planned for the drainageways, as well as the use of broad, gently sloping drainage swales to convey runoff through the golf course would tend to allow suspended sediment to settle out before runoff reaches the marina. However, regardless of the effectiveness of these upstream controls, some sediment would flow into the marina during intense rainfall events. This would temporarily increase turbidity and sedimentation levels near the discharge points. The larger particles would settle out within the marina, allowing it to act as a sediment basin for this material. However, silt- and finer-sized particles can be expected to remain in suspension, producing elevated turbidity levels until the water has reached the ocean.

The material that settles within the marina would gradually reduce water depths, necessitating periodic maintenance dredging. The dredged material from this maintenance activity would have to be disposed of in approved ocean disposal areas. The most likely ocean disposal location is at the EPA Designated South O'ahu Dredge Spoils Disposal Area. Groundwater flowing into the marina would convey nitrates and nitrites into the marina. In future years, typical urban pollutants (e.g. pesticides, lawn fertilizers, street contaminants, etc.) would also enter the marina, either in the groundwater or as surface runoff. Within the marina itself, boats moored and operated there would constitute another source of potential contamination. Fuel and other petroleum products, floating trash and even human waste products may inadvertently be discharged into the marina waters.

Pursuant to Section 401 of the Clean Water Act and the State of Hawai'i Water Quality Regulations, the State Department of Health certified that the marina option is consistent with existing State Water Quality standards at the time the Department of the Army Permit for the project was issued, and the WQC remains in effect for the marina plan that was approved at that time. A key condition of that certification requires Haseko to monitor the water quality of the marina basin as well as the offshore waters, and the approved monitoring program has been carried out consistently for offshore waters since 1990 and for the basin since its excavation was completed in 2008. This monitoring program would continue during and after construction of the entrance channel to determine whether or not additional mitigation would be required to ensure compliance with State Water Quality Standards.

The WQC for the marina was issued based in part on the approved plan to dispose of dredged spoils at the South O'ahu Dredge Spoils Disposal Area. The EPA's subsequent reconsideration of its earlier support for this plan (see Section 3.2.3) would, if their current stance remains unchanged, make it impossible to implement the approved plan. Should that be the case, alternate disposal methods would be required and the WQC that has been issued would need to be updated or replaced to reflect the alternate plans.

4.5.2.3 Alternative 4: No Action Alternative

Under the No Action Alternative, the existing basin would be kept largely in its present state, without the addition of a swimming cove or significant use of the existing basin as a recreational lagoon. The impacts to water quality under this alternative are similar to those discussed for Alternative 1 in Section 4.5.2.1. Haseko and its successors at Hoakalei would continue to monitor the key characteristics of the basin that are relevant to water quality in order to understand the environmental influences acting on it and to inform the monitoring program and other measures used to protect water quality. These measures would include grading surrounding areas to minimize surface runoff

into the basin, controlled usage of the basin to prevent introduction of contaminants, and the exclusion of unsuitable activities in or near the basin.

4.6 WATER QUALITY LAKE WATERS

4.6.1 AFFECTED ENVIRONMENT

4.6.1.1 Applicable Water Quality Standards

As discussed in Section 2.2.5, Haseko plans to excavate two artificial lakes to retain rainfall runoff from the Project Area and flood waters from the Hoakalei Golf Course (Figure 4.14). This will minimize runoff into the lagoon and help protect the lagoon from increased levels of suspended sediments and any contaminants contained in the runoff. No swimming will be allowed in these lakes. These water quality lakes will be subject to the basic water quality criteria that are specified in HAR §11-54-4 and applicable to all State waters (see Section 4.5.1.1).

4.6.1.2 Anticipated Water Quality

Though these lakes have not yet been excavated, the composition of the water in them is likely to be similar to the existing water bodies nearby. The *Mauka* Lake is likely to have a composition similar to the Hoakalei Golf Course water features. The water quality determinations for the closest golf course water feature (Lake 08) are presented in Table 4.11. Similarly, the water quality for the *Makai* Lake is likely to be similar to the water quality in the lagoon. Thus, the *Mauka* Lake is expected to have a salinity of about 4 parts per thousand (ppt), while the *Makai* Lake should have a salinity of about 8.5 ppt. It is noteworthy that the nutrient levels (nitrogen and phosphorus) are substantially higher in the golf course lake than the lagoon, which may be because the golf course lake receives runoff from the irrigation water for the golf course greens and fairways that might include some nutrients.

Table 4.11 Golf Course Lake Water Quality

<i>Variable</i>	<i>Units</i>	<i>N</i>	<i>Min.</i>	<i>Max.</i>	<i>Median</i>	<i>Arith. Mean</i>	<i>Geo. Mean</i>	<i>Std. Dev.</i>
Salinity	‰	10	3.26	5.52	3.90	4.06	3.98	0.85
pH	-	10	7.755	8.625	8.178	8.184	8.180	0.271
PO₄⁻³	µM	10	0.160	2.100	0.525	0.697	0.515	0.597
Organic P	µM	10	0.160	4.800	0.515	1.219	0.643	1.522
Total P	µM	10	0.400	6.900	1.065	1.916	1.193	2.107
NO₃⁻+NO₂⁻	µM	10	216	404	257	284	277	69
NH₄⁺	µM	10	0.28	16.60	1.24	2.74	1.25	4.93
Organic N	µM	10	2.5	105.6	19.1	30.6	15.0	34.6
Total N	µM	10	238	527	262	317	306	98
Silicate	µM	10	450	675	532	532	528	70
Chlor.-a	µg/L	8	0.76	4.13	1.23	1.66	1.39	1.16
Turbidity	NTU	8	0.68	1.42	0.81	0.88	0.86	0.24

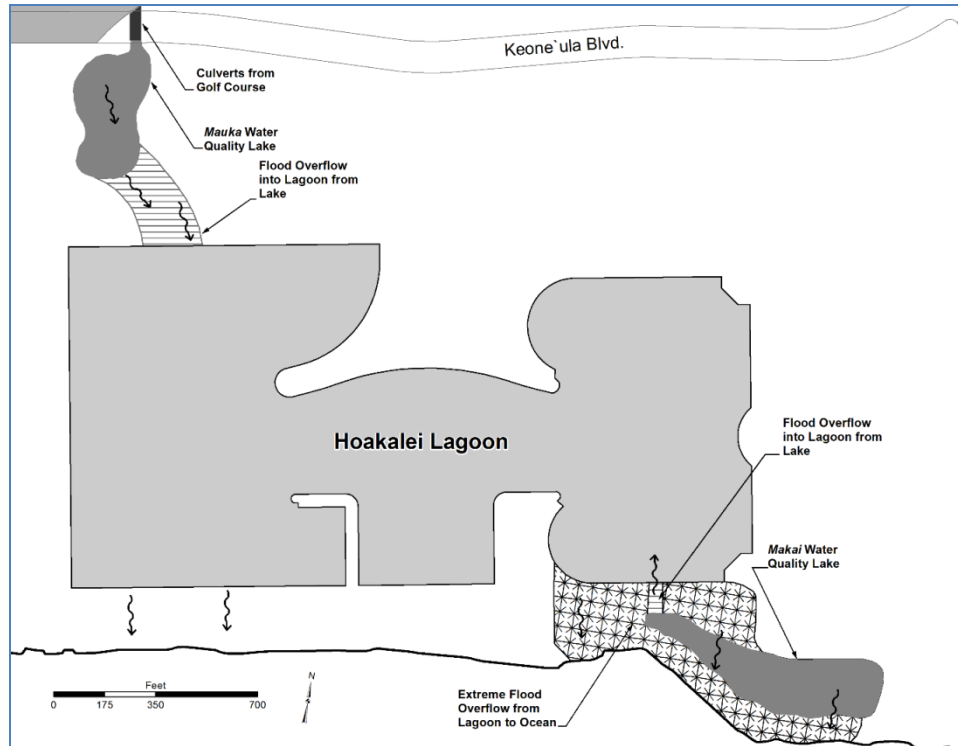
Source: Hoakalei Golf Course Lake 08; Marine Analytical Specialists; compiled by Planning Solutions

4.6.2 POTENTIAL IMPACTS: WATER QUALITY LAKES (ALL ALTERNATIVES)

The drainage planned to go into and out of the water quality lakes is shown in Figure 4.14. Based on Haseko's approved drainage master plan for the area (R.M. Towill, 2012), the Hoakalei Golf Course to the north of the Project Area will flood and discharge water through culverts into the *Mauka* Water Quality Lake only during rainfall events that are equal to or more than the 100-year, 24-hour storm.

Most of the time runoff into the *Mauka* or *Makai* Lakes will consist only of rainfall that falls into the Project Area.

Figure 4.14 Water Quality Lakes



Sources: Haseko, RM Towill (2012)

The area grading and drainage structures will be designed to treat and direct as much runoff as possible into these lakes instead of the lagoon. Water from the lakes will flow in the flood overflow swales that will connect each lake to the lagoon only during events equal to or more severe than 100-year storm events. The lagoon will overflow into the ocean through a wide swale on its southeast corner only during events that are equal to or more severe than two successive 100-year events.

Haseko will use best management practices during the design and installation of drainage structures to ensure minimum transfer of suspended sediments and other contaminants. Haseko will stock the lakes with fish species known to help control aquatic plants and will initiate a program of water quality maintenance that has been proven to maintain good water quality in the Hoakalei Golf Course water features. Haseko will design and install landscape vegetation and structures to resist erosion and retain rainfall runoff. The water quality lakes will be cleaned of floating debris after every major storm.

Because of the design of the drainage and landscape systems and the planned establishment of a proven lake-water maintenance program, the water quality in the lakes is expected to conform with the applicable water quality standards, resulting in minimal impacts to the lake water quality.

4.7 WETLAND WATERS

4.7.1 AFFECTED ENVIRONMENT

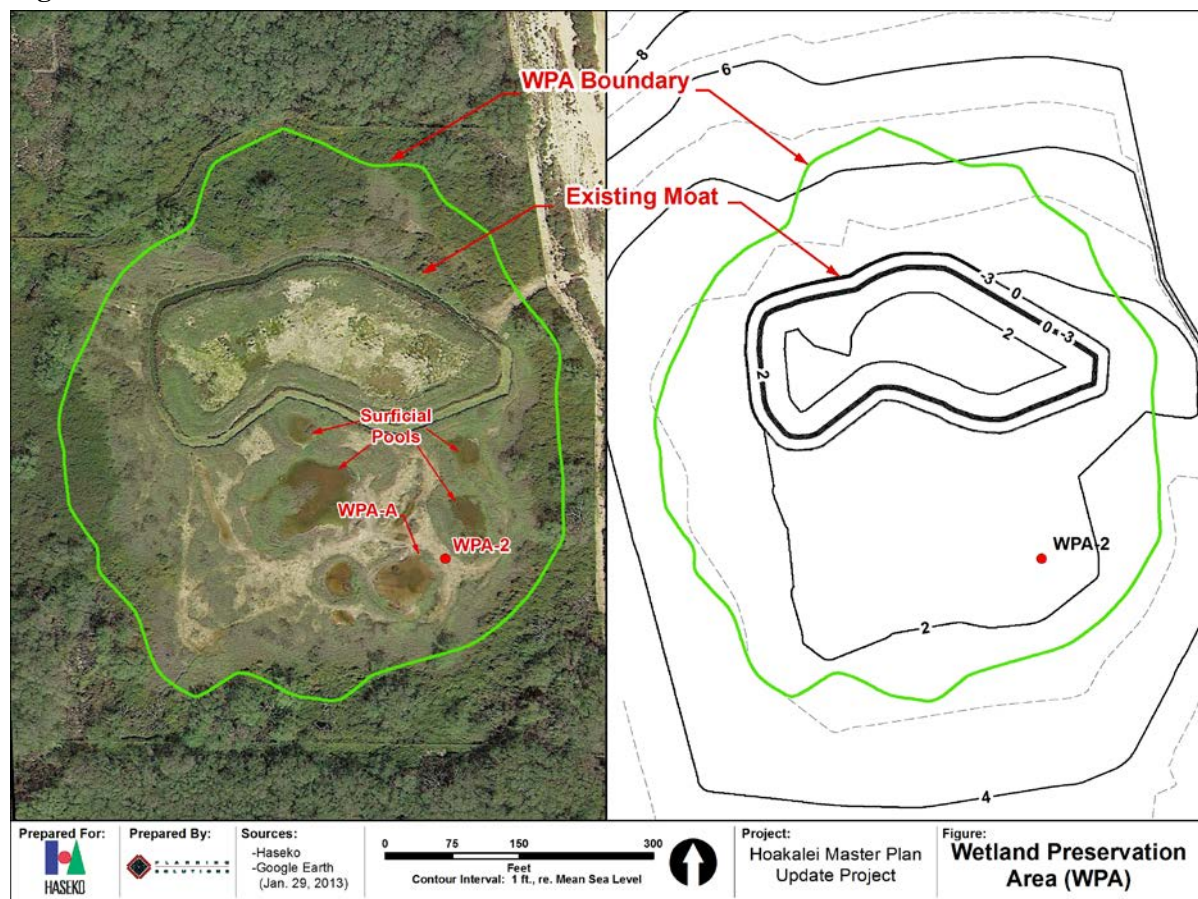
4.7.1.1 Applicable Water Quality Standards

The water bodies in the WPA on the southwestern margin of the Project Area are subject to the basic water quality criteria that are specified in HAR §11-54-4 and applicable to all State waters (see Section 4.5.1.1). It is further protected by its status as a wetland preserve.¹⁸ Haseko has designed the drainage for the adjacent areas to ensure that no outside runoff will enter the WPA.

4.7.1.2 Existing Water Quality

The WPA is a roughly circular depression covered by 3 to 4 feet of fine-grained, virtually impermeable carbonate mud or “marl”¹⁹. As shown in Figure 4.15, there are two distinct types of water bodies within the WPA. One type is in several surficial pools that are found in the low areas within the depression. The other type is found in the moat that Haseko excavated in October of 2004 to protect nesting and foraging Hawaiian water birds.

Figure 4.15 WPA Features



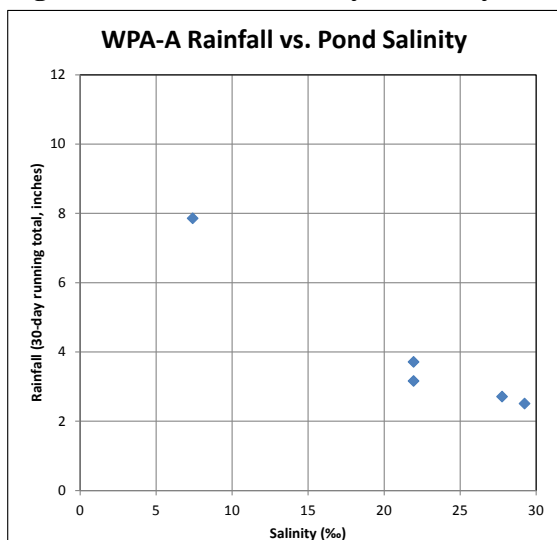
The surficial pools are believed to consist of rainfall that accumulates in the low areas within the WPA and does not percolate through the virtually impermeable marl surface layer. Figure 4.16 shows the relationship between the salinity in one of the superficial ponds (labeled WPA-A; location

¹⁸ Haseko's Department of the Army Permit Special Condition 12(e) requires Haseko to "...ensure that the wetland's pre-project hydrologic conditions and resource values are preserved and maintained."

¹⁹ Marl is defined as "... a mixture of calcareous material and clay." McDonald, Abbott, and Peterson (1983), p. 293.

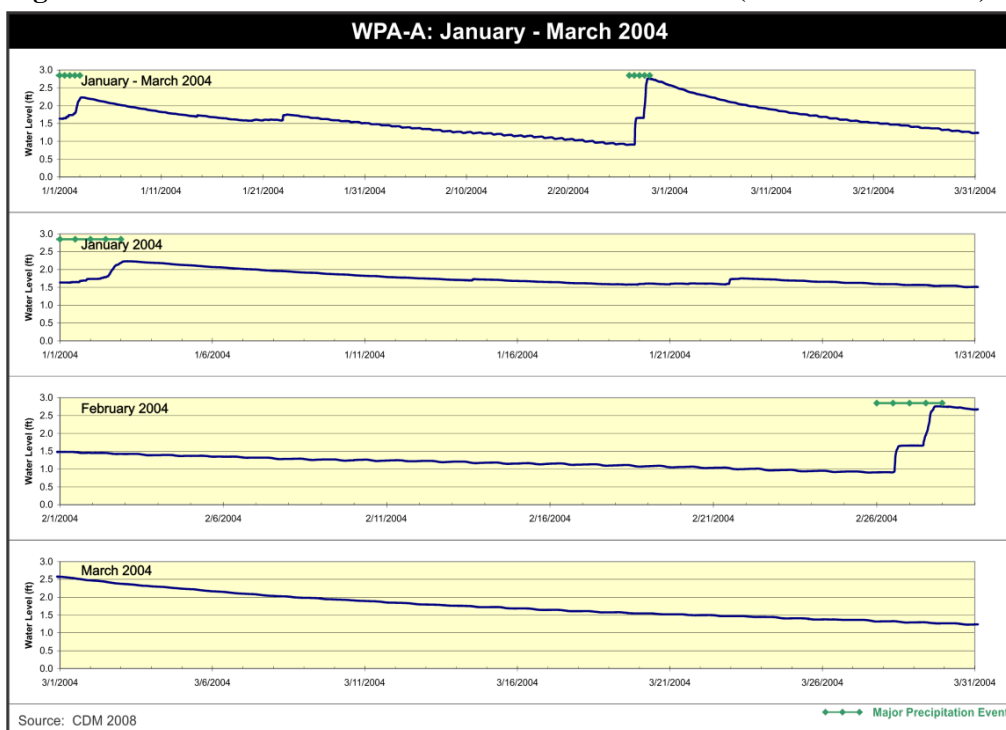
shown in Figure 4.15) that was monitored between 2003 and 2006. As shown in this figure, in this pond the salinity is inversely proportional to accumulated rainfall, consistent with the idea that these surficial pools are effectively isolated from the underlying water table and persist only as long as it takes for the rainfall that gathers in them to evaporate. WPA-A was instrumented during 2004 with a water-level sensor that accurately recorded the water level for the entire year. The record shows a high correlation between the water level and rainfall events (see Figure 4.17)²⁰, with the level rising rapidly with accumulating rain and then slowly dropping as the water evaporates.

Figure 4.16 WPA-A Salinity vs 30-Day Rainfall



Source: Marine Analytical Specialists, data collected between 2003 and 2006.

Figure 4.17 Wetland Surficial Pool WPA-A Water Levels (Jan. – March 2004)



²⁰ Only data for the first quarter of 2004 are shown in this figure, but the relationship between rainfall and water level was consistent for the whole year.

The very small periodic rise and fall of the level shown in these records (and more apparent in records recovered at lower water levels) is not indicative of the tides, since it ranges from peak to crest only once in any 24-hour period; the ocean tides at the Project Area rise and fall twice a day (semi-diurnal). This small periodic change is likely caused by a minor temperature dependence exhibited by the sensor.

The major nutrient levels in WPA-A were determined and are presented in Table 4.12. Also shown in this table for comparison are the levels determined in three groundwater monitoring wells located near to the WPA and one determination of the values found in the moat water. WPA-1 is located near the shoreline, between the WPA and the ocean, WPA-2 is adjacent to WPA-A, and WPA-3 is located inland from the WPA (see Figure 4.22 in a subsequent section). As shown in this table, the levels of inorganic nitrogen (Nitrate + nitrite, labeled as NO_3) are much lower in the surficial pool than in the groundwater, while the salinity of the pool is higher and much more variable than in the groundwater wells, consistent with the notion that these pools are completely isolated from the groundwater by the layer of impermeable mud.

Table 4.12 Major Constituents in WPA Waters

	PO_4 (μM)	NO_3 (μM)	NH_4 (μM)	Si (μM)	TOP (μM)	TP (μM)	TON (μM)	TN (μM)	Turb. (NTU)	TSS (mg/L)	Salinity (‰)
WPA-A											
Average	2.99	1.45	10.3	68	2.64	5.63	363	375	3.86	23.6	21.7
Std Dev	4.81	2.46	7.7	79	1.32	4.56	115	110	1.80	15.2	8.6
WPA-1											
Average	0.93	310	14.7	790	1.24	2.18	43.6	368	3.45	71.4	7.6
Std Dev	0.50	216	18.6	84	0.32	0.43	27.4	223	1.21	58.7	0.8
WPA-2											
Average	0.59	78.3	33.1	490	0.92	1.50	55.3	167	17.8	471	7.2
Std Dev	0.50	93.4	36.8	314	0.60	0.71	41.2	35	17.9	401	1.3
WPA-3											
Average	1.00	376	4.90	824	1.10	2.10	31.5	413	2.34	23.1	3.4
Std Dev	1.36	51	3.12	80	0.62	1.35	31.5	68	1.48	14.8	0.1
Moat (n=1)	0.64	21.2	6.5	678	1.76	2.40	107	135	3.30	13.0	6.5
Source: Marine Analytical Specialists (water testing); compiled by Planning Solutions, Inc.											

The other type of surface water within the WPA is found in the moat. This water consists essentially of groundwater and, like the lagoon itself, the water level in the moat rises and falls with the tides.

4.7.2 POTENTIAL IMPACTS ON WPA

As specified in the Haseko's approved drainage master plan for Ocean Pointe-Hoakalei (R.M. Towill 2012), all of the alternatives considered in this report restrict rainfall runoff from entry into the WPA. Thus, there should be little, if any impacts to wetland waters caused by any of the development alternatives. However, if Haseko is able to complete the topographic modifications envisioned in its plans for enhancing the WPA habitat for water birds, discussed in Appendix A, the surficial pools currently within the WPA would be largely replaced by groundwater, and its composition would be

expected to be similar to the water currently found in the moat (see Table 4.12, last data row). This would be a significant but not negative impact to WPA waters because the planned enhancements to the WPA would include a number of islands that would remain well above the water level even with the most extreme sea level rise envisioned.

4.8 NEARSHORE MARINE WATERS

4.8.1 AFFECTED ENVIRONMENT

4.8.1.1 Applicable Water Quality Standards

The nearshore waters in the vicinity of the project are designated Class A “Open Coastal Waters” in the State of Hawai‘i Department of Health (DOH) Water Quality Standards (HRS §11-54-06). The water quality standards for wet conditions shown in Table 4.13 apply.²¹

Table 4.13 State Water Quality Standards for Open Coastal Waters

<i>Constituent</i>	<i>Geometric Mean Not to Exceed the Given Value</i>	<i>Not to Exceed the Given Value More Than 10 Percent of the Time</i>	<i>Not to Exceed the Given Value More Than 2 Percent of the Time</i>
Total Nitrogen (µM)	10.7	17.9	25.0
Ammonia Nitrogen (µM)	0.3	0.6	1.1
Nitrate + Nitrite Nitrogen (µM)	0.4	1.0	1.8
Total Phosphorous (µM)	0.65	1.29	1.94
Light Extinction Coefficient. (k units)	0.20	0.50	0.85
Chlorophyll <i>a</i> (µg/L)	0.30	0.90	1.75
Turbidity (N.T.U.)	0.50	1.25	2.00
Note: "Wet" criteria apply when the open coastal waters receive more than three MGD of fresh water discharge per shoreline mile. pH Units - Shall not deviate more than 0.5 units from a value of 8.1, except at coastal locations where and when freshwater from stream, storm drain or groundwater discharge may depress the pH to a minimum level of 7.0. Dissolved Oxygen - Not less than 75 per cent saturation, determined as a function of ambient water temperature and salinity. Temperature - Shall not vary more than one degree Celsius from ambient conditions. Salinity - Shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.			
Source: HAR §11-54.6 (converted to molar values for nitrogen and phosphorus species)			

The CCH, Honouliuli Wastewater Treatment Plant discharges about 21 MGD of primary treated effluent 1.8 miles offshore in 200-foot water depths. The buried sewer outfall line bisects the Ocean Pointe-Hoakalei community, crossing the eastern portion of One‘ula Beach Park on its path to the sea. The initial zone of mixing for the outfall is approximately 400 feet wide and 2,000 feet long. Density differences and near-bottom current action tend to move the outfall plume offshore to the southwest, where the effluent mixes with deeper offshore waters.

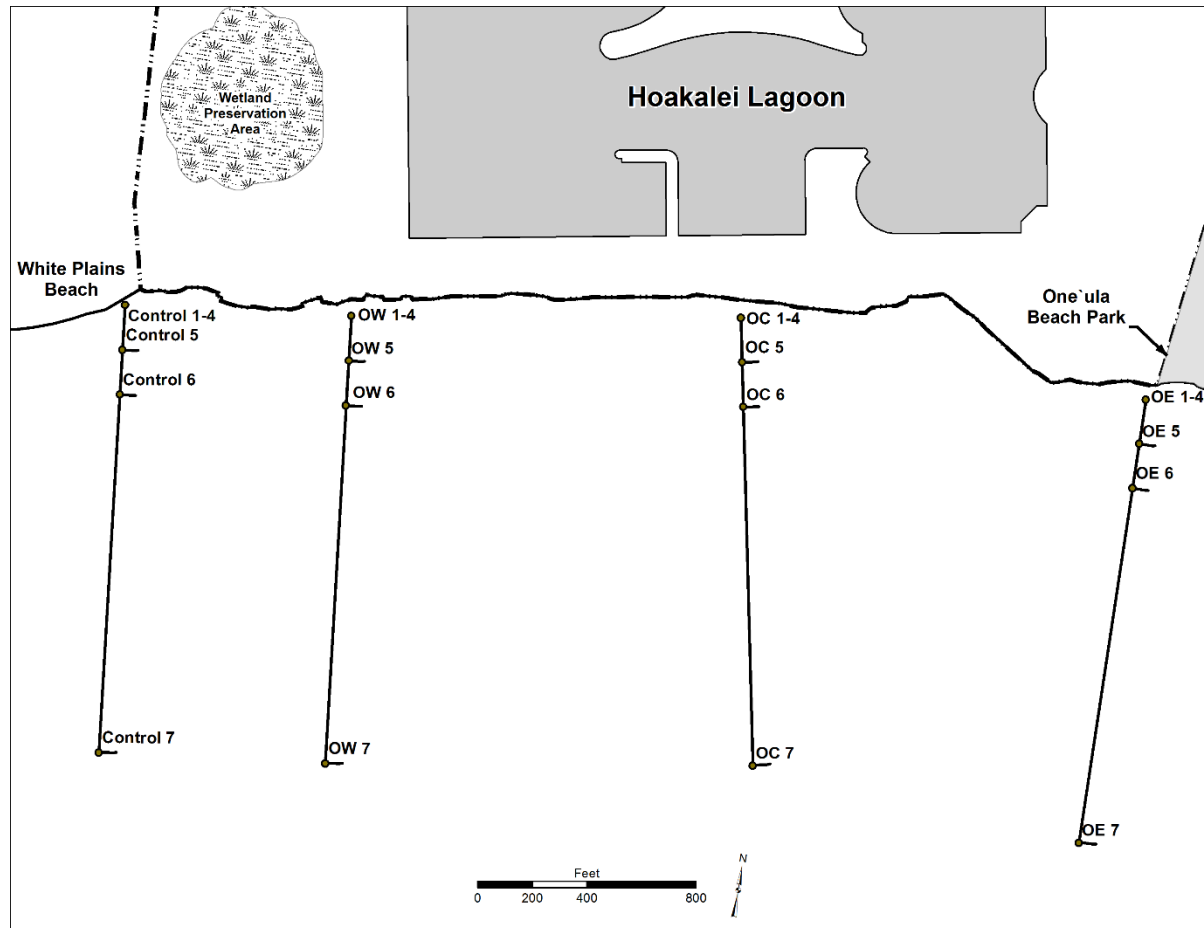
4.8.1.2 Existing Water Quality

Water quality data in the nearshore environment have been collected by Haseko and its consultants as part of an ongoing marine environmental monitoring program. Water samples from the stations indicated in Figure 4.18 have been collected on a quarterly basis since 1990. Some of the seasonal

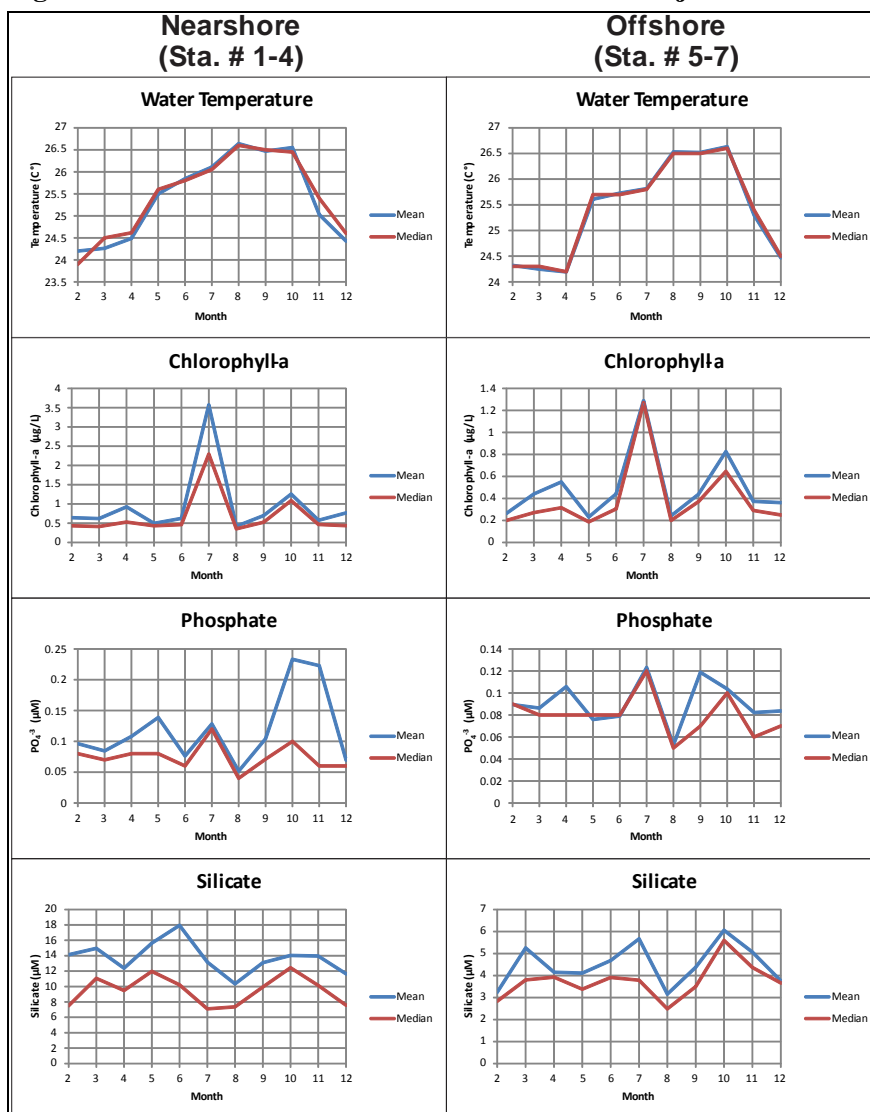
²¹ Tom Nance Water Resource Engineering, Personal Communication, 2013.

trends shown in this large data set (almost 3,500 separate water quality records) are shown in Figure 4.19. As shown in this figure, water temperature and chlorophyll-a levels show reasonable trends both at the nearshore (within 5 m of the shoreline, Station numbers 1-4) and offshore stations (Station numbers 5 to 7), with high values in the summer, but chlorophyll levels overall higher in the nearshore stations. The nearshore phosphate high mean values in October and November may suggest relatively high values entering the ocean due to rainfall runoff at the beginning of the wet season. Silicate shows no clear seasonal trends, but values in the nearshore area are persistently much higher than offshore, possibly indicative of the relatively high inputs from groundwater year round.

Figure 4.18 Haseko Offshore Water Quality Stations



Source: Marine Research Consultants, Inc. (2012)

Figure 4.19 Seasonal Trends in the Ocean Waters Adjacent to the Project Area

Source: Compiled by Planning Solutions from data provided by Marine Research Consultants, Inc. (2013)

Of particular interest is the comparison of the offshore water quality that existed prior to the lagoon excavation to after its completion. This comparison is presented in Table 4.14. As shown on this table, phosphorus and nitrogen species, turbidity, total suspended solids, silicate, and chlorophyll remained the same or decreased somewhat after excavation. Table 4.15 lists the geometric means of the key water quality variables for which the State has issued standard values. As shown in this table, before excavation of the lagoon, the standards were exceeded for total nitrogen, nitrate-nitrite, chlorophyll, and turbidity. After excavation, the standard is met for all variables except for turbidity. Clearly, the excavation had no negative impacts on the water quality of the adjacent nearshore ocean water.

Table 4.14 Comparison of Nearshore Water Quality Before and After Lagoon Excavation

	<i>N</i>		<i>Average</i>		<i>Median</i>		<i>Maximum</i>		<i>Std. Dev.</i>	
	<i>Before</i> ¹	<i>After</i> ²	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
PO₄	541	288	0.095	0.078	0.080	0.070	2.92	0.240	0.137	0.041
Si	547	288	15.1	14.4	10.6	8.42	102	123	13.3	17.3
TOP	547	288	0.310	0.289	0.280	0.280	5.440	0.500	0.252	0.072
TON	543	288	9.03	7.67	8.09	7.58	129	21.7	6.44	1.68
TSS	384	216	11.4	7.34	10.4	6.80	43.3	25.0	5.85	4.18
SAL	547	288	34.28	34.37	34.40	34.57	35.2	35.4	0.67	0.81
Temp	483	288	25.35	25.23	25.50	25.19	29.4	27.4	1.21	1.09
pH	516	288	8.151	8.167	8.135	8.170	8.370	8.380	0.076	0.079
TN	547	288	12.2	10.5	10.1	8.69	140	46.0	8.77	5.52
NH₄	543	288	0.280	0.368	0.200	0.150	10.8	2.24	0.511	0.475
NO₃	546	288	2.780	2.434	0.835	0.305	69.0	38.7	5.64	5.37
TP	547	288	0.449	0.367	0.360	0.350	23.85	0.65	1.03	0.081
CHL-a	547	288	0.91	0.31	0.66	0.25	23.81	1.28	1.20	0.19
TURB	547	288	1.03	0.77	0.93	0.70	4.12	3.51	0.60	0.52

Source: Marine Research Consultants, Inc.; from water samples collected within 5 m of shoreline (Station numbers 1-4); compiled by Planning Solutions, Inc.

¹Before lagoon excavation began, January 2004

²After lagoon excavation was completed, August 2008

Table 4.15 Nearshore Waters and State Water Quality Standards (Geometric Means)

<i>Parameter</i>	<i>Standard</i> ¹	<i>Before Excavation</i>	<i>After Excavation</i>
Total Nitrogen (μM)	10.7	10.8	9.6
Ammonia Nitrogen (μM)	0.3	0.2	0.1
Nitrate + Nitrite Nitrogen (μM)	0.4	0.8	0.4
Total Phosphorous (μM)	0.65	0.38	0.36
Chlorophyll <i>a</i> (μg/L)	0.3	0.7	0.3
Turbidity (NTU)	0.5	0.9	0.6

Source: Marine Research Consultants, Inc.

¹from Table 4.13

4.8.2 POTENTIAL IMPACTS ON NEARSHORE MARINE WATERS

4.8.2.1 Alternatives 1, 2, and 4 Impacts on Nearshore Marine Waters

As described in Section 2.2.5, Haseko's drainage master plan (R.M. Towill 2012) has been designed to eliminate storm water runoff into the ocean except under the most extreme (i.e., occurring less than once every 100 years) storm conditions. Haseko plans to implement this plan for all of the lagoon alternatives considered in this report. The grading will channel storm water into two retention lakes that will have the capacity to retain runoff from 100-year storm events, and it will require two such events back-to-back to result in any significant runoff into the ocean.

As discussed above (Section 4.8.1.2), excavation of the lagoon did not lead to any decline in offshore water quality, and implementation of planned infrastructure improvements will include multiple drainage controls such as grassed swales, diversions into the retention lakes, installation of low-maintenance ground cover, and other measures to minimize entrainment of suspended sediments and other pollutants into storm water runoff. Because of these measures, Alternative 1 (the proposed

action), Alternative 2 (All-Mauka resort development only), and Alternative 4 (No Action) will not lead to any significant impact on nearshore ocean water quality.

4.8.2.2 Alternative 3 (Marina Alternative) Impacts on Nearshore Marine Waters

If the basin is completed as a marina with the excavation of an entrance channel (Section 3.2.3) the operation would have temporary but significant impacts on nearshore water turbidity within the immediate vicinity of the dredge site. The dredging operation would also include additions of noise caused by the break-up and removal of rocks and sediments within the excavated channel area. Long-term impacts might include a slight increase in nutrient levels very close to the channel. OCEES International, Inc. (1992), evaluating a marina option significantly larger than the existing basin excavation, predicted that marina water introduced to coastal waters through an entrance channel would contain slightly elevated levels of chlorophyll-a, which would require a dilution of approximately 24 to 1 to meet the Department of Health water quality standards.

More significantly, with the opening and channel in place, water from the basin would flow freely out to sea. The analyses conducted for the proposed marina indicated that this would not lead to the violation of State Water Quality Standards. However, a greater volume of suspended sediment would inevitably reach the ocean than is the case for any of the lagoon alternatives.

4.9 GROUNDWATER RESOURCES

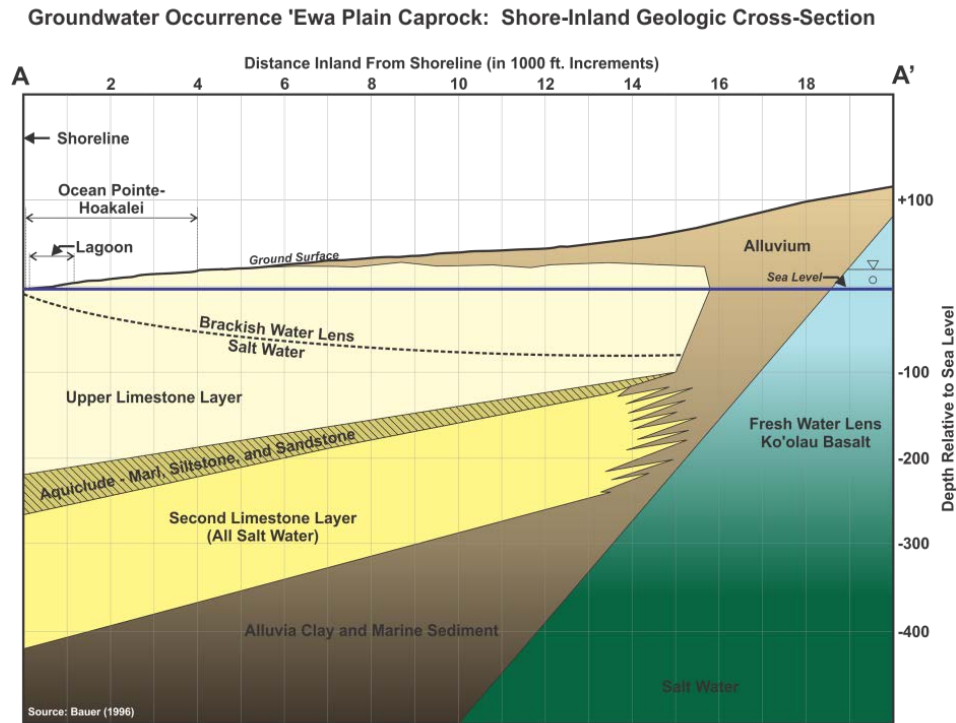
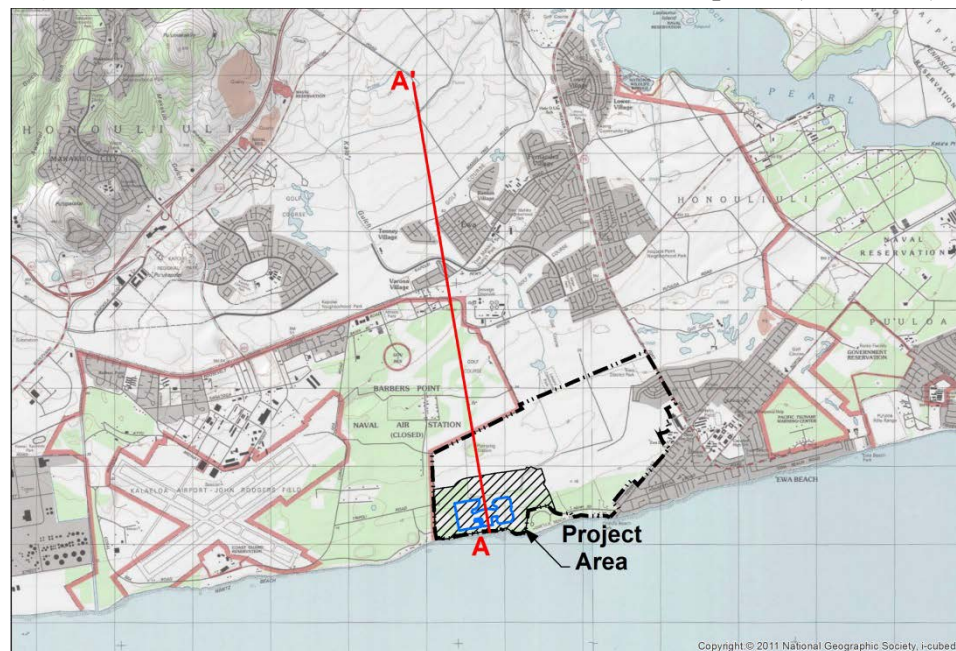
4.9.1 AFFECTED ENVIRONMENT

Three groundwater bearing strata exist beneath the Project Area (see Figure 4.20 and Figure 4.21). In sequence from top to bottom, they are: (i) the permeable surface limestone; (ii) a second permeable limestone layer separated from the one above it by an impermeable layer of marl, siltstone, and chalky limestone; and (iii) the Ko'olau volcanics which are at substantial depth (Bauer 1996). A description of the groundwater in each of these strata and its ongoing monitoring follows below.

4.9.1.1 Upper Limestone Layer

The upper limestone layer is approximately 150-250 feet thick beneath the Project Area. It contains a brackish basal lens known locally as the 'Ewa Caprock Aquifer. The portion of the groundwater body on the eastern side of the 'Ewa Plain is referred to as the Pu'uloa Sector of the 'Ewa Caprock Aquifer. After its initiation in 1960 and until its abrupt cessation in October 1994 O'ahu Sugar Company (OSCO) pumped between 15 to 25 MGD from five skimming wells in the Pu'uloa Sector of the aquifer to water its sugar cane fields. To keep this irrigation water at salinities acceptable for sugar cultivation, OSCO added to two of the skimming wells 10 to 15 MGD of less saline water pumped from its wells further inland, which tapped groundwater in the Ko'olau volcanics.

During the first decade following OSCO's closing, use of groundwater from the Pu'uloa Sector of the 'Ewa Caprock Aquifer was generally limited to irrigating golf courses. Currently, the golf courses' use of groundwater has been augmented and mostly replaced by using the R-1 treated wastewater from the Honouliuli Wastewater Treatment Plant. Total groundwater use at present is less than 0.5 MGD as a year-round average. The salinity of the water in the upper limestone layer is about 1.5 to 2.0 parts per thousand (‰) at its inland boundary, adequate for irrigation of salt-tolerant landscaping (by way of comparison, seawater salinity is ~35 ‰). Along the shoreline fronting the project, the nearshore groundwater salinity is on the order of 8-10‰, far too saline for irrigation use. The basin is excavated to a depth of approximately 20 feet, well into this groundwater body, and contains approximately 300 million gallons. On average, its water level stands about 1.15 feet above MSL and responds to the tide and other variations in ocean level.

Figure 4.20 Groundwater Occurrence in 'Ewa Plain Caprock (Cross-Section)**Figure 4.21 Groundwater Occurrence in 'Ewa Plain Caprock (Plan View)**

4.9.1.2 Lower Limestone Layer

The second limestone layer is approximately 200 feet thick across the 'Ewa Plain. Based on deep wells on the west side of the 'Ewa Plain, its permeability is comparable to the upper limestone layer. Groundwater in it is confined by the overlying marl and siltstone and it is also entirely saline. At the four cogeneration plants in Campbell Industrial Park, on the west end of the 'Ewa Plain, the second limestone layer is used for disposal of warm (86° to 96° F) and hypersaline (up to 60‰) water from their respective cooling towers. The total disposal is on the order of 8 MGD. There is no other use anywhere across the 'Ewa Plain of the saline groundwater in this second limestone layer.

4.9.1.3 Ko'olau Volcanics Layer

Wells in the Ko'olau Volcanics layer, from Waipahu up through Mililani, provide more than 50 MGD of drinking water for Central O'ahu, Waipahu, Honolulu, 'Ewa, and Nānākuli. However, the surface of the volcanic rocks slopes down in a seaward direction. In the 'Ewa area, this surface dips below sea level *makai* of Farrington Highway, which is far inland of the Project Area. Beneath the project, the surface of the volcanic rocks is roughly 1,000 to 1,200 feet below sea level and hydraulically isolated from the second limestone layer by layers of marine and alluvial clays. At this depth, water in the Ko'olau Volcanics is essentially as saline as seawater.

4.9.1.4 Groundwater Monitoring in the Pu'uloa Sector of the 'Ewa Caprock Aquifer

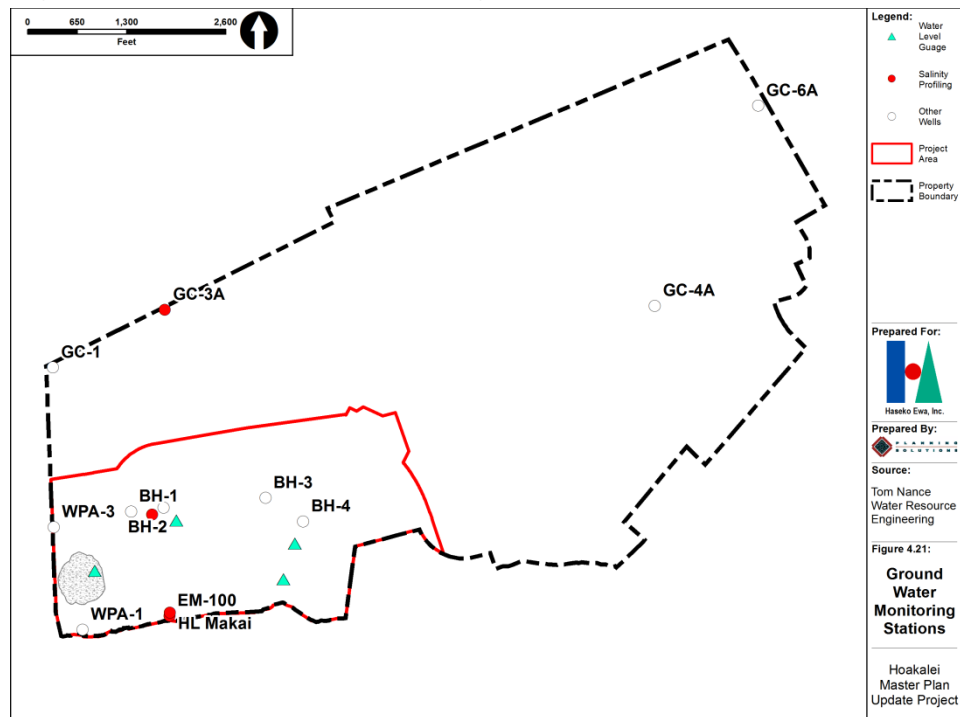
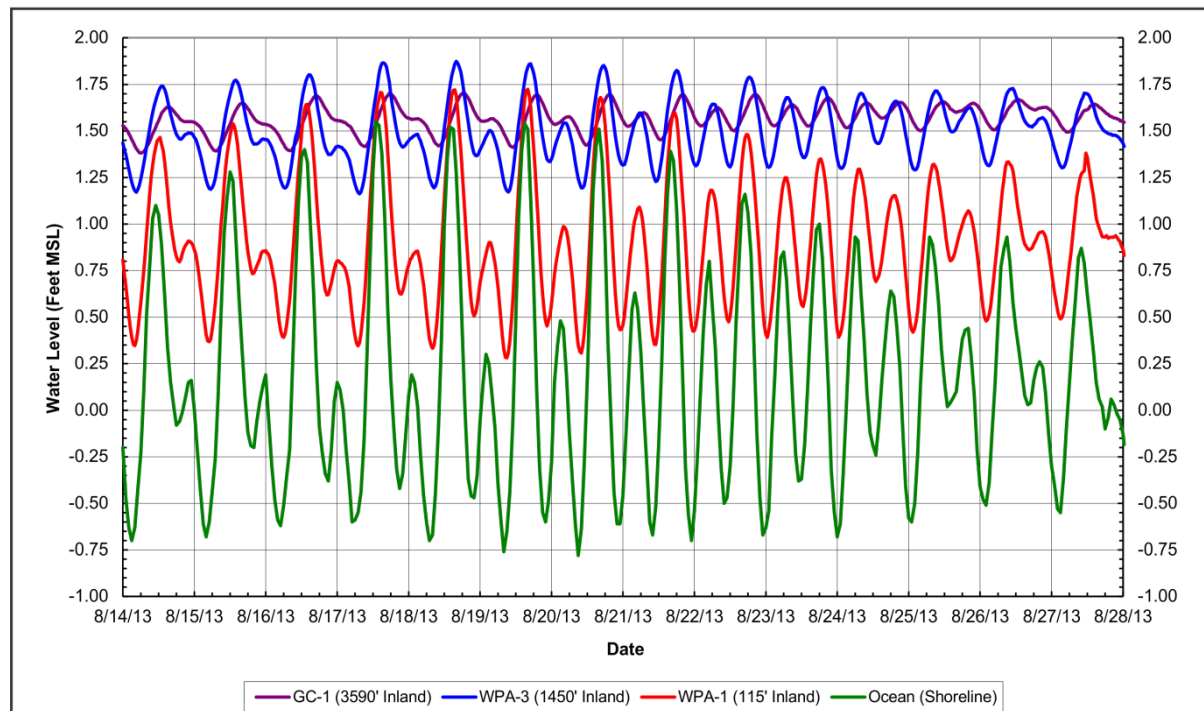
Active stations used for monitoring the Pu'uloa Sector are shown in Figure 4.22. Regularly scheduled monitoring consists of recording water levels at eight locations in Ocean Pointe-Hoakalei (six monitoring wells, the open water surface in the WPA, and the Hoakalei Lagoon) and periodic salinity profiles of the water columns of monitoring wells that penetrate through the brackish basal lens to the saline groundwater below. Salinity profiling has and is being done in six locations, four of which are in the Haseko property (GC-3A, HL-*Mauka*, HL-*Makai*, and EM-100). The other two locations, known as FG-1 and FG-2, are further inland on the east side of Fort Weaver Road in the 'Ewa by Gentry development. These two sites are beyond the limits of Figure 4.22. A detailed discussion of this monitoring program is presented in Appendix F.

As shown in Figure 4.23, the groundwater level closely follows the ocean water level with very little lag but increasing attenuation inland. Thus, the level in the most inland (*mauka*) well (GC-1, 3,590 ft. inland) has a tidal range of about 6 inches while the ocean exhibits a range of about 2 feet. As shown in Table 4.16, the groundwater contains high levels of nitrates, particularly in the shallow levels, but the one well immediately shoreward of the lagoon (HL *Makai*) shows relatively depressed levels of nitrates, probably caused by the removal of some of this nutrient by the photosynthetic processes taking place in the lagoon itself.

4.9.2 POTENTIAL IMPACTS

4.9.2.1 Alternative 1, Alternative 2, and Alternative 4

It is important to note that excavation of the Hoakalei Lagoon basin is not part of the proposed action. The impacts of this already completed action were assessed and fully permitted under Federal, State and County laws and regulations (see Haseko, 1993). However, knowledge of how groundwater interacts with the lagoon is important for developing methodologies for maintaining lagoon water quality and for assessing the long-term impacts of the lagoon on other water bodies, such as the nearby WPA and the nearshore ocean waters nearby. The summary of these interactions, based on the extensive monitoring work carried out to date and discussed in more detail in Appendix F, is presented below.

Figure 4.22 Groundwater Monitoring Stations**Figure 4.23 Groundwater Responses to Ocean Tides**

Source: Tom Nance Water Resource Engineering (Appendix F)

Table 4.16 Nutrient and Salinity Levels in Groundwater

<i>Monitoring Well</i>	<i>Depth into Water (Feet)</i>	<i>Salinity (‰)</i>	<i>Nitrate (μM)</i>	<i>Phosphate (μM)</i>
Up-gradient of the Lagoon				
HL <i>Mauka</i>	6	4.65	368	1.04
	8	4.59	373	0.88
	32	6.55	346	0.88
	44	17.75	189	1.52
BH-1	8	2.53	411	0.48
	16	2.56	412	0.96
BH-2	8	3.92	384	0.72
	16	4.34	364	0.96
BH-3	8	3.61	361	0.56
	16	3.89	356	0.56
BH-4	8	4.89	431	0.48
	16	5.58	421	0.64
Down-gradient of the Lagoon				
HL <i>Makai</i>	4	9.38	67.1	0.56
	13	9.40	62.2	0.56
	20	11.79	58.2	0.64
	30	22.20	44.8	1.04
Note: Water samples collected on August 7, 2013				
Source: Tom Nance Water Resource Engineering (2013).				

The extant basin spans a half-mile-long section of the coastline; prior to the basin's excavation an estimated 1.5 MGD of groundwater discharged into the marine environment along this shoreline. The basin excavation extends 20 feet into groundwater. The excavation removed porous and permeable reef limestone through which the groundwater moved, replacing it with an exposure of the groundwater body. At its 20-foot depth into groundwater, the basin's water volume is about 300 million gallons.

Groundwater across the 'Ewa Caprock region occurs as a thin, brackish, and nutrient-rich basal lens. Its water level responds to the ocean's water level variations, including long term mean level changes as well as the semi-diurnal tides. As groundwater moves more readily through the open water in the lagoon than the reef limestone that was excavated, the groundwater flow through the shoreline segment *makai* of the lagoon was increased from 1.5 MGD to an estimated 2.5 MGD. That translates to an average residence time of water in the lagoon of about 120 days. Because it is well-mixed, that average is probably typical of the residence time throughout the lagoon.

Groundwater in the lagoon is in dynamic equilibrium with the groundwater around its entire perimeter. However, due to the greater effective porosity in the lagoon in comparison to the surrounding reef limestone (1.0 versus about 0.2), tidal amplitude in the lagoon is decreased and its lag is greater than in groundwater in the surrounding reef limestone. This results in a semi-diurnal reversal of flow rates into and out of the lagoon all around its perimeter and a localized change in groundwater levels. For example, lagoon effects on groundwater levels are not detectable at all beyond a lateral distance of 800 feet from the lagoon. At 100 feet inland of the lagoon, the change is less than 0.10 feet. At a 2,550-foot distance inland there is no detectable change.

Due to aquatic growth and other processes during the 120-day groundwater residence time in the lagoon, nitrates and phosphates are removed from the incoming groundwater. At the 2.5 MGD

groundwater inflow rate, these removals are estimated to be 102 pounds per day of nitrate-nitrogen and 0.46 pounds per day of phosphate phosphorus. These amounts would otherwise be discharged into the marine environment.

Implementation of the development envisioned under the Preferred Alternative (Alternative 1), All-Mauka alternative (Alternative 2), or the No Action Alternative (Alternative 4) will have insignificant impacts on groundwater in the area. Use of best management practices during construction of facilities in the area and carefully controlled application of fertilizers will ensure minimal introduction of nutrients and other pollutants into groundwater.

4.9.2.2 Alternative 3: Marina Alternative

As discussed above, the existing basin currently acts as a minor and localized sink for nutrients and reduces the amounts of inorganic nitrogen and phosphorus in the groundwater that flows into the ocean. The direct connection of this water body to the ocean through construction of an entrance channel will to some extent eliminate this sink, but photosynthetic activity within the marina will still convert some or all of these inorganic nutrients into organic forms prior to the marina water's entry into coastal water through the entrance channel. Thus the groundwater flux currently entering the ocean along the shoreline directly *makai* of the lagoon would be halted and replaced by the flow of marina water through the entrance channel. This would be a noticeable local effect.

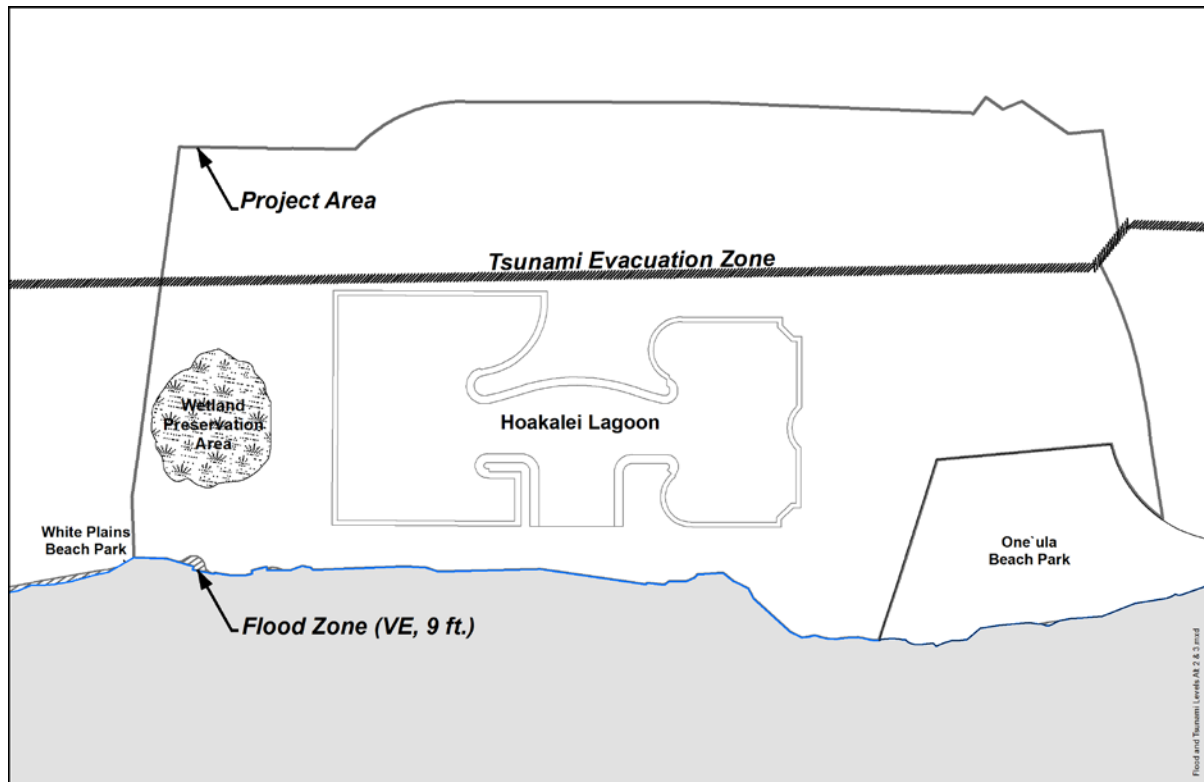
4.10 NATURAL HAZARDS

4.10.1 SUSCEPTIBILITY TO FLOODING & TSUNAMI

Regardless of alternative, the potential exists for flooding in low-lying portions of the Project Area as a result of storm water or tsunami. This inundation could result from the accumulation of storm water entering the site from upland, or from the seawater entering the site by tsunami forces. The flood hazard ratings for the Project Area are shown in the Flood Insurance Rate Map (FIRM) Figure 4.24, which was made using data from the State of Hawai'i GIS system. Most of the Project Area is in Flood Zone Category D (unmarked), which means that no flood hazard has been identified for the area. A small area along the western shoreline is categorized as VE, which means that it is in a 100-year flood zone (flood elevation 9 feet) with the additional hazard of storm waves to be expected.

Figure 4.24 also shows the currently designated Tsunami Evacuation Zone, which extends over most of the Project Area, including the entire lagoon. In the event of a flood or tsunami, and regardless of the alternative selected, *makai* portions of the Project Area could be subject to inundation. For Alternatives 1 and 2, the re-grading of the *makai* lands around the existing basin would allow flood waters a path to escape out into the ocean (see Figure 4.14); for Alternative 3 the marina entrance channel would offer floodwaters a pathway to recede out into the ocean. Any tsunami that strikes the One'ula-Honouliuli coastline would inflict significant damage on a marina and any watercraft berthed there. To the extent that resort development is focused away from the shoreline, as in Alternative 2, the threat of significant damage as a result of inundation is reduced.

In the instance of the No Action Alternative, where there may be no re-grading of these *makai* lands, and no marina entrance channel to allow waters to rapidly recede, Haseko will need to provide for the re-grading of surrounding areas so that the *makai* lands represent the lowest point in the development and can accommodate storm or flood waters receding out into the ocean.

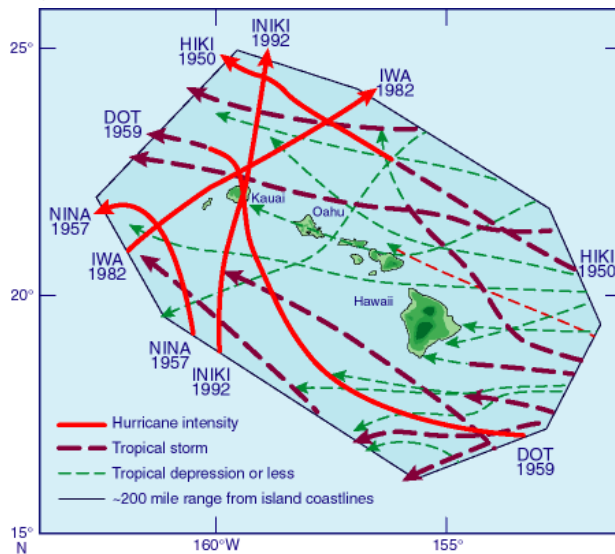
Figure 4.24 Flood Hazard Map

Source: State of Hawai'i GIS

4.10.2 SUSCEPTIBILITY TO HURRICANE DAMAGE

Hurricane season in the Hawaiian Islands begins in June and lasts through November. Most Central Pacific hurricanes originate near the coasts of Central America or southern Mexico and typically subside when they move northwestward over cooler water or encounter unfavorable atmospheric conditions. Consequently, O'ahu's 'Ewa Coastal Plain is seldom impacted by hurricanes and other severe storm events. In fact, while many hurricanes and tropical storms have passed near O'ahu during the last 50 years, only three have had direct impact. In all three cases, Kaua'i was the hardest hit, although O'ahu suffered damages as well. Hurricane 'Iniki in 1992 was by far the most destructive storm to strike Hawai'i in recorded history, with widespread wind and water damage that the National Weather Service estimated value at close to \$3 billion statewide.

O'ahu did not experience hurricane force winds and suffered only modest damage. The National Weather Service reported that the strongest winds from Iniki, measured at Barbers Point, were from the Southeast at 40 mph, gusting to over 50 mph. The areas most affected on O'ahu were the leeward coast from Barbers Point through Mākaha and Ka'ena Point with lesser damage along the south shore from 'Ewa Beach to Hawai'i Kai. The damage that Iniki generated on O'ahu is estimated up to \$15 million (in 1993 dollars).

Figure 4.25 Hurricane Tracks 1950 to 2012

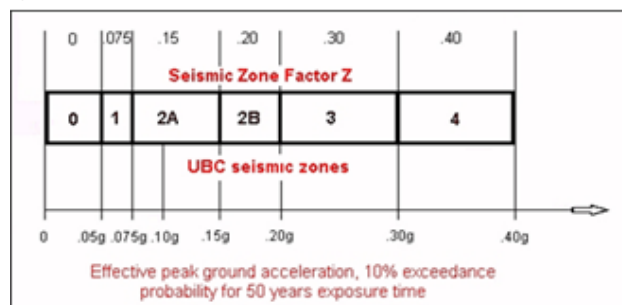
Source: University of Hawai'i School of Ocean and Earth Science and Technology

All proposed structures, regardless of alternative, will be designed and constructed to withstand wind loadings specified in the Uniform Building Code (UBC) and would, therefore, be expected to escape substantial damage from similar hurricane winds as those described above. Any watercraft, whether berthed in a marina or moored in a recreational lagoon could be subject to significant damage in the event of a major hurricane. The HMPU does not call for major storage of watercraft within the basin itself. Individual commercial purveyors/reort operators/residents will be responsible for properly securing their respective watercraft.

4.10.3 SEISMIC DAMAGE AND VOLCANO HAZARDS

Most earthquakes which occur in the State are localized around the island of Hawai'i, and most are too small to be detected except by highly sensitive instruments. The most powerful earthquake in Hawaii on record, reported by the U.S. Geological Survey²² was recorded in 1868. This earthquake occurred beneath the Ka'u district on the southeast flank of Maunaloa, on the island of Hawai'i. It had an estimated magnitude of between 7.5 and 8.1 and caused damage across all of Hawai'i Island. However, even this powerful earthquake, which was felt on O'ahu, did not cause any damage there.

Engineers, seismologists, architects, and planners have devised a system of classifying seismic hazards based on the expected strength of ground shaking and the probability of the shaking actually occurring within a specified time. Figure 4.26 depicts this system of classification. The results are included in the Uniform Building Code (UBC) seismic provisions. The UBC contains six seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10 percent chance of severe shaking in a 50-year interval). For the purposes of structural design, the entire island of O'ahu is classified as Zone 2a (U.S. Geological Survey, 2001), a

Figure 4.26 Seismic Zones

²²<http://pubs.usgs.gov/gip/hazards/earthquakes.html>

relatively low risk of severe ground disturbance. Haseko will, regardless of the alternative selected, construct all structures at Ocean Pointe-Hoakalei in compliance with the Uniform Building Codes for Zone 2a. In addition, the construction and operation of the proposed facilities will not increase the seismic vulnerability of the Project Area.

With regard to volcanic hazards, the Wai'anae and Ko'olau volcanoes that formed the bulk of O'ahu are extinct. Smaller vents in the Honolulu Volcanic Series are more recent and formed volcanic features such as Diamond Head, Punchbowl, Salt Lake Crater, and Koko Crater. In general, these features are believed to be between 70,000 and 500,000 years old, though a few authors have suggested that there may have been some activity slightly more recently than that. Most scientists agree that there is very little likelihood that there will be future eruptions in this series of volcanoes, and thus, there is virtually no possibility that the Project Area could be damaged by volcanic hazards.

4.10.4 CLIMATE CHANGE AND POTENTIAL SEA LEVEL RISE

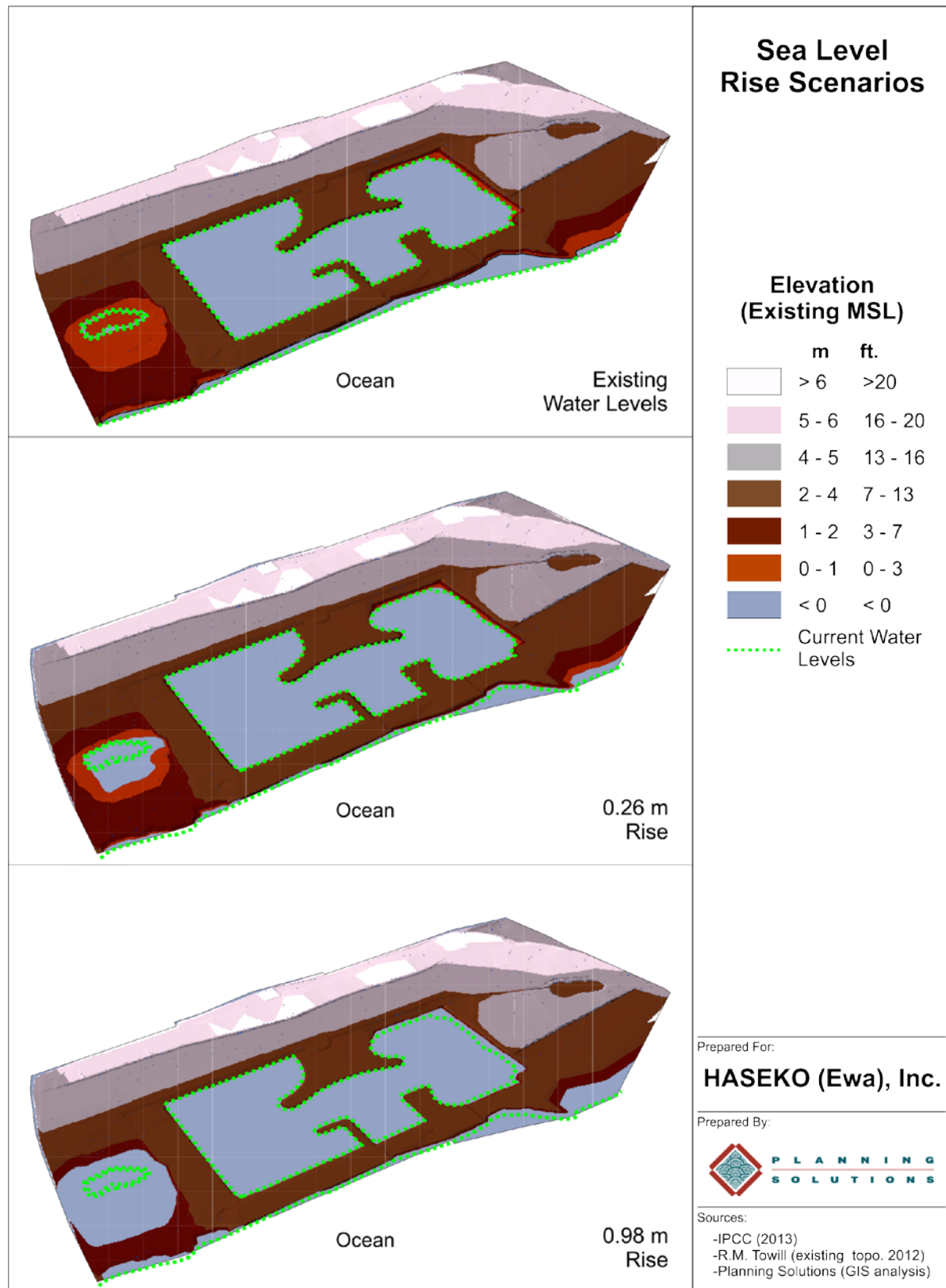
The global community of climate scientists has concluded that sea levels are currently rising, and that this trend is expected to continue for the foreseeable future. The Intergovernmental Panel on Climate Change ("IPCC") recently predicted (Church et al. 2013; IPCC 2013) that the average temperature in the Hawaiian Islands is likely to increase by 0.5 to 1.5 C° (0.9 – 1.7 F°) by 2100; rainfall is likely to decrease by, at most 10%; and sea level could rise between 0.26 to 0.98 m (0.85 to 3.2 ft.)²³. Given this likelihood, Haseko has considered the potential effects this trend could have on development in the Ocean Pointe-Hoakalei and has examined ways in which the development's design can accommodate these changes.

Possible Change in Temperature and Rainfall. The small anticipated temperature change would not significantly modify the development; facilities are already designed to accommodate the usually warm temperatures of the 'Ewa Plain, and any moderate increase would only enhance the value of the water recreation features included in the HMPU. Similarly, the small predicted decrease in rainfall would not challenge the planned development; Haseko already employs substantial water conservation measures in all its construction and uses recycled and brackish groundwater wherever possible for irrigation.

Possible Sea Level Rise. However, potential sea level rise of more than three feet requires a bit more consideration. Figure 4.27 shows the results of sea level rise for the low and high scenarios predicted by IPCC. Rises in the sea level lead to raising of the water table inland and, over time, some increase in the salinity of the groundwater close to the shoreline. The top figure shows the existing situation, with the water level of the lagoon at a level of 1.2 feet above MSL and the water level in the WPA moat shown at the same level. The middle figure shows the effect that a sea level rise of 0.26 m (0.85 ft.) would have on the Project Area; the water is still well contained within the lagoon top banks, but the WPA water level has risen to a level above the top of the existing moat. About half of the WPA is inundated. The bottom figure shows the result with a 0.98 m (3.2 ft.) sea level rise. The lagoon is still mostly contained within the existing top bank except for the eastern side, where the level is just above the existing top bank.

In summary, temperature and rainfall level changes predicted by IPCC are not anticipated to have any significant impacts on the Project Area, but the extreme value for sea level rise might lead to the relocation of some of the facilities very near to the water on the eastern side of the lagoon. These potential impacts are not significant enough to suggest any modification of the existing development plans. As shown in Figure 4.27, impacts to the ocean shoreline would be minimal due to its steepness along the ocean fronting the Project Area. Possibly close to the end of this century, it might be necessary to move the shoreline trail slightly inland in some places, but most of this trail would not be affected.

²³ The island of O'ahu has been uplifting for at least the past 500,000 years, but at much lower rates than the apparent sea level rise (McMurtry et al. 2010)

Figure 4.27 Sea Level Rise Scenarios

CHAPTER 5 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS: BIOLOGICAL, CULTURAL, AND SOCIO-ECONOMIC IMPACTS

This chapter describes the effects that each of the alternatives would have on the biological, cultural, and socioeconomic topics. The discussion is divided into the following parts:

- Section 5.1 covers the effects on terrestrial and avian biota associated with each alternative.
- Section 5.2 discusses the effects that the various alternatives would have on the biota within the existing basin.
- Section 5.3 reviews potential effects on nearshore marine biota; this relates primarily to Alternative 3, as it is the only one that entails work in the ocean.
- Section 5.4 discusses noise-related topics. This includes both noise generation by project-related activities and exposure to existing noise from outside sources.
- Section 5.5 outlines the historic and archaeological resources within the Project Area and surrounds and the measures that have been taken to ensure that the work that is carried out within the area covered by the rezoning application is sensitive to them.
- Section 5.6 summarizes the potential cultural effects of the proposed action, detailing the results of the research and consultation that Haseko has carried out.
- Section 5.7 describes the provisions that the HMPU makes for recreation and shoreline access.
- Section 5.8 depicts the existing land use on and around the 80 acres covered by the rezoning application and discusses the extent to which the proposed rezoning would affect the continuation of existing and planned uses.
- Section 5.9 reviews the economic effects of the development that would occur for each of the four alternatives.
- Section 5.10 briefly reviews scenic and aesthetic characteristics of the alternatives.
- Section 5.11 summarizes the effect that development under each of the alternatives is likely to have on transportation facilities, including roads, harbors, and airports.
- Sections 5.12 and 5.13 briefly discuss the ability of existing and planned utility infrastructure and public services to accommodate the development that would occur under each of the alternatives.

5.1 TERRESTRIAL AND AVIAN BIOTA

Rana Biological Consulting, Inc. and AECOS Consultants completed a study in May, 2013 to characterize the existing botanical, avian, and mammalian biological resources for the Project Area and assess the potential impacts that would be caused by the proposed development. The resulting report is presented in Appendix G. The following section summarizes the key components of this work related to impacts on the development alternatives.

5.1.1 AFFECTED ENVIRONMENT

5.1.1.1 Existing Botanical Resources

The vegetation across a majority of the Project Area can be characterized as ruderal, meaning plants typically associated with highly disturbed environments. A few undisturbed areas within Ocean Pointe-Hoakalei support kiawe (*Prosopis pallida*) forest. This forest area is a remnant of the kiawe forest that occupied most of this land prior to grubbing and grading operations, except for a small portion along the northern margins of the Project Area, which was used for sugar cane cultivation prior to Haseko's acquisition of the property. Within two of these originally forested areas are the WPA and the Ahu archaeological preserve (see Section 5.5), within which occur plant species that are

absent elsewhere on the property. Finally, a coastal strand in close proximity to the ocean shore has conditions that favor certain species, including a number of native species found nowhere else in Ocean Pointe-Hoakalei. There is no federally delineated Critical Habitat present on the site (USFWS, 2012). Thus the continued planned development will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under state law. A sinkhole wetland is present on the west side of the property and is protected within the WPA by an intruder exclusion fence. No other wetland features are on site, although the existing basin is a significant feature in the center of the Project Area. The lagoon is man-made and not connected to the ocean. The margins of the basin consist of steep banks, with rock revetment in some areas, which generally precludes development of wetland vegetation around the shoreline.

The most recent botanical survey of the Project Area was undertaken on March 28, 2013. A majority of the land included in the walking survey is highly disturbed as a result of past and ongoing grading and reshaping. It has a limestone (ancient reef) base and rather level aspect; extensive grading has reshaped the site for the Ocean Pointe-Hoakalei development. A few areas have soil and boulder materials that did not originate in their present location. Generally speaking, where this occurs the soil originated or was created from material originating elsewhere on the 1,100-acre property; only the boulders were imported from off-island as part of construction for the planned marina. Within this highly disturbed area, reestablishment of naturalized plants, essentially pioneer species and mostly ruderal weeds, has been ongoing for various lengths of time, so the Project Area presents a vegetation aspect varying between barren and shrubby.

The survey identified a total of 108 species of flowering plants in the survey area. A complete listing is presented in Appendix G. No ferns, fern allies, gymnosperms, or gymnosperm allies were recorded. All but a small portion of the surveyed property is heavily disturbed and at a stage where only rather weedy species are extant in any numbers across the site. Less disturbed areas kiawe forest, wetland, and coastal strand support more species (80 versus 75) and certainly more biomass per unit area, but constitute a small amount of the total Ocean Pointe-Hoakalei community. Only these less disturbed areas have any potential to harbor important botanical resources (Char and Balakrishna, 1979), and no such species were found during the survey.

5.1.1.2 Avian Resources

The area in and around the excavated basin has characteristics that make it attractive habitat for a number of native species. In addition to the basin itself, the WPA to the west and the golf course water features to the north and east all provide forage and nesting areas for many kinds of water birds. Native species occurring within the Project Area include the Hawaiian Stilt (*Himantopus mexicanus knudensi*), Hawaiian Coot (*Fulica alai*), Hawaiian Duck x Mallard (*Anas wyvilliana* x *A. platyrhynchos*)/koloa maoli] (*Anas wyvilliana*), and the Black Crowned Night Heron (*Nycticorax nycticorax*) which use the area within and immediately adjacent to the Project Area. While it has not yet been documented within the Project Area, it is likely that, over time, the Hawaiian Moorhen (*Gallinula chloropus sandvicensis*) will start to use resources in the Project Area as well. Several of these and other migratory waterfowl and shorebird species are protected under both federal and State of Hawai'i endangered species statutes, as well as the Migratory Bird Treaty Act (MBTA).

A total of 627 individual birds of 22 species (listed in Appendix G), representing 18 separate families, were recorded during station counts. Seven of the species recorded are native species. Haseko recognizes three endangered birds that can occur in the Project Area, the Hawaiian Coot (*Fulica alai*; Hawaiian name 'alae kea), the Hawaiian Stilt (*Himantopus mexicanus knudseni*; Hawaiian name Ae'o), and the Hawaiian duck (*Anas wyvilliana*; Hawaiian name koloa maoli) all listed as endangered species under both federal and State of Hawai'i endangered species statutes. It is important to note that recent studies of the O'ahu populations of the Hawaiian duck appear to be mostly or completely interbred with the common mallard duck (*Anas platyrhynchos*), and thus may not qualify as endangered (see Appendix G).

One species, the Black-crowned Night Heron (*Nycticorax nycticorax hoactli*), is a resident water obligate breeding species. The remaining four native species recorded, Pacific Golden Plover (*Pluvialis fulva*), Ruddy Turnstone (*Arenaria interpres*), Wandering Tattler (*Tringa incanus*), and Sanderling (*Calidris alba*) are indigenous migratory shorebird species. The remaining 14 species detected are alien to the Hawaiian Islands.

5.1.1.3 Mammalian Resources

Based upon many site visits over a period of years by biologists, monitors, and other personnel, other wildlife occurring in the vicinity of the Project Area are known to include mice (*Mus musculus*), rats (*Rattus sp.*), mongooses (*Herpestes auropunctatus*), feral cats (*Felis catus*), and feral dogs (*Canis lupus*). The findings of the mammalian survey for the Project Area are consistent with the results of several other recent faunal surveys conducted in similar habitats on the 'Ewa Plain (David and Guinther, 2005, 2006, 2007, 2010). Although no rodents were detected during the course of the most recent survey, it is likely that the four established alien muridae found on O'ahu, including the roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*), and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use various resources found within the general Project Area on a seasonal basis. All of these introduced rodents are deleterious to native ecosystems and the native faunal species dependent on them.

Three other terrestrial mammalian species were detected on-site during the course of the most recent faunal survey:

- Three dogs (*Canis f. familiaris*) were seen within the survey area, and scat, tracks and sign of dogs were encountered in numerous locations within the survey area.
- Six small Indian mongooses (*Herpestes a. auropunctatus*) were encountered, as was ample scat and tracks of this species.
- Two cats (*Felis catus*) were seen and tracks of this species were observed in numerous locations.

No Hawaiian hoary bats or other mammalian species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs were detected during the course of any of the surveys that have been conducted on the site, nor were any expected (DLNR, 1998; USFWS; 2005a, 2005b, 2013). Given the paucity of documented records of this species from the 'Ewa Plain the chance that any use resources on the subject property are extremely low (USFWS, 1998; David, 2013).

5.1.2 POTENTIAL IMPACTS ON TERRESTRIAL AND AVIAN BIOTA

5.1.2.1 Alternatives 1 and 2

These two alternatives will result in very similar impacts to botanical, avian, and mammalian resources, since they all include construction of new structures, and planting of landscaping over most of the Project Area, as discussed in the following sections.

Effects on Flora. For most of the development, the existing ruderal communities will be replaced by cultivated lawns, planter boxes, trees, and other landscaping components. As discussed in Section 2.2.7, the shoreline trail improvements include removal of non-native species and preservation of the existing native species already growing along the shoreline, specifically *naio* (*Myoporum sandwicense*), *milo* (*Thespesia populnea*), *kou* (*Cordia subcordata*) and others if they are found. As discussed in Section 2.2.6, portions of the Kauhale Preserve, consistent with the SHPD-approved Preservation Plan implementation, will be cleared of most of the existing plants, except for a few kiawe trees to provide shade, and planted with native plants. A trail thru the *mauka* portion of Kauhale is already in place and volunteers are tending to the newly-planted native species in the preserve. Haseko also plans to create a trail in the Ahu Preserve to the site's archaeological features as specified in the SHPD-approved preservation plan. A site-specific implementation plan for the Ahu Preserve will be updated as needed to better support preservation activities.

No species of plant listed as threatened or endangered under state or federal statutes was recorded during the survey and none is expected to occur on this highly disturbed site, although coastal kiawe groves can harbor a few rare natives such as ‘akoko (*Euphorbia skottsbergii* var. *skottsbergii*) and ‘Ewa hinahina (*Achyranthes splendens* var. *rotundata*). Both of these ESA listed species have been found at Kalaeloa just to the west of the Project Area (Char and Balakrishnan, 1979; USFWS, 2013). Both species were searched for in the kiawe forest areas, but not observed (except *A. splendens* planted in the archaeological preserve; see above).

Because the changes planned all replace invasive weeds with Native Hawaiian and other cultivated species, and because no threatened or endangered species will be put at risk, the impacts of these alternatives to botanical resources will be minimal.

Effects on Avian Species. The principal potential effect on protected shorebird and waterbird species is the possibility that construction activity and subsequent recreational use of the lagoon may disturb nesting stilts and coots, and possibly in the future Common (Hawaiian) Gallinules (*Gallinula galeata sandvicensis*) should they eventually occupy the habitat that has been created.²⁴ The enhancement measures planned within the WPA (Section 2.2.8) will serve to improve the habitat for the waterbirds foraging and nesting and possibly increase their numbers slightly.

The principal effect on seabirds is the increased threat that night-flying birds could be disoriented by lights associated with the planned development during the nesting season. This could occur if it is necessary to conduct nighttime construction activities due to the flood lights used for construction and/or any unshielded exterior lighting is used during the seabird nesting season. Such potential effects can be minimized and/or mitigated by:

- Minimizing outdoor floodlighting of construction activity and/or equipment maintenance.
- Where such lighting cannot be avoided, shielding and pole-mounting lights on poles that are high enough to allow the lights to be pointed directly at the ground.
- Using only fully shielded streetlights (Reed, Sincock, and Hailman 1985; Telfer et al. 1987).

Based on these considerations and with the implementation of these mitigation measures, completion of the development as envisaged under any of the four alternatives should result in minimal impacts on avian resources.

Effects on Mammalian Resources. Construction and operation of the facilities as planned will likely result in a small but probably insignificant change in the populations of these alien rodent and feral pests. Trapping and exclusion measures will decrease populations, but development activities, with landscaping plants and potential access to garbage, will increase potential food sources. Construction workers, residents and other lagoon users will be reminded to properly dispose of trash. The planned development will not significantly impact any threatened or endangered mammal species.

5.1.2.2 Alternative 3

With regard to impacts to botanical, terrestrial and avian biota, the primary difference between the two lagoon alternatives and Alternative 3 is the elimination in the latter of a small portion of terrestrial habitat that now exists on the land separating the excavated basin from the ocean. Its small areas extent (~2 acres) and the absence of any notable species on it mean that the small loss would not have a measurable effect on the species that are present. Vessel traffic in a marina would increase the frequency of disturbance of the waterbirds that now use it. While it is not possible to determine whether the small boats or recreational activity would be more intrusive, the differences appear likely to be small. Moreover, these possible disturbances do not change the fact that vastly more productive waterbird habitat is available with the basin presently than would otherwise have been the case.

²⁴ No Common (Hawaiian) Gallinules (*Gallinula galeata sandvicensis*) have been recorded on the site or on the adjacent Hoakalei Country Club, though as habitat on the survey site and golf course matures, it is possible that this species may colonize the area.

5.1.2.3 Alternative 4: No-Action Alternative

The no action alternative would leave a greater area in its present, disturbed but undeveloped state. Surveys have found no evidence that this would have a positive or negative effect on terrestrial or avian flora relative to Alternatives 1, 2, or 3.

5.2 EFFECTS ON AQUATIC BIOTA WITHIN THE LAGOON

5.2.1 AFFECTED ENVIRONMENT

Section 4.5.1 describes the key characteristics of the basin water. The discussion makes the point that it is brackish (average salinity 8.6 parts per thousand), well mixed, saturated with oxygen, reasonably clear (average turbidity 1.7 NTU), and contains substantial levels of inorganic nitrogen (avg. 32 μM) and silicate (avg. 440 μM). The following sections describe the aquatic plants and animals that are currently found living and reproducing in this habitat.

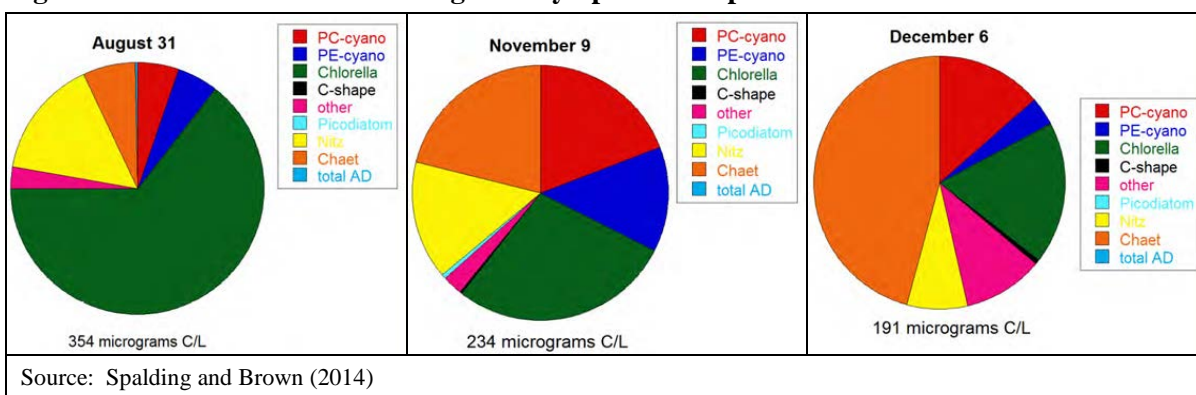
5.2.1.1 Plankton Communities

Spalding and Brown (2014) conducted several surveys to sample and examine the planktonic species currently living in the basin. The results are highlighted below and summarized in Appendix H. During the course of their surveys they collected samples (from the same stations used for water quality sampling (see Figure 4.8) to assess temporal and spatial variation of the plankton assemblage as well as the stability of the microbial system.

Heterotrophic (non-photosynthetic) bacteria utilize organic carbon sources for growth, are often a primary indicator of water quality, and directly affect water clarity. Changes in the heterotrophic bacterial population reflect changes in the organic carbon content of the site. Bacterial abundance across the lagoon ranged from 1.46×10^6 cells/ml to 1.63×10^6 cells/ml; this is on the low end of the range for brackish subtropical lagoons (Li 1998; Piccini et al., 2006; Alonso et al., 2013; MacCord et al., 2013).

Photosynthetic bacteria in the lagoon include two types of cyanobacteria, pycocyanin-rich cells (PC-cyano) which are generally associated with freshwater systems and phycoerythrin-rich cells (PE-cyano), which are usually associated with marine systems. Both groups belong to the genus *Synechococcus*. *Synechococcus* species are common components of tropical waters. Other components of the phytoplankton community found in the lagoon include: (i) spherical, non-motile cells resembling *Chlorella*, which are 2 to 3 times larger than the cyanobacteria; (ii) diatoms (*Nitzschia* and *Chaetoceros* species); and (iii) other less common phytoplankton types. As shown in Figure 5.1, the relative abundances of these different species vary over time, primarily due to seasonal changes in light levels, changes in nutrient inputs from groundwater and rainfall runoff, and possibly other factors.

Figure 5.1 Relative Biomass of Lagoon Phytoplankton Species in 2013



Zooplankton communities in the lagoon include single-celled protozoans and larger dinoflagellate grazers. Larger, multi-cellular zooplankton also occur, including rotifers (*Branchionus* sp.), copepods, and polychaete-worm larvae.

5.2.1.2 **Benthic Flora**

The most noticeable species present is *Chara zeylanica* (commonly known as Stonewort, Muskwort, or Muskgrass), a green algae that covers almost the entire bottom of the basin. With *thalli* (branches) over 3 feet tall in some places, it forms a relatively dense mat. Calcium carbonate precipitates on its surface, giving the plant a whitish appearance when viewed from above. The genus *Chara* is known to occur in fresh water in Hawai'i (Sherwood 2004), but the identity of the species present in the brackish water of the basin was uncertain until genetic analysis indicated it was *C. zeylanica* (Foster and Smith 2012). A detailed assessment of the *Chara* densities found in the lagoon is presented in Appendix I.

The two *Chara* species found within Hawai'i, *C. zeylanica* and *C. braunii*, have cosmopolitan distributions in temperate to tropical environments (Sherwood 2004). These species are considered native to Hawai'i and are not listed as invasive.²⁵ The Hawaiian word for *C. zeylanica* is 'Onohi'awa (Abbott 1992). Pukui and Elbert (1957) define 'Onohi'awa as "black moss found in fresh water". Abbott (1992) offers a slightly different interpretation, with "'Onohi" meaning "ray", describing the whorls of branches that are similar to the *hinai* baskets formerly used for certain kinds of fishing.

The average percent (%) cover of *Chara* in the basin at the time of the 2012 surveys was determined to be $55 \pm 4\%$. There is no significant difference in the % cover of *Chara* from east to west; however, the % cover of *Chara* was significantly higher ($64 \pm 5\%$) in the northern half of the excavated basin than in the southern half of the lagoon (where it was $44 \pm 7\%$). Canopy height varies from 2 to 37 inches, with an average of 13 inches.

Cladophora sp. This species is another variety of green algae, very fine and filamentous, which occurs in entangled mats. It is abundant, particularly in the shallower areas of the basin, where it grows attached to small objects on the lagoon floor or to other plants. It also can occur free floating, and accumulates on the banks of the excavation, depending on the wind direction. Genetic analysis of samples that were collected from the basin could not resolve it to the species level. All three species of *Cladophora* that are known to occur in the Hawaiian Islands are likely native.²⁶

Ruppia maritima. This species, commonly known as Ditchgrass, is an aquatic vascular plant that is common in the shallower areas of the basin. Unlike *Chara*, it does not form dense stands.

5.2.1.3 **Invertebrate Fauna**

Six macro-invertebrate species have been identified in the lagoon (Spalding, Brown, and Ross 2013; Appendix J). The most abundant are two species of Malaysian Trumpet Snails, *Melanoides tuberculata* (Red-rimmed Melania) and *Tarebia granifera* (Quilted Melania) (Mitchell and Brandt 2005; Miranda et al. 2010). As their name indicates, both are introduced species. They are approximately 0.5 inches in length and herbivorous or detritivorous. The snails are abundant throughout the lagoon and on the *Chara* that covers the lagoon bottom. Both tend to burrow during the day so are believed to be even more abundant than observation indicates. The other abundant snail (*Pyrgophorus coronatus*) is also non-indigenous and invasive, and is most commonly found underneath the stands of *Chara*.

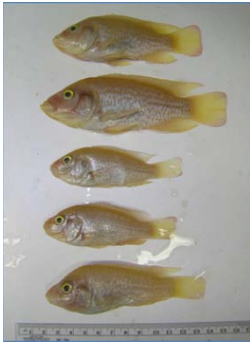
Another invertebrate species present is *Palaemon debilis* ('Opae huna in Hawaiian, also known as Feeble Shrimp). This species is approximately 1 inch in length and is a native omnivore usually found in brackish water, including anchialine ponds (Chai et al. 1989). It is abundant in shallow water, often swimming between clumps of *Cladophora* and *Chara*. Two species of dragonfly larvae

²⁵ Harmful to the environment, economy, and/or human health. URL: <http://www.hawaiiinvasivespecies.org/pests/>

²⁶ As of summer, 2012, <http://www.algaebase.org> indicates that there are 1,058 species of *Cladophora* in its database.

(*Odonata* sp.) have also been occasionally found entangled in the *Chara*. Mature dragonflies are commonly seen at the lagoon and within the adjacent WPA.

5.2.1.4 Vertebrate Fauna



Only one vertebrate fish species, the Gold Tilapia (*Oreochromis mossambicus*), has been observed in the lagoon. Originally from East Africa, this common aquaculture species is now found on all the major Hawaiian Islands (Randall 1987). Numerous small (~1 to 3 inches in length) individuals of this species were observed during dives in the lagoon basin, with a few larger ones also seen. Gold Tilapia are known to be exceptionally hardy and can tolerate a wide variety of environmental conditions. It is likely that the tilapia are feeding on the *Chara* and other plants present in the lagoon. During recent surveys of the lagoon bottom (See Appendix J), tilapia nests, where male tilapia care for and defend their young, were encountered approximately every 5 meters (16 ft.). There are no plans to introduce any fish species, since the tilapia appear to be in balance with the other flora and fauna communities in the lagoon. Ongoing monitoring and testing efforts will be continued to document the status of these fish and produce a better understanding of their place in the lagoon biological community.

5.2.2 POTENTIAL EFFECTS ON AQUATIC BIOTA WITHIN THE LAGOON

5.2.2.1 Alternatives 1 and 2

As discussed in Section 2.2.5, the drainage for the lands adjacent to the lagoon has been designed to minimize any runoff into the basin, and the landscaping plans (see Section 4.5.2.1) include measures to eliminate runoff of irrigation water and fertilizers that might introduce nutrients into the lagoon. Very little if any suspended sediment would be introduced directly into the lagoon during rainfall events once landscaping and other edge treatments are completed. Access to the lagoon by watercraft will be managed to ensure that it will not be overused (see Section 2.2.4). Recreational craft with fossil-fuel powered engines will not be allowed with the exception of maintenance and emergency vessels. Construction activities near the lagoon will employ best management practices (silt fences, temporary retention basins, etc.). Haseko and its successor in managing the lagoon will continue to monitor the biota to provide an early warning should significant changes to the biota occur and are committed to being pro-active with efforts to maintain good water quality.

Should it become necessary to implement the contingency plan described in Section 4.5.2.1 and Appendix E by increasing the salinity of its water, there would be significant changes to the lagoon biota. Most notably, for example, it is unlikely that the *Chara* could survive the rapid change in salinity caused by this influx of deep saline groundwater. It and other species that are not tolerant of the higher salinity lagoon water that would result from this would die (with the extent of the impact depending in part upon how quickly the switchover to the new water supply is made). In time, the *Chara* would be replaced by species more adapted to the higher salinity. Because the invasive green alga *Avrainvillea amadelpha* (also called “leather mud weed”) already forms extensive deep-water (~250 feet) communities off ‘Ewa (Spalding 2012), has the ability to grow over both hard and soft substrates, and has a penetrating holdfast that sequesters mounds of fine, anoxic sediments, the species has the potential to fill the niche provided by the elimination of the *Chara*. While the spread of leather mud weed into the lagoon is considered unlikely, Haseko has developed a contingency plan to address this in the event it should start to occur.

Because of these measures, the impacts of Alternatives 1 and 2 on the existing lagoon biota will be minimal. The *Chara* and tilapia communities are likely to continue to be relatively stable, though, as shown in Figure 5.1, the plankton community can be expected to change in response to seasonal and weather-related changes.

The two water quality lakes that are part of the approved drainage master plan have yet to be excavated. They are expected to be very similar to the existing lakes in the adjacent Hoakalei Country Club golf course illustrated in the photo to the right. The golf course lakes serve a function similar to that of the planned water retention lakes, receiving rainfall and irrigation runoff that would otherwise flow off the property to the ocean. The water quality of the water quality lakes will be maintained using a combination of biological and chemical measures similar to those that have been successfully employed in the golf course lakes. Herbivorous fish, such as Koi and grass carp (respectively, *Cyprinus carpio* and *Ctenopharyngodon idella*), catfish (*Ictalurus* sp.) and others are introduced to graze on water plants, and chemicals such as blue dye and enzymes are added periodically to minimize light penetration and lower the water pH. Other fish species, such as *moi* (*Polydactylus sexfilis*) and mullet (*Mugil cephalus*) may be introduced to provide fishing opportunities in these lakes. Best management practices will be employed for all upland facilities to keep potential contaminants out of storm water runoff and to keep the water in them relatively clear and free of excessive aquatic plant growth. Haseko and its successor organization will be responsible for applying these treatments as necessary to keep the lakes clean and attractive. Adequate testing of the lake water and also any fish potentially considered for human or animal food will be included to ensure that any consumption of fish from these lakes will be free of significant contamination.



5.2.2.2 Alternative 3: Marina Alternative

Opening an entrance channel to the ocean would cause major changes to the existing basin biota. The *Chara* community would certainly die off rapidly, as would most or all of the tilapia. The resultant marina would then host a marine community of animals and plants. In a recent study of the nearby Kalaeloa Barbers Point Harbor (DOT-Harbors 2013), a reconnaissance survey identified isolated corals (*Pocillopora* and *Porites* species), sea urchins (*Echinothrix diadema*, *Tripneustes gratilla*), sponges, hydroids, and scarce reef fish as being present. It is likely that over time a similar assemblage would evolve in the basin once it was opened to the ocean.

5.2.2.3 Alternative 4: No Action Alternative

Similar to Alternatives 1 and 2, this alternative would have minimal impacts to the basin biota relative to present conditions. The drainage plan would still be implemented, minimizing runoff into the basin, and any construction activities would employ best management practices to minimize or eliminate impacts to the basin. Since it would not be used as a recreational venue, impacts due to watercraft and swimmers would be almost nonexistent.

5.3 EFFECTS ON MARINE BIOTA

5.3.1 AFFECTED ENVIRONMENT

Alternatives 1, 2, and 4 do not involve activities that have a substantial potential to affect marine biota. Only Alternative 3, which entails creating an entrance channel to provide access from the existing basin to offshore areas, would cause such effects. This section pertains only to the marina alternative.




Cox and Foster (2012) have characterized the benthic invertebrate communities in the area through which an entrance channel would pass. This was based on information collected during the original permitting of the marina and several field surveys conducted between 2006 and 2012. Their findings are summarized below and reproduced in their entirety in Appendix K.

5.3.1.1 Intertidal Zone

Three general intertidal habitat types described in MRC (1991), AECOS (1991), and Foster and Cox (2012) can be found along this stretch of coast. They are illustrated in Figure 5.2. The flat carbonate

benches (Habitat Types 2 & 3) are most common. The area near One‘ula Beach Park consists largely of Habitat Type 2 with the rest of the coastline alternating between the more common Habitat Type 3 and some small areas with Habitat Type 1. While uncommon along this stretch of coast, elevated rocky platforms (Habitat Type 1) characterize much of the coastline to the east along ‘Ewa Beach proper.

Figure 5.2 Intertidal Habitat Types

	<p><u><i>Habitat Type 1.</i></u> Elevated, wave impacted bench. This habitat type is common along ‘Ewa Beach proper to the east of the study area and is interspersed between Habitat Type 2 and 3 between White Plains and One‘ula Park. These are elevated sloped carbonate platforms where rock formations tend to be more angular and rough and receive direct wave impact with little or no sand.</p>
	<p><u><i>Habitat Type 2.</i></u> Flat, sand influenced bench found near One‘ula Beach Park. These relatively flat carbonate benches are directly associated with a beach.</p>
	<p><u><i>Habitat Type 3.</i></u> “Hybrid” habitat found along most of this coastline. This habitat type is characterized by flat benches with raised algal-covered ridges that are backed by a sandy beach and a raised and angular cliff.</p>
<p>Source: Foster and Cox (2012)</p>	

Algal assemblages are diverse and lush in the intertidal zone, covering nearly 100% of rocky surfaces. A combined total of 80 algal taxa have been reported from this area (see Appendix K). Algal biomass is greatest in the mid to lower intertidal region (AECOS, 1991). Species of *Padina*, *Laurencia*, *Dictyota*, and *Acanthophora spicifera* are common and typical of species in intertidal habitats around the island of O‘ahu (Cox et al., 2013).

Small clumps of cryptogenic, invasive species *Avrainvillea amadelpha* are observed in sandy habitats near One‘ula Beach Park. The abundance of this species appears to be increasing in recent years. The mud weed (common name for *A. amadelpha*) mats can be seen growing in the sandy crevices along the edge of the eroded carbonate bench.

The green alga *Chaetomorpha antennina* and bloom-forming species *Hypnea musciformis* and *Ulva lactuca* (formerly *Ulva fasciata*) were identified as common in quantitative surveys conducted in this region in 1991 by AECOS and in 1990 by MRC (see MRC 1991) but were not abundant in quantitative surveys conducted in 2006, 2007, 2008, 2009 or 2012 by Foster and Cox nor by Lapointe & Bedford (2011) who surveyed an intertidal site off of Kalo‘i Gulch. *Chaetomorpha antennina* was noted as common in qualitative surveys conducted by Foster and Cox (2007) on intertidal benches along the west end of this region.

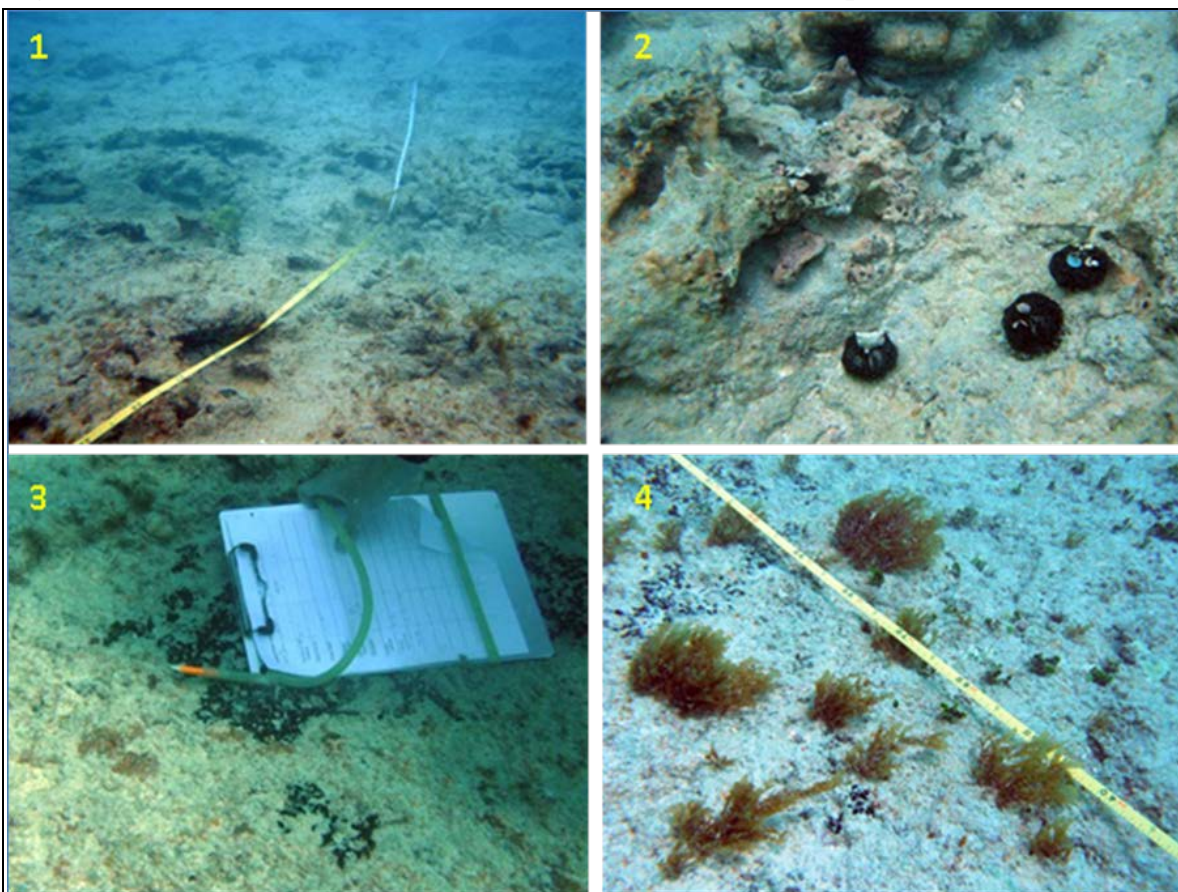
Coral species were seldom observed in the intertidal zone, but sea urchins such as *Echinometra mathaei* and *E. oblonga* are burrowed along crevices in the lower intertidal zones and are the most abundant macro-invertebrates encountered, the latter species being more abundant. The shingle urchin (*Colobocentrotus atratus*) occurs near White Plains Beach along the cliff face where wave action is high, while sea cucumbers, such as *Holothuria cinerascens*, are common within the sand filled depressions in the flat intertidal platforms in the west.

Macro-invertebrates in the high intertidal zone, directly above the algal dominated area, have not been quantified, but *pipipi* shells (*Nerita picea*), bivalves (*Isogonomon californicum*), crabs (*Grapsus* sp.), opihi (*Cellana* sp.), and *kaupa‘a* or green chitons (*Acanthochiton viridis*) have been observed. Other non-coral macro-invertebrates observed include species of cowries (*Cypraea*), predatory snails (*Drupa*, *Morula*), hermit crabs (*Calcinus*), and sponges.

Cox et al. (2010) surveyed the intertidal area along ‘Ewa Beach and found a diverse assemblage of intertidal fishes. Intertidal fishes on O‘ahu vary in composition vertically across the shore with diversity being highest in low pools. They found that the zebra blenny (*Istiblennius zebra*), rock skippers (*Entomacrodus marmoratus*), gobies (*Bathygobius* sp.), and species from the family wrasses (*Labridae* sp.) were common in pools along ‘Ewa Beach proper. Similar assemblages can be expected in the elevated sloped habitat types in this region, but the flat sandy platforms may have different assemblages. Juvenile reef fishes (*Abudeduf* spp., *Acanthurus triostegus*) and resident gobies and blennies have been observed in many of the cracks and crevices in the flat carbonate benches at One‘ula Beach Park.

5.3.1.2 Shallow Subtidal Zone: 0 to 15-foot Depth

The benthic habitat in the shallow subtidal zone (0 to 15 feet depth) has also been described in multiple surveys done using different methods and at different survey stations over many years (e.g. AECOS, 1986; Foster and Cox, 2007). Based on these, the general environment can be characterized as consisting of a broad, generally flat carbonate shelf with some channelization and seasonal shifting sand (Figure 5.3). Sand is commonly suspended in the water column by the constant water motion, and visibility along the reef is poor. The depth range of the sand covering the reef varies spatially and temporally. In 2007-2008, measurements over flat, hard surfaces showed sand thicknesses ranging from 0 to ~3 inches, and sand accumulations in channels ranging from 0.75 to ~5.5 inches (Foster & Cox 2008).

Figure 5.3 Shallow Subtidal Zone Habitats (0 to 15-foot Water Depths)**Notes:**

1. Typical habitat with sediment, turf algae, and patches of other, larger algal species (tape ~ 6 m long).
2. Hard substrate with collector's urchin *Tripneustes gratilla*.
3. The mussel *Brachiodontes crebristriatus* (black patches) partially buried by sand.
4. Algal turf with patches of the larger alga *Dictyopteris* spp. and the mussel *B. crebristriatus*.

Source: Cox and Foster (2012)

Species richness of limu species in the shallow subtidal zone is lower than in the intertidal zones. A combined total of 62 algal taxa were reported from multiple locations. *Halimeda discoidea*, *Dictyopteris plagiogramma* and *Avrainvillea amadelpha* colonize sand and *Asparagopsis taxiformis*, *Laurencia* spp., *Codium* spp., *Dictyota* spp., and *Portiera hornemanni* and other reef species sparsely cover the hard structure.

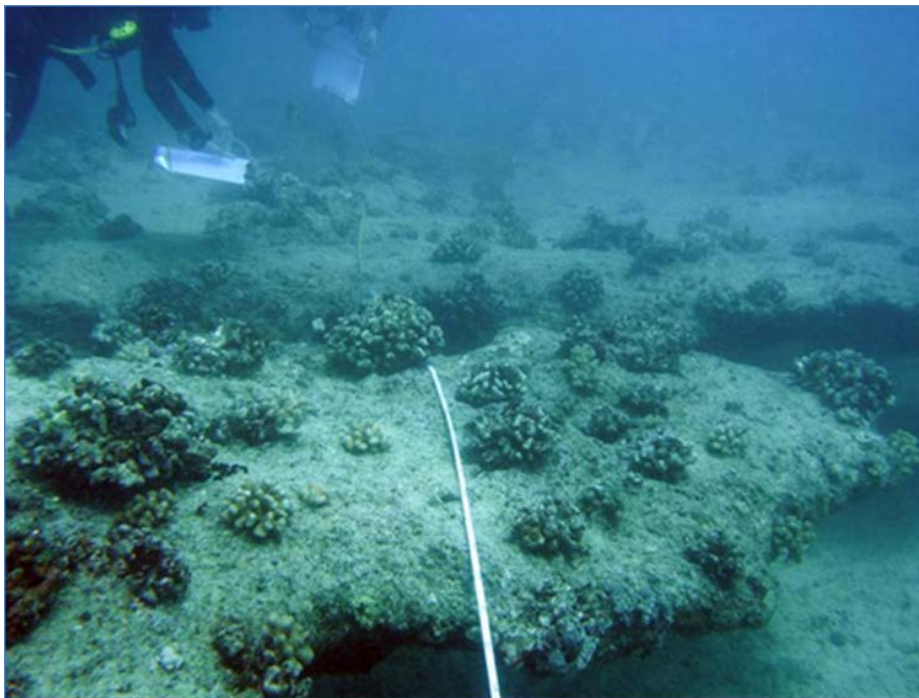
The diversity and cover of large organisms on the substrate is very low, and the majority of species are algae. The typical reef consists of a thin layer of sand over generally flat carbonate rock, with a few channels oriented perpendicular to shore. Small, encrusting or branching corals, small anemones, and algal turf occur in patches on hard structure with occasional sea urchins (mostly *Echinometra mathaei* and *Echinothrix calamaris*) exposed, sheltered in crevices or burrowed into the rock. Numerous bivalves, (*Brachiodontes crebristriatus*) were observed in sandy habitats where either hard structure was absent or was buried by sand. Reef fish such as wrasses (*Labridae*), surgeonfish (*Acanthuridae*), and damselfishes and clownfishes (*Pomacentridae*) were concentrated near areas of higher relief. At many survey stations the number of individuals was low, ranging from 1 to 10 individuals per species per station, 0 to 70 total individuals observed per station (see AECOS 1986; MRC 1991).

Coral cover and diversity (a combined total of 12 species reported) was generally low, and cover was greater in areas where sand was less abundant and hard surfaces more available. These corals tended to be small (< 3 feet in diameter), encrusting or have short branching statures and colonies are widely separated (usually 2-6 feet apart). Common scleractinian species were *Pocillopora meandrina*, *Pocillopora damicornis*, and *Porites lobata*.

5.3.1.3 Shallow Subtidal Zone: 15 to 30-Foot Depth

The biology and surrounding environment within ~ 0.5 miles from shore at a depth of 15 to 30 feet is similar to that of the shallower subtidal zone described above. The substrate is a continuation of that found in shallower water – a sparsely colonized carbonate reef with some channelization, much sedimentation, and considerable sand accumulation in some areas. Algae, corals, and urchins are most abundant, but cover and numbers are low (see Figure 5.4 below). At this slightly deeper depth there is lower benthic diversity, greater diversity of fishes, and an increase in the abundance of hard substrate covered by thicker sand.

Figure 5.4 Shallow Subtidal Zone Habitats (15 to 30-Foot Deep)



Source: Cox and Foster (2012)

The decrease in benthic diversity is largely the result of a loss of algal species with depth. Algal diversity at this deeper depth is much reduced with only 38 taxa being recorded from multiple surveys. The abundance of most of the species was low, less than 20 individuals or 2 percent cover per station (AECOS 1986, MRC 1991, Foster and Cox 2007-2008). *Halimeda discoidea* and *Dictyopteris* spp. are common algal species, found mostly in more sandy habitats.

Coral cover and diversity is generally low but cover is slightly greater at the deeper depths in areas where hard surfaces are available. A total of 12 species of corals were recorded in AECOS (1986), MRC (1991), and Foster and Cox (2007-2008); the species number per quantitative survey station ranged from 0 to 7, but 2 to 3 species was usual. Common species were *P. meandrina* and *P. lobata*. These corals colonies tended to be <3 feet in diameter, with short branching statures; colonies were generally ~1.5 to 3 feet apart.

The same urchin species found at the <15-foot depth occur in deeper water as well, but the abundance of *Tripneustes gratilla* is reduced. A total of 18 non-coral macro-invertebrate species have been reported from this depth range; *Brachiodontes crebistratus* was not found.

Species richness of fishes increased with depth. A total of 60 species were reported from two studies of which 39 were observed by AECOS (1986) and 42 were observed by MRC (1991). Saddle wrasses (*Thalassoma duperrey*) and belted wrasses (*Stethojulis balteata*), common in shallower water, were also found in deeper water. In 1990 (MRC 1991), the Vanderbilt chromis (*Chromis vanderbilti*), the millet butterflyfish (*Chaetodon miliaris*), bluestripe snapper (*Lutjanus kasmira*), and Hawaiian sergeant or mamo (*Abudefduf abdominalis*) occurred in greatest numbers within this depth range. However, these fish sightings tended to be from one or two survey locations (different stations for different species) within the study area. These fishes also tend to congregate, and this could account for the patchy observations. More species of acanthurids and chaetodontids were observed at these deeper depths but overall abundances of species from these families were low.

5.3.1.4 Threatened or Endangered Species

5.3.1.4.1 Sea Turtles

Between 1990 and 2005 Marine Research Consultants, Inc. conducted 35 surveys in the nearshore marine waters off the Ocean Pointe-Hoakalei development to assess the abundance and condition of sea turtles. A summary of the observations made during these surveys is presented in Table 5.1. All turtles identified during these surveys were green sea turtles (*Chelonia mydas*). The Hawaiian population of this species is designated as Threatened under the U.S. Endangered Species Act. No Endangered hawksbill turtles (*Eretmochelys imbricata*) were observed during any of these surveys.

5.3.1.4.2 Humpback Whales (Megaptera novaeangliae)

Endangered humpback whales may occasionally occur offshore from the Ocean Pointe-Hoakalei development, though sightings are rare (e.g. Haseko 1993; Mobley, Spitz, and Grotenfendt 2001) and as can be seen in the graphic reproduced in Figure 5.5, the area is not part of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Counts conducted by observers at One'ula Beach Park (Station 1 on Figure 5.5) in 2011, 2012, and 2013 (<http://hawaiihumpbackwhale.noaa.gov/involved/ocprojectresults.html>) showed very low numbers of whales along this shoreline during their peak time in the Hawaiian Islands (six in 2013, four in 2012, and seven in 2013).²⁷

Figure 5.5 Hawaiian Islands Humpback Whale National Marine Sanctuary O'ahu Count Sites



²⁷ Counts are conducted one morning in each month, for a total of 13 hours each year. No counts were conducted at this location during 2014, possibly because of the very low numbers observed in previous years.

Table 5.1 Cumulative Observations of Sea Turtles Offshore from Basin

Survey	Date	Total Turtles	Sex			Size	
			Male	Female	Unk.	>50 cm	<50 cm
1	9/22/1990	0	0	0	0	0	0
2	11/25/1990	13	3	9	1	13	0
3	1/6/1991	13	3	5	5	13	0
4	5/5/1991	12	2	6	4	11	1
5	6/17/1991	12	3	7	2	11	1
6	7/7/1991	22	6	12	4	20	2
7	8/17/1991	10	3	2	5	10	0
8	9/21/1991	6	2	1	3	5	1
9	10/14/1991	6	1	4	1	5	1
10	1/24/1992	14	4	10	0	14	0
11	4/18/1992	12	2	9	1	11	1
12	6/27/1992	6	4	2	0	6	0
13	9/6/1992	12	0	12	0	12	0
14	11/8/1992	17	2	9	6	16	1
15	12/23/1993	18	3	9	6	17	1
16	4/2/1994	14	2	7	5	12	2
17	10/30/1994	13	2	9	2	11	2
18	3/26/1995	10	1	7	2	9	1
19	10/28/1996	14	2	9	3	13	1
20	5/3/1996	17	2	9	6	16	2
21	10/6/1996	16	3	11	2	14	2
22	8/10/1997	14	1	7	6	10	4
23	7/26/1998	14	2	10	2	12	2
24	7/5/1999	17	0	17	0	15	2
25	12/19/1999	11	1	10	0	10	1
26	9/9/2000	16	4	12	0	13	3
27	12/24/2000	9	1	8	0	9	0
28	6/9/2001	13	0	11	2	13	0
29	12/31/2001	14	2	12	0	14	0
30	5/28/2002	22	2	20	0	22	0
31	11/19/2002	12	0	12	0	12	0
32	3/16/2003	12	1	11	0	10	2
33	12/13/2003	8	1	7	0	8	0
34	12/29/2004	9	1	8	0	9	0
35	5/30/2005	13	3	9	1	13	0
TOTAL		441	69	303	69	409	33
Source: Marine Research Consultants, Inc. (2005)							

5.3.1.4.3 Monk Seals (*Monachus schauinslandi*)

Monk seals are known to frequent the waters offshore from the lagoon and they occasionally rest on the beach at White Sands Beach Park or One‘ula Beach Park.²⁸

²⁸ For example, see <http://monksealmania.blogspot.com/2008/02/wednesday-february-13th-db-post.html>

5.3.2 POTENTIAL EFFECTS ON MARINE BIOTA

5.3.2.1 Alternatives 1, 2 and 4

As indicated at the beginning of Section 5.3, the two lagoon development alternatives and the No Action Alternative (i.e., Alternatives 1, 2, and 4) do not involve any direct interactions with the ocean shoreline or ocean. Implementation of the approved drainage master plan will ensure that rainfall runoff into the ocean from the Project Area will occur only in the most extreme storm events (i.e., those which occur less than once in 100 years (see Section 2.2.5).²⁹ As discussed in Section 4.9.2, excavation of the basin is believed to have resulted in a small decrease in the nitrogen and phosphorus nutrient load of groundwater reaching the ocean, though this decrease had not been detectable by intensive water quality monitoring in the intertidal and offshore areas. Thus, impacts to the intertidal or offshore flora and fauna will be insignificant.

5.3.2.2 Alternative 3: Marina Alternative

The effects of constructing the entrance channel were described in the *Final Federal Environmental Impact Statement for the Proposed 'Ewa Marina Project* (COE, April 1993). The report concluded that construction of a marina entrance channel would entail the removal of approximately 300,000 cubic yards of coralline limestone, sand, and other material that now comprise the benthic habitat along the channel route. This would destroy all of the sessile or slow-moving benthic flora and fauna, as well as temporarily increase turbidity in the vicinity of the dredging. Because the bottom of the entrance channel is likely to accumulate sand and other fine-grained material, it would be less well-suited for the kinds of algal cover that are now present, and these would likely decrease as a result. Water exiting the marina through the channel is likely to contain slightly elevated levels of organic materials (see Section 4.5.2.2). This increase in organic materials could potentially lead to a localized, small increase in the densities of intertidal fauna such as snails and other invertebrates very near to the channel opening. This would be a small but potentially measureable effect. Boats based at the marina that is part of this alternative could increase fishing pressure on the fishes that are present in offshore areas near the marina.

5.4 NOISE

Activities within the Project Area have some potential to affect sound levels, and the proposed development also has some potential to alter land uses (and noise exposure) as a result of existing noise sources. The remainder of this section discusses those potential effects, which are expected to be small. It begins with a brief introduction to ways in which sound levels can be characterized and the regulations that govern community noise. This is followed by a summary of existing sound levels. The section concludes with a discussion of the sound levels and noise exposure that can be expected as a result of each of the alternatives.

5.4.1 NOISE DESCRIPTORS AND RELATIONSHIP TO REGULATORY CONTROLS

The noise descriptor currently used by federal agencies to assess environmental noise is the Day-Night Average Sound Level (DNL).³⁰ The existing combined Day-Night Average Sound Level at the property boundary is estimated to range from 55 DNL to over 65 DNL. The descriptor incorporates a 24-hour average of instantaneous A-weighted sound levels as read on a standard Sound Level Meter. Additionally, sound levels which occur during the nighttime hours of 10:00 p.m. and 7:00 a.m. are

²⁹ As discussed in Section 4.9.2, excavation of the basin is theorized to have resulted in a small decrease in the nitrogen and phosphorus nutrient load of groundwater reaching the ocean, though this decrease had not been detectable by intensive water quality monitoring in the intertidal and offshore areas. This is an existing condition, however, and not the possible result of any proposed additional action.

³⁰ The DNL values represent the average noise level during a typical day of the year. DNL exposure levels of 55 or less are typical of quiet rural or suburban areas. DNL exposure levels of 55 to 65 are typical of urbanized areas with medium to high levels of activity and street traffic. DNL exposure above 65 is representative of densely developed urban areas and areas fronting high volume roadways or other transit corridors.

increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. Because of the averaging used, DNL values in urbanized areas typically range between 50 and 75 DNL. In comparison, the typical range of intermittent noise events may have maximum Sound Level Meter readings between 75 and 105 dBA.³¹

The maximum A-weighted sound level occurring while a noise source such as a heavy truck or aircraft is moving past a listener (i.e., the maximum sound level from a “single event”) is referred to as the “Lmax value”. The mathematical product (or integral) of the instantaneous sound level times the duration of the event is known as the “Sound Exposure Level” (Lse), which is analogous to the energy of the time-varying sound levels associated with a single event.

Table 5.2 categorizes the various DNL levels of outdoor noise exposure with severity classifications. According to the *Guidelines for Considering Noise in Land Use Planning and Control*, published by the Federal Interagency Committee on Urban Noise (June, 1980) a consensus has developed among federal agencies whereby residential housing development is considered acceptable in areas where exterior noise levels do not exceed 65 DNL. This value of 65 DNL is used as a federal regulatory threshold for determining the necessity for special noise abatement measures when applications for federal funding assistance are made. For the purposes of determining an acceptable level of exterior noise for residences, federal agencies have determined that an exterior noise level of 65 DNL or lower is considered acceptable. These federal agencies include the Federal Aviation Administration, Department of Defense, Federal Housing Administration, Department of Housing and Urban Development, and the Veterans Administration. For enclosed, air-conditioned office, commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 70 to 75 DNL are generally considered acceptable. When spaces are naturally ventilated, a lower threshold of 65 DNL is typically applied.

Table 5.2 Exterior Noise Exposure Classification (Residential Land Use)

<i>Noise Exposure Class</i>	<i>Day-Night Sound Level (DNL)</i>	<i>Equivalent Sound Level (Leq)</i>	<i>Federal Standard</i>
Minimal Exposure	Not Exceeding 55 DNL	Not exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL but not Above 75 65 DNL	Above 55 Leq but not Above 75 Leq	Acceptable
Significant Exposure	Above 65 DNL but not Above 75 DNL	Above 65 Leq but not Above 75 Leq	Normally Unacceptable
Notes: 1. Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation. 2. Federal Highway Administration (FHWA) uses the Leq instead of the DNL descriptor. For planning purposes, both are equivalent if: (i) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours; and (ii) traffic between 10:00 p.m. and 7:00 a.m. does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 equivalent continuous noise level (Leq), which is an average energy value over the entire measurement period.			
Source: Y. Ebisu & Assoc. (December, 2012)			

³¹ Definitions of two important technical terms used in the discussion are as follows:

1. *A-Weighted Sound Level (dBA)*. The sound level, in decibels, read from a standard Sound Level Meter using the “A-weighted network”. The human ear is not equally sensitive to all octave bands. The A-weighted network discriminates against the lower frequencies according to a relationship approximating the auditory sensitivity of the human ear at moderate sound levels.
2. Decibel (dB). This is the unit that is used to measure the volume of a sound. The decibel scale is logarithmic, which means that the combined sound of 10 sources, each producing 70 dB, will be 80 dB, not 700 dB. It also means that reducing the sound level from 100 dB to 97 dB requires a 50 percent reduction in the sound energy, not a three percent reduction. Perceptually, a source that is 10 dB louder than another source sounds about twice as loud. Most people find it difficult to perceive a change of less than 3 dB.

As a general rule:

- Rural areas and areas which are removed from high volume roadways have noise levels of 55 DNL or less.
- Urbanized areas with moderate exposure to traffic noise generally have noise levels in the 55 to 65 DNL range.
- Residences which front major roadways can be exposed to levels of 65 DNL or more, while interior lots that are shielded from the street by intervening structures are usually exposed to 3 to 10 DNL lower noise levels than the front lots.

The State of Hawai‘i Department of Health (DOH) regulates the noise levels from fixed machinery by imposing maximum allowable sound levels at the property boundaries for various zoning designations as shown in Table 5.3 below. Because of the mixture of zoning within the Project Area, the allowable noise levels from fixed machinery at or beyond the Project Area boundary varies. Noise produced by portable or movable equipment (such as trucks, bulldozers, etc.) is not subject to the limits set by DOH noise regulations.

Table 5.3 HAR §11-46 Noise Limits

<i>Zoning District</i>	<i>Noise Limit (in dBA)</i>	
	<i>Daytime (7:00 a.m. to 10:00 p.m.)</i>	<i>Nighttime (10:00 p.m. to 7:00 a.m.)</i>
Class A: Areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.	55	45
Class B: All areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.	60	50
Class C: All areas equivalent to lands zoned agriculture, country, industrial, or similar type.	70	70
Source: HAR §11-46 “Community Noise”		

The EDP Guidelines for Ocean Pointe/Hoakalei (Section 3.8.3) provide the following environmental compatibility recommendations (EDP p. 3-39):

- *Do not develop residential and apartment units in areas that would expose residents to excessive aircraft noise.*
- *Since airport operations have continued at Kalaeloa [Airport], ensure land uses at Ocean Pointe/Hoakalei are compatible with airport operations and respect restrictions on development within airport approach and clear zones.*

In addition, HRS 508D-15 requires that all prospective buyers, lessees and tenants of property within the boundaries of the noise exposure area (as shown on maps prepared by the Department of Transportation in accordance with Federal Aviation Regulation (“FAR”) Part 150-Airport Noise Compatibility Planning [14 Code of Federal Regulations Part 150] for any public airport) be notified of the potential for noise impacts (see Figures 5.6 and 5.7). Property located in the 55 DNL or greater contour on noise maps prepared pursuant to FAR Part 150 Airport Noise Compatibility Planning Program are subject to these requirements. In compliance with governmental regulations, all Ocean Pointe-Hoakalei homeowners are notified of the potential for noise impacts, and all Ocean Pointe-Hoakalei homes have been attenuated for sound.

HAR §11-46 regulates construction noise levels using a curfew system whereby noisy construction activities are not normally permitted during the nighttime periods, on Sundays, or on holidays. Construction activities, which could typically exceed established limits for fixed machinery, are normally allowed during the regular daytime work hours on weekdays and on Saturdays through issuance of construction noise permits; noise exceedance outside of those hours require a noise variance.

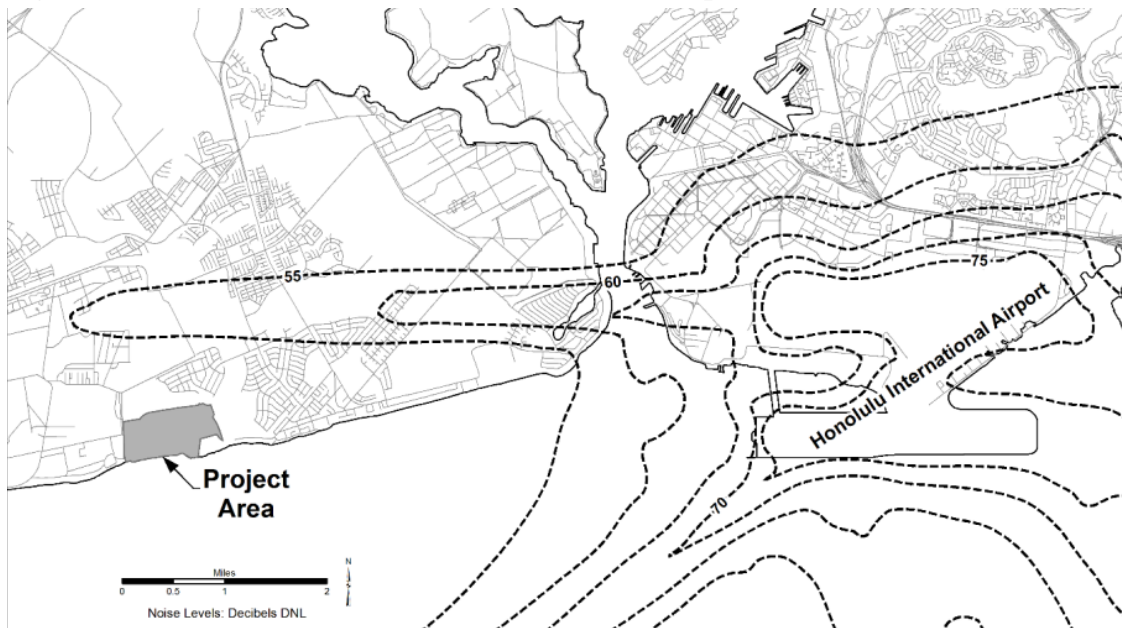
5.4.2 EXISTING AND FORECAST SOUND LEVELS

Because it is presently undeveloped, existing ambient noise levels in the Project Area are relatively low, with clear exception of aircraft noise noted below. The noise levels vary considerably according to the time of day and the location within the area of concern. In areas close to the shoreline, wave action can be the predominant source of noise; in some areas near the eastern periphery, traffic noise and/or noise from ongoing construction activities can be heard.

The Project Area is currently subjected to overflights, noise, and other intrusions associated with aircraft utilizing the runways of Honolulu International Airport and Kalaeloa Airport (formerly Barbers Point Naval Air Station). The existing combined DNL, resulting almost entirely from the combined operations of these two airports, is estimated to range between 55 DNL and 65 DNL at the property boundary.³²

Figure 5.6 shows the latest (2008) available noise level estimates (units: decibels, DNL³³) for aircraft operations at the Honolulu International Airport (“HIA”). The figure shows that aircraft noise from that facility will produce levels well below 55 DNL within the Project Area (E.K. Noda & Associates 2004).

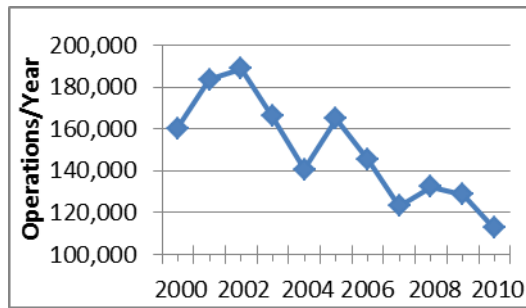
Figure 5.6 Estimated 2008 Honolulu International Airport Noise Contours



Source: Figure 5-3 in Noda and Associates, Inc. (2004); Yearly Day-Night Averages

³² Darby & Assoc. Acoustical Consultants *Environmental Noise Impact Assessment*, Figure 10 (March, 1992)

³³ DNL: Yearly Day-Night Average Sound Levels, i.e. the 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of 10 decibels to sound levels produced between 10 PM and 7 AM.

Table 5.4 Operations at Kalaeloa Airport

The Airports Division of the State of Hawai‘i Department of Transportation now operates Kalaeloa Airport as a general aviation airfield, with the U.S. Coast Guard’s Air Station Barbers Point continuing to use the runways as a base for HC-130 “Hercules” Long Range Surveillance Aircraft and HH-65A “Dolphin” Short Range Recovery Helicopter. As shown on the graph in Table 5.4, the number of aircraft operations has declined substantially over the past 10 years, and the operations that do take place are by aircraft that are much quieter than the military aircraft that formerly used the runways. Figure 5.7 shows noise level contours for Kalaeloa Airport, circa 2020, prepared at the time the State was considering the acquisition of the airfield. These sound level forecasts assume operational volumes substantially higher than have actually been experienced to date. The outermost sound level contour (which is dashed) representing the forecast 55 L_{dn} level extends just to the east of the existing basin; the 60 L_{dn} contour encompasses only a few acres within the 1,100-acre Ocean Pointe-Hoakalei development, all of them within the P-2 zoned area at the far west of the property.

5.4.3 POTENTIAL SOUND LEVEL RELATED EFFECTS

5.4.3.1 Alternative 1: Preferred Alternative

5.4.3.1.1 Construction Period Impacts

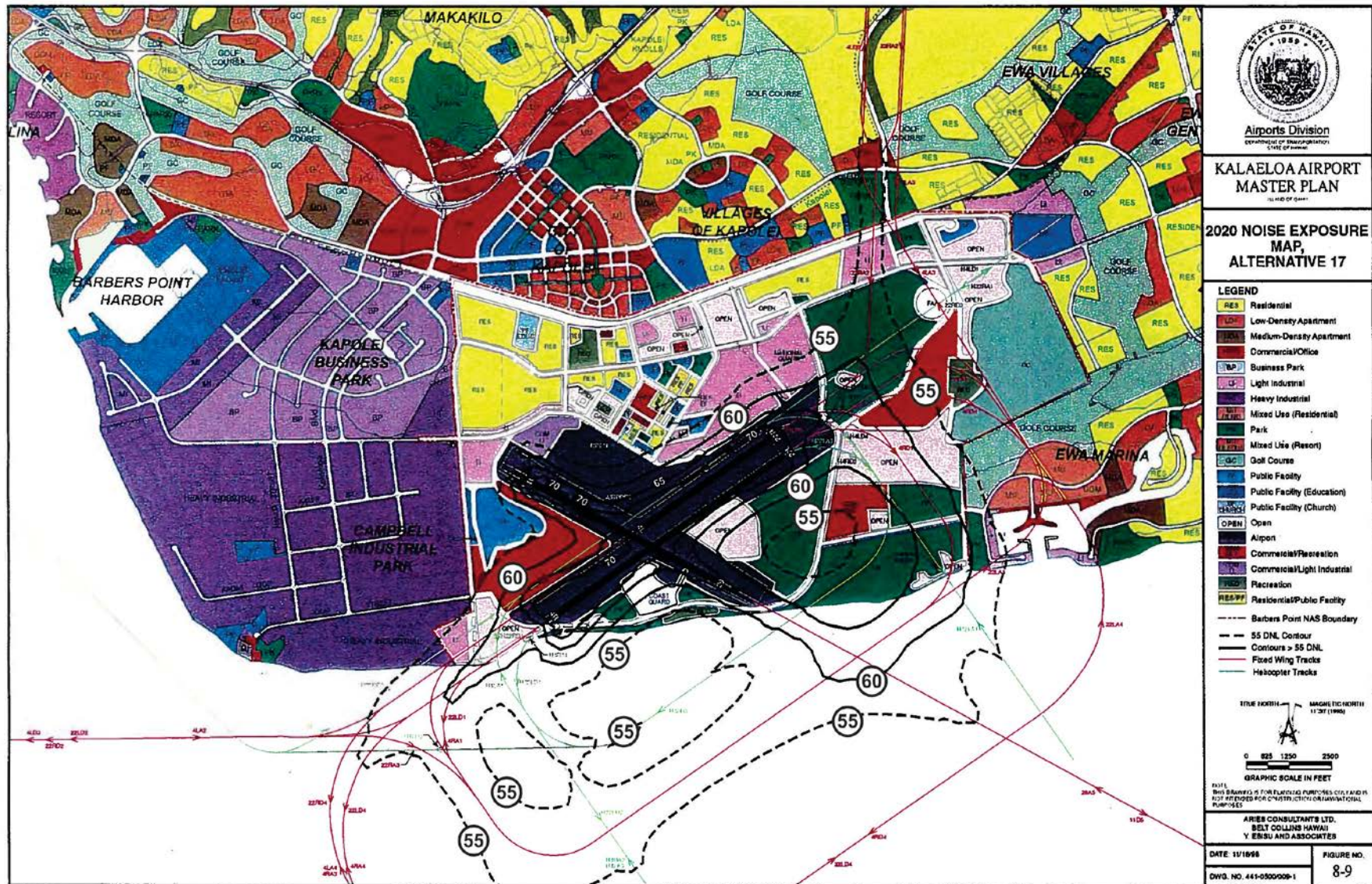
In the short term, construction of the lagoon, and in particular the swimming cove(s), will involve earthmoving, re-grading areas *makai* of the lagoon, creating the water quality features, and constructing infrastructure and buildings such as the cultural activity center. The most significant noise impacts will likely result from the earthwork operations. Much of the noise associated with excavating the cove and water quality lakes will be attenuated by their distance from residences. Other activities, including the truck transport of material and equipment to and from the work site, will occur closer to noise-sensitive areas. Most of this activity will be along public roadways and the vehicle movements associated with them will be a tiny fraction of the overall traffic volume on these roads. Material transport from the nearest roadways onto the Project Area will follow a variety of routes and will depend on the final plan, but all methods under consideration will involve the use of motorized equipment that will produce noise. Similarly, earthwork and building construction, while confined to the Project Area, will entail the use of large construction equipment which produces sound levels well above those that are typical in the area.

In order to ensure that Haseko and its contractors comply with the provisions of HAR §11-46 *Community Noise Control* (see Table 5.3), Haseko will obtain a noise permit in accordance with HAR §11-46-7 should it be unable to comply with the limits therein. If noise-producing work will be conducted outside of permitted hours, it will seek a Noise Variance.

5.4.3.1.2 Operational Period Impacts

Once construction activities cease, flight operations at Kalaeloa Airport, to the west of the Project Area will be the most significant noise source. While individual aircraft overflight will undoubtedly produce elevated sound levels close to their flight paths, it is unlikely that noise resulting from this air traffic would exceed 55 L_{dn} in residential areas. Some of the P-2 General Preservation area on the western side of the property will be within the $L_{dn} > 55$ contour.

Figure 5.7 Kalaeloa Airport 2020 Noise Exposure Map



Once built, the lagoon, swimming cove, pedestrian pathways and other plan elements will not draw activities that are generally considered a source of nuisance noise. Likewise, the resort, commercial, and residential uses which Haseko is seeking in areas around the lagoon will not produce nuisance noise exceeding the 65 L_{dn}-limit established by state level. The analysis that has been conducted indicates that so long as long-term activities are conducted in accordance with HAR §11-46, they will not produce significant noise and will not have any measurable adverse effect.

5.4.3.2 Alternative 2: All-Mauka Resort Alternative

The alternative allocation of the Resort zoning acreage, which is the sole difference between Alternative 2 and the Preferred Alternative, would not alter the considerations of ambient noise and potential construction and operational period impacts presented in Section 5.4.3.1. From the perspective of both the existing environment and their potential impacts, they are functionally identical.

5.4.3.3 Alternative 3: Marina Alternative

5.4.3.3.1 Construction Period Impacts

Implementation of the Marina Alternative would, in addition to the activities required for the other alternatives, entail: excavating the marina channel through the shoreline; emplacing armor stone, concrete, rock, or gravel for the shoreline revetments and the small portion of additional channel needed to connect the basin with the ocean; boat launching ramps, and storm drain outlets; excavating the offshore portion of the marina entrance channel; and constructing infrastructure and buildings, such as a harbor master's facility in conformity with future use of the area as a small boat harbor with supportive surrounding land uses (e.g., boat maintenance and cleaning areas in the I-3 Waterfront Industrial District). The most significant noise impacts are anticipated to occur during earthwork operations related to marina-entrance construction. To a large degree, noise associated with channel excavation would be mitigated by its distance from residential areas. However, implementation of this alternative would probably require a Noise Permit and/or Noise Variance, and this would require the contractor to observe all related limits on permissible operating hours and noise restrictions. While the Federal EIS for the marina provided for the possibility of blasting should that be the only practical means of excavating some offshore portions of the entrance channel, Haseko has determined that it could complete the work without the use of explosives. Hence, no such activity is thought to be likely for this alternative.

5.4.3.4 Alternative 4: No Action Alternative

Noise impacts related to Alternative 4 would be similar to those described for Alternative 1 in Section 5.4.3.1. However, because of the limited scope of this alternative, construction activities and construction-related noise would be marginally lower than that for the other three alternatives.

5.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES

In recognition of the long-term human use and habitation in the Project Area, Haseko has developed and implemented a multi-phase archaeological mitigation program for the Ocean Pointe-Hoakalei development. In addition to the archaeological work discussed below, Haseko has also conducted a Cultural Impact Assessment ("CIA"), including oral-history interviews, discussed in Section 5.6.

5.5.1 AFFECTED ENVIRONMENT

5.5.1.1 Introduction

Prior to Haseko's acquisition of the Ocean Pointe-Hoakalei property, several archaeological reconnaissance-level surveys were conducted. Based on these reconnaissance surveys, the One'ula Archaeological District, State Inventory of Historic Places (SIHP) 50-80-OA-2873, which includes the Project Area, was established and determined eligible for listing on the National Register of Historic Places. After Haseko acquired these lands in 1988, intensive archaeological survey and data

recovery investigations within the One‘ula Archaeological District were completed by Paul H. Rosendahl, PhD, Inc.

Archaeological inventory survey and test excavations identified 53 historic properties within the Ocean Pointe-Hoakalei development. Six historic properties were determined significant for multiple criteria for their information content, and because their architectural features embody the distinctive characteristics of the traditional Hawaiian period and its methods of construction. Forty-seven historic properties were determined significant solely for their information content; no further work was recommended for 32 of the historic properties significant solely for their information content. Additional work was recommended for 21 historic properties, including the 6 properties significant for multiple criteria and 15 properties significant solely for their information content.

In 1990, as part of the historic preservation review process, the U.S. Army Corps of Engineers, in consultation with the SHPD, and in accordance with provisions of Advisory Council on Historic Preservation regulations that implement Section 106 of the National Historic Preservation Act, determined that the development may have an adverse effect on the 21 historic properties recommended for additional work. Subsequently in 1992, a MOA was developed in compliance with conditions of the Department of the Army permit among Haseko (‘Ewa), Inc., the Army Corps of Engineers, the State Historic Preservation Officer, the Advisory Council on Historic Preservation, and the Office of Hawaiian Affairs. The MOA defines agreed-upon measures for (i) archaeological data recovery investigations, (ii) preservation planning, and (iii) archaeological monitoring of construction activities.

In addition, Condition 26 of CDUP OA-2670, as amended by the Board of Land and Natural Resources on February 22, 2008 provides:

[t]he Applicant shall comply with the provisions contained in the Memorandum of Agreement (MOA) among the Applicant, the Hawai‘i State Historic Preservation Division, the U.S. Army Corps of Engineers, the Advisory Council on Historic Preservation and the Office of Hawaiian Affairs regarding the treatment of historic sites on the project site. Provisions of the MOA to the contrary notwithstanding, the Applicant shall also consult directly with the Hawai‘i State Historic Preservation Division (SHPD) and the Office of Hawaiian Affairs (OHA) on matters relating to the MOA. The applicant shall submit quarterly reports to SHPD and OHA on activities relating to and progress in implementing the MOA.

5.5.1.2 Archaeological Investigations

A mitigation plan for data recovery, interim site preservation, and monitoring was developed in accordance with the MOA (Haun et al., 1991). Data recovery investigations at 22 historic properties, including the 21 historic properties covered by the MOA and Site 50-80-14-4297, which was identified during the inventory survey as a possible burial, were completed in 1995 (Franklin et al., 1995). The data recovery investigations completed historic preservation review for the 15 historic properties significant for their information content. Excavation at Site 50-80-14-4297 failed to yield human remains and a recommendation of “no further work” was made for this site, as well.

In early 2004, supplemental archaeological investigations were completed at the request of SHPD in response to the discovery in 2001 of human remains on state land within the shoreline fronting the Project Area. No cultural materials or human remains were found during the supplemental archaeological investigations (Corbin, 2004).

5.5.1.3 Preservation Planning

In 1999, pursuant to the MOA, preservation plans were developed for the six historic properties determined significant for multiple criteria (Maly, 1999). Haseko has continued to work with the community to ensure that development plans are consistent with preservation commitments. During the process, community views of the preservation sites have also changed with growing awareness of

the range of preservation possibilities. The process culminated in 2006 with the establishment of the Hoakalei Cultural Foundation by two area *kūpuna* named Arline Wainaha Ku‘uleialoha Brede Eaton and Mary Kaipo Malama Serrao, whose mission is to ensure good stewardship of the land and heritage of the ‘Ewa Plain. In conjunction with the Hoakalei Cultural Foundation, three historic preserves are now established within the Ocean Pointe-Hoakalei development: Kauhale Preserve comprises Sites 50-80-14-3201, -3202, and -3205; the Kuapapa Preserve comprises Sites 50-80-14-4277 and -4278; and the Ahu Preserve consists of a single historic property, Site 50-80-14-3209. Only the Kauhale and Ahu Preserves are within the present Project Area (See Figures 1.3 and 1.5).

Revised preservation plans for the Kauhale Preserve and the Kuapapa Preserve have been reviewed and approved by the SHPD (Dye, 2007 & 2012). The Kauhale Preserve plan proposes an active preservation program, with a focus on place-based education of schoolchildren. The plan developed for the Kuapapa Preserve creates a park in which the historic properties are interpreted with signage and the visitor learns about them in a self-guided way. A third revised plan, for the Ahu Preserve, is under development.

The preservation plans for the Kauhale Preserve and Kuapapa Preserve are currently being implemented. At the Kauhale Preserve, vegetation has been cleared and native plants were introduced. Trails have been developed at the northern end of the preserve. The Kuapapa Preserve has been cleared of low-lying vegetation and large non-native trees that threatened the integrity of the significant architectural features. A series of trails has been created within the preserve.

The Kauhale Preserve has begun to function according to the revised preservation plan and has been visited by numerous school and community groups. In addition, as part of an approved plan and with the participation of the Hoakalei Cultural Foundation, the O‘ahu Island Burial Council, the Office of Hawaiian Affairs, and the State Historic Preservation Division, a repository for inadvertently discovered human remains from State lands in the vicinity of Hoakalei and for the fragmentary human and non-human remains found in the Project Area during archaeological monitoring has been erected within the Kauhale Preserve and is now in use.

5.5.1.4 Archaeological Monitoring

Haseko provides archaeological monitoring for construction activities with the potential for adverse effects on significant historic properties in the Project Area, as stipulated by the MOA. On October 21, 2011, fragmentary human bones were inadvertently discovered during archaeological monitoring of residential construction. A report of the findings was submitted to the SHPD, the O‘ahu Island Burial Council, the Hoakalei Cultural Foundation, and the Office of Hawaiian Affairs. The human bone fragments have been laid to rest in the repository for inadvertently discovered human remains at the Kauhale Preserve.

In addition, the archaeological monitor has recovered three secondarily-deposited traditional Hawaiian artifacts, including an *‘ulu maika* and two adzes. These artifacts have been turned over to the Hoakalei Cultural Foundation for use in educational and other programs.

5.5.1.5 Quarterly Report

Haseko has complied with Condition 26 of its CDUP OA-2670 and to date has provided 24 quarterly reports to the State Historic Preservation Division and the Office of Hawaiian Affairs.

5.5.2 POTENTIAL IMPACTS AND MITIGATION MEASURES

Haseko has determined that the proposed zone change will not alter its ability to comply with the existing DOA permit MOA, conditions of the CDUP OA-2670, nor the preservation plans for the historic properties on file at the SHPD. No additional mitigation measures are required to preserve historic properties at Ocean Pointe-Hoakalei.

5.6 CULTURAL IMPACT ASSESSMENT

5.6.1 REGULATORY FRAMEWORK

In accordance with the provisions of HRS Chapter 343 and its implementing regulations (HAR §11-200), Haseko has conducted a detailed analysis of the effects that the HMPU could have on cultural practices, resources, and features. The disclosure of this information is intended to promote transparent and responsible decision-making in accordance with Articles IX and XII of the Constitution of the State of Hawai‘i, other state laws, and the courts of the state, all of which mandate government agencies to endeavor to promote and preserve the cultural practices and resources of Native Hawaiians and other ethnicities.

In addition to the content requirements of Chapter 343 and HAR §11-200, on November 19, 1997 the State of Hawai‘i Environmental Council issued specific *Guidelines for Assessing Cultural Impacts*. That guidance provides a methodological and content protocol for projects that may have the potential to affect cultural resources, stipulating specific matters that should be addressed in cultural impact assessments such as this.

Table 5.5 summarizes these requirements. It also identifies the sections in this report which address each requirement.

The remainder of Section 5.6 summarizes Haseko and its consultants’ findings with respect to each of the required topics. Each informational requirement identified in the above table is discussed in one of the following subsections, with a summary of findings and conclusions.

5.6.2 HISTORICAL AND CULTURAL RESEARCH

This CIA is based on a series of cultural studies, *He Mo‘olelo ‘Āina: Traditions and Storied Places of Honouliuli, District of ‘Ewa, Island of O‘ahu* (Maly et al., 2014), which have been conducted relating to the lands of Honouliuli-One‘ula, including the entire area subject to the HMPU. That report assembles a wide range of historical literature describing the larger Honouliuli *ahupua‘a* that has been gathered over a period of 20 years by Kepā and Onaona Maly. This study of historical and cultural resources in the Honouliuli *ahupua‘a* was conducted at the request of Haseko to provide the basis of its analysis of cultural impacts resulting from the HMPU.

Several significant classes of Hawaiian information, which have not been fully considered in previous cultural resource reports for the Ocean Pointe-Hoakalei development, were incorporated into the documentary research. These resources included native lore, land tenure (ca. 1840-1915), land surveys (1870s), and records of land conveyances. They also include a collection of historical narratives describing the land and people spanning the period from ca. 1790s to 1940s. While this technical information is broad in scope, it is not a catalog of all citations recorded from Honouliuli *ahupua‘a*. The authors made a concerted effort to cover critical aspects of the history of the land as recorded by the people of old who made Honouliuli home and to include a wide range of historical accounts penned by eyewitnesses to, and participants in, the history being conveyed.

In addition to this historical documentary research, the authors of *He Mo‘olelo ‘Āina: Traditions and Storied Places of Honouliuli, District of ‘Ewa, Island of O‘ahu* also conducted an ethnographic study as part of the cultural impact assessment process for this report. The resulting information, including oral history and consultation interviews with individuals who had been identified as being knowledgeable of the traditions and history of Honouliuli, is presented in Appendix A of that report. All interviewees possess knowledge of place, or shared familial ties to traditional residents of Honouliuli *ahupua‘a*. The results of those interviews demonstrate continuity in facets of the information that has been handed down over time and an ongoing cultural attachment to place in the context of spiritual and familial relationships, knowledge of place and practices, and the passing of lore from one generation to the next. The entire cultural study is included in Appendix L of this document.

Table 5.5 Guide to Discussion of Cultural Impact Topics

<i>Number</i>	<i>Requirement</i>	<i>Discussion In DEIS</i>
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 or limitations which might have affected the quality of the information obtained.	Sec. 5.6.3
2	Descriptions of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.	Sec. 5.6.4
3	Ethnographic and oral history interview procedures, including the circumstances which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.	Sec. 5.6.4
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.	Sec. 5.6.5
5	A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations, or biases.	Sec. 5.6.2
6	A discussion concerning the cultural resources, practices and beliefs identified, and, for 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 Area.	Sec. 5.6.8
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 development.	Sec. 5.6.8
8	A discussion of confidential information that has been withheld from public disclosure in the assessment.	Sec. 5.6.7
9	A discussion concerning any conflicting information in regard to identified cultural resources, practices, and beliefs.	Sec. 5.6.3
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.	Sec. 5.6.8
11	A bibliography of references, and attached records of interviews which were allowed to be disclosed.	Sec. 5.6.9
Source: State of Hawai'i Environmental Council, <i>Guidelines for Assessing Cultural Impacts</i> (1997)		

For a complete discussion of the related topic of archaeological resources, please see Section 5.5.

5.6.3 CONSULTATION METHODOLOGY

As noted above, in addition to the important cultural-historic documentary research carried out in preparation for this report, Haseko and its consultants conducted oral history interviews with several individuals familiar with the lands encompassed by the HMPU and the larger Honouliuli *ahupua'a*. Because the experiences conveyed through interviews are personal, the narratives are richer and more animated than those found in archival or academic reports. Through the process of conducting oral history interviews, information is preserved which could be overlooked or lost through other forms of documentation. The interviews demonstrate how traditional knowledge is passed down through time, from generation to generation. They also show how, with the passage of time, knowledge and personal recollections change; sometimes, information which was once vitally important becomes forgotten, or assigned lesser importance. Today, when individuals—particularly when they come from a culture different than the one which originally assigned cultural values to places and traditional practices—evaluate such things as cultural sites, resources, practices, and history, their significance is often misunderstood or diminished. Thus, oral historical narratives provide present and future generations with an opportunity to understand the cultural attachment or relationship shared between people and their natural and cultural environment.³⁴

Because of the subjective nature of cultural-historic interviews, the level of documentation is incomplete. In the process of conducting oral history interviews, it is impossible to record all the knowledge or information that the interviewees possess. Thus, the record provides only a glimpse into the stories being told and the lives and experiences of the interview participants. The interviewers made every effort to accurately record and relay the recollections, thoughts, and recommendations expressed by the people who shared their personal history in the study. However, as one might expect, participants in oral history interviews sometimes have different recollections of places, people, and events. There are number of reasons for these discrepancies:

- Recollections result from varying values assigned to an area or occurrences during an interviewee's formative years.
- They reflect localized or familial interpretations, of the particular history being conveyed.
- With the passage of time, sometimes that which was heard from elders in childhood many decades before, may transform into that which the interviewee recalls having actually experienced.
- In some cases, differences can arise as a result of the inadvertent grafting of more recent information onto traditional concepts or practices.
- Some aspects of an interviewee's recollections can be shaped by a broader world view. In the face of continual change to one's cultural and natural landscapes, there can emerge a sense of urgency in caring for what has been.

In general, the discrepancies between the various historical recollections as cited in the oral history interviews are minor. If anything, the differences help to direct new lines of questioning which may be answered through additional research; in some cases they pose questions which may never be answered but which add texture to the record of times past. Diversity in the stories told should be seen as something that will enhance interpretation, preservation, and long-term management of the lands of Honouliuli in general, and specifically those lands ties to the HMPU.

In the broader context of the narratives shared through the oral history interviews, it will be seen that there are consistent themes. These themes include, but are not limited to:

³⁴ Cultural attachment embodies the tangible and intangible value of a culture. It is how people identify with and personify the environment, both natural and manmade, around them.

- Care for the land, water, and ocean resources;
- Honor the natural/cultural history of the ‘āina and kūpuna.
- Respect ‘ilina and cultural sites.
- Promote maintenance and integration of cultural/natural resources and practices into the planned development.
- Integrate the history of place and people into programs that pass that information on to present and future generations through educational/interpretive activities.

5.6.4 INTERVIEW SELECTION PROCESS

Four ethnographic interviews were recorded by Kepā and Onaona Maly. Three of the interviews were conducted with kūpuna Arline Wainaha Ku‘uleialoha Brede Eaton and Sister Thelma Genevieve Parish, elder *kama‘āina* of Pu‘uloa-Honouliuli, as part of the process of developing the initial Hoakalei preservation plan in the 1990s. Aunty Arline and Sister Parish were two of the eldest, lifelong members of the Honouliuli-Pu‘uloa area.³⁵ These kūpuna were sought out to elicit historical narratives, records of Hawaiian sites and practices, and recommendations regarding the Ocean Pointe-Hoakalei development. Kūpuna Arline and Sister Parish were recommended as the most knowledgeable residents of the region. A fourth interview was conducted with members of the Shibuya-Dayanan family. All interviews provide information of time depth and attachment to place, and document personal experiences on the land and in the ocean. Through the generosity of these interviewees, researchers were informed of changes in the environment during their lifetimes.

Two additional oral history interviews were conducted by Leimomi Morgan, descendant of an ‘ohana with generational ties to Honouliuli *ahupua‘a*. These interviewees were provided with the following introduction to the study undertaking, and overview of the types of questions that would be asked:

Aloha – Thank you for agreeing to participate in the Honouliuli Oral History Consultation Study being conducted as part of the Haseko (Ewa), Inc. —Hoakalei Master Plan Update Environmental Impact Statement (please see project overview on pages 2–3). While conducting the interview, we hope to record information from people who know the mo‘olelo (history) of the land and natural/cultural resources. The information gained from these interviews will be used to identify resources in or near the project area and help in determining how they may be affected by the project. With your permission, the interview will be recorded. The recording will be transcribed and a draft transcript, along with the recording will be returned to you for review, corrections and/or additions. If the interview is not recorded, but notes taken, those notes will be developed in an effort to capture key points shared, and returned to you for your approval. When you are satisfied with the transcript (recorded or expanded notes), we would like your permission to incorporate the transcript into the documentary study for the Honouliuli project area. When the study is completed a full copy of the report, including historical background and oral history/consultation interviews will be given to you for your family record.

To begin the interview we would like to establish a background section on your personal history and experiences – how you came to possess the knowledge you share.

- Interviewees Name:
- Interview Date:
- Location:
- When were you born?
- Where were you born?

³⁵ Aunty Arline passed away on December 5, 2013.

- *Are you affiliated with a Native Organization or family group? (name)*
- *Parents?*
- *Grew up where? Also lived at?*
- *Where did you live? Share with us recollections of elder family members and extended family that influenced your life and provided you with knowledge of place and practice?*
- *Family background—grandparents, hānai, etc.; generations of family residency in area...(time period)?*
- *Kinds of information learned/activities and practices participated in and how learned...?*
- *Sites and locations (e.g., heiau, pā ‘ilina, kahua hale, māla ‘ai, ala hele, and ko‘a etc.); how learned, and thoughts on care and preservation.*
- *Do you have knowledge of wahi pana—places of religious and cultural significance in or near the project area?*
- *Where are these places located in relation to the proposed project (see maps)? How did you learn about these places?*
- *Are these places important to you, your ‘ohana, the larger community (or all three)?*
- *What makes these places important in terms of traditional practices or beliefs?*
- *How would you define their boundaries?*
- *Will these places or their use be affected by the project? If so, how might they be affected, and what steps might be taken to minimize impacts on the sites?*
- *Have these places been affected by modern development, and is it relevant to what makes them important?*

Subsistence:

- *Did you/your family cultivate the land? Describe methods of planting and types of plants? Use of particular plants and other natural resources; customs observed when collecting or caring for such resources; and how/when accessed?*
- *Discussion of water flow and weather patterns.*
- *Types of fishing practices: localities of fishing grounds or limu collection areas; and changes in fisheries?*
- *Historic land use practices, fishing activities?*
- *Thoughts on the care of cultural and natural resources...?*
- *May information about these places be shared, or should it be protected from public release?*

Project Overview Provided to Interviewees

Haseko is seeking a zone change for a portion of its Hoakalei Project to accommodate an update to its project master plan. The existing zoning for this area was last modified on July 20, 2007 in anticipation of the existing basin being completed as a small boat marina. The lack of sustainable market demand in the foreseeable future for the boat slips and other marina facilities, together with ongoing and possible future legal challenges to governmental approvals for the marina entrance channel, make it impractical for Haseko to pursue development of a small boat marina for the foreseeable future. Accordingly, it is now requesting rezoning of the land surrounding the existing basin consistent with its use as a recreational lagoon that would have no direct connection to the ocean.

The updated master plan would not increase the total number of planned dwelling units or visitor accommodation units specified in Haseko’s Unilateral Agreement with the City. It is possible that there will be some adjustments to the proposed zoning boundaries that may

affect the sizes and locations of individual zoning districts as a result of consultations with the City Department of Planning and Permitting (DPP). Anticipated permits that require environmental assessment compliant with HRS Chapter 343 include the zone change, and potentially a Special Management Area Use Permit and a Shoreline Setback Variance. Haseko will also seek a modification of the Special Management Area boundary in the area around the recreational lagoon, since it will not be connected directly to the ocean, as the boat marina would have been.

If these approvals are granted, Haseko will continue development of the same kinds of resort, residential, and commercial retail/office/restaurant uses that had previously been approved for the area. In addition, lighter industrial mixed uses will replace the more intensive waterfront industrial uses previously planned in connection with a marina development.

By providing for these uses, the updated master plan for the area covered by this request will continue to create employment and business opportunities as envisioned when the zoning was originally granted. In addition, the plan includes a public swimming cove that would provide a protected swimming area; it also includes facilities that would collect and treat storm water runoff, minimizing the amount that flows into the proposed lagoon. The revised plan also includes pedestrian pathways and other amenities that were not included in the previous plan. Haseko will continue to have primary responsibility for constructing the proposed facilities, including possible residential and/or resort units; commercial and lighter industrial-mixed use structures; infrastructure; public facilities and amenities such as the swimming cove, activity center, comfort station, parking lot, cultural center; and for further enhancing the existing Wetland Preservation Area.

*Mahalo nui.
Leimomi Morgan
Researcher*

5.6.5 BIOGRAPHICAL INFORMATION OF INTERVIEWEES

For detailed information regarding the interview participants, please see *He Mo'olelo 'Āina: Traditions and Storied Places of Honouliuli, District of 'Ewa, Island of O'ahu* (Maly et al., 2014). The primary participants in the oral-history interviews are provided, in the order they are presented, in Table 5.6 below.

Table 5.6 Oral History Interview Cultural Informants

<i>Number</i>	<i>Name</i>
<i>1</i>	Mark Kahalekulu
<i>2</i>	Harry Alama
<i>3</i>	Shibuya-Dayanan Family
<i>4</i>	Arline Wainaha Ku'uleialoha Brede Eaton
<i>5</i>	Thelma Genevieve Parish
Source: Maly et al., <i>He Mo'olelo 'Āina: Traditions and Storied Places of Honouliuli, District of 'Ewa, Island of O'ahu</i> (April, 2014)	

5.6.6 HISTORICAL AND ARCHIVAL RESEARCH

Primary research references cited in *He Mo'olelo 'Āina: Traditions and Storied Places of Honouliuli, District of 'Ewa, Island of O'ahu* (Maly et al., 2014)—which forms the basis for this CIA—include, but are not limited to, land use records, including an extensive review of Hawaiian Land Commission Award (LCA) records from the *Māhele 'Āna* (Land Division) of 1848; Boundary Commission

testimonies and survey records of the Kingdom and Territory of Hawai‘i; American Board of Commissioners for Foreign Missions (ABCFM) mission station records, and historical texts authored or compiled by D. Malo (1951), J.P. I‘i (1963), S.M. Kamakau (1964, 1976), C. Wilkes (1845), A. Fornander (1916-1919b, 1917, 1919a), G. Bowser (1880), and Handy and Handy with Pukui (1972), among others. [For a complete listing of references cited, please see the appropriate section of the Maly et al., 2014 report.] The study also includes several native accounts from Hawaiian language newspapers (compiled and translated from Hawaiian to English by K. Maly), and historical records authored by early visitors, and residents of, the region. The records also include important oral testimonies of elder *kama ‘āina* of the lands within and adjacent to the HMPU Project Area.

Historical and archival resources were located in the collections of the Hawai‘i State Archives, Land Management Division, Survey Division, and the Bureau of Conveyances; the Hawaiian Historical Society; University of Hawai‘i-Hilo Mo‘okini Library; the Hilo Public Library; the Houghton Library at Harvard; the Hawaiian digital library (available online at www.ulukau.org); in the collection of Kumu Pono Associates LLC; and in private collections. This information is generally cited in categories by chronological order of the period depicted in the narratives.

5.6.7 CONFIDENTIAL INFORMATION

Information shared by interview participants is intended to support wise use, community-based stewardship, and protection of the cultural and natural resources at and around the Ocean Pointe-Hoakalei development. The narratives provide readers with lessons from the past, knowledge of place, and can help present and future parties develop a sustainable and culturally responsible system of land and resource management. The oral history accounts are not to be used to support research or assumptions which are inconsistent with traditional and customary Hawaiian cultural values.

At the time of the release of the interviews, the interview participants stipulated that the resulting narratives are not to be cited out of context, or used to justify actions that are detrimental to the land or culture of the Hawaiian people. A reader of the report, or the cultural and ethnographic information contained in Appendix L should not assume that resources or sites—whether historical or cultural—are not valued because they are not described in detail. The consensus between cultural informants and researchers is that sensitive cultural properties or resources shall not be specifically identified or otherwise made vulnerable to misuse. The oral history interviews upon which this CIA is based may not be incorporated as block-quote text in other studies without prior permission of both the interviewees and the authors of *He Mo‘olelo ‘Āina: Traditions and Storied Places of Honouliuli, District of ‘Ewa, Island of O‘ahu*.

5.6.8 ANALYSIS OF IMPACTS

The interview participants revealed several areas of common interest. They included, but were not limited to, the following categories:

- The cultural-geographic landscape—cultural and natural resources are viewed as one and the same in the Hawaiian mind, and their stewardship was the responsibility of all.
- The Honouliuli-One‘ula coastline and Pu‘uloa (Pearl Harbor) was famous for its ocean resources, including *limu* and crab, and Pu‘uloa was particularly renowned for its *‘anae holo* (travelling mullet).
- Sink holes were an important geographical and cultural feature of the ‘Ewa Plain and served a variety of purposes in the pre-contact and early post-contact era.
- The One‘ula shoreline was a common recreational area for surfing, *limu* and crab gathering, fishing, often associated with temporary habitations.
- Coastal and nearshore fisheries and marine resource collection areas drew the *po‘e kahiko* (ancient people) to the area.

- The land has undergone successive waves of development and mismanagement which have radically changed the landscape.

The interview participants also expressed several areas of common concern and recommendations for long-term protection and management of the cultural and natural heritage of Honouliuli-One‘ula lands, including the area encompassed by the HMPU. A general summary of these comments and recommendations include:

- Protection of the natural and cultural features at Ocean Pointe-Hoakalei. Allowing ‘ilina (native burials) to rest where they are, or to be placed as near as possible to the place they are recovered, so that they may continue their journey in peace.
- That with the privilege of living on this land and claiming rights (*pono*) over it comes responsibility (*kuleana*) for its wise use and care.
- Overharvesting, coastal development, and environmental change have depleted the nearshore marine environment to a significant degree.
- It is important that, while the land itself has changed a great deal, the traditional place names are maintained, helping new generations understand why and how places were held to be important.
- That the people native to this land were as familiar with the bathymetry of the area as they were the topography, and that care of the ‘āina extends beyond the shoreline.
- That the system of voluntary management and stewardship of natural resources was, and should continue to be, passed down over generations within families. That this is part of what it means to be *kama ‘āina*, children of the land.

Haseko believes its HMPU balances the development of residential, commercial, light-industrial and resort uses in the area with the need to protect its natural and cultural resources. The HMPU seeks to promote the causes of concern to the native people of Honouliuli (see for example Section 2.2.6) and minimize adverse impacts to the cultural history, resources, and practices which are part of this area’s heritage. Based on the criteria contained in the guidelines and information contained within the CIA, Haseko has concluded that no cultural resources or practices will be negatively impacted as a result of instituting the HMPU.

5.6.9 REFERENCES CITED IN THE CIA

A complete list of references cited and other source material is included at the end of the ethnographic report *He Mo‘olelo ‘Āina: Traditions and Storied Places of Honouliuli, District of ‘Ewa, Island of O‘ahu* (Maly et al., 2014), which is included in its entirety in Appendix L. Interview descriptions and transcripts are provided from page 559 on in the report.

5.7 RECREATION & PUBLIC SHORELINE ACCESS

5.7.1 AFFECTED ENVIRONMENT

5.7.1.1 Project Area and Ocean Pointe-Hoakalei

Up until 2012, there was no recreational use of the Project Area. With the exception of the P-2 zoned Kauhale Preserve in the southwest corner of the project, the Project Area was a construction site around which Haseko had erected a fence for security and safety purposes. Then, beginning in mid-2012, Haseko began allowing very limited use of the area on a trial basis. The first recreational use was by the ‘Ewa Pu‘uloa Outrigger Canoe Club, which uses the basin as a practice area for its teams. Haseko has also allowed its employees to conduct water-based recreational activities such as kayaking and stand-up paddle boarding on a trial basis so that it could better understand the opportunities and constraints of such activities.

Elsewhere in the Ocean Pointe-Hoakalei development there are a series of neighborhood parks and micro-parks, as well as a proposed district park which will support recreational activities for residents and visitors (see Figure 5.8, below).

Figure 5.8 Neighborhood and District Parks at Ocean Pointe-Hoakalei



Source: Gray, Hong, Nojima & Assoc., Inc. (2013)

5.7.1.2 Beaches and Ocean Recreation

There are two existing beach parks adjacent to the Ocean Pointe-Hoakalei development.

- The first is the CCH's 28-acre One'ula Beach Park located a short distance to the east of the Project Area. Pursuant to a condition of the Unilateral Agreement (UA) granting a previous rezoning for Ocean Pointe-Hoakalei, Haseko is currently in the process of conveying approximately nine acres of beachfront land adjacent to the east of the existing park boundary to the CCH. The park expansion will significantly increase the length of the oceanfront recreation area accessible to the public.
- The second existing facility is White Plains Beach Park, which is situated along the shoreline just west of the Project Area. It is owned, operated, and maintained by the U.S. Navy.³⁶

In addition to these two beaches, the coastline immediately *makai* of the Project Area is state-owned. It is accessible from One'ula Beach Park via an existing shoreline trail and is principally used by

³⁶ Navy Region Hawai'i, Morale, Welfare & Recreation Department, runs the Barbers Point Beach Cottages. In addition to the beach facilities that are immediately adjacent to the Ocean Pointe-Hoakalei boundary, it is responsible for 24 cottages located at White Plains and Nimitz Beach. Those at White Plains include six 2-bedroom/one bath duplex units, one 2-bedroom/two bath Cedar cottage, and two 3-bedroom/2-bath White Plains Cedar cottages. The rental cottages are available for daily rental by active duty military to include foreign services and Coast Guard, retired military, members of Reserve components, other military separated from the Armed Forces and their family members, and to Department of Defense Civilians and MWR/NEX/AAFES NAF employees.

fishermen. Vehicular access is not allowed to minimize the dumping of trash and likelihood of unauthorized habitation along the shoreline. The shoreline fronting the excavated basin is rough and rocky, consisting largely of coralline substrate with small patches of sand. For the past several years, Haseko has helped sponsor community clean-ups along the shoreline from One‘ula Beach Park to White Plains Beach, removing non-native invasive plants and more than 150 tons of garbage and debris that had accumulated in front of the Project Area over the years.

The harsh shoreline conditions make it difficult to enter and leave the water in this area, although there is frequent shore fishing along this section of the coast. Common recreational activities along this stretch of shore from One‘ula Beach Park in the east to White Plains Beach Park in the west are summarized below.

Fishing and Crabbing. Fishing and crabbing along the coastline fronting Ocean Pointe-Hoakalei is relatively common. Pole fishing from shore is the most popular activity and catches of *papio*, *ulua*, ‘*o‘io*, and goatfish are reported. Less commonly, both net and spearfishing take place from these areas and pole fishing is also conducted in the nearshore environment; in deeper waters octopus and lobster have been trapped.

The shoreline between One‘ula Beach Park and White Plains Beach Park is a low coral bench, and the primary activity along this reach is pole fishing, either by shore casting or whipping. This rocky shoreline is also a good area for catching ‘*a‘ama*—the thin-shelled rock crab (*Grapsus tenuicrustatus*)—which are a popular local delicacy. Previously, fishermen would drive the vehicles onto this stretch of coastline from One‘ula Beach Park and spend the day, or camp with their families on weekends. Since the general cleanup of the area discussed in Section 2.2.7 and the improvement of the state’s vehicular barrier between One‘ula Beach Park and the shoreline trail, vehicular access has ceased.

Limu Gathering. A variety of seaweeds, collectively known as *limu* in the Hawaiian language, grow on the shallow ocean bottom offshore of Ocean Pointe-Hoakalei. These seaweeds are dislodged by wave- and tidal-action, which carries them up onto the shore. The One‘ula-Honouliuli shoreline provides an important seaweed gathering site for residents of ‘Ewa Beach and other surrounding communities. Seaweed gatherers wade into the surf to collect limu near to shore; it is also gathered by skin divers who harvest the seaweed directly from the ocean floor. In recent years, reports indicate that harvests have declined significantly in volume; many attribute the cause for this decline to offshore harvesters who thoughtlessly pull seaweed out by the roots, leaving nothing to regenerate.



All of the seaweeds commonly gathered in the area are used for home consumption, but the *limu* called *limu wawae‘iole* (*Codium edule*) is sometimes sold to stores and at local farmers’ markets. Commercial seaweed gathering is illegal without a permit, but with little enforcement, unregulated gathering in the area is likely.

Swimming, Snorkeling, and Diving. The rocky shoreline fronting Ocean Pointe-Hoakalei and typically turbid water conditions make the nearshore waters generally uninviting for swimmers and divers. The best swimming area is a sandy section of the shoreline in the eastern portion of One‘ula Beach Park and at White Plains Beach to the west. The rest of the shoreline consists of a mixture of sand and coral outcropping along the ocean.

As noted, poor visibility and lack of bottom relief limit sport diving opportunities near shore. Further out, the ocean floor drops steeply into a series of terraces which are frequented by divers. Commercial dive shops run charters to these offshore drop-offs. Some diving for reef fish, octopus, and lobster occurs along these rocky terraces, however from all accounts the visibility in the area remains poor for most of the year. Diving in the area is also limited by the fear of sharks; there is a community and island-wide belief that the waters off ‘Ewa Beach are shark-infested. This belief is

perpetuated by numerous shark sightings by surfers and divers. The surf site “Shark Country” (see Figure 5.9) has carried that name for more than 50 years. Fishermen commonly find large holes in their nets caused by sharks, and over the years, many large sharks—primarily tiger sharks (*Galeocerdo cuvier*) and hammerhead sharks (*Sphyrnidae spp.*)—have been caught in the vicinity. An attack by a tiger shark at White Plains Beach on July 29, 2013 served to reinforce this perception.³⁷

Surfing. The One‘ula-Honouliuli coastline has several good surfing sites, some regarded as excellent for beginning and novice surfers. Many of these sites are found offshore of Ocean Pointe-Hoakalei and include “Shark Country”, “Hau Bush”, “Sand Tracks”, “Coves”, and “Tree Stumps”. Of all these sites, “Coves” is generally recognized as having the best waves on a good south swell. Resident area surfers feel that its left side is comparable to Ala Moana Bowls in Waikiki, one of the best south shore surfing sites in the state. Surfing contests are held annually offshore One‘ula Beach Park at “Sand Tracks” or “John’s”. Bodyboarding is another important wave-riding sport practiced at all of the ‘Ewa Beach breaks.

Figure 5.9 Surf Sites Fronting the Project Area



Source: Moffat & Nichols, Engineers ‘Ewa Marina Evaluation of Project Impacts on Surf Sites (November, 1990)

Boating. At present, little boating activity occurs in waters off of Ocean Pointe-Hoakalei. The area is subject to surf at all times of the year, particularly in the summer. The boats that do visit the area are usually smaller, motorized boats and zodiac-type inflatable watercraft. These boaters tend to be local

³⁷ On July 29, 2013 surfer Kiowa Gatewood was bitten by what is believed to have been a tiger shark off of White Plains Beach at approximately 1:00 p.m.

divers familiar with the area who know when visibility will be good enough for diving. Little or no sailing or windsurfing occurs in the area.

Paddling and Kayaking. Outrigger canoe paddling is currently taking place within the Project Area; ‘Ewa Pu’uloa Outrigger Canoe Club currently holds some of their practices within the existing basin with the permission of Haseko. In addition, Haseko employees kayak and paddle within the basin. There may also be some canoeing and kayaking taking place in the nearshore area fronting Ocean Pointe-Hoakalei, but it is conducted on an unorganized and intermittent basis.

5.7.1.3 Golfing

The Hoakalei Country Club is situated just inland of the 80 acres covered by the re-zoning application. The par-72, 7,400-yard-long, 248-acre championship golf course is privately owned. It is for the exclusive use of members/guests of Hoakalei Country Club and future resort guests. In addition, there are eight other golf courses on the ‘Ewa Plain, and a ninth course is planned for the Kapolei West development. The facilities and their ownership are listed in Table 5.7 below.

Table 5.7 Golf Courses in the ‘Ewa Planning Area

<i>Golf Course</i>	<i>Ownership</i>
Barbers Point Golf Course	Military
Coral Creek Golf Course	Private
‘Ewa Beach Golf Club	Private
‘Ewa Villages Golf Course	CCH
Hawai‘i Prince Golf Course	Private
Hoakalei Country Club	Private
Kapolei Golf Course	Private
Kapolei West Golf Course	Private, Planned
Ko Olina Golf Course	Private
West Loch Golf Course	CCH
Source: ‘Ewa Development Plan (2013)	

5.7.2 POTENTIAL IMPACTS ON RECREATION & PUBLIC SHORELINE ACCESS

5.7.2.1 Alternative 1: Preferred Alternative

The facilities that Haseko is proposing would affect recreation in two ways:

- First, they would provide a variety of aquatic recreational opportunities that are not now available. These include enhanced swimming opportunities (in the cove) and the chance to paddle, kayak, canoe, pedal-boat and conduct other recreational activities not previously possible by using the fully protected waters of the new lagoon.
- Second, they would create a recreational focal point for local and visitor communities that is now lacking in the ‘Ewa region. Together with the existing shoreline trail *makai* of the lagoon, development of the area as proposed will create a continuous recreational space with open pedestrian access to and from the shoreline and around the lagoon and cove(s).

The change in zoning Haseko requested will allow the company to complete Ocean Pointe-Hoakalei with a recreational lagoon as a focal point instead of a marina, thereby fulfilling the original intent to create a water-oriented community featuring resort, commercial, and residential uses that generate jobs and provide recreational opportunities for the region. As discussed in Chapter 6, the HMPU is consistent with State and County land use plans and policies for the region. Because the land surrounding the Project Area has been developed in anticipation of the kinds of uses contained in the

HMPU, the Preferred Alternative is compatible with the kinds of development that would occur if rezoning is granted. The one possible exception to this relates to certain kinds of uses that would be restricted on Resort-zoned land until the Navy easement issue is resolved (see Section 1.6).

With regard to current recreational resources in the area, none of the facilities, activities or development associated with the HMPU will prohibit, limit access, or detract from existing recreational activities and resources. However, as long-planned development on the 'Ewa Plain continues, the population will continue to rise and likely increase the intensity of use of area recreational resources. Haseko's conveyance of the park extension (see Figures 1.3 and 1.5) to the CCH for the expansion of One'ula Beach Park will increase the length of publicly accessible shoreline and extend even further west along the HMPU oceanfront to White Plains Beach. The HMPU's planned pathway system will provide enhanced connectivity between Ocean Pointe-Hoakalei to trails around the basin and shoreline, compared to the interrupted shoreline access allowed under the existing marina-based plan (Alternative 3).

5.7.2.2 Alternative 2: All-Mauka Resort Alternative

All of the recreational impacts described in relation to Alternative 1 in Section 5.7.2.1 would apply to this alternative as well.

5.7.2.3 Alternative 3: Marina Alternative

The Marina Alternative, unlike the previous two alternatives, has a very distinct set of impacts—both positive and negative—on regional recreational resources and activities. Unlike Alternatives 1 & 2, the break in the shoreline necessitated by the entrance channel connecting the basin to the ocean would interrupt coastal access between One'ula Beach Park and White Plains Beach and redirect pedestrians inland around the marina to maintain east-west circulation, as called for in the EDP and existing marina-based plan. The entrance channel, fishing piers and launch ramps that are part of the marina plan would also provide more access to ocean recreation opportunities. The likely impacts of this alternative are discussed by category in the following subsections.

5.7.2.3.1 Fishing & Crabbing

In common with Alternative 1 and 2, development of the area and improved public access will likely attract more fishermen. This may increase competition for the preferred existing fishing sites. The impact of additional pole fishing pressure on fish populations as a result of improved public access will likely be insignificant in this well-fished area in comparison with the disruption of the benthic habitat that will result from constructing the marina entrance channel and related structures (e.g., wave absorption structures). However, once built, these new features are expected to increase the population and aggregation of fish populations in the area.

More crabbers will also be attracted to the area which will exert greater pressure on the resident crab population. Although the jetties and armor stone revetments will provide additional crab habitat, some crabbers have noted that in other harbors, such as Ala Moana Boat Harbor, the increased pedestrian traffic makes the crabs skittish and more difficult to catch.

5.7.2.3.2 Kalaeloa Artificial Reef Mitigation

In conjunction with the Ocean Pointe-Hoakalei development, Special Condition 13 of Haseko's Department of the Army Permit (PODCO 2117) required it to compensate for the loss of 1.1 acres of reef surface area resulting from the excavation of the marina entrance channel by creating an equally-sized new artificial reef. In the years since the permit was issued, scientific understanding of the ecology of artificial reefs has improved, and most scientists now believe that it is better for the replacement reef to be developed as part of a larger artificial reef complex than as a stand-alone installation.

More than a decade ago, the Division of Aquatic Resource ("DAR") of the State of Hawai'i Department of Land and Natural Resources ("DLNR") identified an area off Kalaeloa as a high priority for the establishment of a new artificial reef. This area is frequently used by many recreational fishing and diving boats because of its proximity to several marinas where small boats

can be berthed and launched, and because it is on the leeward side of the island where conditions are generally calm. Haseko discussed with DAR the steps necessary to satisfy this Special Condition, and DAR asked Haseko for its assistance in obtaining permits for a larger artificial reef complex that it desired, and then developing the 1.1-acre artificial reef habitat required by Special Condition 13 as its first increment.

In light of its better understanding of artificial reef dynamics, DAR, with the participation of the Army Corps of Engineers, signed a MOA with Haseko which supported DAR's development of its proposed Kalaeloa Artificial Reef while also allowing Haseko to satisfy its Department of the Army permit conditions. The MOA specified the financial support that Haseko would provide to DAR for obtaining permit approvals for the Kalaeloa Artificial Reef site and for installing the first increment of artificial reef within the permitted area. It made DAR responsible for the design, construction, and long-term maintenance of the artificial reef and for any subsequent permitting required for the emplacement of additional increments.

DLNR published an EISP for the Kalaeloa Artificial Reef in the March 8, 2006 edition of the Office of Environmental Quality Control's ("OEQC") *Environmental Notice*. The DLNR accepted the FEIS on October 31, 2007. The Board of Land and Natural Resources ("BLNR") issued a CDUP for the artificial reef on May 12, 2008 and the Corps indicated that the State could obtain federal approval for the reef by modifying the existing DLNR Army Permit for artificial reef development generally in Hawaiian waters (DA File No. 200400154). Finally, the State of Hawai'i Department of Health issued a Section 401 Water Quality Certification for the reef on September 18, 2008. On February 8, 2010 Haseko completed its final commitment under the MOA by providing the sum of \$150,000 to DLNR as its contribution towards the construction of the Kalaeloa Artificial Reef, thus fulfilling this required mitigation.

5.7.2.4 Alternative 4: No-Action Alternative

Shoreline pedestrian access and connectivity between One'ula Beach Park and White Plains Beach is the same as Alternatives 1 & 2. However, a more urban pathway planned around the basin may remain in an undeveloped, bare coral state under this No-Action Alternative. Public recreational access to the basin would also be severely limited without supporting economic activity occurring around the waterfront necessary to generate the revenue required to maintain and fully utilize the basin as a recreational amenity.

5.8 LAND USE

5.8.1 AFFECTED ENVIRONMENT

The Project Area, including the land directly adjacent to the excavated basin, is currently cleared and graded, but not in use. The current and proposed uses are described in Chapter 2 and 3. The adjacent property to the north and northeast is the Hoakalei Country Club and Golf Course, which wraps around the Project Area. The property to the east consists of land that has been developed in earlier phases of Ocean Pointe-Hoakalei (see Section 1.2). The satellite photograph used in Figure 1.3 provides a good overview of existing land use in the area as it existed in January 2013.

The Kalaeloa Community Development District, which encompasses approximately 3,695 acres of land within the former BPNAS, is immediately to the west of Haseko's Ocean Pointe-Hoakalei development. The District is governed by the Hawai'i Community Development Authority ("HCDA"), which adopted an overall master plan for the area on March 1, 2006. Highlights of the Kalaeloa Master Plan include: (i) construction of 3 million square feet of light industrial, commercial, retail and office space; (ii) creation of an estimated 7,000 jobs; (iii) construction of approximately 6,350 residential units (minimum 30 percent affordable) in a transit-oriented development with regional connections; (iv) opportunities for high-technology development; (v) alternative energy development to promote self-sufficiency; (vi) building new public schools; (vii) preservation of

recreation, open space and shoreline; and (viii) protection of cultural sites and endangered species through a Native Hawaiian Culture & Education Center.

As shown in Figure 5.10, the *Kalaeloa Master Plan* report, published in 2006, places most of the area immediately adjacent to Ocean Pointe-Hoakalei in a “Public Facilities” category; a narrow strip immediately adjacent to the shoreline is in “OS-1”, which is defined as “foreshore protection”. The sub-category for the public facilities designation is “Institutional: School/ Cultural Center”.

Figure 5.10 Kalaeloa 2006 Master Plan: Preferred Land Uses Map



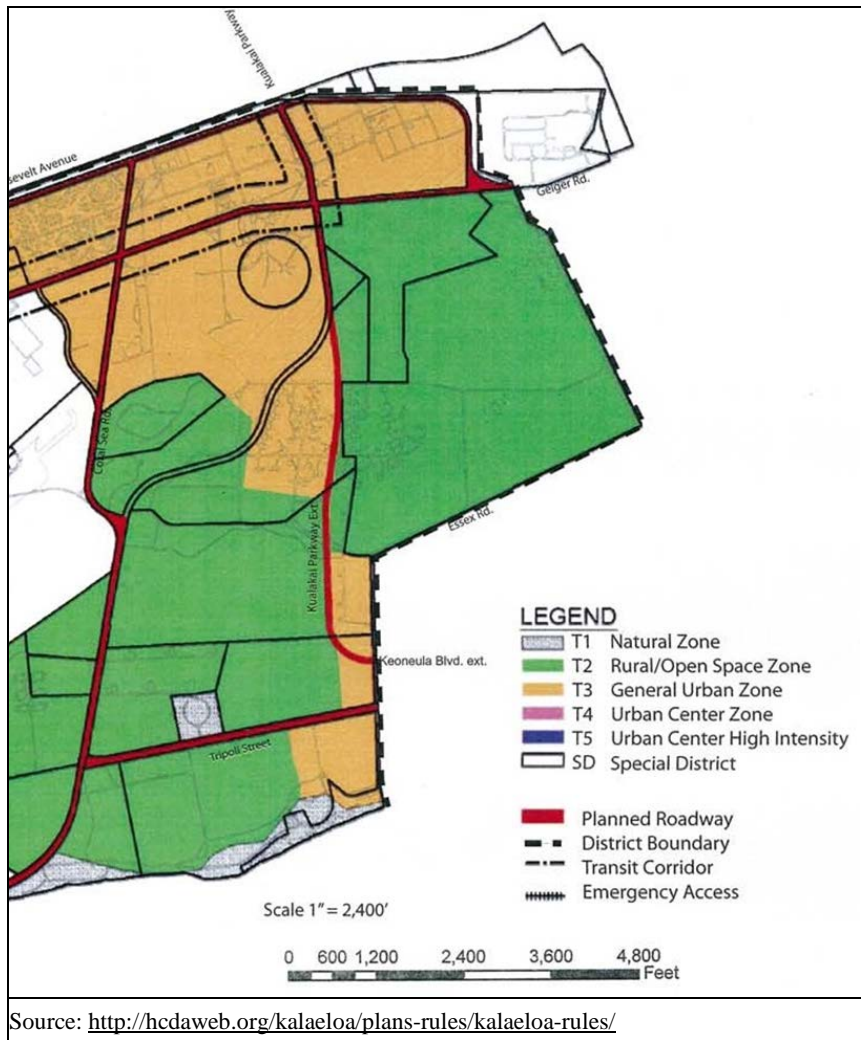
Source: Figure 4-1, Kalaeloa Master Plan, Prepared by: Belt Collins | EDAW | SMS | BAE | Ebisu for the State of Hawai'i HCDA, March 1, 2006.

The July 16, 2012, draft of proposed revisions to HAR Title 15, Chapter 215, entitled “Kalaeloa Community Development District Rules” establishes development use and rules for areas within the Kalaeloa Design District. HAR §15-215-23 defines “transect zones” into which all lots within the Kalaeloa CDD are organized. The map in the draft regulations (see Figure 5.11) categorizes the

immediate shoreline area as “T1 – Natural Zone”, a designation similar to that in the 2006 *Kalaeloa Master Plan*. It defines the T1 zone as follows:

The T1 natural zone shall consist primarily of lots along the ocean. The T1 Natural zone is comprised of natural landscapes, including beaches and vegetation with limited agricultural use;

Figure 5.11 Planned Land Use: Kalaeloa Master Plan



The remainder of the area bordering the western boundary of Ocean Pointe-Hoakalei is designated “T3 – “General Urban Zone” in the draft regulations, which is defined as follows:

The T3 general urban zone is characterized by mixed use projects, with a commercial emphasis. Streets with curbs, sidewalks and landscaping shall define medium-sized, pedestrian-friendly blocks.

5.8.2 POTENTIAL LAND USE IMPACTS

5.8.2.1 Alternative 1: Preferred Alternative

As described in Section 1.3, the requested rezoning of approximately 80 acres amounts to a refinement, rather than a wholesale change to Ocean Pointe-Hoakalei. The one way the Preferred Alternative would promote a different land use pattern is in the absence of the maritime uses that were expected in conjunction with development of a small boat harbor with access to the open ocean.

The change in zoning Haseko is requesting will allow the company to complete Ocean Pointe-Hoakalei with a recreational lagoon as the focal point of the project instead of as a marina, and fulfill the original intent to create a water-oriented community featuring resort, commercial, and residential uses that generate jobs and provide recreational opportunities for the region. As discussed in Chapter 6, the HMPU is consistent with State and County land use plans and policies for the region. Because the land surrounding the Project Area has been developed in anticipation of the kinds of uses contained in the HMPU, the Preferred Alternative is compatible with the kinds of development that would occur if rezoning is granted. The one possible exception to this relates to certain kinds of uses that would be restricted on Resort-zoned land until the avigation easement issue is resolved.

5.8.2.2 Alternative 2: All Mauka Resort Alternative

Alternative 2 consists of a slight rearrangement of the uses that are contained in Alternative 1 (i.e., the Preferred Alternative). Consequently, the same conclusions with respect to land use compatibility that were mentioned for Alternative 1 apply to this as well.

5.8.2.3 Alternative 3: Marina Alternative

Alternative 3 consists of many of the same land uses that are present in Alternatives 1 and 2. However, instead of having commercial and light industrial activities that target recreational activities within the lagoon, this alternative is aimed at providing space for land uses targeting marina uses. Haseko believes that the market for marina facilities is too limited to make their development and operation economically feasible at this time. CDUP OA-2670 – which is needed to construct the entrance channel – is also the subject of ongoing litigation (See Table 5.9 for current litigation summary). Therefore, Haseko is unable to proceed with development of those facilities for the foreseeable future.

In the absence of the entrance channel, a land plan dependent upon uses that require an operational marina cannot be successfully implemented. Because of this, those lands would remain vacant and unproductive for the foreseeable future, thus negatively impacting the project's ability to attract and support the much-needed commercial activity originally planned for Ocean Pointe-Hoakalei.

5.8.2.4 Alternative 4: No-Action Alternative

While it is Haseko's intent to develop as much as it is able within the limitations of the existing zoning, without either a recreational lagoon or marina anchoring the development, it is less likely that Haseko will be able to pursue financing, attract purchasers, or create an equitable distribution of maintenance fees for interested parties for all of the uses that are theoretically possible under the existing zoning. A defined use for the basin, maintenance/operation cost determinations/allocations and supporting economic activity to cover the expenses are needed to make the development sustainable over the long-term. Haseko would be compelled to complete only those areas which it felt were consistent with the present zoning and economically viable. In all likelihood, this would be limited to those areas bordering the Hoakalei Golf Course, including: (i) the Hoakalei Country Club clubhouse, in the BMX-3 north of Keone'ula Boulevard, (ii) housing in the Resort zone north of Keone'ula Boulevard, and (iii) housing in the A-2 Medium Density Residential zone in the far east portion of the Project Area. Other portions of the Project Area would be left undeveloped.

5.9 ECONOMIC AND DEMOGRAPHIC EFFECTS

5.9.1 AFFECTED ENVIRONMENT

The EDP area is the major focus of new urban development on O‘ahu. The City of Kapolei was designated as O‘ahu’s Secondary Urban Center by the CCH’s 1977 GP, and the Ocean Pointe-Hoakalei area was designated as urban fringe. The GP estimates that by 2025 ‘Ewa will encompass 13 percent of the island’s total population.

No homes currently exist in the Project Area. However, based on the listing prices of homes elsewhere in the development, the value of homes can be estimated at approximately \$550,000-\$1,000,000+. In the older ‘Ewa Beach community *makai* of Ocean Pointe-Hoakalei, the majority of house lots along nearby roads such as Pāpipi Road and Pāpipi Drive are typically around 6,500 square feet, with appraised values of approximately \$350,000 and up. The homes in this neighborhood were generally built in the mid- to late-1950s and were originally priced between \$50,000 and \$100,000. According to current realty listings for the area, asking prices for homes in this ‘Ewa Beach community generally range between \$400,000 and \$700,000.

The area covered by the rezoning application is within the Ocean Pointe Census Designated Place (“CDP”) (see Figure 5.12). Its 2010 population was 8,361. The results of the census indicate that it is characterized by young families with an above-average income level. The median age in 2010 was 32.1 years, compared to Honolulu County’s median age of 36.2 years. Similarly, at \$96,048, the area’s median annual household income was 137% of the median income in Honolulu County of \$70,093. This CDP also enjoys a higher-than-average level of education, with 36.9 percent of residents having a Bachelor’s degree or higher, compared with a County average of 31.1 percent. Unemployment was 5.8 percent among Ocean Pointe CDP residents in the labor force, compared to a 5.0 percent unemployment level countywide.

Figure 5.12 Ocean Pointe Census Designated Place



Source: State of Hawaii GIS, MapMart International

Major ethnicities for this CDP include Caucasian (32.9 percent), two or more races (23.2 percent), Filipino (18 percent), Black (9 percent), Japanese (5.7 percent), and Native Hawaiian/Pacific Islander (3.9 percent). The percent of homes where a language other than English is spoken is 23.1 for the Ocean Pointe CDP, compared with 28.1 percent for Honolulu County as a whole.

5.9.2 POTENTIAL ECONOMIC IMPACTS

5.9.2.1 Introduction and Methodology

Dr. Paul Brewbaker (May 2014) prepared an economic impact analysis of the development proposed for the Project Area (see Appendix M). He used a conventional input-output model (I-O) to quantify the economic impacts of the Hoakalei Resort development.³⁸ The I-O framework is commonly used

³⁸ The input-output analysis is calibrated to the 2005 input-output model parameters published by the Hawaii Department of Business, Economic Development and Tourism (DBEDT) (see http://hawaii.gov/dbedt/info/economic/data_reports/2005_state_io/). The Hawaii input-output model of 2005 (published in 2008) carries on a long tradition of I-O research in the islands, supported by estimates of the Bureau of Economic Analysis, U.S. Department of Commerce and vetted by Hawaii economists over several decades of use in a wide variety of applications. While the parameters are drawn from the DBEDT study, the economic assumptions are unique to Dr. Brewbaker’s report.

because of its ability to summarize the effects of inter-industry linkages when tracing changes in one part of the economy to the whole economy. His report contains quantitative estimates of impacts on total output, on total employment, and on government tax revenues. It also provides separate estimates of the effects that the Hoakalei Resort development is likely to have on the CCH's property tax base. All estimates take a simple "before and after approach" (i.e., "with and without" the preferred alternative) to the impact analysis. Dr. Brewbaker augments this with a related qualitative analysis of Hoakalei Resort development economic impacts that are outside the scope of the I-O modeling framework.

The report addresses two types of economic effects: (i) short-run impacts associated with construction and (ii) long-run impacts associated with the creation of tourism and recreation-oriented productive capacity. (The value housing services of housing new stock created is reflected in its market price.) The first of these two impacts - construction impacts - is material but transitory. The short-run impacts of construction last only as long as the construction activity itself, in this case no more than a decade. The second of these impacts is interesting because the resort, commercial, and other economic activity that will occur at the facilities that are developed will make an ongoing net contribution to the productive capacity of Hawai'i tourism, O'ahu's largest export sector.

5.9.2.2 Alternative 1 - Preferred Alternative & Alternative 2 - All-Mauka Resort Alternative

The Preferred Alternative would have economic impacts nearly identical to those of Alternative 2 (All-Mauka Resort Alternative), and both are sometimes referenced in this section as Lagoon Alternatives. The economic impact of Alternative 1 and Alternative 2 clearly indicates that the Lagoon Alternatives provide comparable benefit compared to the marina (Alternative 3).

The estimated overall economic impacts of the development that would occur under either of the Lagoon Alternatives are reported in Table 5.8, below. Construction outlays of about \$720 million are expected to have a total economy-wide impact of over \$1.4 billion, generating over \$81 million in State of Hawai'i tax revenue and creating more than 8,500 job-years of employment.

Table 5.8 Input-Output-Based Hoakalei Economic Impacts (in 2010 Dollars & Jobs)

<i>Construction impacts (short-run)</i>				
	<i>Outlay</i>	<i>Total Output</i>	<i>Jobs</i>	<i>Tax Revenue</i>
Hotel/resort/recreation	\$378.5 mil.	\$738.9 mil.	4,513	\$42.9 mil.
Housing (resident)	\$341.5 mil.	\$666.8 mil.	4,073	\$38.7 mil.
<i>Short-Run Impacts</i>	<i>\$720.0 mil.</i>	<i>\$1,405.8 mil.</i>	<i>8,585</i>	<i>\$81.6 mil.</i>
<i>Tourism, consumption impacts (long-run)</i>				
Tourism	\$347.0 mil.	\$667.7 mil.	5,063	\$41.2 mil.
Resident consumption (incl. recreation)	\$55.2 mil.	\$103.3 mil.	767	\$5.7 mil.
<i>Long-Run Impacts</i>	<i>\$402.2 mil.</i>	<i>\$771.0 mil.</i>	<i>5,830</i>	<i>\$47.0 mil.</i>
TOTAL IMPACTS	\$1,122.2 mil.	\$2,176.8 mil.	14,416	\$128.6 mil.

Long-run, tourism- and resident consumption-related outlays of more than \$400 million are expected to have a total economy-wide impact of more than \$770 million in State of Hawai'i tax revenue and create nearly 6,000 permanent jobs. Combined short-run and long-run impacts are more than \$2 billion in total Hawai'i economic output and more than 14,400 permanent jobs. Impacts include more than \$125 million in State tax revenues. Upon completion, Hoakalei will generate more than \$20 million annually in County property tax revenue, of which half is attributable to the new development (i.e., would not occur if development within the area covered by the rezoning request does not move forward).

As indicated in Appendix 2 of Dr. Brewbaker's May 2014 report, there is a \$37 million variance in outlay not including the projected lagoon cost. Per Haseko's estimate, the proposed lagoon cost

under either of the Lagoon Alternatives – exclusive of costs common to the marina – is at least \$39 million (see Table 2.1). Determining the cost estimation for the alternatives considered in this EIS document is difficult due to the following factors:

- Timing assumptions affect costs. The sooner Haseko is able to build it, the less it will cost. The longer the delay, the greater the increase in cost.
- Specialty work such as lagoon construction is not as competitively bid in Hawai'i as is other more common work. The lack of active competitive bidders can lead to a variation in cost estimation exceeding 25%.
- The small number of contractors who specialize in waterfront/in-water construction can affect pricing. Depending on the level of experience, a specialty contractor may increase the contingency in its proposal to cover uncertainty.
- Rapidly changing safety and environmental laws can potentially create cost deviation depending on the expertise of the contractor.

Table 5.9 shows Dr. Brewbaker's estimate of the variance between what the Marina Alternative was projected to achieve compared to either of the two Lagoon Alternatives. The factor not depicted in the projections is the feasibility that the economic benefits would accrue. As projected, the end impact of housing (residential) is identical, but the resort/lagoon benefits are slightly less than the resort/marina, due in part to the exclusion of projected lagoon-related construction costs.

Table 5.9 Marina vs. Lagoon Output/Revenue/Jobs Comparison*

	<i>Outlay</i>			<i>Total Output</i>			<i>Tax Revenue</i>			<i>Jobs</i>		
<i>Construction impacts (short-run)</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>
Hotel/resort/recreation	\$415.6	\$378.5	-9%	\$811.4	\$738.9	-9%	\$47.1	\$42.9	-9%	4956	4513	-9%
Housing (resident)	\$341.5	\$341.5	0%	\$666.8	\$666.8	0%	\$38.7	\$38.7	0%	4073	4073	0%
Short-run impacts	\$757.1	\$720	-5%	\$1478.2	\$1405.7	-5%	\$85.8	\$81.6	-5%	9029	8586	-5%
<i>Tourism/Consumption impacts (long-run)</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>	<i>Marina</i>	<i>Lagoon</i>	<i>% diff</i>
Tourism	\$347	\$347	0%	\$667.7	\$667.7	0%	\$41.2	\$41.2	0%	5063	5063	0%
Resident consumption (incl. recreation)	\$55.2	\$55.2	0%	\$103.3	\$103.3	0%	\$5.7	\$5.7	0%	767	767	0%
Long-run impacts	\$402.2	\$402.2	0%	\$771	\$771	0%	\$46.9	\$46.9	0%	5830	5830	0%
TOTAL IMPACTS	\$1,159.3	\$1,122.2	-3%	\$2,249.2	\$2,176.7	-3%	\$132.7	\$128.5	-3%	14,859	14,416	-3%

*Reported in Millions of Dollars

The most important issue is the feasibility of the two Lagoon Alternatives versus the Marina Alternative. The status quo of ongoing litigation (see Table 5.10) on the marina combined together with the absence of a vibrant marina market reflects a low probability that the marina could be feasible within the permit period, whereas the lagoon appears very feasible. If a project is not feasible within a reasonable time frame then the supposed benefits becomes less relevant.

In his report Dr. Brewbaker further opines that the offset to this is the significant benefits that the two Lagoon Alternatives provide:

1. Public Access/Recreational Amenities. As stated by Dr. Brewbaker:
2. *“Rising income from job and productivity growth and rising wealth from appreciating stock and housing values, all raise the implicit value of recreational amenities to the public: they increase what the public would have to be compensated to forego recreational access. The public values of Hoakalei Resort development increase over time. The public benefits of open-access, ocean recreation and cultural amenities of*

Hoakalei Lagoon and associated shoreline improvements may be the most valuable economic contribution of the Hoakalei Resort Development.”

3. He further states that “agglomeration externalities”, defined as the unintended, uncompensated benefits to one party from being located near another party, is another public benefit. This has been analogous to the synergy created at shopping centers when businesses cross-support each other by offering convenient “one stop shopping”. In public recreation terms, Haseko is creating a regional recreational center featuring an assortment of activity options provided around the lagoon.
4. Tourism Capacity. As stated by Dr. Brewbaker, tourism in Hawai‘i is presently being constrained primarily by limits on lodging capacity and secondarily by air seat capacity. He concludes that the acceleration of construction of lodging units at Hoakalei and the beneficial recreational infrastructure that is being proposed are essential to help resolve this ongoing problem. Although the maximum number of visitor accommodation units is the same for all four alternatives, demand for the units varies tremendously. The two Lagoon Alternatives clearly support this effort to accelerate resort construction and appear to generate more interest from resort developers than Alternatives 3 and 4.
5. O‘ahu’s Housing Challenge. Dr. Brewbaker makes the case that in addition to a declining number of lodging units, Hawai‘i is similarly seeing a shortfall in residential inventory, which contributes to rising home prices and damages the public’s ability to afford to buy a home. As stated in the report, “Hoakalei residential development will continue to be important in meeting the island’s housing needs ... Only a substantial new housing supply response, to which Hoakalei is contributing materially, can dampen what will otherwise be an acceleration of home price increases that undermines affordability.” Alternative 1 and Alternative 2 both support Hoakalei’s housing efforts.

5.9.2.3 Alternative 3: Marina Alternative

Dr. Brewbaker analyzed the economic impacts of a marina using the same I/O model and assumptions as were used for the Preferred Alternative discussed above, without factoring in feasibility/timing. The results of the analysis are summarized in Table 5.9. A comparison of the marina I/O estimates with those for the Lagoon Alternatives shows that the difference is too small to be significant (approximately 3 percent). Moreover, if one considers the much greater uncertainty associated with the hypothesized income from the marina, both of the Lagoon Alternatives are superior to the marina alternative with respect to their likely economic benefits to the community. In addition, resort, commercial and residential development under Alternative 3 is constrained by the undetermined date the marina litigation will be resolved (see Section 3.2.3).

5.9.2.4 Alternative 4: No-Action Alternative

Finally, under the No Action Alternative, the development-related economic activity summarized in Table 5.8 would be absent because much, if not all, of the planned development around the basin would come to a halt. Other factors that make it likely that the No Action Alternative would produce substantially fewer economic benefits than the other alternatives include the following:

- A substantial proportion of the rezoning is required to make the Public Cove, Lagoon and trail amenities workable. Without those elements, it will be difficult or impossible to use the basin as a recreational lagoon. Because the basin cannot be completed as a marina for an undeterminable time period, it, and much of the surrounding land would be purposeless and no further substantial economic activity would occur in much of the area covered by the rezoning request.
- Uncertainty over how the basin will be utilized will make it impossible to reasonably project maintenance costs or determine/establish an appropriate governance structure for the Project Area.

- Not finishing the resort/commercial portion of the 1,100 acre master planned community would negatively affect the valuation of existing properties surrounding the incomplete Project Area, extending out to the Ocean Pointe-Hoakalei neighborhoods and beyond.

It should be noted that following the October 2011 decision to complete the basin as a recreational lagoon instead of a marina, Haseko has continued to have discussions with resort and commercial operators about their perceived priorities for completing the lagoon amenity to make it desirable enough to attract their investment in/development of the major economic drivers around the lagoon (i.e., the retail/commercial village and resorts). Their feedback, combined with ongoing due diligence work with the scientists and engineers working with Haseko on plans to transform the basin into a viable, sustainable recreational lagoon, has caused a steady increase in the number and types of improvements planned for in and around the basin, including a contingency plan for lagoon water quality (see Section 4.5.2.1.1 and Section 5.2.2.1). Although Haseko continues to request cost estimates from experienced, reputable contractors with specific experience in this type of work, there is still a significant variation in cost estimates (see Section 5.9.2.2). Projected costs associated with the growing list of improvements needed for the lagoon also continue to rise, and it is anticipated that costs may increase even more in the future. The anticipated increase in costs is not reflected in Dr. Brewbaker's report.

Table 5.10 Summary of Current Marina CDUP OA-2670 Litigation

<i>Date</i>	<i>Summary</i>
7/2/2010	Haseko filed application to amend CDUP-OA-2670 to reduce marina basin from 70 to ~54 acres to provide more open public spaces around the marina.
9/9/2010	BLNR granted the application.
9/9/2010	Michael Lee orally requested a contested case hearing.
9/20/2010	Michael Lee filed a petition for a contested case hearing.
7/26/2011	Contested case hearing held.
5/11/2012	BLNR adopted Findings of Fact, Conclusion of Law, Decision and Order granting Haseko's request.
6/12/2012	Michael Lee appealed BLNR's decision to the Circuit Court.
5/30/2013	Judge Rhonda Nishimura affirmed the BLNR's decision.
2/24/2014	Judge Nishimura entered a written Final Judgment.
3/14/2014	Michael Lee filed Notice of Appeal.
Ongoing	Final Outcome of Appeal still to be decided.
Source: Haseko ('Ewa), Inc. (2014)	

5.10 SCENIC AND AESTHETIC RESOURCES

5.10.1 AFFECTED ENVIRONMENT

A key objective both of Haseko's vision for the Ocean Pointe-Hoakalei development, including the proposed lagoon, and of the EDP is to preserve and protect the visual landmarks and vistas that make the area unique and beautiful. Significant scenic resources identified in the EDP includes the following:

- Distant vistas of the shoreline from the H-1 Freeway above the 'Ewa Plain;

- Views of the ocean from Farrington Highway between Kahe Point and the boundary of the Wai‘anae Sustainable Communities Plan Area;
- Views of the Wai‘anae Mountain Range from H-1 Freeway between Kunia Road and Kalo‘i Gulch and from Kunia Road;
- Views of *nāpu‘u* at Kapolei, Pālailai, and Makakilo;
- *Mauka* and *makai* views; and
- Views of central Honolulu and Diamond Head off to the east.

Only the last two of these have a relationship to the Project Area.

The construction within the Ocean Pointe-Hoakalei development that has occurred to date has generally proceeded from east to west. Until recently, safety and operational requirements have led Haseko to keep most of the land that lies within the Project Area off limits to all but construction workers. The Project Area has remained largely unobstructed open space, and removal of the kiawe and other scrub vegetation has provided more expansive views across the property than was formerly the case.

5.10.2 POTENTIAL IMPACTS ON SCENIC AND AESTHETIC RESOURCES

5.10.2.1 Alternative 1: Preferred Alternative

Construction within the Project Area will alter the landscape, but the continuation of the expansive views across the open water and low-lying *makai* area will provide a gracious sense of openness. Because most of the area around the lagoon will be dedicated open space that the public will be encouraged to use, the open space and views across the Project Area will continue to be accessible.

The lagoon and surrounding development will be visible from the shoreline and public spaces surrounding the basin. The *makai* portions of the Preferred Alternative development may also be visible from the western end of One‘ula Beach Park, but the extent of that visibility will depend upon the plantings that grow out within the park and immediately surrounding areas. The layout and land uses of this alternative will ultimately depend upon the outcome of the avigation easement question discussed elsewhere in this report in Sections 1.6, 2.2.2, 3.2.1 and 3.2.2. The ultimate developer of the Resort-zoned land along the western side of the lagoon (which is unique to this alternative) may be able to build structures that provide panoramic views, and which would be visible to people recreating at the lagoon and along the shoreline trail *makai* of the Project Area. Proposed height limits for the zoning districts included in the preferred alternative (see Figure 3.1) will be consistent with the height limits already approved as part of the existing marina alternative.

5.10.2.2 Alternative 2: All Mauka Resort Alternative

This alternative involves development nearly identical to that of Alternative 1. The only notable difference is the absence of resort development adjacent to the western end of the basin and a consequent increase in development density along the *mauka* side of the lagoon. The layout and land uses of this development will ultimately depend upon the outcome of the avigation easement question discussed in Chapter 3 of this report. Proposed height limits for the zoning districts included in Alternative 2 will be consistent with the height limits already approved as part of the existing marina alternative (see Figure 3.2).

5.10.2.3 Alternative 3: Marina Alternative

Because the HMPU retains most elements of the approved marina-based plan, the visual and aesthetic effects of this alternative are similar to those discussed in the preceding two sections. The existing zoning allows structures in the 60- to 90-foot height range to be developed on the Resort, Commercial, and Industrially-zoned areas. In all likelihood these would be limited to the *mauka* side of the basin, but medium-size structures could be developed along the western side of the basin in support of the marina if these were needed to meet the demands of the boating community (see Figure 3.3). The marina and support facilities associated with this alternative would occupy much of the

open water area within the basin. The docks associated with the marina would support several hundred vessels. Some would be small, but others could be 200 feet long and 25 feet high or larger. As a result, the marina basin would have a substantially different character than that of the recreational lagoon that is proposed.

5.10.2.4 Alternative 4: No-Action Alternative

Rejection of the rezoning request would lead Haseko to develop the Project Area as best it can within the limitations of the existing zoning. If market forces allowed, this would lead to the construction of structures of approximately the same size as would occur in Alternative 2 and the visual and aesthetic effects of this would be comparable to those produced by that alternative. Given the current state of the economy, it is likely that the area along the northeastern end of the lagoon, would proceed on schedule and largely as planned (see Figure 3.4). This, in turn, would result in visual effects similar to those described for Alternative 2.

5.11 EFFECTS ON TRANSPORTATION FACILITIES AND SERVICE

Haseko updated its Transportation Master Plan Ocean Pointe/Hoakalei (TMP) to ensure that the transportation facilities within the development are adequate, and the updated plan has been submitted to the CCH (see Appendix N). The plan encompasses a multi-tiered transportation network including a system of multi-purpose walkways linking residential communities to proposed commercial and resort areas. These, together with a system of bikeways and enhanced shoreline and lagoon trails, are intended to support non-vehicular access throughout the Project Area. The TMP also provides access to existing roadways by a system of new internal roads and several improvements to existing transportation facilities.

5.11.1 AFFECTED ENVIRONMENT

5.11.1.1 Vehicular and Pedestrian Access

The communities on the 'Ewa Plain, including Ocean Pointe-Hoakalei are served by an extensive system of roadways maintained by the State of Hawai'i and the CCH. The H-1 Freeway passes north of Ocean Pointe-Hoakalei, with access to the site being provided via Exit 5A (Fort Weaver Road) and Exit 3 (Kualakai Parkway). Fort Weaver Road also carries vehicles to Pāpipi Road, which provides access to the property from the south as well. It is possible that in the future the State or others could extend roadways within the adjacent Kalaeloa area to connect with Keone'ula Boulevard, which runs from east to west through the Ocean Pointe-Hoakalei project. The roadway system within the Ocean Pointe-Hoakalei development conforms to the provisions of the approved Transportation Master Plan for the project (Wilson Okamoto Corporation/W-Trans, May 2013).

The completed portions of the Ocean Pointe/Hoakalei development are currently serviced by TheBus, operated by O'ahu Transit Services. Regional transit service is provided by Routes 41, 42, 91, 101, E, and W1, with stops along Fort Weaver Road.

- Route 41 operates daily between 5:00 a.m. and 10:00 p.m. with service between 'Ewa Beach and Kapolei Transit Center; headways on are between 30 and 60 on weekdays and are approximately 60 minutes on weekends.
- Routes 42, 91, E, and W1 provide transit service between 'Ewa Beach and Honolulu. Routes 42 and E operate daily between 'Ewa Beach and Honolulu, with headways of 30 to 60 minutes. Route 42 stops along local destinations between 'Ewa Beach and Honolulu while Route E provides limited-stop express bus service between 'Ewa Beach and Honolulu. Routes 91 and W1 provide weekday commuter express transit service with approximately 20-minute headways toward Honolulu.
- Route 44 provides local transit service between 'Ewa Beach and the Waipahu Town Center via 'Ewa Villages. It has stops along Pāpipi Road, Fort Weaver Road, Keoneula Boulevard, Kapolei

Parkway, and Kaileolea Drive. This route is expected to be expanded or supplemented to service the remaining areas within Ocean Pointe-Hoakalei as development of the project continues.

5.11.1.2 Harbors and Vessel Access

The nearest commercial harbor is the State of Hawai'i's Kalaeloa Harbor, which is located approximately 5 miles due west of the Project Area.³⁹ It handles most of the bulk cargo (e.g., coal, cement, etc.) that arrives on O'ahu. Honolulu Harbor, which is also operated by the Harbors Division of the State Department of Transportation, is situated a little more than 10 miles due east of Ocean Pointe-Hoakalei. With more than 200 acres of container yards and over 30 major berths, Honolulu Harbor is by far the largest port facility in Hawai'i and most of the food and manufactured products that enter and leave the state pass through it.

5.11.1.3 Airports

The Project Area is approximately 6 miles due west of the nearest runway at HIA, the principal commercial aviation airport serving the island. The time/distance by car is about 30 minutes/ 20 miles. HIA is owned and operated by the State of Hawai'i Department of Transportation. In 2012, it handled over 280,000 aircraft operations, 18 million passengers, and almost one-third billion metric tons of cargo. In terms of passengers, it is one of the 25-busiest airports in the world. The Airports Division also owns and operates Kalaeloa Airport, a general aviation airport located immediately to the west of Ocean Pointe-Hoakalei. By road, it is a 6-mile/15-minute drive. Its runways range from 4,500 to 8,000 feet in length.

5.11.2 POTENTIAL IMPACTS

5.11.2.1 Alternative 1: Preferred Alternative

Vehicles traveling to and from the Project Area would use existing and planned roadways. All Ocean Pointe-Hoakalei roadways have been designed/built/will be constructed to safely and efficiently accommodate the forecast traffic. The Transportation Master Plan Update for the proposed development (Wilson Okamoto Corporation/W-Trans, May 2013), which is the result of an in-depth analysis of all of the roadways within the Ocean Pointe-Hoakalei development, reaches the following conclusions with respect to the planned roadway system.

Traffic operations with the full development of the Ocean Pointe/Hoakalei development are generally expected to remain similar to existing conditions due to the implementation of intersection modifications and installation of traffic signal systems at key intersections. The approaches or critical movements at the study intersections along Kaileolea Drive and Kaimalie Street are expected to continue operating at LOS "C" or better during both peak periods with the exception of the intersections of Kaimalie Street with Fort Weaver Road and Kapolei Parkway which are expected to operate at LOS "D" or better during both peak periods. Along Kapolei Parkway, the approaches or critical movements at the intersections with Keaunui Drive and Kai Oli Street are expected to operate at LOS "C" or better during both peak periods while those at the intersections with Keone'ula Boulevard, Kekaiholo Street, and Pāpipi Road are expected to operate at LOS "D" or better during both peak periods.

At the west end of the project site, the intersection of Keone'ula Boulevard with Road A is expected to operate at LOS "B" or better during the AM peak period and LOS "C" or better during the PM peak period while the intersection with Lagoon Drive is expected to operate at LOS "A" during the AM peak period and LOS "D" or better during the PM peak period. The remaining study intersections along Keone'ula Boulevard are expected to continue operating at LOS "C" or better during both peak periods with the exception of the intersection with Fort Weaver Road and Hanakahi Street.

³⁹ The driving distance (a little less than 15 miles) is much farther.

The approaches or critical movements at the intersection of Keone‘ula Boulevard with Fort Weaver Road and Hanakahi Street are expected to operate at LOS "D" or better during both peak periods. At the south end of the study area, the approaches of the intersection of Pāpipi Road with Fort Weaver Road are expected to continue operating at LOS "D" or better during both peak periods while those at the intersection with Pupu Street are expected to continue operating at LOS "A" during both peak periods.

These conclusions are predicated upon the implementation of recommended modifications to the existing lane use and traffic signal timing at the intersections of Keone‘ula Boulevard with Fort Weaver Road/Hanakahi Street and Kapolei Parkway, as well as the intersection control at the intersection of Kapolei Parkway with Pāpipi Road/Hailipo Street. In summary, the Transportation Master Plan report concludes:

"...with the implementation of these recommendations, traffic conditions in the project vicinity are generally anticipated to remain similar to existing conditions."

Because the HMPU will not increase the amount of residential, commercial, resort, or other development in the Project Area, it will not impact the level of service on existing or planned roadways. Similarly, because the land uses that could occur in the rezoned area are the same as those already approved for the property, approval of the rezoning would not alter the load on State airports or harbors.

5.11.2.2 Alternative 2: All Mauka Resort Alternative

Alternative 2 consists of the same amount of traffic-generating development as Alternative 1. With the exception of shifting the location of small portions of the planned commercial and resort units, it would not affect the location of the planned uses or the routes that vehicles would travel on area roadways. The conclusions reached for this alternative with respect to potential effects on airports and harbors are the same as for Alternative 1.

5.11.2.3 Alternative 3: Marina Alternative

Alternative 3 consists of the same amount of traffic-generating residential, resort, and commercial/industrial development as Alternative 1. In addition, it would generate a substantial number of vehicle-trips by those traveling to and from the marina facilities and, equally important, the boat ramps that are part of this alternative. Because it has essentially the same internal roadway system as Alternatives 1 and 2, it would not produce substantial changes in vehicle routing with the exception of shifting the location of small portions of the planned commercial and resort units, it would not affect the location of the planned uses or the routes that vehicles would travel on area roadways.

Alternative 3's effects on airports would be essentially the same as those of Alternatives 1 and 2. This is not true for the effect that it would have on harbors. Unlike Alternative 1 and 2, the Marina Alternative was designed to accommodate small boats and by doing so reduce the pressure on the other small boat harbors on the leeward side of O‘ahu. At the time it was conceptualized, it was thought that for the most part the market-priced berths and related facilities that the marina would provide would address unmet demand for these facilities. Hence, while some users would relocate from other, existing small boat harbors, the vacated slips would be quickly filled by other potential users who had heretofore been unable to obtain berths. Because that no longer appears to be the case, construction and operation of market-priced slips in a marina at Ocean Point-Hoakalei could result in an oversupply of berthing facilities and lead to a decrease in occupancy at other locations. With largely fixed operating costs, this would tend to lead to higher mooring rates at those locations.

5.11.2.4 Alternative 4: No-Action Alternative

Alternative 4 assumes that market conditions will keep Haseko from developing all of the uses that are called for in the HMPU, at least on the schedule that is now contemplated. This will not affect the extent of the improvements or traffic management measures it implements within the developed

areas, thus assuring that the capacity of those facilities will be as assumed for its Transportation Master Plan. With equal or slightly reduced traffic volumes in some areas, the level of service would be higher. The conclusions reached with respect to potential effects on airports and harbors are the same for this alternative as for Alternative 1.

5.12 UTILITY SERVICES

Presently there are no water, electrical, gas, sewer, or communications lines in the Project Area. However, with the exception of gas, these are present in the already developed portion of the Ocean Pointe-Hoakalei development, and the lines passing through those areas leading up to the Project Area have been sized with the expectation that the Project Area would be developed in accordance with the existing master plan and zoning, and remain consistent with anticipated needs of the HMPU. Because of this, no new facilities would need to be installed in those areas, and the additional loads imposed by the ongoing development will not in any way degrade the level of service provided to existing residents of Ocean Pointe-Hoakalei or its neighbors. Two gas tank farms (east and west) will supply gas service to the area; their location within the Project Area is yet to be determined. The facilities needed to support the development that would occur within each section of the Project Area will be designed in conjunction with the final layout of the area. These infrastructure plans will be submitted to the CCH for review and approval prior to their construction.

5.13 PUBLIC SERVICES

5.13.1 EXISTING CONDITIONS

Police. The nearest police station is the Kapolei Police Station at 1100 Kamokila Boulevard, approximately 3 miles away.

Fire. ‘Ewa Beach Fire Station #24 serves the area, and is currently located off Keone‘ula Blvd. at 91-995 Kaileole‘a Drive. It is about one mile due east of the Project Area.

Emergency Medical Services. The Queen’s Medical Center – West O‘ahu opened in May 2014. The new hospital has 80 beds, with the ability to increase to as many as 135 as needed. Services include a state-of-the-art emergency room, inpatient and outpatient surgery, imaging, cardiology and specialty clinics. The new campus fills the void that was created when the former Hawai‘i Medical Center-West closed its doors in December 2011. It is expected that the facility will be staffed by more than 350 healthcare workers.

Educational Facilities. The Ocean Pointe-Hoakalei development lies within the area served by the State of Hawai‘i Department of Education’s Campbell High School Complex. There are seven elementary schools in the complex, the newest of which is the Keone‘ula Elementary School, which is located at 91-970 Kaileolea Drive in the northwestern corner of the 1,100-acre property. Other schools in the complex include ‘Ewa Elementary School, Pohakea Elementary School, ‘Ewa Beach Elementary School, Kaimiloa Elementary School, Holomua Elementary School, Iroquois Point Elementary School, ‘Ewa Makai Middle School, and Ilima Intermediate School.

Solid Waste Collection and Disposal. There currently is no municipal solid waste collection within the Project Area because it has not yet been developed. Waste collection by the City and County Department of Environmental Services will begin as homes, businesses, visitor accommodations, and recreational facilities are constructed.

5.13.2 POTENTIAL EFFECTS

The police, fire, emergency medical services, solid waste collection and disposal services, and schools that serve the Ocean Pointe-Hoakalei development have been planned and constructed to support the growth that the CCH and State have directed onto the ‘Ewa Plain. None of the

alternatives would increase the demand above the level that would occur under the existing zoning, which existing and already planned facilities are designed to accommodate.

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CHAPTER 6 RELATIONSHIP TO LAND USE PLANS, POLICIES, & CONTROLS

As stated in Chapter 1 of this DEIS, the Proposed Action is a zone change for about 80 acres of the 1,100-acre master-planned Ocean Pointe-Hoakalei development in the areas adjoining the existing basin. The zone change is to accommodate a change in the existing master plan for the Project Area, as documented in the HMPU, which will feature a recreational lagoon as the focal point in place of a marina. This area constitutes the last undeveloped phase of the master-planned development, and proposed land uses are reflected in the HMPU.

This chapter describes the long-standing conformance of the 1,100-acre development (including the 80 acres which is the subject of this DEIS) with State and County plans, policies and controls.

6.1 HAWAI'I STATE PLAN

The Hawai'i State Plan, contained in HRS Chapter 226, as amended, was established pursuant to the Hawai'i State Planning Act, and serves as a broad policy document, guiding the activities, programs and decisions made by all State and County agencies. The Hawai'i State Planning Act was signed into law in 1978 (HRS § 226-1), to "improve the planning process in this State, to increase the effectiveness of government and private actions, to improve coordination among different agencies and levels of government, to provide for wise use of Hawai'i's resources and to guide the future development of the State."

The Act established the Hawai'i State Plan as a long-range comprehensive plan that includes an overall theme, goals, objectives, policies, and priorities, as well as setting forth mechanisms for implementation of the Plan. In summary, the Hawai'i State Plan:

- Serves as a guide for future long-range development of the State;
- Identifies the goals, objectives, policies, and priorities for the State;
- Provides a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources;
- Improves coordination of Federal, State, and County plans, policies, programs, projects and regulatory activities; and
- Establishes a system for plan formulation and program coordination to provide for an integration of all major State and County activities.

The Hawai'i State Plan is a policy document that depends upon implementing laws and regulations to achieve its goals. The sections of the State Plan that are most relevant to the proposed development are reproduced in italics below, followed by comment regarding the development's consistency with the respective policies.

Policy:

Section 226-5 Objective and policies for population.

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

Section 226-5(b)(3) Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.

Section 226-5(b)(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.

Comment: The Ocean Pointe-Hoakalei development is located in the 'Ewa region of West O'ahu, which has been designated by State and County policies as the location of the island's secondary urban center. The 'Ewa region is planned to accommodate a significant proportion of O'ahu's future growth, with public and private investment in infrastructure and facilities supporting future economic and residential development planned for the area. The CCH's EDP calls for the 'Ewa region to accommodate up to 64,000 new homes in master-planned, residential communities. The proposed HMPU, as an integral part of the overall Ocean Pointe-Hoakalei development, would provide additional residential units as is already permitted, supporting employment centers both within the 'Ewa region and beyond.

Sustainable yield for the 'Ewa-Kunia Aquifer System is 16.0 MGD. Currently, 0.543 MGD of the 'Ewa-Kunia Aquifer's sustainable yield is unallocated, and 4.0 MGD of the allocated share is unused, resulting in an unused balance of 4.5 MGD available for future sustainable withdrawals. Based on sustainable yields of the aquifer and the present unallocated and unused supply, the available water supply is sufficient to support the proposed development.

Policy:

Section 226-6 Objectives and policies for the economy--in general.

Section 226-6(a)(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i people.

Section 226-6(b)(10) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.

Section 226-6(b)(15) Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.

Comment: Development of Ocean Pointe-Hoakalei will have positive short term benefits on the local economy from the increased expenditures for construction and construction-related jobs and tax revenue. In the long-term, the HMPU will maximize the public goods benefit by providing broad public access to the proposed lagoon, promenade around the lagoon and commercial areas, cultural and archaeological sites and commercial activity areas. Not only will this provide an accessible recreational asset to the 'Ewa and West O'ahu communities, it will enhance the waterfront commercial and activity-oriented businesses planned for the area. The result will be diverse and expanded employment and economic opportunities for both the Ocean Pointe-Hoakalei development and the region.

Policy:

Section 226-8 Objective and policies for the economy--visitor industry.

Section 226-8(b)(3) Improve the quality of existing visitor destination areas....

Section 226-8(b)(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.

Section 226-8(b)(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.

Comment: The 'Ewa development district has been designated by the EDP as a secondary center for resort development on the island of O'ahu. The Ocean Pointe-Hoakalei development is already permitted to add a maximum of 950 new visitor accommodation units. As noted in Dr. Paul Brewbaker's May 2014 economic analysis of the Ocean Pointe-Hoakalei development, tourism in Hawai'i is presently being constrained primarily by limits on lodging capacity and further by air seat capacity. He concludes that the acceleration of lodging unit construction at Ocean Pointe-Hoakalei and the beneficial recreational infrastructure that is being proposed for the development are essential to help resolve this ongoing problem.

The Ocean Pointe-Hoakalei development will provide visitors and residents with new commercial, resort and recreational opportunities not currently available in the area. These opportunities in turn will help develop and enhance the quality of a designated visitor destination area and provide a new employment center in West O'ahu.

Policy:

Section 226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources.

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

Section 226-12(b)(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.

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

Comment: A key objective both of Haseko's vision for the Ocean Pointe-Hoakalei development and of the EDP is to preserve and protect the visual landmarks and vistas that make the area unique and beautiful. Of those significant scenic resources that are identified in the EDP, two have a relationship to the Project Area: a) *Mauka* and *makai* views; and b) Views of central Honolulu and Diamond Head off to the east. Although construction within the Project Area will unavoidably alter the presently undeveloped landscape, the preservation of the expansive views across the open water and low-lying *makai* area will continue to provide a sense of openness. Since most of the area around the lagoon will be dedicated open space that the public will be encouraged to use, much of the open space and views across the Project Area will be maintained.

The HMPU will not result in structures which would obstruct significant panoramic views of the shoreline or other areas as seen from H-1 Freeway and *mauka* areas. All structures would conform to existing height and density limits.

As previously described in this document, the Kauhale Preserve is one of three archaeological and cultural preserves that have long been established within the existing master plan area. Within these preserves are features that are included in the SHPD-approved Archaeological Preservation Plan, including four (4) archaeological sites.

The HMPU also includes a number of habitat improvements within the existing 6-acre wetland and the 7.2-acre WPA located within the Kauhale Preserve, which will enhance the WPA's value as a wildlife habitat for endangered water birds and indigenous migratory shorebird species.

The Project Area has not been open to public access for many years and is not associated with any ongoing traditional cultural practices for subsistence, cultural, or religious purposes and does not

provide access to cultural resources in other areas. The HMPU would have no adverse impact on Native Hawaiian or other ongoing cultural practices or properties.

Policy:

Section 226-13 Objectives and policies for the physical environment--land, air, and water quality.

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

Comment: The Project Area has already been mass-graded to implement significant portions of the existing master plan. Haseko will implement best management practices in the design and construction of the HMPU's drainage system, which includes: two additional water quality control lakes; grassed swales; runoff treatment structures; extensive landscaping and other measures. Collectively, these facilities are designed to minimize erosion and preclude the introduction of sediments and other contaminants from entering the lagoon basin and storm water runoff. Haseko's intent to prohibit motorized watercraft in the lagoon will also protect the water quality of the basin.

Once the basin is completed as a recreational lagoon, it will be subject to the State water quality criteria applicable to all State waters, as well as the specific State criteria for inland recreational waters.

Ambient air quality for the Project Area will be most affected during construction, and Haseko will require its contractor to implement all measures necessary to minimize airborne pollutants. Once uses are established and in operation, they will generate emissions typical of urban areas elsewhere on the island. No significant sources of airborne emissions are part of the HMPU.

Adjacent to the Project Area are: Hoakalei Country Club and Golf Course, the established community of 'Ewa Beach, Kalaeloa Airport, and a series of inland master-planned residential communities. The Project Area is near several district parks including Ocean Pointe District Park and Kalaeloa District Park, and is also in close proximity to the existing government services and facilities located in the area, including police, fire, emergency medical services, solid waste collection and disposal, and educational facilities.

Policy:

Section 226-15 Objectives and policies for facility systems--solid and liquid wastes.

Section 226-15(b)(1) Encourage the adequate development of sewerage facilities that complement planned growth.

Section 226-15(b)(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.

Comment: As of May 31, 2014, Haseko has received sewer connection permits for over 3,400 homes across Ocean Pointe-Hoakalei. It will continue to coordinate with the Department of Environmental Services and other applicable agencies to ensure that the development of solid and liquid waste-related infrastructure is completed in conformance with all agency requirements and Haseko's DPP-approved Sewer Master Plan. While some aspects of the Master Plan have changed, these changes are not substantive and would not result in additional demands on sewer and waste water treatment capacity. The Honouliuli Waste Water Treatment Plant sewer outfall passes to the east of, and outside, the Project Area. Implementation of the HMPU will not have any impact on access to, or operation and maintenance of, the sewer outfall.

Design strategies and construction technologies that support use of recycled materials and conservation and recycling practices will be incorporated where appropriate. The HMPU will incorporate the use of non-potable water for landscaping and other appropriate uses, and wherever possible, water conservation measures will be employed during construction and operation of the Project Area.

Policy:

Section 226-16 Objective and policies for facility systems--water.

Section 226-16(b)(1) Coordinate development of land use activities with existing and potential water supply.

Section 226-16(b)(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

Comment: Based on a review of groundwater resources prepared by the Commission of Water Resource Management, Report PR-1996-01 Re-evaluation of the Ground-Water Resources and Sustainable Yield of the 'Ewa Caprock Aquifer, the available supply of potable water from the 'Ewa-Kunia Aquifer System should be adequate to support the Project Area. The Board of Water Supply ("BWS") has reviewed and approved Haseko's Water Master Plan for the development. Although based on a previous version of the Master Plan, the subsequent changes would not increase development density or substantively increase demands for potable water. Under current BWS policy, water use allocations are granted in incremental quantities as construction plans are approved and building permits are obtained. Appropriate design and landscaping measures to encourage water conservation and minimize water consumption will be incorporated into the Project Area as appropriate.

6.2 HAWAI'I STATE FUNCTIONAL PLAN

The Hawai'i State Plan establishes a Statewide Planning System to achieve State goals, objectives and policies. This system requires the development of State Functional Plans ("SFPs") which, in conjunction with County GPs, are the primary guideposts for implementing the State Plan. While the Hawai'i State Plan establishes long-term objectives for Hawai'i, the SFPs describe specific strategies of policies and priority actions within specific fields of activity that should be addressed in the short-term. The Hawai'i State Plan directs appropriate state agencies to prepare Functional Plans which address statewide needs, problems and issues, and recommend policies and actions to mitigate those problems in their specific functional areas, which include: agriculture, health, historic preservation, recreation, employment, housing, tourism, and transportation.

The following Functional Plans are most immediately relevant to Ocean Pointe-Hoakalei development.

6.2.1 RECREATION FUNCTIONAL PLAN:

The State Recreation Functional Plan seeks to address these statewide issue areas: 1) Ocean and shoreline recreation (saturation of beach park capacity); 2) Mauka, Urban, and Other Recreation Opportunities (need for activities and facilities in mauka and other areas; expanded urban and community recreation opportunities); 3) Public Access to Shoreline and Upland Recreation Areas (preserve/enhance public access); 4) Resource Conservation and Management (prevent environmental/marine degradation); 5) Management of Recreation Programs, Facilities and Areas (primarily relates to public funding for and management of recreation facilities); and 6) Wetlands Protection and Management

(promote greater use of wetlands for passive recreation, and assure protection of wetland areas).

Comment: The HMPU now proposes a recreational waterfront lagoon as an option to the marina and its attendant ocean outlet and entrance channel. While all available measures would have been employed to mitigate the impacts of creating this outlet and channel on the surrounding environment, preserving the existing shoreline and maintaining the existing ocean environment in the channel area as now proposed eliminates the need for such measures.

Haseko has prepared a comprehensive Drainage Master Plan for the Ocean Pointe-Hoakalei project, approved by the DPP on December 7, 2012, which guides the development's consideration of natural landforms, slope, and susceptibility to inundation. The plan calls for two large water quality lakes to be created to allow storm water from upland areas and the Project Area to either settle in the lakes, or overflow into the basin. Storm water would discharge into the ocean only during the most extreme storm events, such as a 100-year storm. To address the potential for tsunami inundation or erosion of the shoreline over time, and to avoid any possible future requirement for protective structures, the HMPU limits the development of sensitive infrastructure near the shoreline.

The Project Area will not be a significant source of environmental pollutants. In particular, the potential for water and air pollution from motorized watercraft will largely be eliminated. Other mitigation measures aimed at protecting water quality and groundwater resources are also planned.

The HMPU will provide an improved level of access both to the HMPU area and adjacent natural and recreational resources such as the One'ula-Honouliuli shoreline fronting the proposed lagoon. Specifically, the conveyance of approximately nine acres to the CCH will improve public access to the shoreline and One'ula Beach Park. This will result in doubling the lineal beachfront footage of One'ula Beach Park and will provide a public gathering space comparable in size to Ala Moana Beach Park in urban Honolulu. Further, eliminating the need for a channel entrance for a marina allows for continued use of an existing uninterrupted trail along the natural shoreline, providing the public with pedestrian access along the shoreline from One'ula Beach Park in the east to White Plains Beach in the west.

In addition to improved opportunities for access and recreation along the natural shoreline, the HMPU includes a system of publicly-accessible pathways around the lagoon that will meander toward points of interest including through the Kauhale Preserve. This pathway system, estimated to be approximately 1.5 miles in length, will be designed to offer a variety of different experiences to visitors by including cultural interpretive displays, educational signage and kiosks, scenic viewpoints, and other amenities.

6.2.2 STATE HISTORIC PRESERVATION FUNCTIONAL PLAN

This Plan identifies issues, policies, and implementing actions that seek to address these statewide issue areas: 1) preservation of historic properties; 2) the collection and preservation of historic records, artifacts and oral histories; and 3) the provision of public information and education on the ethnic and cultural heritages and history of Hawai'i.

Comment: As previously noted, the Kauhale Preserve is one of three archaeological and cultural preserves that have long been established within the existing master plan area. Within these preserves are features that are included in the State Historic Preservation Division (SHPD)-approved Archaeological Preservation Plan. Consultation with archaeologists and Hawaiian cultural resource specialists has been ongoing to periodically update detailed preservation/interpretation plans for these identified features, which include four archaeological sites.

The HMPU also includes a number of habitat improvements within the existing 6-acre wetland and the 7.2-acre WPA located within the Kauhale Preserve. The improvements are intended to enhance the WPA's value as a wildlife habitat for endangered water birds including Hawaiian stilts, the Hawaiian coot and the Hawaiian duck, as well as indigenous migratory shorebird species. As stated

previously in this document, interpretive programming within all of the Preserves will involve the Hoakalei Cultural Foundation, which was founded by area *kūpuna* to assist with the oversight of the Archaeological Preservation Plan within the Ocean Pointe-Hoakalei development. Under the guidance of the Foundation, educational and informational activities will be developed and conducted for the community about traditional Native Hawaiian culture and practices as it relates to the preservation areas and the 'Ewa Plain.

6.3 STATE LAND USE LAW

The intent of HRS Chapter 205, which established the State Land Use Commission (SLUC), is to preserve, protect and encourage the development of lands in the State for uses which are best suited to the public health and welfare of the people of Hawai'i. All lands in the State are classified in one of four districts: Urban, Agricultural, Conservation, and Rural. The counties govern all land uses within the Urban districts and also regulate land use in the state Rural and Agricultural Districts, but within the limits imposed under Chapter 205.

Haseko's Ocean Pointe-Hoakalei development is a 1,100-acre master-planned community located entirely within the Urban District by four SLUC proceedings: 1) 1964 statewide classification; 2) 1975 reclassification in Docket No. 074-23; 3) 1984 reclassification in Docket No. A83-558; and 4) 1990 reclassification in Docket No. A89-651.

1964 Statewide Classification. In 1964, the State began to implement the State Land Use District boundary classifications. At that time, the shorefront land of Ocean Pointe-Hoakalei (including the areas encompassing the proposed lagoon/marina basin) were being classified within the Urban District, with the remainder being classified within the Agricultural District (most of the Project Area from around the *mauka* boundary of the basin to the shoreline is covered by this classification). No conditions were imposed during the 1964 statewide classification of these lands.

1975 Docket No. 074-23. In 1975, the SLUC, as part of its second Five-Year Boundary Review, under Docket No. 074-23, reclassified approximately 320 acres along Fort Weaver Road from the Agricultural District to the Urban District (none of the Project Area is located within lands covered by this classification). There were no conditions attached to that reclassification.

1984 Docket No. A83-558. In 1984, M.S.M. & Associates, Inc., under Docket No. A83-558, applied to reclassify approximately 181 acres in the Agricultural District to the Urban District. The 1984 reclassification Decision and Order ("D&O") contained 11 conditions as part of the approval (none of the Project Area is located within lands covered by this reclassification). Nine of the conditions currently remain in effect.

1990 Docket No. A89-651. In 1990, Haseko (Hawaii), Inc., under Docket No. A89-651, applied to reclassify approximately 389 acres, in the Agricultural District to the Urban District (the remainder of the Project Area not covered by the 1964 classification and located *mauka* of the basin is covered by this reclassification). This 1990 D&O included 21 conditions.

The Project Area is now entirely within the State Urban District. HRS §205-2 defines allowable activities within the Urban District as:

Urban districts shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated.

All of the proposed uses under all of the evaluated alternatives are allowed in the Urban District, so long as they conform to all other applicable laws and regulations.

Haseko believes that it is in compliance with the conditions of its 1984 and 1990 D&Os, and as the master plan is being updated on the County level, will continue to file annual reports and meet with the SLUC to ensure compliance with and satisfaction of all applicable conditions of the D&Os.

6.4 CHAPTER 343, HAWAII REVISED STATUTES, AND TITLE 11, CHAPTER 200 HAWAII ADMINISTRATIVE RULES

This document is prepared in compliance with the requirement of the EDP that all projects involving a “significant zone change” prepare either an EA or EIS in conformance with the requirements of HRS Chapter 343 and Title 11, Chapter 200 of the HAR.

Ocean Pointe-Hoakalei was formerly known as the ‘Ewa Marina Community Development for which several environmental impact disclosure documents have been prepared, filed and accepted. All of these documents, listed chronologically below, were prepared pursuant to HRS Chapter 343, except one that was prepared by the U.S. Army Corps of Engineers pursuant to the National Environmental Policy Act (NEPA).

1. The first EIS encompassing the area that was known as ‘Ewa Marina Phase I, including Increments 1 and 2, was accepted on February 20, 1981 (the Project Area is mostly located within Phase I, Increment 2). This “programmatic” EIS was accepted subject to the requirement that more detailed supplements to the EIS be prepared for specific increments based on firmer and more detailed development concepts that would become available as the development progressed.
2. The Supplemental EIS for Phase I, Increment 1 was accepted on April 16, 1984.
3. The first Supplemental EIS for Phase I, Increment 2 was accepted by the City Department of Land Utilization (“DLU”) on April 16, 1986.
4. An EIS for ‘Ewa Marina Phase II was accepted by DLU on May 14, 1991 (the remainder of the Project Area is located in Phase II). This was not a supplemental EIS since it encompassed an area that was not previously included in the 1981 EIS (Phase II EIS).
5. In 1992, a second Supplemental EIS for Phase I, Increment 2 was prepared to address a reconfigured marina. This EIS was accepted on May 8, 1992 (1992 Supplemental EIS).
6. A Federal EIS for the 120-acre marina was prepared by the U.S. Army Corps of Engineers pursuant to NEPA in 1993.
7. In conjunction with a shorefront common area facility for the Ocean Pointe-Hoakalei development, an Environmental Assessment (“EA”) was prepared in April 1998. The DLU issued a Finding of No Significant Impact (“FONSI”) and an EIS was not required.
8. A Final Supplemental Environmental Assessment (“FSEA”) was submitted to DPP in June 2001 and resulted in a FONSI. This FSEA evaluated: (1) the elimination of the upper basin of the marina (and consequent reduction in size from 120 acres to 70 acres), (2) the realignment of the golf course as part of the region’s storm water solution, and (3) the reconfiguration of the development’s commercial and visitor accommodations areas.
9. A FEIS was accepted by the DPP on December 23, 2005, for a SMP and SSV (and other State and Federal approvals) for the construction of the Kalo‘i Gulch drainage way to accommodate 100-year storm flows via an ocean outlet through One‘ula Beach Park. The purpose of the project was to provide flood control and address regional drainage for all communities within the Kalo‘i Gulch watershed.

6.5 COASTAL ZONE MANAGEMENT PROGRAM

HRS Chapter 205A establishes the Coastal Zone Management (CZM) program, which includes the provisions establishing and governing of the Special Management Area (SMA). The State Office of Planning (OP) is designated the “lead agency” responsible for overseeing the implementation of CZM requirements, while each County is responsible for administering the provisions of the SMA.

Although each County has the authority to establish its own SMA boundaries, HRS 205A-23(b) states that “any contraction of the special management area boundaries...shall be subject to lead agency

review and determination as to compliance with the objectives and policies of this chapter and any guidelines enacted by the legislature.”

Pursuant to the regulatory authority conferred by HRS Chapter 205A, the CCH’s regulations and procedures pertaining to all lands within the City’s SMA are contained in ROH Chapter 25. Development within shoreline setback areas is governed by ROH Chapter 23.

Haseko remains in compliance with approvals granted under the above-cited sections of HRS 205A and ROH Chapters 23 and 25 for the 1,100-acre master-planned development. Those approvals as well as future approvals to be sought are described in Section 6.8 below.

6.6 THE CITY & COUNTY’S PLANNING PROCESS

The CCH’s planning process is generally comprised of three tiers. As the first tier of this process, the GP establishes policy guidance for O’ahu, with all subsequent City plans and implementing regulations required to be consistent with the GP.

The second tier consists of a Development Plan (“DP”) or Sustainable Communities Plan (“SCP”) across eight regions on O’ahu. These regional plans: a) conceptually describe the desired pattern of land use for the region; b) provide guidance for functional infrastructure planning; and c) identify areas within the DP/SCP boundary that might benefit from more detailed planning.

The City’s third planning tier is comprised of specific mechanisms to implement the first two tiers of the planning hierarchy, and include: a) implementing ordinances and regulations [i.e., Land Use Ordinance (zoning code), Subdivision Rules and Regulations, and the City’s Capital Improvement Program]; public facilities and infrastructure functional plans; and special area plans that give specific guidance for specific portions of DP and SCP areas.

6.6.1 GENERAL PLAN

A requirement of the City Charter, the CCH GP is a comprehensive statement of objectives and policies which sets forth the long-range aspirations of O’ahu’s residents and the strategies of actions to achieve them. As the first tier of a comprehensive planning process, the GP is first a statement of the long-range social, economic and environmental objectives for the general welfare and prosperity of the people of O’ahu. These objectives contain both statements of desirable conditions to be sought over the long run and desirable conditions which can be achieved within an approximate 20-year time horizon.

Second, the GP is a statement of broad policies which facilitate the attainment of the Plan’s objectives.

The GP is intended to guide land use and development decisions and to influence actions in 11 areas of concern, including population, economic activity, the natural environment, physical development and urban design, housing, transportation and utilities, energy, public safety, health and education, government operations and fiscal management and culture and recreation.

This section describes the HMPU within the context of the overall 1,100-acre development’s long-standing consistency with relevant GP objectives and policies.

Policy:

Population

Objective C: To establish a pattern of population distribution that will allow the people of O’ahu to live and work in harmony.

RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

Policy 2: Encourage development within the secondary urban center at Kapolei and the ‘Ewa and Central O‘ahu urban-fringe areas to relieve development pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center.

Policy 4: Direct growth according to Policies 1, 2, and 3 above by providing land development capacity and needed infrastructure to seek a 2025 distribution of O‘ahu’s residential population as follows:

Table 6.1 Distribution of Residential Population

<i>Location</i>	<i>Percentage Share of 2025 Islandwide Population</i>
<i>Primary Urban Center</i>	<i>46.0%</i>
<i>‘Ewa</i>	<i>13.0%</i>
<i>Central O‘ahu</i>	<i>17.0%</i>
<i>East Honolulu</i>	<i>5.3%</i>
<i>Koolaupoko</i>	<i>11.6%</i>
<i>Koolauloa</i>	<i>1.4%</i>
<i>North Shore</i>	<i>1.7%</i>
<i>Wai‘anae</i>	<i>4.0%</i>
<i>TOTAL</i>	<i>100%</i>

Comment: From its inception, the 1, 100-acre Ocean Pointe-Hoakalei master-planned development has been envisioned as a mixed-use development with residential, commercial, industrial and resort uses, with a man-made marina serving as the development’s focal point. From the sale of the project’s first home in 1998 to the present, development has continued uninterrupted generally from east to west across the 1,100-acre property. About 70% of the planned single-family and townhome residences have been completed (including the affordable housing units).

The marina basin has been constructed, and an 18-hole golf course that incorporates extensive drainage infrastructure has largely been completed along with most of the remaining required infrastructure, including roadways, drainage, sewer and water.

In addition to the residential units and attendant infrastructure, Haseko has satisfied many conditions of prior rezonings of the land by accommodating the population through provisions of land for an elementary school, child care center and a fire station, while meeting open space requirements through the development of private parks, and the pending dedication of a district park and the shoreline parcels that will expand One‘ula Beach Park.

As development of Ocean Pointe-Hoakalei has proceeded over the years, plans for the marina basin continued to evolve, and from time to time necessitated minor adjustments to the master plan. Yet while the details have changed over time, the fundamental vision of the Ocean Pointe-Hoakalei master-planned, mixed-use community has remained the same. The HMPU will not have an effect on the population because the total number of residential units remains unchanged.

Policy:*Economic Activity*

Objective A: *To promote employment opportunities that will enable all the people of O‘ahu to attain a decent standard of living.*

Policy 1: Encourage the growth and diversification of O‘ahu’s economic base.

Objective G: *To bring about orderly economic growth on O‘ahu.*

Policy 1: Direct major economic activity and government services to the primary urban center and the secondary urban center at Kapolei.

Policy 3: Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on O‘ahu.

Comment: Resolution 91-239 amended the GP (under Physical Development and Urban Design, Objective C) to add visitor accommodation units in the EDP area as an allowed use within the maritime commercial center incorporated in the master-planned community. This maritime commercial center was envisioned to be a mixed-use, employment and recreation complex which would provide substantive social and economic benefits to the community by creating direct investment and ongoing job opportunities.

The HMPU remains consistent with that this policy, as it is a stimulus for economic activity and generator of jobs for the area. As previously noted, the HMPU will have positive short term benefits on the local economy from the increased expenditures for construction of its hotels, residences, and commercial buildings, as well as the related jobs and tax revenue.

The goal for the HMPU is the creation of a vibrant mixture of resort, residential, light industrial and commercial uses centered on a recreational lagoon with the intent of drawing the public to the area, which will be serviced by local employees. The combination impact of well-managed amenities near the scenic beauty of a recreational lagoon and the shore could combine to create a synergistic effect on employment and revenue generation.

Economic analysis provided in the HMPU has also shown that a lagoon would at the least generate comparable City and State tax revenues (e.g., property, general excise and transient accommodation) and employment creation as a marina. That is, the proposed lagoon and enhanced public access will still serve the objective of job creation in the ‘Ewa region. The land uses provided in the HMPU will provide for the employment and economic opportunities comparable to those envisioned under the existing master plan.

Policy:*Natural Environment*

Objective A: *To protect and preserve the natural environment.*

Policy 1: Protect O‘ahu’s natural environment, especially the shoreline, valleys, and ridges, from incompatible development.

Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water- recharge areas, distinctive land forms, and existing vegetation.

Policy 6: Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.

Policy 7: Protect the natural environment from damaging levels of air, water, and noise pollution.

Policy 8: Protect plants, birds, and other animals that are unique to the State of Hawai'i and the Island of O'ahu.

Policy 10: Increase public awareness and appreciation of O'ahu's land, air, and water resources.

Objective B: To preserve and enhance natural monuments and scenic views of O'ahu for the benefit of both residents and visitors.

Policy 4: Provide opportunities for recreational and educational use and physical contact with O'ahu's natural environment.

Comment: Haseko completed the existing basin for the then-proposed boating marina in 2008, including placing the stone revetments along its banks, in anticipation of opening the basin to the ocean. Only the removal of a narrow plug of land separating the basin from the ocean and construction of a 3,000-foot-long marina entrance channel were left unfinished, with the imported revetment stone needed to complete the small amount of remaining work stockpiled on site.

The HMPU now proposes a recreational waterfront lagoon as an option to the marina and its attendant ocean outlet and entrance channel. While all available measures would have been employed to mitigate the impacts of creating this outlet and channel on the surrounding environment, preserving the existing shoreline and maintaining the existing ocean environment in the channel area as now proposed obviates the need for such measures. Therefore, the HMPU's consistency with the GP's objective of protecting the natural environment is strengthened.

Haseko has prepared a comprehensive Ocean Pointe Drainage Master Plan for the 1,100-acre Ocean Pointe-Hoakalei development, approved by the DPP on December 7, 2012, which guides the HMPU's consideration of natural landforms, slope, and susceptibility to inundation. As described in Chapter 4 of this EIS, this master plan addresses proposed drainage improvements including: runoff control measures, retention lakes, swales, and other water quality treatment structures which will minimize storm water runoff into the lagoon and virtually eliminate storm water drainage into the ocean. To address the potential for tsunami inundation or erosion of the shoreline over time, and to avoid any possible future requirement for protective structures, the HMPU limits the development of sensitive infrastructure near the shoreline.

The Ocean Pointe-Hoakalei development will not be a significant source of environmental pollutants. In particular, the potential for water and air pollution will largely be eliminated by prohibiting motorized watercraft in the lagoon. Other mitigation measures aimed at protecting water quality and groundwater resources are described in Chapter 4 of the DEIS.

The HMPU will provide an improved level of access both to the HMPU area and adjacent natural and recreational resources such as the One'ula-Honouliuli shoreline fronting the proposed lagoon area. Specifically, the conveyance of approximately nine acres to the CCH will improve public access to the shoreline and One'ula Beach Park. This will result in doubling the lineal beachfront footage of One'ula Beach Park and will provide a public gathering space comparable in size to Ala Moana Beach Park in urban Honolulu. Further, eliminating the need for a channel entrance for a marina allows for an uninterrupted natural shoreline with trail, providing the public with pedestrian access along the shoreline from One'ula Beach Park in the east to White Plains Beach in the west. This distance is roughly equivalent to the combined shoreline frontage of Ala Moana Beach Park and Kailua Beach Park.

In addition to improved opportunities for access and recreation along the natural shoreline, the HMPU includes a system of publicly-accessible pathways around the lagoon that will meander toward points of interest including through the Kauhale Preserve. This pathway system, estimated to be

approximately 1.5 miles in length, will be designed to offer a variety of different experiences to visitors by including cultural interpretive displays, educational signage and kiosks, scenic viewpoints, and other amenities.

The Kauhale Preserve is one of three archaeological and cultural preserves that have long been established within the existing master plan area. Within these preserves are features that are included in the SHPD-approved Archaeological Preservation Plan. Consultation with archaeologists and Hawaiian cultural resource specialists has been ongoing to periodically update detailed preservation/interpretation plans for these identified features, which include four archaeological sites within the HMPU.

The HMPU also includes a number of habitat improvements within the existing 6-acre wetland and the 7.2 acre WPA located within the Kauhale Preserve. The improvements are intended to enhance the WPA's value as a wildlife habitat for endangered water birds including Hawaiian stilts, the Hawaiian coot and the Hawaiian duck, as well as indigenous migratory shorebird species. Interpretive planning and programming within all of the Preserves will involve the Hoakalei Cultural Foundation, which was founded by area kūpuna to assist with the oversight of the Archaeological Preservation Plan within the Ocean Pointe-Hoakalei area. Plans include an active preservation program for the Kauhale Preserve with a focus on place-based education of school children, and establishment of marked trails within both the Kauhale and Kuapapa Preserves through which visitors can learn about the historic sites through interpretive signage on self-guided walks.

Under the guidance of the Foundation, educational and informational activities will be developed and conducted for the community about traditional Native Hawaiian culture and practices as it relates to the preservation areas and the 'Ewa Plain.

In light of the above measures and actions reflected in the HMPU, the master planned development remains consistent with the GP's objectives and policies to: protect and preserve the natural environment, and provide opportunities for recreational and educational use and physical contact with O'ahu's natural environment.

Policy:

Physical Development and Urban Design

Objective A: *To coordinate changes in the physical environment of O'ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.*

Policy 3: Phase the construction of new developments so that they do not require more regional supporting services than are available.

Policy 4: Require new developments to provide or pay the cost of all essential community services, including roads, utilities, schools, parks, and emergency facilities that are intended to directly serve the development.

Objective C: *To develop a secondary urban center in 'Ewa with its nucleus in the Kapolei area.*

Policy 6: Encourage the development of the 'Ewa Marina Community as a major residential and recreation area emphasizing recreational boating activities through the provision of a major marina and a related maritime commercial center containing light-industrial, commercial, and visitor accommodation uses.

Comment: Haseko has been in the process of building out the Ocean Pointe-Hoakalei development since the late 1990s. During that time, the development has been divided into two increments: Ocean Pointe, the largely residential component, and Hoakalei, which includes resort, commercial, light

industrial and residential uses. The 1,100-acre master-planned community was further divided into sub-planning/development areas which have been developed sequentially over the years, beginning in the east side of the development and moving west over time. The intent of this phased development has been to accommodate market conditions and allow Haseko to create the necessary infrastructure to support the increased population and development. Haseko has worked with State and County agencies to contribute its proportionate share of essential community services and facilities, including roads, parks, water, sewer and drainage facilities, emergency shelters, civil defense warning sirens, land for a child care center and an elementary school, and land and equipment for a fire station.

Resolution 91-239 amended the GP under *Physical Development and Urban Design, Objective C*, to add visitor accommodation units in the EDP area, as one of the uses allowed within the maritime commercial center encouraged for the master planned development. This maritime commercial center was envisioned to be a mixed-use, employment and recreation complex which would provide substantive social and economic benefits to the community by creating direct investment and job opportunities. The amendment emphasized the mixed-use commercial center's role as a generator of jobs and economic activity through its attraction as a recreation center. The existing master plan for the development has remained consistent with this policy, minus the marina component.

Due to the need to adapt to significant changes in the global economy and ongoing legal challenges to governmental approvals over the past years, the vision for Hoakalei, as represented in the HMPU, is a vibrant waterfront community now focused on development of a lagoon rather than a marina. Nevertheless, the HMPU and its proposed lagoon are consistent with the overriding objectives of the GP, which is to encourage the same mix of zoning uses (i.e., light industrial, commercial, residential, visitor accommodation) referenced in the GP and still qualifies as a "major residential and recreation area" as contemplated in the GP. The construction of a marina at some point in the future is still feasible even if the lagoon is constructed first. As discussed in Section 3.8.1 of the EDP, the proposed lagoon development is stated as an alternative to a marina development. For these reasons, the EDP remains consistent with the GP. Constructing a recreational lagoon rather than a marina at this time still meets the GP's major objective of promoting long term job creation in the 'Ewa region. Long term job creation can only result from a mixed-use project (as opposed to a project with only residential use) that has a viable program. While a marina is not feasible for the foreseeable future, a project featuring a recreational lagoon can succeed so long as the mix of uses, including commercial, residential, and visitor accommodation uses is preserved.

Therefore, the HMPU remains consistent with the GP's vision of the Ocean Pointe-Hoakalei development as a major residential and recreation area with a waterfront commercial center.

Policy:

Culture and Recreation

Objective B: *To protect O'ahu's cultural, historic, architectural and archaeological resources.*

Policy 2: Identify, and to the extent possible, pre-serve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance.

Policy 4: Promote the interpretive and educational use of cultural, historic, architectural, and archaeological sites, buildings, and artifacts.

Objective D: *To provide a wide range of recreational facilities and services that are readily available to all residents of O'ahu.*

Policy 6: Provide convenient access to all beaches and inland recreation areas.

Policy 8: Encourage ocean and water-oriented recreation activities that do not adversely impact on the natural environment.

Comment: In recognition of the Honouliuli's legacy of centuries of human use and habitation, Haseko has developed and implemented a four-phase archaeological mitigation program for the entire 1,100-acre Ocean Pointe-Hoakalei development. This program was developed in compliance with conditions of Haseko's Department of Army permit and a MOA between Haseko ('Ewa), Inc., the Army Corps of Engineers, the State Historic Preservation Office (SHPD), and the Advisory Council on Historic Preservation. The program included the preparation of site-specific preservation and implementation plans, all of which have been reviewed and accepted by the SHPD. The program also includes the creation and maintenance of archaeological preserves within the HMPU.

In addition, as part of the planning process for the HMPU, Haseko has worked with T.S. Dye & Colleagues, Archaeologists, Inc., to prepare a CIA. The CIA includes documentary and interview data pertinent to the entire Ocean Pointe-Hoakalei development and provides a series of recommendations which will be used in support of cultural-interpretive programming within the Project Area. A summary of the comments and recommendations of CIA interview participants include: the protection of natural and cultural features at Ocean Pointe-Hoakalei including native burials; depletion to a significant degree of the near shore marine environment from overharvesting, coastal development and environmental change; living on the land comes with responsibility for its care; the importance of maintaining traditional place names for the understanding of future generations; that care of the land extends beyond the shoreline; and that the system of voluntary stewardship of natural resources was, and should continue to be, passed down over generations within families. These recommendations/comments fully support the above-stated policies of identifying and preserving areas of cultural, historic and archaeological significance; and promoting the interpretive and educational use of cultural and historic sites.

The HMPU includes increased public access to, and promotion of, the archaeological and cultural preserves as permitted under the archaeological mitigation program described above.

Consultation with archaeologists and Hawaiian cultural resource specialists has been ongoing to periodically update the detailed preservation plans, ensuring appropriate preservation, interpretation, and educational use of the features within the three preserves, including four archaeological sites.

The planned system of publicly-accessible pathways around the lagoon will meander toward points of interest, including through the Kauhale Preserve. This pathway system, approximately 1.5 miles in length, will be designed to offer a variety of different experiences to visitors that include cultural interpretive displays, educational signage and kiosks, scenic viewpoints, and other amenities.

The HMPU calls for the development of a swimming cove in the northwest corner of the basin that will provide a recreational amenity - swimming in calm, shallow waters – not available elsewhere in the 'Ewa region. The lagoon itself would be used for water activities such as stand-up paddle boarding and canoeing, kayaking and other small non-motorized, non-polluting recreational craft.

The HMPU includes the conveyance of approximately nine acres to the CCH, which will improve public access to the shoreline and One'ula Beach Park. This will result in doubling the lineal beachfront footage of One'ula Beach Park and provide a public gathering space comparable in size to Ala Moana Beach Park. Additionally, eliminating the need for a channel entrance for the previously-planned marina will allow for an existing uninterrupted trail along the natural shoreline, providing the public with pedestrian access along the shoreline from One'ula Beach Park in the east to White Plains Beach in the west.

Collectively, the above-described measures ensure the compliance of both the Ocean Pointe-Hoakalei development and the HMPU with the GP objectives of protecting O'ahu's cultural, historic, architectural and archaeological resources, and providing a wide range of recreational facilities to the residents of O'ahu.

6.6.2 ‘EWA DEVELOPMENT PLAN

As previously noted, the second tier of the City’s planning process is the eight regional Development Plans (DPs) and Sustainable Communities Plans (SCPs), which conceptually describe the desired pattern of land use for the region, provide guidance for functional infrastructure planning, and identify areas within the DP/SCP boundary that might benefit from more detailed planning.

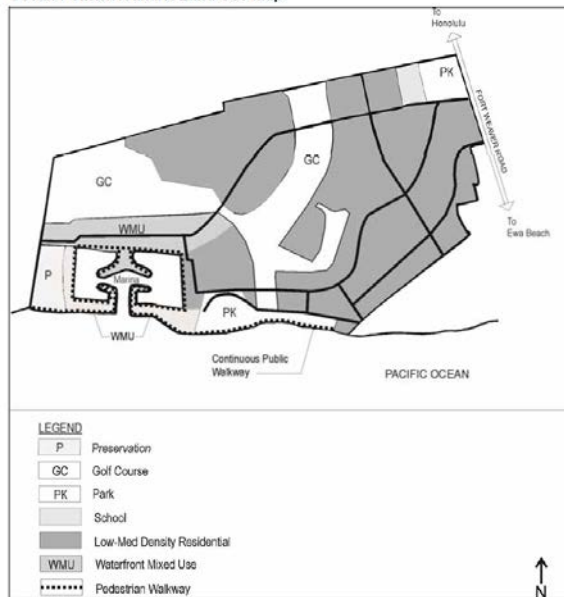
The EDP’s General Policies have long-recognized Ocean Pointe-Hoakalei (previously known as ‘Ewa Marina) as a planned residential mixed-use development. As stated in the 1997 edition of the EDP, portions of Section 3.6.2.1 of the EDP stated:

- “‘Ewa Marina, when developed, should be the region’s principal recreational marina destination for local residents and visitors. Developed on over 1,100 acres located between ‘Ewa Beach and Kalaeloa (former BPNAS), the community should be centered around a 120-acre marina which should serve as a major recreational resource and visual amenity for the community.
- The marina should provide recreational boating opportunities, supported by 1,400 boat slips, marine haul-out and other repair facilities, and a public boat ramp.
- The City supports timely development of the ‘Ewa Marina as a key element needed to mitigate drainage impacts in the Kalo‘i Gulch watershed during major storms. The marina’s role as a storm water storage and detention basin has been acknowledged and included in previously approved environmental impact statements and land use approvals for projects in the Kalo‘i Gulch watershed.
- ‘Ewa Marina should provide substantial public areas through shoreline and waterfront access, expansion of One‘ula Beach Park, and creation of a District Park on Fort Weaver Road. The public waterfront promenade at ‘Ewa Marina should have a hard edge and should focus on boating activity. Shoreline parks linked by pedestrian ways should be provided for public use along the entire waterway. A golf course should provide a major open space and visual amenity while also providing detention basins to receive run-off from light storms.
- On the eastern end, the ‘Ewa Marina Community should consist of Low and Medium Density Residential neighborhoods extending from Ft. Weaver Road, encompassing the eastern “loop” of the marina and an island within the marina.
- The existing community commercial center at ‘Ewa Beach should be enlarged by development on land along Ft. Weaver Road at the eastern corner of the ‘Ewa Marina community.
- On the west, a mix of activities should be sited around the marina basin, including a Marina Mixed Use area with resort and commercial development, a High Density Residential area, and a Marine Industrial area. ‘Ewa Marina is planned to have about 950 visitor units to support its marina-oriented activities”.

As the first step to recognize the change of focus for Ocean Pointe-Hoakalei from a marina to a recreational lagoon, Haseko sought an amendment to the EDP to allow a recreational lagoon as an alternative to a marina (as well as attendant modifications that support such an option). The updated EDP incorporating the amendment was approved by the City Council on July 10, 2013 and approved by the Mayor on July 22, 2013. Specifically, the approved amendment is an addition under the EDP’s General Policies (Sec. 3.8.1), which states that within Hoakalei:

“A recreational waterfront project (consisting of a lagoon) may be developed where the marina is shown on the map (Exhibit 3.5). Such a waterfront development would similarly serve as a major recreational resource, visual amenity, and economic generator for the community and is a compatible use that would not preclude the eventual development of a marina”.

This approved EDP amendment does not disallow a marina in the future, but instead allows the recreational lagoon to be pursued as an alternate use of the basin. Figure 6.1 reproduces Exhibit 3.5 of the EDP.

Figure 6.1 Ocean Pointe-Hoakalei Land Use MapExhibit 3.5
Ocean Pointe/Hoakalei Land Use Map

Source: City and County of Honolulu (2013)

The following describes the 1,100-acre Ocean Pointe-Hoakalei development's consistency with relevant general policies and attendant guidelines for Ocean Pointe-Hoakalei as specified in Sec. 3.8.1. of the EDP.

6.6.2.1 General Policies:**Policy:**

A recreational waterfront project (consisting of a lagoon) may be developed where the marina is shown on the map (Exhibit 3.5). Such a waterfront development would similarly serve as a major recreational resource, visual amenity, and economic generator for the community, and is a compatible use that would not preclude eventual development of a marina.

Guideline – Appropriate Scale and Siting – Minimize the visibility of large building volumes and elements from waterfront and residential areas through building envelope restrictions, site planning and landscaping.

Guideline – Community Integration – Although the design of Ocean Pointe-Hoakalei may have a distinct identity and entry, link Ocean Pointe-Hoakalei with surrounding areas, such as 'Ewa Beach and Kalaeloa by using connecting roadways, walkways, landscape and architectural design.

Comment: Haseko is currently undergoing the required environmental review process as the first step in obtaining the approvals needed to develop a recreational lagoon. The goal for the HMPU is the creation of a vibrant mixture of resort, residential, light industrial and commercial uses centered on a recreational lagoon with the intent of drawing the public to the area. The combination of well-managed amenities near the scenic beauty of a recreational lagoon and the shore could produce a synergistic effect where recreational activities, economic opportunities, and the location itself combine to create employment and generate revenue. Therefore, the HMPU will support and promote both the population and economic growth for the secondary urban center called for in the GP.

As previously described, the HMPU will provide an improved level of access both to the Project Area and adjacent natural and recreational resources such as the One‘ula-Honouliuli shoreline fronting the proposed lagoon area. The conveyance of approximately nine acres to the CCH will improve public access to the shoreline and One‘ula Beach Park. In addition, the HMPU includes a system of publicly-accessible pathways around the lagoon that will meander toward points of interest including through the Kauhale Preserve. This pathway system is estimated to be approximately 1.5 miles in length.

This increased pedestrian access complements the existing inter-connective elements already provided throughout the developed portions of the project, and which are also planned within the HMPU: a well-designed hierarchy of landscaped roadways and pedestrian-friendly pathways which promote complete integration within the development, as well as enhanced connectivity with surrounding areas.

Through appropriate site planning, landscaping and design of future structures, Haseko will ensure that the lagoon will not preclude eventual development of a marina, and that building volumes along the waterfront and in residential areas are appropriately scaled. No increases in the building heights or densities currently permitted are proposed.

Policy:

Develop Ocean Pointe-Hoakalei in ways that ensure environmental compatibility of uses.

Guideline- Environmental Compatibility – a) Do not develop residential and apartment units in areas that would expose residents to excessive aircraft noise; 2) Since airport operations have continued at Kalaeloa, ensure land uses at Ocean Pointe-Hoakalei are compatible with airport operations and respect restrictions on development within airport approach and clear zones; 3) Locate and operate uses that generate high noise levels in a way that keeps noise to an acceptable level in existing and planned residential areas; 4) Design and develop the built environment to avoid adverse impacts on natural resources or processes in the coastal zone; and) To retain a sense of place, incorporate natural features of the site and utilize landscape materials that are indigenous to the area in the design of hotel and recreation areas, where feasible.

Comment: The noise descriptor currently used by federal agencies to assess environmental noise is the Day-Night Average Sound Level (DNL). The project area is currently subjected to overflights, noise and other intrusions associated with aircraft utilizing the runways of the Honolulu International Airport and Kalaeloa Airport (formerly BPNAS). The existing DNL primarily from the operations of these two airports is estimated to range between 55 DNL and 65 DNL at the property boundary.

There is general consensus among federal agencies (i.e., Federal Aviation Administration, Federal Housing Administration, Department of Defense, Department of Housing and Urban Development, and the Veterans Administration) that residential housing development is acceptable in areas where the exterior noise levels do not exceed 65 DNL.

State law requires that all prospective buyers, lessees and tenants of property within the boundaries of the noise exposure area (as shown on maps prepared by the State Department of Transportation in compliance with federal requirements) be notified of potential noise impacts. In compliance with these regulations, all Ocean Pointe-Hoakalei homeowners are notified of the potential for noise impacts, and all Ocean Pointe-Hoakalei homes have been attenuated for sound.

There is no use proposed within the Project Area that is expected to generate high noise levels; nonetheless, appropriate sound attenuation and other mitigation measures will be provided for any potential noise-generating uses.

Haseko has undertaken extensive studies to ensure that the establishment and operations of the recreational lagoon do not adversely impact the natural resources or processes in the coastal zone.

Where they exist within the HMPU, natural features will be retained if possible, and native and indigenous plant material will be used extensively throughout the HMPU's landscaped areas.

Policy:

Provide substantial public areas at Ocean Pointe-Hoakalei through shoreline and waterfront access, expansion of One'ula Beach Park, and dedication of a District Park on Fort Weaver Road.

Develop the waterfront promenade at Hoakalei with a hard edge and a focus on recreational water activities. Provide shoreline parks linked by pedestrian ways for public use along the entire waterway.

Guideline – Public Access - a) Provide a continuous pedestrian pathway open to the public along the shoreline and along most of the basin, with the exception of sections where private residential lots directly front the basin; b) Provide access to the entire waterway and ocean shorelines to the public through the internal and peripheral pedestrian pathways; and c) Provide public parking, restrooms, and shower facilities at regular intervals for all sandy beach areas.

Comment: As previously described, the HMPU will provide an improved level of access both to the HMPU area and adjacent natural and recreational resources such as the One'ula-Honouliuli shoreline fronting the proposed lagoon area. The conveyance of approximately nine acres to the CCH will improve public access to the shoreline and One'ula Beach Park. This will result in doubling the lineal beachfront footage of One'ula Beach Park and will provide a public gathering space comparable in size to Ala Moana Beach Park in urban Honolulu. Further, eliminating the need for a channel entrance for a marina allows for continued use of an existing uninterrupted trail along the natural shoreline, providing the public with pedestrian access along the shoreline from One'ula Beach Park in the east to White Plains Beach in the west. Restroom and shower facilities and public parking are included in the proposed HMPU plans.

In addition, the HMPU includes a system of publicly-accessible pathways around the lagoon that will meander toward points of interest including through the Kauhale Preserve. This pathway system, estimated to be approximately 1.5 miles in length, will be designed to offer a variety of different experiences to visitors including cultural interpretive displays, educational signage and kiosks, scenic viewpoints, and other amenities.

Along with the pathways intended to increase public access to the site, Haseko plans to create two recreational features that will attract public visitation. The first is a public swimming cove for swimming and sunbathing opportunities in a sheltered environment. It is expected that this feature will serve as a significant attraction to a broad segment of the population. The second is the recreational lagoon itself, which will allow for the use of non-motorized watercraft in a similarly sheltered environment.

In satisfaction of Condition 13 of Ordinance 93-94, Haseko has graded, grassed and irrigated the approximately 20-acre district park on Fort Weaver Road it will dedicate to the City. In addition, Haseko has also committed to constructing the first phase of improvements to the park so that upon dedication, residents of 'Ewa Beach will have facilities ready to use and enjoy. Construction of the comfort station, backstop and parking lot will be completed in time for dedication sometime in 2014.

Policy:

Develop the golf course to provide a major open space and visual amenity while also providing detention basins to receive run-off from light storms.

Guideline – Natural Environment – Design the golf course to accommodate storm water runoff in a manner that maintains coastal water quality and avoids the use of concrete channels for diversion drainage. Design the waterway to accommodate the runoff of collected storm waters generated by a potential 100-year storm. Channel design should use the most effective means to provide natural flushing of its waters. Develop silting ponds mauka of the site to preserve water quality so that use of near-shore waters for recreational purposes and aesthetic enjoyment is not limited in any way.

Comment: Haseko has prepared a comprehensive Drainage Master Plan for Ocean Pointe-Hoakalei, approved by the DPP on December 7, 2012, which guides the project's consideration of natural landforms, slope, and susceptibility to inundation. The plan calls for two large water quality lakes to be created to allow storm water from upland areas and the Project Area to either settle in the lakes, or overflow into the basin. Storm water would discharge into the ocean only during the most extreme storm events, such as a 100-year storm. To address the potential for tsunami inundation or erosion of the shoreline over time, and to avoid any possible future requirement for protective structures, the HMPU limits the development of sensitive infrastructure near the shoreline.

The HMPU will not be a significant source of environmental pollutants. In particular, the potential for water and air pollution from motorized watercraft will largely be eliminated. Other mitigation measures aimed at protecting water quality and groundwater resources are also planned.

Since Haseko is pursuing the option of developing a recreational lagoon instead of a marina, the consideration of a marina channel design is unnecessary.

Policy:

*On the west, develop a mix of activities around the basin including a **Waterfront Mixed Use** area with resort and commercial development, a **Medium Density Residential** area, and a **Light Industrial Mixed Use Support** area. Hoakalei is planned to have about 950 visitor units to support the waterfront-oriented activities.*

*Guidelines- Urban Form – a) **Waterfront Mixed Use**- Develop a waterfront commercial center with associated visitor units adjacent to the waterfront, featuring a wide public promenade with retail attractions. Hotel and apartment buildings in this area should generally not exceed 90 feet and all other buildings should generally not exceed 60 feet. Buildings with frontage on the interior basin should be limited to 40 feet. Buildings taller than 40 feet should be set back from the basin frontage; b) **Medium Density Residential Area** – Develop a medium density residential area adjacent to the Waterfront Mixed Use area to provide a transition between the mixed uses of the Waterfront Mixed Use Area and the Single Family and Low Density Residential area to the east. Building heights in this area should generally not exceed 60 feet.*

In order to minimize the visual impacts of the Medium Density Residential areas adjacent to One'ula Beach Park, the developer should – a) Maximize mauka-makai and other view corridors in the area by orienting the narrow dimension of buildings parallel to the shoreline or predominant view; b) Maximize open space by minimizing building bulk and using extensive landscaping to create a park-like setting; and c) Provide greater setbacks and/or terraced building setback from the edge of the basin for buildings exceeding 25 feet in height.

Comment: The HMPU remains consistent with the EDP in supporting the development of a mix of residential, resort, light industrial and commercial uses centered on a recreational lagoon. Nothing being done now will prevent the permitting and construction of a marina by another entity in the future. Such flexibility will remain while establishing an amenity that will serve both the Ocean Pointe-Hoakalei development as well as the greater community. The siting, scale and design specifics of future structures within the Project Area will be in compliance with the EDP, LUO, and other applicable rules and regulations.

6.6.3 CCH'S LAND USE ORDINANCE (LUO)

The CCH's Land Use Ordinance (LUO) regulates land use in accordance with adopted land use policies, including the GP and DPs. The LUO provisions are also referred to as the zoning ordinance and zoning designations are shown on the City's zoning maps.

Section 2.2.2 of this EIS, *Surrounding Land Use*, describes how the proposed mixture of commercial, preservation, residential, resort, light industrial and mixed uses included in the HMPU conform to the intent of each respective zoning district as stated in the LUO.

All project height limits will conform to the limits established by the DPP's zoning maps and all development densities will comply with provisions in the LUO.

Zoning History Summary:

- December 1988: Haseko acquired the Ocean Pointe-Hoakalei development. Ordinance 85-44 rezoned a portion of the development pursuant to the then prevailing master plan.
- December 1993: Ordinance 93-94 rezoned the remainder of the development.
- March 2002: Ordinance 02-09 rezoned/reconfigured development and amended the Unilateral Agreement (UA).
- November 2002: Ordinance 02-58 further amended the UA.
- July 2007: Ordinance 07-35 rezoned/reconfigured the development to accommodate the Kalo'i Gulch regional drainage channel.

As required by Ordinance 93-94 (as amended by Ordinances 02-09, 02-58, and 07-35), Haseko submits to the DPP its annual progress report addressing its compliance with the UA conditions contained therein.

Below is a more detailed description of this zoning history.

Since the entire master plan for the 1,100-acre development was first approved by the City in 1993 by Ordinance 93-94, the plan has been revised due to infrastructure concerns related to the Honouliuli sewer outfall line that crosses the Ocean Pointe-Hoakalei development site. Haseko reached agreement with the CCH concerning a regional storm water solution, which included the elimination of a previously conceived plan to siphon the Honouliuli sewer outfall to allow navigability in the upper basin of the proposed marina. This resulted in the approval by the CCH of a revised master plan ("First Reconfigured Master Plan") that eliminated the upper basin of the proposed marina and realigned the golf course into a more north/south configuration as part of the region's storm water solution. This solution included a proposal to lower the Honouliuli sewer outfall to allow storm water to be diverted into the proposed marina. The reconfiguration essentially resulted in the same project, although the sizes and land locations of its components were adjusted. A FSEA evaluating these modifications was submitted to the DPP and resulted in a FONSI. On July 21, 2001, Haseko's application for partial rezoning ("2001 Rezoning Application") that reflected these modifications was accepted by the DPP. The City Council approved the 2001 Rezoning Application by Ordinance 02-09, which became effective as of March 6, 2002.

In 2004, Haseko and the CCH agreed to further amend the Ocean Pointe-Hoakalei Master Plan. Due to environmental concerns over the proposal to lower the Honouliuli sewer outfall, Haseko prepared a

revised drainage master plan that was accepted by the DPP in April 2004 (“Second Reconfigured Master Plan”). The Second Reconfigured Master Plan reconfigured a portion of the proposed golf course and the Kalo’i regional drainage channel so that storm waters would instead go straight to the ocean over a section of the One‘ula Beach Park. On November 28, 2006, Haseko’s application for Partial Rezoning (“2006 Rezoning Application”) to reconfigure the project to accommodate the Kalo’i Gulch regional drainage channel was accepted by the DPP. On July 2007, Ordinance 07-35 approved Haseko’s 2006 Rezoning Application.

6.6.4 SPECIAL MANAGEMENT AREA AND SHORELINE SETBACK AREAS

HRS Chapter 205A establishes the CZM program, which includes the provisions establishing and governing the SMA. Specifically, it delegates to the counties the responsibility of establishing and administering the SMA within their respective counties.

Pursuant to the regulatory authority conferred by HRS Chapter 205A, the CCH’s regulations and procedures pertaining to all lands within the City’s SMA are contained in ROH Chapter 25. Development within shoreline setback areas is governed by ROH Chapter 23.

On December 1, 1993, the City Council adopted Resolution 93-286, CD-1 which granted a SMP/SSV to Haseko for development of Ocean Pointe-Hoakalei.

The SMP/SSV allowed for the excavation of the existing basin and other improvements within the SMA. Since the adoption of the SMP/SSV in 1993, several modifications of the permit as well as the SMA boundary have been approved, as described in Section 6.7 (see Figures 1.6 and 1.7).

First, on September 12, 2002 the DPP approved Haseko’s request for a minor modification to the SMP/SSV to accommodate reconfiguration of the marina from approximately 120 to 70 acres. The reconfiguration was the result of a re-examination by the CCH of a prior approved drainage plan, which called for storm water from upland properties to be discharged into the marina. Implementation of this original configuration would have required constructing an inverted siphon to lower the Honouliuli Wastewater Treatment Plant’s sewer outfall pipe to accommodate navigability over the outfall within the marina’s upper basin. Growing environmental awareness and concerns about the maintenance requirements and infrastructure risks associated with the inverted siphon, however, led to the abandonment of this plan. Because there was no feasible alternative to an inverted siphon to accommodate navigability over the outfall, the marina upper basin was eliminated – reducing the marina to 70 acres.

On April 23, 2007, a second minor modification of the SMP/SSV was approved to reflect further reconfiguration of the marina; specifically, to reduce the marina basin from 70 to approximately 54 acres. This reconfiguration was part of Haseko’s ongoing process of complying with regulatory constraints and requirements for Ocean Pointe-Hoakalei, and refining development plans.

In compliance with Condition F of the SMP/SSV approved by Resolution 93-286, CD-1, Haseko continues to submit an annual status report to the DPP on its compliance with the SMP/SSV conditions.

Lastly, pursuant to Resolution No. 07-118, CD1, on June 6, 2007, Haseko was granted a SMP for construction of the Kalo’i Gulch regional drainage channel through One‘ula Beach Park.

Resolution 93-286, CD-1, requires that a new SMP be obtained for any part of the project that is sufficiently different from the approved plans. While the development called for in the HMPU is generally similar to the development for which the existing SMP was issued, there are differences that affect the impact that it could have on coastal resources that the SMA regulations were designed to protect. Because of this, Haseko expects to seek a new SMP for the development arrangement called for in the HMPU, and generally described in this EIS along with the SMA boundary adjustment discussed below.

Per the requirements of HRS Chapters 205A and 343, and ROH Chapter 23, a variance is required for all structures and activities in the shoreline setback area which varies in depth along the portion of the shoreline that fronts the HMPU area. While Haseko does not envision the construction of permanent buildings within the setback area, the provision of public shoreline access through this area that is an inherent part of all the plans under consideration is likely to require work that could not be undertaken without a SSV. Haseko will pursue the appropriate SSV approval for the project in consultation with DPP.

6.7 SMA BOUNDARY MODIFICATIONS

The SMA boundary for Ocean Pointe-Hoakalei was first amended by Ordinance 94-63, which took effect on September 15, 1994. Through the adoption of this ordinance (a map with notation), the City Council recognized that future marina configurations were likely, and that the SMA boundary should adjust with the changing waterway boundaries, as stated in the excerpt of the ordinance below:

The SMA boundary for the marina is located 100 feet inland from the water's edge of the marina as constructed.

On March 19, 2007, the DPP submitted to the OP a proposal to conform the SMA boundary to the current marina configuration of approximately 54 acres. Based on the reconfigured marina as established by DPP-approved grading plans, the proposed boundary line was drawn 100 feet inland from the water's edge. On April 11, 2007, the OP approved the contraction of the SMA boundary, finding that it was consistent with the objectives and policies of the CZM.

Ordinance 07-34, which amended the boundaries of the SMA map for the 'Ewa area to conform to the current configuration of the Hoakalei marina, took effect on July 20, 2007.

To advance the HMPU's goal of developing a recreational lagoon as an alternative to a marina, Haseko will be pursuing, in addition to rezoning of the land surrounding the existing basin, an amendment to the SMA boundary. The current boundary is based on the current marina configuration because when the shoreline is breached, the marina walls essentially serve as the new shoreline. Haseko proposes to contract the boundary to 50 feet *makai* of the lagoon's water edge, but maintain it around the Kauhale Preserve since there is no basis for having the SMA boundary follow the outline of the lagoon if the shoreline is not breached (Haseko proposes to keep the Preserve within the SMA since doing so is consistent with the objectives of the CZM such as preserving natural and manmade historic and prehistoric resources). This new 50-foot wide area adjustment would accommodate all water, power, and communication equipment to support the lagoon edge treatment, as well as the lagoon's operations and maintenance equipment (circulation pumps, aerators, slope protection, barriers, etc.). The 50-foot width has been identified by Haseko's engineering consultants to ensure the safe installation, operation, maintenance and screening of all equipment for these service utilities.

On September 2012, DPP submitted such a proposal to the OP, and, on October 12, 2012, the OP concurred with the proposed SMA boundary contraction to 50 feet *makai* of the lagoon water's edge, except for the Kauhale Preserve, which will remain in the SMA. Per Haseko's request, DPP deferred the transmittal of the proposed SMA boundary contraction to the City Council until other anticipated applications are processed.

Upon approval of the proposed contraction, Haseko anticipates that a SMP/SSV will be sought for the shoreline areas that will be within the SMA. As previously noted, nothing is being done that would prohibit another entity from completing a marina, if they choose to do so sometime in the distant future.

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CHAPTER 7 OTHER CHAPTER 343 TOPICS

HAR §11-200-17 establishes the content requirement for Environmental Impact Statements. Most of these topics have been dealt with in preceding sections of this report. This chapter addresses and/or provides supplemental information on the few required topics that are not fully addressed elsewhere.

7.1 SECONDARY AND CUMULATIVE IMPACTS

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

The Ocean Pointe-Hoakalei development, including the HMPU alternatives, is an integral aspect of the EDP, which guides the CCH's planning efforts for the region. The update to HMPU is consistent with the CCH's objectives for population and economic growth in 'Ewa as a secondary urban center for the island of O'ahu. While the HMPU will guide economic activity and population distribution within the area it covers, this increase is in keeping with planned growth for 'Ewa and will not result in an unanticipated burden on planning or infrastructure.

Haseko and its contractors will purchase labor and materials from independent suppliers. Additional material and fuel will be used to implement the HMPU, but the expenditures are relatively equivalent to the previously-planned marina with potentially greater public benefits.

The Project Area occupies the southwestern quarter of the Ocean Pointe-Hoakalei development. As discussed elsewhere in this report, the alteration to the configuration of zoning around the proposed lagoon would not result in a significant change in the types and intensity of uses in the area. Instead, the rezoning request will redistribute uses around the proposed lagoon in a manner which Haseko believes optimizes the flexibility and viability of these areas. Total numbers of residential and visitor accommodation units will remain the same at 4,850 residential units and 950 visitor accommodation units as stated in UA 93-94. Hence, the proposed action does not have the potential to cause additional cumulative effects.

7.2 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The existing master plan for Ocean Pointe-Hoakalei, the EDP, as well as many of the previous permits and approvals that have been granted to Haseko over the years, established that use of this area as a recreational and commercial nexus, drawing people and economic activity to the development, is appropriate. The purpose of this HMPU, and the rezoning request which supports it, is to bring Haseko's plans for the Project Area into alignment with current economic realities and the most recent conclusions that have been reached regarding the most beneficial use of the property, both for the inhabitants of 'Ewa and of the island at large.

Haseko believes its HMPU provides greater productivity over both the short- and long-term for its lands, than the existing marina-based master plan. In addition, the HMPU is configured in such a way so as to not preclude the possibility of a marina development at this location if, and when, that becomes a viable use.

7.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

Haseko's HMPU, and the rezoning request which supports it, does not represent an irreversible or irretrievable commitment of the land it would occupy and does not foreclose other options in the future. Most of the irreversible alterations, such as changes to topography as a result of mass grubbing and grading, have already been conducted under the previous master plan. The buildings

and other improvements that would be constructed can be removed at some future date, should that be justified by changed socio-economic conditions.

Construction of the preferred alternative will require the commitment of some non-retrievable resources (e.g., capital, construction materials, fuel for vehicles, etc.). However, these non-retrievable commitments would be required for nearly any development of this scale and are not unique to the HMPU. Further, these commitments would not prevent any other purchaser or developer from pursuing other, alternative uses—including a marina—for the basin and surrounding lands, should they feel this is a more viable option. Finally, use of the existing basin as a recreational lagoon, instead of the previously planned marina, would avoid the irreversible alteration of that portion of the shoreline and seafloor which would need to be removed to construct a marina entrance channel.

7.4 UNAVOIDABLE ENVIRONMENTAL EFFECTS & PROPOSED MITIGATION

Haseko has conducted a thorough analysis and evaluation of likely effects caused by implementation of the HMPU on the natural and human environment; these likely environmental impacts are discussed by topic in the preceding chapters. Haseko has weighed the potential benefits of the proposed action against reasonably foreseeable adverse impacts and believes that the preferred alternative, as defined in this DEIS, represents its best efforts to avoid, minimize, and mitigate such impacts. Where HMPU-related activities might have an adverse effect on the environment, that effect is either ameliorated or substantially outweighed by other considerations. Where adverse impacts are unavoidable, or where reasonable uncertainty exists as to the extent or severity of impacts, Haseko has identified monitoring protocols which will ensure adaptive management over time, further minimizing potential adverse impacts.

7.5 UNRESOLVED ISSUES

The major unresolved issue is whether or not the Honolulu City Council will approve or deny Haseko's request for rezoning of the Project Area. The outcome of this determination and any conditions placed on it will, to a great degree, affect which development alternative Haseko will pursue. There are also many design, operation, and maintenance questions—including issues related to the avigation easement discussed in Section 1.6—which will be determined over the course of continual adaptive management of project programs and facilities, but these are relatively minor and are often specific to the alternative in question. Should the marina alternative be pursued in the future, clarification from EPA on its unofficial stance questioning its previous position supporting disposal of dredging material from the entrance channel in the South O'ahu Dredge Spoils Disposal Area will need to be resolved.

7.6 LIST OF PREPARERS

The professionals who contributed to the completion of this report are listed in Table 7.1.

Table 7.1 List of Preparers

<i>Name</i>	<i>Title</i>	<i>Company</i>
Perry J. White	President	Planning Solutions, Inc.
Charles L. Morgan	Senior Environmental Planner	Planning Solutions, Inc.
Makena White	Planner	Planning Solutions, Inc.
Julia H. Tashima	Jr. Planner	Planning Solutions, Inc.
<i>Other Preparers</i>		
Haseko ('Ewa), Inc.		
Moriwara Lau & Fong LLP		
Source: Compiled by Planning Solutions, Inc. (2014)		

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CHAPTER 8 PARTIES CONSULTED

8.1 EA/EIS PREPARATION NOTICE

On October 10, 2013, the CCH DPP informed the State of Hawai'i Office of Environmental Quality Control ("OEQC") that under the provisions of Act 172(12), the Department had determined that an EIS should be prepared for Haseko's proposed zone change and other proposed actions subject to HRS Chapter 343. Its transmittal to OEQC included a completed Bulletin Publication Form and EISPN. The EISPN included a description of the requested zone change and brief consideration of potential environmental impacts to be analyzed.

Pursuant to the requirements of HAR Section 11-200-3, and HAR Section 11-200-15, DPP requested that OEQC publish this determination and notification in the next available periodic bulletin (*The Environmental Notice*). In response to this request, OEQC published an announcement of the intent to prepare an EIS in the October 23, 2013, edition of *The Environmental Notice*.

Reproduced at the end of this chapter are: (i) the EISPN that DPP transmitted to OEQC; (ii) the 67 comments submitted; and (iii) Haseko's responses to them.

Table 8.1 EISPN Consultation Participants

<i>Organizations and Individuals in Receipt of EA/EISPN</i>	<i>Comment Letter Dated</i>	<i>Response Letter Number</i>	<i>Date Response Letter Sent</i>
<i>CCH</i>			
Board of Water Supply			
Department of Community Services	11-7-13	8	1-15-14
Department of Design and Construction	11-20-13	21	1-15-14
Department of Emergency Management			
Department of Environmental Services	2-7-14	67	3-13-14
Department of Facility Maintenance			
Department of Parks and Recreation	11-22-13	28	1-15-14
Department of Planning and Permitting	12-3-13	64	1-15-14
Department of Transportation Services	11-18-13	65	1-15-14
Fire Department	11-4-13	5	1-15-14
Police Department	11-6-13	7	1-15-14
<i>State Agencies</i>			
Department of Agriculture			
Department of Accounting and General Services	10-25-13	1	1-15-14
Department of Business, Economic Development and Tourism (DBEDT)			
DBEDT – Strategic Industries Division			
DBEDT – Office of Planning	11-21-13	42	1-15-14
Department of Defense			
Department of Education			
Department of Hawaiian Homelands			
Department of Health (DOH) – Environmental Planning Office	11-5-13	6	1-15-14
DOH – Environmental Health Administration			
DOH – Clean Water Branch, Environmental Management Division	11-1-13	3	1-15-14
Department of Human Services	11-1-13	4	1-15-14
DLNR – Land Division	11-21-13	51	1-15-14

<i>Organizations and Individuals in Receipt of EA/EISPN</i>	<i>Comment Letter Dated</i>	<i>Response Letter Number</i>	<i>Date Response Letter Sent</i>
DLNR – Division of Boating and Ocean Recreation	10-28-13	52	1-15-14
DLNR – Office of Conservation and Coastal Lands	10-28-13	53	1-15-14
DLNR – Division of Aquatic Resources	10-28-13	54	1-15-14
DLNR – Land Division, O‘ahu District	10-28-13	55	1-15-14
State Historic Preservation Division			
Department of Transportation	12-23-13	66	1-15-14
O‘ahu Metropolitan Planning Organization			
Office of Hawaiian Affairs			
University of Hawai‘i – Environmental Center			
Land Use Commission			
Hawai‘i Community Development Authority – Kalaeloa	11-21-13	41	1-15-14
<i>Federal Agencies</i>			
U.S. Department of Agriculture – Regulatory Branch			
U.S. Department of Agriculture – Pacific Islands Area			
U.S. Fish and Wildlife Service	11-20-13	31	1-15-14
U.S. Department of the Interior – Geological Survey			
U.S. Department of Commerce			
U.S. Department of the Interior			
U.S. Naval Base Pearl Harbor			
U.S. Department of Transportation			
U.S. Department of Homeland Security – Coast Guard			
Environmental Protection Agency			
<i>Elected Officials</i>			
Senator Brian Schatz			
Senator Colleen Hanabusa			
U.S. Representative Mazie Hirono			
U.S. Representative Tulsi Gabbard			
State Senator Will Espero	10-25-13	2	1-15-14
State Senator Mike Gabbard			
State Representative Bob McDermott			
State Representative Rida Cabanilla			
State Representative Sharon Har			
State Representative Karen Awana			
Councilmember Kymberly Pine	11-21-13	39	1-15-14
Councilmember Ron Menor			
Neighborhood Board No. 23 Vice-Chair, Joe Hartsell			
Neighborhood Board No. 34 Chair, Evelyn Souza			
<i>Local Utilities</i>			
Hawaiian Telcom	11-18-13	20	1-15-14
Hawai‘i Gas			
Hawaiian Electric Company, Inc.	11-25-13	56	1-15-14
Oceanic Time Warner Cable			
<i>Other Parties</i>			
‘Ewa Beach Lions Club			
‘Ewa Beach Elementary School			

<i>Organizations and Individuals in Receipt of EA/EISPN</i>	<i>Comment Letter Dated</i>	<i>Response Letter Number</i>	<i>Date Response Letter Sent</i>
'Ewa Makai Middle School			
'Ewa-Pu'uloa Hawaiian Civic Club	11-22-13	36	1-15-14
Boys and Girls Club Hale Pono, 'Ewa Beach Clubhouse			
Cates International, Inc.			
Hoakalei Cultural Foundation			
Hoakalei Resort Community Association			
'Ilima Intermediate School			
James Campbell High School			
Kapolei Hawaiian Civic Club			
Keone'ula Elementary School			
Land Use Research Foundation			
O'ahu Hawaiian Canoe Racing Association			
Ocean Pointe Residential Community Association			
'Ewa Pu'uloa Outrigger Canoe Club			
Seagull Schools at 'Ewa Beach (Ocean Pointe)			
Uncle Henry Chang Wo, Kūpuna			
Sierra Club, O'ahu Group			
West O'ahu Economic Development Association			
Native Hawaiian Legal Corporation			
Hawai'i's Thousand Friends			
The Outdoor Circle			
'Ewa by Gentry Community Association			
West Loch Estates Homeowners Association			
West Loch Fairways Homeowners Association			
Hawai'i Wildlife Center			
Wai'anae Boat Fishing Club			
Robert Duncan	11-14-13	9	1-15-14
Dee White-Gettle	11-13-13	10	1-15-14
Barb and Terry Travis	11-18-13	11	1-15-14
jtsego@aol.com (no name provided)	11-18-13	12	1-15-14
Raquel Larson	11-19-13	13	1-15-14
Val Tavai	11-19-13	14	1-15-14
Gary Fuchikami	11-19-13	15	1-15-14
Alan Sarhan	11-19-13	16	1-15-14
William Bryan	11-19-13	17	1-15-14
Ruth Brown	11-19-13	18	1-15-14
Mike Lee	11-20-13	19	1-15-14
Karen Copeland	11-20-13	22	1-15-14
Kerrie Prowse	11-20-13	23	1-15-14
Roxanne Malaga-Tupuola	11-21-13	24	1-15-14
Ray Cureton	11-20-13	25	1-15-14
James Cox	11-19-13	26	1-15-14
Hannah Murphy/Manu O Ke Kai Canoe Club	11-21-13	27	1-15-14
Hawai'i Regional Council of Carpenters	11-21-13	29	1-15-14
Edward Prowse III	11-21-13	30	1-15-14
William Payne and Thomas Lewand	11-21-13	32	1-15-14
Kurt Fevella	11-19-13	33	1-15-14

<i>Organizations and Individuals in Receipt of EA/EISPN</i>	<i>Comment Letter Dated</i>	<i>Response Letter Number</i>	<i>Date Response Letter Sent</i>
Gordon (no last name provided)	11-22-13	34	1-15-14
‘Ewa Beach Community Association	11-23-13	35	1-15-14
Tesha Malama	11-20-13	37	1-15-14
Melvon Ahlo-Pinera	11-20-13	38	1-15-14
Garry Smith	11-22-13	40	1-15-14
Dan Greeson	11-23-13	43	1-15-14
John Bond	11-23-13	44	1-15-14
UNITE HERE Local No. 5	11-23-13	45	2-3-14
Kevin Rathbun	11-23-13	46	1-15-14
Zachary Soriano	11-23-13	47	1-15-14
Ramona Bolosan	11-24-13	48	1-15-14
Raina Cabanilla	11-20-13	49	1-15-14
Weed and Seed Hawai‘i	11-21-13	50	1-15-14
Ami Balecha	11-21-13	57	1-15-14
Anthony Alameda	11-21-13	58	1-15-14
Thomas Hendershot	11-22-13	59	1-15-14
Christiane Bolosan-Yee	11-21-13	60	1-15-14
JoAnn York-Gilmore	11-23-13	61	1-15-14
Crystal Scurr	11-23-13	62	1-15-14
Michael and Carol Johnson	11-23-13	63	1-15-14
<i>Libraries and Depositories</i>			
DBEDT – Research Division Library			
‘Ewa Beach Public Library			
Kapolei Public Library			
Kapolei Hale Satellite City Hall			
University of Hawai‘i Hamilton Library			
Legislative Reference Bureau Library			
Hawai‘i State Library – Pearl City Regional Office			
County Department of Customer Services Municipal Library			
Hawai‘i State Library Documents Center			
Note: The “Letter Number” is the number assigned to each comment letter received. Those comment letters, and Haseko’s responses, are reproduced at the end of Chapter 8.			
Source: Compiled by Planning Solutions, Inc. (2014)			

In preparation of this report Haseko has informally consulted with members of the organizations listed in Table 8.2.

Table 8.2 Organizations and Individuals Consulted for this Report

<i>Organization</i>
U.S. Army Corps of Engineers
U.S. Navy
U.S. Coast Guard
State Dept. of Health Clean Water Branch
State Dept. of Land and Natural Resources
State Land Use Commission
State Office of Conservation and Coastal Lands
State Office of Planning
Honolulu City Council Committee on Zoning & Planning
Honolulu Dept. of Planning and Permitting
‘Ewa Neighborhood Board
Hawaii Community Development Authority – Kalaeloa
‘Ewa Beach Elementary School
‘Ewa-Pu‘uloa Hawaiian Civic Club
James Campbell High School
‘Ewa Pu‘uloa Outrigger Canoe Club
‘Ewa Beach Lions Club
<i>Individuals</i>
Senator Will Espero
Representative Rida Cabanilla
Councilmember Kymberly Marcos Pine
Councilmember Ron Menor
Source: Compiled by Planning Solutions, Inc. (2014)

8.2 COMMUNITY OUTREACH

As part of Haseko’s Standard Practices, the company regularly communicates with residents of its development and surrounding communities through meetings and newsletters to keep the general public informed about its plans and progress. With the Company’s November 6, 2011 announcement that it intends to utilize the existing basin as a recreational lagoon instead of a marina (a development option that is still the subject of legal challenge), Haseko expanded its community outreach efforts to keep residents informed. These efforts included hosting regularly scheduled Q&A sessions or “coffee hours” for Ocean Pointe-Hoakalei residents and conducting escorted visits, by appointment, to the lagoon. Haseko continues to have a company representative attend the monthly ‘Ewa Neighborhood Board meetings to answer questions that arise about the Ocean Pointe-Hoakalei project. It also regularly updates area lawmakers and community leaders.

PARTIES CONSULTED

Haseko presented its updated plan to the 'Ewa Neighborhood Board on November 10, 2011 and participated in then-Councilmember Tom Berg's town hall meeting to discuss the lagoon on July 18, 2012. It again presented to the 'Ewa Neighborhood Board on May 9, 2013 as part of its notification process that the EISPN was expected to be published in the coming months. Haseko announced that the EISPN had been submitted to DPP at the October 10, 2013 'Ewa Neighborhood Board meeting and informed the community that it would have 30 days to comment upon OEQC's publication of the EISPN. Councilmember Kymberly Pine sent a group email to her District 1 constituents to notify them about the EISPN; the Star-Advertiser published a front-page article about the HMPU, and Civil Beat also posted an online article. At the November 14, 2013 'Ewa Neighborhood Board meeting, Haseko announced a reminder about the EISPN comment deadline of November 23, 2013. Haseko intends to announce the publication of this DEIS at an upcoming 'Ewa Neighborhood Board meeting in the summer of 2014.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluluapp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR



GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2013/ELOG-1944 (ts)

October 10, 2013

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

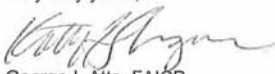
Dear Ms. Salmonson:

Under the provisions of Act 172(12), the Department of Planning and Permitting (DPP) of the City and County of Honolulu has determined that an environmental impact statement should be prepared for Haseko's proposed zone change and other proposed actions subject to Hawaii Revised Statutes (HRS), Chapter 343. The actions relate to portions of its Hoakalei Project in Ewa. A completed Bulletin Publication Form and Environmental Impact Statement Preparation Notice (EISPN) are attached. The EISPN includes a description of the requested zone change and brief consideration of potential environmental impacts to be analyzed. We have sent a copy of this letter and the attachments via electronic mail to oeqc@doh.hawaii.gov.

Pursuant to the requirements of Section 11-200-3, Hawaii Administrative Rules, and Section 11-200-15, Hawaii Administrative Rules, we request that you publish this determination and notification in the next available periodic bulletin (*The Environmental Notice*) for the public to submit comments to the DPP during the statutory thirty-day consultation period.

If there are any questions, please contact Tim Streitz of our staff at 768-8042 or tstreitz@honolulu.gov.

Very truly yours,


George I. Atta, FAICP
Director

cc: Haseko
Planning Solutions, Inc.

Attachments:
(1) Completed Bulletin Publication Form
(2) EISPN

APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JANUARY 2013 REVISION)

Project Name: Hoakalei Master Plan Update
Island: Oahu
District: 'Ewa
TMK: 9-1-134: Parcels 007, 022(por.), 025, 026, 027, 028 (por.), and 029
Permits: Zone Change, SMA Boundary Modification, SMP, SSV, NPDES (NOI-C), Grading & Building permits

Approving Agency:
City & County of Honolulu Department of Planning and Permitting
650 South King Street, 7th Floor, Honolulu, HI 96813. Contact: Timothy Streitz, 768-8042

Applicant:
Haseko (Ewa), Inc. 91-1001 Kaimālie Street Suite 205, 'Ewa Beach, HI 96706
Contact: Raymond Kanna, 689-7772, x 242

Consultant:
Planning Solutions, Inc. 210 Ward Avenue, Suite 330, Honolulu, HI 96814
Contact: Perry White; 550-4483

Status (check one only):

- ☐ _DEA-AFNSI Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.
- ☐ _FEA-FONSI Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.
- ☐ _FEA-EISPN Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.
- ☒ X Act 172-12 EISPN Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
- ☐ _DEIS The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
- ☐ _FEIS The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
- ☐ _Section 11-200-23
Determination The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the

__Statutory hammer	applicant. No comment period ensues upon publication in the periodic bulletin.
Acceptance	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.
__Section 11-200-27	
Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.
__Withdrawal (explain)	

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

Haseko (Ewa) Inc. proposes zone changes for a portion of its Hoakalei Project in Ewa, Oahu. The City rezoned the 1,100 acres for the master-planned Ewa Marina/Hoakalei Resort/Ocean Pointe project in 1985 and 1993. The project included a man-made marina with a maritime commercial complex, waterfront industrial, commercial, and retail facilities. It also included a golf course, a district park, 950 resort units, and a maximum of 4,850 residential units. The proposed zone change involves approximately 244 acres, including land within the Special Management Area (SMA), which both trigger an EA/EIS. The rezoning would accommodate an updated master plan calling for the existing basin to be used as a recreational lagoon rather than as a boat marina. Haseko also proposes to amend the SMA boundary to run parallel to the shoreline since the marina is no longer part of Haseko's current plans. The owner has concluded that a marina would not currently constitute a sustainable use for the property, although a marina could still be a future option. Build-out for the proposed recreational lagoon, including a swimming cove, is anticipated to be completed before the end of 2015.

Notice of Intent to Prepare an Environmental Impact Statement for the Hoakalei Master Plan Update

APPLICANT:
Haseko (Ewa), Inc. (hereinafter referred to as "Haseko")
91-1001 Kaimalie Street, Suite 205
Ewa Beach, HI 96706
Contact: Raymond Kanna (808) 689-7772, X 242

ACCEPTING AUTHORITY:
Director, Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96913

DATES:
All comments on this notice will be considered if received between October 23, 2013 and November 23, 2013.

All comments received are a part of the public record. All personal identifying information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information. Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe PDF file formats only.

ADDRESSES:
Please provide your email address with your electronic and written comments if possible. Electronic inquiries and comments are preferred and may be sent to: pwhite@psi-hi.com with copies to tstreitz@honolulu.gov.

All written inquiries and comments may be sent to:
Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814 with copies to the City and County of Honolulu, Department of Planning and Permitting (address above), Attn: Tim Streitz.

FOR FURTHER INFORMATION CONTACT:
Julia Ham Tashima of Planning Solutions, Inc. at julia@psi-hi.com or (808) 550-2423, or alternatively, Tim Streitz of the City and County of Honolulu, Department of Planning and Permitting at tstreitz@honolulu.gov or (808) 768-8042.

BRIEF DESCRIPTION OF PROPOSED ACTION:

Haseko is seeking a zone change (see 'Ewa Development Plan §5.4.1) for a portion of its Hoakalei Project (Figure 1) to accommodate an update to its project master plan. The existing zoning for this area (Figure 2) was last modified on July 20, 2007 in anticipation of the existing basin being completed as a small boat marina. The lack of sustainable market demand in the foreseeable future for the boat slips and other marina facilities, together with ongoing and possible future legal challenges to governmental approvals for the marina entrance channel, make it impractical for Haseko to pursue development of a small boat marina for the foreseeable future. Accordingly, it is now requesting rezoning of the land surrounding the existing basin (Figure 3) consistent with its use as a recreational lagoon that would have no direct connection to the ocean. The updated master plan would not increase the total number of planned dwelling units or visitor accommodation units specified in Haseko's Unilateral Agreement with the City (Ord. 93-94). There will be some adjustments to the proposed zoning boundaries that may affect the sizes and locations of individual zoning districts as a result of consultations with the City Department of Planning and Permitting (DPP).

Anticipated permits that require environmental assessment compliant with HRS Chapter 343 include the zone change, and potentially a Special Management Area (SMA) Use Permit and a Shoreline Setback Variance. Haseko will seek a change of the SMA boundary. The marina would have connected directly to the ocean, essentially functioning as part of the modified shoreline. Current plans do not connect the existing basin to the ocean. The proposed boundary adjustment would remove the existing basin from the SMA.

If these approvals are granted, Haseko will continue development of the same kinds of resort, residential, and commercial retail/office/restaurant uses that had previously been approved for the area. In addition, lighter industrial mixed uses will replace the more intensive waterfront industrial uses previously planned in connection with a marina development. By providing for these uses, the updated master plan for the area covered by this request will continue to create employment and business opportunities as envisioned when the zoning was originally granted. In addition, the plan includes a public swimming cove that would provide a protected swimming area; facilities that would collect and treat storm water runoff, minimizing the amount that flows into the proposed lagoon; and pedestrian pathways and other amenities that were not included in the previous plan.

The comparison between the existing zoning and preliminarily proposed zoning acreages under the updated master plan are listed in Table 1. The proposed zoning district boundaries would accommodate a land use plan that is better suited to a recreational lagoon than the present, marina-focused plan.

Haseko will continue to have primary responsibility for constructing the proposed facilities, including possible residential and/or resort units; commercial and lighter industrial-mixed use structures; infrastructure; public facilities and amenities such as the swimming cove, activity center, comfort station, parking lot, cultural center; and for further enhancing the existing Wetland Preservation Area (see Figure 2 or Figure 3). It is seeking development partners for some of the resort, commercial, and light industrial uses. A combination of parking and user fees for recreational activities and resort and residential owner assessments would provide the necessary funds for maintenance and capital improvements to ensure the long-term sustainability of the recreational lagoon, public swimming cove, and other public amenities envisioned in the plan.

The updated master plan calls for Haseko to forego construction of a number of previously planned facilities that were directly related to the basin's use as a small boat marina (e.g., the harbor master's facility, a seven-lane boat launch ramp, approximately 600 small boat slips, a fuel pier, etc.).

Table 1 Existing and Preliminary Proposed Zoning

Zoning District	Existing Acreage	Proposed Acreage	Change in Acreage
A-2 Apartment, Medium Density	45.9	59.2	13.3
B-1 Business, Neighborhood	0	4.2	4.2
BMX-3 Business-Community Mixed Use	45.3	33.1	-12.2
I-3 Industrial-Waterfront	26	0	-26
IMX-1 Industrial-Commercial Mixed Use	0	11.9	11.9
P-2 Preservation, General	89	89.8	0.8
Resort	38.4	46.4	8
Totals	244.6	244.6	0
Source: ¹ City and County of Honolulu GIS; load date November 30, 2012. ² Compiled by Planning Solutions, Inc. using information from Haseko ('Ewa), Inc.			

Unlike a small boat marina, the recreational lagoon does not require a break in the shoreline that would interfere with lateral shoreline movement and public access. Similarly, it does not require construction of the 3,000-foot-long entrance channel that is needed for a small boat marina.

The rezoning being requested is consistent with the 'Ewa Development Plan (EDP) and the City & County of Honolulu General Plan, and Haseko believes that it will provide substantially greater public benefits than would have been realized through completion of a small boat marina. While the marina project would have largely benefitted a comparatively small (boating) community, the lagoon project, with its unprecedented amount of open space and proposed recreational opportunities that appeal to a broader spectrum of the community, has the potential to provide community benefits that exceed the previously planned marina. These benefits include an extensive, uninterrupted shoreline pathway, a swimming cove, and opportunities for a greater number of people to engage in recreational water activities, such as calm-water sailing, stand-up paddle boarding, canoeing, and kayaking. Therefore, it is expected that the rezoning and change to the master plan will have a positive effect on area residents, community organizations, and Oahu residents in general.

Because the updated Project Master Plan entails the development and operation of land uses that are very similar to those in the previously approved master plan, many of the potential effects are similar as well. For example, the impacts on public infrastructure (e.g., roads, water supply, sanitary wastewater collection and disposal, electrical power system, etc.) and public services (e.g., educational facilities, police, fire, and emergency health care services) are comparable to those of a marina project. In some cases, such as the general prohibition of motorized water craft in the lagoon and the elimination of the boat launch ramps, fuel pier and other industrial-waterfront type uses, the revised plan would substantially decrease impact-causing activities. Additionally, the deletion of the long entrance channel eliminates the potential impacts associated with its construction and maintenance.

The EIS will examine these potential impacts as well as others, including the changes in land use that would accompany the proposed zone changes and the differences in water quality that would result from the plans to keep the lagoon isolated from ocean waters and changes in the management of storm water runoff.

DETERMINATION & REASONS SUPPORTING DETERMINATION:

In the early 1980s when the master plan for the 1,100 acres was first formulated, the City approved a programmatic EIS for the project (February 20, 1981). Subsequently, the City has accepted several supplemental Chapter 343 documents for components of this long-range master planned community, all of them with a small boat marina and entrance channel. Most of the land development that would occur under the updated master plan for this portion of Haseko's overall development is similar to that which has long been planned. However, to accommodate the updated plan, a zone change which qualifies as a "significant" zone change under the EDP is necessary to allow for different spatial distribution of land uses.

Therefore, pursuant to the requirements of Section 5.4 of the EDP, Haseko will prepare an EIS for the proposed project to assess the updated Hoakalei Project Master Plan and its impacts. The DPP will be the accepting agency, and the EIS is being prepared in conformance with the provisions of HRS, Chapter 343, Hawaii Administrative Rules, Section 11-200.

In addition to the proposed action (Alternative 1, Proposed Zoning without Marina), the EIS will evaluate two additional alternatives. The second Alternative (Alternative 2, Existing Zoning with Marina) will address the completion of the basin as a small boat marina in accordance with the plan on which the existing zoning was based. The discussion of this Alternative will describe the impacts that would result from development of the area covered by the rezoning application if it were to proceed as currently zoned. The reason for including this Alternative in the EIS is to provide a specific comparison of the economic, social, physical, and biological impacts anticipated for the planned recreational lagoon with those expected from the development of a marina instead. As discussed above, Haseko has concluded that it cannot complete the basin as a marina for the foreseeable future. It recognizes, however, that some other developer may be able to construct a marina at some future date, and its revised plans do not preclude such a possibility.

The third Alternative (Alternative 3, Existing Zoning without Marina), the No Action Alternative, examines the development that is likely to occur if the proposed zone change is not granted and Haseko must proceed with the existing zoning designations as well as the current state of the unfinished marina. Under this Alternative, Haseko would develop the lands adjacent to the existing golf course and leave for future developers the task of making productive use of the existing basin (e.g., as a lagoon or other use). Consideration of this Alternative is required by State law and will permit a direct comparison of the effects to be expected with and without the proposed zone change.

GOVERNMENT AGENCIES RESPONSIBLE FOR APPROVALS:

U.S. Army Corps of Engineers (compliance with existing Dept. of the Army permit)

State of Hawaii Department of Health (NPDES permitting for storm water runoff)

State of Hawaii Historic Preservation Division (approval of Ahu Preserve Implementation Plan)

State of Hawaii Office of Planning (modification of SMA Boundary)

City & County of Honolulu Department of Planning & Permitting (Zone Change, modification of SMA Boundary, potentially SSV and SMP, grading, drain connection, and building permits)



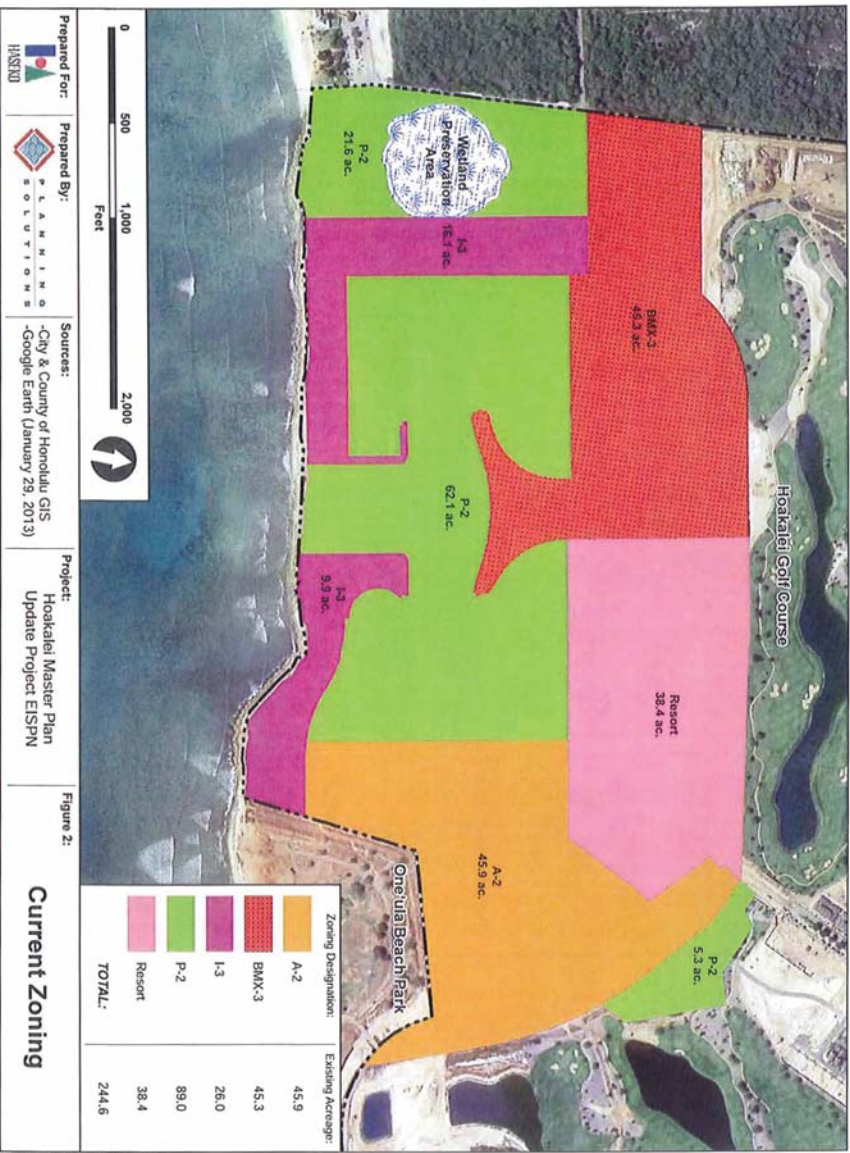


Figure 2 Current Zoning Map 2013-09-30.mxd

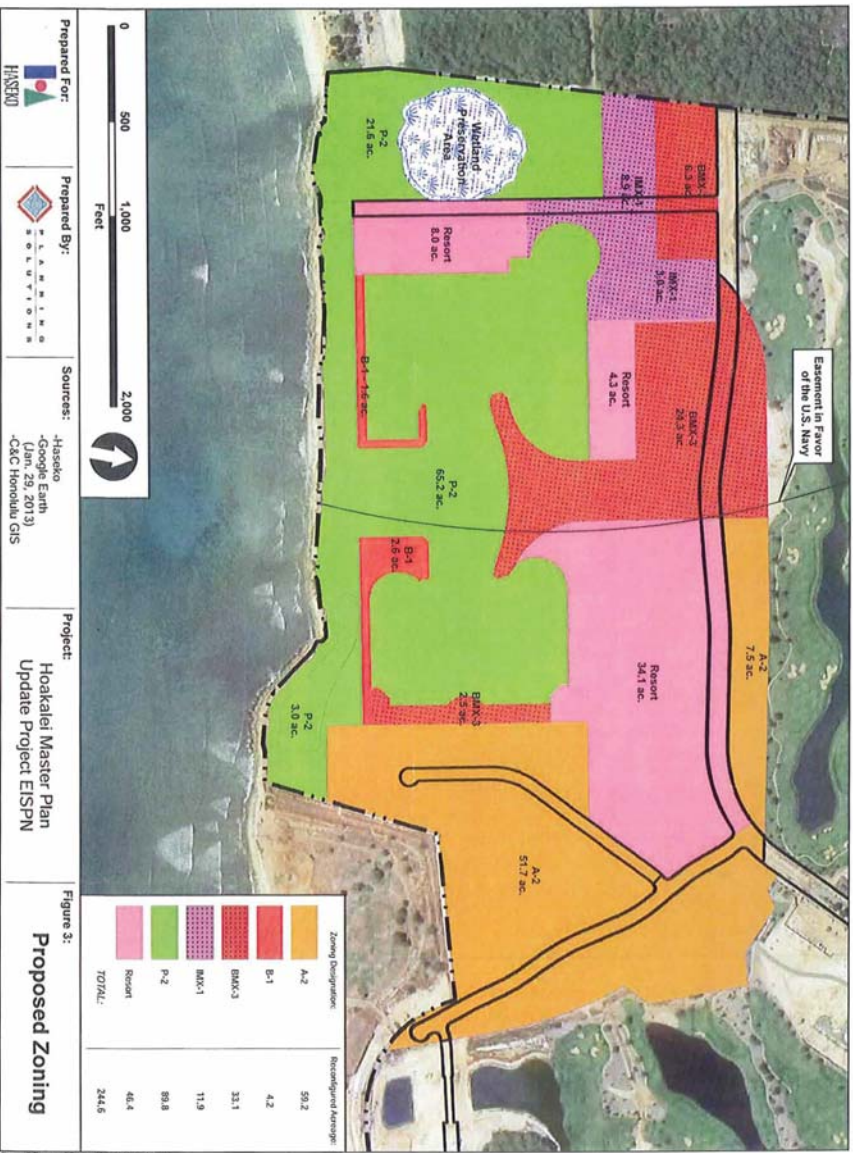


Figure 3 Proposed Zoning Map 2013-10-30.mxd

Comment No. 1

NEIL ABERCROMBIE
GOVERNOR



Dean H. Seki
Comptroller
Maria E. Zielinski
Deputy Comptroller

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1246.3

OCT 25 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Ave., Suite 330
Honolulu, Hawaii 96814

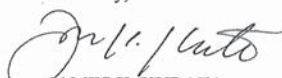
Dear Mr. White:

Subject: Notice of Intent to Prepare an Environmental Impact Statement
(EISP) for the Hoakalei Master Plan Update

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

If you have any questions, please have your staff call Mr. Alva Nakamura of the Planning Branch at 586-0488.

Sincerely,


JAMES K. KURATA
Public Works Administrator

AN:jk

c: Mr. Tim Streitz, CCH Dept of Planning and Permitting
Mr. Raymond Kanna, Haseko (Ewa), Inc.
Sharene Saito Tam, Haseko (Ewa), Inc.



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. James K. Kurata, Public Works Administrator
Department of Accounting and General Services
State of Hawai'i
P.O. Box 119
Honolulu, Hawai'i 96810-0119

Subject: Environmental Impact Statement Preparation Notice (EISP)

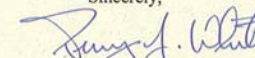
Dear Mr. Kurata:

Thank you for your October 25, 2013 letter [reference (P)1246.3] concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you and your staff spent reviewing the EISP and preparing your letter.

Thank you for confirming that the proposed project will not impact Department of Accounting and General Services projects or existing facilities. A copy of the Draft EIS will be provided to you when it becomes available.

If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,


Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



The Senate

STATE CAPITOL
HONOLULU, HAWAII 96813

October 25, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330

RE: Hoakalei Master Plan Update EISPN

Dear Mr. White,

Thank you for sending me a copy of the EISPN for the Hoakalei Master Plan Update. Although the project does not propose any increases in the number of housing or hotel units, the proposed zone changes to accommodate a recreational lagoon instead of a marina raises several issues that should be addressed in the EIS:

1. Public Access to/around the lagoon (ie. combined pedestrian/bicycle sidewalks? Vehicular access?)
2. Connections from the existing parks on either side of the project to the lagoon
3. Adequacy of parking facilities for the general public

Constituents have expressed excitement about the lagoon and the planned public swimming cove, but wonder who will maintain it and how that maintenance will be paid for. I hope the EIS includes answers to those questions as well.

Haseko has said many times that the company's decision to convert the basin into a recreational lagoon will not prevent someone else in the future from completing the long-planned marina when and if it makes economic sense to do so. I appreciate Haseko's efforts to keep the Hoakalei development moving forward in this challenging economic climate, and I look forward to seeing the employment/business opportunities and public benefits that are expected to result from completion of the project.

Sincerely,

Sen. Will Espero
District 19 -- 'Ewa Beach

cc. City & County of Honolulu, Department of Planning and Permitting (Attn: Tim Streitz)



P L A N N I N G
S O L U T I O N S

January 15, 2014

The Honorable Will Espero
District 19 -- 'Ewa Beach
State Capitol
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice (EISPN)

Dear Senator Espero:

Thank you for your October 25, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei project. We appreciate the time you and your staff spent reviewing the EISPN and preparing your comments. To simplify your review, we have reproduced your comments below in *italics*, followed by our response.

Comment:

Although the project does not propose any increases in the number of housing or hotel units, the proposed zone changes to accommodate a recreational lagoon instead of a marina raises several issues that should be addressed in the EIS:

1. *Public Access to/around the lagoon (ie. Combined pedestrian/bicycle sidewalks? Vehicular access?)*
2. *Connections from the existing parks on either side of the project to the lagoon*
3. *Adequacy of parking facilities for the general public*

Response:

The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will contain a thorough discussion of the vehicular and pedestrian access that will be provided to/around the recreational lagoon. The DEIS will describe the location and extent of the public parking facilities that will be provided and assess their ability to satisfy the anticipated demand.

Comment:

Constituents have expressed excitement about the lagoon and the planned public swimming cove, but wonder who will maintain it and how that maintenance will be paid for. I hope that the EIS includes answers to those questions as well.

Response:

The DEIS will include a detailed discussion of existing water quality within the lagoon, the likely effects of the surrounding development, and the impact of its use as a recreational attraction. It will also describe the water quality monitoring and maintenance which Haseko will set in place to promote its safe operation in the years to come. Finally, the DEIS will discuss the measures which Haseko will institute to help fund that there is adequate revenue to pay for the care and upkeep of the lagoon over time.

Page 2
Sen. Will Espero
January 15, 2014

Comment:

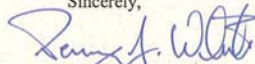
Haseko has said many times that the company's decision to convert the basin into a recreational lagoon will not prevent someone else in the future from completing the long-planned marina when and if it makes economic sense to do so. I appreciate Haseko's efforts to keep the Hoakalei development moving forward in this challenging economic climate, and I look forward to seeing the employment/business opportunities and public benefits that are expected to result from completion of the project.

Response:

Haseko firmly believes that the measures contained in the updated Master Plan, including a recreational lagoon and supportive uses on surrounding lands is the best way to keep the development viable and competitive in today's market. In doing so, it is Haseko's aim to make Hoakalei a continuing contributor to the 'Ewa community, generating income, jobs, and recreational opportunities for visitors and residents alike. The forthcoming DEIS will contain a comprehensive discussion of the social, economic, and cultural impacts of the proposed Master Plan Update and alternatives

We will provide you a copy of the DEIS when it becomes available. If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,



Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



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

November 1, 2013

Comment No. 3

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
EAMD/CWB

11007PCM.13

Mr. Perry J. White
President
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

SUBJECT: Comments on the Notice of Intent to Prepare an Environmental Impact Statement for the Hoakalei Master Plan Update Ewa, Island of Oahu, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated October 21, 2013, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the 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://health.hawaii.gov/epo/files/2013/10/CWB_Oct22.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:
 - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
 - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
 - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. You may be 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). An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the CWB Individual NPDES Form through the e-Permitting Portal and the hard copy certification statement with \$1,000 filing fee. Please open the [e-Permitting Portal](#)

Mr. Perry J. White
November 1, 2013
Page 2

11007PCM.13

website at: <https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx>. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the "CWB Individual NPDES Form." Follow the instructions to complete and submit this form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommend that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 438-9258) regarding their permitting requirements.

Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

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

If you have any questions, please visit our website at: <http://health.hawaii.gov/cwb>, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,


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

CM:rh

c: Tim Streitz [via email tstreitz@honolulu.gov only]



P L A N N I N G
S O L U T I O N S

January 15, 2014

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

Subject: Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Wong:

Thank you for your November 2, 2013 letter [reference 11007PCM.13] concerning Haseko (Ewa), Inc.'s *Environmental Impact Statement Preparation Notice for the Hoakalei Master Plan Update* (EISPN). We appreciate the time you and your staff spent reviewing the EISPN and preparing your comments.

The information you provided regarding the water quality criteria that must be met was quite valuable. Haseko understands that it must comply with the provisions of HAR §11-54. For reasons that will be fully explained in forthcoming Draft Environmental Impact Statement (DEIS), Haseko believes that the nature of its proposed uses and the ways that they will be implemented and maintained are such that the project will not adversely affect the quality of State waters.

At the present time Haseko does not anticipate seeking a permit to discharge wastewater. However, Haseko will work with your Branch to ensure that it complies with all applicable regulations, and that any discharges related to construction and operation of the proposed facilities will comply with all State of Hawai'i water quality standards.

We will provide a copy of the DEIS to you when it becomes available. If you have any further questions concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

NEIL ABERCROMBIE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
Benefit, Employment & Support Services Division
820 Mililani Street, Suite 606
Honolulu, Hawaii 96813

November 1, 2013

Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Subject: Haseko's proposed zone changes to the Hoakalei Project in Ewa Beach


Dear Mr. Perry White:

Thank you for your letter dated October 21, 2013 that requests the Department of Human Services (DHS) review and comment on the proposed zoning changes to the Hoakalei Project in Ewa, Oahu.

Upon review of the attachments from the City and County of Honolulu Planning and Permitting office, it is the understanding of the DHS that zoning changes to a 244 acre parcel are the result of an update to the master plan at Hoakalei. The update calls for a change from the proposed small boat marina to a recreational lagoon and adjustments to the surrounding land. A shoreline variance will be required for the project. As there are currently no child care facilities in the immediate vicinity, the DHS has no comment at this time.

If you have any questions or need further information, please contact Ms. Jill Arizumi, Child Care Program Specialist, at (808) 586-5240.

Sincerely,


Scott Nakasone
Assistant Division Administrator

c: Patricia McManaman, DHS Director
Department of Planning and Permitting, Policy Planning Branch
Attn: Tim Streitz

Comment No. 4

PATRICIA McMANAMAN
DIRECTOR
BARBARA A. YAMASHITA
DEPUTY DIRECTOR



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Scott Nakasone, Assistant Division Administrator
Department of Human Services
State of Hawai'i
820 Mililani Street, Suite 606
Honolulu, Hawai'i 96813

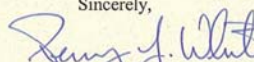
Subject: Environmental Impact Statement Preparation Notice (EISPEN)

Dear Mr. Nakasone:

Thank you for your November 1, 2013 letter concerning the *Environmental Impact Statement Preparation Notice (EISPEN) for the Hoakalei Master Plan Update*. We appreciate the time you and your staff spent reviewing the document and preparing your letter.

Thank you for confirming that there are currently no child care facilities in the immediate vicinity of the proposed project and that you have no comment at this time. We will provide you a copy of the Draft Environmental Impact Statement when it becomes available. In the meantime, if you have any questions concerning this project, please call me at (808) 550-4483.

Sincerely,


Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

KIRK CALDWELL
MAYOR



MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

November 4, 2013

Mr. Perry White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

Subject: Notice of Intent to Prepare an Environmental Impact Statement for the
Hoakalei Master Plan Update
Tax Map Keys: 9-1-134: 007, 022 (Portion), 025, 026, 027, 028 (Portion),
and 029

In response to your letter of October 21, 2013, regarding the above-mentioned subject,
the Honolulu Fire Department (HFD) requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]TM, 2006 Edition, Section 18.2.3.2.2.)

A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; UFCTM, 2006 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an

Mr. Perry White
Page 2
November 4, 2013

approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFCTM, 2006 Edition, Section 18.3.1, as amended.)

3. Submit civil drawings to the HFD for review and approval.

Should you have questions, please contact Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151 or sbratakos@honolulu.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Rolland J. Harvest".

ROLLAND J. HARVEST
Assistant Chief

RJH/SY:bh

cc: Tim Streitz, Department of Planning and Permitting



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Rolland J. Harvest, Assistant Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, Hawaii 96813-5007

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Harvest:

Thank you for your November 4, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update project. We appreciate the time you and your staff spent reviewing the EISPN and preparing your comments. To simplify your review, we have reproduced your comments below in *italics*, followed by our response.

Comment 1:

Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]™, 2006 Edition, Section 18.2.3.2.2.)

A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; UFCTM, 2006 Edition, Section 182.3.2.1.)

Response: After reviewing its plans, Haseko and its consulting engineers have confirmed that all of the facilities which may be constructed under the proposed zoning reconfiguration addressed in the *Hoakalei Master Plan Update EISPN* would be within 150 feet of a fire department access road. Thus, it is in accord with the requirements of Section 182.3.2.1 of the 2006 Uniform Fire Code.

Comment 2:

A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFCTM, 2006 Edition, Section 18.3.1, as amended.)

Response: Haseko has worked with the City and County of Honolulu Board of Water Supply to create an approved water supply capable of providing the needed fire flow for fire protection to all of the areas which would be subject to development under the proposed rezoning.

Page 2
Rolland J. Harvest, Assistant Chief
January 15, 2014

Comment 3:

Submit civil drawings to the HFD for review and approval.

Response: If the proposed rezoning and other approvals necessary for the proposed reconfigured development are granted, Haseko will prepare detailed civil drawings and submit them to the Honolulu Fire Department for review and approval.

We will provide you a copy of the Draft Environmental Impact Statement when it becomes available. In the meantime, if you have any further questions concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



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

November 5, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement for the Hoakalei Master Plan Update

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated October 21, 2013. Thank you for allowing us to review and comment on the subject document. The document was routed to the Clean Water and Wastewater Branches. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments at: <http://health.hawaii.gov/epo/home/landuse-planning-review-program/>.

You are required to adhere to all standard comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable design of communities, including the:
State of Hawaii, Office of Planning: www.planning.hawaii.gov and the new 2013 ORMP;
U.H., School of Ocean and Earth Science and Technology: www.soest.hawaii.edu;
U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability; and
U.S. Green Building Council's LEED program: www.usgbc.org/leed.

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at: www.cdc.gov/healthyplaces/hia.htm. We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We require a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to: epo@doh.hawaii.gov. We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Manager, Environmental Planning Office

c: Tim Streitz, CCofH, DPP

Comment No. 6

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:

File:
13-205
Hoakalei Master Plan



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Laura Leialoha Phillips McIntyre, Manager
Environmental Planning Office
Department of Health – State of Hawai'i
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. McIntyre:

Thank you for your November 5, 2013 letter regarding Haseko's *Hoakalei Master Plan Update EISPN*. We appreciate the time you and your staff spent reviewing the EISPN and preparing your response. We understand that the Clean Water and Wastewater Branches will be providing additional comments, and we will respond to their comments separately.

Haseko attempts to follow sustainable design strategies in all phases of its development, including those described in the sources you provided. Moreover, in accordance with Chapter 343 guidelines, the forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will assess the potential for health effects as part of the overall environmental impact evaluation process.

We will provide you a copy of the DEIS when it becomes available. In accordance with your request, Haseko will also notify your office when the Final EIS is available. This letter provides the written confirmation of receipt of your November 5, 2013, letter that you also requested.

If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Ward Plaza, Suite 330 • 210 Ward Avenue • Honolulu, Hawaii 96814-4012
Phone: 808 550-4483 • Fax: 808 550-4549 • www.psi-hi.com

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 • INTERNET: www.honoluluupd.org

Comment No. 7

KIRK CALDWELL
MAYOR



LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. MCCABLEY
DEPUTY CHIEFS

OUR REFERENCE EO-WS

November 6, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 South King Street, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

This is in response to your letter dated October 21, 2013, requesting comments on a notice of intent to prepare an Environmental Impact Statement for the Hoakalei Master Plan Update project.

The Honolulu Police Department has no concerns at this time.

If there are any questions, please contact Major Kerry Inouye of District 8 (Kapolei) at 723-8403 or via e-mail at kinouye@honolulu.gov.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By 
CLAYTON G. KAU
Assistant Chief
Support Services Bureau

cc: Mr. Tim Streitz, Policy
Planning Branch, DPP

Serving and Protecting With Aloha



P L A N N I N G
S O L U T I O N S

January 15, 2014

Louis M. Kealoha, Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Subject: Hoakalei Master Plan Update EISPN

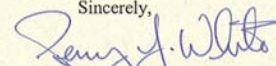
Dear Chief Kealoha:

Thank you for your November 6, 2013 letter [your reference EO-WS] concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you and your staff spent reviewing the EISPN and preparing your letter.

Thank you for confirming that the Police Department has no concerns at this time regarding the proposed project. A copy of the Draft EIS will be provided to you when it becomes available.

If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,


Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Ward Plaza, Suite 330 • 210 Ward Avenue • Honolulu, Hawaii 96814-4012
Phone: 808 550-4483 • Fax: 808 550-4549 • www.psi-hi.com

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU

715 SOUTH KING STREET, SUITE 311 • HONOLULU, HAWAII 96813 • AREA CODE 808 • PHONE: 768-7762 • FAX: 768-7792

KIRK CALDWELL
MAYOR



PAMELA A. WITTY-OAKLAND
DIRECTOR

GARY K. NAKATA
DEPUTY DIRECTOR

November 7, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement
(EISPN) for the Hoakalei Master Plan Update

We have reviewed your letter dated October 21, 2013, and the information provided for this "Notice of Intent to Prepare an Environmental Impact Statement (EISPN) for the Hoakalei Master Plan Update" for a 244-acre portion in Ewa, Oahu.

Our review of the information provided indicates that the actions described in the proposed Master Plan Update will have no adverse impacts on any Department of Community Services' activities or projects at this time.

Thank you for providing us with the opportunity to comment on this matter.

Sincerely,

Pamela A. Witty-Oakland
Director

PAW:sk

cc: Tim Streitz, Department of Planning and Permitting
Policy Planning Branch



P L A N N I N G
S O L U T I O N S

January 15, 2014

Pamela A. Witty-Oakland, Director
Department of Community Services
City and County of Honolulu
715 South King Street, Suite 311
Honolulu, Hawaii 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Witty-Oakland:

Thank you for your November 7, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you and your staff spent reviewing the EISPN and preparing your letter.

Thank you also for confirming that the proposed project will not adversely impact any of your department's activities or projects.

We will provide a copy of the Draft Environmental Impact Statement (DEIS) to you when it becomes available. If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 9

From: "Duncan Hawaii" <duncanr001@hawaii.rr.com>
To: <pwhite@psi-hi.com>
Cc: <tstreitz@honolulu.gov>
Subject: Hoakalei EISPN
Date: Thu, 14 Nov 2013 13:42:51 -1000

Dear Mr. White,

I hope that the existing basin on Haseko's property will be zoned and developed as a lagoon instead of the marina that had been envisioned in the past. I believe that the lagoon concept will have a lesser environmental impact on our shoreline and surrounding reefs. I believe that a lagoon and resort will be of greater value to myself and my neighbors.

I'm interested in knowing what this change in concept will have on the cultural areas, businesses, and roadways. I hope that the environmental impact statement talks about these things. If the new environmental impact statement reveals an equal or lesser effect than what was determined by developing the marina, I am in support of Haseko's zoning change request.

Sincerely, Robert W. Duncan

91-370 Papipi Dr.

Ewa Beach, Hawaii, 96706

11/14/2013



P L A N N I N G
S O L U T I O N S

January 15, 2014

Robert W. Duncan
91-370 Pāpīpi Drive
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Duncan:

Thank you for your November 14, 2013 email concerning the proposed Hoakalei Master Plan Update Project. We appreciate the time spent reviewing the EISPN and preparing your email. Haseko (Ewa), Inc. thanks you for your expression of support for the updated Hoakalei Master Plan.

The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will include sections devoted to the topics you mention in your letter. These include the project's anticipated impacts on area businesses and roadways. In addition the DEIS will include a substantial description of the archaeological, historic, and cultural properties within the project area and measures that Haseko proposes to take to protect and preserve this important legacy.

We will send you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

November 13, 2013

Perry J. White
Planning Solutions, Inc
210 Ward Avenue, Suite 330
Honolulu, HI 96813

Aloha,

I've been living in Ewa Beach for a long time, and I think Haseko's idea to keep the basin a lagoon instead of turning it into a marina is a better choice for the community and the 'āina. Personally, I support the zoning change they are requesting and will be looking forward to their environmental impact statement.

One thing I would like the EIS to discuss is, now that it is a lagoon and resort, what will the parking situation be like and how accessible will it be to the general community? I read that Haseko is considering paid parking but will there be enough stalls and how much will it cost to park? Will parking be affordable for people from our community? Please address these topics in the EIS.

Overall, with the lagoon, the shoreline won't be broken, which is better for preserving our reefs and the ocean life that depend on them. Making a lagoon instead of a marina means fewer boats in the ocean, which means cleaner water too. Based on what I have heard so far, I support Haseko's request for a zoning change 100 percent and hope it will be approved. My family and I are excited to have more choices for swimming and water activities.

Mahalo,



Dee White-Gettle



P L A N N I N G
S O L U T I O N S

January 15, 2014

Dee White-Gettle
P.O. Box 2402
Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

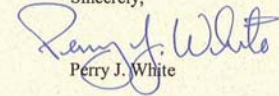
Dear Ms. White-Gettle:

Thank you for your November 13, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time spent reviewing the EISPN and preparing your letter, and for expressing your support for the updated Hoakalei Master Plan.

The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will discuss the topics you mention in your letter, including—but not limited to—the design, location, and cost of parking.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,



Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 11

From: "Barb & Terry Travis" <terrytravis@hawaiiantel.net>
To: <pwhite@psi-hi.com>
Cc: <tstreitz@honolulu.gov>
Subject: Comments on Haseko's rezoning request
Date: Mon, 18 Nov 2013 16:57:40 -1000

Aloha,

My wife and I are residents of Ewa Beach. We are strongly opposed to the requested change to the zoning plan. We do NOT want any 90 feet tall structures, and especially do not want 3 of them. We do not want Ewa Beach turned into another Ko'olina where access to the lagoons is extremely limited by lack of parking.

Please do not approve this change.

Barb and Terry Travis,
91-999 La'aulu St.
Unit F,
Ewa Beach, HI 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Barb and Terry Travis
91-999 La'aulu Street, Unit F
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. and Mrs. Travis:

Thank you for your November 13, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time spent reviewing the EISPN and preparing your comments.

We understand your concerns regarding the requested change in zoning and the nature of forthcoming resort development; however it is important to note that all previous plans for the project included substantial resort zoning as well. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will include sections devoted to discussion of the topics you mention in your letter, including—but not limited to—the types and locations of resort development, public access, and parking if the proposed rezoning is granted. In addition, the DEIS will present several project alternatives, including development of the area as a marina, and a "no action" alternative.

We will provide you a copy of the DEIS when it becomes available. You will have an additional opportunity to provide comments at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 12

Subject: Haseko rezoning
From: jtsego@aol.com
Date: Mon, 18 Nov 2013 18:11:49 -1000
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>

Dear Representative Pine,

Thank you for your efforts at keeping your supporters informed.

My husband and I are homeowners in the Hoakalei community. We are supporters of Haseko's plans to add amenities to the lagoon area, to include resorts hotels. After purchasing our home, we were disappointed to hear that the marina was not going to be built; however, we feel that the alternate plans for a lagoon area and resort would add jobs and provide a nice recreational area for the community.

Thank you.

Sent from my iPhone



P L A N N I N G
S O L U T I O N S

January 15, 2014

jtsego@aol.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear jtsego@aol.com:

Thank you for your November 18, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time spent reviewing the EISPN and preparing your comments; because you did not include your name in your comment, I am addressing this response to your email account.

Haseko has asked us to express its gratitude for your statement of support for the proposed change in zoning, it is seeking in order to complete its Hoakalei resort community and recreational lagoon. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe the proposed action, several project alternatives, and their likely effects, including economic impacts.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550 4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streit, Department of Planning and Permitting (via electronic mail only)

Comment No. 13

Tue, 19 Nov 2013 17:44:00 -0800 (PST)
Date: Tue, 19 Nov 2013 19:44:00 -0600
Subject: Haseko Proposed Zoning Changes at Hoakelei
From: Raquel Larson <raquel.larson1@gmail.com>
To: pwhite@psi-hi.com, tstreitz@honolulu.gov

Aloha,

As an investor in Ocean Pointe, one of the selling points was the proposed marina and resort, so changing the marina plans has been a huge disappointment for me, but the changes do offer some redeeming factors. The main one being the possibility of a future marina. This would bring a whole new market to Ewa Beach and keep the boating community, however small it is, with all of its needs (such as gas, maintenance, tackle, and bait, etc.) in Ewa Beach. As it stands, the "small" boating community is having to travel to other places for these services, leaving this kind of money and jobs outside of our community.

As responsible Ewa Beach residents, we do need to think about the proposed zoning effects on the greater community. The proposed changes would bring business opportunities and jobs to Ewa Beach. I have family members who work in Waikiki hotels. It would be great for them to not have to commute anymore and be able to spend more time with their families. In addition to this, the recreational lagoon will bring a safer water and recreational area for families and groups in comparison to Ewa Beach Park, which is not safe at times. And, again, Alternative 2 in the proposal leaves the possibility for an option for a small marina to be built in the future for people in the boating community.

Haseko has discussed the question of parking and roads, which has been a part of the plan all along. If 90' high (I think you mean 90 story high?) resorts are a problem for some, it is not a problem for me when I think about the jobs and business it will bring. Someone has to clean, maintain, and supply those buildings. These resorts typically bring coffees shops, restaurants, and other small businesses. This would even bring professional jobs to the community as more doctors, dentists and lawyers will be needed to serve the growing population. I would like to be able to do all of my business on the west side of the island, and the plans in this proposal looks like it will help with that. This is why my husband and I invested in Ocean Pointe in 2005 at thirty years old. We envisioned being able to spend our retirement years safely, on a golf cart, getting food, hair cuts, and walking the promenade without having to leave our beloved community.

Mahalo for your time,
Raquel Larson



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Raquel Larson
raquel.larson1@gmail.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Larson:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time spent reviewing the EISPN and preparing your comments; because you did not include your mailing address in your comment, I am addressing this response to your email account.

Haseko has asked us to thank you for expressing your support for the proposed change in zoning. Haseko is seeking in order to complete its Hoakalei resort community and recreational lagoon. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe the proposed action, several project alternatives, and their likely effects, including economic impacts.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 14

From: Val Tavai <valt@hcapweb.org>
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>
Date: Tue, 19 Nov 2013 11:57:14 -1000
Subject: Haseko

As a resident of Hoakalei-Ka Makana, I'm not in agreement with the zone changes or the additional resorts. Is anyone seeing the issues going on in the neighborhood, the high turnover rates, the crime? First of all the lagoon will bring the public in, I'm not in favor of it because there's not been a determination if there will be security guards like Ko Olina.

Two additional resorts, are you kidding? Why?

You folks need to do a survey of the Hoakalei community. I'm saying not in my backyard. I didn't want to look out at resorts when I bought my house. Haseko just wants to build more to get more. Really. Survey the residents please. Look at our turnover rates.



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Val Tavai
valt@hcapweb.org

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Tavai:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time spent reviewing the EISPN and preparing your comments. Because you did not include your mailing address in your comment, I am addressing this response to your email account.

The forthcoming Draft Environmental Impact Statement (DEIS) for the Project will discuss the topics you mention in your letter, including – but not limited to – the locations of resort development, public access, and public safety if the proposed rezoning is granted. In addition, the DEIS will present several project alternatives, including development of the area as a marina, and a "no action" alternative.

When you do review that document, I hope you will keep in mind that virtually all of the concerns that you have expressed stem from uses that are in the existing master plan, not from uses that were not previously proposed.

- The proposed master plan does not, for example, propose two additional resorts; the resort zoning is simply divided into three parts rather than concentrated in the single location allowed by the existing zoning. In both instances the maximum number of resort units would be the same (950).
- The same is true for the number of residential units that would be developed within the area covered by the rezoning request. The same number (not more than 850) would be constructed regardless of whether the existing or proposed zoning is in place.
- Finally, while the revised master plan provides recreational opportunities that Haseko believes are more finely attuned to the needs of the residents of surrounding land (including Ka Makana at Hoakalei), those are likely to attract fewer people from outside the development than would the original marina plan. The boat launch ramps and slips in the original (small boat marina) plan would have attracted many more people from farther away than will the facilities that would be developed if the updated master plan is approved and implemented. Understanding this may help reduce your security concerns.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550 4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 15

To: pwhite@psi-hi.com
Subject: Haseko resort request zoning change
From: wh6c@cs.com
Cc: tstreitz@honolulu.gov
Date: Tue, 19 Nov 2013 12:43:28 -0500 (EST)

To Whom It May Concern,

I'm writing to express my strong opposition to Haseko's request for rezoning in Ewa Beach for them to build more resorts in the Oceanpointe/Hoakalei area. Their original proposal was to build a marina, which would've been minimally acceptable, but now, they apparently want to make more money by building a resort complex there. We have enough problems with the current infrastructure just barely meeting residential requirements in and out of Ewa and don't need to have a major resort complex built. Haseko, like most corporations, care nothing about the residents and the impact a resort would have on our community. All they care about is money. I sincerely request that you NOT grant their rezoning request for the above reasons as well as the kind of impact it would have on the environment and community.

Thank you very much!

Sincerely,
Gary Fuchikami
91-1038 Niolo St.
Ewa Beach, HI 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Gary Fuchikami
91-1038 Niolo Street
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Fuchikami:

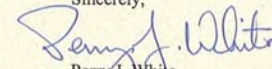
Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you spent reviewing the Environmental Impact Statement Preparation Notice (EISPN) and preparing your comments. Haseko has asked me to acknowledge your expression of opposition to the requested change in zoning and the land use plan that rezoning would allow it to implement.

As indicated in the EISPN, and as requested in your email, the Draft Environmental Impact Statement (DEIS) will evaluate a number of alternatives. These will include construction of the facilities that it plans to develop if the rezoning is approved and construction and operation of the facilities that it would develop if its rezoning application is partially or wholly denied (i.e., no/limited re-zoning). It will also discuss the effects of completing the project with the basin used for a small boat marina open to the ocean rather than as a recreational lagoon.

I would like to take this opportunity to correct what appears to be your misunderstanding of the differences between the proposed plan and the plans for the marina. All of Haseko's plans for the area have included water-oriented resort, commercial, and residential uses. The revised plan that is now proposed will not increase the total number of resort or residential units from the previous plan, and is not expected to increase impacts to area roads or other public facilities.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550 4483.

Sincerely,



Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 16

From: "Alan Sarhan" <asarhan@hawaii.rr.com>
To: <pwhite@psi-hi.com>
Subject: Haseko Rezone
Date: Tue, 19 Nov 2013 07:05:29 -1000

I do not think the city should allow Haseko to change the plan for the Ewa Beach coastal lands. They should be doing what they said it is. They marketed do what they promised what the home buyers were promised.... a marina. There are too few places to moor and launch boats on the Ewa coast . They sold all those houses with the promise of a marina and should be required to fulfill the promise.

Alan Sarhan
Makakilo



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Alan Sarhan
asarhan@hawaii.rr.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Sarhan:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you spent reviewing the EISPN for the Hoakalei Master Plan Update Project and preparing your comments. Because you did not include your mailing address in your comment, I am addressing this response to your email account.

Haseko has asked me to acknowledge your opposition to the requested change in zoning and to the nature of the forthcoming resort development. The company understands your preference that it construct the marina that it had originally planned for the area.

The Draft Environmental Impact Statement (DEIS) for the Project will discuss the factors that have led Haseko to seek the zoning change. The DEIS will also discuss several project alternatives, including development of the area as a marina as originally proposed, as well as a "no action" alternative. This will allow a comprehensive comparison of anticipated impacts.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550 4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 17

From: WILLIAM BRYAN <zerotime54@hotmail.com>
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>
CC: "tstreitz@honolulu.gov" <tstreitz@honolulu.gov>
Subject: zoning changes
Date: Tue, 19 Nov 2013 10:51:00 -1000

Aloha,

My name is William Bryan. I purchased a home in Ka Makana in Hoakalei and completely disagree with Hoseko's proposed zoning changes for the planned marina. I do not want a recreational lagoon or rezoning for 3 resort parcels.

The main reason I purchased at Ka Makana is because I wanted to park my sailboat at the marina. By changing zoning it ruins the marina idea, and dividing the resort parcel into 3 allows for too much traffic and congestion. This is a housing development, not a tourist destination!

Kind regards,
William Bryan



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. William Bryan
zerotime54@hotmail.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Bryan:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time spent reviewing the EISPN and preparing your comments. Because you did not include your mailing address in your comment, I am addressing this response to your email account.

Haseko has asked me to acknowledge your opposition to the requested change in zoning and to the recreational lagoon and pattern of development that it would allow. I understand your disappointment at not being able to eventually have a mooring for your sailboat close to your home at Ka Makana.

The Draft Environmental Impact Statement (DEIS) for the Project will discuss the factors that have led Haseko to seek the zoning change. The DEIS will also discuss several project alternatives, including development of the area as a marina as originally proposed, and a "no action" alternative. This will allow a comprehensive comparison of anticipated impacts.

We will provide you a copy of the DEIS when it becomes available. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 18

Date: Tue, 19 Nov 2013 22:48:43 -1000
From: Ruth Brown <brownr100@hawaii.rr.com>
To: pwhite@psi-hi.com
CC: tstreitz@honolulu.gov
Subject: Haseko's proposed zoning changes at
Hoakalei.

While I am inclined to agree with the proposed change of the marina to a recreational lagoon, I do not support three resorts in the area. Since the heights are uncertain and could go up to 90 feet, it seems that it would be unsightly on Ewa Plain.

Thank you,
Ruth Brown
Waianae HI 96792



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Ruth Brown
brownr100@hawaii.rr.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Brown:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s rezoning request. We appreciate the time you spent reviewing the EISPN and preparing your comments. Because you did not include your full mailing address in your comment, I am addressing this response to your email account.

Haseko has asked me to express its gratitude for your support of its request for rezoning that would use the basin as a recreational lagoon rather than as a small boat marina. It acknowledges your concern about the reconfiguration of the resort zoning into three different areas and your desire that structure heights remain well below the 90-feet that is allowable under the present designation.

The forthcoming Draft Environmental Impact Statement (DEIS) will describe and assess the potential effects of the proposed action and several project alternatives (including one that maintains the resort zoning in a single area), and their likely effects, including visual impacts. A copy of the DEIS will be provided to you when it becomes available, and you will have an additional opportunity to offer comment at that time.

If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 19

To: pwhite@psi-hi.com
Subject: Enough already!!!
From: Michael Lee <mfklee62@aol.com>
Date: Wed, 20 Nov 2013 03:47:44 -0500 (EST)

How much more can Ewa Beach take, what is the limit of greed from Haseko to destroy our community, make this insanity stop already or there will no longer be an Ewa Beach to live in!!!!...Nuff said.



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Mike Lee
mfklee62@aol.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Lee:

I received your November 20, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. Because you did not include your full mailing address in your comment, I am addressing this response to your email account.

Haseko understands that you are opposed to its project. A copy of the DEIS will be provided to you when it becomes available, and you will have an additional opportunity to offer comment at that time.

Sincerely,

Perty J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 20

Hawaiian Telcom

November 18, 2013

Planning Solutions, Inc.
Ward Plaza, Suite 330
210 Ward Avenue
Honolulu, HI 96814-4012
Attention: Mr. Perry J. White

Dear Mr. White:

Subject: Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update

Thank you for the opportunity to review and comment during the Environmental Impact Statement (EISP) process for the subject project.

Hawaiian Telcom does not have any comments to offer at this time.

If you have any questions or require assistance in the future on this project, please call me at 546-7761.

Sincerely,



Les Loo
Network Engineer – Outside Plant Engineering
Network Engineering & Planning

cc: T. Streitz – Department of Planning and Permitting, Policy Planning Branch
File [Ewa Beach]

Always on.™

PO Box 2200, Honolulu, HI 96841 hawaiiantel.com



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Les Loo, Network Engineer
Outside Plant Engineering
Hawaiian Telcom
P.O. Box 2200
Honolulu, Hawai'i 96841

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

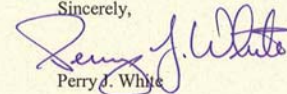
Dear Mr. Loo:

Thank you for your November 18, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISP and preparing your response. We understand that you do not have any comments to offer at this time.

A copy of the forthcoming Draft Environmental Impact Statement will be provided to you when it becomes available, and you will have an additional opportunity to offer comment at that time.

If you have any further questions, please call me at (808) 550-4483.

Sincerely,


Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Ward Plaza, Suite 330 • 210 Ward Avenue • Honolulu, Hawaii 96814-4012
Phone: 808 550-4483 • Fax: 808 550-4549 • www.psi-hi.com

Comment No. 21

From: "Morita, Lori" <lmorita@honolulu.gov>
Date: November 20, 2013 at 1:43:20 PM HST
To: "'pwhite@psi-hi.com'" <pwhite@psi-hi.com>
Cc: "Streitz, Timothy" <tstreitz@honolulu.gov>
Subject: EISPN for Hoakalei Master Plan Update

Per your letter of October 21, 2013 requesting comments on the above subject project, the Department of Design and Construction (DDC) submits this comment:

Developer needs to be aware of our Honouliuli WWTP Ocean Outfall and to maintain proper clearances away from our easement. It is difficult to see where our line actually is on such a small scale. We do not have any other sewers in that area.

Should you have any questions, please contact Harvey Chee, Wastewater Division, DDC, at 768-8742.

*L. Morita
Department of Design & Construction
City & County of Honolulu
Phone: 768-8480
Fax: 768-4567*



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Lori Morita
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Morita:

Thank you for your November 21, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

The presence of the Honouliuli Waste Water Treatment Plant ocean outfall has been a major factor in the design of Haseko's project. All of the area covered by the rezoning request lies to the west of the City's easement, and construction documents (i.e., plans and specifications) for areas adjacent to the City's easement will instruct contractors of its presence and of the need for them to maintain proper clearances when they work.

A copy of the forthcoming Draft Environmental Impact Statement (DEIS) will be provided to you when it becomes available, and you will have an additional opportunity to offer comment at that time. If you have any further questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 22

----- Original Message -----

Subject: Hoakolei Lagoon Comments

From: Karen Copeland <karen.copeland@rocketmail.com>

Date: Wed, November 20, 2013 7:39 pm

To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>

Cc: Sherri Cell <taketthat4win@yahoo.com>

I live in Hoakolei and I support the change to a lagoon. It is something that myself and my family would enjoy using. I also understand the marina is being blocked so the completion could take years if it is ever allowed to be built.

We did purchase our home thinking that a marina would be built and our home values would increase as a result. Having neither a marina or a lagoon only hurts our home values.

This issue needs to be resolved. It is unfair to our community to allow the issue to remain unresolved.

Karen Copeland
Hoakolei Home Owner

Sent from my iPad



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Karen Copeland

karen.copeland@rocketmail.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Copeland:

Thank you for your November 21, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address in your comments, I am sending this response to your email address.

Haseko has asked me to express its gratitude for your expression of support for its rezoning request. The forthcoming Draft Environmental Impact Statement (DEIS) will describe the proposed action and several alternatives, including construction and operation of the marina as originally planned.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)

Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 23

----- Original Message -----

Subject: Support Haseko Rezoning

From: K P <alohawrap@gmail.com>

Date: Wed, November 20, 2013 9:22 pm

To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>

Aloha,

I have been briefed by Haseko about their requested zoning changes that are more suitable for a lagoon than the initially planned marina and would like to express my support.

My husband and our 2 kids have lived in Ewa Beach for years and we fully support the new master plan to build a lagoon. We have young kids and a swimming cove where we can spend safe and fun family time is ideal for our weekends. I understand that the lagoon will not have a opening to the ocean. I understand there will be some kind of circulation but would like more information on it. Will it be safe for swimming and how will the water be circulated?

Haseko has been doing great work within our community and I urge you to approve the zoning change so that they may continue.

Mahalo,

Kerrie Prowse



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Kerrie Prowse
alohawrap@gmail.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Prowse:

Thank you for your November 21, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address in your comments, I am sending this response to your email address.

Haseko has asked me to express its gratefulness for your expression of support for its rezoning request. The forthcoming Draft Environmental Impact Statement (Draft EIS) will describe the proposed action, including a discussion of how lagoon water quality will be maintained.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 24

-----Original Message-----

From: Roxanne Malaga-Tupuola [<mailto:rocky96792@yahoo.com>]
Sent: Thursday, November 21, 2013 6:15 AM
To: Streitz, Timothy
Cc: rocky96792@yahoo.com
Subject: Haseko's Request for zoning Change and Project Plan update

Aloha Tim Streitz,

Thank you for the opportunity to provide comments. I am totally against granting the zone change request.

I have the following comments.

1. I opposed the marina and resort.
2. since I opposed the marina in the first place I would be okay with the lagoons replacing the marina.
3. I opposed the zoning change that would allow hotels to be built on the shoreline.
4. I opposed the hotel period.

In conclusion, the whole build out will negatively impact our Ewa Beach lifestyle. please do not grant the zoning change.

Sincerely,
Roxanne Tupuola
40 resident of Ewa Beach
91-818 Lawalu Place
Ewa Beach, HI 96792

Sent from my iPad



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Roxanne Malaga-Tupuola
91-818 Lawalu Place
'Ewa Beach, Hawai'i 96792

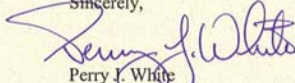
Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Malaga-Tupuola:

Thank you for your November 21, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to acknowledge your objection to the proposed rezoning and to the land uses that have been long-approved for the project area. The forthcoming Draft Environmental Impact Statement (Draft EIS) will describe and evaluate the effects of the development likely to occur under both the existing and the requested zoning.

We will provide copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any further questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 25

----- Original message -----

From: ray cureton <raycureton@yahoo.com>
Date: 11/20/2013 11:18 PM (GMT-10:00)
To: pwhite@psi-hi.com
Cc: tstreitz@honolulu.gov
Subject: Hoakalei EISPN rezoning

ALCON,

I greatly support the new zoning proposal for Hoakalei EISPN. No increase of dwellings and the potential for job creation as well as improving the community with new businesses is very exciting. We need more developers with such care and consideration for improving the community and respecting the land as Haseko. I am deeply impressed with their community outreach program and the positive impact they continue to achieve. Thanks for your time and support for the rezoning!

Very Respectfully,
Ray A. Cureton



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Ray A. Cureton
raycureton@yahoo.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Ray Cureton:

Thank you for your November 20, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to express its gratitude for your expression of support for its rezoning request. The company's staff members were very pleased that you took the time to recognize the care and consideration they devote to improving the community and respecting the land.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any further questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 26

From: James Cox [<mailto:james31tn@msn.com>]
Sent: Tuesday, November 19, 2013 9:50 AM
To: pwhite@psi-hi.com
Cc: Streitz, Timothy
Subject: NO! to the zoning changes at Koakalei by Haseko.
Importance: High

NO! to the zoning changes at Koakalei by Haseko!
Do NOT allow changes that allow from one to possibly three resort structures in that area.

Hawaii has less marina berths than Wyoming for crying out loud. Even if Haseko themselves no longer want to build a marina, though. That was the original deal (or... was it??? Hmm...).

Whether or not they want to build the marina, do not allow zoning changes allowing instead up to three resort structures.

v/r

James K Cox

Leeward coast resident, registered voter



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. James K. Cox
james31tn@msn.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

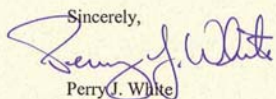
Dear Mr. Cox:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to acknowledge your objection to the proposed rezoning. You are one of many individuals who have registered their opinions.

I would like to correct one possible misunderstanding on your part concerning the rezoning request. If approved, it would not increase the number of hotel structures or the number of hotel rooms (which would remain at the presently approved 950) that are constructed. However, it would allow those units to be situated in three separate areas rather than on parcels that are contiguous to one another as called for under the existing zoning.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. If you have any further questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 27

From: Hannah Murphy [<mailto:63hannahlee@gmail.com>]
Sent: Thursday, November 21, 2013 11:27 AM
To: pwhite@psi-hi.com
Cc: Streitz, Timothy
Subject: Haseko Zone Change

Aloha,

I am excited for Haseko to complete its lagoon and resort. I've been briefed by Haseko and have had a chance to experience the lagoon. As an avid canoe paddler, I view the lagoon as a perfect place for keiki to learn how to paddle and so I fully support this project and would like to see it completed.

I read that Haseko is requesting a zoning change and will be drafting an environmental impact statement. Everyone in Community will benefit from the lagoon. I think it was smart of Haseko to make the decision to forego the marina.

I imagine that the lagoon will have less environmental impacts than a marina since there will be no need for a channel entrance. I do hope, however, that Haseko addresses what will happen to storm water. How will be assured that storm water will not get into the lagoon? How will we be assured that the lagoon water will be safe to paddle and swim in?

Mahalo,
Hannah Murphy
Steersman
Manu O Ke Kai Canoe Club



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Hannah Murphy
63hannahlee@gmail.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Hannah Murphy:

Thank you for your November 21, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to express its gratitude for stating your support for its rezoning request. The forthcoming Draft Environmental Impact Statement (Draft EIS) will describe the effect of the proposed action, including the way that it expects to ensure that storm water runoff does not make the lagoon unsafe for paddlers.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comments at that time. In the meantime, please call me at (808) 550-4483 if you have any questions.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

DEPARTMENT OF PARKS & RECREATION
CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR



TONI P. ROBINSON
DIRECTOR
JEANNE C. ISHIKAWA
DEPUTY DIRECTOR

November 22, 2013

SENT VIA EMAIL

Mr. Perry J. White
pwhite@psi-hi.com

Dear Mr. White:

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (EISP)
for the Hoakalei Master Plan Update

We have reviewed the EISP for the above-mentioned project and have no comments at this time.

Should you have any questions, please contact Dexter Liu, Leeward Oahu District Manager, at 675-6030.

Sincerely,

Toni P. Robinson
Director

TPR:by
(539673)

cc: Tim Streitz
Department of Planning and Permitting

Comment No. 28



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Toni P. Robinson, Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawai'i 96707

Subject: Hoakalei Master Plan Update EISP

Dear Ms. Robinson:

Thank you for your November 22, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISP and notifying us that the Department of Parks and Recreation has no comments at this time.

We will provide a copy of the Draft Environmental Impact Statement to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 29

From: "Mitchell Tynanes" <mtynanes-hrcc@hawaii.rr.com>
To: <pwhite@psi-hi.com>
Subject: Haseko
Date: Thu, 21 Nov 2013 15:15:39 -1000

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz

Re: Haseko's Zoning Change for a portion of its Hoakalei Project

Mr. White and Mr. Streitz,

As a community leader and a member of the carpenters union I realize the impact of market changes has on development and the need to reexamine the Hoakalei Project Master Plan. I am writing in support of replacing the Marina with a Lagoon, but I have serious concerns about the zoning change in replacing the current industrial zoning with resort zoning.

My opposition to granting the zoning change is specific to allowing resort type projects so close to the beach front and next to the archaeological Kauhale preserve. because I do not want to see the resort zoning moved to the shore line. I have lived in Ewa Beach for over 39 years. My family and I have committed our lives to Ewa Beach. We have dealt with rapid growth. The infrastructure improvements have not kept pace resulting in disjointed connectivity, not enough parks, anger and wasted time on the roadways just to get back and forth to work.

In general I have tried to understand and be patient about all of the changes happening in our community. I get involve when something is not working and I believe in creating jobs for local people. The boating community is not happy, but I believe a lagoon can still create a sound public benefit and jobs in our community. I was happy to hear that Haseko had a plan that would allow for public access and parking along the Kauhale Preservation area. As a child I remember going to swim at a brackish swimming area in One'ula Beach/Hau Bush, so I can relate to having a lagoon in the area. I did not support breaking through the reef anyway, but would have supported it to create a marina and marina related jobs, commercial spaces and as important a launching area for our canoe clubs.

I am totally in opposition of having any hotel near the shoreline and would absolutely be against the increased heights of 90 feet right on the beach. I understand the current zoning would allow for 60 foot tall structures, but I calculated that since Haseko had to set the resort/hotel area back along Keoneula Boulevard I figured they would not have built anything tall enough to block the view of the ocean. I did not support the idea of a resort atmosphere and was totally against hotels and having our community turn into a tourist destination. I thought that we should restrict those activities to Waikiki and Ko'olina. I compromised in my mind because I thought about all of our people getting on the bus and traveling to Waikiki to work and found value in allowing for those types of jobs in our community.

In closing I feel like we have compromised enough. Moving the resort zoning near the shoreline is just wrong and it feels like Haseko is just pushing the community to the brink. It is unnecessary for Haseko to move the resort to the shoreline and frankly I am shocked that they are requesting that knowing how

the community already feels about the resort. Please do not allow the zoning to be changed if it ultimately means hotels will be put near the beach.

Sincerely,

Mitchell Tynanes,
39 year resident of Ewa Beach
91-3074 Makalea Loop
Ewa Beach, Hawaii 96706



Mitchell M. Tynanes
Field Representative

HAWAII REGIONAL COUNCIL OF CARPENTERS
1311 Houghtailing Street
Honolulu, Hawaii 96817-2712
Phone: (808) 847-5761 Direct: (808) 440-9137
Fax: (808) 440-9109
Email: mtynanes-hrcc@hawaii.rr.com



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Mr. Michael M Tynanes, Field Representative
Hawaii Regional Council of Carpenters
91-3074 Makalea Loop
Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Tynanes:

Thank you for your November 21, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to express its gratitude for your understanding of its need to reexamine the project in view of market changes and also to acknowledge your reservations about the revised plan it has proposed. They are pleased that you also support the plan's provisions for public access and parking along the Kauhale Preservation area and that you feel a lagoon may be at least as appropriate as a marina that required breaking through the reef.

You are not the only person who has expressed concern about granting the zoning change that would allow resort type projects closer to the ocean shoreline and to the Kauhale Preserve than had previously been planned. The forthcoming Draft Environmental Impact Statement (DEIS) will describe and assess the impacts of not only the updated master plan it has proposed, but several alternatives as well. These will include construction and operation of the marina and surrounding land uses much as originally planned and a lagoon with hotel development limited to its *mauka* side adjacent to Keone'ula Boulevard.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 30

Subject: Support letter for Haseko
From: Wren Prowse <wrenagade@hawaiiintel.net>
Date: Thu, 21 Nov 2013 15:58:49 -1000
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>,
"tstreitz@honolulu.gov" <tstreitz@honolulu.gov>

Aloha,

Iâ€™m an Ewa Beach resident and I support Hasekoâ€™s request for zoning changes so that they can start work on lagoon and resort. My classmates and I are looking forward to the completion of the lagoon.

As an athlete, I think having a lagoon with shoreline paths for runners like myself will be a huge benefit to the community. I read that the paths will connect the lagoon to White Plains Beach Park in Kalaeloa and Oneula Beach Park in Ewa Beach.

With a lagoon, Iâ€™ll be able to train close to home. My only concern with the pathways is safety and access. Will it be well lit at sundown and will I need to be concerned about my safety while running or biking in the evenings? Also, how easy will it be to access these pathways?

Mahalo,
Edward R. Prowse III



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Edward R. Prowse III
wrenagade@hawaiiintel.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Prowse:

Thank you for your November 21, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to express its gratitude for your expression of support for its rezoning request. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe the proposed action, several project alternatives, and their likely effects. The evaluation will address the pathway access and safety issues you inquired about.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850



Comment No. 31

In Reply Refer To:
2014-TA-0027

November 20, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawai'i 96814

Subject: Technical Assistance for the Preparation of an Environmental Impact Statement
for the Hoakalei Master Plan Update, O'ahu

Dear Mr. White:

The U.S. Fish and Wildlife Service (Service) received your letter on October 22, 2013, notifying our office on your Notice of Intent to prepare an Environmental Impact Statement for the Hoakalei Master Plan Update. Haseko (Ewa), Inc., is seeking a zone change for a 422-acre portion of its Hoakalei Resort/Ocean Pointe Project (Project) in 'Ewa, O'ahu, to accommodate an update to the Project master plan [TMKs: (1) 9-1-132: 007, 025, 026, 027, 029, and portions of parcels 002 and 028]. The planned Project (formerly known as Ewa Marina) included a golf course, a district park, 950 resort units, and a maximum of 4,850 residential units. Additionally, the Project included a man-made marina with a maritime commercial complex, waterfront industrial, and retail facilities. The updated master plan calls for the existing basin to be used as a recreational lagoon with no direct connection to the ocean rather than a small boat marina, and for related adjustments to the use of the surrounding land. There will be no increase to the total number of planned dwelling units or visitor accommodation units specified in Haseko's Unilateral Agreement with the City (Ord. 93-94). We understand there will be some adjustments to the proposed zoning boundaries that may affect the sizes and locations of individual zoning districts as a result of consultations with the City Department of Planning and Permitting.

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program. This response is in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). Our data indicate the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian gallinule (*Gallinula chloropus sandvicensis*), Hawaiian coot (*Fulica alai*), (collectively referred to as Hawaiian waterbirds), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), and a candidate for listing, the Anchialine pool shrimp (*Metabetaeus lohena*), may be present in the vicinity of the proposed project site. The federally threatened Newell's shearwater (*Puffinus auricularis newellii*) and endangered Hawaiian petrel (*Pterodroma*



Mr. Perry J. White
sandwichensis) (collectively referred to as Hawaiian seabirds) may fly over the project area when traversing between the ocean and mountainous breeding colonies. Seabird species that are protected under the Migratory Bird Treaty Act [16 U.S.C. 703-712], such as the wedge-tailed shearwater (*Puffinus pacificus chlorhynchus*), may be present in the vicinity of the proposed project site and fly over the project area from its breeding colonies. Critical habitat – Lowland Dry – Unit 11 also occurs within the vicinity of the proposed project footprint. The O'ahu – Lowland Dry – Unit 11 habitat are for the following species: *Chamaesyce skottsbergii* var. *skottsbergii*, *Bidens amplexans*, *Achyranthes splendens* var. *rotundata*, *Bonania menziesii*, *Chamaesyce celastroides* var. *kaenana*, *Euphorbia haeleleana*, *Gouania meyenii*, *G. vitifolia*, *Hibiscus brackenridgei*, *Isodendron pyrifolium*, *Melanthera tenuifolia*, *Neraudia angulata*, *Nototrichium humile*, *Schiedea hookeri*, *S. kealiae*, and *Spermolepis hawaiiensis*. We recommend you have a qualified biologist survey for any of the following species and find ways to minimize any impacts of the proposed Project in your Environmental Impact Statement.

In addition, the endangered Hawaiian monk seal (*Monachus schauinslandi*) may use beach habitat in the vicinity of the proposed project. The National Marine Fisheries Service (NMFS) is the Federal agency that consults on potential impacts to monk seals, both in their on-shore and ocean habitats. Therefore, we did not review the proposed project for potential project impacts to monk seals. We recommend that you contact NMFS regarding the presence of monk seals in the area and potential impacts to the species from the project.

If it is determined that the proposed project may affect federally listed species, we recommend you contact our office in the planning process so that we may assist you with Endangered Species Act (ESA) compliance. If the proposed project is funded, authorized, or permitted by a Federal agency, then the Federal agency should consult with us pursuant to section 7(a)(2) of the ESA. If no Federal agency is involved with the proposed project, the applicant should apply for an incidental take permit under section 10(a)(1)(B) of the ESA. A section 10 permit application must include a habitat conservation plan laying out the proposed actions, determine the effects of the action on affected fish and wildlife species and their habitats, and define measures to minimize and mitigate adverse effects.

If you have questions regarding this letter, please contact Jiny Kim, Fish and Wildlife Biologist (phone: 808-792-9400; email: jiny_kim@fws.gov).

Sincerely,

11/20/2013

X Vickie Caraway (acting for)

Daniel Clark
Supervisory Fish and Wildlife Biologist
Signed by: U.S. Fish and Wildlife Service



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Mr. Daniel Clark, Supervisory Fish and Wildlife Biologist
c/o Ms. Vickie Caraway
Pacific Islands Fish and Wildlife Office
Fish and Wildlife Service
U.S. Department of the Interior
300 Ala Moana Blvd., Room 3-122
Honolulu, Hawai'i 96850

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Clark:

Thank you for your November 20, 2013 letter (reference 2014-TA-0027) concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you and others at the Service spent reviewing the EISPN and preparing your response. To simplify your review, we have reproduced your comments below in *italics*, followed by our response.

Comment:

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program. This response is in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.). Our data indicate the endangered Hawaiian stilt (Himantopus mexicanus knudensi), Hawaiian gallinule (Gallinula chloropus sandvicensis), Hawaiian coot (Fulica alai), (collectively referred to as Hawaiian waterbirds), the endangered Hawaiian hoary bat (Lasiurus cinereus semotus), and a candidate for listing, the Anchieline pool shrimp (Metabateus lohena), may be present in the vicinity of the proposed project site. The federally threatened Newell's shearwater (Puffinus auricularis newelli) and endangered Hawaiian petrel (Pterodroma sandwichensis) (collectively referred to as Hawaiian seabirds) may fly over the project area when traversing between the ocean and mountainous breeding colonies. Seabird species that are protected under the Migratory Bird Treaty Act [16 U.S.C. 703-712], such as the wedge-tailed shearwater (Puffinus pacificus chlorhynchus), may be present in the vicinity of the proposed project site and fly over the project area from its breeding colonies. Critical habitat – Lowland Dry – Unit 11 habitat are for the following species: Chamaesyce skottsbergii var. skottsbergii, Bidens amplexans, Achyranthes splendens var. rotundata, Bonamia menziesii, Chamaesyce celastroides var. kaenana, Euphorbia haelecleana, Gouania meyenii, G. vitifolia, Hibiscus brackenridgei, Isodendron pyriformis, Melanthera tenuifolia, Neraudia angulata, Nototrichium humile, Schiedea hookeri, S. kealiae, and Spermolepis hawaiiensis. We recommend you have a qualified biologist survey for any of the following species and find ways to minimize any impacts of the proposed Project in your Environmental Impact Statement.

Response: Haseko has worked with a team of qualified biologists to monitor the biota present within the area covered by the rezoning request over a period of many years. During this period it has created an environment that is far richer for many of the species you noted than was previously present. This information, as well as an evaluation of potential impacts, will be presented in the Draft Environmental Impact Statement (DEIS).

Page 2
Mr. Daniel Clark
January 15, 2014

Your letter makes reference to a number of protected species that "may fly over the project area", but it does not reference any site-specific sources on which that conjecture is based. If the Service has specific records that show that such overflights actually occur on a regular basis, we would appreciate it if you would share that information with us so that we may consider it as we prepare the document. It would be helpful also if you could note any adverse effects that you believe would occur as a result of the rezoning. Haseko has always tried to be proactive in this regard, and your insights could help it chart the details of ongoing development.

Finally, you make reference to Critical habitat – Lowland Dry – Unit 1, citing the species that are present in that habitat area. To the best of our knowledge, no critical habitat lies within Haseko's property, and the sorts of changes in land use that might occur as a result of the requested rezoning do not have the potential to affect the area in question, and we will report that in the Draft EIS. If you believe that this is not the case, would you please call me to discuss the subject?

Comment:

In addition, the endangered Hawaiian monk seal (Monachus schauinslandi) may use beach habitat in the vicinity of the proposed project. The National Marine Fisheries Service (NMFS) is the Federal agency that consults on potential impacts to monk seals, both in their on-shore and ocean habitats. Therefore, we did not review the proposed project for potential project impacts to monk seals. We recommend that you contact NMFS regarding the presence of monk seals in the area and potential impacts to the species from the project.

Response: Thank you for the information you have provided regarding Hawaiian monk seals. While Haseko has strong evidence to believe that the proposed project will have no impacts on monk seals, we will consult with the National Marine Fisheries Service on this matter and include the results of that consultation in the Draft Environmental Impact Statement (DEIS).

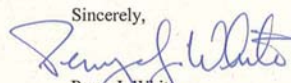
Comment:

If it is determined that the proposed project may affect federally listed species, we recommend you contact our office in the planning process so that we may assist you with Endangered Species Act (ESA) compliance. If the proposed project is funded, authorized, or permitted by a Federal agency, then the Federal agency should consult with us pursuant to section 7(a)(2) of the ESA. If no Federal agency is involved with the proposed project, the applicant should apply for an incidental take permit under section 10(a)(1)(B) of the ESA. A section 10 permit application must include a habitat conservation plan laying out the proposed actions, determine the effects of the action of affected fish and wildlife species and their habitats, and define measures to minimize and mitigate adverse effects.

Page 3
Mr. Daniel Clark
January 15, 2014

Response: Haseko believes that it can conduct activities related to construction and operation of the proposed project without harming threatened or endangered fish and wildlife, or their habitats. However, should new information become available that alters this, Haseko will initiate further consultation with your office.

If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 32

From: William Payne <willmpayne@gmail.com>
Date: Thu, 21 Nov 2013 16:16:40 -1000
Subject: Haseko Hoakalei zoning change proposal
Cc: tstreitz@honolulu.gov,
kmpine@honolulu.gov
To: pwhite@psi-hi.com

Before this change can be approved, the Ocean Pointe and Hoakalei communities need written commitments to resurface and maintain on a quarterly basis the roadways now leading in to this area.

Specifically:

1. Keoneula Blvd from Ft Weaver Road to the waterfront area covered by their proposal
2. Kapolei Parkway between Geiger Road and Papipi Road
3. Geiger Road intersection with Kapolei Parkway - the southwest right turn lane from Geiger to southbound Kapolei Parkway
4. These roadways have deteriorated to the raw dirt level, have been patched, only to continue deteriorating.
5. Roadways described in 1 and 2 above were only in recent years - 5 to 7 years approximately - created as new. The daily traffic volume will substantially increase at these points with the proposed resort developments.
6. Geiger Road intersection described in 3 above has only a PARTIAL right-turn lane, with large potholes extending from the roadway into the adjoining dirt area. There is no curb, and the dirt becomes a mud hole during rainy periods. The lane width is less than the width of my personal vehicle, and of many vehicles I observe using this right-turn lane.

Please include these considerations as the Haseko proposal is reviewed.

Thank you.

William M Payne & Thomas Lewand
91-1051 Kaileolea Drive 2B3
Ewa Beach, HI 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Messrs. William M. Payne and Thomas Lewand
91-1051 Kaileolea Drive 2B3
Ewa Beach, Hawaii 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Messrs. Payne and Lewand:

Thank you for your November 21, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to acknowledge your recommendation that the City better maintain area roadways prior to granting the change in zoning which the company is seeking. As you know, Haseko builds the public roadways within Ocean Pointe and Hoakalei to City & County standards before giving the completed roadways to the City to own and maintain.

The forthcoming Draft Environmental Impact Statement (Draft EIS) for the Hoakalei Master Plan Update Project will include an analysis of the probable impacts to area roadways that you have cited as a concern.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 33

November 19, 2013

Planning Solutions, Inc.,
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Attn: Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz

Re: Haseko's Zoning Change for a portion of its Hoakalei Project

Mr. White and Mr. Streitz,

As a previous Ewa Neighborhood Board Chairperson and community leader I am writing in opposition to granting the zoning change, because I do not want to see the resort zoning moved to the shore line. I have lived in Ewa Beach for over 20 years. My family and I have committed our lives to Ewa Beach. We have dealt with rapid growth. The infrastructure improvements have not kept pace resulting in disjointed connectivity, not enough parks, anger and wasted time on the roadways just to get back and forth to work. In general I have tried to understand and be patient about all of the changes happening in our community. I get involve when something is not working and I believe in creating jobs for local people. Market changes resulted in the need to change from a Marina to a Lagoon project. The boating community is not happy, but I believe a lagoon can still create a sound public benefit. I was happy to hear that Haseko had a plan that would allow for public access and parking along the Kauhale Preservation area. As a child I remember going to swim at a brackish swimming area in One'ula Beach/Hau Bush, so I can relate to having a lagoon in the area. I did not support breaking through the reef anyway, but would have supported it to create a marina and marina related jobs, commercial spaces and as important a launching area for our canoe clubs.

I am totally in opposition of having any hotel near the shoreline and would absolutely be against the increased heights of 90 feet right on the beach. I understand the current zoning would allow for 60 foot tall structures, but I calculated that since Haseko had to set the resort/hotel area back along Keoneula Boulevard I figured they would not have built anything tall enough to block the view of the ocean. I did not support the idea of a resort atmosphere and was totally against hotels and having our community turn into a tourist destination. I thought that we should restrict those activities to Waikiki and Ko'olina. I compromised in my mind because I thought

about all of our people getting on the bus and traveling to Waikiki to work and found value in allowing for those types of jobs in our community.

In closing I feel like we have compromised enough. Moving the resort zoning near the shoreline is just wrong and it feels like Haseko is just pushing the community to the brink. It is unnecessary for Haseko to move the resort to the shoreline and frankly I am shocked that they are requesting that knowing how the community already feels about the resort. Please do not allow the zoning to be changed if it ultimately means hotels will be put near the beach.

Malama Pono,

Kurt Fevella,
20 year resident of Ewa Beach
91-941 Ikulani Street
Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Kurt Fevella
91-941 Ikulani Street
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Fevella:

Thank you for your November 19, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to express its gratitude for your understanding of its need to reexamine the project in view of market changes and also to acknowledge your reservations about the revised plan it has proposed. They are pleased that you also support the plan's provisions for public access and parking along the Kauhale Preservation area and that you believe a lagoon can still create a sound public benefit.

You are not the only person who has expressed concern about granting the zoning change that would allow resort type projects closer to the ocean shoreline and to the Kauhale Preserve than had previously been planned. The forthcoming Draft Environmental Impact Statement (DEIS) will describe and assess the impacts of not only the updated master plan it has proposed, but several alternatives as well. These will include construction and operation of the marina and surrounding land uses much as originally planned and a lagoon with hotel development limited to its *mauka* side adjacent to Keone'ula Boulevard.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Date: Fri, 22 Nov 2013 10:05:31 +0000
From: <alongboarder@hawaii.rr.com>
To: pwhite@psi-hi.com
Subject: zoning change

i think that allowing more development on the west side is a ridiculous idea. for those of us who live on this side the traffic is already a disaster. to even think of putting more families and cars on the highway on this side seems thoughtless for those of us who already suffer with dealing with the incredible time it now takes to get in and out of the west side of oahu.

since we are concerned about developing the west side, the first thing that should be developed is our road ways in and out of the west. between makaha to ewa there needs to be an increase in the number of lanes for vehicles to travel on. the two lanes each way does not provide an effective or efficient way to get in and out of makaha, maile, and nanakuli. it seems that the road ways were improve only to the koolina area. this provides better traveling to koolina area, after that hotel area..., nothing. us being stuck in traffic every weekday between 3 - 6 pm is the norm.

if your concern is for the people on the west side then do something about farrington highway. expand the highway so that there are more than the current two lanes going each way. we have to get in and out of our area daily and in times of emergencies, tsunami etc., we are stuck in traffic. if there are any accidents, we are stuck. if there is any road work being done, we are stuck. if there is a big rain fall, we are stuck..... help our community and those that live out here by improving our means our getting in to and out of the west side.

thanks for reading my memo and hopefully you will try to get it done.
gordon



P L A N N I N G
S O L U T I O N S

January 15, 2014

Gordon
alongboarder@hawaii.rr.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Gordon:

Thank you for your November 22, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Because you did not include a mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to acknowledge your objection to the proposed rezoning. Your comments indicate that your objection stems from concerns about the amount of additional traffic that approval of the rezoning would lead to being present on Farrington Highway between Mākaha and 'Ewa. The Draft Environmental Impact Statement (DEIS) for the proposed rezoning will discuss the effect that approval of the rezoning request would have on area roadways. Please note, however, that little if any of the discussion will pertain to the specific areas that you referenced (Mākaha, Maile, and Nānākuli). That is because the nature of the rezoning and the distance between the area covered by the rezoning request is so great that there is no tangible connection between the two.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

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‘EWA BEACH COMMUNITY ASSOCIATION
CHARTERED 1960 - 53 YEARS OF COMMUNITY SERVICE

November 23, 2013

Glenn Oamilda, President
‘Ewa Beach Community Association
91-1179 Puamae’ole Sreet, 24V
‘Ewa Beach, Hawai‘i 96706
Email: imkanaka2@yahoo.com

Mr. Tom Streitz
Department of Planning and Permitting,
Policy Planning Branch
650 South King Street, 7th floor
Honolulu, Hawai‘i 96813
Email: tstreitz@honolulu.gov.

Reference: Preparation of an Environmental Impact Statement (EIS): a Recreation Lagoon

Aloha, ano‘ai,

Mahalo Mr. Streitz for allowing me to make comments on Haseko's latest request for a recreation lagoon to be included in its Hoakalei/Ocean Pointe master plan. My name is Glenn Oamilda, one of eight children born and raised in Waipahu on O‘ahu's sugar plantation, and now a thirty year resident of ‘Ewa Beach. Throughout those years, I have been active in the political, social and cultural issues within moku ‘Ewa, as well as, island and state-wide having sat on boards, organizations and clubs. The ‘Ewa Beach Community Association too has a long history of advocating for the preservation and protection of recorded in the ‘Ewa region as well as throughout the state of Hawai‘i.

Mr. Streitz, I have followed Haseko's original proposed planned marina project since inception, since the first ever presentation made to the residents of ‘Ewa Beach. The developer's big selling points that convinced the public to buy-in were: jobs and the trash clean-up of the beach park. In fact, way back in the ‘80s, I was one of the first testifiers in favor of the marina project because of all the positive amenities they will bring to the community was the promise of permanent jobs. Through the entire planning process, I held firm, optimistic, one I could rally around and remained hopeful this was a good, well planned out project, the economic engine that could finally turn the community around.

In this isolated one-way-in and one-way-out sea-side community, residents were overwhelmed, stoked to hear of the prospects of good paying permanent jobs; unaware that

some fifteen years later the promise of those jobs had not materialized. This began the planned marina ill-fated journey when Haseko deferred the start of phase I in lieu of phase II and now into phase IV of construction not having fulfilled any of the original provisional agreements made to the public, feds and to the local governments, and now opting to constructing an inland dredged-out lagoon instead.

In the mid ‘90s, Haseko, (‘Ewa), Inc. applied to the Land Use Commission (LUC) for and was granted land use reclassification from agriculture to urban for 1,100 acres. The ‘Ewa marina project was phase I, a sea-side proposed master planned development of 120-acre that would provide recreational and boating activities with a seaward entrance into a 1,400 boat slip basin equipped with boat repair facilities, public boat ramps, a 950-unit hotel with gift shops and restaurants all available to the general public. The proposed marina was touted by the developer as the "center-piece," the premiere regional and island-wide visitors' destination.

Haseko's successful sales pitch strategy was focused directly on providing the ‘Ewa Beach area with permanent jobs, and the clean-up of rubbish and debris and forever rid the area of squatters and the homeless at One‘ula Beach Park. Those salable points were convincing enough for the residents to buy into the plan. So, after years of open public debates and testimonies, the developer got all the required necessary permits and government approvals.

But, as the community anxiously awaited the start of phase I, Haseko switched direction and chose instead to building housing units, now into phase IV a step closer to being a total housing built-out. That move transformed ‘Ewa Beach into a bedroom community saturated with just houses, and yet no marina and no permanent jobs for the daily working commuters. In those early years of the housing construction, the community remembered vividly the traffic impacts that permanently affected their quality-of-life and life-styles. Today, community leaders believed Haseko had absolutely no intention of ever fulfilling any of the provisions of the marina master plan; provisions believed to be contrived, too glossy, loaded with empty rhetoric and sold to the public. Initially, it all sounded great, but after twenty years the residents accepted the realization they were duped.

Haseko knew all along phase I was certainly beset with fears and uncertainties, the risks versus the benefits, over the construction of the marina. Deference to ground-break was a no-brainer, one which the developer deemed that: 1) breaching the coastline could cause irreparable damage to the near shore ecosystem jeopardizing the Hawaiian cultural customary gathering rights and religious practices; and, 2) the construction of the seaward entry-way into the marina along with the deep dredging for the marina footprint could permanently damage the lens of the ‘Ewa fresh water aquifer, were too risky yielding little to

no benefits in return. The final death-nail to the entire planned marina project came in 2012, about fifteen years overdue from the original start time, when an economist was hired to say that continuing to pursue a marina, in so many words, was not economically profitable.

As the many years Haseko been in the community, the relationship have changed a lot between the old 'Ewa Beach and the new development. The lack of openness and transparency on political, environmental and cultural issues has labeled the developer an unfriendly partner. Moreover, the failure to communicate, consult and update the community on new or revised construction and development plans further amplified Haseko's contentious public relation policies. The Wall and the Papipi Road drainage comes to mind of projects that were ill-conceived and counter-productive.

The community had other concerns as well, over the secrecy and non-transparent unilateral agreement between the city and county and the developer- a 9-acre beach front lot, plus two million dollars deal in exchange for the Hoakalei golf course permits. So, what is the present status of the 9-acres and the two million dollars? The 9-acre parcel was designated a park, the Hoakalei golf course is up and functioning for over three or four years, yet there were no periodic or final updates. The community met twice over the last five years with a private landscape architectural firm to design and plan for a community park that would be contiguous to the One'ula Beach Park. Looking at the circulated layout, Haseko seemed to have moved and expanded the property boundary to the limits, to the near shore high water mark, literally wiping out the park designation, and left One'ula Beach Park in isolation, like a ship adrift in the middle of the vast ocean.

The event that finally toppled and buried phase I, the marina master plan, was the non-agreement between the developer and the city and county over the lowering of the secondary treated sewer outfall pipe that originated from Honouliuli Waste Water Treatment Plant (HWWTP) and terminated two miles off shore. Haseko claimed that not lowering the sewer outfall pipe would impede the small boat owners from navigating up and down the proposed inland waterways, still the developer refused to accept and assume the liability, cost, responsibility, jurisdiction and maintenance of the pipe never mindful that it entered and crossed the property at the mauka end along Geiger Road. For the first time, the master plan was downsized resulting in a total reconfiguration of the marina.

A proposed golf course, located at the uppermost end of the property running parallel along Geiger Road, and the inland navigable waterways, respectively, were originally designed and planned by the developer as a primary and a secondary catchment or retention basins for the 100-year mauka flood and spill-over waters and debris, but were both scrapped. Haseko was then required to submit a new flood drain-way-channel design and realignment plan. As an alternative, the approved Land Use Commission (LUC) permit requested by the

developer opened up almost 5 acres of perpendicular shoreline property. Chicken Creek, a natural little stream became the major flood drain way channel for the 100 years flood waters and debris that would flow unobstructed and unimpeded toward the ocean.

The second downsizing of the marina came over Hawaiian cultural issues. Kahu Mike Lee, a recognized cultural practitioner, a lineal descendant of family members interred at the marina site and a local resident, filed a lawsuit calling for more preservation, protection of archeological sites, more surveys and assessments of the property. He believes continuous construction, grading and grubbing on the property will open to more law suits, will destroy more ancient Hawaiian burial site and features, destroy sub-surface karst systems, the estuaries and streams, diverting the water flow that carries nutrients to the near shore flora and fauna. Request to access the property to visit or revisit already identified Hawaiian sites and features, archeological monitoring at construction sites, wet lands and animals, birds and plant sanctuaries were all denied, not even considered.

So as the result of this second downsize, all the provisions master planned marina was totally emasculated: 1) the elimination of plans for low and medium density residential housing units built along the proposed in- and upland waterways; 2) the elimination of the seaward entrance into a 1,400 boat slip basin equipped with boat repair facilities; 3) the elimination of public boat ramps; 4) the elimination a 950-unit hotel within the marina with gift shops and restaurants all available to the general public; 5) reneged on the promise of permanent area jobs; 6) refused to accept and assume the liability, cost, responsibility, jurisdiction and maintenance for the lowering the sewer outfall pipe; 7) failure to consider the impacts of realigning and reconfiguring a flood waters drain way channel running perpendicular, unimpeded toward the near shoreline; and, 8) the lack of openness and transparency on political, environmental and cultural issues.

On June, 2012, Haseko transmitted a letter to the City Planning Commission with a list of proposed amendments one of which was the request for a dredged-out recreational lagoon, but left open the door as a future option rights to revisit the ocean recreational boating marina master plan. The commissioners approved the request that gave Haseko a "no-holds-barred, an open-ended", a choice between a marina or a lagoon. The community, at the public hearing, voiced strong opposition to the commissioners' decision, as not having complete understanding of the entire master planned marina project, the failure to grasp all the negativities that transpired over the twenty-five years, as well as, the full knowledge that Haseko had already stabbed the original planned ocean marina idea multiple times, abandoned the idea for good, and left the project to die with no intention of ever revisiting or restarting construction.

Residents, who bought homes in Haseko's planned developments of Ocean Pointe and Hoakalei, were furious when the developer opted for a lagoon, felt duped, caught in a trap of bait-and-switch through slick radio ads and glossy brochures. Has the community lost creditability and trust in Haseko, the developer?

So what has the 'Ewa Beach community gained by Haseko's switching from the marina plan to offering up the lagoon plan instead? Most residents would say, absolutely nothing! Others would say that it is simply appalling for a foreign developer to remain in a special place like Hawai'i for over twenty-five years, present an acceptable ocean marina development plan, not accomplish any goals, then, do a one-hundred-eighty degree switch. What was Haseko thinking about when making the decision? Was it a land grab? Was it an investment in housing and other infrastructures? With no track record to look back on, what is the likelihood Haseko this proposed lagoon endeavor will be successful?

By first seeking support and approval from the City Planning Commission it's pretty much in the minds of most people that the lagoon plan is a done deal; but a backlash could force Haseko back before the State Land Use Commission (LUC) for a re-review and a redefinition as to the intention of the developer, the similarities and differences between both plans. Haseko can claim that an out-reach presentation on the lagoon to the community has already been done; however, unlike the marina plan which went to the community first for discussion, input and a final consensus acceptance.

Lastly, Mr. Streitz, here are some questions the community has and are eager to hear the answers. Will there be an Archeological Inventory Survey (AIS) performed on the site? If so, what will be the methodology or procedures to accomplish the task? If not, Why not? Will there be a Hawaiian cultural monitor present during both the AIS and the construction phases? In regards to the pond, will the developer present an acceptable comprehensive water plan? What methodology will be used to balance the salinity in the pond? What process will be used to backfill the evaporated pond water? How will the sea water inside the pond be charged, recharged and discharged? What will be methods of water aeration and water circulation? And finally, how will the polluted pond water be prevented from contaminating the ocean?

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November 23, 2013

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Mahalo, 'io 'oe,

Glenn J. Oamilda, President
'Ewa Beach Community Association



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Mr. Glenn Oamilda, President
'Ewa Beach Community Association
91-1179 Puamae'ole Street, 24V
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Oamilda:

Thank you for your November 23, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Many of the statements in your letter are not specific to the EISPN and go beyond the scope of the review process set forth in Chapter 343 of the Hawai'i Revised Statutes. Because of this, we have not attempted to respond to them here. We have, however, attempted to answer all of the project-specific questions that we could identify. To simplify your review, we have reproduced your comments below in *italics*, followed by our response.

Comment:

Will there be an Archaeological Inventory Survey (AIS) performed on the site? If so, what will be the methodology or procedures to accomplish the task? If not, why not? Will there be a Hawaiian cultural monitor present during both the AIS and the construction phases?

Response: Haseko has completed, and the State Historic Preservation Division approved, a series of archaeological surveys of the entire 1,100-acre property many years ago. It has subsequently prepared and implemented a series of detailed site preservation plans. Those plans have, in turn, provided for archaeological and cultural monitoring during construction. Haseko has monitored in accordance with these plans and with all other applicable laws and regulations.

Comment:

In regards to the pond, will the developer present an acceptable comprehensive water plan?

Response: For the purpose of this response we have assumed that "pond" means "lagoon", if this is incorrect please let us know. The Draft EIS will lay out the measures that will be taken to ensure that the quality of the water in the lagoon meets water quality standards. The discussion will include both the standard operating procedures it will put in place and the extraordinary measures that will be held in reserve in case the behavior of the lagoon differs from what is anticipated. With respect to "acceptability", that will be based on compliance with the State Water Quality Standards, not through some separate approval process.

Comment:

What methodology will be used to balance the salinity in the pond?

Response: We are puzzled by this question. Salinity is not something that one balances; it is simply a measure of the amount of chlorides and other salts dissolved in the water. The DEIS will discuss the anticipated salinity levels in the lagoon.

Page 2
Mr. Glenn Oamilda
January 15, 2014

Comment:

What process will be used to backfill the evaporated pond water?

Response: The meaning of your question is unclear. If your concern is over the mechanism through which water that evaporates from the lagoon will be replaced, then the answer is that the evaporation of water from the lagoon surface will lead to the inflow of groundwater from the surrounding areas.

Comment:

How will the sea water inside the pond be charged, recharged, and discharged?

Response: Here again, the meaning of this question is unclear. The DEIS will discuss the forces which will lead to water movement through the lagoon.

Comment:

What will be methods of water aeration and water circulation?

Response: Water in the lagoon naturally aerates itself as a result of wind and wave action, and groundwater continuously flows through the water body. Ongoing monitoring of the water in the existing basin indicates that dissolved oxygen in the lagoon is generally at or above 98% (and mostly above 100 percent) throughout the water column. Only in the last few inches above the bottom do dissolved oxygen levels drop below that.

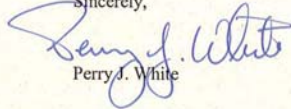
Comment:

And finally, how will the polluted pond water be prevented from contaminating the ocean?

Response: Your comment incorrectly implies that water in the lagoon will be "polluted". Water in the lagoon will not be "polluted" and does not, therefore, have the potential to pollute anything.

If you have any further questions, please email me at pwhite@psi-hi.com.

Sincerely,


Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

From: Laulani@aol.com
Date: Fri, 22 Nov 2013 10:11:05 -0500 (EST)
Subject: Proposed Zone Change - Haseko Hoakalei Project
To: pwhite@psi-hi.com
CC: tstreitz@honolulu.gov, stam@haseko.com, corrinamoefu@gmail.com

Aloha Mr. White,

I represented the 'Ewa - Pu'uloa Hawaiian Civic Club at a meeting with Sharene Saito Tam of Haseko Development on November 12, 2013 regarding the proposed zone change to the Hoakalei Master Plan. The purpose of the meeting was to discuss 3 specific concerns of our club.

Our primary concern dealt with public access to the ocean area bordering the makai side of the project area. We know that this stretch of ocean can be accessed from either White Plains Beach or Oneula Beach Park. However, we also wanted to insure that this area could be directly accessed from the mauka side of the project area. This would be especially important if users of the public swimming cove (Haseko intends to build the cove on the mauka side of the project area) want to access the ocean. According to Ms. Tam, pathways will be constructed completely around the perimeter of the project area allowing easy access to the ocean.

Second, we wanted to know how water runoff from the nearby housing development would be contained. Ms. Tam explained that 2 artificial lakes would be constructed in the project area to contain the runoff.

Our final concern was about water quality. How would the required water quality be maintained in the lagoon? Ms. Tam explained that there is a natural re-circulation of about 3 million gallons of brackish groundwater in the lagoon daily and that the lagoon bottom is laced with chara seaweed which also aids the water quality. And a team from the University of Hawaii periodically tests the water quality.

We are satisfied with the measures explained to us by Haseko and have no objections to the proposed zone change. I am the designated representative from the 'Ewa - Pu'uloa Hawaiian Civic Club for this project and can be reached at laulani@aol.com.

E malama pono,

Larry Woode
Ph. 685-2797



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Larry Woode
'Ewa-Pu'uloa Hawaiian Civic Club
laulani@aol.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Woode:

Thank you for your November 22, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response. At your request, I am sending this response to your email address.

Haseko has asked me to express its gratitude for your support for its rezoning request. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe and evaluate the potential for the sorts of effects mentioned in your letter. Specifically, it will:

- Describe the provisions for public access to the ocean area bordering the *makai* side of the project area, confirming that shoreline areas will be directly accessible from the *mauka* side of the project area around the perimeter of the project area allowing easy access to the ocean.
- Discuss the way in which artificial water quality lakes would be used to contain runoff into the lagoon from nearby housing projects.
- Evaluate the ways in which water quality within the lagoon would be maintained over time.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

November 20, 2013

Planning Solutions, Inc.,
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Attn: Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz

Re: Haseko's Request for Zoning Change and Project Plan Update

Aloha Mr. White and Mr. Streitz,

Thank you for the opportunity to provide comments. Haseko's request for zoning change and Project Master Plan Update has two major changes:

1. Replace the Marina with a Lagoon due to market demand, legal challenges and government permit approvals.
2. Replace industrial zoning with resort zoning along the ocean front.

I have the following comments for your consideration:

1. I had environmental concerns about the impact to the reef, impacts on One`ula Beach Park and runoff entering the ocean. Therefore, I support replacing the marina project with a lagoon type project. This change will have a negative impact on our boating community with no public slip access at Ko`olina the closest safe public slip access is at Ke`ehi Lagoon or at Wai`anae Boat Harbor.
2. I strongly oppose replacing the industrial zoning with resort zoning which would allow for the construction of resorts along the shoreline. This change should not be granted, because potentially the ninety feet height allowances for resort zoning could change the entire nature of the Ewa Beach and Kalaeloa communities in that area. When discussions about the Hoakalei Resort Project began I was reluctant to support it, because I was concerned resort related activities would

choke out our small community connection and "end-of-the road" lifestyle I cherished so much. It was my belief that resort related activities should be designated for specific areas on our island and supported restricting it to Waikiki and Ko`olina. As development exploded in our community, infrastructure failed to keep pace and our roadways turned into parking lots, I realized we must look at potential job creation opportunities for our community. My aunties and uncles were getting on the bus early in the morning in order to get to their jobs in Waikiki and I realized we have the potential to create those types of jobs right here in our community, but we did not have to sacrifice our beach front if development was done right. I knew ultimately to reduce traffic we needed more jobs where we lived, but we did not have to sacrifice our views of the Waimomi (Pearl Harbor) Channel, the Honolulu Airport Reef Runway, Ala Moana Shopping Center Fireworks Shows and ultimately Diamond Head. I was convinced that we did not have to sacrifice our Ewa Beach lifestyle, instead we could share it with those foreigners who came to our shores if we would restrict resort zoning to just makai of Keone`ula Boulevard where it is zoned today. The current zoning significantly sets resort use back from the ocean front. I remember expressing these concerns early on to Haseko representatives and why I felt it was a win-win solution. At the time the majority of the Ewa Beach community was totally against the notion of resort zoning, but a number of us went out on a limb to support it.

In closing, I know the current industrial zoning along the shoreline allows heights up to sixty feet, but I calculated that with the resort zoning set significantly back along Keone`ula Boulevard and away from the shoreline the developers would be reluctant to build projects along the shoreline that would block the view of the ocean from the resort area. The Hoakalei Kauhale Preserve is a symbol of Haseko's humility and respect for our host culture please do not allow the resort zoning change in that area to dishonor the past. My number is 808-372-3562 for any questions.

Malama Pono,

Tesha H. Malama,
40 year resident of Ewa Beach
91-818 Lawalu Place
Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Tesha H. Malama
91-818 Lauwala Place
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Malama:

Thank you for your November 20, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to express its gratitude for your expression of support for its decision to pursue the lagoon alternative in lieu of a marina at this time, and also to acknowledge your opposition to the proposed rezoning which would allow for the construction of resorts closer to the shoreline. The company understands your concern that overly tall resort structures could change the nature of the communities in that area. Instead, you prefer that resort zoning be restricted to the area just *makai* of Keone'ula Boulevard where it is zoned today.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 38

November 20, 2013

Planning Solutions, Inc.,
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Attn: Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz

Re: Haseko's Request for Zoning Change and Project Plan Update

Aloha Mr. White and Mr. Streitz,

I am writing in opposition of the request for zoning change for the following reasons:

1. I strongly oppose replacing the industrial zoning with the 8 acres of resort zoning near the shoreline. This change would potentially allow ninety foot tall structures to be built near the shoreline. The whole nature of the Ewa Beach and Kalaeloa communities in that area would be forever changed.
2. I strongly opposed even the notion of any resort type building in our community, but could see the potential for job creation. The compromise for allowing resort zoning was that resort zoning would be significantly set back away from the shoreline, so now this is sounding like a bait and switch, which I totally take offense to.
3. The location of Hoakalei Kauhale Preserve sets precedence for the area. It is protected and that surrounding area should be protected not be next to a 90 foot hotel.
4. I had environmental issues about the reef, negative impacts on One`ula Beach Park and polluting our ocean. Therefore, I support replacing the marina project with a lagoon type project. Even though it is a negative impact on our boating community with no public slip access at Ko`olina the closest safe public slip access is at Ke`ehi Lagoon or at Wai`anae Boat Harbor.

Thank you for your consideration.

Sincerely,

Melvon L. Ahlo-Pinera,
Over 30 year resident of Ewa
91- 1645 Hookahe Place
Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Melvon Ahlo-Pinera
91-1645 Hookahe Place
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Ahlo-Pinera:

Thank you for your November 20, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to express its gratitude for your support for its decision to pursue the lagoon alternative in lieu of a marina and to acknowledge your opposition to zoning which would allow for the construction of resorts closer to the shoreline. The company understands your concern that overly tall resort structures could change the nature of the communities in that area. Instead, you prefer that resort zoning be restricted to the area just *makai* of Keone'ula Boulevard where it is zoned today.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550 4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
530 SOUTH KING STREET, ROOM 202
HONOLULU, HAWAII 96813-3065
TELEPHONE: (808) 768-5010 • FAX: (808) 768-5011

KYMBERLY MARCOS PINE
COUNCILMEMBER, DISTRICT 1
TELEPHONE: (808) 768-5001
EMAIL: kmpine@honolulu.gov

November 21, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, HI 96814

VIA U.S. MAIL AND EMAIL

Subject: Comments on Haseko (Ewa), Inc.'s Notice of Intent to Prepare an
Environmental Impact Statement for the Hoakalei Master Plan Update

Dear Mr. White,

Thank you for the opportunity to provide comments on Haseko (Ewa), Inc.'s ("Haseko") Notice of Intent to Prepare an Environmental Impact Statement for the Hoakalei Master Plan Update ("Notice"). I write today to express my concern regarding the Hoakalei Master Plan Update's consistency with the recently approved 'Ewa Development Plan, Ordinance 13-26 ("EDP").

As I understand, Haseko is seeking a zone change for a portion of its project master plan, specifically with respect to land surrounding the existing lagoon basin. These requested changes will affect the size and locations of individual zoning districts, particularly the I-3 Industrial-Waterfront zoning district, which will be reduced from 26 acres to zero. According to the proposal, this I-3 zoning district will be summarily replaced with Resort, Business ("B-1"), Business Mixed-Use ("BMX-3") and Preservation ("P-2") zoning districts.

The Notice does not specify what the intended heights of potential developments in the proposed districts will be. I am concerned that development in these proposed zoning districts, with higher height limits, may be not be consistent with the EDP, which provides "Buildings with frontage on the interior basin should be limited to 40 feet. Buildings taller than 40 feet should be set back from the basin frontage." (EDP, 3-41.)

In addition, the I-3 zoning district, which Haseko proposes to eliminate, permits a wide range of commercial activities and is the only district to include port facilities as a permitted use. Although Haseko's current plan is to complete the build-out of an enclosed lagoon, I am concerned that this proposed update may be inconsistent with planning policy established in the EDP, which provides "A recreational waterfront project (consisting of a lagoon) may be

developed where the marina is shown on the map (Exhibit 3.5). Such a waterfront development . . . is a compatible use *that would not preclude eventual development of a marina.*" (EDP, 3-38, emphasis added.)

While Haseko notes in its Notice "the rezoning being requested is consistent with the 'Ewa Development Plan" and "that some other developer may be able to construct a marina at some future date, and its revised plans do not preclude such a possibility," rezoning and then developing the property currently zoned as I-3 may in fact preclude any realistic opportunity for a future marina at this location. (Notice, 2; 3.)

For these reasons, I look forward to hearing more about the proposed height limit revisions to the area zoning map, as well as Haseko's Environmental Impact Statement (EIS) that will not only evaluate its desired proposal, but will also evaluate the impact of feasible alternatives, including development with the existing zoning granted to Haseko.

Thank you again for the opportunity to provide comments on this matter. Should you have any questions or concerns please do not hesitate to contact me via email: kmpine@honolulu.gov or telephone: 768-5001.

Sincerely,

Kymberly Marcos Pine
Councilmember, District 1

cc: Tim Streitz, Department of Planning and Permitting



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

The Honorable Kymberly Marcos Pine
City Councilmember, District 1
City and County of Honolulu
Honolulu, Hawai'i 96813-3065

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Councilmember Pine:

Thank you for your November 21, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you and your staff spent reviewing the EISP and preparing your response. To simplify your review, we have reproduced your comments below in *italics*, followed by our response.

Comment:

The Notice does not specify what the intended heights of potential developments in the proposed districts will be. I am concerned that development in these proposed zoning districts, with higher height limits, may not be consistent with the EDP, which provides "Buildings with frontage on the interior basin should be limited to 40 feet. Buildings taller feet should be set back from the basin frontage." (EDP, 3-41.)

Response: Haseko will comply with all the requirements of the 'Ewa Development Plan, including the 40-foot height limit on buildings with frontage on the lagoon basin. The Hoakalei Urban Design Plan will also be updated to reflect this compliance.

Comment:

In addition, the I-3 zoning district, which Haseko proposes to eliminate, permits a wide range of commercial activities and is the only district to include port facilities as a permitted use. Although Haseko's current plan is to complete the build-out of an enclosed lagoon, I am concerned that this proposed update may be inconsistent with planning policy established in the EDP, which provides "A recreational waterfront project (consisting of a lagoon) may be developed where the marina is shown on the map (Exhibit 3.5). Such a waterfront development...is a compatible use that would not preclude eventual development of a marina."

While Haseko notes in its Notice "the rezoning being requested is consistent with the 'Ewa Development Plan" and "that some other developer may be able to construct a marina at some future date, and its revised plans do not preclude such a possibility," rezoning and then developing the property currently zoned as I-3 may in fact preclude any realistic opportunity for a future marina at this location. (Notice, 2:3.)

Response: The requested changes to the zoning are ones which Haseko feels best support use of the basin as a recreational lagoon. Should another purchaser/developer seek to build a marina at some point in the future, it would be incumbent on them to designate uses compatible to these re-zoned lands, or to request a subsequent change in zoning which supports its intended use of the basin as a marina. Because Haseko cannot know what potential future developments may occur, it has opted to develop areas around its proposed lagoon in such a way as to not encumber, and thus prevent, such a future development into a marina with outlet to the ocean. Examples of this flexible land-use posture

Page 2
Councilmember Pine
January 15, 2014

are the inclusion of the boat-launch ramp area on the west bank of the lagoon, and the P-2 Preservation zoning which it is maintaining along the *makai* edge of the lagoon fronting the ocean. By developing the land around the lagoon in this way, Haseko believes that it can support the intended use of the basin as a recreational lagoon while building into its design a degree of flexibility which allows for the possibility of a marina.

With specific reference to the conversion of I-3 zoning to preservation and resort zoning, it should be noted that I-3 zoning is not a requirement of a marina. Whether a future purchaser/developer of these lands would need I-3 zoning to pursue their vision of a marina is entirely contingent upon the nature of its plans. If such a development did require significant I-3 zoning, it would be incumbent upon the developer to seek a change in zoning, at that future date, which best supported their intended use of the area in much the same way as Haseko is currently doing.

Finally, please note that the Draft Environmental Impact Statement (DEIS) will assess alternatives to the requested rezoning. One of these will leave the resort zoning concentrated in the area between Keone'ula Blvd. and the excavated basin. In that Alternative the potential for marina support development would require much more limited future zoning adjustments.

Comment:

For these reasons, I look forward to hearing more about the proposed height limit revisions to the area zoning map, as well as Haseko's Environmental Impact Statement (EIS) that will not only evaluate its desired proposal, but will also evaluate the impact of feasible alternatives, including development with the existing zoning granted to Haseko.

Response:

The forthcoming DEIS for the Hoakalei Master Plan Update Project will include a detailed description of its proposed action (i.e., rezoning and a recreational lagoon), as well as several plan alternatives, and their probable impacts.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 40

Date: Fri, 22 Nov 2013 18:00:49 -1000
Subject: Haseko zoning changes
From: Garry Smith <garrysmith01@gmail.com>
To: pwhite@psi-hi.com

As a 35 year resident and 3 time neighborhood board member I would like to submit the following comments on Haseko's zoning change request.

Haseko has many reasons to change the design from a Marina to a Lagoon. The problem is that a brackish water lagoon would never pass a dept. of health water test for public use. There are currently the partially dug out lagoon and a small dug out pond near the lagoon, if you take a look at these you will see that this water is unfit for human swimming or contact. I haven't run any tests but I am positive that the water would never pass a bacteria test, certainly not if the public enters and uses this water. The exchange of this water within the brackish water is very very slow and insufficient to cleanse the water for use. The Lagoons at Ko Olina are open to the ocean and flush out naturally, the lagoon proposed by Haseko will never naturally flush. How can a zoning change to allow a lagoon that cannot be used. Require Haseko to build the lagoon first and open it to the public first before they get the zoning change.

Garry P. Smith
91-321 PUpu Place
ewa beach
392-5559



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Garry P. Smith
91-321 Pupu Place
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Smith:

Thank you for your November 22, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to acknowledge your objection to the proposed rezoning and concerns regarding water quality in the proposed lagoon and swimming cove. The forthcoming Draft Environmental Impact Statement (DEIS) will include a detailed discussion of the anticipated water quality within the lagoon, as well as the maintenance and testing regime which it will use to assure that the water within the lagoon meets all applicable water quality standards. With respect to the latter you will be pleased to know that Haseko has been conducting regular tests of bacterial levels within the lagoon for some time now, and the results of these show that bacterial levels are generally extremely low, with the great majority of samples tested having levels below the detection limit.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



HAWAII COMMUNITY
DEVELOPMENT AUTHORITY



KAKAOKO
KALAELOA

Neil Abercrombie
Governor

Brian Lee
Chairperson

Anthony J. H. Ching
Executive Director

Ref. No.: PL KALAELOA 17.3.4

November 21, 2013

Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Attention: Mr. Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Attention: Mr. Tim Streitz

Ladies and Gentlemen:

Re: Haseko's Request for Zoning Change and Project Plan Update

Thank you for the opportunity to provide comments. The Hawaii Community Development Authority ("HCDA") is responsible for the planning and development of the Kalaeloa Community Development District which is located immediately west of the Haseko's Hoakalei Resort Project.

The HCDA has the following comments:

1. Replacement of the long anticipated Marina with a Lagoon would still provide recreational activities and opportunities for the region. The continued development and presence of the Hoakalei Kauhale Preserve will also maintain a balance between human settlement and preservation/restoration of the area ecosystem.
2. While replacing industrial zoning with resort zoning along the oceanfront is consistent with patterns of development occurring throughout our State, any coastal development must protect the near shore environment from non-point source pollution, degradation of coastal scenic resources and other values enumerated in the Hawaii Coastal Zone Management Act and

461 Cooke Street
Honolulu, Hawaii
96813

Telephone
(808) 594-0300

Facsimile
(808) 594-0299

E-Mail
contact@hcdaweb.org

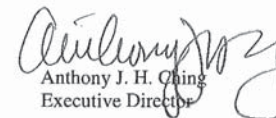
Web site
www.hcdaweb.org

Planning Solutions, Inc.
Department of Planning and Permitting
Page Two
November 21, 2013

Program. Accordingly, we defer to the Office of Planning Coastal Zone Management Program and their administration of development activities in the coastal zone.

If you should have any questions regarding this matter, please do not hesitate to contact Ms. Tesha Malama, Kalaeloa Director of Planning and Development, at 692-7245 or email at Tesha@hcdaweb.org.

Sincerely,


Anthony J. H. Ching
Executive Director

AJHC/TM:ak



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Mr. Anthony J.H. Ching, Executive Director
Hawai'i Community Development Authority
461 Cooke Street
Honolulu, Hawai'i 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Ching:

Thank you for your November 21, 2013 letter (reference PL KALAELOA 17.3.4) concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISPN and preparing your response.

Haseko has asked me to thank you for expressing your belief that replacement of the marina with a lagoon would still provide recreational activities and opportunities for the region and that the presence of the Hoakalei Kauhale Preserve will help maintain a balance between human settlement and preservation/restoration of the area ecosystem. Haseko will work with the Office of Planning's Coastal Zone Management Program to ensure that construction and operation of its proposed project will not result in degradation of the nearshore environment, coastal scenic resources, and other resources protected by the Hawai'i Coastal Zone Management Act.

The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will discuss the proposed project, several planning alternatives, and their likely impacts to the natural environment. We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



**OFFICE OF PLANNING
STATE OF HAWAII**

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

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: <http://planning.hawaii.gov/>

Comment No. 42

NEIL ABERCROMBIE
GOVERNOR

JESSE K. SOUKI
DIRECTOR
OFFICE OF PLANNING

Ref. No. P-14181

November 21, 2013

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

Subject: Notice of Intent to Prepare an Environmental Impact Statement for the Hoakalei Master Plan Update – TMK: 9-1-134: 007, 022 (por.), 025, 026, 027, 028 (por.), and 029

Thank you for the opportunity to provide comments on the Environmental Impact Statement Preparation Notice for the 244-acre Hoakalei Master Plan Update by Haseko (Ewa) Inc. The Office of Planning has reviewed the documents you provided by letter dated October 21, 2013, and has the following comments to offer.

1. The entire state is defined to be within the Coastal Zone Management Area (Hawaii Revised Statutes (HRS) §205A-1 - definition of "coastal zone management area"). The Draft Environmental Impact Statement (DEIS) should include a discussion of the proposed project's consistency with the objectives and policies set forth in HRS §205A-2.
2. The DEIS should include the Coastal Zone Management Act, HRS Chapter 205A, in the list of "Relationship to Land Use Plans, Policies, and Controls."
3. CZM federal consistency review by the Hawaii Coastal Zone Management (CZM) Program may be required since you are seeking approval for compliance with an existing Department of the Army permit. If other federal permits are required, then CZM federal consistency review may also be required for these permits.
4. The proposed project is within the Special Management Area (SMA) delineated by the City and County of Honolulu. Haseko (Ewa) Inc. seeks a change of the SMA boundary. Pursuant to HRS §205A-23, each county authority "shall review and pursuant to chapter 91, amend as necessary its special management area boundaries, to further the objectives and policies of [HRS Chapter 205A], provided that any contraction of the special management area boundaries as provided for in subsection

Mr. Perry J. White
Page 2
November 21, 2013

(a), shall be subject to the lead agency [the Office of Planning] review and determination as to compliance with the objectives and policies of [HRS Chapter 205A] and any guidelines enacted by the legislature."

5. Pursuant to HRS §205A-23, copies of the existing and amended SMA boundary maps at Hoakalei shall be filed with the Office of Planning.
6. The DEIS should provide a discussion on any pending progress or the current status of compliance with the conditions set forth in the Decision and Order for Land Use Commission Docket No. A83-558 MSM and Associates, Inc., dated September 21, 1984.
7. The project was previously planned for the stormwater to channel through the golf course and into the marina before discharging into the ocean. The DEIS should discuss how the project and the regional drainage system will function now that the marina is being replaced with a lagoon.

If you have any questions regarding this comment letter, please contact Josh Hekeia of the CZM Program at 587-2845, or Jenny Lee of the Land Use Division at 587-2805.

Sincerely,

Jesse K. Souki
Director



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Jesse K. Souki, Director
Office of Planning
State of Hawai'i
P.O. Box 2359
Honolulu, Hawai'i 96804

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Souki:

Thank you for your November 21, 2013 letter (Ref. No. P-14181) concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We are grateful for the time you and your staff spent reviewing the EISPN and preparing your response.

Haseko has asked me to say that it appreciates the previous discussions that it has had with your agency and looks forward to further consultation addressing the matters identified in your letter, prior to issuance of the Draft Environmental Impact Statement. In the meantime, if you have any questions please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 43

Date: Sat, 23 Nov 2013 20:11:08 +0000 (UTC)

From: <greeson@aloha.net>

To: kmpine@honolulu.gov, pwhite@psi-hi.com, tstreitz@honolulu.gov

Subject: Re: Your Feedback is Needed on Proposed Ewa Beach Resorts

I purchased a home in Ewa Beach on Pupu Street in 1984. One of the reasons I purchase in that area was because of the plans for a future marina in what is now Haseko's property. When Haseko took over the project, there were still plans to build this marina. I know many people bought homes in their development with the understanding that there would be a marina.

Now Haseko is reneging on their promise. I understand that some homeowners in their development have filed a class action lawsuit against Haseko because of the potential decrease in the value of their properties. I hope they are successful.

Haseko is interested only in making more money. They can make more money with a lagoon and additional resort development than providing Ewa Beach and Leeward Oahu with a much needed marina. In my view, the company is untrustworthy, and if I were a member of the City Council, I would not approve a single zoning request from Haseko until they lived up to their promise to build a marina.

Thank you,
Dan Greeson
Captain, USN (Ret.)



P L A N N I N G
S O L U T I O N S

January 15, 2014

Captain Dan Greeson, USN (Ret.)
greeson@aloha.net

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Captain Greeson:

Thank you for your November 23, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments. Because you did not include your mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to acknowledge your objection to the proposed rezoning and to express its disappointment that you feel it has reneged upon its promises. The company believes it has made great efforts to be a good steward of the land and a good neighbor to the people who live in homes around it.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comments for
Notice of Intent to Prepare an Environmental Impact Statement
for the Hoakalei Master Plan Update

From John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, HI. 96707

Attn: pwhite@psi-hi.com

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814
with

copies to the City and County of Honolulu, Department of Planning and Permitting (address
above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

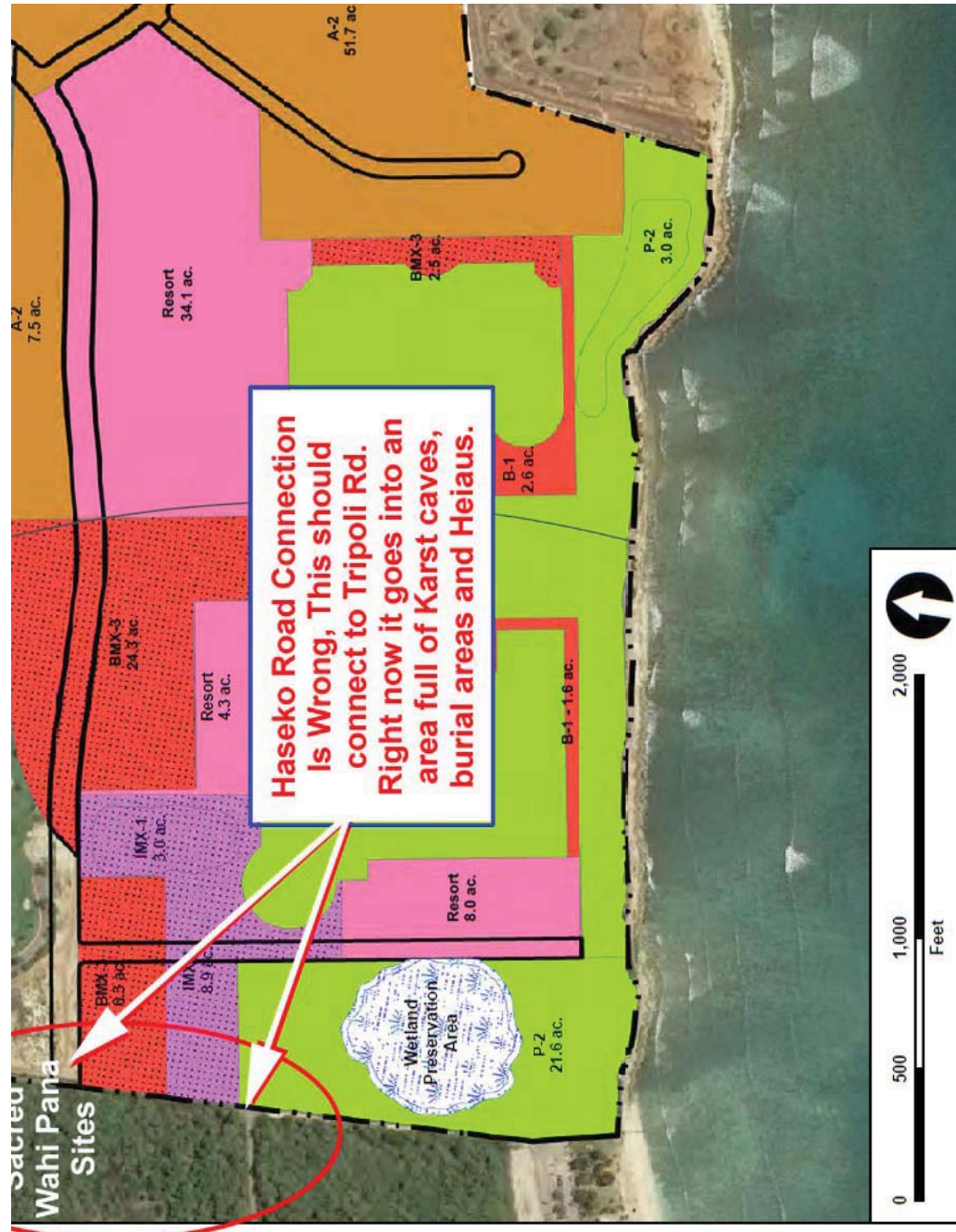
Haseko-HCDA Still Planning Road To Destroy Kanehili Cultural-Historic Sites

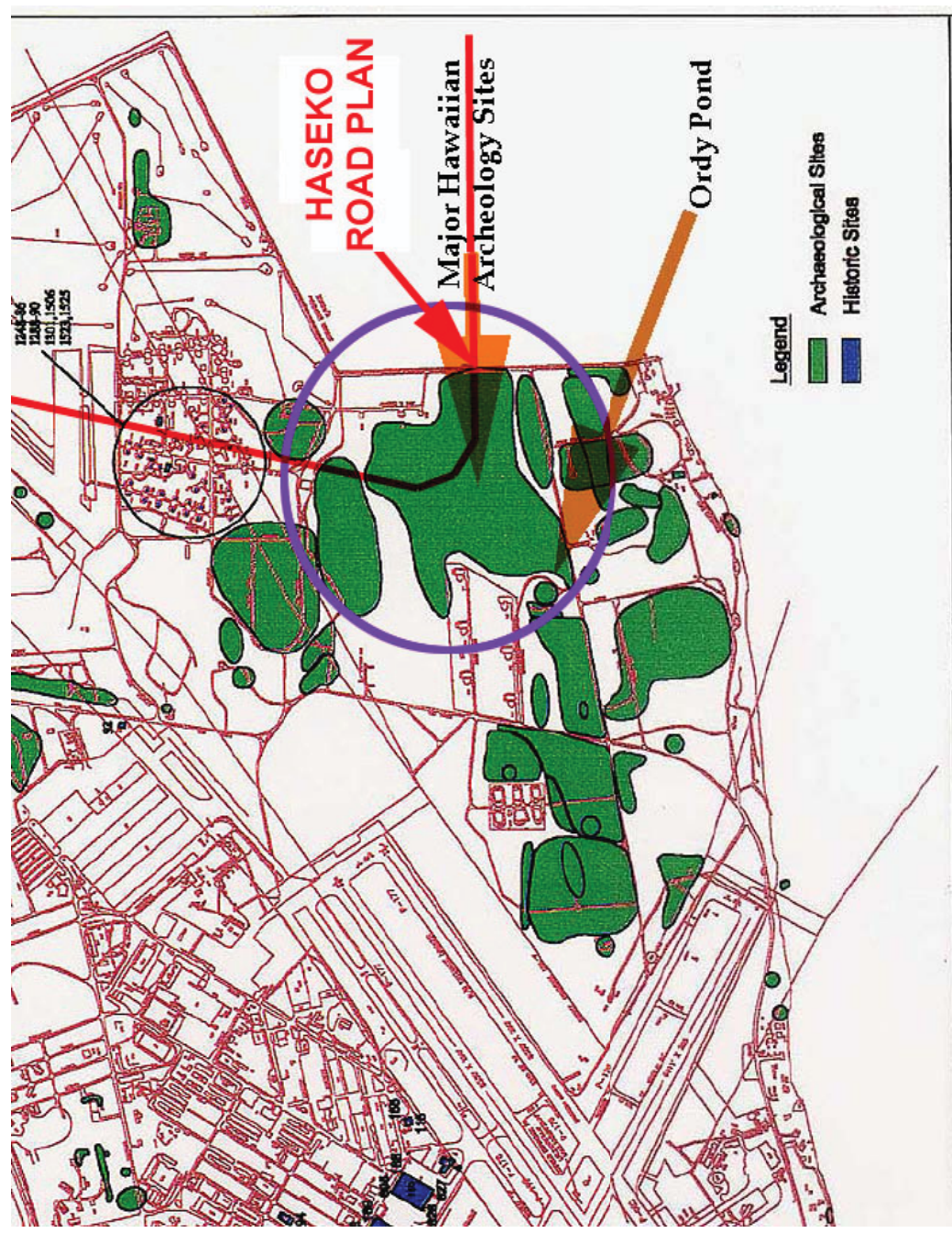
Even after years of comments and testimony to every government
agency and department, Haseko Corp still plans to destroy
the most important cultural and historic sites in Kanehili - MCAS Ewa.

Their road plan, instead of using the already built Tripoli Rd to Coral
Sea Road, instead carves out the absolutely MOST DESTRUCTIVE
ROADWAY POSSIBLE!

We have been pointing this out to HCDA and Haseko for FIVE YEARS
yet they haven't altered their plans at all.

John Bond
Kanehili Cultural Hui





Comments for
Notice of Intent to Prepare an Environmental Impact Statement
for the Hoakalei Master Plan Update

From John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, Hi. 96707

Attn: pwhite@psi-hi.com

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814
with copies to the City and County of Honolulu, Department of Planning and Permitting (address
above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

Aloha,

I have placed documents related to our testimony in a
Google Drive that you can review. You Haseko Road
project will destroy some of the most important cultural
and historic sites in the Hawaiian Islands. We have many
times in the past five years shown the logical alternatives
to this but Haseko-HCDA refuses to stop this widespread
mass destruction that roadway plows through.

This area is a WW-II battlefield, Ancient Hawaiian burial area,
Leina a ka Uhane-Spirit Leap, and location of 1825 Malden
Trails which are actually around 1000 years old and likely
built by Tahitians. This area cultural history has been told
in the chants of Hi'ikaka- Pele's sister.

John Bond
Kanehili Cultural Hui

Part 1: Additional Comments and Testimony From KCH about Haseko EIS Hoakalei Master Plan Update

Comments for
Notice of Intent to Prepare an Environmental Impact Statement
for the Hoakalei Master Plan Update

From John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, Hi. 96707

Attn: pwhite@psi-hi.com

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814
with

copies to the City and County of Honolulu, Department of Planning and Permitting (address
above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

Aloha,

Kanehili Cultural Hui wants to see Department of Hawaiian Homelands use this
area for cultural and historic preservation, an educational area where many, many
native Hawaiian plants still exist along ancient trails.

We don't believe DHHL and most others who have never been in this Kanehili,
MCAS Ewa know how really rich and diverse it is with Karst caves, wetlands,
and many, many archeological sites.

John Bond
Kanehili Cultural Hui

REPORT TO IDENTIFY THE PRESENCE OF PREVIOUSLY UNIDENTIFIED TRADITIONAL CULTURAL PLACES/PROPERTIES IN EWA

A KANEHILI CULTURAL HUI REPORT
FOR REGIONAL PLANNING

Leina a ka Uhane – Spirit Leap and Pathway To And From The Ancient Kaviki Homeland

**This wahi pana area of the Ewa Plains is the Hawaiian Cultural
equivalent of Plymouth Rock, Ellis Island and Arlington National
Cemetery.**

John Bond
11/12/2012

**NOTE: The language in the Honolulu Rail Transit Project (H RTP) Programmatic
Agreement PA doesn't limit Traditional Cultural Place to only Hawaiian TCP. A
baseball field, such as Ewa's 70 Year Old *Pride Baseball Field* could also be a TCP.**

TCPs are identified by the cultural significance derived from the role the property plays
in a community's historically rooted beliefs, customs, and practices. A TCP is defined as
a property eligible for inclusion in the National Register of Historic Places (NRHP)
because of its association with cultural practices or beliefs of a living community that (a)
are rooted in that community's history, and (b) are important in maintaining the
continuing cultural identity of the community.

Kanehili Traditional Cultural Place & Bio Lab Historic and Cultural Landscape Studies Needed

Contents:

Rail Project Reveals Major Ewa Sacred Hawaiian Traditional Cultural Place Recommended For National Historic Register

- **TRADITIONAL CULTURAL PLACES** concept outlined
- **CULTURAL LANDSCAPE REPORTS** outlined
- **Chapter 200 - Environmental Impact Statement Rules** HAR § 11-200
- **SECNAVINST 4000.35A, Section 4.b:**
- *US Navy is committed to responsible cultural resources stewardship*
- **KANEHILI CULTURAL AND ARCHEOLOGICAL REFERENCES**
- Concepts For Kanehili Cultural And Historic Park Preserve
- Agency inaction puts royal Hawaiian burial complex at risk - Samson Kaala Reiny
- Oneula Burials: The Big Cover Up?
- Published Blog Excerpts about Kanehili from Hawaiian Cultural Historian Shad Kane
- HECO Power Corridor, Roads Could Impacting Onelua Beach Limu
- Legal Challenge By 'Ewa Beach resident Michael Kumukauoha Lee
- Storm Water Effects On Native Macroalgae (limu)
- Limu Replanting Project—Ewa shoreline near the Kanehili traditional cultural area
- The House of Limu: Clinging on to the past - by: Samson Kaala Reiny
- Community Supports 150 Year Old Paniolo Culture and Ewa Stables Preservation
- Unsettled Spirits in Kalaeloa Are A Traditional Hawaiian Cultural Concern
- H.C.R. NO. 49 Passed May 6, 2009 by Hawaii State legislature Urges MCAS Ewa Preservation - similar resolutions passed by three local elected neighborhood boards
- Major Points about Ewa Field History

VERY IMPORTANT NEW HART RAIL SURVEY ADDITION
DOUBLES –KANEHILI TCP & EWA TRAILS IMPORTANCE

The Leina a ka 'uhane, wahi pana, may meet the National Register definition of a historic district. (This includes Kanehili - NAS Barbers Point.)

NOTE: The language in the Honolulu Rail Transit Project (H RTP) Programmatic Agreement PA doesn't limit the Traditional Cultural Place (TCP) to only Hawaiian TCP. A baseball field, such as Ewa's Pride Field could also be a TCP.

"This study was undertaken pursuant to Stipulation II of the *Honolulu Rail Transit Project (H RTP) Programmatic Agreement (PA)*. The study builds on the Section 106 process which included identifying properties of religious and cultural significance to Native Hawaiian organizations (ACHP 2011: 14), often called *Traditional Cultural Properties* (TCPs) and culminated with a Programmatic Agreement executed in January 2011.

TCPs are identified by the cultural significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. A TCP is defined as a property eligible for inclusion in the National Register of Historic Places (NRHP) because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community.

To identify possible TCPs, a wide variety of sources were consulted including existing literature, archival documents, historic maps, and oral tradition. The results of this effort are documented in a technical report (Kumo Pono 2012) and a management summary (SRI Foundation and Kumu Pono 2012). The study identified 50 named places (13 ahupuaa, 26 wahi pana, 1 Leina a ka 'uhane and 10 inoa ina).

Rail Project Reveals Major Ewa Sacred Hawaiian Site Recommended For National Historic Register

<http://www.honolulutransit.org/media/83380/20120420-draft-study-to-identify-presence-of-previously-unidentified-TCP-WOFH-KHG-Airport.pdf>

The "DRAFT REPORT STUDY TO IDENTIFY THE PRESENCE OF PREVIOUSLY UNIDENTIFIED TRADITIONAL CULTURAL PROPERTIES IN SECTIONS 1 – 3 FOR THE HONOLULU RAIL TRANSIT PROJECT" verifies what the Ewa based Kanehili Cultural Hui has been reporting, and specifically what Hawaiian cultural practitioner Mike Lee has been saying for years- that this specific area of the Ewa Plains is of utmost importance as a Traditional Cultural Place and also sacred to Hawaiians as a Leina a ka 'uhane or "jumping off place" for spirits departing into the next world.



While many today may think that this area was nothing but a vast dry ancient coral desert, the Malden Trails survey done by the British Royal Navy in 1825 shows that it was an important route in ancient Hawaii for communications, trade and defense. Further, a vast below ground network of coral tubes and channels feed fresh mountain water down to the sea, creating a very unique and very tasty family of famous Ewa limu that can be equated to the special taste of Big Island grown Kona Coffee. These rare and medicinal limu's are still barely hanging on to existence thanks to the tireless efforts of the Ewa Limu Project and Mike Lee's heroic defense of the special water flow system that moves along through Kalo'i Gulch and down to the ancient Hawaiian burial sites along the Onelua shoreline.

The Honolulu Rail draft report to "identify the presence of previously unidentified traditional Cultural properties" -just finally released in April, 2012 and quietly deposited on the HART website, kicks the entire Kanehili Traditional Cultural Place up another big notch by designating it as eligible for the National Historic Register under criteria A and B. (see below) and a likely Historic District.

This "previously unidentified Traditional Cultural Properties" can be placed into much greater historic and cultural context by referring to other maps (see attached). These maps include the (apparently forgotten?) 1999 US Navy commissioned BRAC archeological studies, the Cultural Resource Overlays and relationship to other known Ewa national Register nominated historic features and sites.

The 2012 HART Rail Archeological Survey draft report states:

Summary: In sum, we believe this study has established the following:

Twenty-six individually identified wahi pana are in or near the Project Area. A 27th wahi pana, the Leina a ka 'uhane – consisting of seven individual wahi pana – extends from Halawa and Moanalua to Honouliuli. All 27 wahi pana are likely to be places of religious and cultural significance.

The 26 individually identified wahi pana may be properties that meet the National Register definition of sites; the 27th wahi pana, the Leina a ka 'uhane, may meet the National Register definition of a historic district. (This includes Kanehili - NAS Barbers Point.)

Ancient ala hele (trails) were established to provide travelers with standardized and relatively safe access to a variety of resources. The ala hele were the link between individual residences, resource collection sites, agricultural field systems, and larger communities—the religious and political centers of the island. Along Hawaiian trails may be found a wide variety of cultural resources, including but are not limited to: residences (both permanent and temporary), enclosures, wall alignments, agricultural complexes, resting places, resource collection sites, ceremonial features, ilina (burial sites), petroglyphs, subsidiary trails, and other sites of significance to the families who once lived in the vicinity of the trails.

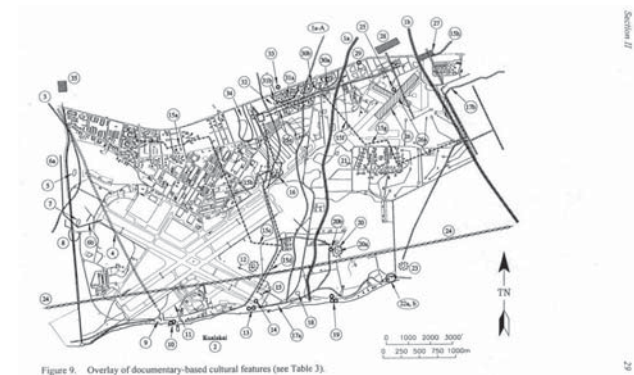
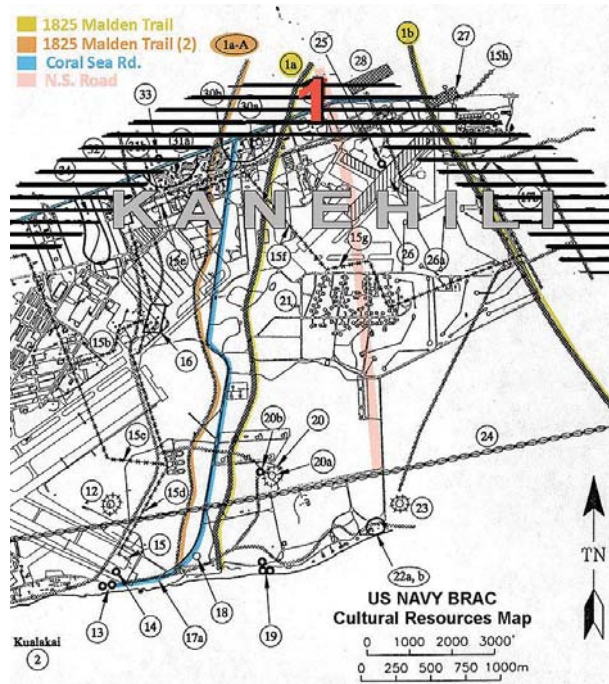
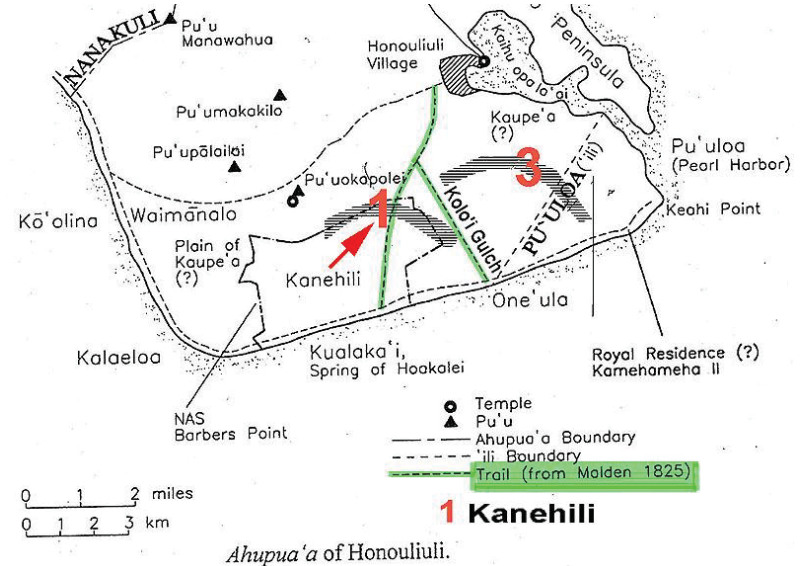


Figure 9. Overlay of documentary-based cultural features (see Table 3).



In addition to the ala hele and ala loa (major thoroughfares which usually encircled the island), that run laterally to the shore, there is another set of trails that run from the shore to the uplands. The nature of traditional land use and residency practices meant that every ahupua'a also included one or more mauka-makai trails. In native terminology such mountain to sea trails were generally known as ala pi'i uka or ala pi'i mauna (trails which ascend to the uplands or mountain).

Many wahi pana may meet one or more of the criteria for listing to the National Register of Historic Places. A final observation relates to iwi kupuna. A number of named places identified during the archival research and listed in Appendix B relate to the dead, although no specific iwi kupuna (burials) appear on the list of wahi pana in Tables 2 and 5. Nevertheless, concern over the disturbance of iwi kupuna and the need for respectful and appropriate treatment has been expressed in the TCP meetings held in February and June 2011, and in the interviews conducted for this study.



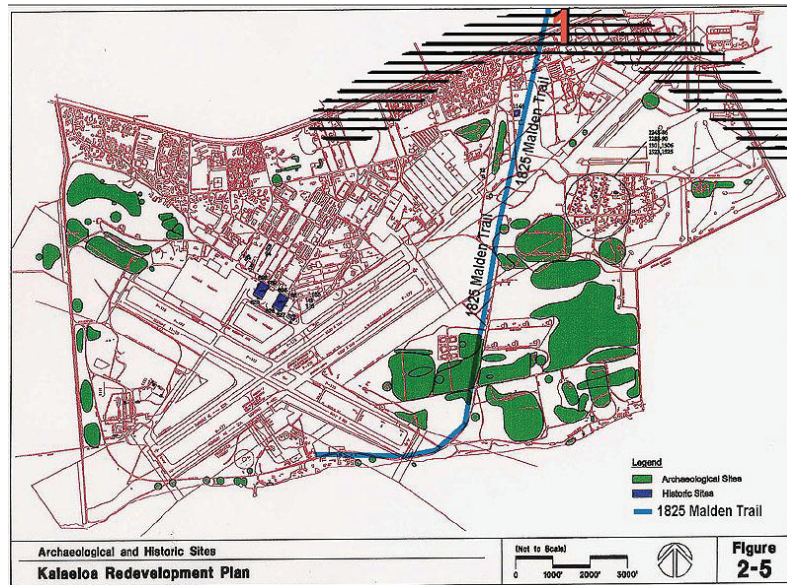
Discovery of iwi kupuna during past construction projects has been painful to the Native Hawaiian community because of the belief that burials are places of religious and cultural significance and that when ever possible these places should not be disturbed. It is anticipated that iwi kupuna will be encountered during construction of the Project, and as such, the Hawaiian view of iwi kupuna is relevant to the discussion of TCPs.

Ewa Sacred Hawaiian Site Recommended For National Historic Register

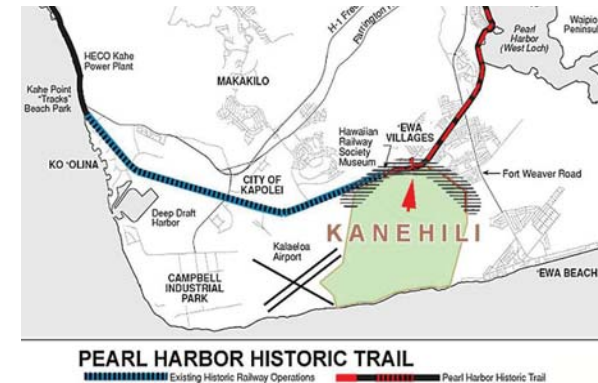
Under Stipulation II of the Project PA, following completion of this report, the next step in the compliance process is for FTA and HART to evaluate the 27 wahi pana identified here for their National Register eligibility and to seek concurrence with the SHPD on these determinations. If the FTA, HART, and SHPD agree that some or all of these wahi pana are eligible for listing to the National Register, then the parties will also assess whether they will be affected by the project and if so how. FTA and HART will consult with the consulting parties, including the NHOs, to minimize, avoid, or mitigate adverse effects to any National Register eligible wahi pana that may be adversely affected by the Project.

See images below for reference:

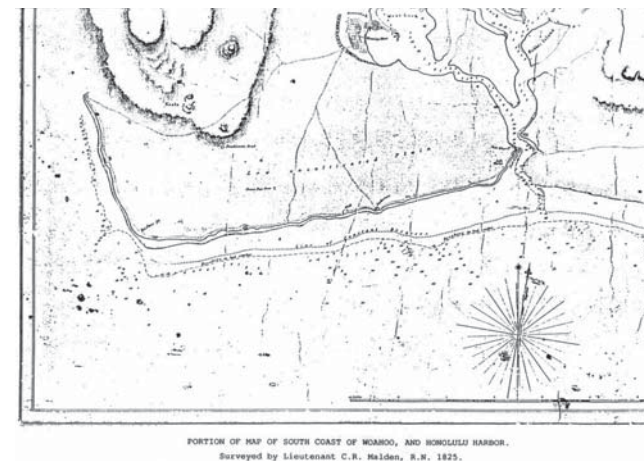
Honolulu Rail Programmatic Agreement TCP Study shows a Leina a ka Uhane within Kanehili, the former MCAS Ewa and NAS Barbers Point. This area is known today as Kalaeloa and Barbers Point. The shaded area is only an approximate location in the draft study and is most likely much larger, extending down towards the coast and other previously identified native Hawaiian archeological sites where lots of known burials exist. The entire Kalaeloa area is loaded with karst sinkholes, caves, channels, caverns and underground waterways.



The map also shows the very important 1825 Malden Trail- which was a British Navy documentation of known ancient Hawaiian trails in what was then known as Kanehili. Formers MCAS Ewa has also since been recommended as national Historic Register eligible including the Ewa Field battle site attacked on December 7, 1941.



This map shows the route(s) of the 1825 Malden Trails as well as other cultural sites which contain ancient Hawaiian settlements and burial sites.



Leina Wahi Pana a Google Earth view of the 1825 Malden Trail, which closely paralleled today's Coral Sea Road. The other branch of the trail followed Kalao'i Gulch which lead down

to Onelua Beach. This entire area is a vast ancient coral reef where water flows to the sea and feeds the limu that still barely survives today due to massive over development.



Modern features include the 1880's era Oahu Railway Line which today is on the National Historic Register. Ewa Village has also been nominated for The National Historic Register, and the Hawaiian Railway site has been nominated to the Hawaii State Historic Register.



More Report background:

This report presents preliminary findings for Project Sections 1–3 and consists of two volumes: this Management Summary and a supporting technical document, He Mo’olelo ‘Aina– Traditions and Storied Places in the District of ‘Ewa and Moanalua (in the District of Kona), Island of O’ahu: A Traditional Cultural Properties Study – Technical Report (the Technical Report) (Maly and Maly 2011b).

Table 4 of the Technical Report (Maly and Maly 2011b:515-519) lists the 39 grants issued, beginning in 1846, that Kumu Pono’s research identified as crossing or adjoining the Project area in the ‘Ewa district. This grant information includes the names of the grantee, acreage, and primary place names covered by the grant.

Wandering spirits are said to inhabit “...the field of kaupea (coral) near Barbers Point, in the desert of Pu’uloa,” (Westervelt 1916:247), also described as the “rough country of Kaupe’a at Pu’uloa on Oahu” (Beckwith 1940:154). The leaping off place can be viewed as a spirit path for the departed soul. These pathways are almost always oriented to the west in Hawaiian mythology (Westervelt 1916). In the project area such a pathway extends from Halawa and Moanalua to Honouliuli. This pathway is defined physically and metaphysically by multiple wahi pana.

The seven wahi pana listed in the table above are interrelated by virtue of their storied connection with the Leina a ka ‘uhane and represent both the leaping off place itself and the place where unfortunate souls wander. The pathway is oriented West-Southwest beginning in Halawa and Moanalua, passing through the entrance to Pearl Harbor, over to Pu’uloa and ending on the plains surrounding Pu’u o Kapolei (K. Maly, personal communication 2012).

While the wahi pana associated with the leaping off place do not appear to be in or near the project area, and are thus not listed in Table 2 above, this spirit pathway is bisected by the project corridor. As a single property, a wahi pana in of itself, the Leina a ka ‘uhane meets the criteria of theme 2: Places of ceremonial importance, tribute sites, places associated with the dead and spirit world (places of ceremonial importance).

Kepa Maly (KPA) raised the issue of what happens to the spirit of the dead in his interview with Kupuna Arline Eaton. He asked Ms. Eaton if she was aware of the “...connection between Leilono at Aliamanu and Kapukaki, all the way to Honouliuli, the leaping place of the spirits.”

Ms. Eaton acknowledged the leaping off place as a place of spirits associated with Kaupe'a and through a process of elimination, the 384 inoa 'Aina were reduced to the 151 named places found to be in or near to the Project area. This list was further reduced to 26 named places considered to be wahi pana by virtue of their name and mo'olelo. In addition, we identified the Leina a ka 'uhane as a single sacred and storied place composed of multiple wahi pana.

Together these 27 properties are advanced for National Register evaluation. The 10 inoa 'Aina listed in Table 3 are not advanced for National Register evaluation at this time pending further consultation with the Native Hawaiian community.

As previously discussed, to be National Register eligible, TCPs must meet the conditions for listing. These conditions are: The property must be relevant to a time, place, and theme important in history or prehistory in order to be eligible under one or more of the National Register criteria; and, the property must have sufficient integrity to convey its importance.

In addition, a TCP must be a property; that is, it must be a place that can be located and spatially defined on a scale that is appropriate to what makes it historically important. We will address the issue of place first.

Parker and King (1990) acknowledge that the first step in the identification of TCPs is to establish that they are, in fact, properties. The National Register recognizes that there is a close relationship between the tangible and intangible when it comes to recognizing historic properties as places of religious and cultural significance. While practices and beliefs may be central to establishing historical or cultural value, these are not, in of themselves, sufficient for listing to the National Register. Practices and beliefs must be associated with location for there to be a property and for the property to be considered National Register eligible. It is also true, however, that a property does not have to have any material evidence of human behavior to be National Register eligible. Each of the 26 individually evaluated wahi pana identified through this study meet the National Register definition of a site, as follows.

A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan of physical development. (National Register Bulletin 1991:5) If a property must be associated with place, then location and boundaries are also relevant to defining historic properties. A practice or belief must be associated with a place and the place must have a location and a boundary, at some scale, to be recognized as a district, site, building, structure, or object eligible for listing to the National Register. This is less relevant to the identification and evaluation of National Register eligible historic properties, and more relevant to assessing effects, which is a later step in the Section 106 compliance process. Since our task, however, is to determine whether or not there are National Register eligible TCPs in or near the Project area, the location and boundaries of the 26 individual wahi pana, plus those associated with the Leina a ka 'uhane, are relevant.

To address this, information on the location of each wahi pana was acquired, where possible, from archival records. Research of these historic records enabled the identification of named places in or adjoining the Project area, or part of larger land claims associated with the mahele applicants or awardees. This research provided the basis for plotting the location of wahi pana on modern maps of the of the Project area.

Giving boundaries to the 26 wahi pana and the Leina a ka 'uhane identified through this study also involves careful consideration of the source information from which stories about place are derived. In some cases, wahi pana have been identified down to individual plots of land through the Boundary Commission claims and awards. In other cases, wahi pana have been identified by individuals in the past who related the location of wahi pana with reference to the Alanui Aupuni (Old Government Road system). As such, a degree of precision has been attempted to help locate and define the spatial boundaries of the wahi pana in relation to the Project area. Maps showing close up views of all the named places identified in this study (wahi pana, the inoa Aina, and Leina a ka uhane) are provided in Appendix E as multiple images of the project alignment. These maps show approximate locations, as best as can be determined, in relation to the project corridor using an aerial overlay of the modern landscape. In this manner, the location of any one wahi pana or cluster of wahi pana can be seen in relation to information on the nature and extent of existing development as well as the proposed transit project.

Defining boundaries for TCPs can be challenging, however. In this case, the 26 individually identified wahi pana and the Leina a ka 'uhane are by their very nature storied places on a sacred landscape, and giving specific definition to any one part that landscape is an arbitrary exercise to some degree. To indicate the approximate nature of boundaries cross hatching is used to define each wahi pana or named place without further definition to indicate that boundaries are not fixed. Parker and King (1990) advise that traditional use of a TCP should be given consideration in defining its boundaries so as to capture the area that is the focus of practices or beliefs that give the place its importance. For these wahi pana, activities carried out on site may not be the issue. It may be that the naming of the place is more important and the physical use of the place less so, especially if the place has been modified and is no longer accessible for use. Traditional use as it relates to TCPs, however, can involve activities that require line of sight or unobstructed view sheds. This issue should be considered and discussed with the NHOs that are party to the Project PA.

Each of the properties identified in Table 2, and the Leina a ka 'uhane identified in Table 5, is associated with a theme or themes that relate to, and is a product of, the Hawaiian perception of the aina (land) as previously discussed. It is this association with the land that gives these places their importance and meaning. Each property can be dated to historic times, as in the battle at Kuki'iahu, or mythical time as in the story of Piliamo'o, a supernatural woman "who met and fell in love with Kuka'eki" and together, they speared 'o'opu fish in Waiawa stream." All are located on the island of O'ahu in or near the Project area. The stories associated with these places are pieces of a broader narrative about the Hawaiian people and are part of their cultural legacy. The placement of these wahi pana in

The National Register criteria define four areas of significance as previously discussed: events or patterns of events that are significant to history, persons that are significant to history, intrinsic qualities recognizable as historically important; and, information potential about the historic or prehistoric past. The property's integrity must also be considered in making eligibility determinations.

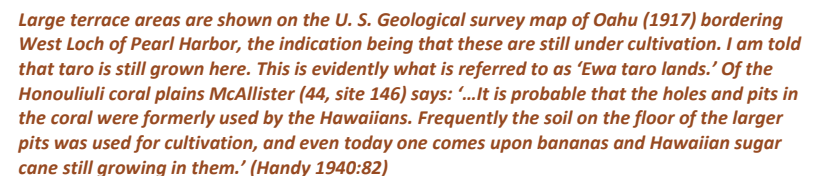
Table 7 presents the Leina ka 'uhane as a single sacred and storied place, identifying the applicable ahupua'a, theme, National Register criteria, and integrity of relationship and condition.

In our opinion, each of the 26 individually identified wahi pana, as well as the Leina a ka 'uhane, likely has integrity of relationship. Wahi pana are sacred and storied places on the land and our archival research and informant interviews suggest that these storied places are important to the retention and or transmittal of knowledge and beliefs about the land and history of the Hawaiian People on O'ahu.

Integrity of condition is the second aspect of integrity that is relevant to evaluating TCPs. Each property must be assessed against the seven aspects of integrity to determine which are relevant to conveying the importance of the property. In our opinion, integrity of location is applicable given that it is the naming of place (location), and the story associated with place, that appears to be important to the Native Hawaiian community. Other aspects of integrity that might apply are feeling and association, as well as setting; however, the physical state of these wahi pana may not be relevant to what makes them important, or at least not now. This is particularly pertinent since many of these places have been affected by modern development and may no longer be accessible as can be seen in the aerial maps in Appendix E. As Monahan (2008) reported in his TCP study of Waimea, physical integrity is often not relevant as long as knowledge about and memory of a place is maintained.

Kalu, October 4, 2011, Maly and Maly 2011b:299; Interview with Henry Chang Wo (HCW), Larry" A. Laulani Woode, Jr.(LW), and others, August 29, 2011. Maly and Maly 2011b:779).

A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, ether standing, ruined, or, vanished, where the location itself possess historic, cultural, or archaeological value regardless of any existing structures. (National Register Bulletin 1991:5)



An open kula land, noted in tradition for its association with Kaupē'a, and as a place of wandering spirits. An inhospitable zone. Cited in the tradition of Hi'iaka-i-ka-poli-o-Pele and in historical narratives.

John Bond
Save Ewa Field - Kanehili Cultural Hui

Final Environmental Assessment Disposal and Reuse of Surplus Property at Naval Air Station Barbers Point, O'ahu, Hawai'i, August 2011, Department of the Navy, Base Realignment and Closure Program Management Office stated regarding former NAS Barbers Point lands:

"Open Space/Recreation. This land area would be comprised of mostly passive open space land uses and preserve/cultural park space. These parcels contain a relatively high density of cultural and archaeological sites."

However, this does NOT mean this will actually happen, as Hawaii Community Development Authority (HCDA) is using every means possible, including the Hawaii State Legislature, to undo ALL cultural and historic protections and covenants so that these special lands can be plundered.

The HUGE build-out of the Ewa Plains is underway and big developers want every inch of land covered in densely packed homes, shopping centers and tiny community parks. After total traffic gridlock, lack of any sustainable agricultural lands and exhaustion of the water aquifers, destruction of traditional food sources and fisheries, there will be a final ecological collapse and the big developers will move on to their next exploitation target on some other island or state.

"Agency inaction puts possible royal Hawaiian burial complex at risk to Haseko development"

Sep 22, 2010 by Samson Kaala Reiny, The Hawaii Independent

EXCERPTS FROM THE ARTICLE:

EWA—The site of what may be the most significant ancient Hawaiian burial complex discovered in recent times happens to be situated along a roughly mile-long stretch of shoreline where luxury resort developer Haseko plans to open up its marina to the ocean.

Lee also noted that, during a visit where he and Office of Hawaiian Affairs (OHA) staff marked the exact locations of the sites with a Global Positioning System (GPS), others there that day agreed with his claims.

But above all else, Lee says that an inadvertent discovery made in 2001 challenges his opponents' legitimacy. It was then, after a raging storm, that a "homeless" man found a skull jutting out from a sinkhole in front of the planned marina. The iwi, or bones, were undoubtedly those belonging to a high-ranking chiefess because she was holding a niho palaoa, or royal whalebone hook, in each hand. Previously, Haseko had stated that many sinkholes were tested but no burials were found.

Also, *The Hawaii Independent* discovered that human remains were found in 1994 on the James Campbell Estate near Kapolei. A piece of heavy machinery fell into a sinkhole, exposing bones and a plank from a traditional canoe.



"He [Rosendahl] really minimized the number of important sites," said photographer and educator Jan Becket. "He claimed there were no ahu [shrines] in existence, even though areas were littered with these large upright stones."

According to Becket, there were over 400 sites, and Haseko preserved a total of six, which are "conveniently located in the corner out of the marina's way."

"The timeliness of where they [SHPD] are with this issue is indicative," Kalu said. "It's not a coincidence that the State allots so few staff to juggle all these responsibilities."

FULL STORY HERE:

<http://www.thehawaiiindependent.com/story/haseko-development-moving-forward-despite-royal-hawaiian-burial-complex-cla>

Oneula Burials: The Big Cover Up?

Protecting exposed and threatened ancient Hawaiian burial sites (maybe 400 in the One'ula area alone), and perpetuating other cultural practices endangered by rapid social and economic change, is a major issue, and demands immediate action by the State. The issuing of permits for any development is government's responsibility, and allows Native Hawaiians an opportunity to put on evidence of traditional and customary practices affected by the proposed

development. In this case, it has not been done, and today construction and dredging goes on by Haseko (Hawaii) Inc., as though nothing is wrong, and all is OK.

Haseko (Hawaii) Inc. was awarded the Ewa Marina dredge contract in 1994, and after that time, reports and findings of additional ancient Hawaiian burials, and skeletal remains were brought to their attention; to other proper State agencies as well.

In the sinkholes today along the Ewa coastline (East of One'ula Park to Barber's Point Naval Air Station) lie many ancient Hawaiian burials and skeletal remains of seven (7) ancient Hawaiian alii (chiefs), who once ruled Oahu in the late 1700's. I am not against progress, and I have promoted Hawaii as a major destination all my life. However, to continue to unearh and disrupt the dead, as though nothing is wrong, is illegal. Period!

Enter Mike K. Lee. He is the second son of Mr. Randy Lee, former COO & GM of the Halekulani Hotel (a person whom you have met). Randy Lee is my first cousin and after you review all the attachments with this email, please note that Randy Lee passed away a number of years ago, and Mike K. Lee is now "kahu or keeper" of family issues.

In November 2002 for example, Mike K. Lee found out that his "Fifth" Great Grandmother - Queen Kaomileika'ahumanu - was buried at the Waipouli cave in the One'ula area. She died on October 31, 1796, but was removed from her burial without approval from the State's OIBC.

Because Mike K. Lee has legal rights to his "Fifth Great Grandmother", he is immediately seeking to have all her remains returned to her "original" burial site in the One'ula area.

<http://hawaiiifreepress.com/ArticlesMain/tabid/56/articleType/ArticleView/articled/4747/Oneula-Burials-The-Big-Cover-Up.aspx>

Using the HISTORIC Right-of-ways will avoid disturbing many undiscovered Hawaiian Burial Sites

Published Blog Excerpts from Hawaiian Cultural Historian Shad Kane about Kanehili

The International Archaeological Research Institute, Inc., IARII, was requested by Belt Collins Hawaii to provide a synthesis of the cultural resource studies of the 'Ewa Plain through the 1990s to include the cultural resource inventory of the Naval Air Station at Barbers Point. This synthesis was intended to serve as a review and documentation of all previous historical and archaeological studies that would provide the foundation for a cultural resource management plan of the cultural landscape of the former Barbers Point NAS as a critical part of base closure.

As part of this effort Dave and Myra Tomonari-Tuggle of IARII was privileged to get the assistance of a number of very respected cultural experts to include Rubellite Johnson, Ross Cordy and Earl Neller. This short article in no way can do justice to the intense work and contributions of all involved in the synthesis. All this article can hope to do is draw some

attention to the work of these people and the need to care for and preserve the cultural landscape of the former Barbers Point NAS.

Based on the traditions it appears that the cultural landscape of the former naval base is a large geographical area perhaps even an Ili or smaller subdivision of an ahupua'a. This becomes an interesting thought. The synthesis identifies much of the former Barbers Point NAS as Kanehili.

In an attempt to summarize the Synthesis of Cultural Resource Studies of the 'Ewa Plain by Dave and Myra Tuggle, this is what seems most obvious. In every area of the former base remnants of ancient past can be found. These valued cultural resources stand in support that the traditions such as Hi'iakapoliopole is a history and not a myth or legend as some of us have been made to believe. The synthesis also states that the work is not done. Much more work must be done in the identification of ancient bird bones in sinkholes. Much more data need to be gathered and cataloged. The vastness of the cultural landscape paints a picture of a community of people that lived in Kanehili. It is not a documentation of individual archaeological features but rather a landscape.....an ancient community that once lived at a place once known as Kanehili.

Example of a C-shaped temporary habitation structure.

The synthesis identify sinkholes as either burials, agricultural or as water resources. Some of these sinkholes that served as water resources have walls constructed around them in an effort to keep opala or trash out of them. The presence of water in sinkholes is unique to this region. Where in most other places water would travel along surface dissections or rivers, water travelled underground in the porous coral of Kanehili.

Walled sinkhole.

Highly probable that it served as a water source. Some of these sinkholes that served as a water resource also have paved stairs within them to reach the water as the water level varied with the rainy season. In the traditions associated with the place once known as Kanehili is the story of the travels of the gods Kane and Kanaloa. In their travels Kanehili is the place they visited where Kane brought forth water from the sinkholes with the strike of his ko'oko'o (staff).

Large walled sinkhole.

Probable water source, however its size seems to indicate a possible religious purpose. Sinkholes are also identified as agricultural sinkholes. Our ancestors planted their crops within the moist and damp recesses of sinkholes. Amongst those agricultural resources were maia (banana), kou (sugar cane), la'i (ti leaves) and others. There are examples of ti leaves growing out of sinkholes. It is also important to understand these ti leaves may be as old as the culturally modified sinkhole. Amongst these burial sinkholes are chambers and walls within the sink designed and constructed to conceal the kupuna. There are also above ground burials as coral mounds or ahu.

Agricultural sinkhole with ti leaf growing in it.

Perhaps the one most interesting cultural feature is a paved trail of upright stones every 6 to 8 feet. This paved trail of coral slates is perfectly straight. Only approximately 200 yards of this trail exist today. It can be seen on Malden's Map of 1825. It had to have taken hundreds of people to construct as the trail provided access to several places to include as far away as Honouliuli or where today is the West Loch Golf Course.

The Kalaeloa Heritage Park, December 10th, 2009 by Shad Kane

HECO Power Corridor, roads through Kanehili Cultural Zone, With Storm Water Runoff Could Impacting Onelua Beach Limu Population and Coastal Fisheries

O'ahu is an island surrounded by ocean and the sea plays a major role in the traditional sources of food for the local population as well as being extremely important to Hawaiian cultural practices such as limu gathering for food and medicinal purposes.

The proposed Project is directly above the underground Karst watershed and will cause contaminants to be transported to the lower coastal area, impacting the struggling limu population and various aquatic species which provide a traditional source of food to the local community.

Scientists posed the hypothesis that nutrients from storm water runoff would affect the nutrition and relative abundance of native and non-native limu. To test this hypothesis, we studied intertidal limu communities at three locations in Ewa Beach, O'ahu. The study was multi-faceted, and involved measuring the following variables in intertidal communities at the three sites.

Throughout the Hawaiian archipelago, there is growing concern about the displacement of native seaweeds, known as limu in the Hawaiian language, by non-native species. Non-native invasive limu compete with and displace native limu species important to Hawaiians for food, medicine, and religious purposes (Abbott, 1984). Russell (1992) documented how non-native A. spicifera and H. musciformis displaced native populations of Laurencia nidifica and Hypnea cervicornis.

Increased urbanization of upland watersheds is a major mechanism increasing nutrient pollution of coastal waters which has been widely recognized as a common factor linking an array of problems, including harmful algal blooms, dead zones, seagrass and coral reef die-offs, declining fisheries, and marine mammal and seabird deaths. Blooms of the native invasive chlorophyte Dictyosphaeria cavernosa, which overgrew and killed corals in Kaneohe Bay, O'ahu, were also linked to nutrient enrichment from sewage.

Summary and conclusions

Our results showed that native limu species diversity and abundance decreased with proximity to stormwater discharges, whereas non-native limu increased. Nutrient availability is a major factor affecting competition among limu in tropical oligotrophic settings.

"Compelling evidence that cumulative impacts from episodic storm water discharges were the primary source of nutrient enrichment in the study area."

Acknowledgements

We would like to acknowledge the assistance of Dr. Phil McGillivray, Mike Lee, Henry Chang Wo, David Kimo Frankel, the Office of Hawaiian Affairs, Dr. Robert Richmond of the University of Hawaii, Manoa, and residents of Ewa Beach that provided access to their properties. This is contribution # 1817 from the Harbor Branch Oceanographic Institute at Florida Atlantic University, Ft. Pierce, FL.

Legal Challenge By 'Ewa Beach resident Michael Kumukauoha Lee

<http://archives.starbulletin.com/2008/01/28/news/story04.html>

'Ewa Beach resident Michael Kumukauoha Lee, through the Native Hawaiian Legal Corp., is challenging Haseko's application, contending that the widened channel would destroy native limu that he learned to gather and use as a medicinal remedy from descendants through the generations.

A study done by Brian Lapointe, a research professor at the Florida-based Center for Coastal Research at Harbor Ranch Oceanographic Institute at Florida Atlanta University, said that testing of existing storm-water discharges showed "significant effects on both the taxonomic and chemical composition of limu communities."

LaPointe concluded that increasing the amount of storm water into the area will add to the growth of invasive, non-native species and degrade native limu communities not only at the Kaloi Gulch, "but also at Oneula Beach Park and other locations to the east and west."

About a decade ago, Lee said, a variety of limu was found off Ewa Beach all year around. "Now it's all bare," he said.

Dovetailing the limu decline is a drop in sand crabs and fish, said fishermen Albert Lauro and Teo Tangjian. Marine scientist Brian Lapointe of Florida has said the cumulative impacts of the storm-water runoff at the proposed sites would likely cause the loss of limu species, coral and invertebrates such as sea urchins and anemones.

University of Hawaii water resource maps show the Kaloi Gulch watershed as including the Eastern side of MCAS Ewa, which means the area where the Hunt PV project is located.

Its from the Hawaii Watershed Atlas ...

http://www.wrrc.hawaii.edu/research/project_liu/kaloi.php

Mike Lee's testimony to the Hawaii land Use Commission regarding a large proposed development north of Ewa Field but within the Kaloi Gulch watershed which directly affects the Ewa - Onelua seacoast limu and fisheries.

As a life resident (65yrs) of Ewa Beach, Earl Arakaki agrees that developers have ruined sea life along the Ewa Beach shoreline.

"Many believe over harvesting of sea weed depleted limu growth in the area. Not so. Because even the "rubbish limu" which once flourished is no more. Notice the pile of seaweed depicted in this photo of the shore line fronting Oneula Place. It was like this from the Barbers Point fence to Puuloa firing range."

Project's impact on limu at issue

<http://the.honoluluadvertiser.com/article/2008/Jun/16/In/hawaii806160327.html>

A study funded by the Native Hawaiian Legal Corp., which is representing a lifelong limu gatherer in the contested case hearing, contends that Haseko's \$2 million Kaloi Gulch drainage way project at the eastern end of One'ula Beach Park could have serious adverse impacts on the native limu beds at the park, also known as Hau Bush, as well as oceanfront along the rest of the 'Ewa Beach coastline.

Ewa Beach resident Michael Kumukauoha Lee, through the Native Hawaiian Legal Corp., is challenging Haseko's application, contending that the widened channel would destroy native limu that he learned to gather and use as a medicinal remedy from descendants through the generations.

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LaPointe concluded that increasing the amount of storm water into the area will add to the growth of invasive, non-native species and degrade native limu communities not only at the Kaloi Gulch, "but also at Oneula Beach Park and other locations to the east and west."

Stormwater nutrient inputs favor growth of non-native macroalgae (Rhodophyta) on O'ahu, Hawaiian Islands

Storm Water Effects On Native Macroalgae (limu)

Brian E. Lapointe *, Bradley J. Bedford

Center for Marine Ecosystem Health, Harbor Branch Oceanographic Institute at Florida Atlantic University, 5600 US 1 North, Ft. Pierce, FL 34946, United States

In Hawaii, blooms of native and non-native macroalgae (limu) have become increasingly problematic in recent decades. Although the role of human vectors in introducing non-native macroalgae is well documented, the ecological role of nutrient pollution in facilitating blooms of these species is not. This study assessed the effects of stormwater discharges on the diversity, abundance, and nutrient content (C, N, P and d15N) of native and non-native limu at three sites in the intertidal zone at Ewa Beach, O'ahu. The results showed that native limu species diversity and abundance decreased with proximity to a stormwater outfall (ASWO), whereas non-native species abundance increased. These results indicate that the spread of non-native macroalgae in oligotrophic coral reef regions can be facilitated by anthropogenic nutrients in stormwater runoff, thereby threatening native species and ecosystem services.

<http://www.fau.edu/hboi/ProjectManagers/BrianLapointe/blhome.php>

LIMU REPLANTING PROJECT –Ewa shoreline near the Kanehili traditional cultural Area
"Ke Akua Ka'au o ke Kai - God's Medicine from the Sea": Kupuna Uncle Henry Chang Wo and a group of loyal caretakers meet every second Saturday of the month to replant limu (seaweed) at One'ula Beach Park in 'Ewa.

Ewa Beach was once known for its abundance of limu, or seaweed. Its limu beds were considered the richest and most diverse in Hawaii. However, Ewa Beach's limu population is now diminishing.

About six years ago, a group assembled to help replenish the limu in the local beaches. That group, a nonprofit foundation founded by Walter Kamanaa, Henry Chang Wo and Mack Poepoe, formed the local Ewa Beach "Limu Project". Since its founding, many members of the community have participated in the project, assisting in various tasks to help replant the limu in Ewa Beach.

One of the dedicated participants is Campbell marine science teacher Eric Whiteman. Whiteman's students are taking part in the project as a marine science class requirement, and they take great pride in it.

The program is designed to educate the community about the history and preservation of the edible limu and unite those whose goals include keeping this part of Hawaiian culture alive.

"I think that it's a wonderful opportunity to get the community together for a good cause, to promote the care of the ocean," Ruth Craft, a Limu Project council member, said. "I hope to gain a better understanding of the limu, friendships, and the closer sense of community and belonging."

Limu preservation involves braiding the seaweed on string and burying them under rocks. The limu lock onto the rocks and repopulate.

Campbell marine science students taught participants how to weave the limu by tying raffia string to their toes and braiding the limu in as they go up the string.

In two years, Limu Project members hope this area in Ewa Beach will be considered a state Department of Land and Natural Resources Sanctuary, stopping any further destruction of the limu.

By Leonard Ridela, Antonio Arevalo and Lance Ordonio Campbell High School

The House of Limu: Clinging on to the past

The Ewa Plains are a massive ancient coral reef where deep underneath, ocean meets mountain streams- to spawn freshwater shrimp and one of the world's most diverse limu populations...

http://www.lawaia.net/blogs/lawaia/2010/8/18/issue5-2010-house_of_limu

"Up until three or four years ago, the water here used to flow straight to the ocean," he said. "You knew because there used to be a lot of toads here. They need the fresh water."

"And how does this connect to the seaweed exactly?" I thought, my forehead wrinkling.

"You have to understand that the ocean needs to drink," he said seeming to anticipate the confusion. "When the water from the mountains meets the ocean, that's when the ocean gives birth. That's where there's the hanau. That's how the limu grow."

Up until that point, the thought of flowing water in Ewa was as real to me as the mirages on Fort Weaver. I had assumed that the golf courses and endless subdivisions drew their water from faraway places. But below the summer heat of Ewa, the underground pulses with water.

For thousands of years, rains from the Waianae and Koolau mountains have drained into the vast underground channels of the Plain. Those waters then used to flow heavily out to Pearl Harbor's and Ewa's shores. According to Uncle Henry, limu needs this constant flow of brackish water to thrive. "It needs the sweet water from the top," he said. "It cannot grow without it."

Unsettled Spirits in Kanehili Are A Traditional Hawaiian Cultural Concern

The Environmental Assessment done for the nearby DHHL Ka Makana Ali'i shopping center project (directly near the UH Bio Lab site) includes a Cultural Impact Assessment (CIA) By Pacific Legacy, which states: *"Furthermore, there is the concern (among local interviewees) about unsettled spirits that remain in the area causing unwanted paranormal activities to plague the new development or, conversely, surrounding localities being haunted by the displaced spirits."*

In fact, considerable Hawaiian cultural and oral history of the Ewa Plains and Kalaeloa speaks of the entire area as a location of unsettled spirits. Even current paranormal researchers who have brought in their own measuring devices claim the Ewa Field area and buildings like Quonset 1545 exhibit intensive and very strong recorded multi-spectrum paranormal activity.

Pacific Legacy states: *"Three of the four interviewees state that the general area of central 'Ewa Plains is the land of the "Wandering Spirits" and "Night Marchers." One interviewee claims that these restless spirits become a problem for many recent developments in the area."*

Furthermore, (says the CIA report) *"there is the concern about unsettled spirits that remain in the area causing unwanted paranormal activities to plague the new development or, conversely, surrounding localities being haunted by the displaced spirits. Some informants fear that archaeological sites and burials, also cultural resources, possibly contained in sinkholes and concealed by plantation era soils may be damaged or lost during ground disturbing activities related to the project's construction. It is a common belief that the disturbance of archaeological sites and burials can also upset spirits or cause bad fortune to befall those who have caused the disturbance."*

USF&WS expressed concerns about BRAC transfer to HCDA

Concerns by the US Fish and Wildlife service expressed in their letter to the Navy about land transfer to HCDA also need to be taken very seriously as HCDA seems to be oriented to insider deals that benefit certain friends and developers rather than community interests for open space, conservation and historic preservation.

HCDA completely REJECTED the suggested amendments provided by attorney Brian Turner of the National Trust for Historic Preservation regarding poorly defined historic preservation guidelines in the draft Kalaeloa Master Plan which was reviewed for comments last year.

Traditional Cultural Places - From the National Park Service website:

“The Traditional Cultural Place (or Property) is one of the most powerful historic preservation designations.”

TCPs and other sacred places can be very broadly defined. These resources can include such things as sacred sites, locations where traditional plants and other resources are collected, and some archaeological sites. "Traditional cultural places" (TCPs) are important for the roles they play in community cultural traditions, beliefs, and activities. They must be considered in planning under the National Environmental Policy Act, the National Historic Preservation Act, Executive Orders 12898 and 13007, and other preservation issues relating to NHPA, NEPA, CERCLA, ARPA, and NAGPRA.

Traditional cultural properties are NPS National Register eligible...

One kind of cultural significance a property may possess, and that may make it eligible for inclusion in the Register, is traditional cultural significance. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices.

Sinkholes in the general area were utilized as natural planters for kalo (taro, dry-land variety), temporary shelters, storage features, and sources of water. The Kalaeloa lands were likely to have been planted in 'ulu (breadfruit), liliko'i (passion fruit), niu (coconut along the beach area), and two types of mai'a (banana). Additionally, birds (today extinct or nearly so) were trapped for feathers in or near to the area, including the ae'o (Himantopus mexicanus knudseni), i'iwi (Vestiaria coccinea), 'apapane (Himatione sanguine), and the mamō (Drepanis pacifica).

More contemporary cultural practices taking place in the area have included the gathering of 'uha loa (Waltheria indica) for traditional Hawaiian medicine and 'alae (red clay) for coloring salt, medicine, dye, and spiritual purification.

CULTURAL LANDSCAPE REPORTS

A Cultural Landscape Report (CLR) is the primary report that documents the history, significance and treatment of a cultural landscape. A CLR evaluates the history and integrity of the landscape including any changes to its geographical context, features, materials, and use.

A CLR will often yield new information about a landscape's historic significance and integrity, even for those already listed on the

National Register. Where appropriate, National Register files should be amended to reflect the new findings.

Executive Order 12898 directs federal agencies to make achieving environmental justice part of its mission.

The EO emphasizes the importance of NEPA's public participation process, directing that each Federal agency shall provide opportunities for community input in the NEPA process. Agencies are further directed to identify potential effects and mitigation measures in consultation with affected communities.

Local Residents Fear Displacement and Loss of Cultural Areas

Other cultural informants, told Pacific Legacy (for the Environmental Assessment done for the nearby DHHL Ka Makana Ali'i Cultural Impact Assessment) that those currently living in nearby (Ewa Plantation) Varona Village, fear that the new development may be further cause to displace them from their plantation era homes. Those informants associated with the Hawaiian Railway Society have similar fears of proposed roadways conflicting with existing tracks and switching yard - ultimately displacing them from their current location.

Traditional Trails Run directly through the Project Area

In the Ewa Kalaeloa Cultural Context, from a larger International Archeological Research Institute Cultural Resource Inventory of NASBP, MCAS Ewa, by the (Tuggles, Denfeld, Yoklavich, MAI, 1997) there is put forth that a major feature of pre-Contact and early Contact Honouliuli, was the Kualaka'i Trail, identified by Lt. Malden in an 1825 map featuring the south coast of O'ahu. This prominent trail once connected Honouliuli Village to the coastal settlements of Oneula and Kualaka'i, and would have been crucial to life on the 'Ewa Plain and its coast.

During the early Western contact era of Kanehili there was first ranching

Wild cattle and domestic cattle and cattle ranches. Kanehili was also once a ranch, and had paniolo horse trails throughout the area to manage the cattle and fences. Staying on fixed trails was very important as the area has vast numbers of sinkholes, some difficult to see in the grass and brush in the Kanehili ranchlands.

Later the area became the Mooring Mast Field in the mid 1920's and cattle roamed throughout the airfield perimeter. (see photos). In 1941 the area became a Marine fighter base and attacked on December 7. This caused a major expansion of the base and the original cattle ranch road was used to access and construct concrete aircraft revetments below the airfield.

During the war these same ranch horse trails became used by mounted Marine security patrols. When the war ended and the base closed, the area reverted back to its earlier Paniolo era with the building of a large rodeo arena and use of the aircraft revetments as horse stables. Quonset Huts that once house fighter pilot mission operations became a place for a riding club and storage of horse tack, feed hay and grain. And It remains so to this very day.

And the traditional Kanehili Paniolo horse trails also remain to this day- which is what the community wishes to preserve for all time.

It is likely that the probability of encountering subsurface archaeological deposits increases with proximity to where ancient trail was located as the sinkholes provided water, planting and burials.

The International Archeological Research Institute Cultural Resource Inventory of NASBP, MCAS Ewa, by the (Tuggles, Denfeld, Yoklavich, MAI, 1997) indicates many such archeological sites, trails, habitation sites, burial remains, etc.

In the Environmental Assessment done for the nearby DHHL Ka Makana Ali'i Cultural Impact Assessment (CIA) by Pacific Legacy states: *"interviewee also recalls the existence of at least one ahu (shrine) in the general area, which was dedicated to agriculture. This ahu 'aina was made of stacked waterworn basalt boulders and cobbles, likely collected from a nearby stream bed, that stood up to five feet tall and possibly as wide as it was tall with a circular plan view. On these ahu, devotees, including the interviewee, would leave offerings to show appreciation for these natural resources and respect for the divine."*

Likely Discovery of New Sinkholes, Caves, Hawaiian burials or Disassociated Iwi Remains

The Ewa Kalaeloa Cultural Context, from a larger International Archeological Research Institute Cultural Resource Inventory of NASBP, MCAS Ewa, by the (Tuggles, Denfeld, Yoklavich, MAI, 1997) states: (Native Hawaiian) Burials- High potential for discovery of additional remains in dunes, habitation and untested sinkholes that may have been covered by base construction.

Cultural Deposits - High potential for discovery of cultural deposits in dunes, habitation and untested sinkholes in areas with demolished surface features.

Haven spoken with various well regarded archeologists they all agree that the last real cultural history and archeology study of the Kanehili area, which was done in 1999, is way out of date. There is still the great likelihood of many archeological sites which have been overlooked, especially below ground caves and sinkholes, which could likely contain iwi.

Horse riders at Barbers Point stables describe many sinkholes throughout the area and the reason why they must stay on proscribed trails when riding.

Past USMC Ewa Field Command History describes karst caves as large as railway box cars.

Chapter 200 - Environmental Impact Statement Rules HAR § 11-200

<http://gen.doh.hawaii.gov/sites/har/AdmRules1/11-200.htm>

"Effects" or "impacts" as used in this chapter are synonymous. Effects may include ecological effects (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic effects, historic effects, cultural effects, economic effects, social effects, or health effects, whether primary, secondary, or cumulative.

"Environment" means humanity's surroundings, inclusive of all the physical, economic, cultural, and social conditions that exist within the area affected by a proposed action, including land, human and animal communities, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

"Environmental impact" means an effect of any kind, whether immediate or delayed, on any component of the environment.

Under the EIS Rules "impacts" are far broader and more inclusive than "significant impacts" as defined under HEPA. The EIS Rules define "impacts"/"effects" as including "primary, secondary, or cumulative" effects. "Secondary impacts" are defined as follows:

"Secondary impact" or "secondary effect" or "indirect impact" or "indirect effect" means effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

"Cumulative impacts" are defined as follows:

"Cumulative impact" means the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. HAR § 11-200-2.

Secondary and cumulative impact analysis occurs in three significant steps under the EIS Rules: (1) when applying for an exemption, (2) when preparing an EA, and (3) when preparing an EIS. If this analysis is missing or lacking, the permit granting authority must deny the requisite request by the applicant.

The Hawaii Environmental Policy Act ("HEPA") in a Nutshell. Before we can make sense of secondary impacts we must first understand the HEPA process. HEPA establishes a system of environmental review that ensures environmental concerns are given appropriate consideration in decision making along with economic and technical considerations.

HRS § 343-1. HEPA will potentially apply whenever an agency or applicant (hereinafter, "applicant") initiates an action that requires a discretionary consent or approval. HRS § 343-2. An applicant must comply with HEPA if its proposed action is one of the triggers enumerated under HRS §343-5. The most common trigger is the proposed "use of state or county lands" (e.g., modification to a state or county highway as part of a residential project).

Once triggered, a discretionary approval cannot be granted and the proposed action cannot proceed until the permitting agency does one of the following:

1. Exemption. Find that the project is exempt from HEPA, because the proposed action "will probably have minimal or no significant effects on the environment." HRS §343-6.; or
2. Finding of No Significant Impact ("FONSI"). If not exempt, an environmental assessment ("EA") must be prepared at the earliest practicable time to determine whether an environmental impact statement ("EIS") is required. HRS § 343-5(b). The permitting authority will review the EA and may issue a FONSI. If so the process ends here.; or
3. EIS. If the permitting authority finds that based on the EA "the proposed action may have a significant effect on the environment" then the applicant must prepare an EIS. Upon completion, the EIS must be accepted by the agency issuing the permit.

This is the short of it: discretionary permit-->trigger-->exemption-->EA-->FONSI-->EIS. Embedded in the process are required periods for public notice, public comment, and specific limitations on when a person can sue for perceived deficiencies in the process. See HRS §§ 343-7, 343-5.

What are Secondary Impacts? The words "secondary impacts" are not found in the HEPA statute. HEPA requires only that environmental documents analyze "significant impacts"/"significant effects" that

will be caused by the proposed action. HEPA defines significant effects as follows:

The sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic welfare, social welfare, or cultural practices of the community and State. HRS § 343-2.

Through HEPA, the legislature directed the Environmental Council to establish rules that, among other things, establish procedures to exempt actions that have minimal or no significant effects on the environment; prescribe the contents of an EA; prescribe the procedure for processing and accepting EIS documents; and establish criteria to determine when an EIS is acceptable. HRS § 343-6. These EIS Rules are codified under chapter 200 of the Hawaii Administrative Rules ("HAR").

SECNAVINST 4000.35A, Section 4.b

https://portal.navfac.navy.mil/portal/page/portal/NAVFAC/NAVFAC_WW_PP/NAVFAC_HQ_PP/NAVFAC_ENV_PP/NAVFAC_BDD_CULTURALRSRC_PP

Protection of the nation's heritage is an essential part of the Department of the Navy (DON) mission - defense of the people, territory, institutions and heritage of the United States. According to SECNAVINST 4000.35A, Section 4.b, "The DON is a large scale owner of historic buildings, districts, archeological sites, ships, aircraft and other cultural resources. Protection of these components of the nation's heritage is an essential part of the defense mission, and the DON is committed to responsible cultural resources stewardship." SECNAVINST 4000.35A establishes policy and assigns responsibilities within the Department of the Navy for fulfilling legally required cultural resource requirements.

The National Historic Preservation Act of 1966 (NHPA) established a national historic preservation program with broad ranging requirements for federal agencies. For example, the Cultural Resources Program assists the Navy in the required identification, protection and nomination of historic properties to the National Register of Historic Places. It also assists the Navy in meeting the two requirements of Section 106 of the NHPA; to take into account the effects of its undertakings on historic properties and to afford the Advisory Council on Historic Preservation an opportunity to comment on those undertakings.

The headquarters level develops policy statements and other forms of guidance, maintains and interprets data and produces a variety of

reference and promotional materials. Headquarters is also responsible for coordinating cultural resources information up and down the Navy's chain of command. In the field, Cultural Resource Managers work directly with naval installations, state historic preservation offices and other interested parties to implement the Section 106 process. Integrated Cultural Resource Management Plans (ICRMPs) are also produced in the field to identify and plan for the treatment of historic resources on specific installations

A historic district, as defined by National Register Bulletin 16A, "...possesses a significant concentration, linkage, or continuity of sites, buildings, structures or objects united historically or aesthetically by plan or physical development."

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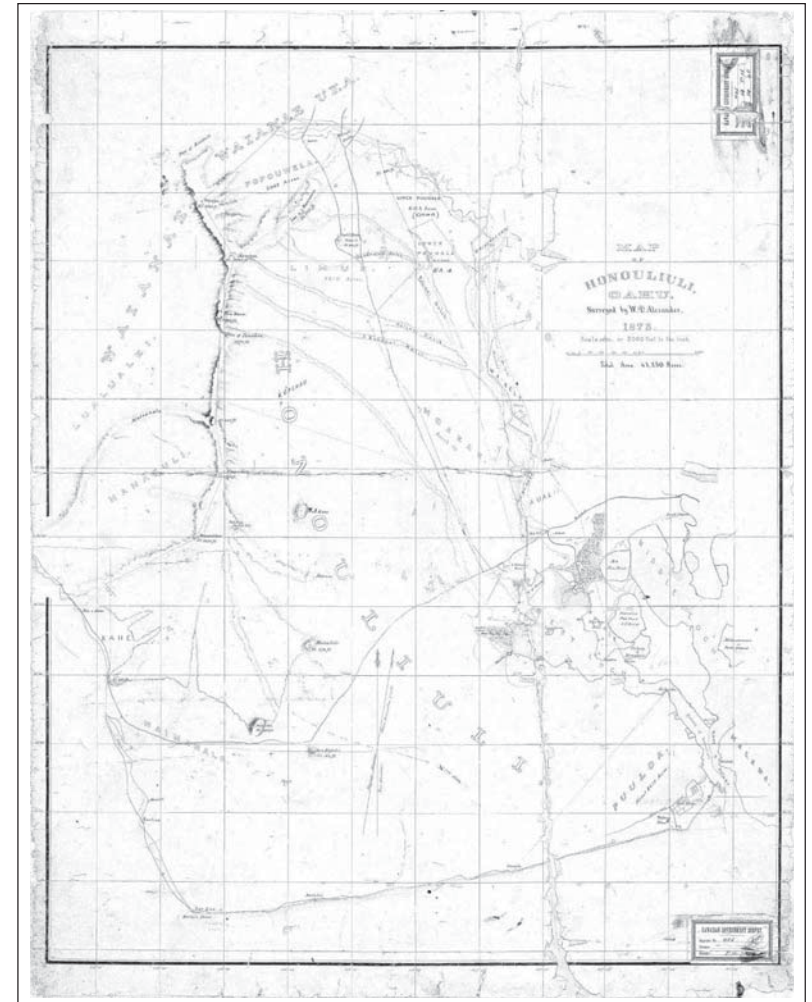
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Background

Conduct educational and informational activities for the community about Native Hawaiian traditional and customary practices, culture, lore, history, Hawaiian language, and Hawaiian land and ocean environments as it relates to preservation areas and the 'Ewa Plain; and to perpetuate knowledge about the wahi pana (storied traditional and sacred place) in the Ocean Pointe master planned community and Hoakalei Resort's preservation areas...

This version of the mo'olelo has yet to be translated in its entirety, and while it follows the basic format of Nathaniel Emerson's 1915 rendition of the story of "Pele and Hi'iaka," it also contains a great wealth of additional island-wide place name accounts, including those for Honouliuli. The narratives include traditions and descriptions of: the famous pipi-bivalves that gave the English name to Pearl Harbor; the native vegetation of the area; document the occurrence of sweet potato cultivation; the trails that cross Honouliuli; and perhaps most significantly, traditions of how places came to be named.



**He Wahi Mo'olelo No Honouliuli, Moku o 'Ewa —
Traditional and Historic Accounts of Honouliuli, District of 'Ewa
(Hoakalei Cultural Foundation – Working Paper)**

The texts also include many mele and 'oli (chants) that provide poetic descriptions of Honouliuli and the shore around the Ocean Pointe/Hoakalei preservation areas. The following English translations were prepared by Maly in 1996 and are a synopsis of the Hawaiian texts, with emphasis upon the main events of the narratives.

He Mo'olelo Ka'ao no Hi'iaka-i-ka-poli-o-Pele

The goddess Hi'iaka journeyed from the island of Hawai'i to Kaua'i, stopping on Maui, Moloka'i, and O'ahu, as she went to fetch the chief Lohi'au-ipo (Lohi'au) from Hā'ena and return with him to Pele's domain at Kīlauea, Hawai'i. The following narratives come from the portion of the legend that describes the return journey to Hawai'i.

...Aloha ka hau o Ka'ala	Beloved is the dew of Ka'ala
'Oia hau halihali 'a'ala mau'u nēnē	That dew which bears the fragrance of the nēnē grasses
Honi ai ke kupa o Pu'uloa	[fragrant dew which] Kissed the natives of Pu'uloa
He loa ka imina e ke aloha e...	One searches far for love... [January 18, 1927]

Preparing to depart from the village of the chiefess, Makua, Hi'iaka elected to travel overland through Wai'anae, to the heights of Pōhākea, and across the plain of Honouliuli. Hi'iaka made preparations for Lohi'au and Wahine'ōma'o to travel by canoe from Pōka'i to the landing at Kou (Honolulu). Before letting them depart, Hi'iaka instructed her two companions...

...As you travel, you will arrive at a place where a point juts out into the sea. That will be Laeloa [Barbers Point]; do not land there. Continue your journey forward. As you continue your journey, you will see a place where the ocean lies calmly within the land. That will be 'Ewa; do not land there. As you continue your journey, you will reach a place where the mouth [of the land] opens to the sea (hāmama ana ka waha i ke kai). That is Pu'uloa, do not land there either. That is the entry way to 'Ewa... [January 25, 1927].

From the heights of Pōhākea, Hi'iaka looked to the shores of 'Ewa, where she saw a group of women making their way to the sea. The women were going down to gather pāpa'i [crabs] and limu [seaweeds], and to gather the mahamoe, 'ōkupe [both edible bivalves], and such things as could be obtained along the shore. Hi'iaka then began to chant about those ladies:

Ka makani kēhau o lalo o Wai'ōpua	The Kēhau breeze is there below Wai'ōpua
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Ko ke kula na'ena'e la i ke kupukupu	Bearing the fragrance of the kupukupu ferns across the plain
Moe no i ke anu o ka mau'u	The coolness is laid upon the grasses
Moe aku la i ke kai o 'Ewa i ke anu	A coolness laid upon the sea of 'Ewa
Anu 'Ewa i ka i'a hāmau leo	'Ewa is made cold [unfriendly] because of the fish which hushes voices
E hāmau e, o ua makani nei	Be silent in that breeze.

Hi'iaka saw the women moving ahead to the shoreline, just like the cold Waikōloa wind that blew from the uplands of this place. And this was why Hi'iaka had chanted to them. Hi'iaka then turned towards the canoe on which her companion and the man [Lohi'au] were traveling. They were paddling and were no longer talking, for Hi'iaka had admonished them, warning—

Anu 'Ewa i ka i'a hāmau leo,	'Ewa is made cold because of the fish that hushes voices,
E hāmau ho'i e!	Be silent!

Now, the famous fish of 'Ewa in those days when the wind blew because of conversations was the pipi [pearl oyster – It was believed that talking would cause a breeze to blow that would, in turn, frighten the pipi. (cf. Pukui and Elbert 1971)] Only when it was very calm could one go to catch the pipi. If anyone spoke while going to get the pipi, the breeze would cause rippling on the water's surface and the pipi would be hidden from sight. In this way, Hi'iaka had instructed Wahine'ōma'o and Lohi'au to be quiet like the women of 'Ewa who were going fishing. If one spoke, the angry winds would blow and bring misfortune... [February 8, 1927]

...Turning her gaze towards the island of Hawai'i, she could see the flames of Pele in the lehua forest of Hōpoe, and she chanted out

Nani Pālailai, he anaina kapu na ka wahine	Beautiful is Pālailai, sacred assembly of the woman
Ke kūkulu nei wau i ka pahu kapu ka leo	I set up the drum of the sacred voice
O ka leo o ke kai ka'u e ho'olono e	The voice of the ocean is what I hear
Ua lono aku la ke kupa	The natives hear it ¹
Ua inu iho la nā manu i ke koena wai noni	The birds drink the water caught in the noni leaves ²

¹ The stormy ocean of Waialua, could reportedly be heard in 'Ewa.
² Traditionally, after storms, forest birds were could be seen in the lowlands drinking water in this manner.

Kūnewanewa a'e la nā 'ōpua i ka mālie	The billowy clouds pass in the calm
Pua o mai ke ahi o Hawai'i ia'u...	The fires of Hawai'i rise above me...

...Hi'iaka then departed Pōhākea, descending to the plain of Keahumoa [between Waipi'o and Honouliuli]. It was at this place that she saw several women gathering the blossoms of the ma'o [Gossypium tomentosum, an endemic yellow-flowered hibiscus that grows on the dryland plains; Figure 2] with which to string garlands for themselves. She then saw them sit down and begin to string and complete the garlands for themselves, so that they could adorn their necks. These women adorned themselves in the ma'o garlands and were really quite beautiful. Hi'iaka then felt her own neck, for she was without a lei. Hi'iaka then thought about what to say to the women regarding the garlands with which they had adorned themselves. She then thought within herself, I am going to ask them for a lei that they had been burdened with making. If they have aloha for me, then there is no kindness which they shall not have, but if they deny me, so it will be.



Figure 2. Blossoms of the ma'o or ma'oma'o (Photo No. KPAC_881)

Hi'iaka then offered a chant to the women who had strung their garlands upon the plain which is burned by the sun.

E lei ana ke kula o Keahumoa i ka ma'o	The plain of Keahumoa wears the ma'o blossoms as its lei
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'Ohu'ohu wale nā wahine kui lei o ke kanahale Ua like no a like me ka lehua o Hōpoe Me he pua koili lehua ala i ka lā	Adorning the women who string garlands in the wild It is like the lehua blossoms of Hōpoe Lehua blossoms upon which the sun beats down
Ka oni pua koai'a i ka pali I nā kaupoku hale o 'Āpuku Ke ku no i ke alo o ka pali o Pu'uku'ua He ali'i no na'e ka 'āina He kauwā no na'e ke kanaka I kauwā no na'e wau i ke aloha Na ke aloha no na'e i kono e haele no māua E hele no wau a—	On the nodding koai'a flowers of the cliff On the rooftops of the houses at 'Āpuku Rising in the presence of the cliff of Pu'uku'ua The land is indeed a chief Man is indeed a slave I am indeed a slave to aloha—love It is love which invites us two—come I come—

['Āpuku and Pu'uku'ua are both places situated on the upland plain of Honouliuli.]

Then one of the women answered her in a kindly manner, "Wait stranger, before you go on your way, here is your lei." It is true what you have said, "He kauwā ke kanaka i ke aloha" [Man is a slave of love or compassion], and it is aloha which beckons to us and moves us to come forth. The woman then moved forward and placed her lei upon Hi'iaka, and the other women did the same as well. The women then saw the true beauty of Hi'iaka and they urged her to join them for a meal at their home on the shore of 'Ewa.

Hi'iaka then spoke to them, "I am not hungry, for your kindness has satisfied me. Here are the words which I share with you—In your dwelling, if one of you should meet with trouble, or if one of the people for whom you have aloha is in need, offer the chant which I offered to you, asking without shame for garlands that you had made. The chant is a prayer for the passing of troubles from you or your loved ones. Now come and kiss me, and I will depart from this long open plain.

All the women stepped forward to kiss Hi'iaka, and as they rubbed noses each one of them remembered the chant which Hi'iaka offered when she asked for their garlands of ma'o. Thus this chant became a prayer for those women in their days of trouble. Hi'iaka then departed from those women who strung garlands of ma'o on the plain and traveled towards the shore of 'Ewa, towards Pu'uloa. Turning towards the ocean of Honouliuli,

Hi'iaka saw the expanse of Leinono³ and she said within herself:

Say! I have not forgotten you Leinono, though perhaps you think I am no good because I don't know you. Therefore, I call to you Leinono with this chant:

Nōweo maka, ea i ka lā	Bright eye, the rising sun
Hoa kuilima laulā o 'Ewa	Companion that travels arm-in-arm with the expanse of 'Ewa
Ka Amu āhua lepo a ka makani	The Amu wind that causes dust to mound up
He hiapō na ka Moa'e	Is the first born of the Moa'e wind
He keiki na ka 'Ewa-loa e hi'i mai la	A child that is embraced by the 'Ewa-loa [breeze on the expanse of 'Ewa]
E Leinono e	Hail Leinono
Hoa aloha wale o kākou ho'i e	Our companion

Finishing her chant, Hi'iaka then turned and saw her companion and Lohi'au paddling their canoe. And her love welled up for her traveling companions. It was also then, that Hi'iaka came to understand that Lohi'au would be killed by Pele when they reached Hawai'i. Hi'iaka then turned and continued her journey along the path that crossed this unpeopled plain. While walking along, she saw two women who were busy stringing garlands of 'ilima [Sida fallax] blossoms. The women were sitting alongside the trail upon which Hi'iaka was traveling. Now when these two women saw Hi'iaka, one said to the other, "Say, this is Hi'iaka who is descending along the path, we must depart with haste, lest she kill us."

The two women hastily departed, and reached a stone that was situated along the side of the trail which continued on to Wai'anae. It was at this stone that the two women transformed themselves into their supernatural mo'o [lizard] forms. One of the lizards then went and hid in a little space on the stone, and the other went near by. One mo'o said to her companion mo'o... [February 15, 1927] "It is fortunate that we have hidden ourselves at this place, so that we may escape being killed by Hi'iaka." Now from ancient times till recently, the place at which this stone was situated, was called "Pe'e-kāua" [We two hidden]. Now that the road has been made, the stone at which these two mo'o wahine [lizard women] has been destroyed.

When Hi'iaka saw that these two women had fled and taken their mo'o forms to hide on the stone along the trail, she chanted out to them:

Aloha 'olua e nā wahine o ke kula	Greetings to you two women of the plain
'Oia kula ānea i ka lā	It is a barren plain in the sun
He lā hao wale ho'i nei	Where the sun bears forcefully down
O ka holo la a pe'e	Having gone to hide
O pe'e kāua i Pe'e Kaua	We two are hidden at Pe'e Kaua
Aloha nō 'olua	Aloha to you two
Eia nō wau ke hele nei	Here I am traveling on

Hi'iaka then continued walking towards the shore. Hearing Hi'iaka's chant of affection, these two mo'o women said to one another, "Say, this is truly remarkable, for we will not die, but have been saved by Hi'iaka. She has given us her aloha as she descends in the heat of the sun, and so it is that we shall remain upon this plain."

Descending to the flat lands of Honouliuli, Hi'iaka then turned and looked at Pu'uokapolei and Nāwahineokama'oma'o who dwelt there in the shelter of the growth of the 'ōhai [Sesbania tomentosa], upon the hill, and where they were comfortably refreshed by the blowing breezes. Hi'iaka then said, "Pu'uokapolei and Nāwahineokama'oma'o, do not forget me, lest you two go and talk behind my back and without my knowing, so here is my chant of greeting to you:"

Aloha 'olua e Pu'uokapolei mā	Greetings to you two o Pu'uokapolei and companion
E Nāwahineokama'oma'o	O Nāwahineokama'oma'o
E nonoho mai la i noho wale la	Set there, and dwelling
I ka malu o ka 'ōhai	In the shade of the 'ōhai
I ke kui lei kukui i ka lā	Stringing garlands of kukui in the day,
Lei aku la i ka pua o ka ma'oma'o	Adorning yourselves in the garlands of the ma'oma'o
Lei kauno'a i ke kaha o Ka'ōlino	Kauno'a [Cuscuta sandwichiana] is the lei of the shores of Ka'ōlino ⁴
He 'olina hele e	There is joy in traveling

When Hi'iaka finished her chant, Pu'uokapolei said, "Greetings. Love to you, o Hi'iaka! So it is that you pass by without visiting the two of us. Lo, we have no food with which to host you. Indeed, the eyes roll dizzily with hunger. So you do not visit us two elderly women who have cultivated the barren and desolate plain. We have planted the 'uwala [sweet potato]

³ Leinono may also be written as Leilono. It is an area in the midlands of Moanalua above Āliamanu, and is situated near the border of the districts of 'Ewa and Kona. At Leilono there was a supernatural 'ulu (breadfruit tree) from which spirits of the deceased leapt and were either caught by welcoming 'aumākua (ancestral deities) or they would fall into an endless night. From Leinono, the unfortunate spirits are said to have wandered hopelessly across the plain of Kaupē'a on Honouliuli and gone off into the sunset (Kamakau 1968: 47 & 49).

⁴ Ka'ōlino (literally: the brightness) appears to be a variation of Ko'olina (interpretively translated as: Joyous).

shoots, that have sprouted and grown, and have been dedicated to you, our lord. Thus as you travel by, pull the potatoes and make a fire in the imu, so there will be relief from the hunger. For we have no food, we have no fish, and no blanket to keep us warm. We have but one kapa [covering], it is the pilipili-'ula grass [Chrysopogon aciculatus]. When it blossoms, we go and gather the grass and plait it into coverings for us. But in the time when the grasses dry, and none is left on the plain, we two are left to live without clothing. The cold breeze blows in the night, the Kēhau and Waikōloa, the cold does not remain though, and when the grasses of the land which give us warmth, begin to grow again, our nakedness is covered, and we are a little better off than the flowers of the ma'o. It is because we are left without our covering of the pilipili-'ula grass, that many people have come to say, "Waiho wale iho ka mau'u o Kaiona" [Kaiona is left exposed by the grasses – It is so hot that the grasses have withered and dried, leaving everything exposed to be seen]." Aloha to you, and aloha be with you in your travels o Hi'iaka-i-ka-poli-o-Pele, our lord.

Hi'iaka then turned and continued her walk in the stifling heat of the sun on the plain of Pu'uokapolei. Hi'iaka saw a ma'o blossom as she descended, and she picked it in the heat of the sun and chanted out

Liua o Kona i ka lā loa o Makali'i	Kona is made dizzy in the long days of Makali'i [summer]
Māewa ka wiliwili hele i ka la'i	The wiliwili [Erythrina] trees sway, then comes the calm
Kulo'ia ka manu o Kānehili	The birds of Kānehili endure
Welawela ka lā o Pu'uokapolei	The sun is exceedingly hot on Pu'uokapolei
'Ukiki ka ma'o kula i kai	The ma'o growth is stunted on the seaward plain
Me he kapa halakea ala ka pua ka nohu	The nohu [Tribulus cistoides] flowers are o like a halakea [kapa] covering
Ka 'owaka, ka pua'ula i ke kaha o Kaupe'a la	The pua'ula [young kumu] fish seem to flash along the shores of Kaupe'a
A he hoa	Striking,
E ho'ohoa aku ana i ka makani he Nāulu	Striking is the Nāulu wind
A he hoa—e	Striking forth

When Hi'iaka finished her chant, she continued toward the shore, and looking to the ocean, she saw the canoe of her friend and Lohi'au, and chanted:

Ku'u kāne i ke awa lau o Pu'uloa	My man on the many harbored sea of Pu'uloa
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Mai ke kula o Pe'ekāua ke noho E noho kāua i ke kaha o ka 'ōhai I ka wiliwili i ka pua o ka lau noni	As seen from the plain of Pe'ekāua Let us dwell upon the 'ōhai covered shore Where the noni blossoms are twisted together
O ka ihona i Kānehili la Ua hili ho'i au—e	Descending along Kānehili I am winding along

Hi'iaka then turned and looked back to Pu'uku'ua, Kānehōa, and Hale'au'au and said, "Do not forget me Pu'uku'ua mā. And so you do not think that I will forget you, here is a chant of endearment for you

Owau e hele i ke kaha o Pu'uloa I ka 'ōhai a Kaupe'a la I ka lā hōanoano e Ua 'ike Ua 'ike aku la ka ho'i au I ke kuahiwi mauna pali O Pu'uku'ua i Hale'au'au O ke oho o ke kukui ehu I ha'a i ka lā o Kānehōa Aloha wale ho'i nā hoa e	It is I who travel along the shore of Pu'uloa Where the 'ōhai is at Kaupe'a In the awe-inspiring sun It is seen It has been seen by me At the mountain cliffs Pu'uku'ua at Hale'au'au The sprouting of the kukui growth Dancing in the sun of Kānehōa Love to you o companions
--	---

...Upon finishing her chant, Hi'iaka continued down the trail and arrived at Kualaka'i. At Kualaka'i, the trail took her to a spring of cool water. Looking into the spring, she saw her reflection shining brightly upon the water's surface. Hi'iaka also saw two lehua trees [Metrosideros polymorpha – Figure 3] growing on each side of the spring. Now these two lehua trees were completely covered with blossoms. She then picked the lehua blossoms of these two trees and strung garlands for herself.

Hi'iaka strung four strands to her lei, she then removed the garlands of ma'o which had received when descending from Pōhākea, and set them aside. She then took the garlands which she had made, and adorned herself with them. Hi'iaka then heard the voice calling out from the area of Kānehili:

O Hi'iaka ka wahine Ke 'ako la i ka pua o Hoakalei Ke kui la, ke uo la i ka mānai	Hi'iaka is the woman Who picked the flowers of Hoakalei And with a needle strung and made them into
'Ehā ka lei, ka 'āpana lei lehua a ka wahine la Ku'u pōki'i	Four garlands, the sectioned lei of the woman O my younger sibling



**Figure 2. Blossom of the dryland lehua (*Metrosideros polymorpha*)
(Photo No. KPAC2a_2102)**

Ku'u pōki'i mai ke ehu makani o lalo	My younger sibling who came from the place where the dusty wind rises from below
Lulumi aku la i ke kai o Hilo-one	Overtaken in the sea of Hilo-one
No Hilo ke aloha	The aloha is for Hilo
Aloha wale ka lei e—	Love for the lei

That place, Hilo-one, which is mentioned in the mele [chant], is situated on the northern side of Kualaka'i, close to Kalaeloa. And the name of the spring in which Hi'iaka looked and saw her reflection was Hoakalei [Reflection of a lei]. It was at this place that Hi'iaka saw the two lehua trees growing, from which she picked the blossoms to string her four garlands.

Hearing the chant, Hi'iaka turned toward where it had come from, and saw her older sister Kapo looking at her. Kapo had arrived at O'ahu from Maui, where she was teaching the practices of the hula. Seeing Kapo, Hi'iaka cried out with affection for her older sister [February 22, 1927; available in paper form only at the Hilo Public Library]:

O 'oe 'ia e Waialua-iki	So, it is you o Waialua-iki
E ka lā uli pali o Uli	Of the sun darkened cliff of Uli
Ua hele wale ia e Li'awahine	Li'awahine has gone traveling
E ka wahine kuhea pali	O woman that stands calling from the cliff
E lei au...	I am adorned with a lei

'Ae—ke lei nei au i nā lehua makanoē I nā lehua lihi wai o Hoakalei	Yes, I am wearing garlands of the misty-centered lehua blossoms The lehua that grows along the water's edge at Hoakalei, My lehua of Hilo-one.
Ku'u lehua i Hilo-one I nā kaha o Ka'olina me Kaupe'a E lei au e—	On the shores of Ka'olina and Kaupe'a I am adorned

The reason that Hi'iaka presented this chant to her elder sister Kapo, saying, "kui pua lei, o Hoakalei" [Stringing flower garlands of Hoakalei] was because in her chant, Kapo had inquired about Hi'iaka's picking the flowers from the spring of Hoakalei and making them into four garlands for herself... As it is seen in this mele [chant], Hilo-one is on O'ahu, there at Kualaka'i, near Kalaeloa.

Thus it is understood that through legends like this, we are given direction in knowing about the names of various places of the ancient people, and which are no longer known in this time...Hi'iaka then continued her journey toward the shore of Pu'uloa, and she thought about the words that she had earlier spoken to Wahine'ōma'o and Lohi'au, and she chanted:

A'ole au e hele i ke kaha o Kaupe'a	I will not travel to the shore of Kaupe'a
I nā 'ōhai o Kānehili i Kaupe'a	To Kaupe'a where the 'ōhai of Kānehili are found
A ua hili au...	I will turn away...

...Hi'iaka then arrived at a place where many people were gathered together, and she overheard them talking about preparations for a journey to Kou, which is the old name for Honolulu. The people were preparing to go to the court of the chiefess Pele'ula, who was hosting kilu⁵ games [March 1, 1927; available in paper form only at the Hilo Public Library].

...Learning of the contest that was to be held at Kou, Hi'iaka had reservations about having Lohi'au stop at the court of the chiefess Pele'ula. So she chanted, calling to Lohi'au, telling him to bring the canoe to shore at Pu'uloa. When Hi'iaka chanted, everyone became quiet, because they were awed by the beauty of her chanting voice. One of the women in the group then called to Hi'iaka, "You are a stranger to us in appearance, but your chant indicates that you are very familiar with this shore, how is that so?" Hi'iaka confirmed that she was indeed a visitor,

⁵ Kilu is a Hawaiian game in which a gourd, or a coconut shell, cut in half, is tossed at an opponent's pob (something like horseshoes). The individual who successfully hits the pob that he or she had selected, was the winner and could claim a kiss or some other favor from the opponent (cf. Malo 1951:216)

and yet familiar with the places of this land. She then said, “Ua maika’i no kâu noi e ke kama’āina maika’i, akā, i Kou ho’i e hui aku ai nā maka” [You have asked a good question, kind native, but, it is at Kou, that all the faces (eyes) shall meet].

Thus it is seen that when Hi’iaka responded to the woman of Pu’uloa, that this famous saying of the people of O’ahu came about, “Hui aku nā maka i Kou” [The faces shall meet at Kou]... Now, Lohi’au had heard the chant of Hi’iaka, and he drew the canoe to the shore. When Hi’iaka boarded the canoe, she bid farewell to the people of Pu’uloa and said, “Hui aku o nā maka i Kou” [i.e., we will meet again].

They then directed the canoe seaward, and went out of opening of Pu’uloa. Hi’iaka then turned and looked towards the land where she saw the dwelling places of Kinimakalehua, Leinono, and Keālia. She called out to them, “So you do not forget me, here is a chant for you:”

Polenaehu i ka ua Kinimaka-	Reddish yellow are the rains of
lehua	Kinimakalehua
Hoahoa Leinono ki’eki’e Pu’uloa	Leinono is the companion above,
makai	and Pu’uloa is shoreward
Ke hele ala i ke one kui-lima	The journey across the expansive sands of
laua o ‘Ewa	‘Ewa has been made arm-in-arm
Ma ‘Ewa ho’i wau	I am at ‘Ewa
E uwē ho’i wau iā ‘oe e	I greet you o Leinono
Leinono e	
Hoa aloha wale ho’i kākou e	We are all companions

In this chant of Hi’iaka, she spoke the famous saying that is the pride of the descendants of ‘Ewa; “Ke one kui-lima laulā o ‘Ewa” [The sands of ‘Ewa, across which everyone joined hand-in-hand]. These words of Hi’iaka are a famous saying of this land to this day. As the canoe continued toward Kou, passing the land of Kalihi, Hi’iaka looked again towards Leinono and Keālia, and she chanted:

Aloha ‘oe e Leinono, e	Hail to you o Leinono,
Kinimakalehua,	o Kinimakalehua
E Keālia i lalo e, aloha	O Keālia who is below, aloha
Eia ke kānaenae ka mōhai	Here is the supplication, the offering
A ka mea hele la, he leo e	of the one who has traveled by. It is a
	voice or song,
He leo wale nō ho’i e—	Only a voice—

She then turned forward and they arrived at Nu’uanu...[March 8, 1927; available in paper form only, at the Hilo Public Library].

Selected Historic References to the ‘Ewa-Honouliuli Region

The coastal coral plains of Honouliuli, which stretch behind Kualaka’i, Keahi, and One’ula (the project area), are thought to be the legendary “kula o Kaupe’a” (plain of Kaupe’a) which is said to be the realm of the ao kuewa or ao ‘auwana (the homeless or wandering souls). Kaupe’a was the wandering place of those who died having no rightful place to go; the souls wandered “in the wiliwili grove” (Sterling and Summers 1978:36). According to 19th century Hawaiian historian Samuel Kamakau, the spirits who wandered “on the plain of Kaupe’a beside Pu’uloa...could go to catch pulelehua (moths or butterflies) and nanana (spiders)” in the hope of finding helpful ‘aumakua (family deity) who could save them (Kamakau 1964:47 and 49).

One of the native Hawaiian informants who recorded her recollections of the Honouliuli area was Hawaiian ethnographer and Bishop Museum employee, Mary Kawena Pukui. Pukui shared her personal experience with the ghosts on the plain of Kaupe’a around 1910:

A wide plain lies back of Keahi and Pu’uloa where the homeless, friendless ghosts were said to wander about. These were the ghosts of people who were not found by their family ‘aumakua or gods and taken home with them, or had not found the leaping places where they could leap into the nether world. Here [on the plain of Honouliuli] they wandered, living on the moths and spiders they caught. They were often very hungry for it was not easy to find moths or to catch them when found.

Perhaps I would never have been told of the plain of homeless ghosts if my cousin’s dog had not fainted there one day. My cousin, my aunt and I were walking to Kalae-loa, Barber’s Point, from Pu’uloa accompanied by Teto, the dog. She was a native dog, not the so-called poi dog of today, with upright ears and body and size of a fox terrier. For no accountable reason, Teto fell into a faint and lay still. My aunt exclaimed and sent me to fetch sea water at once which she sprinkled over the dog saying, “Mai hana ino wale ‘oukou i ka holoholona a ke kaikamahine. Uoki ko ‘oukou makemake ‘ilio.” “Do not harm the girl’s dog. Stop your desire to have it.” Then with a prayer to her ‘aumakua for help she rubbed the dog. It revived quickly and, after being carried a short way, was as frisky and lively as ever.

Then it was that my aunt told me of the homeless ghosts and declared that some of them must have wanted Teto that day because she was a real native dog, the kind that were roasted and eaten long before foreigners ever came to our shores (Pukui 1943:60-61).

McAllister's *The Archaeology of Oahu* (1933), describes how the coral plains around the project area may have been used in earlier times:

Site 146. 'Ewa Plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near Puuloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians.

Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here (McAllister 1933:109).

On the coast, a little west of the project area, there is a place called Kualaka'i, and there is a spring located there that is called Hoakalei. As noted above, the spring is associated in legend with Hi'iaka, the favorite sister of the fire goddess, Pele. Additional information is found in the legendary series titled "Nā Wahi Pana o 'Ewa" (The Famous Places of 'Ewa), which ran in the Hawaiian Language Newspaper "Ka Loea Kālai 'Āina" (c. 1900), readers were told of two "strange" women who lived on the plain called Pukaua, beyond Pu'ukapolei, toward Wai'anae. Once, after going down to Kualaka'i on the coast to gather 'a'ama crabs, pipipi, and limu, they failed to return home before morning light, and were turned into a single pillar of stone (Sterling and Summers 1978:39).

In 1898, Cameron (1898) noted that the kiawe forests of 'Ewa supplied much of the fuel for kitchen fires in Honolulu. Harvesting of kiawe wood continues to this day, although not on the scale that was undertaken during Cameron's time. Earlier this century, a few fishermen and some of their families built shanties by the shore where they lived, fished, and traded their catch for taro at 'Ewa (see also the interview notes with Mrs. Arline Eaton; March 4, 1997). Their drinking water was taken from nearby ponds, and it was so brackish that other people could not stand to drink it. Near Barbers Point there was a pond with fresh-water shrimp, which were assumed to have been brought down from inland streams and put in the pond to propagate (Herman Von Holt, interview April 6, 1970 IN Lewis 1970:16).

The family of the late Eli Williamson (former Bishop Museum staff member and companion of Hawaiian ethnographer, Mary Kawena Pukui, cited above), lived in the small community at Kualaka'i. Kelly (1985) reported on some of the recollections of Mrs. Williamson:

In the Honouliuli area the train stopped among the kiawe (algaroba) trees and malina (sisal) thickets. We disembarked with the assorted food bundles and water containers. Some of the Kualaka'i 'ohana met us to

help carry the 'ukana (bundles) along a sandstone pathway through the kiawe and malina. The distance to the frame house near the shore seemed long.

When we departed our 'ukana contained fresh lobsters, limu (algae), fish and i'a malo'o (dried fish)....Tutu mā (grandfolks and others) shared and ate the seafoods with great relish. (E. Williamson in Kelly 1985:160)

Oral History Interviews and Community Documentation and Recommendations

As a part of the process of developing the preservation plan, two of the eldest, life-long members of the Honouliuli-Pu'uloa (Figure 4) area were sought out to elicit historical narratives, records of Hawaiian sites and practices, and recommendations regarding the Haseko development project. Kupuna Arline Wainaha Pu'ulei Brede-Eaton and Sister Thelma Genevieve Parrish were recommended as the most knowledgeable residents of the region. Both ladies agreed to participate in oral history interviews, and excerpts of those interviews are included here.

Arline Wainaha Pu'ulei Brede-Eaton Informal Oral History Interview—lands of Pu'uloa-Honouliuli with Kepā Maly, March 4, 1997⁶

The following information is a paraphrased summary of historical recollections collected during an informal interview with Arline Wainaha Pu'ulei Brede-Eaton (Auntie Arline). The information was collected as a part of the effort to develop a site preservation plan in conjunction with proposed development on a parcel of property on the 'Ewa plain, in the land of Honouliuli (see also the interview with Sister Parrish and Auntie Arline, of May 2, 1997). The property is generally situated on the coastal flats, between One'ula and Kualaka'i, and while the area has been impacted by cattle ranching and WWII military operations, a number of native Hawaiian cultural sites still remain on the property.

Born in 1927, Auntie Arline has lived in Pu'uloa nearly all of her life. Auntie's hānai (adoptive) parents had been going to the Pu'uloa vicinity for years—Papa Brede oversaw ranch operations for the Dowsett's—and by the time Auntie was born, had bought land and built a home at Pu'uloa. Initially the family spent weekends and holidays, at Pu'uloa, living in Kalihi on week days. Auntie observed, that many of her earliest memories, are of her days at Pu'uloa, and today, she is one of the oldest long-time native Hawaiian residents remaining on the land.

In those early days, Auntie recalls that they were among the few families living in the area. Besides her family, Dowsett Ranch had about 12 cowboys, all Hawaiians, and their families. Few other people lived in the area. When asked about her recollections of life and activities in those early years, Auntie Arline shared the following memories:

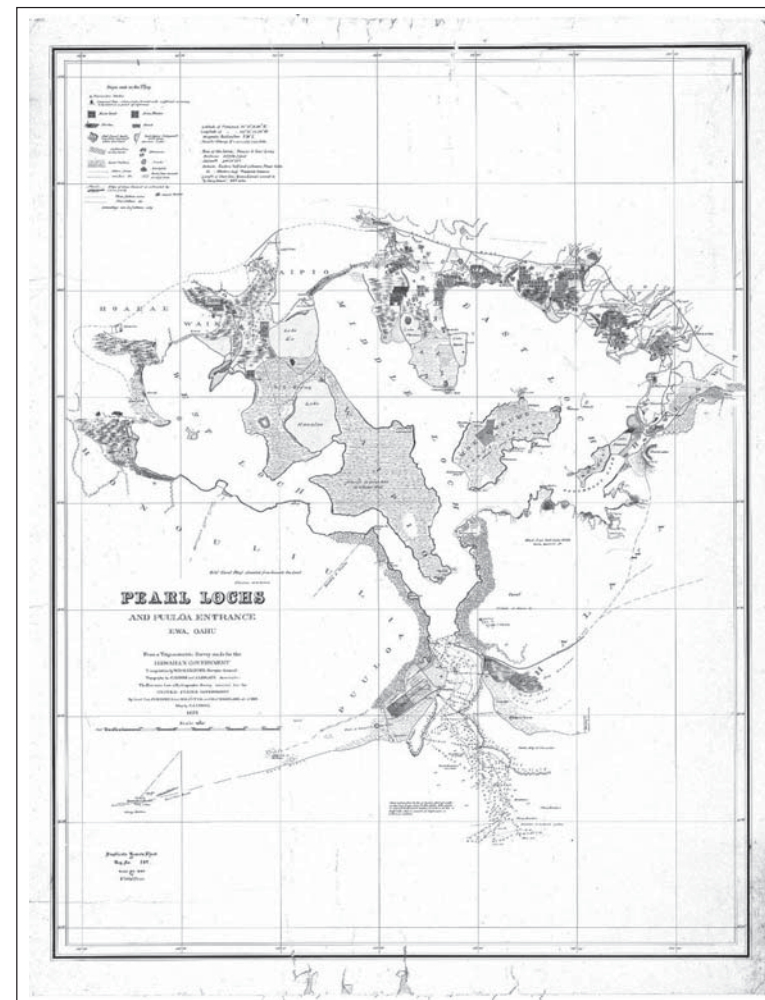


Figure 4. Map of the Pearl Lochs and Pu'uloa Entrance (Register Map No. 1639 - C.J. Lyons, et al., 1873)

⁶ Auntie Arline gave her permission for release of the interview records during meeting and interview with Sister Thelma G. Parrish on May 2, 1997.

The whole region was our play ground, we'd go to Keahi, go by canoe to Laulaunui and fish, and in the other direction, we'd walk as far as Kalaeloa. As children, we'd never think twice about walking anywhere, the distance was nothing. We would walk from Pu'uloa to the shore at (Ke) One'ula, and then on to Kualaka'i, and along the way we would gather limu (sea-weed). There was limu kohu, lipoa, and 'ele'ele, and the fish were so plentiful, not like now. We'd catch 'ō'io, kala, weke, moana, 'ū'ū, and all kinds of fish. It was a good place. Back when I was a child, there was more sand also, the entire shore line was like the beach at Barbers Point. Today, the shore line has all of that craggy coral, before had sand between the coral and the water. Things have changed now, I don't know why.

While no one was living full time out between Keone'ula and Kualaka'i, there were families that would come out for several months at a time. Sort of like my dad them, they'd work in town or somewhere else, and set up temporary residence on the beach. They didn't own the land, but they would go out and stay for certain periods of time. The people would fish, gather limu, and make pa'akai (salt). Other than that though, there was no one living out here. There was not much activity in the area behind the shore. I don't remember that there were cattle back there, and the sugar ended further inland. The CPC had a camp down by Keone'ula, and in from there, there was an old piggery and the old chicken farm. The chicken farm was run from around the early 1930s to 1970.

In response to several questions, Aunty offered the following recollections and comments:

- KM: When you'd go out into the area of the proposed Haseko development, did you ever hear your parents or any of the old cowboys speak about Hawaiian sites or any stories in the area?
- AE: I don't remember hearing too much about any of the history in the area, but I do remember being told that there were some heiau in the area. I think that site (Site 3209) in the Haseko property, the one that will be included in the preservation plan, the coral stone platform is one of the heiau sites. I remember being told that the heiau in this area were good heiau, the kind used for fishing, rain, and agriculture.
- KM: Where did people get water from when they were out there?
- AE: There's water out there, its wai kai (brackish), but we were used to that water, not like today. You can tell that there's water there along the shore, you can see it bubbling up, and the limu 'ele'ele will only grow where there is fresh water coming out of the papa (reef flats). And you know, when I

was young, there was a lot more water in the ponds back there. People don't believe me, but I remember when I was a child, there was a lot of water there.

- KM: Do you remember the wetlands?
- AE: Yes. That's the place where Captain Kealaka'i's mo'opuna (grandson) and I would go play. The water went far across the flats there. If I'm not mistaking, I think it went all the way behind the Barbers Point beach area. The place was clean too, not like now. There were no kūkūs (thorns), and used to have plenty manu (birds). We'd go swim in the ponds back there, it was pretty deep, about two feet, and the birds were all around. There were kōloa (native ducks) and āe'o (native stilts), and people don't believe this, but there were also 'iwa (frigate birds). I remember that when they were nesting, I would see their red chests puff out. It seems like when there were storms out on the ocean, we'd see them come into the shore, but they're not around any more.
- The wet land would get bigger when there was a lot of rain, and we had so much fun in there, but now the water has nearly all dried up. They even used to grow wet-land taro in the field behind the elementary school area when I was young.
- KM: Do you remember if people made salt out in the project area, maybe by the ponds, or along the shore? Or was it pretty much out at Pu'uloa?
- AE: Well, the big salt making area had been at Pu'uloa, and some salt was still being made in the ponds there. I do remember that when we'd go fishing, we, and other families would gather salt from the Keone'ula area. The pa'akai was made in the natural kāheka (salt bowls) along the shore there.
- KM: Are there any other kūpuna, or other old-timers that you could recommend for me to try and speak with about this land?
- AE: I am one of the few older people still around. But as I mentioned to you before, Sister Parrish (Ms. Thelma Parrish) is a good friend of mine. She's a descendant of the Dowsett family, and is very knowledgeable about the area. I tried to call her last week to see if she could join us in the meeting today, but she's been away.
- The Mitsuyasu family are old time residents, they had the first store out here, and someone of them may have some information that could be useful. Also, Ted Farm is very knowledgeable about the marine and fishing resources. I'll try to find out if there is anyone else that might be around, and I'll also keep trying to contact Sister Parrish.
- KM: Would you be interested contributing some of your mana'o and recommendations to the development of the preservation plan to protect and interpret the cultural sites in the Haseko property?

AE: I am very interested in participating in the preservation plan. I feel that I need to because this is my home, and it is important to care for our cultural resources.

**Miss Thelma Genevieve Parish⁷
with Arline Wainaha Pu'ulei Brede-Eaton
Recorded Oral History Interview—Lands of Pu'uloa-Honouliuli, 'Ewa, O'ahu
May 2, 1997, 1:10 p.m. (with Kepā Maly)**

TGP: ...I'm Sister Thelma Genevieve Parish and I was born on May the 26th, 1918. So I'm somewhat antiquated [chuckles]...

And I have known and taken a very vivid interest in my family, on both my father's side, which was the Dowsett side. And my mother's side which comes from the other side of the island in Waiāhole-Hakipu'u. So my grandmother, Mary Kaohinani Dowsett-Parish built one of the first homes in Kaimukī, when it was a very new subdivision in Honolulu. And as a member of the Dowsett family, she had inherited acreage down here in the area that we now call 'Ewa Beach. We never referred to the area as 'Ewa Beach in my younger days. It was always Kūpaka [as pronounced].

[During a site visit on August 20, 1997 with Miss Parrish and Aunty Arline, the general location of Kūpaka was pointed out as extending from the area of the present-day Pu'uloa Beach park to the west, near Keone'ula. Miss Parrish also recalled that in her youth the primary place names she heard were Keahi on the West Loch side of Pu'uloa; Kūpaka, as described above; and Keone'ula. She doesn't remember ever hearing the name Kualaka'i.]

KM: Kūpaka, and you heard that pronunciation?

TGP: Yes, Kūpaka. And whenever we children...on Friday afternoons, we'd get home from school, we had our little duffel bags all packed because we were going to go to Kūpaka, to spend the weekend. Now Kūpaka was part of the ahupua'a of Pu'uloa. And my great grandfather "owned it," and I have to use that word in quotation marks, because, it's refuted, or questioned as to the direct ownership. But he did, in quotes, own from the entrance to Pearl Harbor all the way to approximately, Campbell High School.

And he used that area which was quite barren, he used that area primarily as his fattening paddocks. Because he was into ranching and he had a ranch at 'Ulupalakua, on Maui, which he had acquired from the Makee family. And also, a ranch at Mikilua, which is below Lualualei. A part of the ahupua'a of Lualualei, on the other side of the Wai'anae mountain range, as it comes down to hit the sea on the southern coast. Then he also had a ranch in Leilehua. So these ranches were producing cattle and there were

⁷ At a review meeting on August 20, 1997, Miss Parrish gave her personal release of the interview narratives, as recorded herein, for use in the present document.

times when he would ship from Maui and would have to fatten the cattle before they could be slaughtered.

KM: Do you remember what the grazing material was then, down here that made a good fattening ground?

TGP: I guess the kiawe beans.

KM: So just the kiawe beans?

TGP: Kiawe beans and the haole koa.

KM: Hmm. Was that the predominant growth through out the Kūpaka-Pu'uloa, even into here, Honouliuli area?

TGP: Yes. Oh yes. It was primarily kiawe, the algaroba, and pā-nini, the klu bushes and the cactus, the haole koa, lots of it.

KM: This is from your memories as a child, or even pre...?

TGP: No, my memories as a child and it must have been a little more dense probably, previous to my knowing Kūpaka. However, the pasturage seems unlikely in our terms today, because it's not meadow-like, but it was just virgin country and the pipi, the cattle were turned loose. And then there were divisions (many of them were stone wall enclosures) so that you had one paddock following another paddock, following another paddock. So when we left Honouliuli, we were coming through the tail end of the cane lands, then we'd come to a gate, we'd have to stop and get out. My father was very persnickety about his Model T-Ford, so it wasn't to be scratched [chuckles], and so we had to break or hack-hack at the branches of the kiawe trees that had grown over the road after our last visit. And we'd come down, and I'd have to jump out of the car again, and open the next gate, wait until he'd gone through and close that gate. I think we had to do that three or four times.

KM: Hmm. So from Honouliuli boundary, with Pu'uloa, coming in?

TGP: Yes.

KM: And was your road way...?

TGP: Coral, one lane [chuckles].

KM: Uh-hmm. Were the gates, was it wire, uwea fencing? Or was it pā pōhaku [stone walls], some, do you remember?

TGP: There were coral stone walls and also many were wire fencing, the barbed wire. Not the fancy squared off kinds of fencing, just barbed wire. And strung from one kiawe wood post to the next kiawe wood post, to the next, and on down. And the gates were swung from larger posts, embedded in the coral. And the gate swung only in one direction, and you had to park and then drive through, wait and then close the gate, and then go on to

the next gate. My grandmother's property was always...sort of located by the height of the windmill. She had the only windmill in the area and it was a land mark.

KM: You know, on the old map that we were looking at earlier?

TGP: Hmm.

KM: Alexander's 1873 map, Register Map number 618, we see [opening the map]... See the watering hole here? [pointing to sites identified on the map] In fact, see, this says "stone wall" coming in by the salt works?

TGP: Uh-hmm.

KM: Was Kūpaka the area of your houses and was it on the shore also, or...?

TGP: Kūpaka is now, as I knew it then, is now Parish Drive.

KM: Ahh, okay, that's good to know.

TGP: And so we referred to that whole area...the area we went through, before reaching my grandmother's country home, was that of Mitsuyasu.

AE: Yes, that's right.

TGP: We had a charcoal area.

KM: Oh kiawe charcoal.

TGP: A charcoal burning establishment.

AE: What year did they come down here?

TGP: Mitsuyasu must have been here before 1925. I know, I found my grandmother's records, and she built her home in '25.

AE: So they had to come around that time.

TGP: And they must have been...Mitsuyasu could have been here before that.

KM: So your house area... [pointing to the locations on the map] if the salt works were up here, and this is a walled enclosure, and there are some small houses indicated here.

TGP: Uh-hmm.

KM: But your grandmother's place was down, you think, on this end?

TGP: Yes.

KM: [marking location on map], Towards the end of the stone wall here?

TGP: Uh-hmm.

KM: Ahh. And Mitsuyasu was doing the kiln...

TGP: Charcoal.

KM: Yes. Was it down in Pu'uloa also? As a lease from your grandmother, do you think?

TGP: No...well, he could have had a lease, from what we called then, "The Dowsett Company." Because the Dowsett Company, consisted of the heirs of my great grandfather, James Isaac Dowsett. His businesses were incorporated into what we knew as the Dowsett Company.

KM: Uh-hmm. As we look at the Pu'uloa area here, you see the ahupua'a boundary line that comes up, the fishponds, fisheries, the salt works, and if we come out towards One'ula, do you have recollections of some of the resources? Or were there families out here and things as well?

TGP: It was...my guess is, that there were few...it was very, very unpopulated. Not at all populated. And I often wondered where the Pu'uloa salt works were. My guess was, as I was growing up and heard about them, that they were to the south of Fort Weaver. But I'd been told recently that there were more, up off the West Loch.

KM: That's correct, yes.

TGP: And I do remember my family referring to West Loch as being grandpa's as well. Not so much the water part, but the lands across from West Loch. So that would bring us right directly to One'ula and a little bit further than Campbell High School.

AE: Uh-hmm.

KM: Yes. Was anyone still...what did you hear about the salt works, and was anyone still making salt when you were a child, anywhere out here?

TGP: That, I wouldn't know. I've accumulated a good deal of additional knowledge through my own research, and so now, it's hard for me to delineate and pin-point what I knew as a child, and what I learned as an adult through research.

KM: ...You'd mentioned that you have researched a great deal, so this is clear in our interview. In your understanding, did the salt works play an important part in the history of this land?

TGP: Yes it did. In fact the salt works were the focal point of the ownership, of my great grandfather's ownership. E.B. Scott, in his Saga of the Sandwich Islands mentions it, and he's quoting from someone else, that the salt works were a very prominent part of the economy and the early industrialization enterprises.

KM: Sure, so was the salt used for hides and the salting and preparation of meats and things?

TGP: My great grandfather commercialized in salt, and sold it. According to research, a good deal of the salt that was produced on O'ahu was sold to

the fishing fleets that would come from Alaska and take it back to Alaska for the salting of the salmon.

KM: Ahh, interesting. When we were looking at this map a little earlier, it was also interesting to note that there was, what looks to be [marking on map], almost to be like a little kahe or weir or something that came in off of Pu'uloa. Had you heard at all, about how water was gathered into the salt ponds? Did they dig holes and make...?

TGP: No, this part I have never been able to research in depth, simply because we haven't had access to maps of this vintage. But this map seems to indicate, and I would say, in common sense, it would tell us that they had to bring the salt water in from the lower end, or away from the entrance to Pearl Harbor simply because the outer shore line is too high. And they wouldn't have been able to flood the salt ponds from the south shore. But, bringing it in from the east shore line, and into the salt pans, seems much more sensible.

KM: [copies of Register Map 618, were given to kūpuna Thelma and Arline] Looking at the map, it was interesting to see that it looks like there was this little channel or estuary like that fed into the area of the salt works.

TGP: Uh-hmm. I don't believe that anything remains today of the salt works.

KM: Hmm, yes, even many these fishponds along here have been destroyed. May I ask, if you've heard, because one of the things that I'll send to you, that I think you'll be very interested in... As I was going through the original Māhele texts, I found...and see the problem is, because the kuleana weren't awarded, they weren't recorded in the final Indices, and that why people don't think that any land was claimed in Pu'uloa. But I found a list of about 12 or 15 individuals who in the Native Register of claims, claimed 'āina along this area of Pu'uloa. But by the time the Native Testimonies for awards came up, all of these individuals relinquished their claims here and moved in, particularly, a lot of them moved into the Waikele-Waipio area, you know Loko 'Eo.

TGP: Ahh the Waipi'o area.

KM: Which I thought was really interesting. Did you hear of any early families living anywhere out here at all, as a child?

TGP: Never. The only other habitation, if I can refer to it as such, was my cousin's country home, and she was the daughter of Samuel Dowsett. And Sam Dowsett had an old country home down in this area. And then beyond to the west of my grandmother's holdings was, where the holdings of my grand uncle Alikā, that's Alexander Cartwright Dowsett. And his old home was visible from the beach area outside my grandmother's home. So those were the only two homes I know of, other than Mitsuyasu who was further beyond that.

KM: Uh-hmm. So coming out towards One'ula, like that, or even to Kualaka'i, did you hear...?

TGP: No, not that far. I doubt...even now, in picking up some of the research, nothing seems to resemble anything that I had known as a child. It's all...well, this was all just wild country, all along the shore line.

KM: Yes. Were there cattle then, all throughout your Pu'uloa lands, as you'd said, because they were using it as...?

TGP: As fattening paddocks.

KM: How about into the One'ula, or below the sugar fields and out towards even Lae Loa (Barber's Point), was someone running cattle out there also, that you recall?

TGP: I would say that it was a good possibility, however, you can't overstock the area. The area hadn't much to offer in the first place.

KM: Yes.

TGP: And so they'd probably move the cattle, pipi, for the pasturage, and keep rotating. But, maybe the present names, like we have the name Pā Pipi Road [cattle corral], which seems to indicate that that was used for pipi.

KM: Yes.

TGP: But it's really hard to determine just...well, it's hard for me to determine how much of this area was being utilized, and where. I asked Arline frequently what she remembers of her father and grandfather's experiences and she as a little girl coming down to what we knew of as Kūpaka, every weekend.

AE: Uh-hmm.

KM: Yes.

AE: But, you know, the cattle were around in this area too [pointing to the One'ula area of the map], but like you said, I'm just assuming that your grandfather owned that property because Papa had to bring the cattle down in this area.

KM: Hmm, even into Honouliuli.

TGP: Probably round 'um up and move them...

AE: Yes, move them, every week end, he'd move them to different places.

TGP: Let the pasture come back.

KM: Was there a relationship between Dowsett and Campbell at all, that you ever heard of? Honouliuli was Campbell eh?

TGP: Part of Campbell's.

AE: Part.

KM: And I imagine, that if your grandpa them, on the Dowsett side, were going to use the land, they may have come to some agreement?

TGP: Well, maybe it was just like the old west, you just used what was not blocked off [chuckles].

KM: Hmm. But, it's obvious, in your description of coming in here, going through three or four gates...

TGP: Yes.

KM: That there were obvious pā 'uwea, the wire fences or kinds of things like that.

TGP: Uh-hmm, yes.

AE: Yes.

TGP: And there was a definite scheduling.

KM: Hmm, rotating eh?

TGP: Rotating and scheduling. I don't know where grandpa Dowsett's slaughter house was, the old Hawaii Meat Company.

AE: Yeah, he had a slaughter house, the Hawaii Meat Company, that was part of his.

TGP: Wasn't that up in... [thinking]?

AE: Up near Middle Street. You know where the bus depot is?

TGP: That's a continuation of Pu'uloa. Because, they weren't able to haul these pipi any where, they had to drive them. So the slaughter house had to be at a convenient distance.

KM: Yes... As a child, do you remember, were there good areas for limu, like līpoa or, or fish like 'ō'io...

TGP: Oh! 'Ewa, Kūpaka was noted for it's limu. The limu banks would pile up as high as three feet along the shore line.

KM: Along the area fronting here [pointing to the ocean shore fronting Kūpaka]. So there is a papa, a reef flats or something?

AE: Oh yes.

TGP: Yes, but it's not visible.

KM: Oh submerged?

TGP: Yes, in fact, you'd think there was no reef area because there is no line of breakers. But the limu was extremely plentiful [said with emphasis].

KM: So there was good limu; all kinds, or a particular variety?

TGP: All kinds.
 AE: Yes.
 TGP: And the manaua was particularly important.
 KM: So manaua. Was there wāwae'iole?
 AE: Yes.
 TGP: Yes.
 KM: Līpoa?
 TGP: Plenty.
 KM: Kohu?
 AE: Yes, limu kohu.
 TGP: Yes.
 AE: There's still plenty when you go to Barber's Point, because nobody goes in. They don't have access. I just got some limu kohu, Mary went to make some.
 KM: So was that a popular occurrence, friends and family might come down to gather limu or fish when you were young children?
 TGP: Occasionally, it was almost untouched, as we knew it.
 KM: And you said it was as much as three feet thick?
 TGP: Three feet above the sand level.
 AE: Yeah.
 TGP: And beautiful white sand beaches in the Kūpaka area, what we would call Parish Drive now. That was all beautiful white sand beach. And then, noted for it's limu and noted for it's cat's eyes, those little shells, the little door that flaps, opens up.
 KM: Yes, on the cone-type shell.
 AE: Sister, all of that Hailipō and all of that, that was all Dowsett land eh?
 TGP: Yes.
 KM: Hailipō?
 TGP: Hailipō.
 AE: Because they had the sign out there when they first opened up the subdivision.
 TGP: Well, also too, my grandmother was able to acquire a good deal more property than her original acreage in Kūpaka. So the area now flanking Pāpipi Road, at the end of Pāpipi Road, was all hers.

KM: The makai end?
 TGP: All her development. Ching was the developer in that area, and it was all in lease-hold.
 AE: Uh-hmm.
 TGP: So that was an additional area that my grandmother had.
 KM: Towards One'ula?
 TGP: Towards One'ula, what we call Hau Bush now. Before you get into Hau Bush, at the culdesac, at the end of Pūpū Road. But she had that additional area.
 KM: Did you folks, aside from gathering limu, and perhaps some fishing out here, did you remember traveling down along the coast into the One'ula area?
 TGP: Not that far. It would be...see, the white sand beach ends, maybe two blocks, I'm estimating, two blocks beyond my grandmother's place. And then, there was a coral shelf.
 KM: Yes.
 TGP: And the coral begins, and that coral shelf runs all the way down to One'ula.
 AE: Uh-hmm.
 TGP: Before you begin to see some sandy beach areas again. And it was densely thick with wild [chuckles] vegetation, you just couldn't go through it. The cattle could, but it wasn't a place that we would be allowed to play. It was far too far away. And there was no purpose in anyone going down there. It was easier to go by boat, if we were going to go down the shore line.
 KM: Uh-hmm. Were there good fishing areas out here?
 TGP: Lobsters. We had a Filipino yard man who would come periodically to clean up and all, and over the weekends, he would put on his tiny little goggles [gesturing single lenses over each eye], right up against his eyes, and his cotton gloves. Then he'd go off with his big gunny sack and by the time he got back, the gunny sack was full of lobsters. All he had to do was reach into the lobster holes and pick them up. They were so plentiful.
 AE: Yeah.
 TGP: Lots and lots of fish and lots of lobsters. And I don't remember any sharks in the area. There was no reason for them to come in, there wasn't any pollution of any sort that would attract them.

KM: So, you've mentioned sharks, and of course, Pu'uloa is famed, "Alahula Pu'uloa, he ala hele na Ka'ahupāhau" [The trails of Pu'uloa are those traveled by Ka'ahupāhau]

TGP: Uh-hmm.

KM: The shark goddess.

AE: Yes.

KM: Were there still stories at all being told?

TGP: Well yes, but that was into the Pearl Harbor area. I don't know of sharks being a threat when we went swimming, and we were always on the beach, and into the water.

AE: Yeah. But like sister said, the growth is all dense in this area. Mekia, Major Kealakai's boy, he and I would come walk up, you know where it's all rocky?

KM: 'Ae.

TGP: Uh-hmm, and you'd walk the shore line.

AE: Yes the trails over here [pointing to the map in the area of One'ula-Kualaka'i].

[see notes of March 4, 1997, from the interview with Aunty Arline]

TGP: That's right you used the pipi trails to come up.

KM: So Major Kealakai's mo'opuna [grandson]?

AE: His son, we'd play together.

KM: His name was?

AE: Mekia was his name. He's passed away already...

KM: ...Coming back to Pu'uloa...caring for the land, and calling upon the abundance, the growth, the proper rains so that the crops would grow. To call so that the abundance of the ocean, the limu or the fish, would come back. Was there a sense of...?

TGP: Caring, yes.

KM: In fact today, there is so much talk about "native rights..."

TGP: Yes, it is my understanding that the maka'āinana [commoners, people of the land], were never in possession of any "rights." They kept within, or had to keep within their areas and if they were allowed to go into the sacred lands or into the oceans and all, it was only with permission. They knew their areas. They kept within their areas. And they didn't, in my estimation, gather from here there and everywhere. They didn't take liberties. I don't think that their mode of life necessitated their going out of, or beyond their ahupua'a, where they were born...

KM: ...Of course we're bouncing around a little bit, you said that you noticed that Kūpaka now, as an example, where as before there was three feet thick beds of limu, now...?

TGP: Nothing. There's...in fact, we've seen people walk the beach, or go along in the low tide on their tummies in the water, diving and plucking the very, very, tiniest of the limu growths.

KM: Hmm. So the old system of kapu, restricted seasons and gathering, and when you didn't go out, had some intelligence to it eh?

TGP: It was the real means of conservation, they would have nothing, had they not had their kapus. And they knew that, and no one resented these kapus and no one attempted to sneak around them.

KM: Hmm, they were working within their own lands, the places their families were associated with, traditionally.

TGP: Uh-hmm. If they didn't look after them, they had nothing. So they had to look after the resources and take care of them. And I don't think that our Hawaiian people were unhappy under the kapu system. They were perfectly content, they didn't know, they were not in a position to make comparisons. They didn't know there was a better way. It was their way.

KM: Was it better [chuckles]?

TGP: Well, they didn't...the point of comparison was eventually thrust upon them and they were taught and told that the old way was no good, and that they could no longer be the "pagans" that they were admitted to. Then they began to look to something else. But, I think that awareness was fostered and perhaps forced upon them. The awareness of, "Well, there's something else besides what we know..."

KM: ...So today we see people come in to gather, even the smallest...pulling the rock, the limu, or take the last of the fish. And you'd mentioned the ula, the lobster that were out here and things, and of course there was this wealth of fishponds out here. Were you folks still gathering anae or awa, anything out in these areas? And did the cowboy's families go traveling places that you heard of and gather fish or things like that?

TGP: Not...that would all be conjecture on my part. I would have to guess, simply because it didn't ever come into my range of experience, having other people in the area. You see, by the time I was growing up, Pearl Harbor was already established and the old Hawai'i was long gone from the area...

KM: Yes. [speaking to aunty Arline] Aunty did you share that you couldn't even take a canoe... Do you remember when you were a child, could you still go in here and canoe or boat or anything? Or had they closed down?

TGP: By the military.

AE: Uh-hmm. But I noticed, that they would allow the old...especially on your papa's ranch, they would let them net fish.

TGP: Yeah, in the old days.

AE: And they allowed them to go.

KM: 'Ana'e like that?

AE: Yeah. They'd go in there.

TGP: But then, Fort Weaver wasn't built up as it is today.

AE: Oh no.

TGP: And you had access to the fishponds.

AE: 'Cause you had to in among the kiawe trees and come along Waipahū and on down Honouliuli, so in this area was like nobody.

KM: So, where the salt works was and like where your house was, everything is bulldozed and knocked down? Is that correct, there's no walls or anything left of the salt works, that you know of?

TGP: I've often wondered in going through that area, where there salt works were located, and I think they were located some what in the vicinity of the firing ranges now. They have some practice ranges out there. And just studying the contour of the land and that's probably where they were located, and probably inland from the shore line in that general area. Which is the entrance of Fort Weaver. And probably extended over into what is now the park.

AE: Yes.

KM: Which park?

TGP: The 'Ewa Beach Park.

AE: Pu'uloa Park, they've put the name back to Pu'uloa.

KM: 'Ae.

AE: We're trying to get Kimo Pelekāne put back too.

TGP: [chuckles] Kimo Pelekāne.

AE: That's her grandfather.

TGP: My great grandfather was known by the natives as Kimo Pelekāne, and everyone called him Kimo Pelekāne. He knew Hawaiian as well as he knew English, and he was a member of the House of Lords, in the old legislature. He would caution the Hawaiians in their wanting to promulgate new laws, and record. "If you say it this way, be careful, because if you say it this way, it's going to mean this to the po'e haole [foreigners]. But if you say it this way, this is what you mean, so you say it this way. This is your intent."

KM: Hmm. What is your sense, there are a few sites that appear to be ancient, or early Hawaiian sites.

TGP: Uh-hmm.

KM: Some kahua hale [house sites], like, some pā [walls or enclosures], small enclosures.

TGP: Uh-hmm.

KM: And at one place...and aunty Arline, I think you went there, there is a kahua [platform; Site 3209]...

AE: Yeah.

KM: [pointing out the size]...elevated from this wall, where the door is, it's at least this big [roughly 12x12], squared. So you have a sense of...and this may be another part of it, did the sugar company, when they did their work, were they in the practice of building up nice stone mounds, or...?

TGP: Oh, well, it all depends. When they would clear sugar land, rather than cart the rock away, they would pile them up, and plant around them, so you weren't aware of those mounds of rock until the cane was cut or burned. Then you became aware of them. I remember this down in Kohala.

KM: Yes. Here, behind One'ula, among the various sites, one of the places is a kahua, an elevated platform, that is about this big.

AE: Yeah.

KM: In fact it's mostly this coral, limestone-type of walls, you know. Do you remember hearing anyone talk about any old Hawaiian sites that had been mentioned, or that the cowboys, you know, spoke of?

TGP: I'd never been personally involved in any of the ancientness of 'Ewa Beach. But, through my research, I can readily understand how it was. I don't believe it was a heavily populated area because of the lack of fresh water. So it could have been an area of periodic habitation.

KM: 'Ae, seasonal, coming down to...

AE: Like fishing.

TGP: Yes fishing.

AE: Spending time.

KM: Ahh, gather pa'akai [salt].

TGP: Uh-hmm.

KM: Dry fish like that.

AE: Uh-hmm.

TGP: And at the proper seasons.

KM: 'Ae. It's interesting, and of course, the kūpuna were so na'auao, how they were able to live off of the land. Even what we wouldn't drink today, the wai kai [brackish water]...

TGP: Yes they could tolerate it.

AE: The brackish water.

TGP: They could tolerate the brackish water...

KM: ...What is your sense of this land, and then preservation of what's left of the Hawaiian sites, and care for these places, and the proposed development that they are looking at with Haseko? Do you have a...?

TGP: I find...well, my personal reaction is that I don't believe the type of development that Haseko has in mind, is necessary. I don't see a point in it. They were able to acquire acreage, to put in a marina [pauses] which, in my mind, doesn't have...it has neither beginning...neither head nor tail. Why a marina? Why in 'Ewa? Why this tremendous undertaking at a tremendous risk, because we don't know, as people have warned us, whether or not the aquifer would be disturbed or the drainage of the underground waters would occur. But I just don't see the reason for it, a good solid necessity in back of the Haseko move, I don't see it. I can understand the housing, but not roof to roof as we see here today. And I can understand the preservation of the beach area, and a low-style condominiums along the beach. But I really question the marina and the dynamiting of the shore line.

KM: Hmm. Were the ocean resources important then, and do they remain important to the people, you think?

TGP: I don't think people really look to the resources as resources any more. If they enjoy the beach, it's because it's available. If they go down to One'ula, it's primarily to fish. You don't see them in groups in any large numbers there, other than to picnic.

KM: Hmm. The community has changed drastically hasn't it? After your time as a child, it sounds like there was no one out.

TGP: That's right.

KM: One'ula, no one out here.

TGP: That's right.

KM: When did the plantation housing and the village come up. Do you recall now?

TGP: 'Ewa Village was the last plantation area of this whole locale, and 'Ewa Plantation was very much in the works, and they had their extensive cane

fields, through Honouliuli and all the way around, along Farrington Highway, almost to Nānākuli. The cane lands and all, that was all kō [sugar cane]. The changes have been tantamount, but they've come about primarily with the closing down of sugar.

KM: So as the sugar closed down, there was a need to make money in other ways and vast development was done? Like Ko'olina, or any of these housing developments? You'd mentioned, roof to roof.

TGP: Uh-hmm.

KM: And of course as the population changed, I guess there's not that sense of aloha.

TGP: But you don't really know which is the horse and which is the cart, which is before the other. Was it the closing down of the plantation that caused the over extended development? Or was the over extended development a part foreseen, and therefore, the plantations were closed down? Which came first?...

KM: Hmm. You had mentioned earlier, you are, of the old part Hawaiian residents of the Pu'uloa-Honouliuli area, you are really amongst the last of the old timers that was here as a child.

TGP: I don't know of anybody else, who's older than I am, and who still resides here. And if there are people older than me, they came here after I had lived here.

KM: Hmm, that's right. You folks have had a generational tie to this land also.

TGP: Yes.

KM: Is it important to care for traditional Hawaiian sites?

TGP: Yes, very. Very important. But it is also as important to care for as it is to know the history and probably, if possible, how they came to be, and what their significance is in the area. And this is what Arline keeps insisting upon.

KM: Yes, yes.

TGP: We know that there are sites, and we are beginning to understand why. I mean, these pits that are gold mines for the fossil findings and for the bones...

KM: ...Hmm. While you were still young, it appears that you were not hearing a great deal of the lore though.

TGP: Nothing.

KM: How about of the shark gods, or things like that?

TGP: I can't say that my father's side of the family, my haole side of the family, knew anything about it. I really don't believe they did. Perhaps great grandpa Dowsett knew, because he was a student, and very astute type of person, and it could have been so well know, as not to have been something to seek after. It was just part and parcel of the place.

KM: 'Ae... Here at Pu'uloa, with all the these lua [pits] yeah? Did you ever hear stories about burial out here?

TGP: [shaking head]

KM: No. Interesting eh.

TGP: I don't think this area was a long time area of habitation, although the legends would say to the contrary, because this is where the 'ulu [breadfruit] was brought. But I just don't know how to interpret it...

TGP/KM: [brief discussions regarding transposition of place names in some historical texts]

KM: ...There are obvious remnants of sites. You know the salt works were important, and in the earlier days where the kāheka, the natural salt beds.

TGP/AE: Uh-hmm.

KM: And like aunty Arline was saying when we'd met previously, there was this area where the ponds are back here, and the old house sites and wet lands [in the vicinity of Sites 3201, 3202, and 3205]. Water was such an important resources, and we were wondering about salt works, or making there. If the people didn't live down here permanently, where did they live? Where were the people coming from that made use of these resources out here?

TGP: As I sort of surmise now, I think the large areas of habitation were Waikele and then down through the lower part of what we call Waipahū. Now Waipahū is not a proper name. It's neither an area or an ahupua'a, it's just a gushing well.

KM: Ahh, yes, Wai-pahū, one site eh.

TGP: Uh-hmm.

AE: That's right.

KM: [looking at Register Map 618] See where it says "Church" here?

TGP: Uh-hmm.

KM: This is in Honouliuli, right on the edge. There was all this taro land up here yeah?

TGP: Uh-hmm.

KM: Do you think that that's where the main people were living?

TGP: These taro lands of Honouliuli supplied the chiefs primarily. There weren't any other taro lands, that I know of.

AE: Not over there.

TGP: And that's why now, if the taro was here, the people were living not too far away from their taro lands. They had to work them, and the chiefly compound, at Waikele was conveniently close. Then, you also have Waipi'o with it's ponds.

AE: Uh-hmm.

TGP: So I would say that the main area of population circled the West Loch.

KM: 'Ae. That's interesting, and probably...?

TGP: Probably during seasons, they would come camp over here. They would have to bring their fresh water. Their tolerance of salt water could not extend for too long. [chuckles] You can't do that for lengths of time.

AE: Uh-hmm.

KM: And of course, it's also very likely that before the cattle deforested a great deal of area here, that the water table into these lua meki, these pits and things, may have been, possibly, different also, There may have been a little more fresh water with good native ground cover, not like kiawe and stuff.

TGP: Well, the kiawe came in, in the 1820s.

KM: Yeah, real early.

AE: They brought it in.

KM: Now, if the people then possibly were coming down here and fishing seasonally and then going back, this sounds like a practice, I think aunty Arline, was saying that... Like the work that Tūtū Kawena did Eli Williamson, as a child yeah, she would come down to Kualaka'i...

AE: Yeah.

KM: Seasonally, families were coming down and fishing, yeah.

AE: Yeah.

KM: That was still happening.

AE: That was.

TGP: And it was a practice that was, I think, what you would call "State wide." You know the Kona area on the Big Island, 'Anaeho'omalū, all the way to Kalāhuipua'a, and then even further towards Kohala.

KM: Oh yes, and to Ka'ūpūlehu and Kekaha also.

TGP: Uh-hmm. But the people from Anahulu came down and spent portions of the year at the shore.

KM: Yes, like Alapa'i mā.

TGP: Right. And they had their shelters in these caves and they would bring only what was necessary and they would always take back their partially crystallized kai [salt water] and finish making their salt mauka. So it was done, these seasonal treks to other areas.

KM: So that's what you visualize as being the practice here?

TGP: Yes, rather than a permanent settlement of any sort here. I've never heard of...I think the permanency, the settlement was in the Waikele area. There are more legends related to that area.

KM: 'Ae. It's so interesting.

TGP: [chuckling]...

KM: ...Were there any Hawaiian, permanent residents, cowboys, down here at all, or was the ranch pretty much pau?

TGP: I don't remember anyone living here, any of that.

KM: So papa them would come down weekends?

AE: Weekends.

KM: So basically, the ranching operation itself, didn't require a big labor force, there weren't a bunch of paniolo?

TGP: No, no, no....this was skeleton crew.

KM: ...You know, I look at this land, the rich fisheries, you know that there had to be activity, even if it was people coming across occasionally.

TGP: Yeah.

KM: And still, the Honouliuli taro farmers were still active at that time.

TGP: Uh-hmm.

AE: You know, Sister, I can't remember the name, but I'll find out, somebody told me that there was a ranch right across here, right next to the shopping center. They gave me the name of the family, but I don't recognize it.

TGP: Uh-hmm.

AE: I'll find out for sure from Amber.

KM: That [looking at the map] Robinson Ranch, was somewhere makai.

AE: I remember you'd said that.

KM: Where would you place us, where we're sitting, on this map? If this is One'ula, we're just a little bit over here?

TGP: Yeah, Haseko takes in this area.

KM: Yeah, it comes behind One'ula.

TGP/AE: Uh-hmm.

KM: Did you remember ever hearing this name, "Kualaka'i" or "Kualakai," as a place name here?

AE: That's where the light house was.

TGP: [shaking head no]

KM: So you don't remember hearing that name?

TGP: No. It was only Barber's Point, 'Ewa Village, and One'ula, above use.

KM: Very interesting...

AE/TGP: [brief discussion of how place names are being mispronounced and improperly translated]
[tape off, then back on]

KM: [the aunties were talking about new place names in the 'Ewa District, and how inappropriate they were, some not even of Hawaiian origins]
...Haseko's looking at place names. What do you feel about that? If they're going to this development, shall they just name it what ever they like, "anywheres-ville" or try to use names that are...?

TGP: There's no excuse for them not to research and find names applicable to the area. There's no excuse for they're not finding applicable names.

AE: I believe that they got Keone Nunes to come in and sit in, and talk to about that. Like Keone says, he doesn't come from this area, and I know that Rubellite [Johnson] did the names in Kapolei, and I made mention of this, that if there was anything of... You know, because she does extensive research work. Somebody that knows, not just any old body, making a name for here. That's what happened with that Gentry, they just...look at the names they have.

TGP: It reflects their mentality.

AE: Conrad.

TGP: It reflects a good deal of the po'e haole [foreign] thinking.... It's so stupid! To have to put up with these nonsensical names.

AE: In fact, when we were going to the council for Haseko, and that fellow that helps with that development, that Japanese fellow from Gentry, he was there. And I asked him, "Where do you folks get your names from? Don't

you research? There are so many beautiful names, why?" And he said "We don't do anything with it, there's a department." I said, you're in charge of these things, aren't you interested in what's going on?" Well, it ended up with giving us some money. But you know, the money didn't have anything to do with it. We put it into the community foundation and all that, but still, you know. And I know that Haseko has lost quite a bit of money, millions of dollars.

TGP: Well, just these delays, everyday costs something.

AE: They're not shrewd or anything, they're just losing the money.

KM: Ah-well, mahalo. Thank you, thank you so much...

Following the interview, Sister Parish shared several other short historical recollections, among them was the following:

Pu'uloa and the Prophecy of Ka'ōpūlupulu:

Pu'u-kahea in the Wai'anae District is a very important place in the history of O'ahu. It is where the chief Kahahana was when he ordered the death of the high priest Ka'ōpūlupulu and his son, Kahulupu'e. At Nānākuli, Kahahana failed to acknowledge the calls of his priest, and it was from that area, that Ka'ōpūlupulu then instructed his son to run to the ocean, for their revenge would come from across the sea. Seeing the end was near, Ka'ōpūlupulu asked to be killed at Pu'uloa, where he did die. A short while after that, Kahahana himself was killed by his uncle Kahekili of King of Maui, who had turned him against the aged O'ahu priest, Ka'ōpūlupulu. And so the priest's revenge did come from across the sea with the invading forces of Kahekili.

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**Barber's Point Riding Club – a presentation to Ewa Neighborhood Board
by Isabella Garcia November 10, 2010**



BPRC offers affordable rates for their services.

BPRC makes owning horses a reality for regular, working-class people,
not just for a privileged few.

BPRC is conveniently located for those who live in the Ewa and West Oahu communities, and
allows them to enjoy equestrian activities without having to travel as far as the North Shore or
Waimanalo.

Importance to the community



Therapeutic Horsemanship of Hawaii teaches people with special needs, as well as their siblings,
how to groom, ride, and saddle a horse. The program has given exceptional children an outlet for
stress, as well as the opportunity to excel.

Should Barber's Point Riding Club be shut down, however, the program would have one less
place to operate in, and fewer horses to use.

Barber's Point's convenient location is important to the members of THH who live close to Ewa.

Barber's Point Riding Club is important to the preservation of Hawaii's Paniolo culture.



Should Barber's Point stables be shut down, fewer people will have access to horses, and Paniolo
culture will fade.

Horses relieve the stress of everyday life for civilians, military personnel, and military dependents
whose parents are deployed.

Those children who work with horses have the opportunity to learn hard work, responsibility, and
leadership, while enjoying themselves at the same time.

Historic significance



BPRC rests on land that was once a part of the Marine Corps Air Station Ewa, the birthplace of
the famous "Black Sheep Squadron," led by none other than Major Gregory "Pappy" Boyington,
a WWII ace awarded the Medal of Honor.

WWII revetments still stand at BPRC.

The Importance of BPRC to the people of Oahu.



BPRC is a “home away from home” for many of the members who have been a part of the stables since childhood.

Should BPRC be shut down, veterans, their families, active duty personnel and their dependents, local residents, and all horses at the stables would be displaced.

BPRC is one of the few remaining wide-open spaces left amid the rapid development of the Ewa plain.

Please Pass This Resolution.

Please pass the resolution to keep BPRC (a 23.5 acre club used as a facility used by military personnel and civilians as an equestrian center) and support the continuing of operations at BPRC which include, but are not limited to, the preservation of open space; the therapeutic treatment and healing of those with physical disabilities as well as wounded war veterans, active duty personnel, and their families; the preservation of historic WWII features; and the interaction with our community to open activities at the stables for the community at large, such interaction being generated by those representing the Barber’s Point Riding Club located within Kalaheo; and to oppose the Navy’s plan to terminate operations at the stables by June 2011.



Ewa Neighborhood Board Votes To Support Ewa Stables Preservation, November 10, 2010

RESOLUTION PASSED:

REQUEST FOR THE PRESERVATION OF THE HISTORIC EWA PLAINS STABLES SITE ON THE WEST SIDE OF THE ISLAND OF OAHU, STATE OF HAWAII, KNOWN DURING WW-II AS US MARINE CORPS AIR STATION EWA, AND LATER AS NAVAL AIR STATION BARBERS POINT, AND TODAY AS THE KALAELOA COMMUNITY DISTRICT.

Whereas,
In 1942 special heavy concrete half shell domed concrete aircraft bunkers, known as revetments, were created for the protection of MCAS Ewa aircraft from air bombardment, and

Whereas,
After the war these same aircraft revetments were adaptively reused as horse stables, stalls and barns, which continues to this very day, and

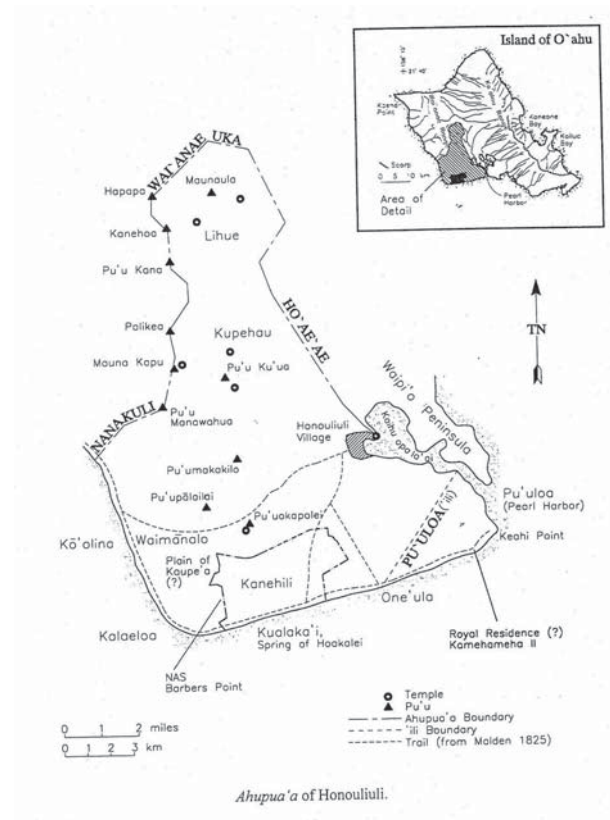
Whereas,
This same historic community facility has seen many decades of use for many community gatherings, events, hayrides, rodeos, and currently for supporting community needs for open space, therapeutic horse riding for handicapped children and military veterans, and

Whereas,
New programs to further involve the local community and schools in activities such as 4H, Future Farmers of America, Boy and Girl Scouts, YMCA are in development, and

Therefore be it resolved,
The Ewa Neighborhood Board supports the continued use and preservation of this valuable and historic community horse stable and riding facility and recommends that it remain open and not be closed down, which would cause many local Ewa Plains horse owners great hardship and terminate many valuable West Oahu community programs.



Kanehili & MCAS Ewa Maps and Diagrams



The Ahupua'a of Honouliuli showing location of Kanehili



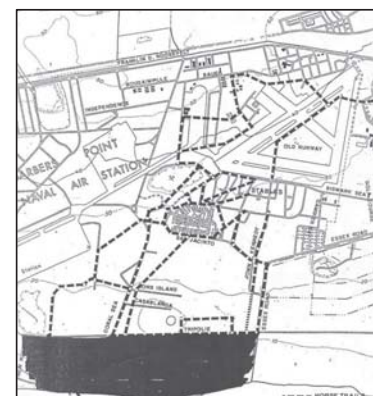
Hawaiian Trails as identified by Lt. C.R. Malden, R.N. in 1825. These trails pass through The Ewa Plains area known to Hawaiians as Kanehili, which later became MCAS Ewa and NAS Barbers Point.

This is the earliest known recorded map of the trail network in the Ewa Plains. Actually there were of course many additional trails that went to various important Hawaiian cultural and sacred sites as well as to water holes, fishing areas, limu gathering areas and burial sites.

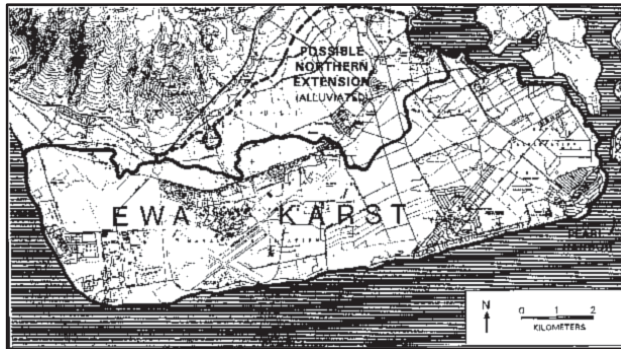
Western culture followed in the footsteps of these trails, first for ranching trails and then for Sisal plantations, salt gathering and then sugar cane plantations with railway tracks throughout the entire Ewa Plains. Ewa Plantation had the largest private railway network in the Hawaiian Islands, which connected to the Oahu Railway and ship loading docks in the port of Honolulu.



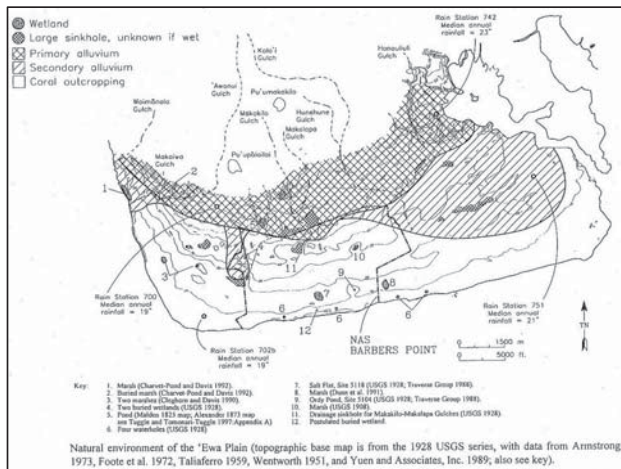
1920's map shows Mooring Mast Field, Ewa Plantation Village, Kalo'i Gulch, Ewa Plains Ranch roads, fences and corrals, trails, waterholes, etc.



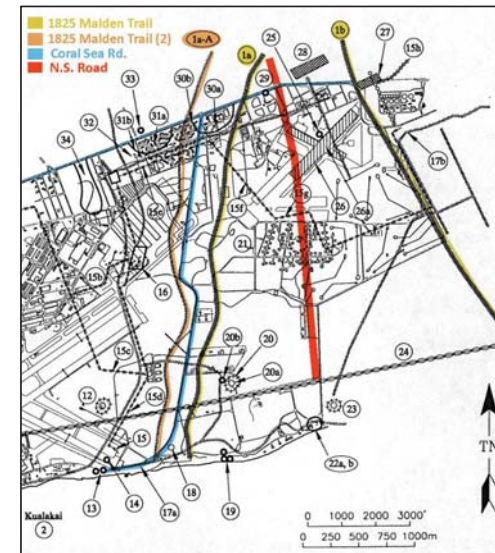
1960's map shows old historic ranch and foot trails which were used by Marine Corps mounted horse patrols in WW-II and for the past 60 years by the Barbers Point Stables and Riding Club.



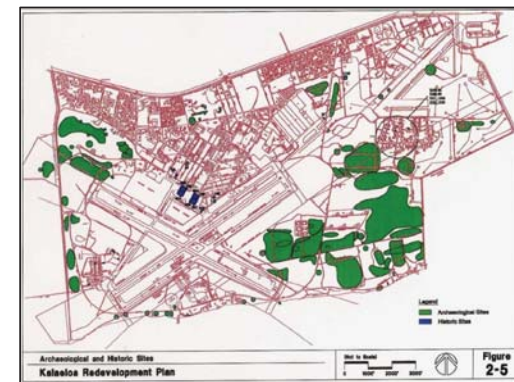
Ewa Plains Karst – maps based on USGS surveys and geological research.



Natural environment of the Ewa Plain, Kanehili area which became MCAS Ewa and NAS Barbers Point in center. Topographic data from the US Geological Survey.



Overlays of cultural and historic sites showing historic trails, roads, etc. – Kanehili & MCAS Ewa



Archeological and historic sites (by no means complete) – Kanehili, NASBP & MCAS Ewa. The ill advised North-South Rd. runs directly through the center of major historic and archeological sites as well as endangered species preserves, sinkholes and burial areas.

The Kanehili Natural Environment

A KANEHILI CULTURAL HUI REPORT
FOR SHPD HISTORIC AND CULTURAL PLANNING

Kanehili – An Ancient Natural Treasure

Development Plans Has Much Wider Impacts Than
Indicated In Environmental Assessment.

By John Bond
9/7/2012

"For future understanding and research of the Islands' natural history,
we should preserve this."

"The timeliness of where they [SHPD] are with this issue is indicative," Kalu said. "It's not a coincidence that the State allots so few staff to juggle all these responsibilities."

Construction below ground in the Kanehili Cultural and Historic area may destroy
Karst caves and endanger water resources affecting limu and coastal fisheries.

Construction in Kanehili will surely uncover many
NEW Hawaiian Burial sites and hundreds previously unknown coral sinkholes.

In 2005 US Fish and Wildlife project demonstrated restoration of anchialine pools within the Kalaeloa Unit area and rehabilitated an anchialine pool and led to the successful recruitment of two color phases of an anchialine pool shrimp known as 'opae 'ula (Halocaridina rubra), a species at risk. Found only in Hawai'i, 'opae 'ula can reach 10 to 15 years of age, an unusually long lifespan for a tiny crustacean. This species is approximately 0.5 inches (1.27 centimeters) in length and occurs in a range of colors--red, pink, white, light yellow/clear, and banded (red/clear). Kanehili is the only location in Hawai'i where two distinct genetic lineages of 'opae 'ula are found to coexist at the same site.

"Ewa Oahu sinkholes yield extinct birds"



"Ewa Oahu sinkholes yield extinct birds"

August 7, 2007 By Jan TenBruggencate Honolulu Advertiser Science Writer

The baking sun and thorny kiawe trees hide dense caches of history, relics from a time when the 'Ewa Plain was a dense forest alive with strange birds now long extinct.

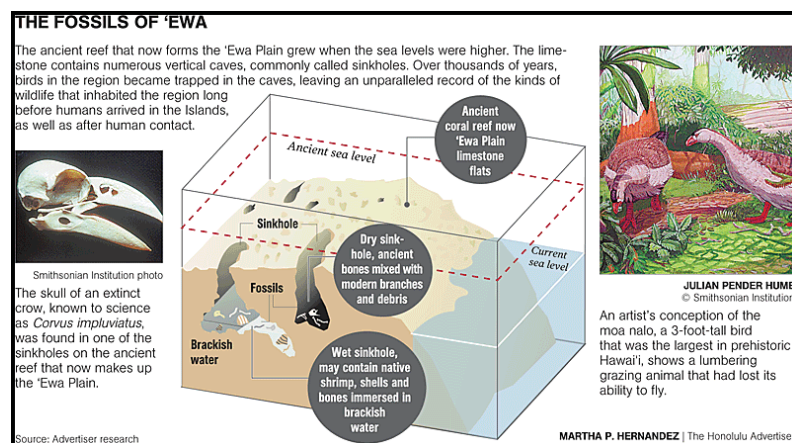
In those years, before the arrival of humans, the amazing moa nalo lumbered through the trees. It was a 3-foot-tall, flightless gooselike duck — the largest of the Native Hawaiian birds. Flightless rails and geese waddled around with it. Overhead flew a sea eagle, owls, crows, a hawk and bats. Finches and other perching birds flitted among the trees. Most of these birds have been extinct for hundreds of years.

But proof of their existence lies in the bottom of limestone "sinkholes" where they sometimes were trapped and died, leaving their bones and beaks behind. The shells of now-extinct tree snails, and the pollen from the plants that once forested this area are found in sediments with the bones.

The sinkholes are vertical caves in an ancient reef that grew during a period 120,000 years ago when sea levels were much higher. There once were thousands of sinkholes across the 'Ewa Plain — time traps that preserved evidence from Hawai'i's prehistory. Most have already been filled or covered by development.

"This is all we have left of a unique geological and biological setting in these Islands," said Helen James, a fossil bird expert at the Smithsonian Institution, who with her former husband, Storrs Olson, has taken the lead in identifying the ancient bones and beaks. "For future understanding and research of the Islands' natural history, we should preserve this."

The first person to find bird bones in sinkholes here was Jennie Peterson, now the environmental education program manager with the Hawai'i Nature Center. During the 1970s, she was an archaeologist with Bishop Museum, studying the area for an environmental impact statement on the then-proposed Deep Draft Harbor "I was digging in a large sinkhole when I found bones. They were so big that I thought they were mammal bones, but I knew they couldn't be because they were too light," she said.



'VANISHED FOWL'

No animal known to have lived in Hawai'i could have produced those bones, so she took them to Bishop Museum zoologist Alan Ziegler, Marjorie Ziegler's dad. He recognized they were the same class as extinct birds whose bones had been found in sand dune deposits on Moloka'i, and consulted with Olson, the Smithsonian Institution fossil bird expert, who happened to be conducting research on Maui.

It was a huge bird like nothing alive in the world today.

They called the group "vanished fowl," or moa nalo in Hawaiian. There are examples in the fossil record on all the major islands. The O'ahu moa nalo was given the scientific name of *Thambetochen xanion*.

Further digging in sinkholes — some of them dry, and some with pools so deep that scuba gear was needed — yielded the bones of dozens of species of flightless birds, land birds, sea birds and raptors. The most common bones came from the ua'u, or Hawaiian dark-rumped petrel. This seabird has never been reported from O'ahu in historic times, but the fossil evidence shows there was an immense number of the birds here at one time.

"There must have been a major colony here. The whole 'Ewa Plain was just covered in them," James said.

Today, people think of the arid Ewa area as former desert, but in pre-human times, it was forested. Researchers have found shells from extinct tree snails, and the pollen from the kinds of vegetation that probably once populated 'Ewa, including pritchardia palms, an acacia that was probably koai'a, and a critically endangered legume called kanaloa.

SURVIVAL PRECARIOUS

Preliminary dating of the sinkhole material suggests that most of the bird species were in the region for thousands of years, and most disappeared from the area in the years after human contact with the Islands.

It is not yet clear what the direct cause was — perhaps humans directly feeding on birds, fire or other kinds of habitat disturbance, human-brought rats that could have both eaten vegetation and bird eggs, or something else.

Michigan State University zoology professor Peggy Ostrom is conducting studies to help answer some of the questions. She said she and her students will attempt to extract proteins from fossils for radio-carbon dating, and to analyze material in the bones to gain information about what the birds ate.

She and James also hope to find clues about the fate of the sinkhole birds.

"I'd be careful about making assumptions. It could have been a number of things," Ostrom said.

There is very little left of the prehistoric life of this region. Almost all the vegetation is modern weeds and hardy introduced trees like kiawe and banyan.

But deep in at least one of the wet sinkholes, in a tiny pool of brackish water, by the illumination from a flashlight, you can see tiny flickers of movement. They are the native anchialine shrimp — living in

darkness and among the last survivors of the time when this region was alive with forms of life no living human has ever seen.

Kalaeloa Habitat Restoration - By Ken Foote, US Fish and Wildlife Service 2009

At first glance, the area resembles an African savanna, but one marked with invasive species such as mesquite (*Prosopis* spp.), Indian marsh fleabane (*Pluchea indica*), and buffleggrass (*Cenchrus ciliaris*) dominating the landscape. A closer inspection reveals an ancient raised limestone coral reef and remnants of the last remaining coastal dryland plant communities on the Hawaiian island of O'ahu.

This harsh, sun-drenched landscape is home to the Kalaeloa Unit of the Pearl Harbor National Wildlife Refuge. Located west of Honolulu on the 'Ewa Plain, Kalaeloa was part of the former Barbers Point Naval Air Station until it was added to the National Wildlife Refuge System to protect native plants, including two endangered species--an 'akoko (*Chamaesyce skottsbergii* var. *kalaeloana*) and the 'Ewa hinahina (*Achyranthes splendens* var. *rotundata*).

Although Kalaeloa has been heavily altered by agricultural, military, residential, and commercial activities, U.S. Fish and Wildlife Service biologists and land managers are working to restore the unique habitats native to this once pristine subtropical dry forest. Continuing habitat restoration activities include the removal of invasive plant species and the propagation and out-planting of native dryland plants, including endangered and threatened species.



The 'opae 'ula (*Halocaridina rubra*) is a freshwater shrimp found only in Hawai'i.

(below): A completely filled in anchialine pool prior to restoration.
(opposite page): Initial cleaning of anchialine pool with heavy equipment.



In addition to subtropical dry forest restoration, the Service is restoring another unique and rare habitat known as anchialine pools. Anchialine pools are landlocked brackish ponds located close to the shoreline and connected to the ocean by subterranean tunnels. On O'ahu, anchialine pools are generally found in karst formations rather than lava fields like those found on Maui and the island of Hawai'i. Karst is the type of topography that forms when raised limestone reefs are subjected to the movement of groundwater over and through the reef. The weak carbonic acid found in ground water slowly dissolves the limestone,

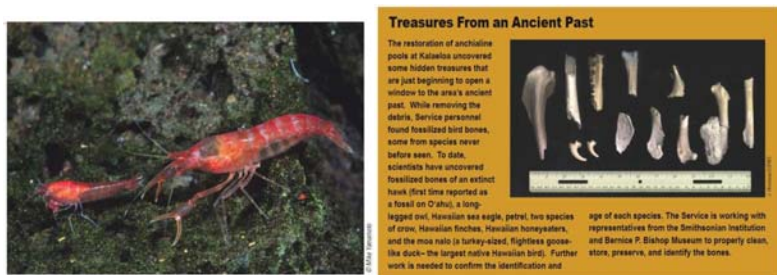
creating large holes, channels, and bumpy surfaces. One of the largest such formations on O'ahu is the 'Ewa karst.

The major threats to anchialine pools and the shrimp species that inhabit them are habitat degradation and destruction, nonnative invasive species, and over-collection of the shrimp for the aquarium trade. In the past, most of Kalaeloa's anchialine pools have been filled in with sediment and coral rubble.



In 2005, Phase I of a project to restore anchialine pools within the Kalaeloa Unit rehabilitated an anchialine pool and led to the successful recruitment of two color phases of an anchialine pool shrimp known as 'opae 'ula (*Halocaridina rubra*), a species at risk. Found only in Hawai'i, 'opae 'ula can reach 10 to 15 years of age, an unusually long lifespan for a tiny crustacean. This species is approximately 0.5 inches (1.27 centimeters) in length and occurs in a range of colors--red, pink, white, light yellow/clear, and banded (red/clear). Kalaeloa is the only location in Hawai'i where two distinct genetic lineages of 'opae 'ula are found to coexist at the same site.

Based on the success of Phase I, Phase II sought to expand the number of restored pools at sites that would benefit both 'opae 'ula and another anchialine pool shrimp, *Metabetaeus lohena*, which is a candidate for Endangered Species Act protection. Restored pools were also targeted as potential translocation sites for the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*), another listing candidate.



In March 2008, Lorena Wada and Aaron Nadig, biologists with the Service's Pacific Islands Fish and Wildlife Office, and Jason Hanley, Invasive Species Strike Team Leader with the Hawai'i and Pacific Islands National Wildlife Refuge Complex, led the project to restore 12 anchialine pools. Personnel from the Service's Hawaiian Refuges and Ecological Services offices, the Hawai'i Division of Aquatic Resources, and the State Natural Area Reserve contributed over 800 hours of work during the first 6 months of the project.

Using heavy equipment, pumps, and hand tools, they removed coral rubble and soil blocking the pools. This work successfully restored natural tidal fluctuations in the pools, which allowed native anchialine pool shrimp to quickly recolonize the sites. In May 2008, the first 'opae 'ula were observed in one of the newly restored pools. 'Opae 'ula have now been seen in eight of the restored sites. As of September 1, 2009, 11 anchialine pools have been restored.

Future plans include monitoring 'opae 'ula, continuing data collection on water quality, evaluating the pools as potential reintroduction sites for the orangeblack damselfly, and evaluating future translocation sites for *Metabetaeus lohena*. The work being accomplished at anchialine pools also provides a unique opportunity for partnerships and educational outreach.

The restoration of anchialine pools at Kalaeloa uncovered some hidden treasures that are just beginning to open a window to the area's ancient past. While removing the debris, Service personnel found fossilized bird bones, some from species never before seen. To date, scientists have uncovered fossilized bones of an extinct hawk (first time reported as a fossil on O'ahu), a long-legged owl, Hawaiian sea eagle, petrel, two species of crow, Hawaiian finches, Hawaiian honeyeaters, and the moa nalo (a turkey-sized, flightless gooselike duck- the largest native Hawaiian bird). Further work is needed to confirm the identification and age of each species. The Service is working with representatives from the Smithsonian Institution and Bernice P. Bishop Museum to properly clean, store, preserve, and identify the bones.

In Hawaii the Ae'o is found on all the main islands except Lanai. On Oahu, the largest numbers are found at Pearl Harbor and Kaneohe.

Finding them today in a relatively dry area like Kalaeloa is largely due to being driven out of other small nesting ponds because of rapidly encroaching home construction in nearly all directions.

Studies have proven that the stilts fly from one island to another. The Ae'o requires shallow brackish water ponds, mud flats and shorelines where it finds its diet of small invertebrates.

The Hawaiian Stilt is an endangered species. Although the species was formerly much more abundant, it now numbers around 1500. Until 1941, the stilt was considered a game bird and it is still sometimes shot illegally. It is also subject to predation by mongooses and feral dogs and cats.

A major reason for the decline of this species has been habitat destruction due to drainage of marshes and other wetland areas. Wildlife refuges in Hawaii help to protect this and other water birds by maintaining and protecting their habitats.

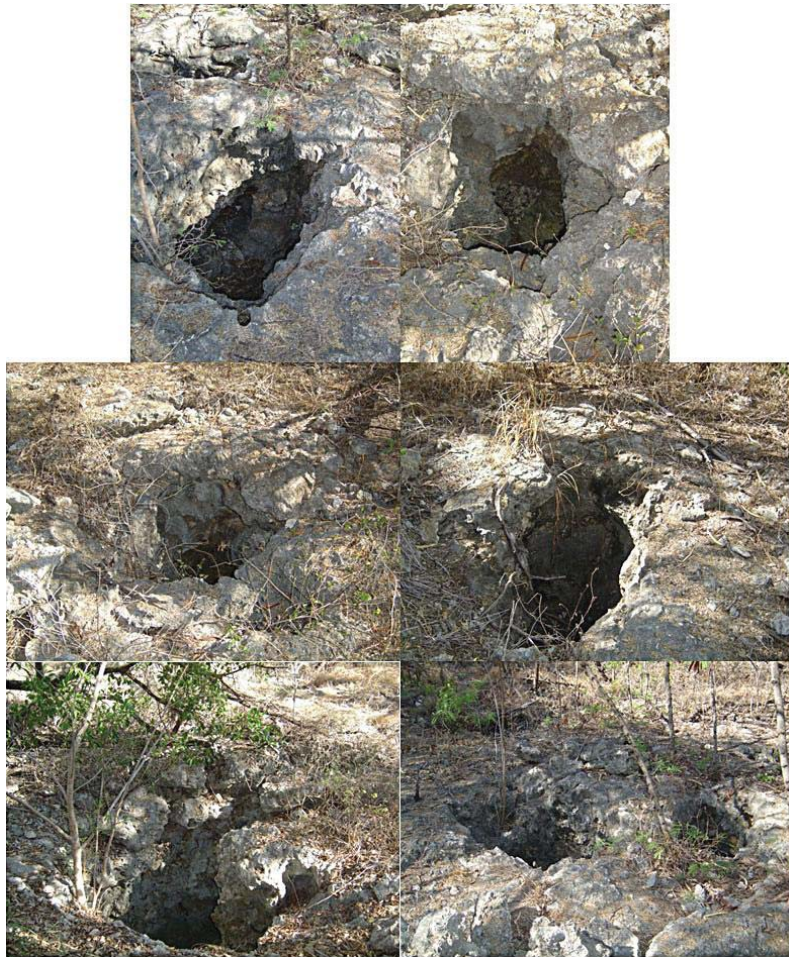
**All information collected and compiled by John M. Bond
For the Kanehili Cultural Hui
P.O. Box 75578
Kapolei, HI. 96707**



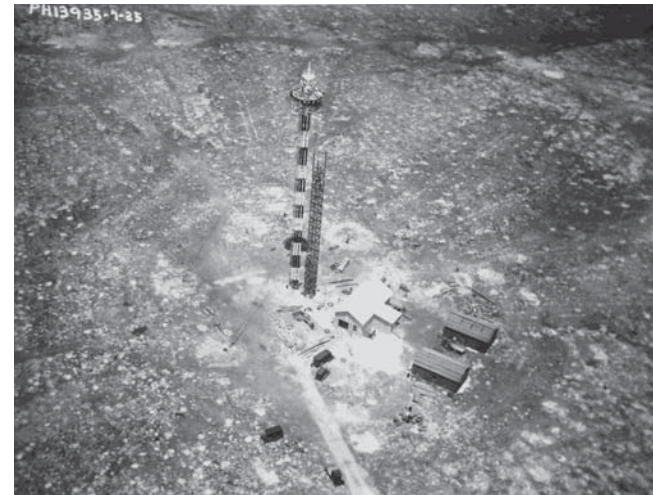
Karst caves and sinkholes located on or adjacent to lands where HART Rail is going.



The Trails of Ancient Kanehili still exist and have yet to be fully researched, documented and analyzed. According to the research done and presented in *A Cultural Resource Inventory of Naval Air Station, Barbers Point, O'ahu, Hawai'i*; and many other related surveys of the area, remnants of the 1825 Malden Trail run directly through the Honouliuli Ewa Plain where currently HART is planning to put a fixed guideway and rail stations.



The sinkholes and caves of Ancient Kanehili still exist and have yet to be fully researched, documented and analyzed. Many still exist just below ground level all over the Ewa Plain.



Ewa Mooring Mast Field in July 1925. Note that there are thousands of topped coral heads, any of which could have also been connected to sinkholes and underground caves. In 1941 when Ewa Field was constructed the runways were all placed atop the coral but of course without benefit of any archeology surveys first. The USMC command history notes finding Karst caves as large as "railway boxcars" at Ewa Field. The likelihood of construction equipment falling into underground caves is still a very real possibility. (The Ewa aviation site is 87 years old!)



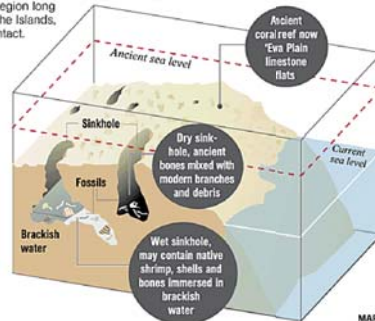
March 1932 photo shows nearby grazing ranch cattle and Ewa Plantation and Ewa Villages.

THE FOSSILS OF 'EWA

The ancient reef that now forms the 'Ewa Plain grew when the sea levels were higher. The limestone contains numerous vertical caves, commonly called sinkholes. Over thousands of years, birds in the region became trapped in the caves, leaving an unparalleled record of the kinds of wildlife that inhabited the region long before humans arrived in the islands, as well as after human contact.



Smithsonian Institution photo
The skull of an extinct crow, known to science as *Corvus impluvitatus*, was found in one of the sinkholes on the ancient reef that now makes up the 'Ewa Plain.



Source: Advertiser research



JULIAN PENDER HUME
© Smithsonian Institution

An artist's conception of the moa nalo, a 3-foot-tall bird that was the largest in prehistoric Hawaii, shows a lumbering grazing animal that had lost its ability to fly.

MARTHA P. HERNANDEZ | The Honolulu Advertiser



Sinkholes in Kanehili can be very small openings which can lead down to caves which can contain ancient fossils, extinct animal bones and Hawaiian burial remains – *Iwi Kupuna*. There are thousands of these sinkholes throughout the entire Kanehili – MCAS Ewa area. Over the years many have started to reappear after heavy rainfalls. They also act as natural storm drains and should all be mapped as they can also pose a hazard to site clearance crews and heavy equipment operators. Historic Ewa Field horse ranch trails still provide safe routes of passage.

Part 2: Additional Comments and Testimony From KCH about Haseko EIS Hoakalei Master Plan Update

Comments for
Notice of Intent to Prepare an Environmental Impact Statement
for the Hoakalei Master Plan Update

From John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, Hi. 96707

Attn: pwhite@psi-hi.com

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814
with copies to the City and County of Honolulu, Department of Planning and Permitting (address
above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

Aloha,

We would like to know why such huge areas have been dug
up on Haseko's property such as the massive, deep hole in
the ground that was dug and then later filled back in with
imported materials from some other location. See photos.

This huge hole was directly next to the major Karst caves,
burial and heiau sites that are along the north-south road
called Essex Rd. Why was this done since it was highly
destructive to the underground Karst waterway system that
goes through this same area. Was this done to destroy this
underground waterway and/or divert water from Haseko
property?

This area is WW-II battlefield, Ancient Hawaiian burial area,
Leina a ka Uhane-Spirit Leap, and location of 1825 Malden
Trails which are actually around 1000 years old and likely
built by Tahitians. This area cultural history has been told
in the chants of Hi'ikaka- Pele's sister.

John Bond
Kanehili Cultural Hui

July 20, 2013

From:
Kanehili Cultural Hui, Ewa, Honouliuli, Oahu
Michael Lee
Glenn Oamilda
John Bond

Cover Letter and Addendums as Comments On:
Honolulu Rapid Transit Corridor Project Archeological Inventory Survey
of the 22 mile fixed guideway and stations (phases 1-4)

To:

Mr. Leslie Rogers, Regional Administrator
Federal Transit Administration, Region 9
201 Mission Street, Suite 2210
San Francisco, Ca. 94105-1831

William J. Aila, Jr., Chairperson
Kalanimoku Building
1151 Punchbowl St.
Honolulu, HI 96813

Kiersten Faulkner, Executive Director
Historic Hawai'i Foundation
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Faith Miyamoto, Chief Planner
Honolulu Authority for Rapid Transportation
City and County of Honolulu, 1099 Alakea Street, 17th Floor
Honolulu, Hawaii, 96813

Barbara Gilliland, AICP, Planning Manager
Parsons Brinckerhoff
1099 Alakea Street, Ali'i Place, 17th Floor
Honolulu, HI 96813

July 20, 2013

Aloha,

The Kanehili Cultural Hui as formed in 2012 is a 501-c-3 was created to address the protection, inventorying and preservation of these critically important cultural and historical sites, trails, Karsts, flora, and fauna for responsible Public Trust community stewardship through education and advocacy of these Ewa Plain Hawaiian Cultural resources. It officially became a HART consulting party in July 2012.

The president and vice president of the Kanehili Cultural Hui are long time members of the Honouliuli-Ewa area. John Bond is a local Ewa historian who has received official recognition certificates from the Honolulu City Council and Hawaii State Legislature and began recording Ewa history in 1969. Glenn Oamilda is extremely well known in the Honouliuli Ewa area for his work in Hawaiian cultural issues, Ewa –Kapolei neighborhood boards, numerous Ewa community development plans, testifying on community concerns at the City Council and State legislature, and is President of the 50 year old Ewa Beach Community Association. He and his wife grew up on and worked for the Honouliuli-Ewa area plantations. Michael Lee provides Kanehili Cultural Hui very deep and well researched insights into native Hawaiian cultural and religious issues and has led the way in Ewa iwi kupuna, wahi pana, and wahi kapu concerns and also in education of the community in the Konohiki – ecosystem management of the Karst water system, native flora and fauna, caves, caverns, sinkholes, ponds and below surface estuaries that affect the limu and Ewa fisheries. Mike Lee's family roots go back to the John Meek Big Tree Ranch in Honouliuli-Ewa.

The Honolulu City Council passed unanimously in 2012 the Ewa Plain Trails resolution, supported by the Kanehili Cultural Hui, giving our community cultural history organization further standing in Honouliuli-Ewa by advocating for the protection of the 1825 mapped Malden Trails (ancient Hawaiian trails) and Ewa Karst water system, which is the ancient limestone reef wetlands water system beneath the Ewa Plains and which also runs along the southern shoreline of Oahu. Much of Honolulu's original history and culture is based upon the Karst water system, Karst burial caves. Kawaiha'o Church is a graphic example of the ancient Honolulu Karst system, having been built from ancient coral reef and the name symbolizes the Karst spring there. I'olani Palace, the royal barracks and other very old and historic structures in the downtown area are made with Karst coral reef blocks from the shoreline areas.

The Leina a ka 'uhane in Kanehili, Honouliuli-Ewa – Make It Go Away?

We are very concerned about the Hawaiian Traditional Cultural Property (TCP) in Honouliuli called the Leina a ka Uhane, a very sacred spiritual leaping place for souls of the deceased returning to their ancient homeland. This major wahi pana (sacred place) was officially recognized as existing by the HART Rail Project AIS in an April 2012 published document as a requirement to identify Honouliuli-Ewa TCPs. This TCP is clearly within the ancient area known as Kanehili, which includes Kaupe'a, and also overlaps most if not all of the important ancient Hawaiian trails within Honouliuli-Ewa identified in the 1825 Malden Trails which the HART AIS did not include maps of or even mention. The ancient Hawaiian trails running from Honouliuli to Ewa, Kualaka'i and One'ula are very key components to understanding the cultural history of the Honouliuli ahupua'a. Portions of these trails still exist throughout Kanehili and cultural and archeological remnants still exist in areas where the HRT-P-HART rail line and stations will be going in. The archeological inventory of this historic trail has NEVER BEEN DONE.

However this TCP has presented a huge problem for HART and FTA and they seem to have done everything possible to somehow move or minimize with mapping manipulation and apparently advice from SHPD-DLNR administrators to get the "no effect" result desired by FTA. The areas where HART has designated the Kanehili and kaupe'a areas are little boomerang shaped Post-It Notes and they continuously had the locations wrong (flipped), since April 2012 when the draft was quietly put out hoping no one would notice. Consultant Kepa Maly had repeatedly, in public meetings, stated that the locations were wrong, but HART never wanted to hear or correct this comment to even attempt some legitimate mapping effort. HART, SHPD has apparently been trying figure out how to make this important sacred Honouliuli Leina problem somehow go away into a small box someplace, which is how iwi kupuna and cultural artifacts are always treated. This is a standard tactic when important Hawaiian culture items and wahi pana sites are found - always treated so as to minimize it and make it disappear.

SHPD administrator Pua Aiu stated in a recent HART meeting that Puu O Kapolei should be recognized as a wahi pana, because "eventually Rail may go by there." This seems to be an issue for her because it would be publically convenient to recognize something completely out of the way that is already a City Park, but not at all convenient to have a wahi pana in the same area as a major shopping center, major railway station and major highway, so that it gets recognition for where it really exists and where Karst caves and underground water still flows with live native shrimp. Because the Leina a ka 'uhane is such a huge problem, the plan has been to obfuscate it and make sure no one locally really knows where it is. Clearly, it is in Kanehili, an area where even DHHL has named their home subdivision development, and where in the chants of Hi'iaka and other stories of Ewa, Kanehili and Kaupe'a are named and described in geographic ways that you know where approximately where these areas are. Other previous major archeological surveys, such as those done for the Navy in 1998-2003, have placed Kanehili in the former NAS Barbers Point – MCAS Ewa area, as well as the 1825 Malden Trails, which are clearly still there. Why hasn't the HART AIS even recognized this?

The 1825 Malden Trails – Another big problem HART land developers want to go away

"In the early 1790s Captain George Vancouver visited the Hawaiian Islands. As a part of the Vancouver expedition, cartographer, Lt. C.R. Malden, prepared a map of a portion of O'ahu, which also covered the Honouliuli – Pu'u'loa region. Malden's map was published in 1825 (Register Map No's 437 & 640), and provides the earliest cartographic record of the Honouliuli region. The map depicts several clusters of houses, fish weirs, and fishponds in the Honouliuli/Pu'u'loa area. Being recorded during the early period of western contact, the map is believed to represent the basic pre-contact coastal settlement pattern for of Honouliuli and vicinity. Even though the map and visit is of an early date, given the rapid decline of the native population just after western contact, it is likely that the pre-contact population would have been higher and settlement more dense than indicated by the Malden." – Kepa Maly

The SHPD-Kaleikini Supreme Court case shows the far-reaching impacts of a Hawaii Supreme Court decision in August for the Honolulu rail project. That ruling concluded the State Historic Preservation Division failed to follow its own rules in allowing an archaeological inventory survey to be completed in four phases — construction was allowed to begin on each rail segment following survey work. Reading the letters exchanged between various City, State and Federal agencies (FTA, etc.) show how incredibly rushed and sloppy this AIS work was and how it was being tailored to fit expedited rail contracts and rail construction. It is clear to anyone familiar with the culture and history of Honouliuli-Ewa that the AIS was a sham and shallow exercise.

The rail AIS is very premature because it is surveying according to maps developed in 2009. Much of the survey work is very outdated or poorly done according to modern professional archeological standards. The city's engineers still need to finish the Final Design of the project in segments #3 and #4. They have specific authority to make changes to the 2009 maps. Their work will result in bid documents that will clearly describe the rail footprint. Will the city do a supplemental AIS to review all the changes made to the 2009 maps? Next year we will see for the first time the support structures required for each of the over 100 columns in segment #4. The largest support structures will require huge construction sites for each column. These large construction sites will be up to 5 times larger than the trenches used in the AIS. We know for a fact that locations for certain stations in Honouliuli-Ewa aren't even accurately located according to GIS GPS data. The station designs are still largely fuzzy conceptual designs and are basically Post-It notes on maps. How can even this latest AIS and the ground surveys accurately define what is really going to happen when the final structural drawings are made and a myriad of utility, power, parking infrastructure aren't clearly known and detailed? Clearly, there will have to be another Supplemental AIS done.

We believe after studying the archeological report made for the Section 1 of the H RTP that this Ewa West Oahu segment has been very inadequately documented as to what cultural and historic structures and features are out in this area.

It was in fact only very recently revealed in a HART meeting that ALL CULTURES in Hawaii have a right to Traditional Cultural Properties. Yet the entire Rail AIS was conducted entirely as a "Hawaiians Only" exercise and virtually no one else was included in the TCP identification process. We doubt that very few in the local communities, especially out in Honouliuli-Ewa even know that their villages and cultural histories are National register eligible. The outreach has been extremely poor and the SHPD administration has consistently worked to exclude public awareness on all these efforts.

In fact, the notice that the public had a right to comment on the entire AIS was put up for just one day on the SHPD website, and then taken down the next day. Only the efforts of concerned community organizations got the word out and eventually forced the SHPD administration to put the notice back up again. We worked to make sure the news media got the word out- but most people in the community only had a few weeks notice. This is exactly how the SHPD-HART "process" has been conducted- to be as exclusionary and "under the radar" as possible to prevent public comment on key requirements- such as an accurate AIS.

Public input on TCP's are supposed to be on-going, consultation process, according to the Federal Section 106 Process. There isn't any "Once and for all" – "Going, going GONE" process- but that is exactly how the H RTP SHPD AIS and TCP program has been run. The idea has been to exclude as many people and sites as possible. How can new or available information be legally excluded from a large Federally funded project like this? There has been a huge amount of historic and cultural site documentation that has been intentionally excluded which directly affects nearby or below ground community cultural resources.

TCPs are "places of religious and cultural significance" (NHPA Section 101 and NHPA regulations, Section 106). NHPA guidance (Parker and King 1990:1) defines a TCP as a property "... that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community." TCPs derive their importance from the practices or beliefs of a community because they are integral to the community's history and identity. The people who are best able to identify these places and

their importance are the members of the community that understand their value. We have spoken directly with Tom King about this and know that the SHPD-HART rail "process" doesn't allow THEM to tell the community what and where their important historic and cultural sites and resources are. SHPD and HART are supposed to listen to the community, but they haven't been doing it.

The Hawaii public is fighting against a "paradigm shift" which is taking over the thinking of more and more government officials. We are following a pattern which has been established with third world countries. Governments of these countries are squeezed by the World Bank and IMF to adopt "austerity" measures, slashing government services on the one hand, while yielding control over public assets to private corporations. The idea is to take advantage of the budget shortfall in order to wring from the government valuable public assets. This has got to stop in Hawaii before it gets started and the Hawaii public is becoming increasingly outraged by these tactics.

Ewa Cultural Historic Corridor District – Protecting the Historic Ewa Cultural Integrity

This needs to be a recognized area and part of any HART rail line in Ewa- the Ewa Cultural Historic Corridor District. We know that there will likely be another rail station at the DeBartolo DHHL "shopping center" site next to Ewa Village and the historic Hawaiian Railway – O.R.& L. Attempts are already being made to make the railway move its historic rail yard. Land next to historic Verona Village has already been taken away and traded to DHHL as part of a HART Rail development deal. Obviously there are MAJOR IMPACTS already underway because of the HART fixed guideway and stations. The HART plan has always been to make it appear that the rail line stops "short" of having any actual historic impacts- yet that is clearly another "under the radar" method of development without revealing the true intentions of the overall project which is being Federally funded.

We cannot stress enough the special native Hawaiian cultural importance of the Ewa area and the ahupua'a of Honouliuli. This very important scared area, in Western terms, is equivalent to Plymouth Rock, The Oregon Trail and Arlington National Cemetery. This is because the very first major landfall from ancient Tahiti was the Ewa shoreline where the very first breadfruit tree from the homeland was planted. The 1825 Malden surveyed trails were major conduits for communication, defense, trade and very important religious and cultural ceremonies. And the Leina a ka Uhane in Kanehili was a sacred burial area for iwi kupuna in the tens of thousands. Burials in the Kanehili, Kaup'e areas were conducted using the native Hawaiian Trails documented by Malden in 1825 and which HART Rail guideway and stations go directly over. There is still archeological evidence of this and the underground Karst caves and water flow system that still exists there.

This area of Honouliuli-Ewa has some of the most important cultural and historic features of any place on Oahu which have been entirely overlooked and/or inadequately documented. We know this because the 1999 closure of Naval Air Station Barbers Point required an extensive number of historic, cultural and archeological studies be done. These extensive and detailed studies mapped ancient sites, trails and historic features throughout the Honouliuli-Ewa area, because they were all contiguous and related to the Ewa Plain and Ewa coastal areas. This has been well documented but HART AIS has somehow ignored all of this and the still existing evidence.

The H RTP AIS failed to adequately document these features, despite having also come up with other separate cultural documentation on the Leina a ka Uhane and Kualaka'i area. Kapa Maly at City Council Ewa Development Plan meeting held at Kapolei Hale in 2012 testified that "hundreds if not thousands of iwi kupuna were buried in the Kanehili area."

The Ewa Historic Corridor: The entire length of Renton Road to Railway Museum, to entrance to MCAS Ewa Field front gate. This area is a hugely important Ewa History Corridor. This links up with the Hawaiian Railway – O. R. & L., Ewa Mooring Mast, Ewa Field, MCAS Ewa, Cold War Era buildings, etc. which have been identified and determined as National Register eligible areas. In addition, this entire area is part of the Ewa Battlefield- still being defined by a survey project currently underway.

The Honouliuli-Ewa Cultural Corridor: From Waipahu to Honouliuli to Ewa to shoreline. One'ula Beach, Kualaka'i, Old Fort Weaver Road, these are all linked historically and culturally. Ewa Plantation Cultural Landscape- Mango Tree Road, Waimanalo Road, Palehua Road, Rail Stops: Sisal, Brown's Camp and more. We have documented many Ewa Villagers and recorded their oral histories about this.

It would seem obvious that ancient populations in Honouliuli-Ewa needed ways to get around and Hawaiians were well known for their extensive trail systems connecting villages, food resources and adjacent ahupua'a's. In the early 1800's a British Royal Navy ship arrived to map out Oahu and took special note of three main features- the Honolulu (Kou) area, the area now called Pearl Harbor, and the major trail system connecting the major village of Honouliuli with the Waianae area and with the important coastal areas of Kualaka'i and One'ula on the Ewa shoreline.

This major ancient Hawaiian trail system documented by Malden in 1825 completely defined and influenced the early settlement of the area of the Ewa Plains for later ranches, the plantations (Sisal and sugar), the Oahu railway, the construction of the Ewa Mooring Mast and the Ewa Marine and Navy Barbers Point airfields. Sections of these ancient Hawaiian trails still exist today and they are hugely important cultural and archeological features that the H RTP HART AIS studies completely neglected to include, and which are in some cases directly under the fixed guideway, rail stations with infrastructure and TOD's.

Ewa Plantation built Pipeline Village in 1906 for Portuguese and Japanese workers. Although the houses had detached cooking facilities, each of the dwellings was built on a separate lot and was "enclosed by a fence and supplied with water. Waimanalo Camp, another village that has not been adequately documented. There is more out there that needs an accurate and modern standard archeological survey done before major land development takes place.

There are archeological sites where American planes crashed during the December 7th attack, locations of Army AA field positions, Command Posts, small army camps, an air strip, Ewa plantation water lines, railway lines, flumes, railway trestles, Ewa Plantation pesticide mixing facility. There is much more out there that was entirely missed in the HART AIS.

Honouliuli was the site of a very important ancient Hawaiian community with vast kalo ponds feeding many thousands of people. Nearby was the original historic capital of the Hawaiian Kingdom- Waipio, and the entire area was known as a breadbasket of kalo, fish, shellfish, etc. This was linked in by these major ancient Hawaiian trails to these related Ewa areas.

Ancient Hawaiian tenants paid labor taxes and annual taxes to the Konohiki, or local overseer, who collected goods to support the chief and his court. The konohiki supervised communal labor within the ahupua'a and also regulated land, water and ocean use. The ancient trail system identified by Malden in 1825 was a major part of this Konohiki system of land and resource management.

Hawaiian Trails were hugely important in ancient times because they were not only key to trade, communication, defense, etc- they were also a showcase for the local Hawaiian community that maintained these important trails. Bad trail maintenance could see the regional chiefs raising the taxes paid as punishment for not keeping a section up to the same quality as other ahupua'a sections. These trails were also of huge importance during the annual Makahiki Ceremonies with Lono processions traveling throughout the ahupua'a of Honouliuli. In addition, it is said that these same trails are still used, even when destroyed, by the Night Marchers of Honouliuli, meaning that future rail stations, offices and homes will be directly on ancient spirit pathways. A large number of Hawaiian soldiers died in fierce combat in these areas and their troops are still heard and seen at certain times of the year moving through the Honouliuli area on these Ancient trails.

The major Kalo'i Waterway was never adequately checked for archeological sites, yet considering that the major 1825 Malden identified trail system ran directly through this area that likely many thousands of native Hawaiians and later ranchers used, there is likely still cultural sites and data to be recovered.

We have interviewed dozens of Ewa Villagers over the past several years and have a large amount of documentation from many sources. Other very good cultural and historic surveys were also done that the H RTP AIS seems to have completely ignored.

We believe there should be established an Ewa TCP, Ewa Historic Corridor and recognition by HART and the City of an Ewa TCL (Traditional Cultural Landscape). These are all National Park Service recognized historic preservation concepts.

1. The initial major historic settlement from Tahiti - Puuloa
2. The Leina a ka Uhane – Very sacred spiritual leap to Tahiti homeland
3. 1825 Malden Trails – Trade, Communication, Defense
4. The most successful Sugar Plantation on Oahu
5. The major extension of the King Kalakaua charted O.R.&L. in 1890
6. The very important below ground Karst water transport system
7. Major importance during the December 7, 1941 attack on Pearl Harbor
8. Major WW-II and Cold War Era Historic Districts
9. Historic Hawaiian Railway train yard under threat of removal.

Federal law concerning major projects like this multi-billion dollar publically funded railway explicitly requires that in the identification of historic cultural sites, a "reasonable and good faith effort" be made. We don't see this as having been the case and certainly Federal Judge Wallace Tashima stated in his ruling that he was greatly concerned about the identification of Traditional Cultural Properties (TCP) along the rail route.

TCP's do not follow any exact linear or simple place box format like a TMK. They can cover a large area and are nevertheless linked together by trails, trade, etc. There are numerous sources that were apparently not consulted or reviewed in determining nothing of cultural or

historic significance in the Honouliuli-Ewa Section. Many large and detailed reports were done by the International Archeological Research Institute and many noted archeologists.

We are especially concerned that Parsons Brinckerhoff wrote in the 2003 Final EIS:

"...extreme disruption of existing underground utilities and constant dewatering made necessary by a high water table and poor soils would drive construction costs to unacceptable levels." -2003 FEIS.

These historic and cultural sites deserve the same attention as the downtown historic and cultural sites. There should be recorded oral histories done with Ewa Village residents for their TCP.

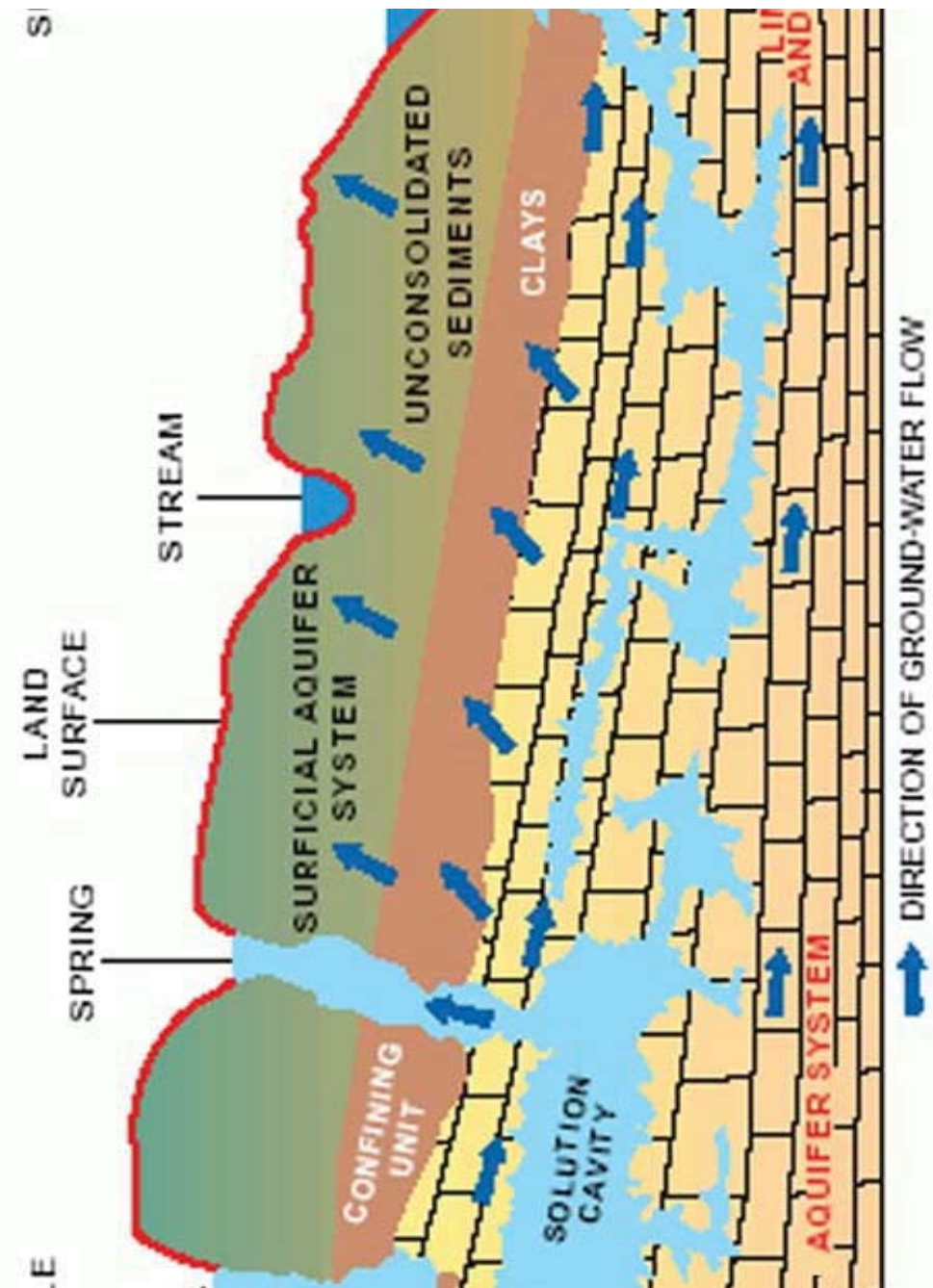
Sincerely,

Michael Lee

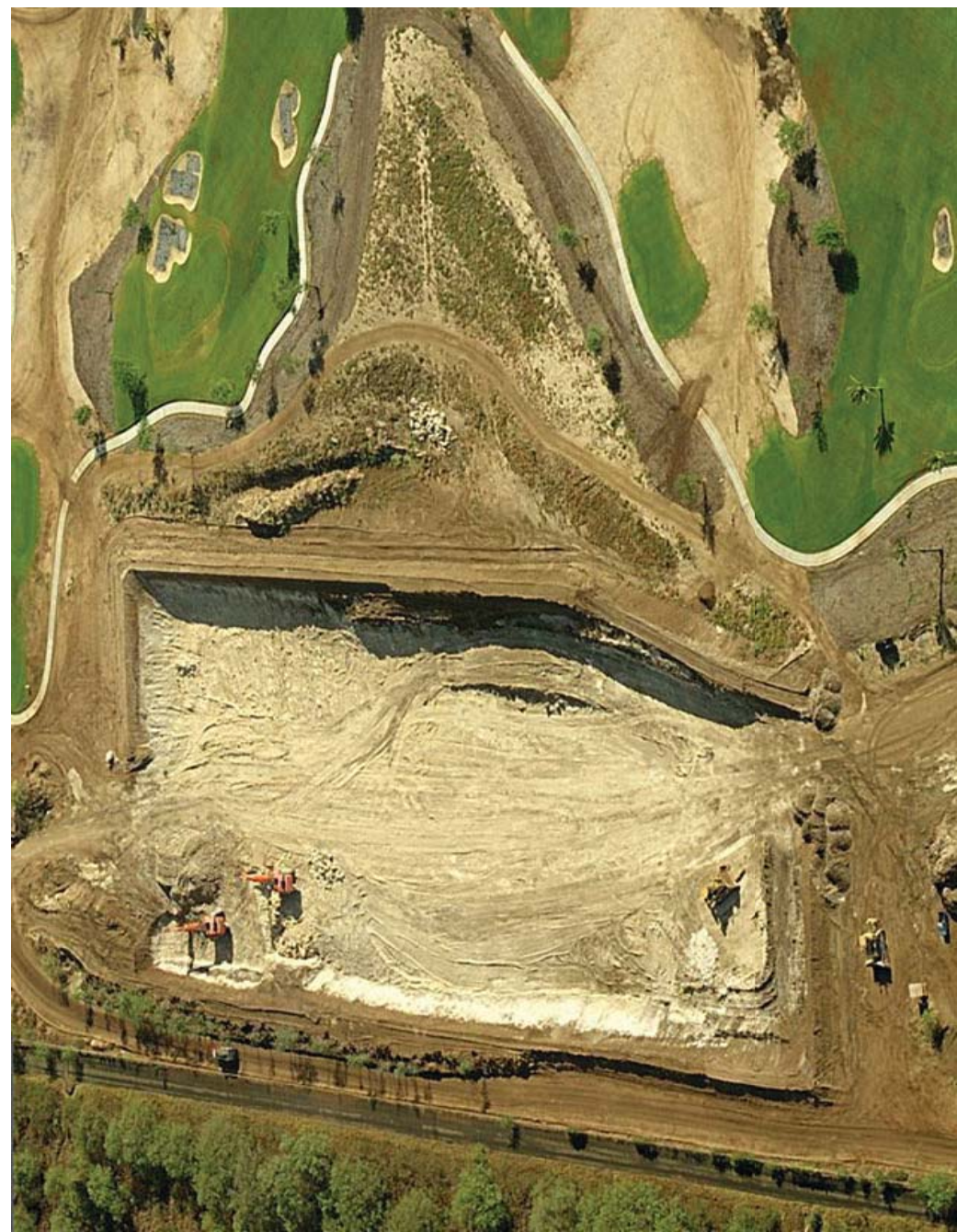
Glenn Oamilda

John Bond

Kanehili Cultural Hui
P.O. Box 75578
Kapolei, Hi. 96707







Ewa Historic Districts Recommended

Ewa Village and related areas would appear to be eligible as an historic district

According to the National Park Service, historic districts are one of the oldest forms of protection for historic properties.

The U.S. Conference of Mayors penned an influential report which concluded, in part, that Americans suffered from a sense of "rootlessness." They recommended historic preservation to help provide Americans with a sense of orientation.

The Ewa Area has been recommended for several Historic Districts, among them:

The WW-II Barbers Point Naval Housing District (1)

The WW-II Barbers Point Tower-Hangar Complex (1)

The Ewa Field Aircraft Revetments Historic District (1, 2)

The Ewa Field Historic WW-II Warehouse District (2)

The Ewa Field Historic Cold War Ewa Buildings District (2)

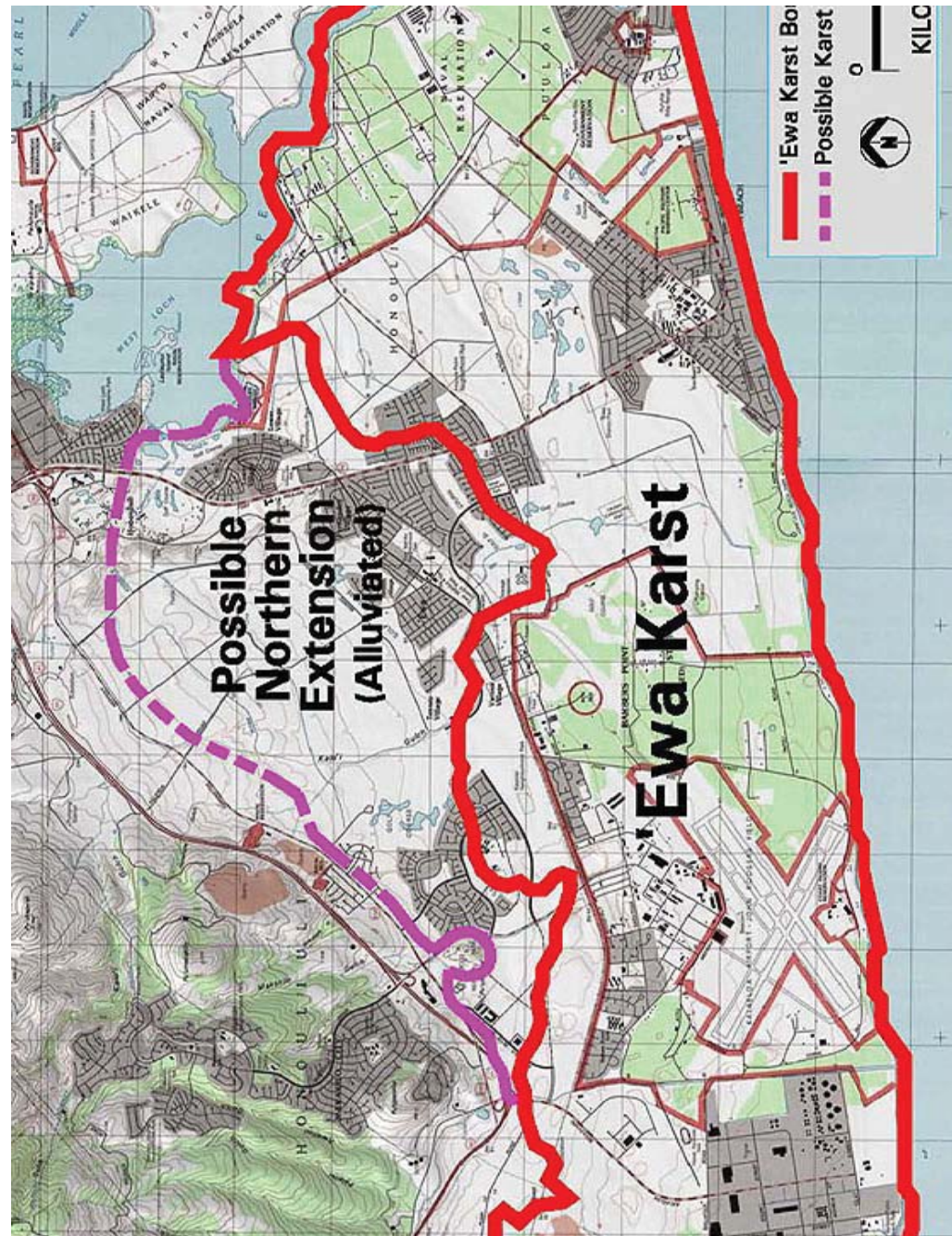
Local historic district property values were found to resist market downturns better than historic non-designated properties. A recent study investigating the data on single-family residential mortgage foreclosures and comparable non-designated neighborhoods found that designated properties were significantly less likely to experience foreclosure.

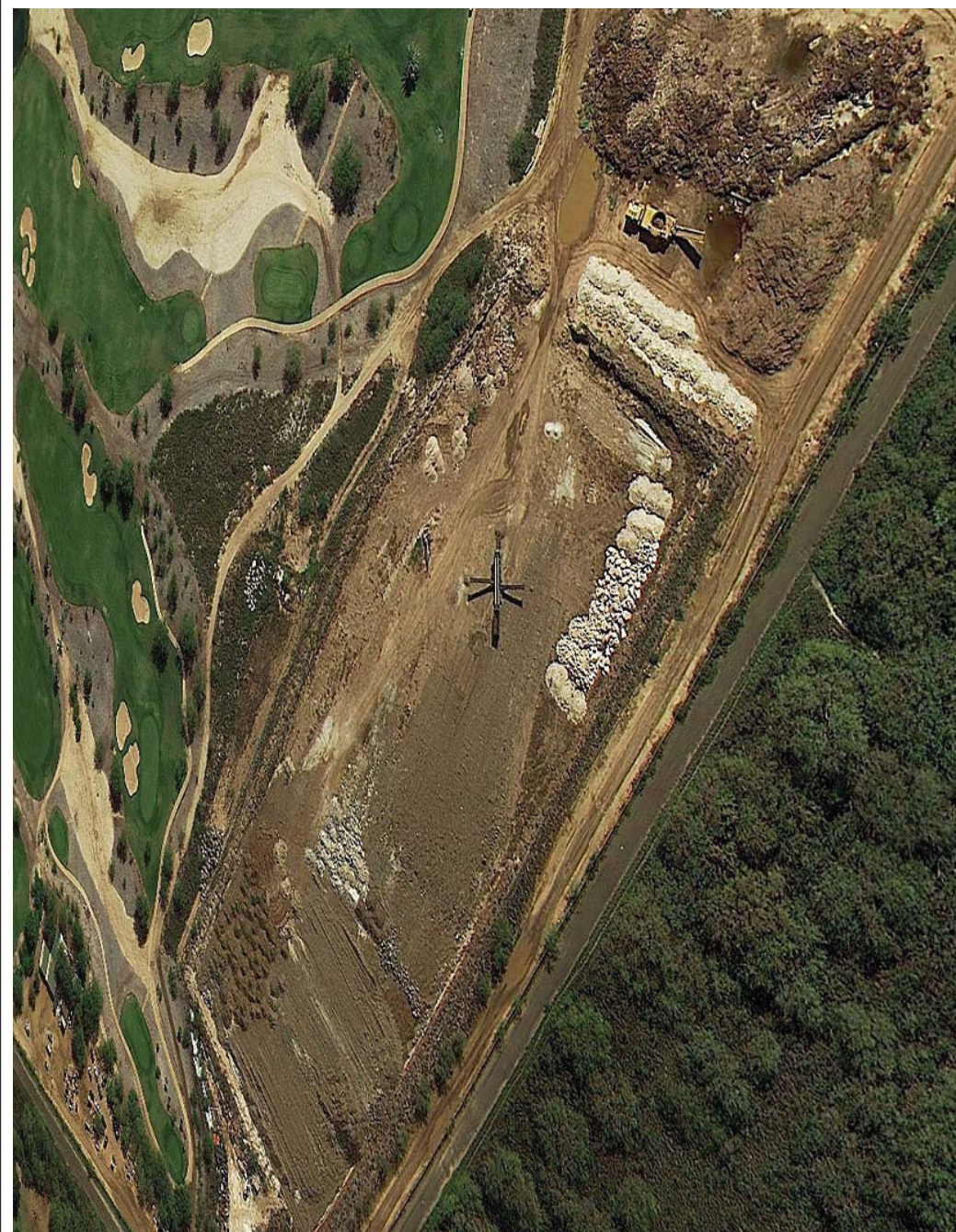
An historic district is a group of buildings, properties, or sites that have been designated by one of several entities on different levels as historically or architecturally significant. Buildings, structures, objects and sites within a historic district are normally divided into two categories, contributing and non-contributing. Districts greatly vary in size: some have hundreds of structures, while others have just a few.

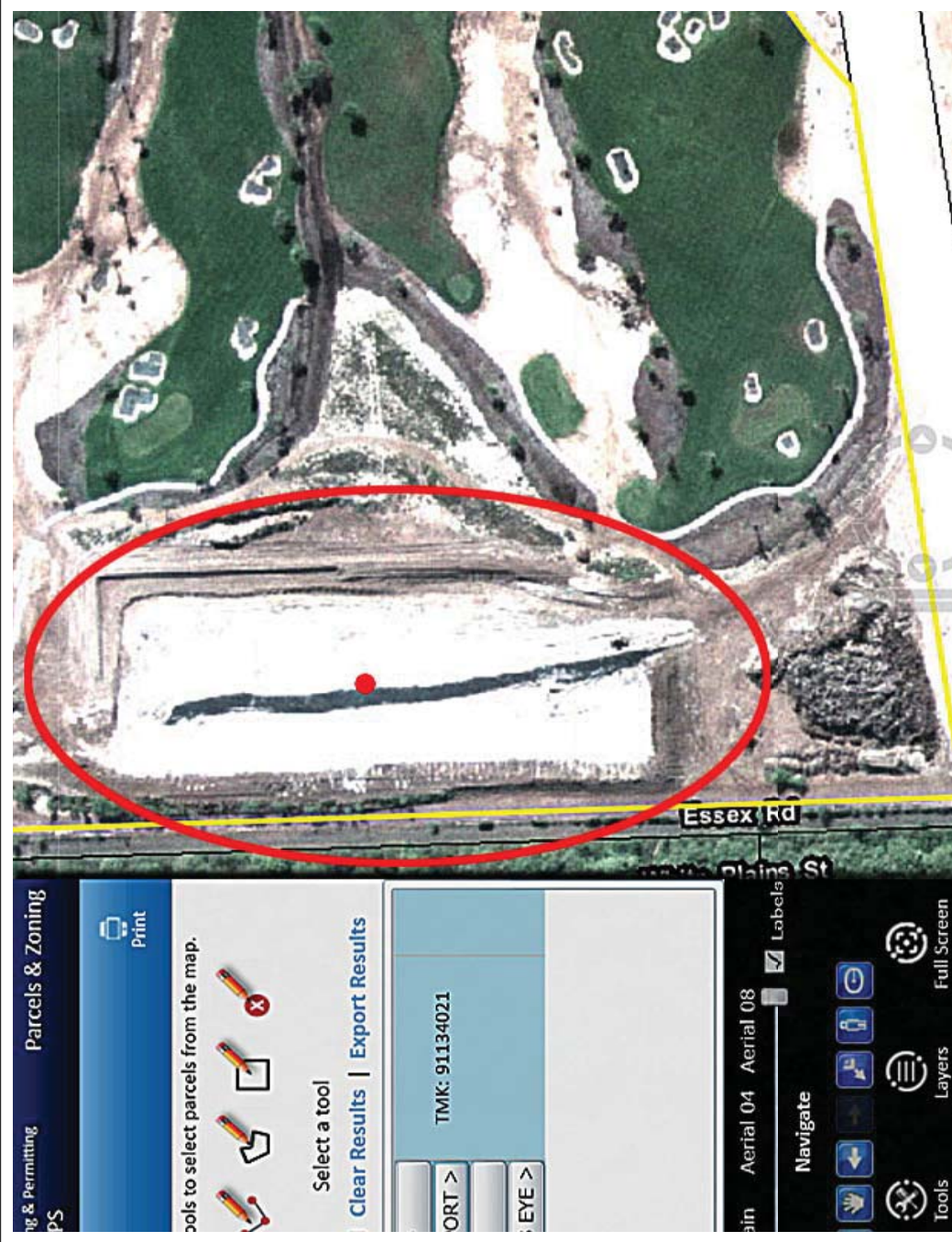
in 1966 the federal government created the National Register of Historic Places soon after a report from the U.S. Conference of Mayors stated Americans suffered from "rootlessness." By the 1980s there were thousands of federally designated historic districts.

Historic districts are generally two types of properties, contributing and non-contributing.[4] Broadly defined, a contributing property is any property, structure or object which adds to the historical integrity or architectural qualities that make a historic district, listed locally or federally, significant.

"a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history."







KANEHILI CULTURAL HUI

Comment/Testimony on HART RAIL AIS – Archeological Inventory Survey – West Oahu Ewa Plain - Honolulu Rapid Transit Corridor

Indexed For Honouliuli-Ewa TCP Sites That Were Missed Or Not Correctly Located As An Important Traditional Cultural Property

Kanehili Cultural Hui – Honouliuli, Ewa, Oahu

May 30, 2013

5/30/2013

This Index of Honouliuli-Ewa sites along the HART RAIL ROUTE
accompanies the hand delivered maps, photos, charts and documents
from Kanehili Cultural Hui with Cover Letter and Questions

2012 City Council *Unanimously Passed Resolution 12-172, CD-1*
URGING THE HAWAII COMMUNITY DEVELOPMENT AUTHORITY AND THE
STATE OF HAWAII TO RECOGNIZE AND PRESERVE THE HISTORIC TRAILS
OF THE EWA PLAINS.- *Includes cultural Hawaiian Karst*

National Register – MCAS Ewa Historic 70 Year Old Baseball Field- *photos, documents*

Kanehili – MCAS Ewa Kanehili is an Ancient Hawaiian Traditional Cultural Place
and a 150 year old Western Cultural Landscape - *photos, documents*

Kanehili – An Ancient Natural Treasure - *photos, documents*

The Honouliuli-Ewa Cultural Corridor - *photos, documents*

HART RAIL SURVEY OF EWA FLAWED - *photos, documents*

1825 Malden Trail Survey - *maps, documents*

Evidence found show Malden Trail Route locations - *maps, documents*

Ewa Plains Big Picture History - *maps, documents*

Ewa Cultural History (parts 1 and 2) - *maps, photos, documents*

Ewa in History - *A Guide to the Resources*

National Register- Ewa Mooring Mast and Ewa Field

Ewa Field – Ewa Plantation, Rail Impacts - *maps, photos, documents*

The Ewa Historic Corridor - *maps, photos, documents*

Ewa Plantation – 1950-1975 - *maps, photos, documents*

Ewa Plantation Cultural Landscape - *maps, photos, documents*

120 Year Old Ewa Plantation Community – *Photos, Maps, Preservation Areas*

Ewa Plantation – TCP – Traditional Cultural Place – *Photos, Maps*

Ewa Villages Project Summary – *Maps, documents*

ECHOS FROM EWA'S PAST – “Ewa Hurricane” newspaper documents massive quantities of Ewa Cultural History, People, Events, Photos, etc.

Ewa's Karst Cave History- *Maps, photos, documents*

Historic Ewa Plantation “Hau Bush” Beach Park - *Photos*

Hawaiian Goddess Hi'iaka Chants About Kanehili - Honouliuli-Ewa

Honouliuli-Ewa Historic Background and Interviews

Kanehili's Paniolo-Cowboy Ranch and Sisal Plantation History

1825 Malden Trails TCP – Honouliuli-Ewa - Parts 1 and 2

MCAS Ewa History Related To Ewa Village Plantation Community

The US Army In Ewa During WW-II – *Maps, photos, documents*

December 7, 1941, US-Japanese Air Combat over Ewa Village and Honouliuli-Ewa Plain - *Documented, photos, art, maps, interviews.*

22 total deaths in air and ground combat in Honouliuli-Ewa. Many more wounded, sent to Ewa Plantation Hospital.

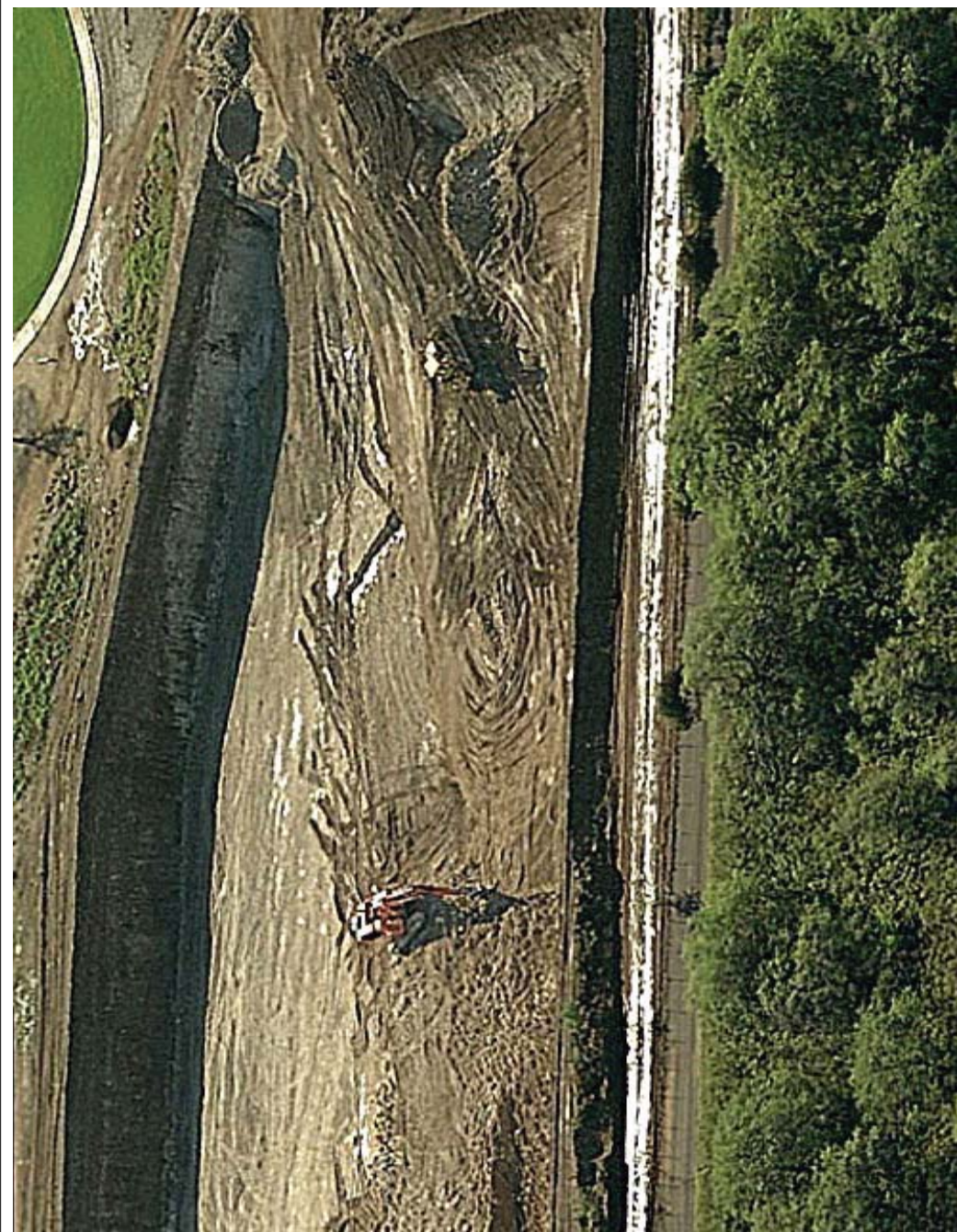
December 7, 1941, Ewa Village Plantation people killed and wounded during Japanese attack on Ewa Field. *Maps, Photos, Interviews.*

Historic Ewa Plantation Railway – Largest private railway in Hawaii.
Photos, Maps, Documents, including flumes, major plantation roads, etc.

Leina a ka Uhane – *Ancient Sacred Hawaiian Burial areas in Honouliuli Ewa*
Where many thousands, if not tens of thousands of iwi kupuna buried where rail will impact.

Kalo'l Gulch Karst waterway, 90% Flows below the surface to Ewa Shoreline.





From Mike Lee about Haseko EIS Hoakalei Master Plan Update

Comments for
Notice of Intent to Prepare an Environmental Impact Statement
for the Hoakalei Master Plan Update

From Mike Lee

91-1200 Keauniu Drive, Unit 614,

Ewa Beach, Hawaii 96706

808-683-1954

Mike Lee who is currently giving classes on the neighbor islands asked me to forward his previous documents of standing as the recognized cultural practitioner for the Haseko TMK's.

You may be already familiar with them but as a matter of record he has concerns and please keep him on any and all mailing about this Haseko EIS Hoakalei Master Plan Update. I will also forward any emails to him as his current one is not working at this time. In the meantime use his home address.

Attn: pwhite@psi-hi.com

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814 with copies to the City and County of Honolulu, Department of Planning and Permitting (address above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

July 20, 2013

From:
Michael Lee, Hawaiian Cultural Practitioner
Kanehili Cultural Hui, Ewa, Honouliuli, Oahu

Cover Letter and Addendums as Comments On:
Honolulu Rapid Transit Corridor Project Archeological Inventory Survey
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To:

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1099 Alakea Street, Ali'i Place, 17th Floor
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Aloha,

Thank you for extending the comment period to May 30th, 2013 and for the requests made to have the entire Honolulu Rapid Transit Corridor Project Archeological Inventory Survey of the 22 mile fixed guideway and stations (phases 1-4) open to public review and comment.

Thank you for allowing me to provide what I believe is important comments and documents that were not included in the preliminary Archeological Inventory Survey that left many voices and important native Hawaiian cultural issues and concerns out.

TCP- The Traditional Cultural Property (TCP) is a very Big Part of my concern. Native Hawaiian TCP isn't just a cultural "place" where we enjoyed some good times and festivals, it is a critical cultural resource for our survival as a native people that lived off natural resources managed under the Konohiki system.

I am a recognized party in the Navy's Section 106 consultation in the lease with the Hunt Development Solar Energy Farm as the Native Hawaiian cultural practitioner of this geographic area within the ahupua'a of Honouliuli, and further under the State of Hawaii Article 12, Section 7 as a Native Hawaiian Cultural Practitioner of my medicinal practice with medicines derived from Ewa shoreline limu varieties fed by the Ewa Karst water system in the Honouliuli ahupua'a. I have further standing in this Honouliuli project site through the Native Hawaiian Burial Council laws as a Cultural Descendant recognized by the State Historic Reservations Division and the Oahu Island Burial Counsel in a certificate, dated April 10, 2011.

I have standing under Hawaii law protecting Native Hawaiian cultural practitioners and I am recognized in the Hawaii First Circuit Court in cases for the Honouliuli area and in Federal Court as the Hawaiian Cultural Practitioner of sea medicine on the Big Island in Kohala in the Kona Blue v. Kahea Kohala fishery's case in 2011. The HART Rail Project Archeological Inventory Survey is inadequate and has failed to mitigate the pylon and construction impacts on the Ewa Karst water system as documented by City, State and Federal hydrological studies and will require the AIS to be done over again.

As a long time kahunalapa'auokekaiolimu, or Native Hawaiian practitioner of limu medicine, disturbance in the fresh water source and water conditions in these interior wetlands adversely affect my protected cultural limu practice. Fresh water flows through an extensive network of underground interconnected Karst caverns from the mountains to the sea and contains the nutrients that feed the foundation of our eco-system food chain. This is true for the entire South Oahu shoreline which is nearly entirely Karst – ancient coral limestone reef. This is a documented fact and I have supplied numerous documents in the addendum to document this.

I must rely upon vigilant protection of my religious, traditional and customary Native Hawaiian practices and cultural and natural resources or I will lose them forever. As the kahu, or keeper, of the iwi kupuna in this area, as recognized by the Oahu Island Burial Council and State of Hawaii Historic Preservation Division, it is my responsibility to ensure the protection and safety of all the bones and objects within my family's burial complexes in this area.

The Honolulu City Council passed unanimously in 2012 the Ewa Plain Trails resolution giving my cultural practice further standing in Honouliuli by advocating the protection of the 1825 Malden Trails (ancient Hawaiian trails) and Ewa Karst water system which is an ancient limestone reef wetlands water system recognized in the United States under the Federal EPA Clean Water Act. Karst is the ancient limestone reef wetlands water system beneath the Ewa Plains and which also runs along the southern shoreline of Oahu. Much of Honolulu's original history and culture is based upon the Karst water system, Karst burial caves. Kawaiaha'o Church is a graphic example of the ancient Honolulu Karst system, having been built from ancient coral reef and the name symbolizes the Karst spring there. I'olani Palace, the royal barracks and other very old and historic structures in the downtown area are made with Karst coral reef blocks from the shoreline areas.

I am also a Hawaiian astronomer or star priest called Papakilohoku recognized by the Honolulu City Council with an Honorary Certificate which gives me standing concerning the recognized Hawaiian Traditional Cultural Property (TCP) in Honouliuli called the Leina a ka Uhane, a very sacred spiritual leaping place for souls of the deceased returning to their ancient homeland. This major wahi pana (sacred place) was officially recognized by the HART Rail Project AIS in an April 2012 published document as a requirement to identify Ewa Plain Honouliuli TCP's, of which I am also part of that consultation as well.

I am very concerned about the Hawaiian Traditional Cultural Property (TCP) in Honouliuli called the Leina a ka Uhane, a very sacred spiritual leaping place for souls of the deceased returning to their ancient homeland. This major wahi pana (sacred place) was officially recognized as existing by the HART Rail Project AIS in an April 2012 published document as a requirement to identify Honouliuli-Ewa TCPs. This TCP is clearly within the ancient area known as Kanehili, which includes Kaupe'a, and also overlaps most if not all of the important ancient Hawaiian trails within Honouliuli-Ewa identified in the 1825 Malden Trails which the HART AIS did not include maps of or even mention. The ancient Hawaiian trails running from Honouliuli to Ewa, Kualaka'i and One'ula are very key components to understanding the cultural history of the Honouliuli ahupua'a. Portions of these trails still exist throughout Kanehili and cultural and archeological remnants still exist in areas where the HRT-P-HART rail line and stations will be going in. The archeological inventory of this historic trail has NEVER BEEN DONE.

I have to really question the credibility of the HRT-P-HART AIS for this entire project and the way it has been conducted so as to exclude a great deal of important Honouliuli - Ewa cultural and historic sites.

However this TCP has presented a huge problem for HART and FTA and they seem to have done everything possible to somehow move or minimize with mapping manipulation and apparently advice from SHPD-DLNR administrators to get the "no effect" result desired by FTA. The areas where HART has designated the Kanehili and kaupe'a areas are little boomerang shaped Post-It Notes and they continuously had the locations wrong (flipped), since April 2012 when the draft was quietly put out hoping no one would notice. Consultant Kepa Maly had repeatedly, in public meetings, stated that the locations were wrong, but HART never wanted to hear or correct this comment to even attempt some legitimate mapping effort. HART, SHPD has

apparently been trying figure out how to make this important sacred Honouliuli Leina problem somehow go away into a small box someplace, which is how iwi kupuna and cultural artifacts are always treated. This is a standard tactic when important Hawaiian culture items and wahi pana sites are found - always treated so as to minimize it and make it disappear.

I must also point out that while I and the Kanehili Cultural Hui have submitted very detailed Hawaiian cultural testimony to the Ewa Field Hunt Development Solar Energy Farm Section 106 and NEPA process all during last year, our views have not only been nearly completely ignored, they have even been mocked in the Navy's Programmatic Agreement (which no one in the local community even signed) with statements that "some Hawaiian's believe in Karst, etc" and other such extremely ignorant statements written it seems by a Navy persons with little Hawaiian cultural interest or scientific knowledge. I hope this isn't what HART's agenda is as well.

SHPD administrator Pua Aiu stated in a recent HART meeting that Puu O Kapolei should be recognized as a wahi pana, because "eventually Rail may go by there." This seems to be an issue for her because it would be publically convenient to recognize something completely out of the way that is already a City Park, but not at all convenient to have a wahi pana in the same area as a major shopping center, major railway station and major highway, so that it gets recognition for where it really exists and where Karst caves and underground water still flows with live native shrimp. Because the Leina a ka 'uhane is such a huge problem, the plan has been to obfuscate it and make sure no one locally really knows where it is. Clearly, it is in Kanehili, an area where even DHHL has named their home subdivision development, and where in the chants of Hi'iaka and other stories of Ewa, Kanehili and Kaupe'a are named and described in geographic ways that you know where approximately where these areas are. Other previous major archeological surveys, such as those done for the Navy in 1998-2003, have placed Kanehili in the former NAS Barbers Point – MCAS Ewa area, as well as the 1825 Malden Trails, which are clearly still there. Why hasn't the HART AIS even recognized this?

The 1825 Malden Trails – Another big problem HART land developers want to go away.

"In the early 1790s Captain George Vancouver visited the Hawaiian Islands. As a part of the Vancouver expedition, cartographer, Lt. C.R. Malden, prepared a map of a portion of O'ahu, which also covered the Honouliuli – Pu'uloa region. Malden's map was published in 1825 (Register Map No's 437 & 640), and provides the earliest cartographic record of the Honouliuli region. The map depicts several clusters of houses, fish weirs, and fishponds in the Honouliuli/Pu'uloa area. Being recorded during the early period of western contact, the map is believed to represent the basic pre-contact coastal settlement pattern for of Honouliuli and vicinity. Even though the map and visit is of an early date, given the rapid decline of the native population just after western contact, it is likely that the pre-contact population would have been higher and settlement more dense than indicated by the Malden." – Kapa Maly

The SHPD-Kaleikini Supreme Court case shows the far-reaching impacts of a Hawaii Supreme Court decision in August for the Honolulu rail project. That ruling concluded the State Historic Preservation Division failed to follow its own rules in allowing an archaeological inventory survey to be completed in four phases — construction was allowed to begin on each rail segment following survey work. Reading the letters exchanged between various City, State and Federal

agencies (FTA, etc.) show how incredibly rushed and sloppy this AIS work was and how it was being tailored to fit expedited rail contracts and rail construction. It is clear to anyone familiar with the culture and history of Honouliuli-Ewa that the AIS was a sham and shallow exercise.

The rail AIS is very premature because it is surveying according to maps developed in 2009. Much of the survey work is very outdated or poorly done according to modern professional archeological standards. The city's engineers still need to finish the Final Design of the project in segments #3 and #4. They have specific authority to make changes to the 2009 maps. Their work will result in bid documents that will clearly describe the rail footprint. Will the city do a supplemental AIS to review all the changes made to the 2009 maps? Next year we will see for the first time the support structures required for each of the over 100 columns in segment #4. The largest support structures will require huge construction sites for each column. These large construction sites will be up to 5 times larger than the trenches used in the AIS. We know for a fact that locations for certain stations in Honouliuli-Ewa aren't even accurately located according to GIS GPS data. The station designs are still largely fuzzy conceptual designs and are basically Post-It notes on maps. How can even this latest AIS and the ground surveys accurately define what is really going to happen when the final structural drawings are made and a myriad of utility, power, parking infrastructure aren't clearly known and detailed? Clearly, there will have to be another Supplemental AIS done.

Hawaiian Land and Cultural Rights As Stated in the Hawaii State Constitution

The land and the people are one. Access to and protection of native ecosystems is a cornerstone of continued cultural practice in Hawai'i. When a native species or critical ecosystem is lost to extinction or a wahi pani or wahi kapu is erased from the landscape, the words and traditions associated with them are also lost.

I believe it is my duty as a native Hawaiian cultural practitioner to state that we cannot afford any more of these losses and developments must adhere to state and federal laws.

In the HART AIS they don't recognize the Konohiki land management system and Wahi Kapu are not being recognized by the rail as a TCP as they protect limu, burial caves for iwi kupuna. These caves making the mistake of calling these wahi pana and not Wahi Kapu. The cultural practices are linked in and HART must provide geotech reports that show the below ground water system. The water needs to be sampled, monitored and not contaminated. Cultural monitoring done. Fresh water shows it is still a spring. I don't want money, I want these resources protected, which is the law in the State Constitution and under the US Federal Clean Water Act. I just want HART to follow the State and Federal laws. These must be retained under the Hawaiian Konohiki practice.

The mitigation is NO DESTRUCTION of these cultural and ecological sites or cause the contamination of them. These should be under cultural boundary zones to protect them.

This is also a Hawaii Public Trust Interest as stated in the Hawaii State Constitution.

The fisheries are for the public, this isn't just about Hawaiians- this is about all of the Hawaii people. The State of Hawaii is mandated to protect this resource- caves, karst, underground streams and rivers under Statute 6D 1-10, Article 11, Section 7 State Constitution: You do NOT destroy these aquifers and native Hawaiian cultural practice.

I would like to state up front that this concern of mine about Karst, caves, water flow, burials, etc. is not something that I "made up 10 minutes ago." I am on record going back at least since 2001 with these issues and at least a decade with Ewa related native Hawaiian cultural concerns. As I child I grew up around a major Karst cave water system in Moiliili as my father was the owner and manager of the historic Willows Restaurant in that community

I have attached to this document copies of correspondence and emails I have had with boards, councils, chairpersons and attorneys, among others, stating specific concerns about Karst, caves, water flow, burials, etc. I have also been practicing what I preach with ongoing classes on Hawaiian cultural practices related to limu, the stars, the Mawaewae Ceremony and have been an expert witness in legal cases involving native cultural practice. I have been officially recognized numerous times, including twice by the Honolulu City Council with Honorary Certificates, and in letters from the Chair of the Office of Hawaiian Affairs and others in City and State government. I have also represented myself Pro Se and won in legal issues in this area. I have recognized cultural practitioner standing from the State of Hawaii Preservation Department and the Oahu Island Burial Council.

The past practices that agencies and private parties have been illegally following for decades has led to the desecration of hundreds of iwi, unnecessary delays and cost overruns. I have advocated for Best Practices but in many cases this is not being followed by developers who are in a big rush to start up their bulldozers and don't really want to hear or know about the actual damage they are doing.

The Department of Transportation Section 4(f) bars the phasing of archaeological work for highway projects. The federal courts have so ruled on multiple occasions. And, section 4(f) protects burials sites, historic sites and cultural sites, which are eligible for listing on the National Register of Historic Places. These must be properly identified and not shoveled under a rug.

The Hawaii public is fighting against a "paradigm shift" which is taking over the thinking of more and more government officials. We are following a pattern which has been established with third world countries. Governments of these countries are squeezed by the World Bank and IMF to adopt "austerity" measures, slashing government services on the one hand, while yielding control over public assets to private corporations. The idea is to take advantage of the budget shortfall in order to wring from the government valuable public assets. This has got to stop in Hawaii before it gets started and the Hawaii public is becoming increasingly outraged by these tactics.

I cannot stress enough the special native Hawaiian cultural importance of the Ewa area and the ahupua'a of Honouliuli. This very important scared area, in Western terms, is equivalent to Plymouth Rock, The Oregon Trail and Arlington National Cemetery. This is because the very first major landfall from ancient Tahiti was the Ewa shoreline where the very first breadfruit tree

from the homeland was planted. The 1825 Malden surveyed trails were major conduits for communication, defense, trade and very important religious and cultural ceremonies. And the Leina a ka Uhane in Kanehili was a sacred burial area for iwi kupuna in the tens of thousands. Burials in the Kanehili, Kaupē'a areas were conducted using the native Hawaiian Trails documented by Malden in 1825 and which HART Rail guideway and stations go directly over. There is still archeological evidence of this and the underground Karst caves and water flow system that still exists there.

Ancient Hawaiian tenants paid labor taxes and annual taxes to the Konohiki, or local overseer, who collected goods to support the chief and his court. The konohiki supervised communal labor within the ahupua'a and also regulated land, water and ocean use. The ancient trail system identified by Malden in 1825 was a major part of this Konohiki system of land and resource management.

Hawaiian Trails were hugely important in ancient times because they were not only key to trade, communication, defense, etc- they were also a showcase for the local Hawaiian community that maintained these important trails. Bad trail maintenance could see the regional chiefs raising the taxes paid as punishment for not keeping a section up to the same quality as other ahupua'a sections. These trails were also of huge importance during the annual Makahiki Ceremonies with Lono processions traveling throughout the ahupua'a of Honouliuli. In addition, it is said that these same trails are still used, even when destroyed, by the Night Marchers of Honouliuli, meaning that future rail stations, offices and homes will be directly on ancient spirit pathways. A large number of Hawaiian soldiers died in fierce combat in these areas and their troops are still heard and seen at certain times of the year moving through the Honouliuli area on these Ancient trails.

The major Kalo'i Waterway was never adequately checked for archeological sites, yet considering that the major 1825 Malden identified trail system ran directly through this area that likely many thousands of native Hawaiians and later ranchers used, there is likely still cultural sites and data to be recovered.

Federal law concerning major projects like this multi-billion dollar publically funded railway explicitly requires that in the identification of historic cultural sites, a "reasonable and good faith effort" be made. We don't see this as having been the case and certainly Federal Judge Wallace Tashima stated in his ruling that he was greatly concerned about the identification of Traditional Cultural Properties (TCP) along the rail route.

I am especially concerned that Parsons Brinckerhoff wrote in the 2003 Final Honolulu BRT EIS:

***"...extreme disruption of existing underground utilities and constant dewatering made necessary by a high water table and poor soils would drive construction costs to unacceptable levels."* -2003 FEIS**

I see this clear warning by a professional engineering company, contracted to give the best advice to their client- the City of Honolulu, as a paramount concern. The massive amount of deep pylon drilling that is going to take place to anchor rail fixed guide ways and station

platforms suggests a coming nightmare of destruction of Karst caverns, caves, below ground water channels and undetected iwi kupuna burials. This is going to be a large scale destruction of wahi pana and wahi kapu sites that are an integral part of native Hawaiian cultural practice.

Federal law concerning a major projects like this multi-billion dollar publically funded railway explicitly requires that in the identification of historic cultural sites, a “reasonable and good faith effort” be made. There are many stories of construction or personal vehicles falling into underground caves and sinkholes over a period of many decades, including up until very recently.

All of the identified caves either HART has identified or I have provided must be protected. This is the reason it made sense in 2012 I requested a FOIA for all of the Pylons, which I was denied and I have cause for eminent harm. We believe that the overall primary, cumulative and secondary project impacts to cultural and historic sites significantly affects the quality of the human environment—and particularly underground resources such as widely documented karst systems known to contain Hawaiian Iwi, pre-historic remains and rare aquatic native shrimp.

The underground water that is known by hydrological documents and traditional Hawaiian cultural observation flows below ground in a myriad of karst channels and networks, which rail pylons and other site construction may impact. In this karst system the water from the upper lands and mountains directly impacts the propagation and sustainability of rare forms of Hawaiian limu along the shoreline which is an important cultural and medicinal resource practice protected for native Hawaiians under Hawaii State Law.

I don’t see this as having been the case so far and certainly Federal Judge Wallace Tashima agreed when he stated in his recent legal ruling that he was greatly concerned about the identification of Traditional Cultural Properties (TCP) along the rail route. Native Hawaiian TCP’s do not follow any exact linear, circular or simple place box format like a TMK. They can cover a large area, vary in depth and width and are often linked together by trails, caves, ponds and canoe landings.

I am very concerned that many of the actual stations appear still as just design sketches, and “wouldn’t it be nice if it looked like this” but in fact there are no actual construction details showing what will REALLY be put up, and exactly where. I am very concerned that another Supplemental Archeological Inventory Survey will have to be required and that this whole project still has many undefined construction parameters that could significantly alter what we are commenting on right now.

My Kuleana is native Hawaiian cultural practice and I am a believer in the Konohiki concept of ecological management. It is my duty and obligation as a native Hawaiian cultural practitioner to require recognition of the **ancient lava tubes** and **Karst cave water systems** as an integral part of protections needed. Careful and thorough studies be done to accurate map out where all Lava and Karst caves, caverns and water channels are and to strictly avoid puncturing and contaminating them.

Careful water studies, geotechnical studies, reports must be made and documentation made showing how these very important features will be avoided and preserved from damage during construction. I need to see these and my past requests for this information has not been honored.

There needs to be continuous water monitoring, to insure that the Clean Water Act is not being violated.

Important Hawaiian Cultural Beliefs Concerning Water:

He huewai ola ke kanaka na Kane.

Water is life and Kane (god) is the keeper of life.

Kuleana

A privilege and responsibility referring to the assignment of managing water.

Ola i ka wai

Water is life (We should not forget this on our island)

Cultural and Legal Rights in Hawaii Nei:

Appurtenant rights: Protects land that was cultivated by traditional crops before the colonization period, such as taro that requires a necessary amount of water to cultivate. Rights are attached to the land, not an individual. This right receives the highest level of protection under Hawaiian law and is considered a public trust purpose.

Native Hawaiian rights: Reinstates Article XII Section 7 of the Hawaii Constitution that states, "The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence cultural and religious purposes and possessed by ahupua'a (see Hawaiian Cultural Beliefs page) tenants who are descendants of native Hawaiians prior to 1778..."

Riparian rights: Protects the interests of people who live near a river or stream to reasonably use that riparian surface water source. Appurtenant and Native Hawaiian rights supersede riparian rights. Existing riparian rights cannot be severed from the riparian land regardless of sale or designated water management areas, however riparian landowners who are not using water currently from an adjacent stream may or may not be granted a new permit.

Michael Lee

91-1200 Keauniu Drive, Unit 614,
Ewa Beach, Hawaii 96706
808-683-1954

Please see attached Addendums:

1. HART Rail FOIA - ML
2. Hoopili Case - ML
3. BLNR Dec. 12, 2008 Item K-3 Contested Case Hearing Request – ML
4. OHA Letter Mr. Nomua
5. Previous Emails with HART - ML

Honouliuli TCP Information

Honouliuli Recognition papers Native Hawaiian Cultural Practitioner

HC's given by City Council as Native Hawaiian Cultural Practitioner

April 7, 2010 OIBC for TMKS of Haseko, etc Honouliuli

Navy recognized Section 106 consultant for Ewa Field PV site

HCDA recognized Native Hawaiian Cultural Practitioner

Recognized April 1, 2012 in Hoopili Case by Dr. Horton

Big Island– Hokulia case - Judge Ronald Ibara as is a precedents for Courts



Mike Lee's entire cultural practice is based upon the connectedness of the upland Karst water system where this very old Ti plant grows at Ewa Field, with the beach areas makai where he picks limu for food and medicinal purposes. Limu colonies vary greatly in type and quality depending upon the season of the year.



It is very important to understand that the fresh aquifer water that nourishes this young Wiliwili tree growing at Ewa Field, flows down through the ancient limestone to the shore to nourish a wide variety

of “House of Limu” seaweeds. Limu actually requires fresh water in order to survive. Without it the shoreline limestone rocks are bare and lifeless and an entire ecosystem is killed off.



Found in two different Karst sinkholes at Ewa Field were honey bee hives! This is extremely important for the health of the upland ecosystem and is also cultural history reminder that Ewa Plantation residents remembered how Karst sinkholes were known for honey bee hives. Not only are the bees well protected, there is water available to sustain their honey production.



Ancient coral at Ewa Field matches up perfectly with ancient coral down along the beach. The upland ancient coral often retains even more natural colors. The same sea creature fossil remains can be found. The sinkhole on the left contains WW-II era artifacts, which is not uncommon as archeological site surveys have actually missed a great deal that is still actually out there, including other military artifacts, aircraft parts and a wide variety of Hawaiian cultural sites- none on State site lists.



Unusual colors and textures of ancient coral colonies can be seen well upland at Ewa Field. This particular bright outcrop on the right isn't very commonly seen –perhaps mainly because tall grass often obscures them. It certainly looks like paint- but it isn't- it's coral!



Hunt PV site work shows spilled oil from heavy trucks being used. Beach sand indicates where Karst holes were filled up with beach sand from the shoreline sand dunes, which is where many burials are found. This white beach sand could very possibly contain Hawaiian iwi.



Part 3: Additional Comments and Testimony From KCH about Haseko EIS Hoakalei Master Plan Update

Comments for Notice of Intent to Prepare an Environmental Impact Statement for the Hoakalei Master Plan Update

From John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, HI. 96707

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814 with copies to the City and County of Honolulu, Department of Planning and Permitting (address above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

Aloha,

These comments are primarily about the trails and the history of Oahu Karst caves, for those who don't want to believe that these natural ancient coral underground caves (cavities, "voids", "dissolution pits" and popularly known as sinkholes) actually exist...

Unfortunately most of the evidence of the section of major trailways that ran through the Haseko TMK's are already destroyed. However, spirit marchers still use them and those who live on these trails in the future buildings will be FOREVER DISTURBED by these spirits and strange things will always happen at certain times of the year or season.

The City Council passed unanimously a resolution about the Ewa Trails and related Karst system in 2012 and this is attached.

This area is WW-II battlefield, Ancient Hawaiian burial area, Leina a ka Uhane-Spirit Leap, and location of 1825 Malden Trails which are actually around 1000 years old and likely built by Tahitians. This area cultural history has been told in the chants of Hi'iakaka- Pele's sister.

John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, HI. 96707

The migrations of Hawaiians to Hawaii of 400 and 450 A. D. and Lono I ka Makahiki, the landing place being Ewa, Oahu.

HUAKA'I-PO~Night Marchers~Juliette May Fraser 1950-1969

In Hawaiian legend, Nightmarchers (huaka'i pō or "Spirit Ranks," 'oi'o) are the ghosts of ancient Hawaiian warriors. On the nights of Kane, Ku, Lono, Akua, or on the nights of Kaloa they are said to come forth from their burial sites to march out to past battles or to other sacred places. They march at sunset and just before the sun rises. Anyone living near their path may hear chanting and marching, and must go inside to avoid notice. They might appear during the day if coming to escort a dying relative to the spirit world.

Anyone looking upon or seen by the marchers will die unless a relative is within the marcher's ranks- some people maintain that if you lie face down on the ground they will not see you. This is to show respect. Others say that this only works if you are naked, not true. However, if exiting the area is the fastest option, it is recommended. Still others say that you should be naked, lie face up and feign sleep, again not true, just lie face down and make no sound. Placing leaves of the ti (Cordyline sp.) around one's home is said to keep away all evil spirits, and will cause the huaka'i pō to avoid the area. Another thing is to always highly respect the night marchers which can result in great things.

The ceremony and conduct of the march is customized to the tastes of its honored leader. A chief known to be fond of music would be honored with much drumming and chanting. If the chief enjoyed peace and quiet, the march would be as silent as possible. If a chief did not like to walk around much, he would be carried in a sling. In old Hawaii, laws declared parts of a chief to be sacred, and not seen. The punishment for looking at these parts was death. If a chief's face was not supposed to be seen, he would lead. If his back was not to be looked upon, he would be in the back. However, for some chiefs, there was no part of them that was forbidden to look at. This chief would march among the other warriors in the group.

There are gods in some marches. The torches are said to burn brighter in these marches. The largest torches are carried at the front, back, with three within the group. The number five is key in Hawaiian mythology. In the march of gods, there are six gods, three male, three female. The Goddess named Hi'iaka-i-ka-poli-o-Pele, (commonly shortened to Hi'iaka), is often within the march. The marches are extremely varied.

"The first thing you will hear is drums in the distance, then you will smell a foul and musky odor, and you will hear a conch shell being blown, for fair warning to get out of the way, and you will see torches getting brighter and brighter as they get closer. Your best chance is to have an ancestor that recognizes you, they will call out, "Na'ul" which means mine. But if you are in the night marchers' bloodline no one in the procession can harm you. No matter what you build in their path they go straight through it. The night marchers are the vanguard for a sacred chief or chiefess who unusually have a high station in life." - Po Kane.
Haunted Hawaiian Nights,
by Lopaka Kapanui

The Makahiki season was the ancient Hawaiian New Year festival, in honor of the god Lono of the Hawaiian religion.

Na Huihui o Makali'i is a cluster of stars the English-speaking world calls the Pleiades or the Seven Sisters. The Makali'i is much revered in the Hawaiian tradition as the place from which, according to legend, the first Hawaiian people came to Earth and the star-based calendar of the ancestral Hawaiians has long placed special significance on their ties to the Makali'i.

Lono, the god of fertility and rain, was identified with southerly storms. He is sometimes referred to as the elder brother of Pa'ao, the influential priest who also arrived from the south and who instituted new rituals and beliefs in the Hawaiian religion. Lono took many forms, or kīno lau. He could be seen in the black rain clouds of kona storms, in flashing eyes that resembled lightning, or in kukui, a plant associated with the pig-god Kamapua'a. Kamapua'a and Pele were both close relatives of Lono. Pele was sometimes called Lono's niece, sharing his southern origins and favoring the rainy seasons and southern coasts for her eruptions.

It was a holiday covering four consecutive lunar months, approximately from October or November through February or March. Thus it might be thought of as including the equivalent of modern Thanksgiving and Christmas traditions. Many religious ceremonies happened during this period. The people stopped work, made offerings to the chief or ali'i, and then spent their time practicing sports, feasting, dancing and having a good time. War during those four months was forbidden (kapu)

Makahiki is a form of the "first fruits" festivals common to many cultures throughout the world. It is similar in timing and purpose to Thanksgiving, Oktoberfest and other harvest celebrations. Something similar was observed throughout Polynesia, but in pre-contact Hawaii the festival reached its greatest elaboration. Lono, the god of agriculture and fertility, was honored to ensure peace and productivity. Lono is seen, associated with or visualized as clustering or dark clouds, as thunder, the partial rainbow, whirlwinds, and even waterspouts - all aspects of Hawaii's winter season.

The Makahiki festival was celebrated in three phases. The first phase was a time of spiritual cleansing and making ho'okupu, offerings to the gods. The Kono'hiki, a class of royalty that at this time of year provided the service of tax collector, collected agricultural and aquacultural products such as pigs, taro, sweet potatoes, dry fish, kapa and mats. Some offerings were in the form of forest products such as feathers. The Hawaiian people had no money or other similar medium of exchange. These were offered on the altars of Lono at heiau - temples - in each district around the island. Offerings also were made at the ahupua'a, stone altars set up at the boundary lines of each community.

In the Hawaiian language, the word Makahiki means "year"[1] as well as the change from harvest time to the beginning of the agricultural season. This probably came from Makali'i hiki the rising of the Pleiades which occurred about this time.[4] It might also come from ma Kahiki, meaning roughly "as in Tahiti", since the legend of Lono is associated with voyages to and from Tahiti. Its origins are linked to the "return" of Lono, during one of the early migrations, in the form of a mortal man. When the Makahiki season closed, Lono went back to the ancestral lands of Kahiki (Tahiti) and Ku returned to be in charge for the growing season.

In ancient times, as the old year drew to a close, the priests associated with certain temples on the western side of each inhabited Hawaiian island would watch for the appearance of Makali'i - the Pleiades - a star cluster which appears in the evening sky in our October. When the priests could finally distinguish Makali'i in the eastern sky shortly after sunset, they announced the next new moon would begin the Makahiki season.

Although the Makahiki events and activities are not practiced to the same extent as in times past there are said to be those souls who return from the past to remind us of those earlier times. Some old-time residents of these islands can describe hearing the ancient drum beats echoing on particular nights in the vicinities of the temples and sites of the Makahiki celebrations.

Likewise on these nights, there are those who have witnessed spectral apparitions of royal processions of spirits in regalia from an earlier era proceeding along the ancient pathways previously used during the Makahiki season.

CURRENT STATUS OF THE EWA KARST, HONOLULU COUNTY, HAWAII

<http://www.caves.org/section/ccms/wrh/>

William R. Halliday

(Pre-printed from The Cave Conservationist - a future issue with a past date that will be out in late February 1998)

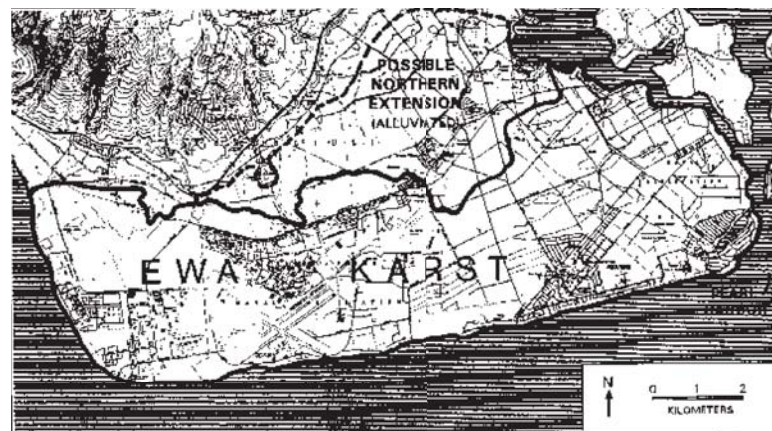


Figure 1. Map of Ewa Karst, base geology by Stearns and Vaksvik, 1935 modified by unpublished data of Board of Water Supply, courtesy Chester Lao. Cartography by Carlene Allred. [To see where this fits into the region, look at these maps from the Web.](#)

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1) Introduction

The Ewa Karst is the largest of several karsts on the well-populated island of Oahu, yet one of the least known (Halliday, 1994). Its exact dimensions are uncertain because geological maps show considerable upslope areas as alluvium and some shore areas as sand. However it clearly covers at least 50 km² in the southwest corner of the island of Oahu (Figure 1). It is a semitropical littoral karst formed on porous, permeable algal and coralline reef deposits formed during at least three high stands of sea level (Figure 2), perhaps with a higher content of sand-sized clasts of foraminifera than contemporaneous Caribbean deposits (Chester Lao, written communication, 1997). The type locality is at Waimanalo, at the east end of the island (Stearns and Vaksvik, 1935). From present sea level these calcareous formations rise to an altitude of about 20 m. Tidal fluctuations extend inland from the shore line but freshwater at least 10 m deep has been found within 2 km of the shore, floating on salt water in the form of a Ghyben-Herzberg lens. Hillsides and mountains upslope from the karst are volcanic (Figure 3). Presumably their runoff is acid, but no dissolution conduits are known in the upslope part of the karst. Some artesian flow is said to be present, confined by clay layers (Chester Lao, oral communication, 1997). The U.S. Geological Survey Ewa Quadrangle shows numerous sinking streams and closed depressions within the Karst. Some of the former are artificial: the result of past water diversion for farming, ranching and domestic use. Some of the depressions are manmade also. Most of the land surface of the karst has been subjected to more than a century of extensive reworking by man.



Figure 2. Stratigraphy of carbonate

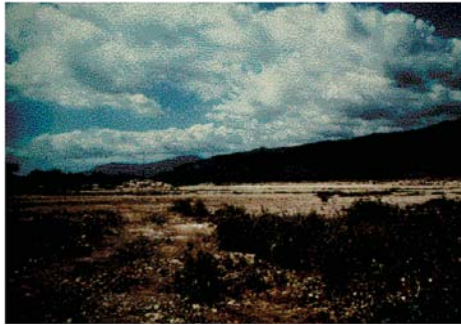


Figure 3. Ewa Karst near barge harbor in 1977,

formations near barge harbor, exposed in quarry wall. WRH photo, July 1997.

looking north toward south end of Waianae Mountains, with vegetation and karstic surface bulldozed. Photo by Ben Atnoi, courtesy Alan Ziegler.

2) Environmental history

Despite its impressive extent and archaeological and palaeontological values, the Ewa Karst is almost entirely unknown to karstographers and speleologists. The late James Quinlan, former hydrogeologist of Mammoth Cave National Park, served as consultant on one project, but my conversation with him shortly before his death led me to believe that he evaluated his study area in terms of classical karst, not sea level karst. His report is not generally available, but he is understood to have noted nothing of significance. In 1955, the late Harold S. Palmer (Professor of Geology at the University of Hawaii) told me he had seen a meter-long stalactite said to have come from a cave in the Ewa Karst (Halliday, 1955, 1958). Extensive bibliographic and some field investigations have yielded no information about this cave and it is not known if it still exists. In 1970, Macdonald and Ahhott mentioned the presence of small caves in calcarenite and aeolianite in this and several other karstic localities (Macdonald and Abbott, 1970) but did not amplify. In July and August 1977 Morganstein and Child conducted a "geological and geo-archaeological reconnaissance in the form of examination of several sinkholes (sic) at Barbers Point" (Hawaii Marine Research, Inc., 1978). They recognized the existence of karst, but their report contained such statements as:

With regard to land utilization, karst regions are generally unfavorable today because of their undulating and dangerous topography...

Their term for a sizeable phreatic dissolution cave accidentally opened in 1973 during quarrying operations ("Site B6-139") was "unmodified wet sink-cave". Quarry operators deliberately tried to fill this cave before 1977 archaeological and palaeontological salvage studies (Sinoto, 1978, p. 45) but it was too large.

Prior to World War II, the principal use of the karst was growing and processing sugar cane, with only small residential communities. Ranching was a smaller industry, in drier areas. For both purposes, native vegetation was destroyed until only tiny remnants remain. Keawe (thorny acacia) was planted as cattle feed. Where not bulldozed in turn, it persists as the dominant vegetation of unurbanized areas. Recent stripping techniques utilize a chain stretched between two bulldozers.

A large naval air station was one of the earlier modern developments on the karst. Currently it is scheduled for closure. Since World War II, industrial parks, quarries, oil refineries and storage tanks, a barge harbor dredged out of an especially cavernous area, the new, growing city of Kapolei, a controversial lead-cadmium dump (Alan Ziegler, oral communication, 1997) and other developments have replaced the

sugar cane which no longer is a profitable crop in Hawaii) (Figures 2,3). Most of this development has occurred without recognition of the special qualities of littoral karat, or appreciation of it. Dredging for the new barge harbor destroyed the most notable cave known in the Ewa Karst without it even receiving a name (Figures 4,5). For unclear reasons, it was rarely even termed a cave and was variously referred to as a "flooded sink", a "wet sink(cave)", etc. It quickly became famous in palaeontological circles because of its content of bones of extinct birds (Figure 6). Then it was destroyed in order to construct the farthest reaches of the barge harbor. "None of the researchers has suggested that the proposed \$100 million harbor should be cancelled to save the sites", the **Honolulu Star-Bulletin and Advertiser** noted (Benson, 1977), and none notified the American cave conservation movement, which was strong and active at that time. Although it contained no archaeological material, this cave is remembered today only by the Bishop Museum archaeological site number "B6-139". The American cave conservation movement learned of it two decades too late.



Figure 4. Stalactites and stalagmites in destroyed cave B6-139. August 1977 photo by J.K. Obota, courtesy Alan Ziegler.



Figure 5. Swimmers in destroyed cave B6-09. August 1977 photo by Ben Obata, courtesy Alan Ziegler.



Figure 6. Subfossil bird bones from destroyed cave B6-139. August 1977 photo by J.K. Obota, courtesy Alan Ziegler.

3) Some features of the Ewa Karst

Morgenstein and Child (Hawaii Marine Research, Inc., 1978) noted:

... the west sink(cave) contains well-formed stalagmites (sic) and stalagmites, some of which are subsurface.

Algal coloration of the high cave aragonite skins indicate that the water levels were at one time elevated above the present mean water table. Various fossil birds are impregnated and cemented with aragonite on the rubble terraces of the cave. The cave was therefore actively precipitating aragonite prior to the birds; arrival, during their entrance into the cave, and during their departure.

They also noted water level fluctuations of 40cm (16 inches) even though the cave is almost 2 km from the shore. However it was left to archaeologist Aki Sinoto to provide details about the cave. He termed it "a unique flooded sinkhole", and found that it measured 11 m in diameter. Fresh to brackish water filled 2/3 of parts of the cave. A nocturnal marine isopod, blue-green algae, and minute red shrimp (*Holocaridinea rubra*) were observed but the primary finding was the rich deposit of intact bones of subfossil and-extinct birds (Sinoto, 1978).

Morganstein and Childs examined and described several other karstic features in and near the harbor-to-be: "... representative sinkholes ... and two major sinkholes (B6-78 and B6-100C)" which they excavated (Hawaii Marine Research, Inc., 1978). B6-78 proved especially important for recent and subfossil mollusca which are excellent indicators of recent environmental conditions (Kirch, 1977). Review of their descriptions, photographs, and maps shows that none of these features were what karstographers or speleologists term **sinkholes**. Yet their term lives on today, probably with serious adverse environmental effect. Most of them are typical small dissolution pit caves (Mylroie and Carew, 1995, p. 60). Nearby is a phreatic dissolution cave of the type called "banana holes" in the Caribbean (Mylroie and Carew, p. 63). A short distance outside the Morganstein/Carew study area, it is an ovate, overhung cavity about 6 m deep and 10 to 20 m in diameter, partially open to the sky as a result of ceiling instability. It was a habitation site for ancient Hawaiians, with a tall, thin rockpile for entry and egress, a hearth containing a burned bone of an extinct giant goose, and other features. Its surroundings now are fenced off by its owner (Campbell Estate), and retain a near-natural state even if not a pristine one (Ziegler, 1990b). On state-owned land nearby, another fenced area contains a much smaller dissolution cave of archaeological significance ("B6-137") (Ziegler, 1990b). Unlike "B6-22", much of the land surrounding it appears to have been bulldozed recently.

In addition to these fenced areas, a small plot on the seaward side of Malakole Road is fenced to preserve a small group of specimens of rare and endangered native plants. This area also is on private land; their protection was a specific requirement for approval of development of a large adjoining area of the karst (Alan Ziegler, oral communication, 1997). Coincidentally, this fence also protects a fine group of epikarst features and pit

caves ½ to 2 m in diameter. Some extend well below mean sea level. Their water is brown and fluctuates perceptibly with tides. Alan Ziegler has removed large quantities of rubble from some of them, under conditions of considerable difficulty. Some other examples have escaped development about 1 km farther north, between Malakole Road and the beach berm (Figure 7). They are largely filled with rubble, but are the only easily inspected examples of Ewa Karst pit caves. They have no protection at all.



Figure 7. Tidal pit cave near barge harbor. July 1997 photo by WRH.



Figure 8. Typical landscape in "8 Acre Tract." July 1997 photo by WRH

4) Present conservation efforts

No part of the Ewa Karst thus has been set aside as an example of the karst *per se* but various individuals and organizations have achieved protection of small areas for coincidental reasons. A similar effort has long been spearheaded by Alan Ziegler, formerly a Bishop Museum vertebrate zoologist. The present protection of "B6-137" is largely due to his efforts, including 1990 testimony to the Hawaii State Legislature on behalf of the Hawaii Audubon Society (Ziegler, 1990 ash). "B6-22" already had been fenced as a result of his persuasiveness. For more than a decade he has been reasoning with the Campbell Estate, the Hawaii Department of Land and Natural Resources and legislature and anyone else he can persuade to listen and/or come and look at another 8-acre parcel confining more than 100 pit caves (Figures 8 and 9). The caves of this area also are notable for their content of bones of extinct birds and land snails (Figure 10). In 1990 he testified:

During the past several years, with the kind permission of the Campbell Estate, several hundred people including students of elementary school through university graduate level have enjoyed group visits to these conveniently located sinkholes and have even had an opportunity to climb down into one and dig for a few fossil bones themselves (Ziegler, 1990a).

But only in 1996 did a few members of Hawaiian internal organizations of the National Speleological Society learn of his work and see what he has shown so many others. We came away convinced. The proposed zoning change that would destroy this area still is in abeyance after more than a decade. But protection of the caves and the 8 acres of karst is an uphill struggle. It may seem amazing that, until recently, the world of cave conservation knew nothing of Ziegler's efforts. But perhaps it would have done nothing even if requested. very few cave conservationists are interested in working to save sinkholes when so many caves need protection so urgently. Truly, seeing is believing here, and understanding that these so-called sinkholes are karstic pit caves -- important structures in their own right, not just collapses containing bird bones and snails (Figure 10). One of these caves -- "Coralloid Cave" is a little chamber nearly 5 m deep, formed by the confluence of three chimneys (Figures 11 and 12). "Rusty Wire Sinkhole" also is better described as a pit cave, and there are more than 90 other "sinkholes"/caves not yet seen by speleologists in this little 8-acre tract.

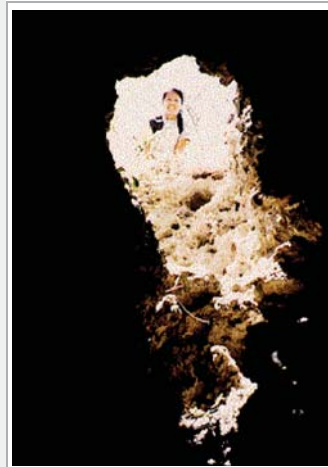


Figure 9. Small phreatic dissolution-cavities in "8 Acre Tract". July 1997 photo by WRH.



Figure 10. Subfossil bird bones and land snails from cave in "8 Acre Tract". March 1997 photo by WRH.



Figure 11. Interior of Coralloid Cave. July 1997 photo by WRH.



Figure 12. Coralloid speleothems in Coralloid Cave. July 1997 photo by WRH.

5) Conclusions and recommendations

Obviously these little caves aren't much for recreational caving, and the area was dragged by bulldozers, but its scientific values are exceptional. Speleologists and karstographers should support Ziegler's effort.

Further, other small remnants of the original karstic features may remain farther east, protected only by chance. A detailed inventory of such remnants is badly needed. The planned closure of Barbers Point Naval Air Station offers a special window of opportunity. In any event, it is [time to save](#) some of the Ewa Karst for its own karstic values, as an example for all Hawaii.

Acknowledgments

Alan Ziegler provided notable on-site guide service and explanations of the resources and values of these small parts of the Ewa Karst, together with much background information. Chester Lao, Board of Water Supply hydrogeologist, provided information on the extent and hydrogeology of this karst, and Hunter Johnson and Michael Kliks of the Hawaii Grotto of the National Speleological Society provided logistic and field support.

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CAVINGNEWS

Hawaii's Kanehili Ewa Karst Caves are Under Threat

March 11, 2013 - John Bond

Hawaii's Kanehili Ewa Karst Caves are allegedly under threat of destruction from Navy contractors.

John Bond of Kanehili Cultural Hui, an organization working to identify and preserve Ewa Hawaiian cultural sites, reports that the caves, some discovered as recently as earlier this month, are located beneath the Hawaiian Electric Company Power Line and PV Farm construction projects.



As part of the project, Hawaiian Electric Company is drilling down 9 feet below the surface to install a major 46 kV power line.

Despite that they will knowingly be they will be breaking into ancient Hawaiian caves just below ground with their boring and drilling equipment, the Navy has refused to undertake an Archaeological Inventory Survey.

The entire Kanehili Ewa Karst area is a major ancient Hawaiian cultural site, with references in 1,000 year old chants of Hi'iaka.

Although many of the caves remain unexplored due to lack of proper equipment, with the only images of the insides resulting video camera lowered down into cave entrances, previous military records note Karst caves as large as railway cars.

Kanehili Cultural Hui is now working to alert news organizations on the mainland to bring awareness to this "major injustice."



Wednesday, December 19th, 2012 | Posted by Robert Thomas

City's and U.S. DOT's Arguments
Robert D. Thornton (Nossaman LLP, Irvine, California argues:

"no indication of karst caverns" and "no karst cave systems."



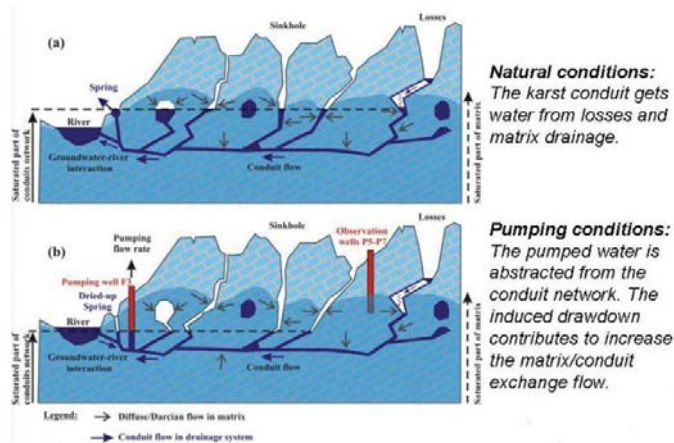
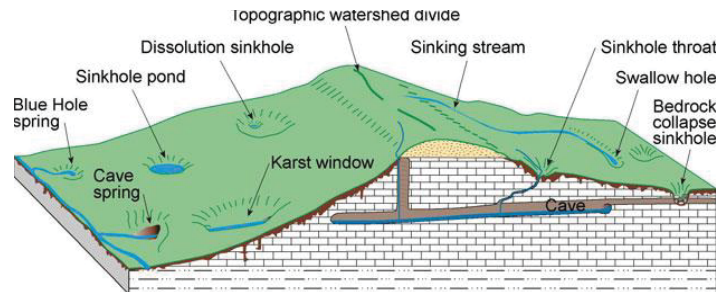
<http://www.hawaiireporter.com/guest-post-an-update-on-the-federal-court-rail-project-challenge-remedy-phase/123>

As ordered by the Hawaii state court, defendants have now completed all archaeological activities in Phases 1, 2 and 3, and the State Historic Preservation Office (SHPO) has reviewed and concurred on July 3, 2012. Only two TCP sites were identified in those areas as eligible for the National Register, and pursuant to section 4(f) regulations (23 CFR 774.15(f)(1)), there will be no impact on either of those sites. Plaintiffs now raise, for the first time, a "late hit" – unsubstantiated claims of burials in the karst topography of the Ewa plain. But as previously found by the SHPO and the state Land Use Commission (LUC) in other cases, there is "no indication of karst caverns" and "no karst cave systems."

There is "no indication of karst caverns" and "no karst cave systems." ???

Karst Preserve – US Fish & Wildlife

http://www.fws.gov/southwest/es/Documents/R2ES/Bexar_RP_Preserve_mod%20_revised.pdf



“Water for Life – Ka Wai Ola.”

“Protection of this resource should lead

the way in popularizing the need for similar protection in other

neglected karst and pseudokarst throughout Hawaii.”

WILLIAM R. HALLIDAY - Hawaii Speleological Survey

William R. Halliday- History and Status of the Moiliili Karst, Hawaii. *Journal of Cave and Karst Studies* 60(3): 141-145.

<http://www.caves.org/pub/journal/PDF/V60/V60N3-Halliday.pdf>

A 1934 construction excavation intersected a previously unknown karstic master conduit at a depth of -7 m msl. Temporary dewatering of over 3.7 x 10⁹ L caused considerable economic loss due to collapses and subsidence in a wedge-shaped area about 1 km on each side. These outline a previously unrecognized dendritic karst drainage. Considerable retrograde flow of salt water also occurred. Subsequent urbanization again lowered the water table and dewatering phenomena are still occurring. A section of Moiliili Water Cave is the only clearly karstic feature that remains available for study. It serves as a floodwater conduit. Surprisingly, its water quality has improved since 1983. Its protection should be a prototype for other Hawaiian karsts. Other sections of Honolulu also are underlain by reef limestone and may be at risk.

CURRENT STATUS OF THE EWA KARST, HONOLULU COUNTY, HAWAII

<http://www.caves.org/section/ccms/wrh/>

from The Cave Conservationist – William R. Halliday 1998

Large Caves Found In Ewa

The Ewa Karst is the largest of several karsts on the well-populated island of Oahu, yet one of the least known (Halliday, 1994). Its exact dimensions are uncertain because geological maps show considerable upslope areas as alluvium and some shore areas as sand. However it clearly covers at least 50 km² in the southwest corner of the island of Oahu (Figure 1). It is a semitropical littoral karst formed on porous, permeable algal and coralline reef deposits formed during at least three high stands of sea level (Figure 2), perhaps with a higher content of sand-sized clasts of foraminifera than contemporaneous Caribbean deposits (Chester Lao, written communication, 1997). The type locality is at Waimanalo, at the east end of the island (Stearns and Vaksvik, 1935). From present sea level these calcareous formations rise to an altitude of about 20 m. Tidal fluctuations extend inland from the shore line but freshwater at least 10 m deep has been found within 2 km of the shore, floating on salt water in the form of a Ghyben-Herzberg lens. Hillsides and mountains upslope from the karst are volcanic (Figure 3). Presumably their runoff is acid, but no dissolution conduits are known in the upslope part of the karst. Some artesian flow is said to be present, confined by clay layers (Chester Lao, oral communication, 1997). The U.S. Geological Survey Ewa Quadrangle shows numerous sinking streams and closed depressions within the Karst. Some of the former are artificial: the result of past water diversion for farming, ranching and domestic use. Some of the depressions are manmade also. Most of the land surface of the karst has been subjected to more than a century of extensive reworking by man.



Swimmers in destroyed cave B6-09. August 1977 photo by Ben Obata

Their term for a sizeable phreatic dissolution cave accidentally opened in 1973 during quarrying operations ("Site B6-139") was "unmodified wet sink-cave". Quarry operators

deliberately tried to fill this cave before 1977 archaeological and palaeontological salvage studies (Sinoto, 1978, p. 45) but it was too large.

In February 1994, heavy machinery belonging to Hawaiian Cement collapsed and filled a portion of a sinkhole containing bones and a plank from a traditional Hawaiian canoe. Some of the skeletal remains are human, and in all likelihood, those of native Hawaiians. All work in the immediate vicinity of the sinkhole ceased and staff of the State Historic Preservation Division (SHPD) were called in to review the extent of damage caused to the cave.

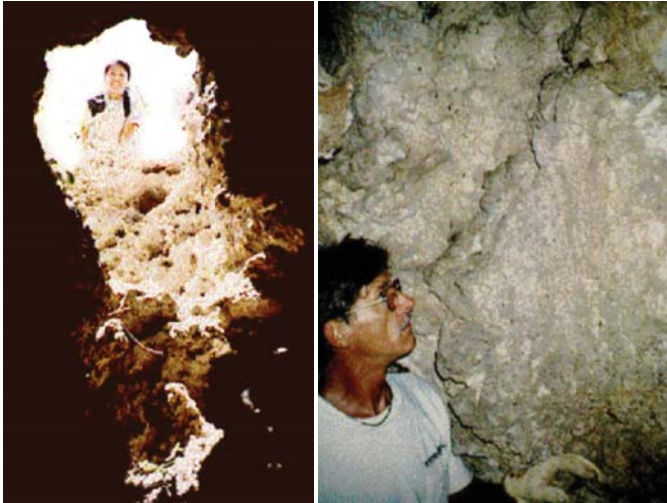
The parcel at issue is situated in the ahupua'a of Honouliuli, in the moku of Ewa, on at Tax Map Key 9-1014:002. The landowner is The Estate of James Campbell.

In December 1976, the Bishop Museum completed a cultural resources and identified a site of a limestone sinkhole/cave shelter with modified interior, 35 meters W [west] measures 2 by 1 meters and 2 meters deep. Large circular area, 5 meters in width under the overhang N of the opening. A smaller raised floor area continued on.

Where the bedrock floor rises at the perimeter of the initial interior floor, a platform is constructed about 0.6 meter [sic] high. A possible step is built into feature. Good deposit on interior floor of circular area. This feature is rather Project Area from both archaeological and geological aspects" (given the Bishop Museum identification number B6-137.)

In December 1991 (Hammatt and Shideler 1991) and in 1994 (Hammatt et al. 1994), worked occurred for sites within the "Proposed Barbers Point Harbor. The sinkhole burial site was assigned state site number 50-80-09-9633. the site and surrounding area as it was drawn for the 1994 study.

In February 1994, the sinkhole burial site was impacted by heavy machinery Hawaiian cement. The impacts consisted of filling the site with soil and debris large coral stones. A site inspection was conducted by Dr. Tom Dye, SHPD O'ahu and Assistant O'ahu Archaeologist Elaine Jourdan at which time the presence of bones, including human skeletal remains were visually confirmed.



Campbell Eight Acre Sinkhole Tract, Dr. Alan Zeigler, July 1997. Photo by WRH

In Kalihi Valley on the Kamaniki side there was once a shallow cave called Keana Kamano. It was given the name cave of the sharks because the great shark god from Pearl Harbor often went there to rest. Keana Kamano was believed in olden times to occupy the center of the island. It was said that one branch led to Pearl Harbor and another to the center of the island, where there was a sacred pool for swimming. Though, in 1900 there was an earthquake that caused the cave to close. No one has entered since (Sterling, 1978, pg. 322).

Sterling, Elspeth P., and Catherine C. Summers. Sites of O'ahu. Honolulu: Bishop Museum Press, 1978.

Important Hawaiian Cultural History Associated With Karst Caves

Pohukaina, former tomb of Hawaiian kings and chiefs, on the grounds of 'Iolani Palace.

Was there really a cave at Pohukaina?

"In the distant past, Waikiki and all the areas up to the Manoa valley were underwater, and there are massive limestone formations, unlike lava tubes which are of volcanic origin, these are of coral. Geologists call this "karst" formations. It's a kind of geologic formation, with vast underground reservoirs, caves with fresh water but also saltwater coming in, and even fish making their way in from the ocean. There are stories of blind mullet in Mo'ili'ili, and many stories of underground springs. The place names are very revealing: Punahou is a spring. Waikiki is 'the spouting waters'."



What of the name "Pohukaina"? Puakea tells us, "The land came to be called Pohukaina there, which gets translated as 'Pohu-ka-'aina'— that 'the land is quiet and calm.' Remote from the hubbub of Waikiki, and from the roar of the sea.

Pohukaina thus forms a sacred place of considerable significance. And so too is its neighboring site, though for different reasons. 'Iolani Palace remains an important site of the Hawaiian Kingdom, past and present.

Hawaiian scholar Samuel Kamakau refers to Konahuanui as the highest point of Pohukaina, a sacred burial cave for Hawaiian royalty that stretches through the Koolaus to an opening near Kahuku.

The Hausten Pond at the Willows (Karst water cave and spring)



<http://hawaiiantimemachine.blogspot.com/2010/09/hausten-pond-at-willows.html#/2010/09/hausten-pond-at-willows.html>

The 1934 dewatering

History of Moiliili Karst

The Karst was an integral part of the economy and world above it. There were several ponds that were fed by karsic springs. One was located west of University Avenue, upslope of Beretania Street. The Kanewai underground pond was important to Hawaiian culture, because its water was said to have healing properties. There was also an implication of a connection from the cave to the ocean due to a legend about fish in the caves hearing the fishermen's plans and swimming out to tell the ocean fish (Army: 9). Another important spring fed pond was the Hausten (formerly Kumulae) pond. Originally the pond was a favorite of Queen Kamamalu (sister of Kamehameha IV and V). The pond served as an enjoyable picnic site for the Queen and her brothers. Hawaiian royalty loved swimming in the ponds, which were also said to have healing powers (Willows Flyer: Appendix A). The pond became the site of the Willows restaurant, and served as an attraction to customers. It was stocked with koi, which interbred with the existing fish creating a school of colorful fish (Halliday 1998).

The 1934 Dewatering

In 1934, a construction endeavor downslope struck a master conduit of the karst. This caused massive water drainage of the upslope area (Halliday: 1998). According to William Halliday (1998:143), "for more than four months, an average of 3.8 x 10⁷ L was pumped daily before the hole could be sealed and construction resumed." The total amount pumped before the leak could be sealed was greater than one billion gallons of water (Halliday 1997). "The pumped

water contained 25% of the chloride content of the ocean," thus indicating retrograde flow from the ocean (Halliday 1998:144).

The lowering of the water table has had several consequences on the surrounding area. The dramatic changes in the karst from before 1934 to present time are a result of the dewatering. There is assumed to have been considerable economic loss as sidewalks split, water and gas mains ruptured, trees sank, and houses rose and settled (Halliday 1998). The spring feed ponds vanished within 24 hours, taking some fish into the karst, while leaving others stranded. There have been several instances of collapses since the dewatering. One instance involves the Standard Trading store falling through the ground into the karst below it (Watanabe 1996). Another instance involves the emergence of a large cavern downslope from the King-University intersection. Some fish that disappeared from the Hausten Pond were seen there (Halliday 1998).

The leak was repaired, but had changed the karst forever. Several spots in the formation were deliberately filled, with no consideration of the organisms within. The change in the water table also had consequences for the Willows Restaurant. The pond had to be lined with concrete, and the willow trees wilted (Halliday 1998). The restaurant lost much of its appeal at the time, but has since been restored. The cave-ins greatly reduced the size of the cave network, and changed access to the underground. The University of Hawaii Quarry was destroyed to create athletic facilities and a parking structure. Most surface karstic formations have been destroyed, and the Water Cave is the only place where bare limestone can be seen. It is enterable by only by a sewer grate, and despite the impacts of human intrusion, "construction fill, metal pilings, and trash swept into the system by floodwaters," the cave has been able to retain its cool, clear water and beautiful landscape (Army: 2003).

Earlier, the near-idyllic life of the Houstens was abruptly challenged by a construction accident. In 1934, municipal workers struck a master conduit of the underground network. This caused massive water drainage and a drastic lowering of the water table that had severe consequences for the surrounding area — sidewalks split, water and gas mains ruptured, trees sank, and houses rose and settled.

The spring-fed pond at the Houstens vanished within 24 hours, its fish swallowed up. Then a large cavern emerged downslope from the King-University intersection in which fish from the Hausten Pond were seen. The willow trees wilted and the gardens lost much of their appeal, but the pond was saved by lining it with concrete and its surroundings have since been restored.

The 1934 cave-ins and subsequent human actions have greatly reduced the size of the subterranean network beneath Mo'ili'ili. Most of the original formations have been destroyed and the water cave beneath University Avenue is the only one still intact. In some areas, the cave has a height of ten feet and a depth of up to five feet. It is accessible only by a sewer grate, and despite the impacts of human intrusion, the cave has been able to retain its cool, clear water.

Recent exploration has confirmed the existence there of blind catfish and blind spiders and other fresh water fish.

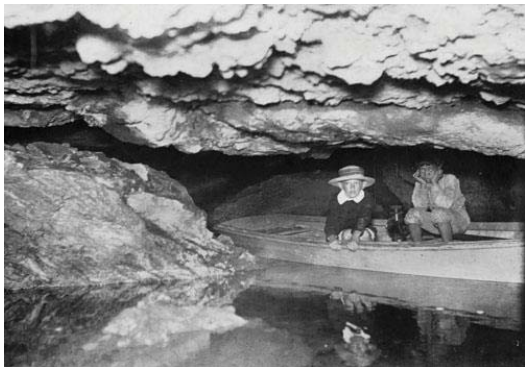
HISTORY AND STATUS OF THE MOILIILI KARST, HAWAII

<http://www.caves.org/pub/journal/PDF/V60/V60N3-Halliday.pdf>

The Moiliili Karst occurs in Pleistocene reef limestone located in a populous, low-elevation area of Honolulu, Hawaii. A 1934 construction excavation intersected a previously unknown karstic master conduit at a depth of -7 m msl. Temporary dewatering of over 3.7 x10⁹ L caused considerable economic loss due to collapses and subsidence in a wedge-shaped area about 1 km on each side. These outline a previously unrecognized dendritic karst drainage. Considerable retrograde flow of salt water also occurred.

Subsequent urbanization again lowered the water table and dewatering phenomena are still occurring.

A section of Moiliili Water Cave is the only clearly karstic feature that remains available for study. It serves as a floodwater conduit. Surprisingly, its water quality has improved since 1983. Its protection should be a prototype for other Hawaiian karsts and pseudokarsts. Other sections of Honolulu also are underlain by reef limestone and may be at risk.



Moiliili Karst boating expedition photographed in 1897 in what was part of it.

Urbanization has destroyed most surface karstic features. A large pond fed by a karstic spring was located upslope of Beretania Street west of what now is University Avenue. This street extends

north on the bed of another (Williams 1935). The former Hausten (Kumulae) Pond farther downslope (discussed below in detail) was another famous feature.

As in much of southern Oahu, the karst bedrock is reef limestone of the Pleistocene Sangamon Interglacial Stage, deposited during a sea level stand 8 m above modern sea level (Stearns 1939).

from Highway H-1 at the site of the former entrance of University of Hawaii Quarry Cave which is partially roofed by the lava (Fig. 2).

Accumulations of similar sediments overlie the limestone farther west. The best-known geological map of the island (Stearns 1939) shows these sediments in most of the coastal strip between Diamond Head and Pearl Harbor, Westward toward and beyond the latter, buried or surficial reef limestone extends many kilometers, to and beyond Pearl Harbor, where Ford Island is entirely calcareous (Stearns 1939). Romantic journalism (e.g., Williams 1935) refers to “miles and miles” of caves here. Although considerable artesian water has been obtained by drilling, a few long drained ponds are the only karstic features known to have existed between the Moiliili Karst and Pearl Harbor.

KARSTIC FEATURES KNOWN IN MOILIILI PRIOR TO 1934

The Sugarloaf lava was quarried extensively, exposing some underlying limestone. Evidently in the early or mid-1920s, a cavern about 8 m wide and up to 5 m high was found in limestone originally overlain by lava, at 2 m msl (Stearns & Vaksvik 1935). Apparently this was a short distance east of University of Hawaii Quarry Cave, whose entrance opened spontaneously in 1978 or 1979 beneath an office building (although fish and invertebrates were observed, authorities soon filled the entrance).

In the first decade of the century, another dissolution cave (not mentioned by Stearns) was entered upslope from South King Street. It is not clear whether this was part of Moiliili Water Cave, or another, now lost. In 1928, still another cave containing a large flow of water was intersected by sewer construction a short distance farther east. Its stream elevation was about 1 meter (Williams 1935; Stearns & Vaksvik 1935). Two pumps yielding 1.5 x 10¹⁰ L per day did not appreciably lower its water level, and special beams had to be installed to support sewer lines (Chester Wentworth, quoted in Williams 1935).

The best-known of the perched water-table ponds was Hausten (Kumulae) Pond, at what became the Willows Restaurant, about 0.3 km southwest of the King-University intersection. Mr. Hausten purchased and cleared the land in the early 1920s, and stocked the pond with koi which interbred with existing fish. This produced a large school of colorful fish which came on signal to be fed. The large clear fishpond quickly became a noted attraction.

In the autumn of 1934 the karst and its drainage were altered profoundly. Five hundred meters downslope from the King-University intersection, construction activities struck a karstic master conduit -7 m msl. The excavation was 18 m² and ~8 m deep (Lao n.d.). A “gushing flow” quickly filled it.

A telephone pole lowered into the hole found a bottom at -10 m msl (Kunesh 1934). The flow was not recognized as karstic, and was attributed to “a lamina of shallow secondary artesian water” (Honolulu Board of Water Supply 1933-34). For more than four months, an average of 3.8 x 10⁷ L

was pumped daily before the hole could be sealed and construction resumed: a total of more than 3.8 x 109 L.

Upslope, the results of this dewatering were dramatic. The Hausten pond disappeared without warning, draining in less than 24 hours. What was described as “a huge outlet” appeared in its bottom, -2 m msl (Kunesh 1934; Wentworth 1953). Some of the famous fish were stranded. Others disappeared into the conduit system. New sinkholes developed. “People living in the vicinity made their way into the caves through holes in their yards and speared fish by the hundreds”(Williams 1935). Several houses “lurched” and settled. Sidewalks cracked and water and gas mains ruptured. Some trees sank almost 1 m (Kunesh 1934; Lao n.d). No accurate determination of the total economic loss is known, but it must have been considerable.

THE KING STREET COMPLEX

Aside from the Hausten Pond area, the most serious effects were southeast of the King-University intersection. “Huge caverns were exposed to view”, seemingly continuous from the conduit rupture to a point above South King Street—a distance of 0.5 km (Honolulu Board of Water Supply 1933-34). About 30 m downslope from the King-University intersection, “a room-sized cavern” suddenly appeared, 3 m below the surface.

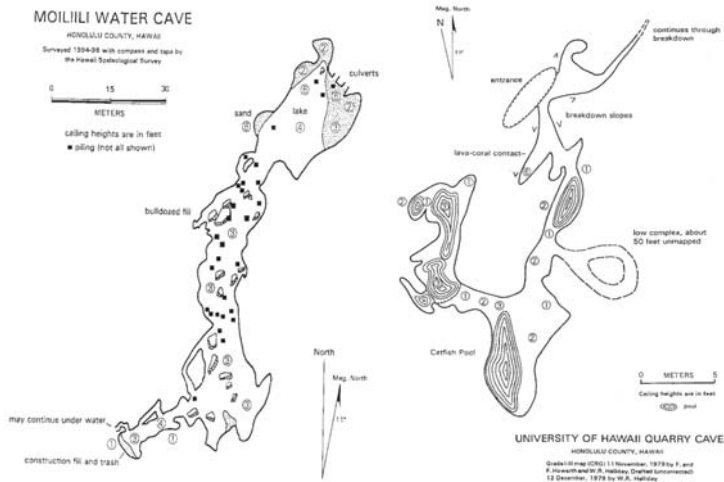
Some of the restaurant’s missing koi were seen, and a hip-booted party found a passage extending 30 m downslope to another entrance. Still another passage extended east under South King Street to the 1928 cavern (Fig. 1). In both upslope branches, water flow was toward the King-University intersection, thence down-slope along what became the southward extension of University Avenue.

Direction of ordinary flow of the Hausten Spring branch is less clear. During the dewatering it flowed toward the University Avenue conduit. This may have been a reversal of its normal flow, which was unrecorded. A 1935 map shows another branch or a separate cave beginning beneath Kuilei Lane (between Hausten Pond and the King-University intersection) and crossing beneath the planned southward extension of University Avenue. The latter was rerouted, but its construction probably unroofed and filled part of the master conduit (Wolfe 1975). In addition to this catastrophic dewatering, some retrograde flow came from the ocean.

Various sewer projects and other urbanization caused sequential lowering of the water table from 1935 to about 1955, and again in the late 1980s. Several relatively small “cave-ins” are well documented near the King-University intersection. One was in line with the lower end of Moiliili Water Cave. Economic loss was comparatively small, but on at least one occasion, a parked car had to be hauled out of a brand-new sinkhole.

In 1975, detailed gravity microsurvey revealed two waterfilled caverns beneath Kuilei Lane, apparently unaffected by the dewatering. Apparently they are independent of the cave shown in this location in 1935. The larger of these is 9-11 m wide and up to 3.5 m high (Wolfe 1975).

One costly 1989 subsidence in Waikiki, however, is on record (Lao n.d.) and in the present litigious era, future excavations in the reef limestone should be conducted in strict conformance with karstic engineering principles. The area downslope from the swallets of upland streams between Moiliili and Punchbowl Crater is at especially high risk of breaching unknown karstic conduits like the one intersected in Moiliili. Similar precautions are needed in some coastal areas elsewhere in Hawaii.



Map of Moiliili Water Cave.

Map of University of Hawaii Quarry Cave.

The subterranean caverns and Springs of Mo'ili'i

It has been known for many years that the Mo'ili'i area has an intriguing system of subterranean caverns which are believed to stretch from Mānoa Valley to Diamond Head and eventually to the ocean. Contrary to popular belief, the caverns are not lava tubes but limestone which was gradually hollowed out over the years by contact with rainwater that flowed down from the valley.

In the 1890’s, Captain John Ena discovered a large underground cavern filled with fresh water mauka of King Street near the quarry. This huge pond was teeming with fish so the captain purchased a rowboat from which he could catch them with spears and nets. His son Tom even learned to swim and row in this underground pond!

In some places, the caves were only a few feet from the surface of the ground. Old time residents of the area recall that some people were able to drop fishing lines into the caverns through holes that opened up in the ground to catch nice, plump mullets! Many of these fish were blind as they lived in a world of darkness and gradually lost the need for eyesight. One

enterprising taxi driver used to fish this way between fares and sell his catch to the local markets!

About one hundred yards across from Varsity Theater, there was a spring fed pond in a limestone cave where people would wash down horses and catch mullet with scoop nets. In that same vicinity, there were other ponds and ditches which have since been filled in or sealed off.

The Kanewai underground Karst pond was important to Hawaiian culture



Kanewai is where Manoa Stream emerges from the valley and opens to the broader expanse of the Waikiki floodplain. Manoa Valley's historically abundant rainfall ensured an endless flow of water capable of supporting irrigated agriculture downstream. For this reason, an auwa was dug at Kanewai, diverting water from the stream to nearby pond fields.

Archaeological surveys and historical documents indicate that the Kanewai area was used primarily for agricultural production since the 15th century. During that time, Chief Kalamakua, well known for his farming, constructed numerous pondfields from the uplands to the sea.

Kaleiheana, who had served as konohiki for the lands of Kanewai since the time of Ke'eaumoku, staked his claim for a portion on August 14, 1846 and on October 13, 1848 received the largest award given to a private individual in the ahupua'a of Mānoa. Testimonies given at that time indicate that the lands of Kanewai were primarily used for taro cultivation.

A Kanewai legend tells of fish who swam up from the ocean to the large underground pool named Kanewai which was located on the mauka side of King Street near the quarry. The fish

would quietly eavesdrop on the plans made by native fishermen who often spent time in the area. They would then go back to the ocean to warn their friends!

The waters of Kanewai, also known as the healing waters of Kane, were much sought after by the Hawaiians. Queen Lili'uokalani was also reported to be interested in the Kanewai pool.

Fish tales spring from Moiliili sinkholes



Former Star-Bulletin reporter Phil Mayer, left, and Chester Lao of the Board of Water supply check out a stream in a Moiliili cavern.

<http://archives.starbulletin.com/96/10/24/features/story3.html>

By June Watanabe
Star-Bulletin

WHEN University Square was built in 1957, the developers configured it in an "L," carefully avoiding the notorious Moiliili sinkholes.

Beneath the streets, homes and businesses around King Street and University Avenue lies a network of caverns and underground springs from which have sprung countless stories of fact and fantasy.

Old timers remember when the Standard Trading store, located just about where Central Pacific Bank in University Square is, actually "just fell in." This was in 1952.

Even earlier, Sidney Kashiwabara, who grew up in Moiliili, remembers "three separate locations where the ground gave way, leaving gaping holes in which we could enter and explore the subterranean caverns below Moiliili."

One was makai of University and King; another "in the back of Kanda store in the heart of Moiliili Town (about where 7-Eleven is today); and the other, "on Nakookoo Street, where Mr. Idemoto lived," said Kashiwabara, now 76.

On one of his underground explorations as a boy, he made sure to carry a spool of string, which linked him to the outside. He vividly recalls seeing carp swimming in underground tidal pools.

Chester Lao, a geologist with the Honolulu Board of Water Supply, has researched this subterranean network, noting both the legends and scientific facts of the origins of the caverns - which are not lava tubes, but formed by fresh ground water from Manoa Valley flowing through limestone reefs.

One legend, for example, is that fish beneath Moiliili would overhear fishermen planning their trips and swim out to sea to warn their friends. "The implication is that the cavern system was connected to the sea," Lao said. "Although the presence of mullet might have suggested this connection, mullet can easily flourish in mildly brackish water and could have been transplanted at some earlier time."

Lao believes the underground fish came from a surface source, such as the old Willows restaurant pond, and adapted over the years to their sunless environment.

He was part of a group that explored a cavern (don't ask where because officials don't want the location publicized), in 1983, paddling on foam boards. The part they saw was four to 10 feet high and the water perhaps five feet deep in spots.

Although most of the dramatic sinkings occurred decades ago, there is evidence in more recent years of the land settling, Lao said.

**Map of Trails and Landscape of the Honouliuli Region in ca. 1793
(Malden, 1825. State Survey Division, Register Map No. 437)**

http://www.hoakaleifoundation.org/data/assets/Honouliuli_Trails_001.pdf

**Historical Notes on Trails of Honouliuli, 'Ewa District, Island of O'ahu 3
Hoakalei Cultural Foundation / Kepā Maly (July 2012)**

In the early 1790s Captain George Vancouver visited the Hawaiian Islands. As a part of the Vancouver expedition, cartographer, Lt. C.R. Malden, prepared a map of a portion of O'ahu, which also covered the Honouliuli – Pu'uloa region. Malden's map was published in 1825 (Register Map No's 437 & 640), and provides the earliest cartographic record of the Honouliuli region. The map depicts several clusters of houses, fish weirs, and fishponds in the Honouliuli/Pu'uloa area. Being recorded during the early period of western contact, the map is believed to represent the basic pre-contact coastal settlement pattern for of Honouliuli and vicinity. Even though the map and visit is of an early date, given the rapid decline of the native population just after western contact, it is likely that the pre-contact population would have been higher and settlement more dense than indicated by the Malden.

**Travel upon the Trails of Honouliuli in 1885 –
A Visit to the Ranch Lands of Honouliuli**

Below, readers are provided a historical perspective of the business in the 'Ewa District, with the steady change in land use, and vast development of lands under the control of ranches, and travel across regional trails:

**August 31, 1885 (page 2 & 3)
The Daily Bulletin Viewing the Ranches
Honouliuli Ranch,**

Wednesday, Aug. 12th.

...The homeward trail leads over large areas of rough land, heavily sprinkled here and there with small rolling stones, almost invisible in the thick grass, and big boulders around which, the graziers say, the chickest bites of cattle feed are found. After getting down the mountain, a detour is made into a large paddock on the immense area of that land referred to above. Here is seen a big drove of the finest cattle, gathered round a large reservoir of water—a sort of fresh water lake. Around this water, there lies an immense plain, already referred to, of about 10,000 acres. The soil is of the best quality on the island. With irrigation, every acre of these lands might be made available for rice, sugar, grape or banana plantations; and what is now but a grand wilderness of shrubs and grasses, supporting herds of cattle, might be made to bud and blossom with the rich products of the tropics, yielding sustenance to hundreds of families together with all the flocks and herds they might require. At half-past one, the party is again enjoying the hospitalities of the ranch house, where the day's excursion, and the dinner too, are unanimously voted superb.

Thursday, Aug. 13th.

The lands seen yesterday from the neighboring hills are today more closely examined in the course of a long weary equestrian tour. On horseback from seven in the morning to three in the afternoon, the sun between 90 and 100 degrees in the shade, the sea breezes intercepted by the mountains, and the coral strand reflecting more incandescent caloric than poetic sentiment—the third day's exploration was one of those intensely exciting sort of holiday excursions that yield their highest satisfaction retrospectively, in the exhilarating recollections of them that arise afterwards. The trail leads over coral which is evidently upheaval. Up through every crevice and around every boulder, big and little, there are thick growths of pili, makuekue, pualele (milk weed), manienie, kukae-puaa and other native grasses. At one place, a cavity in the rocks contains luxuriant growths of breadfruit, bananas, sugar-cane, and numbers of wiliwili trees, with their exceptionally pretty red seeds. The natives say when these seeds are ripe and red, there are plenty sharks off Puuloa. On the lower part of this land among the rocks, fine clumps of algarroba trees appear in different stages of development. All these trees have grown up within about six years. The large progeny of baby algarrobas whose frowzy heads appear here and there over the plains, if not nipped by cattle, would evidently evolve, within a very few years, a race of sylvan giants. Cattle kept off, and the natural propagation of these fine trees assisted by some planting, there is here the possibility of a big bonanza in a ten thousand acre forest within ten miles of the city of Honolulu. As pasture land this portion of the ranch is unsurpassable in richness. It is the part of Honouliuli designated the fatting paddock.

There are numerous historical accounts describing trails and government road and rail work through the 'Ewa District which provide factual and eye-witness accounts of their history and importance on the cultural landscape.

Development of the 'Ewa Sugar Plantation and O'ahu Railway & Land Company (1890)

Henry M. Whitney's "Tourists' Guide..." provides an overview of developments in the 'Ewa-Moanalua region in 1890. At the time of writing, the O'ahu Railway & Land Company (O.R. & L. Co.), had just opened with train service passing from Honolulu to the 'Ewa Court House (remaining track routes to be laid shortly thereafter). With the development of the rail system, businesses began immediately expanding, as rail access made the job of transport freight and livestock an easy task, and the 'Ewa Plantation incorporated.

Sacred Trails The Voice of Kapolei November 30 2012

http://thevoiceofkapolei.com/index2.php?option=com_content&task=view&id=1714&pop=1&page=0&Itemid=1

The recent Federal ruling on Rail stated that the City and HART FAILED to adequately identify TCP's (Traditional Cultural Places) along the Honolulu Rail route corridor. In fact, HART has published a map where the extremely important 1825 Malden Trails were ERASED to show that NOTHING was "there" on the Ewa Plains (where the railway line and stations are located) Yet- under a HART TCP contract there WAS the identification of the extremely important Hawaiian "Leina a ka Uhane" - (Spiritual jumping off place) in this same Ewa Plains location.



The Ancient Trails of Kanehili, as identified by Malden in 1825, still exist today...

HART RAIL Will Run Directly Though Most Sacred National Register Burial/Battlefield Sites

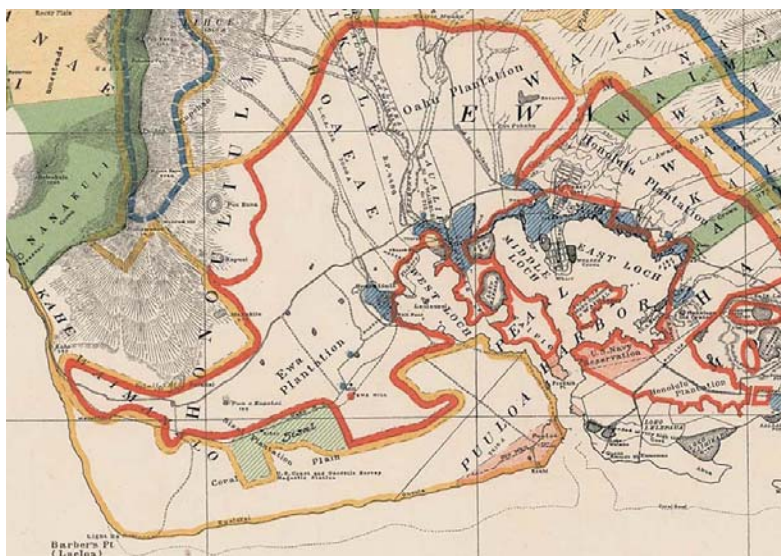
The Historic Malden Trail - Onelua Route- runs though MCAS Ewa Field, Ewa battlefield, Hunt Panhandle and by Barbers Point Riding Club stables revetments. I also believe now that the original surveyors of the 1925 Ewa Mooring Mast located the tower directly on this same trail intentionally.

(And the trails influenced the location the the Ewa Mill Plantation, which also influenced the route of the Oahu Railway line, which influenced the location of the Ewa Mooring Mast, etc...)

The other Kualaka'i section runs through the MCAS Ewa Field Ewa Field Historic Warehouse district area (which still shows evidence of this trail) and down what was originally called Henderson Rd. and then on down to the US Coast Guard station where the Kualaka'i village was.

The Kualaka'i section of the Malden Trail runs exactly through where Shad Kane's well preserved ancient Hawaiian trail area is. Scaling used Puu Kapolei, Onelua Beach and related landmarks to match the 1878 map to the 1962 USGS map.

Without out a doubt these are Oahu's most important and sacred trails and very likely used for annual Makahiki processions and likely for special Alii burial processions as part of the Kanehili "Leina a ka Uhane" wahi pana.



Portion of the Island of Oahu (W.D. Alexander, 1902). The area outlined in yellow depicts grazing lands; the area outlined in red depicts sugar plantation fields; and major roads and railroad routes, as recorded in Government Survey are also depicted. (University of Hawaii-Manoa, Hamilton Library Map Collection—georef_Oahu_Alexander_1902)

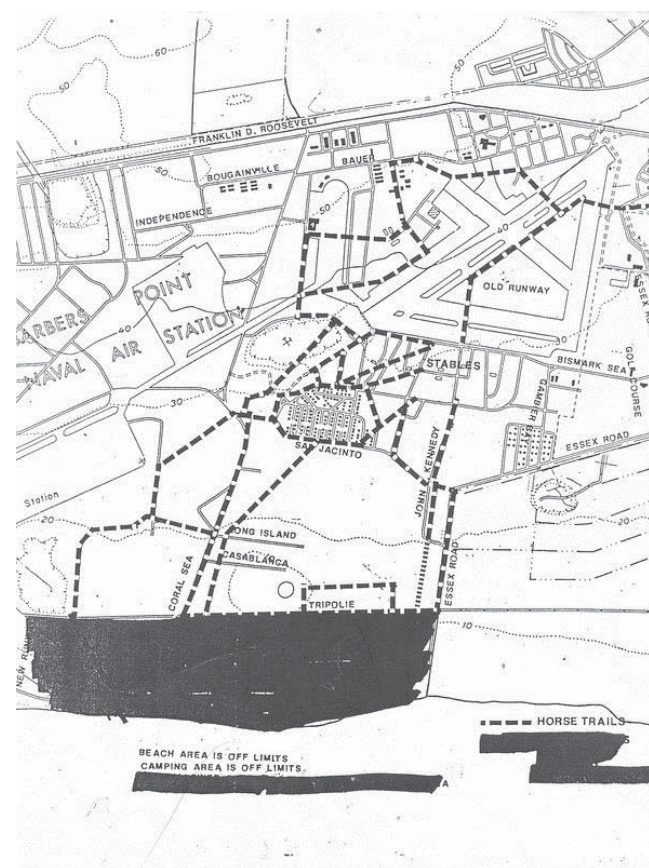
<http://ewaplainsprograms.weebly.com/hawaiian-trails.html>

City Council Urges Preservation of Ewa Trails

To recognize and urge preservation of these ancient Hawaiian Ewa cultural history trails City Council Resolution 12-172, introduced by Ewa Councilman Tom Berg, was passed unanimously by the City Council in August of 2012. These important Ewa trails were first identified to the Western world by the 1825 Royal Navy Malden survey and for 150 years old were also the pathways of the Paniolo and Pa'u horseback culture on the Ewa Plains. Today they are in very great danger of being completely destroyed by developers throughout Ewa and Kalaeloa.

These important Ewa Plains trails traversed through the ahupua'a of Honouliuli and sections of the ancient trails still exist to provide insight as to how historic Hawaiian communities were connected socially, economically, politically and culturally.

Horse Trails from Former NAS Barber's Point



**RESOLUTION RECOGNIZING AND PRESERVING EWA
PLAINS HISTORIC TRAILS
PASSES COUNCIL UNANIMOUSLY**

http://www.councilmanberg.com/pdfs/pr_ewa_plains_081512.pdf

The preservation and recognition of Hawaiian history receives priority as Resolution 12-172, CD1 passed unopposed today for Ewa Plains historic trails with a City Council vote of 9-0. Ewa Plains include historic mountain and coastal trails through the ahupua'a of Honouliuli and provide insight as to how historic Hawaiian communities were connected socially, economically, and politically. These lands give families and Hawaiians the opportunity to walk the trails their ancestors walked, giving clues about places of commerce and religion and where valuable forest and sea resources were once located. Created by a massive ancient karst coral reef where ocean meets mountain, streams and fresh rain water percolate through porous 100,000 year old coral to spawn freshwater shrimp and one of Hawaii's most diverse limu varieties. The history of the Ewa Plains is rich and spans from West Loch to Ko Olina and the trails encompass ancient Hawaiian history up through modern military use for training and horseback riding.

Job creation for cultural interpreters is a priority as visitor related guidance will be needed, stimulating West Oahu economy and giving nearby residents more local resources and historical interaction to enjoy. Resolution 12-172, CD1 creates opportunities for cultural and economic growth and is an important step toward the official recognition and preservation of significant historic trails which can make the park eligible for funding from the federal National Park Service (NPS) Recreational Trails Program funding, as well as Surface Transportation Program Flexible, Transportation Enhancement, and Congestion Mitigation Air Quality Improvement Program funding to enhance possibilities and protection for the community and its sacred and treasured past to invest in our cultural future.

The 1825 Royal Navy Malden survey identified the trails to the Western world and for 150 years old was a mainstay of the West Oahu Paniolo and Pa'u horseback culture, referred to as Malden Trails which this resolution intends to redirect back to the name Ewa Plains. However, the exact location of these Ewa Plains trails today has not been officially recorded and resolution 12-172, CD1, advocates for the identification and preservation of such. An educational and recreational resource open to the coming UH West Oahu college students; local schools, community members, and civic organizations will have access to preserved, natural, protected lands commemorating the history of Ewa Plains that is so richly deserved.

HONOLULU IN 1810 - BISHOP MUSEUM Press 1957

<http://digioll.manoa.hawaii.edu/savedmaps/PDF/mapexplanation.pdf>

The first of these was a sketch map made by Lieutenant Charles Malden of HBMS Blonde in 1825. Malden's map marked the trails, and since there was a lapse of only fifteen years between 1810 and the time of Malden's map, these trails were probably much the same in li's time.



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

No. 12-172, CD1

RESOLUTION

URGING THE HAWAII COMMUNITY DEVELOPMENT AUTHORITY AND THE STATE OF HAWAII TO RECOGNIZE AND PRESERVE THE HISTORIC TRAILS OF THE EWA PLAINS.

WHEREAS, the trails in the Ewa Plains area later known as Marine Corps Air Station (MCAS) Ewa and Naval Air Station (NAS) Barbers Point, and today called Kalaeloa as administered by the Hawaii Community Development Authority, are part of the greater Ewa Plains of West Oahu; and

WHEREAS, the Ewa Plains is a massive ancient karst coral reef where ocean meets mountain streams and fresh rain water percolates through porous 100,000 year old coral to spawn freshwater shrimp and one of Hawaii's most diverse limu varieties; and

WHEREAS, these Ewa Plains trails and their adjacent historic sites provide clues as to how communities were linked socially, economically, and politically; which areas were important in early times, places of commerce, and religion; and where valuable forest or sea resources were once located; and

WHEREAS, these Ewa Plains trails were first identified after Western contact by Lieutenant C.R. Malden of the Royal Navy in 1825 and became known as the Malden Trails on the first published Oahu maps; and

WHEREAS, these Ewa Plains trails identified by Malden became used for ranching and horseback transportation and became an indelible part of West Oahu's 150 year old Paniolo and Pa'u horseback culture and early Hawaiian Kingdom history of ranches and farms which were the original Western economic settlements of the Ewa Plains; and

WHEREAS, these identified trails became the location where the Ewa Mill and Plantation was established and why the Oahu Railway was extended to this very important trailside agricultural community which allowed sugar cane to become the major economic engine of the Ewa Plains; and

WHEREAS, these Ewa Plains trails in 1925, due to the nearby location of Ewa Mill and the Oahu Railway, became incorporated into the United States (U.S.) Navy development of Ewa Mooring Mast Field as a naval airship mooring site; and



RESOLUTION

WHEREAS, these trails, springs, and underground karst water transport system later became further documented in State and Federal land surveys and aquifer maps, and in 1941 when the Ewa Mooring Mast Field became a U.S. Marine Corps airbase known as Ewa Field, these walking and horse ranch trails continued to be used by the Marines and Ewa Plantation community for access to the shoreline; and

WHEREAS, after the Japanese air attack on December 7, 1941 and the great expansion of the area into military airports which became MCAS Ewa and NAS Barbers Point during World War II, these trails were important for military training, patrols on foot and mounted Marine Corps horseback security patrols; and

WHEREAS, after the closure of the Marine and Navy airbases, published 1950s maps show the trails on former MCAS Ewa that are still used today by the Barbers Point riding club; and

WHEREAS, these historic horse and foot trails also link with the over 100 year old Oahu Railway right-of-way and Pearl Harbor Historic Trail plan that allows travel by foot, horse or bike from Pearl Harbor to Nanakuli, and which places the Ewa Plains trails as a center junction point and provides access to the Ewa shoreline; and

WHEREAS, an educational feature of these Ewa Plains trails could also be restored karst sinkhole sites along the trailways explaining the ecological system that sustains the limu, nourishes food sources such as freshwater shrimp and which helps perpetuate Ewa's offshore fisheries and sustainability; and

WHEREAS, these trails could become a cultural, historic, recreational and educational experience of walking, biking or horseback riding over trails featuring native Hawaiian plants, bird and aquatic life, telling cultural histories, explaining geological facts; and

WHEREAS, an Ewa Plains historic trails project could be a community supported endeavor bringing together cultural practitioners, educators, scientists, environmental and veteran organizations in a positive, holistic concept for community education, recreation and restoration; and

WHEREAS, recreational trails in Ewa could qualify for federal National Park Service (NPS) Recreational Trails Program funding, as well as Surface Transportation Program Flexible, Transportation Enhancement, and Congestion Mitigation Air Quality Improvement Program funding and would be consistent with the Oahu Regional Transportation Plan; and



RESOLUTION

WHEREAS, federal programs such as the NPS Service Battlefield Protection Program have already awarded a \$53,000 grant to help define the Ewa Field battlefield as an historic site, and which could include walking trails and points for historic interpretation; and

WHEREAS, federal programs such as the U.S. Fish & Wildlife Service have programs to restore Ewa Plains karst sinkholes and have already demonstrated that native freshwater shrimp can be restocked and flourish in these unique karst sinkhole habitats, providing working environments for education and training; and

WHEREAS, there are many interested individuals from equestrian clubs, biking, recreational groups, schools, colleges and universities, active duty military family and morale, welfare and recreation organizations, that could benefit from and assist in supporting an Ewa Plains trails program; now, therefore,

BE IT RESOLVED by the Council of the City and County of Honolulu that it supports the mapping and identification of historic trails in the Ewa Plains; and

BE IT FURTHER RESOLVED that the Hawaii Community Development Authority, the State of Hawaii, the United States government, and the City and County of Honolulu are urged to participate in the mapping and identification of the Ewa Plains historic trails; and

BE IT FURTHER RESOLVED that the City and County of Honolulu will not expend any monies to provide for the mapping and identification of any historic trails in the Ewa Plains; and



RESOLUTION

BE IT FINALLY RESOLVED that copies of this Resolution be transmitted to the Hawaii Community Development Authority, the Governor, the Department of Hawaiian Homelands, the Office of Hawaiian Affairs, the President of the United States, the Commander of United States Pacific Command, and the Mayor.

INTRODUCED BY:

Tom Berg

DATE OF INTRODUCTION:

July 11, 2012
Honolulu, Hawaii

Councilmembers

"Kalaeloa Constraints Plan" From KCH about Haseko EIS Hoakalei Master Plan Update

Comments for
Notice of Intent to Prepare an Environmental Impact Statement
for the Hoakalei Master Plan Update

From John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, HI. 96707

Attn: pwhite@psi-hi.com

Attn: Perry J. White, Planning Solutions, Inc., 210 Ward Avenue, Suite 330, Honolulu, HI 96814
with copies to the City and County of Honolulu, Department of Planning and Permitting (address
above),

Attn: Tim Streitz.
at tstreitz@honolulu.gov or (808) 768-8042.

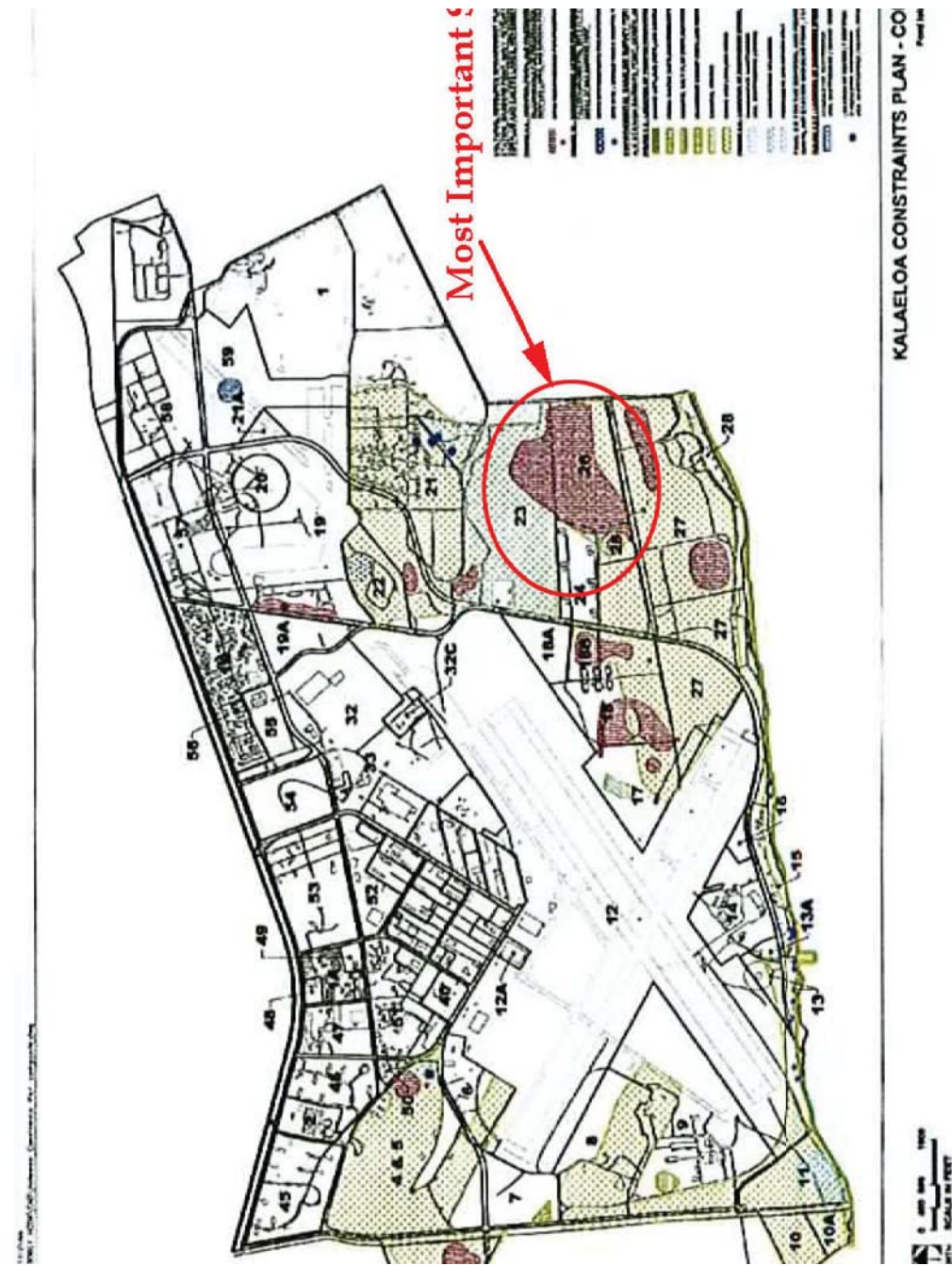
Aloha,

Attached is another map which shows the "Kalaeloa Constraints Plan" which
apparently was produced by Hunt Corp in conjunction with HCDA in 2011 to
show areas of special archaeological "constraint." Most likely this map draws
on studies done much earlier by the Tuggles for the Navy BRAC.

Nearly all honest archeologists will tell you that the BRAC studies are all
outdated because they were not done to the level of modern archaeological
and cultural survey standards. Being such a large area many sites were
missed and I have seen this myself as there are far more than what shows
up in SHPD reports and surveys in their library.

The Haseko Road plan goes DIRECTLY THROUGH the center of the
most sensitive areas according to the map, but I can tell you that above this
area is the largest highly endangered natural Akoko population (which they
are hoping will die off) and even more cultural and historic sites.

John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, HI. 96707





P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. John Bond
Kanehili Cultural Hui
P.O. Box 75578
Kapolei, Hawai'i 96707

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Bond:

Thank you for your November 23 and 24, 2013 emails concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you spent reviewing the EISPN and preparing your response. Many of the statements in your emails are not specific to the EISPN and go beyond the scope of the review process set forth in Chapter 343 of the Hawai'i Revised Statutes; thus, they will not be addressed here.

A copy of the Draft EIS will be provided to you when it becomes available, and you will have an additional opportunity to offer comment at that time. If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 45

Date: Sat, 23 Nov 2013 17:11:16 -1000
From: Benjamin Sadoski <bsadoski@unitehere5.org>
To: pwhite@psi-hi.com, tstreitz@honolulu.gov
Subject: Comments Regarding Environmental Impact
Statement Preparation Notice Hoakalei Mas
ter Plan Update

Aloha,

Please see the attached comments regarding the EIS Preparation Notice for the
Hoakalei Master Plan.

Mahalo,
Ben Sadoski
UNITE HERE, Local 5

--

Benjamin Sadoski
UNITE HERE! Local 5
1516 South King St.
Honolulu, HI 96826
Ph: 808-941-2141 x238
Fax: 808-941-2166
www.unitehere5.org



Eric Gill, Financial Secretary-Treasurer

Hernando Ramos Tan, President

Godfrey Maeshiro, Senior Vice-President

November 23, 2013

Planning Solutions, Inc.
210 Ward Ave., Ste. 330
Honolulu, HI 96814

Subject: Comments Regarding Environmental Impact Statement Preparation Notice -
Hoakalei Master Plan Update

To Whom It May Concern:

UNITE HERE Local 5 represents over 10,000 workers in Hawaii's tourism, food service and healthcare industries. Some of our members live in the Ewa and Ocean Pointe areas and will be impacted by the proposed construction project. We firmly believe it is important for Haseko (Ewa) Inc's ("Haseko") proposed plans to serve the long-term interests of the local community. We therefore request to become a consulted party in the development of the EIS.

Local 5 takes no position either in support of or in opposition to the proposed development at this time. We understand that some island residents, particularly those living in the area and those who have bought residences in the area recently, may be concerned and even disappointed that one of the main public benefits of this project which was offered when the company needed its original approvals has now changed significantly. We feel this could set (or perhaps help solidify) a trend of developers going back on their promises after receiving key approvals or even after constructing and selling portions of their projects. This in turn raises questions about how real the permitting process is, and how real the promises of developers are. In order to address these concerns, it is essential that Haseko work extensively with all members of the community and community organizations to ensure that the changes being proposed can result in something positive for the community.

Additionally, after reviewing the company's Environmental Impact Statement Preparation Notice ("EISPN"), we have several questions:

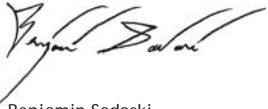
1. Why does the EISPN contemplate three resort-zoned parcels instead of one?
2. Does the developer intend to develop or allow for the development of three distinct resort operations? If so, what would be the anticipated impacts of these projects? How does this compare to the resort development previously contemplated for this project?
3. What sort of resort development is being contemplated for this project (i.e., limited-service hotel, luxury hotel, timeshare, condo-hotel, etc.)?
4. Will the developer make a commitment to developing (or allowing others to develop) only full-service hotel units as opposed to any other sort of resort development? If not, please describe the different impacts that each potential project type might have on the community, in terms of socioeconomic and other environmental impacts.
5. Will the developer commit to a development time schedule?

1516 South King Street • Honolulu, Hawaii • 96826-1912 • Phone (808) 941-2141 • Fax (808) 941-2166 • www.unitehere5.org

6. Please address personal safety issues regarding the lagoon development; how they differ from the development of a marina; and what safety mitigation measures the developer will implement at the lagoon.
7. How could the conversion of the proposed marina to a proposed lagoon change the value of the units at Haseko's Ocean Pointe development?
8. What will Haseko do to engage in a meaningful way with community members about how to make sure these changes have a positive impact rather than a negative one?

Thanks very much for your consideration of these matters.

Sincerely,



Benjamin Sadoski
UNITE HERE, Local 5
1516 South King St.
Honolulu, HI 96826
Phone: 808-941-2141 x238
Email: bsadoski@unitehere5.org



P L A N N I N G
S O L U T I O N S

February 3, 2014

Mr. Benjamin Sadoski
UNITE HERE, Local 5
1516 South King Street
Honolulu, Hawaii 96826-1912

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Sadoski:

Thank you for your November 23, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISPN and preparing your comments/questions. To simplify your review, we have reproduced your comments below in *italics*, followed by the response that Haseko has provided.

Comment 1:

Why does the EISPN contemplate three resort-zoned parcels instead of one?

Response: Haseko believes that allocating the resort zone in three distinct segments will best support a diverse and varied combination of land uses around the lagoon, which will in turn give it maximum flexibility in marketing this acreage. According to the company, this is not purely a calculation based on profitability, but instead is intended to create the right balance of land uses with the lagoon as a recreational and aesthetic centerpiece. The Draft Environmental Impact Statement (DEIS) will discuss the effects of this arrangement, as well as those of retaining the present arrangement, in which all the resort zoning is concentrated on the *mauka* side of the basin.

Comment 2:

Does the developer intend to develop or allow for the development of three distinct resort operations? If so, what would be the anticipated impacts of these projects? How does this compare to the resort development previously contemplated for this project?

Response: Haseko is still developing the details of what development might look like if the proposed rezoning is granted. One possible development scenario is that each of the three areas would be purchased by a different developer, each constructing and operating facilities that are distinct from one another. Another possibility is that the same developer purchases two or even all three areas and develops them along the same lines as one another. In no instance will the rezoning lead to an increase in the total number of resort units at Hoakalei over the 950 presently allowed.

The forthcoming DEIS for the Hoakalei Master Plan Update Project will discuss the likely environmental impacts of the proposed resort zone arrangement, as well as several plan alternatives. This will make it possible to compare the likely effects of each alternative, including the plan on which the existing zoning was based.

Comment 3:

What sort of resort development is being contemplated for this project (i.e., limited-service hotel, luxury hotel, timeshare, condo-hotel, etc.)?

Ward Plaza, Suite 330 • 210 Ward Avenue • Honolulu, Hawaii 96814-4012
Phone: 808 550-4483 • Fax: 808 550-4549 • www.psi-hi.com

Page 2
Mr. Benjamin Sadoski
January 31, 2014

Response: Haseko is still in the process of developing its vision for the resort development at Hoakalei, including the precise mixture of hotel, condominium, and timeshare units which it will pursue. The DEIS Haseko is preparing will include a more precise portrait of the proposed resort development.

Comment 4:

Will the developer make a commitment to developing (or allowing others to develop) only full-service hotel units as opposed to any other sort of resort development? If not, please describe the different impacts that each potential project type might have on the community, in terms of socioeconomic and other environmental impacts.

Response: Haseko does not intend to be the developer of the resort parcel(s) but instead plans to seek interested buyers who will develop product appropriate for the market conditions and the location in question. The DEIS will include a discussion about the project's potential impacts on the community.

Comment 5:

Will the developer commit to a development time schedule?

Response: Haseko has a tentative development time schedule, but is unable to commit to a definitive schedule right now because the company is still in the process of updating its entitlements for the recreational lagoon.

Comment 6:

Please address personal safety issues regarding the lagoon development; how they differ from the development of a marina; and what safety mitigation measures the developer will implement at the lagoon.

Response: As compared to a marina, where water safety issues would generally be limited to boating rules, the lagoon plan provides swimming opportunities in designated cove(s) outside the existing basin. It allows the public to engage in certain watersports, such as calm-water standup paddle boarding, kayaking and canoeing, in the relatively tranquil waters of the lagoon. Haseko anticipates that registration and licensing of all watercraft will be necessary to prevent overcrowding and rules must be established and enforced by the entity ultimately responsible for the lagoon to promote the safety of all users. The DEIS will discuss the likely nature of these rules, but over the long term they will ultimately be the responsibility of a party other than Haseko.

Comment 7:

How could the conversion of the proposed marina to a proposed lagoon change the value of the units at Haseko's Ocean Pointe development?

Response: Haseko expects the lagoon to enhance the desirability of the existing community by providing the public with the opportunity to enjoy unique recreational activities that would not be available in a marina. In addition, the change will result in public access to an uninterrupted 1.5

Page 3
Mr. Benjamin Sadoski
January 31, 2014

miles of winding trails along the shoreline between One'ula Beach Park and White Plains Beach and continued enjoyment of ocean activities that would be significantly more limited if a marina channel were dredged. As explained by a Hawai'i economics consultant, these are contributions to the community that a marina cannot match. Instead of an anchorage that only benefits boaters, the lagoon will provide more extensive access to recreational resources that will be available to a greater percentage of the public; this will make the area attractive to more people. In a report to the City Council's Zoning and Planning Committee, the same economic consultant noted that the lagoon trumps the marina that was previously planned and said that "...the switch from a marina to a lagoon is a win-win outcome for private investors as well as for the community and the general public."

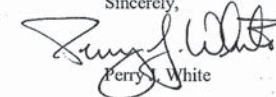
Comment 8:

What will Haseko do to engage in a meaningful way with community members about how to make sure these changes have a positive impact rather than a negative one?

Response: Haseko has a long-standing history of working with the community. In addition to newsletters and update letters distributed to residents and the community at large – both in print and on-line – regular monthly meetings are held specifically for Ocean Pointe/Hoakalei residents. A company representative also attends the 'Ewa Neighborhood Board's monthly meetings to provide the public with a regular opportunity to ask questions and give feedback, and employees frequently volunteer at 'Ewa Beach events to work side-by-side with residents and build an overall stronger sense of community.

If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,



Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

From: "Kevin Rathbun" <rathbunk001@hawaii.rr.com>
To: <pwhite@psi-hi.com>
Cc: <tstreitz@honolulu.gov>
Subject: EISPN comments ICO Haseko requested Zone Changes
Date: Sat, 23 Nov 2013 20:30:07 -1000

Aloha Mr. White,

I am submitting my comments in full support of the Haseko requested zoning changes for the Hoakalei Project in Ewa Beach.

The changes benefit our community and its residents, will continue to provide much needed jobs now and in the future when the resort is completed and most importantly will help preserve or aina in and around the development. We have been waiting for too many years to realize the benefits of the development mainly because a few people don't want our community to prosper as we continue to grow. As a 10 year resident of Ewa Beach I stand behind the Hoakalei project with the proposed changes and fully support the necessary changes required to best produce a "World Class Resort."

Mahalo,

Kevin M. Rathbun
91-1019 Kai Wana St
Ewa Beach, HI 96706
(c) 808-348-6263
Rathbunk001@hawaii.rr.com



CERTIFIED DISTRESSED PROPERTY EXPERT®



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Kevin M. Rathbun
91-1019 Kai Wana Street
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Rathbun:

Thank you for your November 23, 2013 e-mail concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments.

Haseko has asked me to express its gratitude for your support of its rezoning request. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe the potential effects of the proposed action, as well as those of several project alternatives. The discussion will include the economic benefits you have mentioned.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 47

Subject: Concerning haseko
From: Zachary Soriano <choncho808@gmail.com>
Date: Sat, 23 Nov 2013 21:03:41 -1000
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>

Some say three resorts will bring tourists and money to ewa beach. Some say it will bring more jobs, but all those jobs will be low-paying jobs for locals to serve tourists. It will also bring more traffic to a place that is difficult to get in or out of. But I think the most important reason for this protest is the reef and aquatic life. Development would destroy the coral and ocean life that ewa beach is so abundant with. Not to mention that they didn't even ask the community if we wanted these resorts or not, now we only have four days to write all these letters of protest.



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Zachary Soriano
choncho808@gmail.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Soriano:

Thank you for your November 23, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Project. We appreciate the time you spent preparing your comments. Because you did not include your mailing address with your comments, I am sending this response to your email address.

Haseko has asked me to acknowledge your objection to the proposed rezoning. It has also asked me to let you know that the individuals who called your attention to the EISPN may not have provided you with the correct information. I say that for several reasons, among them the following:

- There is no connection between the lagoon and the ocean and no work would be undertaken within many feet of the shoreline. Hence, there is no way in which the reconfigured project could adversely affect the reef and aquatic life. In that respect it is substantially better than the approved configuration, which requires excavation of a long entrance channel.
- The reconfigured zoning would allow no more residential, commercial, and resort development than has already been approved. Hence, it would not exacerbate the traffic situation.
- Resort use has been a fundamental part of all plans that City, State, and community groups have approved and supported over the past several decades. The EIS Preparation Notice was published on October 23, 2013, 30 days before the date on your email. Hence there were far more than 4 days in which individuals and groups could submit their comments.

We will provide a copy of the Draft Environmental Impact Statement to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 48

From: ramona b <ramonab6776@hotmail.com>
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>
CC: "tstreitz@honolulu.gov" <tstreitz@honolulu.gov>
Subject: Re: Haseko's Request for Zoning Change and Project Plan Update:
Date: Sun, 24 Nov 2013 08:12:37 +0000

November 23, 2013

Planning Solutions, Inc.,
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Attn: Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz

Re: Haseko's Request for Zoning Change and Project Plan Update

Aloha Mr. White and Mr. Streitz,

Thank you for the opportunity to provide comments.

** Haseko's request for zoning change and Project Master Plan Update has two major changes:

1. Replace the Marina with a Lagoon due to market demand, legal challenges and government permit approvals.
2. Replace industrial zoning with resort zoning along the ocean front.

I have the following comments for your consideration:

1. I have environmental concerns about the impact to the reef, impacts on One`ula Beach Park and runoff entering the ocean. Therefore, I support replacing the marina project with the lagoon. Also, I believe that this lagoon should be **accessible to the public for public use**.
2. I strongly oppose replacing the industrial zoning with resort zoning which would allow hotels along the shoreline. This change should not be granted because the ninety feet height allowances for resort zoning would change the entire nature of Ewa Beach and Kalaeloa communities. It is my belief that tourism related and resort activities should be designated for specific areas like Waikiki and Ko`olina.

I am confident that I would be able to get over 1000 signatures to oppose this rezoning request and updated development plans. I am also certain that people that care about my community

share the same thoughts that these new plans would not benefit Ewa Beach but would be detrimental to our hometown of Ewa Beach, our 'aina that we love. "He ali'i ka 'aina, he kauwa wale no ke kanaka." - The land is chief and man is merely the servant. We must remember that man would not be if not for the natural abundance that the land provides. We must never put our needs above those of the 'aina. By serving the land, the land will always feed us. The changes requested will destroy our views of our beautiful ocean and will lessen our ability to access and care for our ocean and coastline forever. As a long time resident of Ewa Beach for over 40 years and as a steward of the 'aina and the kai, I ask that you not support the request for rezoning and master plan updates.

If you have any questions please do not hesitate to call me at 808-778-6776.

Malama Pono,
Ramona Bolosan
42 year resident of Ewa Beach
91-826 Lawalu Place
Ewa Beach, Hawaii 96706

ramonab6776@hotmail.com



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Ramona Bolosan
91-826 Lawalu Place
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Ms. Bolosan:

Thank you for your November 23, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISP and preparing your comments.

Haseko has asked me to say that it is pleased to know that you support replacing the marina project with the lagoon. In addition, it acknowledges that you oppose replacing the industrial zoning with resort zoning, which would allow hotels closer to the shoreline out of concern that the ninety foot height allowances for resort zoning would change the nature of 'Ewa Beach and Kalaeloa communities.

In case you were not aware of this, please be advised that in addition to the proposed reconfigured lagoon, the Draft Environmental Impact Statement (DEIS) will evaluate several alternatives. One of these will be a layout that continues to focus resort development on areas along the *mauka* sided of the lagoon, which is approximately one-quarter of a mile inland of the shoreline.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

November 20, 2013

Planning Solutions, Inc.,
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Attn: Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz

Re: Haseko's Request for Zoning Change and Project Plan Update

Aloha Mr. White and Mr. Streitz,

Thank you for the opportunity to comment. I am writing in support of the changing the Marina to a Lagoon Project. I strongly oppose the change in resort zoning for the 8 acres near the shoreline.

I would like to suggest the 8 acres near the Kauhale Preserve and near the shoreline be zoned for public access and the resort area zoning be aligned along Keoneula Boulevard.

Thank you for your consideration.

Sincerely,

Raina J. Cabanilla,
Over 30 year resident of Ewa
91- 820 Lapine Place
Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Raina Cabanilla
91-820 Lapine Place
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Cabanilla:

Thank you for your November 23, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments.

Haseko has asked me to express its gratitude for your support of its proposal to develop a lagoon rather than a marina as well as to acknowledge your objection to the change in resort zoning for the 8 acres near the shoreline. The Draft Environmental Impact Statement (DEIS) will evaluate the potential effects of an alternative that restricts resort development to the *mauka* side of the lagoon.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



WEED & SEED

Comment No. 50

*A program of the United States Attorney
District of Hawaii*

November 21, 2013

To Whom It May Concern:

My name is Gale Bracerros. As the Program Director of Weed and Seed Hawaii, working in the Ewa-Ewa Beach community for 9 years, I have had the privilege of working closely with Haseko. Weed and Seed is a comprehensive strategy which includes assisting communities in bringing people and resources together to prevent and control crime and improve their overall quality of life. Haseko has been an important partner on various community projects.

Oneula Beach Park (known by many as Hau Bush) has been a major concern with illegal drug transactions, bulky item dumping, and illegal campers. Throughout the years, Haseko has supported Neighborhood Restoration projects to help improve this beach area so residents might once more enjoy this beach park as an important family recreation site. Haseko's plans for the lagoon have brought tremendous positive changes, and lagoon development has already made a huge improvement to Oneula Beach Park, providing many opportunities for residents and businesses here in Ewa Beach. These opportunities come in the form of much needed jobs and recreational activities for our youth.

Haseko has clearly shown that it cares for the community, and they continue to place community support as their utmost priority in their plans for lagoon development.

Sincerely,

Gale Bracerros
Program Director
Weed and Seed Hawaii
Ewa-Ewa Beach

Ste III: Ewa-Ewa Beach 91-884 Ft. Weaver Road, Suite A Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Gale Bracerros, Director
Weed & Seed
91-884 Fort Weaver Road, Suite A
Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Bracerros:

Thank you for your November 23, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to thank you for expressing your support of the proposed change in zoning. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe the proposed action and its effects, including the economic and recreational benefits you note in your letter.

We will provide a copy of the DEIS to you when it becomes available. In the meantime, if you have any further comments or questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Ward Plaza, Suite 330 • 210 Ward Avenue • Honolulu, Hawaii 96814-4012
Phone: 808 550-4483 • Fax: 808 550-4549 • www.psi-hi.com

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Comment No. 51

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

November 21, 2013

Planning Solutions, Inc.
Attention: Mr. Perry J. White
210 Ward Avenue, Suite 330
Honolulu, HI 96814-4012

via email: pwhite@psi-hi.com

Dear Mr. White,

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (EISPN)
for the Hoakalei Master Plan Update

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

(4) Land Division - Oahu District

At this time, enclosed are comments from (1) Division of Boating and Ocean Recreation; (2) Office of Conservation and Coastal Lands; and (3) Division of Aquatic Resources. No other comments were received as of our suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,


Russell Y. Tsuji
Land Administrator

Enclosure(s)

c: DPP, Policy Planning Branch
Attn: Tim Streitz, tstreitz@honolulu.gov



P L A N N I N G
S O L U T I O N S

January 15, 2014

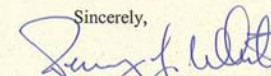
Mr. Russell Y. Tsuji, Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, Hawai'i 96809

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice
(EISPN)

Dear Mr. Tsuji:

Thank you for your November 23, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISPN and assembling and providing to us comments from the various Divisions within the Department. We have responded to their memoranda separately.

We will provide a copy of the Draft EIS to you when it becomes available. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

NEIL A. ABRAHAMSON
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 28, 2013

MEMORANDUM

TO: DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
— Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division - Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update

LOCATION: 244-acre portion of the Hoakalei Project in 'Ewa, O'ahu; TMK 9-1-134: Parcels 007, 022(por.), 025, 026, 027 028(por.), and 029

APPLICANT: Haseko (Ewa), Inc. by its consultant, Planning Solutions

RECEIVED
LAND DIVISION
2013 NOV -1 PM 2:53
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Transmitted for your review and comment on the above-referenced document which can be found here:

1. Go to: <https://sp01.ld.dlnr.hawaii.gov/LD>
2. Login: Username: LD\Visitor Password: Opa\$word0 (first and last characters are zeros)
3. Click on: Requests for Comments
4. Click on the subject file "Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update", then click on "Files" and "Download a copy".

We would appreciate your comments on this document. Please submit any comments by **November 21, 2013**. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed:
Print Name: Edward R. Underwood
Date: 10/29/13

cc: Central Files

OCT29 13PM11:00BDR DIV



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Edward R. Underwood
Division of Boating and Ocean Recreation
Department of Land and Natural Resources
State of Hawai'i
333 Queen St., Room 300
Honolulu, Hawai'i 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Mr. Underwood:

Thank you for your November 1, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISP and preparing your letter.

We understand that your division has no comments at this time. We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

NEIL A. ALCORN
GOVERNOR OF HAWAII



2013 OCT 29 A 11: 50
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 28, 2013

MEMORANDUM

TO: DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
___ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division - Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update

LOCATION: 244-acre portion of the Hoakalei Project in Ewa, O'ahu; TMK 9-1-134: Parcels 007, 022(por.), 025, 026, 027 028(por.), and 029

APPLICANT: Haseko (Ewa), Inc. by its consultant, Planning Solutions

Transmitted for your review and comment on the above-referenced document which can be found here:

1. Go to: <https://sp01.ld.dlnr.hawaii.gov/LD>
2. Login: Username: LD\Visitor Password: 0pa\$\$word0 (first and last characters are zeros)
3. Click on: Requests for Comments
4. Click on the subject file "Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update", then click on "Files" and "Download a copy".

We would appreciate your comments on this document. Please submit any comments by **November 21, 2013**. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed:
Print Name: K. Tiger Mills
Date: 11-1-2013

cc: Central Files

Comment No. 53



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. K. Tiger Mills
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
State of Hawai'i
1151 Punchbowl St., Room 131
Honolulu, Hawai'i 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Ms. Mills:

Thank you for your November 1, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISP and preparing your letter.

We understand that the Office of Conservation and Coastal Lands has no comments at this time. We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 54

WILLIAM C. ABERCROMBIE
GOVERNOR OF HAWAII



RECEIVED
LAND DIVISION

2013 NOV -5 AM 9:35

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

WILLIAM C. ABERCROMBIE, JR.
GOVERNOR
COMMISSIONER OF LAND AND NATURAL RESOURCES
COMMISSIONER FOR WATER RESOURCES MANAGEMENT

DAR 4819



JK ✓
AT ✓

October 28, 2013

MEMORANDUM

TO: DLNR Agencies:
☒ Div. of Aquatic Resources
☒ Div. of Boating & Ocean Recreation
☒ Engineering Division
☒ Div. of Forestry & Wildlife
☐ Div. of State Parks
☒ Commission on Water Resource Management
☒ Office of Conservation & Coastal Lands
☒ Land Division - Oahu District
☒ Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (EISPN) for the Hoakalei Master Plan Update

LOCATION: 244-acre portion of the Hoakalei Project in 'Ewa, O'ahu; TMK 9-1-134: Parcels 007, 022(por.), 025, 026, 027 028(por.), and 029

APPLICANT: Haseko (Ewa), Inc. by its consultant, Planning Solutions

Transmitted for your review and comment on the above-referenced document which can be found here:

1. Go to: <https://sp01.ld.dlnr.hawaii.gov/LD>
2. Login: Username: LD\Visitor Password: 0pa\$\$word0 (first and last characters are zeros)
3. Click on: Requests for Comments
4. Click on the subject file "Notice of Intent to Prepare an Environmental Impact Statement (EISPN) for the Hoakalei Master Plan Update", then click on "Files" and "Download a copy".

We would appreciate your comments on this document. Please submit any comments by **November 21, 2013**. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: [Signature]
Print Name: WILLIAM C. ABERCROMBIE, JR.
Date: 11/11/13

cc: Central Files



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Frazer McGilvray, Administrator
Division of Aquatic Resources
Department of Land and Natural Resources
State of Hawai'i
1151 Punchbowl St, Suite 330
Honolulu, Hawai'i 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. McGilvray:

Thank you for your October 29, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISPN and for confirming that your division has no objections and no comments at this time.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

[Signature]
Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 55

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 28, 2013

MEMORANDUM

DLNR Agencies:

- ☒ Div. of Aquatic Resources
- ☒ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☒ Div. of Forestry & Wildlife
- ☐ Div. of State Parks
- ☒ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division - Oahu District
- ☒ Historic Preservation

TO: [Signature]
FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update
LOCATION: 244-acre portion of the Hoakalei Project in Ewa, O'ahu; TMK 9-1-134: Parcels 007, 022(por.), 025, 026, 027 028(por.), and 029
APPLICANT: Haseko (Ewa), Inc. by its consultant, Planning Solutions

Transmitted for your review and comment on the above-referenced document which can be found here:

1. Go to: <https://sp01.ld.dlnr.hawaii.gov/LD>
2. Login: Username: LD\Visitor Password: 0pa\$\$word0 (first and last characters are zeros)
3. Click on: Requests for Comments
4. Click on the subject file "Notice of Intent to Prepare an Environmental Impact Statement (EISP) for the Hoakalei Master Plan Update", then click on "Files" and "Download a copy".

We would appreciate your comments on this document. Please submit any comments by **November 21, 2013**. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: [Signature]
Print Name: [Signature]
Date: [Signature]

cc: Central Files



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Barry Chung, O'ahu District Land Agent
Land Division - O'ahu District
Department of Land and Natural Resources
State of Hawai'i
1151 Punchbowl St, Suite 330
Honolulu, Hawai'i 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Mr. Chung:

Thank you for your October 28, 2013 memorandum concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISP and confirming that you have no comments at this time.

We will provide a copy of the Draft Environmental Impact Statement to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

[Signature]
Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)



November 25, 2013

Mr. Perry J. White
Planning Solutions, Inc
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

Subject **NOI to Prepare an EISPN for the Hoakalei Master Plan Update**

Thank you for the opportunity to comment on the subject project. Hawaiian Electric Company has no objections to the project. Should HECO have existing easements and facilities on the subject property, we will need continued access for maintenance of our facilities.

We appreciate your efforts to keep us apprised of the subject project in the planning process. As the Hoakalei Master Plan project comes to fruition, please continue to keep us informed. Further along in the design, we will be better able to evaluate the effects on our system facilities.

If you have any questions, please call me at 543-7245.

Sincerely,

A handwritten signature in cursive script, reading "Rouen Q. W. Liu".

Rouen Q. W. Liu
Permits Engineer

Cc: Tim Streitz (DPP)

BCC: <http://workspaces/gm/folder-1.11.123111>





**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Mr. Rouen Q.W. Liu, Permits Engineer
Hawaiian Electric Co., Inc.
P.O. Box 2750
Honolulu, Hawai'i 96840

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Liu:

Thank you for your November 25, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments.

Thank you for confirming that you have no objections to the project at this time. Haseko has asked me to assure you that it will continue to coordinate with Hawaiian Electric as the project proceeds.

A copy of the Draft EIS will be provided to you when it becomes available, and you will have an additional opportunity to offer comment at that time. If you have any questions in the future concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 57

November 21, 2013

To Whom It May Concern:

I am a resident of Ewa Beach, recently purchased our home in Fairway's Edge. I take daily walks and I am very impressed with the development of the lagoon. I have carefully reviewed the plans of the lagoon and I am totally in favor with Haseko's plan. It is very obvious that extensive planning and research was put into this project.

Having the lagoon will have a positive impact to Ewa Beach. I was very hesitating in purchasing my first home in Ewa Beach but after reviewing the plans of the lagoon, I know we made the right choice. The once negative image will surely help and it is all because of Haseko. It clearly shows that Haseko is looking after not only for the residents but for the entire community.

Sincerely,

Ami E. Balecha
91-2082 Kaioli Street, #3602
Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Ami E. Balecha
91-2082 Kaioli Street, #3602
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Balecha:

Thank you for your November 25, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments. Haseko has asked me to thank you for expressing your support for the requested change in zoning.

We will provide a copy of the Draft Environmental Impact Statement to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

November 21, 2013

To Whom It May Concern:

As we were searching to purchase our first home together, it didn't take long for us to purchase our home at Fairway's Edge in Ewa Beach. What attracted us was the development of the lagoon.

I agree with Haseko's plans from a resort to a lagoon, because I know that they have studied and research what would be the most beneficial for the people in this community. The lagoon will only increase the value of our home and most of all will provide this community economically.

I appreciate that Haseko is developing a lagoon and that it will be open to the public for everyone to enjoy. I have been a resident for a year now and I see a huge improvement in that area, not only seeing the development of the lagoon but also their contribution in improving the Oneula Beach park area.

I strongly support Haseko's plans and I ask that you support this too.

Sincerely,

Anthony Alameda
91-2082 Kaioli Street, #3602
Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Anthony Alameda
91-2082 Kaioli Street, #3602
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Alameda:

Thank you for your November 21, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments.

Haseko has asked me to thank you for expressing your support for the requested change in zoning. It is pleased that you have observed a huge improvement in that area as a result of the lagoon and the improvements to the One'ula Beach Park area.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 59

From: Tom H [<mailto:tomcorey1@live.com>]
Sent: Friday, November 22, 2013 8:53 PM
To: pwhite@psi-hi.com
Cc: Streitz, Timothy
Subject: Comments to the Haseko Requested Zone Change (Ewa Development Plan)
Importance: High

Aloha,

I have thoroughly reviewed the subject plan. I believe this is a beneficial plan for the residents of Ewa Beach and all Oahu. The proposal to delete I-3 industrial waterfront and replace most of it with P-2 preservation is definitely a great and lasting benefit for Hawaii. The other suggested rezoning changes will encourage a more spread out development of the resort area which will encourage residents to explore all the area has to offer.

The proposal to charge for parking or have a usage fee established is an effective way to self sustain the area as these funds would go back to the upkeep of the area. The issue of losing the marina is not a concern for me. The lagoon will benefit many more residents than the marina, provide many more jobs and be much less of an impact on the environment since there would be no heavy industrial zoning to support a marina and no diesel boat engines polluting the water and air.

I look forward to seeing this project being completed.

Mahalo.

Thomas Hendershot
Ewa Beach



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. Thomas Hendershot
tomcorey1@live.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

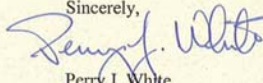
Dear Mr. Hendershot:

Thank you for your November 22, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments. Because you did not include a mailing address in your comments, I am sending this response to your email address.

Haseko has asked me to thank you for expressing your support for the requested change in zoning. It is pleased to know that you share its belief that the lagoon will benefit as many or more residents as the marina, provide many more jobs, and have less potential to adversely affect the environment.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,



Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

November 21, 2013

Planning Solutions, Inc.,
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Attn: Perry J. White

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96913
Attn: Tim Streitz
Re: Haseko's Request for Zoning Change and Project Plan Update

Aloha Mr. White and Mr. Streitz,

Thank you for the opportunity to provide comments. Haseko's request for zoning change and Project Master Plan Update has two major changes:

1. Replace the Marina with a Lagoon due to market demand; legal challenges and government permit approvals.
2. Replace industrial zoning with resort zoning along the oceanfront.

I have the following comments for your consideration:

1. I had environmental concerns about the impact to the reef, impacts on One'ula Beach Park and runoff entering the ocean. Therefore, I support replacing the marina project with the lagoon. Also, I believe that this lagoon should be accessible to the public for public use.
2. I strongly oppose replacing the industrial zoning with resort zoning which would allow hotels along the shoreline. This change should not be granted because the ninety feet height allowances for resort zoning would change the entire nature of Ewa Beach and Kalaeloa communities. It is my belief that tourism related and resort activities should be designated for specific areas like Waikiki and Ko'olina.

I am confident that I would be able to get over 1000 signatures to oppose this rezoning request and updated development plans. I am also certain that people that care about my community share the same thoughts that these new plans would not benefit Ewa Beach but would be detrimental to our hometown of Ewa Beach, our 'aina that we love. "He ali'i ka 'aina, he kauwa

wale no ke kanaka." The land is chief and man is merely the servant. We must remember that man would not be if not for the natural abundance that the land provides. We must never put our needs above those of the 'aina. By serving the land, the land will always feed us. The changes requested will destroy our views of our beautiful ocean and will lessen our ability to access and care for our ocean and coastline forever. As a long time resident of Ewa Beach for over 39 years and as a steward of the 'aina and the kai I ask that you not support the request for rezoning and master plan updates.

If you have any questions please do not hesitate to call me at 808-778-3230.

Malama Pono,



Christiane Bolosan-Yee,
39-year resident of Ewa Beach

Ewa Beach, Hawaii 96706



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Christiane Bolosan-Yee
cbolosanyee@yahoo.com

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Bolosan-Yee:

Thank you for your November 21, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comments. Because you did not include a mailing address in your comments, I am sending this response to your email address.

Haseko has asked me to express its gratitude for your expression of support for its decision to pursue the lagoon alternative in lieu of a marina at this time, and also to acknowledge your opposition to the proposed rezoning that would allow for the construction of resorts closer to the shoreline. The company understands your concern that overly tall resort structures could change the nature of the communities in that area. Instead, you prefer that resort zoning be restricted to the area just *makai* of Keone'ula Boulevard where it is zoned today. The Draft Environmental Impact Statement (DEIS) will discuss this as an alternative.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 61

From: JoAnn York-Gilmore <joannYorkgilmore@yahoo.com>
To: "pwhite@psi-hi.com" <pwhite@psi-hi.com>; "tsstreitz@honolulu.gov" <tsstreitz@honolulu.gov>
Sent: Saturday, November 23, 2013 8:30 AM
Subject: haseko resort plan zoning changes

Aloha....I support the proposed plans by Haseko to modify the resort area. I live in Ka Makana and support the lagoon vice marina. However, in order to make the lagoon financially viable and ensure it becomes a safe location for the community, we do need a commercial footprint which the resort will provide. The resorts will help subsidize the expense of the lagoon and provide hospitality related jobs in this area as well as provide security for users of the lagoon and residents of the adjacent residential areas. Oneula Beach Park has been so improved by the efforts of Haseko and having a commercial footprint of resorts will help keep the riff raff out of Oneula Beach Park as well. In fact, the addition of a resort community will facilitate making the entire shore line a more user friendly and safe environment for residents on this side of the island.

I don't necessarily welcome the additional traffic, but request the developer be required to add stop signs at Keoneula Blvd and Ka Makana Street to reduce speeding and make this intersection a 4-way stop. In addition, please add cross walk striping. This is the ONLY intersection on Keoneula Blvd that does not have traffic signals or stop signs or marked cross walks. As a result, we have significant challenges with drivers far exceeding the current speed limit along Keoneula Blvd to Kapolei Parkway. In addition, request the speed limit along the entire Keoneula Blvd in residential areas be reduced to 25 mph instead of the current 30 mph. There is a precedence for this as Kapolei Parkway has variable speed limits in residential areas.

Thank you for reviewing my comments. I trust my requests concerning the traffic controls and marked pedestrian cross walks will be included as part of the approval request to change the zoning.

JoAnn York-Gilmore
91-1355 Keoneula Blvd, Unit 706
Ewa Beach



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. JoAnn York-Gilmore
91-1355 Keoneula Boulevard, Unit 706
Ewa Beach, Hawaii 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Ms. York-Gilmore:

Thank you for your November 23, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISP and preparing your comments.

Haseko has asked me to thank you for expressing your support of the requested change in zoning. The forthcoming Draft Environmental Impact Statement (DEIS) for the Hoakalei Master Plan Update Project will describe the proposed action, several project alternatives, and their likely effects, including the traffic impacts you note in your letter. In addition, Haseko is processing a *Transportation Master Plan Update* (TMPU) that will guide its review of roadway design, speed limits, and signage throughout Hoakalei. Information from that will be included in the DEIS.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Comment No. 62

-----Original Message-----

From: Crystal Scurr [<mailto:crystalscurr@gmail.com>]

Sent: Saturday, November 23, 2013 2:00 PM

To: pwhite@psi-hi.com

Cc: Streitz, Timothy

Subject: Deny Changes to Hanseko Proposal

Aloha-

I have been fortunate to live and work in the Ewa Beach area since 2005. Even one resort is too much for the Ewa Beach area let alone three. The roads and infrastructure are not at a level to sustain this and it would greatly harm our way of life to allow any person or corporation to pursue the proposal.

Crystal Scurr

5514 Bittern Ave

Ewa Beach HI 96706

(808)343-9049



P L A N N I N G
S O L U T I O N S

January 15, 2014

Ms. Crystal Scurr
5514 Bittern Avenue
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Scurr:

Thank you for your November 23, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your comment.

Haseko has asked me to acknowledge your objection to the proposed rezoning. The Draft Environmental Impact Statement (DEIS) will address the potential effect of several alternatives, including keeping the zoning as it currently is.

We will provide a copy of the DEIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

From: Carol Johnson [<mailto:caj511@yahoo.com>]
Sent: Saturday, November 23, 2013 2:25 PM
To: Carol Johnson
Subject: Haseko Zoning Proposal for Ewa Beach

On behalf of my husband, Michael, and myself, homeowners in the Haseko Hoakolei Kamakana development, we would like to declare our support for the changes being submitted to the plans for our community.

Michael lived on Oahu for six years previously and we have lived here together now for two years. We moved into our home in Kamakana in December 2012. About half the reason we purchased here was the proposed resort community, including the recreational lagoon, bike and walking paths, the proposed restaurants and retail, and the neighborhood atmosphere, or "community", we hope to have here.

The thought of being able to walk or ride bicycles to a restaurant and have a drink and dinner, or to the beach or lagoon to swim, or to patronize small local shops at Wai Kai, is so appealing to us. We hope to enjoy this development for years to come with neighbors, friends that live elsewhere on the island, and out of town friends and family that visit here.

We currently enjoy our amenities such as the bike paths and pool, and cannot wait to expand our recreational choices to sailing, kayaking and SUP. While the development of the beautiful islands of Hawaii will always be controversial, it is something that happens everywhere in the world in order to accommodate the growing populations. The fact that Haseko is honoring the Hawaiian land and its people with the nature preserves and historical sites should provide some satisfaction that this community will not lose site of the Hawaiian heritage we have come to love and respect. Our hope is that it will become a gathering place for everyone who call Oahu home.

Sincerely,

Michael & Carol Johnson
91-2162 Kaiwawalo St.
Ewa Beach, HI 96706
734/516-8269



P L A N N I N G
S O L U T I O N S

January 15, 2014

Michael and Carol Johnson
91-2162 Kaiwawalo Street
'Ewa Beach, Hawai'i 96706

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. and Mrs. Johnson:

Thank you for your November 25, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you spent reviewing the EISPN and preparing your response.

Haseko has asked me to thank you also for expressing your support for the proposed change in zoning which it is seeking. It is pleased to know that proximity to resort uses, including the recreational lagoon, bike and walking paths, the proposed restaurants and retail, was one of the factors that you found attractive.

We will provide a copy of the Draft EIS to you when it becomes available, and you will have an additional opportunity to offer comment at that time. In the meantime, if you have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
 650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
 PHONE: (808) 768-8000 • FAX: (808) 768-6041
 DEPT. WEB SITE: www.honolulu.gov • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
 MAYOR



GEORGE I. ATTA, FAICP
 DIRECTOR
 ARTHUR D. CHALLACOMBE
 DEPUTY DIRECTOR

December 3, 2013

2013/ELOG-2056 (ts)

Mr. Perry J. White
 Planning Solutions, Inc.
 210 Ward Avenue, Suite 330
 Honolulu, Hawaii 96814

Dear Mr. White:

We have received your memorandum dated October 21, 2013 with the request to review and comment on the attached Environmental Impact Statement Preparation Notice (EISP) for the Hoakalei Master Plan update. We offer the following comments:

- Consistency with the General Plan and the 'Ewa Development Plan - The Draft Environmental Impact Statement (DEIS) should state how the proposed zone changes and subsequent development are consistent with the General Plan and the 'Ewa Development Plan (DP) vision, policies, and guidelines.
- Marina Development Alternative – The DEIS should explain how the possible future development of a marina at Hoakalei would be feasible with the proposed zone changes; or alternatively, explain what would be necessary to accommodate the marina should it be pursued again in the future.
- Shoreline access – The DEIS should indicate the 'Ewa DP provision on shoreline access and also indicate the extent of public access to the lagoon recreational area and/or along the shoreline, including charges for parking. Note any major changes in shoreline and ocean access resulting from changing the marina to lagoon.
- Sea Level Rise – The DEIS should analyze the possible impact of sea level rise on the project and identify, if appropriate and feasible, any measures that could be incorporated in the project design and operation to reduce risks and increase resiliency to impacts of sea level rise.
- Sustainability – The DEIS should discuss how the project will conserve energy, potable water, and other resources.
- Discuss zoning district height limits that will be proposed.

Mr. Perry J. White
 Planning Solutions, Inc.
 December 3, 2013
 Page 2

- An updated sewer master plan will be required prior to subdivision approvals.
- A proposed timeline or phasing plan that describes when roadways in the proposed zoning areas will be constructed will be required prior to subdivision approvals. The timeline should include the roadway connecting the resort and residential area (Area III). An updated traffic impact analysis report (TIAR) and updated roadway master plan for the proposed zoning areas should also be included in the timeline.

The updated TIAR, specifically for the resort area, should identify any additional traffic roadway improvements necessary to support development, including warrant analysis and the need to install new traffic signals. This update should include the existing roadway network extending from the proposed zoning area to Fort Weaver Road.

The updated roadway master plan, specifically for the resort area, should incorporate complete streets concepts and standards, and roadway connectivity with a particular focus on bicycle, pedestrian, and transit connectivity.

Should you have any questions, please contact Tim Streitz of our staff at 768-8042 or tstreitz@honolulu.gov.

Very truly yours,


 George I. Atta, FAICP
 Director

GIA:js



P L A N N I N G
S O L U T I O N S

January 15, 2014

Mr. George I. Atta, FAICP
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

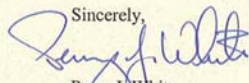
Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Mr. Atta:

Thank you for your November 25, 2013 email concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISP and preparing your comments.

Thank you also for providing guidance regarding topics you will expect to be covered in the Draft Environmental Impact Statement (DEIS). We will be sure to include those. The DEIS will note that an updated sewer master plan and a new roadway phasing plan will be required prior to subdivision approvals.

I would like to take this opportunity to express my appreciation for the very professional way that your Department's staff has worked with us in preparing the EISP. The good communication and cooperation is deeply appreciated. If you, Tim Streitz, or anyone else at the Department have any questions, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK CALDWELL
MAYOR



MICHAEL D. FORMBY
DIRECTOR

MARK N. GARRITY, AICP
DEPUTY DIRECTOR

November 18, 2013

TP10/13-535697R

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

SUBJECT: Draft Environmental Impact Statement (DEIS) Preparation Notice
Hoakalei Master Plan Update

In response to your letter of October 21, 2013, we have the following comments:

1. The DEIS should include a traffic impact study. The study should discuss local as well as regional traffic impacts resulting from the proposed land use changes. The study should also discuss long term and short term traffic mitigation measures.
2. The DEIS should also discuss future transit service. Currently, the City transit (TheBus) has no future plans to expand service to the area.
3. The area Neighborhood Board, as well as the area residents, businesses, etc., should be kept apprised of the details of the proposed project and the impacts, particularly during construction, the project may have on the adjoining local street area network.
4. The section *Government Agencies Responsible for Approvals* on page 3 should clarify that the zone changes and major Special Management Area (SMA) permits are processed by the Department of Planning and Permitting (DPP) but *approved* by the City Council. Also, while the Office of State Planning must approve the modification/contraction of the SMA boundary, the DPP must forward that approval to the City Council for its final review and acceptance.

Mr. Perry J. White
November 18, 2013
Page 2

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Michael D. Formby".
Michael D. Formby
Director

cc: Mr. Tim Streitz
Department of Planning and Permitting
Policy Planning Branch



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Mr. Michael D. Formby, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISP)

Dear Mr. Formby:

Thank you for your November 18, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent reviewing the EISP and preparing your comments/questions. To simplify your review, we have reproduced your comments below in *italics*, followed by the response that Haseko has provided.

Comment 1:

The DEIS should include a traffic impact study. The study should discuss local as well as regional traffic impacts resulting from the proposed land use changes. The study should also discuss long term and short term traffic mitigation measures.

Response: Haseko has an approved *Transportation Master Plan* for Ocean Pointe/Hoakalei. The land use changes that would occur if the rezoning request is granted would not alter either the overall magnitude of the major traffic-generating components of the project or their relationship to major transportation arterials. Consequently, regional aspects of the highway system are not expected to be impacted by the zoning decision. The rearrangement of land uses within the Hoakalei Resort area will affect local traffic patterns there. Moreover, there are localized differences between the various alternatives that the Draft Environmental Impact Statement (DEIS) will address. These will be discussed, to the extent possible given the level of detailed design plans available, in the environmental impact statement.

In that regard, please note also that Haseko is currently processing a *Transportation Master Plan Update* (TMPU) that will guide its review of roadway design, speed limits, and signage throughout Hoakalei. Information from that will be included in the DEIS, including a discussion of material and cumulative effects of the project on area roadways.

Comment 2:

The DEIS should also discuss future transit service. Currently, the City transit (TheBus) has no future plans to expand service to the area.

Response: The DEIS will discuss future transit service to the area covered by the rezoning request. As it has in the past, Haseko will work with the Department of Transportation Services to develop expanded bus service to the area if the rezoning request is approved and it is successful in developing the homes, apartments, and hotel rooms as proposed.

Page 2
Mr. Michael Formby
January 15, 2014

Comment 3:

The area Neighborhood Board, as well as the area residents, business, etc., should be kept apprised of the details of the proposed project and the impacts, particularly during construction, the project may have on the adjoining local street area network.

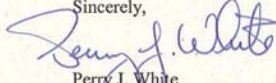
Response: Haseko regularly attends 'Ewa Neighborhood Board meetings to provide project updates and answer community questions. The company also mails out newsletters and update letters to residents/homeowner associations/community, in addition to conducting monthly coffee hour meetings specifically for Ocean Pointe/Hoakalei residents.

Comment 4:

The section Government Agencies Responsible for Approvals on page 3 should clarify that the zone changes and major Special Management Area (SMA) permits are processed by the Department of Planning and Permitting but are approved by the City Council. Also, while the Office of State Planning must approve the modification/contraction of the Special Management Area boundary, the DPP must forward that approval to the City Council for its final review and acceptance.

Response: The discussion of the SMA requirements in the DEIS will include the information you provided. It had been omitted from the EISP only so that the discussion could be brief. The DEIS will describe the accepting agencies and final determining authority for the all of the permits and approvals required for the proposed action.

If you have any further questions concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

NEIL ABERCROMBIE
GOVERNOR



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

December 23, 2013

Comment No. 66

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
RANDY GRUNE
AUGREY HIDANO
JADINE URASAKI

IN REPLY REFER TO:

STP 8.1426

Mr. Perry White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

Subject: Hoakalei Master Plan Update (Plan Update)
Environmental Impact Statement Preparation Notice
TMK: (1) 9-1-034:007, 022 and 025-029

Our Department of Transportation's comments on the subject Plan Update are as follows:

DOT Airports Division

1. The subject project is located just over a mile from the runways at Kalaeloa Airport and within or near the aircraft traffic pattern for runways 4R/22L and 11/29. Aircraft noise and overflights will be heard both day and night, including large aircraft. The project lies beyond the 60 Day Night Level (DNL) average noise contour for Kalaeloa Airport however single-event noise levels can exceed 60 decibels.
2. According to the Plan Update, the existing Wetland Preservation Area is located approximately 8,000 feet from the end of Runway 29 at Kalaeloa Airport. Federal Aviation Administration Advisory (FAA) Circular 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports, "recommends a distance of five (5) statute miles between the farthest edge of the airfield's Air Operations Area and" land use activities that could cause "hazardous wildlife movement into or across the approach or departure airspace." Further enhancement of the wetland may become a wildlife attractant and potentially become a hazard to safe aircraft operations at Kalaeloa Airport.

Mr. Perry White
December 23, 2013
Page 2

STP 8.1426

3. Code of Federal Regulations, Title 14, Part 77.9, recommends the developer submit FAA Form 7460-1 "Notice of Proposed Construction or Alteration," for construction or alteration within 20,000 feet of a public use or military airport which exceeds a 100:1 surface, from any point on the runway of each airport with its longest runway more than 3,200 feet. FAA Form 7460-1 should also be submitted for any tall equipment, such as cranes, that may be used during construction.

Copies of FAA determination(s) shall be provided to DOT-Airports Division.

DOT Highways Division

The Traffic Impact Analysis Report (TIAR) for the Hoakalei Master Plan shall be updated and submitted to DOT Highways Division for its review and acceptance.

If there are any questions, please contact Mr. Norren Kato of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation



**P L A N N I N G
S O L U T I O N S**

January 15, 2014

Dr. Glenn M. Okimoto, Director of Transportation
Department of Transportation
State of Hawai'i
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

Subject: Hoakalei Master Plan Update Environmental Impact Statement Preparation Notice (EISPN)

Dear Dr. Okimoto:

Thank you for your December 23, 2013 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei Master Plan Update Project. We appreciate the time you and your staff spent meeting with us, reviewing the EISPN, and preparing your comments. To simplify your review, we have reproduced your comments below in *italics*, followed by the response that Haseko has provided.

Airports Division - Comment 1:

The subject project is located just over a mile from the runways at Kalaeloa Airport and within or near the aircraft traffic pattern for runways 4R/22L and 11/29. Aircraft noise and overflights will be heard both day and night, including large aircraft. The project lies beyond the 60 Day Night Level (DNL) average noise contour for Kalaeloa Airport however single-event noise levels can exceed 60 decibels.

Response: Thank you for this information and for confirming that the area for which rezoning is being requested is entirely beyond the 60 Day Night Level (DNL) average noise contour for Kalaeloa Airport. Haseko understands that some single-event aircraft events are likely to produce noise levels in excess of 60 decibels within certain portions of the subject area, and it will incorporate this information into the Draft Environmental Impact Statement (DEIS).

Airports Division - Comment 2:

According to the Plan Update, the existing Wetland Preservation Area is located approximately 8,000 feet from the end of Runway 29 at Kalaeloa Airport. Federal Aviation Administration Advisory Circular 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports, "recommends a distance of five (5) statute miles between the farthest edge of the airfield's Air Operations Area and" land use activities that could cause "hazardous wildlife movement into or across the approach or departure airspace. Further enhancement of the wetland may become a wildlife attractant and potentially become a hazard to safe aircraft operations at Kalaeloa Airport.

Response: The Wetland Preservation Area was established as a condition of the Department of the Army Permit (PODCO 2117) for the overall project that was issued in 1993, and Haseko is required to maintain and preserve this area as a habitat for endangered water birds. We are not aware at this time of any harmful interactions between these birds and aircraft approaching or departing Kalaeloa Airport.

Page 2
Dr. Glenn Okimoto
January 15, 2014

At our meeting with Airport Division on November 20, 2013 Mr. Henry Bruckner of your staff indicated that he would provide available data pertaining to bird strikes at Kalaeloa Airport, but to the best of our knowledge he has not yet been able to track down and transmit to us any documentation of such events. We would be very grateful if you would ask the Airports Division to follow up on this and either forward to us whatever data are available or a brief note to the effect that airport records do not indicate any such collisions. We will use this information in preparing the DEIS.

Airports Division - Comment 3:

Code of Federal Regulations, Title 14, Part 77.9, recommends the developer submit FAA Form 7460-1 "Notice of Proposed Construction or Alteration," for construction or alteration within 20,000 feet of a public use or military airport which exceeds a 100:1 surface, from any point on the runway of each airport with its longest runway more than 3,200 feet. FAA Form 7460-1 should also be submitted for any tall equipment, such as cranes, that may be used during construction.

Response: The southeastern end of Runway 11/29 (+26' msl) is approximately 8,000 feet from the nearest point whose zoning would be altered if Haseko's request is granted. The northeastern end of Runway 4R/22L (+10' msl) is approximately 6,000 feet distant. At present, Haseko does not anticipate constructing any structures sufficiently tall to exceed the 100:1 surface as measured from those points. Should these plans change, or should a construction contractor desire to use equipment that has the potential to exceed the 100:1 surface, it will submit FAA Form 7460-1 "Notice of Proposed Construction or Alteration" in accordance with the regulations.

Highways Division - Comment 1:

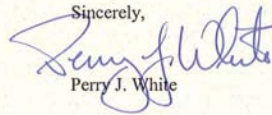
The Traffic Impact Analysis Report (TIAR) for Hoakalei Master Plan shall be updated and submitted to DOT Highways Division for its review and acceptance.

Response: Haseko has an approved Transportation Master Plan for Ocean Pointe-Hoakalei. The land use changes that would occur if the rezoning request is granted would not alter either the overall magnitude of the major traffic-generating components of the project or their relationship to major transportation arterials. Consequently, regional aspects of the highway system are not expected to be impacted by the zoning decision.

The rearrangement of land uses within the Hoakalei Resort area will affect local traffic patterns there. Moreover, there are localized differences between the various alternatives that the DEIS will consider. These will be discussed, to the extent possible given the level of detailed design plans available, in the DEIS. In this regard, please note also that Haseko is currently processing a Transportation Master Plan Update (TMPU) which will guide its roadway design, speed limits, and signage throughout Hoakalei. Information from that will be included in the DEIS, including a discussion of material and cumulative effects of the project on area roadways. Site-specific TIARs will be prepared for each component of the TMPU prior to its development, as appropriate.

Page 3
Dr. Glenn Okimoto
January 15, 2014

If you have any further questions concerning this project, please call me at (808) 550-4483.

Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streit, Department of Planning and Permitting (via electronic mail only)

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 768-3486 • FAX: (808) 768-3487 • WEBSITE: <http://envhonolulu.org>

KIRK CALDWELL
MAYOR



LORI M.K. KAHIKINA, P.E.
DIRECTOR

TIMOTHY A. HOUGHTON
DEPUTY DIRECTOR

ROSS S. TANIMOTO, P.E.
DEPUTY DIRECTOR

IN REPLY REFER TO
PRO 14-018

February 7, 2014

Mr. Perry J. White
Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814

Dear Mr. White:

SUBJECT: Notice of Intent to Prepare an Environmental Impact
Statement (EISP) for the Hoakalei Master Plan Update

We have reviewed the subject document as transmitted to us by your letter dated
October 21, 2013. We have the following comments:

1. The Department of Planning and Permitting (DPP), Wastewater Branch has
the lead role in issuing sewer connection permits.
2. The Environmental Impact Statement (EIS) should address storm water quality
and storm water runoff from the Kaloi Gulch.
3. The EIS should address future protection and maintenance access for the
wastewater effluent outfall pipe that runs through this site.

Should you have any questions, please call Lisa Kimura, Civil Engineer, at
768-3455.

Sincerely,

Ross S. Tanimoto
Lori M.K. Kahikina, P.E.
Director

cc: Department of Planning and Permitting, SDD, WWB
Department of Planning and Permitting, PD, PPB, Timothy Streitz
Department of Environmental Services, EQD, SWQB



P L A N N I N G
S O L U T I O N S

March 13, 2014

Ms. Lori M.K. Kahikina, Director
Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707

Subject: Environmental Impact Statement Preparation Notice (EISP)

Dear Director Kahikina:

Thank you for your February 7, 2014 letter concerning Haseko (Ewa), Inc.'s proposed Hoakalei
project. We appreciate the time you and your staff spent reviewing the EISP and preparing your
comments. To simplify your review, we have reproduced your comments below in *italics*, followed
by our response.

Comment 1:

*The Department of Planning and Permitting (DPP), Wastewater Branch has the lead role in
issuing sewer connection permits.*

Response:

Thank you for confirming that the Wastewater Branch has the lead role in issuing sewer connection
permits. To date, Haseko has completed over 3,350 residential and other units and has received
sewer connection permits for all of them. The Wastewater Branch's staff has been extremely helpful
as we have processed these permit applications and Haseko has asked me to say that it looks forward
to continuing to work with them as it continues the project.

Comment 2:

*The Environmental Impact Statement (EIS) should address storm water quality and storm
water runoff from the Kaloi Gulch.*

Response:

The DEIS will discuss the impact that the proposed action and several action alternatives are likely to
have on storm water quality and storm water runoff. Please note that the project area lies in a
different watershed and so does not interact with storm water runoff from Kalo'i Gulch. Please refer
to Attachment 1, which shows the relationship of the project site to the Kalo'i Watershed.

Comment 3:

*The EIS should address future protection and maintenance access for the wastewater effluent
outfall pipe that runs through this site.*

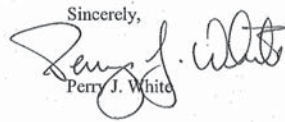
Response:

The Honouliuli Waste Water Treatment Plant (HWWTP) outfall is outside the project area. Haseko
is aware of the location of the pipe and access easements and will take all measures necessary to
maintain and protect this facility. For reference, we have included the location of the outfall pipe and
easement on Attachment 1, to clarify the relationship between the project site and the HWWTP
outfall. We have also included the Drainage Master Plan Map (also by RM Towill) for Ocean

Page 2
Lori M.K. Kahikina
March 13, 2014

Pointe-Hoakalei (Attachment 2) which shows clearly the location of the outfall easement adjacent to, but outside, the project area.

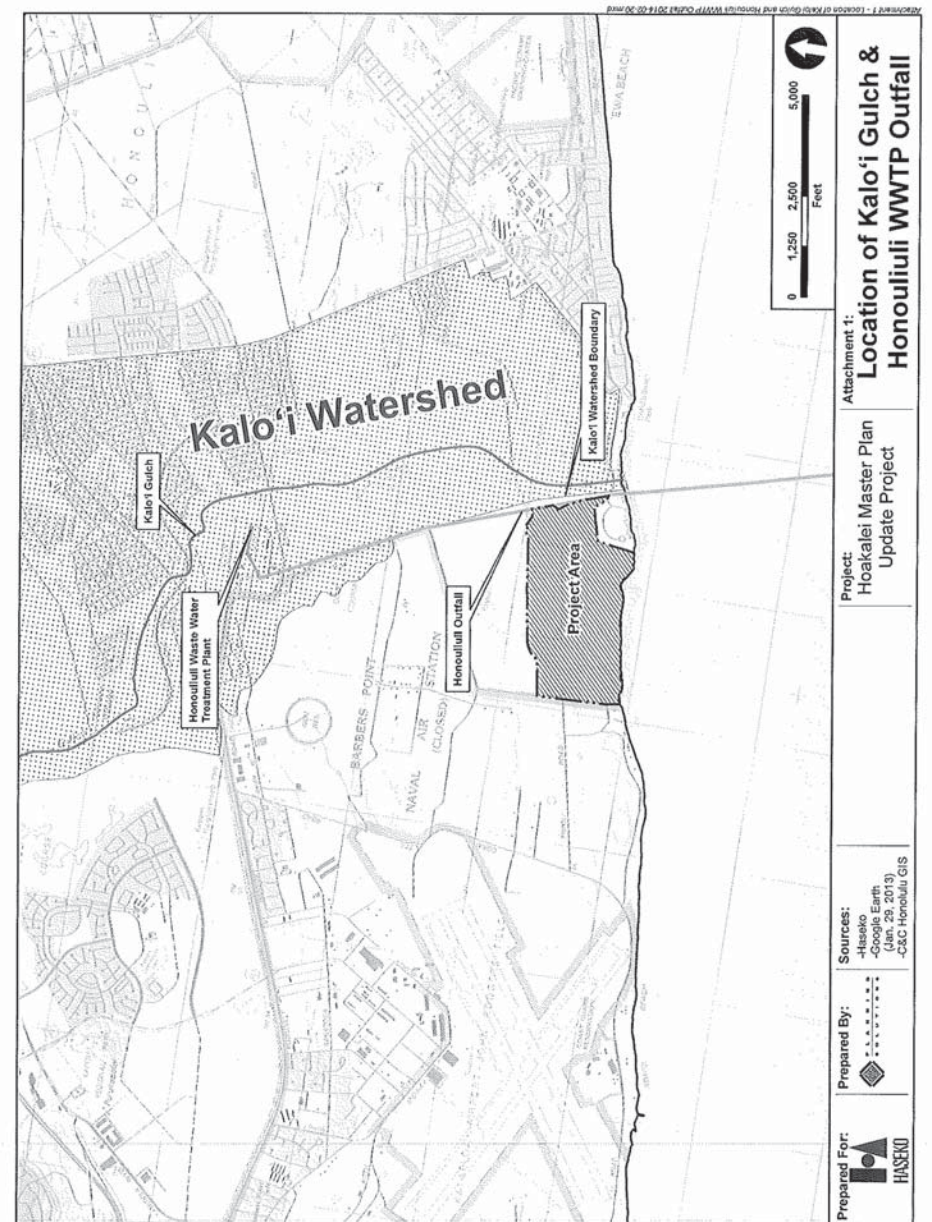
We will provide you a copy of the DEIS when it becomes available. If you have any questions in the future concerning this project, please call me at (808) 550-4483.

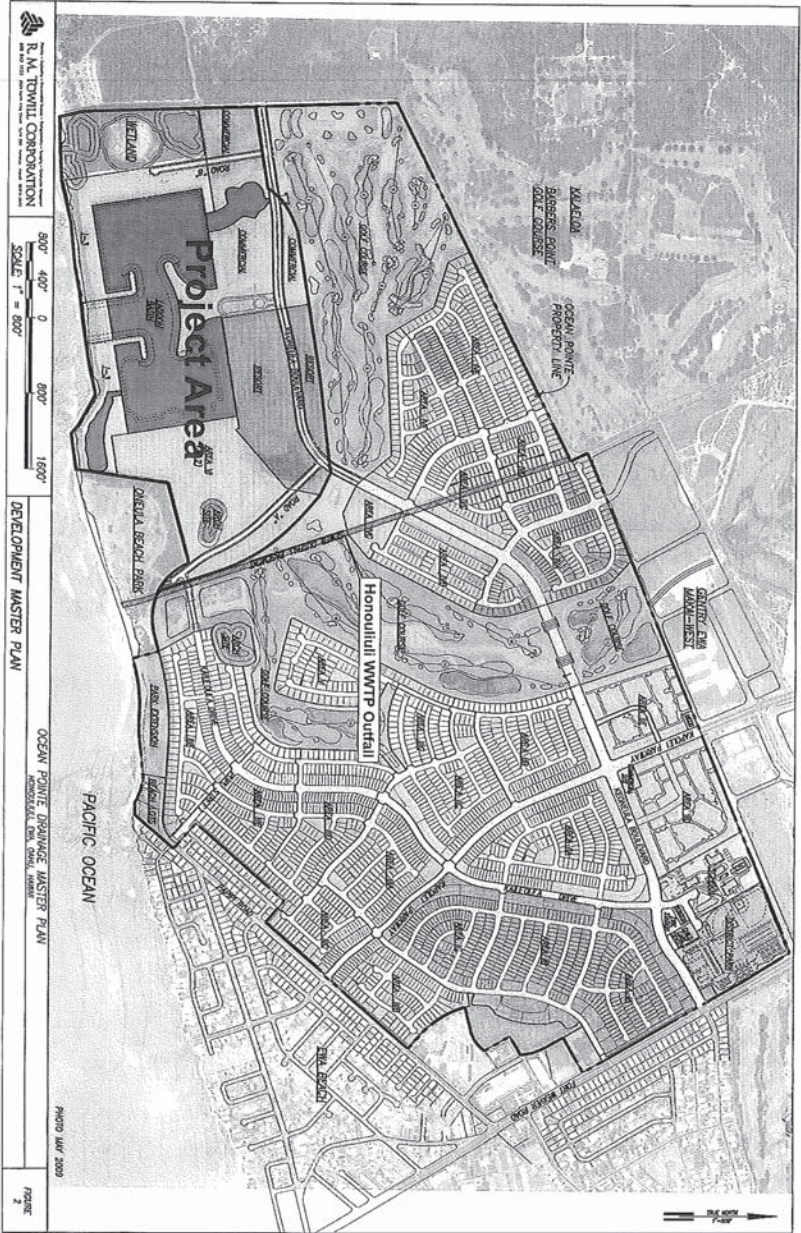
Sincerely,

Perry J. White

cc: Raymond Kanna, Haseko (Ewa), Inc. (via electronic mail only)
Tim Streitz, Department of Planning and Permitting (via electronic mail only)

Attachments:

1. Location of Kalo'i Gulch and Honouliuli Waste Water Treatment Plant Outfall
2. Drainage Master Plan





CHAPTER 9 DISTRIBUTION

Haseko will distribute this DEIS to the individuals and organizations listed in Table 9.1 and request their comments on the report. It will provide a limited number of loan copies to libraries.

Table 9.1 EIS Distribution List

State Organizations	CCH
Department of Agriculture	Board of Water Supply
Department of Accounting and General Services	Department of Customer Services
Dept. of Business, Economic Development & Tourism	Department of Community Services, Municipal Library
DBEDT - Research Division Library	Department of Design and Construction
DBEDT- Strategic Industries Division	Department of Environmental Services
DBEDT - Office of Planning	Department of Facility Maintenance
Department of Defense	Fire Department
Dept. of Education	Department of Planning & Permitting (2 copies)
Dept. of Education-Hawai'i State Library Documents Center	Department of Parks and Recreation
Dept. of Education-Kaimukī Regional Library	Police Department
Dept. of Education-Kane'ohe Regional Library	Department of Transportation Services
Dept. of Education-Pearl City Regional Library	Department of Emergency Management
Dept. of Education-Hawai'i Kai Regional Library	Kapolei Hale (Satellite City Hall)
Dept. of Education-Hilo Regional Library	Federal Agencies
Dept. of Education-Kahului Regional Library	U.S. Geological Survey
Dept. of Education-Lihu'e Regional Library	U.S. Fish and Wildlife Service, Pacific Islands Office
Department of Hawaiian Homelands	U.S. National Marine Fisheries Service
Dept. of Health - Environmental Health Admin.	U.S. National Parks Service
Dept. of Health - Clean Water Branch	U.S. Natural Resources Conservation Service
Dept. of Health - Environmental Office of Planning	U.S. Army Corps of Engineers
DLNR (5 copies)	U.S. Department of the Navy
DLNR - Historic Preservation Division	U.S. Federal Aviation Administration
Department of Transportation – Highways Division	U.S. Federal Transit Administration
UH Water Resources Research Center	U.S. Coast Guard
UH Environmental Center	U.S. EPA – Pacific Islands Office
UH Marine Option Program	
UH Hamilton Library	<i>Libraries and Depositories (Nearest Public Library)</i>
UH at Hilo-Mo'okini Library	'Ewa Beach Public Library
UH Maui College Library	Kapolei Public Library
UH Kaua'i Community College Library	UH West O'ahu Library
Office of Hawaiian Affairs	
Legislative Reference Bureau Library	<i>Media</i>
Hawaii Community Development Authority - Kalaheo	Honolulu Star Advertiser
Land Use Commission	Honolulu Civil Beat
Department of Human Services	

Oahu Metropolitan Planning Organization	
Elected & Other Officials	<i>Other Parties</i>
U.S. Senator Brian Schatz	‘Ewa Beach Lions Club
U.S. Senator Mazie Hirono	‘Ewa Beach Elementary School
U.S. Representative Colleen Hanabusa	‘Ewa <i>Makai</i> Middle School
State Senator Will Espero (District 19)	‘Ewa-Pu‘uloa Hawaiian Civic Club
State Senator Mike Gabbard, (District 20)	Boys & Girls Club Hale Pono ‘Ewa Beach Clubhouse
Representative Bob McDermott (District 40)	Cates International, Inc.
Representative Rida Cabanilla (District 41)	Glenn J. Oamilda
Representative Sharon E. Har (District 42)	Hoakalei Cultural Foundation
Representative Karen Awana (District 43)	Hoakalei Resort Community Association
City Councilmember Ernest Y. Martin-City Council Chair	Ilima Intermediate School
City Councilmember. Kymberly Marcos Pine (District 1)	James Campbell High School
City Councilmember Ron Menor (District 9)	Kapolei Hawaiian Civic Club
City Councilmember Ikaika Anderson-Planning & Zoning Committee Chair	Keone‘ula Elementary School
City Councilmember Ann Kobayashi-Budget Committee Chair	Land Use Research Foundation
City Councilmember Breene Harimoto-Transportation Committee Chair	O‘ahu Hawaiian Canoe Racing Association
Chairperson Kevin Rathbun, ‘Ewa Neighborhood Board	Ocean Pointe Residential Community Association
Chairperson Evelyn Souza, Makakilo/Kapolei/Honokai Hale Neighborhood Board	‘Ewa Pu‘uloa Outrigger Canoe Club
	Seagull Schools at ‘Ewa Beach (Ocean Pointe)
	Uncle Henry Chang Wo, Kupuna
Local Utilities	West O‘ahu Economic Development Association
Hawaiian Electric Company, Inc.	Sierra Club Hawaii Chapter
Hawaiian Telcom	Native Hawaiian Legal Corporation
Hawai‘i Gas	Hawaii’s Thousand Friends
Oceanic Time Warner Cable	The Outdoor Circle
	‘Ewa by Gentry Community Association
	West Loch Estates Homeowners Association
	West Loch Fairways Homeowners Association
	Hawaii Wildlife Center
	Waianae Boat Fishing Club
Source: Compiled by Planning Solutions, Inc. (2014)	

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***Draft Environmental Impact Statement
Volume 2***

**HOAKALEI MASTER PLAN UPDATE
'EWA, O'AHU, HAWAI'I**

**PREPARED FOR:
Haseko ('Ewa), Inc.**



PREPARED BY:

**P L A N N I N G
S O L U T I O N S**

JUNE 2014

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APPENDIX A. WETLAND ENHANCEMENT

APPENDIX A. WETLAND ENHANCEMENT

A. INTRODUCTION

Haseko is considering as a part of its development of the area a number of habitat improvements within the approximately 6-acre wetland and 7.2-acre Wetland Preservation Area (WPA) located within the Kauhale Preserve. The improvements would enhance the WPA's value as a wildlife habitat for Hawaiian Stilts (*Himantopus mexicanus knudseni*), the avian species for which the WPA was established. Any such improvements would in all probability provide usable resources for two other endangered waterbirds, the Hawaiian Coot (*Fulica alai*) and the Hawaiian Duck (*Anas wyvilliana*), known to be present in the area. Any such habitat enhancement would also benefit at least three regularly occurring indigenous migratory shorebird species [Pacific Golden-Plover (*Pluvialis fulva*), Wandering Tattler (*Heteroscelus incanous*) and Ruddy Turnstone (*Arenaria interpres*)], as well as a diverse set of regular and extralimital migratory waterfowl and shorebird species, that winter on O'ahu.

B. LIMITING FACTORS TO BE ADDRESSED

Hawaiian Stilt habitat requirements revolve around their need for: (i) adequate food resources; (ii) safe places to loaf and socialize; (iii) areas in which they can safely breed; and (iv) suitable nesting and chick-rearing habitat. To the extent that these are absent, they limit the carrying capacity of the habitat.¹ Haseko has evaluated the following factors to determine which, if any, might be modified in order to enhance the habitat value of the WPA:

Predation by alien mammalian predators – adults and chicks;
Predation by native and alien waterbirds – eggs and chicks;
Lack of safe nesting habitat;
Lack of safe loafing habitat;
Lack of adequate foraging resources; and
Avian botulism.

Based on its evaluation, it has developed the following integrated habitat improvement program that it believes will: (i) reduce predation; (ii) make the existing habitat more favorable for nesting, loafing and foraging; and (iii) minimize the potential for the persistence of avian botulism.

C. REDUCING PREDATION

Dogs, cats, mongooses, and rats are the principal alien mammalian predators that prey on stilts in Hawai'i. The long-term monitoring that Haseko has conducted within the WPA (quarterly since February 1993) has shown that all of these predators are present in the surrounding areas and have entered the WPA on occasion. To reduce or eliminate these predators from this area ideally employs a series of tools and methods, as no one such tool or method has yet been identified as the standard method.

Predator Barriers – Fencing. Predator-proof fencing is available that is capable of protecting areas from mammalian predators down to the size of a two-day-old mouse. The first such fence erected in Hawai'i

¹ In attempting to modify a specific area (such as the WPA) to better meet these basic needs, it is necessary to identify which limiting factors can be removed, minimized, or mitigated through some practicable intervention. Some of the limiting factors predictably are issues with impacts to all phases of a stilt's life cycle; predation by alien mammalian species is a good example of one of these. Others are significant only in certain phases.

has been deployed at Ka'ena Point, and it has reportedly proven very efficient in keeping predators out. The cost of replacing the existing half-mile-long fence around the WPA with such fencing is high, but if it could be done at some time when the existing chain-link fencing needs replacement anyway, the incremental cost might not be prohibitive. If this top-of-the-line fence option is not economically viable, then the following measures are recommended:

Ensure that the fence is intact – replace any sections, which are currently compromised. Install and bury an additional skirt 12-inches deep attached to the bottom of the fence to reduce the possibility of predators burrowing under the fence.

Replace any gates in the perimeter fence with double entry gates installed on sliding tracks cemented into the ground. This will ensure that persons entering or leaving the WPA can open only one gate at a time, thereby minimizing the potential for predators gaining entry into the WPA.

Remove any vegetation that is taller than the fence within ten-feet of the fence, to prevent predators from climbing up the vegetation and down into the WPA, or by climbing up the vegetation and jumping over the boundary fence.

Remove trees close to the WPA on which the native Black-crowned Night-Herons (*Nycticorax nycticorax hoaciti*) can roost; this is desirable as this species preys on the eggs and young of stilt. This action may also reduce the chance that alien Cattle Egrets (*Bulbucis ibis*) roost or worse, set up a nesting colony close to the WPA.

Predator Barriers – Moat. Nearly ten years ago Haseko excavated a moat around a portion of the area within the WPA as a means of providing additional protection for Hawaiian Stilt habitat. If it were to be expanded to circle the entire defined wetland within the fenced WPA, the moat would protect a much larger area. The following enhancements would improve the moat's efficacy.

Lengthen the moat to encompass a greater proportion of the WPA.

Widen the moat to a minimum of 10 feet and deepen it to ensure that the moat always has water at least a foot deep within it. This will make it harder for invasive vegetation and algae (across which predators can walk) to choke the moat.

Erect a high-impact plastic barrier within the moat to provide a third and final barrier precluding cats, and rats from attaining landfall within the stilt habitat. This plastic barrier would be 7-feet from the outside edge of the moat and would extend 12-inches above the highest water level in the moat.²

The enhancement of the moat will not only provide a third predator barrier, but also ensure that there is sufficient water exchange to minimize the potential for epizootic outbreaks of avian botulism (though complete removal of that risk is not likely).

D. PREDATOR REMOVAL/CONTROL

Once barriers have been constructed predators need to be removed and depending on the goals of the management plan controlled over the long term. As soon as the perimeter fence is completed, dogs will be easy to remove. Cats will need to be trapped using HavahartTM or similar live cat traps within the fenced and moated WPA. Standardized trapping protocols should be followed so as to ensure humane treatment of trapped animals.

² The Animal Services Division of the USDA and researchers at the Biological Resources Division of the USGS are using such plastic fencing in the Marianas as brown tree snake (*Boiga irregularis*) interdiction barriers around the harbors and airport cargo areas. Adequate holes need to be provided in the barrier below the waterline to ensure free water circulation through it within the moat.

E. MONGOOSE AND RODENT CONTROL

Mongoose should be controlled using strategically located Diphacinone baited bait stations around the perimeter of the perimeter fence, additional stations should be deployed and maintained on the still nesting islands. A rodent control program using commercially available bait stations should be designed and implemented on the still nesting islands.

If the predator exclusion fence is constructed, then following its completion a comprehensive mongoose and rodent control program ought to be designed, implemented and monitored until it is determined that all mongooses and target rodents have been removed from within the fenced WPA. The continued mongoose and rodent free state of the WPA should be tested on a quarterly basis.

F. HABITAT ENHANCEMENT

Modification of Topography

The core area within the moated WPA could be mechanically cleared to remove existing vegetation, and to ensure that there is no remaining cover in which mammalian predators can seek refuge. The area surrounded by the moat will in effect be an island. To assist in the control of alien vegetation, especially pickle weed (*Batis maritima*) it would be ideal if approximately 50% of the area could be excavated to a level that will ensure that it periodically floods during high tide events and heavy rains. The remaining area within the moated site should be maintained as hummocks that have gently sides but never actually flood. These islands will provide loafing, and nesting habitat for stilts. Their sloping shores will provide foraging, loafing and easy access for chicks to walk onto and off of the islands before they learn to fly.

Vegetation Control

This current wetland mosaic is primarily vegetated with a deep cover of pickle weed (*Batis maritima*), a highly salt-tolerant alien species. Within the mosaic there are a few small circular ponds containing patches of bulrush (*Scirpus sp.*).

The dense blanket of *Batis* and the incursion of *Pluchea* (squaw bush) severely limits the habitat available to waterbird species within the wetland. While constructing the enhanced wetland, heavy equipment would be used to remove the *Batis*, *pluchea* and other alien species within the fenced and moated portion of the WPA.

Annual cycles of vegetation maintenance should be timed to avoid and minimize potential disturbance to waterbirds between March and July, the peak period of nesting activity by Hawaiian waterbirds. During these months vegetation control activities should be limited to the perimeter of the WPA and outer edges of the surrounding moat, and halted if nesting birds react negatively to human presence and activity.

APPENDIX B. WATER QUALITY MEASUREMENT METHODS

WATER QUALITY MEASUREMENT METHODS

All water quality data for the offshore marine water, lagoon water, and monitoring well water were collected under the supervision of Marine Research Consultants¹ using the following collection protocols:

Offshore Marine Water Sample Collection

These samples are collected in accordance with the methodology approved by the State of Hawai'i Department of Health pursuant to the Water Quality Certification² for the original marina project. Water samples are collected on transects that extended seaward from the shoreline to the open coastal ocean. Transects are oriented perpendicular to the shoreline and depth contours. Water samples are collected at seven stations on each transect from the shoreline to approximately 500 m offshore. Such a sampling scheme is designed to span the greatest range of salinity with respect to potential input of materials at the shoreline. Sampling is more concentrated in the nearshore zone because this area is most likely to show the effects of shoreline modification. With the exception of the two samples collected adjacent to the shoreline, samples are collected at two depths at each sampling station; a surface sample is collected within approximately 10 centimeters (cm) of the sea surface, and a bottom sample is collected within one m of the sea floor.

Lagoon Water Sample Collection

Lagoon water samples are collected from surface water (within 6 inches of the surface) and bottom water (within 1 foot of the lagoon floor). All samples are collected using a small, inflatable boat. Bottom samples are collected using a Van Dorn oceanographic sampling bottle. The bottle is lowered to the desired sampling depth with spring-loaded end caps held open so water can pass freely through the bottle. A weight hung below the bottle signals the designated sampling depth above the bottom. At the sampling depth, a weighted messenger released from the surface triggers closure of the end caps, isolating a volume of water. Upon retrieval, water from the Van Dorn bottle is poured into 1-liter, triple-rinsed polyethylene bottles. Surface samples are collected by filling bottles by hand over the side of the boat.

Monitoring Well Water Sample Collection

The wells are sampled at multiple depths using a bailer with spring loaded end caps cocked in an open position as the device is lowered slowly through the water column. The bailer is triggered to close at the desired depth by releasing a weighted messenger from the surface, which releases the end caps to isolate a volume of water. Upon retrieval, the water is poured into 1-liter, triple-rinsed polyethylene bottles.

Laboratory Testing

Water quality parameters evaluated for both the lagoon and nearshore ocean monitoring included all of the specific criteria designated for open coastal waters and embayments in Chapter 11-54 of the State of Hawai'i Department of Health (DOH) Water Quality Standards. These criteria include: total nitrogen (TN), nitrate + nitrite nitrogen ($\text{NO}_3^- + \text{NO}_2^-$; hereafter referred to as NO_3^-), ammonium nitrogen (NH_4^+), total phosphorus (TP), chlorophyll-a (Chl-a), turbidity, pH, salinity and temperature. In addition, orthophosphate phosphorus (PO_4^{3-}) and silica (Si) are also reported, because these parameters are sensitive indicators of biological activity and the degree of groundwater mixing.

¹ Marine Research Consultants, Inc., 1039 Wai'akua Place, Honolulu, HI 96822

² WQC 137, issued as required by the Clean Water Act of 1977 under Army File No. PODCO 2117.

Following collection, subsamples for nutrient analysis are immediately placed in 125-milliliter (ml) acid washed, triple rinsed, polyethylene bottles and stored on ice. Analysis for NH_4^+ , PO_4^{3-} , and NO_3^- are performed with a Technicon autoanalyzer using standard methods for seawater analysis (Strickland and Parsons 1968, Grasshoff 1983)³. TN and TP are analyzed in a similar fashion following oxidative digestion. Total organic nitrogen (TON) and total organic phosphorus (TOP) are calculated as the difference between TN and dissolved inorganic N and TP and dissolved inorganic P, respectively.

Water for other analyses is subsampled from 1-liter polyethylene bottles and kept chilled until analysis. Chl-a is measured by filtering 300 ml of water through glass fiber filters; pigments on filters are extracted in 90% acetone in the dark at 20° C for 12-24 hours. Fluorescence before and after acidification of the extract is measured with a Turner Designs fluorometer. Salinity is determined using an AGE Model 2100 laboratory salinometer with a readability of 0.0001‰ (ppt). Turbidity is determined on 60 ml subsamples using a Monitek Model 21 nephelometer, and reported in nephelometric turbidity units (NTU).

In situ field measurements of water temperature, pH, dissolved oxygen and salinity are acquired using an RBR Model XR-620 CTD calibrated to factory specifications. The CTD has a readability of 0.001°C, 0.001pH units, 0.001% saturation, and 0.001 parts per thousand (salinity).

Most of the laboratory testing (all offshore marine water samples, well water samples, and lagoon samples reported here for every year except for 2012) is conducted by Marine Analytical Specialists in Honolulu, Hawai'i. Marine Analytical Specialists possesses the acceptable rating from EPA-compliant proficiency and quality control testing. During 2012, water samples collected from the lagoon are tested at the University of Hawai'i, Mānoa under the supervision of Prof. Martin Atkinson using similar, EPA-approved methods.

³ Grasshoff, K. 1983. *Methods of seawater analysis*. Verlag Chemie, Weinheim, 419 pp.; Strickland J. D. H. and T. R. Parsons. 1968. *A practical handbook of sea water analysis*. Fisheries Research Bd. of Canada, Bull. 167. 311 pp.

**APPENDIX C. TECHNICAL REPORT: DECAY RATES OF FECAL
ENTEROCOCCUS FOLLOWING EXPOSURE TO MIXOHALINE
BASIN WATERS AT OCEAN POINTE, OAHU, HAWAI'I.**

Technical Report

Decay rates of fecal *Enterococcus* following exposure to mixohaline basin waters at Ocean Pointe, Oahu, Hawai'i.

Submitted by

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October, 2012

Executive Summary

The rates at which enteric bacteria may be expected to die-off following exposure to the mixohaline waters within the Ocean Pointe basin, Oahu, Hawai'i were determined. Samples of Ocean Pointe basin water from 2, 10 and 18 feet depth were collected, admixed with a source of fecal *Enterococci* bacteria, incubated *in situ*, and periodically subsampled/analyzed for *Enterococci* abundance over a period of two days to ascertain the decay rates of *Enterococci* as a function of time and depth. The fecal *Enterococci* that were used for the trial were sourced from primary treated effluent from the Honouliuli Sewage Treatment Plant. Data from the five subsamplings yielded values for *Enterococci* decay rates ranging from -0.65 to $-1.32d^{-1}$ following exposure to Ocean Pointe basin waters. The calculated die-off rates of fecal *Enterococci* bacteria were $-1.32d^{-1}$, $-0.86d^{-1}$, and $0.65d^{-1}$ for waters collected and incubated at 2, 10 and 18 feet depths, respectively. The analytical reproducibility index, calculated from seven replicate analyses from subsamples taken from a single depth yielded a relative standard deviation of 13% for the data used in these analyses of *Enterococcus* decay rates.

Introduction/Background

Enterococci are commonly found in the feces of humans and other warm-blooded animals. Because *Enterococci* share a common source with many human pathogens and display decay rates that are understood to mirror those of specific human pathogens, they are frequently used as indicators of health hazard by governmental regulatory agencies. Although some strains are ubiquitous and not related to fecal pollution, the presence of *Enterococci* in water is an indication of fecal pollution and the possible presence of enteric pathogens. This accounts for its use by regulatory agencies for monitoring to protect recreational waters for safe department by the public. Epidemiological studies have led to the development of criteria which can be used to promulgate recreational water standards based on established relationships between health effects and water quality. Interest in the presence of *Enterococci* in recreational fresh or marine water samples centers on the relationship between the density of *Enterococci* and the risk of gastrointestinal illness associated with depontment/contact with the water.

Methods

Samples of Ocean Pointe basin water (OPBW) were collected from depths of 2, 10, and 18 feet using a Niskin sampler, and transferred to replicate, sterile, 4L polycarbonate containers. These samples were quantitatively admixed (5mL HSTP:4L OPBW) with primary treated sewage

effluent from the Honouliuli Sewage Treatment Plant collected the previous day to provide a representative source of *Enterococci* bacteria. The replicate 4L containers were vigorously mixed to obtain a uniformly mixed solution of HSTP:OPBW fluids. These vessels were subsequently subsampled into sterile 250mL polycarbonate, and redeployed onsite for *in situ* incubation at the three depths of origin. All samples were collected and incubated from a single station located approximately 300' and 40' from the inside shorelines of the back basin (Figure 1). Following the initial collection and subsampling, these vessels were retrieved, vigorously mixed, subsampled, and redeployed to depth on four occasions over the following two days. Collected subsamples were placed in a cooler containing an ice pack to maintain ambient temperature and transported to the lab for immediate processing. On each of the sampling occasions, replicate subsamples from each replicate sample, were processed in replicate filtrations at each of several filtration volumes. Over the course of the experiment, filtration volumes variously ranged from 1 to 100mL in the attempt to embrace appropriate *Enterococci* densities for reliable enumeration. This study used Standard Method 9230C, membrane filter procedure (Difco m Enterococcus Agar, 48h incubation at 41 °C) for the detection and enumeration of *Enterococci* bacteria in water as described in Standard Methods for the Examination of Water and Wastewater (Clesceri, L. S., A. E. Greenberg, and D.A. Eaton. 1998. *Standard Methods for the Examination of Water and Wastewater*. American Public Health Association. Washington, DC).

Results

Decay Rate Trial. *Enterococcus* results from the five subsamplings are summarized in Table 1. The temporal decline in the densities of colony forming units (CFU) for each of the replicate samples and depths are shown in Figure 2, and the time series for the average CFU of the replicate samples for each depth are given in Figure 3. The temporal sequences of the natural logs of the mean CFU results are given in Figure 4. Regression analyses of these ln (CFU) data were performed to determine the decay rates (k); these are presented in units of inverse time. The vertical distribution of k throughout the basin depth is shown in Figure 5. The results produced estimates of *Enterococci* decay rates ranging from -0.65 to $-1.32d^{-1}$ for the three depths examined within the Ocean Pointe basin.

Reproducibility Trial. A trial to describe the degree of reproducibility associated with individual *Enterococci* abundance assessments was performed at the start of the experiment (i.e., day 0). Seven separate 5mL subsamples from mixed HSTP : OPBW taken from the surface were filtered and incubated as per the other samples. Results showed counts of 38, 35, 30, 33, 38, 45, and 32 CFU / plate for the seven replicates. The calculated relative standard deviation (i.e., s.d. / mean) of these data gives a reproducibility estimate of 13%.

Summary

These results indicate that exposure of enteric bacteria, such as the indicator group *Enterococcus*, to waters of the Ocean Pointe Basin may be expected to exhibit rapid die-off rates.

**APPENDIX D. AN ASSESSMENT OF THE WATER CHEMISTRY OF
THE HOAKALEI LAGOON. IMPLICATIONS FOR SUSTAINABLE
MANAGEMENT.**

An Assessment of the Water Chemistry of the Hoakalei Lagoon. Implications for Sustainable Management.

Report prepared by Kenneth Coale, Moss Landing Marine Laboratories and Coastal Solutions Group

For Haseko (Ewa) Incorporated
September, 2013

Introduction and Background

The Hoakalei lagoon is a 48.2 acre (1.02 x 10⁹ liter) excavated basin, located just south of the town of Ewa Beach, and West of the Pearl Harbor complex, on the island of Oahu, HI. This feature was originally constructed to serve as a harbor/marina for the surrounding community as being developed by the Haseko Corporation. The original design parameters were developed to accommodate vessels with keel depths close to 5 meters. The average depth of the excavated basin is approximately 5.9 meters and thus the volume is relatively large for a typical lagoon of this same area. The original design included the construction of a navigable channel connecting the marina with the near shore, southern shelf. Such a channel would have provided significant flushing of the harbor with coastal waters forced by tidal exchange and wind-driven circulation. Thus, the harbor waters, as designed, would have mimicked the biogeochemical conditions of the proximate intertidal and subtidal communities, located only about 90 meters to the south. The conversion of the excavated basin to a recreational water body without an open channel to the sea, poses several new management challenges that require investigation. The Haseko Corporation engaged Dr. Marlin Atkinson to evaluate the reconfigured system from a biogeochemical perspective. In his reports, Dr. Atkinson focused on the interactions of the water chemistry of the source flow with the dominant sink terms. The major source of nutrients to the lagoon is from groundwater and the major sink for nutrients appears to be uptake by the benthic alga *Chara zeylanica*, and to a lesser extent *Cladophora sp.* and *Ruppia maritima*. (Foster and Cox, 2012). Atkinson worked closely with analyst, Dr. Steve Dollar and hydrologist Tom Nance to develop an understanding of the nutrient concentrations and their fluxes to and from the lagoon. Atkinson and Dollar found relatively high nitrate concentrations (and fluxes), yet relatively low corresponding phosphate concentrations (Atkinson and Dollar, 2012). Due to the great abundance of *Chara*, Atkinson surmised that the *Chara* was growing only as fast as new inputs of phosphate would allow, and thus was keeping the lagoon in an oligotrophic state, despite the high nitrate concentrations. Atkinson proposed that a judicious harvesting of the *Chara* could be engineered to match the phosphate input and minimize both the amount of organic carbon sequestered in the sediments and the likelihood of nuisance phytoplankton blooms (Atkinson and Dollar, 2013). The goal of the Atkinson approach would be to reduce phytoplankton blooms, maintain water clarity, and minimize the potential for sub- and an-oxic organic matter diagenesis in the sediments of the lagoon. Following the death of Marlin Atkinson, Kenneth Coale was

contacted to provide a biogeochemical review of the available data and work to date, focusing on nutrient dynamics. The analysis given here incorporates the review of two of Dr. Atkinson's reports, meetings on site with Drs Morgan, Dollar, Spalding, Foster and subsequent meetings with hydrologist Tom Nance and principals of the Haseko Corporation. This analysis seeks to identify ongoing biogeochemical processes and threats that could represent contraindications to a sustainable recreational water body as the Haseko Corporation now seeks to manage.

Hydrodynamics and Flow

Based upon the analysis of Tom Nance, the Hoalakei Lagoon receives nearly all of its water from groundwater sources. In well holes the major halocline occurs, in general, just below 25 feet, above which the salinity varies between 2.5 and 5 ppt. This is below the salinity of the lagoon, which is near 8.6 ppt. Neglecting evaporative losses and precipitation, this suggests that a significant portion of the source water originates from below the halocline. The average well hole depth where a salinity of 8.6 ppt is found is approximately 35 feet. This raised questions regarding source waters and an addition well was drilled on both the Mauka and Makai sides. The Makai side shows a much shallower halocline and higher salinities overall. The lagoon salinities could be explained by an admixture of both sources. There is some temporal variability in lagoon salinity, varying between 7.5 and 9.5 over the last 7 years, and averaging closer to 8.6. This is important due to the halo-tolerance of *Chara*, thought to survive up to 10 ppt. In December of 2005 and again in December of 2008 salinities reached 9.8, very close to the tolerance limits for the dominant benthic flora. A greater contribution of Makai water could lead to a die-off of the *Chara*. From time-series measurements of ground water, Tom has been able to identify changes in aquifer level and attribute their cause to land use practices including agriculture and golf course water reclamation, etc... It is likely that such fluctuations will continue, but there is no evidence to date to indicate salinity is rising. The current hydraulic residence time has been estimated to be 150 days. This has been calculated simply as the lagoon volume divided by the groundwater inflow. This is relatively long for a lagoon and low flushing rates render this lagoon less resilient to both outside influences (salinity spikes, tsunami) and internal processes (potential hypoxia, or blooms). Longer hydraulic residence times could allow poor water quality to persist for many months.

Hydrography

The average depth of the Hoalakei Lagoon is 5.9 meters. Based on bathymetric surveys the bottom is relatively flat and, although separated into three main basins, wind stress from the predominant trades, provides for near homogenous mixing of the entire lagoon. This is evidenced by uniform structure in temperature, salinity, oxygen (measured continuously using a CTD profiler) as well as discrete measurements of nutrients chlorophyll, pH and turbidity. These discrete measurements from the surface waters, deep waters and at different locations on a single day are almost indistinguishable. This indicates that processes responsible for the production/consumption of these constituents act slowly with respect to the mixing rate. Throughout the water column

oxygen is at 100% saturation and chlorophyll levels are well mixed. This would indicate a mixing time of less than a day.

Nutrient Dynamics

A good time series of discrete sample analyses has been collected since early 2005 and extended through to the present time. These analyses include measurements of salinity, inorganic phosphate, organic phosphate, total phosphate, nitrate + nitrite, ammonia, organic nitrogen, total nitrogen, chlorophyll, turbidity, and pH (Figure 1). The frequency of analysis has been about twice per year until about 2012 when the sampling rate was increased to about once per month. Samples were collected at three locations (west, center and east) and at two depths (surface and deep). Together with continuous profiles of salinity, temperature and oxygen, these are essential parameters required to understand bottom up limitation processes affecting photosynthesis in aquatic systems. Several major points can be made from these data: 1) The lagoon is well mixed. On a given sampling date, there appears to be no spatial or vertical difference in all parameters measured. 2) Total nitrogen is extremely high (>250 µM initially) and appears to have declined almost monotonically with a small recent increase in concentration and is now approaching 70 µM, whereas 3) phosphate is generally very low (about 0.5 µM) and 4) ammonia (actually ammonium) appears to be increasing now between 1 µM and 3 µM. For over 6 years the N:P ratio was over 150:1 relative to the prime aquatic ratio of 16:1. Atkinson and others concluded that in such a system, phosphate was limiting growth of phytoplankton and possibly *Chara*.

Recently, more fluctuations in this ratio have been seen and in some instances this ratio has fallen by a factor of two. This would still be limiting but vulnerable to additional phosphate inputs.

Stability

The stability of this system depends upon a balance of sources and sinks and stable processes that control these fluxes. Over the last several years, it appears that groundwater supplied the nutrients, *Chara* provided the uptake and excess nitrate left with the flux of water out of the system. This kept phosphate low and inhibited the bloom of phytoplankton species. The monotonic decline in nitrate + nitrite without a similar pattern in the other nitrogen species is likely due to two uptake/removal mechanisms: assimilatory nitrate reduction, as performed primarily by an increasing biomass of *Chara* in the lagoon, and dissimilatory nitrate reduction (or denitrification) performed by bacteria, occurring in the sediments. As organic matter accumulates in the sediments, bacteria will respire the organic matter utilizing oxygen. When oxygen is depleted, nitrate is the next most energy efficient electron acceptor for respiration, leading to denitrification. At extremely high nitrate concentrations denitrification can occur quite near the sediment water interface and rates of denitrification can be quite high. This is a positive aspect of the system as it promotes organic matter respiration and reduces the overall organic matter in the sediments. When nitrate and oxygen both are consumed and residual organic matter remains, sulfate can provide the next terminal electron acceptor for bacterial respiration, producing sulfide. There is some anecdotal

evidence that this may be occurring at 1 to 2 feet depth (Spalding, personal communication). This is a common feature of sediments with relatively little organic carbon. So, it appears that there is sufficient organic matter remaining to support sulfate reduction. Should the sulfate/sulfide redox couple shoal towards the sediment/water interface, sulfide could be released into the water column. This could occur with an accumulation of organic matter. The result would be a decline in water quality.

Atkinson recommended that *Chara* be harvested at a rate equal to the rate at which phosphate was being added, to insure a steady state system. He argued that such a harvest would prevent the build up of organic matter and avoid two negative impacts: 1) nuisance algal blooms and 2) sulfide production. Yet, when *Chara* was recently harvested, significant changes to the water chemistry appears to have resulted. These include an increase in phosphate, total nitrogen, a recent rise in phytoplankton pigments and an increase in turbidity. In conversation with Drs. Dollar and Spalding, it appears that *Chara* does not grow back rapidly in the locations harvested, contrary to Atkinson's predictions. If this strategy is to be pursued, some adjustment of the harvest method may be necessary to maximize the survival and regrowth of this species.

I offer below, an untested hypothesis that may explain the recent concomitant degradation in water quality. In other systems with emergent vegetation (*Elodea*, sea grasses, kelps, etc...) the hydrodynamic energy in the boundary layer is decreased considerably. In a system that is as vigorously mixed as the Hoakaie Lagoon, considerable wind-driven turbulence would not allow fine particles to settle, yet in a benthic boundary layer where mixing was physically dampened by dense stands of *Chara*, particle sinking velocities could exceed resuspension rates and particles would be removed to the sediments. When *Chara* was removed, beginning in mid November, 2012, this natural filter/sediment trap mechanism was no longer functioning at same rate and, in addition, phosphate was not taken up to the previous extent. In the harvest scenario, particles would have much greater residence times and more phosphate could go into phytoplankton production. Thus an increase in turbidity, total nitrogen, and phytoplankton chlorophyll would result. This explanation is generally consistent with the water quality data but remains to be tested.

It is unknown whether *Chara* acts as a climax species, but it may in other systems and this would be useful to know, as opportunistic species are not known to provide ecological stability. It may take some time to establish, yet may not grow back as rapidly as first believed.

Sediments

To date, there have been no sedimentary studies. Anecdotal accounts suggest that the sediments are comprised primarily of an unconsolidated calcareous ooze. Accounts from the Atkinson reports indicate sediment depths of 1 to 2 ½ feet. More recent accounts suggest that sediment depths exceed 3 feet. This represents a significant sedimentation rate within the lagoon, not yet confirmed by sonar surveys. Scanning electron microscopic analysis is ongoing but suggests the sediments are mainly calcium carbonate but we cannot exclude that there is some dolomite as well (Figure 2). The main observation so far is that the only clear bioclast seen are well-preserved ostracode valves about 400µ in length. Some ostracodes are filled with and embedded in

microsparite (a few μm -sized calcite crystals) some of which occurs in spheroidal aggregates. There are also spine-like structures that can be echinoid spines. The rest is microcrystalline calcite. The tentative interpretation is that the microsparite is probably of biogenic origin. This means that the preliminary finding is that the majority of the sediments derive from the aeolian deposition of adjacent arid sediments surrounding the lagoon, rather than the *in situ* precipitation of calcium carbonate formed through the intrusion of high alkalinity ground waters. Another potential source of sediments is the underwater weathering (erosion) of the bank materials. Anecdotal observations suggest that the wall material may be chemically eroded and become friable, possibly contributing to the sediments observed on the bottom of the lagoon. All processes likely contribute to sedimentation in the lagoon, and all could be significant. The provenance of these materials remains an ongoing study.

Another aspect of the sediments, that is important to water quality, is the depth of the sulfate/sulfide redox couple and the organic matter content to support sulfate reduction. Anecdotal evidence suggests that this may be occurring about 1 to 2 feet below the sediment/water interface, yet this has not been confirmed and there is no indication that sulfide is being released into the water column.

Threats to the System

There are several obvious threats to this system that could degrade water quality from the perspective of managing a recreational water body. These include 1) nuisance blooms of phytoplankton, particularly harmful algal blooms (HABs), 2) sulfate reduction and the production of hydrogen sulfide, 3) microbial pollution (enteric bacteria), 4) increased turbidity, 5) increased salinity via changes in groundwater supply, or a tsunami (http://www1.honolulu.gov/dem/new_tsunami_evacuation_zone_maps.htm). For example, a 1 m overtopping of 35 ppt seawater would increase the lagoon salinity to over 12 ppt and likely kill all of the *Chara*. All of these processes are linked to nutrient cycling and the stable maintenance of salinity in the lagoon. Here, *Chara* plays an important role (nutrient uptake, organic matter production, sedimentation and turbidity, etc...) yet it's stability is uncertain. In light of a tsunami, it is only a matter of time until the lagoon will be overtopped. Recovery from a single such an event could take years.

Future Studies

Because the system is not inherently stable over long periods and seems to be undergoing some transitions now, efforts should be undertaken to monitor and identify the threats mentioned above. Nutrient, chlorophyll, turbidity and salinity monitoring was a very good start and should be continued, yet there is a need to focus on specific drivers of habitable/recreational incompatibility. Specifically, the role of the sediments needs to be investigated. This would include down-core measurements of oxygen penetration, organic matter composition and the presence of sulfide. Periodic enumeration of the water column phytoplankton assemblages and an estimate of their biomass are critical. Attention should be paid to nuisance species such as *Microcystis* spp. and other cyanobacteria. Some monitoring of fecal indicator bacteria (FIBs) should be taken using methods to exclude avian coliforms. In addition, because the system is now structured

around one dominant benthic macrofloral species (*Chara*), a better understanding of its ecological role would benefit management. Most accounts of this species derive from studies of shallow water bodies, ditches and lakes, where *Chara* has been characterized as an opportunistic species. It would be useful to identify systems where *Chara* has been established over long periods in deeper water settings and understand the other components of the ecosystem in these examples including herbivorous grazers (fish and invertebrates). Long-term records of these processes will inform the stability of the system for aquatic recreational uses. I understand that some of these studies have been recently initiated and applaud these efforts.

Alternatives

Due to the inherent instability of this feature and its vulnerability to increased salinity and thus massive changes in the present ecosystem, it would benefit the management to develop some alternatives to their current and secondary plans. In the event that the system becomes unstable, or permitting pressure allows, some other strategies should be ready to implement. From my consultations, the original plan (a) was for a marina. Due to political/"environmental" pressures this plan was abandoned in favor of plan (b), a brackish water recreational body requiring high water quality. In light of the inherent risks such a feature, as designed, may pose, alternative uses should be investigated. In my opinion, options that would increase flow and decrease the residence time of the water in the lagoon should be explored. Depending on the approach taken, it may be necessary to consult a hydrodynamicist who could advise on the necessary modifications to best achieve the desired function of such a feature.

Summary

In summary, Haseko has assembled an excellent team and produced some high quality data over long periods of time. This data has enabled the preliminary interpretation of the hydrodynamics and nutrient cycling in the Hoakalei Lagoon, yet more direct ties to water quality should be made. Additional studies that integrate the biological/ecological findings with the water quality aspects should be continued and expanded, including some investigation of the sediments. The harvest of *Chara* should be suspended until its role and resilience is more clearly understood. The system is now at risk for instability. A plan C alternative to a brackish water recreational site should be developed that would allow for greater ventilation of the lagoon.

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Interactions of water chemistry and benthic algae in Hoakalei Lagoon: Estimate of *Chara* removal. Report #2. 2013. M. Atkinson and S. Dollar.

Description of biological communities in Hoakalei Lagoon. 2012. M. Foster and E. Cox.

State of Hawaii, Official Website of the City and County of Honolulu:
http://www1.honolulu.gov/dem/new_tsunami_evacuation_zone_maps_.htm

Personal communications with the following people:

- Charles Morgan, Planning Solutions
- Steven Dollar, Marine Research Consultants
- Michael Foster, Coastal Solutions Group
- Tom Nance, Water Resource Engineering
- Heather Spalding, University of Hawaii at Manoa
- Raymond Kanna, Haseko Development, Inc.
- Sharene Saito Tam, Haseko Development, Inc

Data supplied by Planning Solutions:

Hoalakei Lagoon Consolidated Water Quality Data
Water Quality from Well Monitoring of Haseko Wells
CTD profiles of Hoalakei Lagoon

Figure 1.

See file WQ Consolidated 2013-08-20.pdf, included

Figure 1a



Hoalakei Lagoon Consolidated Water Quality Data

Vertical axis scales 7-day running average = 3 months

Figure 1b

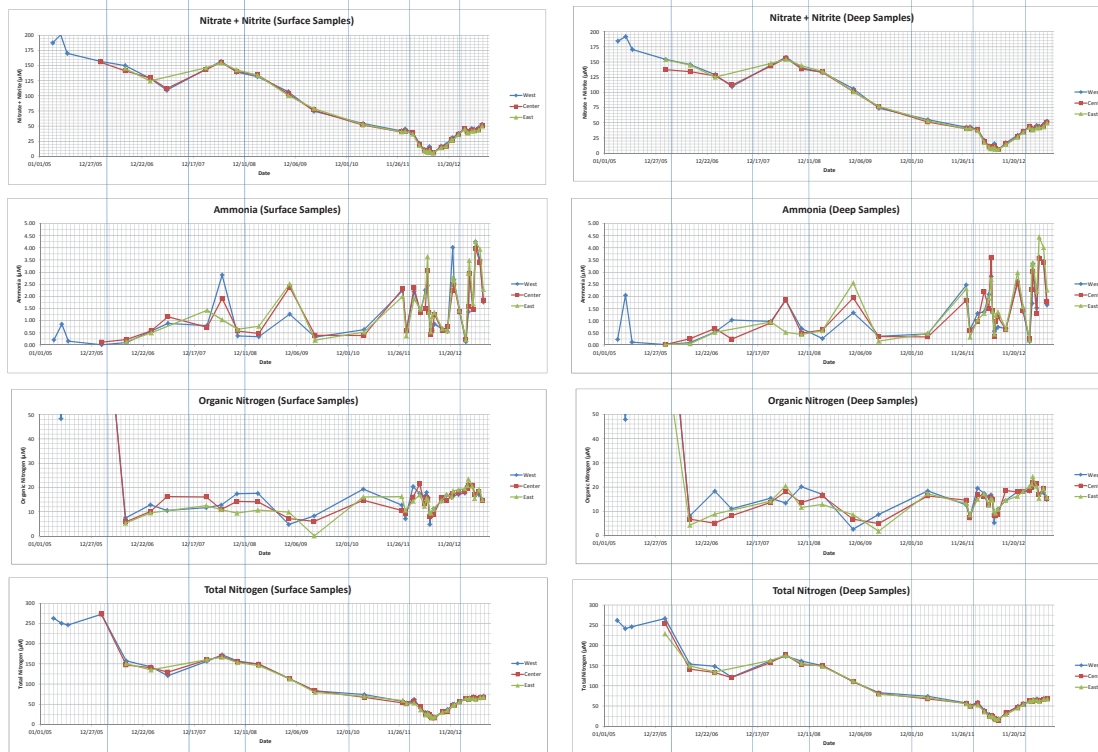


Figure 1c

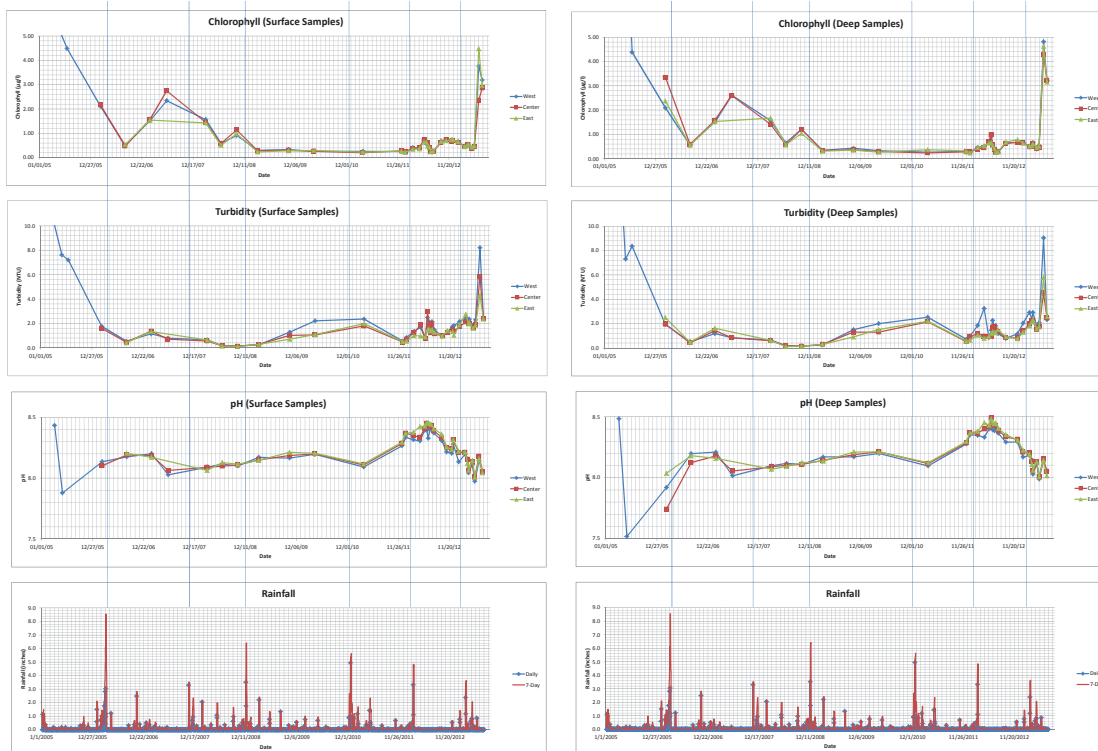


Figure 2.

Scanning Electron Micrograph showing mix of biogenic clasts and minerals. The preliminary analysis indicates this material is predominantly allochthonous, likely originating from aeolian deposition or bank erosion.



APPENDIX E. ALTERNATIVE CIRCULATION SCHEME FOR THE HOAKALEI LAGOON USING SALINE GROUNDWATER



No. of pages: 12
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Original ☐ will be mailed to you.
☒ will not be mailed to you.

October 24, 2013
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MEMORANDUM

To: Charles Morgan – Planning Solutions, Inc.
From: Tom Nance
Subject: Alternative Circulation Scheme for the Hoakalei Lagoon
Using Saline Groundwater

Introduction

The relatively stable salinity, temperature, and nutrient levels of the water in the 48-acre, 310 million gallon (MG) Hoakalei Lagoon reflect an apparent dynamic balance of the inflow of an estimated 2.6 million gallons per day (MGD) of nutrient rich brackish groundwater, uptake of the nutrients by aquatic plants in the Lagoon, evaporative loss from the Lagoon's water surface on the order of 0.3 MGD, and discharge from the Lagoon on its makai side.

In the long term, this dynamic balance may not continue and an imbalance could have undesirable consequences. To prepare for such a possibility, Haseko proposes to drill saltwater wells which, if ultimately utilized, would pump on the order of 50 MGD of saline groundwater into the Lagoon to create stable and controllable water quality conditions. This memo and its attachments describe this circulation scheme and assess its potential impacts on groundwater.

Hydro-Geologic Circumstances

The Ewa Plain is an emerged limestone reef. The formation consists of two highly permeable limestone layers separated from each other by a stratum of essentially impermeable marl and siltstone. The uppermost limestone layer forms the surface of the Ewa Plain. It is wedge-shaped in cross section, on the order of 100 feet thick toward its inland margin, and about 200 feet thick at the shoreline. The reef limestone in this layer is very porous (specific capacity estimated to be 0.20) and highly permeable (a permeability on the order of 40,000 feet per day on a macro-scale).

Groundwater in the upper limestone layer exists as a thin and brackish basal lens. From the 1930s until 1994, the basal lens on the east side of the Ewa Plain was used extensively for irrigation of

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sugarcane. Use of this groundwater since the closing of Oahu Sugar in 1994 has drastically diminished. It is now limited to modest capacity landscape irrigation wells with a total combined use of less than 1.0 MGD. Groundwater in the upper limestone layer on the west side of the Ewa Plain has always been too saline for irrigation use. However, since the early 1990s, it has been used extensively by the cogeneration plants in Campbell Industrial Park (AES, Kalaeloa, and HPOWER) for cooling purposes. The combined use for this purpose is on the order of 8.5 MGD.

The marl and siltstone beneath the first limestone layer is 40 to 50 feet thick. As it is essentially impermeable, it functions as an aquiclude which provides complete hydrologic separation of groundwaters in the upper and second limestone layers. On the west side of the Ewa Plain at the cogeneration plant sites, the second limestone layer is about 170 to 200 feet thick and its permeability is comparable to the upper reef limestone layer. All three of the cogeneration plants, as well as the more recently developed HECO plant next to HPOWER, use the second limestone layer for the disposal of cooling tower blowdown. Prior to the start of this practice, salinity of the water in the second limestone layer was 34 to 35 parts per thousand (PPT), essentially identical to seawater. Its temperature was 76° to 77°F, also the same as seawater. After 20 years of the cooling tower blowdown disposal practice, salinity in the second limestone layer in the southwest corner of the Ewa Plain is about 45 PPT, its temperature is about 88°F, and its piezometric head has been raised about 2.5 feet. This practice has not impacted salinity or temperature in the second limestone layer on the east side of the Ewa Plain.

Description of the Saline Groundwater Circulation Scheme

The alternative saltwater circulation system would consist of 10 saltwater wells arrayed around the Lagoon's perimeter. Figure 1 shows their tentative locations and Figures 2 and 3 are plan and section views of a typical well and pump station. Each would be designed to draw 3500 gallons per minute (GPM) of saline groundwater from the second limestone layer and deliver it into the adjacent Lagoon. The combined 35,000 GPM capacity would deliver 50 MGD of saline groundwater when run continuously. This would create an average residence time of six to seven days in the 310 MG Hoakalei Lagoon. By contrast, the residence time at present with the estimated 2.6 MGD inflow rate of brackish groundwater is about 120 days.

Probable Effects on Groundwater of the Saltwater Circulation System

There are four major impacts that implementation of the saltwater circulation scheme would have on groundwater in the upper limestone layer: (1) increase the salinity in the 48-acre Lagoon; (2) surcharge the water level in the Lagoon; (3) create a hydraulic barrier to groundwater flow to shoreline

discharge; and (4) change the concentration of nitrates and phosphates ultimately discharged into the marine environment. Each of these is described below.

Salinity Increase in the Lagoon. The ten wells, each of 3500 GPM capacity, would produce 50 MGD when run continuously. In about 6.2 days, the equivalent of the Lagoon's entire 310 MG storage volume will have been pumped into it. The salinity of the pumped water is expected to be 34 to 35 PPT, essentially equivalent to seawater salinity. At present, the Lagoon's salinity is on the order of 8.7 PPT. In the initial week of pumping, the Lagoon's salinity would rapidly rise to 34 to 35 PPT.

The salinity tolerance of chara, the benthic plant which covers most of the bottom of the Lagoon, is thought to be in the range of 10 to 15 PPT. The saline groundwater would be toxic to the chara. Given its substantial biomass, it would be necessary to remove the chara from the Lagoon prior to implementing the saline groundwater circulation system.

Increase in the Lagoon's Water Level. Data documenting the Lagoon's water level rise during two substantial storm events provide a basis for estimating the possible water level rise due to the continuous inflow of 50 MGD of saline groundwater. The two events were in March 2012 and March 2013. Figure 4 depicts the rainfall and relevant recorded water levels during the March 6 to 7, 2012 storm event. Converting the recorded water level data to moving 24-hour average (24-MAVs) removes the semi-diurnal variations, making the water level responses to the storm rainfall easier to interpret (Figure 5). Much of the groundwater level rise is due to a rise of the mean ocean level resulting from a drop in barometric pressure. Based on the March 6th rainfall, and accounting for the barometric-driven ocean level rise, it appears that the direct rainfall on the Lagoon's 48 acres and runoff into the Lagoon from an estimated 40 surrounding acres amounted to 6.1 MG in the first 24 hours and it produced a water level rise of 0.34 feet in the Lagoon. A similar analysis for the March 10 to 11, 2013 storm event indicates that direct rainfall and runoff from adjacent areas amounting to 4.4 MG produced a water level rise of 0.17 feet (Figures 6 and 7). An extrapolation of these results suggest that the 50 MG of pumped inflow is likely to raise the Lagoon's water level by 2.6 feet.

As a check on the reasonableness of this estimate, calculations were made for the possible flow out the sides and bottom of the Lagoon resulting from 50 MGD of pumped inflow. The bottom of the Lagoon is covered with a 3-foot thick layer of calcareous silt. Its permeability coefficient is assumed to be on the order of 0.01 feet per day. If the sides of the Lagoon are assumed to have a permeability coefficient of 4000 feet per day, about a tenth of the macro-scale permeability coefficient of the upper limestone layer, then the calculated build-up for the 50 MGD inflow would be 1.3 feet. Based on both these results, an estimated build up on the order of 2.0 feet appears to be a reasonable approximation.

Hydraulic Barrier to Groundwater Flow to the Shoreline. It is estimated that prior to the Lagoon's excavation, the flow of groundwater through the Lagoon's 2300-foot section of the shoreline was about 2.0 MGD. Excavation of the Lagoon replaced the reef limestone through which groundwater flowed with an open water surface. As a result of this excavation, groundwater flows laterally into the Lagoon as well as into its mauka boundary. The resulting flow through the Lagoon is now estimated to be 2.6 MGD.

As stated above, pumping 50 MGD of saline groundwater from the second limestone layer into the Lagoon will raise its water level above the adjacent groundwater by about two feet. Due to the calcareous silt layer which blankets the Lagoon bottom, only an inconsequential amount of the 50 MGD would seep out the bottom. Essentially all of the 50 MGD would flow laterally from the sides of the Lagoon into the surrounding groundwater. The distribution of this discharge around the perimeter would be in proportion to the head difference between the Lagoon's water level and the adjacent groundwater. As such, a greater amount of the discharge would occur along the makai side of the Lagoon.

By far the greatest impact of the surcharged Lagoon water level would be its function as a hydraulic dam, preventing the flow of brackish groundwater into the Lagoon. This flow will instead be rerouted around the Lagoon and ultimately discharge into the marine environment to the east and west of the Lagoon.

Change in Nutrients in Groundwater Discharging Along the Shoreline. Calculations of the change in nutrients in groundwater discharging along the shoreline are presented herein for nitrate-nitrogen and phosphate phosphorus. Three time frames are considered: (1) before the Lagoon's excavation; (2) the Lagoon as it is at present with groundwater flowing through it; and (3) after the pumped saltwater circulation scheme for the Lagoon is implemented. For each of these time frames, a groundwater flowrate of 2.6 MGD is used.

Prior to the Lagoon's excavation, it is estimated that 2.0 MGD was flowing through the 2300-foot section of the shoreline now occupied by the Lagoon. For a distance of 350 feet on each side of the Lagoon, another 0.6 MGD was flowing to the shoreline. Based on groundwater samples collected upgradient and beyond the influence of the Lagoon, nitrate-nitrogen and phosphate-phosphorus concentrations were 388 and 0.73 µM, respectively. These concentrations translate to discharges into the marine environment of 118 and 0.48 pounds per day.

In the 5-year period since completion of the Lagoon's excavation, substantial growth of aquatic plants has occurred, most as the benthic alga chara on the bottom of the Lagoon and a lesser amount as

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phytoplankton in the water column. These strip out the nutrients at a growth rate that appears to be phosphate limited. Water passing from the Lagoon into the marine environment, based on extensive monitoring in the Lagoon by Marine Research Consultants, is 52.2 μM as nitrate nitrogen and 0.05 μM as phosphate phosphorus. This amounts to a biological uptake of 102 pounds per day of nitrogen and 0.46 pounds per day of phosphorus, amounts which otherwise would have been discharged into the marine environment.

If the pumped saline groundwater scheme is implemented, the 2.6 MGD of brackish groundwater now flowing into and through the Lagoon would be prevented from doing so by the hydraulic dam created by the Lagoon's super-elevated water surface. The groundwater would be routed around the Lagoon and ultimately discharge into the marine environment without undergoing the current nutrient uptake by aquatic plants. Total nitrate and phosphate discharges into the marine environment would be returned to their pre-Lagoon excavation rates.

Attachments

ec: Greg Fukumitsu – TNWRE



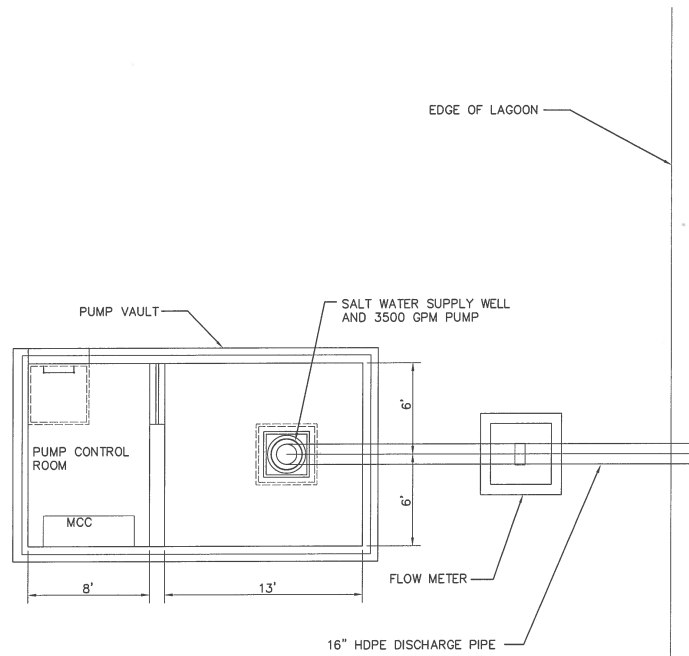


FIGURE 2
PLAN VIEW OF THE SALTWATER WELL AND PUMP STATION

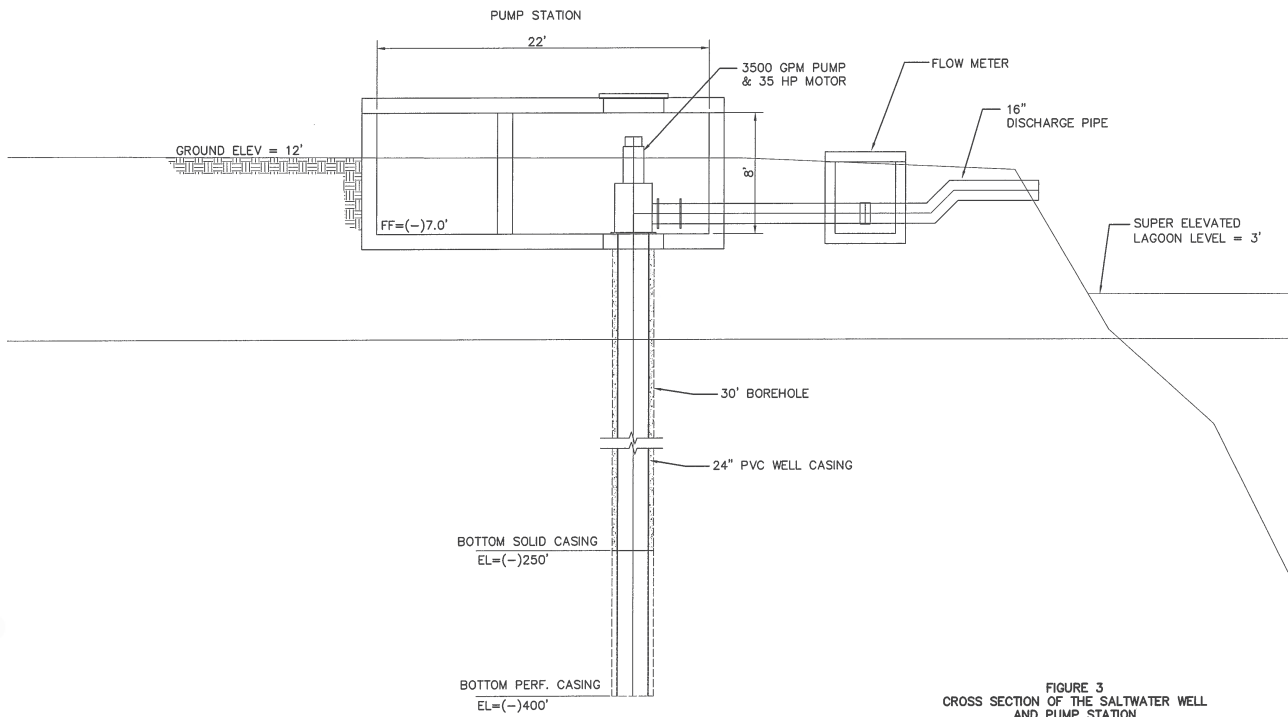


FIGURE 3
CROSS SECTION OF THE SALTWATER WELL AND PUMP STATION

Figure 4. Recorded Water Levels During and Following the March 6 to 7, 2012 Storm Event

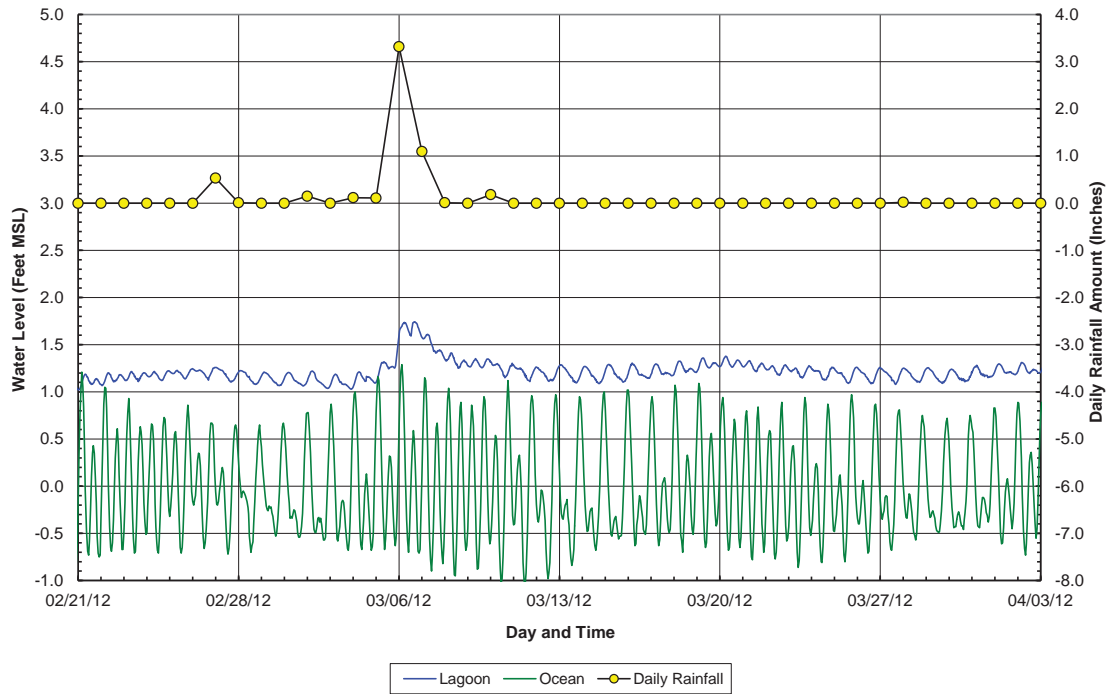


Figure 5. 24-MAVs of Recorded Water Levels During and Following the March 6 to 7, 2012 Storm Event

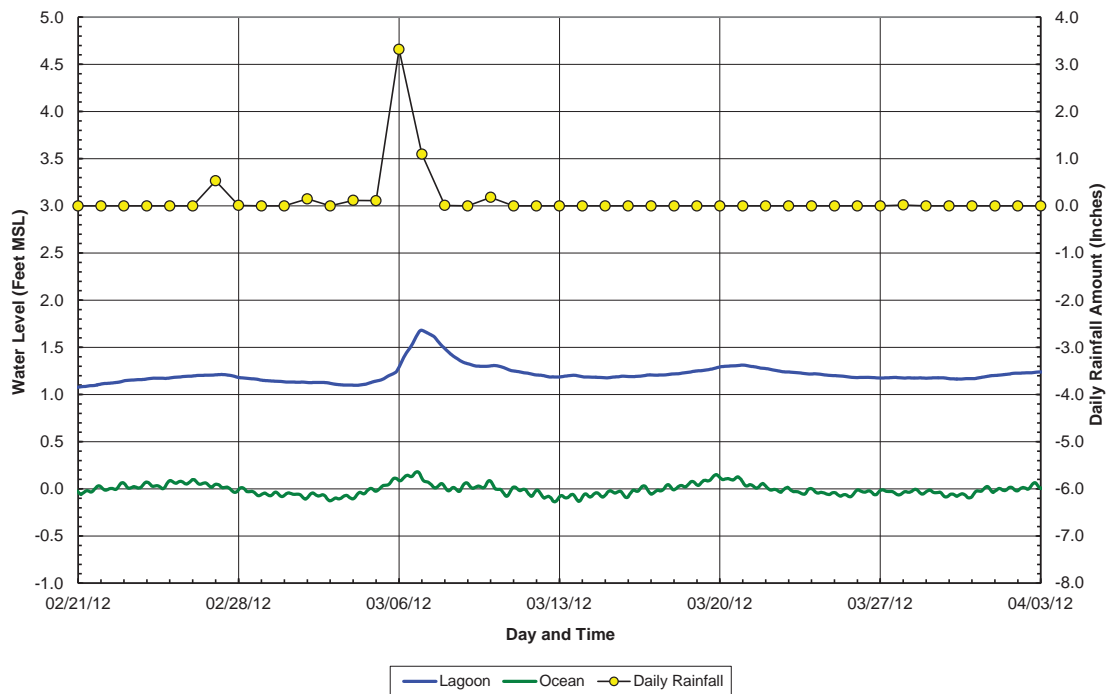


Figure 6. Recorded Water Levels and Rainfall During the March 10 to 11, 2013 Storm Event

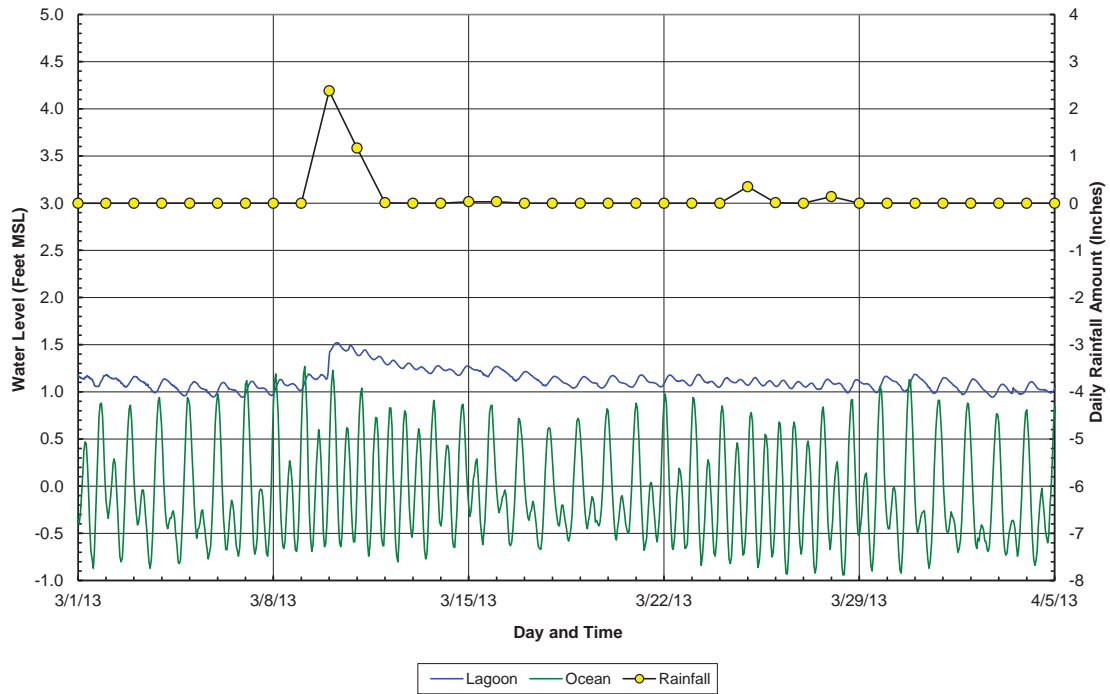
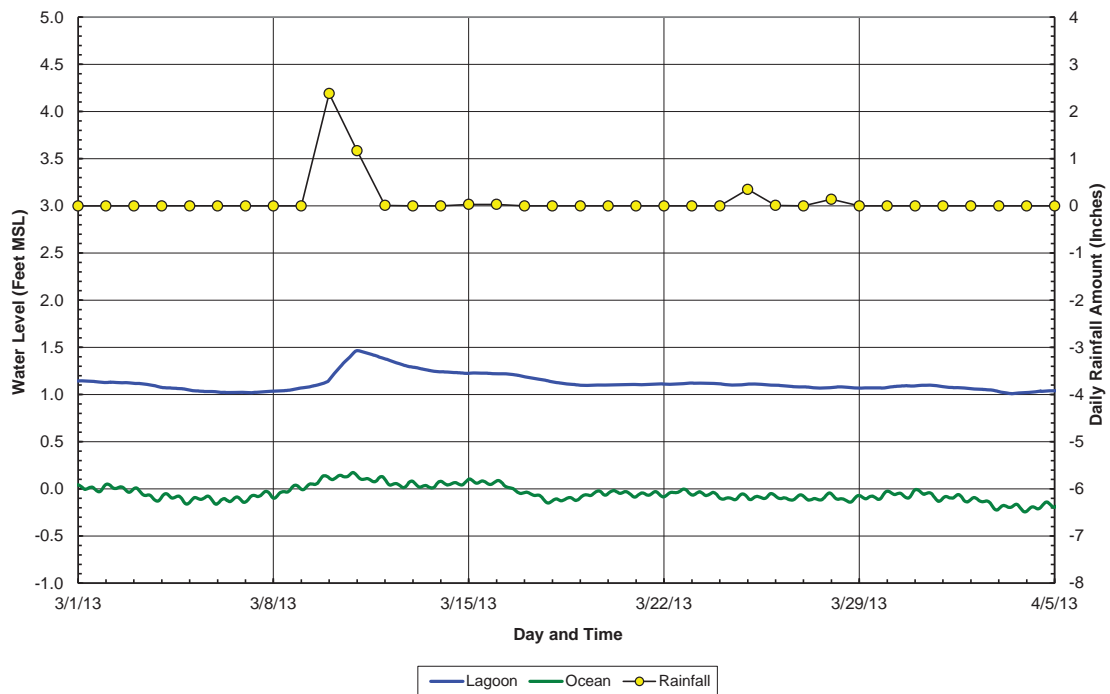


Figure 7. 24-MAVs of the Recorded Water Levels and Rainfall During the March 10 to 11, 2013 Storm Event



**APPENDIX F. IMPACT OF THE EXCAVATION OF THE HOAKALEI
LAGOON ON GROUNDWATER IN THE PU‘U LOA SECTOR OF
THE EWA LIMESTONE (CAPROCK) AQUIFER**

MEMORANDUM

To: Charles Morgan – Planning Solutions, Inc.
From: Tom Nance
Subject: Impact of the Excavation of the Hoakalei Lagoon on Groundwater in the Puuloa Sector of the Ewa Limestone (Caprock) Aquifer

Introduction

This memo and its attachments provide an assessment of the impact that excavation of the Hoakalei Lagoon has had on groundwater in the Ewa Caprock. The 48-acre Lagoon was excavated to a depth of 20 feet into groundwater. The portion of the excavation work below the groundwater occurred over the 4-year and seven month period from January 2004 through August 2008. The 20-foot deep exposure of the groundwater body contains about 310 million gallons of water. The Lagoon has remained essentially unused in the five years since its excavation was completed.

Groundwater in the Ewa Limestone (Caprock) Aquifer

The Ewa Plain is comprised of a raised coral reef. Across its makai half, the limestone is typically very porous (an effective porosity on the 0.20) and highly permeable (a permeability coefficient on the order of 40,000 feet per day on a macro-scale). Groundwater in this formation is referred to as the Ewa Caprock Aquifer. It occurs as a thin, brackish, and nutrient rich basal lens. For regulatory purposes, the State Commission on Water Resource Management (CWRM) had divided the Ewa Caprock Aquifer into three sections. The eastern third, in which the Hoakalei Lagoon is located, is referred to as the Puuloa Sector.

Historically, sugarcane dominated land and water use across the Puuloa Sector. Starting in the early 1930s as Ewa Plantation and continuing as Oahu Sugar Company (OSCO) from 1960 through October 1994, on the order of 15 to 25 million gallons per day (MGD) of brackish groundwater was withdrawn from the Puuloa Sector from five skimming-type wells. To keep salinity at acceptable levels for sugarcane cultivation, about 10 to 15 MGD of fresh water from inland wells was brought onto the Ewa Plain and delivered to two of the five skimming wells known as EP-23 and EP-27. This cultivation practice came to an abrupt end in October 1994 when OSCO ceased its operations in Ewa.

Today, ongoing development in the Puuloa Sector has replaced sugarcane with residences, shopping centers, and five golf courses. All five of the golf courses have converted from various groundwater sources to irrigation by R-1 quality treated wastewater from the Honouliuli WWTP. Use of groundwater from the Puuloa Sector of the Ewa Caprock Aquifer is now limited to small landscape irrigation wells operating at nominal pumping rates, most of which are in the Ewa by Gentry project area. Diversified agriculture is still being done across the mauka portion of the Puuloa Sector, but its irrigation supply is from wells located further inland which draw water from the Koolau volcanics.

Monitoring of Groundwater in the Puuloa Sector of the Ewa Caprock Aquifer

Locations of ongoing monitoring of groundwater in the Puuloa Sector of the Ewa Caprock Aquifer are shown on Figure 1. Regularly scheduled monitoring consists of recording water levels at eight locations in the Haseko property (six monitor wells, the open water surface in the Wetlands Preservation Area, and the Hoakalei Lagoon) and periodic salinity profiles of the water columns of monitor wells that penetrate through the brackish basal lens to the saline groundwater below. Salinity profiling has and is being done in six locations, four of which are in the Haseko property (GC-3A, HL Mauka, HL Makai, and EM-100). The other two locations, known as FG-1 and FG-2, are further inland on the east side of Fort Weaver Road in the Ewa by Gentry project area. These two sites are beyond the limits of Figure 1.

Figure 2 is an illustration of the water level data using three monitor wells that form a mauka to makai transect on the western edge of the Haseko property. GC-1 which is 3590 feet inland from the shoreline; WPA-3 which is 1450 feet inland; and WPA-1 which is only 115 feet inland. For reference, these data are compared to the ocean level as recorded by NOAA in Honolulu Harbor. These data illustrate the following properties of groundwater in the Ewa Caprock Aquifer:

- The groundwater response to tidal variations is clearly evident, but the tidal signal is increasingly attenuated and lagged with distance inland.
- The semi-diurnal tide makes comparisons of water level recordings difficult to interpret. However, the tidal variations can be "filtered" by calculating the moving 24-hour average (24-MAV) as shown on Figure 3. Plots of the 24-MAVs make water level differences and changes easier to interpret.
- Over a longer period of time such as the eight months of record in 2013 shown on Figure 4, the plot of the 24-MAVs demonstrate that most of the change in groundwater levels is in response to mean ocean level changes. The ocean level variations are due to large scale meteorological events of days, weeks, and even months in duration.

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- Due to the very high permeability of the Ewa limestone, groundwater gradients are extremely flat (Figure 5). Over a relatively short distance close to the shoreline, the basal lens contracts and its gradient rapidly steepens.

Recorded groundwater levels, particularly when plotted as 24-MAVs, are one way to identify and quantify changes to the groundwater body. For the Ewa Caprock, however, salinity profiling has proven to be a more effective tool than tracking water levels. The historic record of profiling in the FG-2 monitor well illustrates this:

- Figure 6 is a salinity and temperature profile through the water column of the FG-2 monitor well in Ewa Gentry made on September 27, 2013. Its salinity is a typical sigmoid curve which defines the salinity and thickness of the basal lens, the transition zone, and the saline groundwater at depth.
- From each such profile, indicators of the groundwater salinity (taken as the salinity 10 feet into water) and thickness of the lens (taken as the depth to the midpoint of the transition zone) are determined.
- When the trends of these indicators are arrayed over time, the impact of major events on the groundwater body are readily identified (Figures 7 and 8). Since mid-1993 when profiling in the FG-1, FG-2, and EM-100 wells was started, three major events have occurred.
 - OSCO terminated sugarcane cultivation in Ewa in October 1994;
 - a major storm on election night in November 1996; and
 - golf course irrigation converted from well water sources to reuse of treated Honouliuli WWTP effluent in the early 2000s.

Impacts of Excavation of the Hoakalei Lagoon

The Lagoon is rectangular shaped and oriented parallel to the shoreline. Its total length is about 2350 feet, its average width is about 1125 feet, and its depth into groundwater is about 20 feet. The makai edge of the Lagoon is about 275 feet in from the shoreline. Removal of the coral limestone through which groundwater was flowing has changed the effective porosity from about 0.20 in the limestone to 1.00 in the open water body. It has also changed the permeability in the excavated area from about 40,000 feet/day (on a macro-scale) for movement through the limestone to essentially infinite as movement through the open exposure of groundwater.

The changes to groundwater as a result of the Lagoon's excavation are: rerouting a greater groundwater flowrate through the Lagoon; a change of groundwater levels as a result of rerouting of the

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groundwater flow; a change in residence time for groundwater flow through the Lagoon; and water quality changes due to the increased residence time, exposure to sunlight and wind, and aquatic growth in the groundwater body. Each of these is described in the sections following:

Greater Groundwater Flowrate through the Lagoon. Calculations of the flowrate of groundwater through the Puuloa Sector of the Ewa Caprock and discharging along the shoreline are very approximate, but a reasonable estimate appears to be about 4.5 million gallons per day (MGD) per coastal mile. This approximation is based on measured groundwater gradient on the order of 5.5×10^{-5} , a macro-scale permeability coefficient of 40,000 feet per day, and actual groundwater levels relative to mean ocean level. The Lagoon spans 2350 feet of the shoreline. Prior to its excavation, groundwater flow through its area is estimated to have been about 2.0 MGD.

Groundwater levels to the east, west, and inland of the Lagoon are higher than in the Lagoon itself. This translates to lateral, as well as mauka-to-makai, net groundwater flow into the Lagoon. The lateral water level differences indicate a lateral inflow along the east and west edges of the Lagoon of about 0.3 MGD. This would increase the total groundwater flow through the Lagoon to about 2.6 MGD, an increase on the order of 30 percent compared to the rate of flow prior to the Lagoon's excavation.

Change of Groundwater Levels. Figure 9 presents water level recordings along a mauka-makai transect through the western half on the Lagoon and extending inland to the GC-3A monitor well. Key aspects illustrated by these levels are:

- Tidal attenuation and lag within the Lagoon are greater than in the groundwater adjacent to it. This difference is attributable to the differences in effective porosity (about 0.20 in the reef limestone versus 1.0 in the open water body).
- There is a mauka-to-makai tilt of the water surface in the Lagoon on the order of 0.06 feet. It is attributable to the dynamic equilibrium between water in the Lagoon and in the groundwater all around it.
- Depending on phase of the tide, groundwater levels on all sides of the Lagoon can be higher or lower than in the Lagoon itself. This results in a semi-diurnal reversing of flow into or out of the Lagoon all along its perimeter.

Figure 10 shows water level recordings of monitor wells aligned in a mauka/makai transect along Haseko's west boundary over the same time period as Figure 9. The WPA-1 and WPA-3 wells are about 785 feet west of the western edge of the Lagoon. Using the 12-MAV values at all sites on February 26th

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at 12:00 noon, Figure 11 is a comparison of water levels along both transects. It illustrates the effect that excavation of the Lagoon has had on groundwater levels:

- Within the Lagoon itself, the gradient is much less than in the adjacent groundwater.
- Between the makai edge of the Lagoon and the shoreline, the groundwater level is higher post Lagoon excavation due to the greater flow there than to either side of the Lagoon.
- At a short distance inland of the mauka edge of the Lagoon, the Lagoon's impact on groundwater levels is very small. Further inland, it is not detectable.

Change in Groundwater Salinity and Temperature. The salinity and temperature of the water in the Lagoon itself has been well documented during and following the Lagoon's excavation by Marine Research Consultants. With regard to salinity and temperature, the water in the Lagoon has been incredibly well mixed, a result attributed to the long (120-day) residence time, mixing along the Lagoon's perimeter due to tidal phase differences, and wind stress across the water surface.

The salinity and temperature impacts on the surrounding groundwater due to the Lagoon's excavation can be characterized with the available profiling data in nearby deep monitor wells. The EM-100 well is located 175 feet from the makai edge of the Lagoon and 100 feet in from the shoreline. It has provided data on the salinity and thickness of the basal lens since September 1993:

- Figure 12 compares the EM-100 salinity profiles three months before the start of excavation of the Lagoon and four years after the excavation was completed. As a result of re-routing more groundwater through the Lagoon and past the EM-100 site to shoreline discharge, the lens has been significantly thickened, the salinity five feet into water increased somewhat (from 8.9 to 9.8 PPT), and the transition zone has become more sharply defined.
- Figure 13 compares temperature profiles in EM-100 before and after Lagoon excavation. As a result of the greater flowrate due to the Lagoon excavation, the temperature in the basal lens makai of the Lagoon decreased. At five feet into water, the decrease was from 81.0° to 79.6° F.

There are three other deep monitor wells on the Haseko property, all three installed relatively recently: (1) GC-3A, located 2550 feet upgradient from the Lagoon's mauka edge and installed in December 2007; (2) HL Mauka, located 22 feet from the mauka edge of the Lagoon and completed in February 2013; and (3) HL Makai, located 130 feet from the makai edge of the Lagoon and also completed in February 2013. The three wells are generally aligned in a mauka to makai transect and their profiles define the following changes to groundwater as a result of the intervening Lagoon:

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- Figure 14 is a comparison of the salinity profiles of these three monitor wells taken on October 9, 2013. The progressive salinity increase and decrease of the lens as groundwater nears its discharge into the marine environment shoreline would occur with or without the intervening Lagoon. However, some adjustments to the shapes of the salinity profiles in the HL Mauka and HL Makai wells are clearly in response to groundwater discharge into and through the Lagoon.
- Figure 15 is a comparison of temperature profiles. The warmer temperature in HL Makai on the downgradient side of the Lagoon is clearly in response to the warming that occurs during the residence time in the Lagoon. However, as was evident by the record of EM-100 (Figure 13), that warming effect is actually less than was naturally occurring prior to the Lagoon's excavation.

Changes in Nitrates and Phosphates in Groundwater. Table 1 is a compilation of salinity, nitrate, and phosphate levels in groundwater upgradient of the Lagoon, in the Lagoon itself, and in groundwater makai of the Lagoon. All samples were taken in August 2013. With regard to changes in nitrates, the data indicate the following:

- Incoming groundwater is very high in nitrates. The average value is 388 micromolar (μM). This is equivalent to 5.43 milligrams per liter (mg/l) as nitrogen.
- Nitrate in the Lagoon is reduced to an average of 52.2 μM (0.73 mg/l). It is presumably taken up by the aquatic plant that covers the Lagoon bottom and phytoplankton in the water column.
- In the HL Makai monitor well downgradient of the Lagoon, nitrate is increased somewhat compared to the Lagoon water – a level of about 64.6 μM or 24 percent higher than in the Lagoon.

Phosphates in groundwater discharging into the Lagoon average about 0.73 μM (equivalent to 0.022 mg/l as phosphorus). It is essentially stripped out to 0.05 μM in the Lagoon due to plant uptake. However, phosphate values a short distance downgradient of the Lagoon in the HL Makai monitor well are 0.56 μM , almost as high as in the upgradient groundwater. It appears that this is due to vertical mixing with the more phosphate rich but saltier water at depth.

Summary of Findings and Conclusions

1. The rectangular-shaped Lagoon spans a 2350-foot long section of the coastline.
2. Prior to the Lagoon's excavation, an estimated 2.0 MGD of groundwater flowed in the 2350-foot long coastal section, discharging into the marine environment at the shoreline.
3. Excavation of the 48-acre Lagoon extended to a depth of 20 feet into groundwater.

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4. The excavation removed porous and permeable reef limestone through which the groundwater moved, replacing it with an exposure of the groundwater body. At its 20-foot depth into groundwater, the Lagoon's water volume is about 310 million gallons.
5. Groundwater across the Ewa Caprock occurs as a thin, brackish, and nutrient-rich basal lens. Its water level responds to the ocean's water level variations, including long term mean level changes as well as the semi-diurnal tides.
6. As groundwater moves more readily through the open water in the Lagoon than the reef limestone that was excavated, the groundwater flow through the 2350-foot long shoreline segment was increased from 2.0 MGD to an estimated 2.6 MGD. That translates to an average residence time of groundwater in the Lagoon of about 120 days.
7. Groundwater in the Lagoon is in dynamic equilibrium with the groundwater around its entire perimeter. However, due to the greater effective porosity in the Lagoon in comparison to the surrounding reef limestone (1.0 versus about 0.2), tidal amplitude in the Lagoon is decreased and its lag is greater than in groundwater in the surrounding reef limestone. This results in a semi-diurnal reversal of flowrates into and out of the Lagoon all around its perimeter.
8. The change in groundwater levels caused by the Lagoon is quite localized. For example, it is not detectable at a lateral distance of 800 feet from the Lagoon. At 100 feet inland of the Lagoon, the change is less than 0.10 feet. At 2550-foot distance, there is no detectable change.
9. Due to aquatic growth and other processes during the 120-day groundwater residence time in the Lagoon, nitrates and phosphates are stripped from the incoming groundwater. At the 2.6 MGD groundwater inflow rate, these removals are estimated to be 102 pounds per day of nitrate-nitrogen and 0.46 pounds per day of phosphate phosphorus. These amounts would otherwise be discharged into the marine environment.

Attachments

ec: Greg Fukumitsu – TNWRE



Figure 2. Recorded Water Level Data Compared to the Ocean Level Along a Mauka to Makai Transect at the Western Boundary of the Haseko Property for the Period of August 14 to 28, 2013

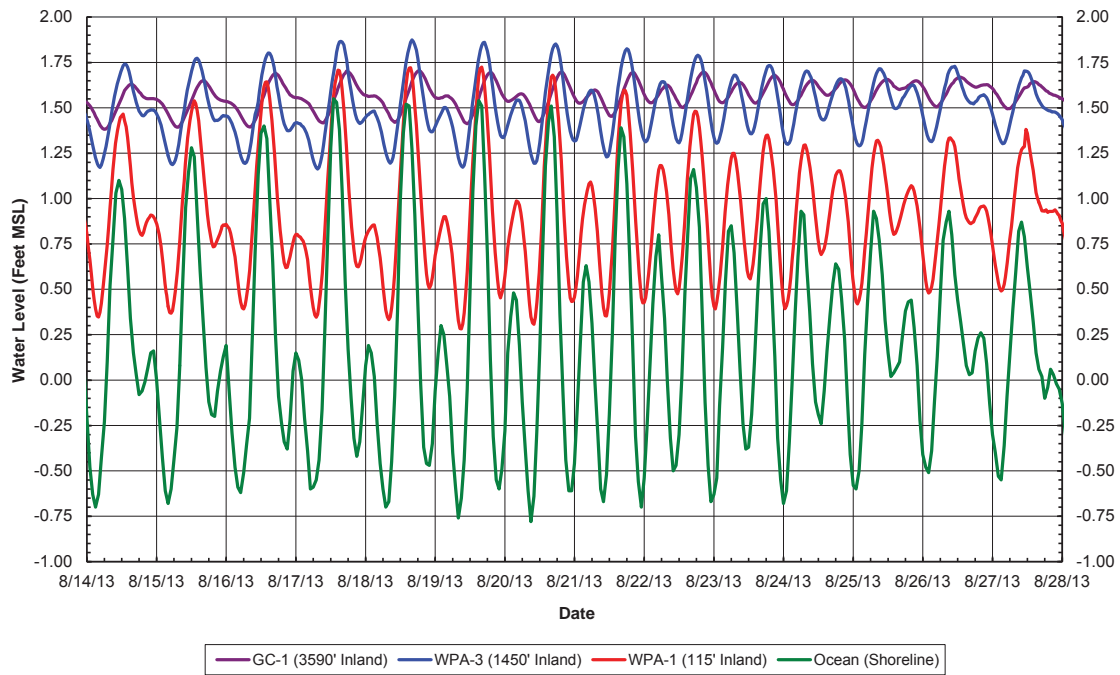


Figure 3. Moving 24-Hour Average of the Recorded Water Level Along a Mauka to Makai Transect at the Western Boundary of the Haseko Property for the Period of August 14 to 28, 2013

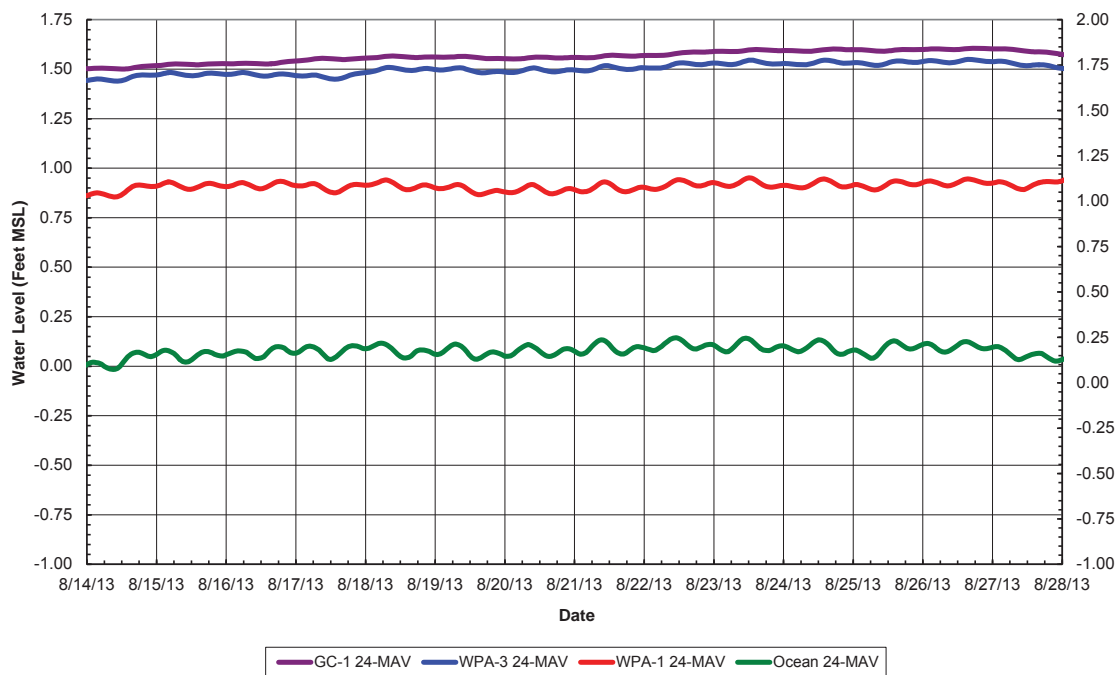


Figure 4. 24-Hour Moving Average of Recorded Water Levels Along a Mauka to Makai Transect at the Western Boundary of the Haseko Property for January to Mid-August 2013

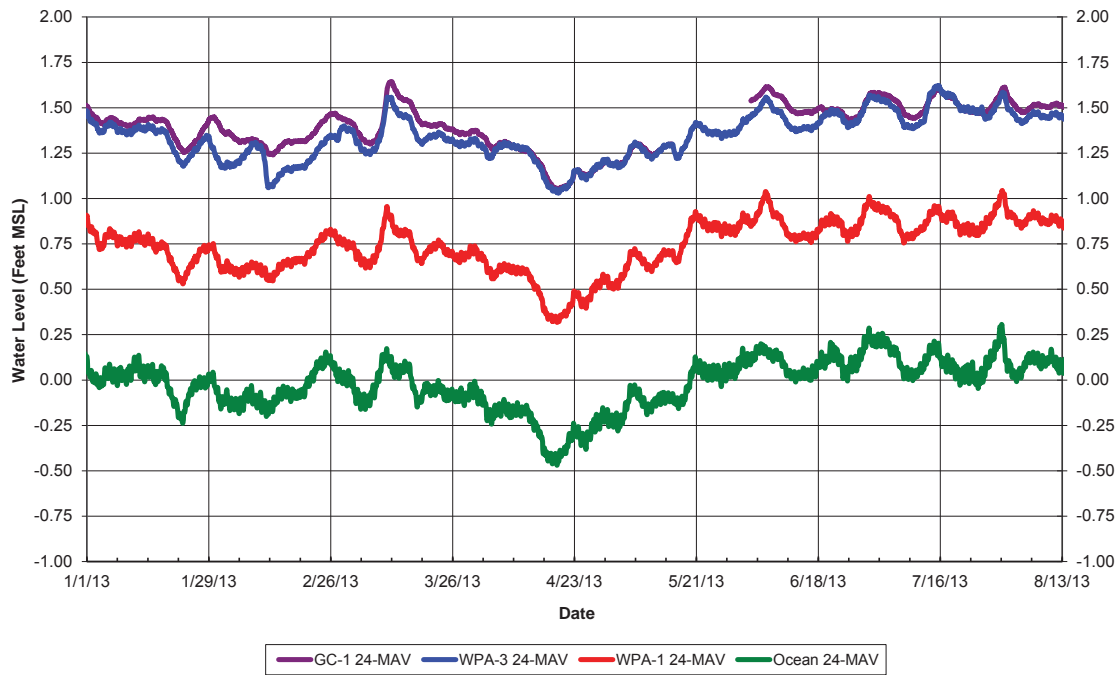


Figure 5. Mauka to Makai Water Level Transect At the West Side of the Haseko Property Based on 24-MAV Values at 0:00 on June 8, 2013

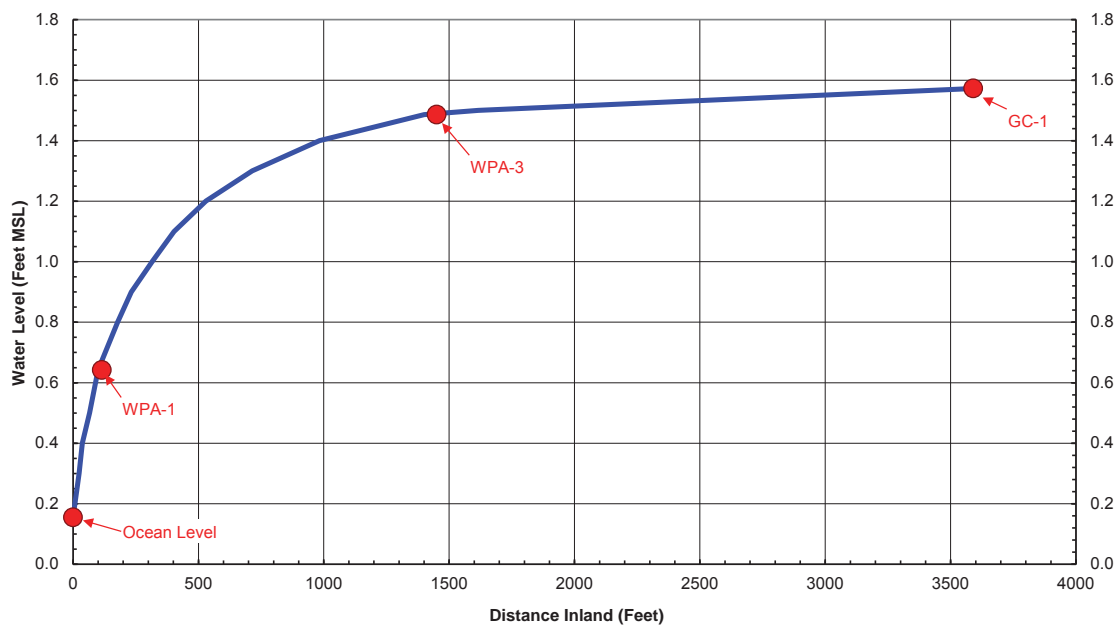


Figure 6. Profile through the Water Column of the FG-2 Monitor Well on September 27, 2013

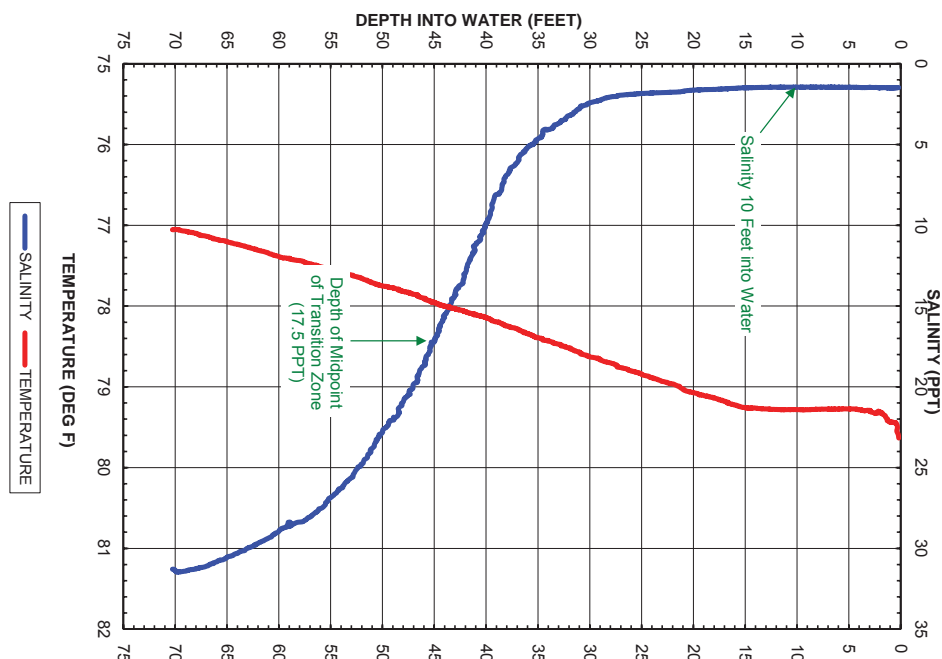


Figure 7. Salinity Trends in the Puuloa Sector of the Caprock Aquifer

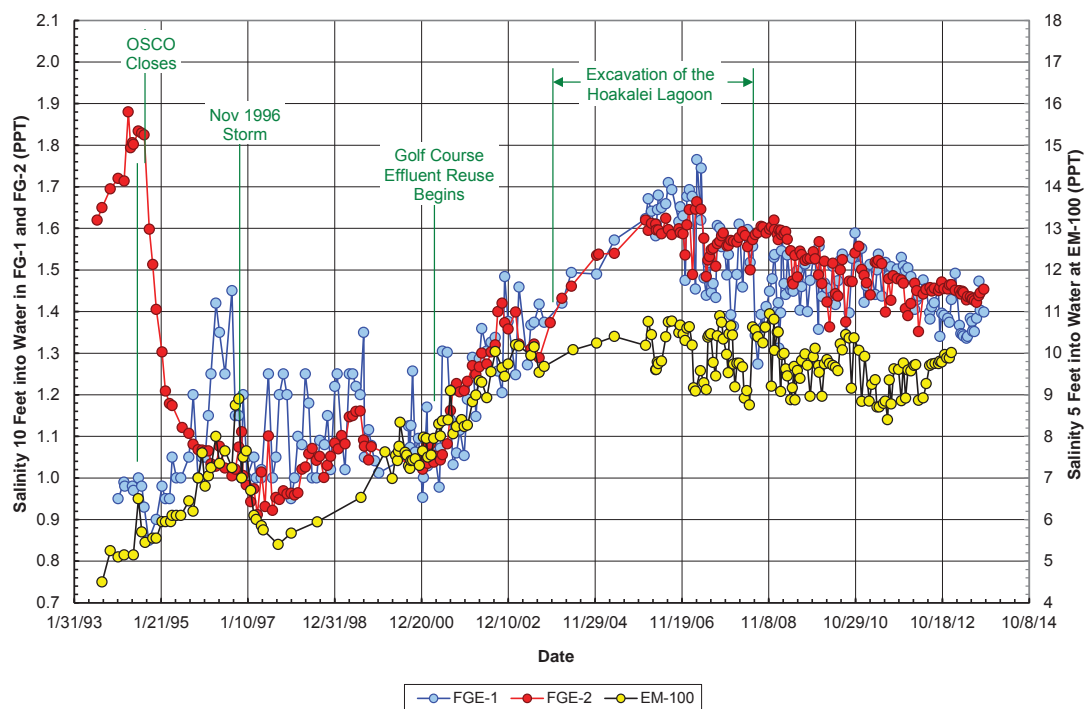


Figure 8. Trends of Aquifer Thickness in the Puuloa Sector of the Caprock Aquifer

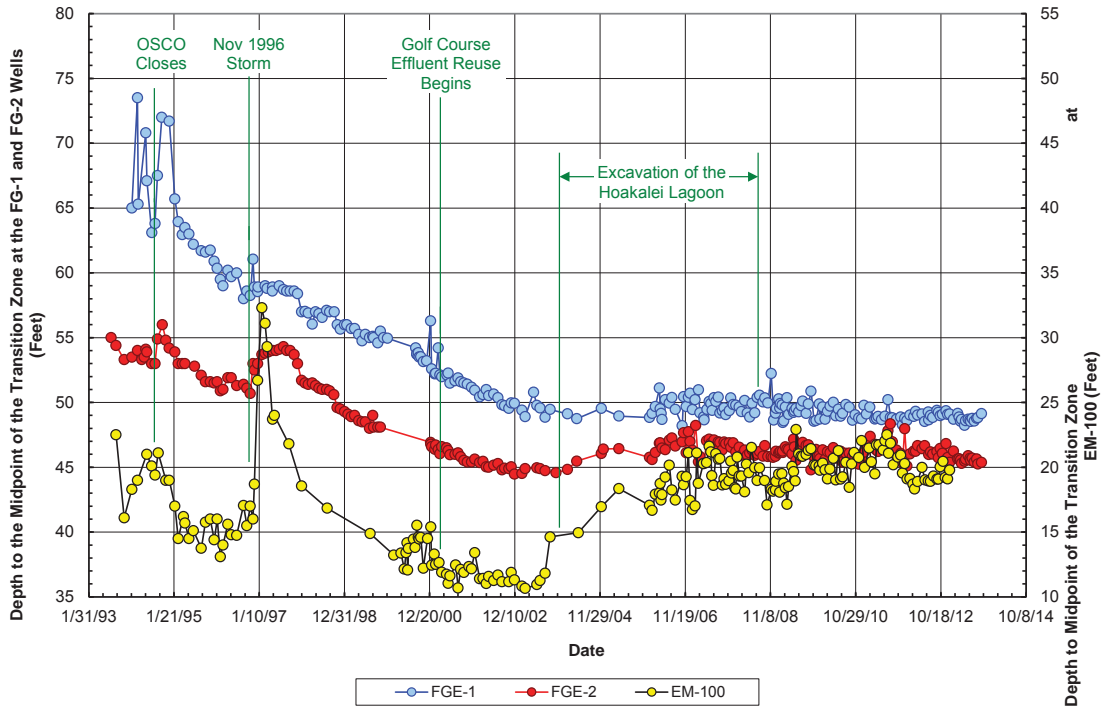


Figure 9. Recorded Water Levels Along a Mauka to Makai Corridor through the West Side of the Hoakalei Lagoon on February 23 to 27, 2013

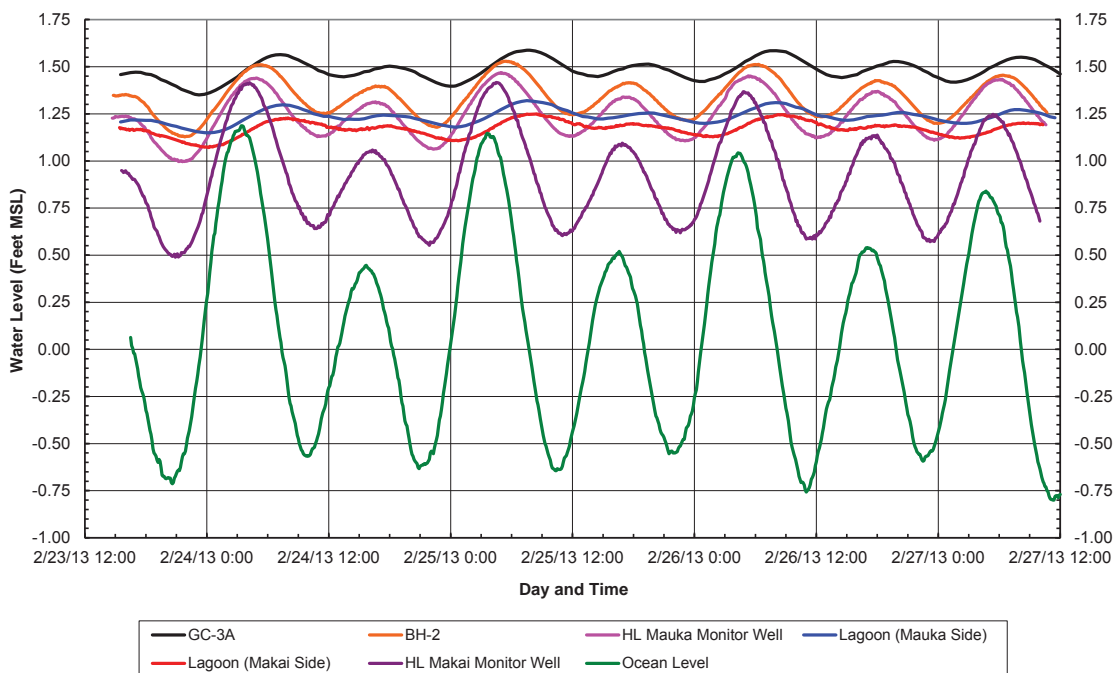


Figure 10. Recorded Water Levels Along a Mauka to Makai Corridor at the Western Boundary of the Haseko Property on February 23 to 27, 2013

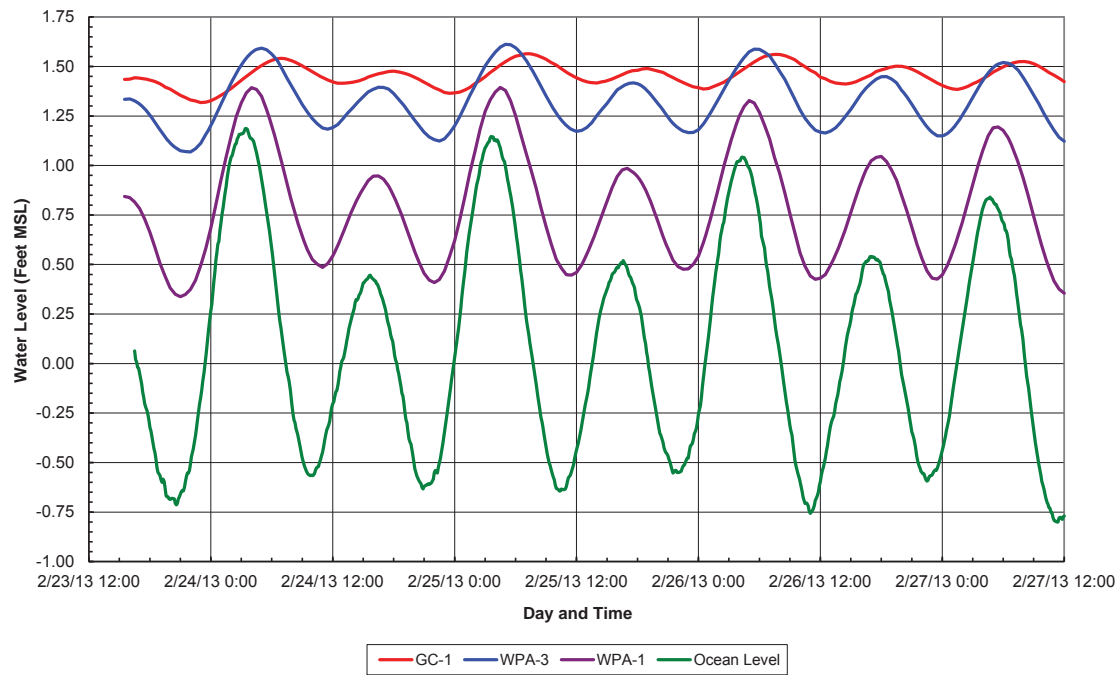


Figure 11. Comparison of the 12-MAV of Water Levels at 12:00 Noon on February 26, 2013 in the Mauka to Makai Transects Shown on Figures 9 and 10

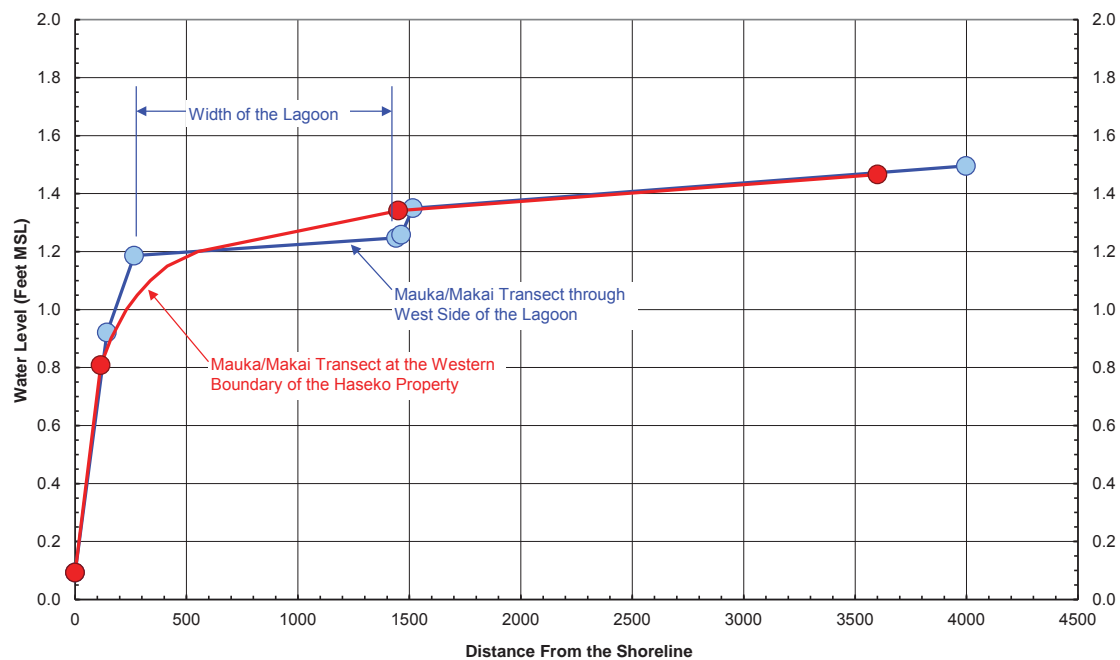


Figure 12. Comparison of Salinity Profiles in the EM-100 Monitor Well Before and After Excavation of the Hoakalei Lagoon

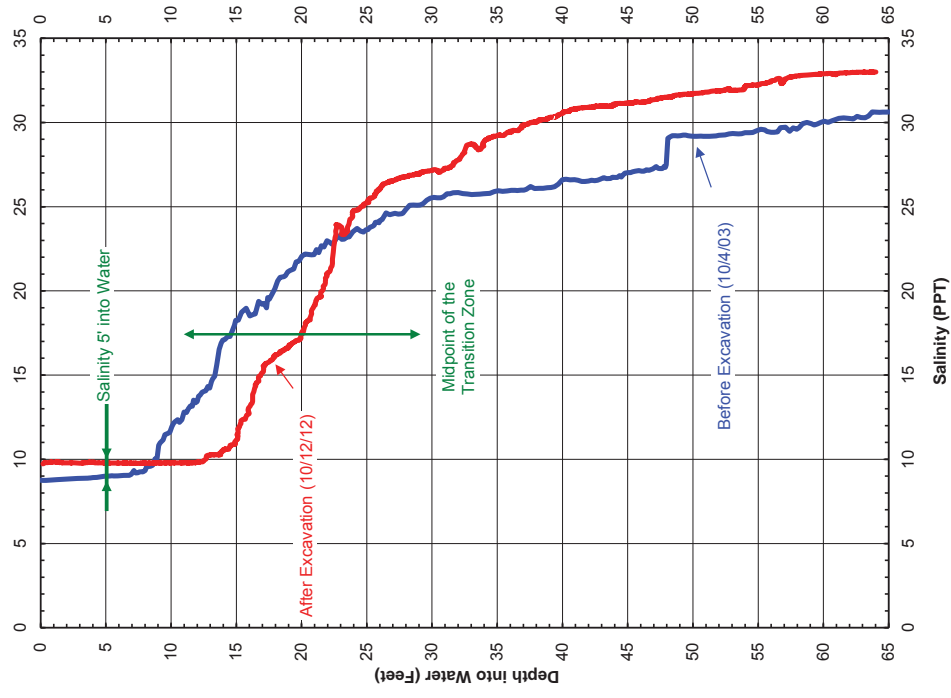


Figure 13. Comparison of Temperature Profiles in the EM-100 Monitor Well Before and After Excavation of the Hoakalei Lagoon

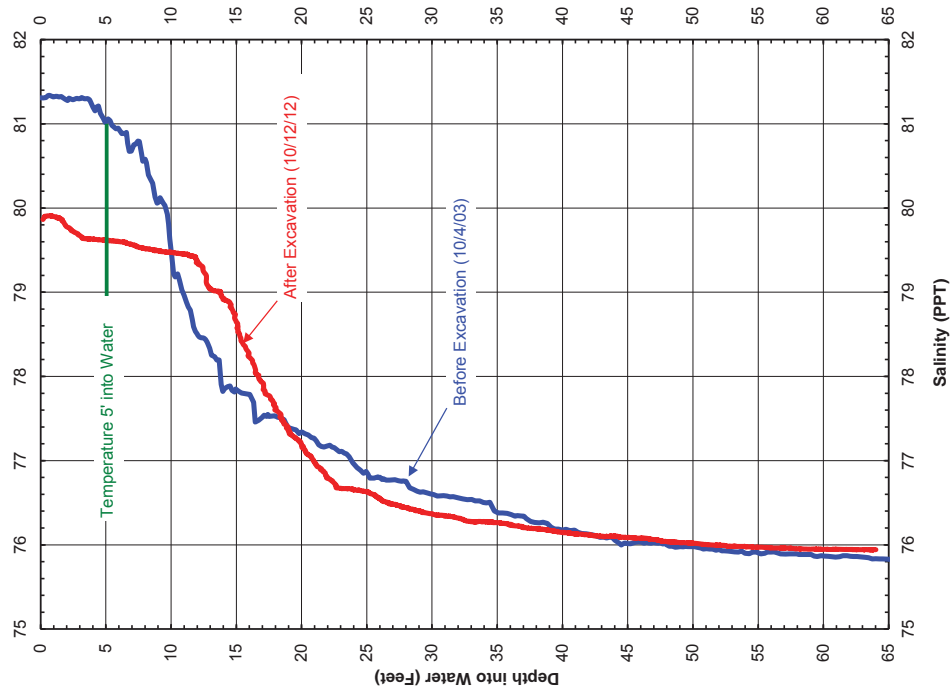


Figure 14. Comparison of Salinity Profiles in Groundwater Mauka, Within, and Makai of the Lagoon Taken on October 9, 2013

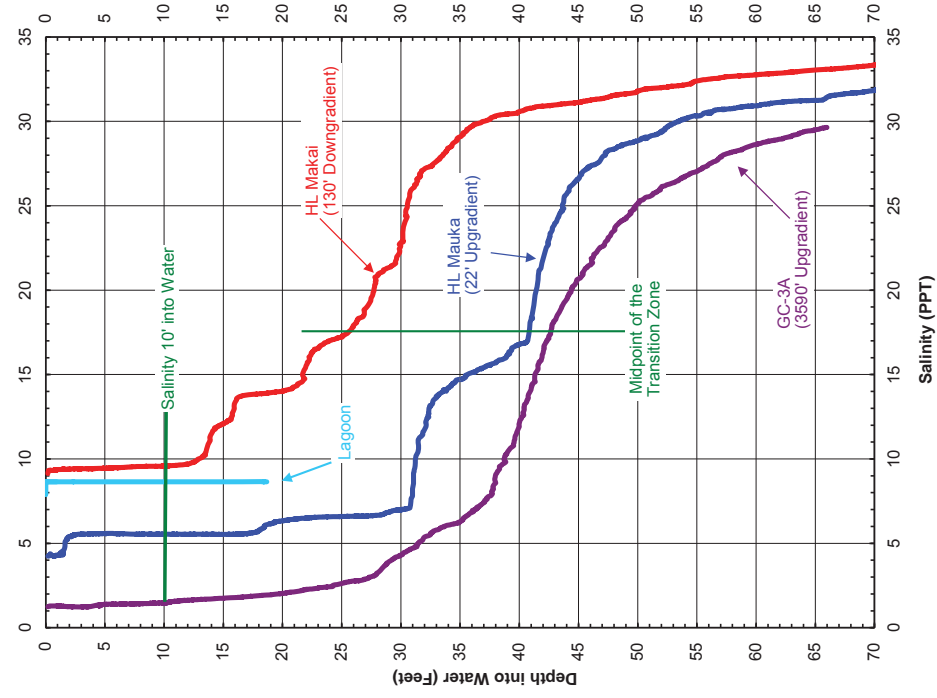


Figure 15. Comparison of Temperature Profiles in Groundwater Mauka, Within, and Makai of the Lagoon Taken on October 9, 2013

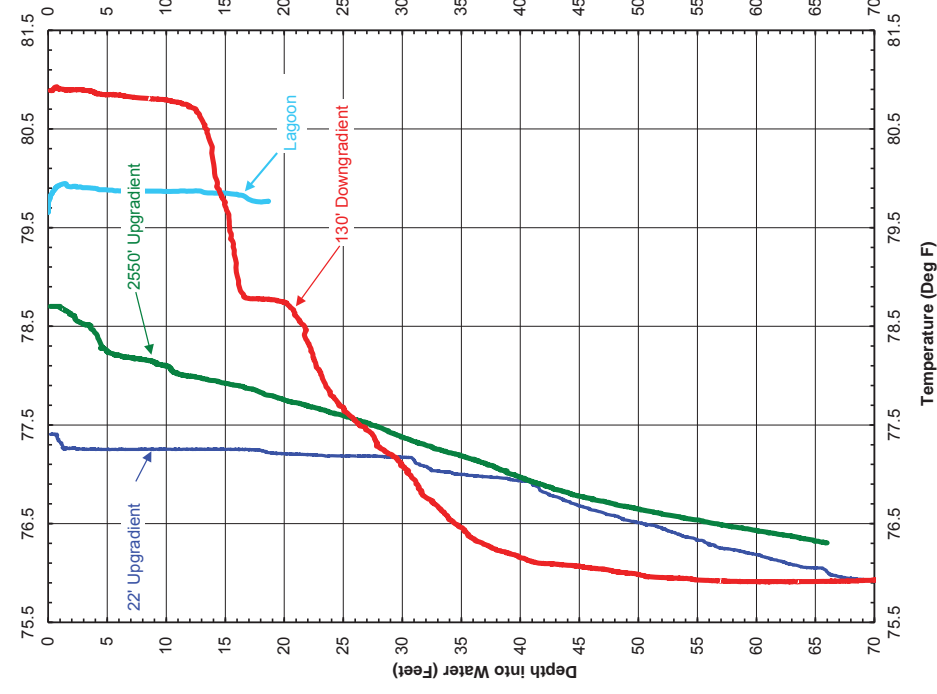


Table 1. Nitrate and Phosphate Levels in Groundwater Upgradient, Within, and Downgradient from the Lagoon

Monitor Well	Depth into Water (Feet)	Salinity (PPT)	Nitrate (μM)	Phosphate (μM)
Upgradient of the Lagoon				
	• HL Mauka			
	6	4.65	368	1.04
	8	4.59	373	0.88
	32	6.55	346	0.88
	44	17.75	189	1.52
• BH-1	8	2.53	411	0.48
	16	2.56	412	0.96
• BH-2	8	3.92	384	0.72
	16	4.34	364	0.96
• BH-3	8	3.61	361	0.56
	16	3.89	356	0.56
• BH-4	8	4.89	431	0.48
	16	5.58	421	0.64
Within the Lagoon				
	• East Side			
	0.5	8.57	51.1	0.05
	20	8.55	51.1	0.05
• Center	0.5	8.58	52.0	0.05
	20	8.57	51.9	0.05
• West Side	0.5	8.55	54.4	0.05
	20	8.55	52.6	0.05
Downgradient of the Lagoon				
	• HL Makai			
	4	9.38	67.1	0.56
	13	9.40	62.2	0.56
	20	11.79	58.2	0.64
	30	22.20	44.8	1.04

Notes: 1. Monitor well samples collected on August 7, 2013.
2. Samples in the Lagoon taken on August 4, 2013.

**APPENDIX G. BIOLOGICAL SURVEYS CONDUCTED FOR A
PORTION OF THE OCEAN POINTE-HOAKALEI PROJECT, EAST
KAPOLEI, 'EWA DISTRICT, ISLAND OF O'AHU**

Biological Surveys Conducted for a Portion of the Ocean Pointe-Hoakalei project, East Kapolei, ‘Ewa District, Island of O‘ahu

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May 22, 2013

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Introduction

Haseko (Ewa), Inc. is seeking a zoning reconfiguration for a portion of its Ocean Pointe-Hoakalei project to accommodate a change in its development plan. Under the revised plan Haseko proposes to use the large existing basin as a recreational lagoon rather than opening it to the ocean for use as a small boat marina. The change in plans would allow Haseko to forego the effects and cost of constructing the marina entrance channel. The subject property covers approximately 239.2 acres of land, identified as 'Tax Map Keys (TMK) 9-1-134:007, 025, 026, 027, 028, 029, is located at Kalaeloa, 'Ewa District, O'ahu (Figure 1).

This report describes the methods used and the results of the botanical, avian, and mammalian surveys conducted on the subject property as part of the environmental disclosure process associated with the proposed project.

The primary purpose of these surveys was to determine if there are any botanical, avian, or mammalian species currently listed, or proposed for listing, under either federal or State of Hawai'i endangered species statutes within or adjacent to the study area. The federal and State of Hawai'i listed species status follows species identified in the following referenced documents: (Department of Land and Natural Resources (DLNR) 1998; U. S. Fish & Wildlife Service (USFWS) 2005a, 2005b, 2013). Fieldwork was conducted on March 21, and 22, 2013.

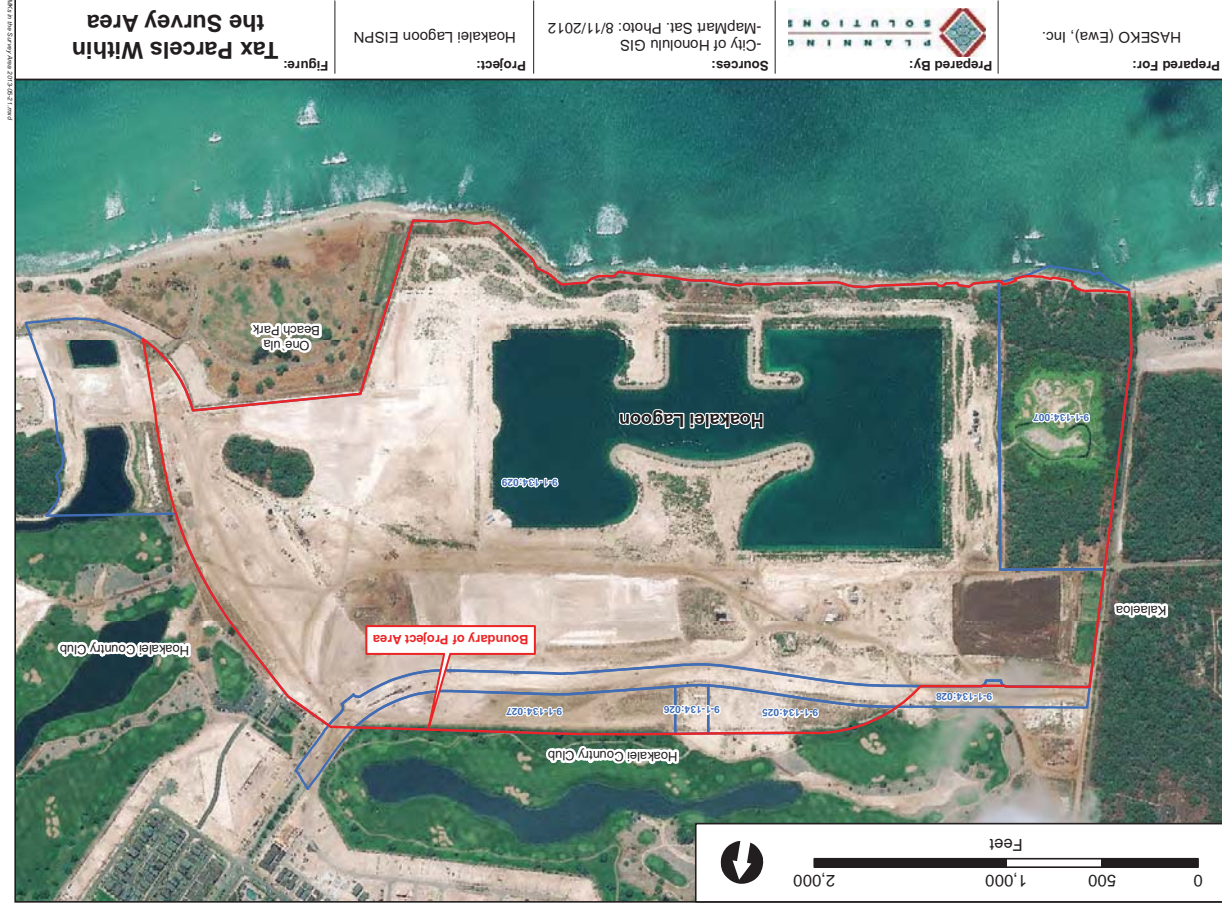
Hawaiian and scientific names are *italicized* in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text.

Project and General Site Description

The 239.2-acre site is bounded by the existing Hoakalei Golf Course and Country Club to the north and east, and by the former Barbers Point Naval Air Station to the west, and One'ula Beach Park and the Pacific Ocean to the south. Within the site Haseko maintains a 21.5-acre archaeological preserve (Kauhale Preserve) and Wetland Preservation Area (WPA) on the southwest corner of their property (Figure 1). The archaeological preserve occupies 6 acres and the WPA occupies the remaining 15.5 acres of this area.

If the zoning change and other land use approvals and environmental permits being sought are granted, Haseko would:

- Continue development of the approximately 950 hotel rooms, 900 multi-family units, and commercial retail/office/restaurant space that had been planned for the area under the existing zoning, but forego construction of the harbor master's office, boat maintenance area, and seven-lane launch ramp facility that was intended solely to support the basin's previous intended use as a small boat marina. The revised plan continues to provide for resort and commercial development that creates employment and business opportunities for the area.



- Construct a public swimming cove inland of the northwest corner of the lagoon that would provide a protected public swimming beach. Haseko would also provide for the possible future construction of two other swimming coves on fast land around the perimeter of the main lagoon. Together, these coves would create recreational opportunities not available elsewhere in 'Ewa Beach.
- Complete construction of Keone'ula Boulevard to the edge of Kalaeloa with the addition of a public access road that would lead to the Kauhale Preserve and permit access to the western side of the proposed lagoon.
- Install multiple water quality treatment facilities and associated grading of the area and drainage structures on the northeast, northwest and the southeast corners of the project area that will collect storm water runoff and minimize collection into the proposed lagoon.
- Construct pedestrian pathways and other amenities that exceed those possible under the previous plan. Because it does not require a break in the shoreline for a marina entrance channel, the proposed lagoon will facilitate lateral shoreline movement and public access, enhancing recreational opportunities in the area.

Large portions of the site have been grubbed and graded (Figure 1 and 2).

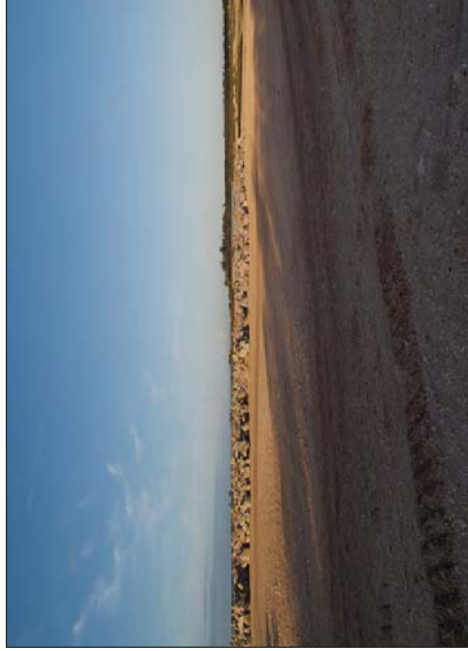


Figure 2 – Project Site, looking west from the eastern side of the lagoon, showing the graded nature of the majority of the site and sparse vegetation

The vegetation across a majority of the site can be characterized as ruderal, meaning plants typically associated with highly disturbed environments. A few undisturbed areas within the survey area support *kiawe* (*Prosopis pallida*) forest which is a remnant of the forest that occupied most of this land prior to grubbing and grading operations. Within one of these forested areas occurs a wetland (the WPA), within which are plant species that are absent elsewhere on the property. Finally, a coastal strand in close proximity to the ocean shore has conditions that favor certain species, including a number of native species found nowhere else on the property.

Methods

Plant names follow *Manual of the Flowering Plants of Hawaii* (Wagner *et al.*, 1990, 1999) for native and naturalized flowering plants, Palmer (2003) for ferns, and *A Tropical Garden Flora* (Staples and Herbst, 2005) for crop and ornamental plants. Place names follow *Place Names of Hawaii* (Pukui *et al.*, 1974). The avian phylogenetic order and nomenclature used in this report follows the *AOU Check-List of North American Birds* (American Ornithologists' Union, 1998), and the 42nd through the 53rd supplements to the Check-List (American Ornithologists' Union, 2000; Banks *et al.*, 2002, 2003, 2004, 2005, 2006, 2007, 2008; Chesser *et al.*, 2009, 2010, 2011, 2013). Mammal scientific names follow (Tomich, 1986). Place names follow (Pukui *et al.*, 1974).

Botanical Survey Methods

The botanical survey was undertaken on March 28, 2013, utilizing a pedestrian survey to cover the project area. The progress of the survey was recorded on handheld Global Positioning System (GPS) Global Navigation Satellite System (GNSS) units (Trimble GeoXT[®] and GeoXH[®]) carried by the botanists (E. Gunther and D. Miranda). The survey was conducted by these two botanists in the wet season and therefore under conditions likely to yield the largest number of species. The majority of the site consists of ground that is highly disturbed and supports ruderal and pioneer vegetation that is highly tolerant of extended dry conditions.

Avian Survey

Fifteen avian count stations were evenly spaced within the project site. A single six-minute avian point count was made at each count station. Field observations were made with the aid of Leica 10 X 42 binoculars and by listening for vocalizations. The point counts were conducted between 6:30 am and 10:00 am, the peak of bird activity. Additionally, four 30-minute time-dependent waterbird counts were conducted. Three of the waterbird count stations were conducted at locations around the lagoon, and one was conducted within the WPA on the west side of the site. These counts were repeated on both days of the survey.

When not conducting point counts or time-dependent waterbird counts the zoologist searched the remainder of the site for species and habitats not detected during the point

counts. Weather conditions were ideal, with no rain, unlimited visibility and winds of between 1 and 10 kilometers an hour.

Mammalian Survey

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ōpe'a as it is known locally, all terrestrial mammals currently found on the Island of O'ahu are alien species, and most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all terrestrial vertebrate mammalian species detected within the project area.

Results

Botanical Surveys Vegetation

A majority of the land included in the survey is highly disturbed as a result of past and ongoing grading and reshaping. Although the site is on the 'Ewa plain and has a limestone (ancient reef) base and rather level aspect, extensive movement of soil and base substratum has been ongoing to reshape the site for the proposed development. Included in some parts of the site are soils and boulder materials brought in from outside the area. Consequently, within this highly disturbed area, re-establishment of naturalized plants—essentially pioneer species (mostly ruderal weeds)—has been ongoing for various lengths of time, so the site presents a vegetation aspect varying between barren and shrubby.

Two areas of remnant dryland forest dominated by *kiawe* are present along the east and west edges of the site. The forested area on the west is broken by a shallow sinkhole wetland, which harbors distinctive wetland vegetation. Surrounding the wetland and saline flats is a nearly impenetrable band of sourbush (*Pluchea indica*), which merges into the *kiawe* forest beyond.

Finally, the narrow strip of land outside the security fence along the coastal (southern) boundary of the property is not disturbed by project grading and grubbing activities, but is disturbed by off-road vehicular use and other activities (fishing, camping, etc.). This narrow strip of land termed a "coastal strand" is characterized by a strong influence of wind and salt air that limits the vegetation to certain low-growing herbs and shrubs tolerant of the adverse conditions.

Flora

A plant checklist (Table 1) was compiled from field observations, with entries arranged alphabetically under plant family names (standard practice). Included in the list are scientific name, common name, and status (i.e., whether native or non-native) for each species observed during the survey. Species status given in **bold** indicates a plant of

particular interest to the Hawaiian Islands flora (indigenous [Ind], endemic [End], or Polynesian introduction [Pol]). Qualitative estimates of plant abundance were made for each species recorded on the survey date, with the survey area divided into the three basic vegetation types of highly disturbed (graded) land (GL), remnant (ungraded) forest (Fo) and coastal strand (CS). Abundance values are coded in the table as explained in the Legend to Table 1. For some species, a two-level system of abundance is used; with a letter-number code indicating a species having a somewhat clustered distribution. For example, a species infrequently encountered but numerous where found would have an abundance rating of "R" indicating a plant encountered only one to three times during the entire survey of the site, but would have an abundance rating of "R2" to indicate several to many individuals present where encountered. An "R3" rating would indicate a plant similarly seldom encountered (i.e., rare), but locally abundant in one or more of the locations where encountered.

A total of 108 species of flowering plants was identified from the survey area. No ferns, fern allies, gymnosperms, or gymnosperm allies were recorded. All but a small portion of the surveyed property is well underway towards project development and at a stage where only rather weedy species are extant in any numbers across the site. Less disturbed areas—*kiawe* forest, wetland, and coastal strand—support more species (80 versus 75) and certainly more biomass per unit area, but constitute a small amount of the total area. Only these less disturbed areas could potentially harbor important botanical resources (Char and Balakrishna, 1979), but none was found in our survey.

Table 1 – Listing of Plants (flora) at Haseko Property West O'ahu, Hawai'i

SPECIES LISTED BY FAMILY	COMMON NAME	STATUS	ABUNDANCE		NOTES	
			(GL)	(Fo)	(Cs)	
FLOWERING PLANTS						
DICOTYLEDONES						
ACANTHACEAE						
<i>Asystasia gangetica</i> (L.) T. Anderson	Chinese violet	Nat	O	C	C	
AIZOACEAE						
<i>Sesuvium portulacastrum</i> (L.) L.	'akulikuli	Ind	R	R	U	
<i>Tetragonia tetragonioides</i> (Pall.) Kuntze	New Zealand spinach	Nat	U	--	R	
<i>Trianthema portulacastrum</i> L.	---	Nat	R	--	R2	
AMARANTHACEAE						
<i>Achyranthes aspera</i> L.	---	Nat	--	R1	--	
<i>Alternanthera pungens</i> Kunth	khaki weed	Nat	U1	R	R	
<i>Amaranthus spinosus</i> L.	spiny amaranth	Nat	O	O	U	
<i>Amaranthus viridis</i> L.	slender amaranth	Nat	O	O	--	

Table 1- continued

SPECIES LISTED BY FAMILY		COMMON NAME	STATUS	ABUNDANCE		NOTES	
				(GL)	(Fo)	(Cs)	
ANACARDIACEAE							
	<i>Schinus terebinthefolius Raddei</i>	Christmas berry	Nat	--	R1	--	
APOCYNACEAE							
	indet. shrub or liana	---	Nat	--	R	--	
ASCLEPIADACEAE							
	<i>Stapelia gigantea</i> N. E. Brown	giant toad plant	Nat	--	R	--	
ASTERACEAE (COMPOSITAE)							
	<i>Bidens alba</i> (L.) DC	beggartick	Nat	O3	--	--	
	<i>Eclicpta prostrata</i> (L.) L.	false daisy	Nat	R	--	--	
	<i>Emilia fosbergii</i> Nicolson	<i>pualele</i>	Nat	--	R	--	
	<i>Flaveria trinerva</i> (Spreng.) C. Mohr	---	Nat	U	--	--	
	<i>Pluchia carolinensis</i> (Jacq.) G. Don	sourbush	Nat	A	C	--	
	<i>Pluchia x fosbergii</i> Cooperr. & Galang	---	Nat	U	--	--	
	<i>Pluchea indica</i> (L.) Less.	Indian fleabane	Nat	O	C	AA	
	<i>Sonchus oleraceus</i> L.	sow thistle	Nat	U	U	R	
	<i>Verbesina encellodes</i> (Cav.) Benth. & Hook.	golden crown-beard	Nat	U2	O	O1	
	<i>Xanthium strumarium</i> L.	<i>kikiana</i> , cocklebur	Nat	R1	--	--	
BATACEAE							
	<i>Batis maritima</i> L.	pickleweed	Nat	R1	--	A	
BIGNONIACEAE							
	<i>Spathodea campanulata</i> P. Beauv.	African tulip	Nat	R	--	--	
BORAGINACEAE							
	<i>Cordia subcordata</i> Lam.	<i>kou</i>	Ind	U	--	--	
	<i>Heliotropium curassavicum</i> L.	<i>kipūkai</i>	Ind	--	--	C2	
CACTACEAE							
	<i>Opuntia ficus-indica</i> (L.) Mill.	<i>panini</i>	Nat	--	--	R	
CAPPARACEAE							
	<i>Cleome gynandra</i> L.	wild spider flower	Nat.	R	--	R	
CASURINACEAE							
	<i>Casurina equisetifolia</i> L.	common ironwood	Nat	R	R	--	
CARYOPHYLLACEAE							
	<i>Spergularia marina</i> (L.) Griseb.	saltmarsh sand spurry	Nat	O	--	U	
CHENOPODIACEAE							
	<i>Atriplex semibaccata</i> R. Br.	Australian saltbush	Nat	--	--	O	
	<i>Atriplex suberecta</i> Verd.	---	Nat	A	--	--	
	<i>Chenopodium murale</i> L.	<i>'ahechea</i>	Nat	O	O	U	
	<i>Salsola tragus</i> L.	tumbleweed	Nat	R	--	--	
CONVOLVULACEAE							
	<i>Convolvulus arvensis</i> L.	field bindweed	Nat	R	--	--	
Table 1- continued							

SPECIES LISTED BY FAMILY		COMMON NAME	STATUS	ABUNDANCE		NOTES	
				(GL)	(Fo)	(Cs)	
CONVOLVULACEAE continued							
	<i>Ipomoea aquatic</i> Forssk.	ung choi	Nat	R	--	--	<2>
	<i>Ipomoea batatas</i> (L.) Lam.	<i>'uala</i>	Pol	R	--	--	<2>
	<i>Ipomoea obscura</i> (L.) Ker-Gawl.	---	Nat	U	--	--	
	<i>Ipomoea triloba</i>	little bell	Nat	R	--	--	
	<i>Jaquemontia ovalifolia</i> (Choisy) H. Hallier	<i>pa'uahi'ika</i>	Ind	R	--	R	
	<i>Merremia aegyptia</i> (L.) Urb.	hairy merremia	Nat	U	--	--	
CUCURBITACEAE							
	<i>Sicyos pachycarpus</i> Hook. & Arnott	<i>kūpala</i>	End	--	C3	U	
EUPHORBIACEAE							
	<i>Chamaesyce albomarginata</i> (Torr. & A.Gray) Small	rattlesnake weed	Nat	R	R	R	
	<i>Euphorbia cyathophora</i> J. A. Murray	wild poinsettia	Nat	--	R	--	
	<i>Euphorbia hypericifolia</i> L.	graceful spurge	Nat	R	--	--	
	<i>Phyllanthus debilis</i> Klein ex Willd.	niruri	Nat	--	R	--	
	<i>Ricinus communis</i> L.	castor bean	Nat	U	O	--	
FABACEAE							
	<i>Acacia farnesiana</i> (L.) Willd.	<i>klu</i>	Nat	R	--	--	
	<i>Cratalaria incana</i> L.	fuzzy rattlepod	Nat	R	--	--	
	<i>Desmanthus virgatus</i> (L.) Willd.	virgate mimosa	Nat	U	O	--	
	<i>Leucaena leucocephala</i> (Lam.) deWit	<i>koa haale</i>	Nat	U	C	A	
	<i>Indigofera spicata</i> Forssk.	creeping indigo	Nat	--	R	--	
	<i>Macroptilium atropurpureum</i> (DC) Urb.	---	Nat	U	--	--	
	<i>Pithecellobium dulce</i> (Roxb.) Benth.	<i>'opiuma</i>	Nat	R	R1	--	
	<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kunth	<i>kiawe</i>	Nat	R	AA	--	
LAMIACEAE							
	<i>Leonotis nepetifolia</i> (L.) R. Br.	lion's ear	Nat.	R	U	--	
LAURACEAE							
	<i>Cassytha filiformis</i> L.	<i>kauna'oa pehu</i>	Nat	--	O1	R	
MALVACEAE							
	<i>Abutilon grandifolium</i> (Willd.) Sweet	hairy abutilon	Nat	--	R1	--	
	<i>Abutilon incanum</i> (Link) Sweet	hoary abutilon, <i>ma'o</i>	Ind	--	R	--	
	<i>Malva parviflora</i> L.	cheeseweed	Nat	C2	--	O	
	<i>Malvastrum coramandelianum</i> (L.) Garck	false mallow	Nat	U	U	U	
	<i>Sida ciliaris</i> L.	---	Nat	U	U1	U2	
	<i>Sida fallax</i> Walp.	<i>'ilima</i> , <i>'ilima papa</i>	Ind	U	U	O	
Table 1- continued							

SPECIES LISTED BY FAMILY	COMMON NAME	STATUS	ABUNDANCE			NOTES
			(GL)	(Fo)	(CS)	
MALVACEAE continued						
<i>Sida spinosa</i> L.	prickly sida	Nat	R	R	--	
<i>Thespesia populnea</i>	<i>milo</i>	Ind	U1	--	--	
MYOPORACEAE						
<i>Myoporum sandwicense</i> A. Gray	<i>nalo</i>	End	R	R1	--	
<i>Myoporum sandwicense</i> var. <i>stellatum</i> G.L. Webster	<i>nalo</i>	End	--	--	O3	
NYCTAGINACEAE						
<i>Boerhavia coccinea</i> Mill.	false <i>alena</i>	Nat	U1	--	U	
<i>Boerhavia repens</i> L.	<i>alena</i>	Ind	--	--	C	
PASSIFLORACEAE						
<i>Passiflora foetida</i> L.	running pop	Nat	U	U	--	
PLANTAGINACEAE						
<i>Plantago lanceolata</i> L.	narrow-leaved plantain	Nat	U	U	--	
PLUMBAGINACEAE						
<i>Plumbago zeylanica</i> L.	' <i>lile'e</i>	Ind	--	R	--	
POLYGONACEAE						
<i>Coccoloba uvifera</i> (L.) L.	sea grape	Orn	--	--	R	
PORTULACACEAE						
<i>Portulaca oleracea</i> L.	pigweed	Nat	U	R	O1	
SOLANACEAE						
<i>Lycium sandwicense</i> A. Gray	' <i>ohelo kai</i>	Ind	--	R1	--	<1>
<i>Nicandra physalodes</i> (L.) Gaertn.	apple of Peru	Nat	R	--	--	
<i>Nicotiana glauca</i> R.C. Graham	tree tobacco	Nat	--	C	O	
<i>Solanum americanum</i>	<i>pōpōlo</i>	Pol	--	U	U2	
<i>Solanum melongena</i> L.	egg plant	Orn	R	--	--	<2>
<i>Solanum lycopersicum</i> var. <i>cerasiforme</i> (Dunal) Spooner, G.J. Anderson & R.K. Jansen	cherry tomato	Nat	R	R	--	
STERCULIACEAE						
<i>Waltheria indica</i> L.	' <i>uhaloa</i>	Nat	U	U	--	
TILIACEAE						
<i>Triumfetta semitriloba</i> Jacq.	Sacramento bur	Nat	--	R	--	<1>
ZYGOPHYLLACEAE						
<i>Tribulus cf. terrestris</i> L.	puncture vine	Nat	R	--	R	<3>

Table 1 - continued

SPECIES LISTED BY FAMILY		COMMON NAME	STATUS	ABUNDANCE		NOTES
				(GL)	(Fo)	(CS)
MONOCOTYLEDONES						
AGAVACEAE						
<i>Cordylone fruticosa</i> L.	<i>ti</i>		Pol	R	--	-- <2>
ALOEACEAE						
<i>Aloë vera</i> (L.) N.L. Burm.	aloë		Orn	--	--	R
ARECACEAE						
<i>Cocos nucifera</i> L.	<i>niu</i> , coconut		Pol	--	R	--
ARECACEAE continued						
<i>Phoenix</i> hybrid	date palm		Nat	--	R	-- <3>
CYPERACEAE						
<i>Balboschoenus maritimus</i> (L.) Palla	<i>kaluhā</i>		Ind	--	R3	-- <1>
<i>Cyperus laevigatus</i> L.	<i>makalaa</i>		Ind	--	R	-- <1>
<i>Eleocharis</i> sp.	spikerush		Nat	R	--	--
<i>Fimbristylis miliacea</i> (L.) Vahl.	---		Nat	--	O1	-- <1>
<i>Kyllinga brevifolia</i> Rottb.	<i>kili'o'apu</i>		Nat	R	--	--
<i>Schoenoplectus californicus</i> (C.A. Mey.) Palla	<i>kaluhā</i> , giant bulrush		Nat	--	AA	-- <1>
POACEAE						
<i>Cenchrus ciliaris</i> L.	buffelgrass		Nat.	C	A	A
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass		Nat.	C	C	U
<i>Gynodon dactylon</i> (L.) Pers.	Bermuda grass		Nat.	U	U	C
<i>Gynodon x magnensisii</i> Hurcomb	Bermuda hybrid		Orn	R3	--	-- <2>
<i>Dactyloctenium aegyptium</i> (L.) Willd.	beach wiregrass		Nat	U	--	--
<i>Eleusine indica</i> (L.) Gaertn.	beach wiregrass		Nat.	R	--	U
<i>Eragrostis amabilis</i> (L.) Wight & Arnott	lovegrass		Nat	O	--	--
<i>Eragrostis pectinacea</i> (Michx.) Nees	Carolina lovegrass		Nat	U	O	O
<i>Melinis repens</i> (Willd.) Zizka	Natal redtop		Nat	U	--	--
<i>Panicum maximum</i> Jacq.	Guinea grass		Nat	O	A	--
<i>Paspalum vaginatum</i> Sw.	seashore paspalum		Nat	--	C	-- <1>
<i>Saccharum officinarum</i> L.	kō, sugar cane		Pol	R	--	-- <2>
<i>Setaria verticillata</i> (L.) P. Beauv.	bristly foxtail		Nat	U	--	--
<i>Sporobolus diandrus</i> (Retz.) P. Beauv.	Indian dropseed		Nat	U2	U1	O
<i>Sporobolus virginicus</i> (L.) Kunth	'aki'aki		Ind	--	U	--
<i>Urachloa mutica</i> (Forssk.) T.Q. Nguyen	California grass		Nat	--	A	-- <1>
TYPHACEAE						
<i>Typha latifolia</i> L.	common cattail		Nat	--	A	--

Legend to Table 1

STATUS = distributional status for the Hawaiian Islands:
end = endemic; native to Hawaii and found naturally nowhere else.
ind = indigenous; native to Hawaii, but not unique to the Hawaiian Islands.
nat = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.
orn = exotic, ornamental or cultivated; plant not naturalized (not well-established outside of cultivation)
pol = Polynesian introduction before 1778.

ABUNDANCE = occurrence ratings for plants by area:
R – Rare seen in only one or perhaps two locations
U – Uncommon seen at most in several locations
O – Occasional seen with some regularity
C – Common observed numerous times during the survey
A – Abundant found in large numbers; may be locally dominant
AA – Very abundant, abundant and dominant; defining vegetation type

Numbers following an occurrence rating indicate clusters within the survey area. The ratings above provide an estimate of the likelihood of encountering a species within the specified survey area; numbers modify this where abundance, where encountered, tends to be greater than the occurrence rating:

- 1 – Several plants present
- 2 – Many plants present
- 3 – Locally abundant

SURVEY AREA: Survey areas for this report:
(GL) – Graded areas, disturbed ground; majority of site
(Fo) – Ungraded areas; forested (*kiawe*)
(CS) – Coastal strand

NOTES:
<1> – Associated with wetland or sink hole
<2> – In this setting, planted as an ornamental
<3> – Plant observed lacking fruit or flowers; identification uncertain

**Avian Survey
Point Counts**

A total of 627 individual birds of 22 species, representing 18 separate families, were recorded during station counts. Twenty-two percent (~7) of the species recorded are native species. Two of which, Hawaiian Coot (*Fulica alai*) and Hawaiian Stilt (*Himantopus mexicanus knudseni*) are listed as endangered species under both federal and State of Hawaii's endangered species statutes. One species, Black-crowned Night-Heron (*Nycticorax nycticorax hoactli*) is a resident water obligate breeding species and the remaining four native species recorded, Pacific-Golden Plover (*Pluvialis fulva*), Ruddy Turnstone (*Arenaria interpres*), Wandering Tattler (*Tringa incanous*), and Sanderling (*Calidris alba*) are indigenous migratory shorebird species. The remaining 14 species detected are alien to the Hawaiian Islands (Table 2).

Avian diversity and densities were in keeping with the highly disturbed nature of the habitat present on the site, and the site's location on the 'Ewa plain. Four species: House Finch (*Haemorrhous mexicanus*), Pacific Golden-Plover, Common Myna (*Acridotheris tristis*), and Skylark (*Aldaia arvensis*), accounted for slightly more than 50 percent of the total number of birds recorded during point counts. House Finch was the most commonly recorded species during the points, accounting for 23 percent of the total number of birds recorded.

On March 22, 2013 following point counts and after the time-dependent waterbird counts a series of large groups of Pacific Golden-Plover started to fly into the central part of the site *mauka* of the lagoon – over the next two hours over 300 plover were counted loafing on the graded pad. This aggregation of plover was likely a pre-migration assemblage preparing for their flight to the Arctic; this phenomenon repeats itself across the state in the last two weeks of April, the plover usually head north in large groups near the end of April each year.

Table 2 – Avian Species Detected Within the Haseko Site During Point Counts

Common Name	Scientific Name	ST	RA
	ANSERIFORMES		
	ANATIDAE - Ducks, Geese & Swans		
	Anatinae - Ducks		
Feral Mallard	<i>Anas platyrhynchos</i>	A	0.13
	GALLIFORMES		
	PHASIANIDAE – Pheasants & Partridges		
	Phasianinae – Pheasants & Allies		
Gray Francolin	<i>Francolinus pondicerianus</i>	A	1.93
	PELECANIFORMES		
	ARDEIDAE - Herons, Bitterns & Allies		
Black-crowned Night-Heron	<i>Nycticorax nycticorax hoactli</i>	IR	0.40
	GRUIFORMES		
	RALLIDAE - Rails, Gallinules and Coots		
Hawaiian Coot	<i>Fulica alai</i>	EE	2.73
	CHARADRIIFORMES		
	CHARADRIIDAE - Lapwings & Plovers		
	Charadriinae - Plovers		
Pacific Golden-Plover	<i>Pluvialis fulva</i>	IM	4.60

Table 2 continued

Common Name	Scientific Name	ST	RA
Black-necked Stilt	RECURVIROSTRIDAE - Stilts & Avocets <i>Himantopus mexicanus knudseni</i>	EES	1.40
Wandering Tattler	SCOLOPACIDAE - Sandpipers, Phalaropes & Allies <i>Tringa incana</i>	IM	0.20
Ruddy Turnstone	<i>Arenaria interpres</i>	IM	0.47
Sanderling	<i>Calidris alba</i>	IM	0.07
Spotted Dove	COLUMBIFORMES COLUMBIDAE - Pigeons & Doves <i>Streptopelia chinensis</i>	A	3.00
Zebra Dove	<i>Geopelia striata</i>	A	0.73
Sky Lark	PASSERIFORMES ALAUDIDAE - Larks <i>Alauda arvensis</i>	A	3.47
Red-vented Bulbul	PYCNONOTIDAE - Bulbuls <i>Pycnonotus cafer</i>	A	1.73
Red-vented Bulbul	<i>Pycnonotus jocosus</i>	A	0.47
Japanese White-eye	ZOSTEROPIDAE - White-eyes <i>Zosterops japonicus</i>	A	1.07
White-rumped Shama	TURDIDAE - Thrushes <i>Copsychus malabaricus</i>	A	0.07
Northern Mockingbird	MIMIDAE - Mockingbirds & Thrashers <i>Mimus polyglottos</i>	A	0.27
Common Myna	STURNIDAE - Starlings <i>Acridotheres tristis</i>	A	3.73
Red-crested Cardinal	EMBERIZIDAE - Emberizids <i>Paroaria coronata</i>	A	1.27
Northern Cardinal	CARDINALIDAE - Cardinals Saltators & Allies <i>Cardinalis cardinalis</i>	A	1.67
House Finch	FRINGILLIDAE - Fringilline and Cardueline Finches & Allies Carduelinae - Cardueline Finches <i>Haemorrhous mexicanus</i>	A	9.60
Common Waxbill	ESTRILIDAE - Estrilid Finches Estrildinae - Estrildine Finches <i>Estrilda astrild</i>	A	2.93

Legend to table 2

ST	Status
A	Alien - Introduced to the Hawaiian Islands by humans
IR	Indigenous Resident - Native breeding species, not unique to the Hawaiian Islands
IM	Indigenous Migratory - Native migratory species, not unique to the Hawaiian Islands - non breeder
EE	Endangered Endemic - A native unique species to the Hawaiian Islands, also listed as endangered
EES	Endangered Endemic sub-species - A native unique sub-species species to the Hawaiian Islands, also listed as endangered
RA	Relative Abundance - Number of birds detected divided by the number of count stations (15)

Time-Dependent Waterbird Counts

Four 30-minute time-dependent waterbird counts were conducted on the site. Three of the waterbird count stations were sited at locations around the lagoon, and one was sited within the WPA on the west side of the site. High counts resulted in the following data: 38 Hawaiian Coots, four Hawaiian Stilt, five Black-crowned Night-Herons and two feral Mallards in or around the lagoon, and four Hawaiian Stilt, one Hawaiian Coot, three feral Mallards and two Black-crowned Night-Herons with in the WPA. Given the site and the siting of the point count stations it is unlikely that the birds recorded on these counts are in addition to the birds recorded on the point counts.

Mammalian Survey

Three terrestrial mammalian species were detected on site during the course of this survey. Three dogs (*Canis f. familiaris*) were seen within the survey area, and scat, tracks and sign of dogs were encountered in numerous locations within the survey area. Six, small Indian mongoose (*Herpestes a. auropunctatus*) were encountered, as was ample scat and tracks of this species. Two cats (*Felis catus*) were seen and tracks of this species were observed in numerous locations on the site.

No mammalian species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs were detected during the course of this survey, nor were any expected (DLNR, 1998; USFWS, 2005a, 2005b, 2013).

Discussion**Botanical Resources**

Of the 108 species of flowering plants recorded during our survey (Table 1), only 15 (13.9 percent) are plants native to the Hawaiian Islands. Another 5 species (4.6 percent) are regarded as early Polynesian introductions (purposeful or accidental; so-called "canoe plants"); these percentages are actually relatively high for lowland areas on O'ahu. The number of native and early Polynesian plants found in the graded land (GL) area is more typical at 8.2 percent (9 species), still somewhat surprising considering the extent and nature of the disturbance. The coastal strand might be expected to have a greater number (and percentage) of natives given the environmentally rigorous setting. During the survey, 7 native and two Polynesian introduced species were recorded in the coastal strand area against a total of 41 species recorded there (yielding 17 percent native and 5 percent early Polynesian introduction).

Endemics are generally of most interest and potential concern because these are both uniquely native to the Hawaiian Islands and typically rather rare in the lowlands of O'ahu. For this survey, the following endemics were noted: *kūpala* (*Sicyos pachycarpus*) and *naio* (*Myoporum sandwicense*). *Kūpala* is a climbing vine that crops up in rocky places in mainly

leeward locations in the rainy season and then disappears (leaving only seeds) in the dry season. Growth can be quite prolific for the brief few months the vine is around. *Kūpala* was seen in the *kiawe* forests and sparsely in the coastal strand. *Naio* was observed in small numbers scattered about, but fairly abundant as a small shrub in the coastal strand. The plants in the latter location were examined closely and determined to represent the coastal variety (*M. s. var. stellatum*), restricted in its distribution to coastal areas in the vicinity of Barber's Point on O'ahu. Neither of these species is considered rare or threatened. With one exception, all of the indigenous species recorded are common to dry lowland areas on O'ahu and the other Hawaiian Islands. The exception is *'ōhelo kai* (*Lycium sandwicense*), a somewhat uncommon species most often seen near coastal wetlands on leeward coasts. *'Ōhelo kai* in this case was recorded in the fenced reserve (wetland) on the west side of the project site.

One area observed supporting a number of native plants is not included in our survey results: an archaeological preserve with access trails on the west side of the property is being actively maintained in an open part of the *kiawe* forest by Hoakalei Cultural Foundation. A number of native plants appropriate to this setting have been planted here and are being cared for. These species were not included in our Table 1 because their occurrence is essentially ornamental and they are being protected as part of the archaeological reserve.

Avian Resources

The findings of the avian survey are consistent with the results of several other recent faunal surveys conducted in similar habitats on the 'Ewa plain (David and Guinther, 2005, 2006, 2007, 2010). During the course of this survey 22 avian species were detected, seven of which, Black-crowned Night-Heron, Hawaiian Coot, Pacific-Golden Plover, Black-necked (Hawaiian) Stilt, Wandering Tattler, Ruddy Turnstone and Sanderling are native species. Two of these, Hawaiian Coot, and Black-necked (Hawaiian) Stilt are listed as endangered species under both state and federal endangered species statutes. One species, Black-crowned Night-Heron, is a common indigenous resident water obligate breeding species. The remaining four species Pacific Golden-Plover, Wandering Tattler, Ruddy Turnstone, and Sanderling are indigenous migratory shorebird species which nest in the high Arctic during the late spring and summer months, returning to Hawai'i and the Tropical Pacific to spend the fall and winter months each year. They usually leave Hawai'i for their trip back to the Arctic in late April or the very early part of May. The remaining 14 species are alien to the Hawaiian Islands (Table 2).

Although no seabirds were detected during the course of this survey, several seabird species potentially overfly the site on occasion in low numbers. The primary cause of mortality in resident seabirds is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983; Simons and Hodges 1998; Ainley *et al.*, 2001). Collision with man-made structures is considered to be the second most significant cause of mortality in locally nesting seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting,

When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961; Teller 1979; Sincok *et al.*, 1985; Teller *et al.*, 1987; Cooper and Day, 1998; Podolsky *et al.* 1998; Ainley *et al.*, 2001; Hue *et al.*, 2001; Day *et al.* 2003).

There are no known nesting colonies of any of the resident seabird species present on O'ahu on, or within close proximity of the project site.

Mammalian Resources

The findings of the mammalian survey are consistent with the results of several other recent faunal surveys conducted in similar habitats on the 'Ewa plains (David and Guinther, 2005, 2006, 2007, 2010).

Although no rodents were detected during the course of this survey, it is likely that the four established alien *muridae* fund on O'ahu, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*), and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use various resources found within the general project area on a seasonal basis. All of these introduced rodents are deleterious to native ecosystems and the native faunal species dependent on them.

No Hawaiian hoary bats were detected during the course of this survey. Given the paucity of documented records of this species from the 'Ewa plains the chance that any use resources on the subject property are extremely low (USFWS, 1998; David, 2013).

Potential Impacts to Protected Species and Critical Habitat

Botanical

No species of plant listed as threatened or endangered under state or federal statutes was recorded during the survey and none is expected to occur on this highly disturbed site, although coastal *kiawe* groves can harbor a few rare natives such as *'akoko* (*Euphorbia skottsbergii* var. *skottsbergii*) and *'Ewa hinahina* (*Achyranthes splendens* var. *rotundata*). Both of these ESA listed species have been found at Kalaeloa just to the west of the Project area (Char and Balakrishnan, 1979; USFWS, 2013). Both species were searched for in the *kiawe* forest areas, but not observed (except *A. splendens* planted in the archaeological reserve; see above).

Shorebirds & Waterbirds

The principal potential impact that the proposed development poses to protected shorebird and waterbird species is the increased threat that construction activity, and (following build out) the recreational use of the lagoon which may result in disturbance to nesting birds,

coots, and possibly in the future Common (Hawaiian) Gallinules (*Gallinula galeata sandvicensis*).¹

Seabirds

The principal potential impact that further development to this site poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the project during the nesting season. The two main areas that outdoor lighting could pose a threat to these nocturnally flying seabirds is if: 1) during construction it is deemed expedient, or necessary, to conduct nighttime construction activities; and, 2) following build-out, the potential use of streetlights or other exterior lighting during the seabird nesting season.

Critical Habitat

There is no federally delineated Critical Habitat present on the site (USFWS, 2012). Thus the continued development of the site and operation of proposed development will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under state law.

Wetlands

A sinkhole wetland is present on the west side of the property and is protected within the WPA by an enclosure fence. No other wetland features were noted, although a large lagoon is a significant feature in the center of the project area. This lagoon is man-made and not connected to the ocean. The margins of the lagoon consist of steep banks, with rock revetment in some areas, which generally precludes development of wetland vegetation around the shoreline.

Recommendations

- If nighttime construction activity and/or equipment maintenance is proposed during the construction phases of the project, all associated lights should be shielded, and when large flood/work lights are used, they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground.
- If streetlights or exterior facility lighting are installed in conjunction with the project, it is recommended that the lights be shielded to reduce the potential for interactions between nocturnally flying seabirds and external lights and/or man-made structures (Reed *et al.*, 1985; Teller *et al.*, 1987).

¹ No Common (Hawaiian) Gallinules (*Gallinula galeata sandvicensis*) have been recorded on the site or on the adjacent Hoakalei Country Club, though as habitat on the survey site and golf course matures, it is possible that this species may colonize the area.

Glossary

Alien – Introduced to Hawai'i by humans
Endangered – Listed and protected under the Endangered Species Act of 1973, as amended (ESA) as an endangered species
Endemic – Native to the Hawaiian Islands and unique to Hawai'i
Indigenous – Native to the Hawaiian Islands, but also found elsewhere naturally
Muridae – Rodents, including rats, mice and voles, one of the most diverse family of mammals
Naturalized – A plant or animal that has become established in an area that it is not indigenous to
Nocturnal – Night-time, after dark
'Ōpeʻapeʻa – Endemic endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*)
Pelagic – An animal that spends its life at sea – in this case seabirds that only return to land to nest and rear their young
Phylogenetic – The evolutionary order that organisms are arranged by
Ruderal – Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles
Sign – Biological term referring tracks, scat, rubbing, odor, marks, nests, and other signs created by animals by which their presence may be detected
Threatened – Listed and protected under the ESA as a threatened species
DLNR – Hawai'i State Department of Land & Natural Resources
DOFAW – Division of Forestry and Wildlife
ESA – Endangered Species Act of 1973, as amended
GNSS - Global Navigation Satellite System
GPS - Global Positioning System
TMK – Tax Map Key
USFWS – United State Fish & Wildlife Service
WPA – Wetland Preservation Area

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APPENDIX H. AN ECOLOGICAL CHARACTERIZATION OF PLANKTON AND IRRADIANCE IN HOAKALEI LAGOON

March 10, 2014

AN ECOLOGICAL CHARACTERIZATION OF PLANKTON AND IRRADIANCE IN HOAKALEI LAGOON

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Project Summary

Hoakalei Lagoon (Lagoon) is an excavated basin on the HASEKO property in Ewa, Hawaii. Originally intended to accommodate a marina with a channel connecting it to the open ocean, it is being reevaluated as an enclosed lagoon that requires revised maintenance and a management strategy. We were contracted to characterize the plankton community and light environment at 12 existing water quality stations within the lagoon. This report includes plankton and light data collected during December 2013, and makes temporal and spatial comparisons between this data and other surveys conducted in August and November 2013. Recommendations are made for future monitoring and management purposes based upon spatial (among sites) and temporal (between months) trends. This report is divided into two sections covering plankton surveys and results (by S. Brown) and light profiles and data analyses (by H. Spalding).

Summary of Results

1. East-West spatial trends in the abundance and cellular properties of component bacterial populations indicate differences and/or a gradient in the physical-chemical Lagoon environment. This spatial gradient was not observed in the light environment within the Lagoon.

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2. Several anomalies in plankton populations were noted at Station 12 including a reduction in the diatom *Nitzschia*, an increase in the number of photosynthetic dinoflagellates and a minima in protozoan grazer populations.
3. Zooplankton numbers are quite low and dominated by rotifers; polychaete (worm) larvae were observed for the first time in December 2013.
4. Since the initial plankton sampling, there has been a shift in biomass from the "Chlorella-like" microalgae to the smaller cyanobacteria, seemingly concurrent with increased water clarity.
5. The abundance of phycoerythrin-rich cyanobacteria, presumably marine *Synechococcus* sp., has been decreasing over the past three months.
6. The dominant diatom population has shifted from *Nitzschia* to *Chaetoceros* spp.
7. Marked temporal (Nov and Dec 2013) changes in cyanobacteria numbers and the size structure of the phytoplankton suggest the Lagoon system is still evolving.
8. The light environment was similar spatially within a specific month (Nov. and Dec. 2013), with minor differences among Lagoon regions and water quality stations.
9. Water clarity and light penetration in the Lagoon changed dramatically between Nov. and Dec. 2013; the water was clearer with increased light penetration in Dec., as shown by lower attenuation coefficients, increased Secchi depths, and greater % subsurface irradiance at 6 m depths at all 12 stations sampled.

Recommendations

1. Sampling for plankton and light should continue on a monthly basis, though at a reduced level.
Justification: the microbial system is still evolving and dynamics change significantly in a month's time; we have not established a consistent baseline.
2. Continue to sample all 12 stations monthly for bacterial abundances and cellular properties (via flow cytometry). **Justification:** these measurements are quick, cost-effective (~ \$330, see Appendix E) and to date - indicate Lagoon-wide spatial variation in some aspect of the physical-chemical environment.
3. Sample and analyze a subset of stations (6) monthly for the phytoplankton community structure and biomass estimates via microscopy; stations 1, 3, 5, 6, 10 and 12 are suggested as they span the Lagoon. **Justification:** 1) phytoplankton that are of concern for public health (filamentous cyanobacteria, red tide dinoflagellates, prymnesiophytes) are not distinguished and/or identified by flow cytometry and 2) limited sampling has shown the accumulation of larger cells at discrete stations, as identified by microscopy, and is likely to occur again.
4. Sample monthly for zooplankton at the same subset of 6 stations. **Justification:** 1) in one month's time, there has been a marked increase in the rotifer population 2) zooplankton distribution is not uniform across the Lagoon 3) zooplankton in low salinity water can include sea lice and stinging jellies that impact recreational usage.
5. Sample monthly for light at the same subset of 6 stations. **Justification:** There are not significant spatial trends in the different Lagoon regions, suggesting that light data can be sampled at fewer

Spalding and Brown, Dec 2013 data, p. 2

- stations (6 versus 12) while still capturing adequate variability in the data for temporal comparisons.
6. Collect, preserve, and store water from the remaining 6 stations each month. **Justification:** requires minimal time and effort (~ \$330, see Appendix E), yet retain the ability to identify the cause or effect of anomalies seen in Water Quality analyses or bacterial populations.
 7. Sample a subset of stations for plankton sampling and light profiles during episodic events (for example, precipitation events causing run-off and sediment accumulation into the lagoon) to assess the immediate impact on biology and the light environment. **Justification:** Quantifying the impact of these events will inform as to the infrastructure and actions needed to prevent and/or mitigate the effects.

SECTION 1: PLANKTON SAMPLING



Figure 1. Map of Hoakalei Lagoon showing the Water Quality (WQ) station locations sampled for plankton populations and irradiance on December 6, 2013. The Lagoon is separated into 3 regions: West, Center (or Middle), and East.

Background

Water clarity has generally been clear near the surface of the lagoon. However, spikes in water column chlorophyll *a* data associated with a greenish tint in the water in 2013 (S. Dollar, pers. comm.) suggested that phytoplankton populations may be fluctuating. An initial assessment of the species composition of phytoplankton present within the lagoon, their relative abundance, and a characterization of the light environment were needed to provide a baseline to evaluate any possible changes in phytoplankton composition and the light environment. We were contracted to conduct a preliminary survey of the plankton community and light environment at five stations in Hoakalei Lagoon on August 31, 2013. After the major components of the plankton population were identified, additional surveys were requested to characterize the spatial (among stations) and temporal (month to month) variability in the plankton community and light environment. A full survey of the plankton community and light environment at 12 field sites, corresponding to the Water Quality (WQ) stations, was completed on November 9, 2013. The full plankton survey data included the abundance of phytoplankton, identification of the major components of the phytoplankton population, and an initial assessment of the zooplankton grazer community. The same stations were revisited one month later on December 6, 2013; this report details the December field survey, and compares the results to the August and November surveys.

Methods

Samples for analysis of the plankton assemblage were collected to assess temporal and spatial variation, the stability of the microbial system, and to complement water chemistry measurements. Sampling occurred on December 6, 2013. This was within 48 hours of water chemistry sampling (S. Dollar), and all 12 water chemistry stations (Fig. 1) were sampled such that the two data sets (microbial and water chemistry) are comparable in time and space. The winds were light, and the skies were sunny and clear at the time of sampling. Water clarity visually appeared to be much improved from the previous month. Prior chemistry data (Atkinson and Dollar, 2013) indicated a high degree of vertical mixing in the lagoon, thus sampling at the surface was assumed to represent the entire water column.

Whole water samples for phytoplankton and zooplankton analyses were collected in 1L dark bottles and 1 gallon plastic jugs respectively, from the surface waters of each station (Fig. 1). Zooplankton samples were preserved on site; phytoplankton samples were immediately taken to the laboratory on ice and preserved within 2 hours for subsequent analyses. Because the size range of the plankton assemblage spans four orders of magnitude (<1 µm to >1 mm), a suite of different preservatives and methods were necessary to address each segment of the population (see Spalding and Brown 2013 a, b, and Appendix A for detailed methodology). Salinity was 9 practical salinity units (psu) as measured with a Atago Pocket refractometer PAL-03S.

Results - Spatial Variability

Bacterial Populations

Heterotrophic bacteria utilize organic carbon sources for growth and are often a primary indicator of water quality and a determinant of water clarity. Changes in the heterotrophic bacterial population reflect changes in the organic carbon content of the site, whether from *in situ* detrital matter (e.g. *Chara*), shifts in planktonic food webs (i.e. diatom blooms), or from sources outside the Lagoon (exogenous sources). Because of this, they are a useful water quality indicator and are used in this analysis/report.

Bacterial abundance across the Lagoon ranged from 1.46×10^6 to 1.63×10^6 cells ml^{-1} , on the low end of the range for brackish subtropical lagoons (Li 1998; Piccini et al., 2006; Alonso et al., 2013; MacCord et al., 2013). On average, abundances were lower at stations in the Western region of the Lagoon (Table 2, Figure 2) with a minimum at Station 4 (Table 1). Noting recent observations of enhanced run-off, and presumably more organic carbon in this area relative to the West Lagoon (see Section 2), the higher abundance of bacteria in the East Lagoon may be a consequence of similar prior run-off events.

The mean DNA content of a population, as determined by fluorescent staining with HOESCHT, is a general indicator of cell size. The DNA data that were obtained from this sampling indicate that mean cell size of the main bacterial population decreases from west to east across the lagoon (Figure 3). Smaller cell size may reflect newly divided cells, consistent with higher numbers in the eastern portion of the Lagoon. Based on cell size, a second "sub"-population of distinctly larger bacterial cells was present at all stations, but in numbers two orders of magnitude less (Figure 2). Interestingly, this population of larger bacteria was not present in the previous month's sampling.

Of the photosynthetic bacteria, a single-celled cyanobacteria population of phycocyanin-rich cells (PC-cyano) was the numerical dominant, and is generally associated with freshwater systems (Table 1). The distribution of the PC-cyano was relatively constant across the Lagoon, with both the highest and lowest numbers occurring in the Western region (Figure 2). A second cyanobacteria population of phycoerythrin-rich cells (PE-cyano), associated with marine systems and belonging to the genus *Synechococcus*, was also present, but was an order of magnitude less abundant. The PE-cyano decreased in abundance from west to the east (Tables 1 and 2; Figure 2). Both phycoerythrin and phycocyanin-containing *Synechococcus* are common components of tropical waters and their presence in the Lagoon are not surprising, or of concern.

Despite the relatively even distribution of PC-cyano, the cellular properties displayed clear spatial trends. The mean cell size, based on DNA staining, increased in a west to east direction, in contrast to that of the heterotrophic bacteria, whereas the average chlorophyll per cell decreased from west to east (Figure 4). Although differing in numbers, the less abundant population of PE-cyano showed the same west-east trend in both increasing cell size and decreasing chlorophyll per cell. These opposing trends in cellular properties may reflect differences in the number of dividing cells (more DNA per pigment/cell) between the regions. Alternatively, the opposing trend could reflect differences in growth strategies of populations varying between strictly photosynthetic growth versus mixotrophic growth that also utilizes

simple organic carbon sources (Kang et al. 2004, Ludwig and Bryant 2012). Regardless of the physiological basis, spatial trends in cell size and cellular fluorescence indicate a difference or gradient in an aspect of the physical-chemical environment (e.g. wind driven circulation, ground cover, nutrients, organics, and/or trace metals) that we have not identified, which may affect the ecology of the lagoon. Significant west-east trends were not observed in the light environment (see Section 2).

Table 1. Abundance of photosynthetic and heterotrophic bacteria (HBacteria) in cells ml^{-1} .

Station	PC-cyano	PE-cyano	HBacteria
1	166,169	24,478	1,557,353
2	170,448	25,778	1,553,573
3	174,989	25,463	1,533,473
4	169,595	23,993	1,464,533
5	163,866	24,347	1,527,993
6	168,650	21,873	1,595,029
7	170,769	23,290	1,616,948
8	169,057	21,164	1,570,124
9	168,840	21,840	1,628,970
10	171,255	22,962	1,572,067
11	168,361	22,962	1,546,893
12	165,998	20,974	1,602,845

Table 2. Abundance of photosynthetic and heterotrophic bacteria (cells ml^{-1}) averaged by region. Stations 1-5 = West, stations 6-7 = Center, stations 8-12 = East.

Stations	PC-cyano	PE-cyano	HBacteria
West	169,013	24,812	1,527,385
Center	169,710	22,582	1,605,988
East	168,702	21,980	1,584,180

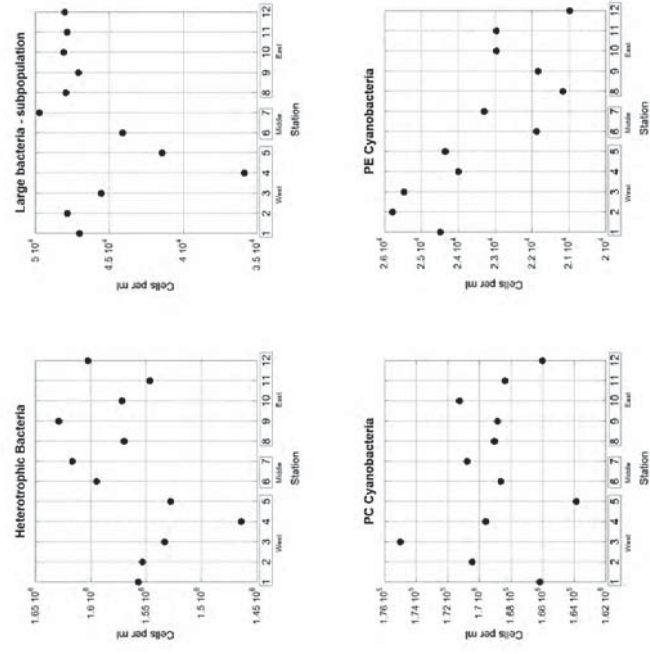


Figure 2. Graphical representation of the abundances of the heterotrophic and photosynthetic bacterial populations.

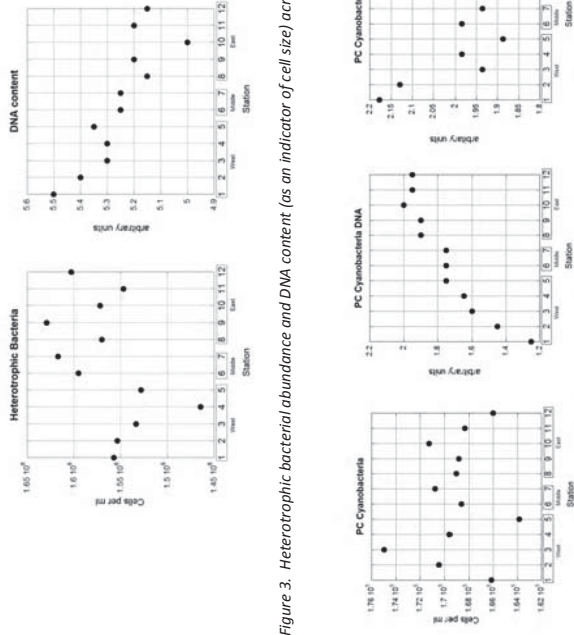


Figure 3. Heterotrophic bacterial abundance and DNA content (as an indicator of cell size) across the Lagoon.

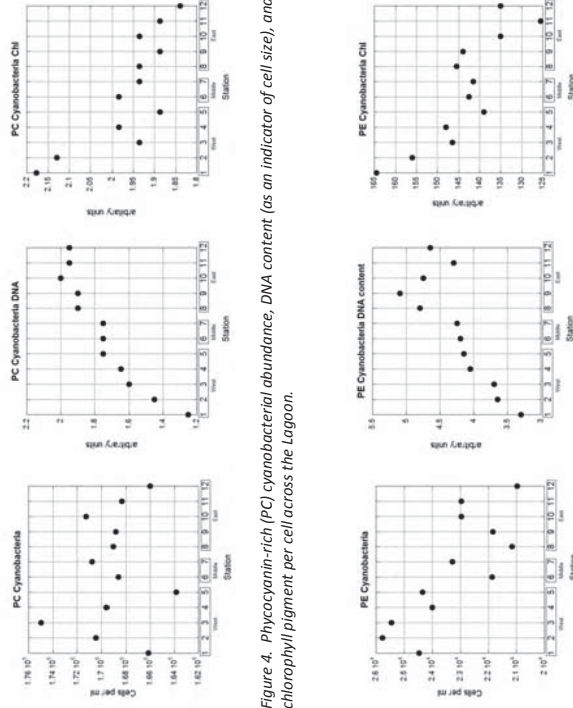


Figure 4. Phycoerythrin-rich (PE) cyanobacterial abundance, DNA content (as an indicator of cell size), and chlorophyll pigment per cell across the Lagoon.

Figure 5. Phycoerythrin-rich (PE) cyanobacterial abundance, DNA content (as an indicator of cell size), and chlorophyll pigment per cell across the Lagoon.

Phytoplankton Populations

The bulk of the rest of the phytoplankton community (non-bacterial) was primarily comprised of very small cells, 2-3 times larger than the single-celled cyanobacteria. Of these small cells, spherical non-motile cells resembling *Chlorella* account for 20% of the numerical abundance. Also prevalent were crescent or c-shaped flagellates of a similar size range (Table 3). There was not a clear spatial trend in the distribution of these populations, or in the non-bacterial phytoplankton as a whole; cell numbers were fairly constant. The exception was a small, but distinct group of cells with the pigment signature of PE-cyanobacteria, but larger in cell size, as detected by flow cytometry. This population increased in abundance by a factor of 5 from west to east. *Synechococcus* cells are known to clump in groups of three or four cells at times, which may account for the observed population.

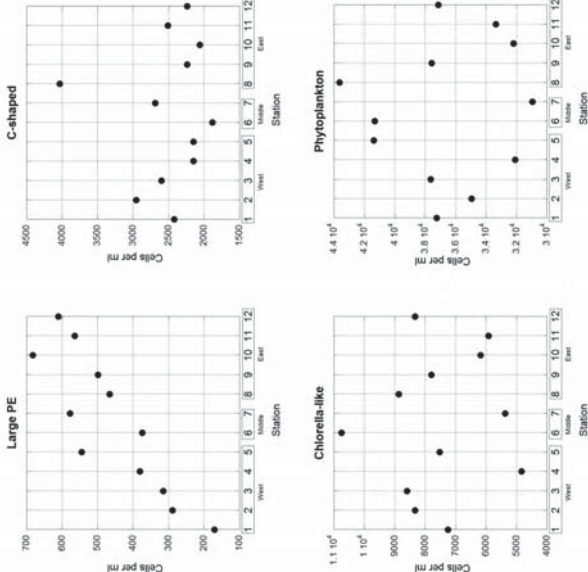


Figure 6. Graphical representation of the abundance of non-bacterial phytoplankton groups in the Lagoon. PE denotes cells with a Phycoerythrin-rich (PE) pigment signature.

The diatom biomass was comprised almost exclusively of two common genera, *Nitzschia* and *Chaetoceros* species. These cells are two orders of magnitude greater in size than the single-celled cyanobacteria and despite lower numbers, account for a substantial portion of the total phytoplankton biomass. Diatom cell walls are composed of silica (Si), analogous to glass houses, and thus require dissolved Si in the water to flourish. The *Nitzschia* cells are needle-like in shape and measure approximately 50 μm in length; *Chaetoceros* cells are small (3-4 μm) and form chains of 5-6 cells, but with spines that span over 100 μm across. The abundance of *Nitzschia* was highest in the West Lagoon region and decreased to the east. The lowest numbers of *Nitzschia* were found at Station 12, approximately 1/3 of the number of cells found at Station 1 (Table 3, Figure 7). *Chaetoceros* spp. were more evenly distributed across the Lagoon with abundances varying by less than a factor of 2.

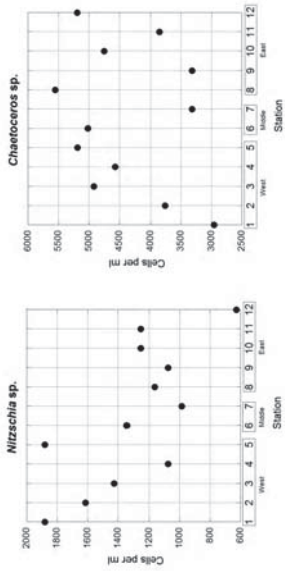


Figure 7. The abundance of the two genera of diatoms across the Lagoon.

Of the larger (> 10 μm) non-siliceous phytoplankton, numbers were quite low and not likely to be ecologically significant, with a slight accumulation of thecate dinoflagellates at Station 12 (Table 3). Filamentous cyanobacteria, of interest as potential toxins and skin irritants, were rare in the December sampling with a residual few strands from November noted at Station 5.

Station	<i>Chlorella</i> -like shaped	C- shaped	PE-rich	other unid	other unid	<i>Nitzschia</i>	<i>Chaetoceros</i>	Thecate dinos	Non-thecate dinos	PC filaments	Total
1	7,253	2,418	171	22,395	1,880	2,955	3	4		<1	37,080
2	8,328	2,955	289	17,710	1,612	3,761	2	1		<1	34,658
3	8,596	2,598	315	19,476	1,424	4,916	2	2		1	37,329
4	4,836	2,149	381	18,693	1,075	4,567	1	0		<1	31,701
5	7,522	2,149	545	23,544	1,880	5,185	2	3		2	40,831
6	10,746	1,880	374	21,566	1,343	5,016	4	0		<1	40,929
7	5,373	2,686	578	17,421	986	3,312	2	1		<1	30,360
8	8,865	4,030	466	23,086	1,163	5,553	3	0		<1	43,165
9	7,791	2,238	499	22,148	1,075	3,312	4	0		<1	37,065
10	6,179	2,060	683	16,591	1,255	4,747	3	1		<1	31,519
11	5,910	2,506	564	18,689	1,255	3,850	2	1		<1	32,777
12	8,328	2,238	610	19,538	626	5,193	15	3		<1	36,550

Table 3. Abundance of non-bacterial phytoplankton groups at the 12 WQ stations. All abundances are reported in cells ml⁻¹. C-shaped refers to the crescent shaped flagellate referenced in the text. PE-rich represents large phycoerythrin containing cells detected by flow cytometry. "other unid" refers to unidentified non-diatom cells. PC-filaments refers to the phycoerythrin-rich filamentous cyanobacteria.

Table 4. Abundance of major phytoplankton groups averaged in each of the three regions. All abundances are reported in cells ml⁻¹. C-shaped refers to the crescent shaped flagellate referenced in the text. PE-rich represents large phycoerythrin containing cells detected by flow cytometry. Chaet are Chaetoceros. Phyto are phytoplankton.

Stations	Large PE-rich	c-shaped	<i>Chlorella</i> -like	<i>Nitzschia</i>	<i>Chaet</i>	Total Phyto
West	340	2,454	7,307	1,574	4,277	36,315
Center	476	2,283	8,059	1,165	4,164	35,640
East	564	2,614	7,414	1,075	4,531	36,209

Grazer Populations

The protozoan (single-celled) grazer population feeds on the smaller phytoplankton and bacteria and is a primary loss term, or control, on phytoplankton biomass. The small flagellate grazers and larger dinoflagellate grazers were fairly constant across the study site, varying by a factor of 2 or less. The lowest number of protozoan grazers occurred at Station 12 (Table 5).

Table 5. Abundances (cells ml⁻¹) of the total protozoan grazer population and component groups.

Station	Flagellates	Ciliates	Heterotrophic Dinoflagellates		Total
			thecate	non-thecate	
1	11,552	1	6	25	11,583
2	11,820	0	11	14	11,845
3	11,194	2	7	10	11,213
4	8,328	4	6	13	8,351
5	10,120	1	7	20	10,148
6	8,596	1	5	11	8,614
7	8,239	1	3	21	8,264
8	11,732	0	4	15	11,750
9	11,463	0	3	17	11,483
10	9,134	2	7	16	9,159
11	10,746	2	6	17	10,771
12	7,522	3	9	8	7,542

Zooplankton are larger, multicellular organisms ranging in size from 100 µm to 2 mm in size. This group constitutes an important trophic link that crops down and feeds on phytoplankton, and serves as a food source for higher trophic levels such as juvenile fish. Based on our limited sampling of six stations, the three zooplankton groups observed were cyclopoid copepods and earlier life stage nauplii, the rotifer *Brachionus* sp., and polychaete worm larvae. Rotifers can be voracious grazers on phytoplankton; however, their optimal and maximum prey size is smaller than that of copepods. Rotifers are also less selective and graze on all microbial components of appropriate size (bacteria, protozoan grazers,

phytoplankton); thus, these two zooplankton have different impacts on the plankton population. The larvae of polychaete worms are transient components of the plankton, settling to the bottom for further development. Polychaete larvae were only found at Station 1, whereas rotifers and copepods were present at all six stations. Rotifers were more abundant than copepods at all six stations with a notable accumulation at Station 12 (Table 7). It should be noted that although these rotifer numbers are very low in general, with sufficient food and minimal predation, rotifers have the ability to multiply rapidly and concentrations can reach 8000 individuals per ml in tropical coastal lagoons (Castilho and Arcifa 2000; Le Moigne et al. 2013). At high concentrations, rotifer grazing can affect the species composition of the phytoplankton community.

Table 6. The abundance of zooplankton in organisms per L at 6 of the 12 WQ stations.

Station	Rotifers	Copepods	Copepod nauplii	polychaete larvae
1	0.4	0.0	0.3	0.1
3	1.0	0.1	0.0	0.0
5	1.1	0.0	0.1	0.0
7	0.8	0.2	0.0	0.0
9	1.5	0.2	0.0	0.0
12	4.6	0.2	0.2	0.0

Results - Temporal Variability

The initial survey of the plankton community was conducted in August of 2013 and included five stations (Stations 1, 2, 3, 6, 9); two complete surveys of all 12 water quality stations were completed in November and December 2013. Data averaged from each time point into West (Stations 1-5), Center (Stations 6 and 7) and East (Stations 8-12) regions provides an initial look at the temporal variability in the Lagoon (Table 7). In general, the microbial populations changed the most in the Western region of the Lagoon and remained more constant in the East.

Cyanobacteria populations changed the most over time in the Western region of the Lagoon. Between the initial survey in August and the first full survey in November, the concentration of PC-cyano nearly tripled in the Western and Center regions, and increased by factor of two in the East. Concurrently, the PE-cyano doubled in the West. By December, there was a marked decrease in both populations in all three regions (Table 7, Figure 8).

The component diatom populations exhibited opposing trends over time. The *Nitzschia* decreased by approximately 4X between August and December in all three regions whereas the *Chaetoceros* increased by a factor of approximately four (Table 7, Figure 8). The large PC filamentous cyanobacteria decreased over time, and were barely detectable by December. While component populations changed, the total phytoplankton count decreased by a factor of ~2 in the West and Center, and remained fairly constant in the East.

Table 7. The average abundance (cells ml⁻¹) of major planktonic groups in the West (Stations 1-5), Center (stations 6 and 7) and East (stations 8-12) regions. Only 5 stations (1,2,3, 6, and 9) were sampled in Aug.. "Total phytoplankton" does not include the photosynthetic cyanobacteria. Numbers in parentheses are the calculated standard error.

Group	West	
	Aug (Stations 1,2,3)	Nov Dec
Cyanobacteria		
PC-Cyano	107,972 (10,214)	293,831 (2,473) 169,013 (1,906)
PE-Cyano	45,412 (12,536)	111,128 (1,607) 24,812 (343)
PC filaments	13 (4)	8 (3) 2 (1)
Diatoms		
<i>Nitzschia</i> sp.	4,933 (140)	3,325 (235) 1,574 (152)
<i>Chaetoceros</i> sp.	1,057 (156)	2,922 (414) 4,277 (408)
Total phytoplankton	57,642 (3,427)	30,385 (1,582) 36,315 (1,516)
Heterotrophs		
Bacteria	n/a	1,557,650 (17,119) 1,527,385 (16,691)
Dinoflagellates	188 (36)	61 (9) 24 (3)
Flagellates	25,461 (2697)	10,905 (952) 10,603 (638)

Group	Center	
	Aug (Sta 6)	Nov Dec
Cyanobacteria		
PC-Cyano	117,115	297,698 (3,350) 169,710 (1,060)
PE-Cyano	91,274	97,906 (1,555) 22,582 (709)
PC filaments	8	2 (0) 0
Diatoms		
<i>Nitzschia</i> sp.	4,030	2,820 (224) 1,165 (179)
<i>Chaetoceros</i> sp.	1,780	1,880 (112) 4,164 (852)
Total phytoplankton	74,186	28,757 (1,097) 35,640 (5,284)
Heterotrophs		
Bacteria	n/a	1,583,078 (55,269) 1,605,988 (10,959)
Dinoflagellates	146	72 (16) 20 (2)
Flagellates	27,924	8,729 (3,626) 8,418 (179)

Group	East	
	Aug (Sta 9)	Nov Dec
Cyanobacteria		
PC-Cyano	167,857	288,368 (2724)
PE-Cyano	78,771	99,914 (1,805)
PC filaments	4	5 (1)
Diatoms		
<i>Nitzschia</i> sp.	5,001	2,883 (260)
<i>Chaetoceros</i> sp.	1,075	2,239 (237)
Total phytoplankton	30,016	28,202 (1,458)
Heterotrophs		
Bacteria	n/a	1,553,958 (25,186)
Dinoflagellates	222	74 (2)
Flagellates	17,817	9,186 (609)
		1,584,180 (14,299)
		21 (2)
		10,119 (791)

Heterotrophic bacteria were not enumerated in August, but appeared relatively unchanged in all three regions between November and December (Table 7, Figure 9). Both large (heterotrophic dinoflagellate) and small (heterotrophic flagellate) grazers decreased by a factor of 2-3 over the three month period.

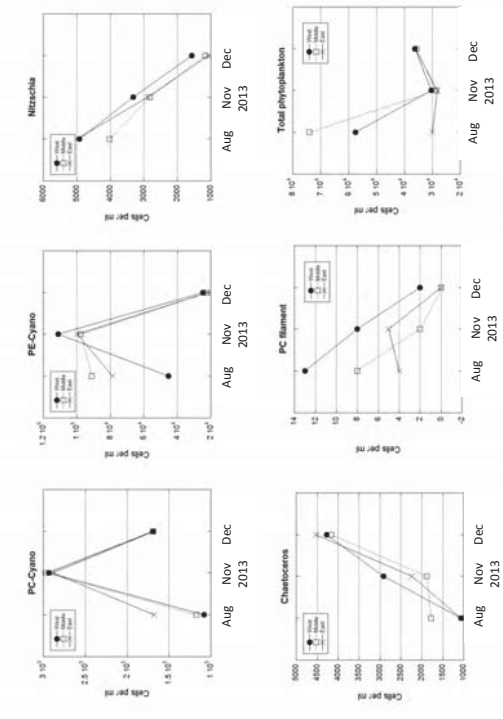


Figure 8. Abundances of component phytoplankton populations over time.

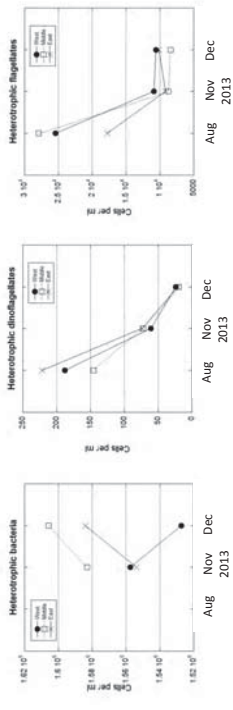


Figure 9. Abundances of component heterotrophic populations over time.

Since the initial sampling, there was a shift in biomass from the “*Chlorella*-like” microalgae to the smaller sized cyanobacteria, and protozoan grazer abundance was significantly reduced. This shift is consistent with the visual improvement in water clarity (see Section 2: Irradiance). Changes in the smallest components of the plankton assemblage, typically the “background communities”, suggest that

phytoplankton growth and grazing are not in balance, thus the system is not in steady state. Typically the smallest size fractions of the microbial communities are in growth and grazing balance and remain relatively constant; instead, changes in the larger size fractions overprint these background communities and account for most of the variation.

Results – Temporal Changes in Biomass

Due to differences in cell size, taxonomic abundance data does not always represent biomass. Biomass, in terms of carbon, is a more useful currency for nutrient budgets, biogeochemical cycling, and a general understanding of ecosystem functioning. Estimates of the taxonomic distribution of plankton biomass rely on carbon per cell conversion factors and/or carbon to biovolume calculations. In lieu of the tedious, time-consuming, and costly effort of measuring the length and width of every cell, average sizes and biovolumes were assumed for component plankton groups, and the biomass of these groups were estimated from published conversion factors (see Appendix A).

To determine if the sum of our assumptions produced reasonable biomass estimates, we compared the total photosynthetic biomass to chlorophyll concentrations (S. Dollar, pers. comm.) (Figure 10).

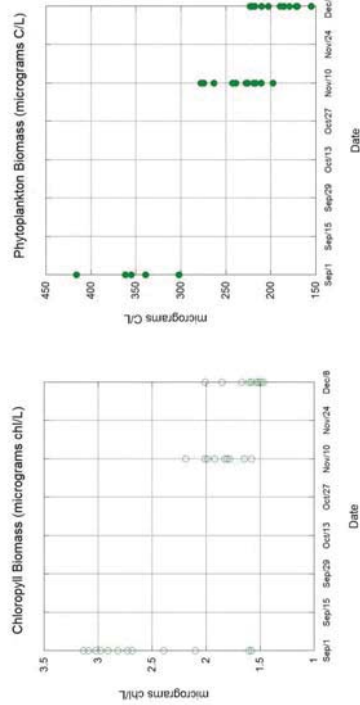


Figure 10. Chlorophyll concentrations (left) and total phytoplankton biomass (right) during the three sampling periods to date, each circle represents a different station. Sep/1 represents sampling on August 31.

Calculated C:Chl ratios, a commonly reported ecological parameter, ranged from 84 to 198 over the three sampling periods, well within realistic ranges. Kaneohe Bay, for example, has comparable chlorophyll concentrations and is reported to have C:Chl ratios in the range of 125-150, with a minimum of 70 (Taguchi and Laws, 1989). Based on the supposition that our biomass estimates are reasonable, we can then breakdown the relative and absolute contribution of component groups to total biomass.

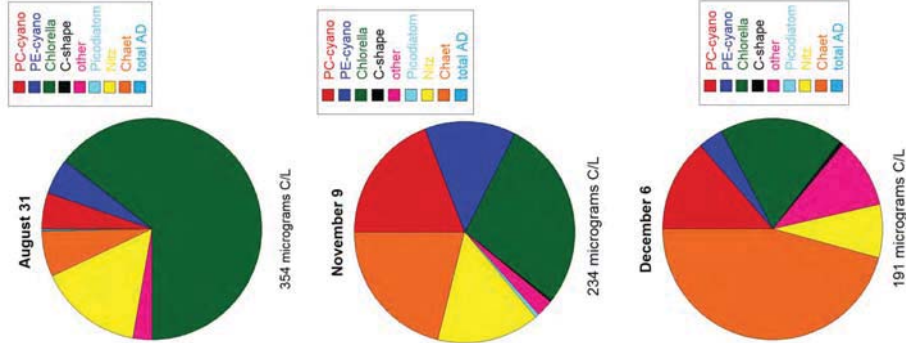


Figure 11. Relative biomass estimates for component groups of the photosynthetic community. Biomass is averaged for all stations at a given time point. The total average photosynthetic biomass for the lagoon is reported under each graph.

The *Chlorella*-like population clearly dominated the biomass in the initial survey on August 31st, 2013 (Figure 11). The dominance of *Chlorella*, a green alga, is consistent with the pea green color reported for the water, and reduced visibility. In November, the biomass was more evenly distributed between the different groups, with an increase in the contribution of the cyanobacteria representing a downward shift in the size structure of the community. Also evident was the increasing contribution of the diatoms *Nitzschia* and *Chaetoceros*. By December, nearly 50% of the biomass was attributed to the diatom *Chaetoceros* spp. The increase in not only the relative importance of diatoms, but also the total diatom biomass, is consistent with a concurrent drawdown in dissolved Si concentrations between August and December (S. Dollar, pers. comm.).

In looking at the absolute numbers (Figure 12), the importance of the *Chlorella*-like population to the total biomass is again obvious. Compared to November and December, the additional biomass of *Chlorella* in August essentially doubled the photosynthetic biomass in the lagoon, clearly accounting for the parallel increase seen in chlorophyll (Figure 10). However, we have yet to determine the cause of this bloom in phytoplankton, or the ecological effect on the lagoon biology, whether in terms of sedimentation to the benthic community (note the appearance of polychaete worms) or incorporation and propagation up the pelagic food chain.

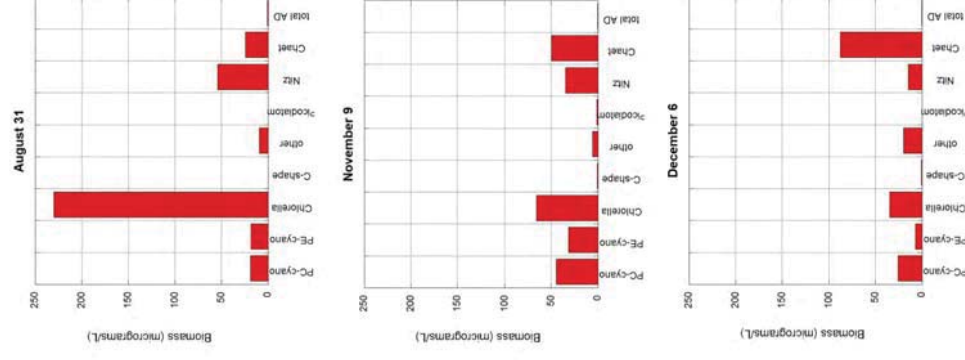


Figure 12. Biomass (micrograms of carbon per L) of component groups of the phytoplankton community.

SECTION 2: IRRADIANCE PROFILES

Background

Measuring irradiance, or light, in the Lagoon water column will allow us to compare changes in the diffuse attenuation coefficient, or K_d , over time due to increases or decreases in phytoplankton, and determine changes in the quantity of light available for *Chara* growth and the percent of subsurface irradiance (%SSI) at specific depths. The K_d is like a measure of water clarity, and is shown as a negative value per meter. This value is derived from an equation based on Beer's Law, and can be used to extrapolate light levels at specific depths in the water (see Kirk 1997 for more information). The %SSI is derived from the irradiance just below the water surface, and is used to determine the lower depth limits of macrophytes. For instance, the lower depth limits of large brown algae (or kelps) occur where the irradiance is 0.7 – 1.4% of that penetrating the surface (Kirk 1997).

Another measurement of water clarity is the Secchi depth, which is measured as the distance from the water surface when a round white disc (Secchi disc) is no longer visible in the water column. Both the Secchi depth and profiles of irradiance in the water column were measured for comparisons of water clarity and %SSI at the 12 Water Quality stations (Figure 1). Temporal comparisons were made with irradiance sampling done at the 12 WQ stations in November 2013.

Methods

Irradiance profiles were measured mid-day at 1 m depth increments from just below the water surface to the Lagoon bottom (or top of the *Chara* canopy, as determined when the profiling line became slack). Measurements were only taken when weather conditions were consistently clear and sunny. Profiles were conducted on the sunny side of the boat to minimize the effect of boat shadow. A Li-COR Li-1400 datalogger coupled with a Li-COR underwater spherical quantum sensor mounted on a profiling frame with a 10 m Li-COR underwater cable were used to measure irradiance. Depth was measured with a line marked at 1 m increments. A spherical sensor was used instead of a cosine sensor because the spherical sensor more accurately measures light in a manner consistent with how *Chara* absorbs light at depth (from approximately 360° versus 180°). The Secchi depth was also recorded at each site to compare with the diffuse attenuation coefficient.

Results – Spatial Variability

In December, the average (\pm SE) irradiance at all 12 WQ stations was 295 (\pm 15) $\mu E\ m^{-2}\ s^{-1}$ with an average (\pm SE) diffuse attenuation of -0.35 (0.01) m^{-1} (Table 8). The average visibility, as measured with Secchi depth, was nearly 2.5 m. The East and Center Lagoon regions were most similar in terms of light penetration, with only slightly lower attenuation coefficients and higher % SSI and irradiance at 6 m depth (Table 9) than the Western region. These differences were small, however, and were likely not significant, suggesting that the light environment was similar throughout the Lagoon in December (Table 9; See Appendices C and D for complete irradiance datasets at all stations in December).

Table 8. Summary of data from irradiance ($\mu E\ m^{-2}\ s^{-1}$) profiles at 12 WQ sites during November and December 2013. Irradiance and % subsurface irradiance (% SSI) from 6 m depth. K_d is the diffuse attenuation coefficient. Secchi is the Secchi depth.

	November				December			
	Avg	SE	Min	Max	Avg	SE	Min	Max
Irradiance	180	10	115	245	295	15	197	355
$K_d\ (m^{-1})$	-0.48	0.01	-0.55	-0.42	-0.35	0.01	-0.41	-0.32
% SSI	7.2%	0.4%	4.7%	10.2%	14.3%	0.6%	10.9%	16.9%
Secchi (cm)	170	2	159	184	263	8	208	292

Table 9. Summary of irradiance ($\mu E\ m^{-2}\ s^{-1}$) data in West, Center, and East Lagoon regions in Nov. and Dec. 2013. See Table 8 for definitions of K_d and % SSI. Irradiance and %SSI from 6 m depth.

	November						December					
	Irradiance		K_d (m ⁻¹)		% SSI		Irradiance		K_d (m ⁻¹)		% SSI	
	Avg	SE	Avg	SE	Avg	SE	Avg	SE	Avg	SE	Avg	SE
West	172	3	-0.47	0.01	7.6%	0.7%	258	28	-0.37	0.02	12.9%	1.1%
Center	178	6	-0.47	0.01	7.9%	0.3%	315	20	-0.34	0.02	14.6%	0.6%
East	166	2	-0.50	0.02	6.6%	0.7%	325	3	-0.33	0.002	15.5%	0.2%

Results – Temporal Variability

The largest variation in irradiance data occurred temporally. Water clarity and light penetration in the Lagoon changed dramatically between Nov. and Dec. 2013; the water was clearer with increased light penetration in Dec., as shown with lower attenuation coefficients, increased Secchi depths, and greater % SSI at 6 m depths at all 12 stations sampled (Table 8). Differences in light parameters (irradiance, K_d , and %SSI) between the Western, Center, and East regions in both months were minor, suggesting the Lagoon is well-mixed, but varied greatly between the two months sampled. These temporal differences in the light environment were consistent with increased densities of PC- and PE-rich cyanobacteria, *Nitzschia* sp., and heterotrophic dinoflagellates in November (Table 7).

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APPENDICES

Appendix A. Plankton Methods

Four subsamples per station were preserved: 1) with paraformaldehyde for epifluorescent microscopy on 0.8 µm pore size filters 2) paraformaldehyde for inverted microscopy of settled cells, 3) an alkaline Lugol's/formalin/sodium thiosulfate solution sequence for epifluorescent microscopy of larger cells on 8.0 µm pore size filters, and 4) acid Lugol's solution for inverted microscopy of cells in gravity settling chambers. An additional 2 x 2-ml per station was preserved with paraformaldehyde, flash frozen and stored at -80 C for subsequent flow cytometric analysis.

Populations of heterotrophic and photosynthetic bacteria were analyzed by flow cytometry according to the Hoechst staining method of Monger and Landry (1993). Populations were analyzed with a Beckman-Coulter Altra flow cytometer equipped with two argon ion lasers (1 W of 488 nm and 200 mW of UV excitation). Population designations, based on the scatter and fluorescence signals, were derived from listmode files using FlowJo software (Tree Star, Inc., www.flowjo.com).

Phytoplankton samples were analyzed several different ways to accommodate the orders of magnitude difference in scale of both cell size and abundances. Paraformaldehyde samples were stained with proflavin and DAPI and filtered onto a 0.8 µm black filter for epifluorescent microscopy; alkaline Lugol's samples were stained with proflavin and DAPI and filtered onto an 8.0 µm black filter for epifluorescent microscopy. Several different volumes of each preservation treatment were filtered for each station to capture enough cells of a given type for quantitative analysis. Acid Lugols and formalin samples were settled in Utermöhl sedimentation chambers for analysis with both light and epifluorescent microscopy.

Slides and chambers were observed with an Olympus IX71 inverted microscope with 200X, 400X, and 1000X magnification as needed. For some target populations, the entire filter or chamber was counted, for more abundant targets, random fields were counted and digitized. Digital images were acquired with an attached MacroFire camera for digitally enhanced image analysis. Cells were manually counted and identified.

At the time of sampling, 28 liters of surface seawater at each station were strained through a 93 µm mesh filter funnel. The plankton retained on the 93 µm mesh was then rinsed with sterile filtered lagoon water into 50 ml plastic centrifuge tubes. On shore, samples were immediately preserved with buffered formaldehyde for subsequent microscopical analysis. All zooplankton from a given sample were settled via gravity, imaged, identified and measured with Olympus IX71 inverted light microscope.

Carbon conversion factors were applied to cell numbers and/or biovolumes to estimate the contribution of component taxonomic groups to total biomass. Biovolumes (BV) were calculated assuming appropriate geometric shapes and the average length and width. Conversion factors were chosen from the published literature that best represented comparable sizes and environmental conditions.

Group	Conversion factor	Reference	Notes on BioVolume
PC-cyano	153 fg C per cell	Verity et al., 1992	
PE-cyano	301 fg C per cell	Grob et al., 2007; Liu et al., 1999	diameter = 1.27 µm
HBacteria	30 fg C per cell	Fukada et al., 1998	
Chlorella-like	logC=0.94logBV-0.60	Strathmann, 1967; Eppley et al., 1970	BV = 22.4 µm ³
C-shaped	logC=0.94logBV-0.60	Strathmann, 1967; Eppley et al., 1970	BV = 1.6 µm ³
Other unidentified	logC=0.94logBV-0.60	Strathmann, 1967; Eppley et al., 1970	BV = 4.2 µm ³
Picodiatom	logC=0.76logBV-0.29	Strathmann, 1967; Eppley et al., 1970	BV = 2.4 µm ³
Nitzschia spp.	logC=0.76logBV-0.29	Strathmann, 1967; Eppley et al., 1970	BV = 58.9 µm ³
Chaetoceros spp.	logC=0.76logBV-0.29	Strathmann, 1967; Eppley et al., 1970	BV = 125 µm ³
A dinoflagellates	logC=0.94logBV-0.60	Strathmann, 1967; Eppley et al., 1970	BV = 66.9 µm ³
H Flagellates	logC=0.94logBV-0.60	Strathmann, 1967; Eppley et al., 1970	BV = 4.2 µm ³
Hdinoflagellates	logC=0.94logBV-0.60	Strathmann, 1967; Eppley et al., 1970	BV = 66.9 µm ³

In the initial survey, most of the non-bacterial phytoplankton were *Chlorella*-like, thus 80% of the abundance was assumed to be *Chlorella* for the purposes of biomass calculations.

Appendix B. Biomass data

Date	STA	PC-cyano	PE-cyano	Chlorella	C-shaped	other unid	Pico diatom	Nitzschia	Chaetoceros	Adinos	Phyto carbon
8/31/2013	1	15.1	9.5	197.6		8.2		55.5	16.2	0.8	302.1
8/31/2013	2	14.8	10.3	240.5		9.9		59.0	20.5	0.3	355.0
8/31/2013	3	19.6	21.2	209.0		8.6		53.5	27.0	0.4	339.0
8/31/2013	6(4)	17.9	27.5	277.6		11.5		45.8	35.8	1.1	416.0
8/31/2013	9(5)	25.7	23.7	224.6		9.3		56.8	21.6	0.8	361.6
11/9/2013	1	45.0	34.1	60.3	0.6	5.7	2.6	36.6	40.5	0.1	225.5
11/9/2013	2	45.3	34.3	72.9	0.3	7.3	0.8	43.3	73.5	0.1	277.6
11/9/2013	3	45.8	33.4	59.0	0.9	8.6	1.3	41.5	51.9	0.2	242.3
11/9/2013	4	45.2	33.8	60.3	0.8	9.6	1.8	39.3	83.2	0.1	274.2
11/9/2013	5	43.5	31.6	55.3	0.8	4.7	1.8	28.1	44.8	0.2	210.7
11/9/2013	6	45.0	29.9	66.6	0.8	5.4	0.8	34.6	35.6	0.2	218.8
11/9/2013	7	46.1	29.0	76.6	1.5	3.4	1.3	29.5	40.1	0.2	227.5
11/9/2013	8	44.7	30.3	90.4	1.0	3.4	1.3	43.4	48.6	0.2	263.1
11/9/2013	9	44.7	31.2	74.1	0.4	6.5	1.3	25.4	55.0	0.2	238.6
11/9/2013	10	45.0	31.1	56.5	0.8	5.4	1.1	31.3	45.3	0.3	216.5
11/9/2013	11	43.3	28.4	57.8	0.4	5.7	0.8	33.1	49.4	0.2	218.9
11/9/2013	12	43.0	29.3	60.3	1.1	4.7	1.6	30.5	27.0	0.2	197.5
12/6/2013	1	25.4	7.4	33.9	0.9	21.8		21.4	59.5	0.1	170.2
12/6/2013	2	26.1	7.8	38.9	1.1	17.4		18.3	75.7	0.0	185.3
12/6/2013	3	26.8	7.7	40.2	1.0	19.1		16.2	98.9	0.1	209.8
12/6/2013	4	25.9	7.2	22.6	0.8	18.4		12.2	91.9	0.0	179.1
12/6/2013	5	25.1	7.3	35.2	0.8	23.3		21.4	104.3	0.1	217.3
12/6/2013	6	25.8	6.6	50.3	0.7	21.2		15.3	100.9	0.1	220.7
12/6/2013	7	26.1	7.0	25.1	1.0	17.4		11.2	66.6	0.0	154.5
12/6/2013	8	25.9	6.4	41.5	1.5	22.7		13.2	111.7	0.0	222.9
12/6/2013	9	25.8	6.6	36.4	0.9	21.9		12.2	66.6	0.0	170.4
12/6/2013	10	26.2	6.9	28.9	0.8	16.7		14.2	95.5	0.1	189.2
12/6/2013	11	25.8	6.9	27.6	1.0	18.6		14.2	77.5	0.0	171.6
12/6/2013	12	25.4	6.3	38.9	0.9	19.5		7.1	104.5	0.2	202.6

Spalding and Brown, Dec 2013 data, p. 27

Date	Station	HBacteria	H Flag	Hdinos	Hetero carbon
8/31/2013	1.0		29.6	3.4	
8/31/2013	2.0		20.8	2.0	
8/31/2013	3.0		23.3	1.9	
8/31/2013	6(4)		27.0	1.9	
8/31/2013	9(5)		17.2	2.9	
11/9/2013	1.0	47.4	9.9	0.6	57.8
11/9/2013	2.0	45.0	11.4	0.6	57.0
11/9/2013	3.0	47.7	12.5	0.7	60.9
11/9/2013	4.0	46.1	11.7	0.9	58.7
11/9/2013	5.0	47.4	7.3	1.2	55.9
11/9/2013	6.0	45.8	11.9	0.7	58.5
11/9/2013	7.0	49.2	4.9	1.1	55.2
11/9/2013	8.0	48.1	10.1	0.9	59.1
11/9/2013	9.0	47.5	7.3	0.9	55.6
11/9/2013	10.0	48.0	7.8	1.0	56.8
11/9/2013	11.0	44.7	10.1	1.0	55.8
11/9/2013	12.0	44.9	9.1	1.0	55.0
12/6/2013	1.0	45.3	11.2	0.4	56.9
12/6/2013	2.0	45.2	11.4	0.3	56.9
12/6/2013	3.0	44.6	10.8	0.2	55.7
12/6/2013	4.0	42.9	8.0	0.2	51.1
12/6/2013	5.0	44.6	9.8	0.4	54.7
12/6/2013	6.0	46.5	8.3	0.2	55.0
12/6/2013	7.0	47.0	8.0	0.3	55.3
12/6/2013	8.0	45.7	11.3	0.2	57.2
12/6/2013	9.0	47.5	11.1	0.3	58.8
12/6/2013	10.0	45.7	8.8	0.3	54.8
12/6/2013	11.0	45.0	10.4	0.3	55.7
12/6/2013	12.0	46.6	7.3	0.2	54.1

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Appendix C. Irradiance Data: Data from light, or irradiance ($\mu\text{E m}^{-2} \text{s}^{-1}$), profiles and the resulting diffuse attenuation coefficients (K_d) at the 12 Water Quality (WQ) sites. Time = time of day of the profile measurement. Region = Western, Center, or East Lagoon regions. Site = the WQ station. R^2 = the coefficient of determination. Secchi = the Secchi depth. “*” = irradiance extrapolated from exponential equation because of shallower depth at this site.

Time	10:40	10:55	11:05	11:15	11:21	11:29	11:40	11:50	11:59	12:07	12:18	12:30
Region	West	West	West	West	West	Center	Center	East	East	East	East	East
Site	1	2	3	4	5	6	7	8	9	10	11	12
Depth (m)												
0.01	1800	1900	2000	2100	2100	2100	2200	2100	2200	2000	2100	2100
1	1500	1600	1600	1600	1700	1700	1650	1600	1700	1600	1600	1650
2	1000	1100	1150	1150	1250	1250	1250	1270	1300	1300	1300	1200
3	655	710	740	805	865	860	885	870	900	900	900	900
4	435	475	495	555	615	605	632	630	645	644	640	620
5	300	317	355	370	460	415	463	450	460	430	440	440
6	197*	210*	264	263*	355	295*	335	329	332*	323*	328*	315
K_d	-0.405	-0.408	-0.37	-0.366	-0.319	-0.355	-0.323	-0.324	-0.332	-0.333	-0.329	-0.333
R^2	0.9997	0.9998	0.9961	0.9992	0.9969	0.9994	0.9994	0.9975	0.9989	0.9942	0.9952	0.9989
Secchi (cm)	232	208	240	255	269	279	275	280	290	292	250	287

Appendix D. %SSI data: The % of subsurface irradiance (%SSI) based on irradiance at 0.01 m (Appendix B).

Region	West	West	West	West	West	Center	Center	East	East	East	East	East
Site	1	2	3	4	5	6	7	8	9	10	11	12
Depth (m)												
1	83%	84%	80%	76%	81%	81%	75%	76%	77%	80%	76%	79%
2	56%	61%	64%	64%	69%	69%	69%	71%	72%	72%	72%	57%
3	36%	39%	41%	45%	48%	48%	49%	48%	50%	50%	50%	43%
4	24%	26%	28%	31%	34%	34%	35%	35%	36%	36%	36%	30%
5	17%	18%	20%	21%	26%	23%	26%	25%	26%	24%	24%	21%
6	11%	11%	13%	13%	17%	14%	15%	16%	15%	16%	16%	15%

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Appendix E. Estimated costs for future plankton analyses. Detailed information on each cost estimate available upon request.

Scenario 1: \$10,572/monthly sampling (similar to Dec. 2013 sampling)

- 12 stations for bacteria
- 12 stations for phytoplankton
- 6 stations for zooplankton

Scenario 2: \$6,756/monthly sampling

- 6 stations for bacteria (via flow cytometry)
- 6 stations for phytoplankton
- 6 stations for zooplankton

Scenario 3: \$7,090/monthly sampling (Recommended based upon spatial and temporal trends in data)

- 12 stations for bacteria (via flow cytometry)
- 6 stations for phytoplankton (archive water from other 6)
- 6 stations for zooplankton

APPENDIX I. GROWTH OF *CHARA*, AND INVENTORY OF FLORA, FAUNA, AND PHYTOPLANKTON IN HOAKALEI LAGOON



REPORT #1:

GROWTH OF CHARA AND INVENTORY OF FLORA, FAUNA, AND PHYTOPLANKTON IN HOAKALEI LAGOON

September 30, 2013

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Cover Photos: Fieldwork in Hoakalei Lagoon showing Chara biomass from a clearing in a 0.25 m² quadrat, a color-corrected image of a diver conducting a SCUBA survey in the East Lagoon, a snorkeling site in the West Lagoon (Collection Site 1), and light profiling equipment in the East Lagoon.

PROJECT OVERVIEW

Hoakalei Lagoon (Lagoon) is a 54-acre excavated basin on the HASEKO property in Ewa, Hawaii. Originally designed as a marina with a connection to the open ocean, it was subsequently restructured as an enclosed lagoon that requires revised maintenance and a management strategy. This report was solicited to monitor some of the biological organisms within the Lagoon, and subsequently aid in an Environmental Impact Statement (EIS) including this information. The proposed work involves three primary tasks overseen by H. Spalding: 1) fieldwork in the Lagoon, 2) creation of a report to be included in the EIS statement, and 3) availability for consultation regarding Lagoon biology in response to the EIS. Fieldwork entails re-surveys of flora and fauna in the Lagoon, collections of phytoplankton samples, a determination of a method to measure *Chara* growth, and measurements of light in the water column to calculate diffuse attenuation (a measurement of water clarity) and determine the amount of light at depth. Phytoplankton samples will be analyzed for species composition and relative abundance. Tasks 1) and 2) and recommendations for further research are included in this report, with the timeline for Task 3) to be determined.

Summary

1. Overall, the composition of the flora and fauna is similar between Foster and Smith (2012) and this study. Additional species found in this study were the result of additional effort in examining species caught in the *Chara* canopy and underlying surface sediments.
2. *Ruppia maritima* may be increasing in the Lagoon. A patchy seagrass bed of *R. maritima* occurs along the 6-7 foot depth Lagoon embankment.
3. The size and abundance of Hawaiian Gold Tilapia may be increasing, though it is difficult to assess this without a quantitative assessment of the population size.
4. The most abundant phytoplankton were PE-rich picocyanobacteria, PC-rich picocyanobacteria, autotrophic eukaryotes, *Nitzschia* sp., and *Chaetoceros* sp. These are common species in marine and brackish environments.
5. Phytoplankton densities ranged from 188,917 to 312,794 ml⁻¹, while protozoan grazers ranged from 18,040 to 30,914 ml⁻¹.
6. There appeared to be a two-fold increase in the abundance of small phytoplankton cells (photosynthetic picocyanobacteria) across the Lagoon from the western to eastern portions, whereas the abundance and distribution of the larger phytoplankton cells remained fairly constant.
7. Measurements of the apical growth of *Chara* can be accomplished in the field. A conservative estimate of growth is 2.0% ±0.6% in wet weight per day. Seasonal and spatial studies with higher replication are needed to accurately estimate *Chara* growth.
8. The wet weight of *Chara* from 5 cleared quadrats in the East Lagoon was 3.6 lbs of wet weight per m² per foot height of canopy.

9. Continued monitoring of cleared quadrats is needed to determine the amount of time for *Chara* regrowth.
10. *Chara* covered 28% of the substrate in a 50 m long survey in the East Lagoon. Average sediment depth was 2.9 ± 0.1 SE ft. *Chara* canopy height averaged 1.1 ± 0.3 SE ft from this survey.
11. Average light attenuation in the Center and East Lagoon was -0.38 m^{-1} , and was similar between sites. Irradiance at 6 m depth ranged from 130 to $145 \mu\text{E m}^{-2} \text{ s}^{-1}$.
12. *Chara* has been found to induce a clear water state when in high abundance in other freshwater and brackish systems. Further removals of *Chara* from the Lagoon are not recommended at this time.

RESULTS AND DISCUSSION

This is the first report by Spalding et al. on the fieldwork completed in the Lagoon from July – Sept 2013. Additional background on the Lagoon and past research can be found in Foster and Smith (2012) and Atkinson and Dollar (2013).

Flora and Fauna

The flora and fauna of the Lagoon was initially surveyed by Foster and Smith (2012) during January and March 2012. The objective of this report was to review and update Drs. Foster & Smith's qualitative report, and resurvey the same sites. On July 20, 2013, Collection site 1 (21° 18' 29.38" N, 158° 02' 20.52" W) and Collection site 2 (21° 18' 20.77" N 158° 02'05.46" W), (Figure 1) were qualitatively surveyed by wading in shallow water and snorkeling to 6 m depth. Collections and a visual survey from the shoreline and were made along the eastern shore of the Lagoon on 27 July 2013 (Figure 1) to determine the distribution of the seagrass *Ruppia maritima* on the ~6-7 ft depth embankment. Additional observations and collections were made during a 50 m transect SCUBA survey on 7 Sept 2013 (see section *Chara* survey for location), and from SCUBA dives and clearings at the *Chara* growth site (Figure 1) on 31 August 2013 in the East Lagoon. SCUBA surveys in the West Lagoon were not completed due to technical difficulties with the boat and engine.

Similar to the findings of Foster and Smith (2012), there were very few macroscopic organisms observed in the Lagoon at the sites surveyed (Table 1). The green alga *Chara zeylanica* was still the dominant, habitat-forming organism, forming dense beds with canopy heights up to 3 ft. The distribution of *Chara* was patchy in the East Lagoon, with many bare, sediment-dominated areas. There was a slight floral zonation from shallow to deep water. The filamentous alga *Cladophora* sp. covered the shallow rocks and slopes of the Lagoon down to ~1 foot in depth (Figure 2). The seagrass *Ruppia maritima* grew in crevices and grooves along the sides of the Lagoon, and then formed a patchy seagrass bed along the 6-7 ft depth embankment plateau. As the Lagoon steeply dropped off into the 15-20 ft depth range, the *Ruppia* became sparse, and was replaced by dense beds of *Chara* (Figure 2) or bare sediment. Sparse pieces of *Ruppia* were also found drifting at the Lagoon surface (Figure 2) and entangled in the *Chara* canopy. At Collection Site 1, a fine, slimy cyanobacteria (unidentified, Figure 2) was entangled in the surface of the *Chara* canopy from ~3-6 ft. depth, but was not observed at other sites.

Table 1. A comparison of common flora and fauna encountered from a previous study (Foster and Smith 2012) and this study, with the species' current listing as nonindigenous (introduced) or native species in Hawaii. v? = the species is likely a native species, but this has not been verified. * = not verified by an expert.

Scientific Name	Description	Common Names	Previous Study	This Study	Non-indig.	Native
Plants and Algae						
<i>Chara zeylanica</i>	Green alga	Stonewort, Muskwort, Muskgrass	X	X		v
<i>Ruppia maritima</i>	Seagrass	Ditchgrass, Widgeongrass	X	X		v
<i>Cladophora</i> sp.	Green alga	none	X	X		v?
Cyanobacteria	Blue-green algae	none		X		v?
Macroinvertebrates						
<i>Melanoides tuberculata</i>	Snail	Malaysian Trumpet Snail	X	X		v
<i>Tarebia granifera</i>	Snail	Malaysian Trumpet Snail	X	X		v
<i>Pyrgophorus coronatus</i>	Shrimp	none		X		v
<i>Palaemon debilis</i>	Shrimp	Glass Shrimp, Fragile Shrimp	X	X		v
<i>Odanota</i> sp. 1*	Dragonfly larvae	Dragonfly		X		v?
<i>Odanota</i> sp. 2*	Dragonfly larvae	Dragonfly		X		v?
Fish						
<i>Oreochromis mossambicus</i>	Cichlid fish	Hawaiian Gold Tilapia	X	X		v
Birds						
<i>Fulica alai</i> *	Coot	Hawaiian Coot	X	X		v
<i>Anas wyvilliana</i> *	Duck	Hawaiian Duck	X	X		v
<i>Nycticorax nycticorax</i> *	Heron	Black-crowned Night Heron	X	X		v
<i>Himantopus mexicanus</i> *	Silt	Hawaiian Black-Necked Stilt	X	X		v

Six macroinvertebrates were found, of which three were described by Foster and Smith (2012) (Table 1, Figure 3). The two invasive Malaysian Trumpet Snails and native Glass Shrimp (Table 1, Figure 3) continued to be abundant. The other abundant macroinvertebrate not reported by Foster and Smith (2012) was the small snail *Pyrgophorus coronatus* (Figure 3). This species was found primarily in the sediment surface underneath the *Chara*, and was first encountered in the *Chara* biomass removed in the *Chara* clearings. *P. coronatus* is a nonindigenous, invasive species first collected in Hawaii at Pearl Harbor in 1988, and prefers a silty mud environment with salinities ranging from 1‰ to 9‰ (Cowie 1999). Two species of dragonfly larvae were also found entangled in the *Chara*, though in low abundance. These species are likely invasive dragonflies, as native species tend to occur at higher elevations (<http://www.birdinghawaii.co.uk/nonavianair2.htm#DRAGONFLIES>, accessed 20 Sept 2013). Mature dragonflies (unidentified) were often observed at the Lagoon.

The only fish observed was the highly invasive Hawaiian Gold Tilapia (Table 1, Figure 3). Tilapia individuals were caught from the small pier at Collection Site 1 (Figure 1). A small hook baited with live earthworms and weighted with a split shot was cast into the deeper section of the Lagoon, allowed to sink to the bottom, and then slowly retrieved. Captured fish ranged in size from 9.6 – 13.7 cm. Approximately 30 – 40 smaller Tilapia were observed in the vicinity of the pier, but were not collected.

These numbers appear to be greater than was previously observed (M. Foster, personal communication), but population size is difficult to assess without a quantitative estimate, and visual estimates *in situ* are difficult given the limited visibility of the Lagoon.

The same constituent of birds was observed in the Lagoon, with the Coots continuing to be most numerous (Table 1, Figure 3). Coots were observed wading at the water's edge at the small boat ramp (Figure 3) and foraging along the edge of the Lagoon.

Phytoplankton

A preliminary water sample was taken on July 27th, 2013 for phytoplankton analyses. An initial microscopic assessment of the microplankton (cells 20-200 µm in length), concentrated from a towed net, indicated there was sufficient biomass to warrant further investigation of the phytoplankton community. Specifically, commonly occurring siliceous needle-like diatoms and ornate chain-forming diatoms were readily apparent.

Samples for quantitative analysis were collected on August 31, 2013. Water chemistry data (Atkinson and Dollar, 2013) indicated a high degree of vertical mixing in the Lagoon, thus sampling at the surface was assumed to represent the water column. Five sites were chosen, spanning from the northwestern region influenced by groundwater input to the East Lagoon site of *Chara* growth studies (Figure 4). Easterly tradewinds (~10-15 knots) were present and stations were placed in a direction consistent with wind patterns.

Whole water samples for phytoplankton enumeration were collected in 2L dark bottles from the surface waters of each station. For archive, concentrated plankton samples were collected in a towed 20 µm mesh net held streaming at the surface by drift from the wind force. Samples were immediately taken to the laboratory and preserved for subsequent analyses. Four subsamples per station were preserved: two with paraformaldehyde for epifluorescent microscopy on filters (0.8 µm pore size) and inverted microscopy of settled cells, one with an alkaline Lugols/formalin/sodium thiosulfate solution sequence for epifluorescent microscopy of larger cells on filters (8.0 µm pore size), and one with acid Lugols solution for inverted microscopy of cells in gravity settling chambers. Plankton tows were treated with buffered formalin and stored in the dark for archival purposes.

Due to the size structure of the plankton community, including the very smallest phytoplankton to the prevalence of large diatoms; each major group had to be evaluated with a different method. The photosynthetic bacterial population of phycoerythrin-rich cells passed through the 0.8 µm filter and went undetected at first. These cells were not detected in settled samples using standard filter sets for epifluorescent microscopy, but were only visible in settled samples with a filter set specific for the phycoerythrin pigment. The ornate, spiny *Chaetoceros* cells (Figure 5) did not sink well enough in the gravity settling chambers and broke apart upon filtration; an additional volume of sample had to be gently filtered to capture the structure and abundance of these cells.

Table 2. Phytoplankton and protozoan cell abundance (ml⁻¹).

Phytoplankton	Sta 1	Sta 2	Sta 3	Sta 4	Sta 5
PE-rich picocyanobacteria ¹	31,542	34,259	70,435	91,274	78,771
PC-rich picocyanobacteria ²	98,772	96,776	128,368	117,115	167,857
Autotrophic eukaryotes ³	52,811	64,267	55,848	74,186	60,016
<i>Nitzschia</i> sp. ⁴	4,889	5,194	4,716	4,030	5,001
<i>Chaetoceros</i> sp. ⁵	806	1,021	1,343	1,780	1,075
Autotrophic dinos ⁶	61	24	31	81	65
Filamentous PC cyanobacteria	20	9	9	8	4
Filamentous PE cyanobacteria	< 1	< 1	< 1	17	< 1
cf. <i>Cyclotella</i> sp.	10	6	4	6	3
<i>Navicula</i> sp.	5	< 1	1	< 1	< 1
Total	188,917	201,558	260,756	288,498	312,794
Protozoan grazers	Sta 1	Sta 2	Sta 3	Sta 4	Sta 5
Heterotrophic flagellates ^a	30,641	21,568	24,173	27,924	17,817
Heterotrophic dinoflagellates ^b	260	155	148	146	222
Ciliates ^c	13	3	< 1	< 1	< 1
Total	30,914	21,726	24,322	28,071	18,040

¹Single celled cyanobacteria with phycoerythrin as the primary pigment. Individual cells are approximately 1.2 µm in diameter.

²Single celled cyanobacteria with phycoerythrin as the primary pigment and lacking phycoerythrin. Cells are less than 1µm in diameter.

³Autotrophic eukaryotes include all microalgae less than 8 µm. The majority of autotrophic eukaryotes were spherical, non-motile (lacking flagella) cells with an average diameter of 3.7 µm and a morphology consistent with *Chlorella* species. The "*Chlorella*" morphology can be expressed in species belonging to three classes of Chlorophyta (Chlorophyceae, Trebouxiophyceae, Ulvophyceae) but the ecology here is consistent with *Chlorella* sp.

⁴Appears to be one *Nitzschia* species, 50 µm in length.

⁵Individual cells range from 8-12 µm in length and form chains. Curved spines are >60 µm in length, the width of the chain averages 120 µm.

⁶Photosynthetic dinoflagellates >8 µm in length; most are thecate.

^aFlagellated protozoan grazers <8 µm in length.

^bHeterotrophic dinoflagellate grazers >8 µm in length.

^cRepresents large ciliated protozoa >20 µm.

There appeared to be a two-fold increase in the abundance of photosynthetic picocyanobacteria ("pico" refers to cells less than 2 µm in length) across the Lagoon from the western to eastern portions, whereas the abundance and distribution of the larger cells remained fairly constant (Table 2; Figures 6, 7). These single-celled photosynthetic cyanobacteria are typically the numerical dominant in marine systems, although the small size does not always contribute significant biomass. In general, PE-rich cyanobacteria

are associated with marine systems and PC-rich cyanobacteria are associated with freshwater systems; the existence of both is consistent with the brackish nature of the lagoon. The abundance of picocyanobacteria in the Lagoon is generally in agreement with other tropical systems. The abundance of the pigment phycocyanin likely contributes to the greenish hue of the Lagoon waters. Given the small cell size and minimal chlorophyll per cell, such changes in picocyanobacterial populations are unlikely to impact total chlorophyll levels, but may indicate some variability in the phytoplankton across the Lagoon. More spatial coverage is necessary to resolve and/or confirm such variability.

The abundance of autotrophic eukaryotes was relatively constant across the Lagoon. This group includes flagellated and non-flagellated cells larger than photosynthetic bacteria, ranging in size from 2-8 microns. The dominant phytoplankton in this group was a spherical, non-motile species, resembling *Chlorella* in size and morphology. *Chlorella* is a green alga, the presence of which is consistent with the water color of the Lagoon. The abundance of autotrophic eukaryotes ranged from 5×10^4 to 7×10^4 cells ml^{-1} . These concentrations are on the high end of the range reported for similar lagoons.

At the other end of the size spectrum, diatoms belonging to the genera *Nitzschia* and *Chaetoceros* (Figure 5) were present in significant numbers (Table 2). These cells are two orders of magnitude greater in size than the picoplankton and despite lower numbers, can account for a substantial portion of the total phytoplankton biomass. Diatom cell walls are composed of silica, analogous to glass houses, and thus require dissolved Si in the water to flourish. *Nitzschia* is one of the most common genera of diatoms and is ubiquitous in marine and freshwater systems. Empty diatom frustules from dead *Nitzschia* species were also present in similar abundance, contributing to the particulate matter in the water and poor visibility. *Chaetoceros* is another common diatom when silica levels are sufficient, requiring more silica for incorporation into ornate spines and protrusions (Figure 5). Due to the size of the diatoms in this system, populations are unlikely to be grazed down or controlled by single-celled protozoan grazers that typically feed on phytoplankton. The shape of these diatoms also makes handling and ingestion by larger crustacean zooplankton predators difficult. The standing stock of phytoplankton is a balance between growth and grazing. With high nutrient levels and unchecked grazing by zooplankton, these diatom populations may continue to accumulate biomass in the Lagoon and further impact water quality. In contrast, the picocyanobacteria and smaller phytoplankton cells are more susceptible to being feed on by protozoan grazers, and may be held relatively constant by grazing pressure.

Chara Growth

Water chemistry data suggest that *Chara* growth is the major process for the uptake of carbon, calcium, and nutrients from water entering the Hoakalei Lagoon (Atkinson and Dollar 2013). *Chara* growth in the Lagoon can be viewed from two different perspectives: growth of a *Chara* individual, and regrowth of the *Chara* population after removal, such as from a clearing. Thus, we conducted pilot studies to test both methods of growth.

Individual Chara growth

The goal of this pilot study was to assess the feasibility of measuring *Chara* apical growth *in situ* under low visibility conditions in a soft sediment environment. Apical growth of the individual was evaluated by isolating a long fragment of *Chara*, carefully measuring the initial length and wet weight in the laboratory, returning the fragment to the same Lagoon environment, and retrieving the fragment after a set period of time to measure any possible changes in growth (Figure 8). Given the difficulty of locating an individual in the water (with limited visibility), individual pieces were enclosed within a PVC frame with a transparent mesh. Five individuals were haphazardly selected from the *Chara* canopy, weighed and measured, and deployed in cages on 27 July 2013 at the *Chara* growth site. Individuals were retrieved 42 days later on 7 Sept 2013, and reweighed and measured in the laboratory (Figure 8). Upon retrieval of the cages, it was noted that 3 of the 5 cages contained Glass Shrimp. Large clumps of sediment were also evident within the cages (Figure 8, red arrow), although only one sample (Plant #2) appeared to be entangled within the sediment. This sample was the only sample that decreased in size over the course of the experiment, and appeared unhealthy (yellowish) at day 42. Thus, it was excluded from growth estimates.

Over the course of the 42 days, average growth of the apical shoot from healthy plants ($n=4$) was $2.0\% \pm 0.6\%$ per day based on wet weight growth (Table 3). This growth rate should be viewed as a conservative estimate given the low replication size of this pilot study. Elongation, measured via length, was not able to be accurately measured at day 42 due to the tangled and delicate nature of the plants (Figure 8). Overall, this method was successful at estimating apical growth, but could be improved by: 1) Suspending the cages in the water column to decrease sedimentation within the cage, 2) Eliminating the interference of Glass Shrimp within the cage, 3) Increasing replicates to more accurately model natural variability ($n = \sim 10-20$), and 4) Conducting measurements seasonally (twice a year) and at different locations (East and West Lagoon) to reflect temporal and spatial differences in growth. Given the high growth rate described, the duration of the growth experiment could also be reduced to a shorter period of time, such as 2-3 weeks versus 6 weeks.

Table 3. Growth of individual *Chara* apical shoots in cages over 42 days. Measurements of length at Day 42 were not possible given the entangled and delicate nature of the plants.

Plant #	Day 0		Day 42		% growth over 42 days		% growth per day	Comments on Day 42
	Length (cm)	Wet Wt (g)	Length (cm)	Wet Wt (g)	Length (cm)	Wet Wt (g)		
1	2.5	0.581	0.7148	0.7148	23%	1%	1%	healthy
2	11.2	0.295	0.1005	0.1005	-	-	-	mostly dead
3	14.6	0.453	0.7968	0.7968	76%	2%	2%	healthy
4	16.1	0.523	0.9483	0.9483	81%	2%	2%	healthy
5	13.9	0.658	1.6323	1.6323	148%	4%	4%	healthy
			Average	82%	26%	2.0%	0.6%	
			SE (\pm)					

Chara clearings

Eight different areas in the East Lagoon were checked via snorkelling for a high abundance of continuous *Chara* bed. An area in the southeast corner of the East Lagoon (Figure 1, "Growth Site"; next to Site 9 from Atkinson and Dollar (2012)) had the most appropriate coverage for conducting the *Chara* clearing experiment. A ten meter line with markings every 2 m was permanently laid in the middle of the *Chara* bed, and marked with buoys and weights at the beginning and end of the line. The corner of a 0.25 m² PVC quadrat was placed at each 2 m marker on the line. *Chara* canopy height and sediment depth were measured in five haphazard areas within the each quadrat (Table 4). *Chara* biomass within the quadrat was then removed by cutting through the *Chara* around the inside perimeter of the quadrat with a large bread knife, rolling the *Chara* into a large "ball", and placing it inside a small mesh bag. Stakes with small sub-surface buoys were placed in the corner of each quadrat to track the location of each quadrat clearing (Figure 9). All visibility was lost over the course of clearing the *Chara*, so the clearing quadrats were visited one week later to examine the effectiveness of removal in each quadrat (Figure 9).

Table 4. Measurements of the density of organisms within 0.25 m² of cleared *Chara* canopy, *Chara* canopy height, and sediment depth within the quadrats. See Table 1 for genus species. Canopy heights and sediment depths are the average of 5 haphazard measurements within each quadrat, and shown in both metric and English units.

Quadrat	Snails	Glass Shrimp	Dragonfly Larvae	Chara Canopy Ht (cm)	Chara Canopy Ht (inches)	Sediment Depth (cm)	Sediment Depth (inches)
E1	92	0	0	30	11.8	130	51.2
E2	46	3	1	52	20.5	137	53.9
E3	83	0	1	64	25.0	78	30.6
E4	9	1	0	48	18.9	77	30.3
E5	13	4	0	42	16.5	49	19.3
Average	49	2	0.4	47	18.6	94	37.1
SE (±)	17	1	0.2	6	2.2	17	6.7

Table 5. Measurements of *Chara* wet weight and dry weight in 0.25 m² cleared quadrats. Measurements are converted to grams and pounds per m².

Quadrat	Chara Wet Weight			Chara Dry Weight			Ratio	
	g per 0.25 m ²	g per m ²	lbs per m ²	g per 0.25 m ²	g per m ²	lbs per m ²	Dry Wt: Wet Wt	% water
E1	325	1300	2.86	59	236	0.52	0.18	82
E2	767	3068	6.75	138	552	1.21	0.18	82
E3	771	3084	6.78	140	560	1.23	0.18	82
E4	556	2224	4.89	109	436	0.96	0.20	80
E5	641	2564	5.64	135	540	1.19	0.21	79
Average	612	2448	5.39	116	465	1.02	0.19	81
SE (+)	82	329	0.72	15	61	0.14	0.01	1

In the laboratory, the *Chara* from each quadrat was sorted to remove all organisms (Table 4), and then spun in a salad spinner for 1 minute to remove all water. Each sample was then weighed with a Taylor 3842BL digital scale for wet weight (g). The samples were then dried at 60°C until a constant weight was achieved, and re-weighed with the same scale for dry weight (g).

Continued monitoring of the clearings is needed to calculate the amount of time needed for *Chara* regrowth. The clearing method used, though, appears to be a successful technique. A larger quadrat size (such as 0.5 m²) should be used if the canopy height is greater than 50 cm. Otherwise, the surrounding canopy overshadows the clearing, making it difficult to assess regrowth and relocate the quadrat.

In comparison with *Chara* clearings by Atkinson and Dollar (2013), we found a similar % water composition for *Chara*. However, our estimate of wet weight biomass was less than half that measured by Atkinson and Dollar (2013). We found an average of 5.4 lbs of wet weight per m² for an average canopy height of 18.6 inches. This converts to ~3.6 lbs of wet weight per m² per foot height of canopy, in comparison to Atkinson and Dollar (2013)'s estimate of 10 lbs wet weight per meter squared per foot height of canopy. Additional measurements of *Chara* biomass from the East, West, and Center portions of the Lagoon are needed to elucidate differences in biomass estimates. Coupling biomass estimates with a clearing experiment to track regrowth in the clearings would be an effective strategy for quantifying both *Chara* biomass and growth at the same time.

Chara Surveys

While selecting a site for the *Chara* clearing experiment, we encountered a large amount of variability in the presence and abundance of *Chara* in the East Lagoon. Thus, a 50 m-long survey was conducted in the area surrounding the clearing experiment to determine if the selected area was typical for this portion of the Lagoon. On 7 Sept 2013, a 50 m transect tape was laid along the Lagoon bottom starting at the white buoy (site 9) adjacent to the clearing experiment and proceeded at a 120° heading towards the middle of the East Lagoon. The transect started at 21°18.372' N, 158°02.111' W, and ended at 21°18.387' N, 158°02.135' W. Sediment depth and *Chara* canopy height were measured every 1 m with a 140 cm long steel rod with 5 cm increments. Sediment depth was determined when the rod encountered solid substrate. The % cover of *Chara* was determined by multiplying the presence of *Chara* at every 1 m (for a maximum of 50 points along the 50 m transect) by 2, for a total of 100% cover.

Visibility along the transect was near zero over areas with only sediment, but often cleared to ~0.5 – 1 m in areas with *Chara* canopy. The sediment was very fine and calcareous, and was easily penetrated with the measuring rod. Sediment depth along the transect ranged from 20 to 140 cm, with an average of 88 ± 4 SE cm. *Chara* canopy ranged from 5 to 95 cm, with an average of 35 ± 8 cm. A few small patches of *Ruppia maritima* were observed, with some plants also intertwined in the *Chara* canopy, though the frequency of *Ruppia* was difficult to discern given the limited visibility. Overall, sediment depth and *Chara* canopy height from the survey were similar to that encountered at the clearing experiment site, suggesting this site is typical of the south-eastern portion of the Lagoon. The total % cover of *Chara* from the survey was 28%, with the highest cover from the first 10 meters of the transect nearest the

shore. The portion of the transect from 11 to 50 m towards the middle of the Lagoon had the lowest cover and canopy height, and was dominated by bare patches of sediment.

The *Chara* canopy height from this survey was greater than that reported by Atkinson and Dollar (2013). When converted to English units, we found *Chara* canopy height to be an average of ~1 ft, while Atkinson and Dollar estimated canopy height was ~ ½ ft in the East Lagoon. Additional surveys of *Chara* canopy height would elucidate whether the *Chara* canopy has increased in the East Lagoon, and/or whether the canopy height in the south-eastern Lagoon is not indicative of the sites surveyed by Atkinson and Dollar (2013). However, average sediment depth was similar (~ 1 ft) from both studies.

Light Conditions

Measuring irradiance, or light, in the Lagoon water column will allow us to compare changes in the diffuse attenuation coefficient, or K_d , over time due to increases or decreases in phytoplankton, and also determine changes in the quantity of light available for *Chara* growth. The K_d is like a measure of water clarity, and is shown as a negative value per meter. This value is derived from an equation based on Beer's Law, and can be used to extrapolate light levels at specific depths in the water (Kirk 1994).

Table 6. Irradiance ($\mu E m^{-2} s^{-1}$) profiles in the Lagoon on 7 Sept 2013. The site numbers refer to the sites established for water chemistry by S. Dollar. * = *Chara* canopy was encountered at this depth, so value was extrapolated from the equation for that site.

Depth (m)	Center Lagoon		East Lagoon	
	Site 6	Site 9	Between Sites 11 & 12	
0.01	1300	1300	1200	
1	1100	1000	1000	
2	690	750	650	
3	440	500	440	
4	310	330	300	
5	210	200	200	
6	145*	130	134	
Equation	$Y = 1436.7e^{-0.382x}$	$Y = 1480.7e^{-0.391x}$	$Y = 1339.7e^{-0.378x}$	
K_d	-0.38	-0.39	-0.38	
R^2	0.99	0.99	0.99	

On 7 Sept 2013, three irradiance profiles were measured mid-day in the Lagoon at 1 m depth increments from just below the water surface to the lagoon bottom (or top of the *Chara* canopy, as determined when the profiling line went slack). Weather conditions were consistently clear and sunny during profiles, and conducted on the sunny side of the boat to minimize the effect of boat shadow. A Li-COR Li-1400 datalogger coupled with a Li-COR underwater spherical quantum sensor mounted on a profiling frame with a 10 m Li-COR underwater cable were used to measure irradiance (see cover photo). Depth was measured with a line marked at 1 m increments. A spherical sensor was used instead of a cosine sensor because the spherical sensor more accurately measures light in a manner consistent with how *Chara* absorbs light at depth (from approximately 360° versus 180°). Three representative profiles (2 in the East Lagoon and 1 in the center of the Lagoon; Figure 1) were completed to determine

any spatial differences in K_d . Profiles in the West Lagoon were not completed due to limitations and technical difficulties with the provided boat and boat engine.

The diffuse attenuation coefficients (K_d) from the profiles were similar between sites, ranging from -0.38 to -0.39 m^{-1} (Figure 10, Table 6), suggesting the optical properties in the east and center portions of the Lagoon are similar, and likely well-mixed. The clarity of the water, however, is turbid (Figure 11). Coastal ocean K_d values in Hawai'i are much clearer, and range from 0.04 to 0.07 m^{-1} (H. Spalding, pers. comm.). Visibility at depth while diving was also limited, with maximum visibility at ~1 m distance or less on 27 July 2013, 31 Aug 2013, and 7 Sept 2013.

The majority of the Lagoon *Chara* population presumably occurs at ~6 m depth, which marks the bottom of the Lagoon. The light levels at 6 m depth ranged from 130 to 145 $\mu E m^{-2} s^{-1}$. Manipulative physiological studies on *Chara*'s light requirements would provide information on how these light levels are influencing *Chara*'s growth, and the effect of decreasing light levels on *Chara*'s survival.

Chara

Submerged vegetation, such as *Chara*, has a strong effect on water transparency, inducing what's known as a "clear water state" (Blindow et al. 2002). This strong positive effect on water transparency is the result of several different mechanisms that affect the planktonic food web, such as physical inhibition of sediment resuspension by the *Chara* canopy that physically increases water clarity, competition for nutrients (such as phosphorus) with phytoplankton that decreases the nutrients available for phytoplankton growth, and *Chara* allelopathy (a negative biochemical effect; van Donk and van de Bund 2002), that negatively affects phytoplankton. Conditions inside a *Chara* bed may also increase denitrification, contributing to a decreased availability of nitrogen for phytoplankton growth (Blindow et al. 2002). The *Chara* also is part of an intricate food web, providing structure and food sources for other organisms within the system. To gain an understanding of the clear water state, an overview of the interactions between the submerged vegetation and other constituents of the food web must be established (for example, see Figure 12).

Water transparency in the Lagoon declined significantly after the removal of substantial quantities (>500 tons wet weight) of *Chara* biomass. One possible explanation for the recent increase in turbidity and phytoplankton is a disruption in the *Chara*-induced clear water state through the removal of the *Chara*. Coale (2013) also surmised that increases in turbidity and phytoplankton populations within the Lagoon may be the result of the *Chara* biomass removal. Additional studies on the food web interactions in the Lagoon, coupled with water chemistry, irradiance, and phytoplankton measurements, would lead to a better understanding of the factors influencing water transparency. This includes feeding rates and preferences of the dominant grazer (Hawaii Gold Tilapia), synchronous monthly sampling of irradiance, phytoplankton, zooplankton, and water chemistry data, physiological studies on *Chara*, and continued monitoring of the organisms within the Lagoon. Given the possible effect of *Chara* biomass on water clarity, it is recommended that *Chara* not be removed from the Lagoon until further studies are completed.

Recommendations for Further Study

Flora and Fauna

- Conduct annual surveys of the flora and fauna to detect any possible changes in community composition
- Conduct feeding and preference studies on Hawaii Gold Tilapia to determine if fish are significant grazers on *Chara* and *Ruppia* populations.
- Determine and monitor population size of Hawaii Gold Tilapia, if possible.

Phytoplankton

- Increase the spatial coverage of the phytoplankton surveys to include all 12 water chemistry sites
- Include corresponding spatial survey of heterotrophic bacterial abundance
- Coordinate phytoplankton and chlorophyll sampling (and other water chemistry collections) in both time and space, with the flexibility to sample phytoplankton bloom events.
- Include quantitative sampling of zooplankton.

Chara Growth

- Continue monitoring the pilot *Chara* clearing experiment on a bi-weekly to monthly basis to generate an initial estimate of *Chara* regrowth.
- Conduct seasonal growth studies on *Chara* apical growth and *Chara* clearing experiments in the West and East Lagoon. This will enable an estimate for how quickly the *Chara* grows and recovers from clearings, and how this varies spatially and temporally.
- Conduct physiological and manipulative studies on the light requirements of *Chara*. This will determine how the *Chara* will respond to changing light conditions and determine the amount of light needed for growth and survival.

Chara Surveys

- Survey 12 locations (at each water chemistry sampling location) within the Lagoon to determine the % cover and biomass of *Chara* within the Lagoon at this time. Resurvey these locations regularly (~2-4 times per year) to detect changes in *Chara* % cover and biomass.

Light Conditions

- Integrate irradiance profiles with plankton and water chemistry sampling, and conduct on a monthly basis.

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Figure 1. Sampling sites used during July – September 2013 for floral and faunal collections, a visual survey for *Ruppia* along the edge of the Lagoon, *Chara zeylanica* growth studies, and light profiles.



Figure 2. Common flora observed in the Lagoon. A. The filamentous green alga, *Cladophora* sp., growing on rocks along water's edge with the drifting seagrass, *Ruppia maritima* (red circle) at Collection Site 2. B. The green alga *Chara zeylanica* covered with fine, green cyanobacteria from 5 m depth at Collection Site 1. C. *Chara zeylanica* canopy at 6 m depth at Collection Site 1.

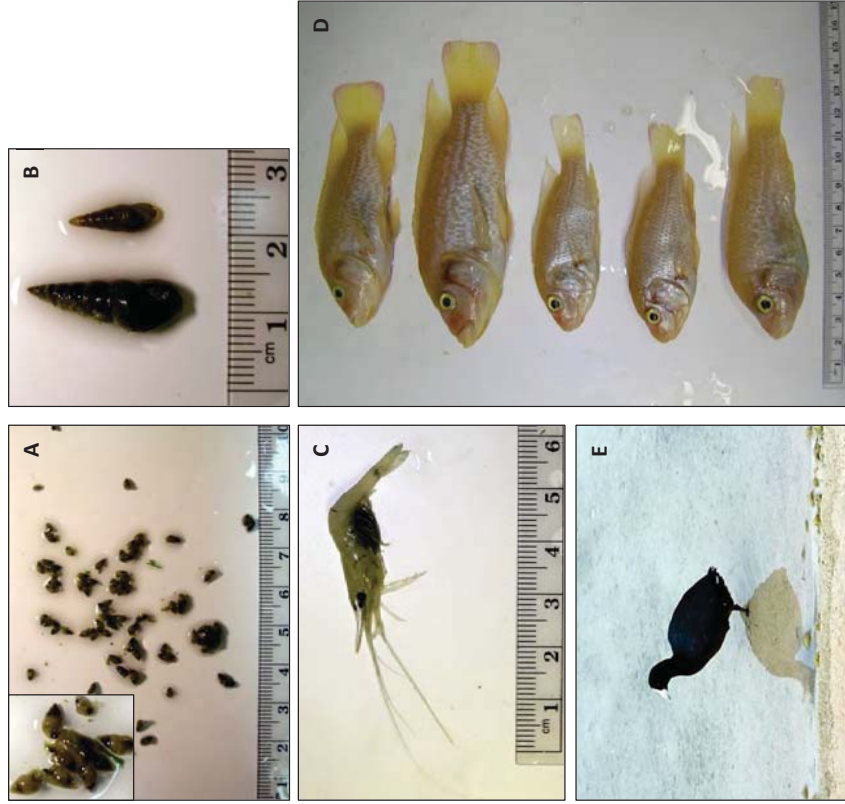


Figure 3. Common fauna observed in the Lagoon. Units on rulers in cm, where applicable. A. *Pyrgophorus coronatus*, with inset showing a close-up of this species. B. Malaysian Trumpet Snails, *Tarebia granifera* (left) and *Melanoides tuberculata* (right). C. Glass shrimp, *Palaeomon debilis*, D. Hawaiian Golden Tilapia, *Oreochromis mossambicus*, caught from Lagoon with hook and line. E. Water bird, (likely a Hawaiian Coot, *Fulica alai*), wading in the shallow waters around the Lagoon boat ramp.



Figure 4. Stations sampled for phytoplankton.

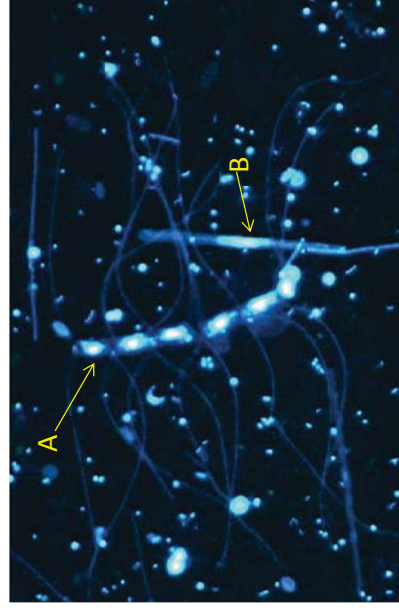


Figure 5. Images of phytoplankton. A. *Chaetoceros* sp., B. *Nitzschia* sp.

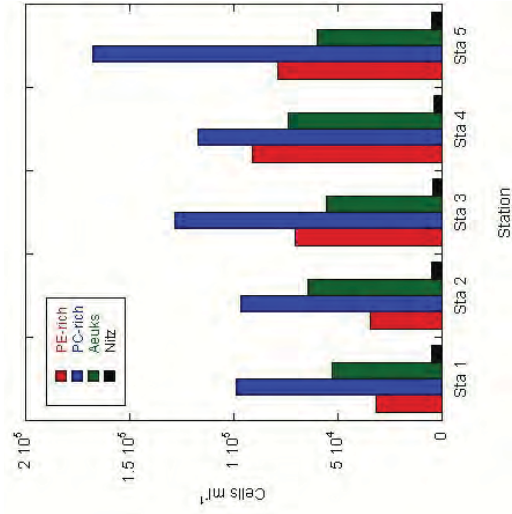


Figure 6. Abundances of the four dominant groups of phytoplankton. PE-rich refers to phycoerythrin-rich picocyanobacteria. PC-rich represents phycocyanin-rich picocyanobacteria. Aeuks = autotrophic eukaryotes. Nitz = *Nitzschia* sp

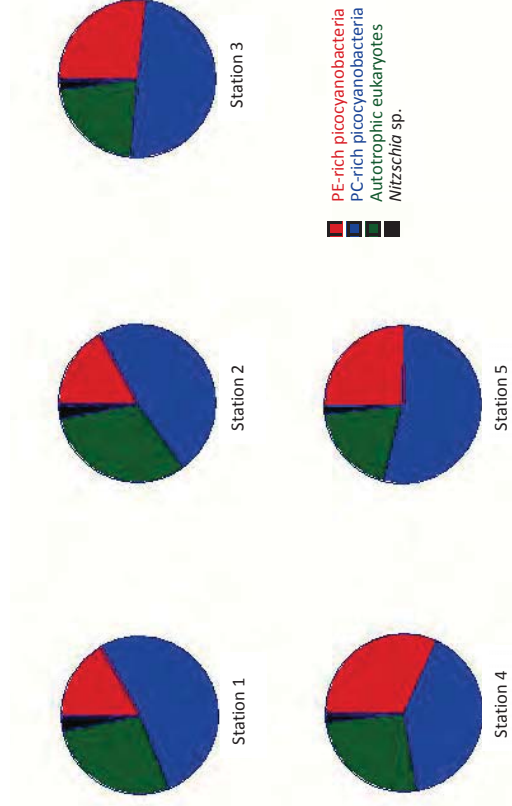


Figure 7. Relative abundance of dominant phytoplankton groups; other groups not in high enough abundance to be visible.

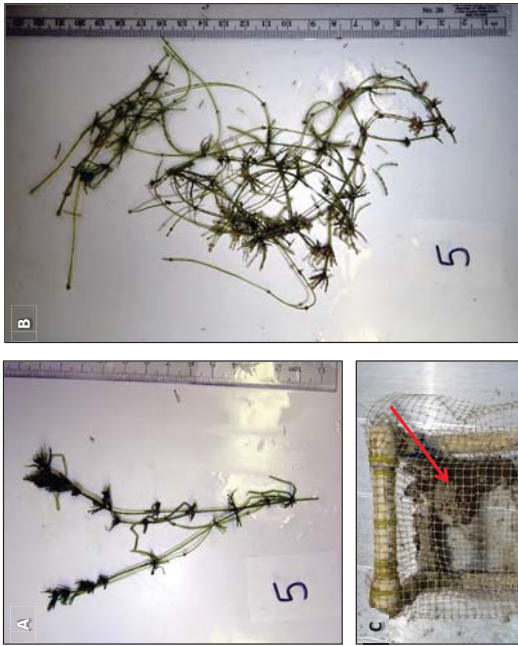


Figure 8. *Chara* individual growth study. A. Plant #5 at day 0. B. Plant #5 at day 42. C. Large clump of sediment (red arrow) inside growth enclosure #2.

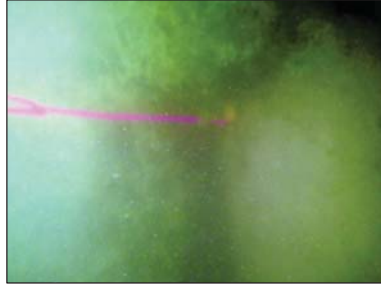


Figure 9. Color-corrected image of the corner of a *Chara* clearing at day 7. The stake with attached pink line marks the corner of the clearing quadrat. Particulate matter in the water column and low visibility caused difficulty in focusing the camera at depth.

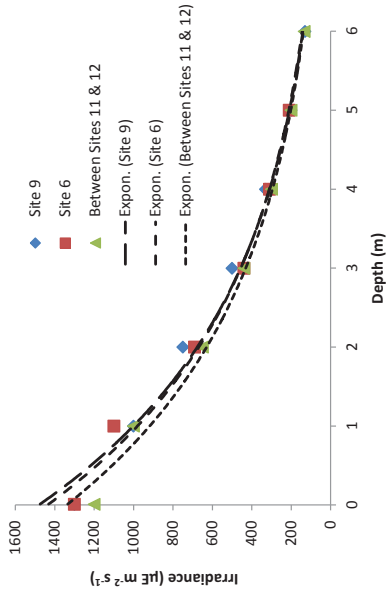


Figure 10. Irradiance profiles at 3 sites in the Lagoon. "Expon." = the line for the fitted exponential equation based on the irradiance values at each depth. Equations are given in Table 6.

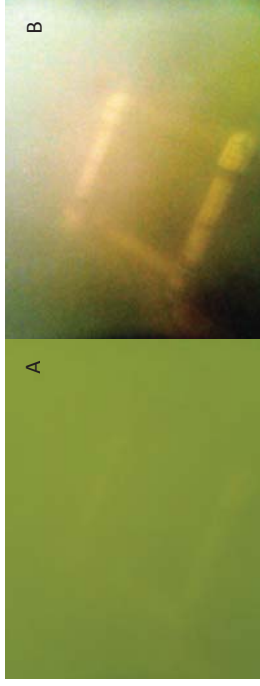


Figure 11. Image taken of *Chara* growth enclosure at Site 6 (Growth site, Figure 1) at 6 m depth. Visibility on this dive was less than 1 m distance. A. Color uncorrected image, showing limited, greenish visibility at depth. The white sides of the cage are just visible. B. Color-corrected image of the same picture. Color correction made with Adobe Photoshop 6.0.

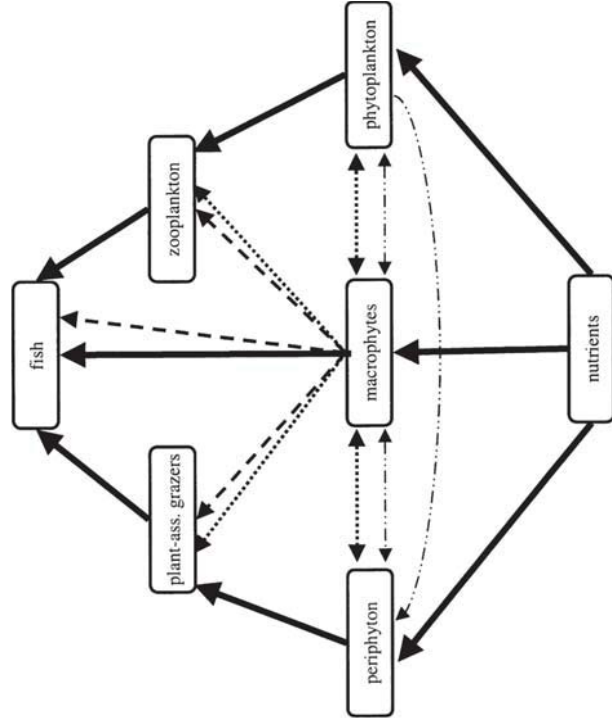


Figure 12. Schematic overview of interactions between submerged macrophytes, such as *Chara*, and other constituents of shallow lake food webs. (—): Food web links; (···): allelopathy; (- · -): spatial refuge; (- · ·): light conditions (van Donk and van de Bund 2002). A similar model could be developed for the Lagoon to better understand the mechanisms involved in a clear water state, but would need to incorporate additional factors, such as macrophyte decomposition in the sediment, denitrification, and sulfide production.

APPENDIX J. DISTRIBUTION AND ABUNDANCE OF *CHARA* IN HOAKALEI LAGOON

April 2, 2014

FINAL REPORT:

DISTRIBUTION AND ABUNDANCE OF CHARA IN HOAKALEI LAGOON



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Cover Photo: Diver conducting a Chara survey. The measuring rod, with white marks every 5 cm, was used to measure Chara canopy height. The yellow tape is the transect line used for 50 m long surveys.

Project Summary

Hoakalei Lagoon (Lagoon) is an excavated basin on the HASEKO property in 'Ewa, Hawai'i. Originally intended to accommodate a marina with a channel connecting it to the open ocean, it is being reevaluated as an enclosed lagoon that requires revised maintenance and a management strategy. The dominant organism covering the bottom of the Lagoon is the green alga *Chara zeylanica* (*Chara*). I was contracted to survey the percent cover and canopy height of *Chara* within 6 regions of the Lagoon, and monitor a pilot *Chara* regrowth experiment. The goal was to determine the current distribution, abundance, and canopy height of *Chara* within the Lagoon, and make recommendations for future sampling. This report is divided into two sections covering *Chara* survey data and the *Chara* regrowth experiments.

Summary of Results

1. The average (\pm SE) percent (%) cover of *Chara* in the Lagoon was $55 \pm 4\%$.
2. There was no significant difference in the % cover of *Chara* among 6 Lagoon sectors or 3 Lagoon regions (West, Center, East); however, the % cover of *Chara* was significantly higher in the Northern ($64 \pm 5\%$) versus Southern ($44 \pm 7\%$) sectors. This difference may reflect an abiotic influence (such as salt water intrusion) or combination of factors that is/are negatively affecting the presence of *Chara* in the Southern sectors closest to the ocean, and/or enhancing the % cover of *Chara* in the Northern sectors.
3. *Chara* canopy height was similar among the 6 Lagoon sectors, 3 regions, and Northern/Southern sectors. *Chara* canopy height ranged from 5 to 95 cm, with an average (\pm SE) of 34 ± 1.7 cm for the entire Lagoon.
4. *Chara* recovery in 4 of 5 cleared quadrats in the pilot study took ~ 102 to 139 days until cleared areas were indistinguishable from surrounding, unmanipulated areas. This equates to ~ 0.7 -1% growth of *Chara* wet weight per day. Studies with higher replication in different Lagoon regions would be needed for a more accurate estimate of regrowth.
5. One cleared quadrat at the edge of the *Chara* bed has not yet recovered. Sedimentation or another disturbance at the edge of *Chara* beds may be affecting *Chara* growth and recovery as compared to areas inside the bed, though additional studies with higher replication are needed to examine this further.
6. The density of *Tilapia* nests averaged ~ 1 every 5 meters. This density is a rough estimate of the number of active, reproductive males in the Lagoon.

Recommendations

1. Monitor the % cover and canopy height of *Chara* on an annual basis to determine any changes in distribution and abundance. Continue monitoring the density of *Tilapia* nests in coordination with *Chara* surveys.
2. Increase the number of transects to 7 per sector (total of 42 transects) to create a balanced design that can be analyzed using a Nested ANOVA, and will detect a ~20% increase or decrease in *Chara* abundance with a power of 0.80.

SECTION 1: CHARA SURVEYS

BACKGROUND

Chara (commonly called stonewort, or musk grass) is a genus of slightly calcified, branched, green algae found in brackish to freshwater environments. The two *Chara* species found within Hawai'i, *C. zeylanica* and *C. braunii*, have cosmopolitan distributions in temperate to tropical environments (Sherwood 2004). These species are considered native to Hawai'i, and are not listed as invasive by the Hawai'i Invasive Species Council (<http://www.hawaiiinvasivespecies.org/pests/>). The species found within the Lagoon is *C. zeylanica* (Foster and Cox 2012). The Hawaiian word for *C. zeylanica* is 'Onohi'awa (Abbott 1992). Pukui and Elbert (1957) define 'Onohi'awa as "black moss found in fresh water". Abbott (1992) offers a slightly different interpretation, with "Onohi" meaning "ray", describing the whorls of branches that are similar to the *hinai* baskets formerly used for certain kinds of fishing.

Previous surveys within the Lagoon found that *Chara* was the dominant organism, with canopy heights of up to ~1 m (Foster and Cox 2012, Spalding et al. 2013). Amid concerns of *Chara* overgrowth and its possible deleterious effects on water quality in the Lagoon, over 500 metric tons of *Chara* (wet weight) were removed from the Western and Center regions of the Lagoon in 2013 (Atkinson and Dollar 2013). *Chara* within the Eastern region was not disturbed. This report was solicited to determine the present percent cover and canopy height of *Chara* within the Lagoon among 6 Lagoon sectors, 3 regions, and Northern versus Southern sectors (Figure 1). These data are used to detect any significant spatial differences in *Chara* abundance (% cover) and canopy height, and to estimate the level of sampling needed to detect future differences of varying magnitude. The outcome of these analyses will aid in determining if additional *Chara* surveys are needed for more precise estimates of percent cover.

METHODS

Initially, 12 transects (1-12, Figure 1) were surveyed in the Lagoon, with one transect located at each of the water chemistry sampling sites (locations from S. Dollar, pers. comm.). A higher level of sampling was desired to discern any spatial differences in *Chara* abundance, so the Lagoon was divided into 6 sectors (NW, SW, CN, CS, NE, and SE; Figure 1) within 3 regions (West, Center, East; Figure 1). Additional transects were added to increase the spatial resolution within each sector. The number of transects per

sector was allocated based upon area, with larger sectors allotted a greater number of transects. For instance, the largest sector (NW) contained 7 transects, while the smallest sector (CS) had 4 transects. The orientation of transects 1-12 was towards the center of the Lagoon, while transects 13 – 32 were generally oriented in a west to east direction parallel to shore, based upon recommendations by S. Dollar because of the orientation of the earlier *Chara* removals.

At each site, the beginning and end of each transect was marked with a buoy, and the GPS location was noted. The percent cover of *Chara* was determined using the point contact method along a 50 m long transect, similar to Foster and Cox (2009). The presence/absence of *Chara* and its canopy height (if present) was measured at every 1 m increment, for a total of 50 points sampled. The % cover of *Chara* was calculated as (the number of points contacting *Chara*)/50 X 100, with the cover of *Chara* expressed as a percent. For example, if a diver noted that a total of 14 of 50 points along the transect tape contacted *Chara*, then the percent cover of *Chara* along the 50 m was 14/50 X 100 = 28% cover. The percent cover of other organisms observed in the Lagoon (Figure 2) was also calculated in a similar manner along the same transect. The number of *Tilapia* (*Oreochromis mossambicus*) nests (Figure 2; described by Tweddle et al. 1998) in a 50 x 1 meter area was counted along the same transect when dive time and visibility allowed for accurate enumeration. Visibility at depth was also noted along the transect line over unvegetated (bare sediment) and vegetated (*Chara*) areas.

The *Chara* canopy was easily disturbed (see diver fin kick, Figure 3), so the diver deploying the transect line swam ~2 meters above the canopy. Canopy height was measured with a 140 cm long steel rod marked at 5 cm increments. The measuring rod easily penetrated the fine, soft sediment under the *Chara* canopy (Figure 2). Thus, the diver measuring canopy height gently placed a hand flat on the surface of the sediment under the canopy (taking care to not disturb the area of canopy being measured), and contacted the bottom of the measuring rod with the top of the hand on the sediment. This ensured the measuring rod did not penetrate the sediment, and allowed for an accurate measurement of canopy height.

One-way ANOVAs and power analyses were used in Minitab® 17.1.0.0 to detect possible differences in the % cover and canopy height of *Chara* among the 6 Lagoon sectors (Figure 1), and 3 Lagoon regions (West, East, and Center). Two sample t-tests were used to detect possible differences in the % cover and canopy height of *Chara* between transects located in Northern (NW, CN, NE) and Southern (SW, CS, SE) sectors. Data passed the assumptions of normality (Bartlett's test) and equal variances (Levene's test). Statistical differences were significant at the $\alpha < 0.05$ level.

RESULTS AND DISCUSSION

General Observations

Surveys occurred from November 5, 2013 to January 17, 2014. All survey data are listed in Appendix A. *Chara* and bare sediment had the highest coverage (up to 96% and 94%, respectively), followed by up to 20% cover of green cyanobacterial mats (Figure 2). Although small patches of the sea grass *Ruppia*

maritima (*Ruppia*; Figure 2) were observed colonizing sections of bare sediment, it was rare and not encountered on the transects.

The density of *Tilapia* nests (Figure 2) ranged from 0 to 40, with an average of 5.1 ± 2.2 (SE) per 50×1 m transect ($n = 19$ transects), or approximately 1 every 5 meters. Although some nests may not be active, this number gives a rough estimate of the number of breeding males. The males establish a single nest, and aggressively defend territories (Chapman 2000). Visual counts of *Tilapia* in the Lagoon would be challenging given the Lagoon's limited visibility and *Tilapia*'s skittish nature around divers. As an alternative, enumerating the number of nests along the 50 m transect may serve as a rough estimate of male *Tilapia* population size that can be tracked through time. This species of *Tilapia* is considered one of the 100 most invasive species in the world (Global Invasive Species Database 2014), and may have a significant impact on the abundance of both *Chara* and *Ruppia* in the Lagoon if *Tilapia* populations increase.

Visibility at 6 m depth in the Lagoon ranged from less than 1 m to almost 2 meters (Figure 4). The average visibility over the *Chara* canopy and unvegetated sediment was 1.4 ± 0.05 (SE) m and 1.1 ± 0.07 (SE) m, respectively. While deploying the transect tape (before any sediment was disturbed by divers), it was noted that the water was visibly clearer over areas with dense *Chara* canopy compared to unvegetated sediment. Physical mechanisms, such as the inhibition of sediment resuspension by *Chara* canopies, have been suggested as important in the maintenance of the clear water state in shallow bodies of water (Blindow et al. 2002).

Chara surveys

Overall trends in the presence and canopy height of *Chara* can be visualized from the transect data shown in Figure 1. Overall, the southwestern corner of the SW sector, the middle of the CS sector, and the northwestern corner of the NW sector had a low cover of *Chara* with canopy heights typically less than 20 cm. Areas with a high abundance of *Chara* with canopy heights > 60 cm were scattered among all sectors except CS and NW. Two transects (9a and 9b; Figure 1) were surveyed in a similar area (~10 m apart) to determine the scale of patchiness in *Chara* % cover and canopy height. Transect 9b (50% cover) had 22% greater *Chara* cover than 9a (28% cover), but there was no significant difference in canopy height (averages \pm SE were $9a = 35 \pm 8$ cm, $9b = 30 \pm 4$ cm; two-sample t (37) = 0.65, $p = 0.518$).

Chara canopy height

Chara canopy height ranged from 5 to 95 cm, with an average (\pm SE) of 34 ± 1.7 cm for the entire Lagoon (Figure 5a). Although canopy height was lowest in the CS sector (Figure 5), there were no significant differences in the canopy height of *Chara* among the 6 sectors (F (5, 26) = 2.59, $p = 0.05$), 3 Lagoon regions (F (2, 29) = 1.3, $p = 0.289$), or between Northern and Southern sectors (two-sample t (30) = -0.18, $p = 0.856$). However, the significance level among sectors was low (at 0.05), with power ranging from 0.33 – 0.64 for 4 to 7 transects per sector. The mean canopy heights among transects varied by up to 10 X (from 5 to 49 cm), but the standard errors were generally low within a transect (average SE within a transect = 3 cm). This suggests that the largest variation in canopy height occurred at scales

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greater than 50 m (the length of the transect sampled) on the level of sectors, and below the level of Lagoon regions.

Chara percent cover

Overall, the average percent cover of *Chara* in the entire Lagoon was $55\% \pm 4\%$ SE (Figure 6a). The highest percent cover of *Chara* was found in the NE and SE sectors on transects 30 (96%) and 8 (90%), respectively, and the lowest percent cover was found in the SW and CS sectors on transects 5 (4%) and 26 (6%), respectively (Figure 1). There were no significant differences in the % cover of *Chara* among the 6 sectors (Figure 6a; F (5, 26) = 2.41, $p = 0.063$) or among the 3 Lagoon regions (F (2, 29) = 1.3, $p = 0.289$). However, the average (\pm SE) percent cover was 20% greater in the Northern ($64 \pm 5\%$) versus the Southern ($44 \pm 7\%$) sectors (two sample t (30) = 2.36, $p = 0.025$; Figure 6b). An abiotic factor (or combination of factors), such as an increase in salinity due to salt water intrusion, may be decreasing the % cover of *Chara* in the Southern sectors of the Lagoon, although this trend in salinity has not been detected in monthly water quality monitoring data (S. Dollar, pers. comm.). Alternatively, the % cover of *Chara* may be enhanced in the Northern sectors as compared to the Southern sectors by a factor such as increased, nutrient-rich groundwater intrusion in the Northern sectors (C. Morgan, pers. comm.).

Power and Sample Size for Chara % cover

Power is the ability to detect a statistically significant effect, if one exists. Expressed as a quantity, power ranges from 0 to 1, where 0.95 would mean a 5% chance of failing to detect an effect that exists. A power of 0.80 is generally considered acceptable for biological studies (Cohen 1988). In other words, if the test has a power of 0.80 or greater, and there is no significant difference, then it's reasonable to conclude that there is no difference. Power tables for analyses comparing the percent cover of *Chara* between Lagoon sectors (Table 1a) and Lagoon regions (Table 1b) show that 10 transects per sector and 49 transects per region would need to be surveyed for a power of 0.80 in detecting possible differences in these areas.

Sample size estimates to detect $\pm 10 - 50\%$ differences in the population mean (\pm SD) of $55 \pm 25\%$ of *Chara* cover were estimated using the Minitab® 17.1.0.0 Power and Sample Size function for a 1 sample t-test at 0.80 power (Table 2). Given the current variation in % cover, 165 transects would need to be surveyed in the Lagoon to detect a 10% difference in the population mean. However, sample size estimates quickly decrease with increasing differences in *Chara* coverage; 43 transects would be needed to detect a 20% difference or 21 transects to detect a 30% difference. The current sample size of surveys ($n = 32$) with a power of 0.80 would be able to detect a 23% change in the % cover of *Chara*.

SECTION 2: CHARA REGROWTH PILOT STUDY

On August 31, 2013, a pilot experiment examining the regrowth of *Chara* into 5 cleared 0.25 m^2 quadrats was initiated (Spalding and Brown 2013). The wet weight of *Chara* in each cleared quadrat was determined by spinning the *Chara* biomass for 1 minute with a salad spinner to remove excess water,

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and weighing the biomass with a Taylor glass digital food scale. The cleared areas were revisited on November 5, 2013 and January 17, 2014 to examine the extent of *Chara* regrowth. After 66 days (November), the clearings had not fully recovered relative to adjacent unmanipulated areas (Figure 7a). Although some regrowth occurred in all clearings, ~20-50 % of each quadrat still contained bare, unvegetated areas of sediment. After 139 days (January), there was no discernable difference between 4 of the quadrats and the surrounding *Chara* canopy (Figure 7b). The marker buoys were completely overgrown (Figure 8), requiring extensive searching to find the original quadrat areas.

One quadrat (E1) located at the edge of the *Chara* bed had not yet fully recovered as of January 2014, with ~30% of the quadrat containing bare, unvegetated sediment. This quadrat also had the lowest initial wet weight, suggesting the edge of the *Chara* bed is not an ideal location for *Chara* growth. Heavy sedimentation was observed around the edge of the *Chara* bed, and may have contributed to the lower rate of recovery in this quadrat. The lower coverage of *Chara* around the sides of this quadrat (versus higher *Chara* coverage surrounding the quadrats located within the *Chara* bed) may also have decreased the potential for vegetative regrowth into this quadrat.

The full time of recovery for quadrats E2 – E5 is estimated between 102 (~half way between the November and January monitoring days) to 139 days. Assuming the estimate of regrowth based on visual similarity to uncleared areas indicates a similar biomass to that before clearing, the % growth in wet weight ranges between 0.7 - 1% per day (Table 3).

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Tables and Figures

Table 1. Power tables used to detect differences among the 6 sectors (a) and 3 regions (b). Actual are the range of sample sizes used per sector or region. Desired is the desired level to achieve a power of 0.80. Levels are the 6 sectors or 3 regions. Sample sizes are the range in the number of transects surveyed per sector or region. Maximum difference is the difference between the highest and lowest sector or region averages. Power is the ability to detect a statistically significant effect, if one exists. Population Standard Dev is the population standard deviation for the entire Lagoon. Sample size numbers highlighted in yellow are sample size number for a power of 0.80.

Table 1a. Sectors	Actual			Desired
Levels	6	6	6	6
Sample Sizes	4	5	6	7
Maximum difference	44	44	44	44
Power	0.34	0.45	0.55	0.64
Population Standard Dev	25	25	25	25

Table 1b. Regions	Actual			Desired
Levels	3	3	3	3
Sample Sizes	9	10	13	49
Maximum difference	16	16	16	16
Power	0.19	0.21	0.27	0.80
Population Standard Dev	25	25	25	25

Table 2. Sample size estimates to detect differences in *Chara* cover of varying magnitudes for the entire Lagoon. A 1 sample t-test at 0.80 power with a population mean (±SD) of 55% (±25%) cover of *Chara* was used for all analyses. Difference is the % difference from the population mean. Margin of Error is the difference from the population mean for each % difference in *Chara* cover. Confidence Interval is the range in *Chara* % cover for the specified % difference. Sample size is the number of transects needed to detect the desired difference in *Chara* % cover.

Difference in <i>Chara</i> cover	±10%	±20%	±30%	±40%	±50%
Margin of Error	5.5	11	16.5	20	22
Confidence Interval	49.5 - 60.5%	44 - 66%	38.5 - 71.5%	35 - 77%	33 - 82.5%
Sample size (transects)	165	43	21	15	13

Table 3. *Chara* regrowth into cleared 0.25 m² quadrats located in the SE sector (near transect 9a; Figure 1). The g wet wt. 0.25 m² is the initial cleared biomass. Wet weight regrowth per day is based on recovery from 102 to 139 days. Nr is not recovered.

Quadrat	g wet wt 0.25 m ²	102 days		139 days	
		wet wt day ⁻¹	% wet weight day ⁻¹	wet wt/day	% wet weight day ⁻¹
E1	325	nr	nr	nr	nr
E2	767	7.52	1.0%	5.52	0.7%
E3	771	7.56	1.0%	5.55	0.7%
E4	556	5.45	1.0%	4.00	0.7%
E5	641	6.28	1.0%	4.61	0.7%

Figure 1. Map of Chara surveys and canopy data within the Lagoon. The six sectors are NW (Northwest), SW (Southwest), CN (Center North), CS (Center South), NE (Northeast), and SE (Southeast). Regions are West, Center, and East. Northern sectors are NW, CN, and NE. Southern sectors are SW, CS, and SE. Site 9a was sampled on 7 Sept 2013. All other surveys were sampled Nov 2013 to Jan 2014.

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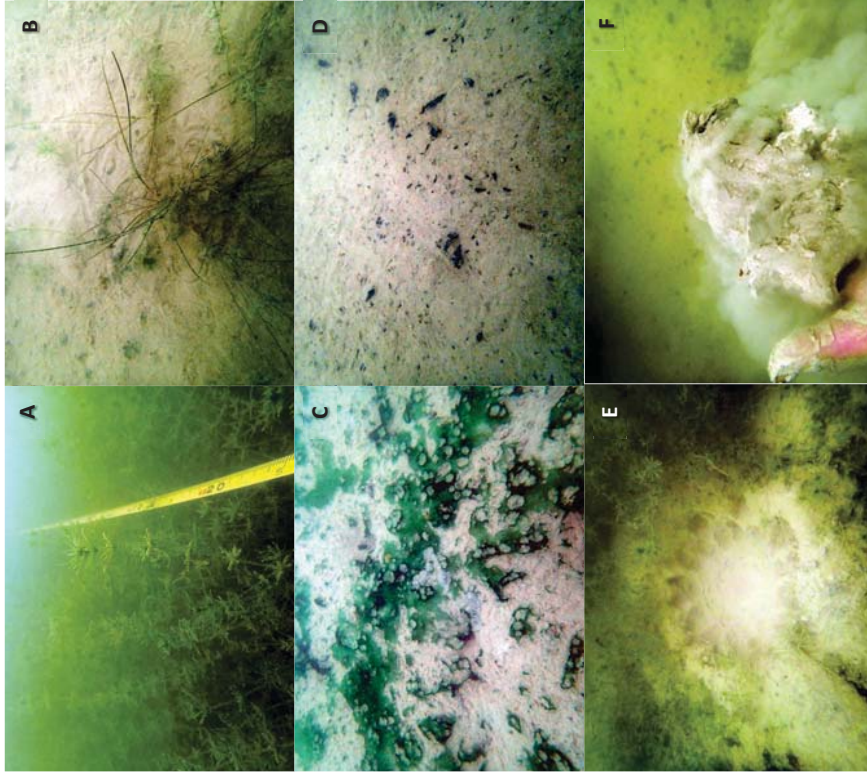
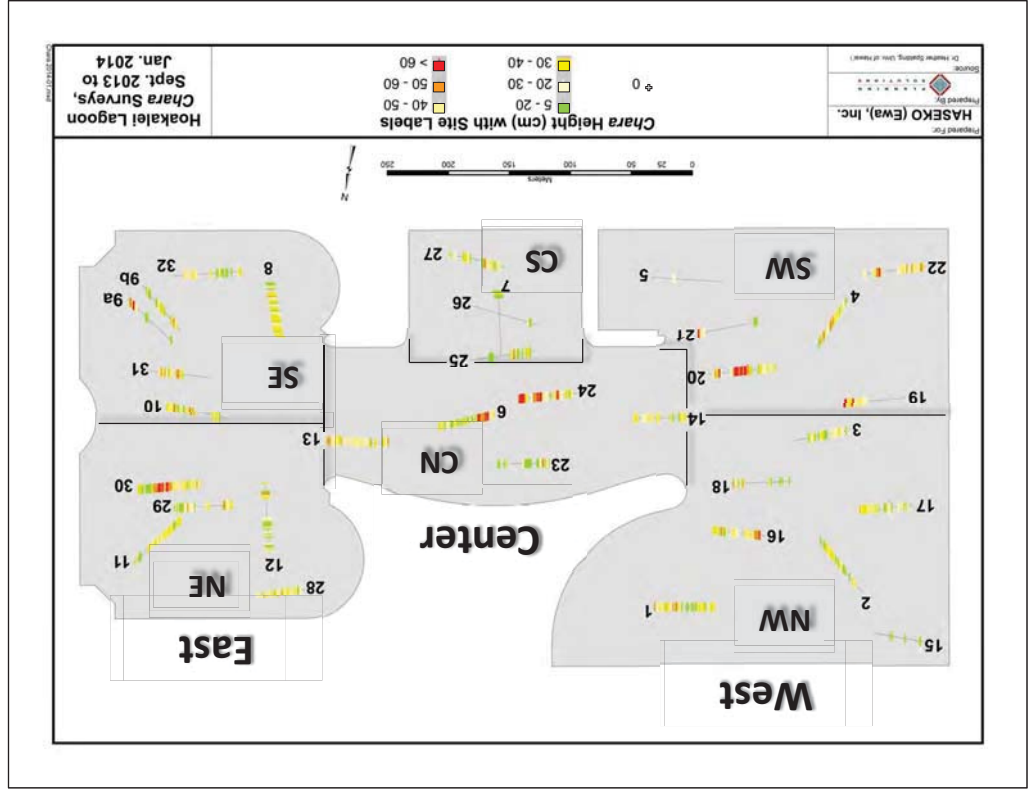


Figure 2. Images of general observations made during Chara surveys. A. Typical Chara canopy. B. Small patch of Ruppia over bare sediment. C. Green cyanobacterial mat. D. Bare sediment with small black snails. E. Tilapia nest. F. Fine, soft sediment at 6 m depth.



Figure 3. Impression in the *Chara* canopy made by the fin kick of a swimming diver. The top of the *Chara* canopy was delicate and easily disturbed.

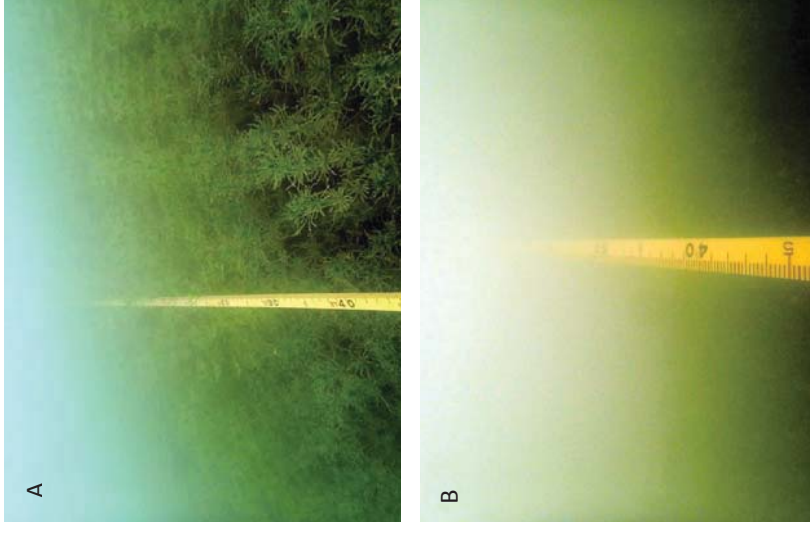


Figure 4. Comparison of visibility along the transect line during surveys. **A.** Visibility was 1.3 m at Site 24, **B.** Visibility was ~20 cm at Site 5.

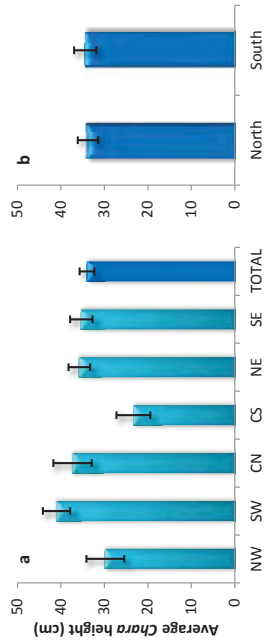


Figure 5. Average *Chara* canopy height (\pm SE) at each Lagoon sector (a) and between Northern and Southern Lagoon sectors (b). TOTAL is the average (\pm SE) for the entire Lagoon.

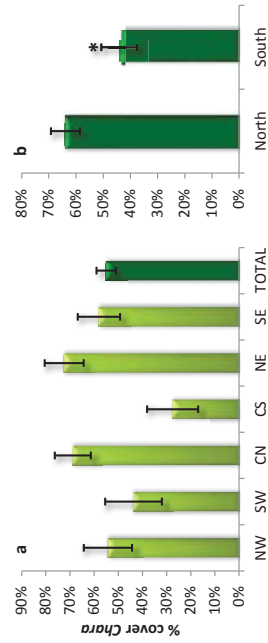


Figure 6. Average % cover of *Chara* (\pm SE) among Lagoon sectors (a) and between transects in Northern and Southern sectors (b). TOTAL is the average (\pm SE) for the entire Lagoon. “*” denotes significant differences.

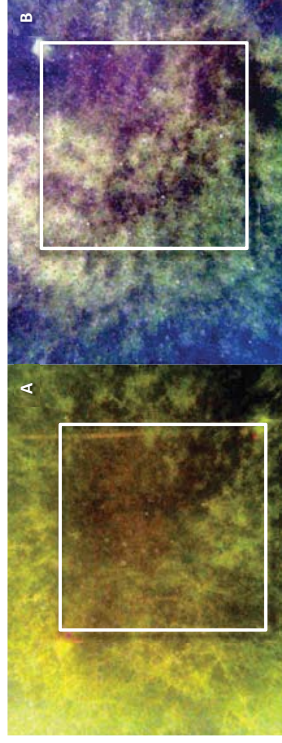


Figure 7. Images from the pilot *Chara* regrowth experiment. The area outlined in white is the position of the original 0.25 m² quadrat cleared on day 0, as determined by the position of yellow subsurface buoys **A.** 66 days after clearing. Note the bare patch of sediment in the middle of the quadrat. **B.** 139 days after clearing, with no discernable difference in canopy height between the area cleared and the surrounding canopy. The canopy in the upper right hand corner of the quadrat was moved to the side in the process of finding the subsurface buoy, which was overgrown by the surrounding *Chara* canopy.



Figure 8. Subsurface buoy overgrown by *Chara* from the pilot clearing regrowth experiment. A subsurface buoy marked each corner of the cleared quadrat.

APPENDICES

Appendix A. *Chara* survey data

Site	1	2	3	4	5	6	7	8	9a	9b
Lagoon Sector	NW	NW	NW	SW	SW	CN	CS	SE	SE	SE
GPS Start	21.30782	21.30747	21.30630	21.30535	21.30542	21.3066	21.30567	21.30590	21.18372	21.30608
	158.03967	158.04128	158.04097	158.04080	158.03924	158.03819	158.03806	158.03627	158.02111	158.03528
GPS End	21.30775	21.30714	21.30645	21.30573	21.30537	21.30677	21.30615	21.3063	21.18387	21.30636
	158.04015	158.04089	158.04054	158.04062	158.03979	158.03777	158.03816	158.03641	158.02135	158.03563
Heading	250°	120°	70°	20°	260°	70°	345°	345°	120°	300°
Date	16-Nov-13	5-Nov-13	5-Nov-13	5-Nov-13	16-Nov-13	13-Dec-13	16-Nov-13	6-Dec-13	7-Sep-13	6-Dec-13
Dive Time (min)	18	16	14	20	10	13	15	nr	nr	nr
Max Depth (ft.)	18	20	21	20	21	18	23	nr	nr	nr
Water Temp (F)	78°	80°	80°	80°	78°	78°	78°	nr	nr	nr
Visibility (m) <i>Chara</i>	1.7	1.5	1.5	1.5	<1	1.5	<1	1.8	<1	1.4
Visibility (m) sediment	nr	nr	nr	nr	nr	nr	nr	nr	<1	nr
Tilapia nests (1 x 50 m)	nr	nr	nr	nr	nr	16	nr	nr	nr	nr
Canopy Height										
Min (cm)	5	5	10	5	25	5	5	5	5	5
Max (cm)	60	50	50	60	30	70	40	55	95	60
Average (cm)	36	29	30	42	28	36	21	34	35	30
SE (cm)	2	3	2	2	3	3	4	2	8	3
Average (in)	14.2	11.6	11.9	16.7	10.8	14.3	8.1	13.4	13.6	11.7
SE (in)	0.8	1.0	0.8	0.9	1.0	1.2	1.6	0.8	3.0	1.4
<i>Chara</i> cover	84%	58%	56%	70%	4%	88%	16%	90%	28%	50%
Cyanobacterial cover	2%	14%	14%	14%	nr	0%	12%	0%	0%	0%
<i>Ruppia</i> cover	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sediment cover	16%	42%	44%	30%	96%	12%	84%	10%	72%	50%

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Appendix A. continued

Site	10	11	12	13	14	15	16	17	18	19
Lagoon Sector	SE	NE	NE	CN	CN	NW	NW	NW	NW	SW
GPS Start	21.30693	21.30810	21.30787	21.30698	21.30639	21.30776	21.30717	21.30678	21.30683	21.306
	158.03561	158.03556	158.03660	158.0369	158.03970	158.04182	158.04045	158.04156	158.04013	158.04137
GPS End	21.30695	21.30774	21.30737	21.30694	21.30647	21.30775	21.30719	21.30687	21.30674	21.30611
	158.03609	158.03587	158.03648	158.03741	158.03926	158.04143	158.04004	158.04115	158.04059	158.04091
Heading	250°	80°	160°	250°	80°	70°	70°	70°	250°	70°
Date	13-Dec-13	9-Nov-13	9-Nov-13	13-Dec-13	16-Nov-13	23-Dec-13	23-Dec-13	23-Dec-13	23-Dec-13	23-Dec-13
Dive Time (min)	11	16	11	13	11	15	12	12	10	11
Max Depth (ft.)	23	19	20	20	21	22	21	21	22	22
Water Temp (F)	78°	80°	80°	79°	78°	78°	78°	78°	78°	79°
Visibility (m) <i>Chara</i>	1.5	1.5	1.5	1.8	1.4		1.7	1.1	1.7	1.3
Visibility (m) sediment	0.9	nr	nr	nr	nr	1.4	1.4	1.1	1.3	0.7
Tilapia nests (1 x 50 m)	6	nr	nr	0	nr	40	5	9	0	1
Canopy Height										
Min (cm)	5	10	5	5	10	5	15	5	5	30
Max (cm)	60	50	55	60	50	5	65	60	60	80
Average (cm)	37	35	28	41	39	5	40	35	33	46
SE (cm)	3	2	3	2	2	0	2	2	5	4
Average (in)	14.4	13.6	10.9	16.0	15.2	2.0	15.7	13.6	13.1	17.9
SE (in)	1.1	0.7	1.1	0.7	0.8	0.0	0.9	0.9	2.0	1.4
<i>Chara</i> cover	62%	74%	50%	82%	52%	10%	70%	74%	28%	36%
Cyanobacterial cover	0%	0%	0%	0%	2%	4%	4%	8%	2%	8%
<i>Ruppia</i> cover	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sediment cover	38%	26%	50%	18%	48%	90%	30%	26%	72%	64%

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Appendix A. continued

Site	20	21	22	23	24	25	26	27	28	29
Lagoon Sector	SW	SW	SW	CN	CN	CS	CS	CS	NE	NE
GPS Start	21.30606	21.30578	21.30502	21.30689	21.30635	21.30622	21.30584	21.30549	21.3081	21.30766
	158.03981	158.03967	158.04137	158.03868	158.0388	158.03793	158.03789	158.03763	158.03693	158.0358
GPS End	21.30593	21.30562	21.30515	21.30696	21.30646	21.30609	21.3059	21.3055	21.30822	21.30757
	158.04034	158.04012	158.04089	158.03827	158.03835	158.03841	158.03841	158.03809	158.03654	158.03625
Heading	250°	250°	70°	70°	70°	255°	255°	255°	70°	250°
Date	23-Dec-13	23-Dec-13	23-Dec-13	17-Jan-14	17-Jan-14	13-Dec-13	13-Dec-13	13-Dec-13	17-Jan-14	17-Jan-14
Dive Time (min)	12	12	12	14	13	9	7	11	13	13
Max Depth (ft.)	22	22	21	22	23	24	21	21	22	23
Water Temp (F)	80°	79°	78°	76°	76°	78°	78°	78°	77°	76°
Visibility (m) Chara	1.4	1.1	1.4	1.1	1.3	1.2	1.3	<1	1.5	1.3
Visibility (m) sediment	1.3	1.1	1.4	0.5	0.9	nr	nr	nr	0.9	0.7
Tilapia nests (1 x 50 m)	0	0	3	13	0	nr	0	nr	0	0
Canopy Height										
Min (cm)	10	10	25	5	10	5	5	5	10	5
Max (cm)	75	70	65	60	90	60	30	55	50	55
Average (cm)	48	37	46	22	49	24	15	34	39	35
SE (cm)	3	7	2	3	3	5	8	3	2	3
Average (in)	18.8	14.4	18.2	8.6	19.3	9.5	5.9	13.2	15.3	13.8
SE (in)	1.1	2.7	0.7	1.2	1.3	1.8	3.0	1.1	0.7	1.2
Chara cover	72%	18%	62%	52%	70%	34%	6%	54%	82%	60%
Cyanobacterial cover	0%	0%	6%	0%	0%	0%	2%	20%	4%	0%
Ruppia cover	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sediment cover	28%	82%	38%	48%	30%	66%	94%	46%	18%	40%

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Appendix A. continued

Site	30	31	32
Lagoon Sector	NE	SE	SE
GPS Start	21.30757	21.30669	21.30597
	158.03549	158.03545	158.03551
GPS End	21.30745	21.30667	21.30586
	158.03598	158.03592	158.03603
Heading	250°	250°	250°
Date	17-Jan-14	13-Dec-13	13-Dec-13
Dive Time (min)	13	10	11
Max Depth (ft.)	23	23	22
Water Temp (F)	76°	78°	78°
Visibility (m) Chara	1.3	0.8	0.9
Visibility (m) sediment	1.3	1.3	1.1
Tilapia nests (1 x 50 m)	2	3	0
Canopy Height			
Min (cm)	5	10	5
Max (cm)	70	60	50
Average (cm)	43	45	31
SE (cm)	3	3	3
Average (in)	16.7	17.5	12.4
SE (in)	1.0	1.0	1.2
Chara cover	96%	40%	48%
Cyanobacterial cover	0%	0%	0%
Ruppia cover	0%	0%	0%
Sediment cover	4%	60%	52%

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**APPENDIX K. DESCRIPTION OF BIOLOGICAL COMMUNITIES IN
INTERTIDAL AND SHALLOW SUBTIDAL MARINE HABITATS
OFFSHORE FROM HOAKALEI LAGOON**

13 June 2012

Description of Biological Communities in Intertidal and Shallow Subtidal Marine Habitats Offshore from Hoakalei Lagoon

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Location & Approach

This report qualitatively characterizes the marine biological communities that occur in the intertidal zone, and shallow zone to a depth of ~ 30ft in southwest O'ahu from east end of White Plains Beach to One'ula Beach Park. The specific region described begins along the fence that designates the boundary at the east end of White Plains Beach and extends to the east end of One'ula Beach Park before 'Ewa Beach proper and includes the area directly in front of the Hoakalei Lagoon, approximately 4 miles of coast line (Fig. 1). The subtidal description focuses on the flora and fauna from the low tide mark to 30 ft deep (~ 0.5 miles offshore).

The biological communities in southwest O'ahu consist of species of algae, coral, non-coral macroinvertebrates (e.g. urchins, sea cucumbers, mollusks) and fishes. Monk seals and green sea turtles have been observed offshore. This report describes the intertidal and subtidal habitats where these taxa occur and identifies the common species in each habitat. It focuses on large (greater than a few cm) diurnal species that are obvious on the bottom and in the water column. The report is based on qualitative observations and quantitative data reported from intertidal and subtidal surveys of marine biota conducted in daylight hours from 2006-2012 by Foster & Cox (or Cox & Foster) and also draws upon a review of marine surveys conducted in the vicinity from 1986 to 2012 (*see references*).



Fig. 1 Map of study area outlined in yellow along southwest O'ahu from White Plains Beach (WPB) to One'ula Beach Park (OBP). Subtidal surveys were conducted from 1-30 ft depth, mostly focusing on the area directly in front of the Hoakalei Lagoon.

Brief Description of Survey Methods

Intertidal surveys of algae and invertebrates by Foster and Cox have been ongoing from 2006. The algal community was surveyed at 11 sites in March and April 2006 along One'ula Beach Park- 'Ewa Beach Proper. Three sites, two along 'Ewa Beach Proper and one at One'ula Beach Park (site referred to as Kaloi) were quantitatively surveyed again, along with two additional western sites in June 2007, March and June 2008, and March 2009 to determine the abundance and composition of conspicuous macroinvertebrates (sea urchins and sea cucumbers) and algae. Qualitative notes were made on the composition of algae and macroinvertebrates at these in intertidal areas and from White Plains Beach to 'Ewa Beach. Methods are described in Foster and Cox (2006).

Subtidal surveys by Foster and Cox (2008) were done at eight subtidal sites at ~15 to 20 ft depth to the east and the west offshore from the center of the Lagoon in June 2007, and March and June 2008. Sampling is described in Foster & Cox 2008 and was done using SCUBA.

Fishes, invertebrates, and algae were also surveyed by others. AECOS (1986) did subtidal surveys of invertebrates, algae, and fishes at set stations in the area. A total of nine stations were surveyed, three at a depth greater than 15 ft but shallower than 30 ft. Marine Research Consultants (1991) did a quantitative survey of corals and fishes at three locations at set depths (15, 30, 60 ft, one location included 20 ft depth) and qualitatively surveyed benthic species, recording their abundance as common, occasional, or rare. AECOS (1991) surveyed the biomass and the diversity of shallow water marine algae. The information reported in these surveys will be discussed briefly to describe fish species and to document what has been reported by other surveys in the area in the same or differing locations and over varying depths. Because the methods used in each study varied in approach, replication, year and season sampled, methods, and objectives this

report is meant to serve as a qualitative description, a synthesis used to generally describe the area.

Brief Description of the Area

Southwest Oahu from White Plains Beach (21° 18' 12.92 N, 158° 02' 39.09 W) to 'Ewa Beach Proper (21° 18' 21.52 N, 158° 01' 38.70 W) is located within one large watershed. The surrounding land is now mostly but was once used for agriculture. The Ocean Pointe development is located directly inshore and is flanked by White Plains Beach and One'ula Beach Park. Homeless temporary camps are often observed along the dirt road seaward of the development but above the intertidal zone, in areas that would otherwise be dominated by the surrounding Kiaawe bushes. Harvesting of edible limu and macroinvertebrates is known to occur along the shore, and recreational fishers are often observed fishing with hook and line or throw nets from the beaches or fishing from small boats. Waves are common along this stretch of coastline and surfing is popular near One'ula Beach Park and White Plains Beach.

The Intertidal Zone

General Description

In general, the rocky intertidal shoreline is ~ 30-60 ft wide and composed of eroded carbonate reef dominated by a diverse and lush algal assemblage. Much of the intertidal region is only emerged on the lowest of low tides or intermittently between waves. Corals are rare in this wave-impacted habitat but algae and urchins are abundant. There are major differences in algal species composition and abundance among intertidal areas that correspond with physical differences in elevation, slope, water motion, and sand influence.

At least three general intertidal habitat types described in MRC (1991), AECOS (1991), Cox & Foster (2012; Fig. 2) can be found along this stretch of coast. These include 1) elevated sloped carbonate platforms where rock formations tend to be more angular and rough and receive direct wave impact with no or little sand, 2) relatively flat carbonate benches that are directly associated with a beach and are sand influenced and, 3) "hybrid" habitats with lower carbonate intertidal benches with a small sandy beach backed by a highly eroded cliff. The carbonate benches at the latter are relatively flat but contain raised algal covered ridges and eroded depressions filled with sand. The flat carbonate benches (habitat type 2 & 3) are most common. The area near One'ula Beach Park consists largely of habitat type 2 with the rest of the coastline alternating between the more common habitat type 3 and some small areas with habitat type 1. While uncommon along this stretch of coast, elevated rocky platforms (habitat type 1) characterize much of the coastline to the east along 'Ewa Beach proper).



Fig. 2 (left panels 1-3). Habitat types found in the intertidal zone.

Habitat type 1 (left): Elevated, wave impacted bench. This is habitat type is common along Ewa Beach proper to the east of the study area and is interspersed between habitat type 2 & 3 between White Plains and One'ula Park.



Habitat type 2 (left): Flat, sand influenced bench found near One'ula Beach Park.



Habitat type 3 (left): "Hybrid" habitat found along most of this coastline. This habitat type is characterized by flat benches with raised algal covered ridges, and is backed by a sandy beach and a raised and angular cliff.

Algae (Limu)

Algal assemblages are diverse and lush in the intertidal zone, covering nearly 100% of rocky surfaces. A combined total of 80 algal taxa have been reported from this area (Appendix I, Table A). Algal biomass is greatest in the mid to lower intertidal region (AECOS, 1991). Species of *Padina*, *Laurencia*, *Dictyota*, and *Acanthophora spicifera* are common (Table 1) and typical of species in intertidal habitats around the island of O'ahu (Cox et al, *in press*).

The algal assemblages differ at elevated habitat type 1) versus more flat carbonate sites (habitat type 2 & 3, see Cox & Foster 2012; AECOS 1991). Algae from the order Dictyotales (*Padina sanctae-crucis*, *Dictyota* spp.) are more abundant on flat benches with less elevation like those at Kalo'i (near One'ula Beach Park) while fleshy red algae such as *Pterocladia* spp. and the introduced alga *Acanthophora spicifera* are more abundant at elevated sloped habitats, like those along 'Ewa Beach proper.

Small clumps of cryptogenic, invasive species *Avrainvillea amadelpha* are observed in sandy habitats near One'ula Beach Park. The abundance of this species appears to be increasing in recent years. The mud weed (common name for *A. amadelpha*) mats can be seen growing in the sandy crevices along the edge of the eroded carbonate bench.

The green alga *Chaetomorpha antennina* and bloom-forming species *Hypnea musciformis* and *Ulva lactuca* (formerly *Ulva fasciata*) were identified as common in quantitative surveys conducted in this region in 1991 by AECOS and in 1990 by MRC (see MRC 1991) but were not abundant in quantitative surveys conducted in 2006, 2007, 2008, 2009 or 2012 by Foster & Cox nor by Lapointe & Bedford (2011) who surveyed the Kalo'i intertidal site. *Chaetomorpha antennina* was noted as common in qualitative surveys conducted by Foster & Cox (2007) on intertidal benches along the west end of this region. These differences may be related to spatial placement of surveys, identification discrepancies between surveyors, or temporal changes in nutrients that may affect algal abundances..

Table 1. Algal species that have been identified as common in the intertidal zone within the study area.

Abundant intertidal algal taxa	Identified by
<i>Acanthophora spicifera</i> , <i>Chaetomorpha antennina</i> , <i>Dictyosphaeria versluisii</i> , <i>Hypnea musciformis</i> , <i>Laurencia</i> spp., <i>Pterocladia capillacea</i> , <i>Porolithon onkodes</i> , <i>Ulva lactuca</i>	AECOS 1991
<i>Acanthophora spicifera</i> , <i>Chaetomorpha antennina</i> , <i>Caulerpa racemosa</i> , <i>Caulerpa serrularoides</i> , <i>Halimeda discoidea</i>	MRC 1991
<i>Acanthophora spicifera</i> , <i>Crustose Corallines</i> , <i>Dictyota</i> spp., <i>Mixed Turf</i> , <i>Laurencia</i> spp., <i>Padina sanctae-crucis</i> , <i>Pterocladia</i> spp., <i>Asparagopsis taxiformis</i>	Foster & Cox all years

Coral
Coral species were seldom observed in intertidal zone.

Non-coral Macroinvertebrates

Sea urchins such as *Echinometra mathaei* and *E. oblonga* are burrowed along crevices in the lower intertidal zones and are the most abundant macroinvertebrates encountered, the latter species being more abundant. *Colobocentrotus atratus* occurs near White Plains Beach along the cliff face where wave action is increased, while sea cucumbers, such as *Holothuria cinerescens*, are common within the sand filled depressions in the flat intertidal platforms in the west.

Macroinvertebrates in the high intertidal zone, directly above the algal dominated area, have not been quantified, but *Nerita picea*, *Isogonomon californicum*, *Grapsus* sp., *Cellana* sp., and *Acanthochiton viridis* have been observed (See Appendix I, Table B). Other non-coral macroinvertebrates observed include species of cowries (*Cypraea*), predatory snails (*Drupa*, *Morula*), hermit crabs (*Calcinus*), and sponges.

Fishes

To our knowledge a comprehensive survey of intertidal fishes along this coastline has not been done. Cox et al.(2011) surveyed intertidal fishes along 'Ewa Beach proper and found a diverse assemblage of intertidal fishes. Intertidal fishes on O'ahu vary in composition vertically across the shore with diversity being highest in low pools.

Istioblennius zebra, *Entomacrodus marmoratus*, *Bathygobius* spp., and species from the family Labridae were common in pools along Ewa Beach proper. Similar assemblages can be expected in the elevated sloped habitat types in this region but the flat sandy platforms may have different assemblages. Juveniles reef fishes (*Abudefduf* spp., *Acanthurus triostegus*) and resident gobies, and blennies have been observed in many of the cracks and crevices in the flat carbonate benches at One'ula Beach Park.

Shallow Subtidal Zone: 0- 15 ft deep

General Description

The benthic habitat in the shallow subtidal zone to a depth of 15 ft has also been described (see references) in multiple surveys done using different methods and at different survey stations over many years. The general environment consists of a broad, generally flat carbonate shelf with some channelization and seasonal shifting sand (Fig. 3). Sand is commonly resuspended by the constant water motion and visibility along the reef is poor. The depth range of the sand covering the reef varies spatially and temporally. In 2007-2008, measurements over flat, hard surfaces ranged from 0 - <8 cm deep, and sand accumulated in channels ranged from 2 - 14 cm deep (Foster & Cox 2008).

The diversity and cover of large organisms on the substrate is very low, and the majority of species are algae (Appendix II, Tables A,B, and C). The typical reef consists of a thin layer of sand over generally flat carbonate rock with a few channels oriented perpendicular to shore. Small encrusting or branching corals, small anemones, and algal turf occur in patches on hard structure with occasional sea urchins (mostly *Echinometra mathaei* and *Echinothrix calamaris*) exposed, sheltered in crevices or burrowed into the rock. Numerous bivalves, *Brachiodontes crebistratus* were observed in sandy habitats where either hard structure was absent or buried by sand. Reef fish from the families Labridae, Acanthuridae, Pomacentridae were concentrated near areas of higher relief and

at many survey stations the number of individuals was low (1-10 individuals per species per station, 0-70 total individuals observed per station see AECOS 1986; MRC 1991).

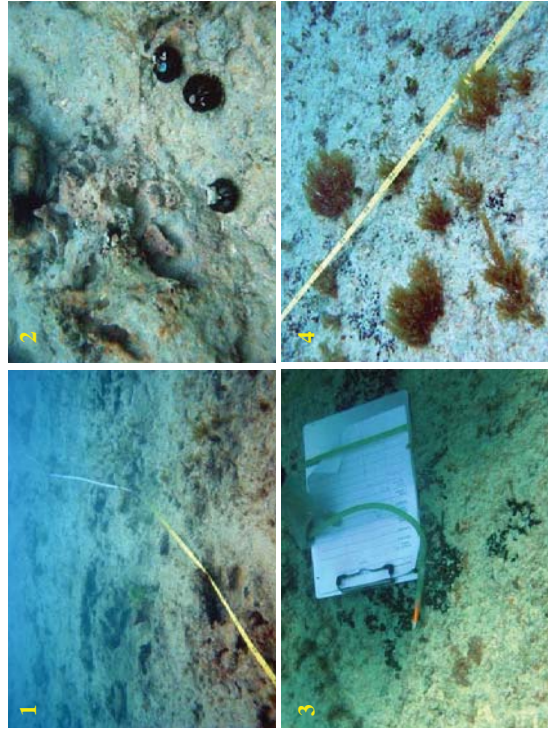


Fig. 3 Images of habitats and organisms in the shallow subtidal zone 0 – 15 ft deep taken in 2007-2008. 1. Typical habitat with sediment, turf algae, and patches of other, larger algal species (tape ~ 6 m long). 2. Hard substrate with collector's urchin *Tripneustes gratilla*. 3. The mussel *Brachiodontes crebrisirriatus* (black patches) partially buried by sand. 4. Algal turf with patches of the larger alga *Dictyopteris* spp. and the mussel *B. crebrisirriatus*.

Algae

Species richness in the shallow subtidal zone is lower than in the intertidal zones. A combined total of 62 algal taxa were reported from multiple surveys (Appendix II, Table A). *Halimeda discoidea*, *Dictyopteris plagiogramma* and *Avrainvillea amadelpha* colonize sand and *Asparagopsis taxiformis*, *Laurencia* spp., *Codium* spp., *Dictyota* spp., and *Poriterra hornemanni* and other reef species sparsely cover the hard structure. In the multiple year and seasonal surveys conducted by Foster & Cox (summarized in 2008 report), the abundances, as percent cover, of most of the algal species were low (0.03 – 4.43 %, except turf and *A. amadelpha*). In sandy locations, the community appeared to vary temporally with the seasonally shifting sands. For example, *Dictyopteris plagiogramma* was more abundant in summer than winter.

The three studies done at this depth found different species as most abundant (Table 2). This discrepancy between MRC (1991) and the other two surveys (AECOS 1986 and Foster & Cox 2008) may be largely due to how abundance is defined and the methods used. To determine the abundance of algal species, MRC (1991) used a qualitative approach based upon approximate number of individuals to define the most abundant species and surveyed a much larger area. This could produce results different from AECOS (1986), Foster & Cox (2008) that used a quantitative approach measuring the percent cover of species in defined reef regions. In addition, hard substrate is very patchy and sand constantly shifts. Thus differences in abundances may be due to spatial or temporal changes in the physical habitat.

Table 2. Most abundant algal species within 15 ft depth

Species	Identified by
<i>Codium edule</i> , <i>Dictyota</i> spp., <i>Halimeda discoidea</i>	AECOS 1986
<i>Hypnea</i> spp.	MRC 1991
<i>Avrainvillea amadelpha</i> , Turf	Foster & Cox 2008

Coral

Coral cover and diversity (a combined total of 12 species reported, see Appendix II, Table B) was generally low and cover was greater in areas where sand was less abundant and hard surfaces more available. These corals tended to be small (< 3 ft. dia.), encrusting or have short branching statures and colonies are widely separated (usually 2-6 ft apart). Common scleractinian species were *Pocillopora meandrina*, *Pocillopora damicornis*, *Porites lobata* (Table 3).

The higher percent cover of coral colonies documented by MRC (1991) is likely due to differences in approach. MRC (1991), selected transect locations to characterize hard bottom areas of the reef whereas Foster & Cox (2007, 2008) characterized the area at a set distance from shore.

Table 3. Most abundant (% cover) coral species (in descending order) observed within 15 ft depth. * The percentages determined by AECOS 1986 are not provided because % cover was reported differently than other two studies.

Species	Identified by
<i>Porites lobata</i>	AECOS 1986
<i>Porites lobata</i> (0 – 4.6 %)	MRC 1991
<i>Pocillopora meandrina</i> (0.0-0.5%), <i>Pocillopora damicornis</i> (0-0.3 %)	Foster & Cox 2008

Non-Coral Macroinvertebrates

Sea urchins were common and diverse at this depth in areas with hard substrate while large numbers (hundreds) of the bivalve *Brachiodontes crebristratus* were encountered in areas with deeper sand. In areas without *B. crebristratus*, *Echinometra mathaei* was most common followed by *Echinothrix diadema*, *Triplaneustes gratilla*, *Echinothrix calamaris*, and *Echinometra oblonga* (Foster & Cox 2008). Other urchin species observed included *Heterocentrotus mamillatus*, and *Echinostrephus aciculatus*. Small anemones, possibly *Aiptasia pulchella* identified by AECOS (1986), were abundant on hard substrate and the occasional sea cucumber was found. See Appendix II. Table C for a list of other reported non-coral macroinvertebrates.

Fishes

Fishes are sparse and when observed they tended to be clustered in specific areas of the reef with greater relief. Within this depth of the reef, MRC (1991) and AECOS (1986) report observing members from many families, most herbivores or omnivores (Table 4). Fifty fish species are reported from this depth range (Appendix II. Table D). The total number of fish individuals at a survey station ranged from 0-70 (AECOS 1986; MRC 1991).

Common fish species in the shallow subtidal zone both in 1986 (AECOS 1986) and in 1990 (MRC 1991) include the labrids *Stethojulis balteata* (2 – 23 individuals observed per station) and *Thalassoma duperrey* (2-26 individuals observed per station) (Table 4). Cox from Foster & Cox 2007-2008 also observed individuals of *S. balteata* and *T. duperrey* during their surveys of benthic organisms. *Pervagor spilotosoma* was very common in AECOS (1986) surveys with 54 individual, but was rare in surveys by MRC (1991). The difference is likely due to the episodic occurrences of this species in Hawaiian waters (Stimson 2005).

Table 4. Most abundant fish species in terms of total # individuals (species listed in descending order) observed within 15 ft depth.

Species	Identified by
<i>Pervagor spilotosoma</i> , <i>Thalassoma duperrey</i> , <i>Stethojulis balteata</i>	AECOS 1986
<i>Parupeneus multifasciatus</i> , <i>Thalassoma duperrey</i> , <i>Acanthurus triostegus</i> , <i>Chromis vanderbilti</i> , <i>Stethojulis balteata</i>	MRC 1991

Shallow Subtidal Zone: 15 - 30 ft deep

General Description

The biology and surrounding environment within ~ 0.5 miles from shore at a depth of 15-30 ft is similar to the shallower subtidal zone described above. The substrate is a continuation of that found in shallower water – a sparsely colonized carbonate reef with some channelization, much sedimentation, and considerable sand accumulation in some areas. Algae, corals, and urchins are most abundant but cover and numbers are low (Fig. 4). At this slightly deeper depth there is lower benthic diversity, greater diversity of

fishes, and an increase in the abundance of hard substrate covered by thicker sand. The decrease in benthic diversity is largely the result of a loss of algal species with depth.

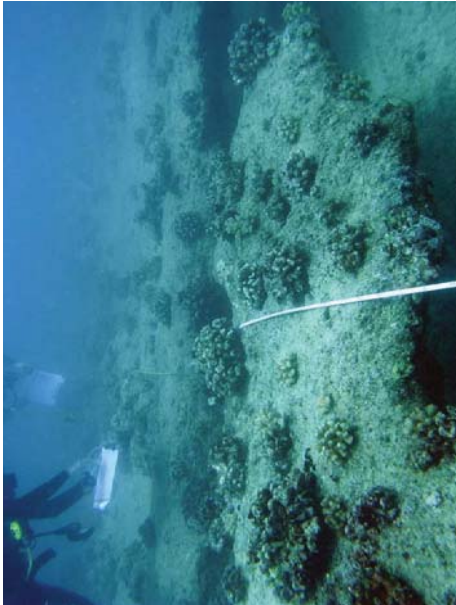


Fig. 4 Hard bottom habitat with some relief within the subtidal zone 15-30 ft depth in 2007. Note colonies of the coral *Pocillopora meandrina*.

Algae

Algal diversity at this deeper depth is much reduced with only 38 taxa being recorded from multiple surveys (Appendix III, Table A). The abundance of most of the 36 species was low, less than 20 individuals or 2% cover per station (AECOS 1986, MRC 1991, Foster & Cox 2007-2008). *Halimeda discoidea* and *Dictyopteris* spp. are common algal species, found mostly in more sandy habitats (Table 5). Differences in abundances among surveyors may be due to different methods or the spatial or temporal changes in the physical habitat.

Table 5. Most abundant algal species >15-30 ft depth

Species	Identified by
<i>Codium edule</i> , <i>Dictyopteris australis</i> , <i>Halimeda discoidea</i> , <i>Portiera hornemanni</i> , <i>Tolyptocladia glomerulata</i> , (all at low % cover)	AECOS 1986
<i>Caulerpa</i> spp., <i>Halimeda</i> spp., <i>Asparagopsis taxiformis</i> , <i>Acanthophora spicifera</i> , <i>Lyngbya majuscula</i>	MRC 1991
<i>Dictyopteris</i> spp., <i>Halimeda discoidea</i> , <i>Laurenciaia</i> spp.	Foster & Cox 2008

Coral

Coral cover and diversity is generally low but cover is slightly greater at the deeper depths in areas where hard surfaces are available. A total of 12 species of corals were recorded in AECOS (1986), MRC (1991), and Foster & Cox (2007-2008; Appendix III, Table B) and the species number per quantitative survey station ranged from 0-7, but 2-3 species was usual. Common species were *P. meandrina* and *P. lobata* (Table 6). These corals colonies tended to be <3 ft. in diameter with short branching structures, and colonies were separated by ~1.5 - 3ft.. At these depths, AECOS (1986) noted a colony with a maximum diameter of 4.9 ft but the mean colony size tended to be smaller.

The higher cover of coral colonies found by MRC (1991) is likely due to differences in approach. Surveys from MRC (1991), selected transect locations to characterize hard bottom whereas Foster & Cox (2007-2008) attempt to characterize the general reef, choosing to survey hard and soft bottoms at a set distance from shore.

Table 6. Most abundant (% cover) coral species (species in descending order)

Species	Identified by
<i>Porites lobata</i> , <i>Pocillopora meandrina</i>	AECOS 1986
<i>Porites lobata</i> (1.6 -6.7 %), <i>Pocillopora meandrina</i> (1.6 -5.5%)	MRC 1991
<i>Porites lobata</i> (0.2 – 3.7%), <i>Pocillopora meandrina</i> (0.0 -2.8%)	Foster & Cox 2008

Non-Coral Macroinvertebrates

The same urchin species found at the >15ft depth occur in deeper water but the abundance of *Tripteneustes gratilla* is reduced. A total of 18 non-coral macroinvertebrate species have been reported from this depth range (Appendix III, Table C). *Brachiodontes crebristratus* was not found.

Fishes

Within this depth range, observations of fishes tended to be infrequent but aggregated when encountered. For example, AECOS (1986) and MRC (1991) found 1 – 50 individuals/species/survey station, or 18 - 372 total individuals/survey station. This contrasts with shallower water where the total number of individuals/station ranged from 0-70. Thus the total numbers of individuals observed may be related to depth but these observations can be quite variable depending on the survey station. Observations in the area support the suggestion that variation in fish abundance is related to the physical structure of the reef.

Species richness of fishes increased with depth. A total of 60 species were reported from two studies of which 39 were observed by AECOS (1986) and 42 were observed by MRC (1991) (Appendix III, Table D). *Thalassoma duperrey* and *Stethojulis*

balteata, common in shallower water, were also found in deeper. In 1990 (MRC 1991), *Chromis vanderbilti*, *Chaetodon militaris*, *Lutjanus kasmira*, *Abudefduf abdominalis* occurred in greatest numbers within this depth range (Table 7) but these fish sightings tended to be from one or two survey locations (different stations for different species) within the study area. These fishes also tend to congregate and this could account for the patchy observations. More species of acanthurids and chaetodontids were observed at these deeper depths but overall abundances of species from these families were low (1 - 31).

Table 7. Most abundant fish species in terms of total # individuals (species in descending order) observed in surveys > 15-30 ft depth

Species	Identified by
<i>Pervagor spilosoma</i> , <i>Acanthurus nigrofasciatus</i> , <i>Stethojulis balteata</i> ,	AECOS 1986
<i>Thalassoma duperrey</i> , <i>Chromis vanderbilti</i>	
<i>Chromis vanderbilti</i> , <i>Abudefduf abdominalis</i> , <i>Lutjanus kasmira</i> ,	MRC 1991
<i>Chaetodon militaris</i> , <i>Thalassoma duperrey</i> , <i>Acanthurus nigrofasciatus</i>	

Summary and Additional Comments

1) Surveys of nearshore marine habitats (<30ft deep) from White Plain Beach to Ewa Beach proper show that the benthic marine community is algal dominated and influenced by the water motion and sedimentation. Community composition changes along a gradient with water depth.

2) Benthic intertidal assemblages are diverse with abundant algae. Three intertidal habitat types are described. The abundances of particular species vary among these habitat types. In particular, members of the algal order Dictyotales and sea cucumbers are more prevalent on flat, sand influenced shores while red algae such as *Pterocladia* spp. and *A. spicifera* are more common on elevated, sloped habitats.

3), The benthic community in the subtidal zone is influenced by sand with very low biological cover and low species diversity. From 0 - 15ft deep, the hard substrate is colonized by low abundances of the corals *Pocillopora meandrina*, *Pocillopora damicornis*, *Porites lobata*, sea urchins, and turf algae. The bivalve *Brachiodontes crebristratus* and the cryptogenic alga *Avrainvillea amadelpha* are found in areas with greater accumulation of sand. In deeper regions of the reef there are fewer algal species and fewer numbers of the urchin *Tripteneustes gratilla*. Coral cover increases relative to more shallow water but remains quite low. Water motion combined with the resuspension and seasonal movement of sand likely limits coral recruitment and growth, and tends to result in a sparsely populated, spatially and temporally variable benthic community. Corals tend to be small in size with short, stubby branches.

4) Fish assemblages are vertically structured from the high intertidal to depths of 30 ft. Juvenile (*Abudefduf abdominalis*, *Acanthurus triostegus*) and resident tidepool species (*Istiblennius zebra*, *Entomacrodus* spp., *Bathygobius* spp.) were observed in the

nearshore. In the subtidal zone, fishes were seldom encountered but when observed tended to be concentrated in areas with greater relief. More fish species and individuals were observed in MRC (1991) than AECOS (1986) despite the greater number of survey stations in the latter. The differences may result from differences in the location of survey stations; MRC (1991) characterized hard bottom habitats that may provide more relief. In addition, in 1982-1987 *Pervagor spilosoma* was known to be abundant in Hawaiian waters (Simson 2005) and this is evident in the 1986 survey of the reefs in Ewa. In both 1986 and 1991, wrasses (labrids) were common at all depths. The diversity of fishes increased and observations of acanthurids and corallivorous chaetodontids were more frequent as depth increased.

5) Monk seals and green sea turtles have been observed offshore.

6) A few introduced species occur in the study area. Several invasive algae occur in the intertidal and subtidal zones including *Acanthophora spicifera*, *Hypnea musciformis*, and the cryptogenic *Avrainvillea amadelpha*. Currently, *A. amadelpha* is more common in the subtidal zone and *Acanthophora spicifera* occurs abundant in the intertidal zone. The abundance of *A. amadelpha* is, however, increasing in the intertidal zone. In a June 2012 community effort, ~25 people removed about 50 lbs wet weight of this mud weed from the Kaloi area alone. The introduced zoanthid *Anithelia edmondsoni* and two introduced fishes, the blue lined snapper *Lutjanus kasmira* and the roi *Cephalopholis argus*, occur in the subtidal zone.

Impact of Proposed Swimming Lagoons in Hoakalei Lagoon On Biological Communities Ocean Offshore

The water in the swimming lagoons will be pumped from the lagoon, filtered and aerated, and discharged back into the lagoon. It should be little different from natural lagoon water that already flows to the ocean as ground water. The swimming lagoons should not, therefore, have any adverse impacts on the marine environment offshore.

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Appendix I. Intertidal zone

Table A. Common algal taxa reported to occur in the intertidal zone within the study area. A combined total of 80 taxa have been reported.

Algal taxa	Reported by
<i>Acanthophora spicifera</i>	AECOS 1991;MRC 1991; Foster & Cox 2006-2009, 2012
<i>Amphiroa valonioides</i>	Foster & Cox 2006
<i>Amphiroa</i> sp.	AECOS 1991
<i>Anotrichum tenue</i>	Foster & Cox 2008
<i>Articulata Canline</i>	Foster & Cox 2006, 2008
<i>Asparagopsis taxiformis</i>	Foster & Cox 2006-2009, 2012
<i>Avramillea anadelpha</i>	Foster & Cox 2009, 2012
<i>Bornetella sphaerica</i>	Foster & Cox 2008-2009
<i>Brayopsis</i> sp.	AECOS 1991
<i>Caulerpa lentillifera</i>	Foster & Cox 2006, 2008
<i>Caulerpa Mexicana</i>	Foster & Cox 2007-2009
<i>Caulerpa racemosa</i>	AECOS 1991;MRC 1991 Foster & Cox 2007, 2009, 2012
<i>Caulerpa verticillatoides</i>	MRC 1991; Foster & Cox 2006-2009, 2012
<i>Caulerpa taxifolia</i>	AECOS 1991; Foster & Cox 2006-2008
<i>Caulerpella ambigua</i>	Foster & Cox 2006-2007
<i>Centroceras clavulatum</i>	Foster & Cox 2006-2008
<i>Centroceras</i> sp.	AECOS 1991
<i>Ceolothrix irregularis</i>	AECOS 1991; Foster & Cox 2006
<i>Chaetomorpha antennina</i>	Foster & Cox 2006-2008, 2012
<i>Chaetomorpha</i> sp.	Foster & Cox 2008-2009
<i>Champia parvula</i>	Foster & Cox 2006-2009, 2012
<i>Chondria minutula</i>	Foster & Cox 2008-2009
<i>Chondrophycus doryi</i>	Foster & Cox 2006-2009, 2012
<i>Cladophora lucurians</i>	AECOS 1991; Foster & Cox 2006
<i>Cladophora vagabunda</i>	AECOS 1991
<i>Cladophoropsis</i> sp.	AECOS 1991
<i>Codium arabicum</i>	Foster & Cox 2008
<i>Codium edule</i>	AECOS 1991, Foster & Cox 2008
<i>Codium recedue</i>	Foster & Cox 2006
<i>Colpomenia sinuosa</i>	Foster & Cox 2006-2009, 2012
<i>Crustose Coralline</i>	Foster & Cox 2006-2009, 2012
<i>Cyanobacteria</i>	Foster & Cox 2012
<i>Dasya anastomosans</i>	Foster & Cox 2006
<i>Dasyopsis</i> sp.	AECOS 1991
<i>Dicopoteris plagiogramma</i>	Foster & Cox 2006, 2012
<i>Dicysphaeria cavemosa</i>	Foster & Cox 2007
<i>Dicysphaeria versluysi</i>	Foster & Cox 2009
<i>Dicystosphaeria versluysi</i>	AECOS 1991; Foster & Cox 2006-2009, 2012
<i>Dicystota acutiloba</i>	AECOS 1991
<i>Dicystota bartovesciana</i>	Foster & Cox 2007-2008
<i>Dicystota ceylanica</i>	Foster & Cox 2007, 2012
<i>Dicystota ciliolata</i>	Foster & Cox 2006
<i>Dicystota friabilis</i>	AECOS 1991; Foster & Cox 2006-2009
<i>Dicystota sandvicensis</i>	AECOS 1991; Foster & Cox 2007-2009, 2012
<i>Dicystota</i> spp.	Foster & Cox 2007-2008
Gelidiales	AECOS 1991
<i>Gelidiopsis scoparia</i>	AECOS 1991
<i>Gracilaria bursa-pastoris</i>	AECOS 1991
<i>Gracilaria coranapifolia</i>	AECOS 1991
<i>Gracilaria</i> sp.	AECOS 1991
<i>Gracilaria</i> sp.	Foster & Cox 2006-2009, 2012
<i>Griffithsia heteromorpha</i>	MRC 1991; Foster & Cox 2006-2009, 2012
<i>Halimeda discoides</i>	AECOS 1991; Foster & Cox 2006, 2008-2009
<i>Hypnea chondracea</i>	

Table A continued. Common algal taxa reported to occur in the intertidal zone within the study area.

<i>Hypnea musciformis</i>	AECOS 1991, Foster & Cox 2007-2009
<i>Hypnea spinella</i>	Foster & Cox 2006; Foster & Cox 2006-2009
<i>Iania micranthodia</i>	Foster & Cox 2007, 2012
<i>Iania</i> sp.	AECOS 1991, Foster & Cox 2007
<i>Laurencia nidifica</i>	AECOS 1991
<i>Laurencia</i> spp.	AECOS 1991, Foster & Cox 2006-2009, 2012
<i>Lyngbya</i> spp.	Foster & Cox 2009, 2012
<i>Lyngbya</i> spp.	Foster & Cox 2006-2007, 2012
<i>Muriensia fragilis</i>	AECOS 1991
<i>Microdictyon</i> sp.	AECOS 1991
Mixed Turf	Foster & Cox 2006-2009, 2012
<i>Nomeris</i> spp.	Foster & Cox 2012
<i>Nomeris variboscuae</i>	Foster & Cox 2008
<i>Padina gymnospora</i>	Foster & Cox 2006
<i>Padina sanctae-crucis</i>	AECOS 1991; Foster & Cox 2006-2009; Foster & Cox 2012
<i>Peysionella rubra</i>	AECOS 1991
<i>Placamilium sandvicensis</i>	AECOS 1991
<i>Polysiphonia</i> sp.	AECOS 1991
<i>Porieria homanumii</i>	Foster & Cox 2008
<i>Porocladella caerulescens</i>	Foster & Cox 2007-2008
<i>Porocladella capillacea</i>	AECOS 1991; Foster & Cox 2007-2009
<i>Porocladella</i> sp.	AECOS 1991
<i>Sargassum aquifolium</i>	Foster & Cox 2006-2009, 2012
<i>Scinaia hormoides</i>	AECOS 1991
<i>Spyridia filamentosa</i>	AECOS 1991; Foster & Cox 2006, 2008, 2009
<i>Talytia-cladia glomerulata</i>	Foster & Cox 2006
<i>Ulva lactuca</i>	AECOS 1986; Foster & Cox 2006-2009
<i>Valoniia aegagropila</i>	Foster & Cox 2008
<i>Wangiella elegantissima</i>	Foster & Cox 2006-2009

Appendix I. Intertidal Zone continued.

Table B. Common non-coral macroinvertebrates reported to occur in the intertidal zone within the study area. 23 taxa have been reported.

Non-coral Macroinvertebrates	Reported by
Sea cucumbers	
<i>Actinopyga mauritiana</i>	Foster & Cox 2008
<i>Halothuria atra</i>	Foster & Cox 2007-2008
<i>Halothuria chlorascens</i>	Foster & Cox 2007-2009, 2012
Urchins	
<i>Colobocentrotus atratus</i>	Foster & Cox 2007
<i>Echinometra mathaei</i>	Foster & Cox 2007-2009, 2012
<i>Echinometra oblonga</i>	Foster & Cox 2007-2009, 2012
<i>Echinodirix calamaris</i>	Foster & Cox 2008
<i>Echinodirix diadema</i>	Foster & Cox 2007-2008
Arthropoda	
<i>Calcinus elegans</i>	Foster & Cox 2007
<i>Grapsus</i> spp.	Foster & Cox noted
Mollusks	
<i>Acanthochiton viridis</i>	Foster & Cox 2007
<i>Cellana</i> sp.	Foster & Cox 2007
<i>Conus flavus</i>	Foster & Cox 2008
<i>Conus pinacoides</i>	Foster & Cox 2008
<i>Conus rufus</i>	Foster & Cox 2008
<i>Cypraea capersperpentis</i>	Foster & Cox 2007-2008, 2012
<i>Cypraea mauritiana</i>	Foster & Cox 2012
<i>Drapa morum</i>	Foster & Cox 2008
<i>Isoegomus californicum</i>	Foster & Cox noted
<i>Morula granulata</i>	Foster & Cox 2012
<i>Nerita picea</i>	Foster & Cox noted
Sponges	
	Foster & Cox 2006-2012

Appendix II. Subtidal Zone: 0- 15 ft depth

Table A. Common algal taxa reported to occur within 0-15 ft depth in the study area. A combined total of 62 taxa have been reported.

Algae	Reported by
<i>Acanthophora spicifera</i>	AECOS 1986; MRC 1991
<i>Amphiroa fragilissima</i>	AECOS 1986; MRC 1991
<i>Asparagopsis tasiformis</i>	AECOS 1986; MRC 1991
<i>Avrainvillea amadelphia</i>	Foster & Cox 2007-2008
<i>Bryopsis hypnoides</i>	Foster & Cox 2007
<i>Caulerpa mexicana</i>	Foster & Cox 2007
<i>Caulerpa racemosa</i>	MRC 1991
<i>Caulerpa serrulatioides</i>	MRC 1991, Foster & Cox 2007
<i>Caulerpa taxifolia</i>	Foster & Cox 2007
<i>Chaetomorpha antennina</i>	Foster & Cox 2007
<i>Codium arabicum</i>	AECOS 1986; Foster & Cox 2007-2008
<i>Codium edile</i>	AECOS 1986; Foster & Cox 2007
<i>Codium recedae</i>	AECOS 1986; Foster & Cox 2007
<i>Codium</i> spp.	MRC 1991
<i>Colpomenia sinuosa</i>	MRC 1991
<i>Conallina</i> sp.	AECOS 1986
<i>Cratogeomella</i>	AECOS 1986; MRC 1991
<i>Dasya treadwelli</i>	Foster & Cox 2007
<i>Dicyota australis</i>	AECOS 1986
<i>Dicyota</i> spp.	MRC 1991, Foster & Cox 2007-2008
<i>Dicvosphaeria</i> spp.	MRC 1991
<i>Dicyota acutiloba</i>	AECOS 1986; Foster & Cox 2007-2008
<i>Dicyota frabillii</i>	AECOS 1986
<i>Dicyota sandwicensis</i>	AECOS 1986
<i>Dicyota</i> spp.	MRC 1991
<i>Doryella havaiensis</i>	AECOS 1986
<i>Euphyllodes magnifera</i>	Foster & Cox 2007-2008
<i>Galaxaura fastigata</i>	AECOS 1986
<i>Galaxaura filamentosa</i>	AECOS 1986
<i>Galaxaura</i> spp.	MRC 1991
Gelidiales	Foster & Cox 2007
<i>Gracilaria bursa-pastoris</i>	AECOS 1986
<i>Halimeda discordea</i>	AECOS 1986; Foster & Cox 2007-2008
<i>Halimeda opuntia</i>	AECOS 1986
<i>Halimeda</i> spp.	MRC 1991
<i>Halophila</i> sp. (seagrass)	Foster & Cox 2007-2008
<i>Halymenia Formosa</i>	Foster & Cox 2007
<i>Hydroclitum</i> spp.	MRC 1991
<i>Hypnea musciformis</i>	AECOS 1986
<i>Hypnea spinella</i>	AECOS 1986
<i>Hypnea</i> spp.	MRC 1991
<i>Jania</i> spp.	AECOS 1986; MRC 1991
<i>Laurencia niddica</i>	AECOS 1986
<i>Laurencia obtusa</i>	AECOS 1986
<i>Laurencia</i> spp.	Foster & Cox 2007-8
<i>Liagora</i> spp.	Foster & Cox 2007
<i>Lingbya</i> spp.	Foster & Cox 2007
<i>Mariensta fragilis</i>	MRC 1991
Mixed Turf	AECOS 1986; Foster & Cox 2007
<i>Neogoniolithon</i> sp.	MRC 1991

Appendix II continued. Subtidal Zone 0- 15 ft depth

Table A continued. Common algal taxa reported to occur within 0-15 ft depth in the study area. A combined total of 62 taxa have been reported.

<i>Padina sanctae-crucis</i>	AECOS 1986
<i>Padina</i> spp.	Foster & Cox 2007
<i>Peysionella rubra</i>	AECOS 1986, MRC 1991
<i>Porolithon</i> spp.	MRC 1991
<i>Portieria hornemanni</i>	AECOS 1986; MRC 1991
<i>Siphonocladus tropicus</i>	Foster & Cox 2007
<i>Spyridia filamentosa</i>	AECOS 1986
<i>Trichoglossa requienii</i>	Foster & Cox 2007
<i>Ulva lactuca</i>	AECOS 1986
<i>Ulva</i> spp.	MRC 1991
<i>Wrangelia elegantissima</i>	Foster & Cox 2007

Table B. Common coral species reported to occur within 0-15 ft depth in the study area. A combined total of 12 species have been reported.

Corals	Reported by
<i>Acropora edmondsoni</i>	MRC 1991
<i>Montipora patula</i>	AECOS 1986, MRC 1991
<i>Montipora verrucosa</i>	MRC 1991
<i>Lepastrea purpurea</i>	MRC 1991
<i>Porites compressa</i>	AECOS 1986
<i>Porites lobata</i>	AECOS 1986, MRC 1991, Foster & Cox 200
<i>Porites evermanni</i>	AECOS 1986
<i>Porites molokensis</i>	AECOS 1986
<i>Pocillopora damicornis</i>	Foster & Cox 2007-2008
<i>Pocillopora meandrina</i>	AECOS 1986, MRC 1991, Foster & Cox 2007-2008
<i>Palythoa tuberculosa</i>	AECOS 1986, MRC 1991
<i>Zanclus</i> sp.	AECOS 1986

Appendix II continued. Subtidal Zone: 0- 15 ft depth

Table C. Common non-coral macroinvertebrates reported to occur within 0-15 ft depth in the study area. A combined total of 22 species have been reported.

Non-coral Macroinvertebrate	Reported by
Sea anemones	
<i>Alipastia pulchella</i>	AECOS 1986
Sea cucumbers	
<i>Holothuria atra</i>	AECOS 1986, MRC 1991
<i>Holothuria whitnaci</i>	MRC 1991
Urchins	
<i>Echinometra mathaei</i>	AECOS 1986,MRC 1991, Foster & Cox 2007-2008
<i>Echinometra oblonga</i>	MRC 1991, Foster & Cox 2007-2008
<i>Echinodirix diadema</i>	AECOS 1986, MRC 1991, Foster & Cox 2007- 2008
<i>Echinodirix ciliata</i>	MRC 1991, Foster & Cox 2007
<i>Echinostrephus aciculatus</i>	AECOS 1986,MRC 1991
<i>Heterocentrotus mamillatus</i>	MRC 1991, Foster & Cox 2008
<i>Triptenaes gratilla</i>	AECOS 1986, MRC 1991, Foster & Cox 2007-2008
Artiopoda	
<i>Calappa</i> sp.	AECOS 1986
<i>Gonodactylus</i> sp.	AECOS 1986
<i>Pandinus penicillatus</i>	AECOS 1986
<i>Squilla serrata</i>	AECOS 1986
Mollusks	
<i>Brachidontes crebristriatus</i>	AECOS 1986, Foster & Cox 2007-2008
<i>Comus distans</i>	AECOS 1986
<i>Comus leopardus</i>	AECOS 1986
<i>Comus lividus</i>	AECOS 1986
<i>Comus miliaris</i>	AECOS 1986
<i>Drupa morum</i>	AECOS 1986
<i>Ocenebra cyanea</i>	AECOS 1986
Sponges	
	AECOS 1986, MRC 1991, Foster & Cox 2007

Table D. Common fishes reported to occur within 0-15 ft depth in the study area. A combined total of 50 species have been reported.

Fish species	Reported by
Acanthuridae	
<i>Acanthurus blochii</i>	MRC 1991
<i>Acanthurus dasymieri</i>	AECOS 1986, MRC 1991
<i>Acanthurus leucopareius</i>	AECOS 1986
<i>Acanthurus nigrofasciatus</i>	AECOS 1986
<i>Acanthurus nigrostriatus</i>	MRC 1991
<i>Acanthurus olivaceus</i>	MRC 1991
<i>Acanthurus triostegus</i>	AECOS 1986, MRC 1991
<i>Acanthurus xanthopterus</i>	AECOS 1986
<i>Naso lituratus</i>	AECOS 1986
Balistidae	
<i>Rhinecanthus aculeatus</i>	AECOS 1986
<i>Rhinecanthus rectangulus</i>	AECOS 1986, MRC 1991
<i>Sufflamen framtatum</i>	AECOS 1986, MRC 1991
Bleimidae	
<i>Plagiotremus ewanensis</i>	AECOS 1986

Appendix II continued. Subtidal Zone: 0- 15 ft depth

Table D continued. Common fishes reported to occur within 0-15 ft depth in the study area. A combined total of 50 species have been reported.

Chaetodontidae	MRC 1991
<i>Chaetodon lunula</i>	AECOS 1986
<i>Chaetodon miliaris</i>	AECOS 1986
<i>Chaetodon quadrimaculatus</i>	AECOS 1986
Cirrhitidae	
<i>Cirrhinus pinnulatus</i>	AECOS 1986
<i>Paracirrhites arcatus</i>	AECOS 1986
<i>Paracirrhites forsteri</i>	AECOS 1986
Diodontidae	
<i>Diodon hystrix</i>	AECOS 1986
Holocentridae	
<i>Sarcocentron punctatissimum</i>	AECOS 1986
Labridae	
<i>Anampses cwiei</i>	ACOS 1986
<i>Coris gaimard</i>	AECOS 1986, MRC 1991
<i>Coris venusta</i>	AECOS 1986
<i>Labroides philirophagus</i>	AECOS 1986
<i>Macropharyngodon geoffroy</i>	AECOS 1991
<i>Stethojulis balteata</i>	AECOS 1986, MRC 1991
<i>Thalassoma ballianii</i>	AECOS 1986
<i>Thalassoma dipperrey</i>	AECOS 1986, MRC 1991
<i>Thalassoma trilobatum</i>	AECOS 1986, MRC 1991
Monacanthidae	
<i>Pervagor spilosoma</i>	AECOS 1986, MRC 1991
Mullidae	
<i>Parupeneus multifasciatus</i>	AECOS 1986, MRC 1991
<i>Parupeneus pleurostigma</i>	AECOS 1986, MRC 1991
<i>Parupeneus porphyreus</i>	AECOS 1986
<i>Upeneus arge</i>	AECOS 1986
Muraenidae	
<i>Gymnothorax undulatus</i>	AECOS 1986
<i>Gymnothorax flavimarginatus</i>	AECOS 1986
Ostraciidae	
<i>Ostracion melanostris</i>	AECOS 1986
Pomacentridae	
<i>Abudefduf abdominalis</i>	AECOS 1986
<i>Chromis ovalis</i>	AECOS 1986
<i>Chromis vanderbilii</i>	MRC 1991
<i>Plectroglyphidodon imparipennis</i>	AECOS 1986, MRC 1991
<i>Plectroglyphidodon sindonis</i>	AECOS 1986
<i>Stegastes fasciatus</i>	AECOS 1986
Priacanthidae	
<i>Heerptacanthus cruentatus</i>	AECOS 1986
Tetraodontidae	
<i>Arothron hispidus</i>	AECOS 1986
<i>Canthigaster amboinensis</i>	AECOS 1986
<i>Canthigaster coronata</i>	AECOS 1986
<i>Canthigaster fasciatus</i>	AECOS 1986, MRC 1991
Zanclidae	
<i>Zanclus cornutus</i>	AECOS 1986

Appendix III. Subtidal Zone: 15-30 ft. Deep

Table A. Common algal taxa reported to occur 15-30 ft deep in the study area. A combined total of 38 taxa have been reported.

Algal taxa	Reported by
<i>Acetabularia spicifera</i>	MRC 1991
<i>Amphiroa fragilissima</i>	MRC 1991
<i>Asparagopsis taxiformis</i>	MRC 1991; Foster & Cox 2007
<i>Caulerpa mexicana</i>	Foster & Cox 2008
<i>Caulerpa racemosa</i>	MRC 1991
<i>Caulerpa sertularioides</i>	MRC 1991
<i>Codium ambicam</i>	Foster & Cox 2007
<i>Codium edule</i>	AECOS 1986
<i>Codium spp.</i>	MRC 1991
<i>Corallina sp.</i>	MRC 1991
<i>Crustose Coralline</i>	Foster & Cox 2007
<i>Dictyopectis australis</i>	AECOS 1991
<i>Dictyopectis spp.</i>	MRC 1991; Foster & Cox 2007, 8
<i>Dictyosphaeria spp.</i>	MRC 1991
<i>Dicyonota acutiloba</i>	Foster & Cox 2007
<i>Dicyonota spp.</i>	MRC 1991
<i>Galaxaura sp.</i>	MRC 1991
<i>Halimeda spp.</i>	MRC 1991
<i>Halimeda discoidea</i>	AECOS 1986; Foster & Cox 2007, 8
<i>Hydroolithon spp.</i>	MRC 1991
<i>Hypnea spp.</i>	MRC 1991
<i>Iania sp.</i>	MRC 1991
<i>Laurencia spp.</i>	Foster & Cox 2007, 8
<i>Lyngbya spp.</i>	Foster & Cox 2007
<i>Lyngbya majuscula</i>	MRC 1991
<i>Martensia fragilis</i>	MRC 1991; Foster & Cox 2008
<i>Mixed Turf & Turf</i>	Foster & Cox 2008
<i>Neosamolothion sp.</i>	MRC 1991
<i>Neomeris amulata</i>	MRC 1991
<i>Padina spp.</i>	MRC 1991
<i>Peysionella rubra</i>	MRC 1991
<i>Portieria homemannii</i>	MRC 1991; Foster & Cox 2008
<i>Porolithon spp.</i>	MRC 1991
<i>Ralfisia sp.</i>	MRC 1991
<i>Tolypocladia glomerulata</i>	AECOS 1986
<i>Ulva spp.</i> (includes members formerly in <i>Enteromorpha</i> spp.)	MRC 1991
<i>Valonia sp.</i>	MRC 1991
<i>Wrangelia elegantissima</i>	Foster & Cox 2008

Appendix III continued. Subtidal Zone: 15-30 ft. Deep

Table B. Common coral species reported to occur 15-30 ft deep in the study area. A combined total of 12 species have been reported.

Coral species	Reported by
<i>Aniella edmondsoni</i>	MRC 1991
<i>Cyphastrea ocellina</i>	MRC 1991
<i>Lepastrea purpurea</i>	MRC 1991
<i>Montipora patula</i>	AECOS 1986; MRC 1991
<i>Montipora verrucosa</i>	MRC 1991
<i>Palythoa tuberculosa</i>	AECOS 1986; MRC 1991
<i>Pavona varians</i>	AECOS 1986
<i>Pocillopora damicornis</i>	Foster & Cox 2007, 8
<i>Pocillopora meandrina</i>	AECOS 1986; MRC 1991; Foster & Cox 2007,2008
<i>Porites compressa</i>	AECOS 1986
<i>Porites evermanni</i>	AECOS 1986
<i>Porites lobata</i>	AECOS 1986; MRC 1991; Foster & Cox 2007, 2008

Table C. Common non-coral macroinvertebrates reported at 15-30 ft. deep in the study area. A combined total of 18 species have been reported.

Non-coral Macroinvertebrates	Reported by
Sea anemones	
<i>Alipastia pulchella</i>	AECOS 1986
Sea cucumbers	
<i>Actinopyga obesa</i>	MRC 1991
<i>Holothuria atra</i>	MRC 1991
<i>Holothuria whitmae</i>	MRC 1991
Urchins	
<i>Echinometra mathaei</i>	AECOS 1986; MRC 1991; Foster & Cox 2007,2008
<i>Echinometra oblonga</i>	Foster & Cox 2007,2008
<i>Echinostrephus aciculatus</i>	AECOS 1986; MRC 1991
<i>Echinothrix diadema</i>	MRC 1991; Foster & Cox 2007,2008
<i>Echinothrix calamaris</i>	Foster & Cox 2007,2008
<i>Heterocentrotus mamillatus</i>	MRC 1991
<i>Tridacna gradilla</i>	AECOS 1986; MRC 1991; Foster & Cox 2007,2008
Sea Star	
<i>Linckia columbiae</i>	MRC 1991
Arthropoda	
<i>Charybdis orientalis</i>	AECOS 1986
Mollusks	
<i>Comus leopardus</i>	AECOS 1986
<i>Coma sparsalis</i>	AECOS 1986
Polychaetes	
<i>Spirobranchus</i> sp.	AECOS 1986
Sponges (all species of sponges)	AECOS 1986; MRC 1991; Foster & Cox 2007, 2008
Chordata	
<i>Didemnum candidum</i>	AECOS 1986

Table D. Common fishes reported to occur 15-30 ft. deep in the study area. A combined total of 60 species have been reported.

Acanthuridae	
<i>Acanthurus bleekii</i>	MRC 1991
<i>Acanthurus dasymileri</i>	AECOS 1986
<i>Acanthurus nigrofasciatus</i>	AECOS 1986; MRC 1991
<i>Acanthurus nigrostriatus</i>	MRC 1991
<i>Acanthurus olivaceus</i>	AECOS 1986; MRC 1991
<i>Acanthurus triostegus</i>	AECOS 1986; MRC 1991
<i>Naso lituratus</i>	AECOS 1986; MRC 1991
Balistidae	
<i>Melichthys niger</i>	AECOS 1986; MRC 1991
<i>Melichthys vidiua</i>	MRC 1991
<i>Rhinecanthus aculeatus</i>	AECOS 1986; MRC 1991
<i>Rhinecanthus rectangulus</i>	AECOS 1986; MRC 1991
<i>Sufflamen bursa</i>	AECOS 1986; MRC 1991
<i>Sufflamen fraenatum</i>	AECOS 1986; MRC 1991
Bleinnidae	
<i>Plagiotremus ewersensis</i>	MRC 1991
Carangidae	
<i>Decapterus macarellus</i>	AECOS 1986
Chaetodontidae	
<i>Chaetodon kietii</i>	AECOS 1986
<i>Chaetodon lunula</i>	AECOS 1986
<i>Chaetodon miliaris</i>	AECOS 1986; MRC 1991
<i>Chaetodon multicinctus</i>	AECOS 1986; MRC 1991
<i>Chaetodon ornatissimus</i>	AECOS 1986
<i>Chaetodon quadrimaculatus</i>	AECOS 1986; MRC 1991
<i>Forcipiger flavissimus</i>	MRC 1991
Cirrhitidae	
<i>Cirrhitops fasciatus</i>	AECOS 1986; MRC 1991
<i>Panacirrhites arcatus</i>	AECOS 1986; MRC 1991
<i>Panacirrhites forsteri</i>	MRC 1991
Holocentridae	
<i>Sargocentron punctatissimum</i>	AECOS 1986
Labridae	
<i>Anampses cwoier</i>	MRC 1991
<i>Bodianus bilamulatus</i>	AECOS 1986
<i>Chlorurus sordidus</i>	AECOS 1986
<i>Coris gamard</i>	MRC 1991
<i>Coris venusta</i>	AECOS 1986; MRC 1991
<i>Halichoeres ornatissimus</i>	AECOS 1986
<i>Halichoeres</i> sp.	MRC 1991
<i>Labroides phillipphagus</i>	MRC 1991
<i>Macropharyngodon geoffroy</i>	MRC 1991
<i>Seethalix halota</i>	AECOS 1986; MRC 1991
<i>Thalassoma duperrey</i>	AECOS 1986; MRC 1991
<i>Thalassoma trilobatum</i>	AECOS 1986
Lugjanidae	
<i>Lufjanus kasmita</i>	MRC 1991
Monacanthidae	
<i>Cantherhines sandwicheiensis</i>	AECOS 1986
<i>Pervagor spilostoma</i>	AECOS 1986
Mulidae	
<i>Paripenaeus cyclostomus</i>	MRC 1991

Appendix III continued. Subtidal Zone: 15-30 ft. Deep

Table D continued. Common fishes reported to occur 15-30 ft. deep in the study area.

<i>Parupeneus insularis</i>	MRC 1991
<i>Parupeneus multifasciatus</i>	AECOS 1986; MRC 1991
<i>Parupeneus pleurostigma</i>	MRC 1991
Muraenidae	
<i>Gymnothorax flavimarginatus</i>	AECOS 1986
Ostraciidae	
<i>Ostracion meleagris</i>	AECOS 1986
Pomacentridae	
<i>Abudefduf abdominalis</i>	MRC 1991
<i>Chromis agilis</i>	MRC 1991
<i>Chromis vanderthili</i>	AECOS 1986; MRC 1991
<i>Dacyllus abissella</i>	AECOS 1986; MRC 1991
<i>Pteroglyphidodon imparipennis</i>	AECOS 1986; MRC 1991
<i>Pteroglyphidodon johnstonianus</i>	MRC 1991
<i>Stegastes fasciatus</i>	MRC 1991
Serranidae	
<i>Cephalopholis argus</i>	MRC 1991
Tetraodontidae	
<i>Arothron hispidus</i>	AECOS 1986
<i>Canthigaster amboinensis</i>	AECOS 1986
<i>Canthigaster coronata</i>	AECOS 1986
<i>Canthigaster jactator</i>	AECOS 1986; MRC 1991
Zanclidae	
<i>Zanclus cornutus</i>	AECOS 1986; MRC 1991

APPENDIX L. CULTURAL REPORT

**He Mo'olelo 'Āina: Traditions and Storied
Places of Honouliuli, District of 'Ewa, Island
of O'ahu**

Kepā Maly Onaona Maly
with contributions by Leimomi Morgan

June 13, 2014

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1 Honouliuli—A Collection of Traditions and Historical Accounts

This study incorporates a wide range of historical literature describing the larger Honouliuli Ahupua'a that has been gathered over the last 20 years by Kepā and Onaona Maly. The narratives include primary Hawaiian-language documents and the accounts penned by early residents—often witnesses in or participants to some of the histories being described—pertaining to the *āluhiua* 'a of Honouliuli. The accounts also include references to the relationship of Honouliuli to the neighboring *āluhiua* 'a, ocean and water resources, and people in the larger 'Ewa region (fig. 1). The scope of this study is broad, as it seeks to provide readers with detailed and factual accounts pertaining to the history of Honouliuli, from mountaintops to the fisheries which form a major boundary of the land. Several significant classes of Hawaiian information, which have not been fully considered in previous cultural resource reports for the Haseko-Hoakalei project area, are now incorporated into a single volume. The resources include native lore, land tenure (ca. 1840–1915), surveys (ca. 1850–1910), testimonies of witnesses before the Boundary Commission (1870s), and records of land conveyances. They also include a collection of historical narratives describing the land and people spanning the period from ca. 1790s to 1940s. While this technical report is broad in its scope, it does not reflect every citation recorded from Honouliuli. We have made our best effort to cover critical aspects of the history of the land as recorded by the people of old who made Honouliuli home, and to include a wide range of historical accounts penned by eyewitnesses to and participants in the history being conveyed.

In addition to the literature research, Leimomi Morgan, Kepā Maly, and Onaona Maly conducted oral history and consultation interviews with individuals who had been identified as being knowledgeable of the traditions and history of Honouliuli. While not exhaustive in scope, the interviews provide readers with valuable details on thoughts and beliefs pertaining to the care of cultural resources in the Honouliuli-Hoakalei coastline. All interviewees possess knowledge of place, or shared familial ties to traditional residents of Honouliuli Ahupua'a. The results of those interviews

demonstrate continuity in facets of the information that has been handed down over time and an ongoing cultural attachment to place in the context of spiritual/familial relationships, knowledge of place and practices, and the passing on of lore from one generation to the next. These interviews may be found in appendix A.

2 Storied Places of Honouliuli Cited in Native Traditions and Historical Records

From the earliest of human times, the Hawaiian landscape has been alive with spiritual beliefs, traditions, customs, and practices. Unfortunately, with the passing of time, irretrievable traditional knowledge has been lost. This is in part a result of the rapid decline of the native population, and enforcement of restrictions placed upon Hawaiians in education and all facets of life which culminated in the overthrow of the Hawaiian Kingdom Government in 1893. By 1900, English became the official language of the schools and government, and native Hawaiian children were punished at school for speaking their *‘ōlelo mākauhiine* (mother tongue/language). Thus, slowly but steadily, children and grandchildren were distanced from their elders, and the passing on of *mo'olelo* (traditions) of place, family, and practice—traditional knowledge—was largely cut off.¹

The loss of language, practice, and land were accompanied by changing demographics and the development of large plantations, sprawling communities, military complexes, and resorts. These changes led to the destruction of noted traditional places, or loss of access to sites where traditional and customary practices occurred. Thus, it became difficult, if not impossible, to pass on the experience of practice and familiarity with *wāhi pana*—those sites which would qualify in their native culture and communities as “traditional cultural properties.”

Even with all that has been lost, research in Hawaiian-language materials, historical literature, and in the knowledge of families descended from traditional residents of the land reveals a wealth of history through place names, and in some instances through ongoing practices. Through place names, many *wāhi pana* (storied and sacred places) are found to exist, and for Hawaiians today, those *wāhi pana* remain important. In this modern age, and often in the context of historic preservation, it is the biggest sites and features—such as *heiau* and mass *ilina*—that are determined to be the most significant. But Hawaiians have observed that “The land is not sacred because the heiau is there. The heiau is there because the land is sacred.” This sacredness is conveyed in the cultural attachment shared between Hawaiians and the *‘āina* (land/natural environment) that nurtured and sustained them and their relationship with the *ilina* of their ancestors who rose from and returned to the embrace of the *‘āina*. This living and ongoing sacredness also implies that there need

¹J. W. H. I. Kibe, “Na Hoomanao o ka Maanawa,” *Ka Hoku o Hawai'i*, June 5th and 12th, 1924.

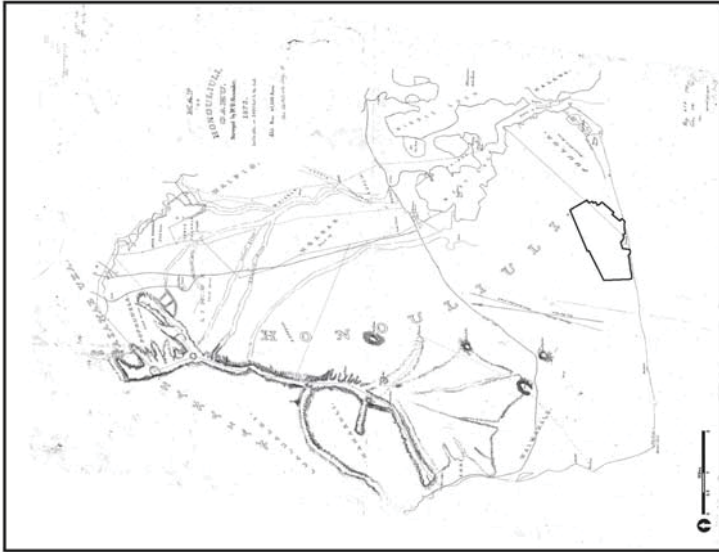


Figure 1: Map of Honolulu, Oahu. Surveyed by W. D. Alexander, 1873. Boundary Commission Certificate Map No. 4 (State Survey Division). Annotated to outline the Haseko-Hoakalei Program Area and scale.

not be physical remnants of “traditional properties and features” on the ground. When all else is lost, it is enough to speak the names and pass on the knowledge of

place.

2.1 Inoa ‘Āina: Place Names

By learning place names and their traditions, even if only fragmented accounts remain, one begins to see a rich cultural landscape unfold on the lands of Honouliuli Ahupua‘a. There are a number of place names that have survived the passing of time. The occurrence of place names demonstrates the broad relationship of the natural landscape to the culture and practices of the Hawaiian people. In *A Gazetteer of the Territory of Hawaii*, Coulter [7] observed that Hawaiians had place names for all manner of feature, ranging from “outstanding cliffs” to what he described as “trivial land marks” [7:10]. In 1902, W. D. Alexander, former Surveyor General of the Kingdom—and later government—of Hawai‘i, wrote an account of “Hawaiian Geographic Names” [1]. Under the heading “Meaning of Hawaiian Geographic Names,” he observed,

It is very difficult, if not impossible, to translate most of these names, on account of their great antiquity and the changes of which many of them have evidently undergone. It often happens that a word may be translated in different ways by dividing it differently. Many names of places in these islands are common to other groups of islands in the South Pacific, and were probably brought here with the earliest colonists. They have been used for centuries without any thought of their original meaning. [1]

History further tells us that named locations were significant in past times, and it has been observed that “Names would not have been given to [or remembered if they were] mere worthless pieces of topography” [14:412].

In ancient times, named localities served a variety of functions, telling people about (i) places where the gods walked the earth and changed the lives of people for good or worse; (ii) *heiau* or other features of ceremonial importance; (iii) triangulation points such as *ko‘a* (ceremonial markers) for fishing grounds and fishing sites; (iv) residences and burial sites; (v) areas of planting; (vi) water sources; (vii) trails and trailside resting places (*o‘io‘ina*), such as a rock shelter or tree-shaded spot; (viii) the sources of particular natural resources/resource collection areas, or any number of other features; or (ix) notable events which occurred at a given area. Through place names, knowledge of the past and places of significance were handed down across countless generations.

The gazetteer below is a compilation of 60 place names that are referenced in the literature and oral history interviews reviewed as a part of this study.

2.2 A Gazetteer of Places Names in Honouliuli Ahupua'a, Including the 'Ili of Pu'uloa and Adjoining Lands

'Alhono An 'ili cited in claims of the *Māhale*.
Ha'aleleui An 'ili cited in claims of the *Māhale*.
Hale'au'au An upland region between Pu'uku'ua and Kānehōa. Cited in the tradition of Hi'iaka-i-ka-poli-o-Pele.
Hanakāhi (Lae o Halakāhi) Pu'uloa/Honouliuli. Site named for a man who resided at this place, and who called upon the unknown gods, making offerings and asking for their blessings in his livelihood as a fisherman. Kāne and Kanaloa heard his prayers and visited him, granting his request because of his faithfulness to them. They built fishponds at Keanapua'a, Kepo'okala, and at Kapākule for him. Kapākule near the shore of Keahi, was the best formed of the ponds, and fed Hanakāhi's family and later generations of 'Ewa residents for hundreds of years. Cited in "Na Wahi Pana o Ewa" [2]. The fishery boundary of Hanakāhi (Halakāhi) was disputed with Hālawā.

Hilo-one A coastal area famed in *mele* from the tradition of Hi'iaka-i-ka-poli-o-Pele.
Hoakalei A coastal spring famed in *mele* from the tradition of Hi'iaka-i-ka-poli-o-Pele.
Honouliuli Ahupua'a. In one tradition, Honouliuli is named for a chief of the same name, who was the husband of Kapālāma. They were the parents of Lepeamoa and Kaulani, two heroes in ancient tradition. Numerous claims cited in the *Māhale*, though the awarded claims were generally in the "taro lands" section of Honouliuli² in a watered area. In traditional times, the land area known as Pu'uloa was an 'ili of Honouliuli, though it was sold as a separate land during the time of the *Māhale*. All native tenant claims made for *kūlana* at Pu'uloa were given up by the claimants. "Large terrace areas are shown on the U. S. Geological survey map of Oahu (1917) bordering West Loch of Pearl Harbor, the indication being that these are still under cultivation. I am told that taro is still grown here. This is evidently what is referred to as 'Ewa taro lands'. Of the Honouliuli coral plains McAllister (44, site 146) says: "...It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them" [13:82].

Hopeliki & Hopenui Honouliuli, Waikele, and Waipi'o, 'ili lands. Cited in claims of the *Māhale*.

Ka'aimalu Waiawa Ahupua'a, associated with Kūalaka'i. This storied land and spring site was named for a young girl and her brother who ate their fish in secret ('*ai mīlū*). A *palani* fish had been caught along the shore at Kūalaka'i (Honouliuli). Having no further luck in catching fish, the two children set out on their trip home. They followed the path past Pu'uokapolei, and along the

²See Registered Map No. 630.

plains of Kaupe'a, and went on to Puohulunui and Kalipāhe'e. From there they went down to Waiawa Stream. There, the children stopped to rest and drink water. Because they had only one fish, the sister suggested that they eat it prior to their return home, where it would have to be shared. The two ate their fish, and were the first to break the '*ai kapa*' by being members of the opposite sex eating with one another. The god Kekua'ōlelo, dwelling in the uplands at Pu'unahawe, heard their conversation and called out to them repeating what they had said. Because of this event, the name *Kā'aimalu*, meaning "the sheltered or peaceful food or eating," was given to this place.³ Cited in the traditions of Māheha, Makanike'oe, "Na Wahi Pana o Ewa" [2], and claims of the *Māhale*.

Kahāpū An 'ili cited in claims of the *Māhale*.

Kaihuopala'ai An 'ili and fishery. Cited in claims of the *Māhale*. This place was famed in ancient times for its '*ʻānā*'. Ka'ulu and 'Apoka'a⁴ were the parents of two supernatural children: son Kaihuopala'ai and daughter Kaihuku'una. When Kaihuopala'ai matured, he married Ka'ōhai. To Kaihuopala'ai and Ka'ōhai were born a son, Pūhi Lo Laumeki, and a daughter, Kapapūhi. Their story is told in the traditions of Ka 'Ane o Kaihuopala'ai and Makanike'oe, and oral history interviews.

Kalaokāne An area disputed between the people of Honouliuli and Waikele. Site of the ancient village, Kupali'i.⁵ The name translates as "The point of Kāne," and may be suggested to be associated with the tradition of a visit by the gods Kāne and Kanaloa to the region. Cited in the tradition of Māheha.

Kalo'i Kalo'i (Kalo'i) is a traditional name used at several areas in Honouliuli Ahupua'a that are all connected by a series of gulches from the uplands near the 2,200 foot elevation to the shore. Following the ethno-historical record, the names Kalo'i, Kalo'i iki, Kalo'i I'i'i'i, and Kalo'i loa follow from the uplands to the taro land region of Honouliuli, with the latter names being cited in Land Commission Award (LCA) *Hetu* 901, 1570, and 1713. There is no reference to Kalo'i in the One'ula vicinity. Cited in claims of the *Māhale*.

Kama'oma'o An area on the *kūla* lands within view of Pu'u o Kapolei, and associated with Kaupe'a. Named for a supernatural woman who dwelt in the area. The flat land plains of wandering spirits (also see Kaupe'a). Cited in the tradition of Hi'iaka-i-ka-poli-o-Pele and in historical narratives.

Kamō'oliki An 'ili cited in claims of the *Māhale*.

Kānehili Honouliuli/Pu'uloa. An open *kūla* land, noted in tradition for its association with Kaupe'a, and as a place of wandering spirits. An inhospitable zone. Cited in the tradition of Hi'iaka-i-ka-poli-o-Pele and in historical narratives.

³Hawaiian Place Names, <http://ulukau.org/cgi-bin/hpn?>.

⁴Husband and wife; also named localities.

⁵Boundary Commission proceedings.

Kānehooa A mountain pass, famed in traditional lore and *mēle*. Noted for its growth of *kapiti*/*kapu* ferns, and the wind, Waikōloa, which blows from the mountains to the sea. Cited in the traditions of Hi'iaka-i-ka-poli-o-Pele and in historical narratives.

Ka'olina (Ko'olina) An ancient village site on the western shore, between Lae Loa and Pili o Kahe. Cited in the tradition of Hi'iaka-i-ka-poli-o-Pele and historical narratives.

Kapakule Pu'uloa-Honouliuli. A fishpond/ fish trap on the inner shore of Pu'uloa (across from Hālawā), made by the gods Kāne and Kanaloa, for the benefit of Hanakāhi who faithfully worshipped them. Cited in the tradition of Maitea and oral history interviews.

Kapapapūhi Honouliuli-Hō'ae'ae boundary zone. A small point on the shore between these two *alupua'a*. Also the name of a fishery for Honouliuli. Kapapūhi was named for the daughter of Kaihuopala'ai and Ka'ōhai, whose history is told in the traditions of Makamike'oe and Pūhi o Laumeki, and oral history interviews.

Kapuna Waikale Ahupua'a. A place of *kapu* makers, *lo'i kalo*, and houses. The fishery fronting Kapuna belonged to Honouliuli. The people of Kapuna had a way of avoiding the payment of tribute. When the Waikale collector came along, they would claim that they were of Honouliuli; and when the Honouliuli collector came along, they would claim they were of Waikale. Their homes were in Waikale, but their fish belonged to Honouliuli [15:32]. Kapuna was a cave in which chiefs of ancient times once lived. Cited in "Na Wahi Pana o Ewa" [2] and claims of the *Māhale*.

Ka'ulu Hō'ae'ae-Honouliuli boundary zone. An ancient village site, known as "Coneyville" in historic times, named for John H. Coney.⁶ Reportedly named for the chief, Ka'ulu-hua-i-ka-hāpapa [28:93].

Kaupe'a An area noted as the wandering place of the spirits of the dead, who are seeking their way to another realm. An uninhabited plain with *wilivilu* trees and *ōlūai* plants, and associated with Kanehili and Leiolono. From Kaupe'a, one may see Leiolono where unclaimed spirits are lost on never-ending darkness. Cited in traditions and oral history interviews.

Keahi Pu'uloa-Honouliuli. An ancient village site named for a beautiful woman who once lived there. For a time, the demi-god Kamapua'a also lived at Keahi. In the tradition of Kaihuopala'ai, Keahi and Mokuo'ō⁷ were named as companions. Cited in "Na Wahi Pana o Ewa" [2], in claims of the *Māhale*, and in oral history interviews.

Keahumoa The *kūla* on the inland slopes of 'Ewa including Kunia, which continues up to Lihū'e on one side, and is bounded by Kipapa on the other side. The

⁶Boundary Commission proceedings, 1873.

⁷ An island in the sea fronting Moanalua.

area was once extensively cultivated with native crops, planted originally by Ka'ōpele. The fields could be seen when looking *maka'i* from the mountain pass at Pōhākea. Cited in the traditions of Hi'iaka-i-ka-poli-o-Pele and Kaleleluakā. Also situated at Keahumoa are two famous *māla 'iuala* (sweet potato fields) which bear the name Nāmakaokapā'o. Pūali'i was killed here; later, a king of O'ahu and his warriors were also killed here. Cited in the tradition "Kaa no Nāmakaokapao" [11:274–283].

Keoneae An area situated along the old trail between Honouliuli and Waia'anae, on the Pu'uloa side of Pu'uokapolei.

Kepo'okala (Po'okala) Waipi'o Ahupua'a. Associated with the fishery of Honouliuli. The point that juts into Ke awa lau o Pu'uloa (Pearl Harbor), at the end of Waipi'o peninsula. Kepo'okala marks the boundary between the fisheries of Honouliuli and Hālawā. Kāne and Kanaloa made a fishpond here, but were dissatisfied with its walls so they left it. Cited in "Na Wahi Pana o Ewa" [2].

Kohepalaoa Pu'uloa-Honouliuli. An 'ili and fishpond. Cited in claims of the *Māhale*, and in historic narratives of Pu'uloa.

Kual'ōpeli Honouliuli. An 'ili. Cited in claims of the *Māhale*.

Kūlaka'i Honouliuli. An ancient village site situated on the western shore. In a sinkhole cave at this place, an 'ulu tree was planted by the deified navigator Kāha'i, and there had been hidden sacred objects for Nāmakaokapā'o [9]. Cited in native traditions, claims of the *Māhale*, and oral history interviews.

Kumuhau Honouliuli. An 'ili cited in claims of the *Māhale*.

Kumumamo Honouliuli coastal plains. Cited in historical *mēle*.

Kunia An upland 'ili, part of the larger Keahumoa plains, and site of a battle in the time of Kūali'i.

Kupaka A former village site in the 'ili of Pu'uloa, situated on the ocean-fronting shore of Honouliuli, west of Keahi, and marked on historical maps with a stone wall complex. Cited in historical accounts and oral history interviews.

Kupali'i A village site at Kalaeokāne. The area disputed between the people of Honouliuli and Waikale: "in assessing the ancient tax, putting houses on the line so as to evade both."⁸

Lae o Kahuka Pu'uloa-Honouliuli. A point marked by a large pile of stones along the inner shore of Ke awa lau o Pu'uloa.

Laeloa (Kaleloa) A low point of land now known as Barber's Point. Cited in traditions, historical accounts, and oral history interviews.

Lihū'e An upland plain and lower mountain region. Waikōloa is a strong wind of Lihū'e that blows from the uplands to the lowlands.⁹ Mau'unene is a light breeze that blows down the slopes of Lihū'e to the lowlands of 'Ewa. Cited in "Na Wahi Pana o Ewa" [2].

⁸Honouliuli Boundary Commission proceedings, 1873.

⁹Cited in the tradition of Ku-a-Pakaa [24].

Manawaiʻelele Honouliuli, Hōʻāeʻāe, and Waialele boundary junction zone. A gulch near Polihai, and site of an ancient *hāluu* track.¹⁰

Miki Waialele Ahupuaʻa, disputed with Honouliuli. Kalaekāne sits on the shore of the *ʻili*. Cited in claims of the *Māhale*.

Mokumeha Named for a son of Kaihuopalaʻai and Kaʻōhai, the brother of Laumeki. Cited in the tradition of Pihī o Laumeki and in claims of the *Māhale*.

Moʻokapu Honouliuli-Waialele boundary zone. An ancient path which leads into Waiʻanae uka.¹¹

Nāmaakaokapāoʻo An area of *māla* ʻuluā (sweet potato fields) situated on the plain of Keahumoa, a short distance below Kīpapa. Named for a youth who once lived nearby. Cited in the tradition “Kaao no Nāmaakaokapao” [11:274–283].

Nāwahineokamaʻomaʻo An area on the *kūla* lands named for a companion of Puʻu o Kapolei. Cited in the tradition of Hīʻiaka-i-ka-poli-o-Pele.

Pālāʻau An *ʻili* cited in claims of the *Māhale*.

Papio An area in the bay fronting Honouliuli where the chiefess of the same name was killed in an act of anger by the shark-goddess, Kaʻahupāhau. Kolihala, Kaʻahupāhau’s human attendant, was insulted by Papio, and asked that she be killed. The site is also referred to as “Kānahunaopapio.” The coral body form of Kaʻahupāhau is also found near this site.¹²

Pau-kuʻu-loa, ʻAole i pau kuʻu loa Waialele-Honouliuli. A nearshore land and fishery below Hōʻāeʻāe, fronting Ulemoku.¹³ The source of naming this place is found in the tradition of Puʻukuʻua. Cited in “Na Wahi Pana o Ewa” [2].

Peʻekaua Situated on the plain between Puʻuokapolei and Waimānalo. A place famed in the tradition of Hīʻiaka’s journey across ʻEwa. Peʻekaua is found on the *mauka* side of the trail, where there is a large rock standing on the plain. Cited in the tradition of Hīʻiaka-i-ka-poli-o-Pele.

Piliokahe The boundary marker between Honouliuli, ʻEwa, and Nānākuli of the Waiʻanae District. The boundary was made during the journey of Kane and Kanaloa across ʻEwa. During their game of *ʻulu maika*, the boundaries were set by where the *stone* stopped rolling. Cited in traditions and historical accounts.

Pōhākea A famed mountain pass over which an ancient trail between Honouliuli and Waiʻanae crossed. Noted in several native traditions for its commanding view plane to the lowlands and noted places of the ʻEwa District. One branch of the trail to Pōhākea passed near Puʻuokapolei. Cited in the traditions of Kane, Kanaloa, and Hīʻiaka-i-ka-poli-o-Pele.

Pōhaku Mokomoko A stone on the shore marking the boundary between Honouliuli and Hōʻāeʻāe, situated along the side of the government road.¹⁴

¹⁰Boundary Commission proceedings.

¹¹Boundary Commission proceedings, 1873.

¹²He Moololo Kaao Hawaii no Ketikau o Kau, March 15, 1902.

¹³Boundary Commission proceedings, 1873.

¹⁴Boundary Commission proceedings, 1875.

Pōhakupalahalaha A “well known rock along the trail” between Honouliuli and Hōʻāeʻāe.¹⁵

Poʻohilo An *ʻili* named from events following a battle in the Kīpapa-Waikakalua region, in ca. 1400s, in which the head of Hilo (an invading chief from Hawaiʻi) was placed on a stake at this site and displayed. A named locality cited in project area claims of the *Māhale*.

Puʻukuʻua A hill of the inland region of Honouliuli. A place where chiefs once lived, and a battlefield. It is said that the place named “Pau kuʻu loa” originated from a practice of the people here at Puʻukuʻua. Kāne and Kanaloa tired of working, and set aside their work here to return to Kahiki. Cited in “Na Wahi Pana o Ewa” [2].

Puʻuloa This land was traditionally an *ʻili* of Honouliuli, and marked the entrance to Ke awa lau o Puʻuloa: the many bays of Puʻuloa—Pearl Harbor, Pearl River, or Wai Momi. The waters of Puʻuloa were protected by the shark goddess Kaʻahupāhau, her brother, Kahiʻukā, and the little shark god Ka-ʻehu-iki-manō-o-Puʻuloa. Cited in traditions, historical accounts, and oral history interviews.

Puʻu-o-Kapolei This hill was named for the goddess Kapo, an elder sister of Pele. It was also the home of the supernatural grandmother of the demigod Kama-puaʻa.¹⁶ S. M. Kamakau recorded the tradition that Puʻu o Kapolei was used by the people of Oʻahu to mark the seasons of the year. When the sun set over the hill, it was *Kau*, summer. When the sun moved south, setting beyond the hill, it was *Hōʻōilo*, winter [17:14]. The old government road passed behind this hill. Puʻukuʻua is viewed further inland from this hill. The plains around this region were covered with *sugarcane* by the late 1890s. A *heiau* once situated on this hill and a rock shelter were destroyed in the early 1900s [22:108, Site 138]. Cited in traditions, historical accounts, and oral history interviews.

Puʻu Pālailai A hill situated northwest of Puʻu o Kapolei. Pālailai is cited in *mele* recorded in the tradition of Hīʻiaka-i-ka-poli-o-Pele.

Waimānalo An *ʻili*. This is one of the *ʻāai* (watered lands) granted to priests of the Lono class by the demigod Kama-puaʻa. During the time of Kākuhihewa, king of Oʻahu ca. 1500s, Waimānalo was home of a priest named Nāpuaikamaʻo. It was this priest who traveled to Kōʻolīna, where Kākuhihewa was waiting, and foretold that Kaleleluakā would gain victory in the battles being brought to Oʻahu’s shores. Cited in claims of the *Māhale*.

Wanue An area near the Kapapapūhi region of the Honouliuli shoreline, named for a relative of Kaihuopalaʻai. Cited in “Ka ʻAanae o Kaihuopalaʻai,” 1895.

Waipōuli A cave situated about five miles below Nāmaakaokapāoʻo and the Keahumoa plain. The place where the head of Pūaliʻi was thrown after he was killed. The cave was used for a time as a shelter to hide Pōkaʻi, mother of

¹⁵Boundary Commission Proceedings, 1873.

¹⁶He Moololo no Kamapuaa, 1861.

Nāmakaokaopā'o. Cited in the tradition "Kaao no Namakaokaopao" [11:274–283].

2.3 Place Name Series, 1883

In 1883, the Honolulu newspaper *Saturday Press* ran a series of articles to acquaint readers with place names and their meanings from around Hawai'i. Among the names cited were several from Honouliuli:

The names given below are Hawaiian geographical names, towns, estates, mountains, valleys, bays, rivers, etc., which English readers are likely to come across in historical or newspaper reading. Translations are given when a satisfactory English rendering is possible. This dictionary will be continued as possible.¹⁷

Ewa – "Unequal" The district of Oahu between Moanalua and Lihue and Waianae, and being the lands surrounding Pearl river or harbor. Was a favorite residence of the Oahu kings in the olden times.¹⁸

Honouliuli – "The blue bays or inlets" Land in Ewa, Oahu.¹⁹

Kapapahinui – "To bestow honors upon a person" Land in Honouliuli, Ewa, Oahu.

Kauwahine – "Woman mounted" Land in Honouliuli, Ewa, Oahu.

Kamaipapehi – Land in Honouliuli, Ewa, Oahu.

Kapapapuhi – "Eel's Board" Land in Honouliuli, Ewa, Oahu.

Kamumuku – "Shortened" Land in Honouliuli, Ewa, Oahu.

Kaakau – "The right" Land in Honouliuli, Ewa, Oahu.

Kamaipipi – Land in Honouliuli, Ewa, Oahu.

Kaaukakua – "Spirits of one's ancestors always invoked by Hawaiians in cases of distress" Land in Honouliuli, Ewa, Oahu.

Kamilomilo – "To twist" Land in Honouliuli, Ewa, Oahu.

Kamookahi – "Single strip" Land in Honouliuli, Ewa, Oahu.

Kamoku – "Ship or an island, used in Hawaiian proverb (Ka Moku o Keawe) the island of Keawe" Land in Honouliuli, Ewa, Oahu.

Kailikahi – "One skin" Land in Honouliuli, Ewa, Oahu.

Kalokoale – "Black pond" Land in Honouliuli, Ewa, Oahu.

Kaulaula – "The red one" Land in Honouliuli, Ewa, Oahu.

Keakea – "To protest against" Land in Honouliuli, Ewa, Oahu.²⁰

Keaalii – A cave in the sea at the entrance to Puuloa harbor, and known by the natives to have been formerly the home of a large shark called

¹⁷Dictionary of Hawaiian Localities, *Saturday Press*, July 28, 1883, p. 5.

¹⁸Ibid., August 11, 1883, p. 4.

¹⁹Ibid., September 8, 1883, p. 5.

²⁰Ibid., December 1, 1883, p. 5.

Komoawa, who has been generally credited as the watchman on guard at the entrance to Kaahupahau's waters. The latter's royal cave-dwelling was in Honouliuli lagoon.²¹

3 Nā Mo'olelo Hawai'i: Hawaiian Traditions

Mo'olelo contain expressions of native beliefs, customs, practices, and history. The Hawaiian landscape itself is storied, and each place name is associated with a tradition—ranging from the presence and interactions of the gods with people, to documenting an event, or the characteristics of a given place. Unfortunately, today, many of those *mo'olelo* have been lost. Through the *mo'olelo* that have survived the passing of time, we are able to glimpse the history of the land and people of Honouliuli Ahupua'a.

This section of the study provides readers with a collection of narratives written by native Hawaiian authors and historians, as well as non-Hawaiian visitors and residents of the land during the nineteenth and early twentieth centuries. The narratives document traditional lore and knowledge, customary practices and beliefs, and the importance of place names which have survived the passing of time. A number of the accounts come from Hawaiian-language resources which have not been previously available in English. Other citations revisit some of the better known historical accounts, while attempting to shed new light on them, with efforts made to place them in a Hawaiian cultural context based on a wide range of resource materials.

Transcripts and/or translations of the Hawaiian-language accounts are given either verbatim, or in summary for longer narratives, with emphasis on the key events—their association with *akua*, *ʻāina*, and *kānaka* of Honouliuli Ahupua'a. The citations span the period from antiquity to the 1920s. We have elected to include the Hawaiian-language transcripts in an effort to provide present and future generations with easy access to these important narratives as a means of fostering ongoing cultural attachment to place, and for educational and interpretive purposes. In this way the *kīpuna* speak for themselves, and pass their voices on to inspire continued knowledge of place, practice, and use of the native place names.

The narratives which follow are generally organized chronologically, by date of publication, thus one might find descriptions of the historic landscape cited prior to an account describing the presence of the gods touching the land and daily lives of the people. It will be noted that in a number of instances, place names originated as the names of notable figures—either gods, demigods, chiefly personages or deified ancestors—while other names describe events or particular characteristics of named locations.

²¹Ibid., December 29, 1883, p. 6.

3.1 A Little Story and Some Chants; Traditions of Hi'iaka-i-ka-poli-o-Pele

The epic tradition of the goddess Pele and her youngest sister, Hi'iaka-i-ka-poli-o-Pele, a.k.a. Hi'iaka, spans the entire Hawaiian Archipelago, and even beyond, to Kahiki, the ancestral home of the gods. The tradition is the source of many descriptions of places, place names, beliefs, and knowledge of traditional and customary practices. As in the account below, "He Wahi Kaao a me kekahi Mele pu," published in 1860, portions of the tradition were also cited in excerpts to remind people of various facets of knowledge that was recorded in the larger account. Of particular interest in the narratives below are references to Hi'iaka's travels on O'ahu, and mention of places in Honouliuli and vicinity. The original Hawaiian is followed by a summary in English.

O Lohiau me Kaleiopaoa, he mau kanaka no Kauai, o Haena ko laua wahi noho; Ua launa kino wailua wale o Pele me Lohiau, ua ku a aloha loa o Pele ia Lohiau: no ka nui o kona makemake kena'ku la oia ia Hiiaka e kii ia Lohiauipo i Haena a loa. Eia ka laua Berita, "e kii oe ia Lohiau a loa mai me oe a laa ia'u, Oia ka ka aoao I. Eia hoi ka ka aoao elua, e malama oe i kuu aikane ia Hopoe, a hoi mai au;" alaila, hele o Hiiaka i Kauai.

A hiki o Hiiaka me Wahineomao i Haena, ua make o Lohiau, lapau oia a ola, hoi mai lakou a ekolu o Lohiau, me Wahineomao, a me Hiiaka, a hiki i Oahu, pae o Hiiaka mauka o Waianae, ma ka waa no o Lohiau a me Wahineomao, a hiki i Puuloa. Ia hele ana o Hiiaka mauka, a hiki oia maluna o Pohakea, i nana'ku ka hana ua make o Hopoe, e ami mai ana i ke kai, alaila hu mai la ke aloha o Hiiaka no ke aikane ana.

A hiki ma Puuloa, kau hau lakou ma ka waa, a hiki i Mamala, halawai me Peleula ma i heenalu ana, hoi lakou i uka i ka hale, hookipa malikai ia po, lealea lakou ia po, he Kilu ka hana ilaila i ke ai o Hiiaka i ka lea o Lohiau.

Haalele ia Honouluu, hiki lakou i Molokai, noho i ke kaha o Palaua, a make i ka make a ka pololi, lohe mai lakou he hale komo ko Olepau ke alii o Maui, manao aku hoi e ola ka pololi ilaila, i ua la nei i komo ai ka hale o Olepau hiki lakou a ekolu ilaila. I ka ike ana mai o Waihinalo ka wahine a Olepau, ua maopopo ia'ku kona ano, he ano pi.

Hoochuli ae la, oia ia Olepau iluna ke alo, hukihuki i ka umiuni. Alaila hapai ae la o Hiiaka i keia mele, a pane aku ia Waihinalo.

Meamehea kanaka ole ka hoi Puuomoeawa-e,

O Kaupea i ka aina kanaka ole,

A kulou anei e uwe ana—

E kala ka uwe he keiki makua ole.

(He mau mele kike ana keia wahi, aole nae i loa a ia'u aka makemake nae o Olepau e ike ia lakou a ekolu aole nae e hiki.) Ua ninau mai o Hiiaka ia Waihinalo i ka wahine a Olepau, la wai Maui?

Hai mai o Waihinalo ia Olepau.

O Kalani ke'ii Kauhilonohoua,

O Kamakea kahiko a Kiha,

O Kiha nui lulu moku,

O Kaulahea nui o ka lani—e;

Ia ia Maut—a.

Hai mai o Hiiaka, ua makeia. Haha ae ka oe la! O olo ka pihe i ke aumoe, Owawa ka pihe i ke kakahiaka, o ka haka maia a Olepau, ua pau i ka ai ia e ka wahine. Ua make o Olepau, o Olepau Aloha.

Hoole mai o Waihinalo wahine a Kapoipo, aole e make kuu alii ia oe, ke hai mai nei na kua wahine oia nei. O Waiinuu ma laua o Walimaanoao, o Papa o Hoochukalani, e hoole mai ana, aole e make.

Pane mai o Hiiaka i ka hua o ka make.

Ua make ke lili nona nei moku,

He puua kau ko Molokai,—

He ilio kohekohe Lanai,

He pale ka aaka o Kahaloa,

He puua kai Molokini,

Huli kaele o na Hono,

Palaua wale na aina,

Oho ki kepakepa na moku,

Uwe ka wahine, uwe ka hanehane,

Uwe ka leoleo i ke kula, i ke pili la i Kamaomao,

Ia kaa kumakena ia o Maut—e;

Make Olepau, o Olepau aloha.

Pau na mele a laua i paio ai. Iloko o ka Hale komo o Olepau o Kapo, he hoahanau no Hiiaka. Ike oia aole hookipaia kona hoahanau; ku ae la oia a hoi i kona hale, hoolale oia ia Puanui kana kane i mea ai kahu i palua, o Luau. Ua makaukau ka hale o Kapo i na mea ai; (E hoi mai ana o Hiiaka ma a waena o ke Alanui; ua loohia ia o Olepau e ka mai, a areane e pilikia; Hoonuia ke kanaka e kii ia Hiiaka, me ka puua pu, hoolohe mai o Hiiaka e alala aku ana ka puua, ia wa, ua hoaa loa ia ke kanaka me ka puua, ua ninau ke kanaka ia Hiiaka, ua hoochokaia: pela ko laua loa ole ana, a hiki lakou ma ka Hale o Kapo, ua makaukau, ua pau i ka ai; a hiki i ke aumoe make iho la o Olepau, nona ka mea i manaolia.)

B. Kaliaohauola. Wailua, Kauai, Iulai 4, 1860.²²

Below is the summarized translation of the above account, "A Little Story and Some Chants."

Hī'iaika and her companion Wahineoma'o traveled to Hā'ena, Kaua'i and returned Lohiauipo, Pele's mortal lover to life. Hī'iaika, Wahineoma'o and Lohiau then departed from Kaua'i on their journey to the island of Hawai'i where Lohiau would be reunited with Pele. Arriving at Wai'anae, Hī'iaika went overland, instructing Lohiau and Wahineoma'o to continue by canoe, where she would later rejoin them at Pu'uloa.

Hī'iaika walked inland and passed over the summit of Pōhākea, from where she looked to Hawai'i and saw her beloved friend Hōpoe dancing on the shore. She then descended (across Honouliuli), and arrived at Pu'uloa where she boarded their canoe, and traveled on to Māmala and then met with the chiefess Pele'ula (for whom the place in Honouliuli is named). They then traveled by canoe on to Moloka'i and then to Maui...

While on Maui, Hī'iaika chanted a mele in which she described certain places where she had traveled. One of the lines returns to the plains of Honouliuli in which she said:

"O Kaupea i ka aina kanaka ole..." (Kaupe'a is a land without people...)

3.2 A Tradition of Kamapua'a

S. W. Kahiolo contributed the tradition of Kamapua'a to the native newspaper *Ka Hae Hawai'i* in 1861.²³ This is the earliest detailed account of Kamapua'a, a multi-formed deity of traditional significance on O'ahu, and all the major islands of the Hawaiian group. The Hawaiian deity Kamapua'a is a part of the Lono god-force, and possessed many body forms, or *kinohiua*, representing both human and various facets of nature. He was born in pig form to mother Hina and father Kahiki'ula, and was raised at Kaluanui in the Ko'olau loa District of O'ahu.

Excerpts from "He Moolelo no Kamapuaa" provide details on places of traditional cultural significance in the 'Ewa District. This *mo'olelo* offers traditions associated with traditional importance and uses of named localities in Honouliuli and vicinity.

When the chief Olopana was killed, the island of Oahu became Kamapuaa's. He then fetched his people (who he had hidden) from above Kaliuwa and brought them down, and they then returned to their lands.

The priest (Lonoawohi) asked Kamapuaa if he could be given some lands

²²"He Wahi Kaao a me kekahi Mele pu," *Ka Hae Hawai'i*, July 4, 1860, p. 60.

²³The original Hawaiian texts may be viewed in the Hawaiian digital library at <http://www.ulukau.org/>.

for his own as well. He asked, "Perhaps the water lands might be mine." Kamapuaa agreed. This was something like a riddle that the lands which have the word "water" (wai) in their names would be his, like: Wai'ailua, Wai'anae, Waimanalo, Waikale, Waipio, Waiawa, Waimano, Waimalu, Waikiki, Wai'aleae, Wailupe, Waimanalo 2, Waihee, Wai'ahole and etc.

The parents of Kamapuaa, Hina and Kahikiula, thought that this amount of land was too great, and they criticized Kamapuaa for agreeing to it. But his elder siblings and grandmother did not criticize him, agreeing to the priest's request. The remainder of the lands went to Kamapuaa's family.²⁴

Following a journey to Hawai'i, where Kamapuaa fought with Pele, he returned to O'ahu. Upon arriving at O'ahu, Kamapuaa learned that the island was under the rule of another chief, that his parents had been chased to Kaua'i, and that his favorite brother Kekeleiaiku had been killed. The following excerpts include accounts describing sites and activities in 'Ewa.

Kamapuaa walked to Keanapuaa, on the shore at Halawa, and he slept there. When he woke up from his sleep, he urinated in the sea, and that is why the fish of Puuloa have a strong smell to them, so say the uninformed.

From there, he went to Honouliuli and saw his grandmother, Kamaulu-aniho, sitting along the side of a taro pond field. She was looking with desire to the lands below, where some of the men of the king were working, and wishing that they would leave even a little bit of taro behind for her to eat. Kamapuaa then went and stood next to her, and greeted her. She replied, greeting him, but did not recognize him as her grandson. He then asked her why she was sitting there. She told him, "I am looking to the lowlands, where the men of the chief are working, and wishing that they would leave a little behind so that I may have some food." Kamapuaa then said to his grandmother, "How did you live before?"

She answered, "What is it to you? My grandchildren have died, one in a battle with Pele, another buried, and one on Kauai." This is how she spoke, not understanding that the one before her was her own grandson. Kamapuaa then answered, "I am going to get some food for me." She asked, "Where will you get your food?" He told her, "I will go and perhaps ask for some, and maybe they will give me some of their food."²⁵

Kamapuaa went and said to one of the men who was pulling taro, "Let the two of us pull taro for us." The man agreed, and the two of them pulled taro, some for the man and some for Kamapuaa. Kamapuaa

²⁴G. W. Kahiolo, "He Moolelo no Kamapuaa," *Ka Hae Hawai'i*, July 10, 1861.

²⁵*Ibid.*, August 7, 1861.

pulled a large quantity and then carried it up to his grandmother. Because of the large load that he carried, Kamauluanoho suspected that the man was indeed her own grandson, Kamapuaa. She chanted a name song to Kamapuaa and he chanted to her as well. Together, they carried the taro to the house she shared with another old woman, at Puuokapolei. Setting down their bundles of taro, Kamauluanoho placed Kamapuaa on her lap and wept over him. The two were joined by the other old woman and she was introduced to Kamapuaa, who she thought had been lost. Preparations were made for a meal, and Kamapuaa and the old woman went out to her garden to collect sweet potatoes. They then returned to the house and ate.²⁶

Kamapuaa went to Niuanu and performed a ceremony, bringing his brother, Kekelaiaiku, back to life. He then traveled to Kou where he killed the chiefs and people who had killed his brother, and forced his family into their lives of despair ... Returning from Kou, Kamapuaa met his friend Kuolohele and the two of them walked from Moanalua. They reached Waiawa and continued on to Waipahu. Standing on the edge of the stream there, Kuolohele went to bath[e] in the stream. Kamapuaa noticed that Kuolohele had a large lump (puu) on his back. Picking up a stone, Kamapuaa struck the lump on Kuolohele's back.

Kuolohele cried out, thinking that he was about to be killed. Kamapuaa reassured him that he was not going to die, but that instead, he would be healed. He then instructed Kuolohele to touch his back. In doing so, Kuolohele found that the lump was gone.

Kamapuaa then picked up the stone and set it on the cliff-side. That stone remains there at this time, and it is a stone which many travelers visit²⁷ ... Kuolohele and Kamapuaa continued traveling together for a short distance, until Kuolohele reached his destination. Kamapuaa continued to Puuokapolei, where he met with his grandmother and brother. He told them what had transpired, and he then set off for Kauai, to bring his parents back to Oahu.²⁸

3.3 The Tradition of Pikoiaka'alalā

The tradition of Pikoia-ka-ʻalalā (Pikoia-son-of-the-crow), entitled "He Kaao no Pikoiakaalala," was printed in the Hawaiian-language newspaper *Kuokoa* between December 16, 1865 and March 10, 1866, and was contributed by S. M. Kauī.²⁹

²⁶*Ibid.*, August 14, 1861

²⁷The stone is named Kuolohele.

²⁸*Ibid.*, August 21–28, 1861.

²⁹The full tradition may now be found in the Hawaiian Digital Library at <http://www.ulukau.com/>.

Pikoia-ka-ʻalalā was born to ʻAlalā and Koukou on the island of Kauaʻi, and his family were *kīpua*. Pikoia-ka-ʻalalā possessed exceptional sight and excelled in the Hawaiian art of *puna pua*. Through the tradition of Pikoia-ka-ʻalalā, readers learn that many localities throughout the islands are named for places where he competed in matches with archers, shooting *ʻiole* and birds from great distances. The tradition is set in the late 1500s when Keawe-nui-a-ʻUmi was the king of Hawaiʻi Island. When Pikoiakaʻalalā's travels around Oʻahu are described, readers are told "The districts of Oʻahu are thus known ... The land from Piliokahe to Kapukakā makes up the district of ʻEwa."³⁰

3.4 The Tradition of Puapualenalena

In "Moolelo no Puapualenalena," it is told that Puapualenalena was a supernatural dog who lived during the time of Hakau, the half-brother of Hawaiʻi's ʻUmi-a-Lihoa, ca. AD 1525. His primary residence and adventures occurred on Hawaiʻi, but he also traveled across the islands. While on Oʻahu, the heights of Pohākea where the mountain trail descends into Honouliuli were mentioned. From there he traveled to the shore of Puʻuloa.³¹

While sailing from Kauai, Puapualenalena and his companions reached the Waiaanae coast. Puapualenalena leapt to shore and traveled across the land to Pohākea from where he looked upon the lands of Ewa and Waialua ... He then went down to the shore of Puuloa where the canoes had landed and joined the travelers to continue the journey to Hawaii.³²

3.5 Tradition of the Mullet of Kaihuopalaai

One of the famous traditions of Honouliuli centers on the importance of the *ahupuaʻa* as the source of the annual migration of the *ʻamae holo* around the island of Oʻahu. The tradition was originally published in 1866, under the title of "Ka Amaama o Kaihuopalaai."³³ In 1896, it was published again under the title of "He Moolelo Kaao no ka Puhī o Laumeki," in a major account that cited numerous locations, resources, and residents of Honouliuli Ahupuaʻa. Both traditions are cited below, the earlier one provided in the original Hawaiian language as it sets the foundation for the more detailed account of 1896, and will serve as a resource for students of Hawaiian language. The later account is cited as translated by Maly in 2003.

Ma ka auina la o ka Poalua o ka pule i hala iho nei, ua olioli makou i ka ike anaʻku i ka lehualehu e hou ae ana me na puolo anahe, he ewalu,

³⁰"He Kaao no Pikoiakaalala," *Nūpepa Kuokoa*, December 23, 1865, p. 1.

³¹The full tradition may now be found in the Hawaiian Digital Library at <http://www.ulukau.com/>.

³²*Nūpepa Kuokoa*, February 24, 1866, p. 1.

³³*Nūpepa Kuokoa*, September 17, 1866, p. 3.

a he umi o ka hapawalu. Ua hauoli nui no ke kulanakauhale nei i keia mea, ka hōea hou ana mai o ka anae holo, a ua iho nui ka lehulehu e kuai, a o ko makou Hale Pāi holoooko nei no hoi kahua i iho pu i ka makeke e kua ia ai. He wa no aia iloko o ka makahiki e holo mau ai kela i-a. O Kapapaapuhi me Ewa, a me Kaipapau ma Koolauloa, oia na wahi i oleloia e kahiko, na wahi hoolulu ia o ua i-a nei, he anae. O kona home mau nae o Kapapaapuhi.

Eia malalo nei he wahi kaaao mai kekahi elemakule mai, e pili ana i ka ano o ke kaapuni ana o ka anae a puni keia mokupuni.

He Kaaao no Kaanae.

Aia ma Kapapaapuhi, me Ewa, kahi i noho ai kekahi ohana nui. Na ka makuakane o kei ohana kekahi kaikamahine maikai, a na makua i aloha nui ai. Ua oi ae paha ke aloha o na makua i keia kaikamahine mamua o na keiki e ae. Ua pii ae ua kaikamahine, a aneane paha he umikumamalima ona mau makahiki, hoohaumia ia iho la oia e kekahi mea. I ka ike ia ana o ke ano haumia ia o ua kaikamahine nei e na makua, ninau aku la na makua ia ia me ke ano e hai mai la hoi ke keiki i ka hua o ka lokomaikai; aohe nae wahi mea a hai mai. Huna elele loa nohoi ke kaikamahine.

Ninau pinepione aku la na makua e hai mai, aohe wahi mea a hai mai; a no keia mea, kipaku haaelele aku la na makua me ka hooahuakao, a i aku i ke kaikamahine, "O hele e imi i kau loaa, a mai manao mai oe he hale!"

Ku ae la ua kaikamahine nei o ka hupe o na waimitaka, haaelele iho la oia i ka ohana.

Hele aku la keia i hiki i Kaipapau, makemake ia mai la keia e kekahi kanaka, no ko ia nei ano wahine ui no hoi paha, a hoao ia ae la laua nei he kane a he wahine, a noho iho la ia he wahine no ka pali hauliuli. O ka hana nui a ua kane nei o ka mahiai i kela makahiki keia makahiki. Oi mai ai aku ua kanaka nei a piha ka aina i ka ai, ka uala, ka me ko, a me kela mea keia mea. I ka piha ana o ka aina i kela mea ai keia mea ai, a oi kekahi la, olelo mai la ke kane i ka wahine, "Kanu aku nei kaua ia ka aina a piha i ka ai, a me kela mea keia mea, a eia la auanei i hea ka inai e pono ai o keia ai!"

Kulou ka wahine ilalo, a pane mai la, "Ua i-a! Ina ke mau la no ke aloha o kee mau makua ia'u, alaila ka hoi loaa ma inai o ka ai a kaua i luhii ai. Hele no ka hoi oe la, a hala mai ke Ahupuaa mea la, o mea la, a hele aku no oe. Pela no ka hoi oe e hele ai, a hiki oe i ka aina e kapa ia ana la o Ewa, alaila, ninau iho no oe ia Kapapaapuhi. Aia ka hoi ilaila ko'u nui kahi i noho ai. Hele no oe la, a ilaila, kolea iho oe i o'u mau makua; a i ninau mai ia oe i kau huakai ea, alaila, hai aku oe he i-a kau huakai i hiki aku ai ilaila. I haawi ia mai anei oe i ka ia iloko o ka hale, mai lawe

anei oe. Olelo aku oe i ka ia iloko o ke kai." Ae mai la ua kanaka nei.

He anahulu mahope iho, kaapuni iho la ua kanaka nei, e hele ana i ka hale pa leo he makuahonowai. Ninau hele aku la no hoi keia a hiki wale i ua aina hanau nei o ka wahine, a hai ia mai la no hoi keia i ka hale, kahi i noho ai o kona mau makuahonowai. Hele aku la no hoi keia a hiki ilaila, kolea iho la. Uwe mai la ka ohana holoooko, me he mea la o ke kaikamahine okoa no, ua hoi aku. Uwe iho la a pau, hiowai a luana iho la, ninau mai ka makuahonowai kane, "Kau huakai o ka hiki ana mai?" Olelo aku no hoi keia, "I hoouna la mai nei au i i-a." "Ae," wahi a ka makuahonowai; "eia ae no ka i-a la, he umi halau i piha, a hoi lawe ia i lima." Hai aku la no hoi keia, e like me ka olelo a ka wahine, o ka ia iloko o ke kai. Kulou iho'la ka makuahonowai ilalo a pau, olelo mai la, "O ka i-a ia, lawe ia, aia hoi oe lawe pu me ka ia!"

He mau la mahope mai, hoi mai la ua kanaka nei, a Kapuukolo i Honolulu nei moe, a i ala ae ka hana o ka hiamoe i kakahiaka ae, e kuu mai ana kanaka ii ka anae. Manao iho la keia, he i-a no la no ia whai, noho ilaila ai i-a. Pela aku ana a hiki i ka luahole i Waikiki. Mai laila aku keia a Maunaloa, o ka hana no ka na kanaka o ke kuu i ka i-a. Pela wale a hiki keia i Kaipapau i ke ahiahi o kekahi la, a i ala ae ka hana a ka wahine a nana aku i ke kai e ulu mai ana kje kai i ka i-a, a i aku keia i ke kane, "Ai aka i-a au i hele aku nei." Akahi no keia a hoomanao ae, o ka la no ka ia e kuu mau ia ana na wahi a pau ana e moe ai.

O keia iho la ka ke kumu i holo ai a puni keia moku, pela la ka olelo kahiko, aka, pela paha, aohe paha, he anoninoni loa ko makou mau manao ma ia mea, e like me ka kahiko e olelo nei.³⁴

3.6 A Tradition of Pūhi Laumeki—A Deified Eel—and How the 'Ānae-holo Came to Travel around O'ahu

"He Moolelo Kaaō Hawaii no ka Pūhi o Laumeki, ka Mea i Like me ka Ilio Pua-pualenala" (The Hawaiian tradition of Pūhi Laumeki...) was published in the native-language newspaper *Niuepea Ka Oiaio* between November 8, 1895 and February 14, 1896. The *mo'olelo* was submitted to the paper by native historian Moses Manu. The *mo'olelo* primarily focuses on *uulii pūhi* and features associated with the lands of 'Ewa, O'ahu, recounting events associated with the birth and deification of an eel (*pūhi*) guardian of fisheries, and his siblings, among whom was Mōkumeha. The narratives include important descriptions of Honouliuli as the source of the *'ānae holo*, and fisheries around the island of O'ahu.

It is perhaps not unusual for the Hawaiian people to see this type of long fish, an eel, about all the shores and points, and in the rough seas,

³⁴ "Ka Ānaama o Kāluhuapalaai," *Ke Au Ōkoi*, September 17, 1866, p. 3.

and shallow reefs and coral beds of the sea. There is not only one type of eel that is written about, but numerous ones that were named, describing their character and the type of skin which they had. In the ancient times of our ancestors, some of the people of old, worshipped eels as Gods, and restrictions were placed upon certain types of eels. There are many traditions pertaining to eels. It is for this fish that the famous saying 'An eel of the sea caverns, whose chin sags' ³⁵

Indeed, this is the fish that was desired by Keinohoomanawanui, the eels of the fishpond of Hanaloa, when he was living with his friend, Kaleleluaka, above Kahalepoi at Waipio uka, when Kakuhihewa was the king of Oahu. It was necessary for us to speak of the stories above, as we now begin our tradition.

It is said in this account of Laumeki, that his true form was that of an eel. His island was Oahu, the district was Ewa, Honouliuli was the land. Within this land division, in its sheltered bay, there is a place called Kaihuopalaai. It is the place of the anae (mullet), which are known about Honoluli, and asked for by the people, with great desire.

Kaihuopalaai was human by birth, but he was also a kupua [dual-formed being], who was born at Honouliuli. His youngest sister was known by the name of Kaihukuuna. In the days that her body matured and filled out, she and some of her elders left Ewa and went to dwell in the uplands of Laienaloa, at Koolauloa, where she met her husband. The place known by the name Kaihukuuna, at Laienaloa, is the boundary of the lands to which the anae of Honouliuli travel.

At the time that Kaihukuuna was separated from her elder brother and parents, Kaihuopalaai had matured and was well known for his fine features, and his red-hued cheeks. He was known as the favorite of his parents and all the family. There was a young woman, who like Kaihuopalaai, was also favored by her family. Her name was Kaohai, and she lived at the place where the coconut grove which stands at the estuary of Waialele and Waipio. Thus, these two fine children of the land of the fish that quiet voices (Ka ia hama leo), that is Ewa, were married in the traditional manner.

In their youth, the two lived as husband and wife in peace. And after a time, Kaohai showed signs of carrying a child. This brought great joy to the parents and elders of these two youth. When the time came for Kaohai to give birth, her child was born, a beautiful daughter, who also had the same red-hued nature as her father. While Kaohai was cleaning the child and caring for the afterbirth, she looked carefully at her daughter and saw a deep red-spotted mark that looked like an eel,

³⁵ An expression that was used to describe a prosperous person [26No. 1545].

encircling the infant. Everyone was looking at the mark, contemplating its meaning, and Kaohai was once again taken with birth pains. It was then understood that perhaps there would be a twin born as well. But when the birth occurred, an eel was seen moving about in the blood, on the side of Kaohai's thigh. This greatly frightened the family and attendants, they fled, taking the child who had been born in a human-form, with them. Kaihuopalaai also separated himself from his wife. Kaohai remained with the blood stains upon her, and no one was left to help her.

It was the eel which had been born to her, that helped to clean Kaohai. He worked like a human, and Kaohai looked at the fish child which had been born to her, and she could find no reason to criticize or revile him. Kaohai then called to her husband, Kaihuopalaai, telling not to be afraid, and he returned. They both realized the wondrous nature of this child and cared for him at a good place, in the calm bay of Honouliuli. They named this eel child, Laumeki, and his elder sister, born in human-form, was named Kapapapuhii. This eel became a cherished child, and was cared for as a God. Laumeki, the one who had been consecrated, asked that the first-born, his sister, also be cared for in the same manner, and a great affection was shared between the children born from the loins of one mother.³⁶

Thus, it is told in this tradition, that this is the eel Laumeki. It is he who caused the anae to remain at Honouliuli, and why they are known as "Ka anae o Kaihuopalaai" (The mullet of Kaihuopalaai). With the passing of time, the forms of this eel changed. At one time, he was red with spots, like the eel called puhii paka, at other times he was like the laumilo eel.

A while after the birth of Laumeki, another child was born to Kaohai, a son. He was named Mokumeha, and he was given to Wanue, an elder relative of Kaihuopalaai's, to be raised. There are at Honouliuli, Ewa, places named for all of these people. The natives of that land are familiar with these places. For this Wanue, it is recalled in a song:

The thoughts are set upon the sea at Wanue,
I am cold in the task done here...

The eel-child Laumeki, followed the fish around in the expanse of the sea, and on the waves of this place. This was a work of love and care, done for his parents and family, that they would have no difficulties. In those days, this eel lived in the sea at a place where a stone islet is seen in the bay of Honouliuli, and he would not eat the fish which passed before him. He did these things for his parents and sister Kapapapuhii.

³⁶ *Nūpepa Ka Ohi'o*, November 8, 1895.

Laumeki was very watchful of his family, protecting them from sharks, barracudas, and the long billed marlin of the sea which entered into the sheltered bay of Honouliuli, the land of his birth. Because of his nature, Laumeki did many wondrous things. It was Laumeki who trapped the Puhī lala that had lived out in the sea, in the pond of Hanaloa. This Puhī lala was the one who bragged about his deeds, and when he was trapped his eyes glowed red like the flames of an earthen oven.

It is perhaps worthy here, my readers that we leave Laumeki and speak of Mokumeha and his journey around Oahu. At the time when the sun rested atop the head [describing Mokumeha's maturity], and his fine features developed. He was very distinguished looking. At that time, he determined to travel around the island of Oahu. He asked his parents and guardian permission, and it was agreed that he could make the journey.

Mokumeha departed from Honouliuli and traveled to Waiānae, and then went on to Laiealo, at Koolauloa, the place where the youngest sister of his father dwelt. She [Kaiukuuna] was pounding kapa with her beater and thinking about her elder brother. She rose and went to the door of her house and saw a youth walking along the trail. Seeing the youth, her thoughts returned once again to her brother Kaihuopalaai and his wife Kaohai. The features of this youth in every way, looked like those of his father, and upon seeing him, tears welled up in Kaiukuuna's eyes. She called to the youth inquiring about his journey, and he responded, answering each of the questions. The moment the youth said the name of his parents, and the land from which he came, Kaiukuuna wept and greeted her nephew in the custom of the people of old.

This greatly startled her husband who was out in the cultivated gardens tending to his crops. He thought that perhaps one of his own family members had arrived at the house. When he reached their house, he saw the strange youth and he quickly went to prepare food for their guest. In no time, everything was prepared, and he then went to his wife asking her to stop her crying, and invite the visitor to eat of the food that had been prepared. He told his wife, "Then, the talking and crying can resume." She agreed and they sat down together and ate, and had a pleasant time talking.

Kaiukuuna then asked Mokumeha about the nature of his trip, and he explained that he was traveling around Oahu on a sight-seeing trip. Kaiukuuna told him, "It is wonderful that we have met you and can host you here." She then asked him to consider staying with her and her husband at Laiealo, where all of his needs would be met. "We have plenty of food and if you desire a wife, we can arrange that as well." Mokumeha declined the invitation, explaining his desire to continue the

journey and then return to Honouliuli.³⁷

Now it is true that at this place, Laiealo, there was grown great quantities of plant foods, but the one thing that it was lacking was fish. Mokumeha, his aunt, and her husband, Pueo, spoke about this, and it was determined that Pueo should go to Ewa. Mokumeha instructed him to seek out Kaihuopalaai, Kaohai, Kapapūhi, and Laumeki, and to ask for fish. He told them that "Laumeki will be able to lead the fish to you here at Laiealo."

Pueo departed for Honouliuli [various sites and features are described along the way] ... and he met with Kaihuopalaai. Kaihuopalaai's love for his sister welled up within him, and it was agreed that fish would be given to her and her family. But rather than sending fish home with Pueo in a calabash—fish which would be quickly consumed, causing Pueo to continually need to make the journey between Laiealo and Honouliuli—Kaihuopalaai said that he would "give the fish year round."³⁸

When Kaihuopalaai finished speaking, Pueo exclaimed, "This is just what your son said you would do!" Kaihuopalaai and Pueo then went to the house of Kapapūhi, who, when she learned that Pueo was her uncle, leapt up and greeted him. They discussed the request for fish, and ate while speaking further. Kaihuopalaai then asked, "Where do you come from?" Pueo answered, "Laiealo," and he described the land to her.

The next day, Kapapūhi and Pueo went on a canoe out to the stone islet where Laumeki lived. They took with them food, and as they drew near the stone, the water turned choppy like the water of the stormy winter season. The head of Laumeki rose out of his pit and remained on the surface of the water. Kapapūhi offered him the awa and food she had brought with her. This eel was cared for just as a chief was cared for. When he had eaten his food and was satisfied, he rested on the surface. Kapapūhi explained to Pueo that he too would need to care for and feed Laumeki, in order to obtain the fish he needed. Kapapūhi then called out to Laumeki, "Here is an elder of ours, tomorrow you will go with him and take the fish of our parents with you."³⁹

The next day, Pueo rose while it was still dark, and the stars, Aea, Kapawa and Kaupae were still in the heavens. He prepared the foods needed for Laumeki, and prepared the canoes. He and his wife's family and attendants then went towards Laumeki's house, where he was resting. When Laumeki saw the canoes coming toward him from Lae o Kahuka,

³⁷Ibid., November 15, 1895.

³⁸Ibid., November 22, 1895.

³⁹Ibid., November 29, 1895.

he rose up before them. Together, they passed Kapakule, the place where the sharks were placed in ancient times as play things of the natives of Puuloa. When the canoes and people aboard reached the place where the waves of Kealii break, Laumeki cared for them, to ensure that no harm would befall them. This place is right at the entrance of Puuloa.

As the rays of the sun scattered out upon the water's surface, the people on the canoes saw the red-hues upon the water and upon those who paddled the double-hulled canoes. Pueo then saw something reflecting red, beyond the paddlers, and below the water's surface. Pueo realized that it was Laumeki with the anae fish. The anae traveled with Laumeki outside of Kumumau, and past Ahua. They continued on past the Harbor of Kalihi at Kahakaaulana, with the fish being urged on, by the people back at Kalaekao, Puuloa, and Laumeki was at the front, leading the fish at Mamala... They continued on around Kawailhoa, Makapuu, and traveled passed Koolaupoko, and on past Lamiloa at Laiemaloo, Koolauloa...⁴⁰

... This is how the mullet came to regularly travel between the place called Kaihukuuna at Laiemaloo and Honouliuli at Ewa ...⁴¹

...Mokumeha and Laumeki returned to Honouliuli, and Mokumeha offered a prayer chant to his elder brother:

O eel,
O Laumeki,
Who passed before the point,
Dwelling in the pit,
Eel of the cavern,
You of the kauila (body) form,
That is the form of the Laumilo,
Your wooden body,
It is Laumeki.
Amen, it is freed...

...While Laumeki was resting at Honouliuli, Mokumeha set off once again to visit various locations around the island of Oahu. He bid aloha to his family and walked across the broad plain of Ewa. He arrived at Kapukaki, which is the boundary of the land of the streaked seas, that land in the calm, reddened by the dirt carried upon the wind. This is where Ewa ends and Kona begins...⁴²

⁴⁰Ibid., December 6, 1895.

⁴¹Ibid., December 27, 1895.

⁴²Ibid., January 10 and 17, 1896.

3.7 Pu'uloa and the 'Ewa District in the Tradition of Kūali'i

Native historian Samuel M. Kamakau compiled and published a history of Kamehameha I, which was translated by Mary Kawena Pukui. In doing so, he reviewed various aspects of Hawaiian history leading up to the time of Kamehameha and touched upon the history of a chief by the name of Kūali'i who was the king of O'ahu and later unified all the islands under his rule. Tradition says that Kūali'i lived for 175 years, and he was succeeded in rule by his son, Pele-iō-Hōlani in ca. 1730. A *mele* from the Kūali'i tradition names places, notable people, and resources of O'ahu, including some found in the 'Ewa District: where the chief La'akona once ruled; and where the calm seas of Pu'uloa were noted for the abundance of *nehu* and *lala* fishes.

Ka Moolelo o Kamehameha I

Eia kekahi, o na mele a ka poe kahiko, he mau mele ano nui, he mau mele wanana, he mau mele pule, he mau mele-kaua, he mau mele aina noho wale, a he nui wale ke ano. Aka, o na mele o keia wa a ka poe opio, he mau mele hooipoipo ka nui, he mau mele hoohehie hoalaala puuwai. Mapuna hou mai la keia wanana o Kuali.

The History of Kamehameha I

This also this, the chants of the ancients were of many kind; there were prophetic chants, prayer chants, chants of war, chants of settled land, and many other kinds. But the chants of the young people in these days are largely love songs, songs to enoble and excite the heart. This prophecy of Kuali again comes to mind:

"No wai ke kai? No Ku no,
Inu kai i Tahiti,
I piha kai i ka moana,
I poi ke kai i ke kohola,
I nehe ke kai i ka ilili,
He kai linaliha ko ka puua,
He kai likoliko ko ka moa,
I kiki ke oho i ke kai,
I ehu ke oho i ke kailiu,
I lelo ke oho i ke kailoa,
He kai heenalu ko Kahaloa,
He kai hopuni ko Kalia,
He kai au kohana Mamala,
He kai au aku ko Kapuone,
He kai ka anae ko Keehi,
He kai elemihi i Lelewi,
He kai awalaauke Puuloa,
He kai puhinehu puhilala,

"Whose is the sea? For Ku indeed.
Tahiti drinks the sea;
The ocean embodies the sea;
The sea covers the shoals;
The sea rumbles over the pebbles.
Greasy is the soup of the hog;
Glistening is the soup of the fowl.
Greased is the hair by the sea;
Red is the hair by the very salt sea;
Brown is the hair with the foamy sea.
The sea for surfing is at Kahaloa;
The enticing sea is at Kalia;

Ke kai o Ewa-e-noho i ka la,
O Ewa nei a Laakona,
O Ku i Kulaaukalanani,
He kai mokumoku ko Heeia,
He kai o hee ko kapapa,
He kai o kilo ko Kualoa,
He kai ehuehu ko Kaaawa,
He kai ahui ko Kahana,
Wehe kai ia Paao,
Ikea Kahiwa ilalo-o Kahiwa
ia."

The sea for swimming naked
is at Mamala;
The sea for kicking up mullet
is at Keelii;
The sea for small crabs is at
Leleiwii;
The sea of many crooked har-
bors is at Puuloa.
A sea that blows up nehu and
lala
Is the sea of Ewa, so calm;
The great Ewa (lands) of
Laakona.
Of Ku in Kealaikaokalani.
A mottled sea has Heeia;
A sea for spearing squid has
Kapapa;
The sea watcher is at Kualoa;
The sea is furious at Kaaawa;
The wild sea is at Kahana;
The sea is open for Paao;
The great one is seen below,
he is the great one.”
The people who read carefully,
my salutation.

Owau no o ko oukou wahi lolo hai
moolelo-E aloha no i ka poe heluhelu
me ka noonoo, ia lakou ko'u Aloha.

S. M. Kamakau¹

1 *Nupepa Kuokoa, Helu* 11, January 19, 1867, p. 1-2.

2 Trans. by Mary Kawena Pukui.

3.8 He Wānana: A Prophecy

One of the great traditions of the Pu'uloa area is tied to the event of ca. 1782, when Kahehiki, king of Maui, tricked his nephew Kahahana, king of O'ahu, into killing his high priest Ka'ōpūlupu. Kahehiki had raised Kahahana, and he desired to control O'ahu in addition to his own islands of the Maui group. It was the priest Ka'ōpūlupu who instructed Kahahana and warned him against certain actions proposed by Kahehiki. S. M. Kamakau reported that about eight years into Kahahana's reign as king of O'ahu, Kahehiki succeeded in tricking Kahahana into killing Ka'ōpūlupu.⁴³

⁴³ *Nupepa Kuokoa*, March 23, 1867.

The deceived Kahahana called for Ka'ōpūlupu and his son Kahulupu'e to be brought before him at Wai'anae. The call was made from Pu'ukaheha (Hill of calling). Upon the summons, Ka'ōpūlupu prayed to his gods and discerned that he and his son would be killed once in the presence of the chief. Arriving at the place now called Nanākuli, Ka'ōpūlupu called out to Kahahana who looked at him, but made no response. He then said to his son, 'Ka'ōpūlupu then knew for certain that he and his son were to be killed, and he told Kahulupu'e:

"I nui ke aho a moe i ke kai! No ke kai
ka hoi ua aina!" Strive to lie down in the ocean! For
our revenge will come from other lands
across the sea.¹

1 S. M. Kamakau, March 23, 1867.

Kahulupu'e ran into the water near Pu'uohulu where he was killed. Ka'ōpūlupu continued his flight across the Honouliuli Plain to the shore of Pu'u'oloa, where he was then killed. Elder *kama'āina* have expressed the thought that the prophecy of Ka'ōpūlupu was fulfilled with the arrival of foreigners, the loss of their land and kingdom, and military control over Pu'u'oloa (Pearl Harbor), and even the advent of World War II.⁴⁴

3.9 Noted Places of 'Ewa in 1867

Samuel M. Kamakau, who was one of the esteemed historians tied to the Kamehameha household, wrote on many aspects of Hawaiian history. At times elders in the Hawaiian community—sometimes those whose families descended from lineages and lands which had been subjugated by Kamehameha I—responded to historically biased or incomplete histories which were compiled by Kamakau. In the account that follows, Kamakau responds to critics of his narratives and references noted places and resources of the Ewa District. Various lines in the account appear at times to be facetious taunts, rooted in a time and cultural context that has faded from memory.

Puakoliko, Manua, Kahehuna.
Iulai 30, 1867.

Puakoliko, Manua, Kahehuna.
 July 30, 1867.

“Pehi onu ke kai lono Lihue,
Lono paiaakuli ka uka o Mala-
manui,
Kani ka poo a ke kai i ka laau,
Haalele wale i Pulee,
He uahi mahu kai na ke
koolau o lalo,

"Swollen and striking is the
sea, heard at Lihū'e,
Deafening is the report in the
uplands of Mālanui,
The sea strikes at the summit
of the woods,
Departing from Pulee.

⁴⁴Personal communication, Samuel Hoapili Lono, 1973, and Sister Thelma Genevieve (Dowsett) Parish, 1997.

No lalo—e, he aloha no.”

Ina la i komo ai ka la iloko o Hipakane, a au ana kona hele ana i ke alanui polohiwa, a o na kuhikuhi manamana o kona panana, ua kowelowelo ae ia ma ka Moana Pakipika Komohana, a o kona mau kukuna malamalama, ua keekehi no ia i ke kula o Peekaua; a o kona olilikona, e ulii haamalule ana i Puuokapolei, a ua kolilii koliliko kona waiuula i ke kaha o Kanehili, me he kanaka o-a la i ka la, ka hele o ka wiliwili me ka lau o ka maomao, a paha leo lealea ae la au i Mauiola—

“Me he kanaka ka ohai o
Kaupea,
Ka wiliwili haoe kaune i ka
la,
Kulolia i ke kaha i Kanehili,
I ke kaha kahakai o Kaolina—
e,
He wahi olina na ka la i Puu-
loa,
He kahua olina na ka hau na
ke koekoe,
He kuahiwi pala ole i kai,
Heaha kau hana liliu,
O kuu aina awalau,
He la kaune i ke kulakula
akahi,
He kai makaulia i ka weli,
Ilaila wale no la—a,
He aloha—no—e...”

A mist which rises with the
Ko’olau below,
It is there below. Greetings.”

On the days when the sun sets in Hipakane (a star marking the path of the sun), and its travels are turned to the path of Polohiwa (a celestial point), and its rays point out the direction, fluttering upon the Western Pacific Ocean, and its shining rays stride across the plain of Pe’ekaua; it sparkles, gently treading upon Pu’u-o-Kapo-lei, its image glistening and disappearing upon the shore of Kanehili, like a man forsaken in the sun, walking like the wiliwili trees, the leaves of the ma’oma’o, and so I playfully chant to Mauiola (god of health):

“People are like the ohai blossoms of Kaupea,
The wiliwili appear to stagger in the sun,
Stricken on the plain of Kanehili,
At the shore of Ka-olina (Ko’olina),
There is a place of joy (re-prieve) from the sun at Puuloa,
A foundation of joy in the moist dew,
A hill that is perfect on the shore,
What is your little task,
My many harbored land,
The sun staggers across the lone plain,
The sea is afraid,
It is only there.
Greetings.”

3.10 Kamakau: There are a number of things to criticize in Hawaiian lore

Another of Samuel M. Kamakau’s submittals to the Hawaiian newspaper *Kuokoa* provides readers with details on *wahi pūna* in Honouliuli and the larger ‘Ewa District. In this account, Kamakau cites the tradition of Kana and corrects certain details that had been previously reported. Notably, he recorded the names of certain chiefly and priestly ancestors who came from Kahiki, and who were the founders of lineages tied to various *aliʻi pūnaʻa* in the ‘Ewa District. The highlight of the account is Kamakau’s statement, “He mau mea i hoohalahala ia no na mea lloko o na Kaao Hawaii,” which means, “There are a number of things to criticize in Hawaiian lore.” Following the excerpt in the original Hawaiian is a summary in English.

E Na Luna Hooponopono o ke Kuokoa e:— Ke waiho aku nei au i ko’u mahalo i ka mailo kakau kaao o ko kakou mau Nupepa hai naauao o ka Lahui holookoa; a e lilo ana ia i kumu alakai i ka Lahui, a i ka poe opio, a e lilo ana ia mea e hoonaauao ai i ka hanauna hou aku. Aka, eia ka’u mea kanalua, aoie pololei o kekahi mau mea i kuhikuhiia no ka moolelo o Kana.

O ka moolelo kuaauhau o Kana. Aoie he oiaio no Hawaii; no o Oahu ka oiaio maoli. O Hua a Kamapau ko lakou kupuna, oia hoi o Huanui-ikalalailai ke alii i hanau i Kewalo no Honolulu. Na Huanuiikalalailai o Kuhealani nana mai o Hakalanileo. O Kamale i Waianae ka aina o Hakalanileo.—O Hoohoakalani, he alii wahine no Hilo i Hawaii.

O na keiki i hanau i Oahu, o Kekahawalt, o Kepani, o Haka, a me Nihau. O Makaha i Waianae ka aina o Nihau—O ke keiki hope loa o Kana, aia ma Hanaiahoa i Kanowa ma Puueo ma Hilo kahiki i hanau ai o Kana. Ua lilo ia Uli ka hanai o Kana, i ka makuahine o Hoohoakalani i uka o Kapahukea. E ninau i ko Hilo poe kahiko a e loa na no kuli o Hana. Aka, aia ma Oahu ka nui o kona wahi i noho ai, e nana ma Kaneohe e kokoke ana i Kaulakola, aia kokoke malaila na maka o Kana. Aia ma Kahana, ma ka loko o Huilua kekahi wawae, aia ma Ahu anu ai ka Hana kekahi kuli, a kiei ke poo ma ke kuahiwi o Punaluu.

Ua olelo ke kakau kaao, he poe kanaka no Kahiki mai ka poe kanaka a Kolea ma i hai aku ai ia Moi maloko o ko lakou mele helu kanaka. Aoie pololei o ia olelo ana. No o Oahu na kanaka i helu ia. Aoie nae pololei loa. E hoomaka ma Waikiki ka helu ana, e helu ia ka nui o na kanaka o kela ahupuaa o keia ahupuaa a puni o Oahu. O Pepemua, o Pepeamahope, o Pepeloa, o Pepekamui, no Waiawa ia poe kanaka; O Kiele nahulu no Waipio; O Malamahane no Waikale, O Kaulu no Hoaeae; O Lekiapokii no Honouliuli, aoie nae i pau pono loa na kanaka. E loa no keia poe kanaka ma ka hula Pele a Malaehaakoa.

No Keoloea ma. Aoie o Nuakea a me Moi, he mau pili hoahanau no Keoloea ma; no Ewa no Nuakea me Moi, o Laakona ko lakou mua,

oia o Ewa a Laakona. O ko lakou makuwahine o Wehelani, a o ko lakou makukane o Keauuiamaweke. Ua lilo o Nuakea i wahine na Keolewa, a ua hanau mai ka laua o Kupau-a-Nuakea, oia ke kuamoo alii a me ke kuamoo kahuna o Hawaii ma o Kalahumoku la. No Keolewa ma. O Hinakeka ko lakou makuwahine, a o Kamaaua ko lakou makukane. O Keolewa Nui a Kamau, o Haili nui a Kamau, o Kapepee Nui a Kamau, o Ulihalanui a Kamau. Ma o Haili Nui a Kamau, oia ke kupuna o Kaulilaau. O Haili nui a Kamau noho ia Nuanualolo o Kanikaniaula, noho ia Kakaalaneo o Kaulilaau.

He kanaha mele wanana, he kanaha mele hilani, he kanaha mele kau a Moi i Wanana ai iloko o na po elima, a o ka lele no ka po kolea e helu i na kanaka mai Hawaii a Kauai, i kela ia i keia la, a i ka po hai ia Moi. Hoole no o Moi, pela aku no. Aia maluna aku o Moanalua ma ke komohana akau o Kapapakolea, aia maluna o ka pohaku, he holua, no ua poe kolea la, e loa no ia ke hele e nanao.

Pela no ka moololo o Hamaulau, o ka moololo o Hamaulau aia iloko o ka moaalii o Oahu ; o ka moaalii o Kukaalili aia ma ka moaalii o Hawaii.

Ina paha e hookapake ae ke kakau moololo kaao a me na kumu kaao ana i palau mai ai.

I kaihuauwaa—
I ka peleu—a—
Lai ku ka maa—na—
U—o—ka ale—a—
A Puuloo—la—
I ke awalau—la—
I Kapakule—a—Kohepalaoa—la.

Pela ka moololo o Pakaa. Ua pololei ka makani, he uuku ka makani i haule, aia ma ka moololo ka hemahema a me na kupuna. O ka pololei loa ma ka moololo o Keawenuiaumi, e hana ai, he mau lala keia a he nui loa na lala e lawa ai ka moololo o Keawenuiaumi no ka hapalua o ka makahiki a oi aku.

Hepono i ka poe kakau i ke kaao e hooponopono mua i ka mookuauhau a me ka moololo Hawaii a maopopo kahi e alakai aku ai i ka Lahui i ka ike a me ka oiaio. O ke kakau moololo a kaao, he kanaka oia i manao nui i ka moololo Hawaii, i na mookuauhau, a me na mookaao kahiko o Hawaii nei.

I ko'u manao, i na e like na kanaka naauao me keia kanaka a hui lokahi e hana i mau Buke moololo Hawaii a me na kaao i ku i ka oiaio, alaila, ua pomaikai na 'Lii a me na makaainana, ua loa ka Buke Hawaii oiaio. Ina paha e make ana au, a mahope hui kekahi poe a manao e alakai i kuu

moololo i kumu alakai no lakou. Eia ka hemahema, ua haule kekahi mau makahiki, a ua komohewa ma ka hoohonoho ana a ka poe kukulu kepau. O kekahi mau pauku ua haule. No ka mea, hookahi wale no a'u me ka paulale ole i ka hai ike a me ka hai lohe. Ina na hai ka lawelawe a me ka hana a na'u ke kaao mai a Kumulipo mai a hiki i ka Moi Kamehameha III. Aia a ike oukou i ka mookuauhau i keia mau pule aku paha. No kuu molowa, ua kapae koe ia e a'u. Aole paha e loaa ka piko a me ke au.

Aloha oukou. S. M. Kamakau.
Puakolliko, Manua, Kahehuna, Ian. 31, 1868.

The following is a summary of the preceding excerpt.

There are a number of things to criticize in Hawaiian tales

... It was at Waikiki, that the recitation of people in various ahupua'a around O'ahu began ... Pepemua, Pepemahope, Pepeloa, and Pepekamuimui, were people of Waiawa; Kiele nahulu was of Waipi'o; Malamaianee was of Waikela. Ka'ulu was of Hoaeae; Lekiapokii was of Honouliuli. These are not all the people. Others are found in the Pele dance of Mālaeha'akoa.

About Keolo'ewa folks. Nu'akea and Mo'i were not close relatives of Keolo'ewa folks. Nu'akea and Mo'i were of 'Ewa, La'akona came before, that is 'Ewa a La'akona. Their mother was Wehelani, and their father was Ke-au-nui-a-Maweke. Nu'akea became the wife of Keolo'ewa, and there was born to them, Kupau-a-Nu'akea, this is the lineage of the chiefs and priests and Kalahumoku. About Keolo'ewa folks. Hina-ke-ka was their mother, and Kamaaua was their father. There was Keolo'ewa Nui a Kamau, Haili Nui a Kamau, Kapepe'e Nui a Kamau and Ulihalanui a Kamau. Haili Nui a Kamau dwelt with Nu'anu'alolo o Kanikaniaula, who dwelt with Kaka'alaneo, (to whom was born) Ka'utulā'au.

There are forty prophecy chants, forty exaltation chants, and forty sacred chants by which Mo'i prophesized in the five nights, and then the flight of the kōlea (golden plovers) which counted all the people from Hawai'i to Kaua'i on each of the days and nights that Mo'i chanted. While Mo'i denied it, it was so. It was there, above Moanalua on the north west of Kapapakōlea atop the stone hōlua (sledding track), that those kōlea went about to look...

If the writer of these tales might so sprinkle the stories and traditions:

At Kaihuwaa,
The long canoes
In the beginning
The waves are intertwined
At Pu'uloa

The many bays,
At Kapakule and Kohepalaoa...

Love to you, S. M. Kamakau.
Puakoliko, Manua, Kahehuna, Jan. 31, 1868.

3.11 A Chant for Kualii, Kalanipipili, Kulanioaka, Kunuiakea &c. Composed by Kumahukia and Kaiwiokaekaha, the attendants of Kualii, in the battle at Kunia, at Keahumoa in Lihue.

The history of Kualii'i was cited earlier in this section of the study (sec. 3.7). Here, in "He mele no Kualii, Kalanipipili, Kulanioaka, Kunuiakea &c. i haku ia e Kumahukia a me Kaiwiokaekaha, na kahu pono i o Kualii, ma ke kaua i Kunia, ma Keahumoa i Lihue," Samuel M. Kamakau provides readers with another *mele*, extolling the heritage of Kualii'i, and his association with *vaali pana* across the islands, including several of those found in the 'Ewa District.

Ua hanau ia o Kualii ma Kalapawai, at
ma Kailua, Ko'olaupoko, i ka A.D. 1555. His
mother was Mahulaniuaokalani, and his
father was Kauakahi a Kaho'owahao-
kalani. I leave the rest to the Kumuuili
and Kumulipo. Or perhaps for you. —S.
M. Kamakau.

... O Kawelo! Hail Kawelo!

Sharp pointed hill, Kaweloiki,
Hill of Kapolei,

It is the dark poi which satisfies those
of Honouliuli.

The fine-grained salt is there at Kahua-
iki, Ho'ae'ae,

The fish of Waikele are small—Waikele,
The arched house of Kauamoa is at

Waipi'o,
We two cast the net in the milkfish
pond of Waiawa,

Don't stretch yourself out at Mānana,
There are many stream gulches,

There are many sharks at Waimano,
We two are drawn by the current of

Waiau,
We were sheltered by the kukui of

Waimalu,

E ala kaua ua ao-e-o Kalauao,
E kipa kaua e ai-o Alea,
Mai hoohaluwa ia oe-o Halawa,
Let us stay at the crater/pit of Moana-
lua,
We shall bend the hau of Kahauiki...¹
Hoopiopio hau kaua-o Kahauiki...
(Aoie i pau).²

¹ Trans. by Maly.

² *Niipepa Kuokoa*, May 23, 1868, p. 4.

3.12 A Tradition of Kauliani

"He Kaao no Kauliani," the tradition of Kauliani, spans various islands of the Hawai-
ian Archipelago. It follows the children of chiefly parents with a godly lineage. The
parents of Kauliani and Lepeamoa were Keāhua and Kauhao, both of whose names
are commemorated as places in the Mānana-Waimano vicinity of 'Ewa. Kauhao's
father was Honouliuli and his mother was Kapālana, for whom the lands which
bear their names were given. The daughter Lepeamoa was born in a supernatural
form, possessed of both nature and human body-forms. She participated in histories
of great importance during the reign of Kākuhihewa, as king of O'ahu. This account,
published in *Niipepa Kuokoa*, was submitted by S. Kapohu, and offers richer details to
place, practices, and history than those cited later by Westervelt [32] and Beckwith
[3:428–429].

Kauliani was the son of Keahua (k) and Kauhao (w).⁴⁵ and he was
the younger brother of Lepeamoa (w). The family resided at Wailua
Kauai, where Keahua was the high chief. Kauliani was descended from
high chiefs of Kahiki and Hawaii, and both Kauliani and his elder sister,
Lepeamoa, were possessed of supernatural powers.

The elders of Kauhao were Kapalama (w) and Honouliuli (k), and the
lands on which they lived are now named for them. When Lepeamoa was
born, she was born in the form of a hen's egg. Discerning the supernatural
nature of her granddaughter, Kapalama and Honouliuli sailed to Kauai
on their canoe, Pohakuokauai, and retrieved the egg. With the egg, they
then returned to Kapalama, where they cared for the egg until it hatched.
While sailing from Kauai to Oahu, the canoe passed by Pokai, Waianae,
and sailed along the fine shore of Kualakai, Ewa. From there, they sailed
to the many harbored bay of Puuloa, and entered into the opening of
Puuloa where they landed their canoe on the side of the bay. From there,
they traveled along the plain to Kapalama...

⁴⁵k stands for *kāne*, man or husband, and *w* stands for *wahine*, woman or wife.

[The story continues, describing the care given to the egg-grandchild, Lepeamoa. Which when she hatched, she was in the form of a beautiful bird with many brightly colored feathers.]⁴⁶

After Lepeamoa was taken to Oahu, her younger brother, Kaulani was born. He was taken and reared by his paternal grandparents, Laukaieie (k) and Kaniuala (w), in the uplands of Wailua. Kaulani was bathed in a sacred pool, which caused him to mature quickly, and his grandparents instructed him in various skills and forms of Hawaiian combat. During this time, a god Akua-pehu-ale rise up and fought against Keahua and his people, capturing them and holding them prisoner. Following the instructions of his grandparents, Kaulani fought against the god, [October 2, 1869:1] and vanquished him, returning the rule of Kauai to Keahua...⁴⁷

After the battle, Kaulani and his father were reunited, and in this way, the youth learned that he had a sister who was being raised on Oahu, by the elders of Kauhao. Kaulani determined to go and seek out his sister, and Kauhao instructed him about the lands he would pass and how he would know his sister.

She told him that he must sail from Wailua and along the coast of Waianae, and along the shore of Puuloa, where he would find a landing and the path to Kapalama. Before his departure, Kauhao also gave Kaulani a supernatural spear named Koa-wi Koa-wa, which would help him along his journey, and lead him to his elders on Oahu.

Departing from Wailua, Kaulani traveled to the shore at Nukoli. He threw the spear, and then took off after it, across Kaieiwaho channel, sailing to Oahu. In his canoe, Kaulani passed the coast line of Waianae, and he then drew near the shore of Kualakai where the spear had landed. While Kaulani was traveling from Kauai to Oahu, two sisters, Kamalulena and Keawalau, who had been surfing at Kualakai, returned to the shore and found the spear. Seeing the spear, and recognizing its excellent quality, the sisters hid it, seeing no man who could claim it.

Shortly thereafter, Kaulani passed the coast of Waianae and landed on the shore of Kualakai to retrieve his spear. Upon landing, Kaulani saw the two sisters and noted that his spear was nowhere to be seen. Kaulani inquired of the sisters if they had seen the spear, which they denied. Kaulani discerned that they were lying, and told them so, and he then called out to his traveling companion, the spear, Koa-wi Koa-wa. The spear answered from where the sisters had hidden it, and Kaulani

⁴⁶*Niuepa Kuokoa*, September 18, 1869:1.

⁴⁷*Ibid.*, September 25, 1869:1.

picked it up and threw it again. It landed near the entry way to Puuloa.⁴⁸

Arriving where the spear landed, the spear then told Kaulani to climb a wiliwili tree that was growing nearby. From there, he would see a rainbow at the shore, and a person picking limpets, octopus, and other things. That person would be Lepeamoa, Kaulani's sister. Kaulani climbed the wiliwili tree and saw a red patch of a rainbow upon the water near the shore. He asked Koa-wi Koa-wa about this, and learned that it was the rainbow shroud of his sister, who was in her bird form near the shore. Before Kaulani could approach Lepeamoa, she disappeared, returning to Kapalama. Kaulani prepared to follow, and as he drew near, Kapalama knew of his arrival, and ordered food to be prepared. As Kaulani drew near the house, Kapalama saw him and cried out, greeting her grandson. They ate together, and then Kapalama inquired about the purpose of Kaulani's journey. He explained that he wished to see his sister, Lepeamoa...⁴⁹

Before meeting her young brother, Lepeamoa tested Kaulani to determine the depth of his skills and strength, and his ability to care for himself while traveling around the island. Kaulani demonstrated exceptional strength and skill, and Lepeamoa took her human form and greeted Kaulani. After spending ten days together, Lepeamoa instructed Kaulani to go to Waikiki kai, where the king, Kakuhihewa was hosting Maui nui, king of Maui. Maui nui and Kakuhihewa were competing against one another, in the sport of cock-fighting (hoohakaka moa) ... Kakuhihewa was losing and the stakes were the life of the king that lost ... Learning that Kaulani had arrived on Oahu, Kakuhihewa, who was related to the chiefs of Kauai, sent his messengers to seek out Kaulani, in hopes that he might be able to help...

[Subsequent issues from November 6, 1869 to February 12, 1870 describe events leading to the death of Maui nui's supernatural rooster, Kauhalemoa, who met Lepeamoa in battle, and was defeated. Also described are Lepeamoa's travel to Waiialua, Oahu, and the Wailua region of Kauai.]⁵⁰

3.13 The Tradition of Kalelealuaka

"Ka Moololo o Kalelealuaka," the tradition of Kalelealuaka, touches on places throughout the Hawaiian islands. Kalelealuaka and his father Ka'opele possessed supernatural attributes, and their story describes several places in Honolulu and the larger 'Ewa District. The tradition published in *Niuepa Kuokoa* was submitted by J. W. K.

⁴⁸*Ibid.*, October 9, 1869:4.

⁴⁹*Ibid.*, October 23, 1869:4.

⁵⁰*Ibid.*, October 30, 1869:4.

Kaualilinoe. The original account offers a richer narrative of places and practices than those cited by Fornander [10:464–471] and Beckwith [3:415–418]. There are several *wahine pania* named in the tradition, with descriptions of place and how the names were given.

Kaopele (k) and Makalani (w) were the parents of Kalelealuaka (k). Kalelealuaka was born on Kauai, the native land of his mother. His father had been born at Waipio, Hawaii, and possessed certain supernatural powers. Kaopele was a great cultivator of the land, and he is credited with the planting of large fields on Hawaii, Maui, Oahu, and Kauai. On Oahu, it was at Kapapakōlea in Moanalua, and at Lihū'e (Honouliuli) in the district of Ewa that Kaopele had cultivated large tracts of land. While Kaopele worked the land with great speed, he was also overcome by a deep sleep that lasted for six months at a time. On many occasions, it was thought that Kaopele had died, and then he would reawaken and resume his tilling of the land. When Makalani became pregnant, Kaopele gave her certain items to identify the child as his own, and shortly before giving birth, Kaopele went to sleep.⁵¹

Kalelealuaka was born and grew quickly. When Kaopele woke up from his sleep, he instructed his son in various techniques of fighting, and Kalelealuaka became known as an exceptional warrior, who moved so swiftly, that no one could even see him . . . One day, when looking out across the ocean, Kalelealuaka saw a land in the distance, and he inquired of Kaopele, "What land is that?" Kaopele told him that it was "Kaena on the island of Oahu." Kalelealuaka then asked, "What is the village that is there beyond the point?" Kaopele answered, telling him that it was "Waianae." When Kalelealuaka expressed a desire to travel and see that land more closely, Kaopele made a canoe for his son to travel on.

When preparations were being made for Kalelealuaka's departure, he befriended a youth named Kaluhe, and it was agreed that Kaluhe would travel with Kalelealuaka. When everything was made ready, Kaopele told Kalelealuaka:

Sail until you reach the point outside of the village of Waianae, then travel across the plain to a place where there is a pool of water. That will be the pool of Lualualei. Then you will ascend the pass of Pohakea, from where you will see the flat lands spread out before you. You may also see the expansive cultivated fields of Keahumoa which I planted before coming to Kauai. . .⁵²

⁵¹Niuepa Kioleolu, April 9 to April 23, 1870.

⁵²Ibid., April 30, 1870.

Kalelealuaka and Kaluhe sailed to Oahu and passed the heiau of Kanepuniu and landed on the shore. There Kalelealuaka was met by a group of youth who were surfing. One of the youth inquired about the journey of the two travelers, and one asked if he might accompany Kalelealuaka and his companion. Kalelealuaka agreed, and the group walked across the plain and found the pool of Lualualei. From there, they then ascended the mountain, to the pass at Pohakea, from where they looked out across the broad flat lands of Keahumoa. Descending the slope, they found a large garden planted in bananas that had been planted by Kaopele.

Kalelealuaka then shot his supernatural arrow (pua), and it flew down slope, passing the plains of Puunahawe and Kekuaoele, and it landed at Kekuapoai, awaiting Kalelealuaka's arrival. This was at Waipio, above Ewa. The people of the area saw the flight of the arrow, and cried out "Ka pua lele hoi ei!" (How the arrow flies!). That is why the place is called "Lele-pua" (flying-arrow), to this day.

Kalelealuaka stayed in the uplands above Lelepua, at Kahalepoai, and asked his companions to go and fetch the arrow. He also told them to gather some clumps of awa and sedges for straining it. The two companions went and arrived at the edge of the stream called Kaniukulou, where they saw some women bathing. They asked, "Have you perhaps seen our arrow?" The women denied having seen it, hoping that they might keep it for themselves. Because they had found it and greatly admired its beauty. Sensing that they were lying, Kaluhe called out to the arrow, and it leapt from the place at which it had been hidden, into his hands. The women were frightened by this, and fled away.

Kaluhe and his companion left the stream and arrived at a large house with clumps of awa planted all about it. Looking around, they found no one in the house or in the surrounding lands, so they began to gather some of the awa. While picking the awa, they heard a voice call out to them, "Set aside that which you have taken, or I shall return." Startled by this command, they dropped the awa and fled, returning to Kalelealuaka, and describing the house, its surroundings, and events to him. They noted that the house was an excellent one, and only lacked sleeping mats inside.

Kalelealuaka had them gather rolled sleeping mats and kapa and they then traveled to the house. Entering the house, they found that all was in order, and they prepared food, ate, and drank awa, with no other voices calling to them. The next day, Kalelealuaka arose, and he and his companions planted large fields with various crops. The field planted by Kalelealuaka extended from the uplands of Kahalepoai to the lowlands of Puunahawe. When the work was completed they returned to the

house and prepared popolo, aheahea, and inamona as their food. These were the only things which presently grew around the house that could be eaten until their own gardens matured. While they were eating, the youth from Oahu, ate with great haste and ferocity, and Kaleleluaka called to him, urging him to eat with patience. Because of this, the youth from Oahu, came to be called "Keinohoomanawanui."

One of the problems in living in the uplands was that there were plenty of plant foods to be had, but there was no fish. One day, while preparing their food, Keinohoomanawanui was making inamona (kukui nut relish). When he struck a broiled kukui nut, the shell flew up and struck him in the eye, blinding him in that eye. Kaleleluaka then took up the task of preparing the food.⁵³

Kaleleluaka told Keinohoomanawanui, "I will prepare that food which we two desire." Keinohoomanawanui said, "That which I desire are the sweet potatoes of the planted fields below, and the eels of the pond at Hanaloa." Kaleleluaka told Keinohoomanawanui, that "in time, you will have your desire." Now these foods were the property of the king Kakuhihewa, and they were kapu to all but him and his people. Kaleleluaka told Keinohoomanawanui, "Tomorrow, Kakuhihewa and his people will arrive here in the uplands of Waipio, to gather wood with which to make new houses in the lowlands."

Now while Kaleleluaka and Keinohoomanawanui were discussing these things, Kakuhihewa himself had come to the uplands to gather some of the awa that grew at Kahauone. Seeing the large house in which Kaleleluaka and his companions dwelled, he quietly drew near and overheard the conversation, curious about who these men were. He set a wooden image in the ground near the house to mark the area, and then departed, returning to Puuloa. Kakuhihewa thought about what he had heard, and the bold remarks that they would soon eat the favored eels of Hanaloa. Kakuhihewa spoke of this with his advisors and war leaders, some of whom suggested that a party go to the uplands to kill the impertinent youth.

Instead, Kakuhihewa sent to Waimanalo (Ewa) for his priest, Napuaikamāo. Napuaikamāo traveled to Koolina where Kakuhihewa was staying, and listened to the words of his chief, describing the youth and their conversation. Napuaikamāo thought about their words, and the symbolism of the desire for the eels of Hanaloa, and discerned that one of the youth was the great warrior, Kaleleluaka, of Kauai. Now at this time, Kakuhihewa was at war with a chief named Kualii, the two kings seeking to rule all of Oahu. Napuaikamāo told Kakuhihewa, that it was

⁵³Ibid., May 7, 1870.

Kaleleluaka who would bring victory to his side, and that he should prepare a house for the youth and allow them to fulfill their desires.

Kakuhihewa agreed, and ordered preparations to be made. He then had his counselor, Maluahaio go to the uplands of Waipio and invite Kaleleluaka and his companions to the shore.⁵⁴

Maluahaio arrived before the youth, and following a discussion, it was agreed that they would meet with Kakuhihewa ... Descending to the coast, they passed the plain of Puunahawe. They then passed below Puukuua which is near the mountain ridge, and descended to the shore of Puuloa. Kaleleluaka and his companions were shown the houses and foods that had been prepared for them, and they took up residence at Puuloa....

(During this time, the identity of Kaleleluaka, remained hidden from Kakuhihewa and his people. Because the king had heard Keinohoomanawanui speaking about his desire for the eels of Hanaloa, and because Keinohoomanawanui told people that he had been blinded in one eye by a spear, it was assumed that Keinohoomanawanui was the great warrior that they sought.)

Within the passing of several periods of ten days (anahulu), a messenger from the king, Kualii, arrived bearing the message that Kualii challenged Kakuhihewa to a battle on the field at Kanaloa [Kauālua], in Moanalua.... The warriors met, and a great battle took place in which the champion of Kualii was killed. It was thought that Keinohoomanawanui (mistaken as being Kaleleluaka) had secured the victory for Kakuhihewa.... During this battle, Kaleleluaka had stayed behind at Puuloa, and after the battle began, ran secretly with great speed to the battle ground, and killed Kualii's champion....⁵⁵

(Battles were also fought at Kulaokahua and Kahapaakai, and each time, the victory went to Kakuhihewa's side.)

At each of the battles between the warriors of Kakuhihewa and Kualii, Keinohoomanawanui was credited with, and accepted the honor of having defeated Kualii's champions. Because Kaleleluaka moved so swiftly, no one even saw him enter the battle field. Kaleleluaka had stayed behind at Puuloa, and secretly entered into the battle, killing Kualii's champions, and taking their capes and feather helmets, with which he returned to Puuloa, hiding the items in his house.⁵⁶

At the last battle between Kakuhihewa and Kualii's champions, the forces met near Waolani, and Kaleleluaka killed all of the warriors of

⁵⁴Ibid., May 14, 1870.

⁵⁵Ibid., May 21, 1870.

⁵⁶Ibid., May 28, 1870.

Kualii. Great honor was to be bestowed upon Keinohoomanawanui, but Kaleleluaka arrived before the assemblage and claimed the privilege. Kaleleluaka accused Keinohoomanawanui of deception, and challenged him to a fight to prove it. As quickly as the battle began, Keinohoomanawanui was killed, and Kaleleluaka took his head to Mal-iuhaimo.

Seeing that all of his warriors had been killed, Kualii, thought that his life too was forfeit, but Kaleleluaka invited him to live under Kakuhihewa, to which Kualii agreed. The head of Keinohoomanawanui was taken to Puuloa and then set atop an aa hillock above Kalauao. . . . Kaleleluaka, Kakuhihewa and Kualii, and their people lived out their days in peace.⁵⁷

3.14 Hawaiian History—Some Things Which are of Importance Pertaining to the Dead

Care for the dead (*kupapa ʻu*), respect of the graves (*ʻilina*), and traditions associated with the spirit after death are subjects of great significance to Hawaiians past and present. In his history of the Hawaiian people, Samuel M. Kamakau shared a collection of traditions and practices pertaining to the dead, and identified some of the places of importance in these practices. These narratives are of particular importance to lands and specific *wali pani* of the Honouliuli-Moanalua region. Under the heading “O kekahi mau mea i manao nui ia o ke kupapau,” which means “Some things which are of importance pertaining to the dead,” Kamakau writes the following: The English translation follows.

... Hookahi anahuna kaulana ma Oahu. O Pohukaina ka inoa, aia ma ka pali o Kanehoalani mawaena of Kualoa a me Kaaawa, ai ka puka i manao ia ma ka pali o Kaoio e huli la i Kaaawa, a o ka lua o ka puka aia ma ka punawai o Kaahuula-punawai. He anahuna alii keia, a he nui ka waiwai huna iloko a me naʻlii kahiko. O Hailikulamau, oia kekahi puka, aia a kokoke makai o ke ana Koluana i Moanalua, aia ma Kalihi, ma Puhiwa, oia na puka ekolu o Pohukaina ma Kona, a o Waipahu ma Ewa, aia ma Kahuku i Koolauloa kekahi puka, a o kauhuhu o kaupaku o keia hale anahuna, oia no ka mauna o Konahuanui a iho i Kahuku. Ua olelo ia ma ka moololo a kanaka, ua nui ka poe i komo ioloko me na ihoiho kukui, mai Kona aku nei a puka i Kahuku...

Na uhane mahope o ka make ana o ke kino.

O ke ao kuewa: a o ke ao auana kekahi inoa. I ka make ana o ke kanaka kuleana ole, ua auana kuewa hele kona uhane me ka lalau hele i ka nabelehele, a ua hele wale i Kamaomao, a i ka wiliwili o Kaupea, a

⁵⁷Ibid., June 4, 1870.

hiki kona uhane i Leilono, aia malaila ka Uluolaioawalo; a i loaia ole kona uhane aumakua i maa mau ia ia, a aumakua kokua hoi, alaila, e lele kona uhane ma ka lala ulu popopo a haule ilalo liko i ka po pau ole i o Milu la...

O Leilono, oia kekahi wahi e make ai na uhane i ka po pau ole. Aia o Leilono kokoke i ka pohaku o Kapukaki a ma nae aku, e kupomo ana i puu hoilina kupapau o Aliamanu, a huli i ka aoao akau o Hokupaa, aia ma ke kapaluna o ke alanui kahiko, aia he hapapa pahoehe pohaku, a ia maluna he wahi ponaha, he alua paha kapuai ke anapuni, oia ka puka e iho ai ilalo, o ka nuu ia o Papa-ia-Laka he ao aumakua ia wahi, aia ma ka puka e iho ai o ka puka o Leilono, he ulu o Leiwalo, elua lala ma ka hikna kekahi a ma ke komohana kekahi, he mau lala ulu hoopunipuni keia, a o kekahi lala niu, he lala e lele ai i ka po pauole, a o ka lua o ka lulu ulu, aia a kokua ia mai e ka uhane aumakua kokua, alaila, e ike auanie maia ao aumakua, i na kupuna i olelo ia o Wakea a me ka huina kupuna a pau, a me ko ke ao holookoa e hele nei, i ka lakou huakai; a o kekahi hapa, aia ma kela alala ulu hoopunipuni i ka po pauole. O ka palena o Leilono, o Kapaea-kolea ka palena hikina, he peetua nui launa ke kiai hikina o Keleana; a o Napeha ka palena komohana, a he moo ke kiai malaila, a i makai i keia mau kia, alaila hoi hou i hope, a i kokua hou ia e na uhane aumakua, alaila, ua hou, a ua alakai ia i ke ao aumakua.

A i makau i ka peetua e alai ana i ke alanui mai kela aoao mai o Alia, kiei je poo ma ka pali o Kapakolea, alaila makau ke uhane a auwana, a pili aoao ma ke kahawai ma ka hale hana ili, aole he alanui aupuni mamua, aka, he alanui kamaaina no Kauhilaale, a ua olelo ia aia a komo ka auwana maloko o na palena, he make wale no kona uhane, a o ke lele i ka po pau ole; aka, ua oleloia ua ola mai no kekahi poe uhane auwana ke loaia i na uhane aumakua kokua, a o ka poe kokua, a o ka poe kokua ole, e make no i ka po pauole, a i o Milu la. Aia ma ke kula o Kaupea, ma ke kaha o Puuloa, e hele ai na uhane auwana e poipoi pulelehua, a e poipoi nanana, oiai aole e hele loa na uhane auwana i na wahi i olelo ia mamua, a i loaia paha i na uhane aumakua e poipoi nanana ana, a ua hoopakeleia, a o ka poe uhane kokua ole, he poe uhane haukae lakou, a mai ka wiliwili i Kaupea, i Kanehili, he nui no na wahi i oleloia ma keia inoa. O Kalea-a-kauhane [Ka-leina-a-ka-uhane], a me ka Ulu o Leiwalo, aia ma Hawai, ma Maui, ma Molokai, ma Lanai, ma Kauai a me Niihau, hookahi no moolelo like no keia mau wahi...

The following summarizes the preceding. Make note of the locations in the Honouliuli-Moanalua region that are mentioned.

There is only one famous hiding cave, ana huna, on Oahu. It is Pohukaina. The opening on Kalaeoka oʻio that faces toward Kaʻaʻawa is

believed to be in the pali of Kanehoalani, between Kualoa and Ka'a'awa, and the second opening is at the spring Ka'ahu'ula-punawai. This is a burial cave for chiefs, and much wealth was hidden away there with the chiefs of old. On the Kona side of the island the cave had three openings, one at Hailikulamānu—near the lower side of the cave of Koleana in Moanalua—another in Kalihi, and another in Pu'iwa. There was an opening at Waipahu, in Ewa, and another at Kahuku in Ko'olauloa. The mountain peak of Konahuanui was the highest point of the ridgepole of this burial cave "house," which sloped down toward Kahuku. Many stories tell of people going into it with kukui-nut torches in Kona and coming out at Kahuku. Within this cave are pools of water, streams, creeks, and decorations by the hand of man (hana kinohinohi'ia), and in some places there is level land. [16:38]

The leina a ka 'uhane on Oahu was close to the cape of Ka'ena, on its right (or north, 'akau) side, as it turns toward Waialua, and near the cutoff (alanui 'oki) that goes down to Keaoku'uku'u. The boundaries of this leina a ka 'uhane, it is said, were Kaho'ihō'ina-Wakea, a little below Kakahe'e, and the leaping place (kawa-kai) of Kilauea at Keawa'ula. At these places would be found helpful 'aumakua souls who might bring back the spirit and restore life to the body, or if not, might welcome it to the realm of the 'aumakua. Places within the boundaries mentioned were where souls went to death in the po pau 'ole, endless night.

Leilono at Moanalua, Oahu, was close to the rock Kapukaki and easterly of it (a ma ka na'e aku), directly in line with the burial mound of Allamānu and facing toward the right side of the North Star (a huli i ka 'ao'ao 'akau o ka Hokupa'a). On the bank above the old trail there was a flat bed of pahoehoe lava, and on it there was a circular place about two feet in circumference. This was the entrance to go down; this was the topmost height (nu'u) of Kapapaialaka, a place in the 'aumakua realm. Here at the entrance, ka puka o Leilono, was a breadfruit tree of Leiwalo, he 'ulu o Leiwalo. It had two branches, one on the east side and one on the west.

These branches were deceiving. From one of them, the soul leaped into the po pau 'ole; if he climbed the other, it would bring aid from helpful 'aumakua ('aumakua kokua). From that branch the soul would see the 'aumakua realm and the ancestors spoken of. Wakea and all the rest, and those of the entire world who had traveled on this same journey.

The boundaries of Leilono were, Kapapakolea on the east, [with] a huge caterpillar (pe'elua nu) called Koleana as its eastern watchman, and the pool Napeha on the west, with a mo'o the watchman there. If the soul was afraid of these watchmen and retreated, it was urged on by the 'aumakua spirits, then it would go forward again and be guided to the

'aumakua realm. If a soul coming from the Alia (Aliapa'akai) side was afraid of the caterpillar, whose head peered over the hill Kapapakolea, and who blocked the way, it would wander about close to the stream by the harness shop. This was not the government road (alanui aupuni) of former times, but was a trail customarily used by "those of Kauhila'ele" [figuratively, the common people; the la'ele, old taro leaves, as contrasted with the liko, the new and choicer leaves—that is, the chiefs]. It was said that if a wandering soul entered within these boundaries it would die by leaping into the po pau 'ole; but if they were found by helpful 'aumakua souls, some wandering souls were saved. Those who had no such help perished in the po pau 'ole of Mīlu.

On the plain of Kaupe'a beside Pu'uloa, wandering souls could go to catch moths (pulelehua) and spiders (nanana). However, wandering souls would not go far in the places mentioned earlier before they would be found catching spiders by 'aumakua souls, and be helped to escape. Those souls who had no such help were indeed friendless (he po'e 'uhane hauka'e lakou), and there were many who were called by this name, po'e 'uhane hauka'e.

There were Leina-a-ka-'uhane and 'Ulu-o-Leiwalo on Hawaii, Maui, Molokai, Lanai, Kauai, and Niuhau as well as on Oahu. The traditions about these places were the same. They were where spirits were divided (mahele ana) to go into the realm of wandering spirits, the ao kuewa or ao 'auwana; or to the ancestral spirit realm, the ao 'aumakua; or to the realm of endless night, the po pau 'ole.

The places said to be for wandering spirits were: Kama'oma'o for Maui; Uhana [Mahana] at Kahokunui for Lanai; Ma'ohelaia for Molokai; Mana for Kauai; Halal'i for Niuhau; in addition to Kaupe'a for Oahu. In these places the friendless souls ('uhane makamaka 'ole) wandered. [16:49]

3.15 The Swimming Trails of Pu'uloa Are the Trails Traveled by Ka'ahupāhau

In 1870, native historian S. M. Kamakau wrote about several practices and beliefs pertaining to *manō*, sharks, in ancient life. One practice of note in the Pu'uloa region was the practice of transforming deceased family members into *manō* as '*aumakua*. These family '*aumakua* would help relatives when in danger on the sea—if a canoe capsized or a man-eating shark was threatening attack. Hawaiians also worked with and tamed sharks so that one could ride them like a horse, steering them to where one wished to go.⁵⁸ *Kupuna* Mary Kawena Pukui shared that there were two basic classes of sharks—*manō kāmaka*: sharks with human affiliations; and *manō i'a*: wild sharks of the sea, man eaters. The *manō kāmaka* were revered and cared for, while the

⁵⁸S. M. Kamakau, January 6, 1870; Pukui, translator, 1976.

manō'i'a were at times hunted and killed following ceremonial observances.⁵⁹ The practice of chiefs hunting sharks using the flesh of defeated enemies or sacrificial victims as *kīpahu manō* (shark fishing chum), and of commoners using rotted fish as *kīpahu manō* are further described in several historical narratives.

Ke Awālau o Pu'ūloa, "the many bays of Pu'ūloa" (Pearl Harbor), are famed in traditional and historical accounts of *manō*. The traditions center around the several deified sharks, foremost of whom is the goddess Ka'ahupāhau, then followed by several others, including but not limited to Kahi'ukā, Kūhaimoana, Komoawa, Ka'euhikimānoōpu'ūloa, Keli'ikau-o-Ka'u (Kaalikauaoka'u), and Mikololou. With the exception of Mikololou, all these shark gods were friendly to people, and dedicated to keeping *manō i'a*, wild sharks of the sea, out of the Pu'ūloa-Ewa waters and protecting people.

Traditions of *Ke Awālau o Pu'ūloa* tell us that one of the most important *kānāwai* governing *manō* was that they would not attack humans. This *kānāwai* was created by the shark gods themselves. In 1870, Kamakau wrote about the establishment of this *kānāwai* in a section titled "Alahula Pu'ūloa, he Alahela na Ka'ahupāhau," which means "The Swimming Trails of Pu'ūloa Are the Trails Traveled by Ka'ahupāhau."

Oahu was made a kapu land by this kanawai placed by [the shark gods] Kanehunamoku and Kamohoali'i. But their sister Ka'ahupāhau broke the law and devoured the chiefess Papio. She was taken and "tried" (ho'okolokolo) at Uluka'a [the realm of these gods], but she escaped the punishment of death. It was her woman kahu who paid the penalty of the law because it was her fault—she reviled Papio. The trouble arose over a papahi lei of 'ilima flowers which belonged to Ka'ahupāhau that her kahu was wearing. [The kahu refused to give it to Papio, and] Papio said, "I am going bathing, but when I come back you shall be burned with fire." But Ka'ahupāhau devoured Papio before she could carry out her threat, and she was punished for this. That is how Pu'ūloa became a [safe] thoroughfare (alahula). After her confinement ended several years later, Ka'ahupāhau was very weak. She went on a sightseeing trip, got into trouble, and was almost killed. But she received great help from Kupiapia and Laukahi'u, sons of Kūhaimoana, and when their enemies were all slain, the kanawai was firmly established. This law—that no shark must bite or attempt to eat a person in Oahu waters—is well known from Pu'ūloa to the Ewas. Anyone who doubts my words must be a malihini there. Only in recent times have sharks been known to bite people in Oahu waters or to have devoured them; it was not so in old times.⁶⁰

⁵⁹M. K. Pukui, personal communication to Kepa Maly, 1976.
⁶⁰S. M. Kamakau, Pukui, translator, 1968/73.

Several place names commemorate the shark gods of Pu'ūloa. Among them are three recorded in the *Saturday Press* of December 29, 1883:

Ke'a'alii A cave in the sea at the entrance to Pu'ūloa harbor, and known by the natives to have been formerly the home of a large shark called Komoawa, who has been generally credited as the watchman on guard at the entrance of Ka'ahupāhau's waters. The latter's royal cave-dwelling was in the Honouliuli lagoon.

Kuhia Ioko Waiawa. Named for one of the attendants/purveyors of the shark goddess Ka'ahupāhau.

Kuhia waho Waiawa. Named for one of the attendants/purveyors of the shark goddess Ka'ahupāhau.

In addition to the traditions of Ka'ahupāhau, two other accounts center around the nature of sharks in the 'Ewa District, and battles that were fought to kill offending sharks. In the early 1820s, members of the Protestant mission station traveled to the 'Ewa District, and learned something about the shark gods of Pu'ūloa.

Hiram Bingham accompanied King Kamehameha II (Liholiho), the royal family, and attendants to 'Ewa in 1823, where they stayed near the shore of Pu'ūloa. During the visit, the king and party, along with Bingham, visited the dwelling place of a noted shark god. The name of the god was not recorded in Bingham's journal, though one must infer that it was either the goddess Ka'ahupāhau or her brother, Kahi'ukā. Bingham wrote:

I one day accompanied the King [Liholiho] and others by boat to see the reputed habitation of a Hawaiian deity, on the bank of the lagoon of Ewa. It was a cavern or fissure in a rock, chiefly under water, where, as some then affirmed, a god, once in human form, taking the form of a shark, had his subterraneous abode. Sharks were regarded by the Hawaiians as gods capable of being influenced by prayers and sacrifices, either to kill those who hate and despise them or to spare those who respect and worship them. It had been held that, when a mother gave her offspring to a shark, the spirit of the child dwelt in it, and the shark becoming an akua, would afterwards recognize and befriend the mother on meeting her, though ready to devour others. [4:177]

Later, in January 1825, Elisha Loomis also traveled to 'Ewa and stayed along the Pu'ūloa shore [31]. During his visit, Loomis learned the name of the shark goddess who protected the waters of the Pearl Harbor region, and also reported hearing about a war between the good sharks and those who sought to eat human flesh. It will be noted that due to his limited Hawaiian-language skills, Loomis apparently transposed *she* for *he* in his journal.

After supper I conversed with them a long time on the subject of religion ... during the conversation one of them mentioned that in former times

there dwelt at Puuloa a famous shark named Ahupahau. He had a house in the hole of a rock. He was one their gods. On one occasion a strong shark 3 or 4 fathoms long came into the channel to make war upon the sharks and upon the natives that dwelt there. Ahupahau immediately communicated to the natives information advising them to get a net out and secure him. They took the hint and spread their nets, and in a little time the stranger was captured.

Loomis's reference to a war between an invading shark coincides with the traditions of Ka-'ehu-iki-mano-o-Pu'uloa.⁶¹ Mikololou and Keali'ikauaoka'u,⁶² in which battles between sharks are fought in order to protect the people of the 'Ewa region from attacks by *mano i'u*.

J. S. Emerson presented a paper titled "The Lesser Hawaiian Gods" before the Hawaiian Historical Society on April 7, 1892. In this report are details of Ka'ahupāhau, Kahi'ukā, and Mikololou in the history of 'Ewa and the waters of Pu'uloa:

One reason for the affection shown to the shark aumakua was the fact that so many of them claimed human parentage, and were related by ties of kinship to their kahus. Such was the case with Kaahupahau and her brother Kahi'uka, the two famous shark-gods of the Ewa Lagoon on this island. Their birth and childhood differed in no essential features from that of other Hawaiian children up to the time when, leaving the home of their parents, they wandered away one day and mysteriously disappeared. After a fruitless search, their parents were informed that they had been transformed into sharks. As such, they became special objects of worship for the people of the districts of Ewa and Waianae, with whom they maintained pleasant relations, and were henceforth regarded as their friends and benefactors. After a time the man-eating shark, Mikololou, from the coast of the island of Maui, paid them a visit and enjoyed their hospitality until he reproached them for not providing him with his favorite human flesh. This they indignantly refused to give, whereupon, in spite of their protest, he made a raid on his own account upon the natives, and secured one or more of their number to satisfy his appetite. Kaahupahau and her brother promptly gave warning to their friends on shore of the character of this monster that had invaded their waters. To ensure his destruction they invited their unsuspecting guest to a feast made in his honor at their favorite resort up the Waipahu river. Here they fed him sumptuously, and at length stupefied him with the unusual amount of awa which they supplied him. While he was in this condition, their friends, who had come in great numbers from

⁶¹W. H. Uaua, "He Moololo Kaa no Kaehuikanoopuloa," *Ka Au Okoa*, Dec. 1, 1870 to Jan. 5, 1871.
⁶²"He Moololo Kaa Hawaii no Kelikau o Kau," *Home Rula Repuhilika*, January 6, 1902, p. 7-8.

the surrounding country, were directed to close up the Waipahu river, which empties into the Ewa Lagoon, with their fish nets, brought for the purpose, while they attacked him in the rear. In his attempt to escape to the open sea he broke through one net after another, but was finally entangled and secured. His body was then dragged by the victorious people on shore and burned to ashes, but certain do got hold of his tongue, and, after eating a portion, dropped the remainder into the river. The spirit of the man-eater revived again, and, as a tongue, now restored and alive, made his way to the coasts of Maui and Hawaii, pleading with the sharks of those waters for vengeance upon the sharks of the Ewa Lagoon. They meantime secured the aid of Kuhaimoana and other notable sharks from the islands of Kaula, Niihau, Kauai, and Oahu. A grand sight it was to the numerous spectators on the shore when these mighty hosts joined in combat and began the great shark-war. It was a contest of gods and heroes whose exploits and deeds of valor have long been the theme of the bards of the Hawaiian Islands... [I]n the first great battle the friends and allies of the cruel man-eater were touted by the superior force of their opponents, which the good Kaahupahau and her brother long continued to enjoy the affectionate worship of their grateful people. It is said that she is now dead, while her brother Kahi'uka still lived in his old cave in the sea, where he was visited from time to time by his faithful kahū, Kimona, now deceased. Sometimes Kimona missed his fish nets, when he was pretty sure to find that Kahi'uka had carried them to a place of safety, to preserve them from destruction by hostile sharks.⁶³

Noted Hawaiian scholar Mary Kawena Pukui wrote about visits she made to 'Ewa and the Pu'uloa region in 1907. She observed that the name Ka'ahupāhau could be translated as "Cloak well cared for," and that her place in the history of the land is commemorated in the saying, "Alahula Pu'uloa he alahela na Ka ahupahau. Everywhere in Pu'uloa is the trail of Ka'ahupahau" [25].

The role of Ka'ahupāhau as a goddess and guardian in the waters of the Pu'uloa bays is still in the minds of Hawaiians in the present day. Her brother Kahi'ukā, whose name means "The smiting tail," is also remembered, and it is said that with his great tail, Kahi'ukā was responsible for destroying any foreign sharks "that offended his sister" Ka'ahupāhau [25:57-58]. His cave is reported in several locations, including Dry-dock No. 1, between Moku'ume'ume and Keanapua'a, and in Waiawa estuary.⁶⁴ The cave, destroyed in the construction of Dry-dock No. 1, was once his home.⁶⁵

⁶³J. S. Emerson, 1892:10-11.

⁶⁴Manu 1895.

⁶⁵For additional background on the sharks of Pu'uloa, see Pukui and Curtis, 1961 [27].

3.16 Hawaiian History—About the Moo Guardians/Ancestral Gods

In this excerpt from a history of Hawai‘i entitled “He Moololo Hawai—No na Amakua Mōo,” which means “Hawaiian History—About the Moo Guardians/Ancestral Gods,” readers learn of the *mōo* goddess Kāneku‘a‘ana. It was to her that the *heiau wai‘ana* were established along the Pu‘uloa lochs to ensure the abundance of various fisheries, and particularly the *pipi*, *nahauele*, *mahamoe*, and other *bivalves* for which ‘Ewa’s inland fisheries were famed. Among the *kapu* of Kāneku‘a‘ana was that fisher-people needed to be very quiet when going to sea to gather the *pipi* and bivalves. The slightest voice would cause the wind to blow, thus making the *pipi* and other bivalves to sink deep into the sands where they would be difficult to find.

It is because of this *kapu* associated with Kāneku‘a‘ana that the famous saying of ‘Ewa, “ka i-a hamau leo o Ewa” came into being.

... Kanekuaana ko Ewa moo kiai, hili-nai nui ko Ewa poe kamaaina iaia, mai Halawa a Honouliuli. Ina e pilikia ka ia, hoou like na kanaka i na waihaue e pili ana iaia, a o ka ho-a no ia o ke ahi e hoaiia i ka pomaikai o ka aiona. O ka Pipi ka ia kaulana o Ewa. Aole e hala ka mahina eono e ku ai ka lala hau ua piha ka aina i ka Pipi, mai Namakaohalaawa a na pali o Honouliuli, mai na kua-pa o ua a na pa akule [Pakule]; mai ka hohonu a ka papa nahawele o kula; mai kaliaawa a ka pohaku ona loko a pela aku.

There is within the flesh of the pipi a beautiful pearl, its size is similar to the eyeball of a fish. Some are like the shiny white of an eye, and are called *mūhe’e* kea. Others are shiny red, like a rainbow, and are called *mūhe’e* makoko. Some are small and others are larger, and they are highly valued.

The ‘ōpae huna and ‘ōpae kala [types of shrimp] are other fish, that are in the sea, the walled ponds, and dune banked forth.

Ala maloko o ka io o ka Pipi momi nani, e like ka nunui me ka onohi ia; he onohinohi keokeo kekahi, ua kapaia he mūhee kea; onohinohi ulaula kekahi me anuenuue ia, he mūhee makoko ia. He liili i nunui kekahi; a he waiwai kumukuai nui ko ia mea.

O ka Opaehuna a Opaekala kekahi ia; paapu maloko o ke kai a na loko kua-pa a no loko puuone. O ka nehu pala kekahi

ia; piha mai ka nuku o Puuloa a uka o na Ewa, pela me na nuku awalau a pau; no laila ka olelo ia ana:

ponds. The nehu pala is another fish which fills the waters from the entrance of Pu‘uloa to the coastal flats of Ewa. It is the same with all of the lochs (awalau). This is why the saying is told:

“He kai puihi nehu puihi lala
Ke kai o Ewa—e.
E noho i ka lai o Ewanui—
A Laakona—a.”

“Nehu appear to be blown upon the sea, causing the water to shine It is the sea of ‘Ewa, Dwelling in the calm of great ‘Ewa, of La‘akona”

He Mahamoe kekahi ia kaulana, a he Okupe a mau ia e ae no kekahi. A ina i ike ia keia mau ia a pau alaila, eia ka olelo a na pulapula:

The mahamoe is another famous fish, and the ‘ōkupe, another, and there are others. And if all these fish are seen there, here are the words of the natives of the land.

“Hoi mai nei ua luahine nei mai na kukulu mai o Kahiki; noho mai la paha a loha i na momoo ana.”

“The old woman (Kāneku‘a‘ana) has returned from the foundations of Kahiki; she dwells here perhaps for the love of her descendants...”

O lakou no kekahi i hai mai i ke ano o na pae aina o Kahiki a me na aina e ae i ike ole ia...

... O Hauwahine, he kiai ia no na loko o Kawainui a me Kaelepulu. O Laukupu ko Moanalua; he malama lakou i ka po-maika‘i, e pale ana i na pilikia maluna o ke kina a me ka ohana...

1 He Moololo Hawai (Mokuna VII), *Niuepea Kuokoa*, May 20, 1893, p. 1.

3.17 A Hawaiian Tradition of Laukaiele

Hawaiian historian Moses (Mose) Manu penned several lengthy traditions for the native newspaper *Niuepea Ka Olatio* in which he included detailed accounts of a wide range of practices, including those associated with fisheries and deified guardians of the ocean and freshwater fisheries. This account, “He Moololo Kaao Hawai no Laukaiele...” was published between January 5, 1894 and September 13, 1895. The tradition is a rich and complex account with (i) island-wide references to places; (ii) descriptions of place name origins; (iii) descriptions of fisheries and aquatic resources; and (iv) history and *māle*, interspersed with accounts from other traditions and references to nineteenth-century events.

The following excerpts of Manu's account were translated by Maly and include an overview of the *mō'olelo* and reference narratives which recount the travels of Makanike'oe, one of the main figures in the account. During his travels, Makanike'oe sought out caves and tunnels that served as underground trails, and through the description of his travels, we learn about some of the *wahī pūna* and resources of the lands through which he traveled. The selected translations also focus on several of the descriptions of fishing, including locations where various species can be found, and the religious-spiritual significance of marine resources:

Kaholokuaiwa (w) and Koakea (k) lived at Ulu, in Waipio Valley on the island of Hawaii. They were descended from the chiefly and godly lines of Kahiki and Hawaii. Their first child was Laukaieie. But because she was born in an eepa (mysterious) form, looking more like a plant than a child, she was wrapped in lipoa seaweed and set in the stream. Without her parents' knowledge, Laukaieie was retrieved by a mountain goddess and nurtured. Later, another child, a son, was born to Kaholokuaiwa and Koakea. They named him Hūlawe, and he lived with his parents.

Koakea's sister was Pokahi, and her husband was Kaukimi. Though they had been married for a long time, they were childless; and because of their prayers and offerings, the forest goddess, Hinauluohia, approached Pokahi while she was gathering seaweed, and told her that she would have a girl child to raise as her own. The condition was that no one, not even her brother and sister-in-law were to know about this child. Because Pokahi and Kaukimi lived on the mountain ridges between Waipio and Waimanu, it was easy for her to keep the secret. It was in this way, that Laukaieie came to be raised by her own aunt and uncle. As a youth, Laukaieie's companions were the spirits of the plants and animals of the forest. When she matured, she was very beautiful, and thoughts of finding an acceptable mate for her began to grow. One night, when Laukaieie was sleeping, she dreamed of flying past the valley lands of Hawaii, and across Maui, Molokai, Oahu, Kauai, Niihau, Kaula, and on to Lehua,⁶⁶ where she saw a handsome young chief, named Kawelonaakalalehua. It was this chief that was destined to become her husband.⁶⁷

The following accounts describing places of the 'Ewa District and neighboring lands are excerpted from the longer narratives which describe the travels of Laukaieie, her younger brother Makanike'oe, and their companions. The *lei momi* (pearl garlands) of 'Ewa were described while Laukaieie and her companions were at Ka ana, Molokai:

⁶⁶The lengthy narratives include site descriptions and traditional accounts for various locations across the island named.

⁶⁷Moses Manu, *Nūpepa Ka O'īo*, January 5 to 19, 1894. Trans. by Maly.

Leiomanu (a youth of Kaala, Oahu) gave Kaana of Molokai, and Kawelonaakalalehua, the prized lei momi of Ewa as gifts. The characteristics of these pearls (momi) included those with a fine yellowish tint, others had bumps like diamonds, and some were bluish-yellow. There were many types of pearls, and they were once regularly seen in the sheltered bays of Ewa at Oahu. They came from the Pipi (oysters), and the pearls were found near the edges of the Pipi shell. They were a thing greatly cherished by the chiefs of old and worn in lei (necklaces). This is why it is said:

My fish which quiets the voices,
You mustn't speak or the wind will blow.

This is the famous thing of Ewa, where the fish quiet the voices, to these new times.⁶⁸ This is the type of lei which had been given to the ali of Lehua, the island which snatches the sun...⁶⁹

...Laukaieie and her companions, Hinahelelani and Koiahi arrived at Honouliuli and were greeted by the natives of that land. Koiahi, a chiefess from Makua, Waianae, was related to Kahoonani (w), Ulalena (w), and Kauakiowao (k), the ali of Honouliuli. It is for these ali that the chant is sung:

Kahoonani resides upon the plain,
Ulalena is completely surrounded by the Kauakiowao rains...

While they were being hosted at the house of these natives, they saw the beginnings of a red-hued rainbow form near the shore and knew that Kauakiowao, the elder brother of the two beautiful sisters, was crossing the flat lands, drawing near to house. When he arrived, Hinahelelani asked Koiahi to invite Kauakiowao to accompany them on their journey to Kauai... The party departed from the residence at Honouliuli and traveled to Puukapolei, where they met the young maidens Nawahi-neokamao and Peekaua, the beauties who dwelt upon the lowlands of Puuloa. These two maidens accompanied the travelers to Waimanalo and Kaiona, for which the song writer of the late chiefess Bernice Pauahi Bishop wrote:

Respond o woman,
Who travels the plain of Katona,
Pursuing the mirages,
On the plain covered with ohai blossoms.

⁶⁸Tradition has it that the *pipi* (mother of pearl oysters) were very sensitive to any sounds, and those who were noisy would scare the shellfish into hiding. Thus, when going to catch *pipi* and other similar oysters, no one spoke. See Pukui [26mo. 493, 1357, and 1377].

⁶⁹*Nūpepa Ka O'īo*, March 9, 1894, p. 4.

Thus, all these beautiful residents of the land of Honouliuli were gathered together, by the famous beauty of Waianae (Koiahi), who is there on the resonating and fine sands of Makua...⁷⁰

... While Laukaie and her companions were traveling through Waianae, Makanikeoe was following behind. Having landed on the shores of Mamala, he then traveled to Kahakaaulana and the landing at Kalihi. He then looked down along the glistening sands and waters where the mullet are found, outside of Keahua, at the place called Keawakalai. There he saw a crevasse open in the sea. In this place, were sleeping many sharks and turtles, almost as if under the sand. Makanikeoe quickly entered into the cave with the turtles and sharks, to see them more closely. Because of his great speed, they didn't know that he had entered their house. It is true that Makanikeoe crawled along one of the crevasses in the sea, and going beneath the land, he exited out at Aliapaakai, at the place called Manawainuikoo. That is the entrance of the sea into that great salt water pond of Moanalua...

Let the author explain here, that this channel was first made when Pele traveled along the islands making craters here and there. This crater is something like the crater of Kauhako, at Kalaupapa, Molokai.

By this little explanation my readers, you may also know that the remaining crater is there above Aliamanu, the hiding cave of the chief Kahahana, his companion, Alapai, and his beautiful wife, Kekuapoi. He (Kahahana) is the one who killed the priest Kaopulupulu and his son Kahulupue, at Waianae. This is how the famous words of the priest came to be spoken:

Strive for the sea my son,
for from the sea shall come (others of) another land.

And this cave has been given the name "Piliua" from the time of the death of the chief Kahahana.

Piliua, the two of you shall go to Ewa,
You are like a canoe,
Pulled by the rope,
To the cliff of Kealia,
At Kamaomao,
There at Kinimakalehua.

After seeing these places, Makanikeoe then went to the top of Leilono, one of the deity of ancient times. There is a pit dug there in which the

⁷⁰Ibid., April 19, 1895, p. 1.

foul smelling bodies of the dead and the defiled matter of the dead are thrown.

Makanikeoe left that place and went to a place that was covered with something like a rough pahoe-hoe surface, below the present-day 5 mile marker on the road at Kapukahi. There he saw the spirit of a woman moving swiftly over a portion of the pahoe-hoe. Makanikeoe recognized that this was a spirit form rather than that of a living woman, and he felt compassion for her. He then saw that there was a deep pit there, filled with the spirits of dead people, swaying back and forth, and crying out, with moaning and wailing. This is the pit which in ancient traditions is called Kaleinaakauhane. The spirits of the dead go there and can only be freed if their aumakua (ancestral family god) fetches them. They might even be returned back to life again...

Now you may be wondering my readers, what was the name of this woman that Makanikeoe took up in his hands. Well the writer will tell you the name of this beautiful young woman of Kalahamauleo o Ewa-nui-a-Laakona (The fish that quiets the voice of Great-Ewa-of-Laakona), it was Kawailiula. She was a native of two lands of Ewa, Waiau and Waimano. And it is for this woman that Kawailiula, between the 9 and 10 mile markers from Waiau and Manana 2nd is named; it is near the present-day court house of Ewa...

At this place, Kaleinaakauhane, hundreds and thousands of spirits have been lost...⁷¹

...Makanikeoe then went to the uplands, atop the cliffs and ridges of Koolau, where he looked down and chanted:

Beautiful is Halawa in the Waahila rains,
Which visits also, the heights of Aiea,
The heat and warmth travels across the plain of Kalauao.

It is true, that he then went to Kalauao, where he saw the pool of Kahuwai. He turned to the uplands and saw the source of the water coming out of the earth, near the top of the cliff of Waimalu. The source of this water, from where it flows, cannot be easily seen because it comes out from the ground in an area where there are many deep holes hidden on the side of the cliff of Waimano. It is from one of these pits that the water flows. It is also at one of these places that the body of David Malo⁷² was laid to rest.

This place, between Waiau and Waimano, called Waipuhia, is the place of Kawailiula, who was brought back to life at Kaleinaakauhane, at

⁷¹Ibid., April 26, 1895, p. 1.

⁷²This is not David Malo of Lahaina Luma, but a namesake, who was also a historian and active church member.

Kapukaki...

Kawailiula invited Makanikeo to her home where food was prepared, the anae (mullet) from the pond of Weloka and the famous foods of the land. Kawailiula invited Makanikeo to stay with her, but he declined, explaining that his elder sister and her companions were waiting for him at Waianae... Kawailiula bid farewell to Makanikeo and he disappeared from sight, born by the wind, Moaeku of Ewa.

Makanikeo then traveled to Manana, now the 10 mile marker, and the place where the court house of Ewa stands. This is the place where Oulu, the famous warrior of Kahekili, king of Maui, was surrounded by warriors who thought to take him prisoner. It is there that Oulu fought like the eel Palahuwana, and with great strength and skill, overcame those who fought against him. The place where this fight occurred is called Kaoinaomakaoulu to this day.

Makanikeo then followed the trail to a place where he saw a large gathering of youth along the trail, at the place called Napohakuhelu. The activity of the children at this place was the shooting of arrows, something that was always done by the youth of those times.

There was among this gathering of youth from Waiawa, a handsome boy named Kanukuokamanu (not to be confused with a place of the same name in Hilo, Hawaii). His place of residence was on the shoreward side of the government road, a place something like a hillock from where one can look to the estuary of Waiawa. It is about at the ten and a half mile point, and the place is known by the name of this youth today.

When Makanikeo arrived at the place where the youth were playing, he was saddened at seeing the young boy crying. This was because the older children had taken all the arrows, and left none for the younger child to play with. Makanikeo took the young boy away from the group to a place off to the side. He told the boy "Stop crying and I will give you an arrow of your own. This arrow will fly farther than any of the arrow of your friends." Makanikeo then gave the boy an arrow like none other he'd seen.

Now Kanukuokamanu was the son of the chief of Waiawa... When he returned to the group of other children who were still playing, he prepared to compete as well. He chanted first to his arrow:

Kaalehuhua flies,
Kaimiki flies,
Ahuahu flies...⁷³

Kanukuokamanu shot his arrow and it flew beyond all the other arrows

⁷³Nupepa Ka Oiaio, May 3, 1895, p. 1.

of the competitors. It flew all the way to "the end of the nose of the pig" at Waimano, and then returned to the youth who had shot it...

Makanikeo then departed and was lost from sight. Looking seaward, Makanikeo saw the fin of a shark passing by, in front of a stone in the estuary of Waiawa, on the west side of Kanukuokamanu, next to Piliuamoa. Seeing the shark, Makanikeo drew nearer and he saw that it was Kahiuka, a native of this estuary. His cave was comfortably situated on the side of the stone. Kahiuka was a good shark, and in his story, he is the guardian of Manana and Waiawa.

The author has met a man at Manana who was known by the name, Kahiuka. He learned the traditions of this shark in his youth, and was taken by this shark for a period of time, and returned again to the land in good health. The man has since died, but his daughter is still alive, and his story is an amazing one.

After seeing the house of this hero of the sea (Kahiuka), Makanikeo turned and walked along the place where the waters flow from the land at Piliuamoa, Mokaalina, Panaio, Kapualihulu, Kapapau, and Manuea. The trail then turned and went to the top of Haupu, where the foundation of the Luakini (Church) of Ewa was later situated. Near there, was a large pond in which awa (milkfish), anae (mullet), and abolehole (Kuhlia sanvicensis) fish were found.

Oh readers, let the author explain something here. At the time Luau came from Maui to dwell on Oahu, he arrived at Waiawa, Ewa. He saw some men thatching dried ti leaves on the Luakini (church) that was being built there. Luau asked some people, "Who is the one that is having this important house built?" They answered, "Kanepaiki." Luau then stated, "The house shall not be finished to its ridge pole before the one who is having it built dies." The people asked, "Why?" Luau answered, "The house is atop the Heiau (temple) and the Fishpond is below. It is because the waters [life and wealth] are flowing out from this place. (So too shall the life flow out.)" These words of Luau were true, the Luakini of Waiawa was not completed before Kanepaiki died. His body was buried in the uplands of Waimalu.

These were the words of Luau. The one who discerned the nature of the land (kuhikuhi puuone) in the time of the King Kauikeaouli K. III. And his descendants are still living at Kanaio, Honuaula, Maui...

From this place, Makanikeo then turned and looked to the calm waters of Kuhia Loko and Kuhia Waho. He went to the ponds and saw water bubbling out, and in the pond were many fish of the sea. It was of this pond, that Kane and Kanaloa spoke, while in Kahiki, as heard by the prophet Makuakaumana, who crossed the sea and traveled to Hawaii:

The mullet are at Kuhia-loko,
The seaweed is at Kuhia-waho,
The salt is at Ninauele,
The nehu pala are at Muliwai
The lone coconut tree stands at Hape,
The taro leaves are at Mokaalika,
The water is at Kaaimalu,
The awa is gathered at Kalahikiola.
Behold the land.

All of these places named by the gods can be seen, extending from the sea of Waiawa, to Halalena at Waiawa uka.

From this place, Makanikeoe then went to a large deep spring which flows from waters beneath Waipio and Waiawa. At a place where the priests discard their offerings. He then came upon another spring at the entrance of the estuary of Waiawa. The trail then turned towards Palea and Pipiloa, where there grew groves of kou and hau in ancient times, and it was the residence of the rulers of Oahu. This is the place where the king of Oahu, Kualii-a-Kauakahiakoowaha, found his first wife, Kawelaokauhuki, who was of the uplands of Waïmano. It is this Kualii who built the long house called Makanaole, on the inland plains of Manana 2nd. It is near the place now called Kulanakauhale Momi (Pearl City).

Makanikeoe then traveled to the fishponds of Hanaloa and Eo, the great ponds of Ewa. It is for these ponds that the lines of the song say:

The water of Eo is not fetched,

It is the sea of Hanaloa that ripples forth.

At this pond, Makanikeoe saw a deep crevasse and inside, there was a giant eel sleeping. The name Hanaloa was given because of the great amount of work that was done by the chief and the people in carrying the stones with which to surround the crevasse and build the pond wall. Thus the pond was built. And it is a famous pond for it is rich with fish, and for the eels which Keinohomanawanui desired to eat.

From the pond, Makanikeoe then walked to a place where there were several small points of land, near where Papio was bitten and where the sea enters Honouliuli. He noticed how very calm the surface of the water was here, but he also saw that it was agitated in its depths. Looking more closely, he saw in the depths some very large fish, as if guarding the entrance to the harbor. One of these two large fish was like a marlin with a long bill and rows of teeth. The other one was a barracuda whose teeth protruded out of both sides of its mouth. These two fish of the bays

of Ewa, had ears with which to hear. They leapt in the ocean like flying fish, and are spoken of in some of the traditions of Hawaii.

The marlin is the one, who with his sharp bill, divided the waters that enter into Ewa. Thus, Makanikeoe understood the nature of these fish, and what their work was. They were the guardians of the place. It is true also, that in a short while Makanikeoe saw a procession of many sharks arrive. There was in this group, the famous chiefess, Kaahupahau, of Puuloa, and the messengers of the king shark [Kamohoolili] of Kahoolawe. She was taking them on a tour and to drink the waters of Waipahu and Waiahualele, and to drink the awa from Kahauone, in Waipio uka...

Makanikeoe then turned again to the place where Papio had been bitten as a result of her asking for the ilima [*Sida fallax*] garlands of the old woman, Ko'hala. This is what the old woman told Papio:

The beautiful girl asks,

That the garlands of the old woman be given to her.

Heed my words dirt of the dog, dirt of the pig,

String your own garland and let it wilt.

Makanikeoe then departed from this place, turning to the plain of Puuloa. He passed many pits in this place where the bones of men have been left. He then followed the trail of the breadfruit tree, Leiwalo, at Honouliuli. This is the breadfruit tree of the expert sailor, Kahai (Kauluakahai), so told in his story.

There are also many pits in which were planted sugarcane and bananas, and planting mounds. He also saw manu oo (honey creepers) sipping the nectar of noni blossoms. There were also two ducks that had gone into a pit, and with a great strength, they were trying to push a stone over, to hide the pit. This Makanikeoe knew what the ducks were trying to do. They wanted to hide a spring of water which flowed underground there. It is this spring which in calm times could be heard, but not found by the people who passed through this area. It was a secret spring, known only to certain native residents of the area, and its name is recorded in the last line of the song:

The o-u is the joyful bird of Kaupea,

The joyful voiced o-o is of Puuloa,

Softening the blossoms of the wiliwili,

Drinking the drops of nectar from the noni,

The birds drink and pass time,

The eyes cast about seeking,

The water of the natives,

The eyes seek the water of Kaiona.

This hidden spring, known only to the natives, was not hidden to Makanikeo. From there, Makanikeo then turned back towards Honouliuli and saw the pit of the native eel, Kapapapuhi, the elder of Laumeki, whose stone-form body is there at the base of Kauiki, Hana, Maui. He was an eel of Oahu who traveled to Hana where he stayed and was turned into stone.

There is also at this place Kaihuopalaai, where the anae (mullet) begin their journey from Honouliuli to Kaihukuuna at Laiemaloo, Koolauloa.

Seeing this pit, Makanikeo swiftly ran back to Waipahu, where he looked at the source of the water, where it came out of the earth, and flowed to the estuary of Waikele. Makanikeo dove into the water to determine its hidden source. He swam underground, and first arrived at Kahuaiki, at Waipio, for which the song is sung:

Return to the coolness of Waipio,
The cold water of Kahuaiki...

He then dove under and came out on the plain of Puunahaweale, that barren and peopleless plain. There he saw the source of the water of Kahuaiki. It is near a hidden stone (shaped like a hook pendant) and close to Kekuaolelo, along the trail which ascends straight up to Waipio uka. Makanikeo then turned and followed the water path, and with great strength, he arrived at Kawaipuolo, at Waialua. There, he saw the pool of Laniwahine in the famous pond of Ukoa. He then quickly went from Waialua to Kawela, and from there, to Punahoolapa, a deep spring on the plain of Kahuku. There he found the water source that the kapa anvil fell into and was carried to Waipahu, at Ewa. Makanikeo then crawled along another path and arrived at Punamano, also at Kahuku...⁷⁴

Makanikeo continued his journey through the various springs of O'ahu, until he rejoined his sister and companions at Wai'anae. The group then continued on their journey to Kaua'i.

3.18 The Hawaiian Tradition of Pakaa and Ku-a-Pakaa, the Trusted Attendants of Keawenuiaumi, the King of Hawaii, and the Grandson of Laamaomao!

In 1901, Moses Nakuina published the tradition of Ku-a-Pāka'a and the supernatural wind-gourd of La'amaomao (Ka-ipu-makani-o-Laa-mao-mao), entitled "Moolelo Hawaii o Pakaa a me Ku-a-Pakaa na Kahu Iwikuamoo o Keawenuiaumi Ke Alii o Hawaii, a o na Moopuna hoi a Laamaomao!" which translates as the section title above. The tradition includes references to winds from each of the Hawaiian Islands.

⁷⁴Ibid., May 10, 1895, p. 1.

On O'ahu, the following winds were named for lands of the Kona and 'Ewa Districts:
...Helu aku la o Ku-a-Pakaa i na ...Kū-a-Pāka'a called upon/named
makani o Oahu, penei: the winds of O'ahu, thus:

...He Olauniu ko Kahaloa,
He Waiomao ko Palolo,
He Kuehulepo ko Kahū'a,
He Kūkalahale ko Honolulu,
He Ao-a-oa ko Māmala,
He Olauniu ko Kapalama,
He Haupeepee ko Kalihi,
He Ho-e-o ko Moanalua,
He Moae-ku ko Ewaloa,
He Kehau ko Waiopua,
He Waikoloo ko Lihue,
He Maunuunu ko Puuloa,
He Kaiaulu ko Waiānae...¹

...The 'Ōlauniu is at Ka-
haloa,
The Wai'oma'o is at Pālolo,
The Kū'ehulepo is at Kahū'a,
The Kūkalahale is at Hon-
olulu,
The Ao-a-oa is at Māmala,
He 'Ōlauniu is at Kapalama,
The Haupe'epe'e is at Kalihi,
The Ho-e-o is at Moanalua,
The Moa' e-kū is at Ewaloa,
The Kēhau is at Wai'ōpua,
The Waikōloa is at Lihū'e,
The Māunuunu is at Pu'uloa,
The Kaiāulu is at Wai'ānae...

¹ 1901, p. 56-57.

3.19 A Hawaiian Tradition of Keliikau o Kau

Keli'ikau-o-Ka'ū was a shark god who traveled to Pu'uloa, 'Ewa from the island of Hawai'i. The tradition, entitled "He Moolelo Kaa'o Hawai'i no Keliikau o Kau," appears only in the short-run Hawaiian-language newspaper *Home Rula Republika* and is incomplete. The narratives are also different in relationship to the events and their outcome, than those found in more widely reported narratives. There is no specific reference to the source of the account, and only two articles in the series are available. The narratives offer some details on named localities and events that are of significance in the history of Pu'uloa at Honouliuli. The excerpt is followed by a summary translation.

Ka Mano Kae'ae'a o Hawai'i nana i hoonahoa a kaiehu aku i ke Alii-wahine Kaahupahau mailuna aku o ke kahua kaua ma ka nuku o Puuloa ma Ewa, Oahu, a nolaila keia olelo kaulana: "Mehameha Puuloa, ua make o Kaahupahau."

O keia mano alii o Kalani ka mea nana i lawe ae ia Keliikau-o-Kau i kino mano a hoonoho ia aku la i kino aka makani unihipili maluna o kona makuahine pono'i, a na keia Kalani no i haawi aku i kekahi hoailona ia Keliikau-o-kau i kona wa e hoi ai a keehi paa iluna o ke kauoha, oia hoi na kiheahea kai maluna o ke kino mai luna a lalo, a o ka malo pua-kai ka

i ka hope, a mamua ae nae o ka hoi ana iho e noho pono iho iluna o ka haka kino hihio makani mai ka waha ae a o keia no ka manawa e ike ia aku ai ke kahe-a-wai ana mai o ke koko ma ka lae me he mea la ua moku i ka pahoa, e hihili ana ma na maka a me na papalima, ame ka ihu, a e kahe ana keia koko a ili i ka umauma, a he manawa keia i makemake ia no ka inu aea, a me na huaolelo ninau no ka pono a me ka hewa no ka hele ana ma lae kahakai, a me ka holo ana ma na wai i ka lawaia. Ua like no ke ano o keia me Hiaka-wawahilani ke hoi mai a noho iho iluna o ke kahu. Ma keia ano, ua lilo keia mano unihipili i mea nui a punahele ia Kalani mai kona loli ana e i kino mano a hiki wale no i kona nui ana i aneane aku he ekolu mau anana ka loa a oi aku i kahi wa.

Ma keia wahi o ko kakou nanea e waiho kakou i ke kamalii ana no ka mea nona keia nanea, a e olelo ae hoi kakou no kekahi mano hookalakupua i hele mai ai mai Hawaii mai a make maloko o ka nuku o ke awa o Puuloa ma Ewa ae nei; nolaila, e oluolu ae e hooheno iho kuaa e ke hoa i keia mau lalani mele malalo iho nei, a e loaia no ka inoa o ua mana la, oia hoi o:—

A ka Hipa i ka Hipa
I na u o Lewa
Lele ana o Kukamaikiakea
Keke na niho o Laniwahine
Opti ke a-lalo ke a-luna
Hoi aku au a Lihue
Nana aku ia kai o Ewa
E au ana Mikololou
A paa ka nahu na o Papio
Paa ke au mimihī Leinaka
Paa ka manao hopu i ka lima

O Mikololou ka inoa o ua mano la i hele mai ai a make me Puuloa, nolaila e pono e kamalii ae kakou nona, i maopopo ai ke kumu o ka hiki ana mai o Kelikau-o-Kau.

Na hoakaka no ka Mano Mikololou, ua oleloia ma keia moolelo na Papai ame Paukupahu i Puna, Hawaii, keia Mano o Mikololou, a o ka mano alii nona ka lae o Leleitiwi a hiki i ke kai o Makaoku e pili la me kahi mokuupuni hoopapa o Mokuola ka inoa, a oia no ka mano alii o Kaneialehia, a ua oleloia he kapu loa kona mau makalae ma kona kai makai o Keaukaha ma Waiakea-kai, ma Hilo Bay, Hawaii; aole loa hookahi kino kanaka maoli i nahuia e ka mano ma keia wahi, mai ka wa kahiko loa mai ahiki wale no i keia au hou. Aole loa e hiki i kekahi mano kamaaina a malihini paha ke nahu i ke kanaka, no ka mea he mana nui ko Kaneialehia, oiai, he elua ona mahele. Mai ke kai aku o Makaoku a hiki i ka lae o

Makahanaloa a holo loa aku i Hilopaliku, hoi aku ke nahu a ka mano. A mamuli o ko Kaneialehia manao aloha, ua ike oia i ka maalo ana ae o keia wahi mano uuku ma kumupali iloko o ka hua o ke kai, a ma kona manao pono ana aku, ua ike aku la oia he wahi mano kanaka unihipili—maopopo koke aku la no iaia he wahi mano unihipili he “Aikahu” a he mea ino keia ano he “unihipili hemo ole” a he wahi olelo ia ai loa keia ma ia ano o na unihipili ma na ike a ka poe Kahuna lapaaui.

Aia no ia wa, ua lawe ae la ka mano alii Kaneialehia ia Mikololou i wahi mano lawelawe malalo ona me he keiki hookama la paha ke ano, a ua noho o Mikololou malalo o ia ano a hiki i kona nui ana, a e hoolohe ana hoi i na olelo apau a ke alii, aole nae oia i ae ia e maalo aku ma ke kai kapu o ke alii ma kahi i olelo mua ia ae nei.

Ua olelo ia no hoi ma keia moolelo, ua haawi aku o Kaneialehia i kona kai me na makalae mai Leleitiwi aku a hiki i Keauhau e pili pu la me Hopoe ma Puna, a o na aina maloko o keia kihi ame kela kihi oia hoi o Papai a me Paukupahu, Papuaa, Haena, Paki, Aalamanu a hiki i Keauhau. Aia ma keia mau aina, ua nui wale na kahu o na mano Mikololou nei e hoi iho ai a noho iluna o na kane a me na wahine, a ua maluhia hoi ka hele ana o na mea apau ma kahakai, ame na lawaia maluna o na waa me he nahu ole ia e ka mano, aia nae, mamuli o ka nui loa o na kahu ana e noho ai, ua ulu ae la na manao pono ole a me ka ohumu i kekahi poe kahu ina loa a me na waiwai o kahi poe e aku, a ua kena aku la lakou ia Mikololou e nahu i ka mea i manao ino ia, a ma keia kumu i hoomaka mai ai o Mikololou e aki (nahu) i ke kanaka me ka hoolohe ole i na olelo ao a Kaneialehia me ka manao paha e nalo ana kana mau hana i kela mana nui e nana mai la.

I ka hala ana o kekahi mau la mahope iho o ko Mikololou nahu ana i ke kanaka mua loa, aia hoi, i kekahi la, ua hoi iho la ua Kaneialehia nei a noho iluna o kona haku, a hai iho la i kana huaolelo i ka ohana o ka hale e nonoho ana ma Kaumau, Keaukaha, e hele kekahi poe me ia ma Papai, a ua hookoia kona leo me ka hakalia ole. I ko lakou hele ana a hiki mahope mai o Papai, ua ike ia aku la kekahi kanaka e lawaia paeaea mai ana maluna o ka lae pohaku, o keia no ka manawa a Kaneialehia i hai iho ai i kana mau hua olelo:

“O keia no ka mea a’u i olelo aku nei ia oukou e hele pu mai me a’u i ike pono oukou, o kela kanaka e noho mai la e lawaia makoi e pau ana i ka mano ia Mikololou.”

I ka pau ana o keia mau olelo, aole i luli iho, ua holu koke ae la ke kai iluna o ua lae nei kahi a ua kanaka nei e noho ana a nalowale pu i ke kai, a i ka mimiki ana iho o ke kai, o ua kanaka pu nei kekahi i haulte iho iloko o ke kai, a oiai o Mikololou e hakapono ae ana kona mau maka lena alohilohi, aia i kela wa i miki koke ai ua mano eueu nei e nahu i ke

kanaka, o keia no ka manawa a Kaneialehia i lele koke aku ai iloko o ke kai me ka awiri nui ma kona kino kanaka a hiki ma kahi o ua Mikololou nei e makaukau ana kona wahia nui me kona mau papa-niho e upa iho i ua kanaka nei a palaha lilili me ka hooihuli ana aku i ke kumupali; aia i keia wa no, i lalau aku ai na lima lauhii o ke Kahu Kanaka maoli o Kaneialehia ma api ame ka lala, ku me ka pane ana aku ia Mikololou peneti: "Ai a mano nana i kumu pali."

Nolaila, ano e hoomanao iho kaua e ke hoa kuwiliwili o keia moolelo, ke kumu i loa mai ai a paanaau no hoi ia kakou i keia manawa ia wahi mapuna olelo ae la maluna e o mau nei i keia hanauna hou a hanauna hou aku no. (Aole i pau.)⁷⁵

Ka Mano Kae'ae'a o Hawaii nana i hoonahea a kaiehu aku i ke Alii-wahine Kaahupahau mailuna aku o ke kahua kaua ma ka nuku o Puulooa ma Ewa, Oahu, a nolaila keia olelo kaulana: "Mehameha Puulooa, ua make o Kaahupahau."

I ka manawa a ke aliawahine e oniu ae ai i kona kino nui me ka uhau anai kona hi'u iluna pono o ka ilikai, a naueae ae la ka papaku o lalo o ke kai a nahaha lilili na puko'a, a ke kope 'la kona mau ha-lo, lele lilili na mea apau o lalo, pouli pu i ka lepo, a he mea weliiweli nui keia i na mano a pau e nana mai ana, aia hoi, o ka manawa no ia a Kelikau-o-Kau i nahi malie aku ai me ka palanehe a pili pu ma ke alo piko a me ka ha-lo aku o kona hoa paio o oia kona manawa i uwehe ae ai i kona mana a me kona mau papa niho wakawaka a komo pu aku la iloko o ka io o ke aliawahine, a loa pono ka opu, ke ake, a me na mea a pau o loko ku ae iwaho, a oia ka wa i hue pau ia mai ai na pilha-a moe wai o uka, aia nae ke aliawahine ke kupaka nei kona kino i o a ianei me ke kepa ana, aole nae he wahi mea a mahuheu iho o kahi ulu iki o Kau, no ka mea, ua pili loa oia iloko o ke alo o ke aliawahine.

Ia wa ike iho la o Kelikau-o-Kau e pilikia ana ke aliawahine iaia maluna o ko laua kahua kaua, ua nalinali malie aku la oia ma ka api a kukai pu me ka wahia, a ike oia e make ana ke aliawahine me ka naue malie ana aku no ka manawa hope loa.

Nolaila, i keia wa, ua hoomaha iho la Kelikau-o-Kau me ka nana pono aku i ke kino mano o kona hoa paio e hooipo la me ke alii o Maui me Olepau.

I ka wa a na olepolepo o ke one a me ke kai, a me ke koko e pualena ana maluna o ka ilikai a mao ae, aia hoi, ua ikeia aku la ke kino mano o ke aliawahine e waiho mai ana ua make loa. Ia wa ua hoi aku la kona kino makani a noho iluna o kona luati mama pono, oia hoi o Koihala.

Ia wa, olelo aku la oia i ka ohana, "ua pino au!" Aia hoi na alina o

⁷⁵ "He Moolelo Kaao Hawaii no Kelikau o Kau," *Home Rule Republica*, January 6, 1902, p. 7-8.

na kiheahea koko a pau me na ulia pino ke hoike mai la maluna o ke kino o kona mama a he wa keia no ke kaumaha luuluu no ke aliawahine i make maluna o kona o hana.

I ka wa i make ai o ke kino mano o Kaahupahau, ua ikeia aku la o Kelikau-o-Kau i na mano alii a pau o na aoao elua e poai puni ana me ka haahao nui o ka lanakila, a he wa hoi ia no ka oliloli nui o na mano a pau mahope ona.

A oia ka wa o Kelikau-o-Kau i pane aku ai i na kiai o ke aliawahine i make iaia, oia hoi o Kamoaana me Kahituka:

"Make ae la ka mea nona ka nuku o Puulooa a me ke Kaikuono o Ewa nei, owai hou mai?"

Pane mai la na kamaaina: "Nui loa!"

I ka pau ana o keia mau olelo, o keia no ka manawa i iho like mai ai na mano o Ewa ia Kelikau-o-Kau e alu like iaia, aia nae, ua lilo lakou i mea ole i ka malihini kuehu lepo o Kau me he puahiohio la, a o keia no ka wa a kahi hiapiole o Kau i kuupau aku ai i kona ikaika nui, aole ona lua e ike ai. Ua hoomaka oia e nahu i na mano a hoolet i uka o ka aina maloo, mai Kalaekao, Kapuaukaula, Keanapuaa, Kamokuumeume, Aiea, Kalauao, Waimalu, Waiau, Waimano, na Manana elua, Waiawa, Hanapouli, Waipio, Waikale, Hoaeae, Honouliuli, Kalaekohuka, Kanahunaopapio, Ke-pookala a me Puulooa.

O keia ka luku nui ana a Kelikau-o-Kau i na mano a pau o Ewa, ku ka pilau i uka o ka aina, a ma keia kaua ana i puka ai kela huaolelo kaulana e o nei. "Mehameha Puulooa ua make o Kaahupahau." A ma kona make ana i lilo ai oia i kino puko' a ma kahi e pili koke ana i Papio, aia hoi ia wahi ke huli pono mai la ma kela aoao mai o Honouliuli kona lua a hiki i keia la.

Ma keia make ana o ke aliawahine ia Kelikau-o-Kau, aia hoi, ma ia hope iho ua noho iho la he ahaolelo kuka na na mano alii a pau loa mawaena o na aoao elua, a ua hooholo lokahi lakou a pau me ka oluolu a me ka maluhia, oia hoi, aole e hana hou ia kekahi hakaka a kaua mawaena o lakou ma ia hope iho a hiki i ko lakou mau la hope, a aeia no hoi lakou e hele ma na kai a pau a puni keia pae moku.

I ka holopono ana o keia manao o ua poe mano nei, ua noia mai la kekahi mau mano alii o Kauai a me Niuhau, o Kelikau-o-Kau imua o Kalani a me Kaneialehia, kona mau haku alii, a ua ae laua me ka manao kanalua ole no keia olelo noi a kekahi mau mano alii o Kauai, oia ua ike laua, aole he pookela o na mano a pau e hoopapa aku ai i ke kekahi o ke Kai Kauhau a ka Malihini o Punaluu a me ka nalu hai o Kana, a he mea oiaio ua hooioia keia olelo.

Mahope iho o keia papa leo ana o na poe mano a pau ua haawi ae la lakou i na aloha hope loa a huli hoi ko na mokupuni hikina, a huli hoi

no hoi ko na mokupuni kaili la, a noho hoi ko Oahu nei poe mano, ma keia huakai hele a kahi eueu a kakou, aia oia ua hoopunilia e na mano alii a pau me ka hanohano nui, me ka loaa ole hoi o kahi mau hana kue, a pahola aku la keia mau mea a puni na pae moku. Haawi na mano i ko lakou mau anoai hope loa a hele o Keliikau-o-Kau i Kaawi.

la manawa ua hoomaka o Kaahupahau e haelele i ka nuku o Puuloa, he wa pokole loa ua oni malie ae la o Kalaeloa mamua o lakou, a i kona hala hope ana ae, aia lakou nei mawaho pono ae o Waianae, aole no i liliu iho, ua hala hope ka lae o Kaena. O ka lae keia i like me ka manu ka lele a Hiiakaipolipoele i oli aku ai ma ke kau penei:

Lele Kaena me he manu la i ka malie,
Me he Kahala la na ka uwa'u,
Na pali o Nenelea.
(Aole i pau.)⁷⁶

Below is a summary of the preceding, "A Hawaiian Tradition of Keli'ikau-o-Ka'u."

Keli'ikau-o-Ka'u was born to his mother as the result of her relationship with the spirit form of Kalani, a king of the sharks. He was a favorite of Kalani, and transformed into a shark, whose body was almost three fathoms long.

At this point in our story, we now look to another mysterious formed shark, and his death at the entrance of Pu'uloa at 'Ewa. His name was Mikololou, it was him who was killed at Pu'uloa, and this is why Keli'ikau-o-Ka'u went there. The background of this shark, Mikololou is given in the traditions Kāneialehia, and Papa'i and Paukūpahu of Puna, Hawai'i. Kāneialehia, protected the lands from Lelewi and Makaokū, near the low islet of Mokuola, and all the way to Makahanaloa of Hilo Palikū. Under the law of Kāneialehia, it was forbidden to kill any human. Kāneialehia saw swimming past the cliffs, and discerned Mikololou's nature as a spirit-transformed shark, he also recognized that Mikololou was a man-eater.

Kāneialehia decided to take Mikololou as an attendant, perhaps even as a foster-son, and to teach him how to live under the law of not killing humans...

[We know from various accounts, as cited earlier in this section of the study, that Mikololou departed from Hawai'i, in the company of other man-eaters, and traveled to Pu'uloa, where he was eventually killed by Ka'ahupāhau, Kahi'ukā and the people of 'Ewa. Based on other accounts, Mikololou was restored to life, and returned to Hawai'i, where he enlisted

⁷⁶Ibid., March 15, 1902, p. 7. Next issues of newspaper not available.

the aid of Keli'ikau-o-Ka'u and other sharks to avenge his treatment by the sharks and people of Pu'uloa. The issues of the paper with this portion of the tradition are missing, and the account is picked up again on March 15, 1902.]

Keli'ikau-o-Ka'u fought with and killed Ka'ahupāhau, and it is because of this event, that the famous saying, "Mehameha Pu'uloa, ua make o Ka'ahupāhau" (Pu'uloa is alone, for Ka'ahupāhau is dead), came about. Keli'ikau-o-Ka'u assumed various body forms he possessed and attacked Ka'ahupāhau from within, and outside her body. Ka'ahupāhau went in spirit form to her attendant, Koihala, calling to her, saying that she was dying. Upon her death, Keli'ikau-o-Ka'u called out to Kamoana and Kahi'ukā, taunting them. He then proceeded to swim through Pu'uloa, biting and tearing at the native sharks of the region, throwing their bodies up onto the dry land from Kalaekao, Kapua'ikāula, Keanapua'a, Kamoku'ume'ume, 'Aiea, Kalauao, Waimalu, Waiau, Waimano, the two lands of Mānana, Waiawa, Hanapōuli, Waipi'o, Waikele, Hō'ae'ae, Honouliuli, Kalaeokahuka, Kanahunaopapio, Kepo'okala and Pu'uloa.

Keli'ikau-o-Ka'u destroyed all the sharks of 'Ewa, and the stench rose upon the land. Thus came about the saying, "Pu'uloa is alone, for Ka'ahupāhau is dead." Upon her death, Ka'ahupāhau's body became a coral formation near the place called Papio, and that place is still seen on the side of Honouliuli to this day.

Following the death of Ka'ahupāhau in this war between the sharks, the shark chiefs of both sides met in council and agreed to no further wars should be fought between them ...

It should be noted here, the elder *kama'āina* of the 'Ewa District still claim that Ka'ahupāhau was seen and cared for during their lifetime.

3.20 Tradition of Nāmakaokapāo'o (Eyes of the goby fish)

There are several traditions pertaining to a youth by the name of Nāmakaokapāo'o that have been published in the Hawaiian-language newspapers, with lengthy accounts in print between 1894 and 1917. The earliest reference identified while preparing this study was published in a short rebuttal by a native of Honouliuli to another writer in the Hawaiian newspaper *Ka Lahui Hawai'i*. While the February 17, 1877 account (see section 5.15, p. 125) is a short one, it references the sweet potato fields of Nāmakaokapāo'o, observing that Nāmakaokapāo'o is the skilled fighter of the cliffs of Lihū'e. The narrative references the severing of a chief's head with a weapon made of *kali'e* (*Acacia koa*) from the heights of Pu'uku'ua.

Later accounts of the tradition provide detailed narratives of events on Maui and Kaua'i, with passing poetic references to O'ahu, Hawai'i, Ni'ihau, and other

locations. It is in Abraham Fornander's *Collection of Hawaiian Antiquities* [11:274-283] that we find events in the life and deeds of Nāmakaokapāo'o taking place on O'ahu. A summary of the O'ahu version of the tradition of Nāmakaokapāo'o follows below, and cites several names and features of the 'Ewa District.

Nāmakaokapāo'o's father was named Ka'uluakāha'i (descended from gods of Kahiki). His mother was named Pōka'i. They lived near the shore at Lihū'e in Honouliuli. After Pōka'i became pregnant, Ka'uluakāha'i traveled to Kahiki. Thus, when Pōka'i gave birth to Nāmakaokapāo'o, the two of them lived in with little to sustain them. One day, Pūali'i, a man who lived in the uplands at Keahumoa, situated just below Kīpapa, went to the shore of Lihū'e to fish. While on his way, he passed the place where Pōka'i and Nāmakaokapāo'o lived. Seeing Pōka'i, Pūali'i fell in love with her, and asked her to be his wife. Agreeing, Pōka'i and Nāmakaokapāo'o went to live at Keahumoa. There, Pūali'i tended two large māla 'uala (fields of sweet potatoes).

In his work, Pūali'i had made an oath that none of the potatoes would be eaten until he had made an offering of an ulua fish, and then eaten of the produce first, himself. When the māla were ready to harvest, Pūali'i went down to Lihū'e to catch his ulua. While Pūali'i was on the shore fishing, Nāmakaokapāo'o and a group of his friends went to the māla 'uala and pulled up all the potatoes and began to cook them. Pūali'i returned, saw what had been done, and went with a large ko'ilipi (stone adze) to kill the boy. As the ko'ilipi fell, Nāmakaokapāo'o offered a prayer to his deified ancestors, and the adze turned and cut off Pūali'i's head.

"Nāmakaokapao picked up Pūali'i's head and threw it towards Waipouli, a cave situated on the beach at Honouliuli (a distance of about five miles)." [11:278]

The māla 'uala where this occurred have been called "Nāmakaokapāo'o" since that time, and are found on the plains of Keahumoa.

Word of this event reached Amāu, king of O'ahu, who was dwelling at Waikīkī. The king wanted to challenge the youth, and proceeded to Keahumoa for the contest. Learning of this, Nāmakaokapāo'o went to his mother and took her down to a cave situated at Waipouli, where he hid her for a while. He then returned to Keahumoa and met with Amāu and his warriors and killed them all. Nāmakaokapāo'o then established his mother Pōka'i as ruler over O'ahu.

3.21 Ka'uluakāha'i (The Breadfruit Tree of Kāha'i) at Kūalaka'i

As cited in the tradition of Nāmakaokapāo'o, Ka'uluakāha'i was the true father of Nāmakaokapāo'o. In Fornander's account, following his victory over the king of O'ahu, Nāmakaokapāo'o traveled to Kūalaka'i where a supernatural breadfruit tree

grew in a sinkhole-cave, and where royal gifts left to him were hidden by his father. Retrieving the items from Kūalaka'i, Nāmakaokapāo'o then traveled to Hawai'i:

After the complete possession of Oahu by Nāmakaokapao, he was desirous of visiting Hawai'i for observation. He then went and got a small gourd wherein to place his garments which his father had left him. This gourd was deposited at Kūalaka'i, where a breadfruit tree is standing to this day. This is the breadfruit impersonation of his father, Kāhailu. When the real person went home the breadfruit tree remained, being in the supernatural state.

Inside of the gourd was a garment, a girdle and a royal cloak (feather cloak). After he had obtained the gourd he journeyed on till he reached Hanauma, in Maunaloa. There he found a canoe which was preparing to sail for Hawai'i. [11:278]

3.22 A Hawaiian Tradition of Hiika who is Held in the Bosom of Pele

The epic tradition of the goddess Pele and her youngest sister, Hi'iaka-i-ka-poli-o-Pele, a.k.a. Hi'iaka, was referenced in section 3.1. From 1860 to 1928, several important Hawaiian-language publications provided readers with variations in the telling of this tradition. The narratives cited below were published under the heading "He Moololo Kaao no Hiikaikapoliopele" in the Hawaiian newspaper *Ka Hoku o Hawai'i* from September 18, 1924 to July 17, 1928, through the partnership of Julia Keonaona, Steven L. Desha Sr., Isaac Kihe, and others. They artfully retold this tradition, embellishing it with descriptions of places and events in history, thus bringing the knowledge of place forward to that later generation.

The excerpts below offer important details pertaining to *uuli pūna*, traditional and customary practices, and the naming of places visited by Hi'iaka as she traveled into and across lands of Honouliuli Ahupua'a. It should be noted also that this tradition is the source of the name "Hoakalei," as cited by Maly through translations of the Hawaiian narrative in 1993. *Kūpuna* Arline Wainaha Ku'uleialoha Brede Eaton, Sister Thelma Parish, and Aunt Mary Kaipo Malama Serrao chose the name "Hoakalei Cultural Foundation" commemorating the history of Hi'iaka's journey through Honouliuli.

Seeing the beauty of Kaala, Hiika chanted:

Beloved is the dew of Kaala,
That dew which bears the fragrance of the nene grasses,
[fragrant dew which] Kissed the natives of Puuloa,
One searches far for love...⁷⁷

⁷⁷"He Moololo Kaao no Hiikaikapoliopele..." January 18, 1927.

...As Hiiaka and her companions prepared to depart from Pokai, she told Lohiau and Wahineomao, that they would travel by canoe, while she would travel for a while over land. They would meet again at Kou [Honolulu], and she instructed them "As you travel, you will arrive at a place where a point juts out into the sea. That will be Laeloa [Barbers Point], do not land there. Continue your journey forward, and as you continue your journey, you will see a place where the ocean lies calmly within the land. That will be Ewa; do not land there. Continue your journey and you will reach a place where the mouth [of the land] opens to the sea (hamama ana ka waha i ke kai). That is Puuloa, do not land there either. That is the entry way to Ewa... The travelers then parted and began their journeys.⁷⁸

Hiiaka continued to the uplands along the trail which passes through Waianae. Now the trail upon which Hiiaka chose to travel, is the trail which passes through the heights of Pohakea. Hiiaka passed along the kula (plain) of Maili, and then turned to look at the uplands. She saw the dazzling light of the sun on the uplands of Lualualei and Hiiaka chanted:

The sun is hot!

The sun is hot!

The heat of the sun is on the plain of Lualualei

The sun chews it up entirely. ...

Hiiaka then continued her ascent on the trail in the stifling heat of the sun, and she chanted:

The path is at Waikonene,

Ascending at Kamoaula,

The heat of the sun is upon the breast,

Ilio is born upon the back of Puhamaloo,

The naulu winds rage,

Breaking the stream, but the breast of Puhawai is quiet,

The kaiaulu breeze seems to fight and rebel against the people,

Striking and causing the noses to rage,

The mucus flows freely,

In the hot sun of Lualualei.

From the heights of Pohakea, Hiiaka looked to the shores of Ewa, where she saw a group of women making their way to the sea. The women were going down to gather papai (crabs) and limu (seaweeds), and to gather the mahamoe, okupe (both edible bivalves), and such things as could be obtained along the shore of that land. Hiiaka then began to chant about those ladies:

⁷⁸Ibid., January 25, 1927.

The Kehau breeze is there below Waipoua,
Bearing the fragrance of the kupukupu ferns across the plain,
The coolness is laid upon the grasses,
A coolness laid upon the sea of Ewa,
Ewa is made cold (unfriendly)
because of the fish which hushes voices,
Be silent in that breeze.

Hiiaka saw the women moving ahead to the shoreline, just like the cold Waikoloa wind that blew from the uplands of this place. And this was why Hiiaka had chanted to them. Hiiaka then turned towards the canoe on which her companion and the man [Lohiau] were traveling. They were paddling and were no longer talking, for Hiiaka had admonished them, warning—

Ewa is made cold because of the fish
that hushes voices,
Be silent!

Now, the famous fish of Ewa in those days when the wind blew because of conversations, was the pipi (pearl oyster). Only when it was very calm could one go to catch the pipi. If anyone spoke while going to get the pipi, the breeze would cause rippling on the water's surface, and the pipi would be hidden from sight.⁷⁹ In this way, Hiiaka had instructed Wahineomao and Lohiau to be quiet like the women of Ewa who were going fishing. If one spoke, the angry winds would blow and bring misfortune...⁸⁰

...Turning her gaze towards the island of Hawaii, she could see the flames of Pele in the lehua forest of Hopoe, and she chanted out

Beautiful is Palailai, sacred assembly of the woman,

I set up the drum of the sacred voice,

The voice of the ocean is what I hear,

The natives hear it

[The stormy ocean of Waialua, could reportedly be heard in Ewa],

The birds drink the water caught in the noni leaves,

The billowy clouds pass in the calm,

The fires of Hawaii rise above me...

... Hiiaka then departed Pohakea, descending to the plain of Keahumoa [in the uplands between Waipio and Honouliuli]. It was at this place that she saw several women gathering the blossoms of the mao [*Cosyrium*

⁷⁹It was believed that talking would cause a breeze to blow that would frighten the pipi [26].

⁸⁰"He Moololo Kaao no Hiiaka kapolole...," February 8, 1927.

tomentosum, an endemic yellow-flowered hibiscus that grows on the dryland plains] with which to string garlands for themselves. She then saw them sit down and begin to string and complete the garlands for themselves, so that they could adorn their necks. These women adorned themselves in the mao garlands and were really quite beautiful. Hiiaka then felt her own neck, for she was without a lei. Hiiaka then thought about what to say to the women regarding the garlands with which they had adorned themselves. She then thought within herself, I am going to ask them for a lei that they had been burdened with making. If they have aloha for me, then there is no kindness which they shall not have, but if they deny me, so it will be. Hiiaka then offered a chant to the women who had strung their garlands upon the plain which is burned by the sun.

The plain of Keahumoa wears the mao blossoms as its lei
Adorning the women who string garlands in the wild
It is like the lehua blossoms of Hopoe
Lehua blossoms upon which the sun beats down
On the nodding koaia flowers of the cliff
On the rooftops of the houses at Apuku
Rising in the presence of the cliff of Puukuu
The land is indeed a chief
Man is indeed a slave
I am indeed a slave to aloha—love
It is love which invites us two—come
I come—

Then one of the women answered her in a kindly manner, "Wait stranger, before you go on your way, here is your lei." It is true what you have said, "He kauwa ke kanaka i ke aloha" (Man is a slave of love or compassion), and it is aloha which beckons to us and moves us to come forth. The woman then moved forward and placed her lei upon Hiiaka, and the other women did the same as well. The women then saw the true beauty of Hiiaka and they urged her to join them for a meal at their home on the shore of Ewa.

Hiiaka then spoke to them, "I am not hungry, for your kindness has satisfied me. Here are the words which I share with you—In your dwelling, if one of you should meet with trouble, or if one of the people for whom you have aloha is in need, offer the chant which I offered to you, asking without shame for garlands that you had made. The chant is a prayer for the passing of troubles from you or your loved ones. Now come and kiss me, and I will depart from this long open plain."

The women stepped forward to kiss Hiiaka, and as they rubbed noses

each one of them remembered the chant which Hiiaka offered when she asked for their garlands of mao. Thus this chant became a prayer for those women in their days of trouble. Hiiaka then departed from those women who strung garlands of mao on the plain and traveled towards the shore of Ewa, towards Puuloa. Turning towards the ocean of Honouliuli, Hiiaka saw the expanse of Leinono⁸¹ and she said within herself:

Say! I have not forgotten you Leinono, though perhaps you think I am no good because I don't know you. Therefore, I call to you Leinono with this chant:

Bright eye, the rising sun,
Companion that travels arm-in-arm with the expanse of Ewa,
The Amu wind that causes dust to mound up,
Is the first born of the Moae wind,
A child that is embraced by the Ewa-loa (expanse of Ewa),
Hail Leinono,
Our companion.

Finishing her chant, Hiiaka then turned and saw her companion and Lohiau paddling their canoe. And her love welled up for her traveling companions. It was also then, that Hiiaka came to understand that Lohiau would be killed by Pele when they reached Hawaii. Hiiaka then turned and continued her journey along the path that crossed this unpeopled plain. While walking along, she saw two women who were busy stringing garlands of ilima [*Sida filifolia*] blossoms. The women were sitting alongside the trail upon which Hiiaka was traveling. Now when these two women saw Hiiaka, one said to the other, "Say, this is Hiiaka who is descending along the path, we must depart with haste, lest she kill us."

The two women hastily departed, and reached a stone that was situated along the side of the trail which continued on to Waianae. It was at this stone that the two women transformed themselves into their supernatural moo [lizard] forms.

One of the lizards then went and hid in a little space on the stone, and the other went nearby. One moo said to her companion moo...⁸²

... "It is fortunate that we have hidden ourselves at this place, so that we may escape being killed by Hiiaka." Now from ancient times till recently, the place at which this stone was situated, was called "Pee-kaua" (We two hidden). Now that the road has been made, the stone at which these two moo wahine (lizard women) hid has been destroyed.

When Hiiaka saw that these two women had fled and taken their moo forms to hide on the stone along the trail, she chanted out to them:

⁸¹Leinono, also written as Leilono [16].

⁸²"He Moolole Kaao no Hiiaka ka poliolepe..." February 15, 1927.

Greetings to you two women of the plain,
It is a barren plain in the sun,
Where the sun bears forcefully down,
Having gone to hide,
We two are hidden at Pee-kaua,
Aloha to you two,
Here I am traveling on.

Hiaika then continued walking towards the shore. Hearing Hiaika's chant of affection, these two moo women said to one another, "Say, this is truly remarkable, for we will not die, but have been saved by Hiaika. She has given us her aloha as she descends in the heat of the sun, and so it is that we shall remain upon this plain."

Descending to the flat lands of Honouliuli, Hiaika then turned and looked at Puuokapolei and Nawahineokamaomao who dwelt there in the shelter of the growth of the ohai, upon the hill, and where they were comfortably refreshed by the blowing breezes. Hiaika then said, "Puuokapolei and Nawahineokamaomao, do not forget me, lest you two go and talk behind my back and without my knowing, so here is my chant of greeting to you"

Greetings to you two o Puuokapolei and companion
O Nawahineokamaomao
Set there, and dwelling
In the shade of the ohai
Stringing garlands of kukui in the day,
Adorning yourselves in the garlands of the maomao
Kaunaoa (*Cuscuta sandwicensis*) is the lei of the shores of Kaolino⁸³
There is joy in traveling.

When Hiaika finished her chant, Puuokapolei said, "Greetings. Love to you, o Hiaika! So it is that you pass by without visiting the two of us. Lo, we have no food with which to host you. Indeed, the eyes roll dizzily with hunger. So you do not visit us two elderly women who have cultivated the barren and desolate plain. We have planted the uuala (sweet potato) shoots, that have sprouted and grown, and have been dedicated to you, our lord. Thus as you travel by, pull the potatoes and make a fire in the imu, so there will be relief from the hunger. For we have no food, we have no fish, and no blanket to keep us warm. We have but one kapa (covering), it is the pilipili-ula [the grass *Chrysopogon aciculatus*]. When it blossoms, we go and gather the grass and plait it into coverings for us. But in the time when the grasses dry, and none is left on

⁸³ *Kaolino*, "the brightness," appears to be a variation of *Koolina*—interpretively translated as "joyous."

the plain, we two are left to live without clothing. The cold breeze blows in the night, the Kehau and Waikoloa, the cold does not remain though, and when the grasses of the land which give us warmth, begin to grow again, our nakedness is covered, and we are a little better off than the flowers of the mao. It is because we are left without our covering of the pilipiliula grass, that many people have come to say, 'Waiho wale iho ka mauu o Kaiona' (Kaiona is left exposed by the grasses) [Nothing is left to the imagination]. Aloha to you, and aloha be with you in your travels o Hiaika-i-ka-poli-o-Pele, our lord."

Hiaika then turned and continued her walk in the stifling heat of the sun on the plain of Puuokapolei. Hiaika saw a mao blossom as she descended, and she picked it in the heat of the sun and chanted out Kona is made dizzy in the long days of Makalii [in the summer],

The wiliwili [*Erythrina*] trees sway, then comes the calm,
The birds of Kanehili endure,
The sun is exceedingly hot on Puuokapolei,
The mao growth is stunted on the seaward plain,
The nohu [*Tribulus cistoides*] flowers
are like a halakea (kapa) covering
The puaula [young kumu] fish seem
to flash along the shores of Kaupea
A companion [is the] Naulu wind,
It is a traveling companion for me.

When Hiaika finished her chant, she continued toward the shore, and looking to the ocean, she saw the canoe of her friend and Lohiau, and chanted:

My man on the many harbored sea of Puuloa,
As seen from the plain of Peekaua,
Let us dwell upon the ohai covered shore,
Where the noni blossoms are twisted together,
Descending along Kanehili
I am winding along

Hiaika then turned and looked back to Puukuua, Kanehoa, and Haleauau and said, "Do not forget me Puukuua ma [and companions]. And so you do not think that I will forget you, here is a chant of endearment for you:"

It is I who travel along the shore of Puuloa,
Where the ohai is at Kaupea,
In the awe-inspiring sun,
It is seen,
It has been seen by me,

At the mountain cliffs,
Puukuu at Haleauau,
The sprouting of the kukui growth,
Dancing in the sun of Kanehoa,
Love to you my companions.

... Upon finishing her chant, Hiiaka continued down the trail and arrived at Kualakai. At Kualakai, the trail took her to a spring of cool water. Looking into the spring, she saw her reflection shining brightly upon the water's surface. Hiiaka also saw two lehua trees [*Metrosideros polymorpha*] growing on each side of the spring. Now these two lehua trees were completely covered with blossoms. She then picked the lehua blossoms of these two trees and made garlands for herself.

Hiiaka fashioned four strands to her lei, she then removed the garlands of mao which she had received when descending from Pohakea, and set them aside.

She then took the garlands which she had made, and adorned herself with them. Hiiaka then heard the voice calling out from the area of Kanehili:

Hiiaka is the woman
Who picked the flowers of Hoakalei,
And with a needle strung and made them into
four garlands, the sectioned lei of the woman,
O my younger sibling.
My younger sibling who came from the place
where the dusty wind rises from below
Overturned in the sea of Hilo-one,
The aloha is for Hilo,
Love for the lei.

That place, Hilo-one, which is mentioned in the mele, is situated on the northern side of Kualakai, towards Kalaehoa. And the name of the spring in which Hiiaka looked and saw her reflection was Hoakalei (Reflection of a lei). It was at this place that Hiiaka saw the two lehua trees growing, from which she picked the blossoms to make her four garlands.

Hearing the chant, Hiiaka turned toward where it had come from, and saw her older sister Kapo looking at her. Kapo had arrived at Oahu from Maui, where she was teaching the practices of the hula. Seeing Kapo, Hiiaka cried out with affection for her older sister...⁸⁴

So, it is you o Waialua-iki,

⁸⁴Ibid., February 22, 1927. Available in paper form only at the Hilo Public Library. "He Moolelo Kaao no Hiiakaikapoloapele..."

Of the sun darkened cliff of Uli,
Liawahine has gone traveling,
O woman that stands calling from the cliff,
I am adorned with a lei,
Yes, I am wearing garlands of the misty-centered lehua blossoms,

The lehua that grows along the water's edge at Hoakalei,
My lehua of Hilo-one,
On the shores of Kaolina and Kaupea,
I am adorned.

The reason that Hiiaka presented this chant to her elder sister Kapo, saying, "kui pua lei, o Hoakalei" (Stringing flower garlands of Hoakalei) was because in her chant, Kapo had inquired about Hiiaka's picking the flowers from the spring of Hoakalei and making them into four garlands for herself... As it is seen in this mele (chant), Hilo-one is on Oahu, there at Kualakai, near Kalaehoa.

Thus it is understood that through traditions like this, we are given direction in knowing about the names of various places of the ancient people, and which are no longer known in this time... Hiiaka then continued her journey toward the shore of Puuloa, and she thought about the words that she had earlier spoken to Wahineomao and Lohiau, and she chanted:

I will not travel to the shore of Kaupea,
To Kaupea where the ohai of Kanehili are found,
I will turn away...

... Hiiaka then arrived at a place where many people were gathered together, and she overheard them talking about preparations for a journey to Kou, which is the old name for Honolulu. The people were preparing to go to the court of the chiefess Peleula, who was hosting *kiliu*⁸⁵ games...⁸⁶

... Learning of the contest that was to be held at Kou, Hiiaka had reservations about having Lohiau stop at the court of the chiefess Peleula. So she chanted, calling to Lohiau, telling him to bring the canoe to shore at Puuloa. When Hiiaka chanted, everyone became quiet, because they were awed by the beauty of her chanting voice. One of the women in the group then called to Hiiaka, "You are a stranger to us in appearance, but your chant indicates that you are very familiar with this shore, how is

⁸⁵ *Kiliu* is a Hawaiian game in which a gourd or a coconut shell, cut in half, are tossed at an opponent's pob, similar to horseshoes. The individual who successfully hits the pob that he or she had selected was the winner and could claim a kiss or some other favor from the opponent [21:216].

⁸⁶ "He Moolelo Kaao no Hiiakaikapoloapele...", March 1, 1927. Available in paper form only at the Hilo Public Library.

that so?" Hiiaka confirmed that she was indeed a visitor, and yet familiar with the places of this land. She then said, "Ua maikai no kau noi e ke kamaaina maikai, aka, i Kou hoi e hui aku ai na maka" (You have asked a good question, kind native, but, it is at Kou, that all the faces [eyes] shall meet).

Thus it is seen that when Hiiaka responded to the woman of Puuloa, that this famous saying of the people of Oahu came about, "Hui aku na maka i Kou" (The faces shall meet at Kou)... Now, Lohiau had heard the chant of Hiiaka, and he drew the canoe to the shore. When Hiiaka boarded the canoe, she bid farewell to the people of Puuloa and said, "Hui aku o na maka i Kou" [in other words, we will meet again].

They then directed their canoe seaward, and went out of opening of Puuloa. Hiiaka turned and looked towards the land where she saw the dwelling places of Kinimakalehua, Leinono, and Kealia. She called out to them, "So you do not forget me, here is a chant for you" —

Reddish yellow are the rains of Kinimakalehua,
Leinono is the companion above, and Puuloa is shoreward,
The journey across the expansive sands of Ewa has been made
arm-in-arm,
I am at Ewa, I greet you o Leinono, We are all companions

In this chant of Hiiaka, she spoke the famous saying that is the pride of the descendants of Ewa, "Ke one kui-lima laula o Ewa" (The sands of Ewa, across which everyone joined hand-in-hand). These words of Hiiaka are a famous saying of this land to this day. As the canoe continued toward Kou, passing the land of Kalihī, Hiiaka looked again towards Leinono and Kealia, and she chanted:

Hail to you o Leinono, o Kinimakalehua, o Kealia who is below,
aloha,
Here is the supplication, the offering, of the one who has traveled by.
It is a voice or song, only a voice—
She then turned forward and the canoe arrived at Nuuanu...⁸⁷

3.23 An Account of Kamehameha I at Puuloa

In the following anecdote published in the *Daily Bulletin*, Kamehameha the Great spies on some chiefs who met at Puuloa to conspire against him. He leaves a sign that he had been there and heard their treacherous words in order to instill fear in the chiefs.

⁸⁷Ibid., March 8, 1927.

When Kamehameha conquered Oahu though he had firmly established himself all the chiefs had not reconciled themselves to his rule. Kamehameha however adopted the plan of making the women chiefs and not allowing their husbands to receive the taxes. He also selected the handsomest and smartest women as spies who used to report to him all that went on their districts. One of these female spies reported to him that the chiefs of Ewa, Waianae, and Waialua, were conspiring against him and were to meet on a given night at Puuloa (Pearl River), then the favorite spot with the chiefs of those districts, to finally settle on their plans.

Kamehameha was then living at Pūlaholaho, afterwards known as Charlton Square, the block now bounded by Merchant, Kaahumanu, Queen, and Nuuanu Street. It was then supper-time and he excused himself from supper and, taking his famous spear of peculiar make, Ka ihe o Kamehameha, the like of which no other Hawaiian had, he started off striking across the harbor at Kapuukolo (near Emmes boat-building establishment,) to Koholaloa, along a fishpond wall to Kulaoakaiwiula, (the plains near Kalihī), then swimming the Kalihī passage and wading till he came to Ahua (the sand beach below Moanalua), then to the Pearl River and swimming across to Puuloa, He thus made a bee-line from E. to W. over land and sea alone without a single attendant. Nothing stopped him. Here he went from halau to halau (the halau is a large meeting house), until he came to the place where all the Chiefs were inside plotting treason against him. After listening long enough to learn all their plans he stuck his spear point downwards, in the sand about 4 feet from the door and returned as he came alone.

When the chiefs awoke next morning and went out they saw the spear. Said they, "The great chief has been here. Here is his spear. He knows all." So in accordance with the ancient Hawaiian custom of those who feared for their lives, they went to Honolulu and crawled in on their hands and knees into the presence of Kamehameha saying "E ola au." (Let me live.) And Kamehameha granted their prayer and had the satisfaction of knowing ever after that they were faithful to him.⁸⁸

3.24 Historical Accounts of the Keahi-Pu'uloa Vicinity

One of the native Hawaiian informants who recorded her recollections of the Honouliuli area was Hawaiian ethnographer and Bishop Museum employee Mary Kawena Pukui. Pukui shared her personal experience with the ghosts on the plain of Kaupē'a around 1910:

⁸⁸*Daily Bulletin*, September 3, 1883, p. 2.

A wide plain lies back of Keahi and Pu'uloa where the homeless, friendless ghosts were said to wander about. These were the ghosts of people who were not found by their family 'aumakua or gods and taken home with them, or had not found the leaping places where they could leap into the nether world. Here [on the plain of Honouliuli] they wandered, living on the moths and spiders they caught. They were often very hungry for it was not easy to find moths or to catch them when found.

Perhaps I would never have been told of the plain of homeless ghosts if my cousin's dog had not fainted there one day. My cousin, my aunt and I were walking to Kalae-loa, Barber's Point, from Pu'uloa accompanied by Teto, the dog. She was a native dog, not the so-called poi dog of today, with upright ears and body and size of a fox terrier. For no accountable reason, Teto fell into a faint and lay still. My aunt exclaimed and sent me to fetch sea water at once which she sprinkled over the dog saying, "Mai hana ino wale 'oukou i ka holoholona a ke kaikamahine. Uoki ko 'oukou makemake 'ilio." "Do not harm the girl's dog. Stop your desire to have it." Then with a prayer to her 'aumakua for help she rubbed the dog. It revived quickly and, after being carried a short way, was as frisky and lively as ever.

Then it was that my aunt told me of the homeless ghosts and declared that some of them must have wanted Teto that day because she was a real native dog, the kind that were roasted and eaten long before foreigners ever came to our shores. [25]

Pukui also learned stories about some of the special sites of the Pu'uloa Honouliuli area. Among her writings are the following recollections:

At the entrance [of Pu'uloa] was a pond built out into the water in the shape of a tennis racket. This pond, called Kapakule, was said to have been the labor of the Menehune. . . . On the left side of the pond stood the stone called Hina, which represented a goddess of the sea by that name. Each time the sea ebbed, the rock became gradually visible, vanishing again under water at high tide. Ku, another stone on the right, was never seen above sea level. This stone represented Ku'ula, Red Ku, a god of fish and fishermen. From one side of the pond a long wall, composed of driven stakes of hard wood, ran toward the island in the lochs. When the fish swam up the channel and then inside of this wall, they invariably found themselves in the pond. A short distance from the spot where the pond touched the shore was a small ko'a or altar composed of coral rock. It was here that the first fish caught in the pond was laid as an offering to the gods. At the time I last saw it in 1907, this altar was fenced in by Edwin P. Mikalemi, the caretaker of the place and brother-in-law

of Akoni Kawa'a [an uncle of Pukui's] . . . There were times when the sharks were caught in the pond at low tide, but no Hawaiian there ever dreamed of molesting them. Never shall I forget the day when a haole guest of Mikalemi went to harpoon one of the sharks in the pond. My uncle shouted for him to get away from there and swore as I had never heard him swear before. Those sharks were as dear to him as a relative, and he did not want to see them speared any more than he wanted us to be hurt in the same way.

At the age of twelve, I was taken to the cave of Ka'ahupahau, Cloak-well-cared-for. Most of the cave was deep under water. A small plant laden with red berries hung over the entrance, and when I reached to pluck one, my uncle pulled my hand back quickly and chided me. Those belonged to Ka'ahupahau. Ka'ahupahau had a brother Kahi'uka. The smiting tail, whose stone form was a good distance away from the cave, lying deep in the water. Yet it was plainly seen from the surface. Ka'ahupahau's son, Ku-pipi, had his home where the drydock was built and sank about thirty years ago. These were not the only sharks at Pu'uloa, for like all members of royalty there were others to stay about and serve them. Ka'ahupahau was the chiefess of sharks in the length and breadth of the Pearl Lochs, hence the old saying, "Alahula Pu'uloa he alalele na Ka'ahupahau," "Everywhere in Pu'uloa is the trail of Ka'ahupahau."

Her brother and she were born, not as sharks, but as human beings. One day a shark god saw them and converted them into sharks like himself. Every day they swam up a stream at Waipahu and there they were fed on 'awa by relatives. 'Awa was always the food of the gods. When they became too large to swim upstream, the offerings of food were carried to the lochs for them.

Because the sharks, though numerous, were not harmful within Pearl Lochs, the natives used to have fun mounting on their backs and riding them as cowboys ride horses. To turn them around, a little pressure was used just back of the eyes. Is this a tall fish story of men riding sharks? No, it is not. My uncle said that it was true and so did the historian Kamakau. [25:56-59]

Pukui also provides readers with narratives which tell why Ka'ahupahau vowed to care for people who swam in the waters around the 'Ewa-Pu'uloa region. Her narratives also mention the surf of "Keahi," which appears to come in near the current project area, and how One'ula (red sand) came to be named:

Papio was a pretty girl who used to go surfing at Keahi, a place between Pu'uloa and Kalaeloa, now Barber's Point. One day she met Koi-hala, an aged relative of Ka'ahupahau, who was busy stringing kou, ma'o, and ilima blossoms into leis for her beloved shark "grandchildren,"

Ka'ahupahau and Kahi'u'ka. Papio begged for a lei, which was, according to the standards of that time, a very rude thing to do. Each time she begged, Koihala refused to give her a lei. Papio then went to her surfing [spot] and on her return snatched one of the leis from Koihala and went away with a laugh. Koihala was filled with anger and when she took the leis to the beach, she told Ka'ahupahau all about it. Ka'ahupahau, too, became angry with Papio.

Papio crossed the channel, found a large rock and stretched herself on it with her long, beautiful hair trailing in the water. She did not suspect that Ka'ahupahau had sent a shark to destroy her. Papio was seized, drawn under water and killed. Then her blood spewed on the shore not far away, staining the soil there red to this day [One'ula].

Ka'ahupahau soon recovered from her anger and became very sorry. She declared that from hence forth all sharks in her domain should not destroy, but protect the people round about. As flowers were the cause of the trouble she forbade their being carried or worn on the waters of Pu'u'loa. From that time all the people of that locality and the sharks in the lochs were the best of friends. [25:57-58]

Pukui also offers this description of the Keahi area:

Keahi, Lying between Pu'u'loa and Barber's Point, is the place where the finest 'o'io fish, Albula vulpes, was caught. This fish is esteemed as one of the best for eating raw. Those caught at Keahi have the fragrance somewhat like the lipoa sea weed and when brought to market, sold readily. [25:60]

McAllister's *Archaeology of Oahu* [22] provides readers with an observation of how the coral plains around the project area may have been used in earlier times:

Site 146. Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near Puuloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. [22:109]

3.25 Pu'uokapolei: Heiau and Historical Observations

In *Sites of Oahu* [29], the authors compiled many legendary and historical accounts of places around the island of O'ahu into one publication. Their work provides great

detail on the history of the 'Ewa Plain; in the description of the area we find that Pu'uokapolei

was one of the most famous hills in the olden days. The chant composed for games in the olden days began with the name of this hill and went on (with the place names) all around the island. This chant was used for those who swung with ropes, played on wooden 'ukeke instruments, or those who juggled with stones, noni fruit or kukui nuts. [29:33-34]

Several early studies of archaeological sites in the Honouliuli area mention that a *heiau* was located on or near Pu'uokapolei. Thrum simply states, "[a] heiau on Kapolei hill, 'Ewa - Size and class unknown. Its walls thrown down for fencing."⁸⁹ McAllister supplied more information:

Pu'u Kapolei Heiau (Destroyed) Site 138, on Pu'u Kapolei hill. The stones from the heiau supplied the rock crusher which was located on the side of this elevation, which is about 100 feet away on the sea side. There was formerly a large rock shelter on the sea side where Kamapua'a is said to have lived with his grandmother. [22]

4 Honouliuli: Historical Residency, Travel, Events in History, and Land Use, 1794-1880

The narratives cited in this section of the study were penned by native Hawaiians, foreign visitors, and residents, and include some of the earliest accounts describing the Honouliuli vicinity following western *Contact*. The narratives provide an overview of

- changes in the landscape;
- the decreasing Hawaiian presence;
- loss of *wahli pana* and noted places;
- development of ranching and plantation business interests in the region;
- concerns about United States control over Pearl Harbor and "Reciprocity,"
- the changing make-up of the communities; and
- travel on the land.

The narratives are generally cited chronologically by period. The first occurrence of place names in each account are indicated in bold.

4.1 Hawaii Nei 128 Years Ago (1794), Pu'u'loa-Wai Momi or Pearl Harbor Cited

In 1793-1794, Archibald Menzies visited Hawai'i with Captain James Vancouver, during which time Menzies and crew members frequently traveled with native

⁸⁹Thrum's *Hawaiian Annual*, 1907.

guides to botanize and take readings of the topography at various places in the islands. Menzies described the scenery on the land while sailing between Honolulu and Pu'uloa (Pearl Harbor):

Vancouver Examines But Does Not Enter Honolulu Harbor

March 23d Early in the forenoon of the 23d, we got under way, but the wind being westerly, we made but very little progress against it. In the evening observing an apparent inlet (The harbor of Kou, now known as Honolulu. Capt. Brown of the Jackal, and Capt. Gordon of the Prince Lee boo, entered Honolulu Harbor for the first time on November 21, 1794. Capt. Brown called it Fairhaven.) in the western side of the bay, we came to an anchor before the entrance to it, and being informed while on the north-west coast of America by the masters of some of the trading vessels that a small snug harbor was situated in this side of the bay, boats were sent out early next morning to examine the passage in, but they found it so guarded by a reef a little distance from the shore that there was no access even for vessels of small draught of water.

Entrance To Pearl Harbor Noticed

The appearance of another opening was seen a little to the northward of this one (Wai Momi, or Pearl Harbor, now an important U. S. Naval Station. "The Key of the Pacific."), whose entrance might perhaps be more favorable, but the boats had not time to examine it, and when they came alongside, and were hoisted in, we in the evening got under weigh again and with a light breeze went round the west point of the bay, which is also the south point of the island.

March 24th Next day being under the high land of the south-west part of the island, we had it mostly calm, with intervals of light fluctuating airs, with which we kept moving slowly along the shore of the island, which here trended northwestward. Off this point of the island, we had very uneven soundings, sometimes no ground with a hundred and ten fathoms of line pretty near the shore; at other times we had suddenly shoal water, so as to oblige us to stand off. [23:125–126]

4.2 Honouliuli Trails Cited on Malden's Map of 1825: Visit of 1794

As a part of the Vancouver expedition, cartographer Lt. C. R. Malden prepared a map of a portion of O'ahu, which also covered the Honouliuli–Pu'uloa region (fig. 2).

Malden's map was published in 1825,⁹⁰ and provides the earliest cartographic record of the Honouliuli region. The map depicts several clusters of houses, fish weirs, and fishponds in the Honouliuli/Pu'uloa area. Being recorded during the early period of western Contact, the map is believed to represent the basic *pre-contact* coastal settlement pattern of Honouliuli and vicinity. Even though the map and visit is of an early date, given the rapid decline of the native population just after western Contact, it is likely that the pre-contact population would have been higher and settlement more dense than indicated by the Malden map.

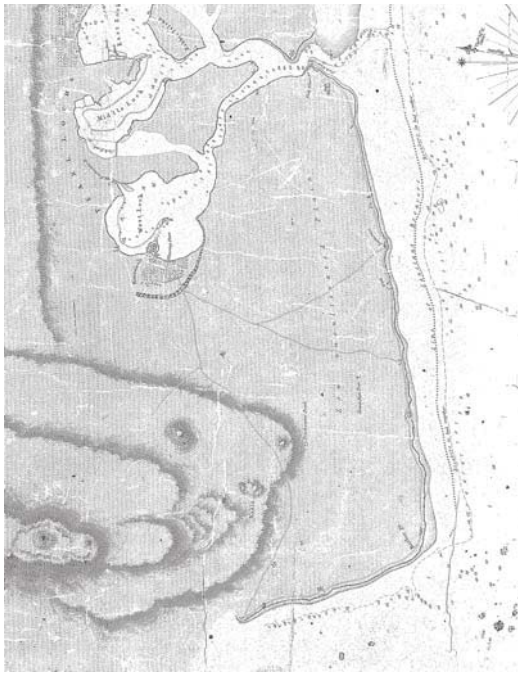


Figure 2: Map of trails and landscape of the Honouliuli Region in ca. 1793 (Malden, 1825, State Survey Division, Registered Map No. 437).

⁹⁰Registered Map No. 437 & 640.

4.3 Sites and Trails of the 'Ewa District, 1800–1811

John Papa ʻŪi, one of the preeminent native Hawaiian historians, was born at Kumelewai, Waipʻo in 'Ewa in 1800. Raised as an attendant to the Kamehameha heirs, he was privy to many facets of early history, practices, and events during his life. In the 1860s, ʻŪi published a history under the title *Na Hunaʻiunia o ka Moololo Hawai'i* that was translated by Mary Kawena Pukui and published as *Fragment of Hawaiian History* [15]. Based on the translations, Paul Rockwood produced a map of the trail routes and several locations identified by ʻŪi in his narratives (fig. 3).

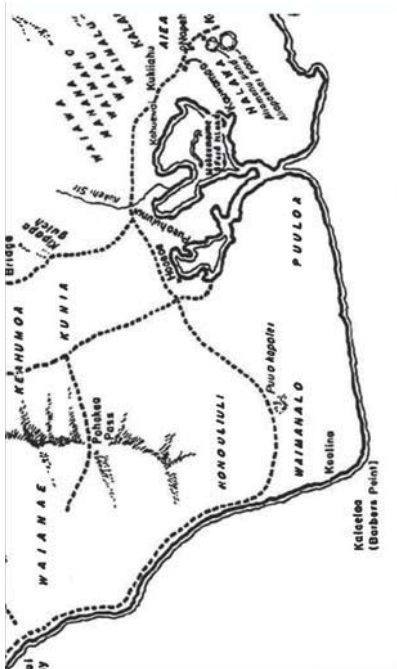


Figure 3: Trails of Leeward O'ahu. Portion of map by Paul Rockwood, based on narrative descriptions penned by John Papa ʻŪi [15].

Trails from Honolulu to 'Ewa

Let us turn to look at the trail going to Ewa from Kīkīhale, up to Leleō, to Kōiuiui and on to Kōoneula. There were no houses there, only a plain. It was there that the boy ʻIi and his attendants, coming from Ewa, met with the god Kaili and its attendants who were going to Hoaeae. When the kapu moe was proclaimed, they all prostrated themselves on the plain until the god and his attendants passed by ... the trail went to Kaleinakaupane, then to Kapukaki, from where one could see the irregular sea of Ewa; then down the ridge to Napēha, a resting place for the

multitude that went diving there at a deep pool. This pool was named Napēha (Lean Over), so it is said, because Kualii, a chief of ancient Oahu, went there and leaned over the pool to drink water.

The trail began again on the opposite side of the pool and went to the lowland of Halawa, on to Kauwamoa, a diving place and a much-liked gathering place. It was said to be the diving place of Peapea, son of Kamehamehanui of Maui who was swift in running and leaping. The place from which he dove into the water was 5 to 10 fathoms above the pool.

There the trail led to the taro patches in Aiea and up the plain of Kukīahu. Just below the trail was the spot where Kao, chief of Kauai, was killed by Kalanikupule. From there the trail went along the taro patches to the upper part of Kohokoho and on to Kahuewai, a small waterfall. On the high ground above, a little way on, was a spring, also a favorite gathering place for travelers. From there it continued over a small plain, down the small hill of Waimalu, and along the taro patches that lay in the center of the land. Above this trail was the home of one of the two haole men previously mentioned, the men to whom the boy's attendants spoke.

Paula Marin had a place there also. It could be seen near the edge of a low cliff going down to the upper side of a grove of cactus plants, said to have been first brought to Hawaii by Marin.

The trail went down to the stream and up again, then went above the taro patches of Waiau, up to a maika field, to Waimano, to Manana, and to Waiawa; then to the stream of Kukehi and up to two other maika fields, Pueohulunui and Haupuu. At Pueohulunui was the place where a trail branched off to go to Waiālua and down to Honouliuli and on to Waiānae. As mentioned before, there were three trails to Waiānae, one by way of Puu o Kapolei, another by way of Pohakea, and the third by way of Kōlekole.

From Kunia the trail went to the plain of Keahumoa, on to Maunauna, and along Paupauwela, which met with the trails from Wahiawa and Waiālua. The trail continued to the west of Mahu, to Malamani, and up to Kōlekole, from where one can look down to Pokai and Waiānaeuka. There was a long cliff trail called Elou from Kalena and Haleauau on the east side of Kaala coming down to Waiānae. There was also a trail called Kumaipo which went up and then down Makahauka. [15:95–97]

Entering the 'Ewa District from Wai'anae uka

There the trail met with the one from Kōlekole and continued on to the stream of Waikakalaua, Piliamoo, the plain of Punaluu, to a rise, then

down to Kipapa and to Kekualele [Kekuaoalelo]. A trail ran from this main trail to Kalakoa, Oahuni, and other places much visited, such as Kukaniloko. From there it extended to the digging place of Kahalo, then went below to Paupalai, thence to Lelepua, and to Kahalepoi, where the legendary characters Kaleleluaka and Keinohoomanawanui lived. Then it reached Kekuaoalelo, the stone in which the niho palaoa was hidden, then went on to Puunahawe and Pueohulunui, where it met with the Waialua trail.

All of these places mentioned had large populations. The land was rich, and there were many trees in olden times. Who has "closed" these places today? We do not know enough to say, "It was so-and-so." But there would be commercial wealth in the trees of these mountains if they were fenced off from animals. So it is with the planting places of every poor person. The person who manages these mountains and valleys could become prosperous. [15:99]

4.4 With Lord Byron at the Sandwich Islands in 1825, "Trip to Pearl River"—Being Extracts from the Diary of James Macrae, Scottish Botanist

In 1824, Liholiho (King Kamehameha II), his wife Kamāmalu, and a group of retainers and foreign advisors traveled from Hawai'i to England. Liholiho and his wife died in England and in May of 1825, their bodies were returned to Hawai'i by Lord Byron. While in the islands, James Macrae, a botanist traveling with the Lord, traveled to various locations in the company of native guides, where he took observations and collected biological samples. One of Macrae's journeys, along with Lord Byron and party, took him to Pu'uloa, the Pearl River, where he described the scene:

Trip To Pearl River Or Harbour

May 17 Joined Lord Byron's party, with Mantle carrying my traps. We did not embark until noon. After two hours sailing along the coast, we entered the mouth of the Pearl River, which divides itself into several branches, forming two islands. One which is smaller than the other is called Rabbit island [Moku'ume'umel, from a person, the name of Marine [Marin], a Spaniard, residing at Hanarura, having put rabbits on it some years ago. The rabbits have since increased in numbers.

It became so calm, that his Lordship, Mr. C., and the Bloxoms left us in the launch, and rowed in the small boat in tow, and soon disappeared from sight. We waited in suspense, hour after hour, not knowing the several branches of the river, nor where we were to spend the night. The boat party pulling into one branch of the river, the other in which I was tacking about from bank to bank till the boaters hauled their boat

ashore and we cast anchor. Both parties were opposite each other on Rabbit Island, but ignorant of the fact, till on walking about the island, the parties met. One hut was noticed, and those on the island made for it, but the launch having the ladies and some others on board, got up anchor and sailed round to the hut, where with the help of canoes, they all landed. The ladies were somewhat discontented, but after a good dinner partaken sitting on mats spread on the grass, harmony was restored.

At dusk we embarked to cross to a larger hut. Landed at 8 p.m. At ten o'clock two old men entered our hut to play the hura dance on a couple of bottle shaped gourds. They took a sitting posture, beating time on the gourd's with the palms of their hands, accompanied by a song made up about the late king.

About 11, we all retired to rest, lying down beside each other on mats, some with pumpkins or what else they could get for a pillow. The ladies got themselves screened off in a corner with a flag without any other accommodation.

Pearl River is about seven miles west of Hanarura, and is improperly called a river, being rather inlets from the sea, branching off in different directions. There are three chief branches, named by the surveyors, the East, Middle and West Lochs. The entrance to Pearl River is very narrow and shallow, and in its present state it is fit for very small vessels to enter, but over the bar there is deep water, and in the channel leading to the lochs there are from 7 to 20 fathoms. The lochs themselves are rather shallow.

The coast from Hanarura to the west of Pearl River possesses no variety of plants beyond two or three species, such as Argemones, Portulacas, and a few other little annuals, intermixed with the common long grass so plentiful everywhere on the coast round the island.

Oysters

The oysters that are found in Pearl River are small and insipid and of no value or consequence...

Ewa District

The neighbourhood of the Pearl River is very extensive, rising backwards with a gentle slope towards the woods, but is without cultivation, except round the outskirts to about half a mile from the water. The country is divided into separate farms or allotments belonging to the chiefs, and enclosed with walls from four to six feet high, made of a mixture of mud

and stone. The poorer natives live on these farms, also a few ragged foreigners who have a hut with a small spot of ground given them, for which they must work for the chiefs a certain number of days besides paying an annual rent in dogs, hogs, goats, poultry and tapa cloths, which they have to carry to whatever spot their master is then living on the island. On the least neglect to perform these demands, they are turned away and deprived of whatever stock, etc., they may possess. Such is the present despotic or absolute law in the Sandwich Islands. This is corroborated by all foreigners met with at different times, who, on our arrival, hoped that Lord Byron would render them their little property more secure in future. Unfortunately they must wait till the British Consul helps them, as we have no authority to interfere with the laws of the country. [2028-31]

4.5 Tours Made Around O'ahu in 1826 and 1828

In 1820, the first contingent of Protestant missionaries associated with the American Board of Christian Foreign Missions (ABCFM) arrived in the Hawaiian Islands. The Honolulu station became the focal point of the missionary's operations, with sub-stations on the major islands in the largest population centers. Periodically, the Honolulu station managers would travel around O'ahu to inspect the progress being made in work in the outlying stations, including church work, educational endeavors, and facilities to support the foreign missionaries' living situation. Levi Chamberlain made tours of O'ahu in 1826 and 1828 and wrote fairly detailed descriptions of the districts he visited, including passing reference to Honolulu.

The following is an excerpt of Chamberlain's original handwritten notes, which were digitized from the ABCFM archives at Harvard by Kumu Pono Associates in 2004. It is from Chamberlain to Rufus Anderson, dated September 12, 1828 and describes two trips made around the island of O'ahu to examine the schools and determine progress in the education of the natives.

About two years ago I performed a tour around this island, and I have recently made another. It was my intention to give you a brief account of my first tour, but I could not find time to do it while the scenes that passed under my observation and the events that transpired were fresh to my mind & retained their hold upon my feelings.

I propose now to give you a history of my last tour, and in doing it I may refer to my minutes of the former tour ... I shall now attempt to give some account of the tour, and of the schools which I visited. I will begin my mentioning the names of my hoahale, [fellow travelers] which were as follows: Jesse Kahananui, Lazarus Kamakahiki, Abraham Naaoo, members of the church, Kaukaluu & Kauhikoo, serious and intelligent

native teachers, each of whom had one or more attendants to accompany them & to carry food and baggage. I was also furnished by Kaahumanu with a suitable number of persons to carry my food & bedding, and to attend to my wants on the way...

[Departing from the Wai'anae District, Chamberlain wrote:]

...The food by which the inhabitants are supplied, is cultivated in the valleys, which open among the mountains two or three mile from the shore.

It was quite dark when we reached Waimanalo, and our arriving at the school house in which we expected to put up, we were disappointed to find it deserted; and it was infested with fleas that we feared we could not make ourselves comfortable in it. Some of the people of the place gathered around us, & we besought them to afford us accommodations in someone of their houses. One man whose house stood nearest us and who was, I believe, the head man of the place, readily offered us his, and immediately began to put things in order for our accommodations; he did what he could to make us comfortable, and, as the house was small, vacated it entirely for our use.

Saturday Feb. 9th I enjoyed comfortable repose during the night and awaked refreshed. I arose and united with my attendants in singing a hymn, and offering a tribute of thanksgiving to God for his care & unflinching kindness. After breakfast a few scholars assembled in front of the house. I examined them and to one of them I gave a catechism and a Sermon on the mount.

Their teacher was absent, and I exhorted them not, on that account, to neglect instructions, but to give more attention to it, to assemble on the Sabbath, and learn the catechism, and repeat passages from the word of God. At 10 minutes before 8 o'clock, after thanking our kind host for his attention to us, we set out for the next district. In consequence of the recent heavy rains the roads were very muddy, & the travelling very bad. We had met with nothing like it in any part of our previous journey travelling. After walking three hours & most of the time in mud, we reached Honouliuli in the district of Ewa. A school of 22 scholars had assembled which I examined. The head man, Kawa, very kindly entertained me, caused a fowl to be cooked and some kalo to be nicely prepared, and furnished the native with a liberal supply of fish and poi. He invited me to stop and spend the Sabbath with him; but as his house was small, and our company had now become large by the accession of the teachers & their attendants who separated from us at Wai'alua and had crossed the inland and had put up at this place, I thought it best

to decline his offer. But feeling desirous that religious worship should be conducted here on the morrow, I recommended that the party who had crossed the island should spend the Sabbath here, while we who had travelled round the shore, should proceed to the next considerable settlement, and make arrangements for spending the Sabbath.

Having expressed to Kawaa my thanks for his kindness, I set forwards with my attendants, and between the hours for three & four o'clock P.M. arrived at Waikale. Towards evening I attended to the examination of two schools, which met in front of the house where I had put up. At the close of the examination I gave information that religious worship would be conducted in the same place on the morrow & requested that all the people of the place should be informed & invited to attend.

Sabbath Feb'y. 10th The people of Waikale & the neighboring lands assembled in the forenoon to the number of 150 or 200.⁹¹

4.6 For This Island, a Census of the People

The newspaper *Ke Kumu Hawaii* was one of the earliest missionary publications. It provided for public education various facets of Hawaii's "progress" in being westernized. The paper included articles by foreign missionaries and Hawaiian leaders in the mission station. The article below, entitled "No Keia Pae Aina. No Ka Helu Ana o Kanaka," detailed population statistics from the 'Ewa District for 1835. Table 1, also from the article, gives population counts for the people of 'Ewa and Wai'anae.

Eia kekahi mau mea i ae like ai na misionari i ko makou halawai ana iho nei.

E helu, a kakau ma ka palapala i ka poe i make, a me ka poe keiki i hanaui. A puni ka makahiki alaila e hoululu, i akaka ai ka mea i oi, o ka poe make paha o ka poe i hanaui paha.

E helu pono hoi i na kanaka a pau loa o keia pae aina, me na wahine me kamalii. O na kanaka maoli ma kekahi palapala o na haole ma kekahi palapala. A e haawi aku i ka poe malama i ka oihana pai palapala ma Honolulu. Aole e hoopanee aku a hala mai ka mua o Novemaba.

Nolaila, ua helu iho nei Mi Kemita i na kanaka a pau o Ewa a me Wai'anae, a hoike mai penei.⁹²

⁹¹Typed by Kumu Pono Associates from a copy of the original handwritten letter in the collection of the ABCFM, Houghton Library, Harvard, Reel 794.

⁹²"No Keia Pae Aina. No Ka Helu Ana o Kanaka," *Ke Kumu Hawaii*, September 2, 1835, p. 140.

Table 1: Na kanaka o Ewa a me Wai'anae, Iulai, 1835

	Kane [Men]	Wahine [Women]	Keikikane [Boys]	Kaikamahine [Girls]	Pau [Total]
Halawa	104	102	48	29	283
Aiea	28	12	7	4	51
Kalaupao	71	68	28	19	186
Waimalu	99	85	30	16	230
Waiau	31	22	3	7	63
Waimano	58	47	12	15	132
Mananui	71	62	24	27	184
Mananaiki	15	10	3	2	30
Waiaua	109	95	33	26	263
Waipio	208	192	59	54	513
Waikale	174	180	48	62	464
Hoaeae	61	51	23	19	154
Honouliuli	345	294	111	120	870
	1374	1220	429	400	3423
1831	Na kanaka o Ewa	4,015	1831	The people of Ewa	4,015
1835	Na kanaka o Ewa	3,423	1835	The people of Ewa	3,423
	O ka emi, i na makahiki eha	592		Decrease over four years	592

4.7 Notes of a Tour Around Oahu, 1839

In 1839, E. O. Hall and a group from the mission in Honolulu traveled around the island of O'ahu visiting various localities. His notes from the journey were published in Volume II, No. I of the *Hawaiian Spectator* under the title of "Notes of a Tour around Oahu" (1839). Hall's narratives include descriptions of places visited and changes in agricultural endeavors and living conditions, with notes from Honouliuli Ahupua'a and neighboring lands.

The objects of the tour were, principally, to become better acquainted with the people, by seeing them at their own houses; and, by being cut off from the English language for a time, to acquire of the people among whom I expect to spend the remainder of my days...

As the journey from Honolulu to Ewa, or Pearl River, is so frequently made, it will be unnecessary to dwell on that part of the route; unless it be merely to say, that after the first mile is passed, most of which is through the sea where one has to ride in a most uncomfortable position or get at least his feet wet, the road is quite pleasant ... the next object of interest to attract attention is the Salt Lake. This is a natural curiosity well worth visiting, especially in the dry season, when the whole margin, and sometime the bed itself, is covered with beautiful salt in immense quantities. It is about one fourth of a mile distant from, and a few feet higher than the sea, and is connected with it by a hole in the centre.

The rest of the way to Ewa presents little of interest to the traveler. There are however several beautiful spots, where the eye will rest with delight, when the blessing of civilization and Christianity shall have through around them the comforts of other lands; and systematic agricultural pursuits have covered the field with golden harvests, and filled the lap of the cultivator with the prolific bounties of a beneficent Providence. Ewa is a place of little interest to the tourist except in a moral point of view. In this respect, however; its inhabitants, about 3,500 in number, may be regarded with peculiar pleasure by the philanthropist and Christian; for their improvement in morals, and consequently civilization, during the past four years is very striking. And the attention they are beginning to bestow upon their persons, children, houses, yards, etc., in the immediate vicinity of the missionary establishment is far better evidence on the subject of missionary influence, than any other that can be obtained.

Rising before the dawn, we left the low ground of the river, just as the natives were assembling in great numbers to spend their accustomed hour in the worship of Jehovah; and as we wound slowly up the hill which we have to ascend on leaving the quiet and secluded residence of the missionary, and cast our eyes around on the many interesting objects immediately about us; and looked still farther back on the distant city of Honolulu on which the sun was just shining as he rose in all his majesty above the high range of Kona-huanui, the beauty of the scene and the quiet and peace of the hour, called up in the mind meditations of the most pleasing character. Lifeless, indeed, must be the heart that does not vibrate in unison with nature at such hours, and whose better sympathies are not called out in moments like these.

Passing all the villages, at one or two of which we stopped, we crossed the barren, desolate plain, at the termination of what is Barber's point; and after passing round the south-east termination of the mountain range of Kaala, and traversing a barren tract of ten or twelve miles, we arrived at the most considerable settlement in Waianae, called Pukaheia [Pukaheia].

4.8 Census of O'ahu

Table 2 gives the result of a census of the island taken in the year 1836. Although not strictly accurate, it probably nearly approximates the truth, being supposed by some who have the best opportunities for judging to fall somewhat short of the actual number of inhabitants. In round numbers, 30,000 is the general estimate of the population of this island at that time.

Table 2: Census of O'ahu, 1836

Honolulu and Waikiki	12,994
Ewa	3,423
Waianae	1,654
Waialua	2,415
Koolauloa	2,681
Palikoolau	4,631
Total	27,789

source: *Hawaiian Spectator*, 1839:112.

4.9 Commander Charles Wilkes, United States Exploring Expedition Trip Through the 'Ewa District, 1840–1841

In the period of 1840 to 1841, Commander Charles Wilkes of the United States Exploring Expedition toured the Hawaiian Islands [34]. During the month of July 1840, Wilkes and other members of his party toured the Kona and 'Ewa Districts on O'ahu. Notes compiled by Wilkes from the various exploration trips provide descriptions of the 'Ewa-Honolulu region. Through the narratives, we learn about cultivation of the land, the abundant flow of water from springs and streams, use of fishponds, various marine and forest resources, the making of salt, and the continued decline of the native Hawaiian population. In 1835, the population of the 'Ewa District was given as 3,423; in 1841, Wilkes gave the number at 2,792 [34], a decline of 631 people in a five-year period.

[Traveling in the company of Reverend J. Emerson, Wilkes reported that his men departed from Waialua, crossed Wai'anae uka and] proceeded on their way to Honolulu, across the plain between the two ranges of mountains. This plain, in the rainy season, affords abundance of food for cattle in three or four kinds of grasses, and is, as I have before remarked, susceptible of extensive cultivation by irrigation from the several streams that traverse it. The largest of the streams is the Ewa. Scraggy bushes of sandalwood and other shrubs are now scattered over a soil fit for the cultivation of sugar-cane and indigo.

At Ewa they were kindly received by the Reverend Mr. Bishop and lady, who have charge of the station. The district of Ewa commences about seven miles to the west of Honolulu, and extends twenty miles along the south shore, or from the hill in the vicinity of the Salt Lake to beyond Laeloa or Barber's Point. There are no chiefs or any persons of distinction residing in the district; the people are labourers or Kanakas, and the landholders reside near the king at Lahaina, or at Honolulu. The

taxes and occasional levies without any outlay have hitherto kept them poor.

In this district is a large inlet of the sea, into which the river Ewa empties; at the entrance of this inlet is the village of Laeloa: the whole is known by the name of Pearl River or harbor, from the circumstance that the pearl oyster is found here; and it is the only place in these islands where it occurs.

The inlet has somewhat the appearance of a lagoon that has been partly filled up by alluvial deposits. At the request of the king, we made a survey of it: the depth of water at its mouth was found to be only fifteen feet; but after passing this coral bar, which is four hundred feet wide, the depth of water becomes ample for large ships, and the basin is sufficiently extensive to accommodate any number of vessels. If the water upon the bar should be deepened, which I doubt not can be effected, it would afford the best and most capacious harbor in the Pacific. As yet there is no necessity for such an operation, for the port of Honolulu is sufficient for all the present wants of the islands, and the trade that frequents them.

Pearl-River Harbour affords an abundant supply of fine fish. Two species of clams are procured here, called by the natives okupe and olepe. Mr. Drayton, who went to Pearl River for the purpose of examining its shores, and obtaining shells, reported that he found a large bed of fossil oyster-shells, extending into the bank in a bed from one to four feet wide, and half a mile in length: they were found cemented together with soft limestone and a reddish sand, and were so numerous that there was scarcely enough of the cement between to hold them together. The dredging was unsuccessful, a small spotted Venus being the only shell that was obtained, although it was the general belief, among both the foreign and native inhabitants, that it would have produced an abundant reward for the trouble...

This district, unlike others of the island, is watered by copious and excellent springs, that gush out at the foot of the mountains. From these run streams sufficient for working sugar-mills. In consequence of this supply, the district never suffers from drought, and the taro-patches are well supplied with water by the same means.

The soil on the sides of the hills is a hard red clay, deemed useless except for pasturage. Here and there in the valleys passing through these hills and in the low grounds, is found a soil capable of producing all the varieties of tropical vegetation.

There is every indication that an elevation of the island has taken place: the flat land is now fifty or sixty feet above the level of the ocean, and the upper rock has the appearance of calcareous sandstone. The latter lies on the bed of lava, part of which is above, but a greater portion below

the ocean level. There are above this rock and on the plain behind some horizontal beds of sea-worm pebbles. It seems remarkable, however, that although this upper rock will effervesce with acids, yet all attempts that have been made to convert it into lime have failed. It has been put into the same kiln with the present reef coral, and while the latter produced good lime, the former came out unchanged,—a pretty conclusive proof that it is not coral rock, as it appeared to be. As this rock will be treated of in the Geological Report, I shall refer the reader to it for further information. [34]

4.10 An Itinerary of the Hawaiian Islands, 1880, with a Description of the Principal Towns and Places of Interest—Developments in the 'Ewa District and Moanalua

George Bowser, compiler and editor of *The Hawaiian Kingdom Statistical and Commercial Directory and Tourists Guide* [5], documented various statistics and places of interest throughout the Hawaiian Islands. The following excerpts from Bowser's publication provide readers with descriptions of travel through the 'Ewa District at the time. He describes the landscape, communities, and development in the region.

By this time, James Campbell's Honouliuli ranch is in full operation, and an artesian well has been tapped. At Pu'uloa, James Dowsett was operating a 500 acre salt works, providing salt to the Honolulu market.

Entering the 'Ewa District from Wai'anae, Bowser reported,

My next halting place after leaving Nanakuli, was at Honouliuli, at Mr. James Campbell's. This gentleman owns, also, the Kahuku ranch, on the extreme north point of the island, of which I have already spoken. The Honouliuli ranch is an extensive property. The main road runs through it for about twelve miles, and the general breadth is seldom less than four miles. The surveyed area is 43,250 acres. One large tract of this land is perfectly level, with the exception of a few acres near the centre, where there is a knoll of rising ground.

From Mr. Campbell's veranda, looking eastward, you have one of the most splendid sights imaginable. Below the house there are two lochs, or lagoons, covered with water fowl, and celebrated for their plentiful supply of fish, chiefly mullet. In the far distance, some twenty miles away, you can see the range of mountains which form the backbone of the island. It was on the northeastern side of the mountains that the earlier part of my ride was taken. The chain runs from Mr. Campbell's place at Kahuku, a way to the easternmost point of the island. The soil at Honouliuli is good, and, with the aid of irrigation, will grow anything. In the meantime, it is wholly pasture land, but the means of irrigation have

recently been secured by Mr. Campbell, who has sunk an artesian well to the depth of 273 feet. This well has delivered a continuous stream of water equal to 2,400 gallons per hour, ever since the supply from which the present flow comes, was struck on the 22d of September, 1879. Besides Mr. Campbell's residence, which is pleasantly situated and surrounded with ornamental and shade trees, there are at Honouliuli two churches and a school house, with a little village of native huts.

Leaving Mr. Campbell's, I came next at Waipio...

...At Puuloa, seven miles from Honolulu, are the salt works of Mr. James I. Dowsett, which are on a very extensive scale. The inclosure of the salt works measures about 500 acres, and there are over 1,600 acres of pasture attached to the property, the whole of which is Mr. Dowsett's freehold. A mile further on is the Halawa Ranch of Messrs. Dowsett & Williams. [5:495–497]

5 Honouliuli: Significant Occurrences in Land Tenure and Land Use, 1836–1910

There are thousands of references contributing to the history of Honouliuli Ahupua'a. From those references are found classes of information covering such topics as

- Residency: land ownership and access;
- *Pu'akāi*: salt making;
- *Kai lanai 'ai*: fisheries and access;
- Ranches and the land development programs in Honouliuli;
- Water development, railroads, and the 'Ewa Plantation; and
- Military condemnation of Honouliuli lands and offshore waters.

The selected narratives provide eyewitness accounts to historic events. While there are few identifiable references for the immediate area of the Hoakalei program, the narratives give us an historical context for understanding changes on the land since western Contact.

5.1 Residency: Land Ownership and Access

By the time of the *Māhalele 'Āina* (Land Division) of 1848, which granted chiefs, native tenants, and a number of foreigners fee-simple title to land, major changes in the Hawaiian way of life—residency and subsistence practices—were occurring across the islands. Among the notable changes in Honouliuli was that the southern, ocean-facing shore of Honouliuli was all but abandoned by the native tenants. The one exception was along the inland shores of Pu'uloa, where foreigners gained control of the land and engaged native Hawaiians as employees of newly developing businesses. The other native tenants of the Honouliuli coastal lands who survived the numerous

bouts of infectious diseases chose to relocate to areas where fresh water and larger communities had been established inland. As a result, there were no native tenant claims recorded for the lands that encompass the Hoakalei Preservation areas.

The historic papers published in Hawai'i in the 1830s to mid-1900s contain many entries identifying residents of Honouliuli Ahupua'a and neighboring lands. From a review of both Hawaiian- and English-language publications are found names of individuals who resided on the land and descriptions of their land-use practices.

5.2 Death of Apii, Konohiki of Puuloa

Here is the first of many examples of historic record of a person of Honouliuli, Apii, a *konohiki* for the 'ili of Kūalaka'i, Pu'uloa, died while fishing. His death was reported by David Kaope, who remained visible in 'Ewa commentary in Hawaiian newspapers in subsequent decades.

Make

Eia no kekahi kanaka no ko makou aina nei ua make, no Puuloa, he konohiki no Kualakai ili. Ua holo oia ma ka moana i hele i ka lawaia makai. Luu malalo a aaki ma ke koa, a make loa. Alaila lana kona waa. Ike mai la kekahi mau kanaka ma kahi loihi e aku e lana aku ana kona waa me na ia no maloko o kona waa.

Alaila olelo kela mau kanaka penei, Aole ae la o Apii; o ka waa wale no ia e lana mai nei, aole ae la ke kanaka. Alaila olelo aku la kekahi o laua, "E kii kaua i ka waa." Kii aku la laua, a loa. Imi laua ma kahi i lana mai ai ka waa. E aku laua e moe mai ana ilalo o ke koa; ua ahi paa loa ilalo. Alaila kii iho kekahi o laua ia ia e moe ana ilalo. Hapai ae la iluna o ka waa, a ho'hoi aku la iuka. Uwe iho la kana wahine me ke aloha. Alaila kii mai la kekahi i ka mea nana e pule.

David Kaope.
Honouliuli. Jan. 25, 1835²

1 Trans. by Malby.
2 *Ke Kumu Hīnani*, Malaki 16, 1836, p. 24.

Died

Here is this, a man of our lands had died. He was of Pu'uloa, and the overseer of Kualakai 'ili. He dove in and struck the coral, and died. So his canoe was floating on the water. Some men saw it some distance off that his canoe was floating, with the fish in the canoe.

Therefore the men said, Apii isn't there, it is only the canoe floating about, there is no man. "let us go get the canoe." They went to get the canoe and search around where the canoe was floating. There they found him below the coral stuck fast underneath. So they retrieved him from where he lay below. They carried him onto the canoe and returned him to the land. His wife cried out of love. Then they went to fetch someone who could offer a prayer.¹

5.3 The Passing of Keali'iahonui: Burial and Land Case, 1849

During the reign of Kamehameha III, High Chief Aaron Kēali'iahonui⁹³ of the Maui and Kāua'i lineages held the entire *aliʻi* of Honolulu as a personal property with his wife, Mikahela Kekauonohi. The report of his death in 1849, and inheritance of Honolulu by his widow Chiefess Kekauonohi, was announced in the *Hawaiian Press*:

1849: On the 23d of June died the high chief Keliiahonui, the last lineal descendant of the Kings of Kauai. He was the husband of the high chiefess Kekauonohi, who subsequently married Levi Haalelea, and died in 1851.⁹⁴

While Chiefess Mikahela Kekauonohi, a granddaughter of Kamehameha I and niece of Kamehameha III, was granted title to Honolulu through the *Māhale ʻĀina* by 1847, she had already begun the process of cutting the 'ili of Puʻuloa out of Honolulu and conveying it to foreign ownership interests.

The passing of Keali'iahonui in 1849, along with the handling of his physical remains, and disputes between the rightful heirs of his estate are also connected with the traditions of Puʻuloa. The articles below include details on the history of land title and the burial of Keali'iahonui.

Disputes Over Settlement of Keali'iahonui's Estate, 1904 The contest over the will of Keali'iahonui was drawn out over half a century because it involved a lot of valuable property, including Ewa Plantation lands.

An old case arising over the will of A. Kealiiahonui who died as long ago as 1849, received a new lease of life this morning by the action of C. W. Ashford who is appearing in the interests of Julius Kaee. The case has been before the courts in many phases and it will probably be gone over again now. The property involved is worth many millions, as Kealiiahonui, when he died owned practically everything on the other side of Nuuanu.

It was, as stated, in 1849 that Kealiiahonui died, but his will was not submitted for probate until 1855. The matter was then the cause of a legal fight and eleven years later, in 1866, a petition was made by Kapiolani who afterwards became queen, to set aside the order of probate. This petition was denied. There followed litigation of different sorts during the different years that followed and in 1890 Kaee, the present petitioner, petitioned in the right of Kamehakaalani (w) for the setting aside of the old probate. It was held on this petition, however, that her rights has been

⁹³Variantly spelled Keliiahonui.

⁹⁴*Saturday Press*, Honolulu, January 28, 1882.

passed upon in the former proceedings when she had been represented by a guardian. About 1892 Kaee again petitioned to revoke the probate, this time in the right of another heir. The petition was resisted by Mrs. A. A. Haalelea. She was the widow of Levi Haalelea whose former wife was Kekauauohi [Kekauonohi], the widow of Kealiiahonui, the man whose will is involved. A demurrer was taken but was overruled.

Thus the matter stood until the turbulent times of 1893–5 when it occurred to the government of the day that it would be a good thing for C. W. Ashford to take a trip away from Hawaii and stay away. The immediate proximity of a bayonet persuaded Ashford that this view of the matter was for the time correct. He was the attorney for Kaee, but even that fact did not weigh when the point of the bayonet was taken into consideration.

Seven years elapsed. T. McCants Stewart was substituted as attorney, but no further steps were taken in the matter. When Ashford returned in 1902 he again resurrected the case and sought to set it for hearing, but a motion to dismiss the petition on behalf of Mrs. A. A. Haalelea prevailed and a decree so ordering was signed by Judge Gear in February of the present year. Only four days remain now in which to take action, and this has accordingly led to the filing today by Ashford of a writ of error to review Judge Gear's Ruling whereby he dismissed the petition of Kaee which was filed in 1892 asking for the revocation of the probate of the will filed in 1855.

When it is remembered that the property involved includes the Ewa plantation, the Dowsett property, a large portion of the Ewa side of Nuuanu, a large number of smaller holdings in the same district as well as property of great value at Waikiki, the interest in the case will be apparent.⁹⁵

"The Funeral Rites of Prince Kealiiahonui" The following is from an annual report of the Hawaiian Historical Society. It elaborates on the handling of Kealiiahonui's remains, which is connected with the traditions of Puʻuloa.

The funeral rites of Kealiiahonui, in 1849, are a striking example of the survival of pagan superstitions long after the introduction of Christianity into these Islands.

This Kealiiahonui was the son of Kaumuali'i, the last King of Kauai, and of Kapuaamohu (w), a Kauai princess of the highest rank. He was, therefore, of the bluest blood in the realm. In addition to this he was

⁹⁵Reviving an old case. Contest over a will over half a century old and involving all of Honolulu 'Ewa of Nuuanu, 'Ewa plantation property, and much other valuable property—long litigation not over yet. *The Hawaiian Star*, August 23, 1904, p. 8.

considered to be the handomest chief in the Islands, and was proficient in all athletic exercises. He was six feet six inches in height and finely proportioned; a model for a sculptor.

In 1821 he was married to the Queen Regent, Kaahumanu, whose matrimonial chains were said by Stewart "not to have been altogether silken." After her death, in 1832, he married Kekaunohi, a granddaughter of Kamehameha I through his son Kahoanoku-Kinau. Her mother was Wahinepio, a sister of Kalanimoku.

It is only too evident that Kealiahonui was kept in the background by the jealousy of the Hawaii chiefs. After Governor Kaikioewa's death, however, in 1840, his wife, Kekaunohi, was for some years Governess of Kauai. The late Levi Haaalea was latterly employed as their private secretary and land agent.

Kealiahonui died at Honolulu, June 23, 1849, in what is known as the "Haaalea House." Haaalea soon afterwards married his widow, who died two years later. There was a famous lawsuit over the genuineness of an alleged will of Kealiahonui (leaving all his lands to his widow), which has twice been renewed since. See Vol. VI Hawaiian Reports, page 1. From the "Polynesian" newspaper of the time we learn that he was born August 17, 1800, and that his public funeral took place in Honolulu, June 30, 1849. A niece of his, Kapule by name, who was still living at a very advanced age when this was written, faithfully attended him during his last sickness and death. She was cited as a witness in the lawsuit over his will. Her mother was the daughter of King Kaumualii by Naluahi, a woman of low rank, and her father was an American sailor, "Ako," who is supposed to have been lost at sea. She and her husband were "Kahus" of Kealiahonui, and had a recognized right to be consulted in the disposition of his remains.

It seems that by Kekaunohi's orders the coffin containing her late husband's remains was removed to Puuloa, Ewa, with the view of having it afterwards taken out to sea and there sunk. It was temporarily deposited in a cavern in the coral limestone back of Puuloa, which has long been used for a burial place, and has lately been closed up.

Kapule strongly objected to the plan of sinking the coffin in the sea, and delayed its execution for a considerable time. At last certain chiefs from Honolulu paid her a visit and succeeded in overcoming her opposition. During the following night she and her husband, with one or two assistants, removed the outer coffin, which they afterwards buried somewhere near Puuloa.

In order to test the truth of her story, at the instance of her lawyer, about 1892, the spot was found by her direction, and part of the coffin was dug up, with the brass plate on it in good preservation. There is a peculiar

superstition among the native Hawaiians in regard to the disposal of the outer coffin in such cases, of which we have had illustrations in recent times. In their opinion, if such a coffin is left unburied it bodes death to some near relative of the deceased. During the same night they took out the sacred bones, the "Unihipiili," which they "Humakele'd," or concealed, according to the ancient custom. I am informed that they were sunk in the sea.

Kapule took an ear ring and a finger ring from the body, which she preserved for a long time as relics of her master.

A day or two after this the coffin was taken on a canoe out to the deep sea outside of Pearl Harbor, to a spot five miles out, known to fishermen as "Kamole ia," to be sunk, by six brothers from Kauai who were "Kahus," or retainers, of the dead chief. A son of one of them, Simona, a well-known fisherman, who died a few years ago at Puuloa, gave this account to the late Jas. I. Dowsett.

Two men had been selected as victims, "Moe puu," to be put to death on the occasion, that they might accompany their chief into the other world. But when the time came only one of them, Kanepio by name, could be found; the other, Opiopio, having absconded. He was taken out to sea in the canoe, but when the time came for despatching him, one of the brothers, Kauhini, made a strong plea for his life. He said that the order of their chief was that two should die, but not that either should die without the other. "Either both or neither," he said. He pressed this argument so strongly that he carried his point, and the coffin, with the remains of the last Prince of Kauai, was committed to the deep without any attendant to bear him company.

My informant relates that the coffin floated at first, on which a superstitious boatman said it was because they had not made the human sacrifice commanded by the chief. Then Kauhini, raising his paddle, smashed the glass case over the face of the corpse, upon which the coffin filled and sank to the bottom of the sea.

The method of burial was closely connected with the belief in "Aumakua," or ancestral deities. In this case the "Aumakua" of Kealiahonui's family may have been shark gods or other marine deities, and the object of sinking his body in the sea was probably to introduce him into the society of these powerful spirits, where he might exert his influence to befriend members of the family in times of danger upon the sea.

In the same way the bones of other chiefs have been thrown into the fiery lake of Halemauau, that they might join the company of Pele and her numerous family of volcanic deities.

W. D. Alexander.⁹⁶

The last two paragraphs of the preceding excerpt are especially important, likening the sinking of Prince Kealiahonoru's remains in the sea to the throwing of remains into Halema'uma'u Crater to unite the deceased with the family spirits, or *'aumakua*.

5.4 Trespass of Horses on Konohiki's Land

Below is a notice published in *Ka Hae Hawaii* stating that horses have trespassed on land owned by the *konohiki* of Honouliuli.

E IKE auanei na kanaka a pau, owau, o ka mea nona ka inoa malalo iho nei, ke hoike aku nei au, he mau lio komo hewa ma kahi i koe o ke konohiki ma Honouliuli, aole i lilo i ka hoolimalima, he malu no nae ko ka mea nana i hoolimalima mua. Ma keia wahi, he mau lio kane keokeo kukaenalo, o ke ano o ko laua mau hao, he like me keia, P ka hao o kekahi lio, a o ka hao o kekahi lio, e like me keia XX. O ka mea nona keia mau lio e kii mai no me ka uku pu mai, he \$20 o na lio elua, he \$10 no ka lio hookahi.

D. Kaopala.

Honouliuli, Ewa, Iulai 21, 1856.¹

1 "Olelo Hoolaha," *Ka Hae Hawaii*, July 23, 1856, p. 81.

2 Trans. by Maly.

5.5 Public Notice: Intent to Lease the Taro Lands of Poupouwela, Honouliuli

By this 1858 notice, Levi Ha'alelea offered for lease the *'ili* of Poupouwela, a section of the *kalo* land of Honouliuli, and the *loko i'a* of Honouliuli, along with others of his personal holdings at Waimalu, his fisheries, and half of Moku'ume'ume. He invited all interested parties to visit him at his home to discuss terms.

Olelo Hoolaha

Notice

Auhea oukou e ka poe makemake aina hoolimalima, ke hai aku nei au ia oukou, land. I tell you that I am one with land

⁹⁶Fourteenth Annual Report of the Hawaiian Historical Society for the Year ending Dec. 31, 1906.

owau no ka mea aina hoolimalima me ka poe e makemake mai ana. Eia malalo iho ka inoa o na wahi i waiho ai ua mau apana aina nei i mana'ia e hoolimalima me kela mea keia mea. O Poupouwela, Ili aina kalo ma Honouliuli i Ewa, O ka pa aina kalo, a me na loko ia ma Honouliuli kai, o ka pa aina kalo ma Waimalu a me kona kai lawaia, a me ka hapalua o ka Mokuumeume ma Ewa. O keia na wahi i mana'ia e hoolimalima ia'na, ina makemake oukou i keia mau apana aina, e lilo ia oukou ma ka hoolimalima, he pono ke hele mai ma ko'u hale noho, e kamailio pu me a'u.

Haalelea

Honolulu, Augate 23, 1858.¹

1 *Ka Hae Hawaii*, August 25, 1858, p. 83.

2 Trans. by Maly.

Haalelea

Honolulu, August 23, 1858.²

5.6 A Lamentation Citing Noted Places of Honouliuli and the 'Ewa District

With the advent of writing and the publishing of native-language newspapers in the islands, the Hawaiian people began sharing their grief at the loss of loved ones with others across the islands. These *kanikau* and *uaoe helu* (lamentations, dirges, and wailing), such as the *kanikau* of Aupuni, describe the cultural attachment that people of old shared with their environment, and are significant sources of cultural knowledge. The *mele* laments are rich with information about *uahi pana*, named places, sites, resources, winds, rains, and traditional knowledge of the land.

Feberuari, la 2, 1862, ma Kualoa, Koolaupoko, make o ke Aupuni w, oia ka la Sabati, hora 9 o ka po.

Haku iho au i wahi kanikau nona. Eia malalo iho kona wahi kanikau.

February 2nd, 1862, at Kualoa, Koolaupoko, Aupuni (f) died, it was the Sabbath, 9 o'clock at night.

I composed this lament for her. Here, below is a lamentation for her.

Kanikau aloha no ke Aupuni,
Kuu wahine mai ka po loloa o ka Hooilo,
Mai ka makani anu he Hoolua...
...Kuu wahine mai ke kula wela, o Wai'anae
Hoomaha aku kua i Puuokapolei,

This lamentation is for Aupuni,
My wife of the long winter nights,
From the cold Ho'olua winds...
My wife with whom I travel the hot plains of Wai'anae
We rested at Pu'u o Kapolei

Awue kuu wahine.
Kuu wahine mai ke kula la o Ewa,
Mai ka i-a hamau leo i ka makani,
Kuu wahine mai ke kula la o Kemo'o,
Mai ka wai aku o Kaukonahua,
Kuu wahine mai ke kahawai aku o
Waikakalaua,
Mai ka ihona o Kipapa,
Aloha ia kula a kakou e hele ai,
Elua kaua, hookahi keiki,
Kuu wahine mai ka laula o Ewa,
Mai ke awa lau o Puuloa¹

Alas my wife.
My wife from the plains of Ewa,
From the place where the fish quiet the
voice in the wind,
My wife from the plain of Kemo'o
From the waters of Kaukonahua,
My wife from the gulch of Waikakalaua
From the descent of Kipapa,
Love for that plain over which we trav-
eled,
The two of us and one child.
My wife from the expanse of Ewa,
From the many bays of Pu'uloa²

1 "He Kanikau," *Nupepa Kuokoa*, April 19, 1861, p. 4.

2 Trans. by Maly.

5.7 Lease of the Kualaka'i-One'ula and Kupaka Lands, 1862

The following notice declares that places in Honouliuli named below are private and only livestock belonging to designated individuals are allowed to enter.

E ike auanei na mea a pau ke nana mai.
Owau o ka mea nona ka inoa malalo ae,
ke hookapu aku nei au i kuu kuleana
aina e watho la ma Honouliuli, ma ka
Mokupuni o Oahu nei, a penei na palena
o ua wahi la, ma kahi i kapa ia o Popoko
e pili ana me Kualakai, e holo ana a hiki i
Oneula i pili pu me Kupaka, a maloko oia
mau wahi, aole e hele na Lio, Bipi, Hoki,
Miula, Hipa, Kao, puua, Moa, pelehua, a
me na holoholona e ae a pau ma ua wahi
la.

Know all men who see this. I, the
one whose name is below, hereby place
a restriction on my personal land sit-
uated at Honouliuli, island of Oahu.
The boundaries are thus: from the place
called Popoko, adjoining Kualakai, and
running to Oneula, adjoining Kupaka,
and everything within those places. No
horses, cattle, donkeys, mules, sheep,
goats, pigs, chickens, turkeys or other
livestock may enter.

A o ka mea kua i na olelo i hāia
maluna ae, alaila, e hoopii no au ia ia
e like me ke Kanawai, aole nae pili ana
kela i na holoholona o J. Meek, a me ka
poe e hele ana i ka hana a ke Konohiki,
a me kekahi mau Kuleana e ae o'u, aia
no ia wahi, o Kihewamakawalu, a me
Koaka, a me Mokuheima, a me Keaniani,
a me Kepoe, a me Kalole, iwaena o ke

The one who opposes the above no-
tice shall be prosecuted by me accord-
ing to the law. This does not pertain to
the livestock of J. Meek, the people of
the Konohiki, or those who have busi-
ness with me. These places are Kihewa-
makawalu, Koaka, Mokuheima, Keani-
ani, Kepoe and Kalole in the middle of
the Ahupua'a of Honouliuli. To which

Ahupuaa o Honouliuli, a e pili ana na
olelo a pau i hāia maluna, ae i keia mau
kuleana, e lilo ana keia i kanawai paa
no ua mau wahi la, mai ka la aku o ka
hoolaha ana.

pertain all the words stated above, and
with those rights. These are held under
the law from the day of this announce-
ment, forward.

D. Kaope. Honolulu, Jan. 29, 1862¹

D. Kaope. Honolulu, Jan. 29, 1862²

1 "Olelo Hoolaha," *Ka Hoku o ka Piki pika*, February 6, 1862, p. 3.

2 Trans. by Maly.

5.8 He Kanikau Aloha Keia Nou e Luakauawahine: This is a Lamentation of Love for you Luakauawahine

Similar to the above lament for Aupuni, the *kanikau* of Luakauawahine includes po-
etic references to several *wahi puna* and other noted places on the Honouliuli-Pu'uloa
Plains. These localities are associated with the spirits of the departed, and found in
a wide range of traditional narratives.

Kuu wahine i ka i-a hamau leo o Ewa,
A pane ae ka leo makani i-a,
Kuu wahine mai ka i-a hawanawana i ka
wawae,

My woman (wife) at Ewa where the fish
that quiet voices are found,
Where the wind is the only voice that
answers,

Olelo ana i ka lau o ka lima,
E hat mai ana i kona inoa, he Mahamoe,
Mai ka makani kuehu lepo o Ewa,
Me he kanaka la ka wiliwili o Kaupea i
Kanehili.

My woman from where the fish whisper
at one's feet,
We spoke by the gesturing of hands,
Speaking its name, a Mahamoe (bivalve),
From the wind which stirs up the dust
of Ewa,

Ua hili au, ua mihi alua i ko aloha,
Kuu wahine mai ke awalau o Puuloa,
Mai ke kula wela la o Peekaua,
Kahi a kaua e noho ai,
Kuu wahine mai ke kaha loa o Kumu-
mamo,

The wiliwili trees are like the people of
Kaupe'a at Kanehili.
I have turned, twice repented in your
love,

O ia wahi a kaua e hele ai,
I ke anu a me ka makani

My woman from the many bays of
Pu'uloa,
From the hot plains of Pe'ekāua,
Place where we two dwelled,
My woman from the distant plain of Ku-
mumamo,

Pawai
Puuhale, Kalihi. Mei 12, 1862...¹

The place where we two traveled,
In the cold and the wind...
Pawai
Puuhale, Kalihi. May 12, 1862²

1 "He Kanikau Aloha Keia Nou e Luakauawahine," *Nupepa Kuokoa*, May 24, 1862, p. 4.

2

2 Trans. by Maly.

5.9 He inoa no Kekamalahaole: A Name Chant for Kekamalahaole

Here is another *kanihau* in which *uaʻahi pama* around the island were cited while lamenting that Kekamalahaole shall never again see or travel to those places with the composer of the *mēle*:

...Pau makemake ia Laie,
A oi pili Nauolewa i ka makani...
...Koekoʻele i ka papa auwae o Makaaho,
Opāt na kuli o Nanakuli i ka makani,
Ika uhehene hōneia e ke kahao Wāimanalo,
Ke oni aela me na wahine o ka mao i Pu-
uokapolei,
Aohe hana a ke kula o Hoaeae,
I ka lawe malieia e ka wai o Waipahu,
Heaha la ka makani he Waikoloa,
E apa nei i ke kula o Punahaweʻle,
I ka milimili a kaa milia e ka wai o
Kamili,
I milia mai e Manana noho Weloka i ka
lai,
Lea ka apaapa i ke kula o ka Wailiula,
Ke nana ia luna o Kaehaeha,
O ka maikai o ke kula e waiho nei,
Ua pahē e nolu wale i ke pili...
...O ka hoi no o maua a pili me kuu
aloha-e,
Aloha oe—o Kekamalahaole he inoa.
[signed] L.¹
... Let us two return to be with my love—
Love to you — Kamalahaole is your
name.²

1 "He inoa no Kekamalahaole," *Niuepa Kuokoa*, June 4, 1864, p. 1.

2 Trans. by Maly.

5.10 Kaikamahine Lelepalī: A Girl Fell off a Cliff

Below is from the newspaper *Kuokoa*, which tells of a girl who tragically fell off a cliff at Honouliuli.

Ua kakau leta maio J. P. Kaiahamauleo o Ewa ia makou, ma ka Poalima, la 1 o Mei, ua kaa kekahi kaikamahine uuku i ka pali o Kaulaula ma Honouliuli. Aia maluna oia puu he mala ipu haole a kona mau kupuna, a i pii aku laua me kona Kupunawahine e nana i ka mala. Hiamoe e nae ua moopuna la, nolaila hoomeia ma kahi hale kiai, hele e ke Kupunawahine e hoa aku i ka pipi, i hoi mai ka hana ua nalowale ka moopuna. Huli wale iho la ia, a hoi i kauhale, loa aku kona haku, a olelo aku la, "ua nalowale ka moopuna a kaa." I huliia aku ka hana, loa aku ua make ma ka huli makai o ka pali, "e moe ana i ka hiamoe kau a hooilo."¹

1 "Kaikamahine Lelepalī," *Niuepa Kuokoa*, May 23, 1868, p. 2.

2 Trans. by Maly.

5.11 School Report of Waiānae and Ewa, 1869

As reported earlier, the mission station of Honolulu began establishing schools around the islands. These schools were situated wherever a community existed that could support the endeavor. The instruction focused on religious and general courses. Nearly every *aliʻi* had at least one school, and in some instances several schools at various locations within an *aliʻi* were established. By 1850, operation of the schools had transferred from the mission station to the government, and a minister of public education oversaw the development of the schools. The report below was submitted by the school supervisor of Ewa in October 1869 and identifies a school at both Puʻuloa and Honouliuli, naming the teachers and number of students in the declining communities of the district.

Sept. 28, M. H. 1869

Hoi ke o Ewa, kula o Puuloa, Keo ke kumu, na haumana 14, keiki kane 4, kaikamanine 10. A. Hookuikui 3, Heluhelu 11, Helu Kamalii 3, Helunau 5, Huinahelu 5, Anahounua 2, Aokiko 7, Palapalaaina 12, Kakaalima 4...

Sept. 28, 1869

Report from Ewa, Puuloa School. Keo is the teacher, There are 14 students, 4 boys, 10 girls. Recitation, 3; Reading, 11; Basic arithmetic, 3; Mental arithmetic, 5; General arithmetic, 5; Geography, 2; Punctuation, 7; Mapping, 12; Writing, 4...

Kula o Honouliuli Kaniela ke kumu, 18 haumana, keiki kane 13. Kaikamahine 5. A Hookuikui 5, Heluhelu 13, Kakaulima 5, Helunau 13, Huinahelu 13, Hoailonahelu 4, Anahonua 7, Aokiko 4, Palapalaaina 18, Kakaulima 13... Writing, 13...

School	Teacher	Number of Students
Puuloa	Keo	14
Kalauao	Kekaina	24
Waiawa	A. Kaina	47
Waipio	Kanahele	53
Honouliuli	Kaniela	18

H. U. Mahi,
G. W. Haaheo,
G. H. O. Keauiaole¹
¹ "Hoike Kula o Waianae a me Ewa," *Nupepa Kuohoa*, October 9, 1869:3.
² Trans. by Maly.

5.12 Public Notice
The following public notice indicates that the named lands of Honouliuli are private and advises against trespassing on them.

All persons are hereby cautioned against trespassing on the lands called Poupouwela, Kapa Aina Kalo, Pauhi, and Oneula, situated in the Ahupuaa of Honouliuli, Island of Oahu, and will take notice that if they trespass on either said lands, by running cattle, horses or other stock thereon or in any otherwise, that they will be prosecuted to the extent of the law.

A. A. Haahele
J. H. Coney, Trustee.
December 12th, 1871.⁹⁷

5.13 Visit by the Board of Health to Honouliuli
This report of the Board of Health describes the condition of three individuals at Honouliuli who were infected with chicken pox. The English translation on the right is not complete, but is a summary.

⁹⁷Public Notice, *Hawaiian Gazette*, January 3, 1872, p. 6.

Malalo iho nei, e ike ia no he palapala hoike na ka Papa Ola, ma o kekahi o kona mau hoa, imua o ka Mea Hanohano W. L. Moehonua, ka Peresidena o ia Papa. O keia palapala hoike, e pili ana no ia i kekahi mau hana a ka Papa Ola, i hapai ia mamuli o na lono i loaa mai no kekahi ano mai puupuu ahulau ma Waianae; a mamuli o ka lokomaikai o ka Peresidena o ia Papa, ke waiho aku nei makou imua o na makamaka:

I Ka Mea Hanohano W. L. Moehonua, Peresidena o ka Papa Ola.

...Mai Waikele aku, holo makou no Honouliuli, kahi o ekolu mea mai i loaa aku ai. O ka mea mua i halawai me makou, o Kekapala (k), ua loohia oia no kekahi mau ia, a ua ola oia, wahi a kona manao iho, e noho ana maluna o ka mauu, a e hilinei ana i ka pohaku. Nana iho la ke kauka, a haawi iaia i ka laau i hookahi inu ana. Mai laila aku, holo aku makou no kekahi hale e pili kohe mai ana, kahi i loaa aku ai, he elemakule a he wahine nona na inoa o Kini (k) a me Kaina (w). Ua loohia laua i keia mai, a ua ea mai he puupuu poha maluna o laua. Maluna o ka papalina o Kini (k) kekahi puu keokeo, a ua kaha iho ke kauka a puka mai la ka palahahe. Ua waiho ia malala kekahi omole laau no ia mau mai. E oluolu ana no keia poe mai a pau ke malama pono lakou ia lakou iho, a ke hoolohe hoi i na kuhikuhi ana.

I ka hora 5 p.m., haahele iho la makou ia Honouliuli, a holo aku la no Waianae me ke kamaaina mua a makou i hele pu aku ai mai Honolulu aku. Hora 9 o ka po, hiki aku la makou ma ka hale noho o Rev. P. W. Kaawa.¹

¹ "Na Ka Papa Ola," *Ka Lahui Haaui*, July 29, 1875, p. 2.
² Trans. by Maly.

Below, we see a communication to the Health Board from one of our associates, given before His excellency, W. L. Moehonua, President of the Board. This explanation concerns some of the work of the Health Board, as carried on after word of the spread of chicken pox at Waianae. Through the kindness of the President of the Board, we set this before you our friends.

His Excellency, W. L. Moehonua, President of the Health Board.

...From Waikele we went to Honouliuli, where we met with three individuals. The first that we met with was Kekapala (k), who had been overcome for several days, and then regained his health, saying that he had been sitting upon grass and resting upon stones. The doctor looked at him and gave him medicine to drink one time. From there we went to another house that was close by, where we met with an old man and a woman. Their names were Kini (k) and Kaina (w). They had been overcome by this illness, which formed bumps on both of them. On Kini's cheeks was a white bump (pimple-like), which the doctor cut and from which came puss. A bottle of medicine was left there for these patients. May these patients please take care of themselves, and heed the instructions.

At 5 p.m., we left Honouliuli...²

5.14 Hookahi Po I Lihue: A Night at Lihue's

In the narratives below, Kalakini, a resident of Kalihi, shares with readers of the newspaper *Ka Lahui Hawaii* a description of his trip to the uplands of Lihue in Honolulu.

Kalakini mentions the potential of development in the 'Ewa District should the Reciprocity Treaty—with the opening of Pu'uloa to American ships—be passed, and the possible economic benefit to the Hawaiian Islands. The visit took Kalakini to the Meek family ranch estate at Lihue in Honolulu, and he makes reference to several noted places in the region through place names and *mele*. A summary translation in English follows.

Hookahi po i Lihue

E Ka Lahui Hawaii: Aloha oe:—

He wahi kanaeae iki keia e waiho aku nei i kou ahonui palena ole, a nau ia e lawe aku iwaena o kou lahui, ke hiki.

I kekahi la o na pule i aui ae nei, i ke kupono ana o ka wati i ka hora 10, e hele ana he huakai makaikai ma na kula akea o Lihue, me he mea la i ka hoomaopopo iho, ua hiki aku ka huina i ka eiwa a umi paha. I ka ike aku a ka mea e kakau nei i keia mau kula, aohe wahi a ka manao e hoohalahala ai. He mau wahi oi loa no na hanai holoholona ana ma keia mau mokupuni, a maluna aku o keia ke holo ke Kuikahi Panalike, aohe wahi e ae a na Hui Kalepa nui o kakou nei e manao ai i mau mahina ko e like me keia. Aka, me ka nui no paha o na lilo e wehe ia ai ka nuku kaulana o Puuloa i hiki ai ke komo na moku nui, ke ole e kuhihewa ka mea kakau, me he mea la, he mau makahiki helu wale no paha, e hoihoi ia no na poho ke holopono na hana.

No Na Awawa a me na Ali

O Kipapa oia kekahi o na awawa nui a akea a'u i ike ai ma keia ala, a he malihini no hoi au i ka hele ana ma keia mau wahi. He awawa maloo loa keia, a me he mea la paha i ka wa hooilo e ike ia ai he wahi wai malaila, i ka nana ana aku, ua piha pono i na holoholona, e ai ana, e moe ana, iluna kekahi i ka nihinihi, ilalo kekahi i ke apoopo, a me na alu. I ko makou kau ana ma kela aoao o keia awawa, ua koe aku makou ekolu wale no, ua huli mai la e nana ia hope, aohe maalo kanaka, o na bipi kupelu o ia kula i hoomaopopo ole mai ia makou ka mea ike a nuu ana i na mauu i paa mau i na kehau waikoloa oia kula uliuli.

Ku iho la makou no kekahi mau minute a nana aku la ia mua, a pela hoi mahope, a ike iho la ua loihii kahi i hele ia, a eia no hoi kekahi, o ko makou wahi paillata, aia aku la oia me ka poe mahope. I keia manawa ua

hiki i ka hora 2, a ke hakumakuma mai la no hoi na ao ua, a o na kauhale kokoke imua o ko makou mau alo; oia no na hale noho kuahiwi o ka makua Capt. John Meek, i hala aku la ma kela aoao, iloko o kona mau la kanikoo. I keia wa, ua kuka iho la makou no ka pono o ka hoi ana ihope, a no ka hele ana imua, ia manawa, ua hooholo koke iho la makou no ke kipa ana i na hale i kokoke imua o ko makou mau alo, a o Lihue ka ihu o na lilo. I keia wa a makou e holo nei maluna o ko makou mau lilo, o ko makou kokookolu he wahi opio, nona ka leo e hoopuiwa mau ana ia maua i na wa a pau, ma ka uwa me ka akana ana, no ka ikaika me ka holo o kona wahi lilo uuku, i oi ae ka mamua o ko maua, a pela io no i ka'u nana iho, ua ano nawaliwali io no ko maua mau lilo, ua hiliina i na no paha ia, no ke nui o ko mau kino, a me ka loa o kahi i hele ia.

Ka Hoea Ana i Kauhale

He hapalua mile paha hiki aku makou i na hale, no ka nui makewai o ko'u mau hoa, ua kipa koke aku la laua malalo o kekahi alu i eli ia he punawai, a i makaukau no hoi i ka bakeke e huki ai, ua kahea mai la laua ia'u. A aole nae o'u wahi mea a hoomaopopo'ku. Auau loa aku la ko'u lilo, me ka manao e hiki koke i kauhale, a e ike paha i kekahi mea i launa a i kamaaina hoi. A i ko'u kaalo ana ae mamua iho o na hale, pae ana he leo, a o keia leo, no kekahi wahine a'u i ano kamaaina iki ia'u mamua, me ka peahi pu mai, ia wa ua komo mai ka hoomanao ia'u no keia mau wahi lalani:

Pa kahea a ke Koolauwahine o Puakei—e
He pua lau kona na ka moe e aloha ai,
Oia aloha la e hoi hou iho,
I kaulele no ka po i hala ae nei.

Iloko o ka eleu, a me ka hiki wawe o ke kamaaina wahine; a kahea ae la ia he mau kanaka elua, na laua i miki aku e malama i kuu lilo. Aohe no hoi i upu iho, ua hoea mai ko'u mau hoa, a ua apo koke ia mai la makou e ke kamaaina wahine i piha i ke aloha akea me ke ahonui. A nona ko makou mahalo piha, ma ke ano o kana hookipa ana, he makamaka heahea oiaio oia, a he ano lede maoli, a hoomaopopo ae la au o ka wahine mare oia a Mr. Richard Meek, kekahi o na ona o ia kulana kauhale, na kula akea a me na kuahiwi kualono. O na mea i oi aku ke kamaaina ia makou, oia no o Thomas Meek me kona kaimana nona ka inoa maluna ae, he mau kanaka hoi i ikeia no ke ano akahai a hookipa oluolu i ka poe e kipa aku ana ma ko laua home.

A iloko o ka lokomaikai palena ole o na Keonimana no laua keia wahi, ua oluolu loa laua i ke noi ana mai ia makou e moe ilaila ia po, a ua ae

koke ia keia noi, a no ke ano nawaliwali no hoi kekahi o ko makou mau lio, nolaila, ua holo lea loa ke noi. Ua nanea iho la ia koena o ka manawa, a hiki i ka makaukau ana no ka paina ahiahi, ia wa, ua ku like mai na kamaaina iluna e hoomakaukau ia, a i ko'u nana ana iho i na mea o ka papaina, ua komo koke mai la ia'u ka pololi, a hoomanao ae la au i na lalani malalo iho :

Me he lamalama la ka pua lena oke koolau,
I ka pala luhī ehu mā kauka o ka Ako.

Ua ai, ua honuu, a ua inu a pitha, aole au e poina iki ana i na hoowe-hiwehi hanohano ana a na keiki lalawai o ia uka iloko o ka hapa hope o ko'u mau makahiki e hele nei, no laua ko'u aloha a nui loa. Ua ano powehiwehi iho la i ka wa i pau ai ko makou paina ana. Ia wa puka aku la mawaho o ka hale, e ike i ke Alii wahine hoomalalama o ka po e pahola ana i kona nani maluna o na papalina o ka honua. A ia wa no hoi au i ike maka iho ai i ke kololio ana mai a ka welau makani kehanu, ke hele la au a maele, i ka ua mea o ke anu e, ke "Hao la na kepa ka hau o Lihue."

I keia wa, ke iho mai la ke ahiihiu makani mai na oawawa mai, me ka halihali pu mai hoi i ke ala kupaoa launahale, a me ke onaona o ka mauu nene, o ia uka aloha a'u e hoomanao ai i keia mau lalani:

"Paoa Lihue i ke ala o ke Kupukupu,
I ke ala o ka mauu pua nene,
I honia e Kokolea a Malamanui,
Maewa ke oho o ke Kaunaoa i ka la."

Aole no hoi au e poina ana ma keia i ka haawi ana i ka mahalo ia Keoni Miki Liili, i kona akamai luaole ma ka hookani ana i ke Guitar, (Ki-ka,) ua like no ia me ka ipo malalo o na kohaihai o kekahi po mahina konane like me keia. Ua hoalo ia ka manawa ma na nanea ana o keia ano, a hiki wale i ka wa i hoalii iho ai ka hiamoe i na maka, ua hoi aku la makou e moe.

A ma ke kakahiaka ae o kekahi la, ua ala ae la, a mahope o ka aina-kakahiaka, ua hoomakaukau iho la makou no ka hoi ana mai. Ua paa ko ko'u mau kokoolua lio, a o ko'u ahi lio, ke noke ia mai la i ka homalimali ia, a aohe wahi mea a malii mai, me he mea la ua

Makemake wale aku no ia i kanahelu,
Ua hiaai wale aku no i ka lehua.

Ke puiwa la kela, ke owala 'la. Me ka leo nui ka hoa'loha Thomas Meek i kahea ae ai i na Paniolo ona, ia wa no hoi makou i ike aku ai i ka eleu nui, me ka hikiwawe i ohi mai ai na keiki o ia nahahe, me na kaula ili pakahi ma ko lakou mau lima, a me he mea la aole i elua minute mahope

iho ua hiipea ka a-i o ua lio nei o'u i na kaula i lele mai ma o a maanei. He wa pokole loa mahope o keia, ua kau like ae la makou maluna o na lio, me ka havi ana i na aloha lulu-lima i na makamaka oiaio o ia uka ano iuu i paa mau i ka ohu.

A pela iho la i hoalo ia ai he manawa pokole o ka mea nana i kakau keia, mawaena o na hoa'loha, me ka haalele aku i ko laila mau kaulaui. Me ka Mahalo i ka Lunahooponopono a me na Keiki o ka Hale Pai.

Kalakini.
Kalihī, Honolulu, Dek. 15, 1875.⁹⁸

The following translation summarizes Kalakini's narrative.

A Night at Lihue

One day, a few weeks past, a trip was made to Lihue to understand events. Upon seeing the plains, the writer found nothing to criticize. There are many excellent grazing lands upon these islands, and if the Reciprocity Treaty moves forward, there is no place else that the Merchants Association is looking at that would be like the lands here for fields of sugar cane. But it is only to give the opening of the famous enter of Pu'uloa so that large ships may enter. Unless the writer is mistaken it will be a number of years for the completion of this work.

The Valleys and the Ravines

Kipapa is one of the large, wide valleys that I saw on this road and I was unfamiliar with travel in these places. This is a dry ravine, though perhaps during the winter water may flow. Upon looking there it was seen that it was filled with livestock, eating and lying down. Reaching the other side, we found on the plains green grasses moistened by the Waikōloa dew.

At 2 o'clock, we arrived at the mountain home of Capt. John Meek, who had passed on to the other side in his old age. We then continued on to Lihue.

Arriving at the Residence

Going on about a half mile we arrived at the house, and because of the thirst of my companions, they went on down to a ravine where there have been dug a spring. I then heard the greeting of a voice from the house, coming from a woman with whom I was somewhat familiar. Two

⁹⁸ *Ka Lahui Hanii*, February 3, 1876, p. 3.

men came out and took my horse as she greeted us. This lady was the wife of Mr. Richard Meek, one of the owners of this house of the broad plains on the mountain slopes. We were also greeted by his older brother, Thomas Meek.

After eating dinner, we went outside and I saw the wisps of the wind born dew descending. It was becoming dark and cold in the rains, as said, "The spurs of Lihue dig in with cold." Then a wild wind came down from the gullies, bearing with it the fragrance of the forests and grasses. There is remembered the lines of this song:

"Lihue is scented with the fragrance of the kupukupu fern,

By the fragrance of the flowering nene grass,

Kissing Kokolea and Mālananui,

As the kauna'oa strands turn in the sun."

The next day we arose, had breakfast, and made preparations for our return journey. Thomas Meek called his cowboys, our horses were prepared, and in a short time we were making our way by to town. Kalakini. Kalihi, Honolulu. Dec. 15, 1875.

5.15 Namakaokapaoo

This excerpt is from *Ka Lohui Hawaii* and was published in 1877. It mentions Namakaokapaoo, "the spear fighting plain" in Honolulu, as well as Kauwaimakalani, a warrior in the time of chief Keawenuiaumi, "the mischievous child of the Lihue cliffs at Honolulu."

E ke hoa, no keaha la oe i lele kamoko
mai nei i ke kahua ka-ka laau o Nama-
kaokapaoo? Ka mea i waiho i ke au-paoo
(uala) a inal me na maka o Kauwaimai-
kalani, ke koa kaulana o Hawaii, i ke au o
Keaweumi ke alii, ke keiki kamaeu hoi
o na pali Lihue o Honolulu, ka mea hoi
nana i kanti i ke poo o ua koa kaulana la
o Hawaii me ke Koa-ie o luna o Puukua.
A nolaila, e ke hoa, ua oki oe. Me ka
mahalo.

Friend, why have you leapt into the
dispute here on the spear fighting plain
of Namakaokapaoo? The one who set aside
the shoots of the sweet potato, garnished
with the tears of Kauwaimakalani, the
famous warrior of Hawaii in the time
of the chief Keawenuiaumi, the mis-
chievous child of the Lihue cliffs at Hon-
olulu. The one who severed the head of
the famous warrior of Hawaii with the
Koale from the top of Puukua. There-
fore friend, you are finished. With ap-
preciation.

Daniel Kalou. Honolulu, Ewa, Feb.
17, 1877.¹ Daniel Kalou. Honolulu, Ewa, Feb.
17, 1877.²

1 "Namakaokapaoo," *Ka Lohui Hawaii*, March 1, 1877, p. 1.

2 Trans. by Maty.

5.16 Obituary of James Dowsett

The following is the obituary of James I. Dowsett, a.k.a. Kimo Pelekane, from the *Hawaiian Gazette*. As will be evidenced in the following sections on land tenure, Dowsett was a significant land owner in Honolulu. The article carried several subtitles, including "Citizen passes to great beyond at advanced age," "As a native of Honolulu, Had a most interesting career," and "Confidant of Monarch—successful in business—Funeral."

James Isaac Dowsett, one of the best known citizens of Hawaii nei and a man all his life held in high esteem by his fellow men, died Tuesday night. The end came at the Queen's Hospital at 7:25 P. M. quickly the news was telephoned over town and expressions of regret and condolence and proffers of assistance came to the family by the hundreds.

James I. Dowsett was born in Honolulu. The house in which he first saw the light of day and which was built by his father, still stands and is occupied. It is the 2-story building in Union street, next to the old bell tower fire station. The parents of Mr. Dowsett came to this country from New South Wales, where they were married at Sydney in 1825. The mother was originally from England. She died here July 4, 1860. The father was a sea captain. He lost his life at the hands of savages in the South Seas. He went ashore from his whaling vessel with a boat's crew and all were murdered by the natives. The elder sister of James I. Dowsett was the first wife of Capt. Howland, a sea captain. The younger sister is Mrs. M. C. Monsarrat of this city.

The wife of Mr. Dowsett was the beautiful Miss Annie Ragsdale. There survive Mr. Dowsett seven daughters and four sons. Two sons have preceded their father to the grave. There are a number of grandchildren.

By the death of James I. Dowsett, a blank is left in the community. He did not care for public office. Had he yearned for political preferment any office was at his disposal for many years. He was appointed a Noble of the Kingdom by Kamehameha III and was friend and confidant of Kamehameha IV and V. His advice was often sought by the monarchs and was given as one entirely disinterested and he held the trust of those in the highest positions as well as the implicit confidence of the common people. He was a great favorite with the native Hawaiians and spoke their language beautifully. Mr. Dowsett was quiet in the conduct of business, but was capable and successful as a man of affairs. In the earliest days he soon saw the opportunities for money making in the whaling industry and was a capitalist in that field. He still has pending Alabama claims, showing that when the fleet was young he was active as promoter and manager. He had since reaching man's estate owned schooners plying in

Hawaiian waters, had extensive land and stock interests and owned the salt works at Pearl Lochs. He owned an undivided one-half interest in the quarantine island and reef property more generally known as belonging partly to the Sumner estate. Mr. Dowsett amassed a large fortune. Up to the very day he was compelled to take to his bed he was at his office in Queen street, where he handled merchandise and schooner business and dealt in livestock. There were always natives about the place. The Hawaiians called Mr. Dowsett "Kimo Pelekane" (Jim the Englishman.) They would ask him about anything and everything concerning their interests.⁹⁹

5.17 The Grave of Loo Ting at Kualaka'i

This following article is from the *Evening Bulletin* regarding the grave of Loo Ting at Kualaka'i, Honolulu. Loo Ting perished in the ocean near Kualaka'i. The title of the article was "To remove his bones."

About a week ago, a Chinese fisherman, Loo Ting by name, was drowned while fishing near Kualaka'i, this island. The waves were high and the poor fellow was capsized. The body was buried at Kualaka'i and Monday morning, a son of the dead man called at the Marshal's office to obtain permission to remove the bones for shipment to China. It is not probable that the Government will allow the body to be exhumed immediately.¹⁰⁰

5.18 Dedication of the Puuloa Church

The article below, published in 1901, is entitled "Dedication of Puuloa Church." Following the fashion of the day, the article carried several subtitles, including "Does not owe a cent," "Puuloa Church is dedicated to God," "Contributions were generous," and "A deficit of \$170 raised before the consecration—Liliuokalani present." The money raised for the construction of the church was short because it turned out to cost more than expected. Some dignitaries were present at the dedication, whose generous donations were able to cover the extra cost. It is pointed out that Puuloa is a fishing village, whose occupants are poor.

The dedication of Puuloa church near Pearl Harbor, took place yesterday, Queen Liliuokalani being among those present from Honolulu. More than 200 people, mostly natives who live in the neighborhood, were in attendance and dedicated the little church to God. Rev. Mr. Timoteo, the native clergyman, delivered the dedicatory sermon, followed by Rev.

⁹⁹"Obituary of James Dowsett (Kimo Pelekane)," *Hawaiian Gazette*, July 17, 1898, p. 2.

¹⁰⁰"The Grave of Loo Ting at Kualaka'i," *Evening Bulletin*, January 3, 1899, p. 7.

O. P. Emerson, who offered the invocation. The services were concluded by the serving of a luncheon, in which both the visiting townsfolk and the natives participated.

Puuloa is a little village on the eastern side of the mouth of Pearl Harbor, where native fishermen reside, earning their living by selling their catches in Honolulu. It is about two miles and a half from the little Puuloa station to where the natives live, a very quiet place directly facing the ocean and close by the entrance to Pearl harbor.

Sometime ago Hon. Henry Waterhouse spoke of building a little church there for the people, who ordinarily had to travel many miles to attend services. To start the work he gave \$100. With this the members made plans for building the structure, succeeded in collecting \$223.00. They built the church, and when completed, found it had cost \$393.50, leaving a deficit of \$170.53, which was a large amount to collect from the poor people of that district.

Yesterday a large gathering of townspeople and some from Ewa came to see the church dedicated. Shortly before 11 o'clock Queen Liliuokalani arrived there in her own carriage, and soon after those who came on the train from town arrived in busses.

The exercises were very interesting. The Puuloa choir opened with a hymn, which was very creditably rendered. After the singing Rev. O. P. Emerson offered a few words of prayer. Then the choir and the congregation all united in singing a hymn appropriate for the occasion. Next was the reading of the committee's report, which showed that they were \$170.53 in debt for the completion of the building. Rev. E. S. Timoteo, pastor of the Kaunakapili church, read the scriptures and offered a prayer. Then came the offerings, Rev. Timoteo called the attention of those present to the \$170.53 left unpaid, and said that he did not feel that it was best for him and those present to dedicate the house of God when it was not all paid for and was not wholly theirs. On hearing this those present gave as much as they could afford. Much credit is due the Queen, Mrs. Ahrens, Mrs. Paris, Mrs. Richardson, Theo. Richards, O. P. Emerson and others for helping pay this deficit. The whole amount was contributed, and a little more, by the few that were there with means.

Puuloa choir followed by singing a very appropriate hymn. Much credit is due their leader for the patience he has shown in teaching such difficult pieces of music. The music was well rendered, and the choir compares favorably with those in other native churches.

Rev. E. S. Timoteo then delivered his dedicatory address. He spoke of the necessity of building a little church for those there who wanted to worship God. Not everyone could build a temple to God. David wanted to build the temple at Jerusalem, but God chose Solomon to finish the

work. It was well to find a place where people could worship God. "The people of Puuloa have traveled miles to do this, and they have a Zion of their own close by, and what they ought to do is to fill the church every Sunday with those desirous of communing with Jehovah, the king of kings. You must not keep him inside and stay on the outside but must do your part. It took a head carpenter with a few other carpenters to build the church. Christ is the head carpenter for souls and we are the helpers. If we want to make our bodies temples of God we must ask Him to come and build and He can do it."

The congregation listened attentively to the sermon, and all were pleased with the words of cheer. Rev. J. M. Ezera then offered a few words of prayer.

By this time everyone was hungry and longing for the many nice things awaiting them. They all came to the big tables, which were loaded with the best of Hawaiian dishes. A special place was reserved for the Queen and her party, and all did justice to the feast. Everyone ate heartily, and enough was left over to feed a hundred more.

Among those present were: Queen Liliuokalani, Mrs. Ahrens, Mrs. Olds, Mrs. Paris, Mrs. Richardson, Miss Rose Kaukaha, Mrs. Pa, Mrs. Rice, Mrs. & Capt. Pederson, Misses Katy Sullivan, Hattie Defries, Jennie Jones, Rev. and Mrs. E. S. Timoteo, Theo. Richards, Rev. O. P. Emerson, Rev. J. M. Ezera, Henry Meemano, B. S. Kapu, Jas. Hakuole, Isaac Harbottle, John Bickerton, William Kapu, D. Kanewanui and Wm. Laa.

The natives appreciated the presence of the Queen, who came so many miles to show her interest in the good work being done amongst them. Her presence was a great source of inspiration to the Hawaiians.¹⁰¹

5.19 Village Planned for Puuloa Peninsula

The following account by Claudine was entitled "Village Planned for Puuloa Peninsula." In the fashion of the day, it carried several subtitles, including "Immense and promising scheme of the Dowsett estate," "Arrangements for quiet retreat," "To occupy a mile of land almost facing Pearl Harbor," and "Material for short railway arrives." Among the things planned for the village are a railway, a tree-shaded boulevard, and boating and bathing facilities. However, it is noted that the plans of the United States to acquire Puuloa lands may affect the village plans.

Puuloa, the famous point at Pearl Harbor, for so many years so dear to the hearts of bridal couples, yachting parties and pleasure-seeking aggregations, is to be made a residence district. If present plans carry—and there is much in their favor—the pretty peninsula may in a few years

¹⁰¹ "Dedication of the Puuloa Church," *Hawaiian Gazette*, May 14, 1901, p. 6.

bear to the visitor the sight of a sea-girt village of tropical cottages in place of the present expanse of waste, kiawe and unattractive landscape.

By the Claudine, which arrived Sunday morning from Maui, came a lot of railway material. Its discharge upon the wharf yesterday was the talk of the front, and the story of its purpose leaked out early in the day. The material was purchased from the Hawaiian Commercial & Sugar Company and is destined for Puuloa where it will become a railway line of about a mile in length for the benefit of prospective settlers. It was purchased and shipped over by the Dowsett Estate, which owns the Puuloa lands and purposes putting the fine lots there on the market at once.

Puuloa begins at the entrance to Pearl Harbor and extends back, north and west, about two miles. The lots near the harbor are the ones that will first be placed upon the market. Following the sale of these, others will be offered to settlers. The whole tract will be plotted and divided into building properties. Along the harbor front two rows of trees will be set out, shading a boulevard. This boulevard will extend from the old house near the shark pen to a point almost opposite the head of the western loch. It will be finely macadamized for driving purposes, and near it will run the little railway that will transport the material for building and other requirements of the settler.

As an inducement to settlement there will be established in this new village exceptional boating and bathing facilities. Homes for yachts will be established and there will be houses at which shore boats and canoes will be kept for the edification of those with a tendency to such luxuries. There will be fish nets, and fish lines, and fish spears and shark pens. After a time there will be a livery stable, with fine horses and good drives.

In co-operation with the general scheme the Oahu Railway & Land Company has consented to lay a special track from Puuloa station to a point near Waiaho, immediately opposite Puuloa. From this terminus residents or pleasure seekers may be easily conveyed by boat to the other side and into the prospective village.

There is but one "bitter in the sweet" of all these plans. It is the question of just what lands the United States government will take for fortifications.

It has been understood all along that the government would require Puuloa point for a fortress. In case condemnation proceedings are instituted the plans affecting the immediate point will have to be modified.¹⁰²

¹⁰² "Village Planned for Puuloa Peninsula," *Honolulu Republican*, November 5, 1901, p. 1.

5.20 Honouliuli Estate Lands of Kapule and Kealualu

After the death of Kapule, his widow, his sister, and the Hawaiian Evangelical Association were given his lands, which were in Honouliuli and Honolulu. The following account was entitled “Probate matters.”

Nua Kealualu, widow of the testator, petitions for probate for the will of Daniel K. Kapule, in which S. H. Oni of Honolulu is named as executor. The estate consists of lands in Honouliuli and Honolulu valued at \$3300. Kealualu the widow; Kamakani, a sister; and the Hawaiian Evangelical Association are named as devisees, the last being given certain kuleanas for the Ewa church.

Charles B. Cooper has presented his final account with resignation as guardian of Reynolds Brodie McGrew, a minor. He charges himself with \$6382.19 and asks to be allowed \$6221.68, the balance being \$160.51. The guardian, being over 13 years of age, nominates Mrs. Pauline McGrew, wife of J. S. McGrew, as guardian of his person and property in succession to Dr. Cooper.¹⁰³

5.21 Pa‘akai: Salt Making, 1852–1922

The making of *pa‘akai*—sea salt—was one of the significant traditional practices associated with the coastal lands of Honouliuli. There are a number of *Māhele* claims by native tenants of the larger Pu‘uloa land division for salt-making sites. While no specific claim was identified for the wetland or shoreline zone within the Hoa kalei program area, it is reasonable to assume that the making of *pa‘akai* was done in the area.

The formation of a salt works business at Pu‘uloa led to continuing residency along the Pakule, Keahi, and Kupaka shoreline leading towards One‘ula. The Pu‘uloa Salt Works was in operation from the 1840s to the early 1900s (fig. 4). The narratives below provide an overview of the modern business venture.

The following is from a Puuloa Salt Works advertisement entitled “Puuloa Salt Works—Sandwich Islands” published in the *Daily Alta California*.

These extensive works are situated at the mouth of Pearl river, Island of Oahu, within ten miles of Honolulu, and has the largest and safest harbor on the entire group of Islands. The entrance is half a mile wide, easily distinguished, with 12 feet of water over the bar at low tide.

These works are capable of supplying the entire Pacific Ocean with the article of salt.

Shippers and masters of vessels may procure entire cargoes or smaller quantities of the above article, in bulk, matt bags or barrels at the works,

¹⁰³ “Honouliuli Estate Lands of Kapule and Kealualu,” *Honolulu Gazette*, October 20, 1905, p. 2.

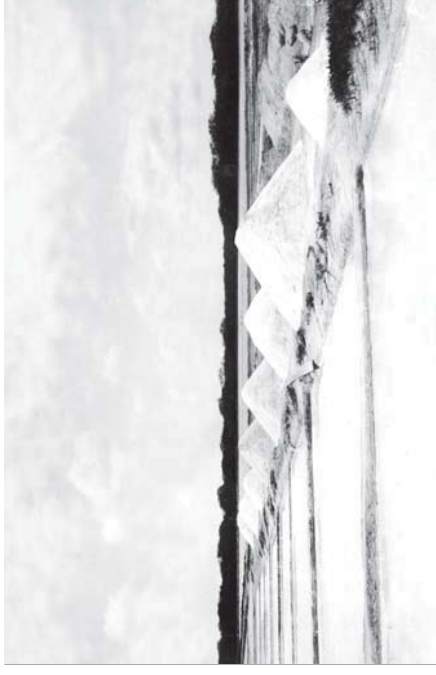


Figure 4: Pu‘uloa Salt Works, 1909 (USGS-Mendenhall Collection, No. mwc00802).

or delivered on board their vessels in the harbor of Honolulu, by applying to:

C. W. Vincent, Honolulu,
Corner of Mauna Kea and King Streets,¹⁰⁴

In 1860, the advertisement below was published announcing the availability of ocean salt which was being made at Pu‘uloa.

From ancient time, the natives have known about and made salt; it is that with which food is seasoned, and is also an item of trade; but the salt of Hawaii is not very good, it is not the best for salting beef and salting pork. If it is left for long, it spoils.

But at this time, salt is made at Puuloa, and it is very good. The bitterness has been removed from within; a mill has been gotten and the salt mixed like flour, and like the salt of other lands; therefore, at this time, the salt of Puuloa is greatly desired. It is taken to other lands and it is a thing that brings prosperity to the land.¹⁰⁵

¹⁰⁴ *Daily Alta California*, July 1, 1852, p. 4.

¹⁰⁵ “Ka Paakai o Puuloa” (The Salt of Puuloa), *Ka Hae Hanani*, July 25, 1860.

The following 1922 article announced the expansion of the business to production of shaker salt.

Following a policy of doing its share towards making the Hawaiian islands self-supporting—productive of all necessities of life possible—an industry few know exists on Oahu is being brought rapidly to a standard equal to the highest achieved by mainland plants.

By a limpid lagoon, just beyond Pearl Harbor where crystal waters are not contaminated by infusion of foreign substances, the Honouliuli salt works has been developing under the eyes of Honolulu yet few have seen.

Machinery is being installed now to take the industry out of its swaddling clothes—to graduate it from its infant drudgery of feeding ice-cream freezers and supplying demand for crystal and rock salt, into what is known in the trade as the shaker salt field.

Now the word shaker means, in the parlance of salt, something which will shake out of a shaker. So it is a step forward from ice cream freezers to the table.

The plant, producing crude salt, is turning out some 55 tons weekly eight months of the year. The other four months overcast skies and rains minimize production. The product is largely due to the care taken in filling the tanks, which are washed, scrubbed and drained before pure sea waters are pumped in. The tanks are of cement. The element of dust and dirt eliminated by the scrubbing makes the product marketable for cruder uses immediately. A fleet of motor trucks is supplying island consumers.

The new machinery will convert part of this crude output into salt for table and kitchen uses, shaker and bag salt. The demand for coarser salt will not be slighted in expanding to enter the shaker salt field. It is the intention of the men who have brought the industry into being, to increase its capacity as the consumption increases.

The new machinery is designed to shatter the crystals and process the salt so that, in the moist climate of the island coasts, it will not cake—in fact it is the intention of the company to produce a Hawaiian product that will compare on all points with the imported article, with the added feature of ocean freight eliminated.

Expert supply surveys have been conducted in the island from time to time to determine just what imports are necessary to make up the difference between local production of any food article and demands of consumers. It is estimated that the salt works, when under full swing, would be able to eliminate this item from freight lists. The plant is on a branch of the railway. The new unit of the plant will be in operation

before summer.¹⁰⁶

5.22 Kai Lawai'a: Fisheries and Access, 1857–1898

Native Hawaiian historian Samuel M. Kamakau observed

The Hawaiian people were a race of expert fishermen. The art had been handed down from their ancestors. Agriculture and fishing were the two main professions always passed on by the grandparents ... The fishing profession was an important one, and one that could not be undertaken without supplies of canoes, nets, and fishing lines. If a fisherman were a landholder or a chief, or a descendant of a fisherman, or a son in a family which had *ʻaumakua* aumakua of fishing, then he could be a true fisherman with no lack of long canoes, short canoes, light, swift canoes, large and small nets, and long and short fishing lines. He would have everything he needed, and there would be nothing to stop him.

Some kinds of fishing required a fleet of canoes, many nets, and many men; other kinds needed only two, three, or four men, and some, only one man. Some ways of fishing were much work, and some were very easy. Fish was obtained in greatest quantity with nets. Other main ways of fishing were, with basket traps; with hook and line; by prodding about with a stick; by feeling about and grasping by hand or ensnaring between the fingers; by striking loose with stones [the *ʻōpili*]; and by drugging fish. A man could also fish with his hands, or with crab or shrimp nets, or with a pole from a ledge or the seashore, or catch fish in tide pools with a scoop net, or go along the seashore with a net, or set a fish line, or search for fish with a small basket trap; or draw a net over sandy spots in the sea or up onto the shore; or drive fish into nets by splashing; or with a pole. [17:59]

The fisheries—those along the shore of the open ocean and in Keawalaū o Puʻuloa (now Pearl Harbor), and along the shoreline—were among the highly valued resources of Honouliuli Ahupuaʻa. With the transitions in land tenure and land use that occurred following 1848, native residents of Honouliuli were steadily denied access to the traditional fisheries. The narratives below are selections from the historical record on the conflicts that arose between the customary practices of Hawaiians with the new landowners and system of access.

¹⁰⁶“Salt Works on Oahu to Branch Out Into Shaker Salt Field,” *Honolulu Star-Bulletin*, March 11, 1922, p. 11.

5.23 Poinoi Distress: Hawaiians Denied Access to Pu'uloa Fisheries

Mose, a native of Honouliuli, presented a public account of the distress that he, Isaaka, and Makahanohano endured in being denied access to the shore along Ke Awalau o Pu'uloa by a foreign tenant of the land, and asked the king if this action was authorized by him. The English translation in the right column is not complete, but is a summary.

Poinoi!

E ka Hae Hawaii e. Aloha oe:— Ka mea e holo ana ma na kihi eha o ke aupuni Hawaii, he hoa kuili oe o ka poe imi noono, he ipo manuahi oe o ka poe ike. He wahi mea ka'u e hai aku nei ia oe, a nau ia e hai aku i ka poe imi noono a pau o ke aupuni Hawaii.

Eia ua wahi mea la. Ia makou i hoonaka ai e holo maluna o ka waapa mai Honouliuli aku a hiki i kahi i kapala o Keawalau o Puuloa, pa mai la kahi makani ma kai mai, he maununu ko ke kaha, he olaunuu ko Waikiki, he kukalahale ko Honolulu, hooohuli pono ae la makou i ka ihu o ka waapa me ka manao e holo aku i Honolulu i ke kuai ia, loaia ihu la makou i ka poino. Eia no ia, ninau mai la kekahi haole ia makou, o Aigate kona inoa, Owai keia waapa? Hai aku la makou, O makou no. Ninau hou kela ia makou, Owai ka inoa? Hai hou aku la makou, O Mose, Isaaka, Makahanohano. Pane hou mai kela ia makou, Go way; be off kanaka. O ke kani koke mai la no ia o ka pu, a pee iho la makou i ka waha o ka waapa, helelei iho la ka lu iluna o makou, kani hou mai la ka pu, helelei hou iho la ka lu. Kena aku la au i ko'u mau hoa e hoe aku i ka waapa, aka, aole e hiki; no ka mea, ua loaia makou i ka pilikia; aka, no ka ikaika ana mai o ka makani ma kai mai, huki pono mai la makou i ke kaula, pei mai la i ka pei, poho aku la ka

Distress

We departed from Honouliuli in our boat and arrived at the place called Keawalau o Pu'uloa, when a wind arose from the shore. It was the mānuumu of the coastal region — the 'ōlaunuu is of Waikīkī, and the kūkalahale is of Honolulu. We turned the bow of our boat, intending to go to Honolulu to sell our fish, that is when we ran into trouble. A foreigner came up to us and asked whose boat is this, his name was Isaac.¹ We told him it was ours. He then asked our names and we told him, Mose, Isaaka and Makahanohano. He then told us, "Go away, be off, Hawaiians." He then shot at us, and we quickly tried to hide in the bow of our boat. We tried to push off, but because of the wind from the sea, we had a difficult time. We finally got the sail up and we were able to get away from the trouble.

pea i ka makani, o ka holo aku la no ia o makou, a pakele makou i keia pilikia.

Ei nani ke aloha o ko kakou Haku i ka lani, ka mea kokua i ka poe poino, nana no i hoopakele mai ia makou mai loko mai o keia popilikia.

Ninau.

Ina ua ae ia e ka Moi a me kona lalo iho, a i ole ia, e na makainana paha e noho ana malalo iho o ka Moi, kona ki wale ana aku i kela kanaka keia kanaka, alaila ua pono; aka, ina aole, e hiki no ia'u ke hoopii e like me ke kanawai o ka aina.

Mose.

Honouliuli, Ewa, 18 Nov. 1857²

- 1 Isaac Montgomery purchased the 'ili of Pu'uloa from Chiefess M. Kekau'ōnohi in 1849. Later, in 1858, Levi Ha'alelea brought suit against Daniel Montgomery, brother of Isaac, in the matter of fishery rights at Honouliuli (Hawaiian Supreme Court Report, 1857-1858:62).
- 2 *Ka Hae Hawaii*, Nowemapa 25, 1857, p. 139.
- 3 Trans. by Maly.

The below article is from the newspaper *Ka Hae Hawaii* and announces the *kapu* fish of Honouliuli.

Ke hoakaka ia nei ma keia Olelo Hoolaha ka inoa o na I/A kapu a na Konohiki i hoouna mai iloko o keia Keena Kalaiana, e like me ke Kanawai. Konohiki. [Landlord] Ili Aina. [Land Name] la Hoomalu. [Restricted Fish] Haalelea, Honouliuli i Ewa, Oahu, Anae.

S. Spencer, Kakaulelelo.¹

- 1 "Olelo Hoolaha," *Ka Hae Hawaii*, March 3, 1858, p. 195.
- 2 Trans. by Maly.

Levi Ha'alelea brought suit against Daniel Montgomery in 1858 in the matter of fishery rights at Honouliuli. The following argues that Montgomery does not own exclusive rights to the fishing grounds off Puuloa, and thus tenants of Honouliuli are entitled to fish in those waters.

By the laws of 1839, as subsequently amended by the organic acts of 1846, the entire fishing ground, lying between low water mark and the outer edge of the coral reef, or kuanalu, along the seaward front of an ahupuaa of land, is the private property of the landlord or konohiki, subject always to certain piscatorial rights of the tenants or hoainas.

The defendant's brother having received from the konohiki a conveyance of a portion of land of the ahupuaa of Honouliuli, by metes and bounds, but not including any portion of the fishing ground adjacent; it was held, that he acquired a common right of piscary as a tenant or occupant of the ahupuaa, appurtenant to the land purchased, and subject always to the rights of the grantor.

It would not have been in the power of the landlord to grant an exclusive right of fishery in the fishing ground, adjoining the land in question, and it was doubtful said landlord could, convey her rights therein, so as to divide the fishery into two or more parts, without infringing on the rights of the tenants.

Where the exact legal signification of the terms of a deed could not be expressed in Hawaiian without great deal of difficulty, recourse was had to the English original.

Justice Robertson delivered the decision of the Court as follows:

The plaintiff brings his action for the purpose, of determining certain rights of fishery, now in dispute between him and the defendant, and also to recover damages from the defendant for having prohibited and prevented the plaintiff and his people, and others occupying certain lands under him, from taking fish on the fishing ground lying to seaward of defendant's land, at Puuloa, on this island.

It appears, from the evidence presented to the Court, that the land now held by the defendant, is a portion of the large ahupuaa of "Honouliuli," and was purchased, in the year 1849, by defendant's brother, Isaac Montgomery, from the late high chief, M. Kekauonohi, then a widow, who died in the year 1851, leaving the land of "Honouliuli;" together with other property by will, to her second husband, the plaintiff in this action. The conveyance from M. Kekauonohi to Isaac Montgomery, was executed in the Hawaiian and English languages, and reads as follows in English:

"Warranty Deed.

Know all men, by these presents, that I, Kekauonohi, of Honolulu, Island of Oahu, for and in consideration of the sum of eleven thousand dollars, to me this day paid in hand by Isaac Montgomery, also of Honolulu, Island of Oahu, the receipt of which is hereby acknowledged, do grant, bargain, sell, and by these presents convey unto him, the said Isaac Montgomery, and to his heirs, executors, administrators and assigns, forever, all that certain lot of land, situated in the Island of Oahu, aforesaid, and described as follows:

Commencing at mauka north corner or point of this land at place called Lae Kekaa, at bend of Pearl River, and running along edge of Pearl River, makai side, taking in three fish ponds called Pamoku, Okioklipti and

Paakule to open sea, thence following along the edge of the sea (reserving all the reef in front) to end of stone wall by sea, in land called Kupaka, at the makai west corner of this land, thence running north 25° E. 283, direct to place of commencement, including an area of acres 2.244 as per plot hereto annexed.

"To have and to hold, the above conveyed premises and all the tenements and hereditaments situate thereon, with this my covenant and warranty and lawful seizers, unto the said Isaac Montgomery, his heirs, executors and administrators and assigns forever.

"In witness whereof, the said party, Kekauonohi, has hereunto set her hand and seal at Honolulu, this 7th day of September, A.D. 1849.
"M. Kekauonohi. [L. S.]

Executed in the presence of Frank Manini."

It is admitted that defendant is now the owner of the property, originally conveyed to his brother by the foregoing deed. The Court also understood the defendant to admit that he had prohibited the plaintiff and his people from taking fish on the place in controversy. And it is admitted by the plaintiff that, from and after the execution of the deed by M. Kekauonohi, she withdrew her Luna from Puuloa, and ceased to take or taboo any fish on the reef opposite defendant's land, up to the time of her death, and that, until recently, Haalelea never asserted, any right or claim to take fish on said reef.

Upon this state of facts, the defendant claims to have, under a proper construction of the conveyance before recited, and the statutes of this Kingdom, an exclusive right of piscary, in the fishing ground lying opposite the land embraced in the deed; and the plaintiff on his part, claims the same exclusive right for himself and his tenants living on "Honouliuli" as against the defendant and all others living on the land covered by the conveyance, or in other words, that the defendant did not acquire by his purchase, a right to take fish anywhere outside of the boundaries of the land conveyed to him, and that the people living on that land after the date of the deed, ceased to be tenants of the Ahupuaa of "Honouliuli," and so lost their rights to piscary, under the laws of the land.

In order to a right decision of this controversy it would seem to be necessary in the first place, to ascertain and define what were the rights of piscary possessed by M. Kekauonohi, as Konohiki of the Ahupuaa of "Honouliuli," at the time she made the conveyance, to Isaac Montgomery. To do this it is unnecessary to inquire what were the respective rights of piscary enjoyed by the Konohiki and the common people, in ancient times, became since the year 1839 those rights have been regulated and defined by written laws.

At page thirty-six of the English version of the old laws, will be found

an enactment on this subject, which commences in the following words: "His Majesty the King, hereby takes the fishing grounds from those who now possess them, from Hawaii to Kauai, and gives one portion of them to the common people, another portion to the landlords, and a portion he reserves to himself.

These are the fishing grounds which His Majesty the King takes and gives to the people: the fishing grounds without the coral reef, viz: the Kilohee grounds, the Luhee ground, the Malolo ground, together with the ocean beyond.

But the fishing grounds from the coral reefs to the sea beach are for the landlords, and for the tenants of their several lands, but not for others."

This is the point at which the existing piscatory regulations of the Kingdom had their commencement, and since which, ancient custom ceased to govern the subject. His Majesty Kamehameha III, as supreme lord of the islands, and having in himself the allodium of all the lands in the Kingdom, did at that time, with the concurrence of the Chiefs, resume the possession of all the fishing grounds within his dominions, for the purpose of making a new distribution thereof, and of regulating the respective rights of all parties interested therein, according to written law.

The fishing rights of both the Konohikis and the hoainas were defined and regulated by the law of 1839, which was at different times amended in some particulars, until the passage of the organic Acts in 1846, when those rights were again defined by article 5th, of chapter 6th, part first, of the Act to organize the Executive Departments. (See 1st Vol. Stat. Laws, pp. 90 to 92, Secs. 1 to 7.) The part of the law to which it is necessary to have reference more particularly in the present case, reads as follows:

"Section 2. The fishing grounds from the reefs, and where there happen to be no reefs from the distance of one geographical mile from the beach at low water mark, shall in law be considered the private property of the landlords whose lands, by ancient regulation, belong to the same, in the possession of which private fisheries, the said landlords shall not be molested except to the extent of the reservations and prohibitions hereinafter set forth.

"Section 3. The landholders shall be considered in law to hold said private fisheries for the equal use of themselves and of the tenants on their respective lands; and the tenants shall be at liberty to use the fisheries of the landlords, subject to the restrictions in this article imposed."

The four succeeding sections of this law, which we deem it unnecessary to cite at length, define and guard the rights of the konohikis, in relation to their reserved or tabooed fish, and contain certain provisions to protect the rights of the tenants or hoainas, from unjust restrictions

and exactions.

Under this statute, as we, understand it, the entire fishing ground, lying between low water mark and the outer edge of the coral reef, (or Kuanalu, as it is called in the Hawaiian version) along the seaward front of the Ahupuaa of "Honouliuli," was private property of M. Kekauonohi, possessed and held by her as such, subject to the piscatorial rights of the tenants living on that Ahupuaa. On this ground she had a common right of piscary with the tenants of "Honouliuli," or she was at liberty, if she saw fit, to taboo or set apart annually, one particular species of fish for her own private benefit, as provided in section 4th, or in lieu of this, she might on consultation with the tenants, as provided in section 7th, make an arrangement whereby she would be entitled to receive one third part of all the fish caught on the ground.

Such were the rights of M. Kekauonohi in the premises at the time when she executed the deed to Isaac Montgomery, and the next question is, what portion, if any, of those rights did she thereby convey to him, or did he, by operation of law, acquire any rights of piscary on the ground in question, upon receiving that conveyance?

It is contended, on the part of the defendant, that by a fair construction of the descriptive part of the deed, it must be held to extend to deep water at the outer edge of the reef, thereby including all that part of the Konohiki's fishing ground lying opposite to the land conveyed to Isaac Montgomery. It is said that the expression, "to open sea," must be understood to mean, "to deep water outside of the reef," in contradistinction to the shallow water upon the reef, between the breakers and low water mark, and that the expression, "following along edge of sea," means following along the edge of deep water, outside of the reef. If this is correct, then unquestionably, the grantor conveyed away all her right and title to the fishing grounds, as well as to the dry land. But it seems very clear that this construction cannot stand without falsifying the obvious meaning of the descriptive language which follows. For if "open sea" means the deep water outside of the reef, and "edge of the sea" means the edge of such deep water, the stone wall which is described as being by sea, in land called Kupaka, must have extended out to the seaward edge of the reef, a proposition which has not been asserted in argument, and which, on reference to the plan annexed to the deed, appears to be conclusively negatived. So the expression "reserving all the reef in front," would seem to be inconsistent with the idea that the line ran along the outer edge of the reef, for in that case there would be no reef in front of the line. That the line ran along the inside of the coral reef, seems to us clear from the language used in the Hawaiian version of the deed, which reads as follows: "Aole nae e hookomo ana i ka papa koa mawaho."

We should translate this expression, "not including, however, the coral reef outside." Again, the last line of the survey is described as running from the end of the stone wall, north 25° east, by compass, 283 chains, to the place of commencement, and it is not pretended that this line extended out to the outer edge of the reef. If such is the case, it is a fact that could be readily ascertained by measurement. But the surveyor's plan clearly indicates the reverse. It is very evident, then, that no part of the fishing ground is included within the surveyed metes and bounds of the property conveyed to Isaac Montgomery.

But, it is argued by defendants, counsel, that M. Kekauonohi's right of piscary in the fishing ground in question, passed to Montgomery as an appurtenance to the land, by virtue of the clause which, in the Hawaiian version of the deed, reads thus: "A me na mea paa a pau e waiho ana maluna iho, a me na mea e pili pono ana," and in the English version, thus: "And the tenements and hereditaments situate thereon." It is said that the words, "a me na mea e pili pono ana," are sufficiently broad in their signification to carry everything appurtenant to the land embraced in the conveyance, and that the Court ought to regard the Hawaiian version of the deed as controlling, wherever their appears a difference between that and the English for two reasons: First—Because the grantor herself was a native, and a person of intelligence, and must, therefore, be presumed, to have intended to convey whatever would pass under the words of the deed, as expressed in her own language; and, secondly, because the Court has decided in several previous cases that, in construing the statutes of the Kingdom, which are enacted in both languages, wherever an irreconcilable difference exists between the two versions, the Hawaiian must govern. On the other hand, it is argued that the grantee, who is an Englishman, received the deed in both languages, thus accepting the English version as the exact counterpart of the Hawaiian; and that, therefore, he and those claiming under him, should be bound by the English version; that the deed in both versions form but one instrument, and that if the language of the one is altogether inconsistent with that of the other, which, however, is not conceded, the proper course would be to declare the instrument void for uncertainty.

This involves a question of considerable magnitude, the decision of which may affect the rights and interests of many individuals throughout the Kingdom. After careful reflection upon the point, we are of the opinion that it would be both unsafe and unreasonable, for the Court to hold that the Hawaiian, and not the English version, should control in this instance, if the difference contended for by the defendant does really exist, which, we think, is not clear. It is true this Court has repeatedly ruled, as stated by the defendant, that, in the case of an, irreconcilable difference

between the Hawaiian and English versions of a statute, the former shall control (See *Metcalfe vs. Kahai*, 1st Haw. Rep., p. 225; *Hardy vs. Ruggles et als.*, *ibid.*, p. 255.) But it seems to us that the same considerations which constrained the Court so to decide in that case, do not exist in the present instance. The deed before us, with the exception of those parts of it which are descriptive, consists of a printed formula, in the two languages, which has been extensively used here, in dealings between natives and foreigners, since the enactment of laws requiring conveyances of real estate to be made in writing. The English version of this formula is, of course, the original, and the Hawaiian merely a translation. There do not exist in the Hawaiian language, two words which would exactly represent the two English words tenements and hereditaments. The exact legal signification of those terms could not be expressed in Hawaiian without great difficulty, and therefore words, which if used in some other connection, or under other circumstances would convey a widely different meaning, have, when used in the printed formula of conveyance now before us, been accepted by the general consent of natives and foreigners using such formula, as meaning precisely the same things, and neither more or less than those two legal terms. So far then as purely legal phraseology, or words or technical import, are concerned, it would seem to us both unsafe and unreasonable, to hold that the Hawaiian translation, and not the English original, should govern, when a question arises, upon the construction of any part of the deed, where such legal or technical language is used. Such a course would unbar the door to endless litigation and fraud, and involve our courts in a maze of uncertainty.

It is contended, further, on the part of the defense, that the conduct of the grantor, in withdrawing her luna from Puuloa, at the time of her execution of the conveyance, and in subsequently, up to the time of her death, forbearing to take or taboo any fish on the reef opposite the land sold to Montgomery, and the like forbearance on the part of the plaintiff, for several years, afterwards, are strong evidence in favor of the defendant, and facts from which it may be fairly inferred that M. Kekauonohi intended to grant away tile fishing ground, or, at least, all her rights in the fishery. To this it is replied, that such a grant cannot be inferred from circumstances, or from the conduct of the grantor, but must be found, if at all, in the express language of the deed.

As to the fact of her withdrawing her luna from Puuloa, after the sale of that land to Isaac Montgomery, we consider it a natural consequence of the sale, and of slight significance as to any bearing it may be supposed to have upon the disputed question of the fishery. If, however, there was any doubt as to the grantor's intentions, arising from the use of unusual or ambiguous language, then, the fact of her subsequent forbearance to take

or taboo fish; upon the place in question, might be regarded as evidence tending to sustain the construction contended for by the defendant. But, it is clear to our minds, for the reasons already stated in remarking upon the descriptive part of the deed, that she did not intend to include therein, or to convey thereby, any part of the fishing ground to Montgomery; nor did she convey to him her individual rights of piscary, under the words, "tenements and hereditaments situate thereon."

None of the rights of piscary possessed by M. Kekauonohi as owner of the fishery, could have passed as a mere appurtenance to the piece of land conveyed to Isaac Montgomery. She could have transferred the fishery, or her right therein, only by an express grant, *eo nomine*. Had she made a deed even of the whole Ahupuaa, by *métes* and bounds, not including the fishery, nor expressly naming it in the conveyance, it is doubtful if either the fishery or her right therein would have passed to the grantee.

Again, if the grantor had conveyed the fishery, or her individual rights therein, by name, to Isaac Montgomery, that would not have conferred upon him the exclusive right which is now set up by the defendant, because M. Kekauonohi herself was not possessed of an exclusive right. It may even be doubted whether she could have conveyed away the portion of the fishing ground lying opposite to Puuloa, or her special rights therein, so as to divide the fishery, without infringing on the rights of the tenants living on "Honouliuli." Certainly if her grantee had tabooed one kind of fish, on his part of the ground, while she tabooed another kind upon the other part, the rights of the tenants would have been violated. And if she could have divided the fishing ground into two parts she could have divided into twenty, and so have rendered the rights of the tenants worthless.

But, while we are clearly of the opinion that M. Kekauonohi did not convey any part of the fishing ground, or of her individual rights therein, to Isaac Montgomery, we are also of opinion that, when he received a conveyance of a portion of the Ahupuaa of "Honouliuli," he acquired along with it a common right of piscary in the fishing ground adjacent. That is to say, he became, for the purposes of the law, governing this subject, a tenant of the Ahupuaa, and as such entitled to take fish in the sea adjoining. We understand the word tenant, as used in this connection, to have lost its ancient restricted meaning, and to be almost synonymous, at the present time, with the word occupant, or occupier; and, that every person occupying lawfully, any part of "Honouliuli," is a tenant within the meaning of the law. Those persons who formerly lived as tenants under the Konohikis but who have acquired fee simple title to their kuleanas, under the operation of the Land Commission, continue to

enjoy the same rights of piscary that they had as hoainas under the old system. (See Joint Resolution on the subject of rights in lands, etc., Vol. 2, Statute Laws, p. 70.) If any person who has acquired & kuleana on the Ahupuaa of "Honouliuli," should sell and convey his land, or even a part of it, to another, a common right of piscary would pass to the grantee, as an appurtenance to the land. In that case it would not be necessary, we apprehend, to mention the right of piscary in the conveyance—it would pass as an incident. (See Kent's Com., Vol. 4, p. 517; Comyns's Digest, Vol. 4, title Grant E. 11.) Here, we think, is the great distinction between the rights of the Konohiki, and those of the tenant or occupant, for, while the former holds the fishery as his private property, the latter has only a right of piscary therein, as an incident to his tenancy. This marked distinction in their respective rights must create a corresponding difference in regard to the transfer of those rights.

As the conveyance, by the owner of a kuleana, of a part of his land to another, would create such a tenancy in the grantee as would entitle him to a common right of piscary, so, in our opinion, the conveyance to Isaac Montgomery, by M. Kekauonohi, of a part of the Ahupuaa, created such a tenancy, as carries with it, as an appurtenance thereto, under our laws, a common right of piscary; subject, always, to the rights of the grantor, and her legal representatives.

No specific damage having been proved by the plaintiff we think he is only entitled to recover nominal damages.

Let judgment be entered for the plaintiff, as of the last day of term, in the sum of five dollars damages, together with the costs of suit.

A. B. Bates, Esq., for the plaintiff.
J. Montgomery, Esq., for the defendant.
January, 1858.¹⁰⁷

Below is a Hawaiian-language report on the Haalelea vs. Montgomery proceedings entitled "Olelo Hooholo a ka Ahakiekie. O Levi Haalelea kua Daniel Montgomery" that was published in the newspaper *Ka Hae Hawaii*.

Hoakaka ae la ka Lunakanawai o Robertson i ka manao hooholo o ka Aha, penei:

Ke hoopii mai nei o Haalelea, i mea e maopopo ai ke kuleana o ka honu ia ana i hoopapaala e ka mea kua e D. Montgomery, a e loa'a paha ia ia kona po'ino no kona hoo'ole ia aole make hopu ia ma kauwahi o Montgomery, ma Puuloa i Oahu nei.

¹⁰⁷The Puuloa Fishery of Honouliuli, Supreme Court—In Banco, January Term—1858, *Levi Haalelea vs. Daniel Montgomery*.

Mamuli o ka hoike ana, o ka aina o D. Montgomery, ka mea kua, he wahi apana ia o ka ahupuaa o "Honouliuli," a ua kuaiia e Isaac Montgomery ke kaukua o ka mea kua, i ka makahiki 1849, no M. Kekauonohi mai, ia manawa, he wahine kane make oia. A mahope iho, i ka makahiki 1851, make oia, me ka waiho ana i ka aina o "Honouliuli" a me na waiwai e ae i kana kane mare hou a oia ka mea hoopii ma keia hookolokolo ana, O ka palapala hoolilo aina a M. Kekauonohi ia Isaac Montgomery, ua kakaia ma na olelo Hawaii a me ka Beritania, a o Frank Manini ka hoike.

Eia na mea i aeia e na aoao elua:

Ua aeia o D. Montgomery, oia ka mea nona ka aina i keia wa e noho nei.

Ua ae mai hoi o D. Montgomery, ua hookapu oia ia Haaalea a me kona poe, aole make hopu i ka ia ma kahi i hoopapaia.

Ua ae mai noi o Haaalea, mai ka wa i kakaia i ka palapala hoolilo aina e M. Kekauonohi, ua pau ka noho ana o kona luna ma Puuloa, a hooki hoi i ka lawaia a e hookapu ia ma ke kohola e ku pono ana i ka aina o D. Montgomery, a make o M. Kekauonohi. A o Haaalea hoi, aole oia i hoike mai i kona manao e hopu i ka ia ma ia wahi, a i keia manawa iho nei.

A mamuli o keia mau mea, manao ae la o D. Montgomery ia ia pono wale iho no ke kuleana hopu ia ma kahi e ku pono ana i kona aina. A manao ae la hoi o Haaalea ia ia pono wale iho no a me kona poe e noho ana ma "Honouliuli" ke kuleana e hopu ia ma ia wahi; no ka mea, i kona manao, aole i loaia D. Montgomery ke kuleani hopu ia mawaho ae o na mokuna o ka aina ana i kuai ai me Kekauonohi.

I ko kakou hoomaopopo ana i ka mea nona ka pono a me ke kuleana o ka hopu ia ana. He pono ke heluhelu i ke kanawai.

Ma ka aoao 36 o ka buke Kanawai mua, olelo Beritania, penei ke kakaia ana: "Ke lawe nei ka Moi o ke Alii nui i na wahi ia noloko ae o ka lima o ka poe i loaia, mai Hawaii a Kauai, a. Ke haawi hou aku i kekahi hapa na na kanaka, a i kekahi hapa na na konohiki, a i kekahi apa hoi nana pono no.

Eia na wahi ia a ka Moi e haawi nei na na kanaka, o na wahi mawaho ae o ka Puukoa, penei, o na wahi Kilohee, o na wahi Luhee o na wahi Malolo, a me ka moana mawaho ae.

A o na wahi ia mawaho ae o ka Puukoa a me ke kahakai. na na konohiki ia a me na kanaka o ko lakou aina aole no na mea e ae."

A mai ia wa mai o ke kuleana hopu ia o ka wa kahiko, ua pau i keia manawa he kanawai i kakaia.

Ma ke kanawai o ka makahiki 1839, o ke kuleana o na konohiki a me na hoaina ua hooponoponoia ma kauwahi, a pela no a hiki i ka makahiki 1846, a malaila ua hooponopono hou ia. E nana i ka buke mua aoao 90 a

hiki 92, pauku 1 a hiki 7. Eia na pauku pili pono:

"PAUKU 20 na wah ia, no na puukoa aku, a ina aohe puukoa, hookahi no mile no ke kahakai aku, ma ke hapawai, oia no ke kuleana pono no o na konohiki no na ka aina e pili ana ma ke ano kahiko, aole e mea ia i na konoliki i ko lakou kuleana hopu ia, aia mamuli o na kanawai e kau ia mahope.

"PAUKU 3. I ka mamio o ke kanawai, no na konohiki no ka hopu ia ana no lakou iho a me na hoaina ma ko lakou aina iho; a e hopu no na hoaina i ka ia o na konohiki malalo nae o na mea i oleloia ma keia kanawai."

Mamuli o keia kanawai, o na wahi hopu ia a pau, e moe ana mawaho o kahakai a me kuanalu makai aku o ka ahupuaa o "Honouliuli," oia no ke kuleana pono o M. Kekauonohi, nona no malalo nae o na kuleana o na hoaina e noho ana ma ia ahupuaa

Oia na kuleana o M. Kekauonohi i kona wa i kakaia i ka palapala hoolilo aina ia Isaac Montgomery; a eia ka ninau ua loaia nei ia ia, ia L. Montgomery, kahi kuleana hopu ia ma ia wahi, i kela palapala hoolilo aina?

Ma ka aoao o ka mea kua, o D. Montgomery, manao oia e holo ana kona aina a i ke kai hohonu mawaho ae o ka papakoa e hookomo ana i kauwahi ia a pau o ke konohiki e kupono ana i ka aina i lilo ia Isaac Montgomery. Ua oleloia, okoa ke kai hohonu, okoa hoi ke kai papau mawaho o ke kuanalu a me kahakai. Aka, ua maopopo aia ka mokuna oia aoao, aia no maloko ae o ka papakoa; no ka mea, penei ka olelo ana: "aole nae e hookomo ana i ka papakoa mawaho." Nolaila, ua maopopo ia makou aole i komo kauwahi hopu ia iloko o ka aina i ana i ana i hooliloia ia Isaac Montgomery.

A olelo mai la ka loia o D. Montgomery. Ua lilo ae la ke kuleana ia o M. Kekauonohi ia D. Montgomery me he mea apana la o ka aina ma keia olelo ana, a me na mea paa a pau e waiho ana. Maltuna iho, a me na mea e pili pono ana, aka, a ko'u manao, aole e pili pono kela mau huaolelo i kauwahi o ke kai.

Ua olelo ia hoi, o ka hoopau ana o M. Kekauonohi i kona luna ma Puuloa i ka wa i lilo ai ka aina a hiki i ka manawa i make ai, aole i hopu i ka ia, ma ka puu koa kupono i ka aina i lilo ia Montgomery, a pela no kana kane o Haaalea no kekahi mau makahiki, oia na mea e maopopo ai ka manao o M. Kekauonohi, a o kona manao ia e hoolilo loa aku i kela wahi ia, a i kona kuleana a pau iloko olaila. Aka, aole e pono ke manao wale aku ma ia mea, i ole e kakaia ma ka palapala hoolilo, aole e maopopo.

Aole i lilo kekahi kuleana ia o M. Kekauonohi me he mea apana la o ka aina i kuai ia Isaac Montgomery. Ma ka olelo maoli wale no i lilo

ai. Ina paha ma ka palapala hoohilo, i hoohilo ai oia i ka ahupuaa a pau ma na mokuna i anaa i puni me ke komo olelo kauwahi ia ma ka olelo, aohe maopopo ka lilo ana o kauwahi ia a o kona kuleana malaila.

I ko makou manao, aole i hoohilo o M. Kekauonohi i kekahi apana o kahi ia, a i kekahi o kona kuleana pono i Isaac Montgomery; a eia hoi ko makou manao, i ka wa i loa i ia I. Monthermerv ke kuleana o kauwahi o ka ahupuaa o "Honouliuli." ua loa ia ia no hoi kekahi kuleana hopu ia me he hoaina la, e like me na kanaka e ae e noho ana ma ia ahupuaa. (E nana i na Olelo ae Like, Vol 2, Statute Laws, pahae 70).

No ka maopopo ole o ka poino i loa ia Haalelea, nolaila, o ka poino i manao wale ia ka pono.

E hooholoia na ka mea hoopii ke ko i ka la hope o ke kau hookolokolo.

Elima dala ka poino me ke koina.

A. B. Bates, Ioio no L. Haalelea.

J. Montgomery, Ioio no D. Montgomery.¹⁰⁸

In 1882, another case, *Aarona Hatton vs. Piopio*, also argued that tenants of the land have right to the fishery and to catch fish for their own use, as well as to sell. It was brought before the Intermediary Court of Oahu on May 26, Chief Justice Judd presiding.

The case comes up on appeal from the District Court of Ewa on the following agreed statement of facts:

This case was brought by plaintiff for an illegal trespass of Piopio in fishing and taking and selling fish caught in the fishery belonging to the Ahupuaa of Honouliuli, Ewa, Oahu, Piopio being a resident of Puuloa and a tenant of James I. Dowsett, under whom he (Piopio) justifies James I. Dowsett being the owner of Puuloa, a portion of the Ahupuaa of Honouliuli, and as such owner entitled to right of piscary, as appears by 2d Hawaiian Reports, page 62, *Haalelea vs. Montgomery*.

1 It is hereby admitted that James Campbell is the owner of the Ahupuaa of Honouliuli.

2 That he has leased to the plaintiff his, the Konohiki's right, to take fish from Kalaeloa, or Barber's Point, to Puuloa wharf.

3 That Dowsett, under whom Piopio justifies, is the owner of Puuloa.

4 That Puuloa is the lower portion, or a part of the Ahupuaa of Honouliuli.

5 That Piopio is a resident of Puuloa, but not in his own right, owning no Kuleana, but a tenant servant of J. I. Dowsett.

¹⁰⁸ *Ka Hae Hawaii*, April 14, 1858, p. 6.

6 That the value of the fish taken and sold by Piopio was \$31.00, and that this proceeds (\$34.00) have been delivered to Dowsett.

7 That the fish were caught in the sea fronting Puuloa.

It is also admitted that Piopio (defendant) was born in the Ahupuaa of Honouliuli and has always lived there. The plaintiff contends that (1) Piopio is not a tenant (ho'a-aina) within the statute; and that (2) though Dowsett is the owner of Puuloa may have the right to take fish in the sea adjoining his land he cannot delegate this right to Defendant; and that (3) though the tenant may fish for his own consumption, he cannot sell the fish taken by him.

The law regulating fisheries of these lands pertaining to this case is found in the following in sections of the Civil Code:-

Section 387 - "The fishing grounds from the reefs, and where there happen to be no reefs, from the distance of one geographical mile seaward to disc leads at low water mark, shall, in law, be considered the private property of the konohiki, whose lands by ancient regulation, belong to the same; in the possession of which private fisheries, the said konohikis shall not be molested, except to the extent of the reservations and prohibitions hereafter set forth."

Section 388 - "The konohikis shall be considered in law to hold said private fisheries for the equal use of themselves, and of the tenants on their respective lands; and the tenants shall be at liberty to use the fisheries of their konohikis subject to the restriction imposed by law."

Section 380 - "The konohikis shall have power each year to set apart for themselves any given species or variety of fish natural to their respective fisheries; giving public notice, by proclamation, and by at least three written or printed notices posted in conspicuous places on the land to their tenants and others residing on their lands, signifying the kind and description of fish which they have chosen to be set apart for themselves."

I am of the opinion that any bona fide resident upon the land is a "tenant" within the terms of the statute. Such was the opinion of the Court in *Haalelea vs. Montgomery* 2nd Hawaiian Rpt. (1848).

Says the Court, per Robertson J. "We understand the word tenant as used in this connection, to have lost its ancient restricted meaning, and to be almost synonymous, at the present time, with the word occupant or occupier and that every person occupying lawfully, any part of Honouliuli is a tenant within the meaning of the law."

"These persons who formerly lived as tenants under the konohikis, but who have acquired fee simple titles to their Kuleanas, under the operation of the Land Commission, continue to enjoy the same rights of piscary that they had as hoainas under the old system."

Every resident on the land, whether he be an old hoaina, a holder

of Kuleana title, or a resident by household or any other lawful tenant, he has the right to fish in the sea apparent to the land as an incident of his tenancy. The seas above referred to clearly decides that the owner of Puuloa has a right of piscary in the sea of Puuloa, as a tenant of Honouliuli. I cannot justify the fishing of the defendant or any person not a bona fide tenant of the land by the permission of Dowsett, for Dowsett has no greater rights than any other tenant of Honouliuli. He has no Konohiki rights in the sea of Puuloa. These remain to the owner of the Ahupuaa of Honouliuli. This was so decided in the above cited case. But as Plopio is concluded to be an old resident or hoaina of Honouliuli and living permanently at Puuloa, he has the undoubted right to fish in the sea of Honouliuli of which the sea of Puuloa is a part, as an incident to his tenancy. It is his domicile on Puuloa as a part of Honouliuli, that gives him the right to fish, and not by a delegation of Dowsett's rights. I come now to the question of the right of the tenant to sell the fish so taken by him.

It is noticeable that in Sec. 1177 of the civil code where certain specific rights of the people are acquired, the people on the lands are allowed to take firewood, house timber, aho, thatch and Ki leaf from the land on which they live, "for their own private use, lest they shall not have a right to take such articles to sell for profit." No such restrictions are made in the statute respecting the fisheries. The words granting the right are, "the tenants shall be at liberty to use the fisheries of their Konohiki, subject to the restrictions imposed by law." What is the nature of that "use of the fisheries," which the tenant may enjoy? Is it the right to take fish for his own consumption merely?

The argument is made that, as in ancient times no fish was accustomed to be sold and as the tenant has no greater rights now than he had then he cannot now sell fish. But in the primitive days of this country there was no trade of commerce and no currency. The business of the country was a system of exchange or barter, and at a comparatively recent day taxes were paid in kind. We are not to enquire what was the "use" to which the tenants in ancient times put the fish he caught, but what the words of our statute fairly comprehend. I do not think that the Konohiki is entitled to the fish caught by the tenant in excess of his own needs for consumption. There are no words of the law warranting the view and it would be oppressive for him then to appropriate the fruit of another man's skill and labor.

The fishing in that open area off our coasts does not tend materially to lessen the supply unless extraordinary means are used and the fish taken in spawning season. For fish in the open area are animals feral nature and go and come at will, unrestrained. If the ordinary means are

employed in taking fish, the Konohiki's opportunities to take all the fish he is able to capture are not diminished by whatever fishing the tenants may do.

It is unreasonable be held that the tenant must put the excess of fish beyond what he can eat, back into the sea to run off again. The case appears stronger if the Konohiki exercise his opinion of taking the tabooed fish (ia hoomalu). These specific fish are set apart for the exclusive use of the Konohiki. His right being the commuted, he has no exclusive right to other varieties of fish, the tenants can sell the unreserved fish which they take.

I do not think the law intended to restrict the tenants to the right to take fish solely for their own use.

I am strengthened on this view by Sec. 392 of the Civil Code, whereby the Konohiki is allowed on consultation with his tenants, to prohibit during certain months in the year, all fishing upon their fisheries, and during the season to exact one third of the fish taken by the tenants as his share. Here, certainly, the Konohiki cannot take more than his one third. Judgment for Defendant.

A. Francis Judd, Chief Justice Holding Intermediate Court of Oahu.
Cecil Brown for plaintiff; E. Preston for defendant.
Honolulu, June 2nd 1882.¹⁰⁹

The following dispute concerning Honouliuli fishery rights was brought before the Supreme Court of the Hawaiian Islands during a special banco term in December, 1883.

This case came to the Supreme Court by appeal from the Intermediary Court of Oahu. The original controversy is as to the line dividing the fishing grounds respectively of the lands of Honouliuli and Waipio in Pearl River, an extensive loch in this island of Oahu. The exceptions relate to the ruling of the Court upon the effect of certain proceedings had before the Boundary Commissioner of Oahu. The following are the instructions asked for by the defendant and refused, and the instructions given by the Court.

1. That the plaintiff's lessors are stopped from now disputing the fishing right of Honouliuli being present and assenting thereto and the right of Waipio being then passed upon.
2. That if the jury are satisfied that J. Komoikeehuehu was present, he being the co-executor of the Chief Justice and assenting, or either of

¹⁰⁹Honouliuli / Puuloa Fishery Rights Case before Intermediary Court, *Hawaiian Gazette*, July 5, 1882, p. 5.

them, that such assent to the finding is binding between the owners of Waipio and Honouliuli.

3. That if the jury find that either of them was present, it is strong evidence in favor of the defendants.

Which directions the presiding Judge declined to give but directed the jury that the lessors of the plaintiff were not bound by the proceedings before the Boundary Commissioner so far as regarded the fishing rights claimed. And that the case must be decided according to the law governing prescription in this country as no grant is shown.

A copy of the record of the Boundary Commissioner is attached to the Bill of Exceptions and we cite from it as follows:-

"The present case is a claim of right of piscary over navigable bay or loch perhaps unlike any other in the Kingdom, and is a claim of exclusive fishing right as to the whole of a certain branch of the part lying outside of a line 'chin deep' opposite the other lands situated on this branch. It is distinguishable from the right claimed and by statute given to Konohiki with certain reservations Civil Code Sec. 387-92 being a claim as a private and exclusive fishing right as completely as that within his 'chin deep' line is claimed for the lands adjacent."

"I find in repeated instances that the Board declined to award and define piscary rights, leaving parties to their rights under general statutes e. g. in the award to Kiahua vol. 10 p. 50 where the fishing right was surveyed and included in the land asked for, the Board expressly refused to award this portion of the survey remitting the claimant to the law, enduring the refusal both on the notes of survey in the award and on the accompanying plot and no instances of a contrary practice are shown to me."

"Upon one consideration of the premises, I decline to award the fishery of Honouliuli as a right or as territory but deeming it of importance that all rights depending on Kamaaina testimony be now settled as far as may be, and knowing of no better place than the records of the Boundary Commissioner for the preservation of such claims, I take the testimony offered on the subject and make such a supplementary finding as such testimony warrants."

"Fishing Rights of Honouliuli in Pearl Loch."

"For reasons set forth at large in the record of the Commissioner, the Fishing Right is not awarded in the body of the certificate of boundaries, but the finding of the Commissioner on the testimony presented as well as by the assent of parties adjacent and in interest is set forth in this supplement to wit:-"

We think there is but one sentence in the above citation which colorably supports the proposition of the defendant, viz the latter part of the last

quoted sentence, these words, "the finding of the Commissioner on the testimony presented as well as by the assent of parties adjacent and in interest be set forth in this supplement as follows." But these words even taken by themselves, fall short of a claim to jurisdiction. The finding is called a supplement and is excluded from that which the Commissioner considered himself authorized to make. The assent of all parties must be taken to mean their assent to taking the testimony, ex parte for preservation which the owner of Honouliuli wished to present for preservation. But the determination of the Commissioner to take testimony must be considered in view of what he had above expressed. Nothing can be more explicit and void of uncertainty than these words, "upon due consideration of the premises I decline to award the fishery as a right or as territory." He gives the authorities and reasoning by which he arrives at this conclusion. How can it be now claimed that a right or territorial line has been awarded by an officer when he has positively declined to make it? And how could the presence of the representatives of Waipio be held to give assent to something which was not done at all?

We therefore overrule the exceptions.

S. H. Dole for plaintiff; E. Preston and Cecil Brown for defendants.¹¹⁰

The following case regards trespassing in a fishery at Auiole, Honouliuli. It was heard by Justices Judd, Bickerton, and Dole of the Supreme Court of Hawai'i sitting in banco during the October term in 1892. It was brought by Mew Kuno Tung and twenty others, composing the Fishing Company of Sun Chan Lee, vs. Wong Ka Mau and ten others. By written agreement of parties and counsel Mr. Dole joined in this decision, though he had resigned as a justice of the Supreme Court after argument and before decision.

Where in an action of trespass the issue is the title to the property alleged to be trespassed upon, the burden is upon the plaintiff to prove his title, and he, having put on such evidence in chief, may not in rebuttal introduce evidence of the same character after the defendant has closed his case.

Opinion of the court per Judd, C. J.

This is an action of trespass begun in the Police Court of Ewa, Oahu, by which plaintiffs claimed that the defendants had unlawfully entered the sea fishery of Auiole, of the Ahupuaa of Waialeale, Ewa, and taken fish therefrom to the damage of the plaintiffs, the lessees of the said right, \$300. The plaintiffs are the lessees of Mr. and Mrs. C. A. Brown who

¹¹⁰Honouliuli Fishery Rights before the Supreme Court, *Daily Bulletin*, February 13, 1884, p. 11.

own the land of Auiole and claim the fishery of Auiole as appurtenant to it, and defendants are lessees of Mr. James Campbell who owns the land of Honouliuli. The case was tried on appeal before a jury in the Supreme Court in July, 1892, and a verdict rendered for the defendants. The plaintiffs moved for a new trial on the ground that the verdict was contrary to the law and the weight of evidence and also alleged errors of law occurring during the trials as follows:

- (1) The refusal of the Court to admit in evidence in rebuttal and in contradiction of the defendants' theory of the case, the records in the case of Akeni vs. Wong Ka Man, on the ground that such records ought to have been offered in chief.
- (2) The refusal of the Court to admit in evidence in rebuttal and in contradiction of the defendants' theory of the case, that the fishery of "Auiole" is not and never was subject to the "chin deep" principle sought to be established by the defendants—which principle was admitted by the plaintiffs to be applicable to the other fisheries of the lagoon).

The first ground for a new trial, that the verdict was against the weight of evidence was not argued nor relied upon by plaintiffs.

An inspection of the records of the case and of the evidence sent up makes it clear that the evidence put in by the plaintiffs was for the purpose of showing that the fishery of "Auiole" extended out from the shore of "Auiole" into the Ewa lagoon (or what is known as the west loch of Pearl Harbor) and was bounded by certain points of land, and would include within its limits the spot where defendants had taken the fish. The contention on the behalf of the defendants was that the fishery appurtenant to the land of Honouliuli extended from the shore of Honouliuli into the loch and across it to where, on the opposite coast, a man could touch bottom with his feet. That is, all the deep water over a man's height was included within the fishery of "Honouliuli," and this would include the spot where the fish in question were taken.

It is true that an action of trespass does not necessarily involve the title, its gist being the injury to the possession; but title may be involved, and, from the way the case was put to the jury, it is clear that what was equivalent to the plea of "liberum tenementum," or justification under special plea of title, was made by the defendants, and the issue for the jury to pass upon was whether the fishery of "Auiole" extended to or near the middle of the west loch, or whether it was limited to the shallow water near the shore whose depth was up to a man's chin. The defendants contended for the "chin deep" principle: the plaintiffs contended that the fishery of "Auiole" was an exception to this principle. It was, then, the plaintiffs' case to put in all competent evidence in chief to sustain the

boundaries of the fishing right as claimed by them, and the defendants having closed their case, it was not rebuttal to offer evidence of a former adjudication of a fishing right in another part of the lagoon, or to establish the exemption claimed for "Auiole" of the "Chin deep" principle. These facts were what the plaintiffs' witnesses had endeavored to establish in chief, and it would have been cumulative evidence and not rebuttal if put on after the defendants had closed. Where the title is the issue in an action of trespass it becomes similar to the action of ejectment, and the burden is upon the plaintiff to prove his title.

If the record of the Akeni v. Wong Ka man case had been offered in evidence as part of the plaintiffs' case in chief, it is impossible to ascertain from the bill of exceptions what relevancy it had to the issue then tried. If it was for the purpose of showing that another jury had found that in another part of this lagoon the boundary of the fishery of "Honouliuli" extended to the middle of the lagoon, this verdict would not be conclusive in regard to the title claimed in the present case, for an action of trespass settles nothing in regard to the title beyond the action tried. Chandler v. Walker, 21 N. H., 285.

We therefore overrule the motion for a new trial on all the grounds and the exceptions are dismissed.

A. Rosa for plaintiffs-appellants: C. Brown for defendants. Honolulu, February 28th, 1893.¹¹¹

The following article, entitled "Fish receipts at the Public Market" and dated May 8, 1898, is a report of fish sold at Honolulu Market. It states how many fish came from Honouliuli.

At the public market last week were received 47,144 fish. Maunalua, Koolau and Honouliuli furnished over 6000 each, Waianae and Mokuoeo 5000 each, and large quantities came from Kauhikapu, Waipio and Pu-uahale. Only 417 were caught in the harbor. There were over 25,000 mullet, and the remainder consisted principally of akule, alahi, aholehole, papai, awa and omaka. There was 548 flying fish captured last week. Receipts for last week show an increase over the preceding week of 6000, the increase coming from Waianae.¹¹²

This is a similar report, entitled "Items from harbor front" and dated June 2, 1898, which shows a significant increase in fish from Honouliuli.

¹¹¹Honouliuli Fishery Rights Case, *Hawaiiian Gazette*, March 28, 1893, p. 10.

¹¹²Report of Fish from Honouliuli Sold at Honolulu Market, *Evening Bulletin*, May 8, 1898, p. 1.

A total of 47,980 fish were received at the public market last week. Honoluluuli sent in 11,595 Maunaloa 7811, Koolau 7373 and smaller quantities came from Mokuoeho, Waikiki and Niu. Mullet were caught to the extent of 28,744.¹¹³

5.24 Ranches and the Land Development: Programs in Honouliuli, 1877–1894

Grazing of small herds of cattle, and eventually larger ranching operations, began to develop in Honolulu by the 1840s. Initially, native tenants and a few foreign residents vied for access to the land. By the 1860s, few native residents could compete, and individuals like Isaac and Daniel Montgomery, John Meek, James Dowsett, and James Campbell came to control the majority of the land in Honolulu. The consolidation of land title set the foundation for radical changes in the landscape, and also led to problems with access to the Honolulu fisheries, and changes in the makeup of the population of Honolulu. The articles in this section of the study focus on the large estates and ranching endeavors in Honolulu (fig. 5). The consolidation of title led to the formation of various business schemes like the "Honolulu Colonization Land and Trust Company," and large-scale development programs. The narratives also document the relationship between Honolulu business interests with those of other locations on O'ahu, in the larger development plans on the island.

The following regards a Honolulu land case, *Coney v. Dowsett*, which came before the Supreme Court of the Hawaiian Islands during the October term, 1876. The plaintiff, John H. Coney, claims damages caused by the trespassing of the defendant's, James I. Dowsett, cattle on his land. The opinion was written by Justice A. Francis Judd and dated Oct. 23, 1876. Lawyers arguing the case were L. McCully and E. Preston for the plaintiff, and A. S. Hartwell and W. C. Jones for the defendant.

This is an action in which \$10,000 are claimed as damages for the trespass of the defendant's cattle upon the land "Honouliuli" in Ewa Oahu, the property of the plaintiff, since Oct. 16th, 1875.

The jury returned a verdict for the plaintiff of \$200, and a motion is made to set aside this verdict and grant a new trial on the ground that the jury must have mistaken or disregarded the instructions of the court on the effect of certain leases under which the defendant justified, or that the jury misunderstood the evidence.

The first lease in question is dated March 3rd, 1846, and running for twenty-five years from the 1st of February of that year, expired on the 1st of February, 1871. It demises to John Meek and his heirs, the kula land at Lihue, and the privilege that his cattle should be undisturbed at Honouliuli, if they should go there.

¹¹³Report of Fish from Honouliuli Sold at Honolulu Market, *Evening Bulletin*, June 2, 1898, p. 8.

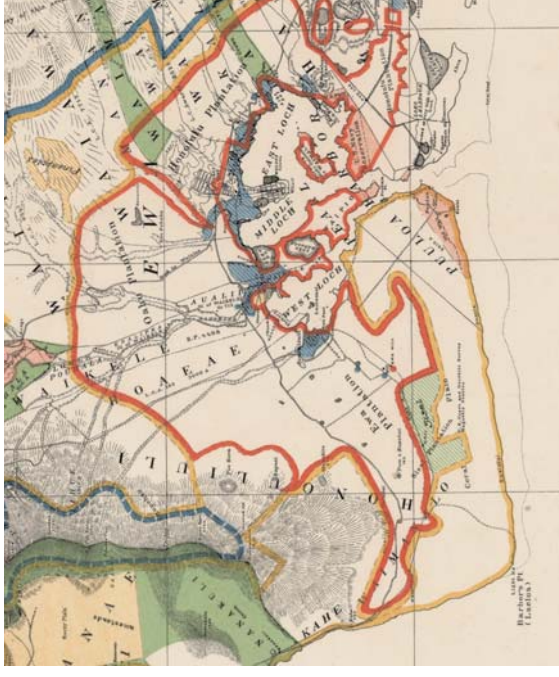


Figure 5: Portion of the Island of Oahu, W. E. Wall, Surveyor, 1902. Yellow lines depict the approximate area of grazing lands; orange lines depict the approximate area of sugar plantations; green lines depict the area of sisal plantation.

The second lease is dated 13th of July, 1851, and leases to John Meek and his heirs and assigns the land called Waimanalo, at Honouliuli, particularly as follows: The kula and the kuahtwi and the rights appertaining thereto, and the Poalimas, the river with all the rights appertaining thereto. It gives the boundaries as follows: On the mauka side the lands previously leased to John Meek, that is, the kula of Lihue and the kula of Honouliuli; on the makai sides Nanakuli and the Koolina. This lease expired on the 5th of July, 1876.

The third lease is dated the 16th of February, 1853, and it being for twenty-five years, does not expire until the 16th of February, 1878. By this

lease there is conveyed to John Meek, his heirs and assigns, all the remaining portions of the lessor's kula land at Honouliuli: this being explained as follows: All parts of this kula land not included in the previous leases made between A. Keliiahonui, M. Kekauonohti and John Meek for that land called Lihue, on the 3rd of March, 1846, and another lease between J. H. L. Haalelea and John Meek, of all that land called Waimanalo, on the 15th of July, 1851, the rents of these two lands shall continue and their lease, until the expiration thereof. They are not included in this lease. Before considering the reservations, which are made at length and with considerable particularity.

Let us go on to the fourth lease, which is dated the 1st of February, 1871, and which conveys all of that certain piece of parcel of land situated in the Ahupuaa of Honouliuli, district of Ewa, Island of Oahu, known as the Ili of Lihue, for seven years, and which will not expire until the 1st of February, 1878.

The plaintiff claims that lease No. 1 conveyed not only Lihue but a portion of the kula of Honouliuli, and builds up an argument in support of this from the words of description of Waimanalo, above given, in which the mauka boundary of Waimanalo is stated to be the kula of Lihue and the kula of Honouliuli, and that the portion of Honouliuli conveyed by the first lease and not included in the third lease, was not covered by the fourth lease, which was a lease of the Ili of Lihue only. The plaintiff claims that as there was abundant evidence that the defendant's cattle pastured upon this tract of land within the dates in which this trespass is laid, the award of the jury of \$200 is far from excessive and should be sustained. But can this position of the plaintiff be sustained?

The first lease conveyed only Lihue, the lessor covenanted in addition that the lessee's cattle should be undisturbed on Honouliuli, if they went there. This does not leave any portion of Honouliuli outside of Lihue, but only protected the lessee from being held liable for trespass if his cattle strayed on Honouliuli. This view is strengthened by the wording of lease No. 3, made in 1853, which shows the interpretation put by the parties on their previous leases after seven years of dealings with each other as landlord and tenant. This lease No. 3 distinctly says that the lease of 1846 was for that land called Lihue, and that the lease of 1851 was for that land called Waimanalo. Now, this lease No. 3 conveyed all parts of the kula of Honouliuli, not included in leases No. 1 and 2, it conveys all of Honouliuli except Lihue and Waimanalo and the reservations.

In a former case between the parties to this suit, the court held that if there exists an ambiguity in the lease, then such construction must prevail as is most strong against the covenantor, for he might have expressed himself more clearly. But there is no ambiguity here, except, perhaps,

the exemption from liability for trespass on Honouliuli, and upon the principle just stated it must be construed to be a mere license, the actual territory over which the license was granted in lease No. 1 being leased by indenture No. 3.

Waimanalo is described in the second lease as being bounded on the mauka side by kula of Lihue and of Honouliuli. This cannot be explained except upon the theory that its extent was not at that time well defined.

It is clear that the plaintiff does not claim now that Waimanalo stretches up to Lihue, and I am inclined to read the description in this way. The land previously leased to John Meek, that is the kula of Lihue and the kula of Honouliuli on the mauka side. Certainly, if Waimanalo is an Ili at one end of Honouliuli, it must have for one boundary the main body of the land of Honouliuli, where it joins the same. The clause "and the kula of Honouliuli." is not necessarily modified by the clause the land leased to John Meek.

It is claimed further by the plaintiff that as the lease of Waimanalo particularizes kula and kuahiwi as being two distinct classes of land, the kula being low land and kuahiwi being mountain land, and as the third lease does not mention specifically the kuahiwi of Honouliuli, it must be considered as intended to be excluded.

I am of the opinion that in this lease No. 3, "kula" means land not kalo land, however this may be, the "kuahiwi" is not excepted in the large number of reservations made and although the lease does not convey the right to actually take the wood in the kuahiwi, it leases the right of pastureage therein, for the kuahiwi is a part of "keia aina kula i komo ole iloko o na hoolimalima mua" (this kula land not included in the previous leases.) To lease the whole of a kula land, reserving certain specific portions and then to say that this does not cover kuahiwi or pali, puu, mauna, awaawa or other portions of land to which various topographical terms may be applied would be disingenuous, and it is so manifestly contrary to the intention of the parties as gathered from all these instruments as not to be countenanced by the court, I observe, in passing, that if the defendant is now liable for trespass upon the kuahiwi of Honouliuli or upon the portion of the kula of Honouliuli claimed by the plaintiff's counsel to be not conveyed by lease No. 3, he was liable for trespass for the same reasons on the list of February, 1871, the date when the first lease of Lihue expired.

I find therefore that as there was no part of the Honouliuli kula between Lihue and Waimanalo not covered by the leases to the defendant the jury were not at liberty to consider in making up their verdict the evidence of the trespass of defendant's cattle on this territory.

The lease of Waimanalo having expired on the 15th of July, 1876, the

jury were instructed that the defendant should be allowed a reasonable time after this date in which to take his cattle off from this land, and in which to restrain them from returning thither. The evidence of damages for trespass on Waimanalo by Dowsett's cattle since the lease expired, consists in statements of witnesses that they had seen his cattle on this land within the month past, and since the time when they were driven off by Dowsett's men. The particular evidence was given by Po who testified that he saw nine head there on the 20th of July, and sixteen head there on the 10th of August, but this witness was uncertain as to the boundaries of Waimanalo, and said they had never been pointed out to him.

When the testimony of Mr. J. H. Wood is considered, who testifies that Waimanalo is worth nothing for pasturage at present, as there is nothing green on it, it is clear that the amount of \$200, if awarded for damage for trespass on this land, is excessive, for if the jury found that defendant's cattle were allowed to remain on this land an unreasonable time after the lease expired, the damage awarded should have been but nominal and not beyond the statutory amount of 12 ¾ cts. for each animal.

The reservations in lease No. 3 are as follows: "These are the places reserved to the party of the first part; the fish ponds in said kula land, having fish in them, and two lots intended to be enclosed hereafter: also Mokumeha adjoining the enclosed taro lands: and also that piece between Kualakai and C. W. Vincent's lot; that places known as Ka pa Uhi is also reserved; the sea fishery and its rights are also reserved, similar to the Waimanalo sea-right reservation; also the Pa aina at Honouliuli and the said enclosure: and also the cultivatable land at Poupouwela, all of which are reserved and not included in this lease, but John Meek's cattle shall not be molested should they go on to these places reserved if not fenced in with a fence sufficient to prevent cattle from trespassing; Poupouwela will still remain as in times gone by, and is not intended to be fenced in as its situation is good, not needing a fence. The tabooed woods of the mountains of the lands mentioned in this lease are also reserved to the party of the first part, but he, John Meek, can take said tabooed wood for his own use, as much as he wishes, but not to dispose of to other parties."

The clause, "but John Meek's cattle shall not be molested should they go on to these places reserved, if not fenced in with a fence sufficient to prevent cattle from trespassing," fixes the obligation upon the lessor to keep his reservations fenced, and as there was no evidence offered to the jury to show that this was done, they were not at liberty to found their verdict upon evidences that the cattle of defendant were accustomed to graze and get water on the reserved portions. It is urged that though the lessor covenants that the cattle shall not be considered as trespassing if

they shall go on the reserved portions, unless fenced, still the evidence shows that the cattle were continually on one of these portions, that is Pa aina, for water, and that this is in excess of the license, and therefore trespass would lie. I am of the opinion this is not sound, for there could be no trespass on Pa aina, unless fenced with a fence capable of turning stock.

The law will not allow a pit-fall for the un-wary to be thus dug, when it was possible, in framing the lease, to make the intention of the lessor to hold his tenant to such a liability more clear.

As regards Poupouwela, its aina mahiai is reserved. This is translated cultivated or cultivatable land. Whichever rendering is taken there is no evidence that Dowsett's cattle trespassed upon either the cultivated land or the land capable of cultivation in Poupouwela. The evidence was confined to the statement that the cattle driven from Waimanalo between the 11th and 18th of July were driven from Lihue to water at Poupouwela and back again, but there was no evidence that this water was in the limits of the aina mahiai. I am of the opinion, though the jury were not so instructed, that no trespass could be maintained even on the aina mahiai of Poupouwela, as the clause in reference to immunity from trespassing applies to it, and the lessor disavows his intention of fencing it, as the situation of the land did not require it. The legal inference from this is, that he took the risk of cattle trespassing on it, though unfenced.

The jury were instructed in regard to the testimony that the cattle of defendant had spread a thorny acacia over the land as follows: That the plaintiff could not recover damages for this if done while the cattle were lawfully upon the plaintiff's land, for he must be held to have foreseen the natural result of the pasturage of cattle in disseminating weeds and thorns on his lands, when he made the lease; and as regards acacia being spread on Waimanalo, the defendant could only be held liable for whatever damage was thus done since July 15, 1876, of which there was no distinct evidence.

The court charged the jury that up to the 15th of July, 1876, when the Waimanalo lease expired, the defendant had the right of exclusive possession of all Honouliuli except the reserved portions, but on suggestion of plaintiff's counsel made the qualification that if the jury found that there was any portion of Honouliuli conveyed by lease No. 1 and not included in lease No. 3 and not re-conveyed by lease No. 4 they might find that trespass was committed on such portion. In giving this modification the court had no intention of allowing the jury to infer that there was any such un-leased portion of Honouliuli, for it had charged the contrary. But this may have misled the jury, which is to be regretted.

It is apparent to me that the jury must have understood the instructions

of the court upon the evidence of trespass upon any portion of Honouliuli, except Waimanalo, and as to Waimanalo, if the verdict was founded upon trespass on this land, the amount of damage is so clearly excessive as to lead to the inference that the jury based their assessment of damage on some erroneous principle.

Exercising the sound and legal discretion vested in me, I am of the opinion that the verdict should be set aside and a new trial granted which is done accordingly.¹¹⁴

More on the Coney v. Dowsett case is below.

John H. Coney vs. James I. Dowsett.

On Exceptions to the Decision of Mr. Justice Judd.

Present: Chief Justice Allen, Justices Harris and Judd.

The question upon which the opinion of the full court is desired, is the construction of the leases on file in the case.

The arguments of the counsel for the plaintiff are exceedingly ingenious, and we have given them full consideration. We have likewise reviewed and weighed the opinion given by Mr. Justice Judd, which is excepted to and we concur in that opinion fully, seeing no reason for altering, amending or expanding it.

The jury will be instructed in accordance with this opinion, in case a new trial is proceeded with.

Elisha H. Allens,

Chas. C. Harris,

A. Francis Judd.

E. Preston and L. McCully for plaintiff, A. S. Hartwell and W. C. Jones for defendant.

Honolulu, Dec. 29, 1876

Below are several articles from *The Daily Bulletin* comprising a series that describes a tour of the Honouliuli Ranch. The first installment is entitled "Viewing the Ranches."

If observation is anything, and scientists say it is everything, these hills and glades go to prove that at least the island of Oahu has been perverted from its original purpose in the economy of nature, and that "someone had blundered." Inasmuch as large areas of its best lands are devoted to the sustenance of the cow, the ox and the goat, the people to

¹¹⁴Honouliuli Land Case—Coney v. Dowsett before the Supreme Court, *Hawaiian Gazette*, January 17, 1877, p. 4.

shift for themselves as best they can about the docks and street corners of Honolulu. Where cultivation appears, it proves an unmistakably grand success. Wherever improvements break up the soil, the soil gives manifold returns. Coming over the brow of one of the hills, an immense structure appears in the distance. It reminds the observer of the bridges over some of the mountain gorges on the line of the Union and Central Pacific railroads. It turns out to be Robinson's irrigating flume, running along on trestle work over a wide gorge at the bottom of which is the Waipahu stream and spring. The road leads down towards the water, and passes under the highest part of the trestle bridge, the flume at the roadway being apparently about eighty feet overhead. Right by the road is a big pump for raising the water to the flume. It is brought by this conduit to Robinson's banana plantation. Covering about fifty acres of land at Ulalena. There is an opinion among the natives that this Waipahu stream has subterranean connection with Kahuku. In support of this theory the story goes that a woman at Kahuku accidentally let a tapa stick fall into the water, and all efforts to recover it proved futile, but some time afterwards being at Ewa, she saw her lost tapa stick and accused the possessor of having stolen it, but the alleged pilferer was acquitted on proving that the stick had been picked up in the Waipahu stream. The "fourth estate" cavalcade passes on, and after another hour's equestrianism, that by this time is beginning to be more painful than romantic to some members of the party, the Honouliuli ranch is reached, horses are taken care of, the pressgang, professor and all, are shown to well-furnished apartments, and every man is hospitably directed to make himself perfectly at home. A sumptuous dinner soon follows, the soup and fowl are excellent, and the fish, a fine Papiopioulua, is simply magnificent. In next letter, you will have an attempted account of a two days' ride over the great Honouliuli ranch, covering a tract of about 43,000 acres.¹¹⁵

The article below is the next one about Honouliuli Ranch.

With a good horse and agreeable companions the ride from Honolulu to Mr. Campbell's ranch at Honouliuli a very pleasant undertaking, and so it proved to a party of gentlemen of the press and others who made the journey on Monday last.

To a traveler who has not been over the ground for some seven or eight years, considerable changes are observable, chiefly in the direction of increased farming and cultivation. The extent of rice and banana land is much enlarged, and Mr. Mark Robinson's flume and pumping engine at

¹¹⁵Honouliuli Ranch, *Daily Bulletin*, August 14, 1885, p. 4.

Ulaelena is a remarkable piece of work. Though apparently of the slightest conceivable scantling it stood through the late gale without injury. This flume irrigates over 200 acres of land fit for banana, watermelons and a variety of produce and of which 35 acres are in bearing.

Of Honouliuli itself there is a great deal to be said. Mr. Campbell's estate contains about 13,250 acres and has been in his hands for eight years. During this time he has put up 30 miles of fencing of which 20 miles are of wire and 10 miles of batten. The estate is thus completed enclosed; either by fence, by the impenetrable ridges of the Waianae Mountains, by the water front of Pearl Harbor or by the open ocean, Hon. J. I. Dowsett's place at Puuloa cuts off a corner stretching from Pearl River to the seabeach behind. There is little of any of this land which is not capable of being made productive in one form or another. At present it only carried 5500 head of cattle, and one rides along the foot-hills of the Waianae range and the plain below through miles of Manienie grass above fellock deep, only sprinkled here and there with high bred cattle in splendid condition. Occasionally one comes to a batch of some acres of mimosa bush and sometime of blue weed. Again on the high plateau on the western terminal slope of the mountains large batches of Spanish clover, kukaepuaa are amongst the prevalent manienie.

On taking possession of the property, Mr. Campbell found it heavily overstocked and wholly unfenced. Buying out the Kahuku property on the north side he caused to be removed 32,300 head of cattle, reserved Kahuku for breeding purposes, and after letting the land rest for twelve months, gradually raised the stock on the two estates to the present figure, viz, about 5300 on Honouliuli and 3300 on Kahuku.

The young stock are driven from the last named place to the Eastern, or Lihue end of the former, and so onwards till they reach the fattening ground of some 15,000 acres, towards Nanakuli and thence is an easy drive to the slaughter house on the Pearl Harbor, whence the carcasses are carried by steamer to the Capital, thus avoiding the deterioration inseparable from long drives to market.

Among the ravines and narrow valleys between the span of the main mountain range towards the Leilehua boundary, are evident traces of extensive taro grounds, sufficient proof that there at least, abundant supply of water has formerly been available. Though the great bulk of the land from Honouliuli to the "big tree" is available at present for cattle runs only, there seems to be no reason why, at reasonable expense a good portion of this might not be irrigated for dairy, grape, vegetable and many other marketable produce.

A well at Kunia, 400 feet above the sea and sunk 50 feet brings water to within twelve feet of the surface, except during long droughts, while an

Artesian well (Waianian) about fourteen feet above sea level has yielded 2,400 gallons an hour since it was sunk in 1879. The water front on Pearl Harbor affords on one side promising bathing places, while the whole area of the sheltered harbor offers unrivalled opportunities for yacht sailing. The rice grounds are in the hands of the Chinese, who pay a low rental for the first seven years, which are nearly expiring, but they are desirous of renewing for another seven years at a considerable advance.

Fishing rights, lime and building stone are also valuable considerations. The soil almost throughout his estate is the rich red volcanic mould familiar in these island, its depth is shown by the numerous cracks and slopes, and its fertility by the spontaneous growth which covers it.

At present the Campbell estates send an average of six carcasses per diem to Honolulu being rather more than one third of the consumption. The cattle are all in prime condition, and judging from the large areas on which mere traces of cattle are now visible and the immense amount of available feed, this quantity could be readily increased by 50 per cent without distressing the land. No doubt a large portion of this land is available for cultivation by small freeholders; how much, can only be ascertained by experiments in the way of raising and distributing water, especially between Honouliuli and Lihue. The questions of market and ready access thereto, may be left for the present to await further information based on actual experiments.

At the ranch itself Mr. Cecil Brown did the honors in most hospitable style, and rode each day with the party ready to lead the way over the country and afford every information asked for, and to him members of the party are indebted for a pleasant trip.¹¹⁶

Another installment about the ride through Honouliuli Ranch is entitled "Tuesday, Aug. 11th," and describes the ranch as one arrives from Waialua across Wai'anae Uka.

Passing on, the party soon reach the Kunia windmill, drawing from a well about thirty feet deep a continuous stream of water. The elevation at this point is estimated to be about 450 feet above sea level. The Kunia windmill is about as good an indicator as can be that these lands may one day be doctored over with the habitations of an industrious agricultural population. If one windmill draws a continuous stream of water from a depth of not more than thirty feet at this elevation, it may reasonably be inferred that a water supply for purposes of settlement can be had at other points as well as here.

¹¹⁶Honouliuli Ranch, *Hawaiian Gazette*, August 19, 1885, p. 2.

The next halting place is in the umbrageous shade of the Big Trees at Lihue. There are two gigantic kukui trees standing about ten feet apart, on the top of a high hill, like sentinels keeping guard over the surrounding country. As every object of not must have a legend, that of the Big Trees is that a native has his six by two resting place under each tree. Several visitors in years gone by have carved their names on the bark, thus leaving to the kukui trees the sacred trust of bearing their names, as the years roll on, higher and higher in view of all who pass this way, in proof of the fact that they had at least made their make in the world. Nearby is a dilapidated old building, once the residence of Captain John Meek. With reference to the capabilities of the soil it is related that Captain Meek raised oats and corn here in his time.

A few miles further on, another halt is called at a magnificent stream, and right by is a fine dairy kept by a Portuguese. It need hardly be said that every milk drinker in the party had his wants supplied to his own satisfaction and the credit of the ranchman's cows. The outward bound ride at length comes to an end at the Papowela [Poupouwela] stream and well. Here, a hole was bored years ago with hand tools, and, as the water did not come at the time, the pipe was plugged. Six months after the plug was taken out, the water flowed and has flowed on ever since.

The order rings along the line, "Back to the ranch house." The march back is close along the line of the Leilehua Ranch. About half way down the home stretch, the ride is mostly over level ground. A gallop of a mile or so over a rich carpet of verdure, then a slow march down a steep bank and across a ravine under clusters of kukui nuts, and up the opposite bank, then off again on another steeple chase (all but the steeple), over another ravine, and so on for five or six miles. Occasionally we pass a drove of cattle, so rolling fat that their sleek coats glisten in the sun. The ilima plain traversed in the morning is again entered, though on a different trail, and at half past one, P.M., a rather sore, but much delighted party of the wise men of Honolulu are luxuriating in the bath room, on the breezy verandahs and at the sumptuous dinner table of the Honouliuli ranch house.

The article continues with an account of "Wednesday, Aug. 12th."

This was the second day's riding over the Honouliuli Ranch, and a more exciting and romantic excursion could hardly have been made. The start was made, as before, from the ranch house, and lay over a part of the wide flat traversed yesterday, and which, as before stated is well covered with the ilima, indigo and other shrubbery much relished by cattle. The shrubbery, I omitted to mention yesterday, is richly supplemented by an

undergrowth of manienie grass. The route this morning is to the mountains. The climbing begins. Looking forward and upward at an angle of about 40 degrees to a height of some 800 feet, the first peak to be scaled [Pohakea] is in full view. The prospect is not a comfortable one to the ranch horses. They face the acclivity, however, with commendable equine determination, pawing their way with sure-footed care up the slope, through heavy grasses growing knee-high. The whole slope is heavily coated with manienie and native grasses, and some Spanish clover, and is well dotted over with trees, chiefly the kukui. After reaching the top of the first peak, the trail winds down, corkscrew fashion, through heavy verdure and under the umbrageous shades of large wide spreading trees into a deep ravine, out of which there is another corkscrew trail up on to the next peak and reaching a little farther into the clouds. Parts of the trail just gone over runs along the margins of immense gulches into which the rider looks down over precipitous descents of some nine or ten hundred feet through the dense foliage of trees that have somehow got rooted in the sides of the declivities, so that they suggest the idea of an aerial vegetation. The prospect up these mountain sides and through these ravines, is grandly picturesque. These exhibitions of mountain scenery grow upon the view. The first hour among them extorts expressions of wonder and admiration. Passing on, their majestic grandeur repeats itself in ever increasing variety. The faithful horses climb almost perpendicular ascents over the rugged natural stairways, and again descend similar hard places, with equal care and safety. "Jerry" proved himself an able and reliable steed. "Sooner," by the way, had been discarded, as deficient in intellect and understanding, and unfit for the service of the Bulletin. But "Jerry" is an intelligent big bay, wanting neither whip nor spur, but always knowing just where to go, and regulating his paces with infallible correctness, whether on the slow march over rough and rugged ways, or on a streaking gallop over pieces of smoother roadway. Midday finds the whole party on the highest point, but one, of the Waianae. The scene at this point is grand. It is magnificent. It is stupendous. We stand here on the rim of an immense basin scooped out of the mountain, with the seaward side broken out. This vast cavity is about a quarter of a mile wide, with almost perpendicular walls a thousand feet high. Beyond the basin northward, the mountains shoot up skyward in colossal isolated cones. Spreading out in the spacious concave of the western horizon, are the deep blue waters of the great Pacific Ocean, the "boundless, vast, illimitable waste of waters." The Nuuanu Pali, with all its grandeur, is surpassed by this exhibition of nature's wonders in the Waianae. All these mountain elevations, with their deep broad gulches are valuable, from the utilitarian standpoint as they are from the romantic and senti-

mental. Herds of splendid cattle are seen feeding on the slopes and in the valleys. The cavalcade moves on down the seaward side of the mountain, in view of thousands of acres of flat land lying along the seashore. These seaward paddocks are pointed out as the territories that will be in order for the explorations of to-morrow...

The story ends on the third day, when the party returned to 'Ewa via the low land trail. This is the account of "Thursday, Aug. 13th."

The trail leads over coral which is evidently upheaval. Up through every crevice and around every boulder, big and little, there are thick growths of pili, makueke, pualele (milk weed), manienie, Kukaepuaa and other native grasses. At one place, a cavity in the rocks contains luxuriant growths of breadfruit, bananas, sugar-cane, and numbers of williwili trees, with their exceptionally pretty red seeds. The natives say when these seeds are ripe and red, there are plenty sharks off Puuloa. On the lower part of this land among the rocks, fine clumps of algaroba trees appear in different stages of development. All these trees have grown up within about six years. The large progeny of baby algarobas whose frowsy heads appear here and there over the plains, if not nipped by cattle would evidently evolve, within a very few years, a race of sylvan giants. Cattle kept off, and the natural propagation of these fine trees assisted by some planting, there is here the possibility of a big bonanza in a ten thousand acre forest within ten miles of the city of Honolulu. As pasture land this portion of the land is unsurpassable in richness. It is the part of Honouliuli designated the fattening paddock. Cattle intended for the slaughter house are brought here to have the "gilt edge" finish put on them. About six head are slaughtered every day for the Honolulu market and forwarded by the steamer Kapiolani. The ranch is capable of supplying a much larger daily quota of beefs, but the demand is limited and the ranch is of course stocked considerably short of its capacity. There are at present on it some 5,500 head all told. But if the grasses, and other plants in their present condition, mean anything, they indicate enough and to spare for herds numbering twice five thousand.

A fact deserving of special note is the improved breeds with which the ranch is almost wholly stocked. Durhams, Herefords, Jerseys, Ayrshires and Holsteins are pointed out. And, really, it needs not the eye of a connoisseur or a grazier to notice that the animals are no "square piles of bones built on four uprights of the same" for no one can view them roaming in herds over the mountains, scattered in squadrons over the plains or massed in closer order around the reservoir on the fattening paddock without noticing many of the points of superiority characteristic

of the several varieties of improved stock...¹¹⁷

5.25 Great Land Colonization Scheme

The Great Land Colonization Scheme was headed by Benjamin F. Dillingham for lands at Kahuku, Waimea, Kawaihoa, and Honouliuli. He formed a joint stock company called the Hawaiian Colonization Land and Trust Company. The company would purchase the lands, and divide and develop them for convenient purchase or lease [8:151-152]. The businessmen associated with the scheme are as follows:

Dillingham, president of the Pacific Hardware Co. and owner of the railroad, was the chief promoter. Other principals in the scheme were James Campbell, owner of the Honouliuli and Kahuku estates; John H. Pate of Bishop and Company Bank, primary owner of the Kawaihoa and Waimea estates; and M. Dickson and J. G. Spencer, part owners of the Kawaihoa and Waimea ranches. [8:152]

The following articles are a prospectus for the Hawaiian Colonization and Land Trust Company, which were published in the *Daily Honouliuli Press*. It contains a section describing the Honouliuli Ranch, one of the properties involved in the scheme.

A property of 115,750 acres offered for sale to a joint stock company, which will sell the same as suitable for sugar, rice, grazing, homestead, dairy, fruit and other purposes.

63,250 acres in fee simple and 52,500 acres held under lease, at present carrying between 12,000 and 15,000 head of cattle and 250 horses and mules.

A large area of this property is suitable, according to locality, for Sugar, Rice, Vineyards, Fruit Orchards, and small Homesteads, the remainder being fine mountain side grazing ground.

Under the proposed arrangements of the Company to be formed an exceptional opportunity is offered for acquiring homesteads, by a system of deferred or gradual payment as may be agreed upon; the whole being within easy reach of Honolulu, the capital city and principal port, with a steadily growing market.

Climate.

The climate is pre-eminently healthy, the North-east trades sweeping across the island for the greater part of the year.

While there are no available registers barometer, thermometer or rainfall for this particular district, there is no reason to question their strict

¹¹⁷Honouliuli Ranch, *Daily Bulletin*, August 31, 1885, p. 2-3.

analogy with that of the Nuuanu Valley, in the same island, and in which Honolulu and its suburbs are situated, where the rainfall amounts to 33.28 inches per annum from a minimum of 0.94 in March to a maximum of 3.43 in December; but these figures relating only to the lower levels in and about Honolulu do not by any means represent the rainfall on the Waianae Mountains, which is very much heavier.

Thus the temperature may be said to range from 68 to 85 Fahr., varied of course by situation, elevation above the sea, accessibility to trade winds, &c.

Honouliuli Ranch

Containing 43,250 acres in fee simple. This land is favorably situated, having direct communication with Honolulu by water, distance 10 miles or by land by a good road, distance 17 miles, the latter offering singular facilities for an inexpensive railway track.

The water route to Honouliuli is from Honolulu harbor skirting the reef to Pearl harbor, a magnificent inlet of the ocean protected by a reef or bar with 11 to 13 feet, but inside with from 20 fathoms to 3 fathoms of land-locked, protected anchorage, fit for all classes of coasters and yachts. On the west arm of this harbor Honouliuli has a frontage of no less than five miles, all steep-to, with from three to twenty fathoms in front of it. The whole fishing rights of this west arm are part of the property.

Honouliuli Ranch is bounded by the sea and Pearl River on two sides, and extends in a westerly direction to the divide of the Waianae Mountains which form a natural boundary so well defined and so difficult to pass as to render fencing on this line unnecessary. But where Honouliuli adjoins the neighboring properties, it is securely fenced. There are twenty miles of five-wire fence with redwood posts, and ten miles batten fence, all in good order and erected within the last seven years.

Stretching from Pearl harbor and skirting the base of Waianae mountains southward and eastward is a plain of about 7,000 acres of rich alluvial soil, eminently suitable—the upper portions for sugar and the lower for rice lands. Of these latter, from 3,000 to 4,000 acres may be irrigated by artesian wells, the elevation above high water mark being between 12 and 35 feet. One well sunk in this district in 1881, to a depth of 186 feet, has yielded unceasingly 2,400 gallons per hour since completion.

On the eastern slopes, among the foot hills of the Waianae mountains, are over 10,000 acres of land, suitable for small farms, vineyards, orchards, &c. Several perennial springs flow through these valleys and ravines, and the extensive traces of taro culture show that in the hands of the old natives there was no lack of water.

Wells have been sunk at elevations from 400 to 700 feet above the sea

level. Water was found at from 30 to 60 feet below the surface. One is a flowing well; on the other a windmill suffices to raise drinking water for surrounding herds.

The ravines of the Waianae slope are narrow and readily lend themselves to favoring the construction of storage dams for purposes of irrigation.

The Waianae mountains attract or precipitate a sufficient rainfall in ordinary seasons for the maintenance of the present heavily-grassed condition of the slopes, and due attention to the forestry will enable them to carry more numerous herds of cattle than those which now fatten hock-deep on the Manienie or Bermuda grass.

The lower and more open slopes are suitable for dairy, poultry or fruit raising. They are within easy reach of the main road to Honolulu, and when peopled must soon invite the construction of a railway to the capital.

The sugar cane and rice land of this property is valued at from \$100 to \$200 an acre, and may be taken up in large or small tracts at these figures; the grazing, farm and fruit lands are valued at from \$10 to \$50 per acre. It is at present intended to offer some 10,000 acres of first-class agricultural land for sale, upon convenient terms, at \$50 an acre for colonization purposes, for resident and improving occupants.

The Kahuku Ranch

Consists of 20,000 acres in fee simple and 5,000 acres Government leasehold, the leasehold having an unexpired term of 17 years, at an annual rental of \$455.

On the estate is a level tract of land at an elevation of from 10 to 25 feet above sea level, extending from Waimea to Laie, a distance of eight miles of sea frontage, and an average breadth of one mile from the sea to the foot hills. This tract is pronounced by competent judges to be excellent sugar cane land. There are already flowing artesian wells on either side of this level tract, while near the middle is an unfailing spring in which the water rises to within 2 ½ feet of the surface, in a column of at least one foot in diameter, and flows thence to the sea. This proves that an ample supply may be found for irrigation.

There have been offered by rice growers to the present owner \$10,000 a year for 400 acres of this land, water for cultivation being furnished.

A contract has been made to bore five additional artesian wells to comply with this requirement.

It may be incidentally noted here that in no case on this island of Oahu has boring for artesian wells failed if sunk from an elevation not exceeding 32 feet above sea level.

There are about 15,000 acres of land suitable for fruit, small farms or pasture, on the Kahuku property, estimated as salable for colonization purposes at from \$15 to \$30 per acre.

Kawailoa and Waimea Ranches

Contain 23,000 acres surveyed land, and about 20,000 acres unsurveyed, all held on lease having an unexpired term of 24 years, at a yearly rental of \$2,200. This rental is at present reduced to \$1,700 by sub-letting a few acres of taro (wet) land. There are 36 miles of new 5-foot wire fence set on California redwood posts. It is further sub-divided into paddocks of from 200 acres to 4,000 acres each, enabling the proprietors to pass their stock from one feeding ground to another as may be advisable.

This land is well adapted throughout for fruit growing or pastoral purposes. There are several wells with windmills on them to supply water for stock. One reservoir of this kind has been built at the Kawailoa Ranch with a retaining wall 150 feet in length, 100 feet thick at bottom, 5 feet at summit, capable of storing 1,127,500 cubic feet of water, for an outlay of \$2,250. This indicates what may be done at the Honouliuli Ranch.

General Remarks.

Kawailoa and Waimea Ranches adjoin Kahuku, and together form a compact property containing 72,500 acres of land. The Honouliuli property is distant about twelve miles, but is connected with them by an excellent road. These properties have at present 66 miles of good fencing. The land is well grassed with a fair proportion of timber throughout. Livestock of all kinds thrive and fatten on the pastures, and by increasing the number of enclosed paddocks and working the combined estates systematically the number of cattle and horses on the land might be largely increased.

The number of cattle, 12,000 to 15,000. Now on these estates has been already mentioned, also 250 head of horse stock and mules, together valued at \$312,000. The horned cattle are bred from "Hereford" and "Short-horn Durham" imported for these estates, and they thrive and fatten without any stall feeding or housing.

The horse stock is exceptionally good, one sire, "Shenandoah," having won over \$20,000 as a two-year-old in the United States. There are also three trotting stallions, two of which cost \$1,000 each, and there are unbroken colts and fillies from these sires, some four or five years old, which may be readily broken for saddle or harness.

These properties, if united, would give the proposed company a controlling interest in the Honolulu market, for produce of all kinds, with a steadily increasing demand; to which the contracts recently entered into

by the Pacific and Oceanic Steamship Companies may prove a valuable stimulant. Indeed it is possible to create a trade with San Francisco for carcasses of beef and mutton carried in refrigerating chambers by the Oceanic Steamships.

The income from these estates at present, including leases, is \$70,000 a year. Moderate calculations show that these figures might be nearly quadrupled.

The fishing rights on Pearl harbor pertaining to the Honouliuli estate, now leased for a short term at \$1,700, can be rented at \$2,500 on the expiration of the present lease.

A limestone quarry on the Honouliuli property at present pays a small annual rent, and a royalty on the lime produced. The entire demand for this kingdom may be supplied from this quarry, instead of, as hitherto, importing lime from California. The builders of Honolulu consider this lime superior in quality and preferable to the Californian lime. There is also a fine limestone quarry on Kahuku Ranch.

The five mile frontage on Pearl harbor spoken of suggests a town site for a summer resort there, the facilities for yachting and boating being unsurpassed, while the climate is all that can be desired.

A vast variety of fruit or timber trees grow with extraordinary rapidity. The whole Eucalyptus family, the algarroba or locust tree (pseudo-acacia), the tamarind, "alligator pear," guava, bread fruit, &c. Citrus fruits especially thrive without care or cultivation. Many ornamental woods known as koa, kou, ohia, &c., grow well. India-rubber (caoutchouc), quinine (cinchona), and perhaps above all the ramie will flourish, each in its suitable locality, which may be found on these estates.

Proposed plan for forming a Joint Stock Company to purchase, sub-let, sell or work these Estates.

It is proposed to form a Joint Stock Company to buy the properties described below, both freehold and leasehold, to divide them for purchase or lease on convenient terms, and to work the unsold or unleased portions for the benefit of the shareholders.

To be held by the promoters of the Company, viz., Jas. Campbell Esq., owner of the Honouliuli and Kahuku estate; Jno. H. Paty Esq., of Messrs. Bishop & Co., Bankers, principal owner of Kawailoa and Waimea estates; M. Dickson Esq., and J. G. Spencer Esq., part owners of Kawailoa and Waimea ranch; Mr. B. F. Dillingham, President Pacific Hardware Co.

As soon as 8,000 shares of the capital stock have been subscribed for by responsible persons, the Company will be incorporated and the stock issued.

Receipts from the sale of the stocks will be paid over to the owners of the properties. Deeds, leases, and bill of sale of landed property and

Property consisting of—

63,250 acres in fee...	\$ 822,250
Capitalized value of leased land, 52,500 acres...	\$ 65,750
15,000 head cattle at twenty dollars each...	\$ 300,000
260 head horses, &c...	\$ 12,000
	\$1,200,000

The Company's stock to consist of—

12,000 shares of \$100 each...	\$1,200,000
8,000 of said shares, par value \$100 each...	800,000
To be offered for sale and	
4,000 of said shares, par value \$100 each...	\$ 400,000

of live stock to be placed in the lands of the officers of the Company appointed to receive them.

The following gentlemen have consented to accept office: President, James Campbell. Vice-President, J. H. Paty. Secretary and Treasurer, Godfrey Brown.

The following gentlemen have consented to be nominated for Directors: James Campbell, J. H. Paty, S. G. Wilder, A. J. Cartwright, W. F. Allen, S. B. Dole, W. Austin Whiting, W. R. Castle, B. F. Dillingham. General Manager, B. F. Dillingham, Sub-Manager, M. Dickson.¹¹⁸

The following, published about 3 weeks later, also in the *Daily Honolulu Press*, informs that further information on the scheme is forthcoming. It succinctly describes the objective of the scheme.

The Hawaiian Colonization Land and Trust Company have issued a preliminary prospectus setting forth the merits of the Honouliuli, Kahuku, and Kawaihoa and Waimea ranches. The introduction to the prospectus contains the following clause: "The object and purpose of this company shall be to purchase the land and leases herein-after described, also other desirable property in the Kingdom which may be offered for sale or lease upon favorable terms, and sell or sub-lease them for colonization purposes, in lots or parcels to suit purchasers, and upon terms which will make it not only possible but convenient for those with very limited means, to gain a 'foot hold' in this country." Occasion will be taken here-after to review the scheme at greater length.¹¹⁹

¹¹⁸Great Land Colonization Scheme, Island of Oahu, Hawaiian Islands, *Daily Honolulu Press*, October 31, 1885, p. 2.

¹¹⁹Honouliuli Colonization Land and Trust Company, *Daily Honolulu Press*, November 19, 1885, p. 3.

Subsequently, further review of the scheme from the *Daily Honolulu Press* is offered in this article entitled "The colonization scheme."

Government are the natural guardians of the people; therefore to protect the rights of an individual is no less the duty of their rulers than it is their duty to foster schemes for the development of the country's natural resources. While it would be impracticable in most instances for a Government to become a party to a corporation, yet it can give protection and add support to its subjects, who are its direct agents for the improvement and development of the country at large. But development is a basis for security, and increased security means financial protection, and financial investment always assumes that the Government is a natural guardian under whom both capital and industry can rest secure and increase without molestation.

It follows that all reasonable projects for developing the resources of these Islands should be furthered and protected by this Government. It is the duty of every citizen to aid in bringing about such a state of reciprocal interests. Such a chance is now offered both Government and citizens in a scheme for the colonization and development of the Island of Oahu by a bona fide joint stock company, known and existing under the style and name of the Hawaiian Colonization Land and Trust Company. The men whose names figure in the preliminary prospectus of the company preclude any doubt as to the sterling worth and merit of this enterprise.

It is proposed by this company to buy up some of the great landed estates of these Islands, the present scheme embracing the Honouliuli ranch containing about 45,000 acres of land, the Kahuku ranch containing about 25,000 acres and the Kawaihoa and Waimea ranches containing about 45,000 acres of surveyed and unsurveyed land. The company proposes to sub-let, sell or work these estates on terms the most favorable to settlers, as will be seen by perusing the preliminary prospectus heretofore published in the press, as well as in pamphlet form for general distribution.

Some of the main points connected with the situation and resources of these ranches may be briefly summed up as follows: The different properties are easy of access either by land or water; they are all fertile valley lands or fine uplands for grazing; all the properties are well watered by springs, artesian wells and natural water sheds with easy constructed reservoirs; they are all well stocked, well grassed, well wooded and well fruited; they contain excellent fishing possibilities which may be practically developed into an immense source of revenue; these different ranches are capable, according to locality, of producing sugar and rice, vineyards and fruit orchards, and are also suitable for small farms or

larger grazing tracts.

One of the main things to be taken into consideration, in the present offer of the company, is, that each and every one of the properties embraced in the scheme is at the present time a paying property. Another feature to be looked at is, that no matter how poor a man may be he can enter upon the land offered and by his own labor and enterprise can not only make a living but can lay by enough money to purchase in a few years, on the installment plan, the homestead upon which he lives, thereby rendering himself and his family independent.

The scheme is a gigantic one but it is backed by men of sterling moral and financial worth, who will use every endeavor to carry it through to a successful consummation. Embracing as it does an estate containing 63,250 acres of land in fee simple and 52,500 acres of leasehold land, it is a scheme that necessarily calls for foreign immigration and home support. What one man may do for the development of these Islands has already been seen and appreciated by many; what an organized company of our best citizens can do, with the proper support from the Government, will by far eclipse any instance of private enterprise and will open up and develop the resources of Hawaii until public debts will not only be a thing of the past, but "Money to Lend" will be posted in every doorway from the Government building to the confines of Chinatown.¹²⁰

This article from the *Daily Bulletin* provides a breakdown of the figures associated with the scheme: the acreage, the sugar yields, and the expected income of lessees and investors.

A communicated article in a contemporary presents some of the sources of profit to investors, and advantages to settlers, held in prospect by the promoters of the "Hawaiian Colonization, Land and Trust Company." For the information of our readers we summarize the leading facts. The Honouliuli territory, of which the company has the refusal, contains 17,000 acres of land suitable for growing sugar cane. Of this amount 7,000 acres are comprised in a plain requiring artificial irrigation. To effect that object artesian wells are proposed for the portion lying at an elevation not exceeding thirty-five feet above sea-level, and a series of dams, in a natural gulch, for higher levels. Both means are proved feasible beyond any reasonable doubt, by the complete success attending their adoption, under similar conditions and in contiguous areas, their estimated cost, for this company's purpose, is \$125,000. When the land is furnished with watering facilities, it is assumed that at least from 2,500 to 5,000 acres will be occupied by responsible cultivators of sugar cane. The cane would be

¹²⁰The Honouliuli Colonization Scheme, *Daily Honolulu Press*, November 30, 1885, p. 2.

raised on shares, in the proportion of, say, five-eighths to the planter and three-eighths to the company. Milling facilities, with transportation of cane to mill and sugar to place of shipment, should be provided by the company, while the planters should do the harvesting and loading. Four tons to the acre is the very lowest estimate of the soil's productiveness, but experience dictates a higher figure by two or three tons. Taking the smallest amount of both land and yield, however, we have 2,500 acres producing an aggregate of 10,000 tons of sugar. Of this the company's share would be 3,750 tons, worth, at present value, \$375,000 net. As to the cost of accomplishing the result just given, the author of the article herein drawn upon presents the following statement:-

Cost of 30-ton mill, say...	\$150,000
Cost water supply for mills and dams...	\$125,000
Cost tramway and cars for trains porting cane and sugar, say...	\$25,000
Total estimate outlay...	\$300,000

On this estimated outlay of \$300,000, which he explains, is a liberal one, the following reductions are allowed: -

Interest at 9 percent...	\$27,000
Wear and tear on mill and tramway, and repairs to dams, say...	\$28,000
Current expenses, taxes, Insurance, etc....	\$75,000
Total annual expense...	\$130,000

Ultimate results are thus deduced from these figures: "If this amount for annual outlay under every legitimate head of expenditure be deducted from \$375,000, the value of a season's sugar crop, there is left a balance of \$245,000 and interest of 9 percent on investment. This is calculated on the basis of existing prices. But suppose that the price of sugar should drop 40 per cent, or 3 cents per pound, as an extreme limit, which is very unlikely, there would be \$150,000 to write off the value of the sugar crop, reducing the \$375,000 estimate to \$225,000. Now, deducting from this sum of \$225,000 the estimated expenditure of \$130,000, there would remain a net profit of \$95,000 and interest at 9 per cent on the investment, making a total income on the investment of \$122,000 per annum."

It is asserted that most, if not all, of the ten thousand acres to be devoted to colonization is good rich soil. Extending from Pearl Harbor to the foothills of the Waianae mountains, the area gradually reaches an elevation of about 1,000 feet. A large proportion of the land may be irrigated by storing water as above mentioned, but, besides that recourse and artesian wells, water is obtainable at many points from springs and

similar favors of nature. Being in the most elevated region of Oahu, the rainfall of the area is very large, and it is anticipated, upon the strength of well-known natural law, that, once under cultivation, more humid conditions still would be induced.

Already over forty applications for lands have been received by the provisional company, the aggregate amount applied for exceeding two thousand acres. The applicants, some of whom are long residents in the country, are confident of being able to make a fair living from products they can raise for even the local market. By raising sugar on shares with the company, the owner of five acres, it is estimated, is assured of a net income of from \$1,000 to \$1,500 a year, besides minor sources of living that an agricultural holding affords. This would indeed, be a princely existence to many millions of people throughout the globe, "who," as the correspondent says, "toil unceasingly six months of the year to exist the remaining six."

Besides the foregoing inducements to settlers, it is intimated that persons disposed to engage in stock-raising can be accommodated with lands of the company, by purchase or lease, with the opportunity of buying a high class of stock now subsisting on the property. The company would even "cut up and dispose of the whole property on very favorable terms to a desirable class of bona fide settlers."¹²¹

5.26 Honouliuli Ranch Water Development

Developing reservoirs capable of supporting the agriculture foreseen for Honouliuli was integral to the success of the land colonization scheme. The article below, entitled "A very large reservoir to be constructed to hold a million and a half gallons of water," is about the Honouliuli Ranch water development. A reservoir with 1.5 million gallon capacity was planned.

Mr. H. M. von Holt, superintendent of ranches for the O. R. & L. Co., is having constructed on the Honouliuli ranch, about five miles from the new Ewa plantation works, a storage reservoir which when completed and full of water will be about 1250 feet long by 150 feet wide, and have a depth of water at the dam of 15 feet. A trench or puddle dam was dug through the fall of the gulch to a depth of from 3 feet on the ends to 7 feet in the centre, where a hard pan, impervious to water, was found. This was then filled up with earth only, and packed down and over this the dam of earth is being built. When completed it will be about 50 feet wide on the middle bottom, sloping upwards to a width of 10 feet on

¹²¹"Prospective Returns of the Honouliuli Colonization Scheme," *Daily Bulletin*, December 17, 1885, p. 2.

top, 150 feet across the gulch and 17 feet high. The dam is situated on one of the large plains extending from the easterly slopes of the Waianae mountains, while deep ravines on either side of the plateau will prevent any chance of mountain freshets. Two gulches starting from zero on the plain about half a mile from the mountains and a quarter of a mile apart ran nearly parallel for about a mile, where they join, running out to the plain again at zero. The dam is a quarter of a mile below the junction of the gulches, and the reservoir when filled with water, as it is hoped by the winter rains, will be backed up as far as this junction. The reservoir will be fenced off and water led into troughs below the dam through a two-inch pipe, so that the stock can have clean and clear water. The survey plans and detail of work were furnished by Mr. G. C. Allardt, civil engineer, who returned on Monday afternoon from inspecting the progress of the work. A gang of twenty Chinese are doing the labor, and are encamped near the works, at a spring of water. After the heavy rains of the beginning of the year, the water seeping out from the clay beds in both gulches continues to flow quite a stream until the middle of June. This supply, together with what storm water may fall on the plains, and flow into the gulches, will be utilized to fill the reservoir, a waste way being provided for the overflow. Mr. Allardt estimates the reservoir when full to hold 1,500,000 gallons of water, which once full will no doubt be sufficient to stand an eighteen months drought, allowing for evaporation and stock purposes.¹²²

Below is an editorial by James W. Girvin, a writer in Hawai'i. Under the headline "Pearl Harbor Valued for Development Opportunities," Girvin extols the advantages of Pearl Harbor and the great development value that lies within it.

On the yacht *Hawaii*, with good company and a generous hamper of provisions, a week ago I visited Pearl lochs for the first time. It was a pleasant day and although the wind was light we ran down very quickly. The sea being calm we had a good opportunity to note the entrance to the lagoon through the coral reef which is very well defined. At Puuloa Point the mouth of the harbor is quite narrow and deep, and thereafter there is plenty of water for the largest ships. Pearl Harbor is one of the most beautiful sheets of water on the Pacific Coast. It is perfectly land-locked and safe at all seasons. The rise and fall of the tide is not over eighteen inches and the calmness of the water will eventually make it a delightful resort for those who are fond of boating. If there was such a sheet of water on the coast of California it would be surrounded with great hotels and houses for tourists, who would explore every nook in this lovely tropical

¹²²"Honouliuli Ranch Water Development," *Hawaiian Gazette*, November 18, 1890, p. 11.

lagoon in steam launches. The feasibility of constructing a dry dock in one of the bights is apparent. The irregular contour of the periphery of the lagoon, together with the fact that the whole surroundings, clear to the beach, are covered with dense tropical foliage make this one of the most picturesque sheets of water in the world.

The great depth of water close to the shore will facilitate wharf-building and the landing of heavy merchandise or naval stores. The fact of there being innumerable fresh-water springs surrounding the lagoon, and artesian water available almost everywhere in the vicinity, quadruples the value of this harbor as a site for a large city or a coaling station for the navies of the world. San Diego harbor has been extolled as one of the deepest, safest and most perfectly land-locked of any on the coast, but it is not the superior of Pearl Harbor. It is only a matter of a short time until the utility and beauty of this magnificent sheet of calm water will be appreciated. Years ago its value was understood, and parties hastened to buy up the surrounding land as a speculation, and not with intent to improve. Their great grandchildren will probably learn that an American government is very slow to pay exorbitant prices for land. Should it ever be induced to purchase any but a small quantity the speculator will have discovered that after deducting the commission paid to lobbyists he will receive only a tithe of his expectations. I have seen coteries in San Diego bond lands endeavor to induce the Government to buy them for military and fortification uses at large prices. They hold them still and are likely to do so. It would be much better to offer lands to the Government at fair prices or at a value fixed by appraisers regularly selected.

Jas. W. Girvin.¹²³

5.27 Water Development, Railroads, and the 'Ewa Plantation, 1886–1913

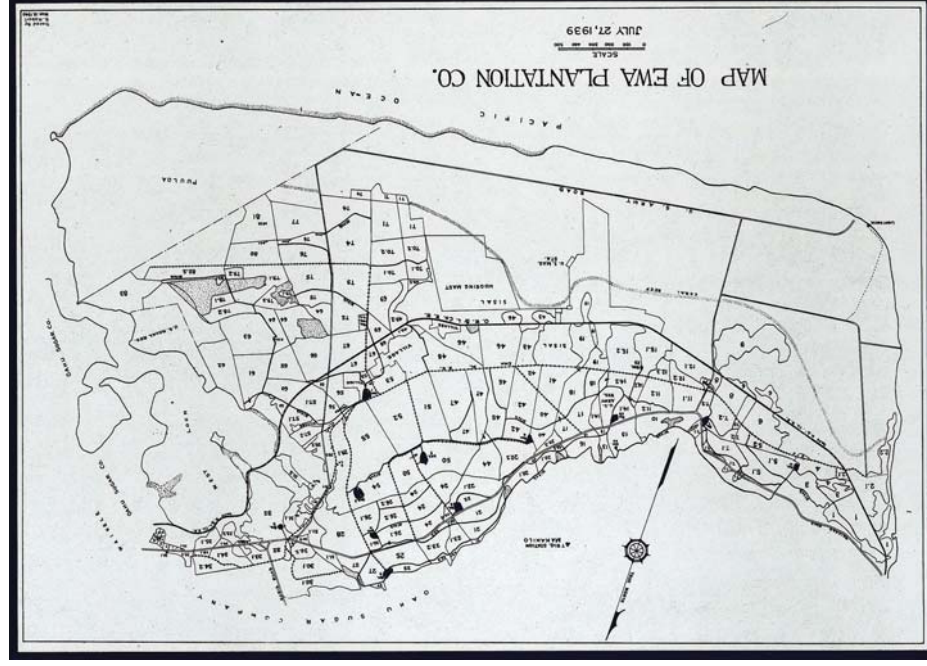
While ranching remained a part of Honouliuli's history through the mid-twentieth century, the development of the Ewa Plantation Company took over as the major revenue generator, and source of the major changes on the land (fig. 6). Thousands of acres were cleared for sugar fields, work force populations were developed, housing and commercial interests grew, and traditional cultural resources were erased from the landscape. Sugar cultivation dominated Honouliuli Ahupua'a through the 1970s.

In an article subtitled "Water prospects of the Colonization lands" the writer discusses the prospects of developing water sources for Honouliuli.

A few weeks ago the writer was one of a party of explorers, to examine the prospects of irrigation on the lands proposed to be developed by the Oahu Colonization Company. The particular occasion was a request

¹²³"Pearl Harbor Valued for Development Opportunities," *Hawaiian Gazette*, April 17, 1894, p. 3.

Figure 6: Map of the Ewa Plantation Fields, 1939. Area on the shoreward side of the numbered fields depicts lands controlled by the ranch and US Military.



from Messrs. John Fowler & Co., a large manufacturing firm of London and Leeds, to Mr. A. M. Sproull, B. E., their practical engineer and correspondent in these islands, to report on the water prospects of those lands. Since Mr. Sproull's arrival in this kingdom about five years ago, that firm has supplied a good deal of sugar making machinery to plantations here, and has also acquired a financial interest in some of them. It is gratifying to have such an influential and wealthy firm, so far away as England, manifesting a practical interest in the colonization scheme, the success of which implies a vast increase in the productive resources of this country. What Mr. Sproull's report will be time may show; but, so far as the unprofessional eye of the Bulletin could judge, the feasibility of ample irrigation of the lands, at a cost not disproportionate to the certain returns, is assured. This conclusion is reached from evidence that may be summarized briefly: 1. Water has been obtained wherever a hole has been bored in the driest of the different properties; 2, the best and widest stretches of soil are below elevations where steady streams have been obtained; 3. Water in great abundance has been procured on other properties, where the conditions do not appear to have been any more favorable than on the colonization lands; 4. In one case, at least, it is demonstrated that the storage of water in mountain gulches is an available resort to a certain extent.

Incidentally the expedition gave an opportunity of inspecting, at close range, other features of the colonization scheme than the one under particular investigation. One fact made prominent was that, an investment, the scheme offers immediate returns from the stock raising branch of the enterprise. Indeed, there seems no necessity for diminishing the scale on which this is conducted, while thousands of acres are being reclaimed for sugar, rice and other cultivation. Also, it seems feasible, by turning water on some now desert stretches that will not be fit for agriculture for a long time to come, to create fresh pastures for herds, thus releasing lands now necessary for their sustenance, on the grassy foothill slopes, for a variety of agricultural operations by prospective settlers. Enough was seen to convince anybody that fruit-growing could be successfully prosecuted over a very large aggregate of ground, in rough and diversified sections, where ordinary agriculture would be attended with more or less difficulty.

A brief report of the expedition referred to, which is given below, will, we think, bear out the generalizations contained in the foregoing. As the lands have been previously described in detail by another member of our staff, in connection with a larger expedition, this narrative only requires to be a brief sketch, as much the record of a very agreeable few days' outing as anything else.

About 4 o'clock in the afternoon of March 9th, an equipage provided and driven by Mr. B. F. Dillingham, chief promoter of the Oahu Colonization Company, rattled up the Ewa road bound for Honouliuli Ranch. It was a strong but not too heavy wagon, drawn by a large, well-fed span of mares, thoroughly trained roadsters. With an ample commissariat and light baggage, as befits an outing of the sort contemplated, and three passengers, the vehicle was snugly but not uncomfortably laden. Between the enthusiastic colonizer, the critical Bachelor or Engineering, and the journalist—supposed always to be on the seat for information on the public's account—it may be imagined that not much of the works of either nature or art within the range of vision escaped notice and discussion by the way. This road—as everybody in Honolulu ought to know—affords one of the pleasantest drives in all the kingdom. The views of the city and harbor from Palama and Kalihi are superb pictures, while the scenery all the way to Pearl Harbor is full of majesty, with snatches of beautiful, but quiet—very quiet—pastoral vales and slopes. Health itself blows on us in the cool, pure mountain breezes: the road for the most part is easy; therefore, this stage of our journey may well be described as delightful. Branching off the main road a few miles from the ranch, a remarkable object looms up over the track. It is an immense piece of trestle-work, gossamer-like in the lightness of its material, but towering up, over the deepest part of the gulch it crosses, some 40 or 50 feet, and stretching away more than half a mile. This elaborate piece of engineering is on the property of Mr. Mark P. Robinson, carrying irrigation pipe from a pump over a steep hill to extensive banana fields. That soil is rich and promising of large returns, indeed, which justifies much costly works of irrigation as this. Shortly after sundown, the young moon lighting the now rather rugged way, Mr. James Campbell's group of houses, local headquarters of the Honouliuli Ranch, is reached. After exhausting his lungs in vain on a tin horn in calling Charlie, our conductor, with the assistance of his guests, proceeds to get up a hot supper. His eminent success in that respect, if allowed as a token of his ability as "chief cook" of the colonization scheme, would leave no doubt of that project doing more than anything else to fulfill his Majesty's motto, "Increase the nation."

Early the next morning the much-wasted Charlie, the head driver of the ranch, a very active native man, had horses ready for a ride over the property. A short distance from the house a flowing excavated well was encountered, its troughs surrounded with cattle. Cantering off over very even ground, the slaughterhouse on the margin of Pearl Harbor is shortly reached and its unrivalled natural facilities for shipping are observed. A pipe line leads to a well dug through ragged coral, a little distance off, which, at an elevation of 20 feet, shows water 15 feet from the

surface, which is pumped by one of the patent windmills supplied by the Pacific Hardware Co. Then, to horse again, and after going through large enclosed paddocks with a capacity of thousands of cattle, we ride for several miles over rich, alluvial soil, apparently of great depth. This part of the estate consists of almost imperceptible slopes from the foothills of the Waianae Mountains, divided at intervals by light gulches. Here and there are the beds of small lakes or large pools, now dry but affording evidence of large volumes running to waste from watersheds above in the rainy season.

After resting a few minutes, while Mr. Sproull takes bearing and notes on his map, on a knob 400 feet above the sea, we head for the top of the mountains. On a high but even slope, beside a vast gulch, a herd of wild goats is seen ahead, and Charlie is after them in a moment with his lasso. He makes a splendidly exciting chase, down and up the precipitous banks, and wheeling like lightning when the goats double on him. It was no use, however; the frisky creatures went through the flying snare and would not be caught. Onward and upward, now, the sure-footed cattle-driving horses are urged, and still it is "Excelsior." Inclines so steep are surmounted, ridges overlooking such awful depths are traversed, and a path so rugged in some places is climbed or descended as on stairs, that nobody who faces the difficulties for the first time would think it possible to get over them on horseback until he was the guide ahead actually performing the varied feats—or rather letting the horse do them. Once the writer's horse stopped at a descent of about four feet at one step, over bare rocks, with a slope of about 45 degrees beyond, and both sides of the path tumbling down through the trees a thousand feet at an angle of 70. It looked prudent to get off, and horse and rider each choose his own way of climbing down. But the reckless brigands below shouted, "Let the reins loose and hit the horse." Not without apprehension this injunction was followed: the animal carefully felt for the notch beneath with his forefeet, then with a lurch brought down his posterior limbs, the saddle creaked and groaned, its bands giving a crack—the descent was made. We reached an altitude of 4,320 feet before returning by an equally difficult way to the plain. The scenery away up there was sublime in lofty peaks, awful gorges, and gaping notches: while beautiful with the foliage of a profuse growth of trees on the mountain sides, and bright green herbage away down in the valleys. Cattle swarmed out of the woods in countless number in answer to the peculiar "whoophoo" of the cowboy. They were rolling fat on the teeming rank grass and rich browsing. Going back over the plain we come to a well sunk over 300 feet at an elevation of 60 feet, in which the water is 20 feet from the surface. There is an engine and piping on the spot, but not in working order.

Next morning the road is taken for Waialua, the wagon having a smooth thoroughfare for several miles before getting off Honouliuli, traversing a magnificent stretch of heavily greased land, containing hundreds more of well-favored cattle of good breed. At an elevation of 800 feet is a windmill, at the foot of the mountain, placed on a dug well 30 feet deep, in which there is 15 feet of water. Just on the border of Honouliuli ranch, close to Hon. C. H. Judd's ranch, at an elevation of 1,000 feet, is a flowing artesian well 80 feet deep, from which a perennial stream flows through a gulch presenting very favorable conditions for storing unlimited supplies of the essential element. It should be mentioned that we had been traveling all morning on the edge of gulches leading from the watershed, which would lend themselves easily and cheaply to a system of water storage. At the main road, the saddles were taken again for a three or four miles' jaunt, to take a view of the Kaukoanahua and neighboring gulches, the one named being the source of the Waialua river. There could be vast reservoirs made almost anywhere here, and judging by the rain clouds bathing the distant mountain summits water would not be wanting to till them.

Early in the afternoon we reach Waialua, where, at the hospitable cottages of Mr. Robert Dickson, manager of the Kawaihoa and Waimea ranches, adjoining each other, we have a chance of changing apparel after being caught in the heavy rain shower, as well as of procuring a bountiful meal. Then we push on to Kahuku ranch, 12 miles distant along the beach. At the Waimea sand spit the breakers catch us when the wheels are down to near the hubs, and we are thankful at getting across with nothing worse than the whipple-tree broken. Having made repairs, the remainder of the road is a pleasant drive over green pastures close to old Ocean. Mr. W. C. Lane, manager of Kahuku, with his amiable partner, gives us hospitable welcome, good cheer and inviting beds. In the morning he and two sturdy sons accompany us on horseback over the mountains to Laie, the Mormon settlement. An orange grove in the mountains is visited on the way, and levied on for its luscious fruit. The chief men of Laie show the party round with great courtesy, the mill and fields being visited. There is a powerful flowing well on the property, but without irrigation this community have got six tons of sugar to the acre. Returning to the ranch house by the plain, any number of wells full of water are inspected.

Returning to Waialua, Mr. Dickson meets us a little way out, and conducts the carriage straight up over the Kahuku ranch, five miles on a luxuriantly grassy slope, smooth as a race course. As much more distance may be traversed the same way, but this brings us to the object of pursuit. Here is a storage dam, with a retaining wall 150 feet in length, 100 feet

thick at the bottom and five feet at the top, having a capacity of nine million gallons.

All the ranches visited are included in the Oahu colonization scheme. Having enjoyed Mr. and Mrs. Dickson's royal hospitality over breakfast on Saturday morning, the party visit Mr. Robt. Halstead's sugar mill—one of the best equipped on the island—then drive on to Mr. James Gay's stock ranch. At his place there are eight or ten abundantly flowing wells. Some 150 acres of dry pasture land have been converted into rice fields, which are leased at \$25 per acre. Mr. Caspar Silva, on the adjoining estate, has an equal area similarly transformed, yielding an annual rental of \$30 per acre. After a bountiful lunch at Mr. Gay's hospitable board, the road is taken for home, Honolulu being reached at sharp, five in the evening, the time fixed three days previously.¹²⁴

The article below, entitled "Over the Oahu Railway Line," describes the Oahu Railway Line through 'Ewa. The development of the railway is yet another factor in grooming 'Ewa to be an area for agriculture.

Just at sunrise on a glorious morning, such a day-break as only Hawaii can furnish, we started for 'Ewa to glance over the line and 'Ewa terminus of the first section of the projected railway. The grass, trees, flowers, fences, everything sparkled with the dew. A few tufts of white and fleecy clouds tipped the mountain summits; a cool air, fresh from the northern ocean, wafted down the valleys and lent an unwonted vigor to us and our horses. The blockade at Leleoa causes a wide detour to School street, emphasizing the need of the new street continuing Beretania to Liliha. After the roughness of the Palama road it was a delight to roll over the smooth hard road through Kalihi and Moanalua. On account of the grade the railway will run off makai from Palama, crossing Kalihi-kai and Kahauiki a good way below the road; but in Moanalua it will tap the center of that thriving and contented looking settlement. The whistle of the engine and roar of the cars will wake the echoes along the cliffs and palis of that old domain of Pele. A new life will be infused into our hitherto sleepy suburbs, and the ancient Hawaiian as he squats on the ground pounding his poi will gaze with astonishment at the speed of the iron horse. Will he realize that it is whirling him and his whole race into a more and more complex life? The changes in Kalihi and Moanalua have been so rapid that one needs to go out there often to keep abreast with the times. The old road leading through a dusty wilderness has changed into a pretty street with the fine buildings and grounds of the Kamehameha School and many private residences, on the one hand,

¹²⁴Development of Water at Honouliuli. *Daily Bulletin*, April 8, 1886, p. 4.

while on the other, a short distance off, a fine rice plantation stretches towards the sea. In Kahauiki the magnificent artesian well near the road still wastes its wealth of waters, although mauka of the road a banana plantation shows how rich the soil and how prolific when it gets the water. In Moanalua improvement has been the order and both sides of the road attest of what the place is capable. Near the head of the valley where the village lies, stands a tall derrick where Mr. Damon, the enterprising owner of the ahupuaa, is sinking a well to supplement the abundant springs in the valley.

At Moanalua the road will turn makai, running south and around the old volcanic crater. It will pass through a very dry but fertile section of country which, if irrigated, will produce abundant crops and support a considerable population. The salt industry might also be made a good deal of here and undoubtedly will be when there are facilities for transportation. The road will reach the shores of the lagoon in Halawa kai, and from this point on to Hoaeae will run along the shores, passing through a continuous and unbroken rice field. The tourists, however, did not turn off and follow the line of the road but continued on the Government road up to the romantic and wonderful gorge which has been torn open in some remote past age by the waters of the Moanalua River. The efficient road supervisor under our Reform administration has made a splendid piece of work of this road; the grades have been improved, the rocks covered, and a carriage rolls through from one end to the other with hardly a jolt. Rising from the gorge our party soon reached the point separating 'Ewa from Honolulu, the highest point on the road. Here the cool air coming down the valley in the morning reminded one of a colder clime and wraps were in demand. The recent rains have made the whole country green, which rendered it doubly beautiful. Only a short stay was made, when the party dashed down the long hill of "Kapukakui," everywhere along the road are visible the signs of improvement; land in the past considered almost worthless are being fenced, wells are being sunk in the valleys in order that new land may be put under cultivation; the rice fields are green with waving rice, and in some places are already well headed out. Whirling on past the old Mission station at Waiawa and here turning south-west the party soon reached the Waipio residence of this estate. Mr. and Mrs. C. A. Brown were of the party and soon made us all at home. A pre-requisite in this place is a dash in the clear cold water of the bathing tank. The water is absolutely clear and pure, flowing in directly from an artesian well. It is protected from the wind, and a bath there is simply perfection. Most of our party evidently thought so, for instead of coming out when they were washed and cool they sat in the water talking railroad! They might have been there to the

present moment had it not been that a call from outside announced the arrival from the fields of a large number of watermelons. All hands now scrambled to see who should get dressed first and in a few minutes were engaged in devouring the most delicious watermelons that ever fell to mortal share. After this a half hour's rest in the delightful cool of the trees surrounding the residence, admiring the beautiful view across the waters of the bay, prepared us for a mount. Half a dozen of us took horse and rode out upon the peninsula which forms the makai extremity of the land of Waipio. This peninsula is divided into two sections, separated from each other by a low and narrow isthmus and from the mainland by a marshy flat now covered with rice fields. The inner section contains about four hundred acres; the outer about one thousand. On the west side lie the Waipio and Honouliuli lochs, on the north-east side is the large body of water comprising the main portion of Pearl Harbor. The extreme point of the peninsula is directly opposite of and in from the mouth of the harbor. It is said that the United States Government has been in negotiation for the purchase of this extremity. It is the commanding point in the entire system of lochs. Upon the inner section Mr. Brown has sunk a fine artesian well which has a magnificent flow of pure sweet water which will rise to an altitude of about thirty-four feet above the sea level. As the highest point of the peninsula is only about thirty feet, water can be made to flow all over it. The success of this well demonstrates that water can be obtained elsewhere on the peninsula. The shores are very much indented with little bays and inlets. They are lined with bluffs or fall gently off into sandy or pebbly beaches. In the little bays it is generally shallow; out-side it is usually deep. The view from the north-east side is one beautiful almost beyond description. The whole Kaukonahuaui range of mountains is in dew. Upon the morning we were there nearly every peak could be seen, for it was perfectly clear. The trade winds coming over the broad water gathers freshness and loses heat, fanning the cheeks with delicious coolness. Across the water the shores of the bay are extremely varied, the low rice fields being broken by the densely wooded Manana point. The soil along this shore is fertile and in some pockets quite deep. It is an interesting question as to where it could have come from, in view of the fact that it could never have received the mountain wash. There are most interesting points all along the shore; at several places are banks composed of immense masses of oyster shells, in some places nearly perfect, in others having the appearance of having been melted by heat or possibly by the action of the water itself. Where these oyster shells could have come from is an interesting question. One of the younger members of the party very nearly wept at the thought of the great waste of oysters which was shown on this great bank. It was

saddening to think that we could have none.

This peninsula is covered with a luxuriant growth containing many algarobas. When the railroad is finished no doubt this whole north-eastern shore will be occupied by residences; people will enjoy living out of town, when they can go and come from such a delightful point within an hour. It is to be hoped that prior to selling lots or permitting the erection of dwellings the whole peninsula may be laid out upon an artistic plan whereby the full effectiveness of its beautiful location and surroundings may be secured. After a long and careful inspection of this land and all of its surroundings till we were satiated with its beauties, the party returned to the Brown residence. Upon the way back a fine view was had of the thousands of acres of splendid agricultural and grazing land lying west of the lagoon. Waipio, Hoaeae and Honouliuli contain thousands of acres of land susceptible of fine cultivation and the production of abundant crops. Several thousands of acres of land lie below the level of artesian water flow and no doubt a series of wells could be bored on the lower Honouliuli lands which would supply flowing water for a first-class sugar plantation. This whole country will grow potatoes and other root crops, melons of every kind, corn, and could no doubt raise all of the hay and feed required for Honolulu. One marvels that these splendid resources should remain so long undeveloped. Were this in California there would have been such a boom long ago as Los Angeles never dreamed of! It lies with the Oahu railway to develop these resources and reap the fruits of the business so created.

We soon reached the house where a most delicious luau was awaiting our arrival. Under the combined attacks of a lot of hungry travelers the good things soon disappeared, and after that the party broke up, some remained to spend the night, others returned to town, and thus ended one of the never-to-be-forgotten days.¹²⁵

The narrative below, entitled "Teachers' Excursion," describes the experience of teachers who traveled to Ewa on the Oahu Railroad and Land Company train line.

The national school bell rang at the depot of the O. R. and L. Co., at ten o'clock Saturday morning and thereupon came hurrying and scurrying from all parts of the city, dominies and school marm's galore, to the trysting place. Five passenger coaches with the band car in the rear were pulled up alongside the platform. At sharp ten, the Royal Hawaiian band struck up a merry air, the engine gave the usual screech and the train moved out leaving nothing but vain regrets for all "passengers aboard who had been left behind." A more highly delighted crowd than filled

¹²⁵-"Progress on the New Oahu Railway Line through Ewa," *Hawaiian Gazette*, September 25, 1888, p. 5.

the coaches could hardly be imagined. As the train went rolling through the rice fields, the clatter of the wheels, the easy rocking of the coaches and the mountain breezes playing through the open windows, recalled to many present some pleasing recollections of home lands beyond the sea. At Pearl City a stop of twenty minutes gave groups of excursionists the opportunity of strolling through the streets and avenues of the Ewa metropolis. Whether any of them located corner lots for themselves deponent saith not. "All aboard" was called again, and the party was run through to Honolulu, where track laying has been carried forward to within about a quart of a mile of the great artesian wells which have already solved the "water problem" of the colonization scheme. Four wells have been sunk and the fifth is in progress. Most of the excursion party having gathered round, the fourth well was uncapped for their entertainment. A volume of water came rushing up through the ten-inch pipe from a depth of 450 feet, with a force that drove the column about a foot above the mouth of the pipe. Hard by, the brick layers are at work on the foundation of a building in which pumping machinery will be fixed with a capacity of raising six million gallons of water per day and delivering it over the adjacent bluff to irrigate the new plantation. The water is clear as crystal and has a barely perceptible brackish taste. On the return trip, a halt was called at Manana for refreshments. A splendid collation was provided in the grand pavilion, Mr. Johnson of the Hamilton House, caterer. In quantity, quality and variety, the bill of fare was first class. "Mine host" of the day, the Hon. C. R. Bishop, personally supervised the serving of the large company and seemed to possess the facility of being everywhere at the same time seeing that no guest's timidity about preventing his wants being fully satisfied. After lunch, the teachers were grouped in the grove and photographed by Mr. J. A. Gonsalves and other operators. The assembly next came to order with the Inspector General standing under a big tree as chairman, when a resolution was read: "That the hearty thanks of all the teachers present are hereby tendered the Hon. C. R. Bishop, President of the Board of Education, for this delightful excursion and entertainment." The motion passed with a strong unanimous "aye," backed by three cheers. The Hon. President responded in brief and cordial terms: "Ladies and gentlemen, if you have enjoyed the day as much as I have, I am satisfied." Then followed a return to the pavilion where the band struck up music, a large number of the guests took the floor and whirled through the maxes of the dance until the foot of the locomotive announced that it was time to return to town. The afternoon train from Honolulu, just arrived, let down one passenger and thereupon the fine physique of the Hon. Secretary of the Board of Education was seen moving toward the pavilion. The "late

Mr. Smith" expressed himself well pleased on hearing about the fun that office duties had prevented his sharing. At 3:30 P. M., the train arrived back at the depot, whence the excursionists disperse, all very grateful to the Honorable President of the Board for his kindness in providing them with such an exceedingly pleasant wind up of the past year's work.¹²⁶

5.28 Development of the Ewa Sugar Plantation and Oahu Railway & Land Company, 1890

Henry M. Whitney's *Tourists' Guide Through the Hawaiian Islands* [33] provides readers with an overview of sugar plantation development in Honolulu and the larger 'Ewa District in 1890. At the time of writing, the O'ahu Railway & Land Company (OR&L Co.) had just opened with train service passing from Honolulu to the 'Ewa Court House; remaining track routes to be laid shortly thereafter. With the development of the rail system, businesses began immediately expanding, as rail access made the job of transport of freight and livestock an easy task, and the 'Ewa Plantation incorporated. Whitney's account of the inaugural service on November 15, 1889, coinciding with King Kalākaua's birthday, and subsequent trips, provides a description of the Pearl Harbor regions, documenting the continuing change in the 'Ewa landscape, and the planning going into making Pearl City where new homes and business opportunities came to be built. Another part of the rail development focused on the wharf at Iwilei, by which crops, livestock, and goods could be easily transported from the field to ships for transport across the sea. Below is an excerpt from *The Tourists' Guide*, which ran under the title "Oahu Railway and Land Co.: The story of its origin."

... Within the past year Hawaii has started in the footsteps of America by projecting a railroad around the island of Oahu, and actually perfecting, within the period from April 1st, 1889, to January 1st, 1890, a well-equipped railroad in running order, extending from Honolulu along the southern shore of the island to a temporary terminus at Ewa Court House, a distance of twelve miles. It was five years ago that Mr. B. F. Dillingham advanced the idea of building a steam railroad that should carry freight and passengers, and conduct business on the most improved American methods. A hundred men told him his scheme was infeasible where one offered encouragement. He believed he was right, and so put forth every endeavor to secure a franchise, which was granted to him only after vigorous legislative opposition to the measure. The incorporation of the Oahu Railway and Land Company with a capital stock of \$700,000 was the next step in the venture, but not an easy one by any means, as

¹²⁶Narrative of a Visit by Teachers to Ewa via the Oahu Railroad and Land Company Train Line—Development Described, *Daily Bulletin*, July 23, 1890, p. 4.

home capitalists were timid at that time, and few would believe that the soil of Oahu was worth developing to the extent of Mr. Dillingham's plans. A small number of gentlemen, notable among whom was Hon. Mark P. Robinson, came forward at the right time and purchased enough stock and bonds to set the enterprise on foot. With all the disadvantages that remoteness from the manufacturing centers of America offered, Mr. Dillingham undertook the contract of building and equipping the railroad. Rails were ordered in Germany, locomotives and cars in America, and ties in the home market; rights of way were amicably secured, surveys defined the line of road, and grading commenced. The work was prosecuted with the utmost speed consistent with stability and safety, and there was hardly a day's delay from the time grading commenced, in the spring of 1889, till September 4th following, when the first steam passenger train, loaded with excursionists, left the Honolulu terminus, and covered a distance of half a mile. It was the initial train, and the day was Mr. Dillingham's birthday, a period he had designated when he secured his franchise, exactly twelve months before, as the natal day of steam passenger traffic on Oahu. The little excursion was a success, as far as it went. On November 15th, his Majesty's birthday, the formal opening of the road took place. Trains ran to Halawa and back all day, carrying the public free. Following this event, which marked a significant epoch in the commercial history of this kingdom, the Oahu Railway & Land Company opened the doors of their commodious offices in the King Street depot for business. [33]

The story continued with a section entitled "Developing the Country."

Simultaneous with the commencement of business was the acquisition, by the O. R. & L. Co., of a fifty-year lease of the Honouliuli and Kahuku Rancho's 60,000 acres, and the purchase of 10,000 head of cattle running thereon. This vast area, hitherto utilized as a stock range, is, under the manipulation of the railroad people, becoming one of the garden spots of the Kingdom. Two new corporations of sugar planters,—the Ewa plantation and Kahuku plantation—capitalized at \$500,000 each, have each secured from the railroad leases of from 5,000 to 10,000 acres for sugar cultivation. Cane is now growing on a part of the lands. These two great agricultural enterprises, the direct outgrowth of the railroad movement, confer valuable pecuniary benefits on the business men and mechanics of Honolulu. Artesian wells, yielding a bounteous flow of water, supply the means of irrigation, and make possible in that section of the island what almost everyone but the promoter of the railroad formerly believed to be impossible—the culture of sugar cane on a large scale. This

abundance of water, which is obtained by the mere sinking of wells, has stimulated other agricultural pursuits on the railroad's lands. Ever since the day traffic was begun, the railroad people have been pushing forward in their good mission of banding the island with iron rails. [33]

The story of the railroad at Pu'uloa was told in a section entitled "Pearl Harbor."

The quiet precincts of Pearl Harbor were first invaded by the locomotive in December, 1889, and in the following month Ewa Court House was reached.

Graders and track layers are still marching on. Pearl Harbor signifies something more than a mere body of water. It is a series of picturesque lochs, connected with the sea, but sufficiently protected from the encroachments of the breakers to render its water calm and placid, whereby boating, bathing, and fishing may be enjoyed in all the fullness of those pastimes. From the sandy shores of these lochs the mountains of the Koolau range rise up to a high altitude. The new town of Pearl City, another offspring of our railroad enterprise, rests on one of the loveliest slopes of Pearl Harbor's borders. A handsome depot and several residences built in new styles of architecture present a decidedly attractive appearance. The town is bisected by a wide boulevard, from either side of which extend well graded avenues. A landscape gardener is engaged in beautifying the borders of the thoroughfares, and setting out trees of all the varieties that flourish in this generous climate. Pearl City will afford pleasant homes for those who desire recreation after the day's toils in Honolulu. Another prominent feature of Pearl Harbor's improvements is a pavilion, seventy feet square, built by the railroad company. This is designed for the accommodation of picnic parties; and, being embowered by a grove of choice tropical trees, furnishes the sylvan environment so essential to the pleasure of the conventional picnic. An electric light plant has been introduced for the special service of evening parties on these grounds. [33]

The efficient layout of the railway on O'ahu was described in a section entitled "Wharf Terminus."

Chief among the ends secured by facilitating the shipment of produce from the interior to the seaboard is the conjunction of ship and car, and principle that Mr. Dillingham had in view when he launched his railroad venture. This project, involving the construction of a wharf from the present railroad terminus at Iwilei to deep water in Honolulu harbor, is being carried out.

Only three or four cities in the United States claim this superior arrangement for rapid and economic transfer of freight, and it certainly becomes a progressive movement on the part of Honolulu when our railroad cars bring sugar, bananas and rice from plantations on the northwest side of the island directly to ship's tackles. The wharf now being built is 200 feet long and sixty feet wide. The piles are torpedo proof, and the whole structure is put up with an eye to strength and durability. Its usefulness will be appreciated when, in 1892, the first crop of Ewa Plantation will, with only a nominal cost of handling, be placed in the hold of out-bound packets. The company are reclaiming in the vicinity of the wharf thirty acres of tideland, which will prove very valuable water frontage. Banana and rice planters along the line of the railroad will not be slow to avail themselves of the shipping advantages provided by the meeting of ship and car. Bananas can be cut from the plant on the morning a vessel sails, and will arrive in the California market in a much better condition than those heretofore transported by horse and mule back from the interior. Hawaiian rice, which commands a higher price in American markets than the South Carolina product, can be placed in San Francisco at a lower figure than formerly. While the banana and rice traffic will be stimulated to a greater extent here than in any other country on the globe, the advantage given to sugar, the staple commodity of the Kingdom, will be heightened to an extraordinary degree. In no other country have we the spectacle of sugar being taken from the mill directly to ship's tackles. In Manila, Jamaica and Cuba, and even in Louisiana and Mississippi, the process of transportation is slow, laborious and expensive, reducing the profits of the planter to a minimum. [33]

The railroad is described as part of a larger project to colonize Hawai'i with Europeans and Americans in the following section, entitled "Colonization."

It is patent to every resident of this Kingdom who is acquainted with Mr. Dillingham that his pet scheme is the industrial development of these islands through colonization. The railroad signalized the advancement of the scheme. It is now the purpose of the railroad company to bring out thrifty people from Europe and America who will take up land, cultivate the same, and establish their homes thereon. The railroad makes colonization possible, and is in itself an invitation to ranchers to engage in the different pursuits that are especially adapted to this soil and climate.

Market gardening, dairying and the raising of poultry can be made lucrative to the industrious, while fruit culture, embracing a large variety of products, offers the liberal inducements. Along the line of the railroad there are now 7,500 acres in rice, yielding 10,000 tons annually,

and 150 acres in bananas, yielding 100,000 bunches annually, and besides these prolific plantations there are, in close proximity to the several stations, thousands of mellow acres untouched, capable of bearing all the multifarious fruits and flowers of the tropics. The plan of colonization contemplated by the railroad tends to promote the nation's welfare as well as to bring the railroad lands under systematic cultivation. Repeated successes in the past give some assurance that the railroad will succeed in this laudable project. None but the industrious and law-abiding will be invited to these shores. Worthy people who are without the means of traveling expenses will be assisted. In the sale of lands special inducements will be given to those now living in the Kingdom. As Mr. Dillingham has recently procured the franchise of a seventy-mile railroad from Hilo to Hamakua, on the island of Hawaii, he will have a still larger scope for the promotion of colonization. [33]

The progress made by OR&L through 1890 is described in the following section, entitled "Condition of the Railroad."

The Oahu Railway & Land Company are nothing if not progressive. It is difficult at this stage of the corporation's history to convey an idea of what will be accomplished at the close of the year 1890. The projection of branch roads, the importation of locomotives and cars, the improvements around Pearl Harbor and the track laying beyond Ewa are circumstances of the present that indicate preparations for an enormous business. The branches or spurs now under way are, one extending into the Palama suburb, having its terminus at the stone quarry, and the other is a line running along the peninsula at Pearl City. The stock of the company is 7,000 shares at a par value of a \$100 each. At a public auction, held in January, 1890, stock sold at five per cent premium. The bounded indebtedness is \$300,000. The income of the railroad with its promising future cannot be readily estimated. It is safe to assume that the income from the lease to the Ewa Plantation alone for the year 1893 will be an amount equal to the rent to be paid by the company on the whole Honouliuli Rancho, 40,000 acres, leaving the income from Kahuku Plantation and sale of livestock, and land rentals, which will amount to about \$60,000, as a net profit on the land transaction. Adding to this figure the returns from sale of lands now owned in fee by the company, and the net earnings of the road, which must necessarily be large in view of the rapidly increasing traffic, there is presented a healthy condition of business. Some idea of the profits may be gathered from the fact that while the trains were running only to Pearl City, during the time of construction, the receipts from passenger traffic exceeded by \$1000 per month the running expenses from the day the road was opened, Nov. 16, 1889. The property of the

Oahu Railway & Land Company, represented on the books at a valuation of \$1,000,000, is as follows: Fifteen miles of road bed (three-foot gauge) equipped with steel rails and ohia and redwood ties, two Baldwin passenger locomotives, two combination baggage and smoking cars, six first class coaches, one parlor car, six second class cars, eight flat freight cars, one box-freight car, two hand cars, eight well-furnished stations, 2,250 acres of land in fee, 60,000 acres under 50 years' lease, 18,000 acres under thirty years' lease, 10,500 head of beef cattle, 325 head of horses, and 50 miles of good fencing on ranch property. The officers of the company are as follows: Jno. H. Paty, President; J. I. Dowsett, First Vice-President; W. C. Wilder, Second Vice-President; Robert Lewers, Third Vice-President; W. G. Ashley, Secretary; C. P. Laukea, Treasurer; W. F. Allen, Auditor; J. B. Castle, S. C. Allen, T. R. Walker, and J. G. Spencer; Directors. [33]

The benefits of the OR&L are extolled in the following section, entitled "Progress of the Oahu Railway and its Attendant Improvements."

The enterprise shown by the Oahu Railway and Land Company from the very commencement of its great undertaking, and in every branch of its service, is worthy of special note and commendation. Every month witnesses the opening of some new plan, or the completion of some noteworthy object, in which all will be more or less interested. Of what may be termed the Pearl Harbor Section of the Oahu Railway there will be sixteen miles of track from the city to the mill of the Ewa Plantation, located near the shores of the west lagoon, of this twelve miles are completed and in excellent order to Pearl City Depot, improving, however, with each month's service and use by daily freight and passenger trains, and with the additional ballasting which the road receives from time to time, wherever and whenever wanted. At each station convenient buildings have been erected, with two good depots at Honolulu and Pearl City. A commodious turn-table building has been erected near the Honolulu Depot, where the engines may be housed when not in use, and another smaller one at Pearl City.

The site of the new town at Ewa, which has been named Pearl City, is a very desirable one, the land rising gradually from the water's edge to the foothills of the mountains, distant three or four miles, and with a beautiful view of the lagoon from any portion of it. About one hundred lots have been surveyed, and will be built on, and water from mountain springs being brought down in pipes for the use of residents. On a recent visit there, the writer left the city on a calm and very sultry day, and on reaching Ewa was surprised to find a cool mountain breeze blowing, which made it very comfortable.

Several new buildings have recently been erected. Among them are the pavilion, the hotel, the depot and several fine private dwellings. The pavilion is located in one of the most beautiful groves on the island. Here will be found the tallest royal palms, Poinciana regia, mango, and other rare exotics, some of which reach eighty to a hundred feet in height. This grove was planted thirty or more years ago by Mr. Remon of the firm of Bernard & Remon, who then owned the property, and introduced many rare trees and plants. [33]

Along with construction of the railroad itself, OR&L developed facilities to promote railroad use. One such facility in Pearl City wasn't a harbinger of fashionable resorts there as the author suggests. The facility is described in the following section entitled "The Pavilion."

Was erected specially for the accommodation of picnic parties, for which it is most admirably adapted. It is seventy feet square, well ventilated on all sides, with a smooth, clear floor, large enough to accommodate at one time twelve to sixteen sets of dancers. It is lighted with electricity, and when the forty incandescent lamps hanging throughout the building and in front as far as the railway track, are all lit, it resembles fairy land. On the occasion of a recent picnic, when six hundred guests were brought by rail from Honolulu, and the pavilion was decorated with flags and colored lanterns, the scene was exceedingly brilliant. For a holiday outing for old and young no more desirable place could be chosen than this charming spot, which must improve from year to year. The Hotel is a small but neat structure, containing a central reception room, and seven smaller ones for sleeping apartments. It stands on a large lot, and can at any time be enlarged to meet the wants of the public. The Depot is also a neat and commodious building, with all the conveniences needed in such a structure. It shows what taste and skill can do at a small cost.

It may not be long before Pearl City will become a fashionable resort, and probably will attract many permanent residents. It enjoys a mild climate, with land and sea breezes, plenty of fresh water, and good facilities for boat sailing on the placid bay, and bathing in the salt water, without fear of sharks, or heavy surf, or strong currents, which in other places endanger life and limb.

Respecting the improvements now being made by the Railway Company along the harbor, the following, taken from Paradise of the Pacific, will be of interest to tourists and readers of the GUIDE.

Hearing that extensive improvements were in contemplation, involving the construction of wharves to connect the rails with the shipping in the

harbor, we wended our way to the engineer's office in the depot building where we found Messrs. Kluegel and Allardt, engineers in consultation with the Minister of the Interior and Superintendent of public works, in regard to the proposed extension of the business area of Honolulu. Mr. Kluegel, Chief Engineer of the Company, a gentleman of large experience and ability, has been with them from the beginning of their enterprise and has shown himself to be a master of the art of civil engineering. Mr. G. P. Allardt is Consulting Engineer of the Spring Valley Water Works of San Francisco. He is considered one of the ablest railroad and hydraulic engineers in the United States. He came here the second time in the interest of this Company with Mr. Dillingham on his return from his late trip to the Coast. He is now installed in the engineer's office as Consulting Engineer for the Company, until such time as the problems involving special engineering skill shall have been worked out. These gentlemen showed us the maps and drawings illustrating what is proposed to be done; which were supplemented by their own lucid explanations; from which it appears that there has been granted by the Government seven hundred and fifty feet of water front property on the harbor, and that wharves are to be built out to where there is sufficient depth of water to accommodate ships of the largest size that enter the harbor. Slips will be made for the accommodation of as many as possible of vessels of all classes that will come to this port to load and unload. To one or more of these, the rails will be laid and the cars will be run, thus securing for Honolulu what is rarely accomplished in any city in the world, the connection of the shipping with the railway lines of the country, avoiding all caring which is no small item of expense in transportation, especially of the heavier articles, such as sugar, rice, etc., much of which will be carried by this route. The building of this extensive line of wharfage involves the filling up and reclamation of twenty-six and a half acres of land south of the prison road; equal to about eleven blocks. So much wrested from the grasp of old ocean and made available for the uses of commerce in what will then be one of the busiest parts of this already busy town, can but be of immense advantage to the city and the interest of that large class of people who will soon do business with the Oahu Railway and Land Co. More than that it will be a public improvement, that will be a benefit to the whole country. The twenty-six and a half acres mentioned are located south of the prison road and do not include the smaller area of reclaimed land north of it, a large part of which has already been done, adding much to the beauty, healthfulness, and business capacity of this commercial and political center of the Paradise of the Pacific. As all this requires time for its full development, the enterprising managers of the road have provided for bridging over the interim by means of a scow

that will run from the end of the rails that will soon be laid to a point where there is sufficient water, to go along side of vessels in the harbor.

In order that the development of the new Ewa plantation may not be hindered, the work is being rapidly pushed forward, so that in a few weeks at most the material for improvements will be taken from the ships directly to them by rail. [33]

The following section, entitled "Pearl City," describes the city's origin as an OR&L project.

Mr. A. B. Loebenstein, civil engineer, has laid out the streets and lots on the site of Pearl City. The main avenue is eighty feet wide. The situation of the embryo town is one of the finest to be found in the Kingdom. It is on a gentle slope where the drainage will be easily accomplished, and the view of the mountains, the harbor and the sea, is such as is but seldom seen from any one point of observation. The shores of the Pearl Harbor lie at its feet, and that inland sea with but a single narrow opening connecting it with the great ocean affords unlimited opportunities for boating, yachting, and all the pleasures to be had upon water untroubled by any stormy wind. Honolulu almost at its very doors, for with the distance-annihilating railway train between, you count not by miles but by minutes. All these advantages will make the new town one of the most desirable places for residence in the world, and the interest which the people of the Capitol city are already taking in the matter, shows that the matter of town or no town at Ewa has already been decided in the affirmative. Some have even thought that, with the great area of fertile land lying back of it and its own great natural advantages, that sometime a city will be built up there that will rival Honolulu in numbers and commercial importance. But that remains for the future to unfold. The success of the present enterprise seems to be assured.

The recent negotiations with the United States have made Pearl Harbor almost as widely known as London, and now these new attractive features that make it easily accessible, and the supplementing of Nature's wonders by these additions from the hand of man will make it in future one of the places that all tourists to the Islands will visit as surely as the volcano. It will be in the programme of tourist travel.

The freight business of the road is increasing with each new enterprise, that is being developed at or near the present western terminus. And it is also a noticeable fact that business along the line of road between Honolulu and Ewa has already received a stimulus that is helping to increase the passenger and freight traffic and to develop the resources of those fertile plains.

Bananas are already coming by rail, as well as wood, beef, milk, etc. During the coming year 10,000 tons of paddy and 100,000 bunches of bananas will be shipped over this route to Honolulu, besides large quantities of the above mentioned article, and the material and supplies to be carried the other way for the use of the Ewa Plantation Company.

In regard to the proposed extension of the road to complete the circuit of the island, it is encouraging to note that Messrs. Kluegel and Allard, assisted by Mr. M. D. Monsarrat, Civil Engineer, have made reconnaissance of the entire island with a view of determining the feasibility of the proposed extension and they both assured us that it is practicable, and that there are no difficult obstacles to overcome, though portions of the line will be somewhat expensive. [33]

The primary business of the OR&L was to transport agricultural produce. The following section, entitled "The Ewa Plantation," describes the origin of that corporation and its future plans for 'Ewa.

One of the direct results of the railroad enterprise is Ewa Plantation, now an accomplished fact. Over 5,000 acres of land have been leased, and a company organized with the following efficient officers, who are all experienced sugar men, thoroughly versed in all the ins and outs of sugar production on these islands: C. M. Cooke, President; J. B. Castle, Vice-President; E. D. Tenney, Secretary; J. B. Atherton, Treasurer; J. H. Paty, Auditor. The foregoing five officers constitute the Board of Directors. Castle & Cooke are agents, and William J. Lowrie is Manager. He has had a large experience as manager on plantations on Maui, and brings to this work the energy and business capacity that are needed. Sixty-five acres are planted with seed cane. The best of Lahaina top-seed is being used, which is considered much the best. Sixty men are now employed. Flumes have been constructed connecting with those from Mark Robinson's pumping works, which were already in operation when the company took possession. The young cane show a marvelous growth for this season of the year. This seed will plant six hundred acres, and that area will be seeded for the first crop, the planting to begin in August, 1890, and next year it is expected that one thousand acres will be planted. The best Fowler & Son's steam plows have been ordered from Scotland. The McCandless Bros. are already at work putting down artesian wells, and expect to have six wells in operation during 1890. The wells are ten inches in diameter, which is somewhat larger than is usual in this country. Carpenters are at work building laborers' houses, etc. A Baldwin locomotive, cars, rails, etc., are already ordered for the transportation of the cane. The pumping plant will be of the latest designs and the best patterns made. Five hundred workmen will be employed, and the

planting of the first crop will be pushed forward as rapidly as possible. [33]

The article ended with some thoughts about the prospects of artesian wells in 'Ewa in a section entitled "Abundant Water Supply."

One peculiarity of the Ewa Plantation which receives the unqualified endorsement of the manager is the source of the water supply. The main dependence will be artesian wells, and as the water does not naturally rise to the required height, the cost of pumping must be taken into account, but notwithstanding that it is claimed to be the best, inasmuch as water can be had in sufficient quantities when it is most needed, which is not the case when the supply is from mountain streams; for when those streams are lowest is the particular time of the year when the most water is needed. Another thing in favor of the Ewa Plantation is the fact that on account of its low altitude and the corresponding warmth of its soils a crop of cane can be matured there in from six weeks to two months less time than in some places where cane is successfully raised on these islands.

From what we have learned from all sources we have greater faith than ever in the success of both the Oahu Railway and Land Company and the Ewa Plantation. [33]

The following is more about development of water resources at Honouliuli from an article in the *Hawaiian Gazette* entitled "Ewa's Pumps: Graphically described, giving their cost and capacity."

On Wednesday a party of business men were enabled through the kindness of the O. R. & L. Co. and the plantation agents, to take a run down to the Ewa plantation. The mill which was made the first objective point, has already been described in these columns. It is being rapidly pushed on to completion, and will be ready long before the cane is. The whole party devoted itself principally to the examination of the pumps which are to put the water on the fields.

There are twenty-two ten-inch wells on the Ewa plantation, and three large pumping stations. The smallest of these pumps is used to raise the water from two finely flowing wells and is now watering 180 acres of cane. The pump if worked twenty-two hours a day will raise from four to five million gallons of water sixty-eight feet. This is fifty per cent more than the average daily water consumption of Honolulu. The whole plant cost \$22,000 which includes building and foundation, piping and a small reservoir. The furnace consumes about two long tons of coal for each day of twenty-two hours, and the coal can be laid down at the furnace doors

for about \$7 per ton. If this single pump—the smallest in the plantation were transplanted from Ewa to Honolulu, the water famine would be over, and people might water their gardens “twenty-five hours in the day.”

The above pump like all those on the Ewa plantation is the produce of the Blake Manufacturing Co. It runs very smoothly, so smoothly that even the engineer one day forgot in a moment of absent-mindedness, that the powerful and noiseless engine was in motion. He got in the way—just with one finger—and did not notice the collision until he saw his finger—lying in the dripping pan!

Pumping Station No. 3 is now in process of construction, and, when complete, will be one of the “sights” of this Island. There will be nothing to beat it on this side of the Rocky Mountains. Two large pumps will lift the water from twelve artesian wells—one to a height of 137 feet, the other to a height of 167 feet above sea level. Deducting 32 feet, the height of the natural flow, we have a straight lift in the two pumps of 105 and 135 feet respectively. The ordinary capacity of these pumps is, together, twenty million gallons per day, but they have a maximum capacity of about ten millions more. Yet the ordinary daily consumption of coal will probably not exceed seven tons. This very moderate consumption of coal will be due in a great part to the use of tubular boilers which, it is claimed will furnish about twice as much steam per pound of coal as the best boilers of any other pattern. These climax tubular boilers were made at the Clombrok Steam Boiler Works in Brooklyn, N. Y. The whole work of preparing the foundation and erecting the pumps is under the personal supervision of Mr. Bunge, a courteous gentleman as well as a skillful mechanic, who has been sent here by the Blake Manufacturing Company for this special purpose.

The total cost of this great pumping station, including the wells and the piping will be in the neighborhood of \$100,000.

The total capacity of the twenty-two artesian wells, with the four pumps working at their maximum capacity, will probably be not far from fifty million gallons per day. This is an astonishing figure, but it gives only a correct idea of the power of these splendid pumps. There will be water enough to irrigate, if necessary, 4,000 acres of cane, and at the ordinary working capacity of the pumps, there will be abundance of water for 3,000 acres. Enough water will flow in the once thirsty deserts of Honolulu to supply a city of 200,000 people.

After doing more than justice to an exceedingly bountiful and generous repast, the party rode through the cane fields to convince themselves by personal inspection of the magnificent condition of the crop.

The condition of the plantation is a highly gratifying one and its

prospects bright, even with sugar at the present low price. Everything which a favorable situation, a surpassingly fertile soil and appliances of the most approved efficiency can do for any plantation, nature and man have done for Ewa. The wells have not been in the smallest degree affected by the severe drought of the passing summer.

The plantation has passed the experimental stage, and the stockholders may lay, as a flattering unction to their souls, the observation of one of Honolulu's leading business men—an observation made after careful personal inspection:

“The plantation appears to be very carefully managed. Everything seems to have been thought out beforehand.”¹²⁷

5.29 Ewa Plantation, 1891: An Overview of the New Plantation Operations and Railroad Access

Little more than a year after the debut of the Oahu Railway & Land Company, the new Ewa Plantation Mill at Honolulu was up and running, and major changes were underway in land use, population makeup, and loss of cultural landscape.

In 1891, a number of men interested in the sugar business visited the Ewa Plantation. The excursion included a trip on the Oahu Railway and Land Co.'s line, and a tour of the new mill.

At a quarter to nine on Saturday morning a party of about five and twenty gentlemen started by train for Ewa Plantation and Mill, at the invitation of Mr. J. N. S. Williams, manager of the Union Iron Works, to whom was assigned the contract for the whole machinery of the mill.

Amongst the invited guests were Senor Canavaro, the Portuguese commissioner, Messrs. W. G. Irwin, Jos. Marsden, H. M. Whitney, H. T. Waterhouse, F. A. Schaefer, F. M. Swanzey, Austin, Chas. Cooke, Bowen, W. O. Smith, Holdsworth, Mist, May, Evans, Frear, J. O. Carter, Kluegel, and the Bulletin and Advertiser representatives, all interested in the sugar business of the country. Mr. Robert Moore, the superintendent of the Union Iron Works, was there too, and neither last nor least Mr. Dillingham, whose indefatigable energy has rendered possible such an undertaking as this which the party went to see.

Stopping for a minute at Moanalua the group was joined by Hon. S. M. Damon, and the train ran on to the Peninsula junction of the Pearl City station, where a few minutes were spent looking at the work going on for an ornamental fish pond for the coming city.

Thence the train ran on to the Ewa station, where the company alighted and, passing through the large general store of the plantation, entered the

¹²⁷“Development of Water Resources at Honolulu,” *Hawaiian Gazette*, September 1, 1891, p. 2.

mill building, a large business-like erection, walls and roof being all of corrugated iron, and here they were met by Mr. Lowrie, the manager, and Messrs. Kopke and Hughes, engineers, who showed the visitors through the works and answered the numerous questions put by observers in search of information.

To go through the mill and describe briefly the processes from the field to the sugar room, we begin with the spot where the cane is brought from the fields and passed direct into the cutting or slicing engine, which was running at full speed.

From here the cane now reduced to shreds is carried by an endless chain of rakes up an incline to the upper story of the building, where it is distributed by a series of hoppers into the diffusion battery of 28 huge vertical cells each of which will take 2 tons of sliced cane. Here it is treated with hot water and the necessary proportion of lime and passed on to the quadruple effect and then to the vacuum pans, one of the 10 tons capacity with 7 coils of steam pipe, the other with 20 tons capacity and 9 coils. After this the sugar descends to the 15 centrifugals where it is dried, the residuum being led into the tank from whence it is passed away as fertilizer.

Meanwhile the chips or slices of cane deprived of 97 per cent of their saccharine qualities, are dropped through the opening base of each diffusion cell on to another moving platform or endless chain, which takes them to a 4-roller mill which was running on Saturday where the water they may contain is thoroughly expressed and they become fit for fuel for the furnaces.

There are 6 boilers all leading into the same steam pipe whence the whole machinery is worked.

A chimney 110 feet high which took 125,000 bricks in its construction affords ample draught.

This, though it may be a mere sketch of a great industrial undertaking, may serve to show the work in outline of one of the newest as well as the greatest of the enterprises of our sugar men. Barons if you like—we hope that they may soon vindicate their title.

From the upper windows of the mill one looks over hundreds of acres of waving cane and other hundreds of acres all of virgin soil only awaiting the plow and the planter to be tuned to a like account.

The red volcanic soil enriched by centuries of neglected vegetation only needs invitation to produce whatever the ingenuity of man can demand from it. The three well-stations of the company will yield, it is estimated, 33,000,000 gallons of water a day, and it is not in hands which will waste it.

After viewing the mill in self-assorted groups, the visitors sat down

to a pleasant lunch of salads and sandwiches, coffee and effervescent drinks, at tables presided over by Messrs. Dillingham, Williams and Lowrie, while Messrs. More and Hughes kept the waiters up to the mark and saw that their guests wanted for nothing.

Soon after noon the party started homeward-bound from Ewa, and stopping for a time at Pearl City Station were able to be present at the opening of the first store in Pearl City itself.

Thence the train ran on to Honolulu, reaching it in time to clear the 2:15 p.m. passenger train just ready to start out.

Many hearty handshakings did Mr. Williams receive as his guests left the train with earnest congratulations on the admirable way in which he and his coadjutors, Mr. More and their staff, had carried to success one of the greatest enterprises ever undertaken in these islands.

All of which would have been impracticable but for Dillingham and his railway!

The weather was delightful and the whole excursion most enjoyable.¹²⁸

An article regarding labor contracts at the Ewa Plantation Company published in the *Hawaiian Star* follows. Entitled "Co-operative Labor," it ran with the subtitles "How it May Supersede Contract Methods" and "A way out for sugar men – How the new method works at Ewa Plantation." It argues that co-operative labor is more beneficial to the laborers than contract labor. It gives an example of the agreement made between employer and planter for the co-operative system.

One way, and perhaps the best, to settle the cane planting question without contract labor, is to run the big sugar farms on the co-operative plan. This method has been tried at Ewa plantation with a measure of success which ought to lead Hawaiian growers generally, as the opportunity comes, to give it a fair trial.

The details of the co-operative plan as it has been developed at Ewa are as follows:

This agreement, made this ... day of ... 189...., by and between the Ewa Plantation Company, a corporation, of the first part, hereinafter called the employer, and ..., of the second part, hereinafter called the planter, witnesseth:

That in consideration of the promises, terms and covenants herein below set forth from either party to the other moving, the said employer does hereby promise, covenant and agree to admit the planter as an

¹²⁸Ewa Plantation. Visited by a Number of Representative Sugar Men. A Brief Description of the New Mill. Excursion Over the Oahu Railway and Land Co.'s Line," *Hawaiian Gazette*, November 3, 1891, p. 4.

agricultural laborer and share planter upon the Ewa Plantation, at Honolulu, on the Island of Oahu and in furtherance of said object does hereby agree:

I. To give to the said above named planter for cultivation on the profit sharing system, as herein below set forth ... of that section of land now plowed and furrowed on the Ewa Plantation amounting to about ... acres, and described in plantation map as follows: ... and also an advance not to exceed ... dollars (\$...) for each month of service for food and other necessary uses of the planter which amount shall be returned by the planter without interest as hereinafter set forth.

II. The employer agrees: to furnish, without charge, lodgings sufficient for the planter, and also fuel for domestic use, which shall be cut and gathered by said planter for himself at such place as the employer shall designate; also tools for irrigating purposes shall be furnished in the first instance, after that all tools shall be furnished by the planter; also seed cane; also water in the main plantation ditches for irrigation, but taking water therefrom to the cane fields shall be done by the planter, and the water so furnished shall be used economically and without waste for each irrigation. Also, to place movable tracks through the fields at a distance of not over four hundred (400) feet apart.

And the planter on his own behalf, covenants and agrees in consideration aforesaid, to go to the Ewa plantation, on the island of Oahu, and there to labor in accordance with the terms of this agreement, to wit:

III. With such other planters as may be designated by the employer to cut and load the seed, prepare the land, make level ditches, put in gates and boxes, plant, irrigate, and cultivate in the best manner to maturity, and, when so required by the employer, to cut and deliver the cane to be so cultivated upon the cars of the employer whenever deemed necessary by the employer. In cutting, it shall be cut close to the ground and topped clean, and care shall be taken not to load any dead or sour cane upon the cars, and all unsound cane so loaded shall be separated at the cane carrier, weighed and deducted from the sound cane, and all expenses connected with separating and weighing such unsound cane, shall be charged to and deducted from the planter's share. All of the cane to be stripped at least twice, and in heavy places three times whenever so directed by the employer; and all roads and ditches running through said fields to be kept clean and free from weeds.

IV. It is likewise hereby agreed that all work, labor and service to be

performed by the planter under this agreement, shall be subject to the supervision, and shall be done to the satisfaction of the employer in all cases; and if it shall seem necessary to employ extra labor to do the work satisfactorily, the employer shall so employ extra labor, and all costs of same shall be charged to and deducted from planter's share with interest at the rate of nine per cent, per annum, except such extra labor as may be necessary in cutting and loading seed, planting and first watering, making level ditches and putting in gates and boxes for which the planter shall be charged \$... per acre to be returned without interest; and the planter shall always be subject to the supervision or order of the employer.

V. For all labor performed under the terms of this agreement in cultivating and harvesting cane upon the land set off to said planter, he shall be paid at the rate of ... per ton of two thousand (2,000) pounds of cane on all of the cane produced upon the land cultivated by himself in common with others as aforesaid, such proportionate part as his labor bears to the entire amount of labor expended upon such premises by the planters, averaging the same between the total number of such planters.

VI. From the proceeds of his labor, as set forth in the last article, he shall return to the employer the advances set for in articles No. 1 and 4 afore said as therein set forth.

VII. This agreement may be terminated at any time by the employer, and upon two months' notice by the planter, the planter being entitled upon such settlement, to wages at the rate of ... dollars per month for the term of his service rendered deducting therefrom the advances as aforesaid under Articles No. 1 and 4.

VIII. In case of the death of the planter during the term of this agreement, the estate shall be entitled to an immediate settlement at the rate of ... dollars (\$...) per month, deducting advances as aforesaid; or settlement may be deferred until the crop is harvested and then it shall be made upon the terms hereof for the proportionate time given by said planter hereunder. In case of accident to or sickness of said planter whereby he is prevented from performing the labor under this agreement, if he shall not supply labor in place of his own, the employer shall do so and a proportionate amount of said planter's share under this agreement shall be deducted for the time lost.

IX. The planter, together with his co-workers, shall have the right to inspect the weighing of their cane at any time.

X. This agreement shall terminate and be at an end when the last cane upon the fields to be cultivated hereunder, shall have been placed

upon the cars and weighed, and settlement shall be made in full not later than one week thereafter.

In witness whereof, the said employer has caused the execution of these presents, by the attachment of its corporate seal together with the names and seals of its President and Treasurer, and the said planter has hereunto set his hand and seal the day and year first aforesaid.¹²⁹

An article from the *Hawaiian Gazette* suggests that the water resources at Honolulu are capable of supplying Honolulu with the water it needs. This in turn is evidence of the capacity of the Honolulu water system. The section reproduced below was subtitled "Water wanted."

The water famine has brought down on the heads of the Government anathemas from all quarters. It must be confessed that these anathemas are not altogether undeserved. The Government has been somewhat dilatory in providing against the recurrence of the annual water famine. With the improvidence which is supposed to be the peculiar characteristic of the aboriginal race, they have enjoyed the moisture when wet, and folded their hands in a fatalistic apathy, when dry.

The curse of the Honolulu water works system has been the infatuation of the rulers with reservoirs and rain water. The study of elaborate maps and estimates and calculations has turned the head of one Government after another, and the result has been that, while Ministers were lapped in gorgeous visions of chains of reservoirs stringing Nuuanu Valley, and costing, fortunately only on paper, fabulous sums, the town has gone dry. Now, a pump has been ordered, and it is to be hoped that the long-tried and deeply discredited mud pond system will yield to a more rational plan.

The wells of Ewa have been flowing for four years, and its pumps have poured out upon the thirsty plains of Honolulu enough water daily to supply the waste of a city as large as San Francisco. With this example at the very door, what possible excuse can there be for any more water famines?

A tenth part of the power in the great pumps at Ewa, applied to a group of two or three artesian wells, will insure to Honolulu an abundant supply of pure, fresh water in the driest days of August no less than in the midst of the winter rains. The problem is a simple one, and there is no reason why there should ever be another water famine in Honolulu.¹³⁰

¹²⁹/⁷ Labor Contracts at the Ewa Plantation Company," *Hawaiian Star*, p. 5, April 22, 1893.

¹³⁰ "Honolulu Water Resources Capable of Supplying Honolulu," *Hawaiian Gazette*, August 16, 1894, p. 4.

5.30 Huakai Makaikai a na Poe Kakau Nupepa i ke Alahao Hou: A Sightseeing Journey of the Newspaper Publishers on the New Railroad

This 1895 article shares an account of the journey made by newspaper staff, landowners, rail executives, and dignitaries on the newly opened extension of the O'ahu Railway & Land Company track to Pōka'i, in Wai'anae. While passing through the 'Ewa District, the author-editor W. H. Kapu referenced several traditions of noted places seen along the way. The translation on the right is not complete, but is a summary.

Huakai Makaikai a na Poe Kakau Nupepa i ke Alahao Hou

E like hoi me ka mea i hoikemua ia, pela no hoi ihooko ia ae ai i kakaikiaka Poalua iho la, hora 9:30. Ua akoakoa ae ua poe kakau nupepa ma ke kahu kikowaena o ka Hui Alahao a Aina Oahu mamua ae o ka manao ihoikeia maluna ae, a i ka hora 9:40 nae hoi i haalele iho ai ia Kuwili, no ka ulu niu o Pokai ka pahuhopu, kahi hoi i makaikai o ka hooloihi ana aku o ke alahao, e hoopuni aku ai paha hoi ia Oahu nei ma keia mua aku, no ka lio hao e holo ai.

Malalo iho na lala o ka Papapai i holo aku F. J. Testa (Hoke), Puuku o ka Ka Makaainana nei; J. Nawahi, Aloha Aina; J. E. Buki, Ka Leo o ka Lahui; a me D. M. Punini o ka Olaio; J. U. Kawainui, Kuoka, i kokuia e G. P. Kamauoha, luna makaainana hoopili wale; Bihopa Wilisi no ka Nupepa Ekalesia oli hapaha, S. W. Bihopa, Hoatoha; W. R. Farinetone, Pi Ki Adavataisa ame Kekake; C. C. Kentonia, Kuokoa namu; E. Tause, Hoku; J. M. Vivas. A Senetinel; G. Mansona, Bulletin Ahiahi; J. D. Haine, Ka Hawaiiana; J. D. Stake, Kamanawa; L. P. Linekonia, nupepa ekalesia oli malama a ka Re. A. Makinikoki; Ho Fona, Nu Hou Pake; C.

A Sightseeing Journey of the Newspaper Publishers on the New Railroad
At 9:30 on Tuesday morning, newspaper editors and others gathered at the Honolulu station of the O'ahu Railway & Land Company. At 9:40 we departed on our trip past Kuwili on our way to the end of the route now at the Pōka'i in the coconut grove.

Iakanama, Manawa Pake; H. M. Wini, nupepa malama a no poe mahi ko; F. Godfere, aithe ana nupepa, aka he kamaaina oia no ia oihana. Aohe mea o na nupepa Kepani i hiki ae, a me he la, oia keia paha kekahi akoakoa nui loa ana o na poe o ka papapai, koe nae hoe ke ano laulea like nui ole ae, A mawaho ae hoi, na kau aku ma ke ano ohua o Hope Makai Nui Kelekona o Waianae a me kana wahine. O ke Ana aina Nui o ka Hai a me ka mea paa ae like no ka hoomeo alahao ana kekahi i kaa pu me na poe kakau nupepa.

Mai ka hoomaka ana aku e holo a hoea hou mai iluna nei, ua nana, malama, a hoomaopopo ia na mea a pau e Luna Nui F. C. Samita, a ua hookeleia hoi ka enegina mahu e ka Wiliki Nui H. D. Robata. Ika haalele ana iho ia Honolulu nei a mahoe koke iho, ua hoolawaia mai kela a me keia me ua po-ke pua Pake poni a ulaula, a ma hope iho me na kika a me na mea inu mama. Hora 10:09 i kaalo loa aku ai ia Kulanakauhale Momi me ka hoomaha ole, a ku i ka halewiliko o Ewa i ka hora 10:25, a aole no i loihi loa iho hoomau aku la i ke kamoe ana no ke kaha o Waianae, kahi i kaulana i ka moolelo o Kamapua, a me Kaopulupulu i ke au o Kahahana ka Moi o Oahu nei, a pela no hou me Hiiaka-i-ka-Poli-o Pele, ma kana huakai imi kane, ia Lohiau.

Ua like ka holo ana o ke kaa mahope iho o ka haalele ana i ka hale wili me he "kai nehe i ka ilili," a e "pabee ana i ka welowelo," hookahi no hana, he hoolai wale no, i ka maikai a iliwai like o ke alanui a i ka laula ae paha hou kahi o ke alahao. I ka hoea ana aku hoi keia i kahi papaakea o ke ala, i awalli pu ia me ka lepo, a ohe puehu a koe mai o ka

... Having left Honolulu, by 10:09 drew near to Pearl City, and then reached the 'Ewa Sugar Mill at 10:25. We continued on our path [through Honouliuli] before us towards the shore of Wai'anae, passing the place made famous in the traditions of Kamapua'a and Ka'opulupulu in the time of Kahanana, king of O'ahu; also in the tradition of Hi'iaka-i-ka-poli-o-Pele, in her journey to fetch Lohi'au.

... We entered into Waimānalo, where the kiawe trees grew here and there, and passed along the seashore, arriving at Pili-o-kahe, where there is an ancient stone wall. This was pointed out by a native as being the boundary between 'Ewa and Wai'anae..

lepa, a poina na maka o na poe ma ke kaa hamama mahope. Maika na me ma ke ala i ka ikena aku a na maka, koe no ka uliuli mai o na pohaku on na pali. Komo aku la i Waimanalo, he ulu kiae me o a maanei, a aole i liuliu iho puka ana i ka aekai, ae waihoa hamama mai ana ka uliuli o ka moana i ka loa a me ka laula, a aohe nani aku a koe mai oia wahi o ke ala. A hoea i Piliokahe, he wahi pa pohaku kahiko, a ilaila la, wahi a kamaaina, pale mai o Ewa a pale aku o Waianae, a e waiho lalahala mai ana hoi mauka ae na awawa hanai holoholona o Nanakuli a me Mikilua...

...A pau no hou ka ai ana, ua hele hou aku kela a me keia e makaikai hou i ka halewili a me kahi mau wahi e ae... a haalele aku ke kaa ia Waianae i ka hora 2. Ma ke ala hou, ua ku ma ka halewili o Honouliuli e kali ai no ke kaa iho aku. A mai laila mai hoi, aohe no i holo nui loa mai, no ka ike e ia ana mai nae paha hoi kahi o kekahi kaa maua i ke kamahele kaa ma Waiau, a nolaila, ua ku pokole ma Kalauao, a hooihiki loa iluna nei he mau minute mahope iho o ka hora 4...

1 Ka Makaniuna, July 8, 1895, p. 1.

In this article, entitled "Trust in the rod of diviner is unabated" and subtitled "Converts of Rev. Mr. Mason are still digging for water on island of Lanai," an individual referred to as Mr. Mason of New Zealand is consulted to find areas to dig for water in Honouliuli. Mason uses a divining rod to find the underground water.

Notwithstanding his scientific communication by United States hydrographers, the Rev. Mr. Mason of New Zealand has not lost a particle of the confidence of those that enlisted his services as a diviner of hidden water in these islands. They are following his advice in going deeper with the well on Lanai, and they are going to dig on Oahu just where he has sensed water.

"The indications are increasing," said Cecil Brown this morning when asked for the latest news from the well on Lanai. "Mr. Mason advised us

before leaving by all means not to stop digging. He thought water would be found below the rock where we are now blasting.

"It is very important to get water at that elevation, because whenever it is struck there pumping will be stopped. The elevation there is 1,200 feet above sea level."

Speaking of Mr. Mason's exploration of Honouliuli ranch, H. M. von Holt said this morning:

Strange as it may seem, Mr. Mason does not look in the beds of gulches for water. He finds water athwart the gulches and on the ridges. This is in accordance with his experience in New Zealand. Without any suggestion from us local people, he pointed out locations of water in the places that were anciently the centers of large population. It was the same on the Island of Lanai. Where he pointed out places there, the natives said that formerly there were large settlements surrounding the spots.

No digging has yet been started on Honouliuli, but wells will be sunk there in the places indicated by Mr. Mason.

Mr. Von Holt stated that he himself had been using the divining rod for more than a score of years. In some cases on Lanai where the stick turned in his hands, Mr. Mason said it was not caused by water but probably by some mineral. He placed the evidence of sensations produced in his arms by water above that of the divining rod, as in only two instances in New Zealand had water not been found where he said it should be, and in these his advice to dig deeper was not taken.

Mr. Mason uses the rod to indicate the depth at which water should be struck. This he does by carrying on the divination beyond the spot first sensed to a point where the rod again pulls.

It is a curious coincidence of Mr. Mason's hydrographic mission to Hawaii that he should first have been interested in the divining rod by a former statesman of the Hawaiian monarchy. This was Dr. Hutchinson, who was minister of the interior at the time that Bishop Staley was introducing the Anglican Church in these islands. He was a very positive character.¹³¹

5.31 Reciprocity and Military Condemnation of Honouliuli Lands and Offshore Waters: Development of Pearl Harbor, 1873-1998

Pu'uloa, the land area of Honouliuli, and the lochs of the harbor played a major role in Hawaii's political history and eventual loss of sovereignty. The narratives

¹³¹ "Seeking Water Resources at Honouliuli and on Lanai," *Honolulu Star-Bulletin*, January 3, 1913, p. 1.

that follow take readers through the decades of turmoil in development of sugar plantations, trade agreements, the "Reciprocity Treaty" (1875 & 1884), and eventual military control of Pearl Harbor and large tracts of Honouliuli Ahupua'a by the United States (fig. 7).

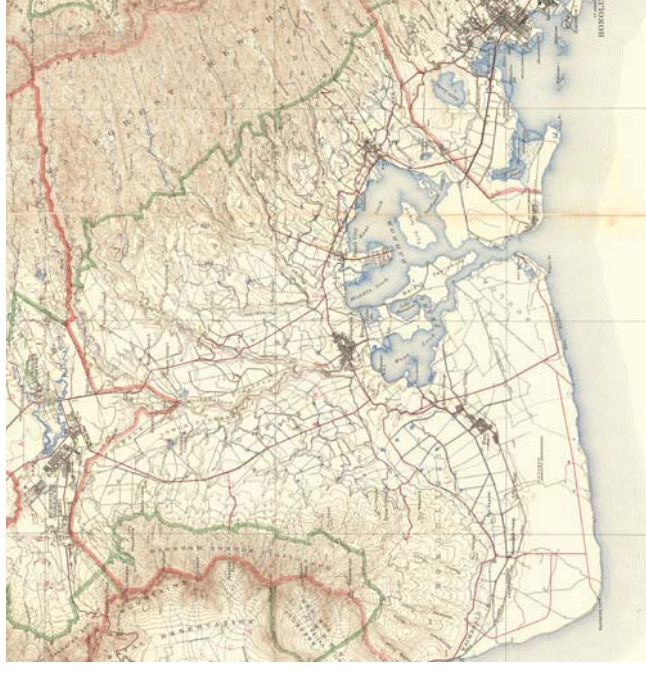


Figure 7: Detail of O'ahu Topographic Map, District of 'Ewa (USGS and War Department Map, 1938). View of plantation lands, railroad alignment, and features of the coastal region of the Hoakalei program area.

In 1884, the "Hawaiian-American Supplementary Convention" amended the January 30, 1875 Treaty to grant sole use of Pearl Harbor to the United States. Article II states:

His Majesty the King of the Hawaiian Islands grants to the Government of the United States the exclusive right to enter the harbor of the Pearl River in the Island of Oahu, and to establish and maintain there a coaling and repair station for the use of vessels of the United States; and to that end the United States may improve the entrance to said harbor and do all other things needful to the purpose aforesaid.¹³²

Military activities directly impacted lands of the Hoakalei program area as roads and training grounds were developed across the region. Cultural sites preserved within the three preservation areas include the remains of military usage, and periodically, unexploded ordnance has been found along the shoreline.

Areas where native Hawaiians and large landowners lived at Pu'uloa-Honouliuli were condemned, including those of families under the names of Dowsett-Parish, Kealoha, Kealakai, Campbell, Stephenson, and others. The nearshore lands that surround the Pearl Harbor lochs were condemned, and access to the harbor waters is still controlled. During the war years, no access was allowed to the Honouliuli coastline fronting the open ocean as well. The resulting development of bases, communications centers, munitions storage facilities, training grounds, naval fleet yards, and housing—such as Keahi, now called Iroquois Point, the childhood home of Sister Thelma Parish and *Kipuna* Arline Wainaha Ku'uleialoha Brede Eaton—have all evolved since 1900.

Colonel David Kalakaua wrote a letter on the Pearl Harbor matter which was published in the *Honolulu Bulletin* in 1873.

Sir—this has been an eventful year for Hawaii. It is only thirty-four years since the King and chiefs of this nation granted a Bill of Rights at Luadhu, Lahaina, Maui, 1839, which is the basis of a civilized government by the people. The Constitution granted by King Kamehameha III, by and with the advice and consent of the Nobles and Representatives of the people, followed in 1852. In 1864 the present Constitution, under which the country has been governed was granted by Kamehameha V.

Many feared that the nation was not sufficiently educated in Constitutional Government to elect a Sovereign on the demise of His Late Majesty without naming his successor. But these fears were groundless. The peaceful election which followed showed that Hawaiians are capable of self-government.

Last July the government proposed to the United States Commissioner to renew negotiations for a treaty of commercial reciprocity, and suggested this might be made desirable to the United States by ceding to them the Harbor of Pearl River for a naval station.

¹³²Hawaiian-American Supplementary Convention, December 6, 1884.

It soon appeared that the Hawaiians were not in favor of such a cession. I was myself not in favor of it. Many people had fears that if the United States has possession of Pearl Harbor, the independence of the nation would be jeopardized.

The previous action of the United States does not justify those fears, for that government has always desired to see the Hawaiian nation free and independent. When Kamehameha III, placed this country under the protection of the United States in 1852, to save us from the threatened attack of a French man-of-war, the United States returned the country to its rightful King as soon as the trouble was over.

From my knowledge of all free government, I know that the prosperity and independence of the Hawaiian Islands, depends on our showing to the world that we are a law abiding people and regard our Constitution and laws, which protect every man's rights.

It is my belief that the Hawaiian people will never permit a violation of the Hawaiian Constitution and laws. If any reforms are needed, there is a lawful way to make them, and that way will always be followed.

We say to the world, as our neighbor the United States says, that we have always welcomed foreigners to our shores. Let them come, and bring with them money and skill to develop the resources of the country; here, as in the freest and strongest nation in the world, all men will be protected in their rights, under civilized law. Whoever says that this is not so, is in my opinion no friend of Hawaii or of Hawaiian independence.

A great deal has been said by a few persons in our community to the effect that the natives are antagonistic to the foreigners. This I deny, and I take this opportunity to say that no such feeling has or now exists; for the proof of which I state that during the discussion about ceding Pearl River to the United States, no violence or threat came from any one of the natives, save a fair criticism in regard to the action of the Ministers.¹³³

5.32 Huikau, Pohihihi ke Kuikahi Panai Like me ka uku Kaulele o Puuloa: Confusing and Bewildering, the Reciprocity Treaty with Its Interest Charge of Puuloa

The move by businessmen—many the children of missionaries, and others foreigners who had taken up residency in the Hawaiian Kingdom—to develop sugar plantations led to the movement toward reciprocity. The sugar growers sought a way to compete with sugar growers in the southern United States, and through the Reciprocity Treaty which took effect on September 9, 1876, the Hawai'i sugar growers were able to export

¹³³Letter from Colonel David Kalakaua on the Pearl Harbor Matter, *Honolulu Bulletin*, December 17, 1873, p. 2.

their sugar and rice crops with relief from taxation on foreign imports. The treaty also set the foundation for American development of Pearl Harbor as a Pacific Base of military operations. In 1887, the re-negotiation of the treaty was forced upon King Kalākau through the “Bayonet Constitution” [19].

In the article below, Hawaiian historian Samuel M. Kamakau questioned the move toward the kingdom relinquishing control of Pu‘uloa (Pearl Harbor) to the United States.

About Ewa. Ewa and it's [sic] many bays are surrounded by land on most sides. The entrance to the Harbor is at Puuloa. Its narrowest point is between Kapuaikaula and Kapakule. It is perhaps a little more or less than a furlong across. The rise (submerged hillock) outside of the entrance is Keaalii. There is a shallow place there, approximately 9 to 10 feet deep.

Here is a description: From Keaalii to the mound at the entrance of Puuloa harbor, there is a channel on the west, near Kapakule. Then [it runs] from Kapakule to Kepookala. From Kepookala one turns towards the estuary of Kaihuopalaai, and Kapapapuhi is on the west side. That is the branch of the estuary of Honouliuli. Amoe Haalelea is the chiefess, landlord of this section of the estuary, and the lesser landlords, who control the fishing boats.

From Keaalii and the channel to Kapakule, and to the east, to the tip of Mokuumeume, is the estuary channel of Komoawa. This branch of the estuary is now called the Halawa Branch. There are two titled landlords here, their highnesses Queen Emma and Ruth Keelikolani.

From Kepookala, along the sheltered western side of Mokuumeume, along the Halawa branch, and along the point of Paauau to Kalaehopu, Kupahu, and Halaalani; this branch of the estuary is called Waipio and Waiawa. The titled land lords of this section of the estuary are Malaea Ii and the relatives of Ruth Keelikolani. This is an expansive place, not filled with thousands of boats and more, from the point of Pipiloa to Mokuumeume, and from there to Halawa. Turning north are the lands along the sheltered bays of Manana, Waimano, Waiau, Waimalu, Kalauao, and Aiea. Waimalu is the land division to which Mokuumeume belongs.

What right does the government have in giving Puuloa and Ewa as payment for the Reciprocity Treaty? I know of no right that the government has.¹³⁴

This is an editorial letter about Pearl Harbor and the treaty. The writer, like Kamakau, believes that the government does not own the waters in Pearl Harbor,

¹³⁴Samuel M. Kamakau, “Huikau, Pōhihihi ke Kuikahi Panai Like me ka uku Kaulele o Puuloa,” *Hawaii Poni*, August 20, 1876, p. 3.

and thus cannot convey the rights of use of the harbor to the US.

Dear Sir: Noticing lately several newspaper paragraphs in relation to the ceding of the water of Pearl River Lagoon to the United States, for a naval station, I should wish to remark that an impression appears to exist at the water of said Lagoon is Hawaiian Government property. But that is not the case; the only piece of water owned by the Government in that neighborhood joins Aiea, and you might almost cover it with a pocket handkerchief.

Being well acquainted with that neighborhood, I write this to inform those who are interested, and those who might wish to know to whom the water belongs inside the mouth of said Lagoon.

The mouth of the Lagoon and the water for a distance of about six miles in a north-westerly direction, being the North-west Lagoon, belongs to Honouliuli; adjoining that and including the central Lagoon, the water belongs mostly to Waipio.

The easterly Lagoon from its boundary with Waipio water, belongs to the Island of Mokuumeume, and extends to the opposite mainland in all directions (except Halawa on the south), so that the mainland water only extends the distance from the shore, that a man can wade so as not to be over his head.

On the Halawa side (south) the water belonging to the Island of Mokuumeume zigzags from the centre of the channel to close to the mainland and the island, until it joins the Waipio water on the west in the middle of that channel.

Therefore, this Government cannot lease what does not belong to it. If the United States wish to procure any part of the Lagoon, they can only do so by leasing or buying any land that the owners wish to dispose of.

The property that would be of most value to the United States, would be the Island of Mokuumeume, it containing about 380 acres, and has more water belonging to it than any other land in the lagoon except Honouliuli; and being an island would be better suited for their purposes than the mainland, supposing they did wish it for a naval station.

Any proposition coming from that Government to lease the island and its waters, would no doubt be entertained by those who have the management of the estate, and who no doubt, are waiting for an opportunity of leasing to them, and to none else.¹³⁵

The article below is about development of Pearl Harbor as a naval base.

Our comparatively venerable and superlatively wise contemporaries are discussing the harbor in a manner that is, at least in part, rather idle.

¹³⁵Pearl River and the Treaty, *Daily Honolulu Press*, May 6, 1886, p. 3.

What is the use of complaining about the filling in that has been done on the harbor front at this time of day? If water is needed more than land, there are vast expanses of coral reef on almost every other side of the harbor that can be dug out as easily as the portion could have been which has been reclaimed for building ground. Supposing the Government waited until it could afford the enormous expense of dredging out what it instead built up into dry land, where could the vast commerce anticipated find space for wharf and warehouse accommodation inside of the deep water line? The land is all occupied right down to the reef, with doubtless a high valuation put upon it by the many proprietors. Commerce cannot establish easy communications between sea and shore over the roofs of houses and flower and vegetable gardens. It would have to buy out all the real estate intervening between the sea and available business sites.

In view of these things, as well as of the fact that the filling in referred to has given a part of the entrance [illegible] the harbor, it would be hardly wise, if matters were put back to the conditions existing before that operation was begun, to decide upon digging out instead of dumping in. By the time the harbor is dug out for deep sea commerce over to the prison embankment on the Ewa side and to the quarantine station opposite the town, the Government will need to take a good long rest for the replenishment of its resources. Indeed, before so much scooping out of coral reef is required by the fabulously large additional commerce anticipated from the Canadian and Panama steam and sailing traffic, it would be necessary to double the width of the harbor entrance and increase its depth by one half.

Moreover, after all is done that may be done for enlarging the capacity of the harbor of Honolulu, before accepting the stupendous alternative of digging out of Esplanade and buying all the real estate from the water front to Queen street, it would perhaps be worthwhile having a commission of engineers to report upon the cost of deepening the entrance to Pearl Harbor. Open out that beautiful and spacious sheet of deep water to commerce, and the fleets of all nations may be invited to come and find accommodation at the hands of "little Hawaii." That would be taking commerce away from Honolulu. So it would, but it would be all in the country, and Honolulu will be rather crowded for comfort when it has secured all the business that its harbor can accommodate after all the presently feasible improvements are accomplished without counting the shoveling out into the ocean of the splendid tract of building ground added to the city front under the administration of Major Gulick.¹³⁶

Two years later, an article in *The Hawaiian Gazette* entitled "Development of Pearl

¹³⁶ "Development of Pearl Harbor as a Base," *Daily Bulletin*, October 28, 1886, p. 2.

Harbor by U.S. Interests" and subtitled "The Disaster at Pago-pago, Samoa" and "What the Samoan disaster may do for Pearl Harbor" continues to push for harbor development.

Among the points upon which interest will be quickened, will be that of foreign harbor improvements. This was shown even before the Nipsic canal, in the liberal appropriation of \$500,000 made by congress for possible contingencies, and for improvements at the harbor of Pago-pago, ceded to the United States at Tutuila. Successive Administrations at Washington have somewhat languidly moved towards the improvement of our Pearl Harbor, of which they have the exclusive privilege for navy purposes. This concession remains useless to the United States until they deepen the channel through the soft coral of the outer bar, so as to admit large ships. Lieut. Wilson of the *Vandalia*, with his assistants, made a minute and exhaustive survey of both the harbor and bar during 1887-8. We believe the cost of opening the channel will be much less than one million dollars. It is reported that the losses of the U. S. Navy at Apia will foot up over two millions, showing how small, in proportion to possible losses, is the probable cost of needed improvement to the harbor.

With the opening of the bar at Puuloa, the Pacific squadron of the American navy will manifestly be in a greatly strengthened position. It will be in the exclusive possession of the only first-class harbor in the mid Pacific, and indeed in all respects, one of the very best harbors in the world. No destructive waves like those at Apia can possibly traverse the long, river-like channels above Puuloa, even if they could pass in full force over the barrier reef. The inner reaches of the harbor are safe against even the heaviest earthquake waves, or of anything short of a Krakatoa convulsion, such as drove the sea five miles inland. We never have hurricanes in this region of the Pacific; but even in the fiercest cyclones, vessels in the Ewa lagoons would have their anchors in stiff mud, the best of holding ground. If driven ashore they would bring up on mud banks from which they could be easily and safely removed.

The defense of Pearl Harbor would seem to be a matter of great simplicity. The only approach for an enemy by water is up a straight channel, directly commanded by the end of the Waipio peninsula, upon which search lights and dynamite guns would form an adequate protection. So large and secure a harbor for purposes of supply and refitting, and in such a choice geographical position, must contribute materially to the efficiency of the American navy. In view of the gain in this respect, the expenditure, even of millions, must be regarded as trifling. It seems reasonable, in view of the recent events, to look for an early opening of

Puuloa bar by the United States Government.¹³⁷

The following is an essay by a student on the history of Pearl Harbor entitled "An Essay on Acquisition of Pearl Harbor" and subtitled "Pearl Harbor. The history of its acquisition," "Its location, appearance, and other characteristics," and "An unorthodox view by a student." This was published in the *Independent* over several issues in 1895.

Allow me space in your columns to publish an essay on Pearl Harbor which probably will seem very unorthodox and which in many ways differs in opinions and views from the well-established doctrine that the salvation of Hawaii lies in the cession of Pearl Harbor to the United States, and that the salvation of the United States lies in the possession of Pearl Harbor. I write at some length because I do not alone desire to convince you, Mr. Editor, but also the great numbers unacquainted with the harbor of its uselessness to Uncle Sam as a naval station or as anything else. Thanking you in advance for the space you allow. I remain yours against annexation. Student.

When in the year 1886, while the treaty extending the alleged "Reciprocity" Treaty of 1874 between the United States and Hawaii, was under consideration in the United States Senate, Senator Edmund secured the interpolation into its text, of an article providing for the cession by Hawaii to the United States, of the exclusive privilege of entering Pearl Harbor with its ships of war, and there establishing coming and repair stations for the navy of the latter, he did an act whose consequences are not yet fully unfolded. That was a shrewd piece of strategy on the part of the Vermont Senator, and one which did not at all appeal to, or comfort the Cleveland administration of the day, as the writer hereof has ample means of knowing. But it rendered possible by the diversity of sentiment in the Senate, as to the renewal or extension of the then all but lapsed treaty, upon any terms; and the scale seems to have been turned in favor of such extension by throwing in that large sized bunch of national policy, of indefinite weight, but then supposed, by those who knew where Pearl Harbor was located, to represent a decisive strategical advantage to the United States.

As negotiated by President Cleveland's Secretary of State, Mr. Bayard, the new treaty was a very brief and unsensational document, and merely extended, in terms, the then existing treaty, for a period of seven years from the date of the exchange of the ratifications therein provided for the old treaty, as already stated, had then all but lapsed. Indeed, it was

¹³⁷ "Development of Pearl Harbor by U.S. Interests (the Disaster at Pago Pago, Samoa)," *Hawaiian Gazette*, April 16, 1889, p. 2.

enjoying a most precarious tenure of life, for its stated term of seven years had long ago expired, and it was subject to abrogation upon twelve months' notice from either of the contracting powers. It was merely a tenant at sufferance in the American Treasury, liable to be served with notice to quit any day, and with a numerous and influential contingent in the Senate clamoring for the immediate service of such notice as would extinguish it, and would relegate Hawaii, that pauper pensioner upon the funds of Uncle Sam, to a position of self-dependence. It was felt, and most reasonably so, that the treaty in question, which admitted Hawaiian sugar and rice to American ports duty free, in the face of a general duty of about two cents per pound upon those commodities, was nothing more or less than a bonus of so much money paid by the American taxpayers to the so-called "Hawaiian" planters, – under which innocent and convenient descriptive appellation were included planters of every nationality from China to Sweden, in an eastward course.

But when the document, submitted by the President to the Senate, came from that body with an amendment embodied in its text which completely changed its purport by calling for a cession by one to the other of the parties of a supposedly highly valuable but indefinite territorial advantage, it metaphorically knocked both the "high contracting parties," as represented by the Executive of either Power, still higher. President Cleveland pouted and sulked, as well he might, to see his little commercial contract transmogrified into a treaty of territorial accession by the Senate, whose sole function in the premises, was supposed to consist in either approving or rejecting the instrument submitted to it, without amendment or alteration. So much disposed was Mr. Cleveland to resent this unexampled invasion of the Executive domain, that his Secretary of State actually notified the Hawaiian Minister at Washington, that the President did not regard the treaty, as negotiated and agreed upon by the diplomats and as submitted by him to the senate, as having been approved by the latter body in such manner as the constitution contemplated, nor so as to make it incumbent upon the President to proceed with the exchange of ratifications.

But, if the effect of the Senatorial aberration referred to was sullenness in the White House, it was consternation in Iolani Palace in Honolulu and in the halls of the sugar barons throughout this group. The administration of Prime Minister Gibson, though wont to flout the barons aforesaid upon all minor matters and occasions, seemed to realize that they must, in spite of the baronial opposition to and abuse of their general policy, so far mollify the barons on the treaty questions as to keep secure their grasp upon the United States treasury. Mr. Gibson was a shrewd old fox in matters political. He has taken the measure of the barons, and of their

patriotic pretensions, and he knew that, while left to feed undisturbed upon the dividend pie for which they have shown such a relish, no real danger lurked behind their political mouthings. Consequently, it was deemed of vital importance to Mr. Gibson's administration that the treaty should be extended upon some terms; but those proposed by the Senate, involving as they did a cession of the territory and of course of sovereignty, would expose that administration, if accepted, to a new danger from its erstwhile supporters, the Hawaiian people, – who swore wild oaths against anyone who should sign away an inch of their territory.

And so it came to pass that the sulks into which the Edmunds amendment to the text of the treaty had thrown Mr. Cleveland, proved the salvation, for the time being of the Gibson regime for, quietly depositing the amended draft of the treaty in a pigeon hole of the State Department, the President wet at rest for a year or more all treaty agitation; the Louisiana Senators retired from the fight against its extension: the barons of Hawaii resumed the task of spending their dividends and clipping their coupons; and until the latter part of 1887 nothing further transpired as to the cession of Pearl Harbor.

In the meantime (June 30 - July 1 - 1887) the first in the series of bloodless revolutions for which Hawaii has become if not famous at least notorious came to pass. Through it Mr. Gibson was forced out of the Government, a so-called Reform Cabinet was placed in office, the constitution was abrogated, and another promulgated in its stead whereby the King was reduced from a personal ruler to a virtual figure head. The sugar barons were in the saddle under the new dispensation, and at once negotiations were re-opened for an extension of the treaty. Mr. Cleveland, meantime, had outgrown the feeling of resentment incident to the Senate's having trodden upon his executive corns, and began to admit the advantage of proceeding to an exchange of ratifications of the treaty. This was accordingly done in November 1887, and so the treaty was given a renewed term of seven years, at the end of which period, in November of last year, and thereafter, either party may abrogate it upon the twelve months' notice to the other.

But the exchange of ratification last referred to was preceded and accompanied by a correspondence between the Hawaiian Government, acting through its Minister at Washington, and the American Secretary of State, Mr. Bayard, wherein was embodied what diplomatic gentlemen are pleased to term a "contemporary construction" of the meaning of the Article in the treaty which cedes to the United States the exclusive rights above referred to. In a few words, the effect of such correspondence was to declare that each of the contracting parties understood and interpreted that article to be coterminous, in point of time, with the rest of the treaty,

and that it implied and involved no cession of sovereignty in any part of the ceded water or territory, by or on the part of the Hawaiian Government to the United States. Just how one nation can cede to another exclusive privileges of occupancy of the territory of the ceding power without a cession or loss of sovereignty, or just how there can be a dual sovereignty in Pearl Harbor, in case it shall ever be occupied as contemplated in the article of the treaty now under discussion, is one of those puzzles which, perhaps, can best be answered by members of the Corps Diplomatic. In the meantime the United States Government through its naval officers on this station has been setting as though it intended to avail itself of the grant in question; and the balance of this article will be devoted to a description of the subject of the grant, its physical features, and other matters pertinent to an understanding of the situation in the world-famous Pearl Lochs.¹³⁸

The existence of Pearl Harbor is without any apparently adequate excuse in nature. It is a body of salt water, but is neither sound, bay, channel, strait or inlet, –nor anything else of the kind for which hydrographers have found appropriate names, so, for want of a more accurately descriptive appellation, it is called a harbor. The prenominal "Pearl" is derived from the fact of pearl oysters being found there in small numbers and of uninteresting physical characteristics. The names Pearl River, Pearl River Harbor, and Pearl River Lochs are also familiarly applied to the water in question, but there is no more excuse for applying the word "river" than the word "ocean" to the place. There is not even a permanent stream of any respectable proportions emptying into the harbor and only one stream (scarcely more than a brook), which is not dry during more than half the year. The "river" is therefore a purely imaginary feature of the landscape.:

In fact, all the streams on the mouth side of Oahu are but brooks, except that entering Honolulu harbor, with that exception, their insignificance is equaled only by that famous stream in America (Heaven only knows its location), for which the local congressman was pulling for an appropriation, whereupon the late lamented "Sunset" Cox declared that along its course, "you can't find a dam, by a mill site! And you can't find a mill, by a dam sight." Yet the supply of water to Pearl Harbor is considerable, numerous springs in the low ground contiguous to the East and Middle Lochs: and this water, before mixing with the brine of the lochs, is utilized to propel the machinery of several rice mills and in irrigating considerable areas of rice, bananas, pineapples and other crops.

¹³⁸ An Essay on Acquisition of Pearl Harbor, *Independent*, May 8, 1895, p. 1.

The south shore line of the Island of Oahu lies in an almost exact east and west direction from the base of Diamond Head (Leahi), that most picturesque landmark at the southeast corner of the island, to the mouth of Pearl Harbor ten miles to the westward. Passing the poetic and picturesque shore of Waikiki, with its deep and feathery fringe of giant cocoa palms nodding above a lower growth of the intensely green and lace-like algarroba, (a species of the locust) with the beach guarded by a reef line upon which the waves break in a continuous line of foam, we reach at a distance of four miles a break in that roof line, through which runs the channel to the harbor of Honolulu. To the westward of the Honolulu harbor entrance the reef-line extends to a greater distance from the shore, while inside the outer reef are ether and almost similar reefs or rather one extended reef, with ridge lines reaching to and above the surface at low water, in many places having over-lapping ends, the whole giving to the locality at low water a monotonous and dreary aspect, which at high tide gives place to a scene of thundering foam, rolling over an expanse of many square miles. And yet that inner field is navigable by very small craft when handled by experienced local navigators, though the deeper water of the open sea is almost invariably sought by the traffic, whether of business or pleasure, between Honolulu and Pearl Harbor and vice versa.

Pearl Harbor is peculiarly difficult of approach, when the normally calm condition of the ocean in its front is taken into account. Among the elements of this difficulty is that very calmness which habitually reigns upon those waters outside the reef, and the absence of bold headlands or other conspicuous landmarks at or near the mouth of the harbor, by which to steer a course, superadded to the torturous character of the channel to the entrance, as now existing. It is well said, that one may reasonably imagine himself on the bosom of the Pacific, while in reality upon the shoal water that for several miles from the entrance to Pearl Harbor is under laid by a deep bed of sand; and this expanse of water, while ordinarily placid during the prevalence of the trade winds from the north east, becomes a raging mass of breakers during the time of a "Kona" or southerly storm of periodical occurrence in these latitudes.

But to leave the subject of this sand-bed for a future paragraph, let us discuss the facilities for entering the harbor as now existing. Your correspondent on the occasion of his visit to Pearl Harbor for the purpose of preparing material for this sketch chartered a sloop in Honolulu, and with a brace of old sea dogs to do the navigation, and a few friends to assist in enjoying the scenery, the balmy breezes and the matchless beauties embodied in the ever-changing hues of that opal sea, glided out of Honolulu harbor on a lovely afternoon of April and headed down the

coast. The peculiar reef formation of the locality makes a wide detour to sea essential to prudent navigation, even in the best of weather, and the day was well spent, when we arrived in line with the two objects which mark the course of approach to the entrance of the harbor. These are the derrick of a salt-pumping establishment standing on the west side of the entrance, and a hump on the shoulder of one of the northward slopes of the lovely Waianae mountains, nearly twenty miles to the westward which picturesque chain of hills, bathed in the haze of the tropic afternoon, form an element of combined beauty and grandeur in the landscape, of rare and striking excellence; and amid the mass Kaala, the giant of Oahu, lifts her verdure-clad peak 4000 feet to a close communion with the clouds. From the base of that chain eastward to the shores of Pearl Harbor, and of the outer sea, stretches a gently sloping plain, scarred and seamed by the torrents of centuries, but presenting, few or none of those scars to the observer from the deck of our craft.

With all available local knowledge and skill, the navigation of the entrance is studded with difficulties and dangers. A bar here, and out-cropping of reef beyond; on this side a sand spit extending into the channel; and on the other rocky shoal, such is the succession of features encountered. But after some preliminary grating upon the coral, and some poling of our craft off the edges of sand spits, the deep water of the inner entrance was reached in safety, and gave opportunities for a survey of the surroundings, unembarrassed by the necessity of efforts to avoid immediate stranding.

From outside the entrance the view of Pearl Harbor is uninteresting and without notable feature. The scene in general, from the outside, is of a mass of shoal water, relieved by the foam of several lines of breakers, with flat expanses of and stretching away beyond to the Waianae mountains on the westward, and to the Konahuanui range on the north. Nor does this scene materially change until, as suggested, the inner entrance is very near at hand. Then the change is sudden, pleasing, and in a degree wonderful. You see the low land which compresses the main artery of the entrance into a width of about four hundred feet. Just ahead is a stretch of deep water, about forty acres in extent, with gradually expanding shore lines, to east and west. But the central view is blocked, by the jutting, almost into the very gate to the harbor, of the foot of a long and irregularly shaped peninsula which protruded from the mainland at the northwest of the entrance a distance of nearly four miles; and forms the barrier which divides the West from the Middle Loch. The picture is most inviting, as we enter the harbor and confront the peninsula directly ahead; its abrupt sides laved by a lovely and narrow channel on the east leading directly north, to Middle and East Lochs; while an equally beautiful

channel, almost a facsimile of the first, leads to the northwestward, and widens into West Loch, leaving the peninsula on the right.

West Loch, while bearing in a generally direct line from the entrances, is sinuous to a degree, and but slight progress into its mazes is requisite to show a completely land-locked harbor: with the low, rocky plateau of Puuloa, Honouliuli and the peninsula about mentioned surrounding you at all points. The average width of the loch during the first two miles from the entrance does not exceed a quarter of a mile; it is sufficiently sheltered by the low surrounding lands with their thickets of algaroba to present an almost unrippled surface in all ordinary weathers. The black and gray rocks which form its peculiarly abrupt banks, with the vivid green of the algaroba fringe, the whole set in the majestic framework of the Waianae and Konahuanui range of mountains combined with the opal hues of the water itself, to comprise one of the most lovely pictures of this character anywhere to be found.

After two miles of a regular, and picturesque career, the West Loch becomes eccentric in its shores, curves and indentations, to a degree which renders description difficult and comparisons impossible. It sends an offshoot into the heart of the peninsula on the north, that almost cuts it in twain; while its main body extends to a width of more than a mile; its waters shoal gradually; and several small islands dot its surface. At a distance of less than four miles from the entrance the inner limit of this Loch is reached, where the rich alluvial land of Honouliuli sloping with a gentle grade from the Waianae mountains, form its shore.

Deep water prevails in the West Loch, which, except in its upper end, is exempt from shoals, during three miles on its course there is a uniform depth of 7 to 9 fathoms, except where a lava ledge crossing from a point of the peninsula reduces the depth to 6 fathoms during a very short distance; and these depths prevail as a rule, not only up to the shore, but in many localities extend for considerable distances under the projecting surface of lava rocks; and ships of the heaviest tonnage, if once introduced into this Loch, could in many places lie alongside the banks, and utilize the lava tableland for a series of quays.¹³⁹

The East and Middle Lochs

What has been said of the West Loch in the way of general description applies with equal fidelity, save for some unimportant details, to the East and Middle Lochs. Returning to the entrance and rounding the point of the peninsula to the north-ward (looking out for a shoal that makes

¹³⁹ An Essay on Acquisition of Pearl Harbor, *Independent*, May 9, 1895, p. 1.

out from that body of land and greatly reduces the width and hampers the navigation of the channel leading to the two Lochs last named), we encounter, at the head of the channel, the large picturesque island of Mokuumeume or Ford's Island, as it is locally called, from the family name of two generations of owners. Arrived at that point, a vista of rare beauty is opened on either side of the Island extending, on either hand, about two and a half miles across the waters of the lagoon variegated by the verdant shores of peninsula, island and mainland, with the stately background of Konahuanui mountains rising beyond and above the whole.

The main course of the channel we are navigating continues in a substantially northern direction, leaving Ford's Island on the east, while a channel much narrower and shallower, but which expands to a width of half a mile before the Island is passed, divides the Island from the mainland on the east, and opens into the East Loch, the most considerable group of water ways. This larger body is also reached from the main channel, by passing to the westward of and between Ford's Island and the Pearl City Peninsula, so-called, which protrudes from the northern mainland to the southward, about a mile and a half, and forms the barrier between the East and Middle Lochs. The former comprises fully three square miles of water, and lies chiefly to the northward, through partially to the eastward of Ford's Island bounded north and east by the mainland, and west by the Pearl City Peninsula. It is completely land-locked, but is open to trade winds and storms which occasionally sweep over the Konahuanui mountains, and render it at times extremely hazardous navigation by small crafts. The depth of water from the entrance into this Loch by the main channel (except for projecting bars and shoals which will yield to dredging operation,) is uniform at 7 to 16 fathoms, but this depth holds good in only a small proportion of the Loch proper, near the west channel. The eastern portion of the Loch shows but 6, 5 and 4 fathoms, and toward the mainland at the north the shoaling process continues until a depth of but one fathom prevails over a mud bottom, with outcropping ridges of lava rock.

The Middle Loch is the least considerable in the group, in point of navigable area, though in superficial area it outranks West Loch. From the point of passing the strait where Beckoning Point on that first described protrudes northward toward the foot of Pearl City Peninsula (in which strait 7 fathoms of water is found) the waters of Middle Loch shoal so rapidly as to be scarcely navigable by the smallest sailing craft throughout two-thirds of its length of nearly two miles. This portion of the lagoon is less interesting as well from a scenic standpoint. A short distance its shores sink from a height of about six feet (at which altitude they

were plentifully covered with the inevitable algarroba) to a series of marshes too low for even rice culture. The green rice fields, succeeded by the rising grounds and bluff, beyond with the mountain background relieving the monotony of muddy water and wet marshes, render the whole by no means uninspiring.

Availability for Naval Purposes

It has become the custom with all who have developed either material or sentimental interests in promoting the acquisition of Pearl Harbor by the United States, to unreasonably extol the supposed benefits to Uncle Sam of such acquisition and to describe this body of water as the one thing needful to complete the naval supremacy of the United States in the Pacific. The present writer will not deny that the Pearl River Lochs, if open to the navigation of the American naval vessels, would constitute most convenient and commodious harbor; but in even these respects, the Harbor has been and is vastly overrated. Supposing the outside entrance (of which more anon) to be cleared and rendered navigable for the ships, there would be considerable dredging of sand bars, and blasting of rocky ridge in the inner Harbor required in order to its safe navigation; while the area of deep water in the Lochs especially the East and Middle Lochs, will be seen from the foregoing, to be much less than is generally supposed and written about. It is a very easy, and somewhat sonorous declaration to make, that the navies of the world might ride at anchor in a given body of water, and Pearl Harbor has not been forgotten when that phrase was going around. And while it is quite true that all the national vessels of the United States could be at anchorage berths in the Harbor, it is equally true that without a most extensive and costly system of dredging, the Harbor could not be made available for anything like naval navigation, as I understand the word navigation. The deep water of Pearl Harbor is confined almost exclusively to the narrow channels above described. Where they extend into lake like proportions the water immediately shoals to a degree that makes naval navigation impossible. The channels holding the deep water are lovely and the great depth of water at the banks would be a great convenience in the matter of docking, but they are too narrow to permit a modern cruiser to turn around within their shores, even by the backing and tacking process, to say nothing of turning at one sweep. Therefore, if it be only an anchorage ground for his ships, of which Uncle Sam is in search, it can be found in Pearl Harbor (after the matter of the entrance shall have been adjusted), but if a maneuvering ground and protected body of navigable water is the object of the search, Pearl Harbor will not and cannot fill the bill, at least not

without the expenditure of enormous and indefinite sums in dredging out the main bodies of the Lochs.

The Harbor's Defensibility

Another reason advanced in favor of the acquisition of the Harbor is that it is so secure as to remove, or exclude all fears of it being tampered with by a hostile Power in time of war. It seems strange that anyone of intelligence can be found to advance that view, when the facts and the logic of the situation are so completely on the other side of the question. It is the most obvious of facts that, if the United States were once established in Pearl Harbor, she would be at the constant risk of losing it in case of war with any power, unless her naval contingent in these waters should be so strengthened as to bid defiance to the strongest power that could be sent against her. In order to hold the Harbor, she must be able to repel all intruders. This she might do by a system of mines planted in the entrance, but such an expedient would suspend the navigability of the entrance, even by her own vessels, and render it valueless either as a refuge for fleeing merchantmen, or as a source from whence to launch her naval enterprises against the enemy. In short, the Harbor could be hermetically sealed by a blockading squadron, and not only its usefulness as a recruiting and repairing station entirely neutralized, but the vessels within its shores would be practically removed from the navy list while such blockade should continue. It will thus be seen that the possession of this Harbor (and in a much greater degree of the whole group of Islands increase the heresy of Annexation should gather force sufficient to bring about that end), would be a source of positive weakness, instead of strength to the Union. The property once acquired, it would have to be utilized at tremendous expense; and it would have to be defended at all hazards, a proposition involving the making of the American naval power supreme in the Pacific; and this means, in these days of rapid steam communication, making it supreme upon every sea.

The American public need no reminder that the cry for naval expenditure and an increase in the number and efficiency of ships comes chiefly from the officers of the Navy and their friends and relatives, who wish for more vessels to command, with the consequent opportunities for rapid promotion. The officers of that branch of the service are restive under condition which (in the words of Lieut. Staunton, in his article "A modern Battle Ship In Action,") render "a good digestion by far the most valuable qualification for attaining the rank of Rear Admiral," while they are playing the "waiting game now essential to promotion in the Navy where," (still quoting from the Jingo Lieutenant), "the indolent and indifferent

share honors equally with the ardent and enthusiastic." They want more opening for promotion, and they see those opportunities in the increase of the navy. Such increase can best and most easily be compassed by persuading the people of the United States that the necessities of their commerce or political prestige demand protection here, a fleet there, and a group of Islands yonder. None better than naval officers know that the possession of the Hawaiian Islands, for instance would in reality prove a source of weakness rather than of strength to the Union, by rendering it essential that sufficient naval force be always maintained in these seas, to repel any attack from any combination of naval powers likely or possible to be brought against the Americans in time of war. This could only be done at fabulous expense, something which, perhaps, the American patriotism would be equal to, as a means of protecting the integrity of its territory, but which can most conveniently be avoided by resisting the temptations of the Jingo party to acquire territory so far from their sea coast, which might by any possibility, and very soon require such expensive sacrifice in order to its protection.

When, therefore, you see an article or an argument in favor of either the annexation of the Hawaiian Islands, or the acquisition of Pearl Harbor for a naval station it is safe to assume it has emanated from some Jingo naval officer; and all that such officers say in favor of either project is *prima facie* a plea for their own promotion, and unreliable both in fact and theory.

The fortification of Pearl Harbor has been discussed, and such project has been advanced as an argument to prove that it could be so defended from hostile attack. But a study of the conditions there existing will convince any reasonable man that fortifications sufficient to repel the attack of a modern naval power are impracticable: and that even if found feasible, they could be constructed only at a cost entirely out of proportion to the advantages to be gained hereby.

To begin with, there is no eligible site for a fort within modern cannon shot of the entrance to the Harbor. The land for many miles' radius, varies in altitude from one foot to eight feet above high water, and this in a locality where the mean rise and fall of the tide is but one foot, seven inches. Though the outer and inner reefs should be covered with fortifications the most formidable permitted by the situation, yet nothing strong than stone and cement could be opposed to the hostile guns of an enemy, and how long would the most perfect construction of such materials, when placed as a fair target for such guns, be left intact? The same result would follow the construction of so-called forts on the land commanding the entrance. In order to command the approach of a hostile fleet, such edifices must themselves be exposed to the fire of that fleet; and,

in the utter absence of anything in the way of natural defensive strength in the position, who so sanguine as to hope or believe in the efficacy of mere masonry, when opposed to the steel of modern ordnance?

As above intimated, the land in the vicinity lies very low, for purposes of defense. This remark applies equally to those within the harbor, whether Island or peninsula. There is absolutely no suggestion of a natural stronghold in the situation. And this fact could not only render impractical the efficient fortification of the entrance, but, granting, for the sake of the argument, that the entrance could be secured, there is nothing to oppose the shelling of the inner works by the long-range guns now in vogue on naval vessels. A war vessel, lying end on to a fort at a distance of several miles, may present a very small target to the fort, - so small as to avoid mishap to the ship while being able herself to effectively attack not only the fort but also to throw destructive missiles past the fort and into the naval yard (supposing one to exist) beyond. And such, it seems to your correspondent, would be the condition of things, even in the event of the entrance to Pearl Harbor being effectively fortified; such course might, (though I do not believe it would) prevent the actual entry of a hostile craft, but could not protect the naval works which might be constructed in the lagoon proper.¹⁴⁰

The Lands and Their Titles

It is no unusual thing to find a land scheme behind propositions for the acquisition by the Government of any given piece of property for public use. Few navy yards have been established; few outpost offices erected; few forts or arsenals built without the colored gentleman in the woodpile being unmasked; and such gentleman of color very generally stands forth as the advocate of a land owner or syndicate. And so it is in Pearl Harbor at the present time. There is a most patriotic desire on the part of divers pretended citizens of America who have long since forsworn their natural allegiance for the benefits of official salary in Hawaii, to confer upon their much beloved Uncle Samuel certain lands in and about the lagoon, in exchange for their aforesaid Uncle's surplus gold coin. Of course, nothing could be more disinterested than the efforts of those patriotic gentlemen to make the desired exchange. Such is always the case. They are burning with ardor to see the flag of their native land floating over the placid waters of the lagoon, and are not only willing, but determined to promote that most worthy object—for a generous consideration. But before discussing individual cases and lands, a brief

¹⁴⁰ An Essay on Acquisition of Pearl Harbor, *Independent*, May 10, 1895, p. 1.

glance at the titles is desirable whose history is brief, and comparatively simple.

Prior to 1848, the feudal idea that all land is owned by the Sovereign, and all occupants hold under him and practically at his will, prevailed in its full vigor in Hawaii. But the advance of civilization among the aborigines, coupled with the material interests of the foreigners, then constantly increasing in numbers in the Islands, developed the necessity of a more liberal system of land tenure. Hence in the year mentioned, the reigning King, Kamehameha III., by virtue of the Royal grace which found expression in the act of the very primitively endowed legislature existing under the constitution then recently granted by the King, made the Great *Māhale* or Land Division to which all titles refer and which was the genesis of them all.

The prevailing idea involved in the Great *Māhale* was to make a division of the whole territory into three substantially equal parts, of which the King personally should continue to own one, the Government one and the people the third. It was fortunate for the Hawaiian race that Kamehameha was sufficiently ignorant and unenlightened not to have learned what the dominant party in Hawaii today assert and act up and act upon in their intercourse with the community respecting the definition of that much abused phrase, "the people." Kamehameha was sufficiently antique in his ideas to suppose that "the people" meant and embraced the whole body of his subjects, without regard to race, creed, color or previous party affiliation, to quote from the modern manifestos of American politicians. But such back number notions find no place in the Government of today in Hawaii, whose votaries, when looking for a definition of the phrase quoted find it impossible to see beyond the little clique of aliens who, by the grace of Minister Stevens, were placed in the political saddle, on January 17, 1894, and have since entrenched themselves in their position, while "the people," as elsewhere understood, and as formerly understood in Hawaii, contented themselves to await the answer of the United States to the protest against the Stevens aggression.

As usual in the case of a concession by a King to the people, Kamehameha did not neglect his own interest in this Division. He was both the King, and the sole Judge of lands he would "assign" to himself, as well as to the others in interest, and in that dual capacity, it would be strange indeed if his interests had suffered. The King selected a lot of lands, by their names, scattered over the entire group of Islands, and the Government's portion was similarly assigned. Then there was created a land Commission, for the settlement of the claim of private individuals, who were awarded for simple titles to such lands as they could prove they had previously occupied by the Royal assent or acquiescence, and exempt

from feudal services or rental paid to any subordinate chief. Many thousands of claims were thus passed upon, in a manner satisfactory to the people, and characterized by a liberality of construction and presumed in favor of the occupant as opposed to the interest of the chief, quite at variance with the spirit of feudalism. The awardees of these claims were afterward granted Royal Patents of their land, upon the payment of almost nominal sums by way of commutation to the Government, but the theory of such commutation is not quite clear, seeing the Government had no valid claim to the lands so awarded.

The small holdings thus awarded were called kuleanas, and the word kuleana has since come into use indifferently to describe not only one's right to a piece of land, but the land itself.

Of course the vast majority of the lands, in point of area, thus assigned to "the people," were gobbled by the high chiefs, to some of whom vast extents were granted by virtue of their former exercise of dominion over the tenants thereof. The unit of land description is the ahupuaa tract invariably running from the sea to the crest of the mountains, beyond which other ahupuaas extend to the opposite shore. There is history written in this name, which is combined of the two elements "ahu," a collection, and "puua," swine: it having been customary in very ancient times for the chief holding an ahupuaa (those larger divisions were all held by the chiefs) to render an annual tax or rental to the King of one swine for each ahupuaa under his dominion. The area of these ahupuaa differ widely, and while some include only a few hundred others embrace many thousands of acres. Thus the ahupuaa of Honouliuli, lying between the Pearl Harbor Lochs and the crest of the Waianae mountains, contain over 50,000 acres.

Within the different ahupuaa are many kuleanas, originally allotted to the peasantry. Next smaller than the ahupuaa, is the "ili" of which many are contained in the former division, and still smaller is the "moo," which may be more than a house lot or a taro patch. Each land, under whichever of these divisions, has its separate name, however small in area, showing a prodigious development of the bump of locality in the aboriginal Hawaiian.

The lands surrounding Pearl Harbor are comprised within comparatively few grants. The ahupuaas are for the most part of great extent, owing chiefly to the fact that the most powerful and influential chiefs were there located in the early days, along the north and west shores of the lagoon; however are a great number of small kuleanas, indicative of the highly concentrated population of that locality in times past—a feature which is still a marked characteristic of the vicinity, as compared with other districts.

The great land of Honouliuli, (which includes that of Puuloa, lying to the westward of the Harbor entrance,) was awarded to a high Chiefess named Kekauonohi, wife of the powerful and popular Kealiahonui, who died in the early fifties. It has come down by few conveyances to the ownership of Mr. James Campbell, probably the most wealthy resident of Hawaii today; and within its borders is located the famous and recently established Ewa Plantation, where the world's record in sugar culture was last year broken by their harvesting within a fraction of ten tons per acre, from an area of 125 acres. From this ownership is excepted the Puuloa lands, referred to, which are the property of Mr. James I. Dowsett, one of the first children born of white parents on the Islands, now an extensive and successful rancher. These lands are devoted to ranching, while near the entrance to the Harbor, salt works of considerable capacity are profitably conducted by Mr. Dowsett. Next adjoining Honouliuli is the ahupuaa of Hoaeae, comparatively small in area, and then comes the extensive and valuable Waipio, in whose borders is embraced the peninsula first herein referred to, which runs to the very entrance of the lagoon, and separates West Loch from the other portions of the Harbor.

Waipio was the property of a very influential Hawaiian, (though not a chief,) named John Li. Who embraced the faith, and some of the thrifty practices of the missionaries, learned to read and write, and was made a Justice of the Supreme Court, a position to which it has never been deemed necessary, in Hawaii, to appoint men learned in the law. Mr. Li died, and left a daughter. She was sole heir to the Li estate.

She married Mr. C. A. Brown, who with the patriotic instinct of a true American, places those acres at the disposal of his home Government, with an alacrity that almost verges upon anxiety to devolve their ownership upon his Uncle Samuel. There comes to him with peculiar force and meaning, as he stands at times upon the cliffs of Waipio, the sentiment of Scott's stirring lines:

"Breathes there a man with soul so dead
As never to himself hath said,
This is my own, my Native (wife's) land."

The major section at the land scheme underlying the Pearl Harbor Naval Station craze is right here at Waipio, and at Ford's Island, now owned by this same patriotic Mr. Brown. This gentleman went all the way to Colorado some years ago, in order to buy up the title to Ford's Island, from a son of the original Dr. Ford for whom it is so named. He secured the deed he went for, but was soon compelled, (or persuaded) to convey the Island to his wife, a mortgage upon whose other hands furnished the funds for the purchase.

That he had the contingency of selling the Island to the U. S. Government in mind sufficiently appears from the fact of his having given his vendor a separate agreement to pay him a further sum of Fourteen Thousand Dollars, in case he, Brown, should sell the Island to the United States or any other Government. As he is now supposed to have been in Washington, engaged in the endeavor to sell to Uncle Sam, and as Ford thinks he will come out at the small end of any deal which Brown may conduct, and the agreement for more money to be paid Ford upon the condition above mentioned was so drawn as to make it unrecordable under Hawaiian law, (as a means of notifying all the world of Ford's equities,) Ford is now stated to be about to begin suit to declare his position and interest in the Island.

The fact that Mr. Brown has most persistently devoted himself to the entertainment of Admirals Irwin, Walker and Beardslee during the last years and that his swell dinners to the officers mentioned are famous lends color to the belief that there may be some understanding between him and them in the premises.

The vicinity of the Harbor is not destitute of other little land projects whose advocates look through a vista having the U. S. Treasury at the other end of it. There is a variegated boom right on the Pearl City Peninsula, so called for the reason that no "city" is apparent in the locality. That imaginary city was laid out by the Oahu Railway & Land Co., a corporation running a little railroad from Honolulu to Ewa Plantation, a distance of about 15 miles, most of which skirts the lagoon. The original "city" was platted on the uplands, running from the shore of the Harbor to the mountains several miles away. It was intersected with avenues bearing names that sooth, and streets bearing names that jingle, and a crowd of suckers were one day corralled in an auction room, hypnotized by the auctioneer, and the lots were sold off in a trice at figures that would create a boom in Denver. This was several years ago. The lots are still there, and as vacant as ever, for the most part. The projector of that scheme, in showing his imaginary "city" to an irreverent visitor one day, remarked that the one needful to make Pearl City great and prosperous, was a plentitude of water, interspersed with good society; to which the visitor replied that Hades needed even less, as it had good society.

Having worked the uplands for all they were worth, the ardent projector moved his paper "city" down upon the Pearl City Peninsula, and laid out more lots, and parks, and avenues than would grace a railroad center in Ohio. After much effort he succeeded in giving some of these away to certain speculators, and swapped a few more for different kinds of old junk. The one investor, has built several cozy cottages, for which there are no tenants, and a school house for which there are neither teacher

nor pupils, and a church for which there are no worshippers; while some other owners, to a total of less than a dozen, have built little camping-out cottages which they sometimes occupy; - and so the Peninsula section of Pearl City stands. Of course each lot owner has an axe to grind, and wants to grind it at the United States Treasury. Each thinks he sees a fortune in his few square feet of soil, in case of the establishment there of the much desired naval station. Though few in numbers, they are fitted with full lung power, and make a good deal of noise when prating of the advantages, (to Uncle Sam, of course,) of such an establishment. But such philanthropic schemes are all alike, in their main features and symptoms, and the American public, having seen so many need little details of description as to this one.

From Pearl City eastward, and around to the entrance to the Harbor, the land is variously owned. The Railway Company, the Crown Land Commissioners, the great Bishop Estate, and the estate of the late Queen Emma, (devoted to the support of the Queen's Hospital in Honolulu,) hold the larger tracts; and, strange to relate, there is no symptom of a land boom, or of a scheme to unload upon Uncle Sam visible in these localities.¹⁴¹

The surveys of the Harbor conducted by the United States navy have presumably been done with a view, looking to its practical utilization. Much of the foregoing article has been devoted to a discussion of the interior of the lagoon. But whatever the advantages of the interior, they must first be reached, in order to be utilized. As above shown, there is no present possibility of conducting any but the smallest craft into the harbor, owing to the shallow and tortuous entrance.

It has been long supposed that the outer shoals were under laid with hard coral and lava rock, and that the process of opening a channel would involve elaborate and expensive blasting operations. But that theory has yielded to some practical experiments, conducted by the naval officers, and which reveal the fact that the material underlying the areas of shoal water off the entrance is nothing more or less than sand; considerably encrusted and hard packed, in places, but still only sand. The manner of the demonstration has been to set up a derrick at different points off the entrance, as the framework of a sand pump, consisting of a four-inch pipe fitted with sand valves and plunger to pump the sand and water from the bottom of the pipe, which would continue to wattle as the pumping progressed until a depth of 32 feet had been reached at each point of operations.

Lieutenant Max Wood, of the U. S. S. "Philadelphia," a most experi-

¹⁴¹ An Essay on Acquisition of Pearl Harbor, *Independent*, May 11, 1895, p. 1.

enced officer under whose command those experiments were conducted, is understood to have written a report in which he sustains, in enthusiastic terms, the feasibility of dredging the entrance, by cutting a ditch or a channel through that great sand bed for a distance of about two miles and so opening the Harbor to naval and commercial crafts. It is further understood that Lieut. Wood takes the ground that such channel would not be in danger of filling up, but that on the contrary, the section of the tides would exert a scouring effect upon the ditch, and keep it from becoming choked. But this sanguine view is not shared by those whose experience in these waters entitles their opinions to respect. Those who oppose the Lieutenant's views, to the very feeble tidal action of these latitudes, as compared with these further north or south. As before mentioned, the mean rise of the tide at Pearl Harbor is but one foot seven inches. It follows, therefore, that no such volume, and consequently, no such force of water would sweep through the proposed ditch, as though the rise and fall of the tide were six to eight feet, a moderate figure in more northern climes.

But if we take it for granted that the sand will shift with the tidal current, it must be remembered that the tide runs in before it runs out, and the incoming tide must be reckoned with, as well as that outward bound. It seems to your correspondent that the experience of the last few years is against the view advanced, or supposed to be advanced by Lieut. Wood. Take for instance the Golden Gate, and Carquinez Straits, between the Sacramento River and San Pablo Bay. The Sacramento is a mighty stream. In it the tide rises to a height of six feet as high up as the Delta of the San Joaquin. And yet, in the case of the "slickens" or debris from the hydraulic mines, although so light as to be held for a great part in solution, it settles along the entire course of the river, until Suisan Bay has become almost unnavigable, and the navigability of Carquinez Straits is seriously threatened, while a well-grounded apprehension exists as to the filling up of the whole of San Pablo and San Francisco Bays, and even the Golden Gate itself. If, then such conditions can exit and grow along the course of the Sacramento, in spite of the tremendous tidal force there constantly exerted, what can be hoped for at the mouth of Pearl Harbor? There are other examples along the western coast of America. All navigators know that the entrance to Humboldt Bay changes with each storm, if not with each tide and the same is true, though perhaps in a lesser degree, of the Columbia River entrance. Who would maintain for a moment that a ditch, cut through either bar last mentioned, could be found the next morning after a heavy tide? And yet, if Pearl Harbor is to be opened and kept open, it must be done under conditions less favorable to the project, in some material respects, than prevail at either Humboldt

Bay or Columbia River. Here the sand shoal extends two miles. There is a storm of periodical occurrence in these waters, called "kona," from the fact of its coming from the south,—that being the "kona" or lee side of the Islands. That is the most furious of all our storms, and the mouth of Pearl Harbor is peculiarly exposed to it, after its sweep across the sand shoal referred to. It is the opinion of excellent judges here that, even were such a ditch dug through the sand shoal to the Pearl entrance, and though it should be kept open by tidal action, or other forces, in ordinary weather,—yet, upon the occurrence of one of our "konas," it would be filled to its banks, during much of its course, by the sand that had been dug to make it, and other sand carried in by the force of the storm. And such is the opinion of your correspondent.

No doubt the recent deepening of the bar to Honolulu harbor will be cited in favor of the feasibility of the project named, but the parallel will not hold good between the two localities. At the Honolulu bar, the dredging operations merely involved the shaving off of the hump of a hillock of sand, whose sides descended precipitously, inshore and offshore, to deep water, and requiring a cut loss that two hundred yards in length. That work has stood the test up to date. But if it has been a ditch through two miles of almost level sand bed, sloping gradually for that distance into deep water, it would have been as it is at Pearl Harbor, a very different story.¹⁴²

The title of the following article, "Development of Pearl Harbor," accurately describes its content. It was published in the *Hawaiian Gazette* in 1903.

Reefs and Shallows of Pearl Harbor Channels; Many Points that may be Dredged or Blasted Away Before Navigation Commences—Sharp Corners that Form Natural Protection

The channel leading into the Pearl Harbor lochs and recently dredged by the United States government has still many reefs and other obstructions to free navigation. One of these reefs is considered a natural protection rather than menace but it is generally accepted that others will be cleared away. In the lochs themselves are many projecting splits and unexpected reefs in the middle of natural channels that will probably be removed as soon as the lochs are opened up for general navigation.

¹⁴² An Essay on Acquisition of Pearl Harbor, *Independent*, May 13, 1895, p. 1.

The Principal Obstacles

The accompanying map¹⁴³ shows the principal obstacles. In the main channel on the right hand or starboard side in entering, all that now remain of the many piles driven by the dredging company and of those that were in place before they started operations, are two dolphins, formed each of three baulks of heavy timber meeting at the apex. Other piles are removed but some are submerged close to the surface. Marking rods of three inch pipe were driven down. Some of these have been broken off by the vessels of the dredger and are a serious menace to entering boats. They lie on the starboard side of the channel on entering but no buoys have yet been placed to mark the entrance of the channel as with the bell and spar buoys in Honolulu harbor. The dolphins already mentioned are nearly half way up the channel and a yacht, tug or vessel not knowing the waters might easily attempt, coming from Honolulu to enter the channel inshore from the proposed entrance and strike the submerged piles. These dangers will be obviated later, when the entrance marks are placed.

Wrecked Dredger a Menace

The sunken dredger, which is marked by a buoy, which is however generally well to leeward of the wreck, is on the edge of the right channel and directly in the road of the old bearings of the Puuloa tower and the line where the Waianae range strikes the plain. These bearings are marked on the chart and will be generally used until the channel is finally buoyed. In ordinary weather the hull shows a brown patch on the water as it lies a scant fathom beneath the surface, but with the surf running free, it is indistinguishable and the buoy is small. Many moorings left by the dredgers are swinging loose in the channel. These are too small to hurt any but a small boat.

Following the channel in to the cross on the chart marked "small stake" an incoming vessel under steam or in tow is compelled to turn a sharp corner and skirting a hard coral reef three feet below the water, with some portions above at low tide. It is thought that this corner will be taken out.

A Natural Protection

The second corner also marked "small stake" and still more abrupt, is the one considered a natural protection as incoming vessels are forced

¹⁴³ Not included in this document.

to proceed slowly and, in the case of an enemy, they could be shelled to pieces by land batteries.

The next stake is on the port or left hand side of the channel and marks the extremity of the "shark pen" built in bygone days as a trap for unwary sharks who found themselves caught within its wall by an ebbing tide. This works and its reef foundation will probably be removed.

Next comes the spit on which the railroad wharf is built and which necessitates a sharp turn to the left. The spit can be easily dredged without blasting.

On the right hand side at the point marked 1-2 (fathom) there is a dangerous coral spit causing a turn to the left before entering the channel to the Middle and East lochs. This was staked by the Hawaii Yacht Club but Japanese sampans have either run down or carried away the stake by mooring.

West Loch is Navigable

The West loch is singularly clear from projecting spits, the water running deeply to the coral banks on either side, where it averages, for some two miles, nine feet for the edge shallows.

The water in the center channel off the shark pen and in that neighborhood, runs to an extreme depth of 138 feet.

Proceeding toward Ford's Island, a rocky point, partly formed from the ruins of an old fish pond, projects off Waipio point, marked 1-2 (fathom) 'stake H. Y. C.' This stake has sunk or broken off close to the surface. This with the point last mentioned will, it is thought, be included in the straightening out plan.

Ford's Island Dangerous

Rounding Ford's Island on the seaward side, the course taken by the Iroquois in her late cruise, that vessel mooring for luncheon at a point off the flag on the Island marked U. S. N. on the chart, a shoal runs out to the center of the natural channel, the deep water being under the lee of the island. This shoal marked 1 (fathom) is charted but not otherwise signalized.

The eastward end of Ford's Island runs out in a shoal of large area from which rise the rocky islets of Moku-nui and Moku-iki. Two stakes are set here by the Hawaii Yacht Club but by these there is a bare two fathoms and the larger boats often get a foot or two too close and stir the mud.

The East and Middle lochs contain much deep water but naturally shoal as they approach their ends where streams are constantly depositing alluvial banks. Off the Peninsula, particularly at its tip and on the leeward or western point, the bottom is but a foot or so below the surface. Where the water deepens between the spot marked 1 (fathom) and the shoal, runs a channel of three to four fathoms. The spot as marked rises abruptly and while charted as one fathom is covered by less than five feet of water. The deeper pleasure craft often pile up here and the yacht club has taken bearings and will stake the spot. They have already staked the extremity of the neighboring shoal.

Middle and East Lochs Shallow

The Middle loch contains but little navigable water for vessels of any draught. The East loch shoals rapidly towards the northern end, near Waianae but is deeper on the Eastern side. The natural channel on the western side of Ford's Island, between it and the Waipio peninsula and across which the ferry between the Oahu plantation sugar wharves piles by cable, is navigable for deep draught vessels.

Four Miles of Inland Seas

The lochs extend inland some four miles from the mouth of the harbor whence it is one and a half miles to the bar of the newly dredged thirty-foot channel.

The Peninsula is settled with the summer homes of Honolulu folk and is the favorite resort of the yachting fraternity. Their principal club house is situated on the leeward side with a smaller erection at Puuloa near the shark pen. The naval property takes in a portion of Ford's Island and the opposite shore as marked by the flags on the chart.¹⁴⁴

This article is about the US government's acquisition of Puuloa Fort Site, which occurred in 1904.

United States District Attorney Breckons paid out nearly \$80,000 yesterday to the owners of Puuloa, Pearl Harbor property. Titles passed from the Dowsett Estate which received over \$65,000, and the remainder was distributed among Waterhouse, Lovekin, and three others.

By June next the United States will have spent about \$300,000 in acquiring property on which to build its fortifications at Pearl Harbor, Kaimuki and Waikiki Beach. The Kaimuki property has already been acquired.

¹⁴⁴Development of Pearl Harbor, *Hawaiian Gazette*, September 8, 1903, p. 2.

Title to the Hobron property at Waikiki Beach will probably pass this week. The Schaefer title has not passed. No option, as far as Mr. Breckons is away, has been obtained on the Afong property.

While individual owners profit by the wholesale purchases of the War Department, the Territorial treasury suffers to some extent. Taking the whole property at an assessed value of \$250,000, the territory loses in taxes about \$2,500 per year.

On the other hand it is said that the property surrounding the War Departments reservations will increase in value, thereby reducing a possible loss to the Territorial treasury.¹⁴⁵

An article about the assessed value of lands owned by the Oahu Railway & Land Company was entitled "Three Million Dollar Assessment for Pearl Harbor Lands" and subtitled "How tax assessor Holt arrived at his figures in Oahu railway case."

The tax appeal of the Oahu Railway and Land Company was argued and submitted by Assessor Holt regarding his method of arriving at the \$3,000,000 assessment of the lands of the company also Ewa Plantation assessments. The assessor's statement of the valuations and apportionments of taxes was as follows:

The value of the lands held by the Ewa Plantation Company are assessed as follows:

6790 acres cane land	\$120...	\$815,800
960 acres pasture	\$ 5...	\$ 4,830
110 acres building sites	\$100...	\$ 11,000

The assessments of the several interests are as follows:

Campbell Est., lessor...	\$171,520
O. R. & L. Co. lessee...	300,000
Ewa Plan., sub lessee...	359,110
	\$830,630

The total value of the Honouliuli lands held under lease by the Oahu Railway & Land Company containing about 40,640 acres is \$1,241,880.

The proportion of the value of the lands subleased to Ewa Plantation Co. is equivalent to 67 per cent of the whole.

The Oahu Railway & Land Company pays an annual rental, according to their return of \$34,000 to the Campbell Estate for the above lands.

¹⁴⁵ "Puuloa Fort Site Now Belongs to Government," *Hawaiian Gazette*, December 23, 1904, p. 7.

The proportion that Ewa has to pay according to the terms of its lease is therefore \$22,780. Deducting this sum from the rentals it receives from Ewa of \$76,273.19 leaves a net rental of \$53,473.91.

Allowing 25 per cent depreciation in the out-put of sugar crop which will naturally decrease the rentals due from Ewa, say, for the coming eight years, leave a clear net gain to the Oahu Railway & Land Co. of \$40,000, which figured on the eight year's rental basis is equivalent to an assessment of \$320,000. I consider that the assessment of \$3,000,000 for the Oahu Railway & Land Company's holding is a just one.

The appeal was argued by D. L. Withington for the railway company and M. F. Prosser for the assessor. Last year an appeal of a much similar kind was taken, and the court denied it. It is contended that there are legal issues not yet determined, and these have been submitted for decision. The tax appealed from is \$3,000.¹⁴⁶

This article is about Hawai'i's position in the Pacific and its strategic value to the U.S.

Look at Hawaii on the Map

Midway between Unalaska and the Society Islands, midway between Sitka and Samoa, midway between Port Townsend and the Fiji Islands, midway between San Francisco and the Carolines, midway between the Panama Canal and Hong Kong, and on the direct route from South America ports to Japan, the central location of these islands makes their commercial importance evident.

But vastly greater is their strategic value to the United States.

Captain Mahan says "Too much stress cannot be laid upon the immense disadvantage to us of any maritime enemy having a coaling station well within 2500 miles of every point of our coast line from Puget Sound to Mexico. Were there many others available, we might find it difficult to exclude from all. There is, however, but the once. Shut out from the Sandwich Islands as a coal base, an enemy is thrown back for supplies of fuel to distances of 3500 of 4000 miles—or between 7000 and 8000 going and coming—an impediment to sustained maritime operations well-nigh prohibitive. It is rarely that so important a factor in the attack or defense of a coast line—of a sea-frontier—is concentrated in a single position, and the circumstance renders it doubly imperative upon us to secure it if we righteously can."

¹⁴⁶ "Three Million Dollar Assessment for Pearl Harbor Lands," *Hawaiian Star*, November 8, 1905, p. 1 & 5.

"This was written in 1893, and the final annexation of Hawaii shows that the lesson and warning conveyed in the above were minded at the right moment."

"With the Sandwich Islands we have acquired Pearl Harbor, of which Admiral Walker said: 'It should not be forgotten the Pearl Harbor offers, strategically and otherwise, the finest site for a naval and coaling station to be found in the whole Pacific.'"

Pearl Harbor Progress

1884 Treaty negotiated by President Grover Cleveland and King Kalakaua, giving the United States exclusive rights to Pearl Harbor.

1898 Annexation of Hawaii to the United States.

1908 Appropriation of \$3,000,000 by Congress to straighten channel and establish Naval Station at Pearl Harbor.

Pearl Harbor Station Protection for America (By Hon. Jonah Kalaniana'ole, Delegate to Congress)

I simply cite some historical facts to show how conclusively and for how long a time the strategic value of Pearl Harbor and the Hawaiian Islands has been officially recognized by the Government of the United States.

Beginning in 1842, President Tyler gave notice to European nations that the United States would never consent to their occupying the Hawaiian Islands.

In 1851, when the French were threatening to occupy Hawaii, Daniel Webster, then Secretary of State, wrote: "I hope the French will not take possession of Hawaii; but if they do, they will be dislodged, if my advice is taken, if the whole power of the Government is required to do it."

William L. Marcy, when Secretary of State, reiterated the declaration that Hawaii would not be permitted to fall into the hands of any European nation. Up to that time there was no menace of Hawaiian occupation by any nation other than European.

Almost a third of a century ago, when King Kalakaua was the reigning monarch of the Hawaiian Kingdom, the United States, by reciprocity treaty, obtained rights over the waters of Pearl Harbor. This was the first step toward carrying out the policy announced by President Tyler thirty-five years previously.

Coming down to the days of Blaine and McKinley, we find those statesmen repeating the declarations of their predecessors.

By the time that President McKinley reached the White House, it had become apparent that the danger of the occupation of Hawaii by a foreign

power had been shifted from European nations to those of the Orient.

Finally, ten years ago, when the unexpected events of the Spanish-American war thrust a new situation upon this nation, it became apparent that it was necessary for the United States to acquire the sovereignty of the Hawaiian Islands, both for the protection of the Pacific coast and in order to make it possible to maintain any naval base in the Far East.

But although this Government annexed the Hawaiian Islands for the particular value of their strategic location, they permitted almost ten years to pass without turning a sod or laying one foundation stone toward the actual construction of a naval station at Pearl Harbor.

A magnificent site of over 600 acres of ground has been acquired for this purpose.

The 10 square miles of landlocked waters in Pearl Harbor could easily accommodate the combined fleets of this nation and of Great Britain, but that can never give shelter to a battle ship till docks are built and the channel approach is straightened.

The importance of Pearl Harbor as a naval and military base has been repeatedly urged by men able and experienced in military and naval science; among them Captain (now Admiral) A. T. Mahan, who pointed out with unanswerable arguments the commanding importance of Pearl Harbor as the key to the Pacific.

This Government for ten years neglected the safeguard of preparing a naval base in the mid-Pacific. Our relations with other nations are such to-day that it would be inexcusable neglect of the responsibility of Congress to the nation to postpone this work another year.

The development of Pearl Harbor is not a Hawaiian proposition; it is a national need. But as my nation gave over its sovereignty to this country ten years ago, we have a right to ask, and we do ask that adequate protection be provided for our islands, so that we could not be captured by a single hostile battle ship as could be done to-day.

Coast fortifications alone are not sufficient; there must be an operating base for war vessels as well as coast defenses, and the latter are useless without the former.

Hawaii should be defended for its own protection; but I repeat that it is far more important for the offensive and defensive plans of the nation as a whole.¹⁴⁷

The following article was entitled "First Pearl Harbor Treaty" and was published with a map (fig. 8).

¹⁴⁷Honolulu and Pearl Harbor. Vital Centers of America's Power in Pacific Ocean, Hawaii Commands the Whole Pacific, *Evening Bulletin*, Section II—Atlantic Fleet Edition, July 16, 1908, p. 1-2.

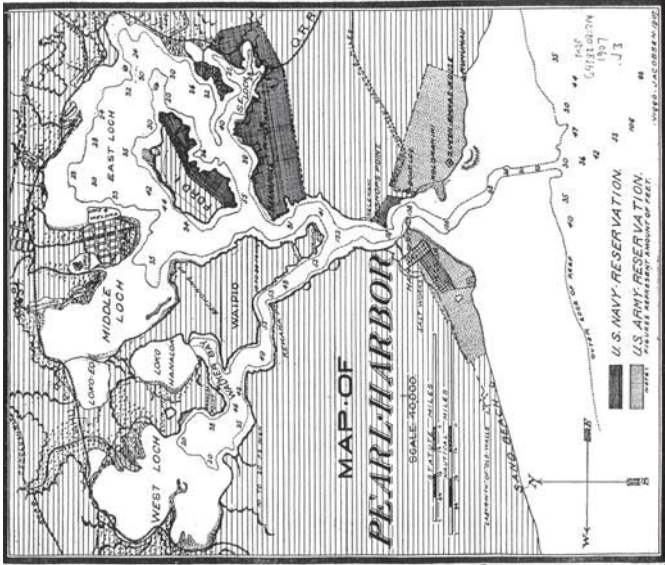


Figure 8: Outline map of Pearl Harbor showing the tortuous channel that must be straightened to allow ships to enter. Lochs showing magnificent harbor facilities—site of Naval Docks and future Naval Station, for which Congress has already appropriated three million dollars. *Source: Evening Bulletin*, July 16, 1908, p. 10.

Grover Cleveland, President of the United States, and David Kalakaua, King of Hawaii, concluded the treaty which first placed Pearl Harbor within the control of the United States.

The proclamation setting forth the terms of the treaty is now in the archives of Hawaii and reads as follows:

Whereas, a Convention between the United States of America and the Kingdom of the Hawaiian Islands, for the purpose of definitely limiting the duration of the Convention concerning Commercial Reciprocity concluded between the same High Contracting Parties on the thirtieth day of January, 1875, was concluded and signed by their respective plenipotentiaries at the city of Washington, on the sixth day of December, in the year of our Lord, 1884, which Convention, as amended by the Senate of the United States and being in the English language, is word for word as follows:

Supplementary Convention to limit the duration of the Convention respecting Commercial reciprocity between the United States of America and the Hawaiian Kingdom, concluded January 30, 1875.

Whereas, a Convention was concluded between the United States of America, and His Majesty the King of the Hawaiian Islands, on the thirtieth day of January, 1875, concerning commercial reciprocity, which by the fifty-second article thereof, was to continue in force for seven years from the date after it was to come into operation, and further, until the expiration of twelve months after either of the High Contracting Parties should give notice to the other of its wish to terminate the same: and

Whereas, the High Contracting Parties consider that the increase and consolidation of their mutual commercial interests would be better promoted by the definite limitation of the duration of the said convention.

Therefore, the president of the United States of America, and His Majesty the King of the Hawaiian Islands, have appointed: The President of the United States, Frederick J. Frelinghuysen, Secretary of State; and

His Majesty the King of the Hawaiian Islands, Henry A. P. Carter accredited to the Government of the United States as His majesty's Envoy Extraordinary and Minister Plenipotentiary;

Who, having exchanged their respective powers, which were found sufficient and in due form, have agreed upon the following articles:

Article I

The High Contracting parties agree, that the time fixed for the duration of the said Convention, shall be definitely extended

for a term of seven years from the date of the exchange of ratifications hereof, and further, until the expiration of twelve months after either of the High Contracting Parties shall give notice to the other of the wish to terminate the same, each of the High Contracting Parties being at liberty to five such notice to the other at the end of the said term of seven years or at any time thereafter.

Article II

His Majesty the King of the Hawaiian Islands grants to the Government of the United States the exclusive right to enter the harbor of Pearl River, in the Island of Oahu, and to establish and maintain there a coaling and repair station for the use of vessels of the United States, and to that end the United States may improve the entrance to said harbor and do all other things needful to the purpose aforesaid.

Article III

The present convention shall be ratified and the ratification exchanged at Washington as soon as possible.
In witness whereof, the respective Plenipotentiaries and signed the present Convention in duplicated, and have hereunto affixed their respective seals.

Done at the City of Washington on the 6th day of December in the year of our Lord 1884.

Fredk. T. Frelinghuysen,
Henry A. P. Carter¹⁴⁸

6 The Māhele ‘Āina Claims and Awards

The Hoakalei Cultural Foundation (HCF) seeks to provide the public with access to the rich history of Honouliuli Ahupua‘a—bringing traditional and historical documentation that has time depth, and that is factual, to the attention of all who care for this land. The research is being conducted in a wide range of archival collections, and incorporates primary—first account—documentation from both Hawaiian- and English-language resources.

As a part of that research, Kepā Maly and Onaona Pomroy Maly completed a review of all the original land title records of the Hawaiian Kingdom recorded during

¹⁴⁸First Pearl Harbor Treaty, *Evening Bulletin*, Section II—Atlantic Fleet Edition, July 16, 1908, p. 2.

the *Māhele ‘Āina* (Land Division) between the years 1847 and 1855. For the first time, all of the *Māhele* records have been compiled in one collection, and the original Hawaiian-language documents of the Native Register and Testimony collections were translated by Kepā Maly for this program. This work was conducted over a five-week period between July and August 2012. The results provide readers with significant documentation coming from those who lived on and knew the land in a traditional manner. The *Māhele* documents describe land use, residency, and the practices of the families of Honouliuli and its smaller land subdivisions. With this information, we are able better to understand the history and cultural landscape of Honouliuli. While much has changed in the last 170 years, the spirit of place, the named places, and lives of those who came before us are still present on the land. Their history adds value to our own lives and community.

All told, 436 *Māhele* documents were found for Honouliuli; no additional *Māhele* claims for Honouliuli are known to exist. This total can be broken down, as follows:

105 Native Register (NR) Claim records registered by 99 native tenants;

80 Native Testimony (NT) Claim records;

99 Foreign Testimony (FT) records;

77 *Māhele* Award Book records; and

75 *Pūlapala Sila Nui* (Royal Patent) records.

Of the 106 native tenant claims and one chiefly claim identified from Honouliuli, 74 were awarded to the claimants or their heirs and 33 were denied.

In compiling this collection of historical land and family records from Honouliuli, we have attempted to ensure the accuracy of all citations. The original records though, are challenging. Being all handwritten, the writing is at times illegible. At other times spelling of personal and land area names vary from one record to another. We have done our best to compare the various records and maintain the highest accuracy possible. The records are organized by *Hele*—the original numerical sequence assigned at the time of recording the information. Also, certain important classes of information such as place names, personal names, subsistence practices, types of features, and cultural and natural resources are called out in tables and summary form for easy access to the historical information.

6.1 Traditional Hawaiian Land Stewardship

In pre-western contact Hawai‘i, all *‘āina*, *kai* *lawaia‘a*, and natural resources extending from the mountaintops to the depths of the ocean were held in “trust” by the high chiefs—*mō‘ī*, *ali‘i ‘ai māka*, or *ali‘i ‘ai ahupua‘a*. The right to use plots of land, fisheries, and natural resources was given to the *hoā ‘āina* at the prerogative of the *ali‘i* and their representatives or land agents, often referred to as *konohiki* or *haku ‘āina*. Following a strict code of conduct, which was based on ceremonial and ritual observances,

the people of the land were generally able to collect all of the natural resources—terrestrial and aquatic—for their own sustenance and to pay tribute to the class of chiefs and priests who oversaw them and ensured the prosperity of the natural environment through their *divine mana*.¹⁴⁹

As western concepts of property rights began to infiltrate the Hawaiian system shortly after the arrival of foreigners in the islands, Kamehameha I, who had secured rule over all of the islands in the early 1800s, granted perpetual interest in select lands and fisheries to some foreign residents, but he and the chiefs under him generally remained in control of all resources. After Kamehameha I died in 1819 and the Protestant missionaries arrived in 1820, the concepts of property rights, including rights to fisheries, evolved and were codified under Kamehameha II and his younger brother, Kamehameha III.

Missionary William Richards wrote this early observation on the nature of Hawaiian resource management—rights to resources from both land and sea—in 1825:

The right, by which a man may claim fish caught by others in the sea, may, indeed, be questioned by those enlightened in the principles of jurisprudence; but the chiefs of the Sandwich Island, make no questions on the subject. They lay equal claim to the sea and land, as their property. The sea is divided into different portions; and those who own a tract of land on the sea shore, own also the sea that fronts it. The common rule observed by the chiefs is, to give about one half of the fish to the fishermen, and take the other half to themselves.¹⁵⁰

The inexorable move to Western style fee-simple property rights in the Hawaiian Kingdom resulted in the *Māhele 'Āina* of 1848, which divided ownership among the king, his chiefs, the government, and commoners. The *Māhele 'Āina* records and associated *Hehu* or LCA Numbers that identified the original holders of title to lands throughout the Hawaiian Islands remain in use today. The story of the *Māhele 'Āina* reveals much about residency, land use, and land tenure, but also leaves much unanswered.

It is important to remember that by the time of the *Māhele 'Āina*, the population of the Hawaiian Islands, including the *aliʻi* of Honolulu, had been in decline for several decades. Many once populated areas along the Honolulu shoreline were abandoned, and the decrease of population continued through the years of the *Māhele*. In several instances, applicants died between the time a claim was registered in 1847 and when testimonies were offered in 1848 to support the claim.

¹⁴⁹It is of interest to note the fact that the Hawaiian system of land ownership, virtually identical to feudalism in medieval Europe in the ninth to fifteenth centuries, could evolve in total isolation, and is the subject of much speculation among scholars. However, there are some who disagree with the characterization of the Hawaiian land ownership system as feudalism [cf. 30].

¹⁵⁰Letter of William Richards dated August 9, 1825, *Missionary Herald*, June 1826, p. 174–175.

6.2 The Board of Commissioner to Quiet Land Titles, 1845

By the 1840s, the *makaʻāinana* began making pleas to the king, asking that he not allow foreigners the right to possess land and hold positions in government. A series of petitions from across the islands on this matter went unheeded. With lands from his personal inventory, the king set up a mechanism to lease out and eventually sell large tracts of land for the development of businesses, which, it was hoped, would also benefit the kingdom. On December 10, 1845, Kamehameha III signed into law a joint resolution establishing and outlining the responsibilities of the Board of Commissioners to Quiet Land Titles, setting in motion the *Māhele 'Āina* or division of lands and natural resources between the king and his subjects. Among the actions called for, and laws to be implemented were

ARTICLE IV. Of The Board Of Commissioners To Quiet Land Titles

SECTION I His Majesty shall appoint through the minister of the interior, and upon consultation with the privy council, five commissioners, one of whom shall be the attorney general of this kingdom, to be a board for the investigation and final ascertainment or rejection of all claims of private individuals, whether natives or foreigners, to any landed property acquired anterior to the passage of this act; the awards of which board, unless appealed from as hereinafter allowed, shall be binding upon the minister of the interior and upon the applicant...

SECTION VII The decisions of said board shall be in accordance with the principles established by the civil code of this kingdom in regard to prescription, occupancy, fixtures, native usages in regard to landed tenures, water privileges and rights of piscary, the rights of women, the rights of absentees, tenancy and subtenancy, —primogeniture and rights of adoption; which decisions being of a majority in number of said board, shall be only subject to appeal to the supreme court, and when such appeal shall not have been taken, they shall be final...

SECTION XIII The titles of all lands claimed of the Hawaiian government anterior to the passage of this act, upon being confirmed as aforesaid, in whole or in part by the board of commissioners, shall be deemed to be forever settled, as awarded by said board, unless appeal be taken to the supreme court, as already prescribed. And all claims rejected by said board, unless appeal be taken as aforesaid, shall be deemed to be forever barred and foreclosed, from the expiration of the time allowed for such appeal.¹⁵¹

¹⁵¹In *The Polynesian*, January 3, 1846, p. 140.

The *Māhale* defined the land interests of Kaulikeaouli (King Kamehameha III), some 252 high-ranking *aliʻi* and *konohiki*—including several foreigners who had been befriended by members of the Kamehameha line—and the government. As a result of the *Māhale*, all lands in the Kingdom of Hawaiʻi—and associated fisheries as described in the laws above—came to be placed in one of three categories: i) Crown lands for the occupant of the throne; ii) Government lands; and iii) Konohiki lands. The “Enabling” or “Kuleana Act” of the *Māhale*, dated December 21, 1849, further defined the framework by which *hoʻāʻāina* could apply for and be granted fee-simple interest in *kūlāna* lands.¹⁵² The Kuleana Act reconfirmed the rights of *hoʻāʻāina* to access the land and collect resources from mountains to the shore. Though not specifically stated in this act, the rights of piscary (to fisheries and fishing) had already been granted and were protected by preceding laws.

6.3 The Kuleana Act of 1850

The Kuleana Act remains the foundation of law pertaining to native tenant rights and prescribed the following:

August 6, 1850

An Act confirming certain resolutions of the King and Privy Council passed on the 21st day of December 1849, granting to the common people allodial titles for their own lands and house lots, and certain other privileges.

Be it enacted by the Nobles and Representatives of the People of the Hawaiian Islands in Legislative Council assembled;

That the following sections which were passed by the King in Privy Council on the 21st day of December A.D. 1849 when the Legislature was not in session, be, and are hereby confirmed, and that certain other provisions be inserted, as follows:

Section 1 Resolved. That fee simple titles, free of commutation, be and are hereby granted to all native tenants, who occupy and improve any portion of any Government land, for the land they so occupy and improve, and whose claims to said lands shall be recognized as genuine by the Land Commission; Provided, however, that the Resolution shall not extend to Konohikis or other persons having the care of Government lands or to the house lots and other lands, in which the Government have an interest, in the Districts of Honolulu, Lahaina and Hilo.

¹⁵² cf. Kamakau in *Ka Au Okoa*, July 8 & 15, 1869; 1961, p. 403.

Section 2 By and with the consent of the King and Chiefs in Privy Council assembled, it is hereby resolved, that fee simple titles free of commutation, be and are hereby granted to all native tenants who occupy and improve any lands other than those mentioned in the preceding Resolution, held by the King or any chief or Konohiki for the land they so occupy and improve. Provided however, this Resolution shall not extend to house lots or other lands situated in the Districts of Honolulu, Lahaina and Hilo.

Section 3 Resolved that the Board of Commissioners to quiet Land titles be, and is hereby empowered to award fee simple titles in accordance with the foregoing Resolutions; to define and separate the portions belonging to different individuals; and to provide for an equitable exchange of such different portions where it can be done, so that each man's land may be by itself.

Section 4 Resolved that a certain portion of the Government lands in each Island shall be set apart, and placed in the hands of special agents to be disposed of in lots of from one to fifty acres in fee simple to such natives as may not be otherwise furnished with sufficient lands at a minimum price of fifty cents per acre.

Section 5 In granting to the People, their House lots in fee simple, such as are separate and distinct from their cultivated lands, the amount of land in each of said House lots shall not exceed one quarter of an acre.

Section 6 In granting to the people their cultivated grounds, or Kalo lands, they shall only be entitled to what they have really cultivated, and which lie in the form of cultivated lands; and not such as the people may have cultivated in different spots, with the seeming intention of enlarging their lots; nor shall they be entitled to the waste lands. [Generally wetlands, ponds, and fallow fields. See citations later in this section.]

Section 7 When the Landlords have taken allodial titles to their lands the people on each of their lands shall not be deprived of the right to take firewood, aho cord, thatch, or ti leaf from the land on which they live, for their own private use, should they need them, but they shall not have a right to take such articles to sell for profit. They shall also inform the Landlord or his agent, and proceed with his consent. The people shall also have a right to drinking water, and running water, and the right of way. The springs of water, and running water, and roads shall

be free to all should they need them, on all lands granted in fee simple. Provided, that this shall not be applicable to wells and water courses which individuals have made for their own use.

Done and passed at the Council House, Honolulu this 6th day of August 1850.¹⁵³

6.4 Honouliuli: Procedures of the Land Commission, 1848–1855

The records of the *Māhale ʻĀina* are a significant source of firsthand accounts from native tenants of Honouliuli whose residency generally spanned the period from ca. 1800 to 1855. The records describe native Hawaiian residency and land use practices. They identify specific residents, types of land use, fishery and fishing rights, crops cultivated, and features on the landscape. The *Māhale ʻĀina* gave the *hoā ʻāina* an opportunity to acquire a fee-simple property interest—lands awarded to the *hoā ʻāina* became known as *kuleana* lands—in land on which they lived and actively cultivated, but the process required them to provide personal testimonies regarding their residency and land use practices.

All of the claims and resulting awards for *kuleana* across the islands were numbered, and the LCA numbers remain in use today to identify original owners of land in the islands. The work of the Land Commission was concluded on March 31, 1855. The program, directed by principles adopted on August 20, 1846¹⁵⁴ met with mixed results. In its statement to the king,¹⁵⁵ the Commissioners to Quiet Land Titles summarized events that had transpired during the life of the commission:

The first award made by the Commission was that of John Voss [a foreigner] on the 31st March 1847.

The time originally granted to the Board for the hearing and settlement of all the land claims in the kingdom was two years, ending the fourteenth day of February, 1848.

Before the expiration of that term it became evident that a longer time would be required to perform the work.... Accordingly, the Legislature on the 26th day of August 1847, passed an Act to extend the duration of the Board to the 14th of February, 1849, adding one year to the term first prescribed, not however, for the purpose of admitting fresh claims, but for the purposes of hearing, adjudicating and surveying those claims that should be presented by the 14th February, 1848. It became apparent to the Legislature of 1848 that the labors of the Land Commission had never been fully understood, nor the magnitude of the work assigned

¹⁵³Copied from original handwritten “Enabling Act.” Hawaii State Archives, DLNR, 2–4. See also *Kanawai Hoopai Kaniina no ko Haouli Pae Aina* (Penal Code) 1850.

¹⁵⁴See ARTICLE IV of The Board of Commissioners To Quiet Land Titles above, p. 250.

¹⁵⁵George M. Robertson, March 31, 1855.

to them properly appreciated, and that it was necessary again to extend the duration of the Board. An act was accordingly passed, wisely extending the powers of the Commissioners “for such a period of time from the 14th day of February 1849, as shall be necessary for the full and faithful examination, settlement and award upon all such claims as may have been presented to said Board.” “[T]he Board appointed a number of Sub-Commissioners in various parts of the kingdom, chiefly gentlemen connected with the American Mission, who from their intelligence, knowledge of the Hawaiian language, and well-known desire to forward any work which they believed to be for the good of the people, were better calculated than any other class of men on the islands to be useful auxiliaries to the Board at Honolulu....

During the ten months that elapsed between the constitution of the Board and the end of the year 1846, only 371 claims were received at the office; during the year 1847 only 2,460, while 8,478 came in after the first day of January 1848. To these are to be added 2,100 claims, bearing supplementary numbers, chiefly consisting of claims which had been forwarded to the Board, but lost or destroyed on the way. In the year 1851, 105 new claims were admitted, for Kuleanas in the Fort Lands of Honolulu, by order of the Legislature. The total number of claims therefore, amounts to 13,514, of which 209 belonged to foreigners and their descendants. The original papers, as they were received at the office, were numbered and copied into the Registers of the Commission, which highly necessary part of the work entailed no small amount of labor....

The whole number of Awards perfected by the Board up to its dissolution is 9,337, leaving an apparent balance of claims Not Awarded of say 4,200. Of these, at least 1,500 may be ranked as duplicates, and of the remaining 2,700 perhaps 1,500 have been rejected as bad, while of the balance some have not been prosecuted by the parties interested; many have been relinquished and given up to the Konohikis, even after surveys were procured by the Board, and hundreds of claimants have died, leaving no legal representatives. It is probable also that on account of the dilatoriness of some claimants in prosecuting their rights before the Commission, there are even now, after the great length of time which has been afforded, some perfectly good claims on the Registers of the Board, the owners of which have never taken the trouble to prove them. If there are any such, they deserve no commiseration, for every pains has been taken by the Commissioners and their agents, by means of oft repeated public notices and renewed visits to the different districts of the Islands, to afford all and every of the claimants an opportunity of

securing their rights.¹⁵⁶

It has been reported that the lands awarded to *hoā āina* totaled approximately 28,658 acres [18:295].

In Honouliuli Ahupua'a no *hoā āina* claims were recorded for lands within the Hoakalei program area. The claims nearest the program area were recorded in the 'ili of Pu'uloa—all of which were relinquished by the native tenants prior to issuing of awards. The major grouping of *kūlana* occurred in the area known as the Honouliuli Taro Lands (fig. 9), being situated several miles inland of shoreline, and near the Hō'ae boundary with Honouliuli. Based on customary practice, it is reasonable to assume that the native tenants of *āina kalo* (taro lands) shared familial ties with those people who once made the coastal lands of the One'ula-Kūlaka'i region home. It was a typical practice to travel between different areas to manage resources and practice what *kāpuna* describe as *kuapo*: the exchange of goods between the extended families and specialists in various fields of subsistence living.

6.5 Buke Māhele, 1848

The *Buke Māhele* (Division Book) of 1848, copy of 1864, documents the agreements among King Kamehameha III, family members, supporting chiefs, and others who supported Kamehameha I and his heirs in the period between the 1790s and the 1830s. The *Buke Māhele* also lists the lands granted by the king to the government land inventory—financial returns from sales and leases of such were dedicated to the support of government operations—and for conveyance through Royal Patent Grants to Hawaiians and other parties in leasehold and fee-simple interests. This book is also the primary source for identifying the Crown and Government land inventory now known as the Ceded Lands.

Pursuant to the Kuleana Act of 1850, the *maka āinana* and foreigners who had sworn oaths of allegiance were granted the right to register claims for parcels from all of the lands listed in the *Buke Māhele*. In Honouliuli, including the 'ili of Pu'uloa, only one chiefly claim was recorded for the *āhupua'a*: Mikahela Kekauonohi, a granddaughter of Kamehameha I, niece of Kamehameha III, and wife of Aaron Kaliahonui, who was son of the last sovereign King of Kaua'i. Tables 3 and 4 show what the *Buke Māhele* reports of the division agreement.

Table 3: Lands Relinquished to Kamehameha III

Na Aina	Ahupuaa	Kalana	Mokupuni
Kapaloa	Ili i Honolulu	Kona	Oahu
Puahia	Ili i Waikiki	Kona	Oahu

¹⁵⁶Minister of Interior Report, 1856, p. 10–17.

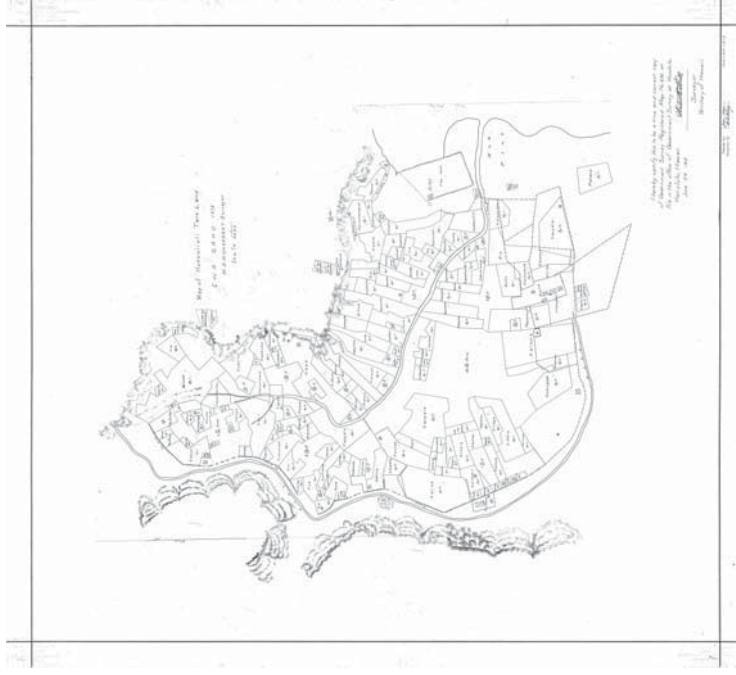


Figure 9: Map of the Honouliuli Taro Lands, Ewa, Oahu. M. D. Monsarrat, Surveyor, 1878. Registered Map No. 630.

6.6 Names of Residents in Honouliuli Ahupua'a, ca. 1800–1855

As noted above, the records of the *Māhele* are the earliest and most detailed records of Honouliuli, in their documentation of native residents—those people who were

Table 4: Lands Retained by M. Kekauonohi

Na Aina	Ahupuaa	Kalana	Mokupuni
Honouliuli	Ahupuaa	Ewa	Oahu
Waimalu	Aoao Komohana	Ewa	Oahu

the survivors of their ancestors, and those whose *iwi* (remains) were buried upon the plains (*kulaivai*). Following a detailed review of all the *Māhele* records from Honouliuli Ahupua'a, at least 208 resident names were found. These names, often modernized surnames, are the people who lived upon, cared for, and were sustained by the *ʻāina* and *kai laʻau*ʻa of Honouliuli. Some of the names are still in use and are familiar in the island community in the present day. These families may in fact search their histories to see if their name descends from one of the original residents of Honouliuli. The voices of these families might speak for the land, under Historic Preservation regulations they hold a privileged position in planning for treatment of cultural properties and familial resources.

It is noted here that *Kūpuna* Arline Wainaha Kuʻuleialoha Brede Eaton, founding president of the Hoakalei Cultural Foundation, was raised at Keahi in the *ʻili* of Puʻuloa, Honouliuli Ahupua'a, by her own *kūpuna*, Kaniela and Mālia Kealoha. The Kealoha line from which Kaniela Kealoha descended was at one time a *konoʻihiki* of Honouliuli Ahupua'a, and a teacher in the *ahupua'a* schools under the chiefs Kekauonohi and Kealiahonui.

Below is a list of all the *hoʻaʻāina* names that could be clearly documented as residents of Honouliuli. In addition to the *hoʻaʻāina*, chiefs who were granted residency rights, or who were associated with Honouliuli in this period were Kinau (k), Kinauwahine (w), Mikahela Kekauonohi (w), Aarona Kealiahonui (k), Mataio Kekuanaoa (k), Kekumanoha (k), Kūihelani (k), Kalaimoku (k), and John Adams Kuakini (k).

Table 5: Residents of Honouliuli Ahupua'a identified in the Mahele 'Āina

Aemaikai (Aimaikai)	Kane	Kumupopo
Aikakane	Kaneaola	Laamaikahiki
Aila	Kanehekili (Kahekili)	Lauhuki
Alauka	Kaneiahuea	Leleiaupa (Leleupa)
Aoao (Samuela Aoao)	Kaneiakama	Liliu
Hane	Kaneikawātola	Limakauai
	(Kaneikawātola)	
Haakue	Kanaiua	Luana
Hano	Kanoʻho	Luika (Louisa Kaulu)
Hapai	Kachai (Ohai)	Maakua
Hapauea	Kaoliko (Kaoliko Kaulu)	Maeaea

Continued on next page

Continued from previous page

Healani	Kaopala (Opala)	Mahae
Heleantiau (Kaheleantiau)	Kaope	Mahina
Hilea	Kapicho	Mahole
Hilinae	Kapoli	Mahoe
Hinaa	Kapuls (Pule)	Maiso (Maio)
Hinauka	Kauakihiau	Makioelani
Honaunau (Honaunau, Nanaui)	Kaulua	Makaulii
Hoolana	Kaumoa	Makaula
Hopenui (also a land name)	Kauhalepa	Makue
Huluhulumoku	Kauhane	Manole
Inoole	Kaui	Manuwa (Manua)
Kaalawaawa (Kaalawaava, Alawaawa)	Kauhikaula	Mauele (Mauwale)
Kaanaana (Kaanaana Kaulu)		
Kauhau (Kaakau)		
Kaehunui		
Kaekuna	Kaumaamaholo	Mili
Kaewa	Kaunahi	Moano
Kahakai	Kauo	Mokumakuole
Kahakullili	Kauouo	Molea
Kahalana	Kauwahine	Naholowaa
Kahalewai	Kawaa	Nahuawai
Kahananui	Kawahaea	Naiwi
Kahaulomo	Kawahala	Nakai (Aaron Nakai)
Kahawai	Kawahamana	Nakukui
Kaheanani	Kawakele	Namau
Kahikūla	Kawaole	Nanaole
Kahimalkai	Kealo	Napahi
Kahoole	Keaona	Napoo (Poo)
Kahue	Keinohanui	Napukaa
Kahulu	Kekai	Naula
Kaikiapu	Kekapa	Nawahinelua
Kaikai	Kekiaha	Nihua
Kailinaoa	Ke-kiwai	Nika
Kaimuena (Kaumuena)	Kekua (Kua, Keakua)	Nioi
Kainaia	Kekuaʻaliu	Nohunohu
Kalama	Kekuaʻhilo (Kuahilo)	Nunu (Kanunu)
Kalanihopu (Kalahopu, Kalethopu)	Kekuaʻhilo	Nuuanu
Kalaoa	Kekuaʻhilo	Ooi
Kalauani	Kekuaʻhilo	Opunui
Kalauhala	Kekuaʻhilo	Paahana
Kalauli (Kalauli / Lauli)	Kekuaʻhilo	Pakane (Pekane, Pere Kane)
Kalehu	Kekuaʻhilo	Paele
Kalola	Kekuaʻhilo	Pihana
Kaluaiaia (Kaluahia Kaulu)	Kekuaʻhilo	Pine
	Kekuaʻhilo	Pio (Kapio)
	Kekuaʻhilo	Propio (Opiopio)
	Kekuaʻhilo	Proopuu (Opoopuu)
	Kekuaʻhilo	Puali

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Kaluhua	Koi	Puanani
Kama	Kou (S. Kou)	Pue
Kamaala	Kua	Puehu (Kapuehu)
Kamakaa	Kuhau	Puhipaka
Kamakau	Kuahine	Punahoa (Kapunahoa)
Kamadae	Kuailau (Kaailau)	Puniawa (Puniwai)
Kamalua	Kuakahia	Punielua
Kamanu	Kuhenu	Pupuka
Kamau	Kuhiana (Kuhiena)	Uia (U'wia)
Kami	Kukae	Upai
Kamoonohu	Kukaikoi	Wahine
Kanahuna	Kuku	Wahinemui
Kanakaole (Kanakaole Kaula)	Kukuaina	Waikela
		Wiwi

6.7 Place Names of Honouliuli

Another important facet of the records compiled as a part of the *Māhele 'Āina* are the place names of Honouliuli. Some 182 place names were cited in the claims, testimonies, and surveys of native tenants lands in Honouliuli. The names are often descriptive of i) the terrain, ii) an event in history, iii) the kind of resources a particular place was noted for, or iv) the kind of land use which occurred in the area so named. Sometimes an earlier resident of a given land area was also commemorated by place names.

The named localities extend from the shore to the mountain slopes. In some instances the place names identify a specific site on the land, while others describe regions or strips of land such as in the name Honouliuli, which comprises some 43,250 acres. Other parcels of land identified in the records include *'ili*, *kūla*, *mō'o* *'āina*, *lo'i*, or *kāhāpai*. These parcels of land were established as smaller subdivisions or management parcels which might include a quarter-acre parcel for a single house site or garden plot, or which might include thousands of acres like the *'ili* of Pu'uloa, which contained 2,610 acres.

While the list of place names identified in the claims of native tenants of Honouliuli provides us with a rich collection of notable places on the landscape, it will be seen that some notable place names are found along the south-facing shore of Honouliuli, the area where the Hoakalei Cultural Foundation is directly based. No identifiable reference to One'ula, Kalaeloa, Ka'olina (Ko'olina), or the nearshore *kūla* lands was recorded. Along the coast, the nearest references are found in the *'ili* of Pu'uloa at Keahi, and in the *'ili* of Waimānalo. The lack of cited place names is reflective of the impacts on the Hawaiian population and environment following western Contact. The exact locations of many places which are found in traditions and historical accounts cannot be accurately identified in historic surveys mapping work.

Table 6: Place names of Honouliuli recorded in the Māhele 'Āina

Aihonu	Kananelu	Makaakua (Kamakaakua)
Aimea	Kanucoopu (Kanucoopa)	Makali
Ainaio	Kauwahine	Makawela (at Honouliuli)
Alae	Kohepalaoa at Puuloa	Makawela at Puuloa
Haalelenui	Kapahupahu	Makawela Iki
Hakelo	Kapahupu	Manawahua*
Halawa	Kapalihi	Manawalelelu*
Haleokame	Kapallima	Maniau
Hlwa	Kapalaha	Manuakapuaa
Hiwalalo	Kapapapuhi	Maui
Hiwaluna	Kapi at Puuloa	Munakapu*
Holenui	Kauakahiwoeola	Moakapuaa
Honouliuli Stream	Kauakahiwoeola	Mokumeha
Hopeki	Kauhikuakua	Mooki
Hopenui†	Kauhimakahou	Mookapu*
I	Kauhupuna	Moolihi
Iao	Kaulabana	Namooelua (Namoolua)
Kaainano	Kaulaula	Naopala
Kaakau	Kaumaka (Kamaka)	Napoole
Kaamalekeha	Kauwahine	Napupu
Kaauamakua	Kawaieli*	Niukee
Kaauwewai	Kawaiwapa	Ohikili
Kahapapa*	Keahi at Puuloa	Ohuanho
Kahakumaka	Kekee	Okea (Kea) at Puuloa
Kahawai	Kenahupu	Okiokiotepe at Puuloa
Kahoopauli	Keolama	Oreulia*
Kahuka*	Kepee	Opunaha Stream
Kahui	Kihewamakawalu	Paakai
Kahuilalo	Komowaa	Paeokilua
Kaipilau	Komomoku at Puuloa	Palaau
Kailaula	Koula	Palahemo
Kaihuopalaai	Kuala	Palakai
Kailikahi	Kualhee	Panahaha
Kalahale	Kualhoe	Panteenui
Kalaipuwaa	Kualopelu	Papaanae
Kalakiki	Kuajupuaa	Papawaa
Kalawaha	Kuaka	Pi
Kalawahaiki	Kuamoo	Pili o Kahe*
Kaloiki	Kuamanuiki	Poiwaikela
Kaloilili	Kuhiwale	Poepoe
Kalolua	Kumuhahune	Pohakea
Kalokoeli (Lokoeli)	Kumuhau	Pohaku palahalaha*
Kalokoloa	Kumunu	Poina
Kalole	Kunupali	Polapola
Kaluamano	Kumudu	Poliwai*
Kaluamoo	Kupali	Poohilo
Kaluamohu at Puuloa	Laela*	Pualuu

* Boundary location. † Place and person.

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Kaluanomaka	Lihue	Puehuehu
Kalulu	Loko Aimea	Pumaiialau
Kamaieleele	Loko Kahui	Puukuu [†]
Kamahihili	Loko Kalahu	Puuloa
Kamapippipi	Loko Kaluakanaka	Ulaaao
Kamāua	Loko Kuaimano	Wāa
Kamilomilo	Loko Nihola (Nihola)	Waimanalo
Kamoku	Loko Omoomoki	Waimanana
Kamookahi (Mookahi)	Loko Panahaha	Waioha
Kamooloa	Loko Panainui (Paneenui)	Waioipu at Puuloa
Kamoomoku (Kamoomuku)	Loko Waianu	
Kamunuku	Loloulu	
Kanahu	Lopaniui	
Kaneakaha	Mauna	
Kanehoa	Maiau	

* Boundary location. † Cited in boundary.

6.8 Land Use, Crops, and Resources Identified in Claims from Honouliuli

In addition to naming traditional residents and noted places of Honouliuli, the records of the *Māhele* *ʻĀina* also provide us with important information on residency, land use practices, physical features—today’s cultural sites, and some of the plants or resources which were tended as food crops by the people who lived on the land.

While there do not appear to be any direct references to lands now within the boundaries of the Haseko Development or for the cultural resources which are under the stewardship of the Hoakalei Cultural Foundation, there are important descriptions of agricultural practices in neighboring coastal lands and similar environments. The descriptions help us form an image of how people lived on the land, and actually provide us with a template for interpretation of some resources in the three preservation areas.

On December 13, 1847, Nahuawai, a native tenant of Pu’uloa, Honouliuli, wrote a description of agricultural practices and features he claimed at Keahi, in the *ʻili* of Pu’uloa, near the Pearl Harbor entrance. The record states

I ka poe hanohano na Luna Hoona
Kumu Kuleana aina o ko Hawai nei pae
aina. Aloha oukou. Ke hai aku nei au
hereby tell you of my house and com-
bined kula parcel claim. The combined
boundaries are not known like those of
the banked walls of loi kalo (taro pond
kuauna elike me ka loi kalo, i ka poopoo
pohaku e kanu ai kekahi, i kahi kaheka
kekahi, lele wale aku no i kela wahi i keia
wahi.
To the Honorable Commissioners who
Quiet Land Claims. Aloha to you. I
hereby tell you of my house and com-
bined kula parcel claim. The combined
boundaries are not known like those of
the banked walls of loi kalo (taro pond
fields), the planting is done in hollows
of rocks, and in kaheka (small brackish
water ponds) and are scattered about at

various places.

Here is my house at Keahi in Puuloa, Ewa, Island of Oahu. Here are its bound-aries: towards the North, a kula parcel where my haha paakai (salt gathering beds) are situated; towards the East, sur-ounded by Naunau; towards the South, the sea; towards the West, surrounded by Mañiole.

My residency at this house claim has been for 16 years. I am with appreciation, your obedient servant.

By Nahuawai

1 Native Register, Vol. 5, Number 6132, Puuloa, Ewa, December 13, 1847, p. 243-244.

6.9 Resources and Features Cited in Claims from Honouliuli

The following plants and other resources are noted in *Māhele* claims.

- ʻAkaʻakai** bulrushes.
- Hala** the pandanus tree.
- Huluhulu (pupulu)** cotton.
- Kalo** taro.
- Kou** the *Cordia* tree.
- Lāʻau kalakala (Lāʻau lapalapa)** the prickly pear cactus/*pāini*.
- Māhiki** coastal grass.
- Pāʻakai** salt.
- Pā waina** grape vineyard.
- ʻUala** sweet potatoes.
- ʻUlu** breadfruit tree.
- Ulu niu** coconut grove.

In addition, there are various land features and land use terms in the claims.

- ʻĀina Nahehele** overgrown land, fallow land.
- Alanui** trail or roadway in modern context.
- Alahele** trail.
- Alanui Aupuni** Government Road.
- ʻApana** parcel, portion, section of land.
- ʻauwaiʻauwai** irrigation channel.
- Awaawa (awāwa)** a gulch or ravine, wet or dry.
- Hale hāiāwai** meeting house.
- Hale kula** schoolhouse.

Hale pule church (Hale pule Katolika – Catholic Church).
‘ili a section of land, usually running *mauka–makai*, within an *alupua‘a*.
‘ili usually had smaller land divisions, tended by the people within them.

Kahawai stream or gulch, may be a wet or dry valley.

Kahakai beach or shoreline.

Kāheka brackish or *anchialine* ponds.

Kahua hale/Pāhale house sites and house lots.

Kai ocean, salt water or fishery.

Kihāpai a garden, agricultural patch, may be wetland or dry land.

Ki‘o i‘i/ili‘i small pond in which juvenile fish or *kalo* might be raised.

Ki‘o pua small pond in which fingerling fish were kept, usually mullet.

Ki‘o pua ho‘oholo small pond in which *pua*, juvenile fish, were released.

Ki‘o wai a freshwater pond.

Kō‘ele a small tract of land which was cultivated for the chief.

Konohiki the chief or overseers of a given land.

Kula traditionally, a flat open land area, also a dry land agricultural parcel. In the late 1800s, the term *kula* became synonymous with a pasture area. In most cases the Honouliuli claims which reference *kula* are describing an agricultural parcel.

Kula ālaila salt beds.

Kula mahi‘ai a cultivated *kula* parcel.

Kula nohu a dry land section of land on which *nohu* plants grew.

Lo‘i pond fields.

Lo‘i ‘aka‘akai ponds in which bulrushes were grown. The *‘aka‘akai* was used as thatching for houses and in weaving.

Loko i‘a fishpond.

Loko kalo a brackish water fishpond in which *kalo* was also grown.

Mo‘o ‘aina (mo‘o) a strip of land usually running *mauka–makai*, and used as an agricultural parcel.

Muliwai estuary.

Pā wall or fence, also a lot or enclosed area for a house or planted area.
Pa‘ahao as a land term, the *pa‘aliao* lots were those which were worked by prisoners or others who were repaying some debt to society. The produce usually went to the support of the government or *konohiki* of a given land. *Pa‘aliao* lots were retained as government property.

Pā ‘aina land division walls.

Pā ‘aina a ke Aupuni land division wall made by the government, marking off parcels of land in which the government held an interest.

Pā pōhaku stone wall.

Pali cliff.

Pā pua‘a a pig enclosure.

Pā ‘uala sweet potato field.
Pō‘alima literally “Friday.” By Kingdom law, certain Fridays were set aside for people to work on parcels of land for the king. The produce of the labor went to support the king and his household.

Pu‘uone a dune-banked fishpond; such ponds were found in areas where sandy banks formed.

7 Native Tenant Land Claims

The following are native tenant land claims from the Native Register for lands in Honouliuli. The claim number or *helu* is given, followed by the name of the claimant, and the name of the land area. The Native Register contains the claims submitted by the person who occupies the land. This includes a description of the location of the land, as well as what has been developed on the land—houses, taro patches, gardens, etc. The native testimony and foreign testimony contain statements from residents in the area which verify the statements of the claimant made in the Native Register. A few of the claims were not awarded.

The accompanying figures are of two kinds. The first kind is the notes of survey which formed the records of the *Māhele* Award Books. They include metes and bounds and plot plans of the parcels surveyed for native tenants. The specific land names and parcels, plot plan maps, and, if provided, additional notes (e.g. names of people and places, or descriptions of features) which supplement the register and testimony volumes are cited.

The second kind of figures included are the Royal Patents issued on *Māhele ‘Āina* Awards. Upon agreement of the land areas to be awarded, surveys were conducted and recorded. The king issued Royal Patents in confirmation of the land areas to awardees. The original documents are presented. The figure captions include the royal patent number (*Palapala Sila Nui Helu*), the LCA number (*Kūlema Helu*), the awardee, land area and description, date, signatory parties, and source. The documents are not transcribed, but may be read from the original patents cited below. In some instances, additional place names which were not identified in the earlier records were also cited in the claims; those place names are cited in the land description from each patent.

7.1 Helu 746: The Claim of Naholowaa

Claimant: Naholowaa

Location: *‘ili* of Kaaumakua

Recorded at: Honouliuli

Date: Sept. 18, 1847

Status: Awarded¹⁵⁷

Native Register To the Honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you my land, as instructed in by the Law. I tell you of the various things. This land is there in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, Loko o Kalahu (pond of Kalahu); towards the East, the land of Kalama; towards the South, Puaaluu; towards the West, the Loko of Kalahu. Here are my houses, there at Kaaumakua, in Honouliuli. Here are the boundaries: towards the North, Mokumeha; towards the East, the sea (fishery) of Kaaumakua; towards the South, the pali (cliff) of Hoienui; towards the West, Mokumeha. My residency is from Kaope.

I am with appreciation, to all you, your obedient servant. Naholowaa X.¹⁵⁸

7.2 Helu 747: The Claim of Nakai

Claimant: Nakai
Location: Ili of Niukee and Kailikahi
Recorded at: Honouliuli
Date: Sept. 16, 1847
Status: Not awarded¹⁵⁹

Native Register To the President and Honorable Commissioner who quiet land claims of the Hawaiian Islands. I hereby tell you of my land claims, Loi (taro pond fields), Kula mahi ai (dry land planting fields), Hale (house). These lands are there at Niukee, Honouliuli, Ewa, Island of Oahu. On the North is a pali. East is the house of Kaunahi and the Kai (fishery) of Kepoe. On the South is the Auwai of Kauwahine and the Loko of Nihola. On the West is the land of Keinohanuui and the land of Kuahine.

Here is my second claim. Here are its boundaries: towards the North, the land of Kuahine; towards the East, the land of Kaunahi; towards the South, the Loko o Nihola; towards the West, the land of Kuhemu.

Here is my third claim. Here are its boundaries: towards the North, the land of Uia; towards the East, the land of Kaalauahi; towards the South, the land of Pao; towards the West, the land of Uia. These lands were given to me by Kuakahia in the time of Kaomi.

Here are my houses. There at Kailikahi is the place where my houses stand. This land is there in Honouliuli, Island of Oahu. Here are the boundaries: towards the North, the pa Aina (Land Division Wall) of Honouliuli; towards the East the house

¹⁵⁷See continuation of the claim in Helu 1570 C, p. 425.

¹⁵⁸Book 2, p. 406, Sept. 18, 1847.

¹⁵⁹See continuation of claim in Helu 1605 B.

of Kuahine; towards the South, the pali of Kihewamakawalu; towards the West, the house of Kinolua. That is it.

Here is my claim for the kula mahi ai. These lands are at Kailikahi, in Honouliuli. Here are its boundaries: towards the North, Waikulu; towards the East, Kalakiki; towards the South, the Kahawaioku (stream); towards the West, the pali. It was given to me by Kaakau, an old woman.

I am with appreciation, your obedient servant. Nakai X.¹⁶⁰

7.3 Helu 748: The Claim of Kalauhala

Claimant: Kalauhala
Location: Ili of Panahana (fig. 10)
Recorded at: Honouliuli
Date: Sept. 19, 1847
Status: Awarded; Royal Patent 6825 (fig. 11)

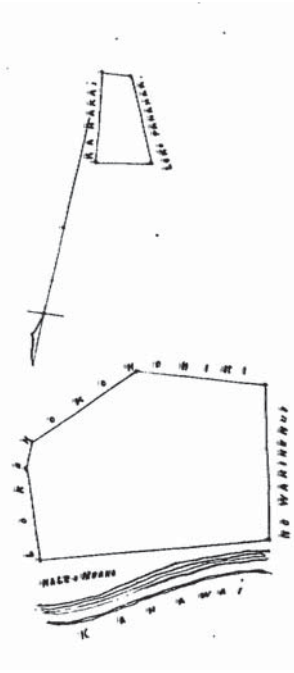


Figure 10: Helu 748 of Kalauhala: *Parcel 1*, A mooina, Panahaha, Ili of Kaaumakua, Honouliuli, E. O.; *Parcel 2*, A house lot on the kula of Panahaha, ili of Kaaumakua, Honouliuli, E. O. There being a total of 1 acre, 2.94 chains in these two parcels. Source: *Māhele* Award Book 2:135.

¹⁶⁰Book 2, p. 406–407, Sept. 16, 1847.

Native Register To the Honorable Commissioners who Quiet Land Claims, of the Hawaiian Islands. Greetings to you. I hereby tell you of my claims. This land is there at Panahaha, in Honouliuli. Here are its boundaries: towards the North, the Kahawai of Makai; towards the East, the loko of Panahaha; towards the South, the land of Mokumeha; towards the West, the land of Pto. Kawa gave it to me.
By Kalauhala X¹⁶¹

Native Testimony Mokumakuaole sworn and stated: I know the place of Kalauhala at Honouliuli, Ewa, Oahu, a land area and a house site. The boundaries are: mauka, an overgrown area (aina nahelehele); towards Ewa, a stream; makai, the loko ia (fish pond) of Panahaha; towards Waianae, an overgrown area. Gotten by Kalauhala from Kawahaea in the year 1837, and he has lived there to this time. He was opposed by Kealiahonui before, and it was tried before Hoolilimanu in favor of Kalauhala in the year 1844. There are two loi and a house lot with one house there. It is not enclosed with a wall. The one the Kawahaea received it from was Kahakai.

Kawahaea sworn and stated: I know this place just the same as Mokumakuaole has stated, but I have no claim there, the role as konohiki is finished.¹⁶²

Foreign Testimony Mokumakuaole sworn. I know this place, it is in Honouliuli in district of Ewa. Consisting of House lot and Kalo in one place. Bounded mauka by bulrush lands; by Ewa Stream on Honolulu side; makai by a pond called Panahaha; Waianae by bulrush land.

Claimant got his land from Kawahaea in 1837, and has held it from that time to the present. The right was disputed to this place in 1844 by Kealiahonui who took away what part of it he pleased. Kalauhala appealed to the Lunaauhau (Tax assessor) and it was tried before him & recovered by ordering it back to Claimant who has held it undisturbed ever since. There is one house belonging to Claimant. Kawahaea received the place from Kahakai.

Kawahaea. I gave the land to Claimant and make no further claim upon it. The testimony given about bounds and every other particular is true.¹⁶³

7.4 Helu 749: The Claim of Mahina

Claimant: Mahina
Location: 'Ili of Kaulaula (fig. 12)
Recorded at: Honouliuli
Date: Sept. 18, 1847
Status: Awarded; Royal Patent 2867 (fig. 13)

¹⁶¹ Book 2, p. 408, Sept. 19, 1847.

¹⁶² Book 2, p. 577, March 20, 1848.

¹⁶³ Book 2, p. 241–242, March 20, 1848.

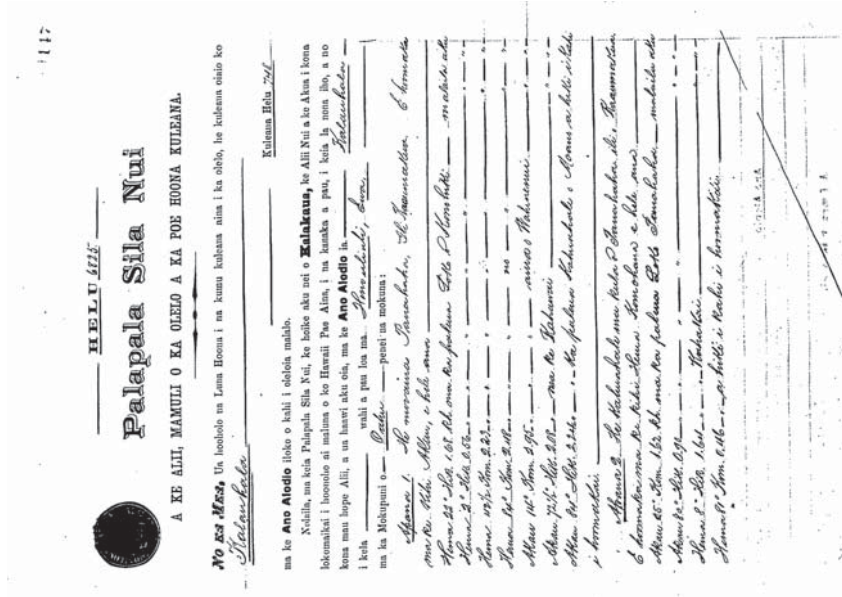


Figure 11: Palapala Sila Nui Helu 6825, Kuleana Helu 748, to Kalauhala. Mo'o & Kahuahale at Panahaha, 'Ili of Kaaumakua, Honouliuli. 1 acre, 2.94 chains. November 12, 1876. Signed by Kalakaua Rex. Volume 26, p. 147–148.

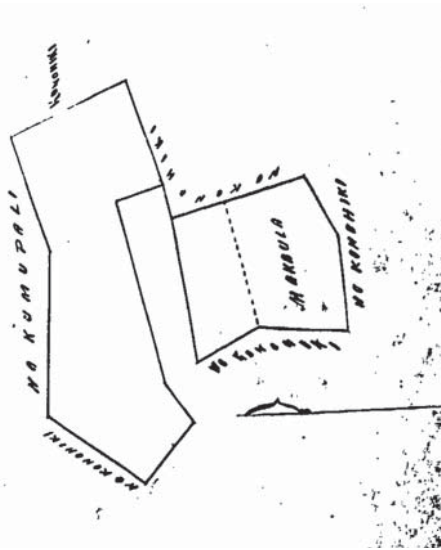


Figure 12: Helu 749 of Mahina: An ili land of Kaulaula, Honouliuli, Ewa, Oahu. The total land is 1.358 acres. *Explanation:* Makaula's opposition was confirmed for two loi as belonging to him indicated therefore they are for him, thus the four lines described run as [Beginning at the North Eastern corner, running South 80° West 223 links along the land of Makaula. South 12° ½ East 90 links along the Konohiki] then running again above the line marked in the circumference. Here is the amount granted to Makaula .412 of an acre. J. Polapola, Surveyor. *Source:* *Māhele Award Book* 9:435.

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Greeting to you. I hereby tell you of my claim. It is there in the land of Kaulaula, Honouliuli, Ewa, Island of Oahu. Here are its boundaries. On the North, the Loi land of Haae. On the East, the land of Puehu. On the South, the house of Opoopuu [Poopuu]. On the West, the pa Aina of Kaulaula and the pali of Kaulaula. I also have several houses that are built there.

Here is my second claim. On the North, the land of Koi. On the East, the land of Puehu. On the South, the Loi land of Haae. On the West, the house of Kauliikaula and Koakanu. My residency has continued from before to this time, from Haae.

By Mahina.¹⁶⁴

¹⁶⁴Book 2, p. 408–409, Sept. 18, 1847.

Native Testimony Maakuia sworn, and states: I know the place of Mahina at Kaulaula, in Honouliuli, Ewa. His is a moo land there, the boundaries are: towards Honolulu, Kapoli's land; mauka, Kapuehu's land and also Haae; towards Waianae, a pali; makai a kula parcel for Kaopala. Mahina received his land from Haae. I first new this in the year 1838. No one has opposed him to this day. There is one house there.

Kinolua sworn and stated: I know this place just like Maakuia has stated, from the giving of this land.¹⁶⁵

Foreign Testimony Maakuia sworn. I know this place, It is kalo land in Honouliuli, in the district of Ewa. A moo or long stretch and bounded Honolulu side by Kapoli's; mauka by Haae's and Puehu's lands; Waianae by a pali with a wall on its top; makai by Opala's [Kaopala] place.

Claimant got this place from Haae. I now him to have lived on it from 1838 to the present time without any opposition or dispute. There is one house of Claimants, and the place is with in the general fence. No other person lives on it.

Kinolua sworn and confirmed the previous statement in the several particulars. I know Claimant got the place from Haae about the time aforementioned. It was a gift of friendship.¹⁶⁶

7.5 Helu 751: The Claim of Kalauli

Claimant: Kalauli
Location: Ili of Kamoku and Kailikahi (figs. 14, 15)
Recorded at: Honouliuli
Date: Sept. 18, 1847
Status: Awarded; Royal Patent 6878 (figs. 16, 17)

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Island. Aloha to you. I hereby tell you my claim. The land is there at Kamoku, Honouliuli, Ewa, Island of Oahu. Here are its boundaries. On the North the pali of Kauhupuna. On the East, the land of Puniawa. On the South, the kahawai of Makaii. On the West, the land of Makue.

Here is my kula claim. On the North, the pali of Kauhupuna. On the East, the land of Manuwa. On the South, the land of Kanoho. On the West, the land of Haae.

Here are my house claims. Being there at Kailikahi, Honouliuli. Here are its boundaries. On the North, the house of Kekua and Kaihuopalaai. On the South, the house of Healani. On the West, Kukae's lot.

¹⁶⁵Book 3, p. 3–4, April 17, 1848.

¹⁶⁶Book 2, p. 272, April 17, 1848.

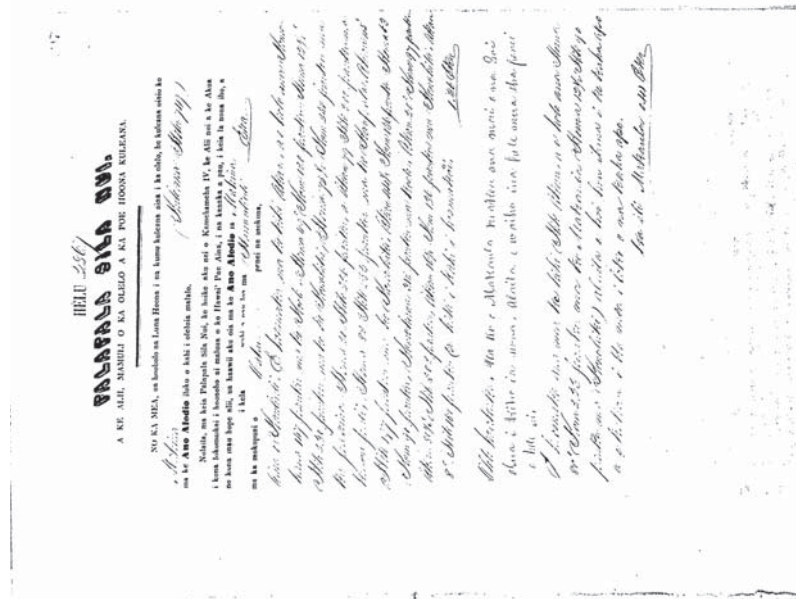


Figure 13: Palapala Sila Nui Helu 2867, Kuleana Helu 749, to Mahina, Kaulaula, Honouliuli. 0.91 acres. May 21, 1856. Signed by Kamehameha and Keoni Ana. Volume 13, p. 197–198.

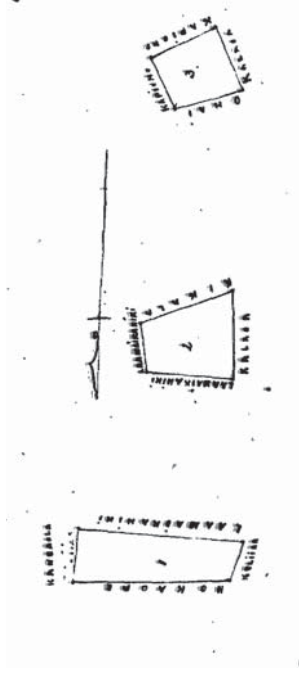


Figure 14: Helu 751 of Kalauli, map 1 of 2: Hiwalalo, moosaina, ili of Palapola, Honouliuli, E. O.: Parcel 1, A lot in Hiwalalo. Containing 2 64/100 chains; Parcel 2, 2 lot at Hiwalalo. Containing 2 34/100 chains; Parcel 3, A lot at Hiwalalo. Containing 1 33/100 chains; Parcel 4, Makalua moo aina in the ili of Kamohi, Honouliuli, EO. Containing 1 Acre, 5 58/100 chains. Source: *Māhele Award Book 2:141*.

Here is my second house claim. On the North, the Alanui hele (trail) and the Kula land of Kaipilau. On the East, the houses of Puniawa. On the South, the pa Aina of Kailikahi. On the West, the pa Aina of Kailikahi.

My residency on the lands has been long.
Done by me, Kalauli X¹⁶⁷

Native Testimony Manuwa sworn, and states: I know this place there in Honouliuli. It is kalo land, and the boundaries are: towards Honouliuli, Puniawa, Kanumu, and Kahalewai's land; mauka, Makue's land; towards Waianae, Nika's land; makai, Haee's place. The pa aina is the boundary of this place. Kalauli receive this land from Kawaa in the year 1838, and he has lived there in peace to this time.

Haee sworn and stated: I know this place as Manuwa as stated.¹⁶⁸

Foreign Testimony Manuwa sworn. I know this place. It is a moo kalo in Honouliuli, Ewa. Bounded Honouliuli side by land of Puniawa, Kanumu & Kahalewai; mauka by Makue's place; Waianae by Nika's place; makai by Haee's land. No one lives on the land it has no house, and the fence is the general one. Claimant lives on the Ewa side. I know that Claimant has been in possession of the land from 1837 and that he

¹⁶⁷ Book 2, p. 409–410, Sept. 18, 1847.

¹⁶⁸ Book 3, p. 4, April 17, 1848.

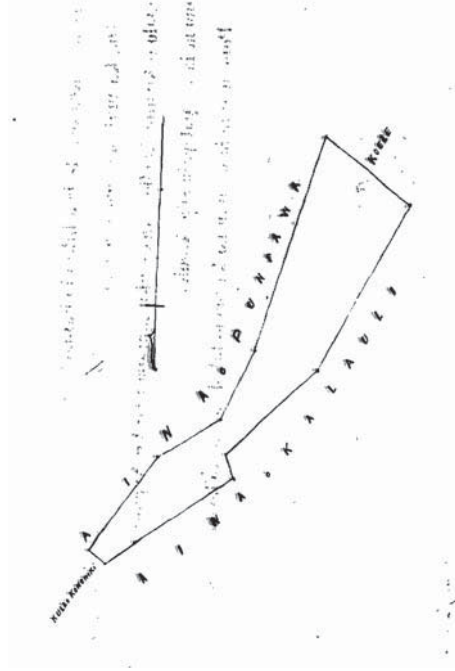


Figure 15: Helu 751 of Kalauli, map 2 of 2. *Source: Māhele Award Book 2:141.*

jointly occupied it with Kawaa before that time, who died in that year. Claimant has never been disturbed in his claim to the land.

Haae sworn, and confirmed the previous testimony, and never knew of any dispute about the land.¹⁶⁹

7.6 Helu 752: The Claim of Haae

Claimant: Haae

Location: 'Ili of Kailikahi (fig. 18)

Recorded at: Honouliuli

Date: Sept. 19, 1847

Status: Awarded; Royal Patent 2869 (fig. 19)

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. It is there in the

¹⁶⁹Book 2, p. 272-273, April 17, 1848.

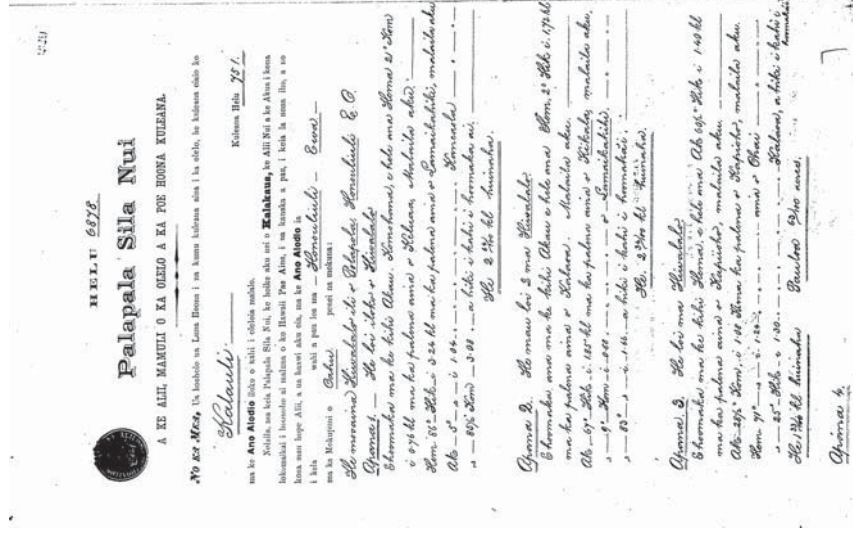


Figure 16: Page 1 of 2. Palapala Sila Nui Helu 6878, Kuleana Helu 751, to Kalauali. *Mō'o* of Hiwalalo, *Ili* of Polapola, Honouliuli. 2.686 acres. March 9, 1877. Signed by Kalakaua Rex. Volume 26, p. 229-230. See fig. 17 for page 2.

Figure 17: Page 2 of 2. Palapala Sila Nui Helu 6878, Kuleana Helu 751, to Kalauli. See fig. 16 for page 1.



land of Kailikahi, Honouliuli, Island of Oahu. Here are its boundaries. On the north, the land of Puhiipaka. On the East, the pali of Kaupipuna, and the land of Kanoho. On the South, the kahawai of Makaii. On the West, the land of Puhiipaka. There are also some houses of mine there. There are some Loi for Kekaunohi there, situated between my place. It was these chiefs who gave me mine.

By Haae.¹⁷⁰

Native Testimony Manuwa sworn, and states, I know this place of Haae at Honolulu, there is a house there, and the pa Aina is the lot. The boundaries are: mauka, land of Poohilo; towards Waimanalo, an estuary that flows to the sea; makai the land of Kanioku; and it is the same towards Honolulu. There are 16 lot at the place named Kalikahi. Haae got it from Kealoa in the year 1842. No one has opposed Haae in getting this place. Kekauonohi gave it to Kealoa. That was in the 1838. There is a Poomila in this place.

Kinolua sworn, and states, I know this place and all things to be exactly as Manuwa has stated.¹⁷¹

¹⁷⁰Book 2, p. 410, Sept. 19, 1847.

¹⁷¹Book 3, p. 4-5, April 17, 1848.

Foreign Testimony Manuwa sworn. I know this place, it is called Kailikahi in Honouliuli, containing Kalo with other land, bounded: mauka by Pohilo [Poohilo], Waianae by Honouliuli Stream; makai by land called Kamoku; also Honolulu side. It has a general public fence containing 16 kalo patches and 1 house in which claimant lives. He got it from Kealoa in 1842, who received it from Kekauonohi about 1838. It was a gift from Kealoa to Claimant, who since he received it, made the kalo patches.

Kinolua sworn. I know all the particulars stated as correct, and never heard of any contention about the piece.¹⁷²

7.7 Helu 753: The Claim of Manuwa

Claimant: Manuwa
Location: 'Ili of Kamoku (fig. 20)
Recorded at: Honouliuli
Date: Sept. 19, 1847
Status: Awarded; Royal Patent 5142 (fig. 21)

Native Register To the Honorable Commissioners who quiet land claims of the Hawaiian Island. Aloha to you. I here by tell you of the land claim. This land is there at Kamoku, Honouliuli, Ewa, Island of Oahu. Here are its boundaries: to the North, the pali of Kauhupuna; to the East, the land of Makue; to the South, the stream of Makaii; to the West, the land of Kanoho and the stream, with some loi situated between my lands. Given to me by Kahalewai.
Done by me, Manuwa X¹⁷³

Native Testimony Kalauli sworn and stated. I know this place at Kamoku, Honouliuli. It is a kalo land and a kula. The boundaries are: mauka, Kanoho's land; towards Waianae, Makue's land; also towards the shore; towards Honolulu, Haae's land. There is no house at this place. There are 6 loi and a kula section. There is one loi of the konohiki there. Manuwa received it from Kawaa in the year 1843, simply given to him. Kealoa gave it to Kawaa, Kahekili [Kanehekili] gave it to Kealoa in the year 1842. No one has opposed him for this land.
Haee sworn and stated. I know this place, all things are as Kalauli has stated.¹⁷⁴

Foreign Testimony Kalauli sworn. I know this place. It is an ili called Moku, in Honouliuli, in Ewa. It is kalo and other land, bounded: mauka by Kanoho's land,

¹⁷²Book 2, p. 273, April 17, 1848.
¹⁷³Book 2, p. 411, Sept. 19, 1847.
¹⁷⁴Book 3, p. 5, April 17, 1848.

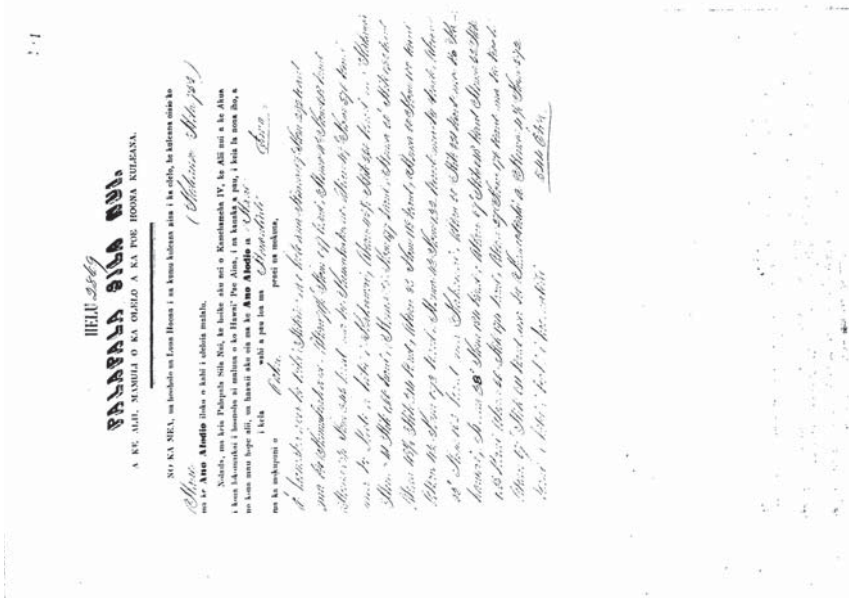


Figure 19: Palapala Sila Nui Helu 2869, Kuleana Helu 752, to Haee, Kailikahi, Honouliuli. 5.44 acres. May 21, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 211–212.

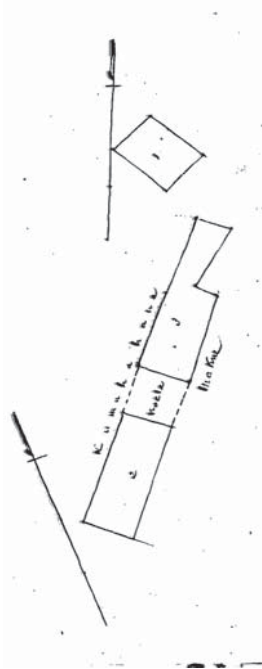


Figure 20: Helu 753 of Manuwa: *Parcel 1*, A house on the kula in the ili of Kamoku. Containing 2.90 chains; *Parcel 2*, Mooloihi moo aina, at Kamoku. Containing 50/100 acres; *Parcel 3*, At Mooloihi. Containing 1 Acre, 3.49 chains. Source: *Māhele Award Book 2:145*

Waiānā by Makue's; makai by Makue's; Honolulu by Hae's land. Claimant lives at another place. It has no house, and has 6 patches & some other land. Claimant got the land as a gift from Kawaa in 1843, who got it from Kealoha in 1842, who got it from Kahekili [Kanehekili], who died in that year. It has always been held in peace to the present time.
Kane sworn and knew the previous statement to be correct.¹⁷⁵

7.8 Helu 754: The Claim of Kaunahi

Claimant: Kaunahi
Location: Ili of Niukee (fig. 22)
Recorded at: Honouliuli
Date: Sept. 16, 1847
Status: Awarded; Royal Patent 3856 (fig. 23)

Native Register To the Honorable commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, for loi, kula and a house. This is as commanded in the law, to tell you of my claim. This land is there at Nukee [Niukee], Honouliuli, Ewa, Island of Oahu. Here are the boundaries of my houses: to the North, the pali of Kaakau; to the East, the sea of Kepoe; to the

¹⁷⁵Book 2, p. 273, April 17, 1848.

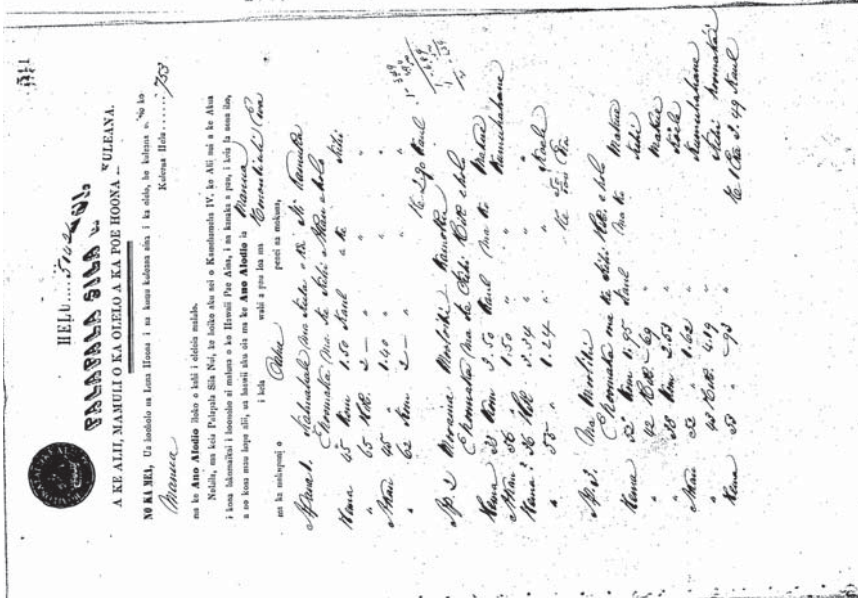


Figure 21: Palapala Sila Nui Helu 5142, Kuleana Helu 753, to Manuwa. *Kohuahele* on the *Kula* in 'Ili of Kamoku; & *Mō'o* of Mooloihi, at Kamoku, Honouliuli. 2 acres, 0.39 chains. January 17, 1863. Signed by Kaahumanu & L. Kamehameha. Volume 20, p. 511–512.

the land of Hapauea.

Here is my third claim and its boundaries: to the North, the land of Hapauea; to the East the land of Hapauea and the land of Uia; and a Poalima; to the South, the land of Kawahamana; to the West, Kaalauahi.

Here is my fourth claim and its boundaries: to the North, the land of Kaalauahi; to the East, the land of Kuhemu; on the South, the land of Maakuia; on the West, the land of Pio. It was given my by Honaunau, and my residency has been since then, without anyone objecting.

I am with appreciation,

By Kaunahi X¹⁷⁶

Native Testimony Kuhemu sworn and stated. I know this place at Niukee, Honouliuli, Ewa. The boundaries are: mauka, Kinolua's land; towards Waimanalo, an estuary; makai, Kawahamana's land; towards Honolulu, Hapauea's land. There is no wall at this place. There are five loi at this place, and one house also there; also a kula section that is a lelele (detached parcel) for this place.

1. The boundaries of this parcel are: mauka, Hapauea's land; towards Honolulu, Kapio's land; makai, Uia's land; towards Waianae, Kawahamana's land.

2. The boundaries of another parcel are: mauka Kaalauahi's land; his also is towards Honolulu; makai, Maakuia's land; towards Waianae, Pio's land.

3. Mauka, Nakai's land; towards Honolulu, Nika's land; makai, Kawahamana's land; towards Waianae, Hapauea's land.

4. Mauka, Nakai's land; towards Honolulu, land of Niukee; makai, Nika's land; towards Waianae, Kuahine's land. Kaunahi received the land from Honaunau, there is a house there, it is not enclosed. Kaunahi lives under Honaunau, in his house, he [Honaunau] is the konohiki.

In the year 1838, this place simply given Kaunahi. No one has opposed him for this land.

Kinolua sworn and stated. I know this place and all pertaining to it; just as Kuhemu has stated.¹⁷⁷

Foreign Testimony Kuhemu, sworn. This land is in Honouliuli, Ewa. It is in Niukee moku. It is bounded: Mauka by Kinolua's place; Waianae by Honouliuli stream; Makai by Kawahamana's land; Honolulu by Hapauea's. It has a general fence and contains 5 kalo patches and some other lands. There is one house in which claimant lives (Witness stated that other patches belonging to several people were interspersed.).

1. Two patches together, bounded: Mauka by Hapauea's land; Honolulu by Kapio's; Makai by Uia's; Waianae by Kawahamana's land.

¹⁷⁶Book 2, p. 411-412, Sept. 16, 1847.

¹⁷⁷Book 3, p. 5-6, April 17, 1848.

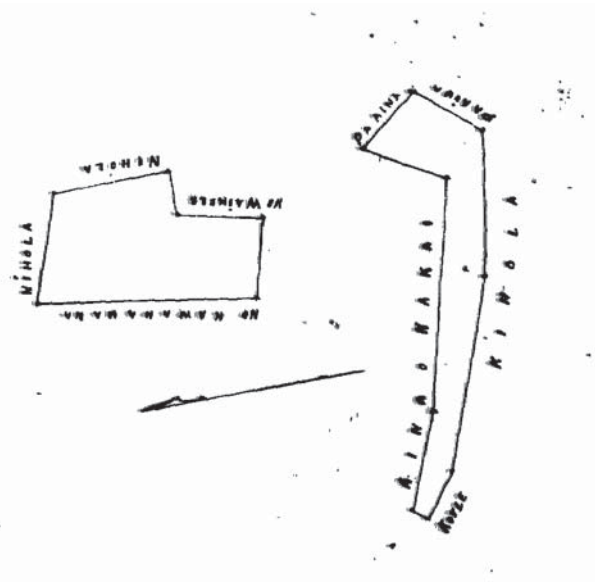


Figure 22: Helu 754 of Kaunahi: *Parcel 1*, An auwai and house lot at Kauwahine, ili of Niukee, Honouliuli, Ewa, Oahu. Containing 4.56 chains; *Parcel 2*, 3 loi in the moo of Kahoopauli, Niukee. Honouliuli, E. O. Containing 9.79 chains. *Source: Māhela Award Book 2:147.*

South, the loko of Nihola; to the West the land of Aaron Nakai and the Auwai of Kauwahine.

Here are my Loi: to the North, the land of Aaron Nakai; to the East, the Auwai of Kauwahine; to the South the Loko of Nihola; to the West, the land of Aaron Nakai.

Here is my second land claim and its boundaries: to the North, the land of Kuhemu; to the East, the Loko of Nihola; to the South, the land of Kawahamana; to the West,

2. One patch: Mauka by Kalaauhi's [Kaalauhi] land; also Honolulu, Makai by Maakua's; Waianae by Pio's land.
3. One patch, bounded: Mauka by Nakai; Honolulu by Nika's; Makai by Kawahamana's; Waianae by Hapauea's.
4. One patch: Mauka by Nakai; Honolulu by Nika's; Makai by Nakai Waianae by Kuahine's place.
5. Uplands, cultivated with potatoes &c. There is a house on this part belonging to the konohiki, Hoonanau [Hoonanau], in which they live together. Claimant got these places from Hoonanau about 1839 and has possessed them ever since without dispute.

Kinolua, sworn, and knew all the particulars in the preceding statement to be correct and no one knew of any counter claim.¹⁷⁸

7.9 Helu 755: The Claim of Keinohanani

Claimant: Keinohanani
Location: 'Ili of Niukee and Kailikahi (fig. 24)
Recorded at: Honolulu
Date: Sept. 16, 1847
Status: Awarded; Royal Patent 1277 (Keinohanani no Kaope) (fig. 25)

Native Register To the Honorable commissioners who quiet land titles of Hawaii. Aloha to you. I hereby tell you of my land claim. The land is there at Nukee [Niukee], Honolulu, Ewa, Island of Oahu. Here are its boundaries: To the North, a pali and some Loi for Kuahine; to the East, the Kula land of Kuhemu and the land of Aarona Nakai; to the South, the land of Kuahine; to the West, Kaluamano and the land of Paele. It was given to me by Kaunahi, and my residency has been since then, from my parents in the time of Liholiho. There is also a house that is mine. It is there at Kailikahi, Honolulu. Here are its boundaries: to the North, the pa Aina of Honolulu; to the East, the pa Aina; to the South, the house of Kuahine; to the West, Lauu lapa-lapa.¹⁷⁹

Done by Keinohanani X¹⁸⁰

¹⁷⁸ Kaurahi, Foreign Testimony, Book 2, p. 274, April 17, 1848.

¹⁷⁹ *Lapalapa* (*Cheirodendron*) is an endemic mountain tree. It is unlikely that the *lapalapa* was found growing in the lowlands of Niukee. We suggest that the written form *lapalapa* was a transcription error as frequently occurred in these records, and the reference was actually *lauu kalakala* as in other claims in Honolulu, *lauu kalakala* being used to describe a buffer of planted *pinini* (*Opuntia megacantha*), an introduced cactus.

¹⁸⁰ Book 2, p. 412, Sept. 16, 1847.

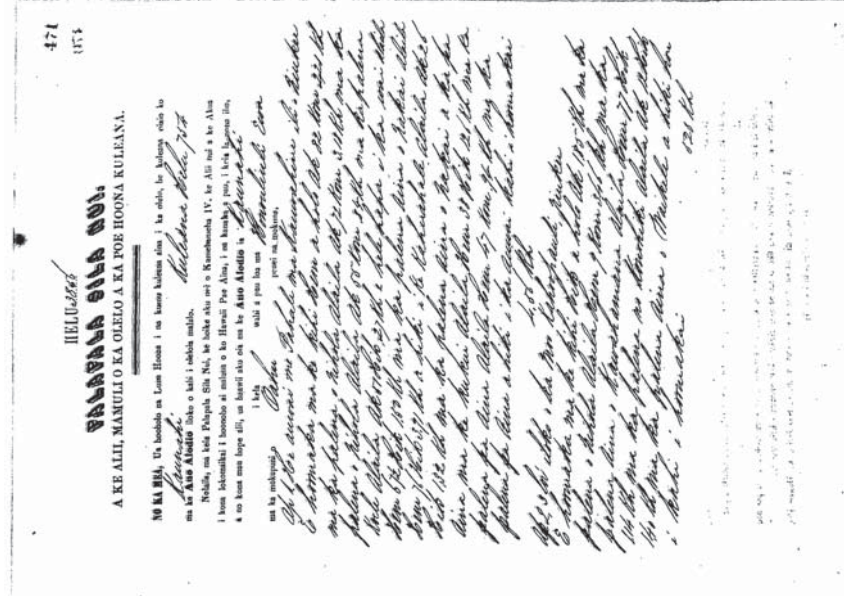


Figure 23: Palapala Sila Nui Helu 3856, Kuleana Helu 754, to Kaunahi. An 'Aunani and *Pihale* at Kauwahine, 'Ili of Niukee; & *Lo'i* in the *Mo'o* of Kahoopauli, at Niukee, Honolulu. 979 chains. December 7, 1857. Signed by Kaahumanu & Kamehameha. Volume 16, p. 471–472.

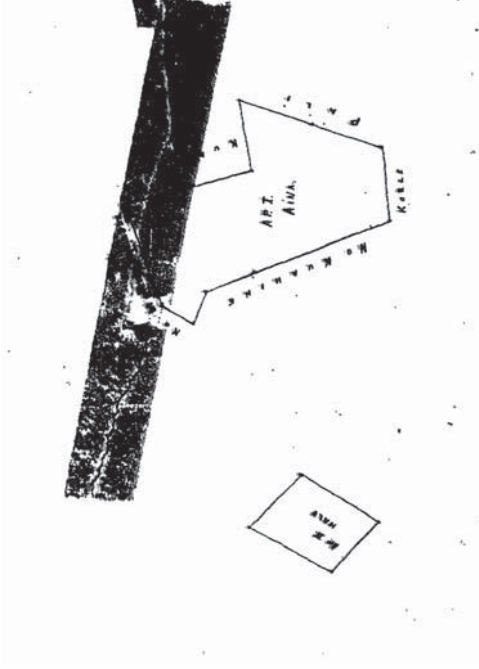


Figure 24: Helu 755 of Keinohanui: *Parcel 1*, Kihewamakawalu moo aina at Niukee, Honouliuli, E. O. *Parcel 2*, House on the kula of Kaakau. Honouliuli, E. O. Bounded on one site by the pa pipi (cattle wall). There being 1 Acre 5.34 chains within the 2 parcels. *Source:* *Māhale* Award Book 2:149.

Native Testimony Kuhemu sworn and stated. I know this place at Niukee [Niukee], Honouliuli, it is a kalo land and a kula section. The boundaries are: mauka, my place; towards Honouliuli, Kuahine's land; makai, Paele's place; towards Waianae, Honaunau's land. There is no wall there, and Keinohanui has one house there. Keinohanui received it from Honaunau in the year 1838, and his residency has been in peace to this day.

Kalama sworn, and states. I know this place exactly as Kuhemu has stated here. Honaunau received the land from Keano, his wife. No one has objected.¹⁸¹

Foreign Testimony Kuhemu sworn. This place is in Niukee in Honouliuli, Ewa, bounded: Mauka by my waste land; Honouliuli by Kuahine's kalo land; Makai by

¹⁸¹ Keinohanui, Native Testimony, Book 3, p. 6-7.

Paele's land; Waianae by Honaunau's [Honaunau] waste land. There is a general fence; and one house on it belonging to claimant, who lived there from about 1839 in peace. He got it from Honaunau, konohiki before that year.

Kalama sworn. I know this place and that the previous statements are correct.¹⁸²

7.10 Helu 756: The Claim of Kauouo

Claimant: Kauouo

Location: *Ili* of Kaaumakua (fig. 26)

Recorded at: Honouliuli

Date: Sept. 18, 1847

Status: Awarded; Royal Patent 6934 (fig. 27)

Native Register To the honorable Commissioners who quiet land title of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. This land is there at Kaaumakua, Honouliuli, Island of Oahu. Here are its boundaries: to the North, the land of Pio; to the East, the land of Napahi; to the South, the pa Aina of Kaaumakua; to the West, that land of Hilea. It was given to me by Kaope.

By Kauouo X¹⁸³

Native Testimony Maakuia sworn and stated. I know this place at Kaaumakua, Honouliuli, and the boundaries are: mauka, Kapio's land; towards Honouliuli, Napahi's land; makai, a kula section for Kekauonohi; towards Waianae, Hilea's land. The pa Aina is the only wall on this place. There is no house. Kaope gave this land to Kauouo in the year, 1847. Kaope got the land from Kekauonohi. There is no other claim there.

Kinolua sworn and stated. I know this place and all the particulars just as Maakuia has stated.¹⁸⁴

Foreign Testimony Maakuia, sworn. I know this place. It is in Kahaumakua [Kaaumakua], Honouliuli, Ewa, consisting of one kalo patch, bounded: Mauka by Pio's land; Honouliuli by Napahi's; Makai by waste land of Kekauonohi; Waianae by land of Hilea. There is neither house nor fence, besides a general one. Claimant got the place from Kaope in 1846 as a gift, who had it from Kekauonohi. He is a konohiki. I know of no dispute existing concerning this place.

Kinolua, sworn, I know the previous statement to be correct.¹⁸⁵

¹⁸² Keinohanui, Foreign Testimony, Book 2, p. 275, April 17, 1848.

¹⁸³ Book 2, p. 413, Sept. 18, 1847.

¹⁸⁴ Book 3, p. 7, April 17, 1848.

¹⁸⁵ Book 2, p. 275, April 17, 1848.

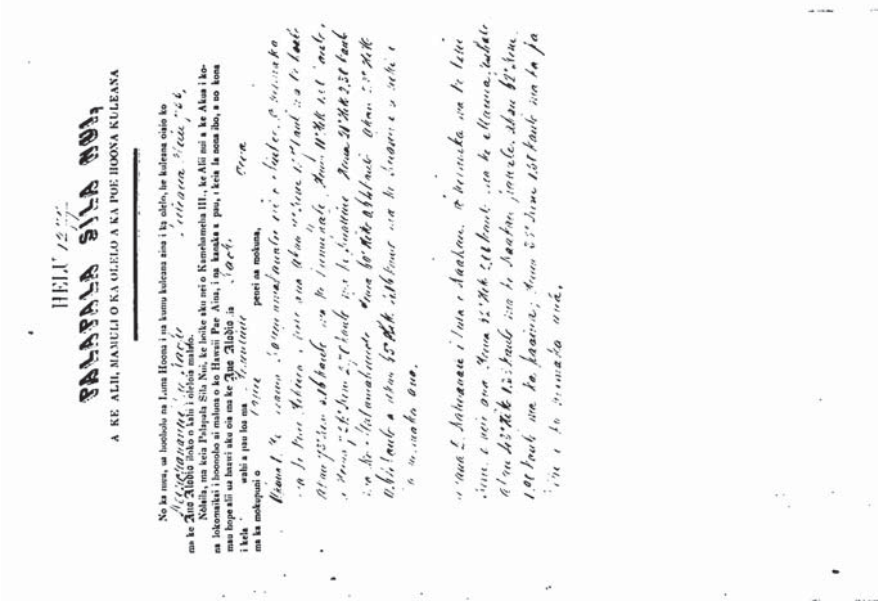


Figure 25: Palapala Sila Nui Helu 1277, Kuleana Helu 755, to Keinohanui for Kaope. Mo'o at Kihewamakawalu & kahuahale at Kaakau, Honouliuli. 1.53 acres. Signed by Kamehameha and Keoni Ana. July 11, 1853. Volume 5, p. 129-130.

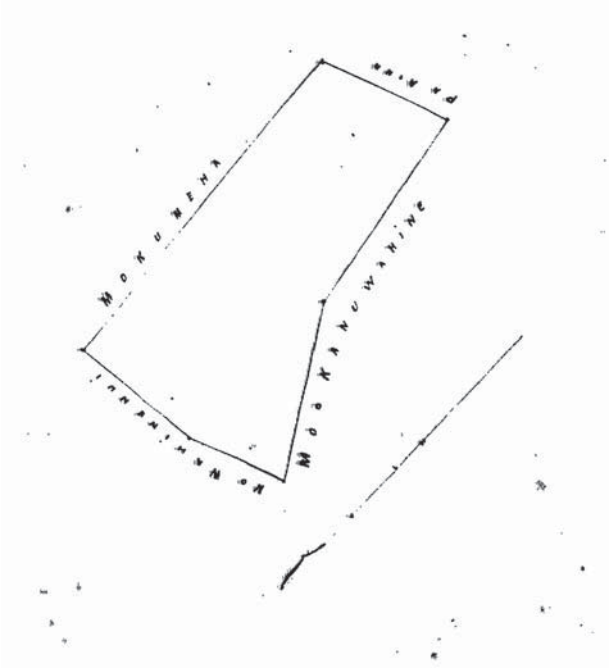


Figure 26: Helu 756 of Kauouo: Mooaina of Maui, ili of Kaaumakua, Honouliuli, E. O. Containing 1 acre, 9.22 chains. Source: Māhele Award Book 2:151.

7.11 Helu 757: The Claim of Kaniau

Claimant: Kaniau
Location: Ili of Kamilomilo (fig. 28)
Recorded at: Honouliuli
Date: Sept. 19, 1847
Status: Not awarded

and one loi. He got his land from Kawaa, it is an old tenancy for him, in the time of Kamehameha I. No one has objected to him.

Keliiaa sworn. I know this place exactly as Pue has stated.¹⁸⁷

Foreign Testimony Pue, sworn. This land is in Kamilomilo, Honouliuli, Ewa, bounded: Mauka by Kalanihopu's place; Honolulu by the Honouliuli stream; Makai by Nunu's place; Waianae by Kanahuna's land. Claimant has one house & one patch, but no fence besides the public one. He received it from Kawaa and has lived upon it to the present time in peace from before the time of 1st Kamehameha.

Keliiaa, sworn, and confirmed the previous testimony in the several parts.¹⁸⁸

7.12 Helu 758: The Claim of Nihua

Claimant: Nihua

Location: *Ili* of Niukee (fig. 29)

Recorded at: Honouliuli

Date: Sept. 19, 1847

Status: Awarded; Royal Patent 4309 (fig. 30)

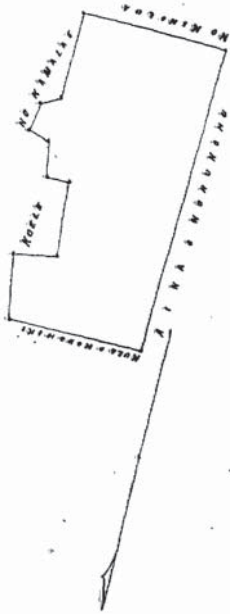


Figure 29: Helu 758 of Nihua: The moo of Niukee, *Ili* of Niukee. Honouliuli, E. O. 1 acre and 4.49 chains. *Source:* *Māhele* Award Book 2:155.

¹⁸⁷Book 3, p. 24–25, April 24, 1848.

¹⁸⁸Book 2, p. 287, April 24, 1848.

Native Register To the Honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claims. This land is there at Nukee [Niukee], Honouliuli, Island of Oahu. Here are its boundaries: to the North, a pali and my houses; to the East, the land of Kinolua, and the land of Kamalae; to the South, the land of Kinolua; to the West, the land of Nohunohu. The right was given to me by Kinolua, though my residency was from before then. By me, Nihua¹⁸⁹

Native Testimony Kinolua sworn and stated. This place is there at Niukee, Honouliuli. There are four loi and a kula section in one place. The boundaries are: mauka, Kekaunohi's land; towards Honolulu, Kamalae's land; makai, my land; towards Waianae, Nohunohu's land. Nihua received the land from Honaunau in the year, 1838, and held it peaceably to this time. No one has objected to him. Maakuia sworn and stated. I know this place and all the particulars exactly as Kinolua has stated.¹⁹⁰

Foreign Testimony Kinolua, sworn, This place is in Niukee in Honouliuli, Ewa, containing 4 patches and some upland [areal], bounded: Mauka by land of Kekaunohi; Honolulu by land of Kamalae; Makai by Kinolua's; Waianae by Nohunohu's place. Claimant got it from Honaunau in 1834 and has held it ever since in peace. There is one house of claimant's on the place in which he lives. Maakuia, sworn, confirmed the previous account in each part.¹⁹¹

7.13 Helu 759: The Claim of Liliu

Claimant: Liliu

Location: *Ili* of Loloulu

Recorded at: Honouliuli

Date: Sept. 16, 1847

Status: Not awarded

Native Register To the honorable Commissioners who quiet land title of the Hawaiian Island. Aloha to you. I hereby tell you of my claim, pursuant to the law. This land is there at Loloulu, Honouliuli, on the Island of Oahu. Here are its boundaries: to the North, the land of Kaalauahi; to the East, Lokoeli; to the South, the land of Kahakuliili; to the West the land of Kama. It was given to me by my Wife, Kalauani, and from Kaope in this time. Aloha to you.

¹⁸⁹Book 2, p. 414, Sept. 19, 1847.

¹⁹⁰Book 3, p. 7–8, April 17, 1848.

¹⁹¹Book 2, p. 275–276, April 17, 1848.

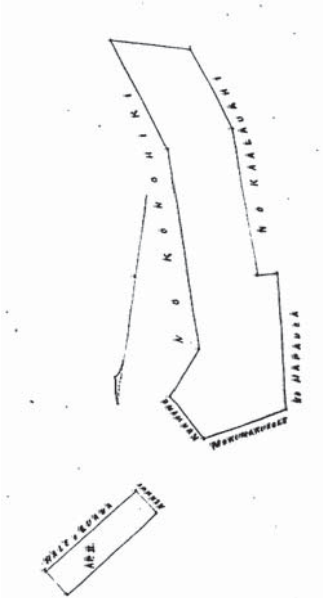


Figure 31: Helu 760 of Kuhemu: *Parcel 1*, The Mooaina of Naopala, Ili of Niukee, Honouliuli, E. O. 1 acre and 5.48 chains; *Parcel 2*, A house lot on the Kula of Kamaipipipi. 1 acre 7 40/100 chains. *Source:* *Māhele* Award Book 2:157.

Here is my house claim. It is there at Kailikahi, in this land of Honouliuli, Ewa, Island of Oahu. Here are its boundaries: to the North, the pa Aina of Honouliuli; to the East, the houses of Kuahine and Keinohanuui; to the South, the pali of Kihewamakawalu; to the West, the house of Aalona Nakai.

I am with appreciation,
By Kuhemu¹⁹⁵

Native Testimony Kinolua, sworn and stated. I have seen this place at Nukee [Niukee] in Honouliuli. There are three patches and a kula section. They are not together in one area. The boundaries of the first section are:

Mauka, Kuahine's place; towards Honolulu, Nakai's place; makai, Kawahamana's place; towards Waianae, Hapauea's land.

The second parcel is: mauka, Kawahamana; towards Honolulu Kekauonohi; makai, her land and the land of Kekaalauahi [Kaalaauahi]; towards Waianae, Kekaalauahi's land.

The third is: mauka, Kekaalauahi's place; towards Honolulu, his land as well; makai, Puanani and Maakuia's land; towards Waianae, Kaunahi's land. Kuhemu's land was from Honaunau in the year 1839. No one has objected to Kuhemu.

¹⁹⁵Book 2, p. 415-416, Sept. 16, 1847.

Kalama sworn by the word of God and stated. I have seen this place and it is exactly as Kinolua has just told you here.¹⁹⁶

Foreign Testimony Kinolua sworn. I know this place. It is in Niukee, Honouliuli, Ewa. Consisting in 3 separate kalo patches and some upland (afterward disallowed):

1. Kalo patch, bounded: Mauka by Kuahine's land; Honolulu by Nakai and Kekauonohi's land; Makai by Kawahamana; Waianae by Hapauea's.
2. 1 kalo patch, bounded: Mauka by Kaawahamana's land; Honolulu by Kekauonohi's; Makai also & by Kaalaauahi's; Waianae by Kaalaauahi's land.
3. 1 kalo patch, bounded: Mauka by Kaalaauahi's land; Honolulu also; Makai by Puanani & Maakuia's; Waianae by Kaunahi's land.

Claimant got these lands from Honaunau before 1839 and has lived in possession of them to this time in peace.

The upland belongs to Honaunau still.

Kalama, sworn, and knew the previous statement to be correct.¹⁹⁷

7.15 Helu 761: The Claim of Kinolua

Claimant: Kinolua
Location: Ili of Niukee & Kailikahi (fig. 33)
Recorded at: Honouliuli
Date: Sept. 17, 1847
Status: Awarded; Royal Patent 869 (fig. 34)

Native Register President and honorable Commissioners who quiet land claims of the Hawaiian Island. Aloha to you. I hereby tell you of my claim. The land is there in Niukee, Honouliuli, Ewa, Island of Oahu. It is bounded on the North by the land of Kekukahiko [Kukahiko]; on the East, by the land of Kamaala; on the South by the Poalima Loi; toward the West, the land of Kamalae. Here is my second claim: on the North the land of Nihua; on the East, the land of Kamalae; Towards the South, the stream of Makai; and to the West, a Poalima and the land of Healani.

Here are my claims for cultivated kula: Here are the boundaries: towards the North, the pali of Kaluamano; towards the East, the kula land of Honaunau; towards the South, Kaluamano; towards the West, the kula land of Kamaala.

Here is my second Kula claim. Towards the North, a cliff; towards the East, the land of Kamaalae; towards the South, the land of Nihua; towards the West, the land of Nihua.

¹⁹⁶Book 3, p. 8.

¹⁹⁷Book 2, p. 276, April 17, 1848.

[illegible]

Figure 32: Palapala Sila Nui Helu 3803, Kuleana Helu 760, to Kuhuenu. *Mo'o* of Naopala, 'Ili of Niukee; & *Kuhuaiale* on *Kula* of Kamalipipi, Honouliuli, 1 acre, 7.46 chains, September 16, 1857. Signed by Kaahumanu and Kamehameha. Volume 16, p. 365-366.

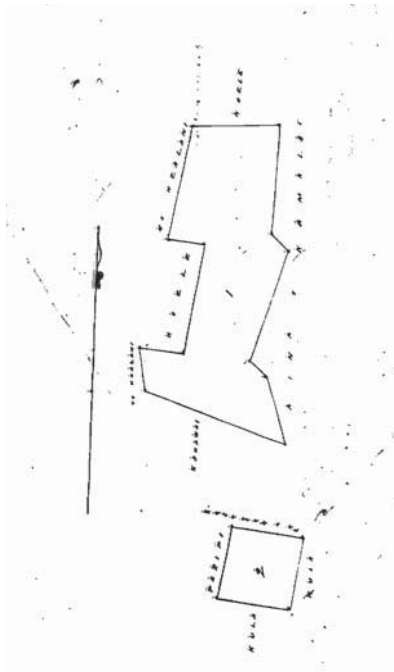


Figure 33: Helu 761 of Kinolua: *Parcel 1*, Moovina of Naopala, Ili of Niukee. Honouliuli, Ewa, Oahu. 1 acre 4 73/100 chains; *Parcel 2*, House on the kula of Palahemo, Honouliuli. Bounded on west side by the pa pipi. 2 56/100 chains. Combined total area is 1 acre and 7 29/100 chains. *Source:* *Māhele* Award Book 2:160.

Here is my third Kula claim. Towards the North, a cliff; towards the East, the land of Nohunohu; towards the South, the land of Nohunohu; towards the West, the land of Kauihi.

Here are my house claims. There at Kalikahiri, a purchased place in Honouliuli. Here are its boundaries: towards the North the pa Aina of Honouliuli; towards the East, the house of Aaronaka Nakai; towards the South, the house of Paale; towards the West, a laau lapa¹⁶⁸. Honaunau gave these lands to me, and my residency has been from before the time of Kamehameha I.

Here is the Kula of mine. Here are its boundaries: toward the North, a Poalima; towards the East, a Poalima of Kamakoa; towards the South, the Stream of Makaii; towards the West, the land of Kamalae.

By Kinolua¹⁹⁹

Native Testimony Maakuia sworn and stated. I know this place at Niukee, Honouliuli, in Ewa, a moo kalo, two parcels of kula, and a houses site. There are five

¹⁹⁸ See note in Helu 755, p. 283 regarding use of the term *lavalam*.

¹⁹⁹Book 2, p. 417. Sept. 17, 1847.

7.16 Helu 762: The Claim of Kalama

Claimant: Kalama
Location: *Ili* of Kaaumakua (fig. 35)
Recorded at: Honouliuli
Date: Sept. 18, 1847
Status: Awarded; Royal Patent 5141 (fig. 36)

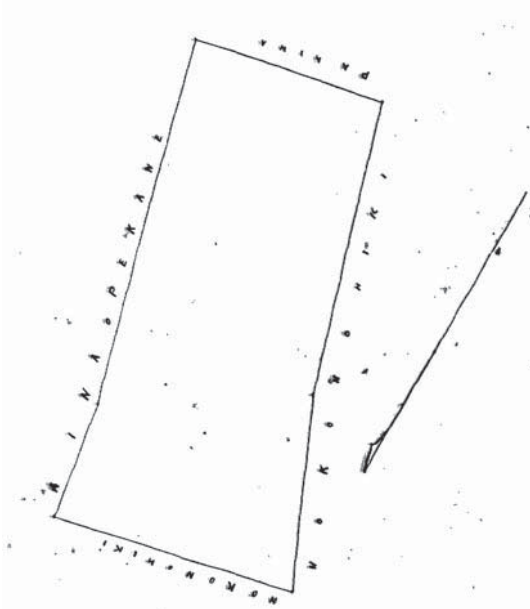


Figure 35: Helu 762 of Kalama: Moovina of Kanuooapu, *ili* of Kaaumakua. Honouliuli, E. O. Containing a total of 5 acres. *Source:* *Māhele* Award Book 2:161.

Native Register To the Pres. and the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my claim, before the time as instructed for telling it to you. This land is it is there at Kaaumakua, Honouliuli, Island of Oahu Here are its boundaries: on the North, the *Loi* of Alae,

Waa and Loloulu, towards the East the Poalima *loi* of Kuaihee and the land of Perekane [Pelekane]; towards the South, the *pa Aina* of Kaaumakua; towards the West, the land of Naholowaa, and some houses, the place where my house stands. Kaope gave me these properties at this time, but my residency has been the same since olden time, from my parents.

I am with appreciation,
By Kalama X²⁰²

Native Testimony Keliiaa sworn and stated. I know this place of Kalama at Kaaumakua in Honouliuli, at Ewa, there are two parcels. The boundaries of the first parcel, which is the house lot, are: mauka, Naholowaa; towards Honolulu, the land of Pekane [Paekane]; makai the *pa Aina*; towards Waianae, Lauili's place. This place is not fenced. There is one house for Kalama at this place.

2. The boundaries of the kalo land are: towards Honolulu, Pekane's [Paekane] land; makai, the *pa Aina*; towards Waianae, Naholowaa's land and Lauili's land; mauka, a Government *Loi*. There are four *loi*. The land has been cultivated. There is no house on this place. Kalama had the land from Kaope, and Kaope had the land from Kawaa, it was in the time of Kuilhelani, and from that time, Kalama has resided there in peace. No one has objected.

Maeaea sworn and stated. I know this place just as all the things that Keliiaa has stated.²⁰³

Foreign Testimony Keliiaa sworn. I know this place. It is in Honouliuli [Honouliuli], Ewa, Kaaumakua [Kaaumakua] is the name of the *ili*. It is in two pieces.

1. House lot, bounded: Mauka by Naholooa's [Naholowaa's] land; Waititi by Paekane's house lot; Paaina Makai; Waianae by Lauili's land.

2. Second piece bounded: Mauka by Government land; Honolulu by Paekane's land and the konohiki, Kealiahonui; Makai by Government fence; Waianae by Naholowaa and Lauili. It is principally kalo land.

Claimant derived those pieces from Kaope in time of Kamehameha 1st, through his ancestors, and has held them to the present time. Without anyone disturbing the right.

Maeaea sworn and confirmed the previous testimony in every particular.²⁰⁴

7.17 Helu 763: The Claim of Keliiaa

Claimant: Keliiaa
Location: *Ili* of Hiwa, Poohilo, and Mauakapuoa (fig. 37)

²⁰²Book 2, p. 418, Sept. 18, 1847.

²⁰³Book 3, p. 21, April 24, 1848.

²⁰⁴Book 2, p. 284, April 24, 1848.

Native Register To the honorable Commissioners who quiet land titles of the Hawaiian Islands. Aloha to you, I hereby tell you of my land claim. This land is there at Hihiwa, Honouliuli, Island of Oahu. Here it is: on the North, the land of Lololuu; on the East, the land of Kawaoale and the land of Mili and the land of Kaunui; on the South, the house of Kikala and the house of Ohai; on the West, a pali.

Here is my second claim. There at Poohilo in Honouliuli. Here are its boundaries: on the North, the land of Kawahala [Kalawaha?]; on the East, the land of Opiopio [Piopio], and the land of Kaewa; on the South, the land of Kaewa and the land of Oni; on the West, the land of Manaole, and a Loi between my land and that of Opiopio, that is for him.

Here is my third land claim. It is there at Mauakapuaa, in Honouliuli. Here are its boundaries: on the North, that land of Kumupopo; on the East, the Loko of Kalahu; on the South, the pa Aina; on the West, the houses of Kapioho.

Figure 36: Palapala Sila Nui Helu 5141, Kuleana Helu 762, to Kalama. *Mo'o* of Kanuopo, 'Ili of Kaauimakua, Honouliuli. 5 acres. January 17, 1863. Signed by Kaahumanu & L. Kamehameha. Volume 20, p. 509-510.

Here is my house claim. There at Poohilo and Maui. Here are the boundaries: on the North, the land of Oni; on the East, the land of Oni, the land of Koi, and the house of Kehuna [Kanhuna]; on the West, the pali of Makaakua. Done by me, Somona [Solomona] Keliiaa X.²¹⁵

Native Testimony Pue sworn and state. I know the place of Keliiaa, there at Hiwa, Poohilo and Moakapuaa with the house lot. The boundaries of the house lot are: mauka, Oni's land; towards Honolulu, Puehu's land; makai, Kanhuna and Koi; towards Waianae, a pali. There is no wall at this place. There is one house for Keliiaa, and to houses for his father, whose name is Puehu, and the fourth house is for Koi.

2. The boundaries of the land at Poohilo with two loi. Mauka, Opunui's land; towards Honolulu Opio's land; makai, Kaewa's land; towards Waianae, Kauinui's land. This place is not enclosed. There is no house.

3. The boundaries of the parcel at Hiwa are. It is a moo aina with 13 loi on it: mauka, Napahi's land; towards Honolulu, Kaui's land; makai, Kalaoa's land; toward Waianae, a pali. There is one house there which is for his father, and the 13 loi, he lives there at this time.

4. The boundaries of the land at Moakapuaa are: mauka Kumupopo's land; towards Honolulu, Lauli's land; makai, Kumupopo's land; towards Waianae a pali; Keliiaa got this land from Punielua it was in the time after the death of Kahekili [Kanehekili] in the year 1843, and his residency has been peaceful there until this time. But the house is an old residency of his father, and Keliiaa got it from him. This place was gotten by the father of Keliiaa in the time of Peleioholani, and residency has been peaceful to this time at the house and two loi. The moo land at Moakapuaa, that place was gotten by Keliiaa in the year 1845. No one has objected to him.

Maeaea sworn, and states. I know the place of Keliiaa, exactly in all things as Pue has stated for Parcels 1, 2, 3 and 4.²¹⁶

Foreign Testimony Pue sworn, I know this land, it is in land of Honouli [Honouliuli], Ewa, consisting of four pieces.

1. House lot, bounded by Oni's land; Honolulu by Puehu's land; Makai, Kuhnana and Koi; Waianae by a ravine. It has only the public fence. There are four houses. Claimant owns 1. Puehu, father of claimant owns two, and Koi 1. Witness after stated that Koi's house was out of the bounds of this land and that there were only 3 houses on Claimant's place.

2. Second piece. Two patches, bounded: Mauka by Opunui's place; Honolulu by Opio's land; Makai by Kaewa's; Waianae by Kauinui's place.

²¹⁵Book 2, p. 419, Sept. 20, 1847.

²¹⁶Book 3, p. 21–22, April 24.

3. Third place, Kalo land and other, containing about 13 patches, bounded: Mauka by Napahi's land; Waititi by Kauinui's land; Makai by Kalaoa's; Waianae by a ravine. It has one house.

4. Fourth is bounded: Mauka by Kumupopo's land; Honolulu by Kalauli and Kalahu; Makai by Kumupopo; Waianae by the ravine.

Claimant received the house lot from his father, Puehu, and has occupied it ever since 1836 or 7, the time of his getting it, in peace. Claimant obtained also the second lot at the same time from Puehu.

He received this lot, No. 3, from his own father, Naulu a long time back, his ancestors having possessed the lot.

He received No. 4 from Punielua about 1843 as a gift. Punielua possessed this lot from his [illegible]. He is living on Hawaii. Claimant has held all these places in peace to the present time.

Maeaea sworn, confirmed the previous statement in every part.²¹⁷

7.18 Helu 764: The Claim of Maeaea

Claimant: Maeaea

Location: *Ili* of Kaulahahanau, Lihue, and Pohakea (fig. 39)

Recorded at: Honouliuli

Date: Sept. 16, 1847

Status: Not awarded

Native Register To the President and honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my claim. This land is there at Kaulahahanau. At Lihue, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: to the North, Punaialau; to the East, Kalakiki; to the South, Kawaipapa.

Here is my second claim, and here are its boundaries: on the North, Kawaipapa; to the East, Kalakiki; to the South, the alapii of Pohakea; towards the West, Pohakea. They were from my parents, who have died, and they bequeathed it to me. And at this time my residency is from Haaea.

I am yours with appreciation.

Maeaea X²¹⁸

Native Testimony Paele sworn and stated. I know the place of Maeaea, It is there at Lihue, adjoining with Waialua. It is a kula land in two parcels. The boundaries of the first parcel are: Mauka, Kanehoa; towards Honolulu, Kunia; Makai, Opunaha; towards Waianae, Pohakea.

²¹⁷Book 2, p. 284–285, April 24, 1848.

²¹⁸Book 2, p. 420, Sept. 16, 1847.

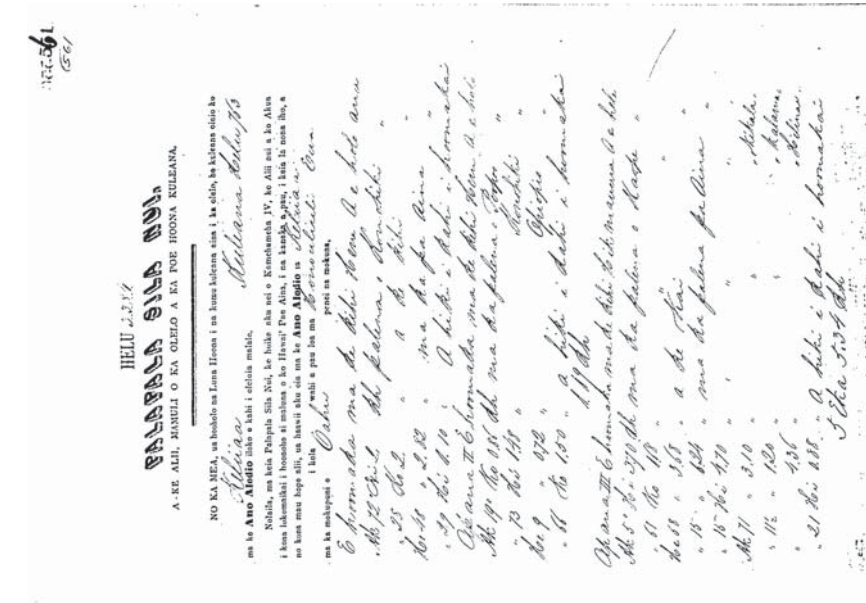


Figure 38: Palapala Sila Nui Helu 3384, Kuleana Helu 763, to Keliiaa. Honouliuli. 6 acres, 0.19 chains. November 12, 1856. Volume 14, p. 561-562.

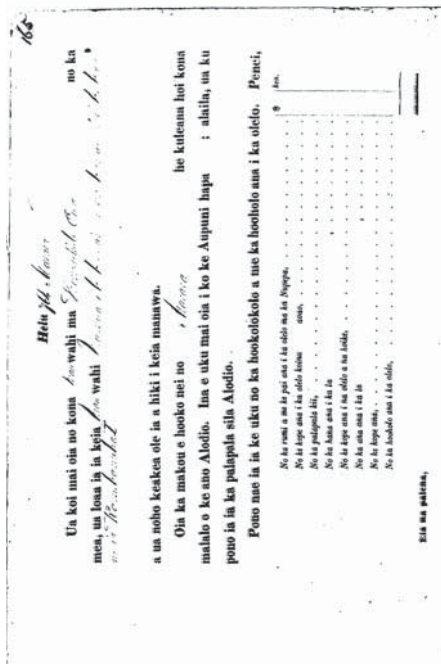


Figure 39: Helu 764 of Maeaea. Source: Māhale Award Book 2:165.

There is no wall at this place, and one house there. The house was burned by a fire and his is thinking of making a new house.

2. The boundaries of the second parcel are: Mauka Nakai's land; Honolulu, the kula of Kunia; Makai, Opunahā; towards Waianae, Pohākea. Maeaea got the land from Kawaa, and Kawaa got it from Kekumanoha. He resides there in peace at this time. There is no wall at this place. There is no house, and no one has objected to him.

Keliiaa sworn and stated. I know this place in all particulars just like Paele has stated, but it was from Keaona, Maeaea's father that he received the land in the time of Kamehameha I. It was in the time of Kamehameha II that Maeaea got the land. No one has objected.²⁰⁹

Foreign Testimony Paele, sworn, This land is in Lihue, Honouliuli, Ewa, in two pieces.

1. is bounded: Honolulu by Kunia (land); Mauka, Kanekoa (land); Makai by Opunahoa (land) Waianae by Punaha Stream. There has been a house but it

²⁰⁹Book 3, p. 23. April 24, 1848.

was burnt down.
2. Second lot, bounded: Mauka by Nakai; Honolulu by vacant land called Kunia; Makai by Opunaha stream; Waianae by ravine.
Claimant derived these places from Kawaa in time of Kamehameha Ist through his ancestors, and has held the land without dispute to the present time.
Keliiāa, sworn. Confirmed the evidence given, and knows no counter claimant.²¹⁰

7.19 Helu 765: The Claim of Kamalae

Claimant: Kamalae
Location: 'Ili of Niukee & Kalikahi (fig. 40)
Recorded at: Honouliuli
Date: Sept. 17, 1847
Status: Awarded; Royal Patent 6509 (fig. 41)

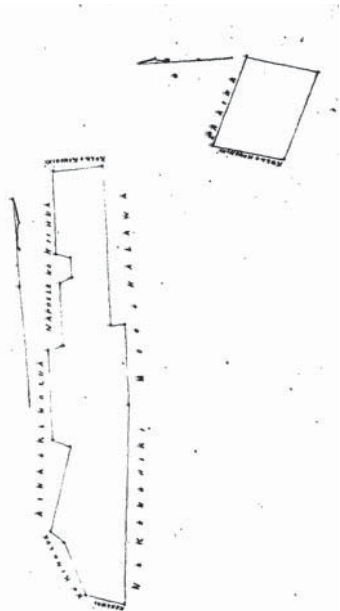


Figure 40: Helu 765 of Kamalae: *Parcel 1*, Mooaina of Kapailima, Ili of Niukee. Honouliuli, E. O. 1 acre and 6 23/100 chains total; *Parcel 2*, House lot on the Kula of Palahemo, Honouliuli. 2.70 chains total. *Source:* *Māhele* Award Book 2:167.

Native Register To the President and honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my claim. The

²¹⁰Book 2, p. 285–286, April 24, 1848.

land is there at Nukee [Niukee], Honouliuli, Ewa, Island of Oahu. Here are its boundaries: to the North, a pali; to the East, the land of Kekukahiko and the land of Kamaala; to the South, the stream of Makai; to the West, the land of Kinolua. Here is my house claim, it is there at Kalikahi, in Honouliuli. Here are its boundaries: on the North the pa Aina of Honouliuli; towards the East, a pa Aina; towards the South, the Alanui; towards the West, he laau lapalapa.²¹¹ Punahoa gave the property to me, and in this time, Kinolua has given it to me.
I am with appreciation, your servant,
By Kamalae X²¹²

Native Testimony Paele sworn and stated, I know this place at Nukee [Niukee] in Honouliuli. It is a mooaina and a house lot. The boundaries of the house lot are: Mauka, the pa aina; towards Honolulu, Nakai's land; Makai, a pali; towards Waianae, Kinolua's land. This place is not enclosed with a wall, there is one house for Kamalae there. The house was for Punahoa, his father, who died. Kamalae received this place in the year 1839. No one has opposed him.

2. The boundaries of the kalo land are: Mauka, a pali; towards Honolulu, Kekukahiko's land; Makai, the stream; Waianae, Kinolua and Nihua's land. This place has no wall, and there is no house. There are five loi and some kula. His land came from Punahoa in the time of Kalola. The public wall is the only wall on this place.

Maeaea Sworn and stated. My knowledge of this place is the same as Paele has stated.²¹³

Foreign Testimony Paele, sworn, This place is in Nukee [Niukee], Honouliuli, Ewa. It is in two pieces.

1. House lot, bounded: Mauka by Government fence; Honolulu by Nakai's with a pali; Makai, and Waianae by Kinolua. There is no other fence than the public one. Claimant owns one house on it from his father, Kapunahoa, who built it, from [whom] he got the land about 1837.

2. is bounded: Mauka by a ravine; Honolulu, Kinolua's and Kukaikoi; Makai by the stream of Honouliuli; Waianae by Kinolua's and Nihua's. Consisting of five kalo patches and other land.

Claimant got it with the first at the same time and from his father, Kapunahoa. Maeaea, confirmed the statement made in the several particulars.²¹⁴

²¹¹See note in Helu 755, p. 283 regarding use of the term *lapalapa*.

²¹²Book 2, p. 420, Sept. 17, 1847.

²¹³Book 3, p. 23–24, April 24, 1848.

²¹⁴Book 2, p. 286, April 24, 1848.

By Paule X²¹⁵

Maeaea Sworn, and stated. My knowledge of this place is exactly the same as stated by Kamaalae.²¹⁶

Claimant has two houses on the land and six kalo patches. He got it from Kalola in about 1837, who was konohiki.

Maeaea, sworn, confirmed the previous statement and knows of no counter claimant.²¹⁷

Claimant: Hapauea

Recorded at: Honouliuli

Date: Sept. 10, 1947
Status: Awarded; no Royal Patent issued

²¹⁵Book 2, p. 421. Sept. 16 1847.

²¹⁷Book 2, p. 286–287, April 24, 1848.

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BALABALA 916 000

AKE ALII, MANULI O KA OLELO A KA POE HOONA KULEANA.

No ka men, ua hoolohlo na Luna Hoona i na kumu kulekana sina i ka ulalo, he kulekana usaro ko
uak *kulekana* *uak* *uak*

[illegible][illegible][illegible]

Figure 43: Palapala Sila Nui Helu 1086, Kuleana Helu 766, to Paele, *Mo'o and Kaluiahale* at Kaluamanoiki, Honouliuli. 1 53/100 acres, December 4, 1852. Signed by Kamehameha and Keoni Ana. Volume 4, p. 821–822.

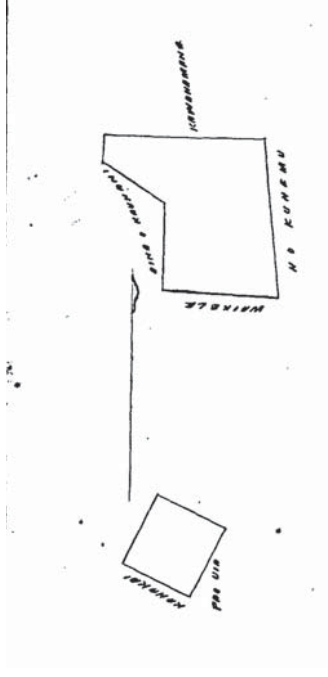


Figure 44: Helu 767 of Hapauea: *Parcel 1*, Mooaina of Nihola, Ili of Niukee. Honouliuli, Ewa, Oahu. Containing 9.84 chains; *Parcel 2*, House lot at Kapapahu, Honouliuli. Containing 2.56 chains. There being a total of 1 acre and 1/40 chains in the two parcels. *Source:* *Māhele* Award Book 9:382

I am with appreciation,
By Hapauea X²¹⁸

Foreign Testimony Kaopala, sworn, says he knows the land of claimant at Honouliuli, Niukee [Niukee], Ewa. It consists of 2 kalo patches and a house site. The 2 patches form one piece, bounded: On Waialua side by Paelé's land; Makai by Waikēle's land; Honouliuli side by Kaunahi's land. His house site is in another place. It is not enclosed. He received the 2 patches from Honaunau, the konohiki, a long time ago and has held ever since in peace.
Kumupopo, sworn, say he knows the land of Clt., 2 kalo patches & a house site. He received the patches from Honaunau before the death of Kinau. He has held the same without dispute.²¹⁹

7.22 Helu 768: The Claim of Pio

Claimant: Pio
Location: Ili of Niukee, Kaaumakua, and Waioha (fig. 45)
Recorded at: Honouliuli

²¹⁸Book 2, p. 422, Sept. 18, 1847.
²¹⁹Book 3, p. 475, August 2, 1853.

Date: Sept. 19, 1847
Status: Awarded; Royal Patent 2337, 6826 (figs. 46, 47)

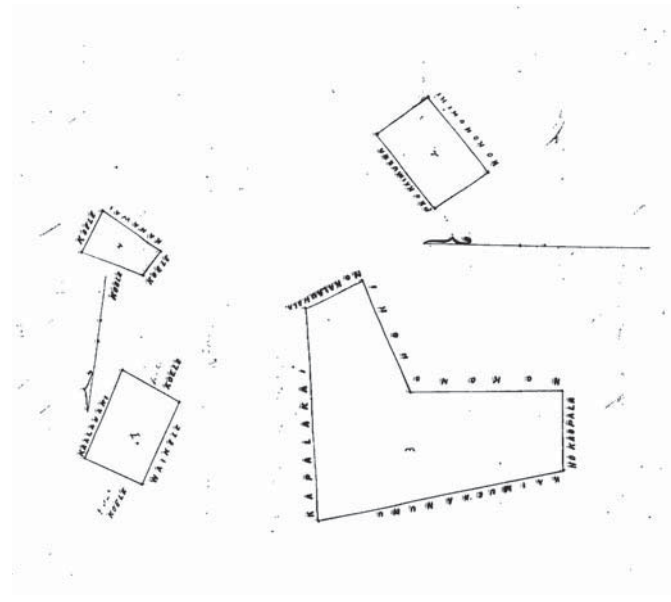


Figure 45: Helu 768 of Pio: *Parcel 1*, Mooaina of Kalole, Ili of Niukee. Honouliuli, E. O. Containing 3.58 chains; *Parcel 2*, House lot at Kalole, Ili of Niukee. H.E. Oahu. Containing 2.02 chains; *Parcel 3*, Mooaina of Keaunui, ili of Kaaumakua. Honouliuli, E. O. Containing 1 acre and 6 87/100 chains; *Parcel 4*, A house lot on the kula of Waioha, Ili of Kaaumakua. Containing 3.87 chains. The total in these four parcels being 2 acres and 0.74 chains. *Source:* *Māhele* Award Book 2:171.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. This land is there at Kaauimakua, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the stream of Makai; towards the East, the land of Kalauhala; towards the South, the land of Kauouo; to the West, the land of Nunu, and the land of Kaimuena. This place was given to me by my wife from before, to this time.

Here is my House claim. Here are its boundaries: towards the North, the house of Kaimuena; towards the East, the beach of Kaauimakua; towards the South, the cliff of Holeinu; towards the West, the cliff of Holeinu.

Here is the land claim of mine at Nukee [Niukee], in Honouliuli. Here are its boundaries: towards the North, the land of Aalona Nakai; towards the East, the land of Kaalauahi; towards the South, the Loi of Kualhee, which is for Honaunau; toward the West, a Poalima Loi.

Here is my fourth claim: towards the North, a Poalima Loi; towards the East, Kualhee; towards the South, the stream of Makai; towards the West, the land of Kawahamana and Kamakaa. It was given to me by Nioi, and at this time from Honaunau.

Done by me, Pto X²²⁰

Native Testimony Kahakulilili Sworn and state. I know the place of Pto at Kaauimakua and Niukee, in Honouliuli, and the house lot at Waioha. The boundaries of the first parcel are:

Mauka, Kalaihopu's land; towards Honolulu, Kalauhala's land; Makai, the pa aina; towards Waianae Nunu's land and Kumuhe's [Kaimuena] land. This has four loi; there is now house, and there is no wall. Pto got this land from Kaope, it is from Nuanu. No one has opposed him.

2. The boundaries of the parcel at Niukee are: Mauka, Kaunahi's land; towards Honolulu, Kaalauahi's land; Makai, Kaunahi and Maakuia; towards Waianae, a muliwa. Pto has two houses there, also two loi, a pa puua (pig enclosure), and planted trees. Wiwi gave Pto the land in the year 1843, or perhaps 4. At the death of Wiwi he obtained this land. No one has objected.

3. The boundaries of the house lot are: Mauka, Kaimuena's land; towards Honoulu, the shore; Makai, the kula of Kaope; towards Waianae, Kaope's land also. This place is enclosed with a wall, and there is one house for Pto, where he lives in peace to this day. Pto got the lot from Hapai upon his death in 1836, when he willed the lot to Pto.

Liliu Sworn and states. I know this place exactly as Kahakulilili has stated.²²¹

²²⁰Book 2, p. 422-423, Sept. 19, 1847.

²²¹Book 3, p. 129-130, July 3, 1848.

Foreign Testimony Kahakulilili, sworn. This land is in several pieces; one piece is in Kaauimakua [Kaaumakua], Honouliuli, Ewa; another in Nukee [Niukee], Ewa; the other is in Waioha, Ewa.

1. First. Kahaumakua, bounded: Mauka by Kalaihopu's [Kalanihopu] land; Honoulu by Kalauhala's; Makai by Govt. fence; Waianae by Nunu & Kaimuena's [Kaimuena] lands. There are 4 kalo patches, no house nor fence. Claimant got it from Kaope [Kaope], former konohiki in time of Hewahewa, and has ever since held it undisturbed.

2. Second, Nukee, bounded: Mauka by Kauanahi's [Kaunahi] land Uia's and Nakai's; Honoulu by Kalauahi's [Kaalauihi] land; Makai by Kauanahi & Makuia's [Maakuia]; Waianae [Waianae] by Honouliuli stream. Pto has two houses on this land, and two kalo patches, no fence. Pto got this land from Wiwi about 1843. He is dead; he gave it by will when he died to claimant, and has been held undisputed.

3. House lot, Waioha, bounded: Mauka by Kaamuen's [Kaimuena] land; Honoulu by Honouliuli stream; Makai by waste land of Ope [Kaope]; also Waianae. It is fenced and has 1 house. The claimant got this place from Hapai who willed it to him before he died. This was in 1836 and it has ever since been held in peace.

Liliu, sworn, and confirmed the testimony now given in the 3 lots, and knew of no counter claim to any of them.²²²

7.23 Helu 769: The Claim of Pekane (Paekane)

Claimant: Pekane (Paekane)

Location: *ʻIli* of Kaaumakua

Recorded at: Honouliuli

Date: Sept. 18, 1847

Status: Not awarded²²³

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, for Loi, kula and house, as you have instructed pursuant to the Source Law. This land is there at Kaauimakua: towards the North, the land of Pto; towards the East, a Poalima loi named Maniau; towards the South, the pa Aina of Kaaumakua; towards the West, the Poalima lot named Kualhee, the land of Kalama, and several houses, one being mine that is standing there.

Here is my second claim, a Loko ia (Fish pond) made by me. Here are its boundaries: towards the North, the sea/fishery of Kaaumakua; towards the East, the

²²²Book 2, p. 368, July 3, 1848.

²²³See continuation of claim recorded in Helu 1570 B.



A KE AHI, MANULI O KA OLELO A KA POE HOONA KULEANA.

No ka mea, ua hōhoi au Liana Hōma i na huna kuleana aia i ka olelo, he kuleana nuiho ko
"No ka mea, ua hōhoi au Liana Hōma" (Andrews, Hele, p. 15)

ua he aia Kuleana Nui maalo o ke Aia Moalo ilaha o kahi i olelo maalo, a no ka mea.

[illegible][illegible]

Figure 47: Palapala Sila Nui Helu 6826, Kuleana Helu 768, to Pio, *Mo'o* & *Kahualale* at Kalole, 'Ili of Niukee, Honouliuli. 9.18 chains. November 13, 1876. Signed by Kalakaua Rex. Volume 26, p. 149–150.

seas/fishery of Kaaumakua; towards the South, a hillock of land and the house of Naholowaa; towards the West, the kula land of Mokumeha. Kaeo gave it to my, though my residency is an old one at this place.
Done by me, Pekane X²⁴

7.24 Helu 827: The Claim of Kauakahilau

Claimant: Kauakahilau
Location: *ʻIli* of Poohilo (fig. 48)
Recorded at: Honouliuli
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 1084²⁵ (fig. 49)

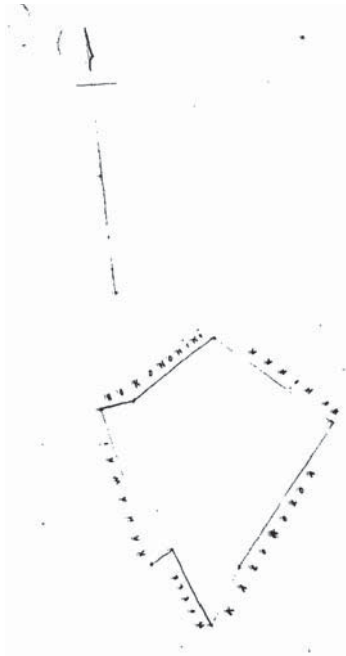


Figure 48: Helu 827 of Kauakahilau: Moaina of Kumuahane, Poohilo. Honouliuli, E. O. Containing 1 acre 5.97 chains. *Source:* *Māhale* Award Book 2:213.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. It is there at Poohilo in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards

²⁴Book 2, p. 423–424, Sept. 18, 1847.
²⁵See Helu 9351, p. 505.

the North, the land of Hinaa; towards the east, the land of Oni and the house of Kekuahilo; towards the South, the land of Oni; towards the West, Hopenui.

Here is my second land claim. Here are its boundaries: toward the North, a cliff; towards the East, the land of Hinaa; towards the South, the land of Hinaa; towards the West, the pa Aina of Poohilo.

Here is my house claim: towards the North, Hopenui; towards the east, Hopenui and the land of Manaole; towards the South, the house of Kawahaea; towards the West, the pa Aina of Poohilo.

I am with appreciation, your obedient servant.

By Kauakahilau X²⁶

Native Testimony Kae-kuna sworn and stated. I know this place, there at Poohilo in Honouliuli, at Ewa, Oahu. The boundaries of the land are: toward Honolulu, the land of Hinaa and Oni; Mauka, the stream; also towards Waianae; Makai, Oni's land.

2. The boundaries of the house lot, land of Hopenui are: Mauka the pa aina at Aumakua [Kaaumakua]; Makai, Hopenui. Kauakahilau received the land from

Kealiahonui, perhaps about 1834, and he has lived there to this time. The pa aina is the only wall at this place. There is one house for Kauakahilau there. Kawahaea Sworn on the Holy Bible and stated. I know this place and particulars exactly as Kae-kuna has stated. I have seen no one else who has a claim there.²⁷

Foreign Testimony Kae-kuna, sworn. I know this place called Honohuliuli [Honouliuli] in Ewa, consisting of a house lot & kalo land.

1. bounded: Honolulu side by Hinaa & Oni's land; Mauka by the brook separating it from Hopenui's place; Waianae side by the same stream separating it from Nakai's; Makai by Oni's place.

The above is relating to the kalo land.

2. House lot is bounded: Honolulu by place of Hopenui; Mauka by a land fence erected for cattle; Makai by Kaumakua [Kaaumakua] between which & this land is Hopenui's land; Makai also by a stream dividing it from Hopenui's.

Claimant received these lots from Kealiahonui in 1834 and has lived there ever since without dispute.

It is partly fenced and has one house belonging to claimant.

Kawahaea, sworn. What the other witness has said is what we all know. I know of no counter claimant.

Note. The witnesses were confused in their account of the land on account of its shape which the surveyor will rectify.²⁸

²⁶Book 2, p. 456–457, Oct. 11, 1847.

²⁷Book 2, p. 588, March 27, 1848.

²⁸Book 2, p. 250–251, March 27, 1848.

By Kawahaea²²⁹

Native Testimony Opiopio sworn and stated. I know the place of Kawahaea at Poohilo in Honouliuli. It is a house lot and kalo land. The boundaries of the kalo lands are entirely surrounded by Kauakahilau. The boundaries of the house lot are: towards Honoluli, the land of Kaimui folks; Mauka, Kauakahilau's house lot; towards Waianae, the pa aina; Makai, Kahanana [Kananahua]. Kawahaea got it from Kahakai. There is one house there for Kawahaea. But it was from Kainaina that Kawahaea lived there, for he was the previous Konohiki. Kahakai was afterwards, perhaps around 1834. Kawahaea has lived there peaceably from that time to the present day.

Kaekuna Sworn and stated. I know the place and all particulars as Opiopio has stated.²³⁰

Foreign Testimony Opiopio, sworn. I know this land. It is in Poohilo in Ewa, consisting of a house lot and land separate;

1. Kula land. It is surrounded by Kauakahilau's land. It is one large kalo lake, the kalo is claimants and the fish Kekauonohi's.
2. House lot is bounded: Honoluli side by Kaimui ma; Mauka by Kauakahilau's land; Waianae side by the cattle fence; Makai by Kananahua's place. There is one house on it belonging to claimant, who got it from Kainaina in 1834, and has ever since occupied the place in peace.

Kahikuna [Kaekuna], sworn, and confirmed the testimony now given throughout, and knew no counter claimant.²³¹

7.26 Helu 831: The Claim of Kaekuna

Claimant: Kaekuna
Location: 'Ili of Poohilo (figs. 52, 53)
Recorded at: Honouliuli
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 4584 (fig. 54)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim and house. This land is there at Poohilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Manaole and the land of Kanehekili;

²²⁹Book 2, p. 457, Oct. 11, 1847.

²³⁰Book 2, p. 588-589, March 27, 1848.

²³¹Book 2, p. 251, March 27, 1848.

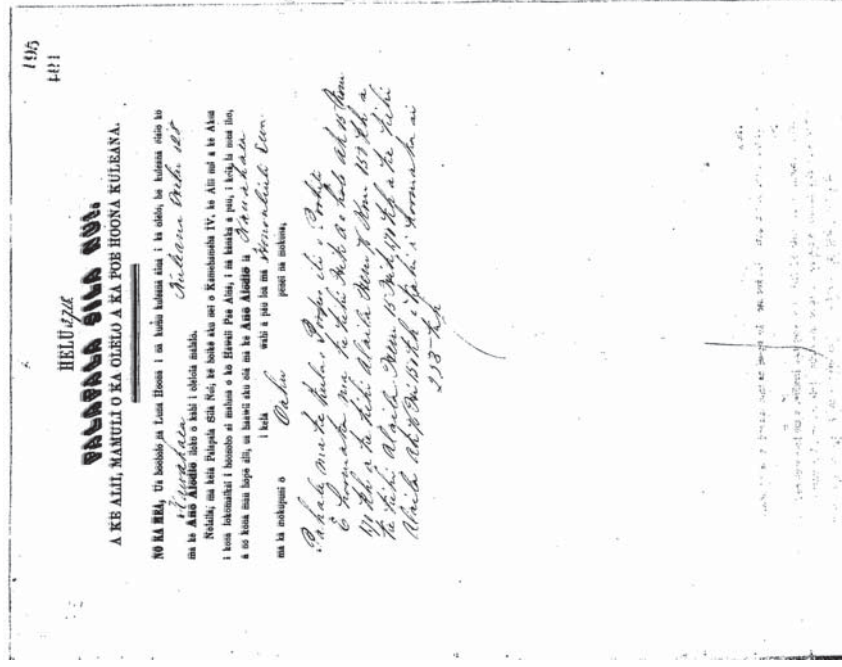


Figure 51: Palapala Sila Nui Helu 3718, Kuleana Helu 828, to Kawahaea. *Pahale* on the *Kula* of Poopoo, 'Ili of Poohilo, Honouliuli. 2.55 chains. May 21, 1857. Signed by Kaahumanu and Kamehameha. Volume 16, p. 195-196.

has stated.²³³

Foreign Testimony Kawahaea, sworn. It consists of a house lot & kalo land.

1. kalo land, bounded: Mauka by Aumea [Aimea]; Makai by Aimana; Honolulu by vacant land; Waianae by Kumuhau. It consists of two patches and some kula land.
 2. House lot, bounded: Mauka by the common cattle fence; Waianae by Keakua's place; Makai by Hopenui's; Honolulu by Manaole's. Within this lot are two kalo patches and two houses belonging to claimant.
- Claimant obtained the land from Kapule in 1834 and has lived there, in peace, to the present time. I know of no other claimant.
- Kauakahilau, sworn, and confirmed the previous testimony throughout.²³⁴

7.27 Helu 832: The Claim of Opiopio

Claimant: Opiopio
Location: 'Ili of Poohilo (fig. 55)
Recorded at: Honouliuli
Date: Sept. 25, 1847
Status: Awarded; Royal Patent 1085 (fig. 56)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my claim, pursuant to the founding Law. This land is here at Poohilo, Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kauakahilau, the land of Kaekuna, and the land of Oni; toward the east, the land of Oni; towards the South, the land of Kaewa; towards the West, the land of Solomona Kelaa [Keliala].

Here is my second claim. Here are its boundaries: towards the North, the land of Oni; towards the East, the land of Kaewa; towards the South, the land of Kuaialau and the land of Puehu; towards the West, the land of Koi. These lands were given to me by Oni.

Done by Opiopio X²³⁵

Native Testimony Kauakahilau sworn and stated. I know this place at Poohilo in Honouliuli. It is only a kalo land that is his. The boundaries are: Mauka, Hopenui's land; towards Honolulu, the stream; Makai, Kaewa's land; towards Waianae, the land of Nika. There are three loi. The fourth is at another place. The boundaries

²³³Book 2, p. 589, March 27, 1848.
²³⁴Book 2, p. 251–252, March 27, 1848.
²³⁵Book 2, p. 460, Sept. 25, 1847.

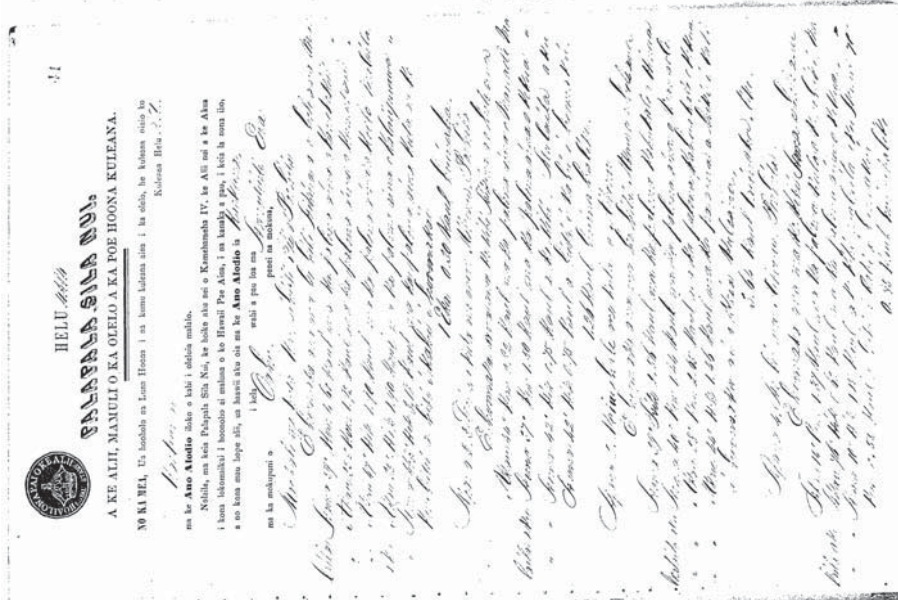


Figure 54: Palapala Sila Nui Helu 4584, Kuleana Helu 831, to Kaekuna. Mo'o of Kamaehili, Poohilo, Honouliuli. 1 acre, 6.05 chains. May 27, 1859. Signed by Kaahumanu and Kamehameha. Volume 19, p. 41–42.

3. House lot (The claimant stated he had no house lot or house, living away from this place but he cultivates it.) He got the place from Oni, his father in 1839 and no one has ever questioned his right.
Kaekuna, sworn, and confirmed the entire statement of the other witness.²³⁷

7.28 Helu 834: The Claim of Oni

Claimant: Oni
Location: Ili of Poohilo and Kailikahi (figs. 57, 58)
Recorded at: Honolulu
Date: Sept. 20, 1847
Status: Awarded; Royal Patent 3415 (figs. 59, 60)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. This land is at Poohilo, Honolulu, Island of Oahu. Here are its boundaries: towards the North, the land of Kawahaea and Kauakahilau; towards the East, the land of Kupali; towards the South, the land of Kapule, Kaewa, Opiopio, the land of Solomon Keliia, and the land of Manaole; Towards the West, the cliff of Makaakua, and some houses there, those houses are mine.

Here is my second claim: towards the North, the Loko of Waianu; towards the East, the Loko of Kahui and the stream of Puehuehu; towards the South, the land of Koi; towards the West, the house of Solomon Keliia and the cliff of Makaakua.

Here are my house claims, there at Kailikahi, Honolulu. Here are its boundaries: towards the North, the pa Aina and the houses of Kaiaawaawa; towards the East, the pa Aina; towards the South, a cliff; towards the West, the house of Kekuahilo. Kauakahilau gave me these properties.

Done by me, Oni X²³⁸

Native Testimony Kaiaawaawa sworn and state. I know the place of Oni at Honolulu, house lot and some kalo land sections. The boundaries of the house lot are: Mauka, my land; towards Ewa, the pa aina; Makai, Kekaunohi's land; towards Waianae, Kaekuna's land and that of Kekuahilo. This place has not wall and no house. Two houses for Oni, and two houses for his father.

2. The boundaries of parcel two, 17' loi, are: Mauka, Kauakahilau, Manaole and Kaewa; towards Ewa, Hinaa's land; Makai, Kekuahilo; towards Waianae, Kapule. This place is not enclosed; there is no house, in the uplands there is a kula in these boundaries.

²³⁷Book 2, p. 252, March 27, 1848.
²³⁸Book 2, p. 462, Sept. 20, 1847.

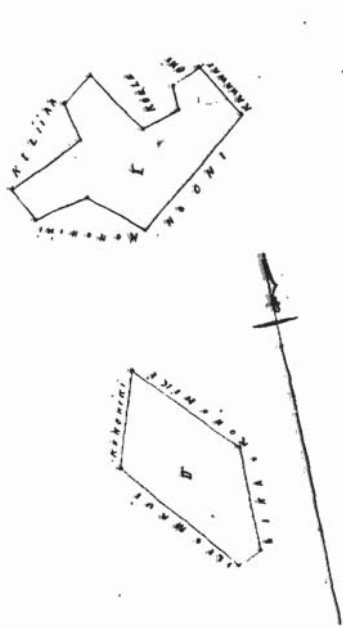


Figure 55: Helu 832 of Opiopio: *Parcel 1*, Mooaina of Ako, Ili of Poohilo, Honolulu, Ewa, Oahu. Containing 6.69 chains; *Parcel 2*, Two loi at Kaluakanaka, Poohilo, Honolulu, Ewa, Oahu. Containing 5.38 chains. The two parcel total 1 acre and 2.97 chains. *Source:* *Māhele Award Book 2219*.

of that loi are: Makai, the Ahupuaa [boundary marker, shrine]; Mauka, Oni's land; towards Honolulu, Kaiaawaawa's land; towards Waianae, Maui, a land. Opiopio got his land in 1839, Opiopio got it from Oni, his father, so this land became Opiopio's. He has a house living below Oni in the house lot.

Kaekuna, sworn and stated. I know this place exactly in all things as Kauakahilau has stated.²³⁶

Foreign Testimony Kauakahilau, sworn, consisting of a house lot & kalo land in Honolulu [Honolulu], Ewa.

1. Kalo land, bounded: Mauka by Opunui's land; Honolulu by a stream; Makai by Ewa's [Kaewa] land; Waianae by land of Nika. There are 3 patches.
2. Another kalo patch in a separate place, bounded on: Makai by the konohiki's place; Mauka by Oni's place; Waianae side by land called Maui; Honolulu by Kaewaawa [Kaiaawaawa].

²³⁶Book 2, p. 589-590, March 27, 1848.

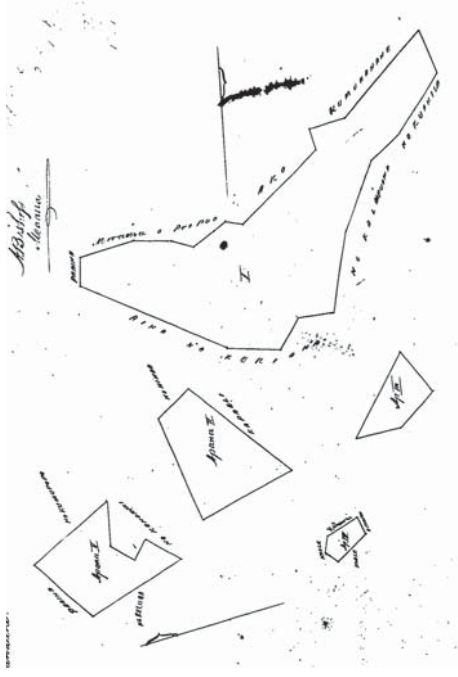


Figure 58: Helu 834 of Oni: *Parcel 1*, Moosaina of Kalokoloa, Ili of Poohilo, Honouliuli, Ewa, Oahu. Containing 3 and 89/100 acres; *Parcel 2*, A fishpond at Kumuulu, Poohilo, Honouliuli, E. O. Containing 7 58/100 chains in this Loko; *Parcel 3*, A kula of maia (bananas) and malawaina (vineyard) at Poohilo. Containing 2 56/100 chains; *Parcel 4*, Lot at Kuhiwale, Ili of Poohilo, Honouliuli, Ewa, Oahu. Containing 0.90 chains in this loi; *Parcel 5*, Mookalo at Ulanaao, Ili of Poohilo, Honouliuli, Ewa, Oahu. Containing 7.63 chains. The total area of these parcels is 5 acres and 7 63/100 chains. *Source: Māhele Award Book 2:221. See page 265, V. 4. Reader then directed to page 457, V. 9.*

enclosed, there is no house. These places were gotten in the time of Kamehameha I by the father of Oni. Kauakahilau is the Konohiki, and Oni resides there. There is no opposition. Aoao sworn and stated. I know these places the same as Kaaiawaawa.²³⁹

Foreign Testimony Kaiavaava [Kaaiaawaawa], sworn. This place is in Honouliuli called Poilo [Poohilo].

²³⁹Book 3, p. 67, May 22, 1848.

1. First, House lot is bounded: Mauka by my lot Ewa by Govt. fence; Makai by Kekauonohi's land; Waianae by Kualilo's [Kekualo/Kekualo] and Kekuna's [KaeKuna] lands. It is not fenced. It has 4 houses of claimant's. Oni owns only 2. Kualilau owns two, for which he has put in a claim.
 2. Second is a moo of 17 patches, bounded: Mauka by Kauakahilau's place Man-aole's [Manaoale] and Kaewa's lands; Ewa by Hinaa's; Makai by Kekuahilo & Kahalana's; Waianae by Kapule's land. Part is upland.
 3. Third, four kalo patches, bounded: Mauka by Govt. fence; Ewa by Kumupopo's place; Makai by Nika. Kaiavaava & Optio's lands; Waianae by Koi and Nika's part is upland.
 4. Fourth, 1 kalo patch, bounded: Mauka by Hinaa's; Ewa by Manaoale's; Makai by Kuahilo's; Waianae by Hinaa's place.
 5. Fifth, two patches and upland, bounded: Mauka by Manaoale's place; Ewa by the Govt. fence; Makai by Puniawa's place.
 6. Sixth, upland, bounded: Mauka by Kauakahilau's land; Ewa by Manaoale's & Kapule's; Makai by Hinaa's; Waianae by Mauele's & Kapule's lands. There is no fence, nor house.
 7. Seventh, 1 kalo patch, bounded: Mauka by Kawahaea's land; Ewa by the stream; Makai by Optio's; Waianae by Kauakahilau's lands.
- Claimant received these lands from his ancestors who held them in Kamehameha 1st's time. There has never been any contest about the right. Claimant has occupied to this time & cultivated all of them. Kauakahilau is the konohiki. Aoao, sworn, confirmed the previous testimony.²⁴⁰

7.29 Helu 839: The Claim of Kaaiawaawa

Claimant: Kaaiawaawa
Location: Ili of Kamilomilo, Poohilo, and Kailikahi (fig. 61)
Recorded at: Honouliuli
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 4585 (fig. 62)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Kamilomilo in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the stream of Makai; towards the East, the land of Kalanihopu; towards the South, the land of Kanahuna; toward the West, the land of Kaulu.

²⁴⁰Book 2, p. 317-318, May 22, 1848.

1883
 (625)
 PALAPALA SIBA OUL
 A KE ALI, NINUI O KA OLELO A KA POR HONA KULEANA.
 1856
 3415
 5 acres, 763 chains. November 12, 1856. Volume 14, p. 623-624. See fig. 60 for page 2.
 337

1883
 (625)
 PALAPALA SIBA OUL
 A KE ALI, NINUI O KA OLELO A KA POR HONA KULEANA.
 1856
 3415
 5 acres, 763 chains. November 12, 1856. Volume 14, p. 623-624. See fig. 60 for page 2.
 337

Figure 59: Page 1 of 2. Palapala Sila Nui Helu 3415, Kuleana Helu 834, to Oni. Honouliuli. 5 acres, 763 chains. November 12, 1856. Volume 14, p. 623-624. See fig. 60 for page 2.

Figure 60: Page 2 of 2. Palapala Sila Nui Helu 3415, Kuleana Helu 834, to Oni. See fig. 59 for page 1.

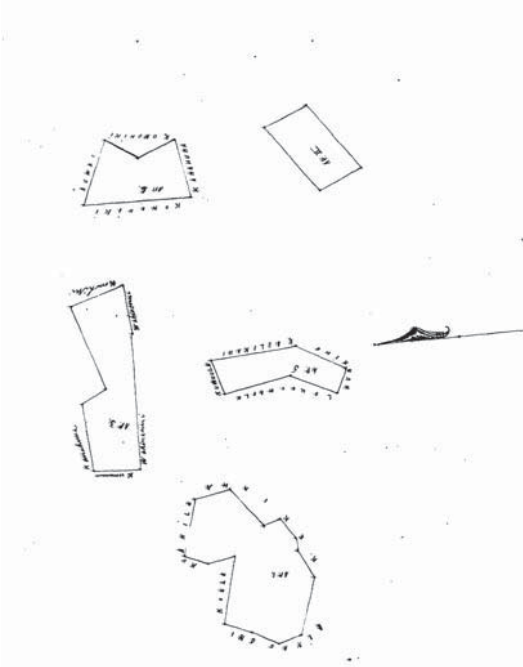


Figure 61: Helu 839 of Kaiaawa: *Parcel 1*, Moo kalo of Kalaipuaa, ili of Poohilo. Honouliuli, Ewa, Oahu. Containing 1 acre and 27/100 chains; *Parcel 2*, House lot on the kula of Kailikahi, Poohilo. Containing 4.26 chains; *Parcel 3*, A Moosaina parcel at Kahui, Ili of Kamilomilo. Honouliuli, E. O. Containing 8.76 chains; *Parcel 4*, A moosaina parcel at Kahui, Ili of Kamilomilo. Honouliuli, E. O. Containing 5.14 chains; *Parcel 5*, A kula mahiai (cultivated dryland parcel) in the Moosaina of Kaole [Kalole]. Containing 3.30 chains. *Source:* *Māhale* Award Book 2:233.

Here is my second claim: towards the North, the land of Kaulu; towards the East, the land of Kanahuna; towards the south, the land of Aemaikai; towards the West, the land of Kahikula.

Here is my third claim. This land is there at Poohilo. Here are its boundaries: towards the North, the land of Oni; towards the East, the Loko of Kahui; towards the South, the Loko of Kahui; towards the South, the land of Kuailau; towards the West, the land of Opiopio;

Here is my fourth claim. This land is there in Poohilo; Here are its boundaries: towards the North, the land of Kekuahilo; towards the East, the land of Kahakai; towards the South, the land of Kahakai and the land of Kapule; towards the West, the land of Kahalana and Kahakai.

Here is my fifth claim: towards the North, the land of Kuailau; towards the east, the pali and the pa Aina; towards the South the kula mahiai (cultivated dryland parcel) of Puniawa; towards the West, the land of Kuailau.

Kauakahilau gave me the kula property.

Here is my house lot claim. These houses are at Kailikahi, in Honouliuli. Here are its boundaries: towards the North, the cliff and the pa Aina; towards the East, the pa Aina; towards the South, the houses of Oni; towards the West, the cliff.

I am with appreciation, your obedient servant.

By S. Kaiaawaawa X²⁴¹

Native Testimony Aoa sworn and stated. I know the place of Kaiaawaawa at Honouliuli, there are seven parcels. The boundaries of the house lot land are: Mauka the pa aina; towards Ewa, Oni's land and Kuailau; Makai Kekukahiko; towards Waianae, Puniwai's [Puniawa] land. There are two houses for Kaiaawaawa there, but it is not enclosed.

2. Boundaries of the second parcel, one loi, are this: Mauka, the muliwai; towards Ewa, Kaleihopu's land; Makai, Kanahuna; towards Waianae, Kaulu. It is not enclosed, there is no house.

3. Boundaries of the third parcel are: Mauka, Kaulu's land; towards Ewa, Kanahuna; Makai, Aemaikai's land; towards Waianae, Kahikula's land. There is no wall there, and not house.

4. The fourth parcel is: Mauka Oni's land; towards Ewa, Nika's land; Makai, Kaailau's [Kuailau] land; towards Waianae, Opiopio. There is no wall nor house there.

5. The boundaries of the fifth are: Mauka, Kekuahilo's land; towards Ewa, Kahakai's land; Makai, Pule's [Kapule] land; towards Waianae, Kahanana [Kahalana] and Kahakai's land. There is no house, and it is not enclosed. This is one loi.

6. The boundaries are, a kula: Mauka, Oni's land; towards Ewa the pa aina; Makai Puniwai's land; towards Waianae, Oni. There is no wall and no house there. In the time of Kamehameha I, Kaiaawaawa's parents lived at this place, and it was from them that Kaiaawaawa got the land.

Kaleihopu is the konohiki of all the Kaiaawaawa's loi, and the kula was from Kauakahilau. That was in the year 1844. No one has objected, and Kaiaawaawa has resided there to this day.

Oni sworn and stated. I know these places just as Aoa has stated to you.

²⁴¹Book 2, p. 466-467, Oct. 11, 1847.

24, May [1848].

Kaukahilau sworn and stated. I know the place of Kaaiawaawa, I gave the kula to him. No one has objected. Aoao 69 See page.²⁴²

Foreign Testimony 1st. Aoao sworn. House lot, bounded: Mauka by Govt. fence; Ewa by Kualau's & Oni's lands; Makai by Kuahilo's; Waianae by Kaaiawaawa's land. It has none but the Govt. fence. There are two houses of claimant's.

2. Second. Two kalo patches, bounded: Mauka by muliwa; Ewa by Kaleihopu's [Kalanihopu] land; Makai, Kanahuna's place; Waianae by Kaaulu's [Kaulu]. It is not fenced nor any house.

3. Third, bounded: [Mauka] by Kaaulu's place; Ewa by Kanahuna's; Makai by Aimaikai's [Aemaikai] place; Waianae by Hikiula's. No house or fence. One patch.

4. Fourth, One patch, bounded Mauka by Oni's place; Ewa by Nika's; Makai by Kualau's; Waianae by Optio's.

5. Fifth, one patch, bounded: Mauka by Kuahilo's place; Ewa by Kahakai's; Makai by Kapule's; Waianae by Kahanana [Kahalana] and Kahakai's places.

6. Sixth, upland, bounded: Mauka by Oni's place; Ewa by Govt. fence; Makai by Puniawa; Waianae by Oni's place. Claimant derived these places from his ancestors who held them in time of Kamehameha 1st without dispute, except the last piece. No. 6 which claimant got from Kauakahilau in 1844. Kalaihopu [Kalanihopu] is konohiki over the first 5 lots.

Oni, sworn, and confirmed the above testimony and knew of no counter claimant. May 24, Kauakahilau, sworn, I gave that land (No. 6) to claimant in 1844 and no one has ever disturbed his right.²⁴³

7.30 Helu 844: The Claim of Kualau

Claimant: Kualau
Location: 'Ili of Puehuehu & Poohilo
Recorded at: Honolulu
Date: Sept. 25, 1847
Status: Not Awarded

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, as instructed by the Source Law. This is at Puehuehu, Honolulu. Here are its boundaries: towards the North, the land of Moano; towards the East, the stream of Puehuehu and the land of Haae; towards the South, the land of Kaneaola; towards the West, the Loko of

²⁴²Book 3, p. 68-72, May 22, 1848.

²⁴³Book 2, p. 318, May 22, 1848.

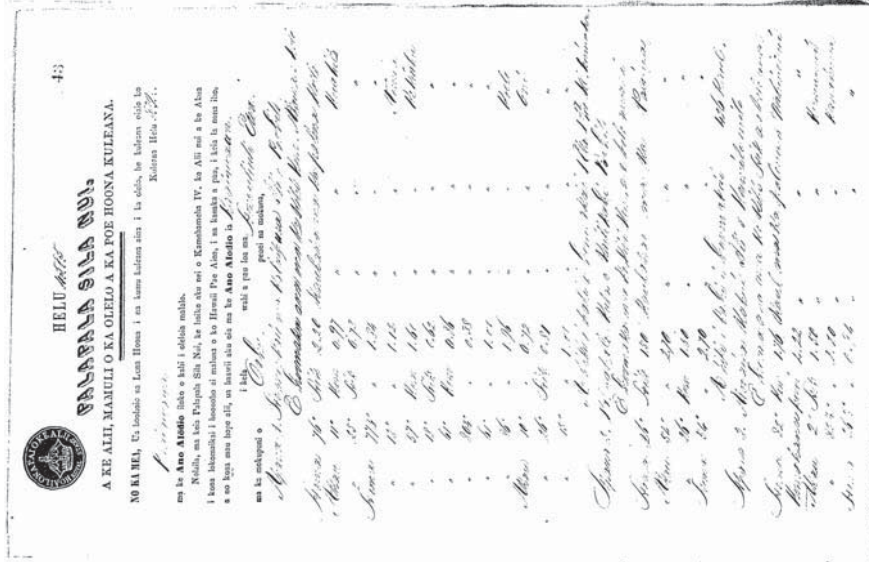


Figure 62: Palapala Sila Nui Helu 4585, Kuleana Helu 839, to Kaaiawaawa. *Mō o kalo* at Kalaiapuawa, 'Ili of Poohilo; & *Kahuahale* at Kailikahi, 'Ili of Poohilo, Honolulu. 3 acres, 3 73/100 chains. May 27, 1859. Signed by Kaahumanu and Kamehameha. Volume 19, p. 43-44.

Kahui, some loi for Alawaawa [Kaaiaawaal], and a loko which is situated between my properties, its name is Puehuehu and it is for Kaope. It is I who takes care of it. Kaope gave me these lands.

Here is my second land claim. There at Poohilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, a cliff; towards the East, the land of Kaiaawaawa and Puniawa, and the cliff; towards the South the land of Manaole; towards the West, the land of Manaole and the land of Oni.

By Kualau X²⁴⁴

Foreign Testimony Kaopala states that this Clt. is dead without heirs & the land is now in his (witness') possession.²⁴⁵

7.31 Helu 845: The Claim of Kekukahiko (Kukahiko)

Claimant: Kekukahiko
Location: Ili of Puehuehu & Poohilo (fig. 63)
Recorded at: Honouliuli
Date: Oct. 11, 1847
Status: See Helu 895, p. 344

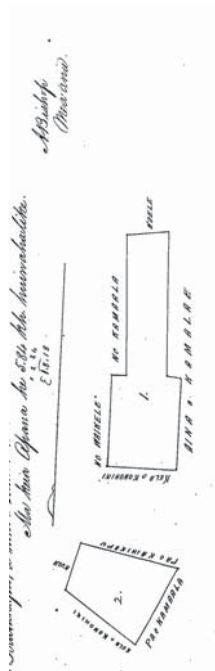


Figure 63: Helu 845 of Kukahiko: *Parcel 1*, Moosaina of Halawa, Ili of Niukee. Honouliuli, Ewa, Oahu. Containing 1 acre 2 34/100 chains; *Parcel 2*, House lot at Kapapapuhi, Honouliuli. Containing 5.84 chains. Source: *Māhele* Award Book 7:258.

²⁴⁴Book 2, p. 471, Sept. 25, 1847.

²⁴⁵Book 3, p. 475.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Poohilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Manaole; towards the East, the houses of Oni, and the land of Kaekuna; towards the South, the Loko of Aimea and Kananelu; towards the West, the land of Kupalii and several houses standing there which are for me.

Here is my second claim. Here are its boundaries: towards the North, the land of Kahakai; towards the east, the land of Kapule; towards the South, the stream of Puehuehu; towards the west, the land of Oni.

I am with appreciation, your obedient servant.

By Kekukahiko X²⁴⁶

7.32 Helu 895 (845): The Claim of Kukahiko

Claimant: Kukahiko
Location: Ili of Niukee & Kapapapuhi
Recorded at: Honouliuli
Date: Oct. 21, 1847
Status: Awarded; Royal Patent 4157 (fig. 64)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land, house, kula and waina (vineyard) claim. This land is there at Niukee [Niukee], in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, a cliff and the Halepule (Church); towards the East, the land of Uwia [or Uial]; towards the South, the Auwai and the land of Moomoki; towards the West, the land of Kamalae and the Ili of Honounau.

Here also is this for me, there in the Ili of Uwia and Kamaala. Here is my house claim at Kapapapuhi. Here are its boundaries: towards the North, the house lot of Healani; towards the East, the cliff head; towards the South, the sea; towards the West, the house of Kamaala. See Helu 845, page 471.

I am with appreciation, your obedient servant.

By D. Kekukahiko²⁴⁷

Native Testimony Kapule sworn and stated. I know this place at Honouliuli, in Ewa. It is a house lot and kalo land. The boundaries of the house lot are: Mauka, Healani's place; towards Ewa, also his land; Makai, the sea; towards Waianae, Kamaala's land. This place is enclosed with a wall, but it has collapsed. His residency is from when he was little. Kamaala got it from his father in the time of Poki, and he has lived there.

²⁴⁶Book 2, p. 472, Oct. 11, 1847.

²⁴⁷Book 2, p. 511–512, Oct. 21, 1847.

- The boundaries of the kalo land are: Mauka, auwai land; towards Ewa, Uia's land; Makai, the auwai and land of Kinolua; towards Waianae, Kamalae's land and the land of Honaunau. His land was from Kinolua, it was at the time that Kinau was residing at Puuloa. He has a hale mahiai (house lived in while planting) there. It is a kula place and secant of an auwai. No one has objected to the present day.

Hinaa sworn and stated. I know this place just as Kapule has stated. No one has objected.²⁴⁸

Foreign Testimony Kapule, sworn. This place is in Honouliuli, Ewa.

- First is a house lot, bounded: Mauka by Healan's place; Honolulu by Healan's pond; Makai by the sea; Waianae by Kamaala's land. It is not at present fenced. There is one house on it of claimant's. Claimant got it from Kamaala, who is living. He got it from Kaamala in Boki's time.
- kalo land, bounded by: a stream on Mauka side; Honolulu by land of Owiaia [Uia]; Makai by Kinolua's land & water; Waianae by Kamalae's & Honaunau's land. Claimant got this place from Kinolua in 1835 in time of Kinau. Kinolua is still alive.

There are two patches on the place and some uplands. The right of claimant has never been disputed.

Kamaala & Kinolua were directed to call when at Honolulu & give confirmatory testimony.

Hinaa, sworn and confirmed the preceding testimony.²⁴⁹

7.33 Helu 847: The Claim of Hinaa

Claimant: Hinaa
Location: 'Ili of Poohilo (fig. 65)
Recorded at: Honouliuli
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 3092 (fig. 66)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Poohilo in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North the land of Kauakahilau, the land of Kapule, the land of Oni, and the land of Manaole; towards the East, the house of Oni and the house of Kekuahilo; towards the South, the land of Kauakahilau, and the kula and house of

²⁴⁸Book 3, p. 95-96, June 12, 1848.

²⁴⁹Book 2, p. 340, June 12, 1848.

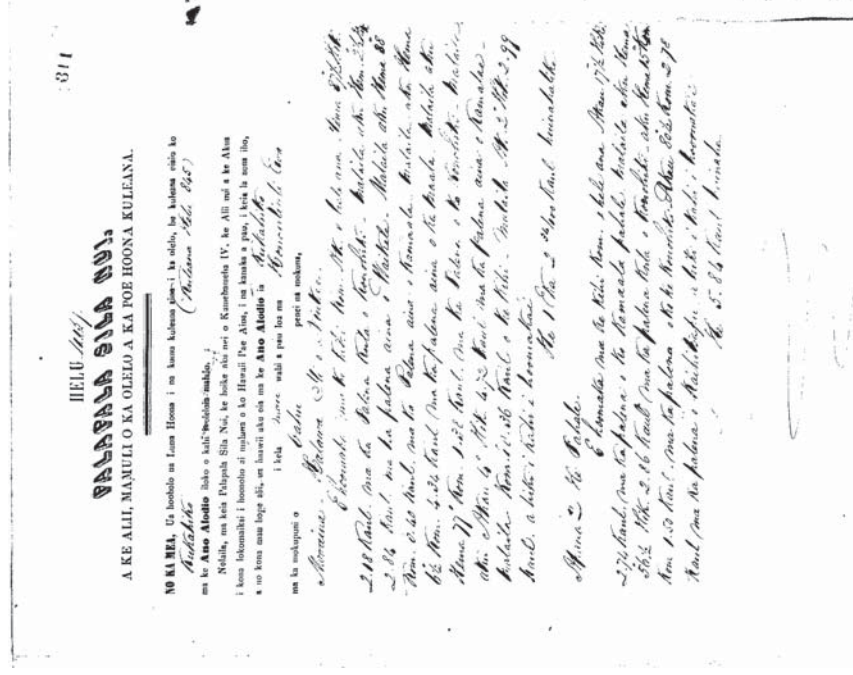


Figure 64: Palapala Sila Nui Helu 4157, Kuleana Helu 845, to Kukahiko, Mo'o of Halawa, 'Ili of Niukee, Honouliuli. 1 acre, 8.18 chains. August 23, 1858. Signed by Kaahumanu and Kamehameha. Volume 17, p. 347-348.

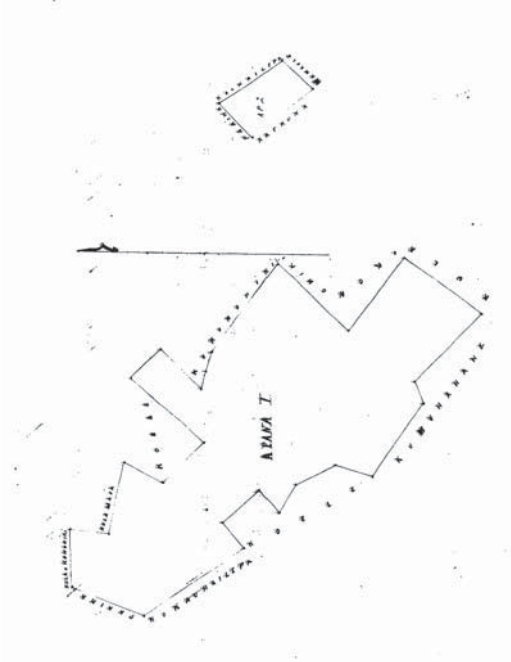


Figure 65: Helu 847 of Hinaa: *Parcel 1*, A Mooina in the ili of Poohilo, Honouliuli, E. O. Containing 5 acres, and 9 75/100 chains; *Parcel 2*, A house lot at Alhому, Poohilo, Honouliuli. Containing 3.45 chains. There being within the two parcels 6 acres and 3.20 chains. *Source: Māhale Award Book 2:241.*

Kauhailepa; Toward the West, the pa Aina. Kauakahilau gave to these properties, but my residency has been continuous at this place.
I am with appreciation, your obedient servant.
By Hinaa X²⁵⁰

Native Testimony Kekukahiko sworn and stated. I know the place of Hinaa at Honouliuli, Ewa, there is one parcel. The boundaries are: Mauka, Manaole's land along with Oni, Kapule, Kauakahilau and Kauhailepa; towards Honolulu, Oni's land and Kekuahilo; Makai, Kauakahilau, the muliwai and Oni's land; towards Waianae, the pa aina, and the hale kiai (watch house) of Hinaa there, he has 14 loi there and a

²⁵⁰Book 2, p. 473–474, Oct. 11, 1847.

kula place. Hinaa got the land from Wahine, it was in the time of Kaomi, but Wahine died. No one has objected to Hinaa to this time.
Kapule sworn and stated. I know this place, exactly as Kekukahiko has stated.²⁵¹

Foreign Testimony Kukahiko, sworn. This place is in Honouliuli, Ewa, bounded: Mauka by Manaole's land, Oni's, Kapule's & Kauakailau's [Kauakahilau] & Kaualepo's [Kauhailepa]; Honolulu by Oni's and Kualo's; Makai by Kauakailau's & stream & Oni's place; Waianae by public fence.

There are 14 patches and some uplands. Claimant got this place from Nawaihia [Wahine] in Governor Adams time and has lived without any dispute to the present time. There is no house nor fence. Nawaihia is dead.

Kapule, sworn and confirmed the testimony in every particular.²⁵²

7.34 Helu 848: The Claim of Kapule

Claimant: Kapule
Location: *Ili* of Poohilo (fig. 67)
Recorded at: Honouliuli
Date: Sept. 25, 1847
Status: Awarded; Royal Patent 3086 (figs. 68, 69)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, as you have instructed in the source Law. This land is there at Poohilo, Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kekuahilo; towards the East, the land of Kaekuna; towards the South, the land of Puhipaka and the land of Kahawai; towards the West, the land of Kahalana, and the land of Kelemanana.

Here is my second claim. Here are its boundaries: towards the North, the land of Oni, and the land of Kekua; toward the East, Kelemanana, the land of Moano, and the land of Mauele; toward the West, the land of Kumupopo;

Here is my third claim. Here are its boundaries: towards the North, the land of Oni; towards the East, the land of Kapule; towards the South, the land of Kekua; towards the West, my houses.

Here is my fourth claim. Here are its boundaries: towards the North the land of Kauakahilau; towards the East, the land of Oni; towards the South, the land of Hinaa; toward the West, the land of Hinaa.

Here is my fifth claim. Here are its boundaries: towards the North, ka ma pupulu [possibly cotton plants]. Towards the East, the land of Manaole; towards the South,

²⁵¹Book 3, p. 96, June 12, 1848.

²⁵²Book 2, p. 340–341, June 12, 1848.

Waianae, Kauakahilau, Kahanana, Kaiaawaawa and Kahakai.

3. Mauka, Oni's land; towards Ewa, the land of Kelemana and Moano; Makai, Mauele' land and that of Kealiahonui; towards Waianae; Kekua's land. There are three loi kalo in this parcel.

4. Mauka, Kauakahilau's land; towards Ewa, Oni's land; Makai Hinaa's land; his land also towards Waianae. This is one loi.

5. Mauka, pa aina; towards Honolulu, Manaole's land; Makai Oni's land; towards Waianae, Kauakahilau's land. This has five loi and a kula parcel. Kapule got his from Kauakahilau in the year 1844.

Parcel one and Parcel three were from Kaekuna. Parcel two was from Hapauea. Parcel four was from Hinaa, it was in the year 1845. And the kula parcel was from Kauakahilau in the year 1844. There are no houses on the four parcels, and there are no walls.

Hinaa sworn and stated: I gave my place to Kapule, and know that Kauakahilau folks gave their parcels to Kapule.²⁵⁴

Foreign Testimony Kukahiko, sworn, this place is in Honouliuli, Ewa.

1. First a house lot, bounded: Mauka by Oni's land & Kaanaana; Honolulu by Keakua's [Kekua] & Kumupopo's; Makai by Kumupopo's; Waianae by Govt. fence & pali. It is not fenced and has 3 houses belonging to claimant. No others occupy the houses but the relatives. There is one patch and some other land. Claimant got the land from Hapauea in time of Kamehameha 1st.

2. Second, kalo land of 6 patches, bounded: Mauka by Kaekuna's land; Honolulu by Nika's and stream; Makai by the river and Nika's; Waianae by Kauakahilau's lands and [illegible].

3. Third, 3 beds Mauka by Oni's land; Honolulu by Kelemana and Moano's lands; Makai by Mauele's [Mauele] & Kealiahonui's; Waianae by Keakua.

4. Fourth. One bed, bounded: Mauka by Kauakahilau; Honolulu by Oni's; Waianae and Makai by Hinaa's land.

5. Fifth, garden land, bounded: Mauka by Govt. fence; Honolulu by Manaole's; Makai by Oni's; Waianae by Kauakahilau's land.

Claimant got No. 2 from Hapauea in Boki's time. No. 3 from Kuku in Kaomi's time. No. 4 from Hinaa in 1844, who got it from Wahie who is dead.

No. 5 from Kauakahilau in 1844.

Hinaa, sworn and confirmed the entire testimony and acknowledged giving No. 4.²⁵⁵

²⁵⁴Book 3, p. 97-98, June 12, 1848.

²⁵⁵Book 2, p. 341, June 12, 1848.

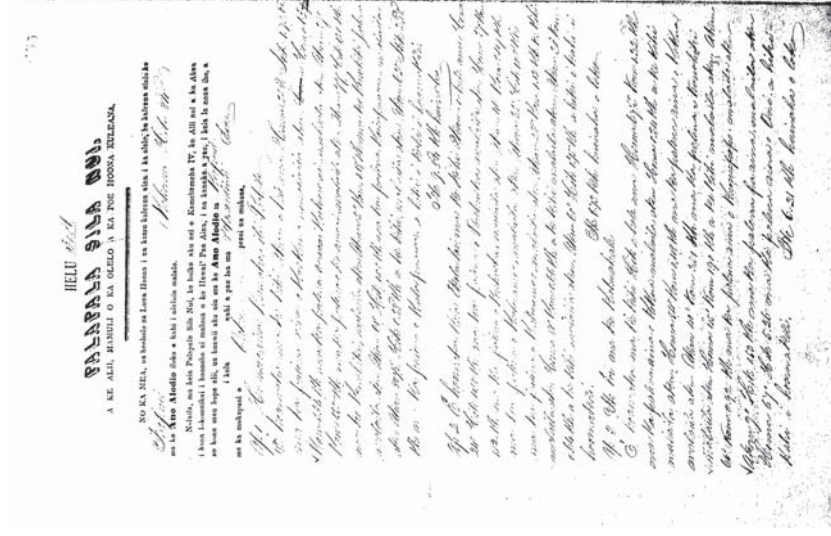


Figure 68: Page 1 of 2. Palapala Sila Nui Helu 3086, Kuleana Helu 848, to Kapule. Mo'o of Kumuhau at Poohilo, Honouliuli. 2 acres, 8.02 chains. August 7, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 655-656. See fig. 69 for page 2.

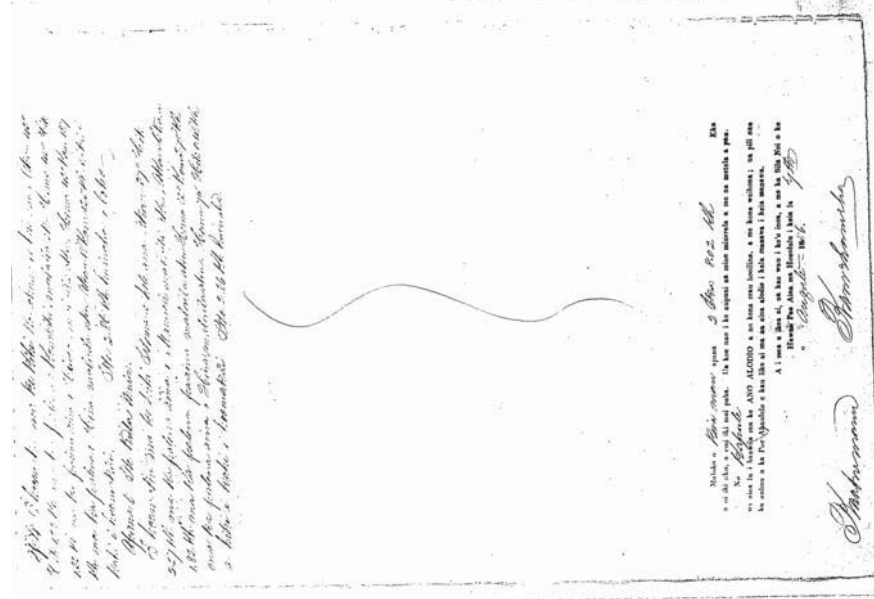


Figure 69: Page 2 of 2. Palapala Sila Nui Helu 3086, Kuleana Helu 848, to Kapule.
See fig. 68 for page 1.

7.35 Helu 869: The Claim of Pue

Claimant: Pue
Location: Ili of Maui (fig. 70)
Recorded at: Honolulu
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 1082 (fig. 71)

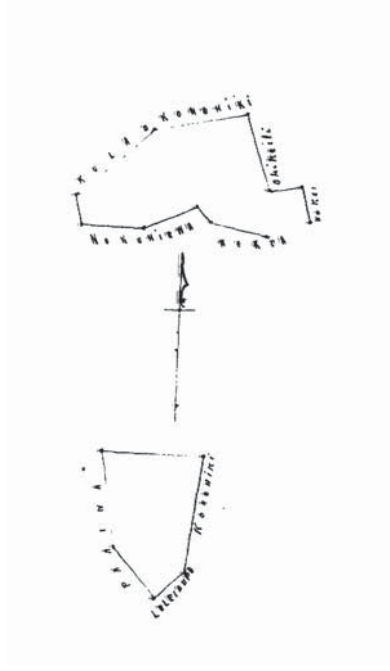


Figure 70: Helu 869 of Pue: *Parcel 1*, Mooaina of Kumupali, Ili of Maui. Honolulu, E. O. Containing 7.59 chains; *Parcel 2*, This is two loi in the Ili of Maui, Honolulu, E. O. Containing 4.64 chains. There being 1 acre and 2.53 chains in these two parcels. *Source:* *Māhele* Award Book 2:269.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim there at Maui, in Honolulu, Ewa, Island of Oahu. Here are its boundaries: towards the North, the house of Koi and the house of Kuhiena; toward the East, the land of Koi; towards the South, the land of Koi; towards the West, the land of Koi.
 Here is my second land claim. Here are its boundaries: towards the North, the land of Koi; towards the East, the land of Koi; towards the South, the land of Koi; towards the West, the land of Koi.

Here are my house claims: towards the North, the land of Koi; towards the East, the land of Koi; towards the South, the pa Aina; towards the West, the pa Aina. Koi gave me these properties.

I am with appreciation, you obedient Servant.

By Pue.²⁵⁶

Native Testimony Kikala sworn and stated. I know the land of Pue at Honolulu, Ewa, he has a moo aina, some kula and house lot. The boundaries of the house lot are: Mauka, Koi's land; towards Honolulu, also his land; Makai, Kuhiena's land; towards Waianae, Koi's land. There are two houses at the place, the second house being for Puali, the parent-in-law of Pue. There is no wall there.

2. The boundaries of the kula place are: Mauka, Puali's land; towards Honolulu, Kua's land; Makai, the pa aina; towards Waianae, the house lot of Pue.

The boundaries of the moo land are: Mauka, Koi's land; his also is towards Honolulu; Makai, Kuhiena's land; towards Waianae, Koi's land also.

Pue received the land from Koi. Its name is Maui. Pue received the land in 1842. Pue has lived there in peace. Koi received the land from Kealoha.

Laamaikahiki sworn and stated. I know the place of Pue, exactly like Kikala.²⁵⁷

Foreign Testimony Kikala, sworn, This land is in Honolulu [Honouliuli] in district of Ewa. Moo aina - consisting of 4 pieces: 2 kalo, 1 kula, 1 house lot.

1. House lot is bounded: Mauka by Koe's [Ko]il land; also on Ewa side & Waianae; Makai by Kūhienā's. There are 2 houses on it. 1 is claimants & 1 Puuli's, his father-in-law.
2. Kula land is bounded: Mauka by Puuli; Ewa by Kua's; Makai by "Paaina"; Waianae by claimant's 1st lot.
3. Kalo land, lots together and is bounded: Mauka by Koe's land, Ewa also Makai by Kūhienā's Waianae by Koe's land. The name of these lands is "Mauli." Claimant got them from Koe the time in 1842. I know of no counter claimant. Koe [Ko]il got them from Kalehu.

Laamaiahiki, sworn, confirmed all the previous testimony.²⁵⁸

7.36 Helu 872: The Claim of Kahakuliili

Claimant: Kahakuliilii

Location: 'Ili of Paakai, Papawaa, and Loloulu (fig. 72)

Recorded at: Honouliuli

Date: Oct. 22, 1847

²⁵⁶Book 2, p. 490, Oct. 11 1847.

²⁵⁷Book 3, p. 141-142, July 14, 1848.

²⁵⁸Book 2, p. 378–379, July 14, 1848.

HELD 11/25

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A KE ALII, MAMULIO KA OLELO A KA POE HOONA KULEANA.

No ka mea, ua hooloholo na Luna Hoona i na kumu kuicanana aiaa i ka olelo, iia kuleana oiaio ko

ma ke Ano Alodio iloko o kahii i oleloia malalo.

Nolaila, ma keia l'alapala Sila Nui, ke hoike aku nei o Kamehameha III., ke alii mau a ke Akua i kona okonakisi i hoonoho si maluna o ka Hawaii 'Ike Aina, i na kanaka a pau, i keia la nona lilo, a no kona mau

Kela *A:du* walija tau loa ma
 opo alii ua luawa aku oia ma ke *Auo* Aloia ia *Ma*
He:eneni

na ka mokupuni o
Jaluu

Thans I. Nazina : Sammelb. d. d. Mus.

[illegible]

Alameda, 2 e Julio 1896. - Sr. D. Donato de la Cruz.

kill. New York, 7th June 77. Thanks a great deal for the 1st of June 77.

Producte Mus. 700 Jan 2 Year - Days 166 Jan 15 - 166 62

body. It was 12.4 feet. Spots were to be put on about 6.5 x 6.5 x 12.4 in.

Handwritten: The measurement, so are 90 x 2 1/2, 100.

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60. Hl. ož. Soupe. o duše i tavi v domácku. 1797 čko.

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[illegible]

U. mus. l. Chua bi, mi hahi. Nula, makihi c. Mou. & hennata

ma ka kili. *det. a. l.* a'i kile krusana. *l. l.* krus. *ma ka* *krusika*.

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Figure 71: Palapala Sila Nui Helu 1082, Kuleana Helu 869, to Pue. *Mo'o* of Kumupali at Maui & Kula land at Maui, Honouliuli. 125/100 acres. October 4, 1852. Signed by Kamehameha and Keoni Ana. Volume 4, p. 813-814.

Status: Awarded; Royal Patent 1278 (fig. 73)

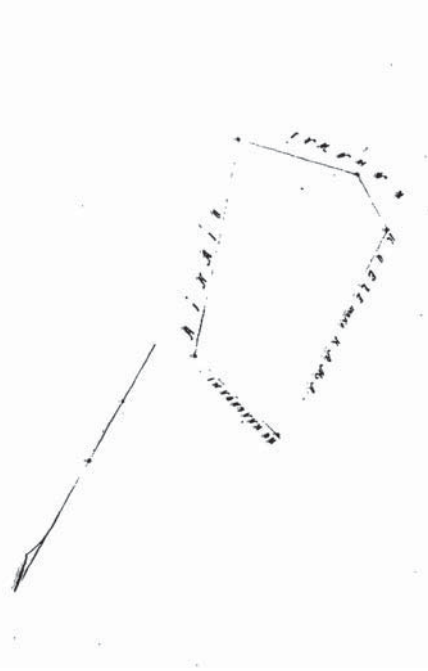


Figure 72: Helu 872 of Kahakulilili. Moosaina of Paakai in the Ili of Poohilo, Honouliuli, E. O. Bounded on east by Ainao. Containing 1 acre and 6.60 chains. *Source:* *Māhale* Award Book 2:271.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, there at Paakai, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kaalauihi; towards the East, Kalokoeli; towards the South the stream of Makaii and the ulu hala (pandanus grove); towards the West, the stream of Makaii and the land of Puanani.

Here is my second land claim, there at Papawaa, in Honouliuli. Here are its boundaries: towards the North, the land of Puanani; towards the East, the land of Puanani; toward the South, the land of Kaulu; towards the West, the land of Pio.

Kaope gave me this lands. I am with appreciation, your obedient servant.

By Kahakulilili²⁵⁹

²⁵⁹Book 2, p. 493, Oct. 22, 1847.

Native Testimony Pio sworn and stated. I know the place of Kahakulilili at Loloulu, in Honouliuli. There is one parcel. The boundaries are: Mauka, Kaalauihi's land; towards Honolulu, Kekauonohi's land; Makai, the muliwai (estuary) of Honouliuli; towards Wanae, Puanani's land and Kama. There is one lot and half a lot. Kahakulilili received it from Kaope, perhaps in the year 1814. Kamehameha I. There is one house there for Kahakulilili. No one has objected.

Liliu sworn and stated; I know this place exactly as Pio has stated.²⁶⁰

Foreign Testimony Pio sworn. This land is Loloulu in Honouliuli, Ewa, bounded: Mauka by Kalama's land. Honolulu by Kekauonohi's; Makai by Honouliuli Stream; Waianae by Puanani's & Kama's land. 1 kalo patch and 1 third of a fish pond. Cit. Had this place from Ope in Kamehameha 1st time, and has never been disturbed. He owns on house it is not fenced.

Liliu [sworn] and confirmed, the particulars as above stated.²⁶¹

7.37 Helu 874: The Claim of Laamaikahiki

Claimant: Laamaikahiki

Location: Ili of Hiwa and Polapola (fig. 74)

Recorded at: Honouliuli

Date: Oct. 22, 1847

Status: Awarded; Royal Patent 3089 (fig. 75)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my claim. This land is there at Hiwa, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kaneaola; towards the East the Loko of Kaneaola; towards the South, the land of Kikala; towards the West, the land of Kapiioho.

Here is my second land claim, at Polapola. Here are its boundaries: toward the north, akaakai (bulrushes); towards the East, Ohai and the land of Kukae; towards the South, the land of Kapiioho; towards the West, the land of Ohai.

Here is my house claim at Polapola, in Honouliuli. Here are its boundaries: towards the North, the house of Kulana [Kalama?]; towards the East, the house of Kaneaola; towards the South, the house of Kapiioho; towards the West, the pa Aina. Kaope gave me these lands.

I am with appreciation, your obedient servant.

By Laamaikahiki²⁶²

²⁶⁰Book 3, p. 130, July 3.

²⁶¹Book 2, p. 369, July 3, 1848.

²⁶²Book 2, p. 495, Oct. 22, 1847.

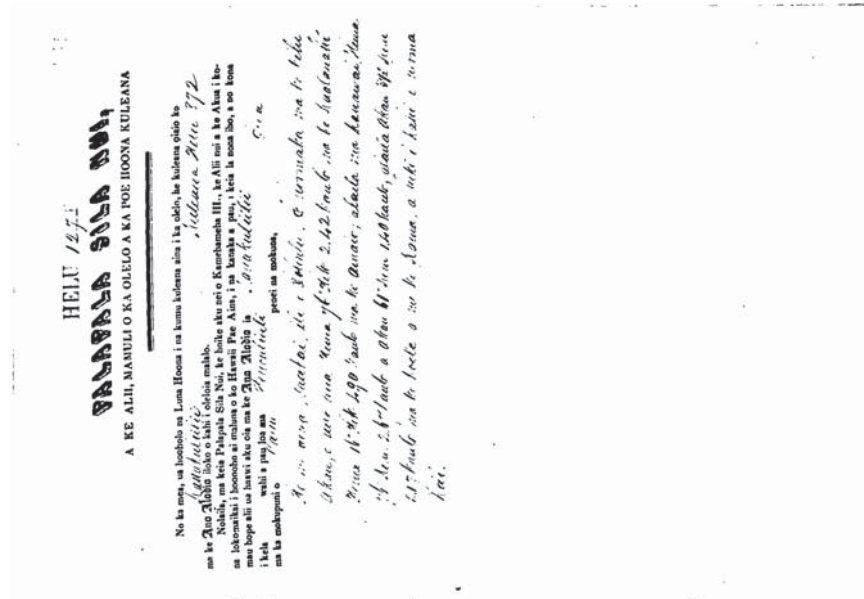


Figure 73: Palapala Sila Nui Helu 1278, Kuleana Helu 872, to Kahakulilili. Mo'o at Paakai, Honouliuli. 1.66 acres. Signed by Kamehameha and Keoni Ana. Volume 5, p. 132-133.

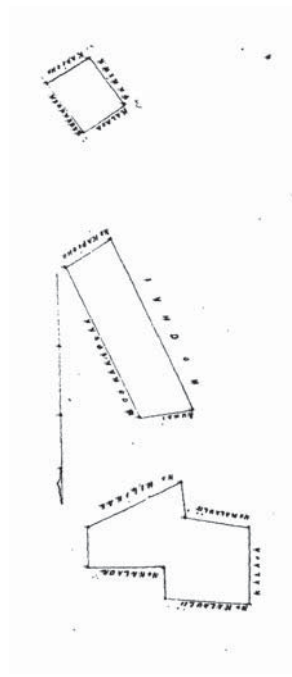


Figure 74: Helu 874 of Laamaikahiki: Parcel 1, Mookina of Hiwa, Ili of Polapola, Honouliuli, E. O.; Parcel 2, Two loi at Kapana, Ili of Polapola, Honouliuli; Parcel 3, House lot on the kula of Polapola. There being 1 acre and 4 72/100 chains in these parcels. Source: Māhete Award Book 2:273.

Native Testimony Kikala sworn and stated. I know the place of Laamaikahiki at Honouliuli, a kalo land and house lot. The boundaries of the house lot are: Mauka, Kalama's land; towards Honouliuli, Kaneaola's land; Makai, my land; towards Waianae, the pa aina. There are two houses there, the second house being for Kaneaola, and the land is his. The claim of Laamaikahiki is only for the house. Also the kalo land is his claim.

The boundaries of the kalo land are: Mauka Lauli's land and Kaneaola; towards Honouliuli, Kekaunohi's land; Makai, my land and Hilinae's land; towards Waianae, Lauli's land and Kapioho. There are five loi on the parcel. Laamaikahiki got it from Kaneaola. Kaneaola got it from Kaope's land. Laamaikahiki got the land in the year 1836. No one has opposed him.

Pue sworn and stated. I know this place exactly as Kikala has stated.²⁶³

Foreign Testimony Kikala sworn. This land is in Honouliuli, Ewa, in two lots.

1. First house lot is bounded: Mauka by Kalama's land; Honouliuli by Kaneaola; Makai by my land; Waianae by Paaina o ke Aupuni; He only owns the house and the land on which it stands belongs to Kamaala.

2. Second Kula. Bounded: mauka by Lauli's & Kaneaola's land; Honouliuli by Kekaunohi's; Makai by my land and Hilinae; Waianae by Lauli's & Kapi-
ioho's.

²⁶³Book 3, p. 142-143, July 14.

There are 5 kalo patches on it. Claimant's lands from Kaneaola about 1836. I know of no counter claim.

Pue sworn. Confirmed the above. I know of no counter claim.²⁶⁴

7.38 Helu 876: The Claim of Nohunohu

Claimant: Nohunohu

Location: 'Ili of Niukee (fig. 76)

Recorded at: Honouliuli

Date: Oct. 22, 1847

Status: Awarded; Royal Patent 4700 (fig. 77)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Nukee [Niukee], in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, an Auwai (irrigation ditch) and cliff, and our house above; towards the East, the land of Nihua, the Auwai and huluhulu (cotton plants); towards the South, the Auwai and land of Healani; towards the West, the land of Aoaao and the Ili of Kinohala.

Here is my second land claim at the moo land of Aoao. Here are its boundaries: towards the North, the Auwai; towards the east, the land of Healani; towards the South, the land of Aoao; towards the West, the land of Kahalewai. My residency upon the land was from Kalola to Honaunau.

I am with appreciation, your obedient servant,

By Iopa Nohunohu²⁶⁵

Native Testimony Laamaikahiki sworn and stated. I know the place of Nohunohu, at Honouliuli, Ewa. Its boundaries are: Mauka, Nihua's land; towards Honolulu, Healan's land; Makai, Aao's land; towards Waianae, also his. This is two loi and some kula. It is not enclosed and there is one house for Nohunohu there. There is no wall. Nohunohu received this land in the year 1818, it was in the time of Kamehameha I. No one has opposed him.

Kikala sworn and states. I know this place exactly as Laamaikahiki has stated.²⁶⁶

Foreign Testimony Laamaikahiki sworn. This land is in Honouliuli of Ewa, 1 piece, part kalo & kula. Bounded: Mauka by Nihua's land; Honolulu by Healanu's; Makai by Aoao's; Waianae, also.

²⁶⁴Book 2, p. 381, July 14, 1848.

²⁶⁵Book 2, p. 497, Oct. 22, 1847.

²⁶⁶Book 3, p. 143–144, July 14, 1848.

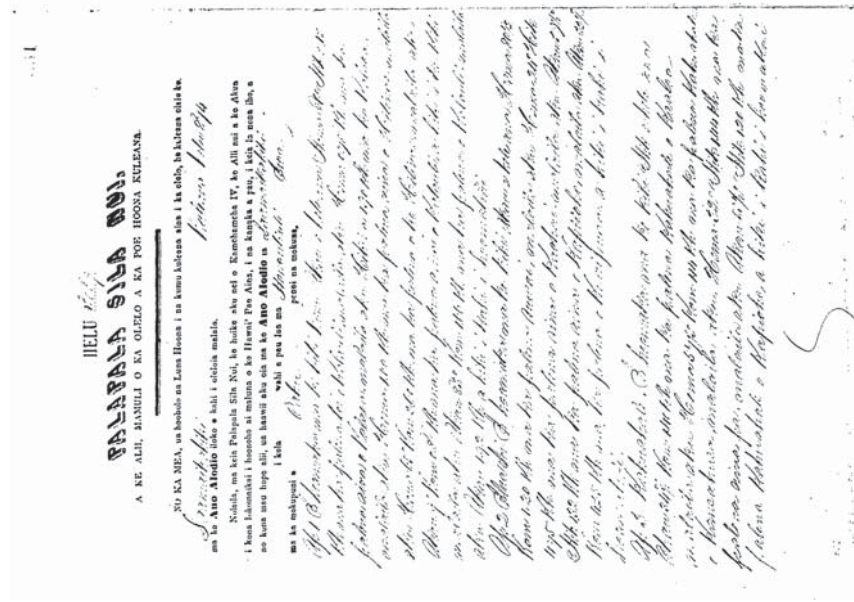


Figure 75: Palapala Sila Nui Helu 3089, Kuleana Helu 874, to Laamaikahiki. Honoiliuli. 1 acre, 4 72/100 chains. August 7, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 661-662.

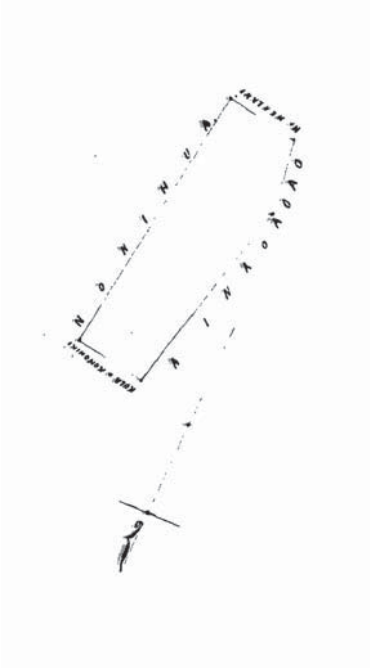


Figure 76: Helu 876 of Nohunohu. Moolaina of Kahuiluna, Ili of Niukee, Honouliuli. E. O. Containing 1 acre and 0.49 chains. Source: *Māhele* Award Book 2.277.

It is not fenced. There are 2 kalo patches & kula land with 1 house. Claimant has lived on it a many years. He got it in Kamehameha 1st time. He has ever held it in peace to this time.
Kikala sworn, an affirmed the same.²⁶⁷

7.39 Helu 881: The Claim of Kikala

Claimant: Kikala
Location: Ili of Polapola (fig. 78)
Recorded at: Honouliuli
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 2871 (fig. 79)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. There at Polapola, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Laamaikahiki; towards the East, the land of Hilineae and the land of Ohai;

²⁶⁷Book 2, p. 382, July 14, 1848.

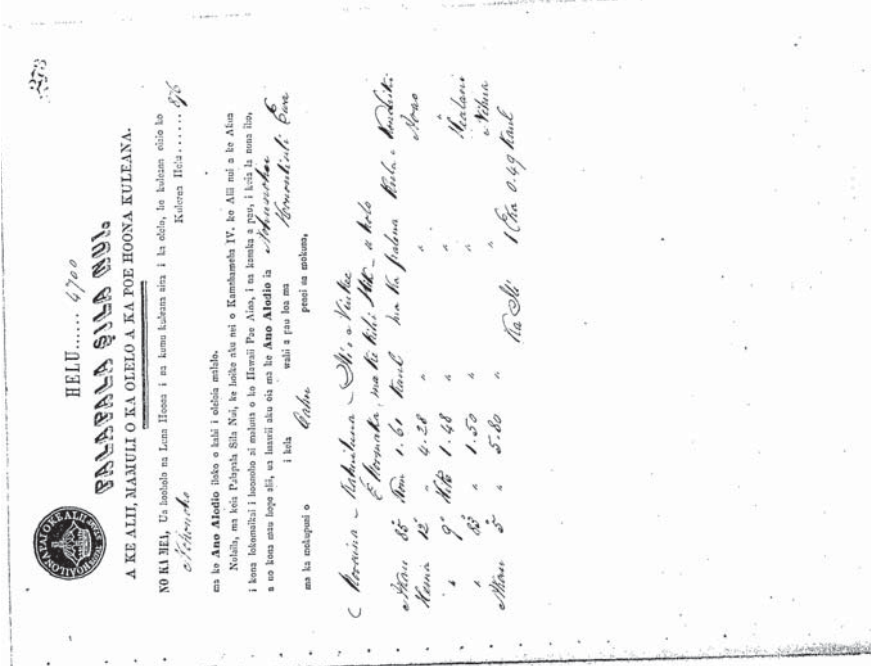


Figure 77: Palapala Sila Nui Helu 4700, Kuleana Helu 876, to Nohunohu. Mo'o of Kahuiluna, Ili of Niukee, Honouliuli. 1 acre, 0.49 chains. July 28, 1859. Signed by Kaahumanu & Kamehameha. Volume 19, p. 273–274.

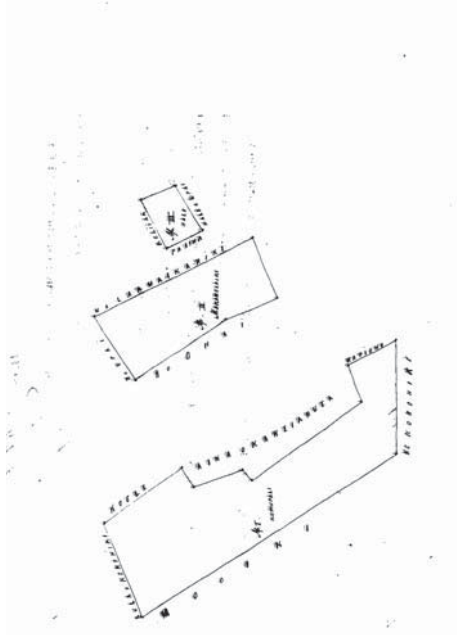


Figure 78: Hehu 881 of Kikala: *Parcel 1*, Moosaina of Kumupali, Ili of Polapola. Honouliuli, E.O. Containing 2 acres and 6.11 chains; *Parcel 2*, Moo parcel of Makawelaiti, Ili of Polapola. Honouliuli, E.O. Containing 1 acre and 1.14 chains; *Parcel 3*, A house lot on the kula of Polapola. H.E.O. Containing 2.16 chains. The combined total of these parcels is 3 acres and 9.68 chains. Source: *Māhale* Award Book 2.281.

toward South, the land of Ohai and the land of Kekai; towards the West, the land of Kukae and Kalama.

Here now is my second claim: towards the North, the land of Kapiioho; towards the East, the land of Lauwahine [Kauwahine], and the land of Noholowaa, a paahao [parcel worked by prisoners]; [Southern boundary not identified] towards the West, the land of Naio [Maio].

Here also is the land of mine: towards the North, the land of Kaneaola; towards the east, the land of Maio; towards the South, the land of Kumupopo; towards the West, the houses of Kapiioho.

Here is my house claim. Here are its boundaries: towards the North the houses of Ohai and Kuahine; towards the East, the houses of Maio; towards the South, Komoawaa; towards the West, the cliff of Polapola.

Here also is the house of mine there at Polapola, in Honouliuli. Here are its

boundaries: toward the North, the land of Keliaa [Keliaa]; towards the East, the land of Kalama; towards the South, the houses of Laamaikahiki, Maio and Upai; towards the West the houses of Ohai.

By Kikala²⁶⁸

Native Testimony Laamaikahiki sworn and stated. I know the place of Kikala at Honouliuli. Two moo lands and a house lot. The boundaries of the house lot are: mauka, Nuka's land; towards Honolulu, Kalama's land; Makai, Kaope's land; towards Waianae, the pa aina. Kikala has one house there. It is not enclosed.

2. A moo land: mauka, Kaope's land; towards Honolulu, Nika's land and Kumupopo; Makai the pa aina; towards Waianae, Maiao's land.

3. The second moo kalo is: Mauka, Hilinae's land; towards Honolulu, Ohia's [Ohai] land; Makai, Kukae's [Nakai] land; towards Waianae, Kalama's land.

On the first parcel, it is only a house. The second parcel is 7 loi and some kula. The third parcel is five loi.

Kikala got the land from Kaope, perhaps in the year 1834 or 5. No one has opposed him.

Pue sworn and stated. I know this place exactly as Laamaikahiki know it.²⁶⁹

Foreign Testimony Laamaikahiki sworn. This land is in Honouliuli, Ewa.

1. It is in 3 pieces. First piece. House lot bounded: Mauka by land of Nika; Honolulu by Kalama's; Makai by Kaope's; Waianae by the Paaina a ke aupuni (Land division wall made by the Government). The Claimant has a house on it. It is not fenced.

2. Second, kalo land. 10 patches & some kula bounded: Mauka by Kaope's land; Honolulu by Nika's & Kumupopo's; Makai by Govt. land; Waianae by Maiao's land.

3. Third, kalo land. Bounded: Mauka by Hilinae's land; Honolulu by Ohai's; Makai by Nakai's; Waianae by Kalama's.

Claimant got these land from Kaope Konohiki in about 1836 as a gift, and has held them ever since in peace. I know of no counter claimant.

Pue sworn. Know of no counter claim, and confirmed the testimony now given.²⁷⁰

7.40 Hehu 883: The Claim of Kumupopo

Claimant: Kumupopo
Location: Ili of Poohilo, Puaaluu, Kaaumakua, and Loloulu
Recorded at: Honouliuli

²⁶⁸Book 2, p. 500, Oct. 11, 1847.

²⁶⁹Book 3, p. 146, July 14.

²⁷⁰Book 2, p. 379–380, July 14, 1848.

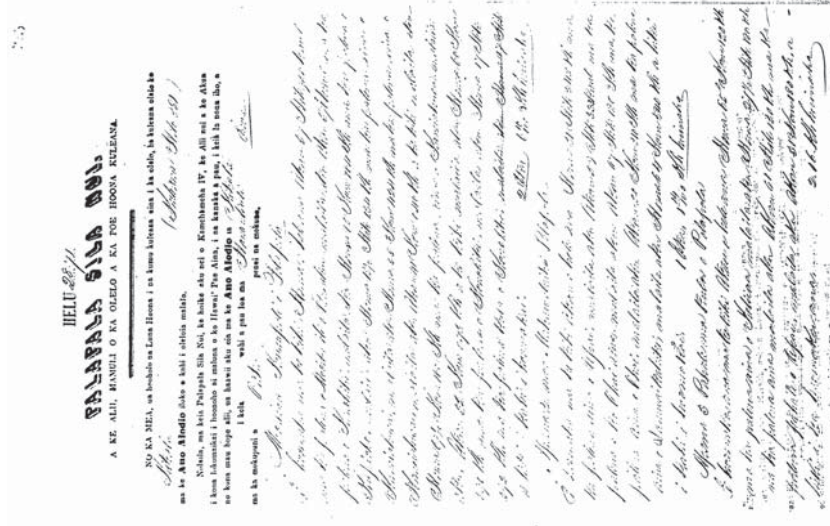


Figure 79: Palapala Sila Nui Helu 2871. Kuleana Helu 881, to Kikala. Mo'o of Kumupali at Palapala; Mo'o of Makawelaiki, at Palapala; & Palale at Palapala, Honouliuli. 3 acres. 9 69/100 chains. May 21, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 205-206.

Date: Oct. 11, 1847
Status: Awarded; Royal Patent 6806 (figs. 80, 81)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Pochilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kekua; towards the east, the Loko of Waianu and Kahui; towards the South the land of Oni; towards the West, the pa Aina, the cliff of Makakua, and some house which are for me.

Here is my second claim. There at Puaaluu, at Honouliuli. Here are its boundaries: towards the North, the land of Kikala; towards the East, the land of Keliiaa; [Southern boundary not identified] towards the West, the houses of Kapiioho.

Here is my third claim: toward the North the land of Kaauhau and the Loko of Kalahu; towards the East, the Pa Aina; towards the South, the kula land of Kelaa [Keliiaa]; towards the West, the land Kelaa [Keliiaa].

Here is my third [fourth] claim for my house, there at Kaamukua, in Honouliuli. Here are its boundaries: towards the North, the cliff; towards the East, the cliff of Holesinui; towards the South, a cliff; toward the West, a cliff.

Here also is the land claim of mine there at Loloulu, in Honouliuli. Here are its boundaries: towards the North, the land of Kaope; towards the East, the land of Kekua; towards the South, the land of Kekua; towards the West, the loi of Napahi. Kahinu, Kaope and Keliiaa, they are the ones who gave me these properties. Done by me, Iona Kumupopo²⁷¹

7.41 Helu 886: The Claim of Kahalewai

Claimant: Kahalewai
Location: 'Ili of Kamoku (fig. 82)
Recorded at: Honouliuli
Date: Oct.
Status: Awarded; Royal Patent 3635 (fig. 83)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Kamoku, in Honouliuli, Ewa, on the Island of Oahu. Here are its boundaries: towards the North, a house for me, and the place of Kou and Aila, and the Atawai; towards the East, the moo land of Aoao and the Loi of Nohunohu; towards the South, akaakai (bulrushes) and the muliwai (estuary) of Makai; towards Honolulu, the moo land of Puniawa.

²⁷¹Book 2, p. 502, Oct. 11, 1847.

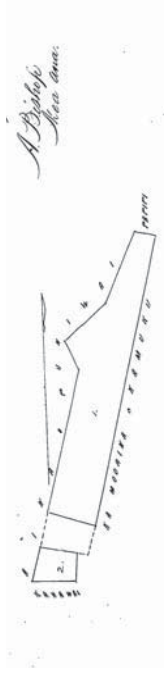


Figure 82: Helu 886 of Kahalewai: *Parcel 1*, Moolaina of Pi, Ili of Kamoku. Honouliuli, E. O. Containing 1 acre and 3 59/100 chains; *Parcel 2*, A loi divided by the koele within Pi. Containing 1 and 4 96 chains. *Source:* *Māhele Award Book* 7:259.

Here is my second claim, the land of Manuwa. Here are its boundaries: towards the North, some Loi of Manuwa; towards the East, the land of Makue; towards the South, the land of Manuwa; towards the west, the land of Kanoho.

Here is my house claim: towards the North the sea; towards the East, the sea; towards the South, the house lot of Healani; towards the West, our house lot. Kawaa gave this land to me.

I am with appreciation, your obedient servant.
By Kahalewai X²⁷²

Native Testimony Healani sworn and stated. I know this land at Honouliuli, Ewa. It is kalo land and a kula parcel where the house stands. The boundaries are: Mauka, pa aina; towards Honolulu, Aoa's land; Makai, the muliwai; towards Waiānae, Puniāwa's land. Kahalewai got the land from Kaneaola in the year 1843. Kahalewai does not go to work. He has one house there and a kula place.

Kaihikapu sworn and stated. I know this land exactly as Healani stated.²⁷³

Foreign Testimony Healani sworn. This land is in Honouliuli, Ewa. Consisting of 4 kalo patches & kula in one lot having one house. Bounded: Mauka by Govt. land; Waiānae by Puniāwa's; Honolulu by Aoa's; Maiao by a small stream dividing it from Kaope's.

Claimant got this land from Kealoha in 1843 who is the agent of Kekaunohi, and lives under her. There is 1 house only on it.

Kaihikapu sworn, affirmed the same, and added he knows of no counter claim.²⁷⁴

²⁷²Book 2, p. 505, Oct.

²⁷³Book 3, p. 147-148, July 14.

²⁷⁴Book 2, p. 382, July 14, 1848.

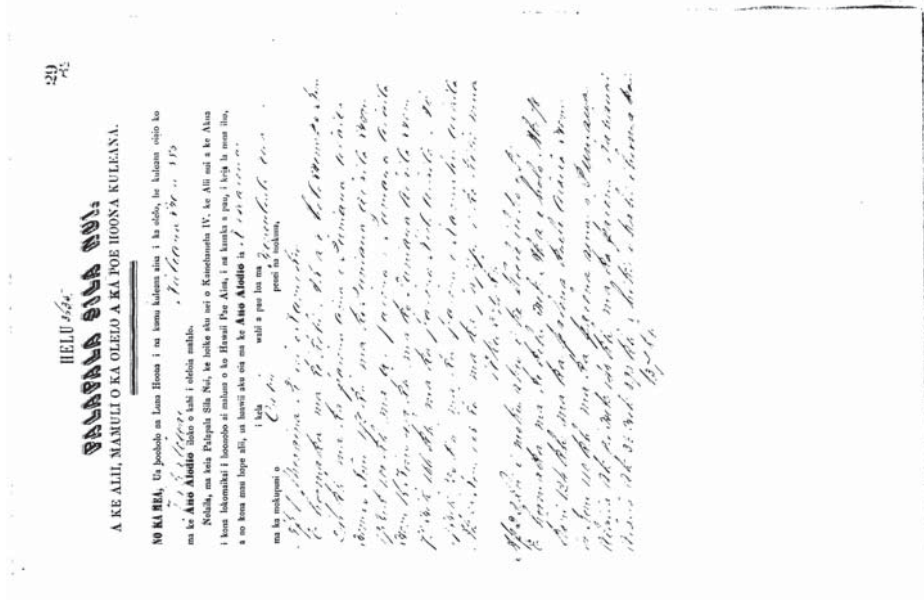


Figure 83: Palapala Sila Nui Helu 3635, Kuleana Helu 886, to Kahalewai. *Mo'o* and *Lo'i* at Pi, in the *Ili* of Kamoku, Honouliuli. 1 acre, 4 96 chains. February 25, 1857. Signed by Kaahumanu and Kamehameha. Volume 16, p. 29-30.

7.42 Helu 887: The Claim of Kaihikapu

Claimant: Kaihikapu
Location: *Ili* of Kapapapuhi (fig. 84)
Recorded at: Honolulu
Date: Oct. 21, 1847
Status: Awarded; Royal Patent 1083 (fig. 85)

After a records search, it was found that the *Māhele* Award Book document (fig. 84) is the only *Māhele* document for this claim that mentions the parcel at Honolulu. The Native Register, Native Testimony, and Foreign Testimony only describe Kaihikapu's claim at Hoaeae.

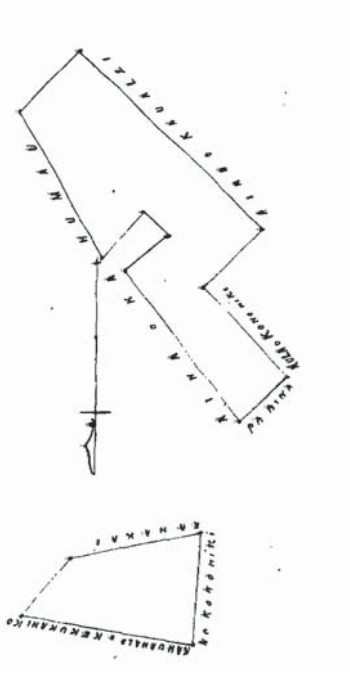


Figure 84: Helu 887 of Kaihikapu: *Parcel 1*, Moosaina of Kalaieka at Hoaeae...; *Parcel 2*, A house lot at Kahaia, Honolulu, E. O. Containing 6.41 chains. *Source:* *Māhele* Award Book 2:285.

7.43 Helu 892: The Claim of Aoao

Claimant: Aoao
Location: *Ili* of Niukee (fig. 86)
Recorded at: Honolulu
Date: Oct. 22, 1847

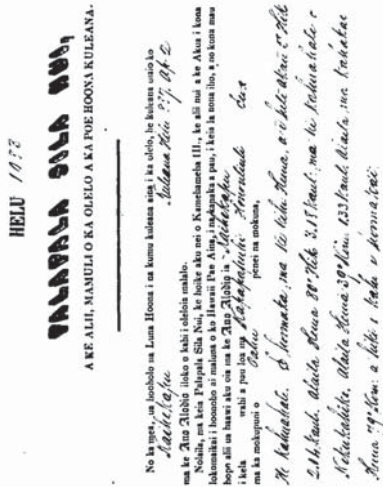


Figure 85: Palapala Sila Nui Helu 1083, Kuleana Helu 887, Parcel 2, to Kaihikapu (Kaihikapu), Land of Kapapapuhi, Honolulu. 45/100 acres. December 4, 1852. Signed by Kamehameha and Keoni Ana. Volume 4, p. 815–816. *Note:* Royal Patent Helu 780 was also issued to Kaihikapu for 1.189 acres at Kalaieka, Hoaeae Ahupua'a. No specific reference to Honolulu was made in the register and testimony volumes.

Status: Awarded; Royal Patent 6767 (fig. 87)

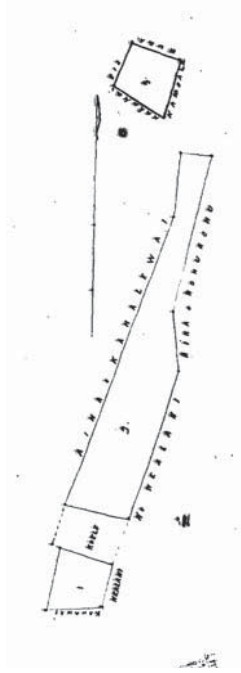


Figure 86: Helu 892 of Samuela Aoa: *Parcel 1*, Mooaina of Kamaka, Ili of Niukee. Honouliuli, E. O. Containing 2.79 chains; *Parcel 2*, A mooaina. Containing 1 acre and 1.08 chains; *Parcel 2*, A house lot at Kapapapuhi. Honouliuli, E. O. Containing Four acres and 1.50 chains. *Source:* *Māhale* Award Book 2:291.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. It is there at Nukee [Niukee], in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North the Ili of Kinolua, and the house of my father, on the top; towards the East, the land of Nohunohu and the land of Kawahamana; towards the South, the Auwai and land of Nohunohu; towards the West, the land of Kahalewai.

Here is my second land claim. It is there at Niukee, in Honouliuli: towards the North, the land of Nohunohu; towards the East, the land of Healani and the Poalima (parcel worked for the chief); towards the South, akaakai (bulrushes) and the muliwai (estuary) of Makai; towards the West, the land of Kahalewai.

Here is my house claim: towards the North, an alanui (trail/road) and the sea; towards the East, the houses of Kamaala; towards the South, the sea; towards the West, an ala hele (trail). It is from Kamehameha II to this time.

I am with appreciation, your obedient servant.

By Sm. Aoa⁷⁵

Native Testimony Oni sworn and stated. I know the place of Aoa, there at Honouliuli. It is a house lot and moo aina. The boundaries of the house lot are: Mauka,

⁷⁵Book 2, p. 509–510, Oct. 22, 1847.

Healani's place; towards Honolulu, the sea; Makai, Uwia's lot; towards Waianae, the sea. The place is enclosed with a wall, and there is one house in it for Aoa.

The boundaries of the kalo land are: Mauka, Kekaunohi; towards Ewa, Healani's land and Nohunohu; Makai, Kinolua's land; towards Waianae, Kahalewai and the pa aina. The pa aina is the only wall on this place. There are five loi there. Aoa got it from Kinolua, [in time of] Kamehameha I. No one has opposed him.

Kaalaawaawa sworn and stated. I know these places exactly as Oni has stated.⁷⁶

Foreign Testimony Oni Sworn. This place is in Honouliuli, Ewa.

1. First. House lot is bounded: Mauka by Healani's place; Ewa by the sea; Makai by Uia's place; Waianae by Sea. It is fenced and has one house of Claimants.

2. Second is bounded: Mauka by Gov't. fence; Ewa by Healani and Nohunohu's land; Makai by Kinolua's; Waianae by Kahalewai. It has no fence. Claimant has one house in it. It has about 5 patches.

Claimant got these two places from Kinolua from the time of Kamehameha I. Kinolua is still living.

Kaalaawaawa sworn and confirmed the previous testimony.⁷⁷

7.44 Helu 898: The Claim of Kaneaola

Claimant: Kaneaola

Location: Ili of Kahawai, Hiwa, Loloulou, and Polapola (fig. 88)

Recorded at: Honouliuli

Date: Oct. 22, 1847

Status: Awarded; Royal Patent 3386 (fig. 89)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my land and house claim. This land is there at Kahawai in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, an alanui (trail/road) and the Auwai; towards the East, a kula parcel and the house of Napahi; toward the South, the land of Puehu; towards the West, the land of Puehu.

Here is my second land claim at Hiwa, in Honouliuli. Here are its boundaries: towards the North, the land of Lauli; towards the East, the land of Laamaikahiki; towards the South, the land of Kalama; towards the West, the land of Nika.

Here is my third land claim: towards the North, the akaakai (bulrushes) of Lolouli; towards the East, akaakai; towards the South, the land of Laamaikahiki; towards the West, the land of Lauli.

⁷⁶Book 3, p. 66–67, May 22.

⁷⁷Book 2, p. 317, May 22, 1848.

²⁷⁸Book 2, p. 513–514, Oct. 22, 1847.

4. Mauka, the muliwai of Honouliuli; towards Honolulu, the Alanui hele (main trail); Makai, Puehu's land; towards Waianae, Koi's land. There are two loi on this parcel, and a kula section. There is no house.
Kaneaola got his land from Kaope in the year 1834. Kaope is a Konohiki of this land. Kuahine sworn and stated. I know this place exactly at Heleaniau stated.²⁷⁹

Foreign Testimony Heleaniau sworn. This land is in Honouliuli of Ewa, consisting of 4 pieces, mostly kalo.

1. First lot is bounded: mauka by Laulii's land; Honolulu by Kapi'oho's & Kaope's; makai by Govt. fence; Makai by Kekauonohi's. It has the kalo patches & 2 houses. It is claimants and Luana's who lives under him.
2. Second. Kula land bounded: Mauka by Kapi'oho's land & Laulii's; Honolulu by Upa'i's; Makai by Nika; Waianae by Laulii's. There are 2 kalo patched on it by no house.
3. Third. Chiefly kalo. Bounded: mauka by Kaopes' land; Honolulu by Laa-maikahiki's; Makai by Laulii's; Waianae by Mahina's and Kaheananui's. This is 1 kalo patch.
4. Fourth is bounded: Mauka by Honouliuli Stream; Honolulu by the high road from the sea in land; makai, by Puehu's land; Waianae by Koi's land. There is some upland & 2 patches on it.

Kaope gave these lands to Claimant in 1834. Kaope is Konohiki under Kekauonohi. Claimant has cultivated these lands & held them in peace to his time.

Kuahine sworn and said he knows the particulars of the testimony as stated were true.²⁸⁰

7.45 Helu 901: The Claim of Kuahine

Claimant: Kuahine
Location: 'Ili of Niukee (fig. 90)
Recorded at: Honouliuli
Date: Oct. 25, 1847
Status: Awarded; no Royal Patent issued

Native Register The Pres. of the Commissioners who quiet land claims. Aloha to you. I here by tell you of my claim. This land is there at Nukee [Niukee], Island of Oahu. Here are its boundaries: towards the North, the land of Keinohananui; towards the East, the land of Nakai; towards the South, the land of Kuheumu; toward the West, the land of Paele.

²⁷⁹Book 3, p. 152-153, July 17.

²⁸⁰Book 2, p. 387, July 17, 1847.

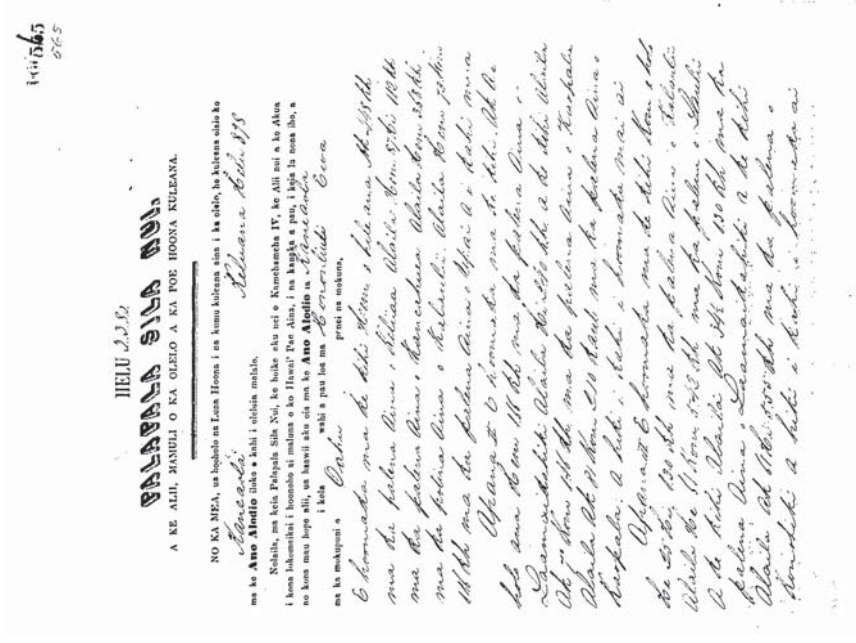


Figure 89: Palapala Sila Nui Helu 3386, Kuleana Helu 898, to Kaneaola, Honouliuli. 1 acre, 5.78 chains. November 12, 1856. Volume 14, p. 565-566.

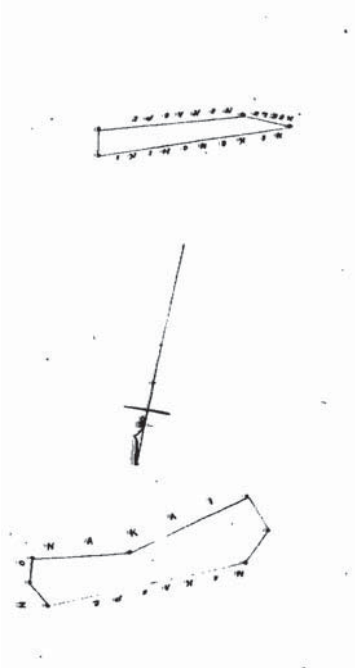


Figure 90: Helu 901 of Kuahine: *Parcel 1*, A loi at Kuaka, Ili of Niukee. Honouliuli, E. O.; *Parcel 2*, A loi at Kalolilili, Ili of Niukee. Honouliuli, E. O.; There being 5.09 chains within these two loi. *Source:* *Māhele* Award Book 2:301.

Here is my second claim. Here are its boundaries: towards the North, the kula land of Honaunau and the cliff; towards the East, the land of Keinohanau; towards the South, the land of Keinohanau; towards the West, the land of Honaunau. Here is my house claim. Here are its boundaries: towards the North, the houses of Keinohanau and the wall; towards the East, the houses of Kaakau; towards the South, the cliff; towards the West, the house of Kuhemu and the gulch.
By Kuahine X²⁸¹

Native Testimony Kaneaola sworn and stated. I know the place of Kuahine at Honouliuli, two loi and two parcels. The boundaries of the first parcel are: Mauka Nakai's land; towards Honolulu, his land also; Makai, Kuhemu's land; towards Waianae, Paele's land.
2. Mauka, Kinolua's land; towards Honolulu, Nakai's land; Makai, Kahue's land; towards Waianae, Honaunau's land. Kuahine received the land from Kaumaumaholo, his wife. There is no house there, and they lived in the house of the Konohiki. Kaumaumaholo got this place in the year 1839. No one has objected.

²⁸¹Book 2, p. 516, Oct. 25, 1847.

Kaheleaniau sworn and stated. I know this place, exactly as Kaneaola has stated.²⁸²
Foreign Testimony Kaneaola sworn. This land is in Honouliuli, Ewa. It consists of two separate kalo patches.

1. First is bounded mauka by Nakai's place; Honolulu by the same; Makai by Kuhema's [Kuhemu]; Waianae by Paele's land.
2. Second is bounded: Maua by Kinolua's land; Honolulu by Nakai's; Makai by Kahue's; Waianae by Honaunau; This land was claimants' which Kaumaumaholo, who gave it to Claimant. She got it from Kinau before 1839. She is too ill to appear here. Claimant and wife have never been disturbed in their possession of it.

Kaheleaniau sworn, confirmed the preceding particulars.²⁸³

7.46 Helu 902: The Claim of Haakue

Claimant: Haakue
Location: *Ili* of Waimanana & Waimanalo (fig. 91)
Recorded at: Honouliuli
Date: Oct. 16, 1847
Status: Not awarded

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Waimanana, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kekuahaliu; towards the East, the land of Kekuahaliu; towards the land of Makuia [Maakuia]; towards the West, the land of Kaneiakama.

Here is my second land claim: towards the North, a stream; towards the East, the land of Kekuahaliu; Towards the South, a stream; towards the West, the land of Molea.

Here is my third claim: towards the North, a kula; towards the East, the land of Kekuahaliu; towards the South, a ala Aupuni (Government road); towards the West, a kula.

Here is my fourth claim: towards the North, an alanui (road/trail) and the land of Kekuahaliu; towards the East, the land of Kaneiakama; towards the South, the muliwai (estuary); towards the West, a house, a wall. I also have some houses standing there; towards the North, a kula nohu (dry parcel with nohu shrubs); towards the East, the house of Molea; towards the South, the sea; towards the West, the sea and the Hale Kula (School House). From Kahakai to me.

²⁸²Book 3, p. 154–155, July 17, 1848.

²⁸³Book 2, p. 388, July 17, 1848.

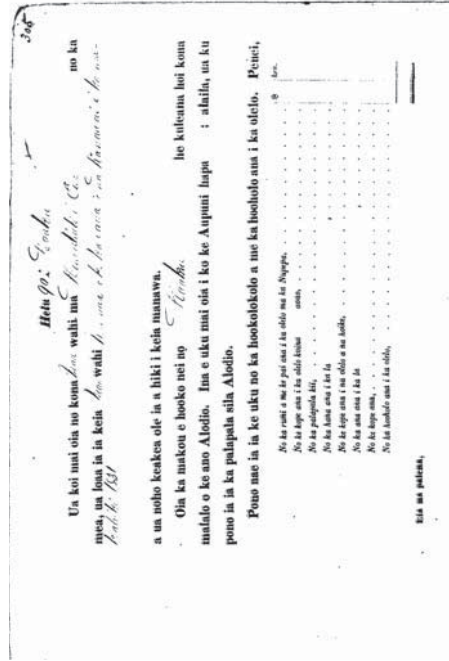


Figure 91: Helu 902 of Haakue. Source: Māhele Award Book 2:305.

I am with appreciation.
By Haakue X²⁸⁴

Native Testimony Kekuhalili sworn and stated. I know the land of Haakue at Waimanalo in Honolulu. There are three loi in two parcels. The boundaries of two loi are: Mauka, Mahina's land; towards Honolulu, Kekuauonohi's land; Makai, a cliff; towards Waianae, a kula.

2. Mauka Kahina's land. Towards Honolulu, his land also; Makai, my land; towards Waianae, Kaneakama's land.

This land was from Kahakai to Kaikai, the husband of Haakue. Kahakai is an overseer under Kekuauonohi, that was for Kuakini at the fort. And she lives there now to this day in peace.

Kailinaoa sworn and stated. I know this place exactly as Kekuhalili stated.²⁸⁵

²⁸⁴Book 2, p. 516–517, Oct. 16, 1847.
²⁸⁵Book 3, p. 155–156, July 17, 1848.

Foreign Testimony Kekuhalili sworn. This land is in Honolulu, Ewa, Waimanalo, consisting of 2 kalo patches in one lot & 1 in another. There is no house on either.

1. First lot. 2 kalo patches, bounded: Mauka by Makuia's [Maakuia] land. Honolulu by Kekuauonohi's Makai by the sea shore bluff; Waianae by Kekuauonohi's kula land.

2. Second. One Patch is bounded: Mauka by Mahina's land; Honolulu also; Makai by my place; Waianae by Kaneakama's [Kaneiakama] place.

Claimant got these lands from her husband Kaikai, who held it from Kahakai; luna (overseer) under Kekuauonohi; Claimant got it about 1831. She & her husband before her have always held it in undisturbed peace.

Kailinaoa sworn and fully confirmed the previous particulars.²⁸⁶

7.47 Helu 905: The Claim of Kaimuena

Claimant: Kaimuena
Location: Ili of Kaaumakua (fig. 92)
Recorded at: Honolulu
Date: Oct. 9, 1847
Status: Awarded; Royal Patent 6820 (fig. 93)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Kaaumakua, in Honolulu, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Nainu [Nunu?]; towards the East the land of Pio; towards the South, the land of Hilea; towards the West, the Loi Poalima (loi worked for the chief).

Here is my second claim. Here are its boundaries: towards the North. Akaakai (bulrushes); towards the East, the loi land of Kaope; towards the South, the land of Kalama; towards the West, the Loi of Waa and Alae.

Here is my house claim. There at Kaaumakua, Honolulu, Ewa, Island of Oahu. Here are its boundaries: towards the North, the houses of Naholowaa; towards the East, the beach; towards the South, the houses of Pio; towards the West, the cliff of Holeinui.

I am with appreciation.
By Kaimuena²⁸⁷

Native Testimony Nunu sworn and stated. I know the land of Kaimuena at Honolulu. 3 parcels. The boundaries of the house lot are: Mauka Naholowaa's land. Towards Honolulu and the two remaining sides are only Kekuauonohi.

²⁸⁶Book 2, p. 388–389, July 27, 1848.
²⁸⁷Book 2, p. 519–520, Oct. 9, 1847.

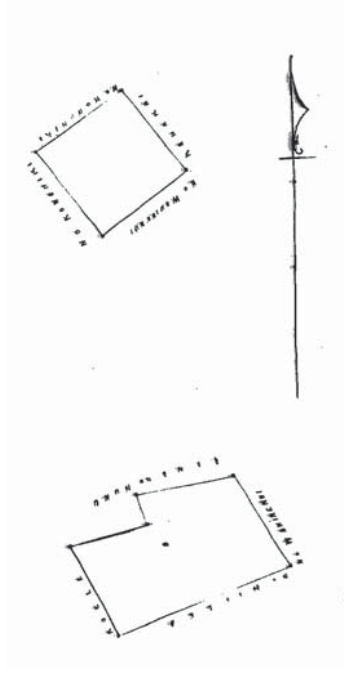


Figure 92: Helu 905 of Kaimuena: *Parcel 1*, House lot at Waioha, Ili of Kaaumakua. Honouliuli, E. O. Containing 7.84 chains; *Parcel 2*, Mookalo of Kumuulu, Ili of Kaaumakua. Honouliuli, E. O. Containing 1 acre and 7.06 chains. Source: *Māhiele Award Book 2:307*.

2. The boundaries of the two other parcels are: Mauka, my land; towards Honoulu, Kekauonohi's land; hers is also Makai and Waianae. Kaimuena received the land from Kaope in the year 1825. No one has opposed him. Kauhailepa sworn and stated. I know this place exactly as Nunu stated.²⁸⁸

Foreign Testimony Nunu sworn. This land is in Honouliuli, Ewa, consisting of 2 pieces.

1. First. House lot is bounded: Mauka by land of Naholowaa; Honolulu by Kekauonohi's; Makai by the same; and Waianae also. Claimant has to houses on it. It is not fenced.
2. Second. Kalo land. Bounded: Mauka by my land; Makai by Hilea's land; Honolulu & Waianae by Kekauonohi's. It is not fenced. Claimant got this land from Kaope, a luna under Kekauonohi in about 1835, and has ever since held it in peace. I know of no contestor.

Kauhailepa sworn, confirmed the preceding particulars, knowing them to be true.²⁸⁹

²⁸⁸Book 3, p. 156, July 19, 1848.
²⁸⁹Book 2, p. 390, July 19, 1848.

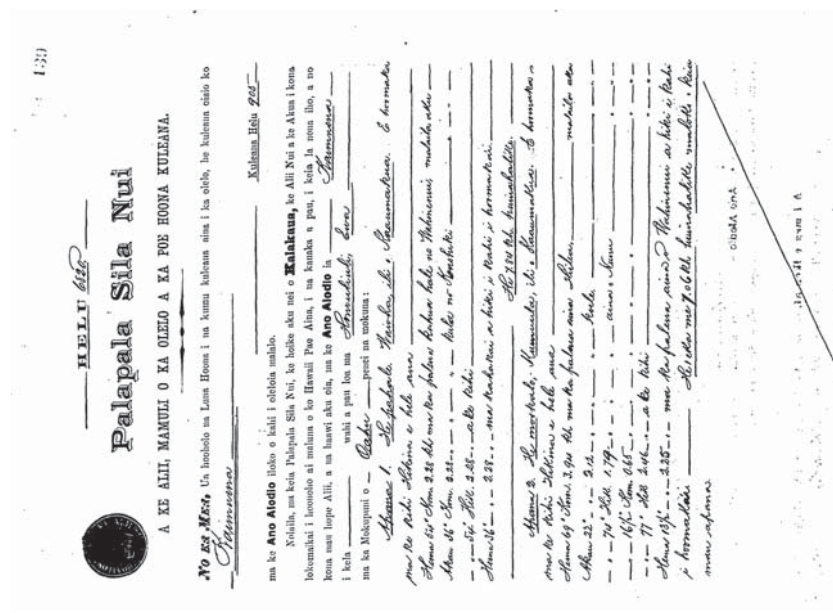


Figure 93: Palapala Sila Nui Helu 6820, Kuleana Helu 905, to Kaimuena. *Pihiale* at Waioha, 'Ili of Kaaumakua; & Mo'o Kalo at Kumuulu, 'Ili of Kaaumakua, Honouliuli. 1 acre, 7.06 chains. October 23, 1876. Signed by Kalakaua Rex. Volume 26, p. 139-140.

7.48 Helu 906: The Claim of Kanoho

Claimant: Kanoho
Location: *Ili* of Kamoku (fig. 94)
Recorded at: Honouliuli
Date: Oct. 21, 1847
Status: Awarded; Royal Patent 3717 (Kanoho no Aberahama) (fig. 95)

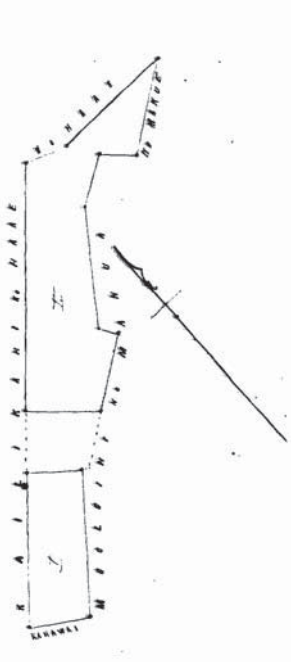


Figure 94: Helu 906 of Kanoho: *Parcel 1*, Moosaina of Kumuhahane, Ili of Kamoku. Honouliuli, E. O.; *Parcel 2*, Some loi in the moo of Kumuhahane. There being 1 acre and 8 41/100, within these Mooaina. *Source:* *Māhele* Award Book 2:309.

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. It is there at Kamoku, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, Kaupipuna and the kula of Hoaeae; towards the east, the land of Manua [Manuwai]; towards the South, the stream; towards the West, the land of Haae. My land claim came from Kalauli.

I am with appreciation, your obedient servant.

By S. Kanoho²⁹⁰

Native Testimony Luana sworn and stated. I know the land of Kanoho at Honouliuli. One parcel, with seven loi and a kula place. The boundaries are: Mauka, Haae's land.

²⁹⁰Book 2, p. 520, Oct. 21, 1847.

Towards Honolulu, Manua's land; towards Waianae, Haae's land; Makai, Kaope's land.

Kanoho got the land from Kahalewai, who is a konohiki under Kekaunohi. It was in the year 1844. No one has objected.

Kamaala sworn and stated. I know this place, exactly as Luana stated.²⁹¹

Foreign Testimony Luana sworn. This land is in Honouliuli, Ewa, consisting of 7 kalo patches & some kula in one lot, and bounded: Mauka by Haae's land; Honolulu by Manuwa's; Makai by Kekaunohi's; Waianae by Haae's. Claimant got this land from Halewai, sub-konohiki under Kaope, he under Kekaunohi, in 1844 it was obtained; and has held & improved it ever since. There was a dispute in old times about this land but it has ceased for 10 years.

Kamaala sworn and confirmed the previous particulars.
(Evidence of Halewai wanted.)²⁹²

7.49 Helu 907: The Claim of Luana

Claimant: Luana
Location: *Ili* of Niukee (fig. 96)
Recorded at: Honouliuli
Date: Oct. 21, 1847
Status: Awarded; Royal Patent 4162 (fig. 97)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Niukee, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the Auwai and the loi of Kamaala; towards the East, land of Kawahamana; towards the South, paahao (parcel worked by prisoners), and the stream; towards the West, land of Kamaala.

Here is the little kula claim of mine at Niukee, in Honouliuli, Ewa. Here are its boundaries: towards the North the cliff and the hale halawai (meeting house); towards the East, Kinolua's kula; towards the South Kamaala's loi; towards the West, Kamaala's kula and the kula of Uwia.

I am with appreciation.

By Luana X²⁹³

²⁹¹Book 3, p. 158-159, July 19, 1848.
²⁹²Book 2, p. 390-391, July 19, 1848.
²⁹³Book 2, p. 520-521, Oct. 21, 1847.

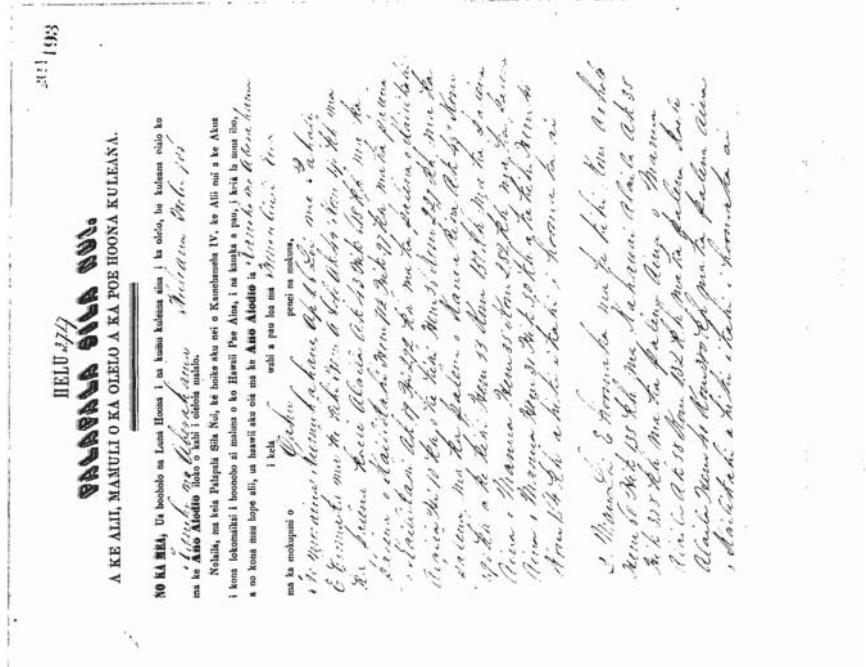


Figure 95: Palapala Sila Nui Helu 3717, Kuleana Helu 906, to Kanoho no Aberahama. Mo'o, Lo'i and Palale at Kumuhahane, Honouliuli. 1 acre, 8.41/100 chains. May 21, 1857. Signed by Kaahumanu and Kamehameha. Volume 16, p. 193–194.

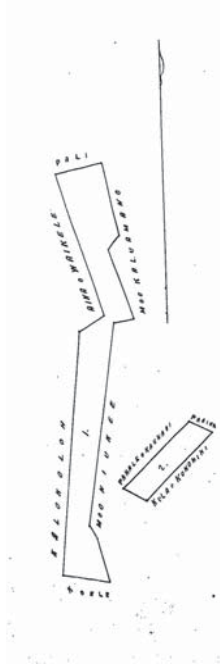


Figure 96: Helu 907 of Luana: Parcel 1, Mooina of Kaluamoo, Ili of Niukee. Honouliuli, Ewa, Oahu. Containing 1 acre and 1.76 chains; Parcel 2, A house lot on the kula of Kamaipipipi, Honouliuli. Containing 1.96 chains. Source: *Māhele* Award Book 7:260.

Native Testimony Kanoho sworn and state. I know this place, there at Niukee in Honouliuli. Two loi and a kula section there in one parcel. The boundaries are: Mauka, Kamaala's land; towards Honolulu, Kawahamana's land; Makai, Honaunau's land; towards Waianae, Kamaala's land. It was from him [Kamaala] that Luana got the land, and he has lived there in peace to this day.

Kamaala sworn and stated. I know this place as Kanoho has stated. It was in the relationship as a brother-in-law that the land was given to Luana. No one objected.²⁹⁴

Foreign Testimony Kanoho sworn. This land is in Niukee [Niukee], Honouliuli, Ewa, consisting of 3 patched of kalo and a strip of Kula land. It is not fence. Bounded: Mauka by Kamaala's land; Honolulu by Kawahamana's; Makai by Honaunau's (Konohiki); Waianae by Kamaala's; from whom claimant got it in 1842 and has ever since cultivated & held it in peace. I know of no counter claimant.

Kamaala sworn. Claimant is my Son-in-law, and I gave him this land is 1842. I got it from Kawaa in 1833 and held it in peace till 1842. I know of no counter claimant.²⁹⁵

7.50 Helu 909: The Claim of Kaneiahuea

Claimant: Kaneiahuea

Location: Ili of Kalahale²⁹⁶ (fig. 98)

Recorded at: Honouliuli

²⁹⁴Book 3, p. 159, July 19, 1848.

²⁹⁵Book 2, p. 391, July 19, 1848.

²⁹⁶Native Register and Native /Foreign Testimony documents under this Helu and claimant cite localities in Hoaeae Ahupua'a.

Here is my third claim. Here are its boundaries: towards the North, an Auwai; towards the East, the house of Pekane; towards the South, a kula parcel; towards the West, the land of Kalama.
Done by me, Nunu X²⁸

Native Testimony Kaimuena sworn and stated. I know the land of Nunu at Honouliuli. It is two parcels. The boundaries of the house lot are: Mauka, the pa aina; towards Honolulu, Kekaunohi's land; Makai, Kanahuna's land; towards Waianae, Aemalkai's land.

2. The boundaries of the kalo land are: Mauka and Honolulu, Kekaunohi's land; Makai, Kaimuena's land; towards Waianae, Kekaunohi's land.

Four loi and a kula section in this parcel. And in the house lot. There are two houses. It is enclosed with a stone wall. His land was from Kawaa, who is the Konohiki. In the year. 1833. No one has objected.

Kauhailepa sworn and stated. I know this place exactly as Kaimuena knows it.²⁹⁹

Foreign Testimony Kaimuena sworn. This land is in Honouliuli, Ewa, consisting of 2 pieces.

1. First. House lot, bounded: Mauka by Govt. fence; Honolulu by Kekaunohi's land; Makai by Kanahuna's; Waianae by Aemalkai's. Claimant has two houses on it, and it is fenced.

2. Second. Kalo land, bounded: mauka by Kekaunohi's land, and Honolulu side; Makai by my land; Waianae by Kekaunohi's. Consisting of 4 kalo patches & some kula.

Claimant had this land from Kawaa the old Konohiki in 1833, and has held and cultivated it ever since in peace without any disputant.

Kauhailepa sworn and knew all the previous testimony to be true.³⁰⁰

7.52 Helu 911: The Claim of Kauhailepa

Claimant: Kauhailepa

Location: 'Ili of Poohilo (fig. 102)

Recorded at: Honouliuli

Date: Oct. 11, 1847

Status: Awarded; Royal Patent 5483 (fig. 103)

²⁹⁸Book 2, p. 523, Oct. 20, 1847.

²⁹⁹Book 3, p. 157, July 19, 1848.

³⁰⁰Book 2, p. 392, July 19, 1848.

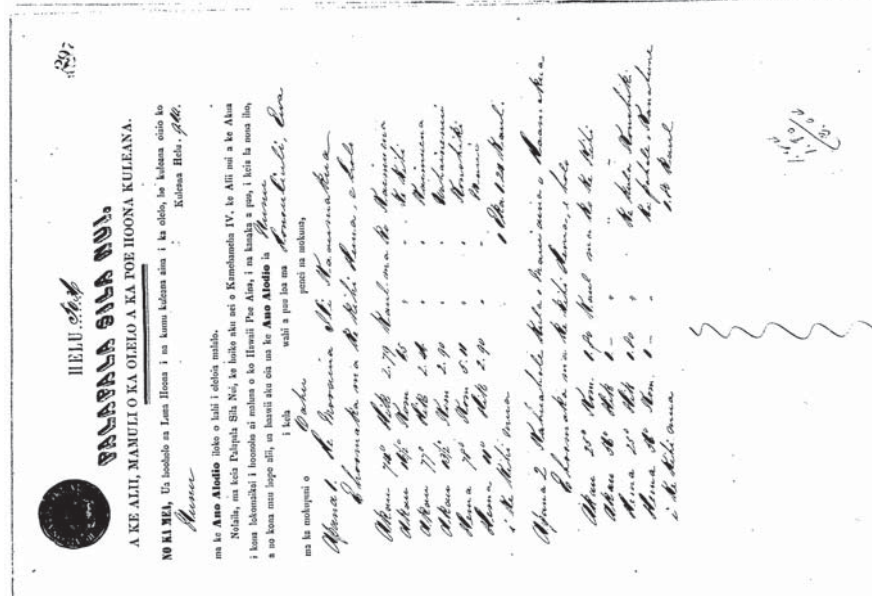


Figure 101: Palapala Sila Nui Helu 5036, Kuleana Helu 910, to Nunu. Mo'o, 'Ili of Kaunakua; & Kahuaile on the Kula of Maui, Land of Kaunakua, Honouliuli. 1 acre, 3.04 chains. June 9, 1862. Signed by Kaahumanu & L. Kamehameha. Volume 20, p. 297–298.

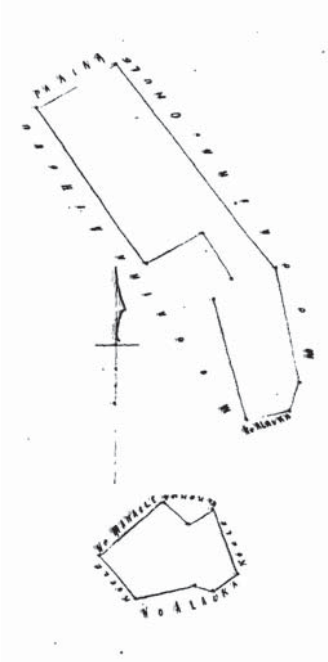


Figure 102: Helu 911 of Kauhalepa: *Parcel 1*, Moosaina of Kamalua at Poohilo. Honouliuli, E. O. Containing 1 acre and 2.45 chains; *Parcel 2*, Loi at Kamooiki, Hopenui, Poohilo. Honouliuli, E. O. Containing 3.89 chains. *Source: Māhele Award Book 2:327.*

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Poohilo in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, a loi paahao (taro pond fields worked by prisoners), and the land of Hinaa; towards the East, the land of Hinaa; towards the South, the land of Kauakahilau; towards the West, the land of Kauakahilau.

Here is my second claim. Here are its boundaries: towards the North, the land of Manaole; towards the East, the land of Kauakahilau; towards the South, Hopenui; towards the West, the land of Kekua.

Here is my third claim. Here are its boundaries: towards the North, the land of Kauakahilau; towards the East, Hinaa; towards the South, the land of Manaole; towards the West the pa Aina. Kauakahilau gave it to me.

I am with appreciation, your obedient servant.

By Kauhalepa X³⁰¹

Native Testimony Kaimuena sworn and stated. I know the land of Kauhalepa at Poohilo in Honouliuli. There are two parcels there, four loi and a house in one parcel.

³⁰¹Book 2, p. 523, Oct. 11, 1847.

One loi in another parcel.

The boundaries of the four loi are: Mauka, pa aina; towards Honolulu, a stream and the land of Hinaa; Makai, Kauakahilau's land; towards Waianae, Manaole's land.

2. The boundaries of the second parcel are: Mauka, Manaole's land; towards Honolulu, Kauakahilau's land; Makai Alauka's land; towards Waianae, Kawahaea's land. Kauhalepa got the land from Kawahaea, he is an overseer Konohiki for Kekauonohi. It was in the time the Kinau was alive. No one has objected to him.

Nunu sworn and stated. I know this place exactly as Kaimuena stated.³⁰²

Foreign Testimony Kaimuena sworn. This land is in Honouliuli Ewa in two distinct pieces.

1. First. Four Kalo patched and a strip of Kula, having a house on it, bounded by Govt. fence, Mauka; Honolulu by a stream between it & Hinaa's land. Makai by Kauakahilau's; Waianae by Manaole's land.

2. Second piece. One kalo patch, bounded: Mauka by Manaole's land; Honolulu by Kauakahilau's; Makai by Alauka's; Waianae, by Kawahaea's land.

Claimant had it from Kauakahilau, Konohiki, in time of Kinau before 1839, and has held & cultivated it ever since without any one two dispute him.³⁰³

7.53 Helu 914: The Claim of Kamaala

Claimant: Kamaala

Location: 'Ili of Niukee and Kapapapuhi (fig. 104)

Recorded at: Honouliuli

Date: Oct. 21, 1847

Status: Awarded; Royal Patent 4163 (fig. 105)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Nukee [Niukee], in Honouliuli, Ewa, Island of Oahu. Here are the boundaries of these loi: towards the North, the Auwai; towards the East, the Auwai and the moo land of Luaana [Luana]; towards the South, a Poalima (parcel worked for the chief), and the estuary of Makai; towards the West, a Poalima and the Loko of Omoomoki.

Here is my second land claim: towards the North, the kula of Luaana; towards the East, the land of Honaunau, the land of Paele, and the land of Kalauahi [Kaalauahi]; towards the West, the Auwai and the loi of U'ia.

³⁰²Book 3, p. 157-158, July 19, 1848.

³⁰³Book 2, p. 392-393, July 19, 1848.

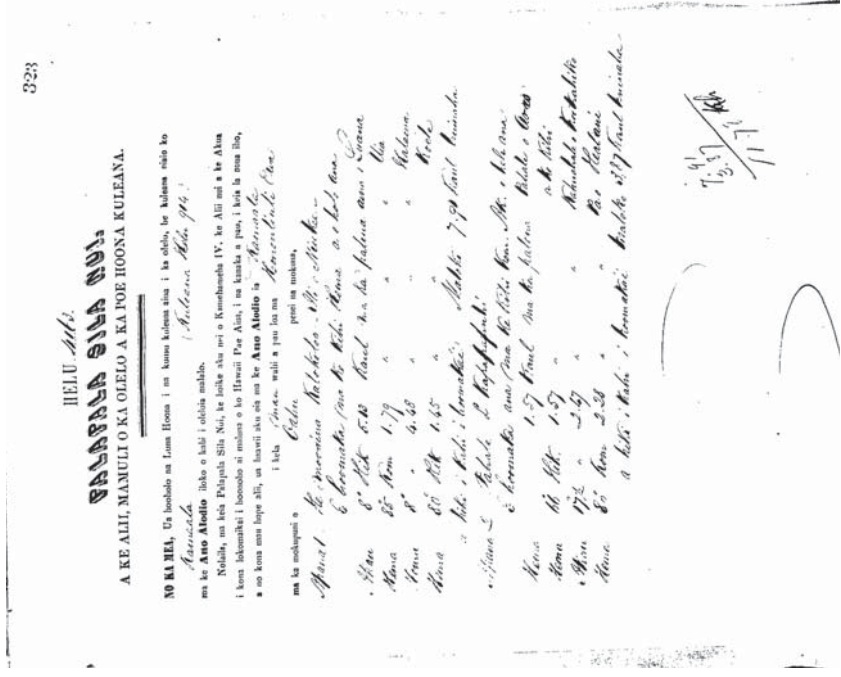


Figure 105: Palapala Sila Nui Helu 4163, Kuleana Helu 914, to Kamaala. Mo'o of Kaloko, Ili of Niukee, & Palala at Kapapahu, Honolulu. 1 acre, 1 78/100 chains. August 23, 1858. Signed by Kaahumanu and Kamehameha. Volume 17, p. 323-324.

3. Parcel three. Mauka, Uia's land; towards Honolulu, Mokumakuaole's land; Makai, my land; towards Waianae, Uia's land. Three lot in this parcel and a kula section. No wall and no house.
Kamaala got the land from Kawaa in the year 1831. No one has opposed him. Nunu sworn and stated. I know this place exactly as Luana stated.³⁰⁵

Foreign Testimony Luana sworn. This land is in 4 pieces in Honolulu. Ewa.
1. First lot, bounded: Mauka by Healan's land; Honolulu by Kawahamana's land; makai by Nika's; Waianae by Aoa's. It is fenced, and claimant has 4 houses on it.
2. Two Kalo patches, bounded: Mauka by Kinolua's land; Honolulu by my place; Makai by Honaunau's; Waianae by Kinolua's. Some kula is in this lot.
3. Three Kalo patches, bounded: Mauka by Ohai's land; Honolulu by Mokumakuaole's land; Makai by my place; Waianae by Ohai's. Also some Kula.
Claimant obtained these land from Kawaa in the time of Kaahumanu and has held the ever since in peace without dispute.
Nunu sworn and confirmed the previous testimony.³⁰⁶

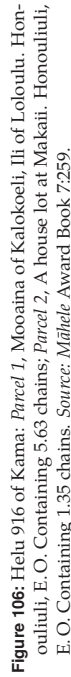
7.54 Helu 916: The Claim of Kama

Claimant: Kama
Location: Ili of Kalokoeli (fig. 106)
Recorded at: Honolulu
Date: Oct. 11, 1847
Status: Awarded; Royal Patent 6261 (fig. 107)

Native Register To the honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim which is at Kalokoeli, in Honolulu, Ewa, Island of Oahu. Here are the boundaries: towards the North, the land Kaalauahi, the Auwai, and the land of Kuhemu; towards the East, the land of Kaalauahi and the land of Kahakulili; towards the South, the land of Puanani; towards the West, the stream of Makai. Kaope gave this to me.
I am with appreciation, your obedient servant.
By Kama³⁰⁷

Native Testimony Kaopala sworn and stated. I know this land of Kama at Honolulu in Ewa. Two parcels. The boundaries of the house lot are: Mauka, Nika's

³⁰⁵Book 3, p. 169-170, July 26.
³⁰⁶Book 2, p. 400, July 26, 1848.
³⁰⁷Book 2, p. 528, Oct. 11, 1847.



land; towards Honolulu, his land also; Makai, Kalaupala's land; towards Waianae, Puanani's land. Kama has two houses there. They are not enclosed

2. Parcel two. Mauka, Kalaauahi's land; towards Waikiki, Kahakulilili's land; Makai, Puanani's land; towards Waianae, Mahina's land. No house on this parcel, and no wall. Kama got the land of parcels 1 and 2 from Kawaia. He is a luna Komohiki for Kekauonohi.

Poopuu sworn and stated. My knowledge of this land is the same as Kaopala's knowledge.³⁰⁸

Foreign Testimony Kaopala sworn. This land is in Honouliuli, Ewa, in two lots.

1. Bounded mauka by Niki's land; Honolulu also; Makai by Kalaehala & stream; Waianae by Kuanani's [Puanani] land. There are 2 houses of claimants.
2. Kalo lands. 2 patches bounded: Mauka by Kalaui's [Kalauihi] land; Honolulu by Hakulihii; Makai by stream dividing it from Puanani's; Waianae by Maakuia's. There is no fence. Claimant got these lands from Kaope in 1842, who owns them under Kekauonohi. Claimant has held them in peace to this time.

POOPUU SWORN, CONFIRMED ALL THE PROCEEDING STATEMENT.³⁰⁹

7.55 Helu 917: The Claim of Kaulu

Claimant: Kaulu

Location: 'Ili of Kamilomilo and Kaaumakua (fig. 108)

Recorded at: Honouliuli

Date: Oct. 21, 1847

³⁰⁸Book 3, p. 167. July 26.

³⁰⁹Book 2, p. 398, July 26, 1848.



Status: Awarded; Royal Patent 2866 (fig. 109)

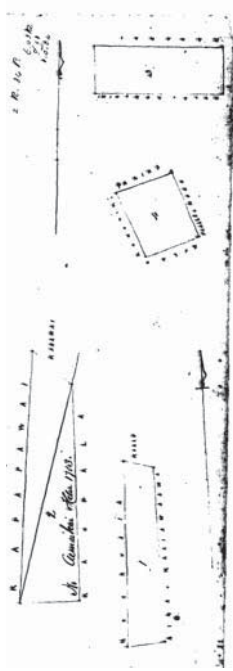


Figure 108: Helu 917 of Kaulu: *Parcel 1*, Moaana of Kumuniu, Ili of Kamilomilo. Honouliuli, Ewa, Oahu. Containing 2 rods, 34 rods; *Parcel 2*, [crossed out] For Aemaikai Helu 1703; *Parcel 3*, A Puuone (dune-banked pond) at Waioha, Ili of Kamilomilo. Containing 693 chains. *Parcel 4*, House lot on the kula of Kaamukua. Honouliuli, E. O. Source: *Māhale Award Book 2*:333.

Native Register The Pres. and honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim, pursuant to the source law. This land is there at Kamilomilo, Honouliuli, Ewa, on the Island of Oahu. Here are its boundaries: towards the North, the stream of Makai; towards the East, the land of Kalanihōpu; towards the South, the land of Kahikiula; towards the West, some akaakai (bulrushes) and the land of Kahakulili.

Here is my second claim. Here are its boundaries: towards the North the Poalima (parcel worked for the chief) of Kalanihōpu; towards the East, the land of Kaiaawa; towards the South, the land of Kaiaawa; towards the West, the land of Kahikiula. Here is my third land claim. Here are its boundaries: towards the North, the Poalima of Kalanihōpu; towards the East, the Poalima of Kalanihōpu and the house of Kaniau; towards the South, an Auwai and some akaakai; towards the West, the land of Kahikiula and the land of Aemaikai.

Here is my fourth land claim. Here are its boundaries: towards the North, the shore; towards the East, a hill and the Loko of Naholowaa; towards the South, a kula Alialia (salt flats); towards the West, Pīo's house.

Here are my house claims. They are at Kaamukua, in Honouliuli. Here are the boundaries: towards the north, the pa Aina; towards the East, the land of Mokumeha; towards the South, a kula parcel and the stream; towards the West, a wall and a kula

parcel. Kalanihōpu gave me these properties, but my residency has been along since before.

I am with appreciation,
By Kaulu X³¹⁰

Native Testimony Nunu sworn and stated. I know the land of Kaulu at Honouliuli, Ewa. Four parcels of land. The boundaries of the first parcel are: Mauka, the muliwai; towards Honolulu Kalaihopu's land; Makai, Kahikiula's land; towards Waianae, Kaope's land.

2. In parcel two, 1 loi. Mauka, Kalaihopu's land' towards Honolulu, Kaiaawa's land; his land also makai; towards Waianae, Kahikiula's land.

3. Parcel three, two loi. Mauka, Kanahuna's land and Kaniau's land; towards Honolulu, Kalaihopu's land; Makai, Kapio's land; towards Waianae, Aemaikai's land. This parcel has no wall.

4. Parcel four, 1 loi. Mauka, the sea and the same towards Honolulu. Makai, Kekaunohi's land; towards Waianae, the land of Pīo.

Kaulu got the land from Kawaa in the time of Kaahumanu. Kaulu died in the year, 1848, and the land went to his son Kaoliko. He had five children. Kaluahai the second. The third is Kanakaole, the forth is Luika w., the fifth is Kaanaana. We accurately heard that Kaulu bequeathed his land to his children. And Kaoliko is their representative.

Luana sworn and stated. I know this land and the will of Kaulu that the land be equally for his children exactly as Nunu has stated.³¹¹

Foreign Testimony Nunu Sworn. This land is in Honouliuli, Ewa, consisting of 4 lots, principally Kalo.

1. bounded mauka by a stream running with the mountain; Honolulu, by Kalaihopu's land; Makai by Kalaihopu; Waianae by Kaope's. Containing 6 Kalo patches.

2. One Kalo patch bounded: Mauka by Kalaihopu's land; Honolulu by Kaiaawa's; Makai also; Waianae by Kaikiula's land.

3. Two Kalo patches, bounded: Mauka by Kaneola & Niau's lands; Honolulu by Kalaihopu's; Makai by Kapio's; Waianae, Aemaikai's land.

4. One Kalo patch bounded: Mauka by a winding branch of the sea; and Honolulu; Waianae by Pīo and Kaimuena's land. Makai by Kekaunohi's land. Claimant got this from his father in 1848 at his death in February last, who had it from Kawaa in Kaahumanu's time.

Kaulu was claimants name as at the head of the claim rec'd., he was father of Kaoliko who puts in his claim as oldest child and as having received it by title. There are 4

³¹⁰Book 2, p. 529, Oct. 21, 1847.

³¹¹Book 3, p. 168-169, July 26.

other children: 1 Kamakaiahi [Kaluahiahi] is one daughter, 2 Kanakaole, 2 Louisa, 4 Kaanaana. This land is left as joint property of all. Kaoliko acts as representative of the rest.

Kaluana sworn. Confirmed the preceding particulars in whole.³¹²

7.56 Helu 946: The Claim of Kauinui

Claimant: Kauinui
Location: 'Ili of Poohilo
Recorded at: Honolulu
Date: Nov. 1, 1847
Status: Not awarded

Native Register President of the Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. It is there at Poohilo, Honolulu, Island of Oahu. Here are its boundaries: towards the North, the Loko of Hopenui; towards the East, the loi land of Keliiaa and the land of Otiopio; South, the land of Oni; West, the houses of Kawahaea and the wall.

I am with appreciation.
By Kauinui X³¹³

7.57 Helu 947: The Claim of Kaopala

Claimant: Kaopala
Location: 'Ili of Loloulu, Kaaumakua, and Kaulaula (fig. 110)
Recorded at: Honolulu
Date: Nov. 1, 1847
Status: Awarded; Royal Patents 3090 and 3091 (figs. 111, 112)

Native Register President of the Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. It is there at Loloulu, Honolulu, Ewa, Island of Oahu. Here are its boundaries: towards the North, the Poalima (parcel worked for the chief) of Kihewa; towards the East, the land of Mahae; towards the South, the land of Kaneaola; towards the West, the land of Keliiaa and the house of Poopuu; Kapoli also has a property at this place. The name of this place is Kumupali, and I take care of it.

Here is my second claim. Here are its boundaries: towards the North, the stream of Makai; towards the East, a Poalima; towards the South, a Poalima; West, a Poalima;

³¹²Book 2, p. 399–400, July 26, 1848.
³¹³Book 2, p. 553, Nov. 1, 1847.

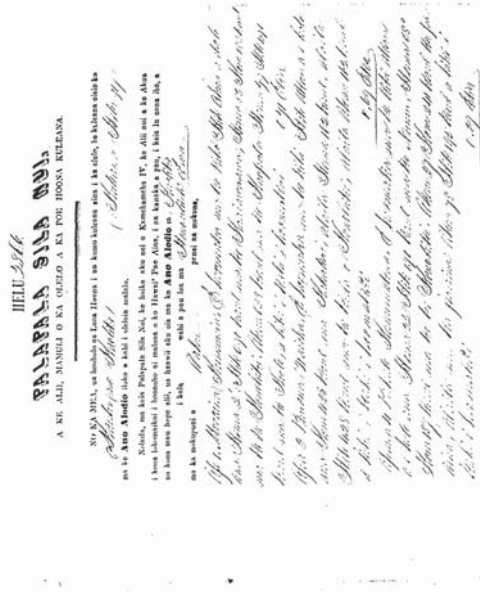


Figure 109: Palapala Sila Nui Helu 2866, Kuleana Helu 917, to Kaoliko (Kaulu). Mō'o of Kumuniu, & Palale at Kaaumakua, Honolulu. 1.79 acres. May 21, 1856. Signed by Kamehameha and Kaahumanu. Volume 13, p. 195–196.

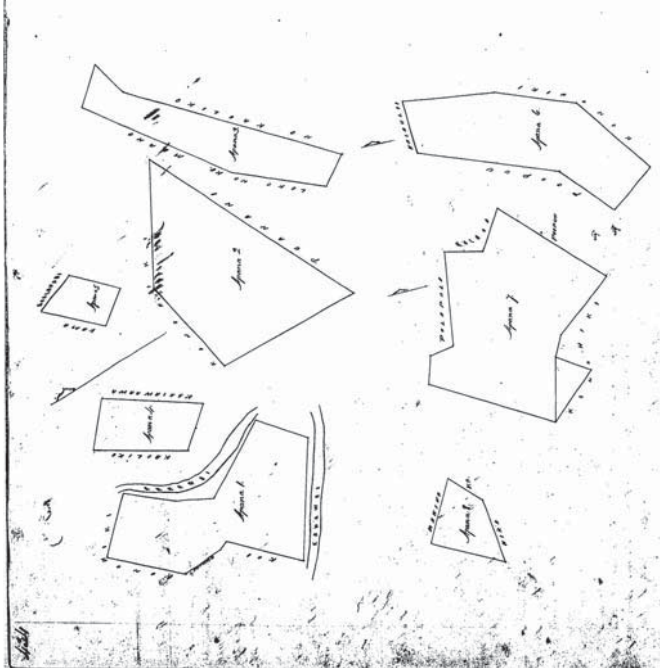


Figure 110: Hele 947 of Kaopala: *Parcel 1*, Mookalo in Ili of Puehuehu, Honouliuli, Ewa, Oahu. Containing 2.676 acres; *Parcel 2*, Mookalo in Mokumeha Ili, Honouliuli, Ewa, Oahu. Containing 3 acres; *Parcel 3*, Mookalo, Kapapawai, an ili of Honouliuli. 1.651 acres; *Parcel 4*, Mookalo of Kuaia, an ili of Honouliuli, E. O. Containing .784 of an acre; *Parcel 5*, Mookalo in Ili of Kalokoeli, Honouliuli, E. O. Containing .360 of an acre; *Parcel 6*, Mookalo in Ili of Kumupali, Honouliuli, E. O. Containing 1.841 acres; *Parcel 7*, Mookalo in Ili of Ohikili, Honouliuli, E. O. Containing 3.123 acres; *Parcel 8*, A house lot at Kumupali, Honouliuli, E. O. Containing .8 of an acre. *Source:* *Māhele Award Book 2:356, Māhele Award Book 9:433.*

Here is my third claim. Here are its boundaries: towards the North, a Poalima; towards the East, the land of Kekua and Kumupopo; towards the South, akaakai (bulrushes); West, the land of Koakanu.

Here is my third [fourth] claim. This land is there at Kaumakua, Honouliuli. Here are its boundaries: towards the North, the Loko of Kauhimakahou; towards the East, the pa Aina; towards the South, the pa Aina; towards the West, the land of Kauouo.

Here are my house claims. There at Kaulaula, at Honouliuli, stand there by the houses of Mahina.

Done by me, Kaopala X³¹⁴

Native Testimony Poopuu sworn and stated. I know the land of Kaopala at Honouliuli, Ewa. Five parcels. The boundaries of the first parcel are: Mauka Puehu's land; towards Honolulu, Nika's land; Makai, Kalaoa's land; towards Waianae, Nika's land.

2. Parcel 2, 14 loi. Mauka, Nika's land; towards Honolulu, Kauhī's land; Makai, Kaneaola's land. Towards Waianae, my land. No wall there, no house.

3. Parcel three. Mauka Kaope's land; Honolulu, Kekua's land; Makai, loi Aupuni (government taro pond field); towards Waianae, Kauhī's land. Three loi in this parcel. No wall, now house.

4. Parcel four, two loi. Mauka Kaneaola's land. Towards Honolulu, Nika's land; Makai, his land also; towards Waianae and Ewa, also his land. No house, no wall.

5. Parcel five. Mauka Lauhala's land; towards Honolulu, Nika's land; Makai, pa aina; towards Waianae, Kauouo's land.

Kaopala got his land from Napahi, his father. It was in the time of Kamehameha I. It was in 1844, that the land became Kaopala's. No one has objected.

Kama sworn and stated. I know this land just as Poopuu's land [description]. But in the first parcel there is a land for Namaau in the middle.³¹⁵

Foreign Testimony Poopuu sworn. This land is in Honouliuli, Ewa, consisting of 5 separate pieces.

1. House lot, bounded: Mauka by Puehu's land; Honolulu by Nika's; Makai by Kalaoa; Waianae by Nika's land.

2. Second lot. 14 kalo patched, not fenced. Bounded: Mauka by Nika; Honolulu by Kauhī's land; Makai by Kaneaola's; Waianae Poopuu's.

3. Third. 3 patches, bounded: Mauka by Kaope's land; Honolulu by Kekua's; makai by Govt. land; Waianae by Nauhī's [Kauhī] land.

³¹⁴Book 2, p. 553-554, Nov. 1, 1847.

³¹⁵Book 3, p. 166-167, July 26.

4. Fourth. 2 patches, bounded Mauka by stream between Kaneaola's land; Honolulu by Nika's; Makai also; Waianae also.

5. Fifth: bounded: Mauka by Kaopala's land; Honolulu by Nika; Makai by Govt. Fence; Waianae by Kauou's land. 3 kalo patches. Claimant has held these lands from his ancestors down. Kaope is a Konohiki & luna, and Claimants elder brother, and he gave him these Kalo lots in 1841. None have disputed his right to this time.

He got the house lot from Napahi, his father in 1841. It has been transmitted from ancestors down without any disputing the right to this time.

Kama sworn and confirmed the entire testimony about the Kalo lands, but knew nothing about the House lot.

Note, There is one Kalo patch in the House lot a it has been defined, belonging to Namauu.³¹⁶

7.58 Helu 960: The Claim of Poopuu

Claimant: Poopuu

Location: 'Ili of Loloulu (fig. 113)

Recorded at: Honouliuli

Date: Nov. 11, 1847

Status: Awarded; Royal Patent 6641 (fig. 114)

Native Register President of the Commissioners who Quiet Land Claims, your honors. Aloha to you. I hereby tell you of my land claim. It is there at Loloulu, Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kaopala; towards the East, the land of Kaopala; South, the land of Kaneaola; West, the land of Kaopala.

Here are my house claims: North, the land of Mahina; East, the land of Kaopala; South, the land of Keliiaa; West, a Kula parcel.

By Poopuu³¹⁷

Native Testimony Kaopala sworn and stated. I know this land of Poopuu at Honouliuli, two parcels. The boundaries of the first parcel, it is the house lot, are: Mauka, my land; and mine on all sides. There is one house for Poopuu there. It was I who agreed to his building his house there. No one objected.

The boundaries of parcel two are: Mauka, Nika's land; towards Honolulu, Kaopala's land; Makai, Kaneaola's land. Towards Waianae, my land. There are 3 loi in this parcel; no wall, no house. I do not know who gave Poopuu this land. His residency was from the time of Liholiho.

³¹⁶Book 2, p. 397-398, July 26, 1848.

³¹⁷Book 2, p. 562, Nov. 11, 1847. See also Helu 1688 for further descriptions of Poopuu's claim.

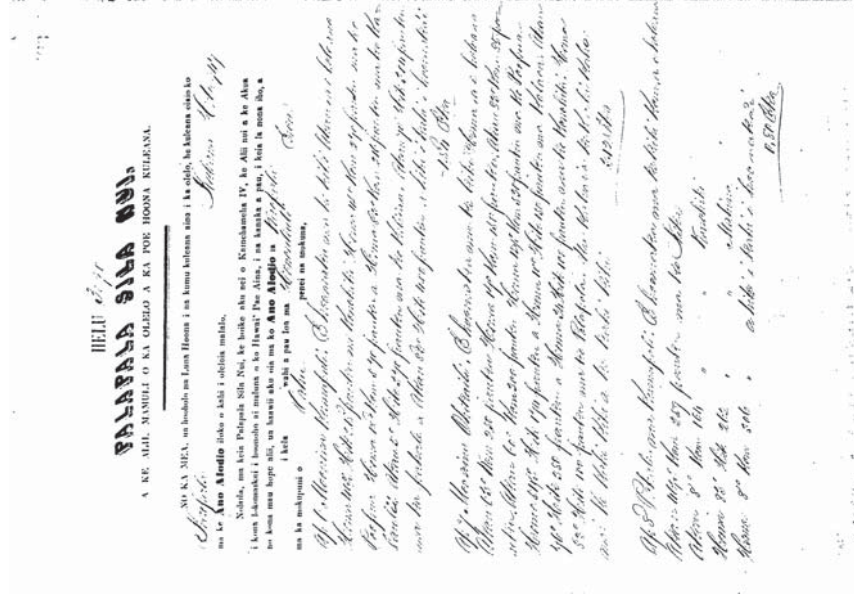


Figure 111: Palapala Sila Nui Helu 3090, Kuleana Helu 947, to Kaopala. Mo'o of Kumupali; Mooaina of Ohikuli; & Pahale at Kumupali, Honouliuli. 5.76 acres. August 7, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 663-664.

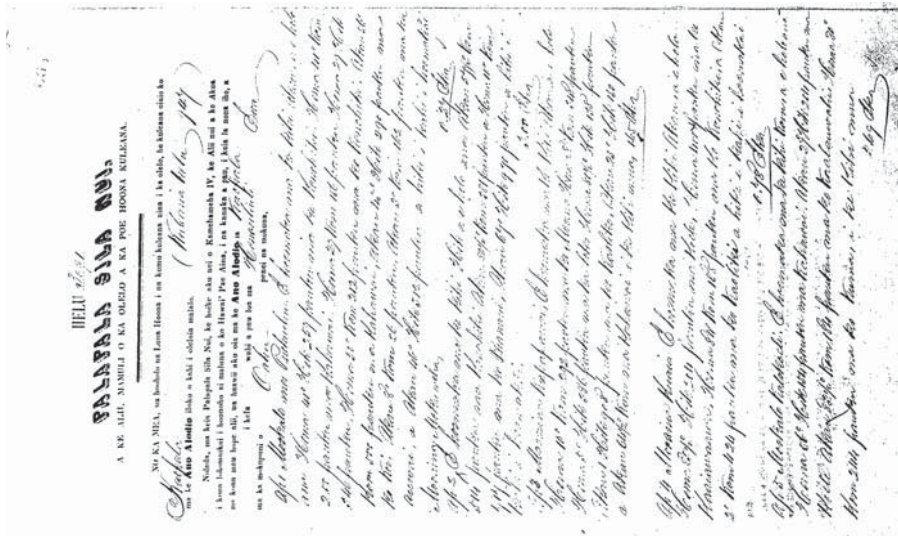


Figure 112: Palapala Sila Nui Helu 3091, Kuleana Helu 947 Kaopala. Mo'ō kalo at Puehuehu; Mo'ō of Kapapawai; & Mo'ō of Kuiaia, Honouliuli. 9.39 acres, August 7, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 665–666.

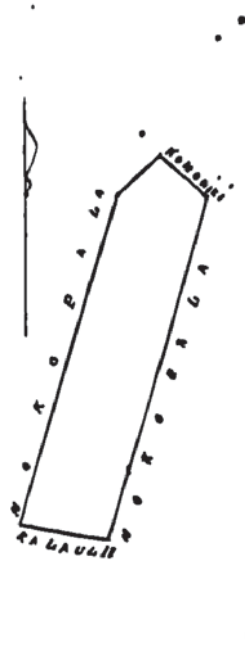


Figure 113: Helu 960 and 1688 to Poopuu. Mooaina of Kanenehu, Ili of Loloulu. Honouliuli, Ewa, Oahu. Containing 7 13/100 chains. Sources: *Māhele Award Book 2:371* and *Māhele Award Book 6:133*.

Kama sworn and stated. I know this land exactly as Kaopala has stated.³¹⁸ Petition of Poopuu. He completed his entry at Honoulu, with the Commissioners who quiet titles in Honoulu.³¹⁹

Foreign Testimony Kaopala sworn. This land is in Honouliuli, Ewa, and consists of two places.

1. House lot is bounded entirely by my land. Claimant has one house on it. There is none for the Govt. fence.
 2. Second. Three Kalo patches. Bounded: Mauka by Nika's land; Honoulu by my land; Makai by Kaneola's land; Waianae by my land. No fence or house. I have always understood Claimant has lived in possession of these two lots from his ancestors in peace to this time There is no dispute that I know of.
- Kama sworn. Confirmed the statement made in all the particulars, and knew of no controversy.³²⁰

Clit. says his claim has been heard before the Land Commission.³²¹

7.59 Helu 1019: The Claim of Kukuiaina

Claimant: Kukuiaina

³¹⁸Book 3, p. 165–166, July 26.

³¹⁹Book 9, p. 280.

³²⁰Book 2, p. 397, July 26, 1848.

³²¹Book 9, p. 134.

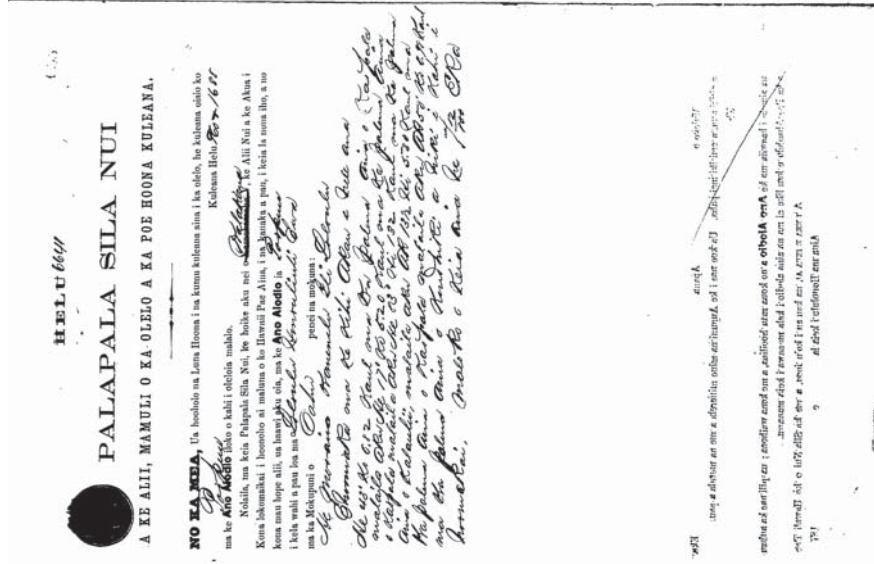


Figure 114: Palapala Sila Nui Helu 6641, Kuleana Helu 960 & 1688, to Poopuu, Mo'o of Kanenelu in 'Ili of Loloulu, Honouliuli. 12/100 acres. November 5, 1874. Signed by Kalakaua Rex. Volume 24, p. 655–656.

Location: 'Ili of Lalanui
Recorded at: Honouliuli
Date: —
Status: Not awarded

Native Register I am Kukuiaina. I hereby tell you of my claims; an ili land in Honouliuli is first. A moo land claim is second. A lot claim under the konohiki is third.

Done by me, Kukuiaina³²²

Native Testimony Kekuahiola sworn and state. I know the land of Kukuiaina at Honouliuli. Lalanui is the name. His is an ili land with a house also.

Mauka, Pupuka's land; towards Honouliuli, kula of Kekuaoonohi; Makai, Hano's land; towards Waianae, Kekuaoonohi's land. This land has no wall. The land was from his father who died in 1847, by will it became his. His father resided there from the time of K [Kamehameha] I. He has many relatives, they are in Ewa at different lands.

Kukuiaina spoke truly, as the Konohiki of the second parcel at Waikele as told in his applications.

Pupuka sworn and stated. My knowledge is the same as Kekuahiola has stated.³²³

Foreign Testimony Kekuahiola sworn. His land is in Honouliuli, Ewa, in 3 separate pieces, or three difference names of one piece.

1. First—house lot bounded: Mauka by land of Pupuka; Honouliuli by Kekuaoonohi's; Makai by Hano; Waianae by Kekuaoonohi's land.

Claimant has 1 house on it, it has no fence, but is planted with potatoes.

Claimant had it from his father by will in 1847, who had it from time of Kamehameha 1 and held it in peace to the time of his death.

Pupuka sworn, and confirmed the testimony given and knew of no counter claim.³²⁴

7.60 Helu 1565: The Claim of Kaalauahi

Claimant: Kaalauahi
Location: 'Ili of Niukee (fig. 115)
Recorded at: Honouliuli
Date: Nov. 23, 1847
Status: Awarded; Royal Patent 3857 (fig. 116)

³²²Book 2, p. 594.

³²³Book 3, p. 181–182, Aug. 4, 1848.

³²⁴Book 2, p. 412, Aug. 4, 1848.

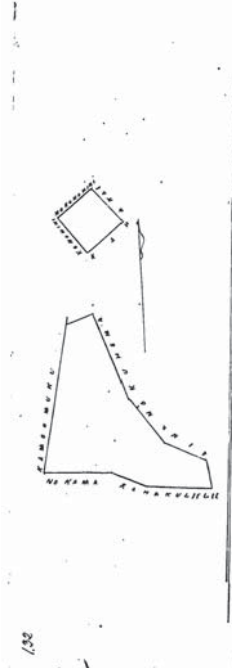


Figure 115: Helu 1565 of Kaalauahi: *Parcel 1*, Mooina of Kalokoeli, Niukee. Honouliuli, Ewa, Oahu. Containing 1 acre and 6 42/100 chains; *Parcel 2*, A house lot at Kapapapuhi. Honouliuli, Ewa, Oahu. Containing 2.56 chains. *Source:* *Māhalele* Award Book 6:131.

Native Register To the honorable Commissioner who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, at Nukee [Niukee], in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, land of Hapauea; towards the East, loi of Kuhemu; towards the South, loi of Kama and the loi of Makuia [Maakuia]; towards the West, loi of Nakai, with the Loi of Pio. I am with appreciation, your obedient servant.

By Kaalauahi X³²⁵

Native Testimony Kawahamana Sworn. I now his place at Niukee ili in Honouliuli, Ewa, 6 loi kalo and a house together. Mautka, Kekaunohi, Kuhemu, and I. Honolulu, Kahakulili, Kama and Maakuia. Maki, Pio, Nakai and Uia. Waianae, Hapauea.

His land came from Paahana, his brother-in-law in the year 1841, and Paahana got it from Honaunau, who is a Konohiki. His residency has been continuous to this time. No objections.

Kekapa Sworn. Our knowledge is the same.³²⁶

Foreign Testimony Kawahamana sworn. I know this place, it is in Nuke [Niukee], Uliuli [Honouliuli], Ewa, consisting of Kalo land, 6 patches, and a house. Mautka is my place, Kekaunohi and Kuahemo [Kuhemu]. Honolulu, Kahakulili & Kama; Makai is Pio, Nakai, Uia; Waianae, Haapauea.

³²⁵Book 3, p. 164, Nov. 23, 1847.

³²⁶Book 3, p. 420, Jan. 29, 1849.

Paahana gave Claimant this lot in the year 1841. He got it from Honaunau, Konohiki unto this time. Claimant has held it unto the present time without dispute. Kekapa sworn, confirmed the testimony as above.³²⁷

7.61 Helu 1566: The Claim of Kaheananui

Claimant: Kaheananui
Location: *Ili* of Loloulu
Recorded at: Honouliuli
Date: —
Status: Not awarded

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim, there at Loloulu, in Honouliuli: towards the North the land of Poopuu; towards the East, the land of Mahina and Kauhikaula; towards the South, the land of Laili; towards the West, the land of Kauhikaula and Mili.
By Kaheananui X³²⁸

Foreign Testimony The people of Honouliuli came and stated, he registered a claim here, but he has died and there is no heir remaining. We think that this land claim rightfully belong to the Konohiki of Honouliuli, Ewa.³²⁹

7.62 Helu 1570: The Claim of Kekua (Kua)

Claimant: Kekua
Location: *Ili* of Poohilo, Aihonu, Waianu, Haalelenui, Haluanonomaka, Kuaiopelu, and Kalokoloa (fig. 117)
Recorded at: Honouliuli
Date: Nov. 25, 1847
Status: Awarded; Royal Patent 3518 (fig. 118)

Native Register This land is there at Poohilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kauhailepa; towards the East, the land of Kauakahilau; towards the South, the land of Kauhailepa; towards the West, the land of Manaole.

³²⁷Book 3, p. 91–92, Jan. 29, 1848.

³²⁸Book 3, p. 165.

³²⁹Book 9, p. 207, Nov. 7, 1854.

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Figure 116: Palapala Sila Nui Helu 3857, Kuleana Helu 1565, to Kaalaauhi. *Mo'o* of Katokoeli, *'Ili* of Niukee; & *Kahuahale* at Kapapahuhi, Honouliuli. 1 acre, 8.98 chains. December 7, 1857. Signed by Kaahumanu and Kamehameha. Volume 16, p. 473-474.

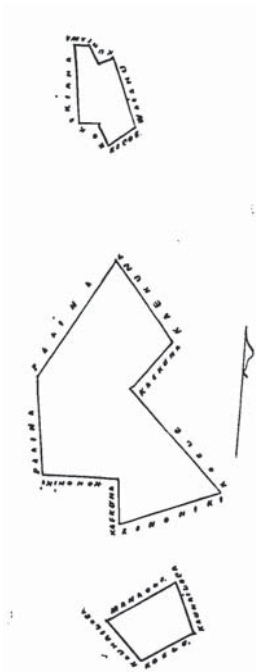


Figure 117: Helu 1570 of Kekua 1: *Parcel 1*, A Moosaina and house on the kula at Ahonu, Poohilo. Honouliuli, Ewa, Oahu. Containing 1 acre and 2.71 chains; *Parcel 2*, A loi at Haalelenui in Ahonu, Poohilo. Honouliuli, Ewa, Oahu. Containing 2.48 chains; *Parcel 3*, Two loi at Kuaiopelu in Poohilo. Honouliuli, Ewa, Oahu. Containing 2.15 chains. There being a total of 1 acre, 9.34 chains in the 3 parcels. Source: Māhele Award Book 6:137.

Here is my second land claim: towards the North, the land of Manaole; towards the East, the land of Hopenui; towards the South the land of Kaekuna; towards the West, the land of Kaekuna;

Here is my third land claim: towards the North, the land of Kubienua; towards the East, the land of Waianu; towards the South, the land of Kumupopo; towards the West, the land of Kapule.

Here is my fourth of my land claims, a small kula parcel by the house of Kauhailepa, in the kula of Kaekuna, by the pa Aina.

I am with appreciation, an obedient servant.
Bv Kekua X³³⁰

Native Testimony

Inoaole Sworn. I know his land, some loi and a kula at Aihonu, in the Moaaina of Waianu in the ili of Poohilo. Here are its boundaries:

M. Koele (agricultural parcel worked for the chief) of Hopenui

H. loi of Mooiki

Mk. loi of Kumuulu for Manaole

W. Pa Aina.

³³⁰Book 3, p. 166, Nov. 25, 1847. See also Helu 1598.

Parcel 2, Loi, Haalelenui in the moo of Waianu, the ili of Poohilo. Here are the boundaries:

- M. 2 loi of Kamalua and Kaloiiki
- H. a koele for the Konohiki
- Mk. Loi of Mooiki
- W. loi and kula of Manaole.

Parcel 3, a kula mahiai (cultivated dryland patch), Kalunonomaka at Aihonu and moo aina in the ili of Poohilo, Honouliuli, Ewa, Oahu. Here are the boundaries:

- M. Mooaina of Poopoo for Oni
- H. lo of Kalokoloa for Kuhiena
- Mk. Mooaina of Kepoe for Kumupopo
- W. kula of Haleokane for Kiaha.

Parcel 4, 2 loi, Kuaiopelu at Waianu in the ili of Poohilo, Honouliuli, E. O.:

- M. Mooaina of Poopoo for Oni
- H. Loi of Kalokoloa for Kuhiena
- Mk. Mooaina of Kepoe for Kumupopo
- W. Kula of Haleokane for Kiaha.

His land was from Manaole in the time of Kaahumanu. No one has opposed him. Kua [Kekua] Sworn, our testimony is the same. There is nothing wrong with his testimony.³³¹

Foreign Testimony Inoaole sworn, says the land of Clt. Is:

Ap. 1. 1 loi & kula called Aihonu, in the moo Waianu ili of Poohilo, Honouliuli, Ewa, Oahu. Bounded:

- M. by the koele (parcel of land worked for the chief) of Hopenui
- H by the loi Mooiki of Kauhailepa
- Mk. By the loi Kumuuulu of Nanaole
- W. by the paaina.

Ap. 2 a loi called Haalelenui in the moo Waianu, ili of Poohilo, bounded:

- M. by the loi of Kamalua & Kalotiki of Kauhailepa
- H. by the Koele of Konohiki
- Mk. by the loi and kula called Manaole

³³¹Book 9, p. 284.

Apana 3, a kula mahiai called Kalunonomaka in the moo aina of Aihonu, ili of Poohilo, Honouli. E. O. it is bounded:

- M. by the apana kula of Kauhailepa
- H. by the loi called Poeoe of Manaole
- Mk. By the apana kula of Kaekuna
- W. by the paaina.

Apana 4. 2 loi call Kaaiopelu and Kalokoloa in the moo aina of Waianu, Poohilo, Honouliuli, Ewa, Oahu. It is bounded:

- M. by the moo aina, Poopoo of Oni
- H. By the loi called Kalokoloa of Kuhiena
- Mk. By the moo aina Kapoe of Kumupopo
- W. by the kula Haleokane of Kekiaha.

Claimant received the land from Manaole in the time of Kaahumanu & has held it in quiet ever since.

Kua sworn, says the testimony of Inoaole is correct and is also his own.³³²

7.63 Helu 1570 B: The Claim of Pekane (Paekane)

Claimant: Pekane

Location: *Ili* of Kaaumakua, Kuaihee, Maiau, and Mooiki (fig. 119)

Recorded at: Honouliuli

Date: —

Status: Awarded; Royal Patent 5134 (fig. 120)

Native Register [See Native Register Helu 769, p. 318, for the original claim.]³³³

Native Testimony Paekane's case.

Paekane came and sworn that his claim was written by Maakua and his claim entered. It was agreed that his claim was secured.

Kumupopo Sworn. I know his land of Maiau, a moo parcel, Mooiki, 10 loi, and the house lot kula land at Kuaihee in the ili of Kaaumakua, Honouliuli, Ewa, Oahu.

Apana 2, two loko at Mokumeha in the mooaina of Kaaumakua.

Parcel 1. 3 loi.

M. mooaina of Kumuuulu

³³²Book 9, p. 139–140.

³³³Book 2, p. 423

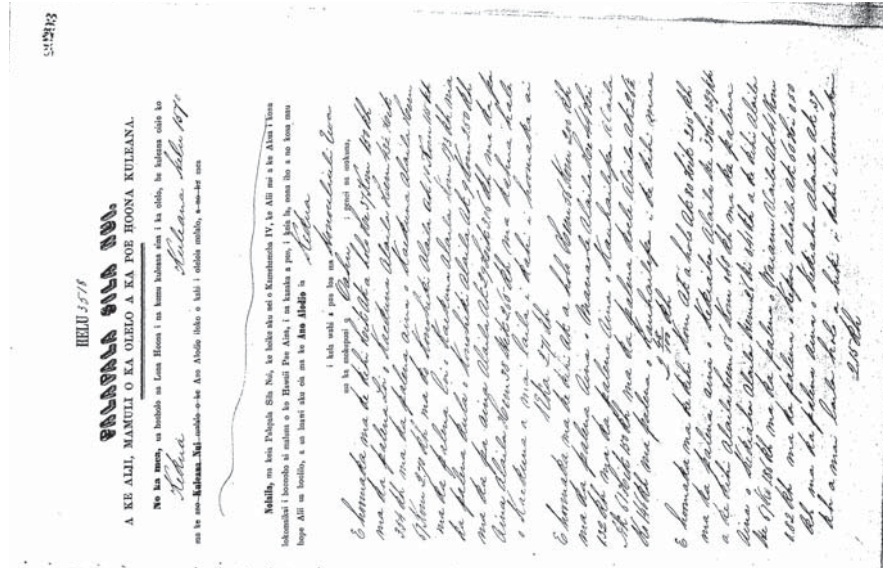


Figure 118: Palapala Sila Nui Helu 3518, Kuleana Helu 1570, to Kekua 1, Honouliuli, 1 acre, 7.24 chains. February 2, 1857. Signed by Kaahumanu and Kamehameha. Volume 15, p. 293–294.

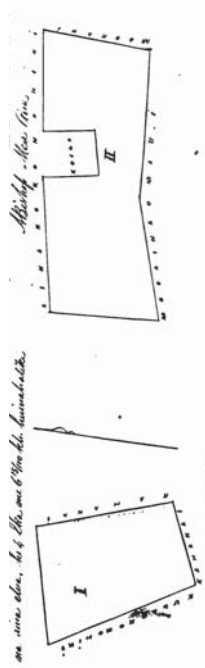


Figure 119: Helu 1570 B of Pekane: *Parcel 1*, A Puuone (dune-banked pond) at Mokumeha, Ili of Kaamakua, Honouliuli, Ewa, Oahu. Containing 1 acre and 7.39 chains; *Parcel 2*, Two Mooaina, Mooiki and Kuaihee, Ili of Kaamakua, Honouliuli, Ewa, Oahu. Bounded on one side by Huluhulumoku. Containing 2 acres and 8 76/100 chains. There being a total of 4 acres and 6 15/100 chains in these two parcels. *Source:* *Māhele Award Book 6:140.*

H. a pa aina
Mk. mooaina of Kanuooopa for Kalama
W. mooaina of Kamookahi for Hilea.

Apana 2. Two loko in the ili of Kaamakua. Here are their boundaries:

M. the shore
H. a kula alialia (salt making parcel)
Mk. a kula for the Konohiki at Mokumeha
W. a kula Kauhamaakakahou.

His land was from Kumupopo in the time of Kaahumanu.³³⁴

Foreign Testimony Clt. appeared & made oath that this claim was duly made out by Maakuia & sent in. The same is therefore admitted to a hearing.

Kumupopo sworn, says the land of Clt. consists 1st of 3 moo aina in one piece called Maiau, Mooiki & Kuaihee, being 10 loi & a kahuahale (house site) in the ili of Kaamakua, Honouliuli, E. O. 2nd Two fish ponds in Mokumeha in the ili of Kaamakua as above.

Apana 1. Is bounded:

M. by the moo aina of Kumuuulu
H. by the paaina

³³⁴Book 9, p. 285.

Mk. By the moo aina Kanuooapa of Kalama
W. by the moo aina Kamookahi of Hilea

Apana 2. The fishponds is bounded:

M. by the sea shore
H. by the kula alialia
Mk. by the kula of Konohiki called Mokumeha
W. by the kula alialia Kohumakakou

Clf. received his lands from [illegible] in the time of Kaahumanu, & has held the same in quiet until now.
Naholowaa sworn, says the above testimony is true & is also his own.³³⁵

7.64 Helu 1570 C: The Claim of Naholowaa

Claimant: Naholowaa
Location: Ili of Kaaumakua, Kaauwewai, and Mokumeha (fig. 121)
Recorded at: Honouliuli
Date: —
Status: Awarded: Royal Patent 6768 (figs. 122, 123)

Native Register [See Native Register Helu 746, p. 264, for the original claim.]³³⁶

Native Testimony Naholowaa's case.
Naholowaa came and swore for his land, that his application, written by Maakuia, had been dropped.
Kumupopo Sworn. I know his land, a moo, Kaauwewai in the Ili of Kaaumakua, Honouliuli, Ewa, Oahu. He has 3 loi, a kula, a fish pond, and some other places around the loko called Mokumeha.
Parcel 1. 2 loi, and a kula mahiai

M. moo aina of Kaiaulaula
H. Pa aina
Mk. some loko of Kalahu for the Konohiki
W. Moaaina of Polapola for the Konohiki.

Parcel 2. House lot at Mokumeha. Here are the boundaries:

M. the shore.

³³⁵Book 9, p. 140.
³³⁶Book 2, p. 406.

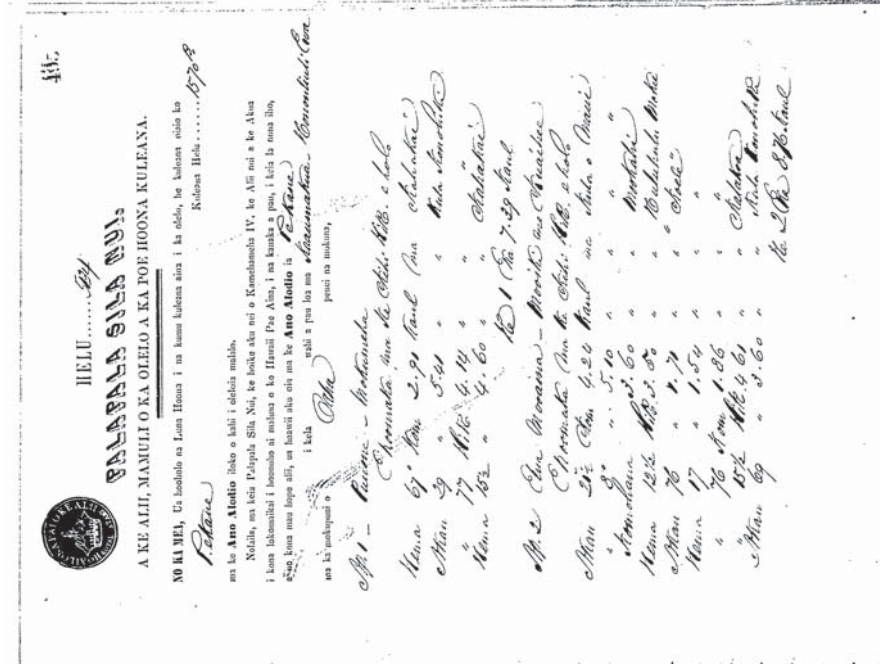


Figure 120: Palapala Sila Nui Helu 1570 B, to Pekane. Puuone of Mokumeha; & Moaaina of Mooiki and Kualhee, Honouliuli. 4 acres 6.15 chains. September 19, 1852. Kaahumanu & L. Kamehameha. Volume 20, p. 495-496.

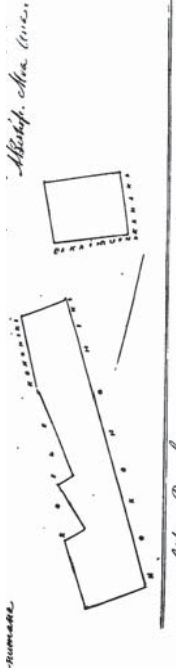


Figure 121: Helu 1570 C of Naholowaa: *Parcel 1*, A House lot at Waioha, Ili of Kaaumakua. Honouliuli, Ewa, Oahu. Containing 4.60 chains; *Parcel 2*, Mooina of Kaaunui, Ili of Kaaumakua. Honouliuli, Ewa, Oahu. Containing 1 acres and 6.14 chains. There being 2 acres and 1 34/100 chains in the two parcels. *Source:* *Māhale* Award Book 6:138.

- H. the houses of Kaimuena folks.
- Mk. kula of Mokumeha
- W. kula of Mokumeha.

His land was from Kumupopo in the time of Kaahumanu. No one has opposed him.³³⁷

Foreign Testimony Clt appeared & made oath that his claim was duly made out by Maakua & sent in. The same is therefore admitted to a hearing.
Kumupopo sworn, says the land of Clt. is a moo aina called Kaaunui in the ili of Kaaumakua, Honouliuli, E. O., containing 3 loi, one of kalo only & 2 with fish, with a kula in one piece. 2nd apana contains his house in Mokumeha.
Apana 1 contains 3 loi and a kula mahiai, and is bounded:

- M. by moo aina Kaiaulaula of Konohiki
- H. by the paaina
- Mk. by the loko of Konohiki called Kalahu
- W. by the moo aina Polapola of Konohiki.

Apana 2, a kahuahale in Mokumeha

- M. by the seashore
- H. by the Kauhale of Kaimuena
- Mk. by the kula Mokumeha
- W. by the kula Mokumeha

³³⁷Book 9, p. 286.

Clt. received his land from Kumupopo in the time of Kaahumanu & has held quiet possession of the same until the present time.³³⁸

7.65 Helu 1573: The Claim of Kawahamana

Claimant: Kawahamana
Location: Ili of Niukee
Recorded at: Honouliuli
Date: Nov. 24, 1847
Status: Awarded; Royal Patent 4244 (fig. 124)

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Niukee, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kaalaauhi; towards the East, the land of Uia and the Poalima (parcel worked for the chief); towards the South, the Poalima; towards the West, the moo aina of Luana.

Here is my second land claim: towards the North, the land of Kaunahi; towards the East, the loko of Niholaa; towards the South, the land of Kuheuu; towards the West, the land of Kaalaauhi.

Here is my third claim, a kula in the place of Nohunohu. Here are its boundaries: towards the North, an Auwai; towards the East, the land of Nihua; towards the South the land of Nohunohu; towards the West, the land of Kinolua.

Here is my house claim at Kapapuhi [Kapapapuhi] in Honouliuli: towards the North, the sea, towards the East, the house of Kaalaauhi; towards the South, the sea; towards the West, salt beds.

I am with appreciation your obedient servant.

Done by me, Kawahamana³³⁹

Native Testimony Kaalaauhi Sworn. I know his place at Niukee in Honouliuli, Ewa. 5 loi kalo.

Mauka, Paele. Honolulu, Kaunahi, Hapauea, and some loi of Honaunau. Makai, Nika. Waianae, Luana and Kamaala.

His land was from Kamakau in the time of Liholiho, and he has resided there in peace to this time. No one has objected. Honaunau is the konohiki at this time.

Kekapa Sworn. Our knowledge is the same³⁴⁰

³³⁸Book 9, p. 140-141.

³³⁹Book 3, p. 167-168, Nov. 24, 1847.

³⁴⁰Book 3, p. 421, Jan. 29, 1849.

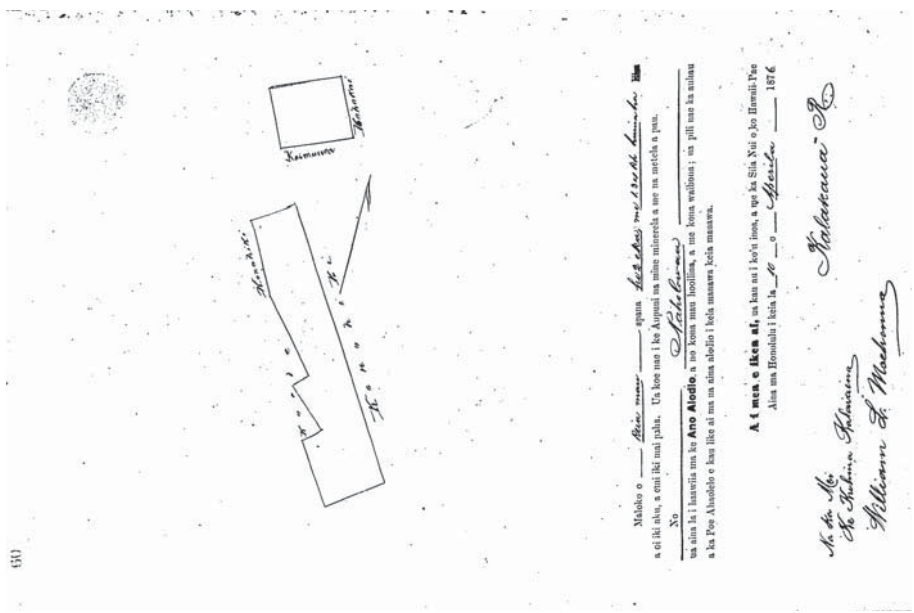


Figure 123: Page 2 of 2. Palapala Sila Nui Helu 6768, Kuleana Helu 1570 C, to Nalowaa. See fig. 122 for page 1.

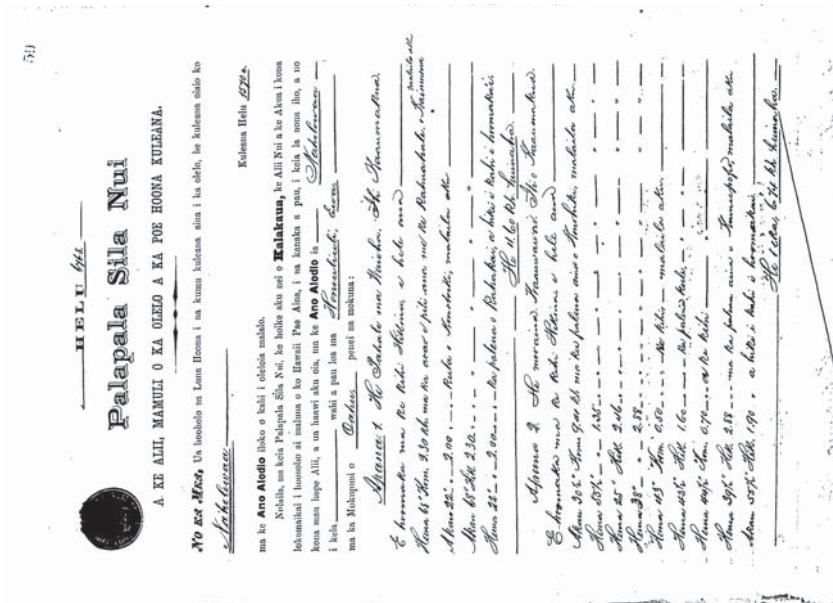


Figure 122: Page 1 of 2. Palapala Sila Nui Helu 6768, Kuleana Helu 1570 C, to Nalowaa. Mo'o in the 'Ili of Kamilomilo, Honolulu. 2 acres, 1.34 chains. April 10, 1876. Signed by Kalakaua Rex. Volume 26, p. 59-60. See fig. 123 for page 2.

Foreign Testimony Kaalawahi [Kaalauahi] sworn. I know this place it is in Niukee, Honouliuli, Ewa, and consists of Kalo land in 5 patches. Mauka is Paele; Honolulu, Kaunahi, Haapauea & Hoonaunau; Makai is Nika, Konohiki; Waianae, Luaana & Kamaala.

Claimant had this lot from Kamakau in time of Rihoriho; and has ever since held it undisputed. Hoonaunau is present konohiki. Kekapa sworn and confirmed the above.³⁴¹

7.66 Helu 1580: The Claim of Kanahuna

Claimant: Kanahuna

Location: 'Ili of Kalawaha, Poina, Palakai, and Kamilomilo (fig. 125)

Recorded at: Honouliuli

Date: Nov. 25, 1847

Status: Awarded; Royal Patent 5018 (fig. 126)

Native Register To the honorable Commissioners who settle land claims of the Hawaiian Islands. Aloha to you. I hereby turn my land and house claim. This land is here at Kamiloilo in Honolulu, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kaaiawaawa and the land of Aemaikai; towards the East, the Poalima; towards the South, the land of Kaulu; towards the West, the land of Kaulu.

Here is my second land claim, there at Kamilomilo a division of land in the land of Kaniau. Here are its boundaries: towards the North the land of Kaniau, and his house; towards the West, the land of Kaniau.

Here is my house claim at Kaumakua. Here are its boundaries: towards the North the pa aia; towards the East, the house of Kaulu; towards the South, a house lot; towards the West, a house lot.

By Kanahuna X³⁴²

Native Testimony Kanahuna's case.

Kaalaawa Sworn. I know his land, 3 loi in two parcel and a kula parcel. Kalawaha, the first loi; Poina, loi 2; Palakai, loi 3. There in the ili land of Kamilomilo in Honouliuli Ewa, O. Here are the boundaries:
Parcel 1.

M. a muliwai of Makaii

H. moovina of Kaaumakua

Mk. Kumuulu koele of Konohiki

³⁴¹Book 3, p. 92, Jan. 29, 1848.

³⁴²Book 3, p. 170-171, Nov. 25, 1847.

431

4485

HELU. 1240

100-87674-100

A KE ALII, MAMULI O KA OLELO A KA POE HOONA KULANA.

NO NA NEA. Ua hōhōle au Liana Hoana i na kaaio kōloana aia i ka olelo, he kōloana eiaio ko
Amalia
 au he Aua Alodia iika o kahi oleloa mahele,
Alana Ala 1898.

Nēhale, ma kōia Pāpāua Sita Nō, ke tōkio āko nei o Kiamahutu IV, ke Alii nui o ke Aloha i kona ikemāhiā i hōmeo ai mahalo o ke Hawai'i Pae Aina, i na kūaka a pū, i kōia la nana lilo, a no kona mau lope alii, ua haʻawai āko nei na ke **AHO ALOHA** i *"Hōhoiho"*.

i kula *My Way*
 wala i pua loa ma *How about, Cha...*
 terei na mea.

[illegible]

Officer Brown, King's Highway, New York, N.Y. 10011. Sept. 16, 1968.

[illegible]

C. de Bonfanti-Rubini

L. M. Paul and Dr. Robert A. S. Spencer, President of the

House, 200 West 4th Street, New York, N.Y.

Adre. Polono. N^o 11 p. 6. 57. *Amel. am. Kacholins. 2000. a. 18.*

Practically Allaying the New England Palmar Node

Dr. D. i. Nobi: *Acromastix m. d.*

Mr. & Mrs. Paul Hunsicker, Lake

Char. d. L. Die hier besprochenen sind die 13. Art.

Chapman and Dr. Pitt. Buchanan & Co. Pitt m.c.

800 Hrs 1.00 hour in a day for the whole. No. 10. 10. 10.

June 15th 1866. Dear Mr. Brewster

Maclaria (Mac. Abrus. Cy. Low. 1st Hand on a Knife

Pula, o Kirovskaja. Mal'nutka adri: Shima 27, Shima 28

Paulina Kapelina and Elena, authors of

1. *Agrostis alba* L.

No. 3 The Great American Lottery

Figure 124: Palapala Sila Nui Helu 4244, Kuleana Helu 1573, to Kawahamana, *Mo'o* of Kamumuku, *Ili* of Niukee, Honouliuli. 9 81/100 chains, November 17, 1858. Signed by Kaahumanu and Kamehameha. Volume 17, p. 485–486.

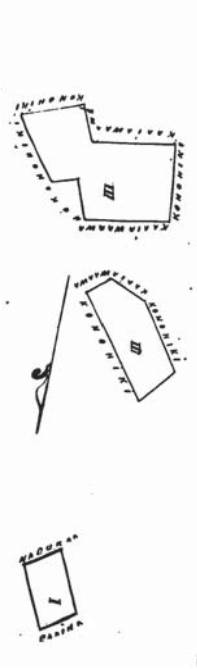


Figure 125: Helu 1580 of Kanahuna: *Parcel 1*, A house lot on the kula of Maui, Ili of Kaaumakua, Honolulu, Ewa, Oahu. Bounded on east by Napukaa. Containing 1.80 chains; *Parcel 2*, Mooaina of Poina, Ili of Kamilomilo, Honolulu, Ewa, Oahu; *Parcel 3*, Mooaina of Kahui, Ili of Kamilomilo, Honolulu, Ewa Oahu. There being a total of 1 acre and 3 9/100 chains in these 3 parcels. *Source: Māhale Award Book 6:135.*

W. Amama koele of Konohiki.

Parcel 2. A mooaina.

M. Kumuulu koele

H. mooaina of Kaaumakua

Mk. mooaina of Palakai for Kaaiawaawa

W. Poalima of Kalaiiki.

The land is from his parents. No one has opposed him.

Paekane Sworn. His knowledge is the same as my knowledge.³⁴³

Foreign Testimony Kaaiawaawa sworn, says he knows the land of Clt., it consists of 3 lois and a kahuahale in 2 pieces. The lois are surrounded by Kalawaha, Poina & Palakai in the Ili Kamilomilo, Honolulu, Ewa, Oahu. Apana 1 is bounded:

M. by the muliwai of Makaii

H. by the mooaina of Kaaumakua

Mk. by the koele Kumuulu

W. by the koele Amama,

Apana 2 is bounded:

M. by the koele Kumuulu

³⁴³Book 9, p. 279.

H. by the mooaina Kaaumakua
Mk. by the mooaina Palakai of Kaaiawaawa
W. by the koele Kalawaha iki.

Clt. received the land from his father in the time of Kamehameha I & has held quiet possession of the same until now.

Paekane sworn, confirmed the above testimony.³⁴⁴

7.67 Helu 1580 B: The Claim of Kapioho

Claimant: The Claim of Kapioho

Location: Ili of Kaihupalaai (Kaihuopalaai), Namoolua (Namooelua), and Hiwalalo (fig. 127)

Recorded at: Honolulu

Date: —

Status: Awarded; Royal Patent 2868 (fig. 128)

Native Testimony Kapioho's claim.

Kapioho came forward and swore that his application had been duly written by Maakua, and that it had been dropped. Therefore it was agreed that his land could be entered.

Kikala Sworn. I know his land, two moo aina called Namoolua in parcel 1. Parcel 2, a loi kalo in the mooaina of Hiwalalo. Said land being in the Ili of Kaihupalaai, Honolulu, Ewa, Oahu.

Parcel 1 Namooelua:

M. loi of Alae and Kikala, and the Konohiki's koele

H. mooaina of Palakai

Mk. Kumupali kula of Kikala

W. mooaina of Lopanui.

Parcel 2 in the mooaina of Hiwalalo:

M. Auwai of Alae

H. Kapalakai mooaina of Maio [Maiau]

Mk. Konohiki's Poalima

W. Lopanui mooaina of Kalaoa.

His land was from Kalaoa in the time of Kinau. No one has opposed him.

Ohai Sworn. His knowledge is the same as mine.³⁴⁵

³⁴⁴Book 9, p. 133.

³⁴⁵Book 9, p. 279–280.

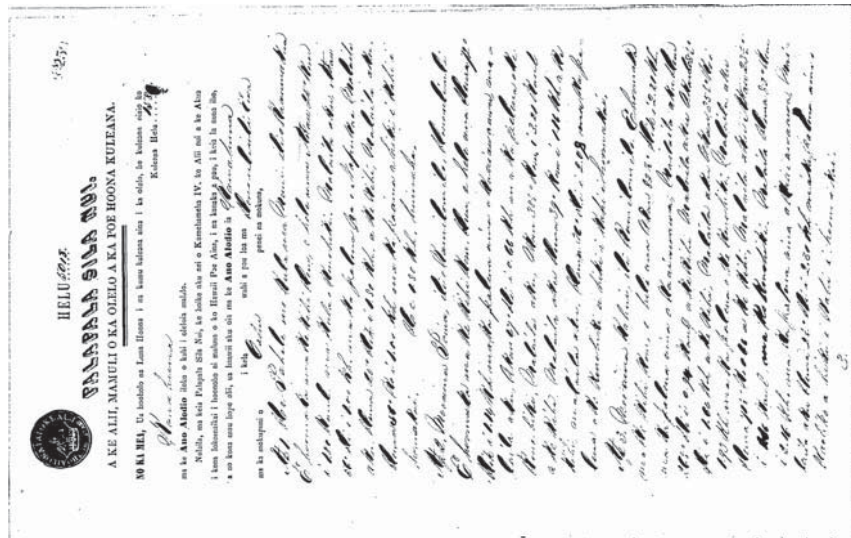


Figure 126: Palapala Sila Nui Helu 5018, Kuleana Helu 1580, to Kanahuna. *Pahale* on the *Kula* of Maui, 'Ili of Kaamakaui; Mo'o of Poina, 'Ili of Kamilomilo; & Mo'o of Kahui, 'Ili of Kamilomilo, Honouliuli. 1 acre, 39/100 chains. April 28, 1862. Signed by Kaahumanu & L. Kamehameha. Volume 20, p. 25-26.

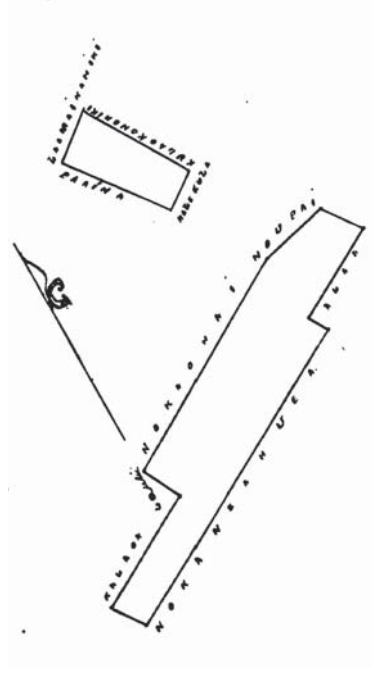


Figure 127: Helu 1580 B of Kapihoho: *Parcel 1*, Mooina of Namooelua, Ili of Polapola, Honouliuli, Ewa, Oahu. Containing 1 acre and 2.56 chains; *Parcel 2*, House lot on the kula of Polapola. Honouliuli, Ewa, Oahu. Containing 2.49 chains. *Source:* *Māhele Award Book 6:140.*

Foreign Testimony Lt. came & took oath that his claim was duly made out by Maakuia & sent in; the same is therefore admitted to a hearing. Kikala sworn, says he knows the land of Clt. It consists 1st of 2 moos named Kamooloa & 2d one loi in the mooina Hiwalalo, both in the ili of Kahiwapalaai [Kaihuopalaai], Honouliuli, Ewa, Oahu. Parcel 1. Namooelua is bounded:

- M. by the loi Alae of deponent & and the Koele Alae
- H. by the mooina Kapalakai
- Mk. by the kula Kumupali of deponent
- W. by the moo Lopanui.

Apapa 2. A loi in the moo Hiwalalo is bounded:

- M. by the auwai of Alae
- H. by the moo Kapalakai of Maio [Maiao]
- Mk. by the poalima of Konohiki
- W. by the moo Lopanui of Kalaoa.

Clt. received his land from Kalaoa in the time of Kinau and has held quiet possession of the same until now.

Ohai sworn, says the testimony of Kikala is true & is also his own.³⁴⁶

7.68 Helu 1583: The Claim of Kekapa

Claimant: Kekapa
Location: 'Ili of Kapapuhi
Recorded at: Honouliuli
Date: Nov. 20, 1847
Status: Awarded; Royal Patent 778 [Hoeaene]

Native Register To the honorable Commissioners who settle land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my house lot claim. This land is at Ulu of Waihi in Hoaeae, Ewa, Island of Oahu...

Here is my second land claim [see locational reference below]. Here are its boundaries: towards the North the sea, towards the East, the sea; towards the South, a pali; towards the West, a pali.

Here are my house claims at Kapapapuhi in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the house of Kalauli; towards the East, the house of Healani; towards the South, the house of Davida Kekukahiko and of Kamaala; towards the West, the houses of Aoao.

Here is the second claim of mine, a Mokupuni (Island) to the East of Kapapapuhi.³⁴⁷ [Note: Native/Foreign Testimony and *Māhele* Award Book documents under Helu 1583 for Kekapa cite locations in Hoaeae Ahupuaa. The final record states claimant, "Kekapa for Nalaelima."]

7.69 Helu 1596: The Claim of Kahawai

Claimant: Kahawai
Location: 'Ili of Polapola
Recorded at: Honouliuli
Date: Nov. 23, 1847
Status: Not awarded

Native Register To the honorable Commissioners who settle land claims of the Hawaiian Islands. Aloha to you. I hereby to you of my land claim. This land is there on the kula of Poohilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the Loko of Puhipaka; towards the East, the land of Haae; towards

³⁴⁶Book 9, p. 133–134.

³⁴⁷Book 3, p. 172, Nov. 20, 1847.

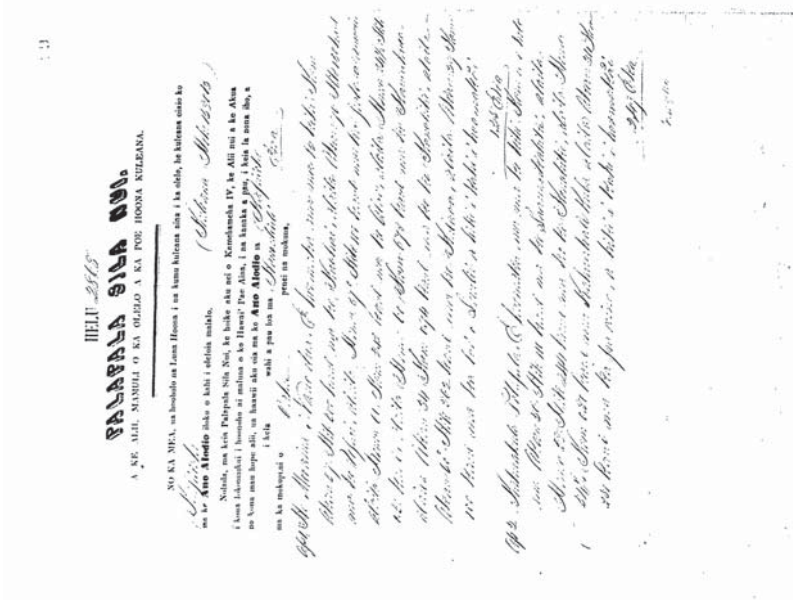


Figure 128: Palapala Sila Nui Helu 2868, Kuleana Helu 1580 B, to Kapihoho. Mōʻo of Namooelua; & *Kaliulilale* at Polapola, Honouliuli. 3.74 acres. May 21, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 199–200.

the South, the muliwai; towards the west, the land of Kapoli. I am with appreciation your obedient servant.

By Kahawai X³⁴⁸

7.70 Helu 1598: The Claim of Kekua

Claimant: Kekua
Location: *ʻIli* of Loloulu (fig. 129)
Recorded at: Honouliuli
Date: Nov. 21, 1847
Status: Awarded; Royal Patent 3087 (fig. 130)

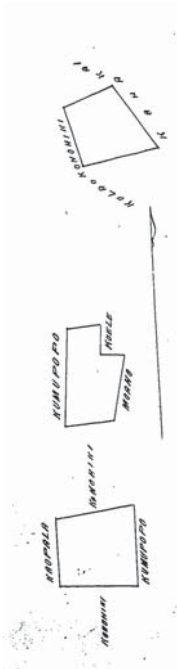


Figure 129: Helu 1598 of Kekua: *Parcel 1*, House lot at Kapapapuhi. Honouliuli, E. O. This parcel containing 3.18 chains; *Parcel 2*, 2 lot in Loloulu. Honouliuli, E. O. Containing 4.20 chains; *Parcel 3*, 2 lot in Loloulu. Honouliuli, E. O. Containing 3.82 chains. There being a total of 1 acre and 1.20 chains in these three parcels. *Source:* *Māhale* Award Book 7:265.

Native Register To the honorable Commissioners who settle land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claims. This land is there at Loloulu, in Honouliuli, Ewa. Island of Oahu. Here are its boundaries: towards the North, the Poalima and the loi of Moano; towards the East, the land of Moano; towards the South, some akaakai (bulrushes); towards the West, the land of Kumupopo.
Here is the second of my land claims: towards the North the Poalima; towards the East, the loi akaakai [pond field with bulrush overgrowth]; towards the South, akaakai; towards the West, a Poalima.
Here is my house claim at Kapapapuhi: towards the North, the sea; towards the East, the sea and the house of Kahalewai; towards the South, a house lot; towards the West, a house lot.

³⁴⁸Book 3, p. 178–179, Nov. 23, 1847.

By Kekua X³⁴⁹

Native Testimony Kaopala S. I know his place at Loloulu ʻili, Honouliuli, Ewa.
1. House lot, 1 house. It is enclosed with a wall. Mauka, the sea; Honolulu, the sea; Makai Healani; Waianae, a kula.
2. 5 loi kalo, Mauka, Kaope; Honolulu, Moano; Makai, some Government loi; Waianae, Kumupopo.
2. 1 loi kalo, Mauka Kaope; Honolulu, Kumupopo; Makai, some Government loi; Waianae, me.
Parcels 2 & 3 were from Kaope in the time of that Kuakini was Governor of Oahu. And his house lot is an old place for him, and he has always lived there to this time. No one objects.
Hapauea S. Our knowledge is the same.³⁵⁰

Foreign Testimony Kaopala Sworn. I know this land. It is in Honouliuli, in Lolohula [Loloulu], Ewa, consisting of:
1. House lot. 1 house fenced. Mauka is Sea Honolulu, also; Makai; Healani; Waianae, Waste land.
2. Kalo land 5 patches. Mauka, Kahope [Kaope]; Honolulu, Moano; Makai, Govt. land; Waianae, Kumupopo.
[3]. Kalo 1 patch. Mauka, Kahope; Honolulu, Kumupopo; Makai, Govt. Kalo; Waianae, my land.
Kahope gave Claimant these lots in time of Kuakini. The house lot was first given to him, and he has never had his Right disputed in any of them to this day. Kahope is present Konohiki.
Hapauea Sworn. Confirmed the above testimony.³⁵¹

7.71 Helu 1605 B: The Claim of Nakai

Claimant: Nakai
Location: *ʻIli* of Niukee, Kailikahi, Hakelo, Mahuna, Kenahupu, Kapaihi, Kalole, and Napupu (fig. 131)
Recorded at: Honouliuli
Date: —
Status: Awarded; Royal Patent 4179 (fig. 132)

Native Register [See Native Register Helu 747, p. 265, for the original claim.]³⁵²
³⁴⁹Book 3, p. 179, Nov. 21, 1847. See also Helu 1570, p. 418.
³⁵⁰Book 3, p. 434, Feb. 9, 1849.
³⁵¹Book 3, p. 105, Feb. 9.
³⁵²Book 2, p. 406–407.

W. house lot of Kamalae.

His land was from Kuakahia in the time of Poki. No one has opposed him. Kamaeaea Sworn. His knowledge is the same as mine.³⁵³

Foreign Testimony Clt. appeared & made oath that his claim was duly made out by Maakuia & presented & his is therefore admitted to a hearing.

Kekukahiko sworn, says the land of Clt. is a moo aina in 3 pieces, & having 6 loi, one called Hakelo, another Mahuna, 2 small ones called Kenahupau, the 5th Kapaihi & the 6th Kalole & a kula in the ili Niukee, Honouliuli, Ewa, Oahu.

Apapa 1 is bounded:

M. by the kula of Konohiki & the loko Kihewamakawalu

H. by the kahuahale of Kaunahi

Mk. by the loko Nihola

W. by the loi called Kapaiki of Kaunahi & a part of Kihewamakawalu

Apapa 2, the loi Kalole, ili Niukee, Hon. E. O. and is bounded:

M. by the loko kalo, Nihola

H. by the loko kalo, Lokoeli

Mk. by the loko belonging to Pto

W. by the Anwai of Niukee

Apapa 3, kahuahale in the ili of Niukee: It is bounded:

M. by paaina

H. by kahuahale of Kaunahi & Manua

Mk. by the pali Kihewamakawalu

W. by kahuahale of Kamaalae.

Clt. received his land from Kuakahia in the time of Boki & has held it in quiet until now.

Maaeaea, sworn, confirms the testimony of Kekukahiko, and says it is his own.³⁵⁴

7.72 Helu 1666: The Claim of Mauwale (Maiwela, Mauele, Mauwele)

Claimant: Mauwale

Location: 'Ili of Poohilo and Kaluamoo (fig. 133)

Recorded at: Honouliuli

Date: Nov. 11, 1847

Status: Awarded; Royal Patent 7356

³⁵³Book 9, p. 277-278.

³⁵⁴Book 9, p. 131-132.

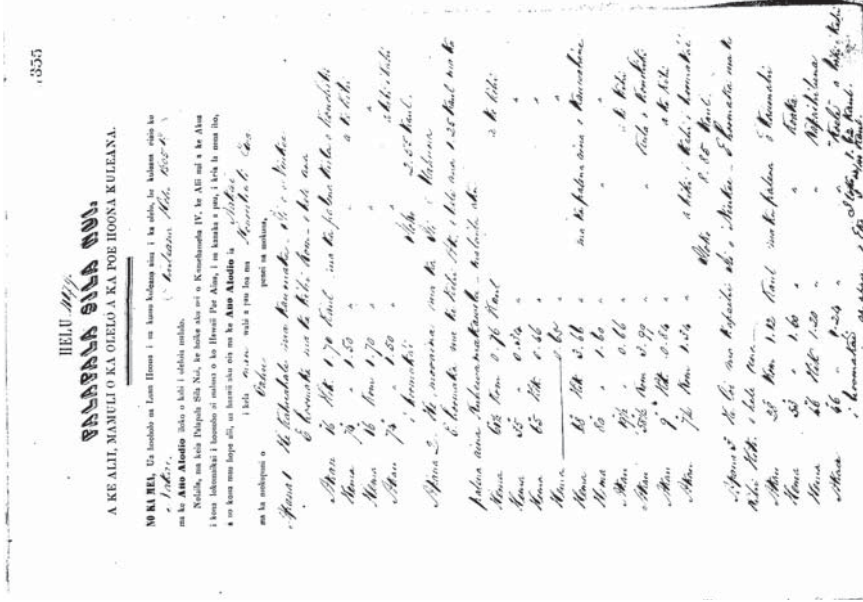


Figure 132: Palapala Sila Nui Helu 4179, Kuleana Helu 1605 B. to Nakai. *Kahuahale* at Kaumaka, 'Ili of Niukee; Mo'o in 'Ili of Mahuna; & Lo'i at Kapaehi, in 'Ili of Niukee, Honouliuli. 1 acre, 3 02/100 chains. September 14, 1858. Signed by Kaahumanu & Kamehameha. Volume 17, p. 355-356.

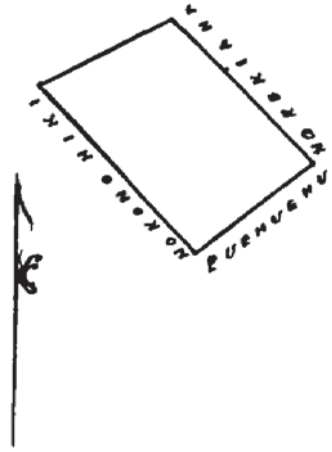


Figure 133: Helu 1666 of Mauwele. Mookalo of Kaluamoo, Ili of Poohilo. Honouliuli, Ewa, Oahu. Containing 5.06 chains. *Source: Māhele Award Book 6:135.*

Native Register To the Honorable Commissioners who quiet land claims of the Hawaiian Island. Aloha to you. I here by tell you of my land and house claim. This land is there at Poohilo in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Kapule; towards the East, the land of Kapule; towards the South, the land of Moano and the land of Puehu; towards the West, the Loko of Kahui and Waianu.

I am with appreciation, your obedient servant.
By Maiwela X³⁵⁵

Native Testimony Mauwale's case.
Kaekuna Sworn. I know his land, a mooaina, Kaluamoo in the Ili of Poohilo, Honouliuli, Ewa, O. 4 loi kalo in one parcel. Here are the boundaries.

- M. mooaina of Paalaau
- H. mooaina of Puehuehu from Kaope
- Mk. mooaina of Kahui
- W. Poalima of Waianu.

His land was from Kauakahilau in the time that the Governor traveled around Oahu. No one has opposed him.

³⁵⁵Book 3, p. 199, Nov. 11, 1847.

Mahina Sworn. His knowledge is the same as mine.³⁵⁶

Foreign Testimony Kaekuna sworn says, I know the land of Clt. It is a moo aina called Kaluamoo in the Ili of Poohilo, Honouliuli, Ewa, Oahu & contains 4 loi in on apana. Bounded:

- M. by the moo aina Palaau of Kapule
- H. by the moo aina Puehuehu of Kaope
- Mk. By the koele Waianu
- W. [not given]

Clt. received the land from Kauakahilau in 1843 when Kekuanaoa visited Waianae, being taken sick there & he has held quiet possession ever since.
Mahuna sworn, says the testimony of Kaekuna is correct, & is also his own.³⁵⁷

7.73 Helu 1666 B: The Claim of Kuahilo (Kekuahilo)

Claimant: Kuahilo
Location: Ili of Poohilo and Kaleipuaawa (fig. 134)
Recorded at: Honouliuli
Date: —
Status: Awarded; Royal Patent 3636 (fig. 135)

Native Testimony Kuahilo's case.
Kuahilo came forward and swore that his application had been duly written out by Maakuia in 1847, and his land claim perhaps entered to the commissioner's office in Honolulu. Therefore his testimony for land was admitted.
Kaekuna Sworn. I know his land, 3 loi and a kula, a section of Ili land in the Ili of Poohilo, Honouliuli, E. O.

- M. the laau kalakala (*Opuntia megacantha* or prickly pear cactus), and the kula of H. [Honouliuli]
- H. Poalima of Aimea
- Mk. Poalima of the Konohiki and the kula of Kaaiawaawa.
- W. Ioko kalo (fish and taro pond) of Kalokoloa.

His land was from Kahawai in the time of Kaahumanu. No one has opposed him.
Mauele Sworn. His knowledge is the same as my knowledge.³⁵⁸

³⁵⁶Book 9, p. 278, April 17, 1850.

³⁵⁷Book 9, p. 132.

³⁵⁸Book 9, p. 278–279.

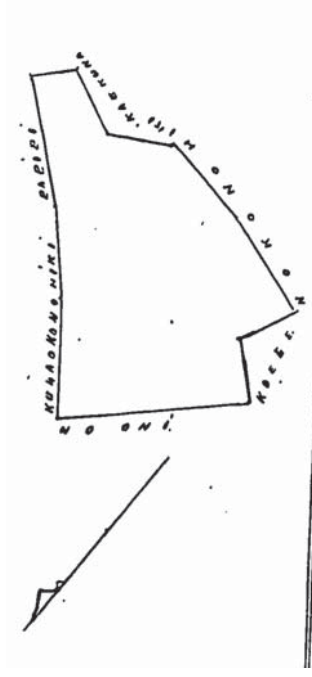


Figure 134: Helu 1666 B of Kuahilo. Mooaina of Kalaipua, Ili of Poohilo. Honouliuli, Ewa, Oahu. Bounded by Pa pipi on south east side. Containing 1 acre and 8 19/100 chains. Source: *Māhale* Award Book 6:139.

Foreign Testimony The Clt. came & made oath that his claim was duly made out by Maakua & presented, the same is therefore admitted to a hearing. Kaekuna sworn, says the land of Clt. is an apana moo aina called Kaleipua in the Ili of Poohilo, Honouliuli, Ewa, Oahu. It contains 3 loi & a kula of Kahakai.

- M. by the prickly pears [*Opuntia megacantha*] & kula of Kahakai
- H. by the koele Aimea
- Mk. by the koele of Kaleipua
- W. by the loko ia Kalokoloa

Clt. received the land from Kahakai in the time of Kaahumanu & has held the same in quiet ever since.

Mauwele sworn, says the testimony of Kaekuna is correct & is also his own.³⁵⁹

7.74 Helu 1670: The Claim of Moano

- Claimant:** Moano
- Location:** 'Ili of Lolulu and Puehuehu (fig. 136)
- Recorded at:** Honouliuli
- Date:** Nov. 27, 1847
- Status:** Awarded; Royal Patent 3548 (fig. 137)

³⁵⁹Book 9, p. 132.

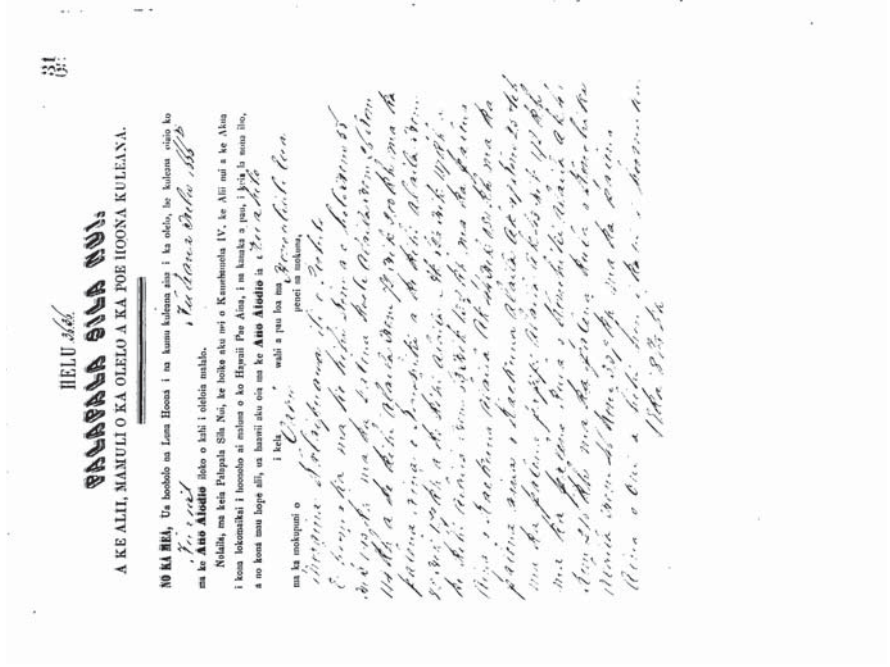


Figure 135: Palapala Sila Nui Helu 3636, Kuleana Helu 1666 B. to Kuahilo. Mo'o of Kalaipua, in the 'Ili of Poohilo, Honouliuli. 1 acre, 8 19/100 chains. February 25, 1857. Signed by Kaahumanu and Kamehameha. Volume 16, p. 31–32.

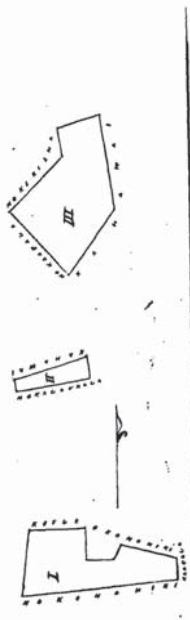


Figure 136: Helu 1670 of Moano: *Parcel 1*, Mooaina of Kauhikuakua, Ili of Loloulu, Honouliuli, Ewa, Oahu. Containing 6.05 chains; *Parcel 2*, House lot at Makai, Ili of Kaaumakua. Containing .91 chains; *Parcel 3*, Mooaina of Puehuehu, Ili of Kaaumakua, Honouliuli. Containing 8.24/100 chains. There being a total of 1 acre and 5.20 chains in the parcels of land. *Source:* *Māhele* Award Book 6:134.

Native Register To the honorable commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim, there at Loloulu, in Honouliuli. Here are its boundaries: towards the North, Kaope and the muliwai (estuary); towards the East, the land of Kaope; towards the South, the land of Pio and the akaakai (bulrushes); towards the West, the land of Kekua;

Here is my second land claim, there at Puehuehu, in Honouliuli; Here are its boundaries: towards the North, the land of Kapule; towards the East, the land of Kaope; towards the South, the land of Kelemana and the muliwai; towards the West, the land [name not cited] and muliwai.

Here is my house claim, in the moo land of Kalaulahala: towards the North, the muliwai and the house of Alakane; towards the East, the loko; towards the South, the land of Kalaulahala; towards the West, the pond field bank and land of Kalaulahala. I am with appreciation, your obedient servant.

Done by me, Moano X³⁶⁰

Native Testimony Aemaikai Sworn. I know his land at Loloulu in Honouliuli, Ewa. One parcels of land.

1 large loi kalo, and a house. Mauka, the land of Kaope. Honolulu, also Kaope. Makai, the same. Waianae, Kekua.

His land was from Kaope in the time that Kinau was living, and he has continuously lived there. No one has objected to his day

Kaneikawaiola Sworn. Our knowledge is the same. No one objects.³⁶¹

³⁶⁰Book 3, p. 201, Nov. 27, 1847.

³⁶¹Book 3, p. 485, Oct. 17, 1849.

Foreign Testimony Aimaikai [Aemaikai] Sw. I know this land in Honouliuli, Ewa. One large kalo patch. Mauka is Kaope's; Honolulu also; Makai also; Waianae Keakua. Claimant had this from Kaope, Konohiki in time of Kinau. Kekaunohi is the head Chiefess of that district. Clt. has always held it in peace.

Kaneikawaiola Sw. Confirmed the testimony as correct.³⁶²

7.75 Helu 1672: The Claim of Makue

Claimant: Makue

Location: *Ili* of Kamoku and Kapapapuhi (fig. 138)

Recorded at: Honouliuli

Date: Nov. 22, 1847

Status: Awarded; Royal Patent 5457 (fig. 139)

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my land claims and house. This land is there at Kamoku, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, laau kalakala (Opuntia megacantha or prickly pear cactus) and the Auwai; towards the East, the land of Kalauli; towards the South, the Loko of Puniawa; towards the West, the land of Manuwa.

Here is my second land claim: towards the North, the land of Puniawa; towards the East, the land of Kalauli; towards the South, the koele (a parcel cultivated for the chief); towards the West, the land of Manuwa.

Here is my third claim, a house at Kapapapuhi: towards the North, the sea; towards the East, Court House; towards the South, a kula parcel; towards the West, the passage between Healan and Kekua.

I am with appreciation, your obedient servant.

By Makue X³⁶³

Native Testimony Kaneikawaiola Sworn. I know his land at Kamoku in Honouliuli, Ewa. One parcel of land, six loi kalo, 1 kula parcel. The boundaries are: Mauka, a pali; Honolulu, Kalauli; Makai, Nika; Waianae, Manuwa.

His land was from Kahalewai in the time that Kalaimoku was living. His residency has been continuous to this time, no one objects.

Moano Sworn. Our knowledge is the same, no one objected to this time. Everything stated above is true.³⁶⁴

³⁶²Book 3, p. 161, Oct. 17, 1849.

³⁶³Book 3, p. 202, Nov. 22, 1847.

³⁶⁴Book 3, p. 485, Oct. 17, 1849.

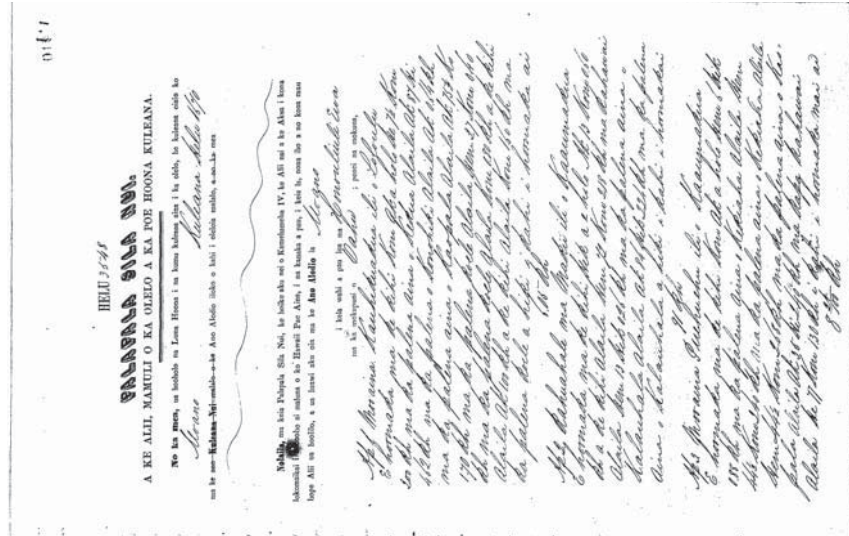


Figure 137: Palapala Sila Nui Hehu 3548, Kuleana Hehu 1670, to Moano, Honouliuli. 1 acre, 5.20 chains. February 2, 1857. Signed by Kaahumanu and Kanehameha. Volume 15, p. 411–412.

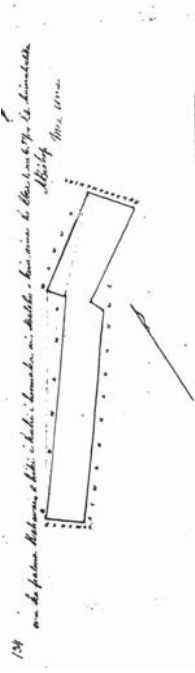


Figure 138: Hehu 1672 of Makue. Moaina of Kaneakihā, ili of Kamoku. Honouliuli, Ewa, Oahu. Containing 1 and 694/100 chains. Source: *Māhele* Award Book 6:133.

Foreign Testimony Kaneikawaiola. This land is called Kamoku in Honouliuli, Ewa Kalo and Kula. No house or fence, including six kalo patches in one lot. Mauka, Pali; Honolulu, Kalauli's; Makai, Nika's; Waianae, Manua's. Claimant had this from Kahalewai, Konohiki in time of Kalamoku, and has ever since held it in undisturbed peace.

Moano Sw. Confirmed the previous testimony.³⁶⁵

7.76 Hehu 1688: The Claim of Poopuu

Claimant: Poopuu

Location: Ili of Loloulu

Recorded at: Honouliuli

Date: Nov. 2, 1847

Status: Awarded; Royal Patent 6641 (see fig. 114, p. 415)

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Loloulu, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North the koele (parcel of land worked for the chief) of Kihewapuu; towards the East, the land of Kaopala; towards the South, the land of Kaneaola; towards the West, the land of Kaopala.

Here is my house claim: towards the North, an alanui (trail) to the house of Kaopala; towards the East, the pa puaa (pig enclosure) and the land of Kaopala; towards the South, a kula parcel to the house of Kaulu; towards the West, a Ulu (tree).

I am with appreciation, your obedient servant.

³⁶⁵Book 3, p. 161.

Here is my second claim, there at Maui: towards the North, the land Kuhiena; towards the East, the land of Koi; towards the South, the land of Kua; towards the West, the land of Koi and Puali.

By Leleiaupa³⁶⁹

7.78 Helu 1701: The Claim of Alauka

Claimant: Alauka
Location: 'Ili of Poohilo (fig. 142)
Recorded at: Honouliuli
Date: Nov. 23, 1847
Status: Awarded; Royal Patent 3084 (fig. 143)

Native Register This land is there at Poohilo, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the muliwa (estuary); towards the East, the land of Kauakahilau; towards the South, the Loko of Hopenui; towards the West, the land of Kauakahilau and the land of Kauhailepa.

Here is my second land claim: towards the North, land of Kauhailepa; towards the East, the land Kauhailepa; towards the South, Hopenui; towards the West, the land of Manaole.

Here is my third land claim, it is an ili. Here are its boundaries: towards the North, the Loko of Hopenui; towards the East, the land of Kauakahilau; towards the South, a kula parcel; towards the West, the land of Manaole.

Done by me, Alauka X³⁷⁰

Native Testimony Kaneikawaiola Sworn. I know his land at Poohilo, Honouliuli, Ewa. 1 parcel of land. 4 loi kalo. Mauka, the land of Oni; Honolulu, the stream; Makai, Kekauonohi's land; Waianae, Kauakahilau's land.

Kauakahilau gave him his land in 1843, and his residency has been continuous to this time. No one as objected.

Aemaikai Sworn. Our knowledge is the same, no one has objected.³⁷¹

Foreign Testimony Kaneikawaiola Sw. This place is called Pohilo [Poohilo] in Honouliuli [Honouliuli] in Ewa. Four Kalo patches: Mauka, Oni's; Honolulu, Kawai (Stream); Makai, Kekauonohi; Waianae, Kauakahilau.

Claimant had this title from Kauakahilau, Konohiki in 1843, and has ever since held it in peace.

³⁶⁹Book 3, p. 217, Nov. 23, 1847.

³⁷⁰Book 3, p. 218, Nov. 23, 1847.

³⁷¹Book 3, p. 487, 1850.

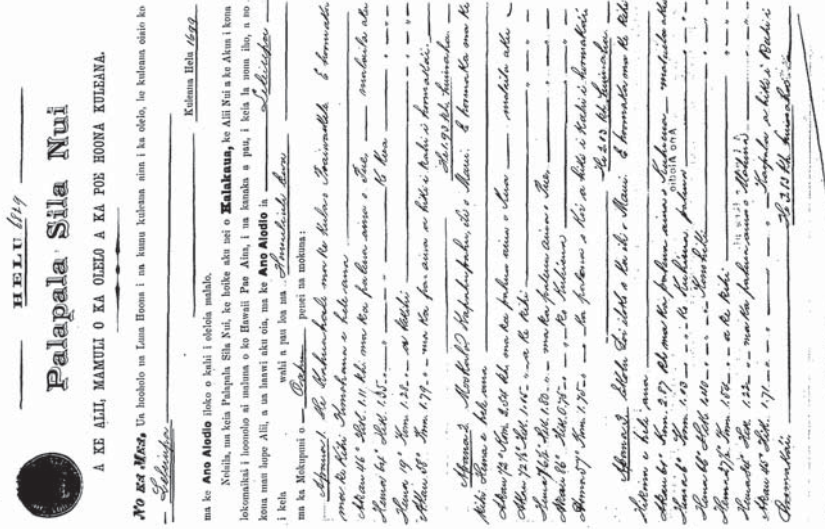
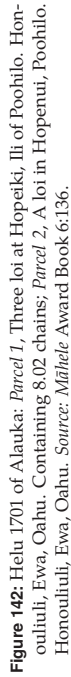


Figure 141: Palapala Sila Nui Helu 6829, Kuleana Helu 1699, to Leleiaupa. Kahuahale at Poaiwaileke; Mo'o kalo at Kapahupahu, 'Ili of Maui; & 3 Lo'i in the 'Ili of Maui, Honouliuli. 7.79 chains. November 13, 1876. Signed by Kalakaua Rex. Volume 26, p. 155-156.



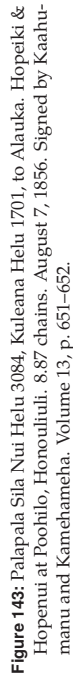
Kahimaikai Sw. Confirms the previous test. As true.³⁷²

7.79 Helu 1703: The Claim of Aemaikai (Aimaikai)

Claimant: Aemaikai
Location: 'Ili of Kamilomilo and Kaamakua (fig. 144)
Recorded at: Honouliuli
Date: Nov. 20, 1847
Status: Awarded; Royal Patent 6771 (fig. 145)

Native Register To the honorable Commissioners who quiet land Claims of the Hawaiian Islands, Aloha to you! I hereby tell you of my land and house claim, there at Kamllomilo, in Honouliuli, Ewa Island of Oahu. Here are its boundaries: towards the North, the land of Kahikula; towards the East, the land of Kahikula; towards the South, a moku akaakai (section of bulrushes); towards the West, the land of Kaope.

³⁷²Book 3, p. 162.



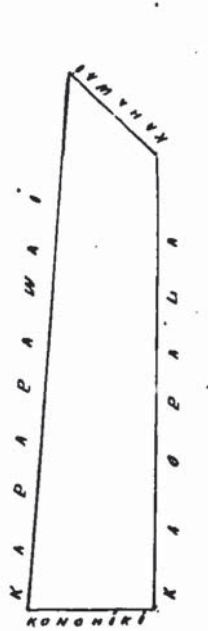


Figure 144: Helu 1703 of Aemaikai. Moosaina of Koula, Ili of Kamilomilo. Honouliuli, Ewa, Oahu. Containing 1 acre and 2 96/100 chains. Source: *Māhale* Award Book 6:139.

Here is my second land claim. Here are its boundaries: towards the North, the land of Kaaiwaawa; towards the East the land of Kanahuna; towards the south, the moku akaakai; towards the West, the land of Kahikiula.

Here is my third land claim. Here are its boundaries: towards the North, the land of Kalanihopu; towards the East, the land of Kalanihopu; towards the South, the land of Kanahuna; towards the West, the land of Kaaiwaawa.

Here is my house claim, there at Kaamakua, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the pa Aina; towards the East, the houses of Kaulu; towards the South, the house of Kanahuna; towards the West, the pa aina and the kula.

Done by me, Aemaikai³⁷³

Native Testimony Moano Sworn. I know his land at Kamilomilo in Honouliuli, Ewa. 2 parcels of land.

1. House lot, 1 house in it. It is enclosed with the wall. Mauka, Nunu's land; Honolulu, kula parcel of Kekauonohi; Makai, a kula parcel of Kekauonohi; Waianae. Pa aina.
2. 1 loi kalo. Mauka, Nunu and Hapauea's lands; Honolulu, Hapauea's land; Makai, Kaope; Waianae, also Kaope.

His land was from his father-in-law, whose name is Kaulu, in the time that Kinau was living, and his residency has been continued. No one has objected.

Makue Sworn. Our knowledge is the same. No opposition.³⁷⁴

³⁷³Book 3, p. 218, Nov. 20, 1847.

³⁷⁴Book 3, p. 487, Oct. 17, 1849.

Foreign Testimony Moano Sw. This land is in Honouliuli, Ewa, called Kamilomilo, consisting of House lot & 1 patch of Kalo in two lots.

1. House lot. 1 house & fence: Mauka Nunu's; Honolulu is Kekauonohi's waste land; Makai, Kekauonohi; Waianae, Govt. fence.
2. 1 Kalo Patch. Mauka is Nunu and Haapauea [Hapauea]; Honolulu, Haapauea; Waianae & Makai, Kaope's.

Claimant received these lots from Kahulu, his father in law, in Kinau's time, and has been held in peace ever since.

Makue Sw. Confirmed the above testimony.³⁷⁵

7.80 Helu 1713: The Claim of Healani

Claimant: Healani

Location: *Ili* of Niukee, Kahui, and Kapapapuhi (fig. 146)

Recorded at: Honouliuli

Date: Nov. 23, 1847

Status: Awarded; Royal Patent 5521 (fig. 147)

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim. This land is there at Nukee [Niukee], in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the auwai and the land of Nohunohu; towards the East, the land of Kalakoa and the poalima (parcel of land cultivated for the chief); towards the South, the Muliwai (estuary) of Makai; towards the West, the land of Aoa.

Here is my second land claim, a small sea pond at Kapapapuhi, in Honouliuli. Here are its boundaries: towards the North, a kula Alalia (salt flats); towards the East, the seas; towards the South, the sea; towards the West, some kio lili (little ponds).

Here is my house claim: towards the North the houses of Kekua; towards the East, the houses of Makue and Kaneikawaiola; towards the South, the house of Kekukahiko; towards the West, Kekapa's house site; Nohunohu gave this land to me. I am with appreciation, your obedient servant.

By Healani³⁷⁶

Native Testimony Poopuu Sworn. I have seen his land, a moosaina of Kahui, in the ili of Niukee, Honouliuli, Ewa, Oahu. 3 loi in the moosaina of Kahui. Here are the boundaries:

³⁷⁵Book 3, p. 162–163, Oct. 17, 1849.

³⁷⁶Book 3, p. 223, Nov. 23, 1847.

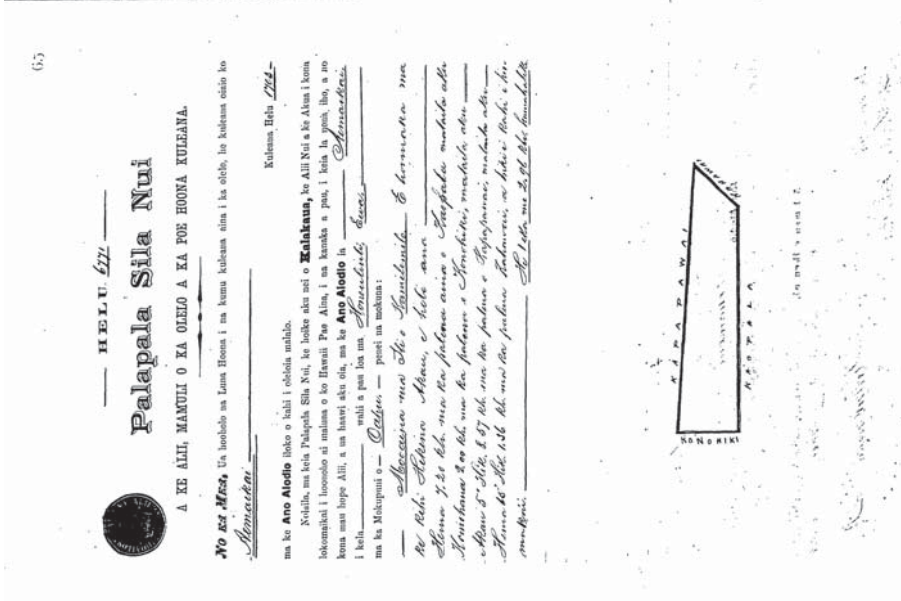


Figure 145: Palapala Sila Nui Helu 6771, Kuleana Helu 1703, to Aemaikai. Mo'ō in the 'Ili of Kamilomilo, Honouliuli. 1 2.96 acres. May 3, 1876. Signed by Kalakaua Rex. Volume 26, p. 65-66.

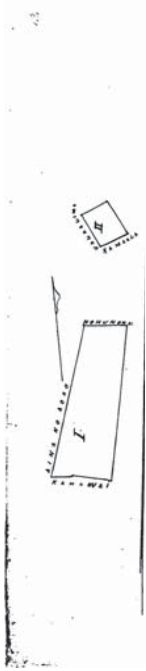


Figure 146: Helu 1713 of Healani: Parcel 1, Moosaina of Kahuilalo, Ili of Niukee, Honouliuli, Ewa, Oahu. Containing 1 acre and 78/100 chains; Parcel 2, A house lot at Kapapapuhi. Honouliuli, Ewa, Oahu. Containing 1.65 chains. Source: Māhale Award Book 6:130.

- M. Poalima of the Konoehiki
- H. stream of Makaii
- Mk. moosaina of Kaloiloo for Aoa
- W. an auwai and Kaloiki.

Parcel 2, a Loko (pond) named Kapapapuhi, Honouliuli, Ewa.

- M. the salt flats (alialia)
- H. the shore
- Mk. the shore
- W. kula of Kapapapuhi, H. [Honouliuli].

Parcel 3. House lot at Kapapapuhi.

- M. house lot of Kaneikawaiola
- H. house lot of Kekukahiko
- Mk. house lot of Kekapa
- W. house lot of Kekua.

His land was from Nohunohu in the time of Kaahumanu. No one has opposed him. Kua [Kekua] Sworn. His knowledge is the same as my knowledge. His knowledge and my testimony are true.³⁷⁷

Foreign Testimony Poopuu sworn, says he knows the land of clt. It is 3 Apana. 1st a moosaina called Kahui in the Ili Nukee [Niukee], Honouliuli, Ewa, Oahu; contains 3 lois & is bounded:

- M. by the koele of konoehiki

³⁷⁷Book 9, p. 281-282.

- H. by the kahawai (stream) Makaii
- Mk. by the moo Kaloioa of Aoao
- W. by the auwai and loia called Kalotiki

Parcel 2. A loi seaward of Kapapapuhi.

- M. by the kula Alialia (salt flats)
- H. by the sea shore
- Mk. by the sea shore
- W. by the kula of Kapapapuhi.

Parcel 3. Pahale in Kapapapuhi, bounded:

- M. by the pahale of Kaneikawaiola
- H. by the pahale of Kekukahiko
- Mk. by the pahale of Kekapa
- W. by the pahale of Kekua.

Clt. received the land from Nohunohu in the time of Kaahumanu & has held quiet possession of the same ever since.

Kua sworn, says the above testimony is true & is also his own.³⁷⁸

7.81 Helu 1719: The Claim of Hilea (Hileea)

Claimant: Hileea
Location: *Ili* of Kaaumakua, Kamookahi, and Kanuwahine (fig. 148)
Recorded at: Honolulu
Date: Nov. 25, 1847
Status: Awarded; Royal Patent 2870 (fig. 149)

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claims at Kaaumakua, at Honolulu, Ewa, Island of Oahu. Here are its boundaries: Towards the North, the Auwai; towards the East, the land of Kaiaawaawa; towards the South, a kula parcel; towards the West, a poalima (parcel worked for the chief).

Here is my second land claim, there at Kaaumakua, in Honolulu: towards the North, akaakai (bulrushes) and the Auwai; towards the East, akaakai; towards the South, akaakai; towards the west, akaakai.

By Hileea X³⁷⁹

³⁷⁸Book 9, p. 136.

³⁷⁹Book 3, p. 226, Nov. 25, 1847.

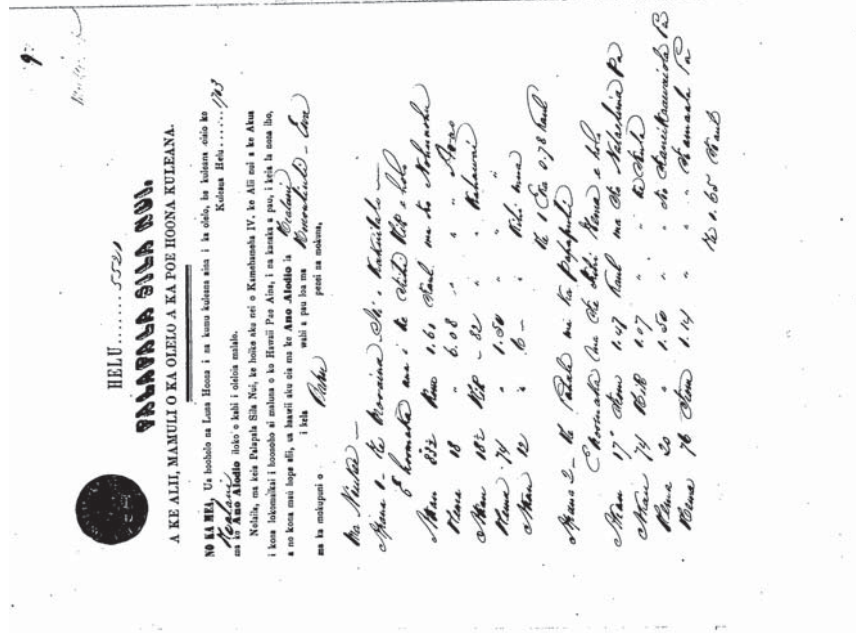


Figure 147: Palapala Sila Nui Helu 5521, Kuleana Helu 1713, to Healani. Mo'o in the *Ili* of Kahuilalo; & *Palale* at Kapapapuhi, Honolulu. 1 acre, 2.43 chains. June 6, 1865. Signed by Kamehameha R. Volume 21, p. 697-698.

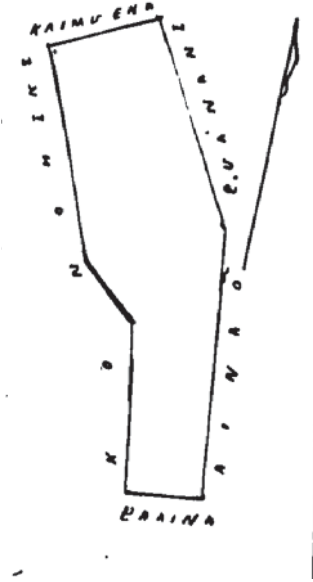


Figure 148: Helu 1719 of Hilea (Hilea). Mooaina of Kanuwahine, Ili of Kaaumakua. Honouliuli, Ewa, Oahu. Containing 1 acre and 1.10 chains. *Source: Māhele Award Book 6:130.*

Native Testimony Hilea's case.

Kumupopo Sworn. I know his land. 2 parcel of land. The first parcel is a mooaina with 5 loi, and there is a kula house lot in the ili of Kaaumakua, Honouliuli. Here are the boundaries:

Apana 1, 5 loi on the mooaina

- M. mooaina of Maui
- H. a Pa aina
- Mk. Koele of the Konohiki
- W. mooaina of Kumulu.

Parcel 2. Here are the boundaries. 1 loi at Kamookahi.

- M. akaakai (bulrushes) of Kaaumakua
- H. auwai of Kaaumakua
- Mk. akaakai of Kamookahi
- W. mooaina of Kamilomilo.

His land was from Kawa in the time of Kaahumanu. No one has opposed him. Poopuu Sworn. His knowledge is like mine. His and my knowledge are true.³⁸⁰

³⁸⁰Book 9, p. 281.

Foreign Testimony Kumupopo sworn, says the land of Clt. consists of 2 pieces. 1st a moo aina of 5 lois and a kula kahuahale called Kauwahine in the Ili of Kaaumakua, Honouliuli, Ewa, Oahu. It is bounded:

- M. by the loi Maui in the moo Maui
- H. by the paaina
- Mk. By the koele of Konohiki
- W. by the moo Kumuulu of Kaimuena.

Apana 2 is a loi Kamookahi by name in the Ili of Kaaumakua, Honouliuli, Ewa, Oahu & is bounded:

- M. by the akaakai of Kaaumakua
- H. by the auwai of Kaaumakua
- Mk. By the akaakai of Kamookahi
- W. by the Ili Kamilomilo.

Clt. received the land from Kawa in the time of Kaahumanu & has held quiet possession of the same until now.

Poopuu sworn, says the testimony above is true & is also his own.³⁸¹

7.82 Helu 1720: The Claim of Hilinae

Claimant: Hilinae

Location: Ili of Polapola and Kapalakai (fig. 150)

Recorded at: Honouliuli

Date: Nov. 27, 1847

Status: Awarded; Royal Patent 3287 (fig. 151)

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land and house claim; This land is there at Polapola, in Honouliuli. Here are its boundaries: towards the North, the paahao (parcel of land worked by prisoners), and the land of Kikala; towards the East, the land of Kikala; towards the South, the land of Kawaakele; towards the West, the land of Kapiioho.

Here is my second land claim. It is there at Polapola, in Honouliuli. Here are its boundaries: towards the North, the land of Kekai; towards the East, the land of Laamaikahiki; towards the South, the land of Kawaakele; towards the West, the loko of Ohai.

³⁸¹Book 9, p. 135.

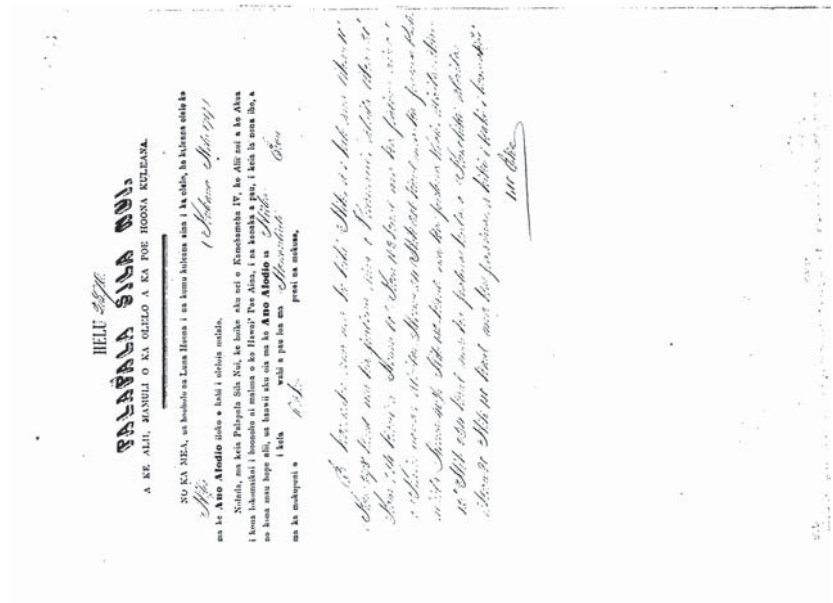


Figure 149: Palapala Sila Nui Helu 2870, Kuleana Helu 1719, to Hilea, Honouliuli. 1.11 acres. May 21, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 203–204.

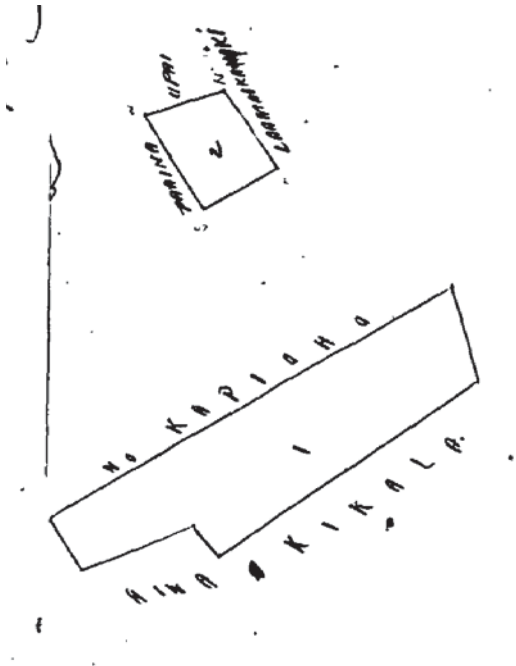


Figure 150: Helu 1720 of Hilinae: Parcel 1, Moosaina in the ili of Polapola. Honouliuli, Ewa, Oahu. Containing 7.81 chains; Parcel 2, House lot on the kula of Polapola. Containing 1/46 chains. Source: *Māhele* Award Book 9:383.

Here is my house claim, there at Polapola, in Honouliuli: towards the North, Upai; towards the East, the house of Kaneola and Laamaikahiki; towards the South, a pa aima; towards the West, the Halepule (Church) of Kapalani (the French – priests). I am with appreciation, your obedient servant.
By Hilinae X³⁸²

Foreign Testimony Kaopala (Assistant Kono'hiki): Sworn and stated. I know his parcels of land at Kapalakai, ili of Polapola, Honouliuli, Ewa, Oahu. 2 pieces of land. Parcel 1, 4 loi kalo. Parcel 2, House lot.

³⁸²Book 3, p. 226–227, Nov. 27, 1847.

Parcel 1. The boundaries are: Mauka, the land of Kapiiohō; Honolulu, land of Konohiki; Makai, land of Kikala; Waianae, the same.

Parcel 2. The boundaries are: mauka, land of Upai; Honolulu, land of Kalaoa; Makai, land of Laamaikahiki; Waianae, a pa aina.

These parcels of land were received from Maio, his father in the time of Kamehameha I, and he held the peaceably until his death from small pox in 1853. His wife also died at that time, there now remain Hinauka, his older sister and her husband, Kaneiahua. They now tend it to this time and no one has objected.

I am the assistant Konohiki and I do not object.³⁸³

7.83 Helu 5204: The Claim of Kalama

Claimant: Kalama

Location: 'Ili of Polapola (fig. 152)

Recorded at: Honouliuli

Date: Jan. 22, 1848

Status: Awarded; Royal Patent 2865 (fig. 153)

Native Register Land claim of Kalama in Honouliuli, in Ewa.

To the Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby petition to you for my land claim at Honouliuli, at Ewa. 1 lot of mine, 1 dryland kula parcel, there in the ili of Bolabola, in the Ahupuaa of Honouliuli in the land division of Ewa, District 5.

My 1 loi and my 1 dry land kula are situated in the same place. Here are the boundaries: Towards the North the Loi (2) of Nika and Kalaoa; towards the East, the Loi of Kikala; towards the South, the two houses of Kalaoa and Laamaikahiki; towards the West, the Pa Aina of Kaope.

That is my land claim.

By Kalama³⁸⁴

Native Register Land claim of Kalama at Honouliuli, Ewa.

To the Commissioners who settle land claims of the Hawaiian Island. Aloha to you. I hereby make application for my land claim at Honouliuli, Ewa. I have 1 loi, and 1 dry land kula, there in the ili land of Bolabola in the Ahupuaa of Honouliuli, in the District of Ewa, Region 5.

The placement of my 1 Loi and 1 dry land Kula is the same. Here are the boundaries. Toward the North, the loi (2) of Nika and Kalaoa; towards the East, the Loi of Kikala; towards the South the two houses of Kalaoa and Laamaikahiki; towards the West, the Pa Aina of Kaope.

³⁸³Book 9, p. 205, Nov. 6, 1854.

³⁸⁴Book 5, p. 16, January 22, 1848.

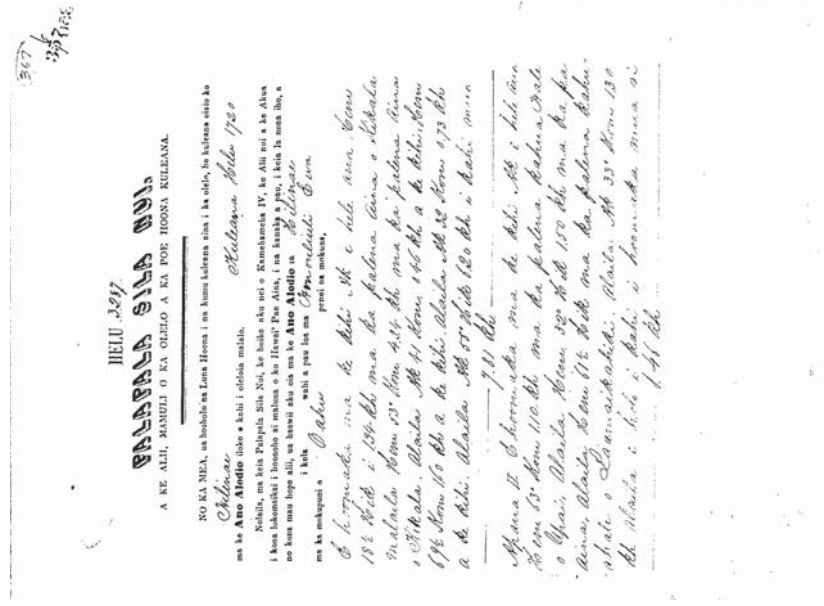


Figure 151: Palapala Sila Nui Helu 3287, Kuleana Helu 1720, to Hilinea. Honouliuli. 9.27 chains. November 12, 1856. Signed by Kaahumanu and Kamehameha. Volume 14, p. 367–368.

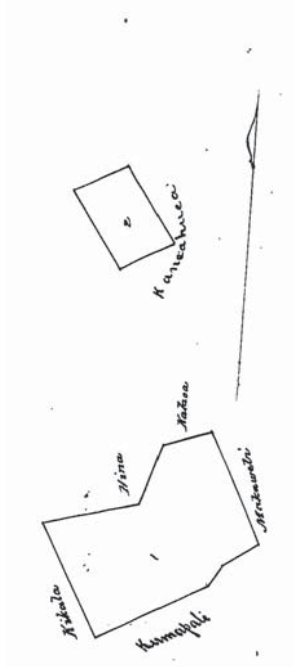


Figure 152: Helu 5204 of Kalama 2: Parcel 1, Moovina of Makawela, Ili of Polapola. Honouliuli, Ewa, Oahu. Containing 9.25 chains; Parcel 2, A house lot on the kula of Polapola. Containing 2.16 chains. There being 1 acre and 1.41 chains in the two parcels. Source: *Māhele Award Book* 7:559.

That is my land claim.
By Kaope.³⁸⁵

Foreign Testimony Kaulua sworn, says he knows the kuleana of Kalama 2, at Honouliuli, Ewa, Oahu. It consists of two pieces, the first a house lot and one kalo patch in the second piece.
The kalo patch is bounded on Waialua side by the land of Kaula [Kalaoa] & Nika; Mauka by the land of Kaulua; Honouliuli side by the same; Makai by House.
The house site is not enclosed. It is surrounded by the Konohiki's land.
Claimant derived this land from his father, Kealu, many years ago and has held & cultivated it without dispute up to this time.
Kalama sworn, says he knows this kuleana well. He confirms in fill the testimony of Kaulua.³⁸⁶
[Transcription errors at the time of recording this claim make the record unreliable.]

7.84 Helu 5584: The Claim of Kauli

Claimant: Kauli
Location: Ili of Puuloa, Kohepalaoa, and Okiokiolepe

³⁸⁵Book 5, p. 16–17, January 22, 1848.
³⁸⁶Book 3, p. 530, March 21, 1854.

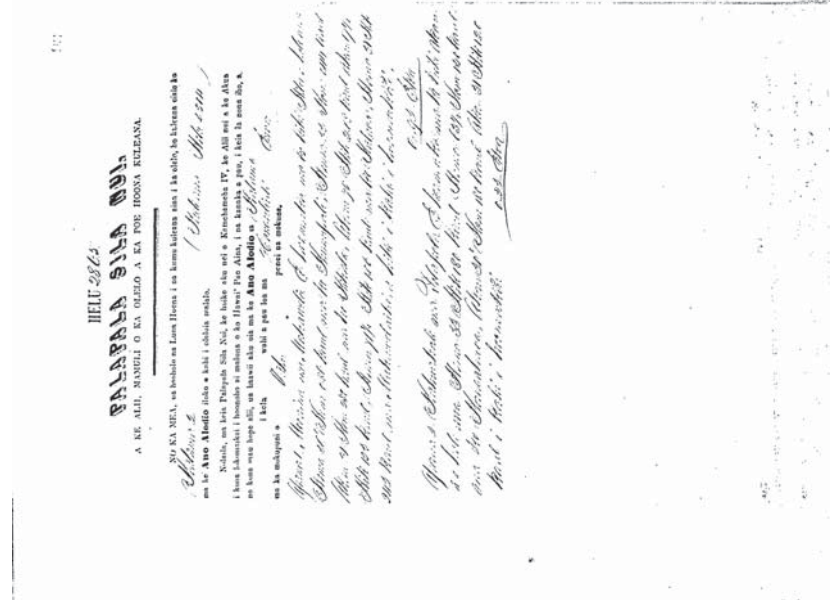


Figure 153: Palapala Sila Nui Helu 2865, Kuleana Helu 5204, to Kalama 2, Mo'o at Makawela; & *Kulihiale* at Polapola, Honouliuli. 1.14 acres. May 21, 1856. Signed by Kamehameha and Kaahumanu. Volume 13, p. 193–194.

Recorded at: Honouliuli
Date: Jan. 11, 1847
Status: Not awarded

Native Register To the Honorable Commissioners who Settle title. Aloha to you. I hereby tell you that you may understand my house lot claim. It is there at Kohepalaoa, Puuloa, Ewa, Oahu. Here are its boundaries: towards the North, the sea along the length of this side, two chains fourteen feet. The house lot of Kauhane is on the East, two chains, twenty two feet. On the South it is two chains, ten feet. On the West it is one chain, 47 feet.

Here is my second claim. It is three Ki'o Pua hooholo la (ponds for liberating fish fingerlings).

Here is my third claim. It is a pa uala (sweet potato planting field). It is there at Okiokiolepe, Puuloa, Oahu. Here are its boundaries: on the North, a kula parcel, on the east, a kula parcel; on the South, a kula parcel; on the West, a kula parcel.

By Kauhī. Written by Maakuia.³⁸⁷

Native Testimony Kauhī's case.
Kamoonohu Sworn. I know his house lot at Kohepalaoa, a wahi pana (storied place) a in the ili of Puuloa, E. O.

M. shore
H. kula of Waioipu
Mk. Mahoe's house lot
W. A house lot.

His land was from his parents in old times. No one has opposed him.

Mahoe Sworn. His testimony is the same as my knowledge. There is nothing wrong with his testimony.³⁸⁸

Foreign Testimony Kamoonohu sworn, says she knows the pahale of Clt. It is in the place called Kohepalaoa, Puuloa, Ewa, Oahu. It contains 2 yards in one piece and is bounded:

M. by the seashore
H, by the kula Waioipu
Mk. by the enclosure of Mahoe
W. by the Kahuahale of Mahoe.

³⁸⁷Book 5, p. 81-82, Jan. 11, 1847.

³⁸⁸Book 9, p. 290-291, Apr. 20, 1850.

Clt. inherited the place from his father who lived on it in olden times, & has held quiet possession of the place.

Mahoe sworn, says the testimony of Kamoonohu is correct, & is also his own.³⁸⁹

7.85 Helu 5587: The Claim of Kaholo

Claimant: Kaholo
Location: *Ili* of Puuloa and Keahi
Recorded at: Honouliuli
Date: Jan. 19, 1848
Status: Not awarded

Native Register To the Honorable Commissioners who Settle Title. Aloha to you. I hereby tell you of my house lot claim. It is there at Keahi, Puuloa, Oahu. Here are its boundaries: towards the North, a kula parcel; towards the East, the houses of Kaule; towards the South, the sea; West, a kula parcel.
By Kaholo X³⁹⁰

Foreign Testimony 5587 – Kaholo 5661 – Kaehunui 6126 – Napoo or Poo 6121 – Nakukui 6132 – Nahuawai 6074 – Hoolana 5958 – Makaoelani 5959 – Makaualii 5986 – Mahoe 5659 – Kaule

Kaehunui and Hoolana appeared on this day and stated that Kaule 5659 died and his claim was relinquished to the Konohiki. We the people whose names are written above have relinquished our claims because there is no good property. It is only a kula land, with no good place for growth of planted things. It is rocky, they are profitless claims, and we will live under the Konohiki as in earlier times.³⁹¹

7.86 Helu 5594: The Claim of Kauhane

Claimant: Kauhane
Location: *Ili* of Puuloa and Kohepalaoa
Recorded at: Honouliuli
Date: Dec. 25, 1847
Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my land and house claims. My planting place is there on the kula. The boundaries are not accurately

³⁸⁹Book 9, p. 144-145, Apr. 20, 1850.

³⁹⁰Book 5, p. 82, Jan. 19, 1848.

³⁹¹Book 9, p. 206, Nov. 7, 1854.

explained, but can be correctly pointed out, and combined with the kula. Here is my little house claim at Kohepalaoa. Here are its boundaries: towards the North, the sea; toward the East, the house of Kahaulonono; towards the South, a kula parcel, and the kio pua (fish fingerling ponds) of Kauhī folks; towards the West, the house of Kauhī.

I am with appreciation, your obedient servant.

Done by me, Kauhane.³⁹²

Native Testimony Kauhane's case.

Kamoonohu Sworn. I know his house lot, there at Kohepalaoa, Puuloa, E. O.

- M. the shore
- H. the house lot of Kahaulonono
- Mk. kula of Waioipu
- W. House lot of Kauhī.

His right was inherited from his parents to the son in the olden time. No one has opposed him.

Kauhī Sworn. His testimony is the same as mine. There is nothing wrong with his testimony.³⁹³

Foreign Testimony Kamoonohu sworn, knows the claim of Kauhane, it is a pahale in Kohepalaoa, Puuloa, Ewa, Oahu & is bounded:

- M. by the sea shore
- H. by the enclosure of Kahaulonono
- Mk. by the kula of Waioipu
- W. by the pahale of Kauhī.

This place was inherited by Clt. from his father from olden time, & he has held quiet possession of the same until now.

Kauhī sworn, says the testimony of Kamoonohu is correct, & is also his own.³⁹⁴

7.87 Helu 5650: The Claim of Kekiwai

Claimant: Kekiwai

Location: 'Ili of Puuloa and Makawela

Recorded at: Honouliuli

Date: Dec. 11, 1847

Status: Not awarded

³⁹²Book 5, p. 85, Dec. 25, 1847.

³⁹³Book 9, p. 291.

³⁹⁴Book 9, p. 145.

Native Register To the Honorable Commissioners who Settle Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my land and house claim. Here is my place at Makawela, in Puuloa, it is only a kula parcel. A kula that is cultivated from the inland and passing towards the shore. The boundaries are not properly known the will be pointed out.

Here is my house at Papaanae. Here are its boundaries: towards the North some stone walls; towards the East, the house of Limakauai; towards the South, the sea; towards the West, the house of Kaluhua.

These are my places, where I was born, and as an old man at this time, now live there. It is I.

By Kekiwai³⁹⁵

7.88 Helu 5653: The Claim of Kua (Kekua)

Claimant: Kua

Location: 'Ili of Maui, Kahui, Polapola, and Kamalua (fig. 154)

Recorded at: Honouliuli

Date: Dec. 6, 1847

Status: Awarded; Royal Patent 3078 (fig. 155)

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my land and house claim. This land is there at Maui, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Leleiaupa; towards the East, the land of Koi; towards the South, a kula parcel for me, to the Pa Aina; towards the West, the land of Puuli. My residency upon this land is from Kawaa to this time, and to Koi in the time of residency.

I am with appreciation, your obedient servant.

Done by me, Kua X³⁹⁶

Native Testimony Kua's case.

Keliipulu Sworn. I know his land, 2 loi and a kula of Kahui, in the ili of Maui, in Honouliuli, E. O. Parcel 2 is a loi in the moo at Kamalua, in the ili of Polapola H. E. O. Parcel 1. 2 loi and a kula parcel.

M. loi of Kahakumaka

H. pa aina

Mk. loi of Puuowaikele for Konohiki

W. loi of Iao for Leleiaupa.

³⁹⁵Book 5, p. 102, Dec. 11, 1847.

³⁹⁶Book 5, p. 103, Dec. 6, 1847.

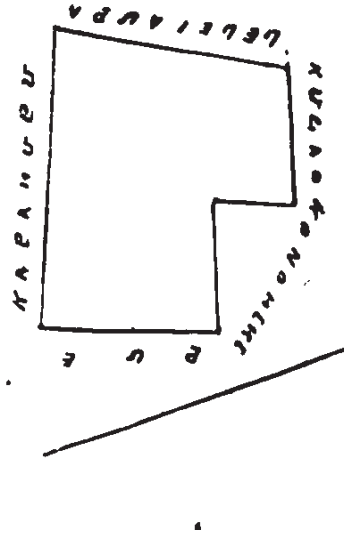


Figure 154: Helu 5653 of Kua. Three loi and a kula in the ili of Maui. Honouliuli, Ewa, Oahu. Containing 7.41 chains. *Source:* *Māhele* Award Book 6:130.

Parcel 2. I loi in the ili of Kamalua

- M. loi of Kapaepae for Kikala
- H. loi of Lohanui for Ohai
- Mk. loi of Kamalua for Kikala
- W. loi of Kamaieleele for Laamaikahiki.

His land was from Kawa, an inheritance from his parents in olden times. No one has opposed him.

Kanehekili Sworn. His testimony is the same as my testimony. There is nothing wrong with his testimony, it is the same as mine.³⁹⁷

Foreign Testimony Kelipulu sworn, says the land of Clt. is in 2 parts.

^{1st} a moosaina of 2 lois & and a kula called Kahui in the ili of Maui, Honouliuli, E. O. It is bounded:

- M. by the loi called Kahakumaka of Koi
- H. by the pa aina
- Mk. by the loi called Poiwaikele of Konohiki

³⁹⁷Book 9, p. 288, April 19, 1850.

W. by the loi called Iao of Leleupa.

Apana 2, one loi in the moosaina of Kamalua, in the ili of Polapola, H.E. Oahu & is bounded:

- M. by the loi Kapaepoe of Kikala
- H. by the loi Lohanui of Ohai
- Mk. by the loi Kamalua of Kikala
- W. by the loi Kamaieleele of Laamaikahiki.

Clt. received the land from Kawa & inherited it from his fathers of old time, & has held it in quiet possession until now.

Kanehekili sworn, confirms the above testimony as true & says it is his own.³⁹⁸

7.89 Helu 5653 B: The Claim of Kanehekili

Claimant: Kanehekili

Location: Ili of Poohilo and Kamookahi (Mookahi) (fig. 156)

Recorded at: Honouliuli

Date: —

Status: Awarded; Royal Patent 6827 (fig. 157)

Native Testimony Kanehekili's case.

Kanehekili came forwards and made an oath that his claim had been written by Maakuia, though his claim had dropped. Therefore it was agreed that his claim would be entered.

Kelipulu Sworn. I know his land, 3 loi and a kula in one parcel. It is the moo of Kamookahi in the ili of Poohilo, Honouliuli, Ewa, Oahu.

M. Pa aina

H. Ili of Kailikahi

Mk. Lokoia (fishpond) of Kaaimano for the Konohiki

W. moosaina of Kumuhau for Kaekuna.

His land was from Hapauea, and it was bequeathed to me his son in the time of Kaahumanu and before.

Kua Sworn. His testimony is the same as mine. There is nothing wrong with his testimony.³⁹⁹

³⁹⁸Book 9, p. 142-143.

³⁹⁹Book 9, p. 289.

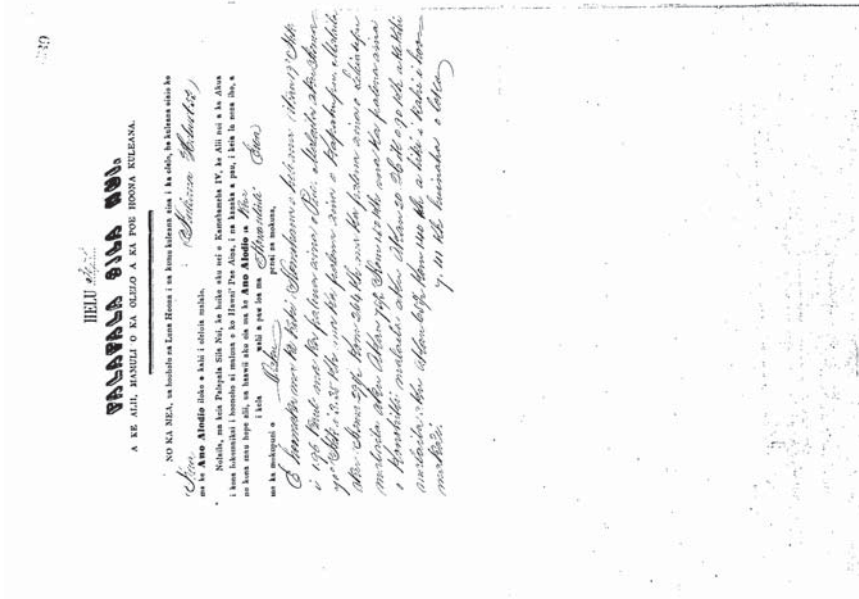


Figure 155: Palapala Sila Nui Helu 3078, Kuleana Helu 5653, to Kua, Honouliuli. 7.41 chains. August 7, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 639–640.

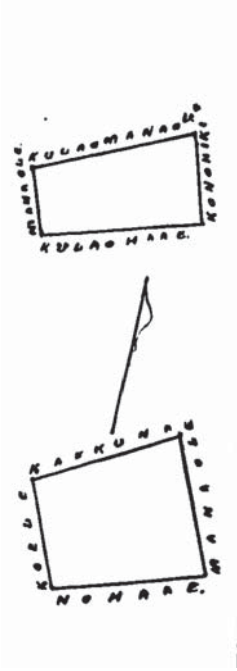


Figure 156: Helu 5653 B of Kanehekili: *Parcel 1*, A kula in Kamoookahi, Poohilo, Honouliuli, Ewa, Oahu; *Parcel 2*, A loi at Kamoookahi, Poohilo, Honouliuli, Ewa Oahu. There being within these two parcels, 8.33 chains. *Source:* *Māhele Award Book* 6:138.

Foreign Testimony Clt. appeared & made oath that his claim was duly made out by Maakuia & presented; the same is therefore admitted to a hearing. Kelipulu, sworn says, he knows the land of Clt. It contains 3 loia & a kula in one piece in the moaina of Mookahi, ili of Poohilo, Honouliuli, E.O. It is bounded:

- M. by the paaina
- H. by the ili Kailikahahi
- Mk. by the loko Kuaimano of Konohiki
- W. by the moo aina Kumuhau of Kaekuna.

Clt. inherited the land from his father, Hapauea, who held it from the time of Kamehameha I. He has held quiet possession of the same until now. Kua, sworn says, the testimony of Kelipulu is correct & is also his own.⁴⁰⁰

7.90 Helu 5653 C: The Claim of Kalauli

Claimant: Kalauli
Location: Ili of Palapala, Hiwalalo, Kamalua, and Puaulu
Recorded at: Honouliuli
Date: —
Status: Not awarded

⁴⁰⁰Book 9, p. 143.

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Figure 157: Palapala Sila Nui Helu 6827, Kuleana Helu 5653 B, to Kanehekili. *Kūla* and *Lo'i* at Mookahi, of Poohilo, Honouliuli. 8.33 chains. November 13, 1876. Kalakaua Rex. Volume 26, p. 151–152.

W. by loi Kaamaikaeha of Mili.

Apana 2. 2 lois in the ili Polapola, Honouliuli, Ewa, Oahu & is bounded:

- M. by the loko Kamalua of Laamaikahiki
- H. by the loko Kanakai of Laamaikahiki
- Mk. by the loko Makawela of Kikala
- W. by the loko Poepoe of Kapiioho.

Apana 3, a kahuahale & a loi in Pualuu [Puaaluu], of Honouliuli, E. O. Bounded:

- M. by the akaakai of konohiki called Kalahu
- H. by the paaina
- Mk. by the loi Mauakapuaa
- W. by the loi Kuaithoe of Konohiki.

Clt. received Apanas 1 & 2 of me (Kalaoa) and Apana 3 of Kumupopo in the time of Kinau & has held quiet possession of the same until now.

Ohai, sworn says the testimony above is correct & is also his own.

The above Apana 3 is claimed by Kumupopo as belonging to the konohiki & says Clt. has a kahuahale in his apana 1.⁴⁰²

7.91 Helu 5654: The Claim of Kuhiena

- Claimant:** Kuhiena
- Location:** 'Ili of Maui, Poohilo, Paecokiha, and Waianu (fig. 158)
- Recorded at:** Honouliuli
- Date:** Dec. 6, 1847
- Status:** Awarded; Royal Patent 3088 (fig. 159)

Native Register To the Honorable Commissioners who quiet land claims of the Hawaiian Islands. Aloha to you. I hereby tell you the source of my land and house claim. This land is thereat Maui, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: tow the North the land of Pue and the land of Koi; towards the East, the land of Kaneaola; toward the South, the land of Leleiaupa and the land of Koi; Towards the West, the land of Koi.

Here is my second land claim at Poohilo, Honouliuli, in the moo land of Kapule. Here are its boundaries: towards the North, the land of Kelemanu; towards the East, the land of Kapule; towards the South, the land of Kekua; towards the West, the land of Kekua.

⁴⁰²Book 9, p. 143–144.

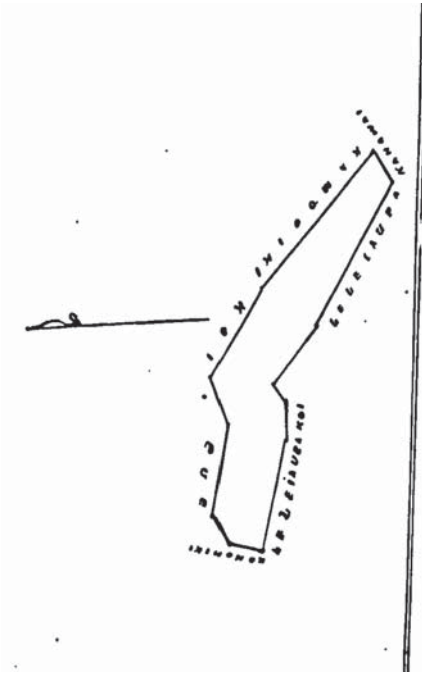


Figure 158: Helu 5654 of Kuhiana. Mookalo of Kapaiokiha, Ili of Maui. Honouliuli, Ewa, Oahu. Containing 6.06 chains. *Source: Māhele Award Book 6:135.*

Here is my house claim: towards the North, the house of Puehu. Toward the East, a Mahiki (grassy area) until the house of Nika; towards the South, the land of Puehu, towards the West, the house of Koi.

My residency is an old one, from Kamehameha first to this time, not having gone about here and there. Gotten from Koi at this time.

I am with appreciation your obedient servant

By me, Kuhiena⁴⁰³

Native Testimony Kuhiena's case.

Kua Sworn. I know his land, 1 moo kalo at Paecokiha, In the ili of Maui at Honouliuli, Ewa, Oahu. 2 loi called Kalokoloa in the ili of Poohilo adjoining the mooaina of Waianu, Honouliuli, Ewa Oahu. Parcel 3, a house lot in the ili of Maui, Honouliuli, Ewa, Oahu.

Parcel 1. Mooaina 1. Here are the boundaries:

M. mooaina of Kahawai

⁴⁰³Book 5, p. 104, Dec. 6, 1847.

H. mooina of Kapahupu, Konohiki's koele
Mk. mooina of Ohikili for Koi
W. mooina of Kumupali for Pue.

Parcel 2. 2 loi called Kalokolooa:

M. 1 loi of Puehuehu with another small loi
H. 1 loi of Palaa for Kekiaha [Kiaha]
Mk. loi of Haleokane
W. an alanui kuauna (road embankment) of Puehuehu, adjoining Oni.

Parcel 3. House lot.

M. house lots of Puehu and Kahawai
H. mooina of Kumupali for Pue
Mk. house lot of Pue
W. the pali.

His land was from Naiwi in the time of Kamehameha I. No one has opposed him.
Hilinae Sworn. His knowledge is the same as mine. His knowledge and mine are the truth.⁴⁰⁴

Foreign Testimony Kua, sworn says, the land of Clt. is 1st a mooina called Paekikiha in the ili of Maui, Honouliuli, Ewa, Oahu.

2d a loi called Kalokolooa in the mooina Waianu, ili Poohilo, Honouliuli, Ewa, Oahu.

3d a kahuahale in the [ili] of Maui, Honouliuli, Ewa, Oahu.

Apana 1 is bounded:

M. by the mooina of Kahawai
H. by koele Kapahupu
Mk. by mooina Ohikili of Koi
W. by mooina Kumupali of Pue.

Apana 2, Kalokolooa in Poohilo. Bounded:

M. by the loi Puehuehu of Kelemana
H. by loi Palaa of Kekiaha
Mk. by loi Haleokane of Kekua
W. by a kuauna alanui (road bank) & land of Ooni [Oni].

Apana 3, kahuahale, ili of Maui, & is bounded:

M. by the kahuahale of Puehu & Kahawai

⁴⁰⁴Book 9, p. 280-281.

H. by the moo Kumupali & land of Pue
Mk. by kahuahale of Koi
W. by the pali.

Clt. received the land from Naiwi in the time of Kamehameha I & he has held quiet possession of the same until now.

Hilinae, sworn says, he knows the land of Clt. The testimony of Kua is true & is also his own.⁴⁰⁵

7.92 Helu 5659: The Claim of Kaule

Claimant: Kaule
Location: *Ili* of Puuloa and Keahi
Recorded at: Honouliuli
Date: Dec. 11, 1847
Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my house claim together with the kula parcel. We cannot properly sketch it, as the cultivated places of the people are scattered. Here is my house claim at Keahi in Puuloa. Here are its boundaries: towards the North, a salt making place; towards the East, Makaioelani's house; towards the South, the sea; towards West, surrounding the salt beds.
It is from the time that Kinau was living at Aliapaakai to this day.
I am with appreciation, your obedient servant.⁴⁰⁶

Foreign Testimony [See the group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴⁰⁷

7.93 Helu 5661: The Claim of Kaehunui

Claimant: Kaehunui
Location: *Ili* of Puuloa and Kapi
Recorded at: Honouliuli
Date: Dec. 13, 1847
Status: Not awarded

⁴⁰⁵Book 9, p. 134-135.

⁴⁰⁶Book 5, p. 106, Dec. 11, 1847.

⁴⁰⁷Book 9, p. 206.

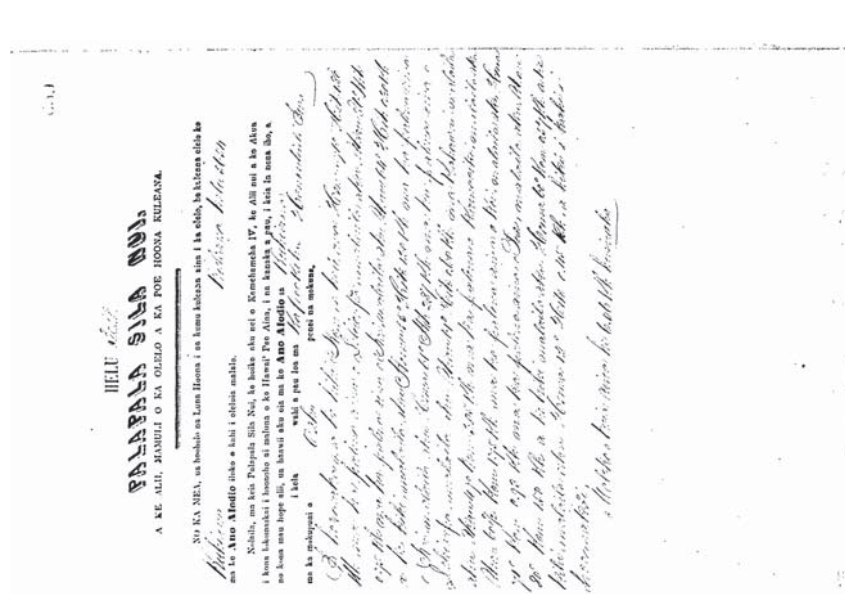


Figure 159: Palapala Sila Nui Helu 3088, Kuleana Helu 5654, to Kauhiana, Kapaeokihia, Honouliuli, 6.06 chains. August 6, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 659-660.

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I here by tell you of my house claim combined with the kula with consists of cultivated kihapai (gardens). We cannot accurately describe the boundaries. Here is my house claim, at Kapi, land of Kaope. There are two claims of the chief in my house claim, a Kou (tree) and a kio pua (pond for fingerling fish). Here are the boundaries: towards the North, a kula parcel, my kio pua and Kaope; towards the East, the sea; towards the South, a kula parcel. There are the two lands of the chief, towards the West, is my salt bed.

I am with appreciation, your obedient servant.

Done by me Kaahunui.⁴⁰⁸

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴⁰⁹

7.94 Helu 5670: The Claim of Kawaokele

Claimant: Kawaokele
Location: Ill of Polapola
Recorded at: Honouliuli
Date: Jan. 11, 1848
Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. This land is there at Polapola, in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the land of Hilinea; towards the East, the land of Kikala; towards the South akaakai (bulrushes); towards the West, the land of Kikala.

Here is my second land claim. Here are its boundaries: towards the North, the land of Kaneiahuea; towards the East, the land of Laamaikahiki; towards the South, the land of Ohai; towards the West, the land of Hilinea.

Here is my third claim: towards the North, the land of Kikala; towards the East, the land of Ohai; towards the south, the land of Kaneaola; towards the West, the poalima (parcel worked for the chief). Residency upon the land is from Kavaa to the present time.

By Kawaokele⁴¹⁰

Native Testimony Kawaokele's case.

⁴⁰⁸Book 5, p. 107, Dec. 13, 1847.

⁴⁰⁹Book 9, p. 206.

⁴¹⁰Book 5, p. 111, Jan. 11, 1848.

This claim has been entered into the Commissioner's office at Honolulu. The house lot remains.
Kaohai sworn. I know his house lot in the ili land of Polapola, Honouliuli, Ewa, Oahu. Here are the boundaries:

- M. the Pa aina
- H. Hale pule Katolika (Catholic Church)
- Mk. an ala nui hele (road)
- W. a hose lot.

His land was from his parents. No one has opposed him.
Kapiioho Sworn. His testimony is the same as mine.⁴¹¹

Foreign Testimony The above claim has been heard before the Land Commission, except the Pahale, which is as follows.

Kaohai sworn, says the Kahuahale of Clt. is situated in Polapola adjoining the Catholic chapel yard, & is bounded:

- M. by the paaina
- H. by the Catholic chapel yard
- Mk. by the public road
- W. by the house lot of mine.

Clt. received this house lot from his father & has held quiet possession of the same until now.
Kapiioho sworn, says the above testimony is correct.⁴¹²

7.95 Helu 5670 B: The Claim of Kaohai

Claimant: Kaohai
Location: 'Ili of Kaihuopalaai, Lopanui, Polapola, Kuaimano, and Makawela (fig. 160)
Recorded at: Honouliuli
Date: Apr. 18, 1850
Status: Awarded; Royal Patent 3085 (fig. 161)

⁴¹¹Book 9, p. 282-283.
⁴¹²Book 9, p. 136-137.

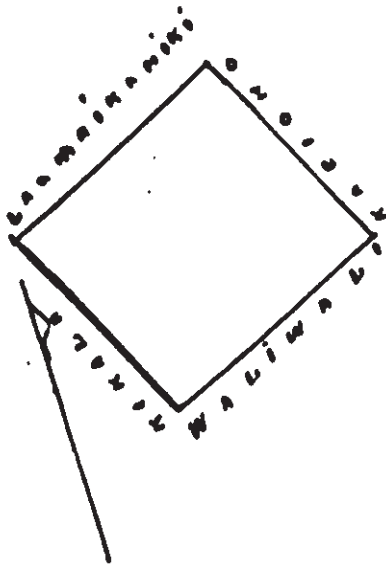


Figure 160: Helu 5670 B of Kaohai. Two loi at Lopanui, Ili of Polapola. Honouliuli, Ewa, Oahu. Bounded by Weliweli on the South. Containing 6 78/100 chains.
Source: *Māhale* Award Book 6:137.

Native Testimony Kaohai's case.

Kikala Sworn. I know his land, a moo kalo; some loi at another place; 3 loi kalo in the mooaina of Lopanui in the ili of Kaihuopalaai. Parcel 3, house lot at Polapola, adjoining the Catholic Church.

Parcel 1. Here are the boundaries:

- M. loi kalo of Puehuehu for Laamaikahiki
- H. mooaina of Kamaihiili for Kapiioho
- Mk. 2 lot at Kumupali
- W. mooaina of Makawela

Parcel two. Is a loi for the Konohiki. Testimony was given in error. It is within the loi area of his, in the ili of Kaihuopalaai, Honouliuli, Ewa, Oahu. The second parcel is contested by the Konohiki, prior to that this land was for Nawiliwili. The boundaries are:

- M. loi of Kuemanuiki

H. loi of Kuaipua
Mk. loi of Pulehu
W. the auwai of Paninui [Panainui].

Parcel 3. A house lot.

M. a pa aina
H. house lot of Kahoekele
Mk. a road and the pa aina
W. a house lot (who's is it?).

His land is from his parents in the time of Kaahumanu. No one has opposed him.
Kapioho Sworn. His testimony is the same as mine.⁴¹³

Foreign Testimony Clt. appears and made oath that his claim was duly made out & presented, the same is therefore admitted to a hearing.

Kikala, sworn, says he knows the land of Kaohai. It is a moo of 3 lois called Lohanui in the ili of Kaihuopalaai, Honouliuli, Ewa, Oahu.
2d. A loi called Kuamoo in the moo Makawela, ili Kaihuopalaai as above
3d. A kahuahale in Polapola adjoining the Catholic Chapel yard.
Apana 1 is bounded:

M. by a loi kalo called Paloku [Puehuehu] of Laamaikahiki
H. by a moosaina Kamaihiili of Kapioho
Mk. by a loi called Kumupali in the same moo
W. by a moosaina Kamakawela.

Apana 2. A loi called Kuaimano in the moo Makawela & ili Kaihuopalaai, Honouliuli, Ewa, Oahu. It is bounded:

M. by the loi Kuaimanoiki
H. by the loi Kuaipuaa
Mk. by the loi Pulehu
W. by the auwai Panainui.

Note: [illegible] apana together with one loi in Apana 1 is claimed by Konohiki as returned to him by Weliiwell when he left for Maui, & was committed to the care of claimant but not given to him as his own.

Apana 3. Kahuahale. Bounded:

M. by the paaina
H. by the kahuahale of C. [Catholic] chapel
Mk. by the road

⁴¹³Book 9, p. 283-284, April 18, 1850.

W. by the pahale & kula.

Clt. received the land from his father in the time of Kaahumanu, & has held quiet possession of the same until now.

Kapioho sworn, says the above testimony is true & is also his own.⁴¹⁴

7.96 Helu 5670 C: The Claim of Kumupopo

Claimant: Kumupopo

Location: *Ili* of Kepoe (Kepoi), Kamooiki (Mooiki), Loloulou, Poepoe, Puaaluu (Puaalu), Poohilo, and Kaoiki (fig. 162)

Recorded at: Honouliuli

Date: —

Status: Awarded; Royal Patent 6806 (see figs. 80, 81, p. 369, 370)

Native Testimony Kumupopo's case.

Kumupopo came forward and made oath for his land, his application had been written by Maakuia and been dropped. His application is entered.

Poopuu Sworn. I know his land, 3 parcels of land.

Parcel 1. Moosaina Kepoe, 7 loi and a kula house lot. Here are the boundaries:

M. loko of Waianu
H. loko of Kahui
Mk. loko of Kaluakanaka for Opiopio
W. Pa aina.

Parcel 2. 1 loi of Kamooiki in the ili of Loloulou, Honouliuli, Ewa, Oahu.

M. loi of Kapalaha
H. akaakai (bulrushes) of Mooiki
Mk. loi of Keolama for Kekua
W. Poalima of the Konohiki.

Parcel 3. 2 loi of Poepoe and a little loi in the moo of Mooiki, in the ili of Puaaluu, Honouliuli, Ewa, Oahu.

M. akaakai of Mooiki
H. ili land of Mauakapuaa for Kahananui
Mk. Pa aina
W. loi of Kikala.

His land was from Kaope in the time of Kinau. No one has opposed him.

Kalama Sworn. His testimony is the same as mine, his is true.⁴¹⁵

⁴¹⁴Book 9, p. 137-138.

⁴¹⁵Book 9, p. 284.

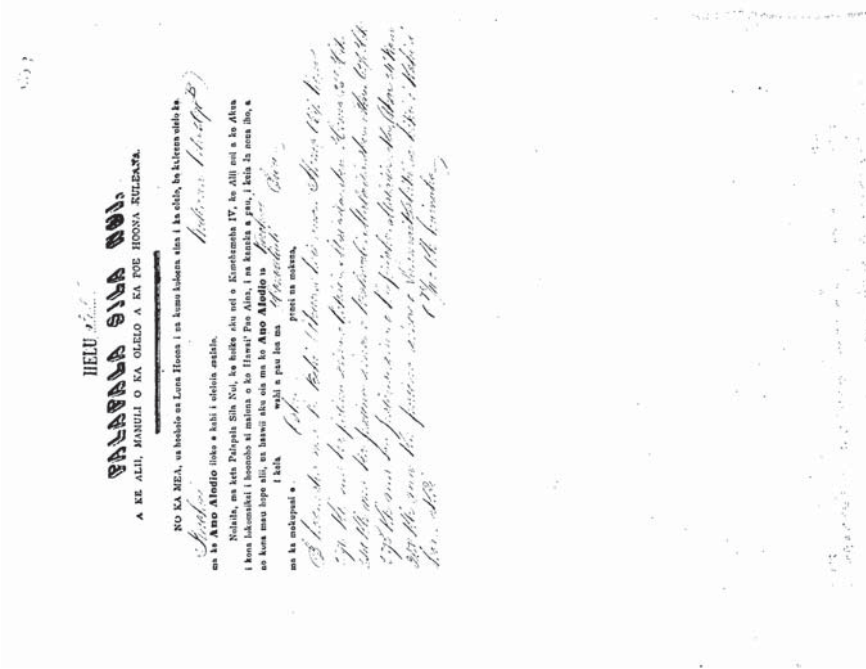


Figure 161: Palapala Sila Nui Helu 3085, Kuleana Helu 5670 B, to Kaohai. Lo'i at Lopanui, III of Palapala, Honouliuli. 6/78/100 chains. August 7, 1856. Signed by Kaahumanu and Kamehameha. Volume 13, p. 653-654.

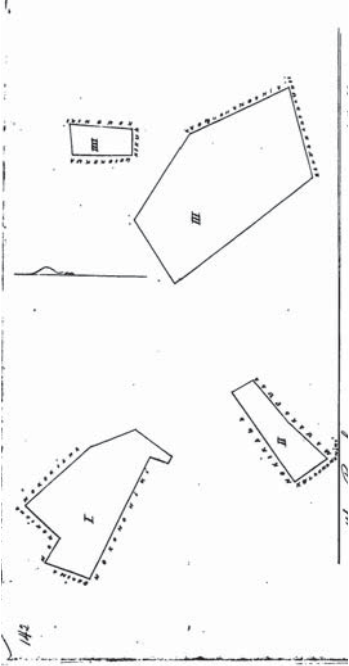


Figure 162: Helu 5670 C of Kumupopo: Parcel 1, Mooina of Kepoe, Ili of Kepoe. Honouliuli, E.O. Containing 1 acre, and 3 69/100 chains; Parcel 2, Two loi at Mooiki, Ili of Puaaluu. Honouliuli, Ewa, Oahu. Containing 4.40 chains. Parcel 3, A Mooina at Puaaluu. Honouliuli, Ewa, Oahu. Containing 2 acres, 5.46 chains; Parcel 4, Two loi in Loloulu. Honouliuli, Ewa, Oahu. Containing 3.68 chains. There being in the combined parcels, 4 acres and 7 23/100 chains. Source: Māhele Award Book 6:141.

Foreign Testimony Clt. appeared & made oath that his claim was duly made out by Maakuia & sent in; the same is therefore admitted to a hearing. Poopuu sworn, says he knows the land of Clt. It consists of 3 parts. Apana 1 is a mooina called Kepoi in the Ili Poohilo, Honouliuli, Ewa, Oahu. It contains 7 loi and a kula kahuaale & is bounded:

- M. by the loko Waianu of Konohiki
- H. by the loko Kahui of Konohiki
- Mk. by the loi Kaluakanaka of Opiopio
- W. by the paaina.

Apana 2, a loi called Kaoiki in the Ili of Loloulu, Honouliuli, Ewa, Oahu & is bounded:

- M. by the loi Kapalaha of Kekua
- H. by the akaakai of Mooiki
- Mk. by the loi of Keolama of Kekua
- W. by the Koele of Konohiki.

Apapa 3, two loia in the moaaina Mooiki, ili of Puaaluu, Honouliuli, Ewa, Oahu. Bounded:

- M. by the akaakai of Mooiki
- H. by the loi Kahananui in the ili of Mauakapuaa
- Mk. by the paaina
- W. by the loi Kumupali of Kikala

Clit. received the land of Kaope in the time of Kinau and has held quiet possession of the same until now.

Kalama sworn, says the testimony above is true, and is also his own.⁴¹⁶

7.97 Helu 5950: The Claim of Pihana

Claimant: Pihana
Location: Ili of Kamoku, Kahui, Kamalua, and Kailikahi (fig. 163)
Recorded at: Honouliuli
Date: Jan. 6, 1848
Status: Awarded; Royal Patent 6935 (fig. 164)



Figure 163: Helu 5950 of Pihana for Puniawa. Moaaina of Kahui, Ili of Kamoku, Honouliuli, Ewa, Oahu. Containing 1 acre and 1.56 chains. *Source:* *Māhale* Award Book 6:133.

Native Register To the Honorable Commissioners who Quiet Land Claims of the Hawaiian Islands. Aloha to you. I hereby tell you of my land claim. This land is there at in Kamoku in Honouliuli, Ewa, Island of Oahu. Here are its boundaries: towards the North, the Auwai and the Cliff; towards the East, the moo land of Kahalewai; towards the South the Estuary; towards the West, the land of Kamanu and the Poalima.

Here is my second land claim in the land of Makue. Here are its boundaries: towards the North, the loi of Makue; towards the East, the land of Kalauli. Towards the South, Makue; towards the West, the land of Kahalewai.

⁴¹⁶Book 9, p. 138–139.

Here is my house claim. Towards the North a kula parcel; towards the East, a kula parcel; towards the South, Pa Aina; towards the West, a Pa Aina.

By Pihana X⁴¹⁷

Native Testimony Pihana's case.

Keliipulu Sworn. I know his land, the moaaina of Kahui with 3 loi and kula land. Parcel 2, 1 loi, Kamalua is the name, in the ili of Kamoku, Honouliuli, Ewa, Oahu. Parcel 4 is the house lot on the kula of Kailikahi.

Parcel 1. Moo aina of Kahui, 3 loi and a kula parcel.

- M. auwai of Kahui and the kula of Kailikahi.
- H. moo aina of Kahui for Kahalewai
- Mk. muliwai of Makaii
- W. moaaina of Kamoomuku for Kalauli.

Parcel 2. 1 loi at Kamalua.

- M. loi of Makue at Kekee
- H. loi of Kalauli
- Mk. moaaina of Kalauli
- W. loi of Kahui.

Parcel 3. House lot in the ili of Kailikahi.

- M. the kula of Kailikahi
- H. the kula of Kailikahi
- Mk. the Pa aina, and the kula of Kailikahi
- W. laau kalakala (*Opuntia megacantha* or prickly pear cactus).

His land was from Puniawa in the time of Kaahumanu. No one has opposed him. Naholowaa Sworn. His testimony is the same as mine. There is nothing wrong with his testimony.⁴¹⁸

Foreign Testimony Keliipulu, sworn, says the land of Clit. consists of 3 apapa. 1st one called Kahui, a moaaina of 3 loia & a kula. 2d a loi called Malua in the moo of Kekee, ili of Kamoku, Honouliuli, E. O. 3d a kula kahuahale in the kula of Kailikahi, Honouliuli, E. O.

Apapa 1, the moo called Kahui, 3 loi & a kula in the ili of Kamoku, Hon. E. O. is bounded:

- M. by the Auwai of Kahui & Kula of Kailikahi

⁴¹⁷Book 5, p. 187, Jan. 6, 1848.

⁴¹⁸Book 9, p. 287–288.

- H. by the mooina Kahui of Kahalewai
- Mk. by the muliwal of Makaii
- W. by the mooina Kamoku of Kalauli.

Apana 2, a loi called Malua, bounded:

- M. by the loi Kekee of Makue
- H. by the loi Kamalua of Kalauli
- Mk. by the mooina Kekee
- W. by the loi Kahui of Manua.

Apana 3. Kahuahale bounded:

- M. by the kula of Kailikahi
- H. by the kula of Kailikahi
- Mk. by the paaina
- W. by the kula of Kailikahi.

Clt. received the land from Puniawa by gift in the year 1846, who received it from Kawaa in the time of Kaahumanu. Clt. succeeds to the rights of Puniawa, & has held it in quiet until this time
 Naholowaa sworn, says the above testimony is true & is also his own.⁴¹⁹

7.98 Helu 5958: The Claim of Makaioelani

Claimant: Makaioelani
Location: 'Ili of Puuloa and Keahi
Recorded at: Honouliuli
Date: Sept. 19, 1847
Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you of my house lot claim at Keahi, Puuloa. Here are its boundaries: towards the North, a kula parcel; towards the East, the house lot of Mahiole; towards the South, the sea; West, the houses of Kaule.
 By Makaioelani⁴²⁰

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴²¹

⁴¹⁹Book 9, p. 141-142.

⁴²⁰Book 5, p. 190, Sept. 19, 1847.

⁴²¹Book 9, p. 206.

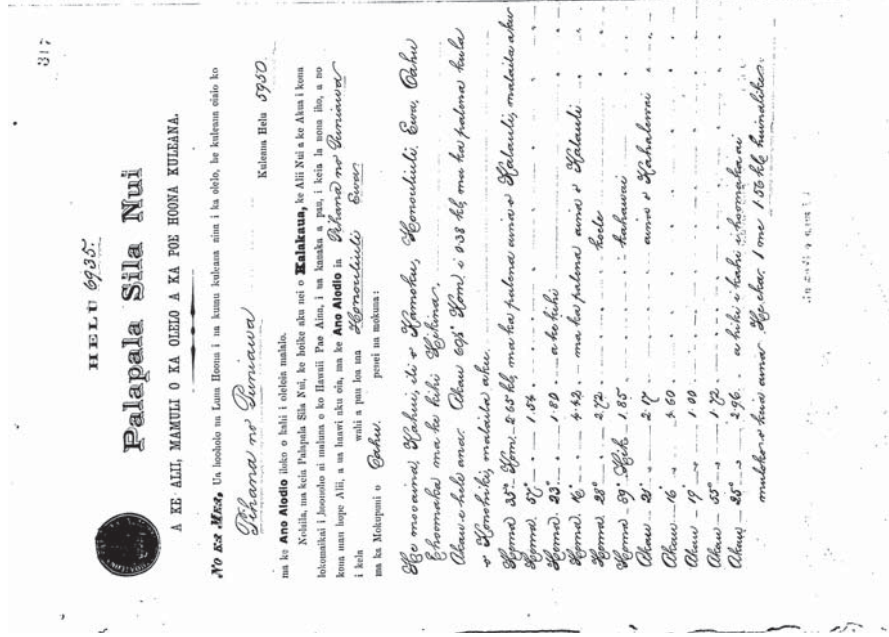


Figure 164: Palapala Sila Nui Helu 6935, Kuleana Helu 5950, to Pihana for Puniawa. Mo'o of Kahui, 'Ili of Kamoku, Honouliuli. 1 acre, 1.56 chains. June 18, 1877. Signed by Kalakaua Rex. Volume 26, p. 317-318.

Foreign Testimony Claimant appeared in person, and stated that he has no right to the land mentioned in this claim, it belongs to the Konohiki.⁴²²

7.99 Helu 5959: The Claim of Makaualii

Claimant: Makaualii

Location: *Ili* of Puuloa and Kapi

Recorded at: Honouliuli

Date: Sept. 19, 1847

Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you of my house lot claim, there at Kapi, Puuloa. Here are its boundaries: towards the North, a kio pua (pond for fish fingerlings), belong to Kamau, and his houses; towards the East, the sea; towards the South, the houses of Pine; towards the West, a kio pua for Kaope.
Makaualii X⁴²³

Foreign Testimony Claimant appeared in person, and stated that he has no right to the land mentioned in this claim, it belongs to the Konohiki.⁴²⁴

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴²⁵

7.100 Helu 5977: The Claim of Mahoe

Claimant: Mahoe

Location: *Ili* of Puuloa and Kohepalaoa

Recorded at: Honouliuli

Date: Jan. 3, 1848

Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you of my house land claim. This house is there at Kohepalaoa, in Puuloa, Ewa, Island of Oahu. Here are its boundaries: towards the north, the sea; towards the East, the house of Kauhī and the kula parcel; towards the South, the house of Lauhuki; towards the West, the combined kula mahi (kula parcel that is cultivated).

⁴²²Book 3, p. 477.

⁴²³Book 5, p. 190, Sept. 19, 1847.

⁴²⁴Book 3, p. 477.

⁴²⁵Book 9, p. 206.

I am with appreciation, your obedient servant.
By Mahoe X⁴²⁶

Native Testimony Mahoe's case.

Kauhane Sworn. I know his 2 house lots at Kohepalaoa, in the ili of Puuloa, E. O. Parcel 1. 2 house lots.

M. house lot of Kauhī and the shore.

H. the kula of Waioipu

Mk. the house lot of Lauhuki

W. the kula of Kaluanohu.

His right is from his parents in olden times. No one has opposed him.
Kahooluhina [Naholowaa] Sworn. I know is house lot, his testimony is the same as mine.⁴²⁷

Foreign Testimony Kauhane sworn, says he knows the 2 pahales of Mahoe. They are situated in the place called Kohepalaoa, Puuloa, Ewa, Oahu, bounded:

M. by the pahale of Kauhī & sea shore

H. by the pahale of Kauhī & kula of Waioipu

Mk. by the pahale of Lauhuki

W. by the kula of Kaluanohu.

Clk. received the place from his father who dwelt there from olden time, & he has always had quiet possession of the same.

Naholowaa sworn, says the testimony of Kauhane is correct, & it is also his own.⁴²⁸

7.101 Helu 5986: The Claim of Mahoe

Claimant: Mahoe

Location: *Ili* of Puuloa, Okiokiolepe, & Komomoku

Recorded at: Honouliuli

Date: Sept. 25, 1847

Status: Not awarded

⁴²⁶Book 5, p. 196, Jan. 3, 1848.

⁴²⁷Book 9, p. 291.

⁴²⁸Book 9, p. 145.

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you the source of house and wahi kanu (planting place). This house claim is at Okiokiolepe and Kumomoku [Konomoku]. Here are its boundaries: towards the North, the sea; towards the East, the sea; towards the South, a kula parcel; towards the West, a kula.

Here is my second house claim at Okiokiolepe. Here are its boundaries: towards the North, the sea; towards the East, a loko (pond); towards the South, a kula and kio wai (fresh water pond); towards the West, a kula parcel. It is a combined kula mahi (cultivated kula).

I am with appreciation.

By Mahoe⁴²⁹

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴³⁰

7.102 Helu 5998: The Claim of Lauhuki

Claimant: Lauhuki

Location: *ʻIli* of Puuloa and Kohepalaoa

Recorded at: Honouliuli

Date: Jan. 7, 1848

Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you the source of my house land claim. This house is there at Kohepalaoa in Puuloa. Here are its boundaries: towards the North, the house of Mahoe; towards the east, a kula parcel; towards the South, a muliwai kai (ocean estuary); towards the West, a muliwai kai combined with a kula mahi (cultivated kula land). I am with appreciation, your obedient servant.

Done by me, Lauhuki X⁴³¹

7.103 Helu 6074: The Claim of Hoolana

Claimant: Hoolana

Location: *ʻIli* of Puuloa and Kapi

Recorded at: Honouliuli

Date: Dec. 26, 1847

Status: Not awarded

⁴²⁹Book 5, p. 200–201, Sept. 25, 1847.

⁴³⁰Book 9, p. 206.

⁴³¹Book 5, p. 203–204, Jan. 7, 1848.

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you of my house lot claim, there at Kapi, Puuloa, Oahu. Here are its boundaries: towards the North, a kula parcel; towards the East, the sea; towards the South, the houses of Naunau [Honaunau]; towards the West, a kula parcel.

By Hoolana X⁴³²

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴³³

Foreign Testimony Claimant appeared in person, and stated that he has no right to the land mentioned in this claim, it belongs to the Konohiki.⁴³⁴

7.104 Helu 6121: The Claim of Nakuikui (Nakukui)

Claimant: Nakuikui

Location: *ʻIli* of Puuloa, Kapi, and Okea

Recorded at: Honouliuli

Date: Sept. 25, 1847

Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you the claim of my house and planting place. This house is at Kapi, the land of Kaope, at Puuloa, Ewa, Island of Oahu. Here are its boundaries: towards the North, the house of Pine; towards the East, the sea; towards the South, the house of Kauamoa; towards the West, a kula parcel, the kiʻo (pond) of Makauali, and my kio.

Here is my place, only on the kula of Okea. It is a combined kula which is not accurately known, so the boundaries cannot be told to you.

It is very old residency from my parents who have died.

I am with appreciation.

By Nakuikui⁴³⁵

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴³⁶

⁴³²Book 5, p. 228–229, Dec. 26, 1847.

⁴³³Book 9, p. 206.

⁴³⁴Book 3, p. 477.

⁴³⁵Book 5, p. 239–240, Sept. 25, 1847.

⁴³⁶Book 9, p. 206.

7.105 Helu 6126: The Claim of Napoo

Claimant: Napoo
Location: *ʻIli* of Puuloa, Kapi, and Kea
Recorded at: Honouliuli
Date: Dec. 25, 1847
Status: Not awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you I hereby tell you the source of my land and house claim. This house land is at Kapi, in Puuloa, Ewa, Island of Oahu. Here are the boundaries: towards the North, the houses of Kaope; towards the East, the sea; towards the South the kio pua (pond for fish fingerlings) of Kamau; towards the West, the kio pua of Mahoe.

The is also a combined kula and planting place, at Kea. The second place is planting place. Its boundaries are not clearly known to be explained. It is under the residency of Kaope at this time.

I am with appreciation, your obedient servant.
Done by me, Napoo X⁴³⁷

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴³⁸

7.106 Helu 6132: The Claim of Nahuawai

Claimant: Nahuawai
Location: *ʻIli* of Puuloa and Keahi
Recorded at: Honouliuli
Date: Dec. 13, 1847
Status: Not Awarded

Native Register To the Honorable Commissioners who Quiet Land Claims. Aloha to you. I hereby tell you of my house and combined kula parcel claim. The combined boundaries are not known like those of the banked walls of loi kalo (taro pond fields), the planting is done in hollows of rocks, and in kaheka (small brackish water ponds) and are scattered about at various places.

Here is my house at Keahi in Puuloa, Ewa, Island of Oahu. Here are its boundaries: towards the North, a kula parcel where my haha paakai (salt gathering beds) are situated; towards the East, surrounded by Naunau; towards the South, the sea; towards the West, surrounded by Mahtiole.

⁴³⁷Book 5, p. 242, Dec. 25, 1847.

⁴³⁸Book 9, p. 206.

My residency at this house claim has been for 16 years. I am with appreciation, your obedient servant.

By Nahuawai⁴³⁹

Foreign Testimony [See group claim under Helu 5587, p. 474, Foreign Testimony for release of claim.]⁴⁴⁰

Foreign Testimony Claimant appeared in person, and stated that he has no right to the land mentioned in this claim, it belongs to the Konohiki.⁴⁴¹

7.107 Helu 8658: The Claim of Kapoli

Claimant: Kapoli
Location: *ʻIli* of Kumupali and Loloulu
Recorded at: Honouliuli
Date: Feb. 1, 1848
Status: Not awarded

Native Register Aloha to you Commissioners who Quiet Land Claims. I am Kapoli and I tell you of my claim, a lo and some kula land and a kio (pond). Kumupali is the name of the Loi, it is there at Loloulu, in Honouliuli. If it has been previously entered, it is for you to judge me and it. That is mine.
With appreciation.
By Kapoli.⁴⁴²

7.108 Helu 8878: The Claim of Kou

Claimant: Kou
Location: [No location]
Recorded at: Honouliuli
Date: Feb. 14, 1848
Status: Not awarded

Native Register Aloha to you Commissioners who Confirm. I hereby tell you of my claim, there in Honouliuli, it is a pa waina (grape orchard) which I planted, and the work is rightly known.

By S. Kou⁴⁴³

⁴³⁹Book 5, p. 243–244, Dec. 13, 1847.

⁴⁴⁰Book 9, p. 206.

⁴⁴¹Book 3, p. 477.

⁴⁴²Book 4, p. 376, Feb. 1, 1848.

⁴⁴³Book 4, p. 396, Feb. 14, 1848.

7.109 Helu 9037: The Claim of H. Kahakai

Claimant: H. Kahakai
Location: 'Ili of Waimanalo, Puukuua, and Aimea
Recorded at: Honouliuli
Date: Feb. 18, 1848
Status: Not awarded

Native Register Waimanalo – Shoreward claim (sketch)
Puukuua – Kula claim (sketch)
Aimea – claim (sketch)

To the President of the Commissioners who Quiet Land Claims. Aloha to you. I hereby tell you of my claim that you may know. Look at the sketches above. That is my claim from Kekauonohi to me. With appreciation, from Ewa, Honouliuli.
By H. Kahakai⁴⁴⁴

Native Testimony Kekuahilo Sworn. I know his land at Waimanalo, Ewa, Oahu. 3 parcels of land.

1. 1 loi at Kalaipuaa, 1 loko (pond), 1 uluniu (coconut grove). The boundaries are: Mauka, mine; Waikiki, for Kaekuna; Makai, [illegible]; Ewa, land of Oni.
2. 1 loko of Hopenui. The boundaries are: Mauka, Aihonu, Hono. Opiotio; Makai, my place; Waianae, a papuaa (pig enclosure).
3. 1 muliwai (estuary), 3 ili uala (section of sweet potatoes); 1 loi kalo (taro pond field). The boundaries are: Mauka land of Kekauonohi; Hono, the same; Makai, Kaakua; Waianae, a kahawai.

It was from Kekauonohi in the year 1837, in the nature his being a man living under her to the year 1849. He was there until peacefully until he was removed, though he had done nothing wrong.

Kawahaea Sworn. Our knowledge is the same.⁴⁴⁵

7.110 Helu 9351/827: The Claim of Kauakahilau

Claimant: Kauakahilau
Location: 'Ili of Poohilo
Recorded at: Honouliuli
Date: —
Status: Not awarded⁴⁴⁶

⁴⁴⁴Book 4, p. 414, Feb. 18, 1848.

⁴⁴⁵Book 3, p. 707–708, Dec. 18, 1850.

⁴⁴⁶See Helu 827, p. 321.

Native Register I am Kauakahilau, the one who has a mooina claim in the ili land of Poohilo, Honouliuli, Ewa, Oahu. Kumuahune is the name. The boundaries as pointed out are: North, Ohuanioh; South, Kalokoloa; East, adjoin the place of Moomoo; West [South] the stream and the Kula at Hopenui; West, adjoining the wall.

By Kauakahilau.⁴⁴⁷

7.111 Helu 10933: The Claim of Uia (Uwia)

Claimant: Uia
Location: 'Ili of Niukee, Kapapapuhi, Kauakahimoeole, and Kamoomuku (fig. 165)
Recorded at: Honouliuli
Date: Feb. 11, 1848
Status: Awarded; Royal Patent 6828 (fig. 166)

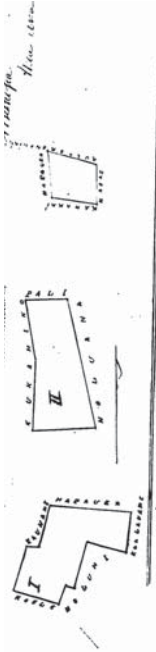


Figure 165: Helu 10933 of Uia or Uwia: *Parcel 1*, Mooina of Kamoomuku, Ili of Niukee, Honouliuli, Ewa, Oahu. Containing 6.37 chains; *Parcel 2*, Moo of Kauakahilau, Ili of Niukee. Containing 1 acre and 2 99/100 chains; *Parcel 3*, A house lot at Kapapapuhi, Honouliuli, Ewa, Oahu. Containing 2.00 chains. *Source:* *Māhale* Award Book 6:132.

Native Register To the honorable Commissioners who quiet land claims of the Hawaiian Island. Aloha to you. I hereby tell you of the source of my land and house claim. This land is there at Niukee, in Honouliuli, Ewa, Oahu. Here are its boundaries: towards the North the pali and the Hale halawai (Meeting house); towards the East the land of Kamaala; towards the South, an Auwai and the land of Kamaala; towards the West, Kukahiko's land.

Here is my second land claim, at Niukee second. Here are its boundaries: towards the North, Hapauea's land; towards the east, Kaalauahi's land and the auwai; towards the South, poalima (Parcel worked for the chief); towards the West, a poalima.

⁴⁴⁷Book 4, p. 444.

Here is my house claim at Kapapapuhi in Honouliuli. Here are its boundaries: towards the North the sea; towards the East, a house; towards the South, the sea; towards the West, a kula parcel.

By Uia⁴⁴⁸

Foreign Testimony Nakai sworn, says he knows the land of the Clt. It consists of 2 apauas, moouana and a pahale.
Ap. 1 the Moouana named Kauakahimoeole in the ili of Niukee, Honouliuli, E. O. It is bounded:

- M. by the land of Kamaala
 - Hon. also & an auwai
 - Mk. also & auwai of Kalokoloa
 - Waialua also, and by the kula and Kahalewai.
- Ap. 2 is 3 loi called Kamoomuku, ili Niukee, and is bounded:
- M. by the land of Kaunahi and Hapauea
 - Hon. by land of Kaunahi [Kaunahi] and Pio
 - Mk. a loi koele called Kuathee
 - W. by land of Konohiki and Kaunahi.

Ap. Pahale in Kapapapuhi, Honouliuli. It is bounded:

- M. by kula of Konohiki
- Hon. by pahale of Aoao
- Mk. by pahale of Kahakai
- Waialua by hale of Hapauea.

Clt. received the land, the ap. 1 from Nawahineelua in the time of Kinau, and the ap. 2 from Kamekawalola in the time of Kinau. He has held quiet possession of the same ever since. Clt. removed to Honolulu and has given over his land and claim to his kaikama (younger brother), Waikale who possesses the same.

Kukahiko sworn, confirms the above testimony as true and says it is also his own.⁴⁴⁹

7.112 Helu 11216: The Claim of Mikahela Kekauonohi

Claimant: Mikahela Kekauonohi
Location: Ahupua'a of Honouliuli (fig. 167)
Recorded at: Honouliuli

⁴⁴⁸Book 4, p. 615, Feb. 11, 1848.

⁴⁴⁹Book 9, p. 154–155.

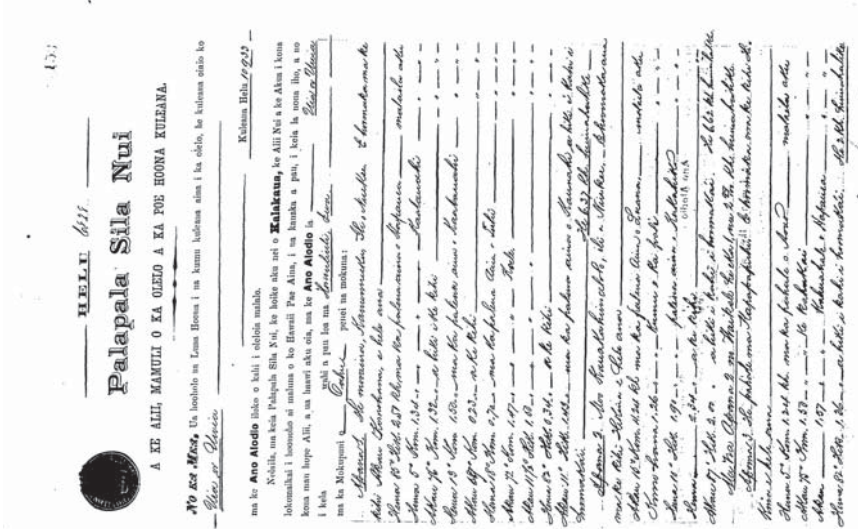


Figure 166: Palapala Sila Nui Helu 6828, Kuleana Helu 10933, to Uia or Uwia. Mo'o of Kamoomuku, 'Ili of Niukee, Mo'o of Kaukahiwalalo, 'Ili of Niukee; Pahale at Kapapapuhi, Honouliuli. 2 acres, 1.36 chains. November 13, 1876. Signed by Kalakaua Rex. Volume 26, p. 153–154.

Date: —
Status: Awarded; Royal Patent 6971

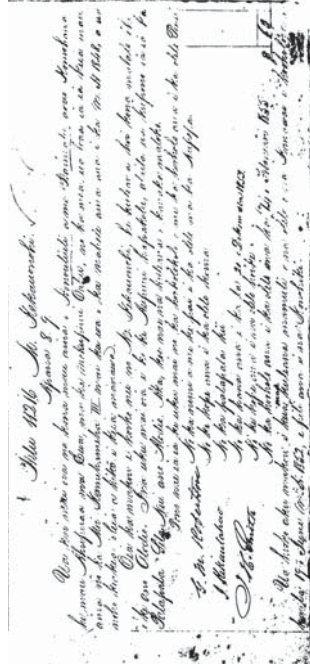


Figure 167: Helu 11216, Apana 8 & 9 of Mikahela Kekauonohi. *Source:* Māhele Award Book 9:655.

Native Register To the Commissioners who Quiet Claims. Aloha to you. We hereby tell you of our land claims from Hawaii to Kauai. They are for Mikahela Kekauonohi: ... Honouliuli Ahupuaa. Kalana, Ewa, Mokupuni, Oahu⁴⁵⁰

Native Testimony ...Honouliuli Ahupuaa. District of Ewa. Island of Oahu.⁴⁵¹

8 Palapala Sila Nui Helu 6971

The following is a transcription of Royal Patent Grant 6971. A copy of the original document is included as figures 168 and 169.

Whereas, the Board of Commissioners to quiet Land Titles have by their decision awarded unto M. Kekauonohi Kuleana Helu 11216 as estate of Freehold less than Allodial, in and to the land hereafter described, and whereas Mrs. A. Haaalea the present occupier of the Ahupuaa of Honouliuli has filed with the Minister of Interior a certificate designating

⁴⁵⁰Book 4, p. 360.

⁴⁵¹ Book 10, p. 334, Dec. 20, 1853.

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the boundaries of said Ahupuaa of Honouliuli as below set forth and whereas the privy council by Resolution have Authorized the Minister of Interior to grant a Royal Patent for the said land without division or commutation with the Government.

Therefore, Kalakaua by the Grace of God King of the Hawaiian Islands, by this Royal Patent, makes known to all men, he has, for himself and his successors in office, this day granted and given absolutely, in Fee Simple, unto M. Kekauonohi all the certain piece of Land situated at Honolulu, Ewa in the island of Oahu, and described as follows:

Beginning at a large flat rock known as Pohaku Palahalaha, a well-known rock now marked by an arrow and the name Honouliuli on one side, and Hoaeae on the other from which Govrmt. Trig Station near Kaula bears S. 22° 40' E. the boundary runs.

S. 38° 16 E. 2875 feet along Hoaeae to a red post, 375 feet beyond the Government road near the brink of a gulch.

S. 36° 06 E. 3703 ft to a point adjoining the west corner of Royal Patent 778 in Haulu along the brink of a pali to a point opposite a redwood post which bears.

S. 34° 23 E. 895 feet from the last corner when the land Hoaeae begins.

Beginning again at Pohaku palahalaha

N. 21° 21' W. 2035 feet go a pile stone along Hoaeae thence

S. 22° 3 W 4686 feet along a pile of stones to a redwood post and thence

N. 23° 46 W. 6422 feet to redwood post and thence

N. 35° 32' W. 4410 feet to redwood post by an old kukui tree adjoining
Hoaeae

N. 20° 33 W. 4237 feet across Ekahanui gulch to a granite post at the NW corner of Hoaeae thence

N. 41° 18 E. 2990 feet to a redwood post still along Hoaeae

N. 43° 3672 feet to a rock marked at the head of an ancient holua near the junction of the Poliwaī with the Manawaielē gulch on the boundary between Hoaeae & Pūhala

N. 16° 49' W. 265 ft. along lower Pouhala as per R. Pat. No. 4486 to a marked stone post; thence

N. 14° 24' W. 2057 ft. along Pouhala to a marked stone and

N. 31° 36' W. 1090 ft. to a large flat rock at the NW corner of R. Patent 4486

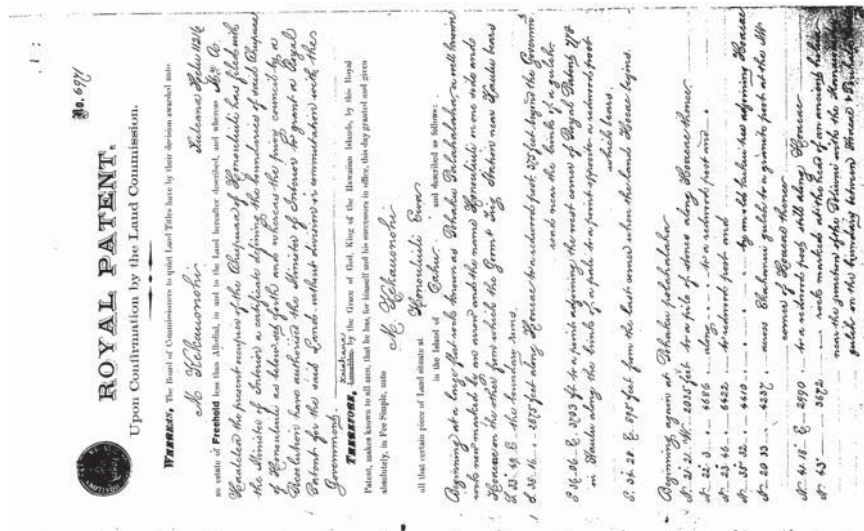


Figure 168: Page 1 of 2. Palapala Sila Nui Helu 6971, Kulanele Helu 11216, to M. Kekauonohi. Honouliuli Ahupuaa. Area of Puuloa – 2,610 acres, Area of Honouliuli – 43,250 acres, September 11, 1877. Signed by Kalakaua Rex. Volume 25, p. 107–108. See fig. 169 for page 2.

N. 26° 43' W. 4587 ft. along upper Pouhala to a marked stone thence
 N. 15° 44' W. 2467 ft. to brink of the Kawaieli gulch by the road – thence –
 N. 11° 52' W. 1363 ft. across the Kawaieli gulch to a granite post which is
 the corner of Honouliuli, Pouhala & Waianae uka
 N. 67° 44' W. 4406 ft. to a red wood post along Waianae and thence
 N. 86° 58' W. 3339 ft. (along an old path called Mookapu) adjoining
 Waianae uka to a red wood post and thence
 S. 60° 49' W. 1677 ft. along Waianae uka to a post and thence
 S. 27° 07' W. 762 ft. across the Kawaieli gulch to a marked stone where
 Kuhau's house formerly stood thence
 S. 47° 14' W. 8660 ft. up a ridge to the summit of Kahapapa thence along
 the summit of the mountain range which separates this land from Waianae
 S. 30° 36' E. 5709 ft.
 S. 12° 37' W. 5190 ft. to Puu Haa thence
 S. 3° 4' W. 9367 ft. along the ridge
 S. 9° 35' E. 4505 ft. to Mauna Kapu, thence
 S. 22° 31' W. 6219 ft. to a redwood post on Manawahua which bears
 N. 77° 44' W. from the Honouliuli Trig. Station near Kaulu, and
 S. 63° 16 1/2' W. 9115 feet along Nanakuli to a pile of stones on the ridge
 and thence
 S. 44° 47' W. 3200 feet along Nanakuli to the Pili o Kahe to a marked rock
 at the end of a stone wall by the road on the shore, thence
 S. 20° 53' E. 28175 feet along the sea to Laeloa or Barbers Point & thence
 N. 82° 56' E. 28641 feet along the sea to a large pile of stones in Oneula to
 Puuloa trig station at windmill
 N. 69° 41' E. 18720 feet thence along short to stone pillar at Hakeeka
 N. 22° 20' W. 10,010 ft.
 Area of Puuloa 2,610 acres
 Area of Honouliuli 43,250 acres...

from time to time imposed by the Legislative Council, equally upon all Landed Property held in Fee Simple.

9 Honouliuli: Proceedings of the Boundary Commission

Following the *Māhele* *ʻĀina*, there was a growing movement to fence off the land areas and control access to resources that native tenants had traditionally used. In the 1860s, foreign landowners and business interests petitioned the Crown to have the boundaries of their respective lands—which became the foundation for plantation and ranching interests—settled. In 1862, the king appointed a Commission of Boundaries, a.k.a. the Boundary Commission, and tasked them with collecting traditional knowledge of place, land boundaries, customary practices, and deciding the most equitable boundaries for each *alupui* *ʻa* that had been awarded to *aliʻi*, *kono*, *hiki*, and foreigners during the *Māhele*. The commission proceedings were conducted under the courts and as formal actions under law. As the commissioners on the various islands undertook their work, the kingdom hired or contracted surveyors to begin the surveys, and in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them.⁴⁵²

Records from the Ewa District were recorded from 1868 to 1904, with the proceeding from Honouliuli being held between 1873 and 1874. The records include testimonies of elder *kama ʻāina* who were either recipients of *kālema* in the *Māhele*, or who were the direct descendants of the original fee-simple title holders. The documentation includes the preliminary requests for establishing the boundaries; letters from the surveyors in the field; excerpts from surveyor's field books (Register Books); the record of testimonies given by native residents of the lands; and the entire record of the Commission in certifying the boundaries of each *alupui* *ʻa* cited. The resulting documentation offers descriptions of the land, extending from ocean fisheries to the mountain peaks; traditional and customary practices; land use; changes in the landscape witnessed over the informants' lifetime; and various cultural features across the land.

The native witnesses usually spoke in Hawaiian, and in some instances, their testimony was translated into English and transcribed as the proceedings occurred. Other testimonies were transcribed in Hawaiian and remained untranslated, but have now been translated for inclusion in this study. Translations of the Hawaiian-language texts below were prepared by Kepa Maly.

The Boundary Commission proceedings documented many traditional place names and features along the boundaries of the *alupui* *ʻa*, with locations extending from the sea—including fishponds and fisheries—to the mountain peaks. These names demonstrate Hawaiian familiarity with the resources, topography, sites, and

⁴⁵²W. D. Alexander in *Thrum's Hawaiian Annual*, 1891:117–118.

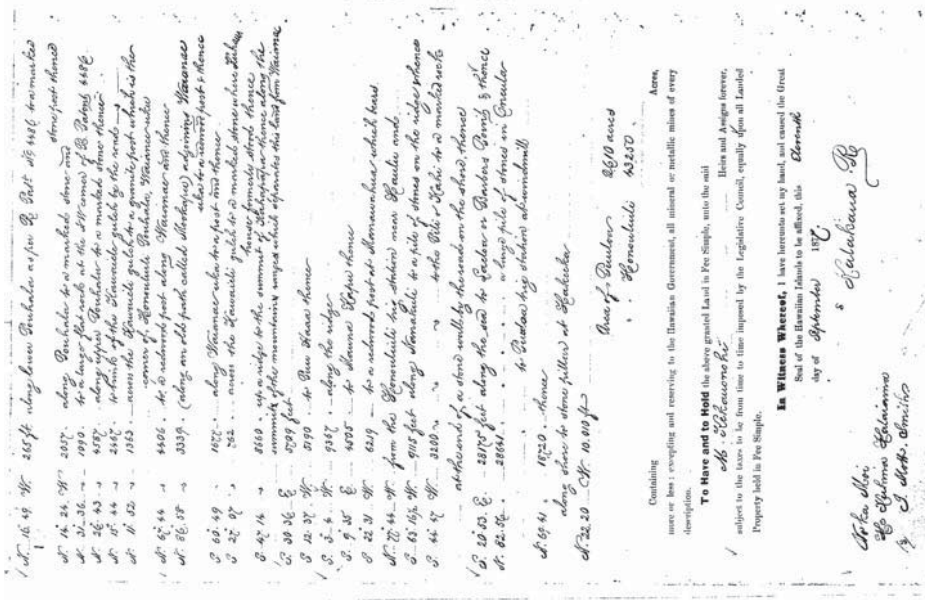


Figure 169: Page 2 of 2. Palapala Sila Nui Helu 6971, Kuleana Helu 11216, to M. Kekauonohi. See fig. 168 for page 1.

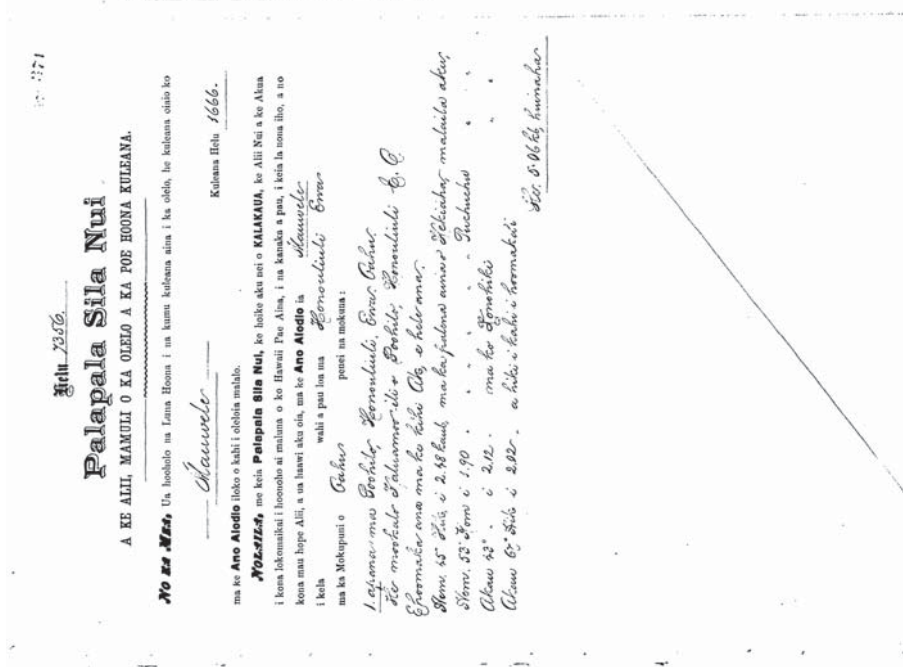


Figure 170: Palapala Sila Nui Helu 7356, Kuleana Helu 1666, to Mauwele. Poohilo, Honouliuli. 506 chains. August 11, 1879. Signed by Kalakaua Rex. Volume 27, p. 371–372.

features of the entire *alupua*’a. Coulter observed that Hawaiians had place names for all manner of feature, ranging from “outstanding cliffs” to what he described as “trivial land marks” [6:10]. History tells us that named locations were significant in past times: “Names would not have been given to [or remembered if they were] mere worthless pieces of topography.” [14:412].

In ancient times, named localities signified that a variety of uses and functions occurred:

- triangulation points such as *ko’a* (land markers for fishing grounds and specific offshore fishing localities);
- residences;
- areas of planting;
- water sources;
- trails and trail-side resting places (*o’io’ima*), such as a rock shelter or tree shaded spot;
- *heiau* or other features of ceremonial importance;
- may have been the source of a particular natural resource or any number of other features; or
- the names may record a particular event or practice (e.g., use for burials, the making of *ko’i* or adzes, or designation as a fishery) that occurred in a given area.

As in the records of the *Māhale*, every place name cited in the Boundary Commission proceedings has been listed below in table 7. A number of the place names remain in use on maps or among some residents, while others are no longer in use. Of particular note are several place names and their associated narratives which document *wahī pūna* on the traditional landscape.

Table 7: Place names cited in Honouliuli boundary proceedings

Apokaa	Kolina	Nanakuli
Auiole	Kualakai	Panau
Ekahanui Gulch	Kupalii	Papapuhi (Kapapapuhi)
Hanohano	Lae o Halakahi	Pili o Kahe (Pili o Kahi)
Homaikaia	Lae o Kahuka	Pohaku Palahalaha
Hoaeae	Laeloa	Pookela
Kahakai	Laeokane (Kalaekane)	Pouhala
Kahapapa	Lihue	Puu Kuua
Kalanimua	Manawahua	Puuloo
Kapuna	Manawaiteleu	Waieli (Kawaieli)
Kauela (Keoneula)	Mauna Kapu	Waikakalaua
Kaulu (Coneyville)	Miki	Waimanalo
Keahi	Mookapu	

Table 8: Registered maps with details of Honouliuli and the larger Ewa region

No.	Area	Case No.	Surveyor	Year	Notes
77	Puuloa Ewa Oahu	17-15	J. Metcalf	ca. 1850	
322	West Loch Peninsula-Pearl River, Ewa, Oahu (with por. of Honouliuli)	29-	J. M. Lydgate	1873	See Field Book No. 191
405	Map of Honouliuli (and neighboring lands), Ewa, Oahu	1-13	W. D. Alexander	1873	
437	South Coast of Oahu	13-25	C. R. Malden	1825	Tracing, with notes to 1857. Detail of Honouliuli Ahupuaa.
445	Island of Oahu	15-39		1833	
567	Pearl Locks and Puuloa Entrance, Ewa, Oahu	2-47	C. J. Lyons	1873	With portion of Honouliuli.
618	Ahupuaa of Honouliuli, Ewa, Oahu	1-13	W. D. Alexander	1873	Boundary Commission Cert. No. 4.
630	Map of Honouliuli Taro Lands, Ewa, Oahu	1-13	M. D. Monsarrat	1878	tracing
640	South Coast of Oahu	13-25	C. R. Malden	1825	Tracing, with notes/ additions to 1857. Detail of Honouliuli Ahupuaa. Original Map No. 437.
835	Honouliuli Fishery, Ewa, Oahu	19-23	M. D. Monsarrat	1878	
896	Coast of Puuloa-Honouliuli, Ewa, Oahu	19-24	M. D. Monsarrat	1881	
1612	Pearl River (Honouliuli to Diamond Head), Oahu	12-20-a	W. F. Thrum	1892	
1639	Pearl River (Puuloa Region), Ewa, Oahu	2-18	C. J. Lyons		Duplicate copy: 1874 to 1892.
1739	Pearl Harbor & Ewa (Honouliuli), Oahu	1-12	S. M. Kanakamui	Oct. 7, 1895	Survey of 1894, 2 copies
1920	Bar & Entrance Pearl Harbor (with portion of coast line), Ewa, Oahu	2-47		1897	Bemington Survey (USGS).
2103	South Coast of Oahu, Pearl River and Lochs, Ewa, Oahu	2-18	Survey of 1897, U.S. Hydrographic Ofc.	August, 1899	
2335	Pearl Harbor (por. Honouliuli), Ewa, Oahu	2-18		Mar. 1905	USGS No. 4107
2374	Island of Oahu (with Honouliuli).	2-91	J. M. Dunn	June 20, 1906	
2426	Pearl Harbor Fisheries, Ewa, Oahu	2-47	M. D. Monsarrat	Oct. 1907	Map not found

Continued on next page

Continued from previous page

No.	Area	Case No.	Surveyor	Year	Notes
2848	Oahu Fisheries (Sheets 7 & 8 for Honouliuli fisheries)	2-77 to 2-88	M. D. Monsarrat	1909-1913	
L. C. App 1069	Honouliuli Taro Lands			Dec. 1922	

The following is from the records of the Boundary Commission. It is an application of A. A. Haalelea, who owns the *ahupua'a* of Honouliuli, and it designates the boundaries of the *ahupua'a* (fig. 171).

To the Honorable W. P. Kamakau
Commissioner Boundaries for the Island of Oahu, one of the Hawaiian Islands.

The undersigned applicant represents that she is the owner of the Ahupuaa called Honouliuli, situated in the District of Ewa, Island of Oahu aforesaid; that the same was awarded by name to Mikahela Kekauonohi, dec'd. by Land Commission Award No. 11216; – that the same has not been awarded by the Land Commission, patented or conveyed by Deed from the King by boundaries described in such award, patent or Deed; and therefore she respectfully requests that the boundaries of said Ahupuaa may be settled by Your Honorable Commission, and to that end makes this application to have the boundaries of said land decided and certified by you as Commissioner of Boundaries as aforesaid.

Pursuant to the statute, the Undersigned applicant represents that the name of the land is Honouliuli, in the District of Ewa, Island of Oahu, one of the Hawaiian Islands; that the following are the names of the adjoining lands, and the names of the owners of the same, so far as known to the undersigned applicant, to wit: "Waianae" – Crown Land; "Nanakuli" – Crown Land; "Pouhala," owned by J. Robinson; "Waikakalaua" – Crown Land in possession of J. Robinson; "Hoeae," owned by J. Robinson; "Waialele," owned by K. Komoikehuehu; "Waipio," owned by Estate John Li, deceased; "Halawa," owned by Dowager Queen Emma.

That the undersigned applicant is unable to give a general description of the boundaries claimed, other than as to lands bordering on the Ahupuaa of Honouliuli, but intends to have filed with the Honorable Commission a full survey and plot of the said land upon which she intends to adduce proof as to the Boundaries of said land.

Very Respectfully
A. A. Haalelea

By her Attorney at Law,
R. H. Stanley
Honolulu, June 23, 1873⁴⁵³

Below is a supplement to the application from R. H. Stanley, on behalf of Haaalelea.

Honolulu, June 24th 1873
Hon. W. P. Kamakau
Commissioner of Boundaries for the Island of Oahu,
Hawaiian Islands,

Sir,
Herewith please find under cover "Memoranda on the Boundaries of Honouliuli" as furnished by Mr. Alexander, Government Surveyor; which please annex as part and parcel of application delivered you yesterday. So soon as the Survey now in progress is completed, full field notes together with a plot or map of the Boundaries of Honouliuli, as claimed, will be furnished.

I am, Very Respectfully
Your Obedt Svt
R. H. Stanley
Attorney for Mrs. A. A. Haaalelea
owner of the Ahupuaa of Honouliuli.

The memorandum below was filed with the above supplement on the same day, June 24, 1873. It describes the boundaries between Honouliuli and the adjacent lands.

Memoranda on the Boundary of Honouliuli.

1. The boundary between this land and Hoaeae was first surveyed by J. Metcalf May 29, 1848, and the "Kula" of Hoaeae was awarded to L. Rees by this survey.

See Award 193, Volume 1, p. 536.

Starting from a stake at makai S.W. corner of Hoaeae at Kaulu, Metcalf's survey runs as follows:

1. - North 45° 30' W. 54 chains - 54.20 in orig. field book - 13 3/12 feet to a point in the old road on mauka side of gulch near mauka N.W. corner of Namaau's land.

(from a long stone in the wall at mauka N.W. angle of Namaau's land, it is N. 72 1/2° W. 7.30 ch. to the above mentioned point in the old road)

⁴⁵³Boundaries of the Ahupuaa of Honouliuli, Oahu, Boundary Commission Volume 1, p. 131-133.

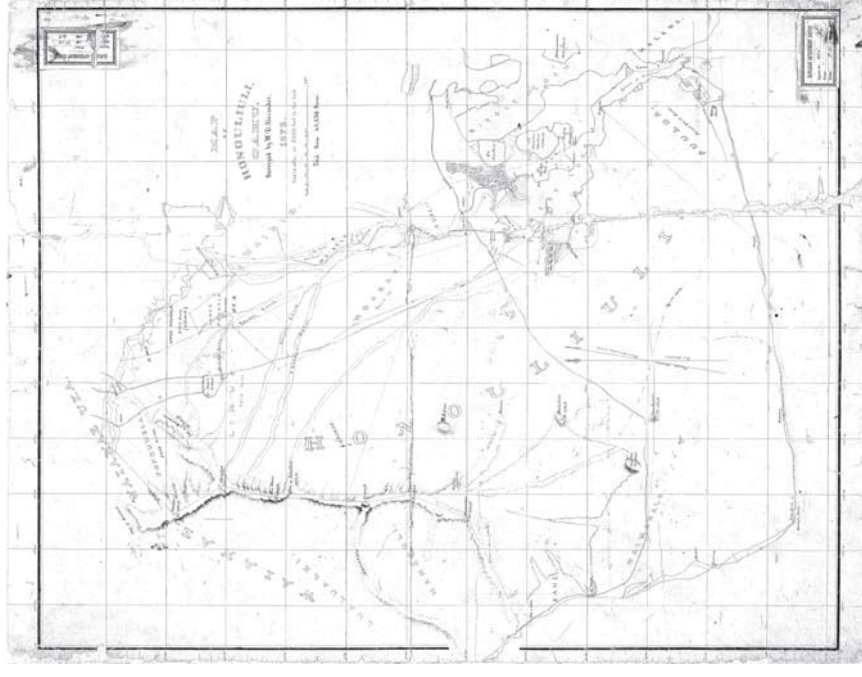


Figure 171: Map of Honouliuli, W. D. Alexander, 1873. Registered Map No. 405. Boundary Certificate No. 4.

II. Thence N. 47° 15' W. 42.90 ch. to a rock by the road called **Pohaku Palahalala**.

III. Thence N. 29° 45' W. 29.30 ch. to a stone marked × by the road.

IV. Thence N. 31° 15' W. 71 ch. to rock marked + by the road;

V. Thence N. 33° 15' W. 97.30 ch. to a large williwili tree;

VI. Thence N. 44° 45' W. 57.40 ch. to old Kukui tree;

VII. Thence N. 29° 30' W. 64.20 ch. to a pile of stones on North upper bank of **Ekahanui gulch**;

VIII. Thence N. 32° 15' E. 45.30 ch. along **Lihue** to a Kukui tree marked A in clump of Kukui trees;

IX. Thence N. 36° 15' E. 55.30 chains along Lihue to a large Kukui tree, marked B, at bottom ledge of Waikele gulch (**Manawaielele** in field book) at mauka N.W. corner of Hoaeae.

2. The boundary of Honouliuli next follows the line between it and the Ili of **Pouhala** in the Ahupuaa of Waikele or more particularly, that part of Pouhala which belonged to the heirs of Luluhiwalani, and now belongs to J. Robinson. This part of Pouhala was conveyed to them by Royal Patent 4486, by a survey made by J. H. Sleeper in March 1859. His survey was made independently of Metcalf's survey of the adjoining land of Hoaeae, and I have not ascertained how well they agree. As near as I can ascertain the boundary between Pouhala and Lihue according to Sleeper's survey would be as follows: –

(X. – N. 26 1/4° W. 4.07 ch.

XI. N. 24 1/4° W. 31.17 ch.

XII.) N. 25 1/4° W. 15.61 ch. to rock at the western corner of this Pouhala.

3. Honouliuli next borders on a portion of Pouhala which belongs to his Majesty, being a Crown land. I know of no survey of it.

4. The next land bordering on Honouliuli is **Waikakalaua**, a Crown Land. By an old survey made in 1846, the boundary between Waikakalaua and Lihue runs as follows, beginning at the corner of Pouhala: N. 30° W. 37 chains; N. 23° W. 24.35 ch.; N. 23 1/2° W. 27.87 ch. to corner of Waianae and Waikakalaua.

5. The boundary of Waianae has been described by natural landmarks in a decision made by the Boundary Commissioner, W. P. Kamakau, Sept. 4, 1869.

6. A survey was made of the land of Nanakuli which is a subdivision of Waianae bordering on Honouliuli by William Webster. Mr. Coney has a

copy of his map.⁴⁵⁴

The following is the boundaries of Kaulu in Honouliuli from the Boundary Commission records.

Kaulu or Coneyville, Sept. 11th 1873

This day in company with Professor Alexander, who is surveying the land went about the boundary in part tracing it, in part looking at natural boundaries. Mr. Coney also in company. Adjacent owners not summoned, this being preliminary.

Sept. 12th Kaulu

The proper name of the locality of the premises on tract, now occupied by Mr. Coney & family is Kaulu.

Beginning at this the boundary along Hoaeae, already surveyed and awarded accordingly will be easily ascertained.

Honouliuli cuts off Hoaeae at top; then runs along Pouhala which is a part of Waikele. The lower part of a crown land, unsettled, for which application is made, and which is to be surveyed by Alexander. It is now understood by surveyor & the petitioner that Waikakalaua, which was claimed as the 4th portion of boundary does not come to Honouliuli but that Pouhala, Honouliuli and Waianae come together in the gulch called by us "**Waielei**" from the pool or bathing place dug for [blank]. Thence the boundary of this land is along Nanakuli of Waianae, the boundary of which has been settled by the B. C.

Court House, Honolulu,

Dec. 30th 1873, 11 A.M.

Hearing assigned for this date and notices issued to Govr. Dominis for Crown Lands; Jas. Robinson for Hoaeae; J. Komoikehuehu for Waipio; A. F. Judd for John li Estate; H. A. Widemann for Halawa, of Queen Emma; J. H. Coney, agent for the petitioner; R. H. Stanley, atty. for petitioner; Chas. R. Bishop, agent for Kapepa, heir of Nakuepa; A. W. Pierce for Puuloa.

Present; J. H. Coney; Komoikehuehu; Kapepa heir of Nakuepa for land & sea of **Hanoahano**; Chas. R. Bishop, R. H. Stanley, Miss Robinson; H. A. Widemann; A. F. Judd.

The petitioner submits as the basis of description of this land and its adjacent kai, a new survey and map executed by Professor Alexander.⁴⁵⁵

⁴⁵⁴Boundaries of the Ahupuaa of Honouliuli, Oahu, Boundary Commission Volume 1, p. 131–133.

⁴⁵⁵District of Ewa, Island of Oahu, Boundary Commission Volume 1, p. 218.

The following are the results of the hearing. The landowners of Honouliuli state their claims for boundaries of their lands.

H. A. Widemann for Halawa, assents to the line of the Halawa fishery as laid down on the Alexander map. Running through the middle of the channel at the entrance of Pearl River.

C. R. Bishop for Waipio claims a shore fishery not laid off on the Alexander map. Will have it surveyed by Mr. Alexander.

A. F. Judd, for Estate of John Li, says that the Estate does not appear to border on Honouliuli; that Auwaiole belongs by devise to Komoikehuhu

W. D. Alexander, sworn, Is Govt. Surveyor, made the survey of Honouliuli for Mrs. Haahele, Coney agent. This is the plot of the survey. In making it the principal kamaaina was Kaopala, brother of the former Luna of H. [Honouliuli] under Haahele on boundary between H. and Waianae. I had the widow of Kuahele. Kamaaina of **Popouwela**, whose testimony agreed with Kaopala, also Kihei K. who went with me, particularly on the b. [border] of Hoaeae. On Poughala I had the present Konohiki, Kulukulu, now resident there. Also Kanehalau, a kamaaina of Poughala. Also Thos. Meek.

In regard to Hoaeae I followed the original survey made by Metcalf, which is incorporated in the Award of Hoaeae. I have made this survey and map to accord with the Hoaeae line. I had Metcalf's original field book, March 29th 1848.

Followed the land in the same order. The point of commencement is **Pohaku palahalaha**, a well-known rock, now marked by an arrow and the name "Honouliuli" on one side and Hoaeae on the other, which I have made the initial point of this survey. I verified this by several courses & measurements.

Thence laid the line accordingly along Hoaeae to Poughala.

Mr. Robinson says he is satisfied this conforms to their line. Note: Lower Poughala is controlled by survey in R. P. No. 4486 made by J. H. Sleeper. I could not find the marks referred to in the survey. The stone was said to have been marked only with a man's spur, marks on kukui trees have perished. The R. P. for Poughala & the award for Hoaeae overlap each other seriously, but that is not material to this survey.

My survey substantially agrees with that in R. P. 4486, and the two maps mine & that made by Sleeper show it. The kamaainas took me to the corner of Poughala, Hoaeae and Honouliuli; there is an ancient holua or

sliding place near this, which is agreed to be the ancient corner.⁴⁵⁶

I marked a flat rock at that point.

From Lower Poughala the line runs along upper Poughala, the property of Crown Lands, to Waianae. In this I consulted all the kamaainas. I also surveyed Poughala for the Crown Commissioners and made the map of Poughala for them. I was authorized by the Comm. to represent the crown in fixing this line, and now appear for Poughala.

The line runs nearly straight, following for the most part the ancient road; where it crosses the Waieli gulch is a remarkable looking rock marked by me. This line is settled as here surveyed. A post, granite, is at the corner of Poughala, Waianae & Honouliuli.

Thence along Waianae, determined by W. P. Kamakau, the Boundary Commissioner. I had a copy of his award, and followed it as near as his description permitted. It takes along the far side of the Waieli gulch to the "houses of Kuhau ma" where it crosses the gulch. It follows an ancient path, thence up spur to Hapapa peak. Thence along the mountain range, an unmistakable line, conforming with Kamakau's award, to three round hills, Manawahua on boundary of Nanakuli, I had here a survey of William Webster of Nanakuli, the award conforms to this survey, and my survey to both of them; The line is defined along Nanakuli; nearly to the sea by ridge of mountains and from its termination to a point on the sea coast, at end of old stone wall.

Mr. Robinson, as lessee of Nanakuli & Mr. Alexander on the part of Crown, agree on this part of the line. The point is called **Kalanimua**, in the award of Waianae.

Thence the line of Honouliuli follows the coast, to the mouth of **Pearl River**; thence up the line of the loch to where the pali comes up to the sea just South of the Kuleana of Koulua, which is the site of the residence of Coney, formerly Monsarratt's, [sic] from thence up to the point of commencement, agreeing with the Metcalf survey.

Fishery of Hoaeae. The testimony of the kamaainas is that the fishery extends to the depth of a man's chin, opposite this land. Mr. Robinson & Mr. Coney agree to this and that outside of that the fishery belongs to Honouliuli. The award of Hoaeae does not include the Kai. The makai, cultivated part of Hoaeae and the Kai or fishery were granted to Namaau by R. P. 4490 for M. Kekuaaoa. The survey by A. Bishop is not copied into the R. Patent; the Patent being without metes & bounds.

⁴⁵⁶ Ahupuaa of Honouliuli, District of Ewa, Island of Oahu, Boundary Commission Volume 1, p. 243-251.

The red line indicating the fishery of Hōaeae, conforms to Mr. Bishop's survey, and is agreed to by Mr. Robinson as representing their rights of fishing.

Next is the Kai of **Apokaa** which is a lele of **Hanoahano**. The petitioner claims to within neck deep of the shore, along this, as far as to point marked "Miki" on the map, but the line of this "neck deep" water has not yet been defined by survey.

Wit. From "**Laeokane**" a point in **Miki**, this survey follows & conforms to the boundary laid down in R. P. No. 4524 to Namahana, of **Auiōle**, an Ili of Waikēle. This patent describes as going to "**Kahakai**" and the plot on the patent bounds it by the "Kai of Honouliuli". This patent terminates at boundary of Waipio & Auiōle [sic]; From thence I followed the authority of a map of Waipio & notes of Bishop. (Waipio has been awarded by survey, following on the coast **Pookela Point**, the terminus of peninsula, not giving on the map any Kai to the peninsula, "Anemoku" of Waipio, as I found none designated in the notes.) From thence the line is midway of channel between this and Halawa (consented to above).

My accompanying notes of survey correspond with this plot and my testimony as given; though I have not described the fishery. My notes and survey follow the line of the shore.

Kukahiko, K. Sworn

I was born at Honouliuli, an ahupuaa on Oahu; born in 1810. Know boundaries; am kamaaina of the land and sea. I know **Papapūhi**. I belong there. It is a cape, the division of Hōaeae & Honouliuli. (Wit. points it out). The fishery opposite Hōaeae where a man can stand belongs to Hōaeae, and outside is deep water is Honouliuli, and so on, the shore water belongs to the land & the deep water of Honouliuli, till you come to **Kalaeokane**, a village **Kupalii**, which is a point of division between Honouliuli & Waikēle, in assessing the ancient tax, putting houses on the line so as to evade both. Thence the line ran on the edge of the shore, giving no water to Auiōle. The line of Honouliuli cutting across the land to **Panau**. There the people would cross from side to side to escape tax of either land. There the whole Kai, of **Homaikaia** belonged to Waipio. Along the coast to Pili o Kahi [**Pili o Kahe**] joining Namakuli is all Honouliuli.

X Kimo. There is a Kai to **Kapuna**, which is a portion of Honouliuli, and not of Auiōle. In ancient times not a division of the fish caught by the Kolo, but latterly John Ii secured a division. I belonged at Honouliuli, not at Kapuna. The Kai mauka of Kaulu belongs to Waipio. The Kai

below, the Moana belonged to Honouliuli. Heard that in shallow places it belonged to Waipio.

Hanama sworn - for petitioner

Was born at Hilo, know land of Honouliuli. Have lived on it now and then a year & some months, with Haaalelea. I am 37 years old. I know the boundaries from Kauhī, a kamaaina, who died three months ago. Kauhī was a makua of Haaalelea's, was of age of last witness. I, Kalaauala, Kamaiani & Haaalelea went around boundary with Kauhī, beginning at **Pili o Kahi**, which he pointed out as the division of Nanakuli & Honouliuli. We stopped there three days; thence we came to **Waimanalo**, a river on coast & stayed one day; thence to **Kolina**, thence to **Kualakai**, thence to **Kauele**, stayed there a week, thence to **Keahi**; thence to **Puuloa**. There then was a conversation with Haaalelea. Kauhī told Haaalelea that ½ the moana was Honouliuli & ½ Halawa. Haaalelea inquired why ½ was lele to Halawa.

Kauhī said that Halawa & Honouliuli were lands joining at their heads at the sea, that the **lae of Halakahi** belonged to Honouliuli & not to Halawa. X [cross examined] This progress was made in 1856, coming to **Pookala**. Kauhī said that Waipio took the shallow water & Honouliuli the deep, to **Kaulu**, that on the West side the Kai belonged to Honouliuli, and on the East side to other lands, coming to **Panau**. The Kai of those places belonged to Honouliuli, thence to **Kapuna**. Honouliuli anciently took the cape & thence turned. [illegible] That from there to **Miki** was all Honouliuli, not mentioning any kai for that shore.

X by Kimo: The same people went all round. They are all dead but me.

We went to Kapuna, Kauhī said it was Honouliuli.

At 5 p.m. adjourned — to 31st 1873

Dec. 31st. Present: Coney, Stanley, Judd, Kimo.

Mr. Judd submits that it is not within the jurisdiction of the Commissioner to award as territory, the sea or inland waters, defining only the land, and leaving fishing rights as appurtenances to be regulated by law.

Mr. Stanley contra. The point is reserved for argument and consideration.

Prof. Alexander gives a mem. from Vol. 10 p. 59 of L. Com Awards, from the award of Keahua, where the part of the survey including the fishery was expressly excluded by the Commissioners, and the party was referred to his right at law.

Considerations respecting Award of Fishery.

The petitioner for settlement of boundaries of Honouliuli asks that the fishing rights in "**Pearl River**" be determined and certified.

The Attorney General advised the Commissioner not to include such rights in the certificate, confining the award to the shore line and leaving fishing rights to the provisions of the Statute.

As the duty of the Commissioner is supplementary to the work of the "Board of Com's to Quiet Land titles," determining the boundaries of what they awarded by name only, the principles and rules adopted by them, and powers granted to them, and their practice together with subsequent statutes or decisions of the Supreme Court will in respect to boundaries form a rule for the Comr of Boundaries.

The Board cite among certain questions to be decided "Water privileges and rights of piscary" page 90, Vol. II of Stat. Laws, and page 109 Vol. I, on the same clause they speak of rights of primogeniture, rights of adoption &c. It is obvious that the Board could have entertained such matters only in a collateral and incidental way, and only in making the award, not in the boundary of what was awarded, and therefore little or no authority can be derived thence to the B. Ct.

There is no question that the treatment of rights to fish ponds and such enclosed spaces of the edge of the sea bays &c was as land to be surveyed and awarded as dry land. There is as to such tracts covered with water, not a mere right of fishing but a sole and exclusive ownership. Sec. 384 Civil Code.

As to the general sea coast both near the shore and beyond the reef there may be rights of piscary but there are statutes which regulate them. In *Oni v. Meek* and in *Haalelea vs. Montgomery* this is expressly held, and parties are remitted to their rights under them.

The present case is a claim of right of piscary over a navigable bay or loch perhaps unlike any other in the Kingdom, and is a claim of exclusive fishing right as to the whole of a certain branch of this loch of the part lying outside of a line "chin deep" opposite the other lands situate on this branch. It is distinguishable from the right claimed and by statute given to *Konohikis* with certain prescribed reservations. Civ. Code Sec. 387-92 being a claim as a private and exclusive fishery as completely as that within the "chin deep" line, is claimed for the lands adjacent.

I find in repeated instances that the Board declined to award and define piscary rights, leaving parties to their rights under general statutes, e.g. in the award to *Keahua*, Vol. 10, p. 59, where the fishing right was surveyed and included in the land asked for, the Board expressly refused to award this portion of the survey, remitting the claimant to the law, endorsing this refusal both on the notes of survey in the award and on the accompanying plot, and no instances of a customary practice are shown to me.

Upon due consideration of the premise, I decline to award the fishery of Honouliuli as a right or as territory, but deeming it of importance that all rights depending on kamaaina testimony be now settled as far as may be, and knowing of no better place than the records of the Boundary Commissioner for the preservation of such claims. I take the testimony offered on the subject and make such a supplementary finding as such testimony warrants.

Award No. 4

Office of the Commissioner of Boundaries of Oahu

In the Matter of the application of Mrs. A. Haalelea for settlement of the boundaries of the Ahupuaa of Honouliuli, Ewa.

Proper application having been made, as above, and notice having been given to all parties concerned the matter came on to be heard at the Court House in Honolulu on the 30th day of December A.D. 1873, and from the proofs taken I find the boundaries of the said Ahupuaa of Honouliuli as follows, to wit:

Beginning at a large flat rock known as **Pohaku Palahalaha**, a well-known rock now marked by an arrow and the name "Honouliuli" on one side and Hoaeae on the other, from which the Govt. Survey Trig. station near **Kaulu** bears S. 38° 48' E. the boundary runs

1. S. 38° 16' E. 2875 feet along Hoaeae, to a red wood post 375 feet beyond the Govt. road near the brink of a gulch,
2. S. 36° 06' east 3703 feet to a point adjoining the west corner of Royal Patent 778 in Kaulu;
3. Along the brink of the Pali to a point opposite a red wood post which bears S. 54° 28' E. 895 feet from the last corner where land Hoaeae begins;
4. Beginning again at Pohaku Palahalaha N. 21° 21' W. 2035 ft. to a pile of stones, along
5. Hoaeae, thence N. 22° 3' W. 4686 ft. along do. to a red post, and thence
6. N. 23° 46' W. 6422 ft. to red wood post, and
7. N. 35° 32' W. 4410 ft. to red wood post by an old Kukui tree adjoining Hoaeae;
8. N. 20° 33' W. 4237 ft. across **Ekahanui Gulch** to a granite post at the N.W. corner of Hoaeae; thence
9. N. 41° 18' E. 2990 ft. to a red wood post, still along Hoaeae;
10. N. 43° 36 ½ ft. to a marked rock at the head of an ancient "holua" near the junction of the Paliwai with the **Manawaielelu gulch** on the boundary between Hoaeae & Puhala, thence;

11. N. 16° 49' W. 265 ft. along Lower Poughala as per Royal Patent No. 4486, to a marked stone post; thence
12. N. 14° 24' W. 2057 ft. along Poughala to a marked stone &
13. N. 31° 36' W. 1090 ft. to a large flat rock at the N.W. corner of R. Pat. 4486;
14. N. 26° 43' W. 4587 ft. along upper Poughala to a marked stone, and thence—
15. N. 15° 44' W. 2467 ft. to brink of the **Kawaieli** gulch by the road—thence—
16. North 11° 52' W. 1363 ft. across the Kawaieli gulch to a granite post which is the corner of Honouliuli, Poughala & Waianae uka—thence—
17. N. 67° 44' W. 4406 ft. to a red wood post along Waianae and thence—
18. N. 86° 58' W. 3339 feet (along an old path called **Mookapu**) adjoining Waianae uka to a red wood post and thence
19. S. 60° 49' W. 1677 ft. along Waianae uka to a post & thence
20. S. 27° 07' W. 762 ft. across the Kawaieli gulch to a marked stone where Kuhau's house formerly stood—thence—
21. S. 47° 14' W. 8660 ft. up a ridge to the summit of **Kahapapa** thence along the summits of the mountain range which separates this land from Waianae;
22. S. 30° 36' E. 5709 ft.
23. S. 12° 37' W. 5190 ft. to **Puu Kuua**—thence
24. S. 3° 4' W. 9367 ft. along the ridge
25. S. 9° 35' E. 4505 ft. to **Mauna Kapu**, thence—
26. S. 22° 31' W. 6219 ft. to a red wood post on **Manawahua**, which bears N. 77° 44' W. from the Honouliuli Trig. Station near Kaulu, and
27. S. 63° 16 1/2' W. 9115 feet along Nanakuli to a pile of stones on the ridge and thence—
28. S. 44° 47' W. 3200 ft. along Nanakuli to the **Pili o Kahe**, to a marked rock at the end of a stone wall by the road on the shore—thence
29. S. 20° 53' E. 28,175 feet along the sea to **Laeloa** or Barber's Point and thence
30. N. 82° 56' E. 28,641 feet along the sea to a large pile of stones in Oneula—thence—

[side note] Amended by new course [illegible]

31. N. 41° 97' E. 20,920 feet along the land of **Puuloa** conveyed to Isaac Montgomery by Kekauonohi, September 7th 1849 to a large pile of stones at the **Lae o Kahuka**
32. Thence the boundary follows the shore to the point mentioned above where the land of Hoaeae begins, including an Area of Forty Thousand, Six hundred and forty (40,640) acres more or less.
- 43,250 acres including Puuloa
- The bearings given in above survey are the true bearings, the mean declination of the magnetic needle being 9 1/4° East.
- Fishing Right of Honouliuli in Pearl Loch
- For reasons set forth at large in the record of the Commissioner, the Fishing Right is not awarded in the body of the Certificate of boundaries, but the finding of the Commissioner on the testimony presented, as well as by the assent of parties adjacent and in interest is set forth in this Supplement as follows, to wit:
- The Fishing Right of Honouliuli covers the whole of "West Loch," with the reservation to Hoaeae, Waialele (Exhibit the Ili of Auiole) and Waipio of the fishing opposite each to where the water is "chin deep" to a man, say five and one half feet deep, also cutting off the bight or inlet where the boundary of Waipio and Waialele cuts across to **Kaulu** constituting the "Fishery of **Hoonaikaia**." The channel at the entrance of the Loch, as far up as **Pookela** point is divided equally between Honouliuli & Halawa.
- Note: The map of survey presented by the petitioner is the one executed by Prof. W. D. Alexander in the year 1873, and the award made conforms to said map.
- In witness whereof I have hereunto set my hand at Honolulu, this 22d day of January A.D. 1874.
- Lawrence McCully
Commissioner of Boundaries, Oahu.
- Honolulu, November 5th 1874
- The petitioner in this case further asking that "Puuloa" a part or il of this land, sold from it to Isaac Montgomery be included in this certificate and the proofs for this purpose being already of record, and this original certificate not yet issued.
- I do hereby supplement the same, as follows
viz. Instead of Course 31 as above, read thus
31. Oneula to Puuloa trig Station, at windmill N. 69° 41' E. 18720 ft; thence along shore to stone pillar at Kahuka N. 22° 20' W. 10010 ft.

Area of Puuloa 2610 acres
Total area of Honouliuli 43,250 acres
Lawrence McCully
Comr. of Boundaries.

Hoeae Ahupua'a (with Honouliuli)

[From boundary of Honouliuli]

1. The boundary between this land and Hoeae was first surveyed by J. Metcalf May 29, 1848, and the "Kula" of Hoeae was awarded to L. Rees by this survey.

See Award 193, Volume 1, p. 536.

... Fishery of Hoeae. The testimony of the kamaainas is that the fishery extends to the depth of a man's chin, opposite this land. Mr. Robinson & Mr. Coney agree to this and that outside of that the fishery belongs to Honouliuli. The award of Hoeae does not include the Kai. The makai, cultivated part of Hoeae and the Kai or fishery were granted to Namaui by R. P. 4490 for M. Kekuanaoa. The survey by A. Bishop is not copied into the R. Patent; the Patent being without metes & bounds.

The red line indicating the fishery of Hoeae, conforms to Mr. Bishop's survey, and is agreed to by Mr. Robinson as representing their rights of fishing.⁴⁵⁷

[From Boundary of Waikale]

Ap. 1 - he aina Kalo me ke kula ma Apokaa. Aia i ke kihi Komohana o keia aina pili ana me "**Hoeae**", ma ka 4 o na pohaku e waiho lalani ana ma kahakai ua hoailona mua ia pea X. Alaila e kuhikuhi i ka palena kai hema 66° 3/4 Hikina e au iho ana i kai ma **Aole i pau kuu loa** me ka palena kai o Honouliuli a hiki i kahi i kapa ia o **Pau Kuu Loa** e pili ana me ka palena kai o Honouliuli. Alaila, ma kela pohaku X, Akau Kom. kaulahao ma Hoeae a hiki i ka **poh. Mokomoko** ma ke alanui Aupuni.¹

1 page 156

⁴⁵⁷ page 245

10 Bureau of Conveyances—Selected Records from the Ahupua'a of Honouliuli, 1847–1877

This section of the study covers several of the primary records of conveyance of lands in Honouliuli Ahupua'a. The major focus is on the larger tracts of land which were subsequently developed into saltworks, ranching, plantation, and military operations. Several of the conveyances also provide samples of how and when native tenant *kuleana* were transferred to larger landowner shares. For lands of the Hoakalei preservation sites and lagoon area, only the large *aliipua'a* conveyance deeds cover transfer of title as no small parcels were held in fee by individuals.

The first is a lease of Puuloa Salt Works from M. Kekauonohi to I. Montgomery.

Rental Agreement

Olelo Hoolimalima

Mawaena o M. Kekauonohi ma kekahi aoao a me Isaac Montgomery ma kekahi aoao.

Ke ae aku nei o M. Kekauonohi e lilo ia Isaac Montgomery kona Loko paakai ma Puuloa, Mokupuni o Oahu, no na makahiki eono mai keia la aku.

Na Isaac Montgomery ka mahele paakai o M. Kekauonohi me na Kanaka, aia no ia Isaac Montgomery a olelo no ia mea, e like me ka M. Kekauonohi mau ana.

Ke ae aku nei o Isaac Montgomery ma kona aoao e uku pono aku oia a me kona mau hope ia M. Kekauonohi i na Dala maikai Elima Haneri no kela makahiki keia makahiki a pau na makahiki i oleloia maluna.

Eia kekahi mea i ae like ia, E hiki no ia Isaac Montgomery ke kukulu i mau hale waiho paakai ma kahi ana e makemake ai, a hiki no na kaa ke hele malaila no ka lawe ana i ka paakai.

A pau na makahiki Eono, e hoihoi mai oia a me kona mau hope i ua aina nei a me na hale a pau maluna, ia M. Kekauonohi a i kona mau hoolina a hope paha.

Between M. Kekauonohi of one part and Isaac Montgomery of the other part.

M. Kekauonohi hereby agrees to let out her salt ponds at Puuloa, Island of Oahu to Isaac Montgomery for the term of six years from this date.

The salt section of M. Kekauonohi and the natives is for Isaac Montgomery. It is there for Isaac Montgomery as stated just as it was under M. Kekauonohi.

Isaac Montgomery agrees on his part, and on the part of his administrators, to truly pay M. Kekauonohi Five Hundred Dollars for each year as cited above.

Here also is this agreement, that Isaac Montgomery may build storage houses in which to hold the salt, at the place he desired, and that carts may travel there to take the salt.

At the end of the six years, he and or his executors shall return the land and the buildings upon it to M. Kekauonohi, her heirs or assigns.

Aole no hoi e kue o ua Montgomery la i na kanawai of keia Aupuni ma kona noho ana malaila.

A no ka oia o keia olelo, ke kau nei mau i ko mau mau inoa a me na Sila i keia la 16, o Iulai 1847, ma Honolulu, Oahu.

(signed) M. Kekauonohi (seal)
Isaac Montgomery (seal)
Ike maka

A. Kealiahonui
S. P. Kalama¹

- 1 Liber 3, p. 212-213, July 16, 1847.
- 2 Trans. by Maly.

In 1948, half of the saltworks was subleased to George Pelly. The following documents the sublease.

Ke haawi aku nei au me ka hoolilo aku i kekahi hapalua o ka waiwai i lilo mai ia'u ma keia palapala, no ka mea, ua loa ia'u ka waiwai like; ua hoomaopopoia hoi, e mahele like ia ka waiwai i laa; no George Pelly a me kona mau hoolilina a me kona mau hoe, a he kuleana like loa hoi me ko Isaac Montgomery a me kona mau hoolilina ame kona mau hope, he hapalua a he hapalua a laua a elua; i mahele like ia hoi ka waiwai i lilo.

(Signed) Isaac Montgomery

Geo. Pelly

Ikemaka Geo. T. Allen
L. Andrews, Jr.¹

- 1 January 12, 1848.
- 2 Trans. by Maly.

Below is the deed conveying Puuloa from M. Kekauonohi to Isaac Montgomery in 1849.

Know all men by these presents, that I Kekauonohi of Honolulu, Island Oahu, for and in consideration of the sum of Eleven thousand dollars, to me this day paid in hand by Isaac Montgomery also of Honolulu, Island of Oahu, the receipt of which is hereby acknowledged, do grant, bargain, sell, and by these presents convey unto him, the said Isaac Montgomery

Said Montgomery shall not oppose the laws of this Nation during his residency there.

In witness of the truth of this state, we hereby affix our names and seals on this 16th day of July, 1847, at Honolulu, Oahu.

(signed) M. Kekauonohi (seal)
Isaac Montgomery (seal)

Witnesses:

A. Kealiahonui
S. P. Kalama²

I hereby makeover and transfer one half share of the property leased me in the within document, for value received; it being understood that each party, that is to say George Pelly, his heirs & ex-ecutors, shall have equal rights with the said Isaac Montgomery, his heirs and ex-ecutors, half & half, each being one half share of the expenses.

(Signed) Isaac Montgomery

Geo. Pelly

Witnesses (Signed) Geo. T. Allen
L. Andrews, Jr.²

forever, all that tract, lot of land situate in Island of Oahu, aforesaid, and described as follows:

Commencing at mauka North Corner or Point of this land at place called Lae Kekaa at bend of Pearl River; makai side, taking in three fish ponds called Pamoku, Okiokialipi and Pakule to open sea; thence following along edge of sea (reserving all the reef in front) to end of stone wall by sea in land called Kupaka, at the makai west corner of this land; thence running N. 25° E. 282 direct to place of Commencement – Including an area of acres 2244. As the plot hereto annexed.⁴⁵⁸

To have and to hold the above conveyed premises and all the tenements, and hereditaments, situate there on with this my Covenant of warranty and lawful seizure unto the said Isaac Montgomery, his heirs, Executors, administrators, and assigns forever.

In witness whereof, the said party Kekauonohi has hereunto sether hand and seal at Honolulu this 7th day of September, 1849.

(sig) M. Kekauonohi (her seal)

Executed in presence of (Sig.) Frank Manini

Personally appeared before me M. Kekauonohi party to the foregoing Instrument and acknowledged that she had executed the same for the terms and purposes therein set forth.

(Sig) John R. Jasper

Registrar of Conveyances.

Recorded & Compared this 4th day of November A.D. 1854⁴⁵⁹

The following conveys the estate of Isaac Montgomery to Charles W. Vincent.

For and in consideration of the sum of Eight Thousand dollars to me in hand paid by Charles W. Vincent of Honolulu Island of Oahu, Hawaiian Islands, the receipt whereof I hereby confess & acknowledge, bargained, granted, sold, assigned and transferred to the said Charles W. Vincent, all my right, title, interest and Estate of in and to, the within described Estate. To have and to hold the same to him, his heirs, Executors, administrators and assigns forever.

In witness whereof I have hereunto set my hand and Seal this 15th day of September A.D. 1849.

(Sig.) Isaac Montgomery

⁴⁵⁸Plot plan not available in Bureau collections. See Registered Map No. 77.
⁴⁵⁹Liber 4, p. 41-42, September 7, 1849.

In presence of
(Sig.) Frank Manini
I. O. Carter⁴⁶⁰

J. H. Levi Haaalelea leased his *kūla* lands at Honouliuli to John Meek. The following documents that lease.

This lease agreement is executed on this 16th day of February, 1853, between J. H. L. Haaalelea of the first part, and John Meek of the other part, both residing in Honolulu, Oahu. J. H. L. Haaalelea on behalf of himself, his heirs and administrators, hereby leases to John Meek, his heirs, assigns and administrators, all of his remaining *kūla* lands at Honouliuli. Here is the entire nature of the *kūla* land entered into this lease, which was originally agreed upon between A. Kealiahonui, M. Kekauonohi and John Meek, for that land called Lihue on the third day of March 1846; and in a certain lease between J. H. L. Haaalelea and John Meek for the land of Waimanalo dated the 15th day of July 1854. The terms of the leases for those two lands continue and are not made a part of this lease.

Here are the places that are retained by the party of the first part, those Loko ia (fish ponds) which are on this *kūla*, and the fishing running between the two walls, with thoughts that it will run to Mokumeha, and adjoin the *kalo* land lots, and also the place between Kualakai and the lot of C. W. Vincent; there is also retained that area call Kapauhi [Kapapauhi]. There is also retained the fishery and rights appertaining to it, just as that which was retained with Waimanalo. There is also retained the land lot at Honouliuli and the *kūla* within the lot, as well as the cultivated land at Poupuowela. None of these things are included within this lease. The livestock of John Meek may peaceably travel upon these places, without being restrained in paddocks. Poupuowela will be continued as it has in the past...

Here also is this, the trees of the mountains shall be protected as a part of this lease though the party of the first part agrees that the party of the second part may go into the forest to gather what he needs, but it shall not be for sale.

John Meek shall have the aforementioned land in lease hold for the term of twenty five years from this day forwards, with no one opposing his residency ... He shall pay to said J. H. L. Haaalelea, his heirs, assigns and or administrators the sum of \$300.00 for each year of this lease agreements.

⁴⁶⁰*Ibid.*, September 15, 1849.

This lease cannot be opposed by the people who are living under the shelter of the party of the first part. At the end of the term of this lease, all of the real property, such as the houses and walls/fences, shall be retained on the land.

In witness of the truth of this lease agreement, we both set our names and seals on this sixteenth day of February, in the year one thousand eight hundred and fifty three.

John Meek

J. H. L. Haaalelea

Witnesses:

W. L. Moehonua

J. I. Dowsett

G. P. Rives⁴⁶¹

C. W. Vincent and Maria Maui Vincent mortgaged Puuloa Salt Works and vicinity to B. F. Angel in 1854. The following document records that conveyance.

Know all men by these presents that We, the undersigned now being at Honolulu, Island of Oahu, for and in consideration of five thousand dollars to us in hand paid by B. F. Angel now likewise living at Honolulu, aforesaid, the receipt whereof we hereby acknowledge, do grant, bargain, and sell... unto B. F. Angel and unto his heirs and assigns forever all that certain lot of land situated in the Island of Oahu, known and described as follows:

Commencing at the mauka South corner at point of this land at a place called Lae Kekai at the Bend of Pearl River and running along the edge of Pearl River makai side taking the fish ponds call Pamoku, Okiokilipi and Pakule to the open seas, thence following along the sea coast reserving the reef in front of the end of a stone wall in the sea on a land called Kupaka at the mauka West corner of the land, thence running North 25 East to place of Commencement.

Being the same lot of land conveyed to Isaac Montgomery by M. Kekauonohi by a Deed dated Sept. 7, 1849, and by the said Isaac Montgomery conveyed to Charles W. Vincent by an instrument dated September 15, 1849, which said instruments are of Record at Liber 4th pages 41 & 42. Miscellaneous conveyances to which said Deeds a plot of survey is appended by which the above described land is said to contain an area of two thousand two hundred and forty four acres.

⁴⁶¹Liber 5, p. 435-436, February 16, 1853. Trans. by Maly.

To have and told the above described premises and all the tenements and hereditaments thereon situated with this my covenant of warranty and lawful seizure unto the said B. F. Angel and to his heirs and assigns forever.

Provided nevertheless that if the undersigned shall pay or cause to be paid unto the said B. F. Angel, his heirs or assigns the aforesaid sum of five thousand dollars with interest of 2 percent per month on or before the 1st day of November in the year of our Lord one thousand eight hundred and fifty five as expressed in a certain promissory note of concurrent date with these present to which said note this mortgage is collateral with this Deed together with the said note shall both be absolutely void to all intents & purposes ... Personally appeared before me Maria Maui Vincent, to me well known as the wife of Charles W. Vincent, and being examined apart from her husband acknowledge that she signed the foregoing document for the purposes there set forth of her own free will.⁴⁶²

On November 1, 1855, Charles W. Vincent declared that the mortgage had been paid in full, and Daniel Montgomery had full title of the property returned to him.⁴⁶³

Daniel Montgomery mortgaged the land of Puuloa Salt Works and vicinity to Benjamin F. Angel in 1855. The following deed records that conveyance.

This indenture made and entered into this first day of November A.D. 1855 between Daniel Montgomery of the island of Oahu ... of the first part and Benjamin F. Angel of the second part. Witnesseth that the said party of first part for and in consideration of the sum of five thousand dollars to him in hand paid by the party of the second part ... hath hereby granted, bargained and sold unto the said Benjamin F. Angel ... that certain tract or parcel of land and the improvements thereon situated, lying and being in the island of Oahu ... and described and bounded as follows to wit:

Commencing at mauka South corner or point of this land at a place called Lae Kekai at the bend of Pearl River and running along the edge of Pearl River makai side taking the fish ponds call Pamoku, Okiokilipi and Pakule to the open sea. Thence following along the edge of the sea reserving all the reef in front to end of a stone wall by sea on a land called Kupaka at the mauka West corner of the land. Thence running North 25 East 283 direct including two thousand two hundred and forty four acres.

⁴⁶²Liber 6, p. 363-365, November 4, 1854.

⁴⁶³Ibid., p. 364.

Said land so described being known and designated as the Puuloa Salt Works. To have and to hold the above described tract of land with the buildings and improvements thereon unto the said Benjamin F. Angel, his heirs, executors and assigns forever. This conveyance is intended as a mortgage to secure the payment of the sum of five thousand dollars in the year from the date of these presents, with interest at the rate of two per cent per month under the condition of a certain promissory note bearing even date.⁴⁶⁴

On October 31, 1856, Benjamin F. Angel declared that the mortgage had been paid in full, and Daniel Montgomery had full title of the property returned to him.⁴⁶⁵ Haalelea decded the *ahupua'a* of Honouliuli to Benjamin F. Snow in 1857.

This indenture made this twentieth day of April A.D. one thousand eight hundred and fifty seven, between Levi Haalelea of Honolulu ... of the first part and Benjamin Franklin Snow of Honolulu aforesaid of the second part. Witnesseth: that the said party of the first part for and in consideration of the sum of Five Thousand Five Hundred Dollars to him in hand paid by the said party of the second part ... hath given, granted, bargained, sold, conveyed and confirmed ... to the party of the second part, his heirs and assigns forever that certain tract or parcel of Land situate on the Island of Oahu ... in the "Kaulana" [Kalana] or District of Ewa, known as the Ahupuaa of Honouliuli and bounded as follow:

Commencing upon the westerly side of Ewa harbor or Pearl River on the North and Easterly corner of the Land at Hulumua, following then the northerly boundary of the lands of Hoaeae and Waikele to the boundary of Waianae; thence along the line of Waianae up the Waianae Mountain to the top of the peak called Kunana, thence to the left along the top of the mountain range past hereby and westerly to the extremity; thence down along the boundary of the land called Nanakuli to the sea at a point named Kananiau; thence follow along the sea to the left to the channel called Kalaekao at the entrance of Pearl River; thence along the westerly side of Pearl River to place of commencement; containing an area of Forty Thousand acres more or less excepting & reserving however of the said land as have been conveyed to Isaac Montgomery, being twenty five hundred acres or thereabouts; and also so much as has been awarded to natives by the Board of the Land Commission being one hundred and fifty two acres, and subject also to the lease or leases now existing of the said premises or any part thereof.

⁴⁶⁴Liber 6, p. 762-763, November 1, 1855.

⁴⁶⁵Ibid., p. 762.

To have and to hold all and singular the above mentioned and described premises together with the privileges, hereditaments and appurtenances, the rents, xxx and property thereof subject to the rights and profits there of (subject to the above mentioned in exception of said reservations) to said party of the second part, his heirs and assigns forever.

This conveyance is intended as a mortgage to secure the payment of a certain promissory note or covenant dated herewith given by the aforesaid party of the first part to the said party of the second part on the principal sum of Five Thousand and five hundred dollars, payable with interest at the rate of one and one half per cent per month at the expiration of three years from its date...

But if default shall be made in the payment of the said principal sum and of the interest thereon, or of any part thereof according to the tenor of the Promissory note, aforesaid, then the party of the second part, his heirs, executors, administrators and assigns are hereby empowered to sell the premises above described or any part thereof after due issuance and advertisement in the manner present by law, and out of the money arising from such sale, to retain the said principal and interest on whatever amount may then be due.⁴⁶⁶

On April 20, 1860, Benjamin F. Angel recorded a transfer of the mortgage note; writing is illegible.⁴⁶⁷
Daniel Montgomery conveyed the Puuloa Salt Works and vicinity via the following mortgage deed to James F. B. Marshall in 1857.

This indenture made and entered into this twenty fifth day of May, A.D. Eighteen Hundred & fifty seven. Between Daniel Montgomery of the Island of Oahu... of the first part, and James F. B. Marshall of Honolulu... Witnesseth that the said party of the first part, for and in consideration of the sum of Three Thousand Dollars in his hand paid by the party of the second part... hath granted, bargained, and sold... unto the said James F. B. Marshall... all that certain tract or parcel of land with the improvements there on, situate or lying and being in the Island of Oahu... and described & bounded as follows to wit:

Commencing at mauka North corner on point of this land at a place called Lae Hukaa at bend of Pearl River and running along edge of Pearl River, makai side taking in three fish ponds called P'amoku, Okiokilipi and Pakule to open sea; thence following along edge of sea, reserving all the reef in from to end of stone wall by sea in land called Kupaka at

⁴⁶⁶Liber 8, p. 606-607, April 20, 1857.

⁴⁶⁷Ibid., p. 607-608.

the makai west corner of this land; thence running North 25 East 283 direct, including an area of Two thousand two hundred and forty four acres. Said land so described by known and designated as the Puuloa Salt Works. TO have and to hold the above described tract of land with the buildings and improvements there on unto the said James F. B. Marshall... forever.

This conveyance is intended as a mortgage to secure the payment of the sum of Three Thousand Dollars in one year from the date of these present, with interest at the rate of one and one half per cent per month, payable semi-annually according to the conditions of a certain promissory note bearing even date.⁴⁶⁸

On February 23, 1858, James F. B. Marshall declared that the mortgage had been paid in full, and Daniel Montgomery had full title of the property returned to him.⁴⁶⁹
Montgomery mortgaged Puuloa Salt Works and vicinity to Henry J. H. Holdsworth in 1858.

Know all men by these presents, that I Daniel Montgomery of Puuloa, Island of Oahu, for & in consideration of the sum of Four Thousand Dollars to me in hand paid by Henry J. H. Holdsworth of Honolulu... do hereby grant, bargain, sell, alien, release & confirm unto the said Henry J. H. Holdsworth... all that tract of Land called & known as the Puuloa Estate and Salt Works on the Island of Oahu which was granted by M. Kekauonohi to Isaac Montgomery by deed dated the 7th day of September 1849 and recorded in Liber 4 on pages 41 & 42, & afterwards legally vested in me by assignment together with houses, buildings & improvements, rights of easements & appurtenances thereunto belonging... To have & to hold the said land & premises unto the said Henry J. H. Holdsworth... forever. But subject to the proviso for redemption herein after contained, that is to say that whereas the said Henry J. H. Holdsworth has this day loaned to the said Daniel Montgomery the sum of Four Thousand Dollars for which and the interest to grow due thereon the said Daniel Montgomery has made this promissory note... of even date herewith payable twelve months after date with interest at Eighteen per cent per annum payable semiannually.⁴⁷⁰

On May 14, 1859, Henry J. H. Holdsworth declared that the mortgage had been paid in full, and Daniel Montgomery had full title of the property returned to him.⁴⁷¹

⁴⁶⁸Liber 9, p. 266-267, May 25, 1857.

⁴⁶⁹Ibid., p. 266.

⁴⁷⁰Liber 10, p. 164-165, February 24, 1858.

⁴⁷¹Ibid., p. 164.

In 1858, Levi Haaalea and wife mortgaged land in Waimanalo, Honouliuli to Joshua R. Williams.

This Indenture made this 21st day of June 1858, between Levi Haaalea of Honolulu, Oahu... of the first part and Joshua R. William of Waimalu, Ewa... of the second part. Witnesseth that the deed of the first part for & in consideration of the sum Three Thousand Dollars to him in hand paid by the said party of the second part... hath given, granted, bargained, sold aliened, conveyed & confirmed... unto the said party of the second part... all & singular those two traces of land situated in the district of Ewa... & known – the one as “Waimalu Komohana” & the other as “Waimanalo in Honouliuli.”

... The second [Waimanalo], lying in the Ahupuaa of Honouliuli & bounded on the Waianae side by the land of Nanakuli, mauka by the ridge of the Waianae Mountains, easterly by the remainder of Honouliuli, & makai by the seam together with the Konohiki fishing rights attached to the said lands...

To have and to hold the above mentioned & described premises with the fishing rights & all other privileged, appurtenances (excepting only the rights of parties holding Land Commission Awards or portions of the above lands & those of present lessees of parts of the same) unto the said party of the second part...

This conveyance is intended as a mortgage to secure the payment of the sum of Three Thousand Dollars at the expiration of two years from this day, with interest quarterly at the rate of one & one quarter per cent per month according to the terms of a certain promissory note of even date herewith given by the said party of the first part...

...I, Kekela Amoi, wife the above named Levi Haaalea for and in consideration of one dollar to me in hand paid & for diverse other good & valuable considerations do hereby release, relinquish, quit claim & convey unto the above named J. R. Williams... all my dower in right of dower to the above described premises.⁴⁷²

Anaderea Amoi

The following record of payments and release of the mortgage was made:

In consideration of Six Hundred and Twenty Five received by me on June 23, 1865, and Six Hundred and Fifty 83/100 Dollars received by me July 25, 1865 and Two Hundred & Twenty Five Dollars received by me October 7,

⁴⁷²Liber 10, p. 531–533, June 21, 1858.

1865 and Four Hundred & Twenty Fours 87/100 Dollars received October 27, 1865 and Fourteen Hundred & Forty Dollars received July 26, 1866 and Three Hundred & Eighty Eight 56/100 Dollars received this day I hereby cancel this Mortgage the same being fully satisfied and paid.⁴⁷³

Montgomery again mortgaged the land in 1859 to Charlotte Coady.

Daniel Montgomery and Charlotte Coady (widow of Richard Coady) of Honolulu, entered into a mortgage deed agreements for the lands known as “All that tract of land called & known as the Puuloa Estate & Salt Works.”

The description of the mortgage agreement follows the same general format as those in preceding years, with conditions being:

The sum of Three Thousand Dollars, payable in two years from date, with interest at the rate of one per cent per month, payable quarterly.⁴⁷⁴

In 1863, Charlotte Coady declared that the mortgage had been paid in full, and Daniel Montgomery had full title of the property returned to him.⁴⁷⁵ John Meek deeded the Puuloa Salt Works and vicinity to Puanani in 1866. The following document records that conveyance.

This conveyance of land is executed on this 22nd day of June, 1866, between John Meek of Honolulu... party of the first part, and Puanani (k), heir of the late Kauouo of Honouliuli, Ewa... of the second part. Witnesseth that the party of the first part aforesaid hereby grants bargains and sells to Puanani, his heirs and assigns that parcel of land situated at Honouliuli, known in Royal Patent Number 3091, granted to Kaopala by Kamehameha, and conveyed by Kaopala to John Meek, and known by the following boundaries:

Parcel 5 in Kalokoeli – beginning at the Western corner and running South 56° East 154 links, along Kahawai; North 27° East 204 links along Keole; North 83 1/2° West 184 links along Kaalawahi; South 80° West 244 links along Kama to the first corner. .396 acre. And containing all things appertaining to it, being conveyed to Puanani, his heirs and assigns for all time. He has granted to John Meek a parcel of land as described

The party of the second part aforesaid hereby conveys and grants by this instrument unto John Meek, his heirs and assigns all that parcel of land situated at Honouliuli, Ewa, Oahu, which was granted to Kauouo

⁴⁷³Ibid., p. 532, August 7, 1866.

⁴⁷⁴Liber 11, p. 502–503.

⁴⁷⁵Ibid., p. 502, February 23, 1863.

in confirmation of Land Commission Award No. 756, and inherited by me from Kauouo, known by the boundaries given below. The moo land of Maui in the ili of Kaamakua, Honouliuli E. O. Beginning at the North Eastern corner and running South 4° East 6.42 chains along the boundary of Mokumeha; then South 70° West 2.35 chains along the boundary of the pa aina; thence North 10° 3.78 chains along the boundary of Kanuwahine; thence North 30° West 3.14 chains to the corner; thence North 72° East 1.82 chains along the land boundary of Wahinenui; thence East 2.80 chains to the point of commencement. Containing 1 acre 9.22 chains total, along with all things appertaining there. Being conveyed to John Meek, his heirs and assigns for all time. This being granted in exchange for the land granted to Puanani, as described above.⁴⁷⁶

Levi Haaalea leased the Honouliuli Fishery to Daniel Montgomery in 1860.

This lease of Fishery privileges made on the twenty fifth day of December 1860, between Levi Haaalea of Honolulu on the first part and Daniel Montgomery of Puuloa, Ewa... of the second part. Witnesseth that the said Haaalea does hereby agree to Lease & doth lease unto the said Montgomery all his fishing rights & privileges (owned by him as Konohiki of the land called Honouliuli) in that portion of the sea of the said Ahupuaa of Honouliuli, contained within the following viz.:

Commencing at a certain point of land called Kahuka on Ewa Harbor, running from there makai to the sea & following the sea to the westerly corner of Honouliuli near Waianae, for the term of Five Years from date at the yearly rent of Two Hundred Dollars. The first year to be paid in advance & following years in semiannual payments at the end of each half year. Should the said lessee & his representative neglect or fail to pay the rent as above stipulated, then the said lessor L. Haaalea & his representatives may enter into or upon the said fishing privileges & repossess the same.⁴⁷⁷

Haaalea also leased some parcels of kalo land and fisheries of Honouliuli to Kekukahiko, Puanani, and Umauma. The lease record is below.

This is an agreement entered into on 9th day of February, 1861 between L. Haaalea of Honolulu of the first part, and Kekukahiko, Puanani and Umauma of Honouliuli, Ewa of the second part. Witnesseth that the party of the first part hereby agrees with the parties of the second part that they may lease and have the rights, for a term of five years, the pa aina

⁴⁷⁶Liber 12, p. 357-358, June 22, 1866. Trans. by Maly.

⁴⁷⁷Liber 13, p. 326, December 25, 1860.

mahi kalo (kalo land parcel that is cultivated), along with Mokumeha, Kapauhi and Kalawaiea under the peace of the Konohiki. All of these rights described above are granted to the parties of the second part at terms of six hundred dollars per year. This agreement does not include the fish which are found outside of Kalae o Kahuka, it pertains to the fish inside of the point, and at Kalua o Mauona, Waipio, and at the place adjoining the Palena Kai (fishery boundary) of Waikele and Hoaeae. From there are retained the fishery of Laulaunui and the end of Kapae for the party of the second part in this agreements.⁴⁷⁸

Paewahine gave her son Oni for adoption to Hinaa in 1861. They are residents of Honouliuli.

Know all men by these presents, I Paewahine (female), residing at Honouliuli, Ewa ... of the first part, and Hinaa, (male) of the same place, of the second part. Witnesseth: the party of the first part, desired to give her son, who is named Oni, he being the one born January 3, 1852, and being eight years old at this time, to Hinaa, party of the second part. There are appertaining to this right of care, all things including the education and care as provided for under the law, and the rights as heir to all personal and real property, as if he were his own child, and he being the child's own father....

In witness of the truth of this, we hereunto set our names and attach our seals on this 28th day of September, 1861...

Witnesses:

Jno. L. Nailili

A. Kalauhala.⁴⁷⁹

Hinaa deeded land at Honouliuli to his adopted son Oni in 1861. The following deed records that conveyance.

Know all men by these presents, that I, Hinaa, residing at Honouliuli, Ewa... now, because of my desire to prepare all things and rights for my son, Oni, who is eight years old at the time, and to protect him from misfortune, and as a means of caring for him. I do hereby grant to him, Oni, for all time, all of my property. Said property being known as Royal Patent Number 3092, situated at Honouliuli, along with all the improvements situated upon said land. But, should Oni predecease Hinaa, then the said property will return to Hinaa...

⁴⁷⁸Liber 13, p. 411-412, February 9, 1861. Trans. by Maly.

⁴⁷⁹Liber 14, p. 309, September 28, 1861. Trans. by Maly.

Witnesses:

Jno. L. Nailili
A. Kalaualala.⁴⁸⁰

In 1862, Daniel Montgomery transferred his interest in the Puuloa Salt Works to Isaac Montgomery.

Know all men by these presents that I the undersigned Daniel Montgomery of Honolulu ... for & in consideration of the sum of one dollar to me in hand paid by Isaac Montgomery of the same place ... do grant, bargain, & sell unto the said Isaac Montgomery all my right, title & interest in & to the Estate known as "The Puuloa Salt Works" on the island of Oahu, being the same Estate conveyed to me by C. W. Vincent by a certain instrument dated the 19th day of June A.D. one thousand eight hundred & fifty five & of Record in the Office of the Registrar of Conveyances in Liber 7 on pages 108 & 109, & miscellaneous records. To have & to hold thee above described property unto the said Isaac Montgomery, his heirs & assigns forever.⁴⁸¹

Later, in 1863, Isaac Montgomery and wife sold the Puuloa Salt Works to Prescove S. Wilcox and Charles L. Richards.

Know all men by these presents that we the undersigned Isaac Montgomery and Kepani Montgomery his wife for & in consideration of Ten Thousand and Seventy Nine Dollars to us in hand paid, the receipt of which is hereby acknowledged, have granted, bargained and sold ... unto Prescove S. Wilcox and Charles L. Richards of Honolulu... all that tract or parcel of land situated on the Island of Oahu known as the "Puuloa Salt Works" being the tract of land conveyed to Isaac Montgomery by a certain Deed from M. Kekauluohi [Kekauonohi] dated the 7th day of Sept. A.D. 1849 together with all the buildings, improvements & appurtenances thereto belonging or thereon situated. ...

To have & to hold to the said Prescove S. Wilcox and Charles L. Richards, their heirs & assigns forever.⁴⁸²

The confirmation of the transaction is below.

Know all men that whereas Isaac Montgomery and Kepani his wife have this day made to us [Wilcox and Richards] a Deed conveying the Estate

⁴⁸⁰Liber 14, p. 310, September 28, 1861. Trans. by Maly.

⁴⁸¹Liber 16, p. 258, December 28, 1862.

⁴⁸²Liber 16, p. 259-260, January 17, 1863.

known as the Puuloa Salt Works, and another Estate in the said Deed described as having been conveyed to Daniel Montgomery by Henry Chamberlain on the 6th day of August 1855. Now therefore it has been understood & agreed between us, that we the undersigned shall receive all the product of the said Estate and sell and dispose of the same for the benefit and account of Isaac Montgomery. And that an accurate account shall be kept of all transactions. And an account state each six month. The said Isaac Montgomery to carry on the Estate and at any time when the said Isaac Montgomery his heirs & assigns shall have paid up the sum now advanced by us or anyone on his behalf shall have so paid the said sum & interest advanced as aforesaid. We will & our heirs or assigns shall convey to the said Isaac Montgomery his heirs & assigns the said "Puuloa Salt Works" & other Estate by the said Deed of Conveyance above referred to.⁴⁸³

Kamea and wife Kamea granted a property at Honouliuli to Levi Haaalea to pay a debt.

Know all men who see this, I am Kamea, whose name is below, and I hereby execute and make known to any who may object to this, the following explanation below. On the 25th day of February, 1863, Kamea whose name is below, hereby gives, grants, bargains and sells all of his property situated at Honouliuli, Ewa, Island of Oahu, to Levi Haaalea. That the said property is forever given to him and his heirs. Here is the reason for this conveyance. Since 1859, I have been in debt to L. Haaalea, in the amount of Two Hundred Dollars in good money, and I cannot repay him. That is the reason granting this property to him. ...

Kamea sworn, states that the above is all true, and that I confirm the statements of my husband.⁴⁸⁴

Wilcox and Richards leased some grazing land at Puuloa outside of the salt works to John Meek and James I. Dowsett in 1863.

This Indenture made the first day of April A.D. 1863, between Wm. Richards & Co. of the first part and John Meek and James I. Dowsett of the second part, witnesseth: That the said party of the first part for and in consideration of the sum of Four hundred dollars to them in hand paid by the parties of the second part ... do hereby demise, lease, and let unto the said party of the second part, their heirs, executors and assigns, the Grazing land of Puuloa, being all that is outside of the enclosure of the Salt works, commencing from the date hereof and ending on the first

⁴⁸³Liber 16, p. 260, February 17, 1863.

⁴⁸⁴Liber 16, p. 270-271, February 25, 1863. Trans. by Maly.

day of January A.D. 1868, together with the use of the Bullock and Sheep yard during the term of the lease.

It is hereby understood and agreed, that the parties of the first part reserve the privilege of pasturing sixty head of horses and working oxen, also a flock of goats not to exceed one hundred and fifty on said grazing land of Puuloa for and during the term of this lease, and said animals shall not be molested should they stray on the grazing land occupied by J. Meek...

And the said parties of the second part for themselves, their heirs and assigns will at the expiration of the term of this lease yield and deliver up to the said parties of the first part, the said demised land together with sheep and bullock yard as good order and condition as they now are.⁴⁸⁵

Kahananui decided his interest in the land of Nika at Honouliuli to Kaopala in 1863.

Know all men by these presents, I am Kahananui (k.) of Honouliuli, Island of Oahu. I hereby execute as a lease, and sell by this instrument unto Kaopala and his heirs, executors and assigns for all time, my interest in the personal property of Nika (k.) my younger brother, situated at Honouliuli. This property described above is plotted out in the award of the Land Commissioner.

Here is the reason for my conveying this property to Kaopala. On this day, Kaopala paid into my hands, ten dollars, that being the purchase price for all the rights. There for I sell all my rights in the property to him for all times. I have no remaining rights in the property.⁴⁸⁶

Kaopala then conveyed the said land to Levi Haalelea.

On this 13th day of July, 1863, by this instrument, I hereby sell and convey all my rights as stated above to Lival Haalelea, his heirs and assigns forever.

Here is the reason for this conveyance. I have received on this day \$25.00 from L. Haalelea.⁴⁸⁷

The following is an assignment of lease for lands of Lihue, Waimanalo, and Honouliuli from John Meek to James I. Dowsett.

Know all men by these presents, that I, John Meek of Honolulu, Island of Oahu ... for and in consideration of the sum of One Thousand Dollars

⁴⁸⁵Liber 17, p. 100, April 1, 1863.

⁴⁸⁶Liber 17, p. 102-103, July 13, 1863. Trans. by Maly.

⁴⁸⁷Liber 17, p. 103, July 13, 1863. Trans. by Maly.

to me in hand paid by James I. Dowsett of Honolulu ... have granted, assigned and set over ... unto the said James I. Dowsett, his executors, administrators and assigns, a certain Indenture of Lease of the Land called Lihue on the island Oahu from Keliiahonui and Kekauonohi to John Meek dated March 3, 1846 & recorded October 13th, 1852 in Liber 5 pages 328 and 329 in the office of the Registrar of Conveyance. And also a certain Indenture of Lease of the Land Called Waimanalo on the island of Oahu from M. Kekauonohi and J. H. L. Haalelea to John Meek dated July 18th, 1851 & recorded September 17th, 1852 in Liber 5 page 326 in the office of the Registrar of Conveyances. And also a certain Indenture of Lease of the Land called Honouliuli on the Island of Oahu from J. H. L. Haalelea to John Meek dated February 16th, 1858 & recorded February 22nd, 1858 in Liber 5 on pages 435 and 436 in the office of the Registrar of Conveyances, with all the appurtenances therein demised. And also all my estate, right, title, term of year yet to come, claim & demand whatsoever of, in, to each of the same or any of them. To have and to hold the said leased premises unto the said James I. Dowsett ... for the residual of the terms mentioned on the said leases.⁴⁸⁸

There is an 1864 lease of grazing land at Puuloa from Wilcox & Richards & Co. to James I. Dowsett.

This indenture made this thirteenth day of April A.D. 1864 between Wilcox - Richards & Co. of the first part, and James I. Dowsett of the second part ... The party of the first part, for and in consideration of the sum of four hundred dollars as advance rent to them in hand paid by the party of the second part ... does hereby demise lease and let unto the said party of the second part, their heirs executors and assigns, the Grazing Land of Puuloa, being all that is outside of the enclosure of the Salt Works, for a term of three years commencing at the first of January A.D. 1868 and ending on the first day of January A.D. 1871 together with the use of Bullock and Sheep Yards during said term.

It is hereby understood and agreed, that the party of the first part reserve the privilege of pasturing sixty head of horses and working oxen on said Grazing Land of Puuloa for and during the term of this lease, and said animals shall not be molested should they stray on the Grazing Lands now occupied by the party of the second part. The party of the first part hereby relinquishes and give up the privileges of pasturing one hundred and fifty Goats (as set forth in a lease dated the first day of April A.D. 1863) from the date hereof, said goats having been sold to party of the

⁴⁸⁸Liber 17, p. 363-364, August 31, 1863.

second part.⁴⁸⁹

Anaderia A. Haaalelea, Levi Haaalelea's widow, leased a portion of Honouliuli Ahupua'a and the fishery to James I. Dowsett in 1865.

This Indenture of Lease made this first day of April A.D. Eighteen Hundred and Sixty Five between Anaderia Amoi Haaalelea, widow of Levi Haaalelea deceased of the first part and James I. Dowsett of Honolulu ... of the second part. Witnesseth: That the party of the first part doth hereby lease unto the party of the second part his representatives and assigns all that portion of the Ahupuaa of Honouliuli and the Sea adjoining which has not hereto fore been leased by M. Kekauonohi and Levi Haaalelea, the said Ahupuaa of Honouliuli being situated in the District of Ewa, Island of Oahu.

To have and to hold the same with all the rights, privileges and appurtenances to the same belonging unto the said party of the second part ... for the term of six years from the first date of April A.D. Eighteen Hundred and Sixty Five at a yearly rent of Five Hundred Dollars, the first yearly payment to be made on the 5th day of April A.D. 1866 and so on thereafter until the expiration of the term.⁴⁹⁰

This is a deed. Know all men by these presents that I, Kaopala, of Honouliuli, Ewa, Island of Oahu, hereby sell, convey and grant unto John Meek of Honolulu, and unto his heirs, assigns and executors for all time, all of those parcels of my property known by Royal Patent Number 3091, as described in the boundaries, with said parcels of land containing 9 39/100th acres. Here is the reason for this conveyance, John Meek has paid into my hands two hundred and fifty dollars ...

Witnesses:

Ihu, his X

J. Ii

Having received in my hands three dollars, I hereby relinquish my rights in the real property above described.

Kale (wife of Kaopala)⁴⁹¹

In 1866, an exchange deed was executed from John Meek to Puanani for the land described in Royal Patent No. 3091 and LCA 756.

⁴⁸⁹Liber 18, p. 102-103, April 13, 1864.

⁴⁹⁰Liber 19, p. 183, April 1, 1865.

⁴⁹¹Liber 21, p. 227-228, May 16, 1866. Trans. by Maly.

This is a land exchange deed executed on this 20th day of June 1866, between John Meek of Honolulu, party of the first part and Puanani (k), the heir of Kauouo, of Honouliuli, Ewa, of the second part. Witnesseth that the party of the first part hereby sells and grants to Puanani, his heirs and assigns, that certain parcel of land situated at Honouliuli, being Parcel 5 of that land described in Royal Patent Number 3091, granted to Kaopala by Kamehameha, and granted by Kaopala to John Meek. The boundaries of Parcel 5, a Moo kalo (taro parcel) at Kalokoeli are: Beginning at the western corner and running South 56°, East 154 links, to the Kahawai. North 27° East 204 links along Keole. North 83 ½° West, 184 links along Kaalaawahi. South 80° West 244 links along Kama to the first point. .369 acres.

Together with all the thing appertained there to Puanani, his heirs and assigns forever. This is done in exchange for a parcel of land which he has conveyed to John Meek, and which is described below. The party of the second part hereby conveys and grant, by this instrument, unto John Meek, his heirs and assigns all that parcel of land situated at Honouliuli, granted to Kauouo in Land Commission Award Number 756, and inherited by him, being bounded as follows, and situated in the moo aina of Maui, Ii of Kaumakua, Honouliuli:

Beginning at the Northeastern corner and running South 4° East 6.42 chain along the boundary of Mokumeha; from there South 70° West 2.30 chains along the boundary of the land wall; thence North 10° West 3.78 chains along the boundary of Kanuwahine; thence North 30° West 3.14 chains to the corner; thence North 72° East 1.62 chains along the land boundary of Wahinenui; thence East 2.60 chains to the point of commencement. Being 1 acre 9.22 chains total. Together with all things appertaining thereto. The said property being granted to John Meek, his heirs and assigns forever, in exchange for the land conveyed to Puanani as described above.⁴⁹²

Levi Haaalelea's widow conveyed the *ahupua'a* of Honouliuli to J. H. Coney in 1867.

This Indenture made this 11th day of May 1867 between A. A. Haaalelea of Hilo, Island of Hawaii, party of the first part and J. H. Coney of the same place party of the second part. Witnesseth that the said A. A. Haaalelea party of the first part in consideration of the sum of one dollar to her paid by the said party of the second part ... hath bargained, sold, demised, released, conveyed and confirmed unto the said J. H. Coney, party of the second part, all the goods, lands and chattels that were demised

⁴⁹²Liber 21, p. 357-358, June 20, 1866. Trans. by Maly.

to A. A. Haaalelea by the will of her late Husband L. Haaalelea, to wit: The Ahupua'a of Honouliuli situate in the District of Ewa, island of Oahu, together with all the appurtenances thereto belonging. Also the Ili aina of Kalawahine in Honolulu, Kona, Oahu, together with all the appurtenances thereto belonging. Also the tract of land on Niolopa, Kona Oahu, together with all the appurtenances thereto belonging. Also the house lot known as Holani on the corner of Richards Street and the Palace Walk and adjoining lot owned by H. R. Kapakuheili and J. Kaeo and Jane Y. Lahilahi together with all the buildings and appurtenances thereto belong or in any wise appertaining ... to the said party of the first part ... To have and to hold for the term of five years from this date ... unto the said J. H. Coney in trust and to and for the several uses and purposes herein after mentioned. Namely:

First. In trust to Lease the same and to take, collect and receive the rent, issues and profits thereof, and out of the same to keep the said premises in good repair and pay all fees and assessments and charge that may be imposed thereon.

Secondly. In trust to pay the residual of all rents, first to the remaining creditors of the Estate of the late Levi Haaalelea and after said debts are fully paid, then to pay A. A. Haaalelea the remainder of all rents received from the said property.

Thirdly. In trust to convey the said land and premises to such persons as she A. A. Haaalelea by her last Will & Testament subscribed by her in the presence of two credible witnesses.

And the said J. H. Coney hereby declares that upon the expiration of the said year the said Trust shall cease... and the land and possessions shall belong in fee absolute to A. A. Haaalelea or such person or persons as the said A. A. Haaalelea shall direct and appoint ... forever.⁴⁹³

In 1870, Isaac Montgomery deeded the Puuloa Salt Works Estate to Abraham W. Peirce, Ebenezer F. Nye, and Peter C. Jones, Jr.

Know all men by these presents that I, Isaac Montgomery of Honolulu, Island of Oahu ... for and in consideration of the sum of Thirty Thousand Dollars to me in hand paid by Abraham W. Peirce, Ebenezer F. Nye and Peter C. Jones, Jr., all of Honolulu... have given, granted, bargained, and conveyed... unto the said Abraham W. Peirce, Ebenezer F. Nye and Peter C. Jones, Jr., their heirs and assigns forever, all that tract or parcel of land situate on the island of Oahu ... known as the Puuloa Salt Works, being the same estate as conveyed to me by M. Kekauonohi by deed dated the

⁴⁹³Liber 23, p. 319-320, May 11, 1867.

7th day of September A.D. 1849, and recorded in the Registry Office in Honolulu in Liber 4 on pages 41 and 42, and therein more fully bounded and described; and also all buildings, erections, structures, improvements, salt in bulk, or in vats, furniture in the houses, cattle, horses, carts, boats, canoes, nets and all other property of whatsoever name and nature on the said Puuloa Estate being together with all the rights, privileges, tenements, hereditaments, to the said premises belonging ... and all my right, title, interest, claim and demand, in law and in equity in the said above granted premises.⁴⁹⁴

Subsequently, Peirce, Nye, and Jones mortgaged the said estate to Montgomery.

Know all men by these presents that whereas we, Abraham W. Peirce, Ebenezer F. Nye and Peter C. Jones, Jr. ... are justly indebted to Isaac Montgomery ... at the day of these presents in the sum of Fifteen Thousand Dollars, half of the purchase money of the estate known as the Puuloa Works for which we have given our joint note, therefore for the better securing of the payment of said note, we have given, granted, bargained, sold and conveyed ... unto the said Isaac Montgomery, his heirs and assigns forever, all that tract or parcel of land ... known as the "Puuloa Salt Works..."

To have and to hold the same with the appurtenances unto the said Isaac Montgomery, his heirs and assigns forever. This conveyance is intended as a Mortgage to secure the payment of a certain promissory note for the said sum of Fifteen Thousand Dollars, dated the 20th day of April A.D. 1870 ... and payable to the said Isaac Montgomery on order in two years from date with interest at nine per cent per annum.⁴⁹⁵

W. C. Parke, executor of the estate of Isaac Montgomery, declared that the Mortgage had been paid in full in 1874.⁴⁹⁶

John H. Coney and his wife Ami sold the *ahupua'a* of Honouliuli to James Campbell in 1877. The conveyance was documented below.

This indenture made this 11th day of September in the year of our Lord one thousand eight hundred and seventy seven between John H. Coney of Honolulu in the Island of Oahu and Ami his wife of the first part and James Campbell of Lahaina in the Island of Maui of the second part. Witnesseth that in consideration of the sum of Ninety five thousand dollars in hand paid by the said James Campbell to the said John H. Coney at or before the execution hereof the receipt whereof is hereby acknowledged.

⁴⁹⁴Liber 31, p. 24-25, April 20, 1870.

⁴⁹⁵Liber 31, p. 25-27, April 20, 1870.

⁴⁹⁶*Ibid.*, p. 26, May 6, 1874.

He, the said John H. Coney doth hereby grant, bargain, sell, release and convey, and the said Ami the wife of the said John H. Coney, doth for the purpose of releasing and relinquishing all her right or claim to dower of, in or to the hereditaments hereinafter described bargain, sell, remise, release, quit claim and confirm unto the said James Campbell and his heir, all that tract or parcel of land known as the Ahupuaa of Honouliuli situated in the district of Ewa in the Island of Oahu, containing Forty three thousand six hundred and forty acres or there about more particularly described in Royal Patent No. 6971 based upon land commission award No. 11,216 except such portion thereof known as Puuloa conveyed to one Isaac Montgomery by deed recorded in Liber 4 on pages 41 and 42. Together with all rights privileges and easements and appurtenances thereunto belonging, and especially all the right of the Konoiki of Fishing, wood or otherwise, and all islands, waters, rivers, streams, water courses, lochs, bays, harbors or other privileges to the said Ahupuaa belonging or appertaining or there with used, held or enjoyed, and all buildings and improvements thereon, and all the estate and interest of the said John H. Coney in and to the same and in and to all Kuleana and tracts or parcels of land lying between the boundaries of the said Ahupuaa.

To hold the same (subject to any rights of native Tenants) unto and to the use of the said James Campbell and his heirs and assigns forever. And the said John H. Coney doth hereby for himself, his heirs, executors and administrators covenant, promise and agree to and with the said James Campbell his heirs and assigns that he the said John H. Coney now hath in himself good right and full power to convey and assume the said hereditaments and premises in manner aforesaid and that the same are now free from all charges or encumbrances of what nature or kind so ever, save and except two certain leases of parts of the said lands made to the late John Meek one whereof will expire on the first day of February next and the other whereof will expire on the sixteenth day of the said month, and further that he will and his heirs, executors and administrators shall warrant and defend the said lands and hereditaments hereinbefore expressed to be hereby conveyed against the lawful claims of all parties except the parties holding under the said before mentioned leases. In witness whereof the said parties to these presents have hereunto set their hands and seals the day and year first before written.⁴⁹⁷

⁴⁹⁷Liber 52, p. 201–202, September 11, 1877.

A Oral History Interviews

Recording oral history interviews is an important part of the historical review process. The experiences conveyed through interviews are personal; also, the narratives are rich and more animated than those that may be typically found in reports that are purely academic or archival in nature—the personal narratives tend to present modern audiences with descriptions of cultural values, practices, and transitions in the landscape. Thus, through the process of conducting oral history interviews, things are learned that are often overlooked in other forms of documentation. Interviews also help demonstrate how certain knowledge is handed down through time, from generation to generation. Of course, with the passing of time, knowledge and personal recollections undergo changes. Sometimes, that which was once important is forgotten, assigned a lesser value, or lost because of alterations to the landscape, economic pressures, and loss of access. Today, when individuals—particularly those from outside the culture which originally assigned the cultural values to places, practices, and customs—evaluate things such as cultural properties, resources, practices, and history, their importance is often diminished. Thus, oral historical narratives provide both present and future generations with an opportunity to understand the relationship shared between people and their natural-cultural environment.

Through oral history interviews, it is also evident that with the passing of *kūpuna* and elder *kama āina* generations, facets of history and knowledge of place are sometimes lost. Readers are asked to keep in mind that while this component of the study records various facets of cultural and historical knowledge of land and resources in Honouliuli Ahupua'a, the documentation is incomplete. In the process of conducting oral history interviews, it is impossible to record all the knowledge or information that the interviewees possess. Thus, the oral history narratives provide readers with glimpses into the stories being told and of the lives of the interview participants as related to the landscape in which they live, work, and play.

As would be expected, participants in oral history interviews sometimes have different recollections of history, or for the same location or events of a particular period. There are a number of reasons that differences are recorded in oral history interviews, among them are that:

- Recollections result from varying values assigned to an area or occurrences during an interviewee's formative years.
- They reflect localized or familial interpretations of the particular history being conveyed.
- With the passing of many years, sometimes that which was heard from elders during one's childhood 60 or more years ago, may transform into that which the interviewee recalls having actually experienced.
- In some cases it can be the result of the introduction of information into traditions that is of more recent historical origin.
- Some aspects of an interviewee's recollections may also be shaped by a broader

world view. In the face of continual change to one's cultural and natural landscapes, there can evolve a sense of urgency in caring for what has been, and history might be embellished.

When based in traditional knowledge, diversity in the histories shared should be seen as something that will enhance interpretation, preservation, and long-term management programs for the lands of Honouliuli. Noticeable differences in histories being recorded may help direct new paths of research and questions which may be answered through further research, or in some cases, pose questions which may never be answered.

In the broader context of the narratives shared through the oral history interviews, it will be seen that there are consistent themes. These themes include, but are not limited to:

- Care for the land, water, and ocean resources;
- Honor the natural/cultural history of the *ʻāina* and *kāpuna*.
- Respect *ilina* and cultural sites.
- Promote maintenance and integration of cultural/natural resources and practices into project design.
- Integrate the history of place and people into programs that pass that information on to present and future generations through educational/interpretive activities.

Two of the oral history interviews were conducted by Leimomi Morgan, descendant of an *ʻoliana* with generational ties to Honouliuli Ahupuaʻa. The interviewees were provided with the following introduction to the study undertaking, and overview of the types of questions that would be asked:

Honouliuli – Hoakalei Oral History/Consultation Study

Aloha – Thank you for agreeing to participate in the Honouliuli Oral History Consultation Study being conducted as part of the Haseko (Ewa), Inc. — Hoakalei Master Plan Update Environmental Impact Statement (please see project overview on pages 2–3). While conducting the interview, we hope to record information from people who know the moʻolelo (history) of the land and natural/cultural resources. The information gained from these interviews will be used to identify resources in or near the project area and help in determining how they may be affected by the project.

With your permission, the interview will be recorded. The recording will be transcribed and a draft transcript, along with the recording will be returned to you for review, corrections and/or additions. If the interview is not recorded, but notes taken, those notes will be developed in an effort to capture key points shared, and returned to you for your approval. When you are satisfied with the transcript (recorded or expanded notes),

we would like your permission to incorporate the transcript into the documentary study for the Honouliuli project area. When the study is completed a full copy of the report, including historical background and oral history/consultation interviews will be given to you for your family record.

To begin the interview we would like to establish a background section on your personal history and experiences – how you came to possess the knowledge you share.

- Interviewees Name:
- Interview Date:
- Location:
- When were you born?
- Where were you born?
- Are you affiliated with a Native Organization or family group? (name):
- Parents?
- Grew up where? Also lived at?
- Where did you live? Share with us recollections of elder family members and extended family that influenced your life and provided you with knowledge of place and practice?
- Family background—grandparents, hānai etc.; generations of family residency in area... (time period)?
- Kinds of information learned/activities and practices participated in and how learned...?
- Sites and locations (e.g., heiau, pā, ʻilina, kahua hale, māla ʻai, ala hele, and koʻa etc.); how learned, and thoughts on care and preservation...
- Do you have knowledge of wahi pana — places of religious and cultural significance in or near the project area?
- Where are these places located in relation to the proposed project (see maps)? How did you learn about these places?
- Are these places important to the you, your ʻohana, the larger community (or all three)?
- What makes these places important in terms of traditional practices or beliefs?
- How would you define their boundaries?
- Will these places or their use be affected by the project? If so, how might they be affected, and what steps might be taken to minimize impacts on the sites?
- Have these places been affected by modern development, and is it relevant to what makes them important?

Subsistence:

- Did you/your family cultivate the land? Describe methods of planting and types of plants? Use of particular plants and other natural resources; customs observed when collecting or caring for such resources; and how/when accessed?
- Discussion of water flow and weather patterns.
- Types of fishing practices: localities of fishing grounds or limu collection areas; and changes in fisheries?
- Historic land use practices, fishing activities?
- Thoughts on the care of cultural and natural resources...?
- May information about these places be shared, or should it be protected from public release?

Project Overview

Haseko is seeking a zone change for a portion of its Hoakalei Project to accommodate an update to its project master plan. The existing zoning for this area was last modified on July 20, 2007 in anticipation of the existing basin being completed as a small boat marina. The lack of sustainable market demand in the foreseeable future for the boat slips and other marina facilities, together with ongoing and possible future legal challenges to governmental approvals for the marina entrance channel, make it impractical for Haseko to pursue development of a small boat marina for the foreseeable future. Accordingly, it is now requesting rezoning of the land surrounding the existing basin consistent with its use as a recreational lagoon that would have no direct connection to the ocean.

The updated master plan would not increase the total number of planned dwelling units or visitor accommodation units specified in Haseko's Unilateral Agreement with the City. It is possible that there will be some adjustments to the proposed zoning boundaries that may affect the sizes and locations of individual zoning districts as a result of consultations with the City Department of Planning and Permitting (DPP). Anticipated permits that require environmental assessment compliant with HRS Chapter 343 include the zone change, and potentially a Special Management Area Use Permit and a Shoreline Setback Variance. Haseko will also seek a modification of the Special Management Area boundary in the area around the recreational lagoon, since it will not be connected directly to the ocean, as the boat marina would have been.

If these approvals are granted, Haseko will continue development of the same kinds of resort, residential, and commercial retail/office/restau-

rant uses that had previously been approved for the area. In addition, lighter industrial mixed uses will replace the more intensive waterfront industrial uses previously planned in connection with a marina development. By providing for these uses, the updated master plan for the area covered by this request will continue to create employment and business opportunities as envisioned when the zoning was originally granted. In addition, the plan includes a public swimming cove that would provide a protected swimming area; it also includes facilities that would collect and treat storm water runoff, minimizing the amount that flows into the proposed lagoon. The revised plan also includes pedestrian pathways and other amenities that were not included in the previous plan.

Haseko will continue to have primary responsibility for constructing the proposed facilities, including possible residential and/or resort units; commercial and lighter industrial-mixed use structures; infrastructure; public facilities and amenities such as the swimming cove, activity center, comfort station, parking lot, cultural center; and for further enhancing the existing Wetland Preservation Area.

Mahalo nui.

Leimomi Morgan
Researcher
(808) 295.1911
Email: oleimomimo@gmail.com

Four additional interviews were previously recorded by Kepā and Onaona Maly. Three of the interviews were conducted with Kupuna Arline Wainaha Ku'uleialoha Brede Eaton and Sister Thelma Genevieve Parish, elder *kama'āina* of the Pu'uloa-Honouliuli, as a part of the process of developing the initial Hoakalei preservation plan in the 1990s. Aunty Arline and Sister Parish are two of the eldest, lifelong members of the Honouliuli-Pu'uloa area (fig. 172). These *kāpuna* were sought out to elicit historical narratives, records of Hawaiian sites and practices, and recommendations regarding the Haseko development project. Kupuna Arline and Sister Parish were recommended as the most knowledgeable residents of the region. A fourth interview was conducted with members of the Shibuya-Dayanan family. All interviews provide information of time depth and attachment to place, and document personal experiences on the land and in the ocean. Through the generosity of the interviewees, we were also informed of changes in the environment during their lifetimes.

We are deeply indebted to the interviewees and their *ʻohana* for their willingness to participate and share in the history of the land.

Mahalo nui no ka lokomaika'i kau palena 'ole: Mark 'Ehukai Kahalekulu, Harry Alama, Jose Dayanan, Roxanne Marie Tagama, Barbara Shibuya, Mona Shibuya,

Janice Trinidad, Arline Wainaha Ku'uleialoha Brede Eaton, and Thelma Genevieve Parish.

A.1 Mark Kahalekulu

Mark 'Ehukai Kwock Sun Yoshio Kahalekulu was born in 1956 along the Honouliuli coast, at 'Ewa Beach. His *kupuna* father worked for the Dowsett-Parish Ranch on the Pu'uloa lands, and lived at various locations between Pu'uloa, One'ula, and Kualaka'i. The Kahalekulu line originated in the Ho'okena-Ho'opūloa Region of South Kona, and were displaced by the 1926 Mauna Loa eruption. Mark's entire young life from toddler through high school was connected to the ocean and nearshore lands of the Honouliuli Ahupua'a.

During the interview Mark shared his recollection of families, practices, fishing, surfing, and walking the Honouliuli coastal lands. The following topics are among those discussed by Mark:

- In the early part of the 1900s there weren't many people out here. Then during the war there was no access to the ocean. After the war the fisheries were very rich. Among the fish were *moi, aua, kala, palani, manini* (and *ōhual*), *ama'ama, āholehole, ōpae, he'e, ʻula*, and crabs.
- *Limu* was plentiful, with beds two to three feet high on the shore. When in season, you could smell the *limu* inland of Pōhākea Elementary School. Types of *limu* included *lipoa, kala*, and *mamaua*.
- Parents always instilled in him the responsibility that *lauai'a* had for care of the fishery resources: taking what could be used; not fishing or collecting out of your own area; and sharing.
- Descriptions of the various reef regions extending from the shore to the deep water at first, second, and third reefs.
- During his youth he witnessed a significant change in the ocean environment and resources. There were major sewage spills, and people from all over came and took more *limu* than the *papa* could restore.
- Before, the ranch and plantation controlled access along the shoreline, and there were a number of gates that people had to go through to get access. There were no squatters in the early days.

Interviewee Mark Kahalekulu (MK)

Interviewer Leimomi Morgan (LM)

Place One'ula Beach, Māmala Bay, 'Ewa

Date January 17, 2014

Final transcription completed February 9, 2014

LM: So, if you want, you can share your whole name, the meaning of your name, and your family connection to 'Ewa.

MK: My name is Mark 'Ehukai Kwock Sun Yoshio Kahalekulu. My connection with 'Ewa is my father and grandfather originally came from Ho'okena, South Kona. They were paniolo working the ranches in that area during the early part of the 20th Century. I looked up census, and they were listed, my father and my grandfather, in the 1920 census in Ho'okena.

LM: And what were their names?

MK: Kahalekulu. Raphael Ka'ihikapuonalani Kahalekulu, that's my dad. And my grandfather was John Kahikapuonalani Kahalekulu. And, by the 1930 census, they're here in 'Ewa. I always wondered why they moved, and then I was reading a book on the historic volcanic eruptions on the Big Island, and there was a real, real big eruption in 1926, and it started from Moku āweoweo on Mauna Loa, and it came all the way down and it went all the way down to Ho'opūloa, and that's the name of that flow. That was in 1926, but they showed the extent of the flow, and if this is Ho'okena here (drawing in the sand), and this is Mauna Loa, the flow came down and all the way to the sea at Ho'opūloa, but some of it actually went and diverted above Ho'okena. So, I can only imagine my family, looking up at night, and seeing the lava just suspended on the mountain above them. I would get out too, I would get out too. So, they came out here ['Ewa] and they started working for, as paniolo, for the Kahuā Ranch that was by Barber's Point. So this was by 1930.

LM: So your grandfather moved here too?

MK: Yeah, yeah. The stories that I've heard, this was way before my time. I was born in 1956, so this was many decades before my time. My father, my grandfather, and my grandmother came and they lived where White Plains, Officers' beach is now, there's that stand of ironwood trees on that point right there. That belonged, according to my mother, Leatrice Kam Ing Kulia Chong Kahalekulu, that that belonged to the Shaffer family, and they had lived there before our family came. So, being that my dad worked for the ranch, and my grandfather worked for the ranch, they had gotten permission from the ranch manager, to basically squat on the beach by the ironwood trees. My mother passed away in '06 [2006]. My dad passed away in 1958 of stomach cancer, but while my mother was still alive, and they had opened up Barber's Point for the public, I tried taking my mom down there, and asking her, "Mom, where did you folks used to live?" and she would say it was Wai'anae side of the Shaffers. And when I'd take her to where the ironwoodironwood trees are, she goes, "You know back in the '30s, didn't have these big tall stand of trees, they were small." But it was a marker for them, those ironwoodironwood trees, and it still is for everybody. So, I can only imagine that where they actually had, and it was like a shotgun shack, it was like a beach shack. Had plenty room for nets, because my dad and my grandfather were very good fishermen from Ho'okena. Maybe 10–15 years ago, I went to Ho'okena for the first time. When I saw the canoes that they had over there, I just totally flashed, 'cause one of

my youngest recollections of living in 'Ewa Beach, was after my father died, my mom still kept his canoe on the side of the house. And it wasn't a dugout canoe like how you would imagine one normal canoe was, dug out from a tree trunk, it was made out of planks, out of boards. But had an outrigger and it was very narrow. It was, you know, the shape of a canoe, but made out of boards.

LM: And, he [your father] used to use it? He made it?

MK: Yes. And then, at the very, very end, it was squared off, and that's where they would put an outboard motor on it.

LM: Ohh, interesting. And they would just take it out?

MK: Yeah. So, when I went to Ho'okena those few years back, I blew my mind, because, on the beach, it was like, Wow! There was like a dozen of them. And I had never seen um before other than my dad's. And that was only from when I was a little teeny-weenie kid, like 3, 4, 5 years old, I remember playing on it. So, it was one of those things that showed me that, we were from over there. My family was very, very much into net fishing. So, even after my dad passed away, we still continued that out here [Ewa beach]. My dad was a very, very good fisherman, so he would work for the ranch as paniolo. My sister, see that milo tree there over there [points] that's my sister's house.

LM: That one?

MK: Yeah, like two houses away from the right way, that's my sister's. Like where that wahine is sitting right there [points].

LM: Ohh. She lives right there still?

MK: Yeah, definitely. Yeah. So, she told me a story, 'cause she's older than me, she's 18 years older than me. That's Yvonne [Leilani Mui Kwai Kahalekulu], Moriguchi is her married name now.

LM: And she was a Kahalekulu, too?

MK: Yeah. So, she had told me a story not too long ago that my grandfather liked to drink. So what he would do, he would get my dad to break horses at Kahuā Ranch, because for every horse that you broke, you got 10 dollars. So, he was like 12, 13, 14, and my grandfather would put him on a horse and go make him break the horse, but he [grandfather] would keep the money, so that he could go drink with his friends.

LM: Ohh... Auē!

MK: Yeah.

LM: That was a lot of money! 10 dollars!

MK: That was big money! Yeah, break your neck though, you're risking your life. So, they would have a lot of drying racks, and even later on, when I came along, we still had these, [points] net, net, net, net, net. And it wasn't that nylon, not string, it was cord. So, even as I grew up, somebody in the family always had to be sewing it, patching it, 'cause we used them all the time. The bottom over here is very, very rough and uneven, so always you gonna have puka.

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So somebody always gotta be patching that constantly, especially if you have literally miles of net.

LM: Wow.

MK: I remember hearing stories of how much fish over here it used to have. And, there wasn't that much people over here. I remember, during the war, you couldn't fish, they closed the beach, and you couldn't fish. What is that... Martial Law?

LM: I don't know.

MK: Yeah, Martial Law. You couldn't do stuff. You couldn't have light coming out of your window at night, because they gotta worry about Japanese bombing, and being able to identify what's happening on the ground. So, even on the ocean, you couldn't go out and go fish. So, my mom would say that, right after they lifted Martial Law, there was so much fish, because nobody could fish for four years. From 1941–1945, you couldn't fish out here. So, had fish up the ying-yang.

LM: Wow.

MK: Yeah, but she said, within less than a year, so many people were hitting it, 'cause they hadn't been able to go all those years, that within a short time, ah, it was hard to get those big catches of fish again. I remember a story my mother telling, and this is down by Barber's Point, when they were down there, before we came this [One'ula] side. My dad had located a school of moi, so he went, and with his canoe, he laid the net from the shore, around the school, and it came back to the shore. I can't even imagine a school this big. And had it almost penned up like cows or something. So, what he would do is, the first day, he would back his truck up to the ocean, and they would use a scoop net, and they would just bring the two ends of the net close to shore so that it would pile the fish right in front of you. And they would just go and get a scoop net and just load up the back of the truck. They would fill up the truck, they would take it down to Chinatown Market downtown, and they would sell um. And I think my mother said, the first day they went do that, they got like 20 cents a pound. They didn't even dent the school. The next day, my father did the exact same thing, back the truck up, pull the school close, and just start scooping fish into the back of the truck. They took that into Honolulu, they still had fish left over from the day before, so they gave him 10 cents a pound.

LM: Did you guys eat the fish, too?

MK: Ohh, Yeah. And then, the third day, my dad did that one more time, took it into town, they gave him 5 cents a pound. He was so angry, he came home, and he opened up the net and he let all the fish go.

LM: Good [laughing]. So you guys would subsistence fish? You guys would always have fish to eat? It was like a part of your life?

MK: Yeah. And a lot of it was dried. The awa. I know my mother would dry awa. That was her favorite, she loved the belly part of the awa, that was the best.

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And, because the awa was such a big fish, yeah?
LM: What would you say was the most numerous fish around here?
MK: I would think it's the kala.

LM: The kala?

MK: Yeah, I always call it the official unofficial fish of 'Ewa Beach, because it's very easy to find, and very easy to catch. And they get very, very big, and they're fat, they're herbivores, so they eat limu. So, especially in the days before, this beach, would have drifts of 2-3 feet high of limu.

Wow:

LM: Yeah, you would be able to smell the limu from Pohakea Elementary School when I used to go over there. Some days, if the wind was onshore and really strong, up to the shopping center and beyond you could smell the limu, it was piled up so high.

LM: Wow. You know what kind it was?

MK: The majority of it was probably the ones that people would call it 'ōpala. But you know, now days, there's no such thing as 'ōpala limu now. That's like, in the old days, palani, and kala even, manini, that was considered "shit" fish. Now, to me, there's no such thing.

LM: Yeah, you take what you can get now.

MK: Yeah, it's an oxymoron now. So, 'ōpala limu is the same thing. But the drifts would be mostly limu kala, long, long strands of limu kala. Lipoa, jus long, long, long strands of lipoa, and most people didn't come to harvest that. And people came from all over the island, especially on the weekend. Monday through Friday, not too bad, just the local, the people from 'Ewa Beach. But on the weekends, Saturday and Sunday, you would have, from all the way down there from the wall, all the way down to Parish Drive, which is the point further up there just beyond those coconut trees is where the Parish family lived. And there would be 2-3 feet all the way, and in the water here, would have limu floating at least, 20-30 feet out. Just thick, thick.

LM: Wow. What happened to it?

MK: I have a friend that, he went Kamehameha grad '74 like me, Alan Perry, he works for whatever city department is in charge of the waste treatment plants. So yeah, I talked to him, and I said, "Alan, you think you can..." and before I can even finish my sentence, he goes, "Mark, I know what you goin' ask me..." And I said, "Okay, what am I gonna ask you?" He goes, "You want me to let the sewage outfall happen, so that the limu comes back to 'Ewa Beach." And I said, "How did you know I was gonna ask you that?"

LM: Is that what it was?

MK: When I was in Kamehameha, I grad '74, I was a boarder...

LM: Oh, really? Why were you a boarder? Oh, 'cause it was far?

MK: Any place from Waipahū out, Wai'anae, Waipahū. Pearl City, you had to be day-student.

LM: Yeah, my mom was day, too.

MK: 'Ewa, Wai'anae, of course, North Shore...

LM: You guys all boarded...?

MK: We all boarded with the outer islands guys.

LM: Ho, I wish it was still like that! I would have boarded!

MK: Let me tell you, hey, it was awesome. But I remember, when you looked from campus, you looked down, and off of Sand Island, about a mile out, you would see this big, brown V, out in the middle of the blue water. And that was raw sewage, and if I not mistaken, I may be wrong, but I think I remember 11 million gallons of raw sewage a day would go out into that outfall. And all you saw was this big, brown V, and then the current runs, and this is Māmala Bay [points out around us] all the way across, so the current would run from Honolulu, and run along where the airport stay, Pearl Harbor, and then come down to 'Ewa Beach.

LM: Wait, what was this bay called?

MK: Māmala.

LM: This is Māmala?

MK: This is Māmala Bay. From Barber's Point to Diamond Head. So, to me, that's why [the limu grew]... it was like fertilizer. That's what it was.

LM: Oh and the fishes love it then, and I bet the honu loved it too.

MK: And to me, that's why, I like talk to you, because to me, that's what we have to preserve, if you don't have the base of the food chain. And to me, it's limu. And then once you get that, because not only the fish eat the limu, there's other things like crabs, and shrimps, the 'ōpae, they live inside the limu for protection. Now, there's other fish that may not eat the limu, they're carnivorous, but they looking for the shrimp and the crab that look for protection. It's like a forest. So, that's why I wanted to talk to you about that, I think that we really need to take care of the limu because that's the basis for 'Ewa Beach. And, as far as Pearl Harbor being Pu'uloa, it's all one big system, including Pu'uloa. Like you said, that's where all had the fishponds and all, yeah?

LM: Yeah, my grandma said she would go out and collect limu when she was young, too. It used to grow in the watercress patches, I guess, too.

MK: You know, if you get clean water, whether it be fresh water or salt water, plants will grow. But, that's why, I would like whatever kind organization, whether it be the state, or whatever, is if you want the fish and everything that goes along with that, you gotta start with the actual papa itself, and make sure that the limu is protected. Another thing, is that, because Pu'uloa was protected, and because a lot of the drainage, I think every drainage, Pearl Harbor is the drainage for, except for Honouliuli.

LM: Yeah, it's all the way out that way.

MK: Yeah, so, all of that comes in, so you get this balance of salt-water /fresh-water, and it just depended on what part of Pearl Harbor you were actually in. And of

course, salt-water's heavier than fresh-water, so even in some parts you gonna have different kind fish, and to me that's why they had so much fish ponds. Because the species that could handle being penned up like that, the awa, the awa aua, the silver fish, the 'aholehole, the mullet, the 'ama ama, all of those, they're brackish water fish. So, to me, a lot of the spawning that happened in 'Ewa has a lot to do with what's happening in Pearl Harbor, Pu'uloa itself. I noticed when I used to go fishing, loaded baby sharks. For me, that's one example. Loaded baby sharks in the mouth of Pearl Harbor, right outside of Iroquois Point, loaded. Lot of hammerheads, but lot of small sharks, 2, maybe 3 feet. Now, when you come out 'Ewa Beach Proper, and you start from Iroquois, the Rifle Range, Ewa Beach Park, just go close right here, you would see bigger and bigger and bigger sharks. So, this is my theory, is that they'll start off at like, Pu'uloa is like a nursery for a lot of species, and as they got bigger, they would come out, and now you get all of this limu-grinds, that herbivore fish would definitely need. Other fish that were carnivorous, they would find the other smaller animals that lived among the limu. And as you went further and further this way [westerly], you'd almost see a growth within a species. So, that by the time you got down to Barber's Point, ho, they're big. You going see the biggest sharks, you going see the biggest enueue, you going see all the big, large adults, the mature adults, over there [Barber's Point]. And I'm sure that they go back, looking for places that they wanna spawn and lay their eggs, or have their young. So, to me, this shallowness and the outside reefs out there, it's not like Big Island where, it's like, right from the shore, boom, the water just deep.

LM: Yeah, this is an old island.

MK: Yeah! It's an older island. The fish have got plenty, plenty places, the sand pockets, the reef, the rubble, there's so many places that the animals can come in and lay their eggs and raise their young in a protected kind of area. Of course, you still gonna have, the further out you go, you gonna have the bigger, larger fish. But now, I spoiled! I dive Big Island a lot, and it's just like, wow, look at this place, the clarity of the water and everything. And that's another thing, because the clarity of the water is generally dirty, maybe that's not a real good word, but it's not clear because of the runoff and infect water from Pearl Harbor. Once it comes out of the mouth, the current catches it, and brings it along this coast, and it just goes right along this way. The only time that it changes, and that's what I was looking for today, is when the winds blow from the north. When the winds blow from the north, it blows all the dirty, unclear water straight out to sea, and this area ['Ewa Beach] becomes...

LM: All clear?

MK: Yeah! It looks like Hau'ula or Punalu'u or something, which it never does.

LM: How often does that happen? Hardly ever?

MK: Very rarely.

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LM: Yeah.

MK: You know when you feel the really really cold morning?

LM: Yeah. We feel it Mililani, too.

MK: That's the days to come! That's when you wanna go diving over here. Because with the nets, you don't need crystal clear water to lay a net. But for diving, you need it.

LM: Yeah...

MK: Yeah, your boyfriend you said he's a big diver, ah.

LM: Yeah.

MK: One thing that we have to play with, you could have nice water and everything, but if there was a lot of limu in the water, you didn't lay a net, 'cause your net just would be full of limu. So, that's what you waited for, you waited for the days when had little limu, and still yet, you still going get limu. So, you laid your net, like you could see, it's kinda light colored about maybe 30, 40, 50 yards out, and then it goes all the way out to that darker area further out, that's the first reef. It runs parallel, it runs almost from like, pretty much from 'Ewa Beach Road all the way out here, and you can see the little white caps out there. It starts off over here as really shallow, 2, 3 feet, and then where it gets to be that lighter color, it's sand and rock. Almost looks like a parking lot, it's flat, not much limu, and then once you get out to where that darker area is, it'll come out maybe from 10 feet deep, it'll come to maybe 5-6 feet deep on a low tide. And then, that reef is maybe only 50-100 yards wide, and then it drops off again into deep, deep sand. And that's probably about 50 feet deep. On other days, like in summer time when there's a south swell, you'll see another set of breakers further out than these ones that you see here, that's the second reef. And that one is probably about a half mile out, the first reef is about a quarter mile out. Then you get that deep sand that will come to maybe about, on a low tide, to maybe 12-25 feet deep, that second reef. But it's, ho, the fish out there. They run in parallel bands, so the first reef runs about a quarter mile, and it runs all the way down, goes. And even like the shark country, where the surfers are, I used to surf too, that's part of the first reef. And then the second reef, it goes, and then it kinda ends about, well it goes actually through Barber's Point, and even through like where the jetty is, maybe like by where Barber's Point is, it'll actually start, it's not so defined. 'Cause really, it'll do this, it'll be shallow, deep, shallow, deep, shallow, deep, and it goes on. I been out to the third reef, but that's as far as I've gone. And I wouldn't doubt that there's reefs even further out. Especially like in past millennium, where the sea level fluctuates, there may be reefs that was in shallower water, long time ago, but the reef is still there.

LM: So, how did you first get into spear fishing? It is spear fishing, right?

MK: I worked for United Airlines after I graduated high school, '74, and in '81 there was an air traffic controllers' strike, and Ronald Reagan was president at the

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time, and he fired all the striking air traffic controllers. So what that did was, is that airlines couldn't expand, in fact they had to cut their flights because there's less ability to control um. You know, air traffic controllers, they gotta follow the airplane, tell um turn left, turn right, go to this altitude. Because of that, United had to lay off a lot of us, throughout the whole system. So, there's a bunch of guys that I know, that I work with now, that we all got laid off in '81. And, I didn't get my job back until '84. I didn't wanna work a straight job. I load and unload airplanes at the airport, and it's kind of a, it's outdoors, and you're not stuck in a cubicle. You're not in an office, you're not behind a computer screen. You're outside, you're doing stuff. It suited me. So, I didn't wanna work a straight job, I'll say it like that. So, after my unemployment ran out, I had heard all these stories about my dad, and how he was master fisherman. And our kuleana was the mouth of Pearl Harbor to Barber's Point. And, later on when I tried diving other places, ho, my mother would scold me, "Boy, that's somebody else's fish. Why you need to go anyplace else, this is our kuleana."

LM: I like that mana'o.

MK: Yeah, don't hana 'ino other peoples', you know, their area, that's for them. So, I told myself, "Okay, I am gonna learn from the mouth of Pearl Harbor, all the way to Barber's Point." And, I did it for 3 ½ years, almost 4 years. And, I had heard stories when I was young that my father died when I was a year and 9 months, not two years old, of stomach cancer. But when I was born, my father had wanted to show me all these spots, and some secret spots. And, after he died, I felt like, wow, I kinda, I lose a big part of my heritage, my legacy. That was supposed to be mine. So, when I got laid off, I said, you know what, "It's still here! It's not like it ran away. It's still here!" So, whenever the winds would turn cold, I'd be out here. You know, this is like punching in, this is where I work. And, just depending on what area was the cleanest, and what area maybe I never go for a while, and I would pick and choose different areas, but a lot of it was, not just looking for the fish, or well, I would look for fish and he'e and lobster, and limu, too. And I would take my catch up to Waipahu, and I would sell it at the markets over there. Mostly it was Yama's, at Westgate Shopping Center, they bought everything I brought.

LM: Wait, in Waipahu?

MK: Yeah.

LM: Yeah, I been there.

MK: Oh, yeah?

LM: Yeah, the fish market. My boyfriend actually took me there.

MK: Oh, yeah? Is it still there?

LM: Yeah.

MK: I'll be darned. Like I said, Yama helped me out plenty, because he would buy, whatever I got was, kala, palani, whatever.

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LM: I'm not sure if it's still called the same thing, but, there's that fish market in Waipahu.

MK: Yeah, yeah, yeah. I'm kinda shocked to hear that it's still there.

LM: Yeah.

MK: So, that's what I did, and what I'd try to do is make a mental map of how this place looked if the water was clean. And, lotta times, you know, say you get like maybe only one day the water clean, and then the wind will switch, and it'll go back to being dirty. Hate to use that word, but not clear.

LM: Yeah.

MK: And, so, those days, a lot of times, even though I'm trying to get fish, or whatever, I'm trying to remember everything, so that one day I could pass it on. And that's what I'm trying to do now with my grandson, is to let him know where everything is.

LM: So you kinda had to like, go and discover it yourself from just the stories of hearing your dad?

MK: Yeah.

LM: That's good.

MK: As Hawaiians, we hear all these stories about our ali'i from long time ago, and sometimes it's almost like not real, or they're just stories.

LM: We're so far removed from it now days.

MK: Yeah. . .

LM: But it wasn't even that long ago.

MK: No.

LM: Your dad! Your dad's generation.

MK: Yeah. So I said, you know. . .

LM: If they could do it, you could do it.

MK: That's right. And that's what I did. And what I would do is, I surfed a lot before, that's why I had all my surfboards and stuff, so what I would do is I would get two guns, I carried a hinge and a three prong, and I would put that on the front of my board. I would have a floater and a lead and a rope, and I would also wear a leg rope on my leg, so that way, if I'm way outside there, and I run into something that I don't wanna be in the water with, I just jump on my board, and it was protection.

LM: That's good.

MK: Yeah, and if I went out to the second reef, I'd put two leg ropes together so that I could reach the bottom in 20, 25 feet of water. And just depending on where I was gonna go, that's how much, I knew I had to have that much rope. So, lotta times, people would come down and they would see my surfboard floating outside, they'd think that's like one abandoned surfboard. 'Til they see me climb on top and paddle, oh, where'd that board go? I started in '81, and then I got my job back in '84, and I told myself, the ocean, 'Ewa would take care of me for almost four years, and that's all I did. And, even though I didn't make

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a lot of money, I fed my family with the fish that we got, and I barely had two nickels to rub together, but that was one of the riches times of my life.

LM: Hum. Interesting?

MK: Hoo, I always look back to that so, so fondly.

LM: Like free...

MK: And you know what, I learned the value of a dollar. I know how hard I had to work to get a dollar. And everything was real, crystal clear. And like now days, it's different now, I live differently. But, that four years really, really taught me a lot.

LM: So, where were you living? Maybe if you could just go back and say where you lived and everything? I know you were explaining on the way here.

MK: Next to the church, yeah, there's actually some property over there.

LM: Yeah...

MK: My mom and dad, after the Japanese bombed Pearl Harbor, they were still squatting down by the Shaffers down by the ironwood trees. And, my dad is pure Hawaiian and my mother is $\frac{3}{4}$ Chinese and $\frac{1}{4}$ Hawaiian. Her father, my Goong-Goong, was Kong Chong, he was half-Hawaiian, but he didn't look it. His father came from China in the 18... my grandfather was born in 1880, he was born on Kekaha in Kaua'i. I don't have any documentation on it, but I'm wondering if that's where they first worked as far as plantation...

LM: Yeah, they had the sugar plantations. Yeah, my grandpa's side is the Chong, too, and they were from Kaua'i, too! It was like, Ah-Chiong, though, and I guess like when they came here they just shortened it to Chong. But he was born in Koloa, Kaua'i.

MK: Koloa, is the south side, yeah?

LM: Yeah, and his dad was from China, too. And the mom was pure Hawaiian.

MK: Yeah, his father, so my great-grandfather.

MK: Okay, my great-grandfather was pure Chinese, born in China. That's Chong Ayau, and then he ends up by the turn of the century on Moloka'i, and what they did was, he married a pure Hawaiian woman from Halawa. And, he opened up a poi shop in Kaunakakai. To this day, my family still makes Moloka'i poi over there, the Chong family on Moloka'i.

LM: Oh, wow! So, wait, what was his name again?

MK: Chong, Ayau, that's my great-grandfather.

LM: And he was the full Chinese from China?

MK: Yep, he was the one who came from China.

LM: And he married...

MK: A pure Hawaiian.

LM: From Moloka'i...

MK: And her name was Kanaka'ole. Her family name was Kanaka'ole.

LM: Oh, interesting.

MK: Yeah, and so to me, I understand that that's where originally the poi, the taro,

the kalo was coming from, was from Halawa. And they used to bring it over on mules, mule train to Kaunakakai. He would make the poi there. He had a machine that did the grinding of the taro. So, even when I was young, on Easter vacation, or on Thanksgiving, lotta times we would go to Moloka'i and we would stay with my mom's cousin. My great-grandfather had two sons, and one son's son stayed on Moloka'i. That's Fook-ana, we called him Fook-ana, Uncle Fook-ana. And, all the boys was all Fook for that generation. Fook-wah, Fook-sun. My generation is Kwock, so that's where I get Kwock-Sun from.

LM: Ohh...

MK: So, we used to go there, and he would make poi every other day. But by the time, this is probably late '60s, the taro came from Maui. So we would have to go with his flatbed truck and go to the Kaunakakai Wharf, and pick up big burlap bags of taro, take um back to the house. His poi factory was a shack that was divided in two, one was to actually puree, mash the cooked taro, and the other half was to cook the raw taro. So, what he had, it was a real, real old machinery. I cannot tell you how old this stuff was, even in the '60s. You filled this big pan with water, this metal pan, and then get kiae trees all around his property, so you got his kiae, and you made this fire under this big, huge pan of water. And then you brought all the taro, bags and all, you unloaded the truck and you put it into this room. The room wasn't very big, maybe about 10 by 10, but you filled it all the way up with taro. And then, we had boards that you closed up this room, and then there was 55 gallon drums of rags. And, you got rags, and you take it your fingers, and you fill all the cracks in between the boards because you no more door, you just have one open wall.

LM: That's how they steamed it?

MK: Yeah. So, to make easy to bring the taro in, there was no wall, so you just unload real easy, just stack, stack. And then, you got boards, and you fitted the boards, there was like one space in between a post, so you get your board, and you make like that, and you get your next one, next one, next one, all the way up.

LM: Ohh, I see. So smart!

MK: But, get small cracks, and cannot have no cracks, it's gotta be like a giant pressure cooker, steamer. So you got all these rags, and that was us as small kids, our job was to make sure we got um filled up all the cracks with rags. So, he did that the night before. The next morning, you would get up and, my cousins would be peeling the taro, so that's what we did, we would help peel taro. And then, he would feed it into the hopper of another really, really old machine, and then that would grind up the taro, and on the other end, would come out poi. So, he would be on the other end, and he would have an old scale, you know the kind that hangs up from above, with a big round face like a clock. So, he had it wired as the poi would come out, and it was hot, he would scoop it up with his hand, and he would put it into the bag, put 'um on the scale, one pound. Perfect. He did it forever. So I remember, couple times, he goes, "Mark,

you go make. Take your turn." So I make. Hey, not only I cannot get it into the bag clean, stuck poi all over my hand, all over the end of the bag, it was awful. Oh, little bit too much. I gotta take out. Ah, little big too little, I gotta add. It was really goofy, I wasn't good at that at all. And, he was a good fisherman on Moloka'i too. But going back to over here [Ewa], my dad, there was a story about when people just started living out here. It was mostly, it was all dirt roads. This area [Māhala Bay] was mostly beach cottages for weekends for people that lived in Honolulu, and there wasn't that many people that actually lived out here, full time.

LM: Yeah, very small community?

LM: Yeah.

LM: But you guys were out here full time?

LM: Yeah. So, when they actually started squatting, the deal was, is that you could squat, but when you guys go, there's all these gates to get to the main road, the Wai'anae Road. So, when you would drive your vehicle up to a gate, then somebody would have to get out, and then open the gate, then you go forward, and you gotta go through and close the gate. I think there was something like 20 or 30 gates that you had to get through before you got to the Wai'anae Road, the one that goes like that. And, people started coming out here, I can only imagine, they had this place all to themselves for a while, but then, Filipinos, other immigrant groups, because they were leaving the plantation, too, like how the Chinese did. So now, because 'Ewa Plantation is right here, some Filipinos started moving to 'Ewa Beach and buying places, and they started fishing. So, my story was, that this is Barber's Point. I don't know if you're familiar with Barber's Point, they get one jetty that goes out.

LM: Yeah, I been there.

LM: Okay, off of that jetty, about maybe quarter mile out, about first reef distance, there's a reef that the waves come in from three sides. Comes in straight, and then comes from two sides, like this. And when the three waves come together on the shallow reef, I've dove there, I mean you don't wanna be there. It'll screw you up big time if you're not careful. So, what the story was that my dad started off at by where the Shaffers is, the ironwood trees, and he was gonna lay his net on the outside reefs, probably first, maybe second reef, I'm not sure. But, he noticed that there was another boat that was following him, so when he would drive, he'd see this thing driving, so he'd stop his motor, and then they would stop their motor. So, he'd start his motor again, and he goes to the next reef, and ho, these guys, they stopped their motor. So, in other words, they're trying to find out where his spots were. So, what he did was, is he just kept on going from reef to reef, and then, they would come, so they're always like one reef behind. So, he got to this, some people call that reef "cross-waters." But that's the Swabbyland, that's the surf spot at Swabbyland.

LM: Ohh.

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LM: So, he got his boat, he went, went, went, went, went, and he knows that if he stops, they goin' stop. So, he waited till they were right over that reef, and turned off his motor. So now they turned off their motor, now so they're sitting ducks.

LM: Oh, no.

LM: So he waited, and sure enough, one swell, the wave came in, it did that triple-up thing, capsized their boat, so he turned around, and he went go rescue them.

LM: [laughing]

LM: A lot of the cowboys, my mother would say, 'cause they didn't use dry boxes, 'cause they had so much fish, a lot of times they would just go dry fish, and then hang it on a clothesline like clothes between the ironwood trees. So the cowboys, my mother said, they on horseback, and they wouldn't even get off their horse, because the line is like right by their [head]. . .

LM: They would just grab the fish?

LM: Yeah, they just go. But, my mother said, you know what was real pretty, was that they would have a, inside their hat, they would have chili pepper, and they would stick, you know like a, you bust one small end of a chili pepper bush, and maybe the thing get like 4, 5, you know, some is red, some is green, some is half-half. So, they would stick it inside their hat almost like one lei or decoration, you know, for them. But . .

LM: Aww, cool. They would use it to eat.

LM: Yeah, yeah, yeah, when it came for lunch time, they had it.

LM: Aww, smart!

LM: And, my mother used to say that every once in a while, the small baby manini would come in, certain times of the year. And you know, I've looked for that, that occurrence, and, I cannot say I've ever really seen that. But she says, every year, certain times of the year, and they would be about as big as a postage stamp, and you know like when you get like a tide pool, the buggahs just full inside. 'Cause they would come in with the tide. And then when the tide went out, they would be all inside the tide pool all low tide.

LM: Ohh. . . wow.

LM: So, my grandmother, Tutu-Lady, she would have an apron. She would use the apron to scoop up the baby manini, and almost like one net. And then she would put that in a bowl, and the big manini, too. And, even that's how, my mom said, 'cause she was raised Chinese style, and to live with Hawaiians was real different from what she was used to. So, her mother-in-law, she kinda tripped out on her mother-in-law, my grandmother.

LM: And she was the Chinese?

LM: No, she was Hawaiian, too.

LM: Your grandmother?

LM: Yeah. . .

LM: What was her name?

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MK: You know, that's a whole 'nother story. 'Cause, I actually have, I guess my family would say, we have two grandmothers. They were sisters. One was married to John Kaihikapuonalani Kahalekulu.

LM: That was your grandfather...?

MK: That was my grandfather. His wife's sister came and lived with them. She got hāpai.

LM: From him?

MK: He said, that's his. That man... my dad.

LM: Ohh, wow, scandalous!

MK: I know.

LM: So like, but back then, everyone was like, hānai, so then you have two moms. So your dad had two moms. They would look at it as, ho you lucky you have two moms. Po'olua they called it.

MK: I know, I know. So true, so true. Po'olua. So, like my family, ho, they don't like that Po'olua theory. They don't like that at all, because to them, it's like, for one thing it is scandal. And second, how can you have two mothers. So, that's old style thinking.

LM: Yeah, it's Hawaiian.

MK: Like Kamehameha had Keōua and Kahekili, they had Po'olua. So, that's something that's gotta be sorted out, and as far as the family, some guys think one way, and some guys think another. And, there's other people, like my sister, who has her own theory, that it wasn't Kahalekulu, John Kahalekulu was the father. It was a Portuguese man. So, there's the Portagee-man theory, too, in my family!

LM: Wow.

MK: I know. And to me it's just like, and you now, it's very divisive, it's very divisive. **LM:** Yeah, you never know...

MK: Yeah.

LM: You could put anything on your birth certificate too, yeah?

MK: And, in the old days, maybe that didn't matter. But now days, say you get your kid in Kamehameha, they not going go with this Po'olua or anonymous-Portagee-man theory.

LM: [laughing]

MK: They want, who was your grandfather. So, that's how that works. But my Tutu-Lady, [Emily Ka'iliponi] who raised my dad...

LM: So she was...

MK: She was John Kahalekulu's married wife.

LM: Ohh, okay.

MK: Yeah, not the sister. The sister, actually she lived with John Kahalekulu and her name was Philomena [Ka'iliponi]. You know they get one, like where that slide park is as you going towards Wai'anae. That used to be one quarry before. And my dad's biological mother [Philomena], and her husband [Keku], the

husband actually was the watchman for that quarry. So, he [my father] had his biological mother close, and his hānai mother with him. So, this [Tutu-Lady] was his hānai mother. So, she would go and catch all these small, little baby manini, and you know, maybe that's bad now days 'cause you wiping out the babies, yeah? You should at least let 'um grow big, yeah? But in those days, that's how they ate. So, she would use the limu kala, just the tips, because the whole limu kala is real hard and spikey. [Goes and grabs some limu kala from the shore.] So, some of this [limu kala], they would just use the soft, soft end. Because, as you can feel, the inside part is kinda hard, and you feel this part here, you don't wanna eat that.

LM: Yeah, this is soft though.

MK: But, the very, very end, and she would just pick this off, and that's what she would put on top of this bowl of those baby fish, and then use hot water...

LM: And pour it?

MK: Yeah, and that would make one soup, and one broth.

LM: That sounds good!

MK: I know! My mother used to say, "I used to think, coming from one Chinese family, I was so weird." But you know, she look at me and she goes, "But it was 'ono."

LM: [laughing]

MK: "I learned to eat that from my mother-in-law, and to this day, I love that." [Quoting his mother] So, that's why I used to go look for that, for her, but I never found that. But what my grandmother would also do, was that she would go get manini, and she would broil the manini, and do the same thing. Put the broiled manini inside a bowl, and then put limu on top and kinda dress it up, and then use the hot water and then make a fast fish soup. So, I could do that, I could go get manini for my mom, and my mom would do that. So, when you think about it, I don't really know very, very much about my family's history as far as when they first came, and all I have is secondhand stories from before.

LM: Well, you grew up here, too, so you have memories of your childhood. So, how many siblings do you have?

MK: I have my sister and a brother, there was just three of us.

LM: What are their names?

MK: This is Yvonne [points to the house close to us].

LM: And her married name is...?

MK: Moriguchi.

LM: Moriguchi.

MK: And then my brother [Raphael Kaleikoa Kwock Sing], he's two years younger than my sister. So, I think she was born 1940, and I think he was born 1942. And then me, I'm 16 years after my brother, and I was born in '56, so, no actually, he would be born 1940, my sister would have been born late 1930s,

1938, something like that. So, when I was young, my father had already passed away at '58. What they did was after World War II, they were squatting down at Barber's Point. My mother's birthday is December 7th, she saw Pearl Harbor get bombed on her birthday. You could never celebrate her birthday, ever. Like she would say, "It was such a sad day." But, because she was Chinese and my father was Hawaiian, they squatted, and my mother told him, "Old Man, we have to buy our own place." And when you think about it, it's kinda Hawaiian for him to think like this, but he goes, "Why buy something that's free?" He was in favor of just squatting. But my mother goes, "No, no, no, we gotta buy one place." So after the Japanese bombed Pearl Harbor, a lot of people that owned these properties, here, most of 'em was along this shore. They wanted to sell and get on the first boat to California, because they thought the Japanese was going to invade.

LM: I see.

MK: You know, they just bombed Pearl Harbor, this [Māmala Bay] is so shallow, this would be perfect for the Japanese to invade. They [my parents] went and bought next to that church, the bought one lot, and it was three hundred dollars.

LM: What did your parents do? Oh, the paniolo.

MK: My dad first came over as paniolo, but by the war time, he had gotten a job, him and his dad, his dad first, and then he followed. They were custodians at 'Ewa School.

LM: Right.

MK: So that was their straight job. And, after paniolo, you don't wanna do that for very long, really hard on your body. So, he would fish and then work at the school. And then when my mom moved down here...

LM: Three hundred dollars!

MK: I know, but that was big money that time!

LM: No, yeah, yeah.

MK: So, my mother came down, and eventually she got a job at 'Ewa School as a custodian. And, later on they moved to other schools, but they usually worked together. McKinley, Stevenson Intermediate down by Roosevelt, Roosevelt High School, too. But they were custodians. That's why, to me, I'm a very big proponent of education because my mother was. She sent me to Kamehameha, sent my brother to St. Louis, sent my sister to Mid-Pacific. How many toilets she had to scrub to send us to those schools, you know? So, to me, it was like, "Wow!" That's how much she valued education, she only went up to the 6th grade. And because she had 13 brothers and sisters, when she got to 6th grade, her mother pulled her out of school and said, "Nuff school, you help at home." And, the boys went on to University of Hawai'i, but her only to 6th grade.

LM: The girls are gonna get married anyway, and have babies...

MK: So it's like, ho, lose money, ah? But, I don't like that way of thinking, but that

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was them.

LM: That was that time.

MK: Yeah. So, when they bought that property next to the church, it was all kiawe, so they cleared it, they busted their ass, lived in a tent. But after they had cleared the land, one of the regular residents of 'Ewa, that was here before us, said, "Do you know a certain family?" And, I think now, that might have been Dowsett, but I don't have no proof. But my mother said that she asked, "Why?" [And he/she answered:] "Because you just cleared their land." They [my parents] said, "No, no, no, we bought." They said, "You bought the piece next to it." But it's all kiawe.

LM: Yeah, how you supposed to know?!

MK: How you supposed to know? So my mother and father were crushed, because they had busted their ass to clear, you know how Hau Bush looks.

LM: Yeah, that's tough.

MK: So my mother said, "You know what Old Man, you gotta go talk to this lady." So they went up there, and she says it was one house up in Nu'uuanu Valley, and it was one old haole-looking lady, and they asked if she'd be willing to sell the one that they wern' clear. And she said, "You know, I wanted to save that for my family, but nobody want it because it's so far out in the boonies, out in the sticks, 'Ewa Beach." But she goes, "You folks, you young, I'll sell it to you folks because you guys, you guys are gonna make better use of this opportunity than my own family." So, she sold it to them. So, they ended up with two pieces. So, while the other one, which was the original one that they bought, still had kiawe tree, they had this one cleared, and they lived in like one army tent my mom says, until my dad could clear the other side, the original one, and put up a house. He eventually put up three houses on those two lots, and at the time you could do that. So one was a three-bedroom house. He originally built one two-bedroom house I think, and then next to it he build one one-bedroom house for his mother.

LM: Aww, okay.

MK: And then later on he went and built a three-bedroom house. When I grew up, my mother had those houses. But they were built like a little after the war time, right around the '40s. So that's where we originally lived was next to that church. The church wasn't there yet. That was actually my father's brother's house. And the church bought from my uncle, that was Uncle [Abraham] Apela, my dad's brother, his half-brother. His hanai mother's son, his half-brother. So, he sold it to the Baptist church, about the early '60s, I only remember little while, about the time I was in second grade it was a church, but they used my uncle's house as the church for many years.

LM: Oh, wow, interesting, huh.

MK: So, we lived there when my mother was just widowed, and she lived in that one bedroom house, and she rented out the two- and the three-bedroom, and

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that's how she made money. Because other than that, after my father died, my mom said that for social security for my father dying, she got \$64 a month, and that's what she had to live for, she and I to live on.

LM: Wow!

MK: You know, I tell you, I didn't know we were poor, 'cause we had a lotta love and always had food on our table. So, I didn't realize that until I went to Kamehameha, and then I saw what other kids had.

LM: When did you get in?

MK: '69, in 7th grade.

LM: Yeah, I got in 7th grade, too.

MK: Yeah! Yeah, otherwise I went Pohakea over here. So, when I was about 5, that house that's right at the T right here [points], that belonged to my Uncle Peter Chong, and he lived in Kalihi with my Goong Goong and my Popo, kinda took care of them.

LM: Peter Chong. Then who was the Goong Goong?

MK: That was Kong Chong, or Chong, Kong, with the last name first, ah.

LM: My grandpa, the Chongs, they grew up in Kalihi, too. On Pohaku Street.

MK: They were right off of King Street, like where Queen's Market. There's a super-market over there, right off the Kalihi Shopping Center, there's Kalihi Stream. In fact, before they moved over there, they actually lived on the stream next door to Hiram Fong the senator, Hiram Fong's family. So my family and their family, not now, but they were close long time ago. Yeah, when everybody was broke! [laughing]

LM: Yeah, anyways! [laughing] So, Peter Chong...

MK: Yeah, we moved when I was about 5, so early '60s, we moved to over here, this is One'ula Place. And then, we lived there. And that's why this beach is very, very near and dear to my heart, 'cause as long as I can remember...

LM: Māmala Bay.

MK: Yeah, Māmala Bay. And then, around the corner, and we can go take a look at that after we leave. As you come out of this One'ula Place, to the right about 3 houses is my aunt, another sister of my mother. When my mother them came down here, all our family was Kalihi, and she was the first to marry Hawaiian. So, she was ostracized by my Popo.

LM: Ohh.

MK: Yeah, that was bad! Marry Hawaiian. But, once her sisters, and she had eleven sisters, ten sisters. Once she married Hawaiian, oh, it was like, "Oh, now it's okay for us to marry Hawaiian!" So, they married Hawaiian, and now they started, it was always every weekend, after pau work, they would all drive from town, and they would all come down, and they would all hang out in 'Ewa. And then, Sunday night, they would all pack up, they all go back to town, they all gotta go work. So, eventually, as places started opening up, they started buying places over here, too. So it was nice.

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LM: Ohh, it's like a Kahalekulu and a Chong... that's so funny.

MK: Yeah! But it was this strip right here, kinda like from that point to that point. This was our playground, our living room...

LM: And your sister lives right on the beach?

MK: Yeah. What happened was is that, about middle '80s, after I got back with United, it used to be, these four houses that was right next to the right-a-way [right-of-way] was one lot and it belonged to a family called the Youngs. And, it was their beach house. And they would come on the weekends. And then, there were two twin boys, and I think they went to like 'Iolani or 'Punahou. And they got into a business deal, and they asked the parents if they could use that lot as collateral for that business. They business collapsed, the bank took that property.

LM: Ohh, wow.

MK: My sister was living in Waipahu at the time. And when she heard, that this lot, what they were gonna do is cut it in half. So it was one big lot, [drawing in the sand] so now, they went cut it in half, here's the right-a-way [right-of-way], and so it's two house lots, two house lots [in four pieces]. So, all the bank wanted is their money. They made an auction, and I think my sister bought that thing for maybe a little over a quarter-mil, two-fifty, something like that for two lots, right on the beach.

LM: Wow, she bought two of them?

MK: Yeah, she bought one half of this, but her half is two lots. So, she eventually put up a big two-story house on the front, on the beach side. And then she has a two- or three-bedroom rental on the street side.

LM: Wow, and she still lives there?

MK: She still lives there. She's retired from the post office, her and her husband.

LM: Good.

MK: So, after we lived here, around the corner you come out of One'ula onto Pōhakupuna Road, I have another aunty that's over there. Her children still live there, in fact, my uncle that my aunt married, he's a Richardson from Lana'i. The Richardsons and the Kaopuikis, who raised Kepā, are related by marriage.

LM: Ohh, I know some Kaopuikis from Lana'i.

MK: Ohh, on Lana'i?

LM: Yeah, from Lana'i, yeah.

MK: Oh, okay, okay. And you remember, I don't know if he was there when you were there, but there was a bus driver, his name was Jerry. Jerry Kaopuiki at Kamehameha School.

LM: Oh, I don't know...

MK: He might be after you. I mean, you might be after him.

LM: Yeah, maybe, I don't know, probably.

MK: But as me, going to school in the '70s, I knew he was family by marriage, twice

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removed. [laughing]

LM: [laughing]

MK: That's why, when Kepā told me he was raised by the Kaopuiki I said, "You're kidding!" So I started tapping off some names, and he goes, "Now, how are you related to those guys?" And I said, "You know, Kepā, you get relatives you know, you get 'ohana over here right on Pōhakupuna Road."

LM: Ohh.

MK: My aunty lived over there. Next to her, in the middle '60s, you know '64, '65, had a Filipino guy and he wanted to sell his house. My cousin was gonna buy that house, and she used to work at Woolworth's when used to have a Woolworth's over here.

LM: I remember... well my mom told me about that.

MK: The Woolworth's?

LM: That it was like the only store...

MK: Yeah, yeah! My cousin worked at, what they call that when they have one, ah, you get soda...

LM: Ohh, a fountain?

MK: Yes, yes! A fountain! So, she was gonna buy that house next to her mother, but my mom asked if she could buy it. And, at first it was like, you know, you get \$64 a month for social security, how you going buy this? Even though it was only \$13,000 at the time.

LM: Oh, wow.

MK: That's what they sold it for. So, my mom, using the property that she got as collateral, she was able to buy that other house. That's the house that I grew up in.

LM: Wait, which one was that again?

MK: This was the one on Pōhakupuna Road, you haven't seen it yet. And now, it's just an empty lot. My mom bull-dozed down that thing in like the middle '90s because it was just too old.

LM: And now you still have that property?

MK: I still own that. And, in fact, after I talk to you, I gotta talk to a realtor, I gotta go talk to a realtor.

LM: Don't sell it!

MK: That's what I'm thinking of doing.

LM: Aww, no! We always just say, don't ever sell, don't ever sell! 'Cause, all the Hawaiians are just getting pushed out...

MK: I know, I know. You know, my father was from the Big Island, and even though I get my daughter, son-in-law, I get two grandsons over here, I get family over here, I enjoy the Big Island. I enjoy going to the Big Island.

LM: But there's so much land there!

MK: I know, I know.

LM: And it's getting bigger! [laughing]

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MK: You never meet my daughter. My daughter is, oh boy. She grad UH with a degree in economics.

LM: Ohh, wow. That's the one married to, Eric?

MK: Yes, to Eric.

LM: What was his last name?

MK: Rhode.

LM: Oh.

MK: So, my daughter is trying, 'cause right now, it's an empty lot, and as far as I've been explained, to get the financing, to put up a house, I would have to rent it out. I wouldn't see any return for many years, I would just be paying it basically for up to ten years before I see any return on it.

LM: That's not that long! [laughing] Nah, it's your money, it's your house, it's your land, I don't know.

MK: But I still have that other house that's next to the church.

LM: Oh I see, and you rent it out?

MK: Yeah, I rent it out.

LM: Oh.

MK: So, it's not like I would be devoid of anything.

LM: Too bad you couldn't like hang on to it and save it for grandkids...

MK: You know, after I started talking to Kepā, and that's what it's gonna go down to. My daughter's gonna get it. All of this, whatever I have, even if I sell this lot here, and get something on the Big Island.

LM: So you just have one daughter?

MK: Yep. So, it'll all devolve onto her eventually. But she was saying, "You know Dad, you go to the Big Island anyway, and you prefer over there." And I do. Even though I get grandkids, very rarely you see me on O'ahu. I'm always on the Big Island if I can.

LM: Oh. What side, you like Kona side?

MK: I like Kona side. But, right now, I'm kinda looking at Honoka'a.

LM: Oh yeah, it's really nice there.

MK: Yeah.

LM: In the middle kinda.

MK: What do you mean?

LM: Or like, kinda in between Hilo and Kona.

MK: Yeah, yeah. But it's kinda at the end of the road. When I got off the plane yesterday and I was driving in that traffic, I said, to me, that's not my idea of... I don't know, I just enjoy the Big Island 'cause get plenty fish, the water is clean, country. There's certain parts that have no traffic.

LM: So you might retire there?

MK: Yeah. I remember one time I went over there during the winter time, and the waves came really big. And, the main spot of Kona is Lymans, it's a left, I'm a goofy footer.

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LM: Me too!

MK: Oh! So, I was taking pictures, and the whole week had waves. And it was like, 3-4, 4-5, and all of a sudden, they said, "Oh, gonna have a real big swell." The thing came up to like 8-10 feet with bigger sets. And I looked out, and it was perfect, and there was a half a dozen guys out there. I looked at my wife, and I said, "You know what, I haven't surfed in long time, but I'm ready to go buy one, if I cannot rent one board, I'll buy one." So, I see this guy, and he was walking away. I said, "Bruddah, you know some place I can go rent one board?" He goes, "You see that condo over there, get one surf shop over there, Kona Bali Kai, they rent you boards over there." I said, "Really?" He goes, "Yeah." Within a half an hour, I'm back with a board under my arm, and I'm all excited, it's pumpin', it's smokin'. And I'm walking up the point, and local guys are looking at me and goin', "Alright, bruddah, go get um, go get um!" "Cause they're looking at me, and it's like, outta six waves, one is ridden. Five empty waves to one. And I was like, I chipped my teeth out at North Shore, surfing the North Shore, and it was dog-eat-dog. Bangin' rails, and it wasn't like, "Oh, yeah, go bruddah!" No, no, guys will drop in on you, I mean mercilessly.

LM: Yeah, there's a lot of people.

MK: So, when guys treated me like that, I was like, "That's aloha, that." And, I'm sorry, but, I respond to that. And, even like now, I'll go over there, and I'll go look for one he'e, I'll let the small ones go. Just if I was over here. If I something with eggs I'll let it go, don't touch it. If it's kapu, don't shoot it. Make sure it's legal size. Even though I'm not a resident of over here, I feel like this is my heritage as a Hawaiian. So, when I go to the Big Island, and over here [Ewa], I'll gather limu, I'll go and go catch he'e, and I'll take that back with me to Colorado, and I'll share it with other Hawaiians that are over there. To me, that's the ability that I have, is to keep, not only for myself, but for other people, this connection. So, to me, it's not just 'Ewa Beach specifically, but it is, but more generally, it's the whole state. I like see the whole state be held in stewardship for our people. Wherever it is. And, I may come back the last time in a box, but my heart is always over here. But I can understand, like you're saying, and I tell you, I still get second thoughts about selling. That's why, even like right now, I thinking about that realtor that I'm gonna talk to, friend of my daughter's, and I'm not sure what I'm gonna tell her, especially after talking to you.

LM: I mean, I don't know the whole story, but that's my first response when I hear somebody's gonna sell their land, especially like family land that you grew up on. I'm just like, "Don't do it!" You'll just regret it.

MK: You know, I read George Kanahale's *Kū Kanaka*, and one part he says, "If you have ancestral land, don't sell it." And, what it is, it's a place where your family can come and learn the stories of your family, and to be introduced to the

history of your family, and a place like this, I mean, this is where we would get the net, lay, go make it, we had two pockets, everybody come in, all the kids, splash, splash, splash, splash, pick up the net with the tube, put the fish in the burlap bag, pick up the net, everybody out, all the kids come back in, the men folks go all the way, start over here by this little cove inside here on the other side of the pipe. And then, go all the way down by Parish Drive, and by the time we got to Parish Drive, we had so much fish. We had more than enough fish for many families, like Uncle Peter, and Aunt Alice, and Uncle Lou, and my brother and my sister. You know, we had all of this as a resource. Whenever we went to Kalihi, we brought gallons of pickled limu with us, you know when we went into town. And for us it was no big deal, but wow, you know when you watch the family, our town family.

LM: They loved it.

MK: Aww, it's like it was gold to them.

LM: Ahh really? I want some of that now!

MK: [laughing] I know.

LM: I want the fish, the manini, that sounds good.

MK: With the little buds of the limu kala...

LM: Yeah! I wanna try that now!

MK: But, no matter what, this place will always be home to me, it will always be one hānau. So, it'll always be this. And even if in the future, I always think that my family, my descendants could be all blond hair and blue eyes one day.

LM: Not...

MK: Pretty soon we're all gonna look the same.

LM: Yeah.

LM: We'll all be one race again. [laughing]

MK: Yeah. I just want them to be able, I really want them to know that they're Hawaiian, that they have Hawaiian, and they should be proud of it. And, even more so, they should try to learn their culture, learn their history, learn their language. For me, I'm terrible with the language. I'm a book worm, I get books all over my house. I can digest books on history, all that, but to learn the Hawaiian language, I have not found the key that unlocks that, and I don't understand how.

LM: Immersion. Yeah, it's hard. Language, you gotta live it, to really know.

MK: That's why, to me, I don't know if I ever will, but I not going give up. And I have friends up there [Colorado] and we tried to.

LM: When did you move to Colorado?

MK: '91. So, I just want my children and my grandchildren and descendants, I want them to be proud of who they are and what they are. And as long as we get at least one place over here [Ewa], we still got our foot in the door as far as being able to have access to this place which has fed my family for almost 100 years. So, at the very least, I still get that, but if I could figure out something as far as

this property, I'll show you after.

LM: Okay.

MK: If I could figure out something, I'd love to be able to figure out something that I could say, you know what, this is the cornerstone of a legacy that I could pass down to my descendants and my family. If I could do that, that would be... I could kick out happy.

The following is a *hali'a aloha* of Honouliuli. The narrative is dated August 29, 2012 and is entitled "Diving the Three Stones, 'One'ula Beach." It is written as notes to *ma'opuna*, and contains important background on ocean resources. Mark 'Ehukai Kahalekulu kindly granted permission to Kepa Maly on April 25, 2014 to share this one of several *hali'a aloha*.

One of the things that I we both enjoy doing is to go lu'u o ke kai—diving in the sea. That day that we went to Kahe Beach, I saw how fearless you were heading into the water and so determined to try and catch the manini with your hand net. You would let go of my hand and dive head first towards the small schools of fish, fully intent on scooping them up, but they of course were too agile and adept at escaping your net. I had to chuckle to myself as I watched you from above, but I couldn't help but think how proud my father would have been to see you swimming underwater chasing those fish, armed only with your red scoop net. Right then and there, I knew that in your breast beat the heart of a fisherman. It is what Kahalekulu's have done in the shallow sea of 'Ewa for almost 100 years.

If you walk down the right of way next to the Moriguchi's house, you come out close to the western end of 'One'ula Beach. In the old days, before they stopped the dumping of raw sewage from Sand Island, the limu on this beach would pile up to three feet thick, brought to shore by the prior night's high tide. Nowadays, there is not much seaweed to be seen, just a few scattered specimens here and there, the sand bare.

I started seriously diving in the early 1980's, after having been laid off at my job at the airport. One place that I enjoyed going to was the Three Stones. It was close to where I was living at the time (I rented Gram's one-bedroom house next to the Baptist Church) and unlike other places, the water was not so dirty and prone to having waves. The best time to dive 'One'ula, and 'Ewa in general, is when the North winds blow offshore during the wintertime. Winter is also the time when the swells predominantly come from the north, producing near flat surface conditions on the south-facing shores. The Northeast tradewind generally pushes the coffee-colored water from Pu'uloa westward along the 'Ewa coastline, making visibility very limited. This is one of the reasons why

fish favor the sea of 'Ewa. Of course, you could lay a net in the old days, and it wouldn't really matter how clean the water was to be able to catch fish. But for diving, and for finding the places offshore where the fish congregated, visibility was very important. The cold North winds, instead of blowing sideshore parallel to the beach, would blow straight offshore, taking the dirty water out with it. If you wanted to dive closer to the shore and wanted the best visibility, you would go early in the morning, an hour or so before bottom low tide, just as the dirty water was being taken out. If you wanted to dive the outer reefs, during the rising tide would be better, because that murky water would be inside of you, pushed shoreward by the incoming tide.

The Three Stones were offshore about 150 yards off of the terminus of 'One'ula Beach. I would usually leave my plastic 5-gallon bucket that I used to carry my fishing gear in next to the concrete and stone stairway in front of the Young's place. I used my 7'-7" Bill Barnfield as a safe platform from which to dive from and to save my energy on forays to the outside reefs. I would have a plastic jug as a floater to which was tied a 20-foot length of nylon rope, which was then secured to a metal weight. My bag was then looped through the handle of the plastic jug. The nylon rope was wound around the weight and the weight then wrapped inside of my bag and placed carefully on the nose of my surfboard. The end of my spears would then be placed resting on the bag/floater/weight, and after having made sure my mask and snorkel were adjusted properly, I would gingerly pick up my rig and proceed into the water.

Once in, I would attach the 14-foot leg rope of my board to my ankle. Sometimes when I would dive the Second Reef, I would connect two leashes to my board so that I could reach the bottom in 20 to 25 feet of water. As you make your way out, there are small, dinky, little waves next to the shore, and they have a tendency to upset the bag and weight, knocking them off the board and into the water. I don't like to wear fins, just reef shoes, because of the uneven, shallow rock-bottom. It takes a little patience and attention to walk out with my board and gear through the shallows, but once out in waist-deep water, I'm then able to mount my board and start paddling.

Even though my ultimate goal is to reach The Stones, the inshore area is prime he'e grounds. I would put my mask on and periodically stick my face in the water, scouting the area as I slowly paddled. You would be surprised how many octopi are watching you as you make your way out towards the reef. They hide in their holes among the limu alani, manaua, lipoa, kala and wawae'iole, as well as the padina, caulerpa and acanthophora, that cover the bottom. The area just off the shore is very uneven, with numerous sandholes and depressions interspersed between

the rocky outcroppings. It is along the edges of these depressions that the he'e like to make their houses. They are able to see well from their protective rock dwellings, overlooking the sand pockets for crabs and other favorite prey. Even though there are no fish to be seen, just off the seawall of the first house after the beach ends, there is a kumu hole about 40 feet straight offshore in about three to four feet of water. It was one of the first fish holes that I found when I started diving.

As you move further outside, the water deepens to about five to six feet, and the bottom topography changes from the limu-covered, uneven rock-rubble to a flat sand and rock surface. The two main varieties of seaweed that dominate this sandy area are the caulerpa (no Hawaiian or common name that I know of) and the limu lipoa (*Dictyopteris* sp.). While at first inspection this area may look to be monotonous and unproductive, take notice of the many abandoned squid holes that are present. During the early fall months of September and October, this can be a great place to look for he'e. The holes are too appealing to he'e and they will be recycled and reused by them every autumn.

As you get further out, maybe 100 yards or so, angle to the right so that you are now directly in front of the black lava rock seawall next to the old Ilaban boat ramp and pipe outfall. The water gets to about eight feet deep and the bottom is almost all sand with occasional clumps of broken coral and rock. There is very little seaweed growing on the bottom, looking much like an underwater desert. Keep on going, because you will soon run into a line of large rocks that run parallel to the shore. Because housing for fish is so sparse in this area, large manini, palani and kala tend to frequent these rocks, hiding underneath.

Sometimes there are slipper lobsters, too, as well as large eels, that share the rocks with the other fish. The last rock on the left is the largest, about five feet across, and is hollow in the middle, with a big opening on the top. Although this rock normally doesn't have much game associated with it, it is your marker for finding the Three Stones. From this mushroom rock, go straight out about 20 to 30 yards. You are looking for a large boulder surrounded by flat sand and rock rubble in about 10 feet of water directly in front of the black lava wall on shore. This is the first of the Stones. Mostly large manini, kala and palani hang around the first Stone, sometimes with an uhu or honu sleeping nearby if you go early enough in the morning, but because there is no hollow for them to hide in, they will normally swim off in the direction of the other two Stones when approached.

From the first Stone, make your way to the right until you are directly in front of the Ilaban's driveway. You know you are very close to the other Stones when you can see cars passing on Pohakupuna Road. If you cannot

see any cars, you are either too far to the left or the right. Adjust your position until you are able to see traffic on the roadway. Once properly situated, I would drop my weight and use the floater as my marker. I would then circle my floater, moving concentrically outwards. Unless the water is crystal clear, the second Stone will suddenly appear eerily out of the gloom. It is a large boulder, about 7 feet in diameter, surrounded by a mix of sand and rubble in about 12 feet of water.

Unlike the first Stone, this one is hollow underneath, with a cavity about 4 feet by 4 feet by 2 feet with a 2 foot opening in the front and the back. There are usually a few large, free-swimming kala and palani, as well as some big manini, that reside under the second Stone. Shooting from the opening that faces the shore is the best approach, with the fish silhouetted by the light filtering in from the backdoor. Once a fish has been speared, the others will quickly exit through the rear opening of the chamber and disappear. The large (three-foot long) kala that are taken from the second and third Stones should be handled with a healthy amount of respect, as their four caudal (tail fin) knives are extremely sharp and can easily inflict a serious wound. Most times, I prefer to hold the kala by the tail, with my thumb firmly on the top of the penduncle, or the narrow part of the tail fin, and the knives projecting sideways away from my fingers. I would grip his tail very firmly, because he will try to escape by beating his tail at you. Every once in a while, you will find a kala hiding with his head in a hole and his tail sticking out. I would use this opportunity to grab the tail with my hand and to pull him out without spearing him. But with the very large ones, it is safer to avoid having your hand anywhere close to the tail. Even after bagging the kala, the cautious diver needs to be constantly aware of the location of the bag and its dangerous contents.

The fish that escaped from the second Stone would invariably run to the third Stone. It lies straight out from the second one, about 15 yards further. The last Stone is very much like the second, about the same size and in the same type of terrain. The only difference is that the opening in the front is larger, and has an overhanging rock above it that you can hold on to for better lining up your shot. The scenario beneath the Stone is very similar as well—a chamber about 4 feet by 4 feet by 2 feet, with a sand-lined bottom and a back entrance that lets in light. Before shooting at the free-swimming silhouettes in the hole, take time to look at the rock ceiling. Sometimes the fish that fled from the second Stone will plaster themselves on the roof of the cave to disguise their location. Not only will the regular kala employ this tactic, but so will big palani, as well as the much rarer 'opelu kala.

About 10 feet to the right of the last Stone is a much smaller rock, about

4 feet in diameter. Underneath it are usually a few medium to large *manini* and medium *palani*, some of whom have just run there from the third Stone. Going out from the third Stone, the depth of the water is about 10 to 12 feet deep; the bottom is mostly flat sand and rock rubble, with a sparse showing of *lepe'ahina* (*Halymenia* sp.) and *limu kohu* (*Asparagopsis* sp.).

Straight out about 40 yards from the last Stone, you will run into the inward edge of the First Reef. The First Reef rises up from the sand and rubble bottom to about six to eight feet deep. The topography is uneven, full of small to medium sized holes and liberally covered with fist-sized nodules of various crustose coralline seaweeds (*Hydrolithon* sp.). As you make your way out over the reef, the depth gets shallower, and the concentrations of fish increase. Free-swimming schools of *palani*, *pualu*, *maiko*, *manini*, and *kala*, as well as the introduced *ta'ape*, sweep in and out between the coral outcrops, occasionally dashing into the innumerable holes that perforate the bottom, disappearing, and then reappearing a few yards further away. Swimming slowly over this beautiful seascape, the bottom undulates, a depression followed by a rise, one after another. Flashing schools of fish, twisting and turning as one, parade ahead of you. At times like this, you forget that you are a man and wish wistfully to be just another one of the lucky denizens of the sea.

The bottom morphs again, telling you that you are approaching the outer edge of the First Reef. The bottom becomes flatter, and the holes become larger: a series of connected rooms and causeways under the rocky strata. I call this the Puka Reef. Very large *kumu*, as well as lobster and big *puihi* live in these sand bottomed crevasses, sharing them with the usual large *kala* and *palani*. The schools of fish swimming around you now become a distraction as you carefully inspect each opening of the reef, not sure if inhabitants deep in the shadows are predator or prey. Large shapes retreat into the dark recesses and disappear. Hunting here can be very rewarding or very frustrating, just depending on the fortunes of the day. Often times a return visit is required to finally bag something that was seen days, weeks or months previously. As you follow the cracks outward, the reef finally gives way to a bank of deep sand.

At this point, you are almost a quarter of a mile out, all by yourself with just a surfboard and a bag of bleeding fish. You could paddle parallel along the First Reef towards the right-of-way, or if you're really ambitious, go out another quarter mile to the Second Reef. Or you could go the other way towards Hau Bush and try the outside reef in front of the Mitsuyasu's place. But by now, though, the wind has probably started to pick up and ruffle the surface of the water. The current that flows from Mamala Bay towards Kalaeloa is picking up and the sun has risen high

in the sky. With a few nice fish in the bag, this might be a good time to go in already. But even if I hadn't caught a thing, just being out there, all by myself, alone with just my thoughts, my 'aumakua and the ocean, that's what it's all about.

A.2 Harry Alama

Harry Alama was born in 1958, and began coming to 'Ewa Beach with his family in the mid-1960s. Harry's family secured leases on three lots from the Dowsett-Parish family and built homes along the 'Ewa Beach coast in the late 1930s, early 1940s. When the war broke out they were unable to return to the shore, but after the war, they settled back in. In the early 1960s, development was coming to 'Ewa Beach and the family decided to give up some of the leases—those are the lands that were later associated with Ted Farm and family.

Harry shared detailed recollections of residents in the One'ula-'Ewa Beach area. The following topics are among those that he discussed during the interview:

- His dad was a fisherman. The family regularly laid nets and fished in the *paipai* style. *Palani*, *kala*, *ō'ō*, *āwawao*, *'i'i* (menpachi), *he'e*, and *weke* were among the fish they'd catch.
- In the area of One'ula and Hau Bush, they would catch crabs.
- He and his family collected various *limu*, among them were *huluhulu wauena*, *manaua* (ogo), and *lipé'epe'e*.
- Recalls sugarcane fields all behind the 'Ewa Beach regions, and the occurrence of ponds with fish inland.
- Described One'ula as once having significant sand dunes. The environment has changed, and he considers one source of the problem being development of the reef runway and the deep-draft harbor.
- Names various surf spots and speaks about the 'Ewa Beach Surf Club.

Interviewee Harry Alama (HA)
Interviewer Leimomi Morgan (LM)
Place 'Ewa, O'ahu
Date February 16, 2014

LM: Okay, so here with Harry Alama, and I guess we could just with you going as far back as you can to your connection to 'Ewa.

HA: Okay...

LM: Kinda like the questions I sent you.
HA: My connection to 'Ewa Beach goes back to the family of Bernhard Gustave Cordes, and that's my father's uncle. My father's name is Bernhard Gustave Alama, so he was named after my dad's uncle. And his wife, Auntie Louise,

worked for a lawyer, and the lawyer used to get involved in land deals. And so, through her they acquired the lease for the beachfront land.

LM: And what was her name?

HA: Auntie Louise Cordes, that's his wife.

LM: Ohh, okay.

HA: So, this is Sonny, this is his nickname is Sonny, Uncle Sonny Cordes. So, most people know him as Sonny. And, Uncle Sonny worked for Aloha Motors, he was a car salesman for Aloha Motors, and his oldest sister is my grandma. And the family was real close. My grandmother and my grandfather really kind of supported most of the younger siblings.

LM: And they were the Alamas, too?

HA: My grandfather's an Alama, my grandmother's a Cordes.

LM: What kind of name is that?

HA: Cordes is German. My great-grandfather's name was Gustave Cordes, and he came to Hawaii from Germany in the 1800s. He came from Bremen, Germany. One of the stories I was told was that he was a part of the Royal Mounted Guard that worked for the queen, and that after she was overthrown, he didn't have a job, so he moved out of town, he moved all the way out to the west side, and squatted. So, he married a Hawaiian lady, and her name is Mary-Ann. I was told that it was Mary-Ann Kahalewai, but the records say Mary-Ann Ulili. They always had all kind different names. Ulili?

LM: Yeah, but I think her middle initial was K.

HA: Ohh, okay. So maybe that was her name...

LM: My dad's oldest brother left Hawaii in 1938, and what he told me one time, he came in 1986, he came home, and it was I think his 76th birthday. And, he came to my house with my dad, and we talked a lot. He was really book-smart about the culture, he was actually close to my great-grandparents, he lived with them, and then they died. But, he told me...

LM: What was his name?

HA: Teddy, Theodore. My dad's oldest brother. Theodore Ma'ili Alama. I lost my train of thought.

LM: Okay, sorry! So... Mary-Ann Kahalewai Ulili and Gustave Cordes, that was your great-grandparents. And then, they had...

HA: They had Bernhard Gustave, and Mabel (my grandma) is the eldest daughter of the Gustave Cordes family. So, they had like 7 children. My grandma was the first born. She was born like in 1892.

LM: Okay, so, Bernhard Gustave Cordes and Auntie Louise, but you called him Uncle Sonny, they had...

HA: Yeah, this is the family. They had one daughter who was Sylvia. Mabel is my grandma, my grandma is his oldest sister. There's also a Theodore Cordes, Uncle Teddy Cordes, which is all different. My dad's brother told me that my great-grandmother, Mary-Ann, was married before she married Gustave

Cordes. So, I'm thinking that Ulili was her married name. 'Cause it's in the record books, Gustave Cordes and her, their marriage is recorded and it's on record. So if you look it up, you'll find it, and any reference to her is under the Ulili.

LM: Okay, so, if we could just connect it down to you through the Alama.

HA: Okay, so my dad's mom is Mabel Cordes, and she married Aina Alama.

LM: And so she was the German, but part-Hawaiian.

HA: She's half-German, half-Hawaiian. But my grandfather is half-Chinese, half-Hawaiian.

LM: Ohh, I see. And then they had your dad?

HA: So, they had 8 kids. And I think they had 7 in her family (Mabel). But my dad was number 5.

LM: And then your dad's name...

HA: Bernhard Gustave Alama. So he's close to Uncle Sonny because he was named after Uncle Sonny.

LM: Ohh, I see, okay.

HA: So, getting back to the 'Ewa Beach story. Uncle Sonny, the extended family... Back then, the families were really tight. We used to all get together with my grandparents' generation, so there might be like 30 people. Because you have their grandparents, and then their children, and we were like the little children. But, that extended 'ohana on the Cordes side, one of my dad's uncles his name is Tommy Chong. He worked for the Damon Estate, so Uncle Tommy was the Damon Estate driver and mechanic. And that was the job that his father had, his father was the original chauffeur back when it was horses, so Uncle Tommy worked for Damon. And, another man, his name is Jackie Roxburg, he worked for Damon and he was the landscape guy, he was the gardener. He took care of all the gardens. Way back Moanalua Valley, before it became what it is, Moanalua was all the way to the ocean, yeah. That ahupua'a goes from the mountain to the ocean. So the lower part of the ahupua'a is where... what is that place called? What is that area below, it's all developed.

LM: Yeah, yeah... umm... Māpunapuna.

HA: Māpunapuna! Yeah, okay, that's the lower part of Moanalua Valley. Before that was developed it was just all wetlands. And, I guess the Roxburg family, they kinda took care of all the... my mom said it was really beautiful just to have... like you ever been to the Pagoda Restaurant?

LM: Umm hum...

HA: It's like that. It's all water, but on top the water everything was built on stilts.

LM: Ohh, that's like Waikiki.

HA: So, it's hard to imagine, but that's why over there always gets flooded. 'Cause it's naturally like a wetland. Like Waikiki, if they didn't have the canal, it would be a problem. So, Uncle Sonny and Jackie Roxburg, who was a member of the Damon workers. And, I'm not sure about this part... but their third house, that

was Kui Ching, was another uncle. He owned Tire-Recap Service. Tire-Recap Service, they kinda worked hand-in-hand with Aloha Motors (Uncle Sonny was a car salesman at Aloha Motors), so those three people got leases for the land [in 'Ewa Beach]. So, if you start at the very first house, where the old road started, the land before that was all owned by the Parish family now, but before that it was the Dowsett family. Like by Punahou, that Dowsetts, they were ranchers, they owned the land up to Fort Weaver Road, and then they ended up buying it all the way along Pāpili Road to where the end of the houses were. And so, Mrs... her name was Parish, she passed away already. She owns that land. Keā Maly did an interview with her, there's a thing about One'ula that he did. So there's a great article, she explains the land that her grandparents owned. And, so after that, the 'Ewa of Campbell Estate had the land for all the sugarcane. But, it was intermixed with lots of ranchers. So, from where the Campbell Estate land was, they leased out the land, and the first lot was leased to Mr. Francis Ching. He's another old 'Ewa Beach family, the Chings. And so, Francis Ching had the first lot, and the next lot was leased to the Matsunaga family, and the Matsunaga family is Emma and Eddie. And then the third lot was Uncle Sonny's house, the fourth lot was Jackie Roxburgh's house, and the fifth lot was Kui Ching's house. So, those three lots, they got together as a hui, and they're all one acre lots along the ocean. They're one acre, pretty square almost, one acre. And, my grandfather and Uncle Tommy and all of the relatives, they built the houses, the three houses. And so from 1940, I heard '39, '40, I don't know exactly the time, they built those houses, and they used to go down there and it was just the beach house, you know a weekend thing. And during the war (WWII), the government took the houses away and the ocean was barb-wired up, so they couldn't go down there during the war. So, from '41 to '42, 1942-1945, they couldn't go down there. And then sometime, I guess around 1960, Jackie... they were already telling him that there was gonna be a big development, so Jackie decided they weren't ever gonna be able to buy the land, so he gave up the lease. And, that's when Ted Farm got it. But, my grandparents, my grandfather and the family, Uncle Tommy, they're the ones that actually built those houses. Then across the street, on the mauka side, those were all big lots, like 4 acre lots. And, I didn't the people there too well. I knew the people that lived right across the street from Uncle Sonny's house, that was the Tanaka family. And, I knew um because there was a store called Tanaka Store, and the daughter was my classmate at elementary school. So, I knew them. And then, their nephew, whose family actually owned Tanaka Store, he and I became friends because he used to make surfboards. He's like maybe 10 years older than I am, but he used to make surfboards across the street from where the beach house was. And, I got two or three surfboards from him. We're friends till today.

LM: What's his name?

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HA: Tanaka. Isaac Tanaka. He's in that thing [Swaylocks blog online] under "Ike." His login is "Cutts" 'cause he owns a gutter company.

LM: Ohh, okay.

HA: So, during the years from I guess '50s on to about 1965, the beach house was, I don't know what was going on. But there was a family that used to go down there a lot, and their name is Philips. And, sometime from the late '50s till '65, the used to actually take care of the house. And they live in 'Ewa Beach. And those brothers are all about 10 years older than I am, down to about 5 years. And their connection is the dad was a police officer, and the police used to buy all their cars from Aloha Motors. Aloha Motors was one time a really big company, they used to occupy the land at the convention center. So, anyway, in 1960, the land that's right across the street from 'Ewa Beach Shopping Center, the old 'Ewa Beach Shopping Center, they developed houses over there. And, that was one of the first places that they actually, the developer went in and built the whole community. So, you just paid your money and then you bought a house. And, then before that, 'Ewa Beach, you bought a lot, and they you had to get somebody to build a house. So it was little bit more involved, little more hassle. My dad, my grandfather was a project manager and he was also a surveyor for the Army Corps of Engineers, and because of that, he was involved in building all the harbors. And, he took my dad out the Big Island, I think it was probably the '46, 1946 tidal wave, and showed him the damage. So, my father would never buy a house that was in the tidal wave inundation zone. When they built that subdivision, that new subdivision, it was in the safe zone. And it was low enough in price that he could afford to buy a house, so they bought that house over there. They were just starting to build it, so you had to like sign up. So he qualified, he bought the house, and we moved over there about 1960. And, I'm sure that he bought the house there because it was also close to the beach house. But in 1961, we were sent to Germany, my father was in the army. And, we went to Germany, and we were away till 1965, so in 1965, he came back to Hawai'i, and that's when we started going to the beach house. So, my first memories of the beach house were from 1965, my first memories of 'Ewa Beach are from 1965.

LM: How old were you?

HA: I was seven. Seven years old. I had just made seven. And, we came home in the end of September, so I started 2nd grade in 'Ewa Beach Elementary School. Then we started to go down to the beach in the summer, the beach house. And at the time, nobody was living there, it was just a weekend house. My father, Uncle Sonny asked my father and my father's brother if they could fix the house up because my grandmother's younger sister had moved back to Honolulu from Moloka'i. She spent most of her life living on Moloka'i. And she moved back to Honolulu and she was living down by Kapi'olani Boulevard on Fern Street. She wasn't doing too good. She was having bad asthma. I

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think it's just that you go from a really country, rural world to the city, it's just hard. So, Uncle Sonny let her stay at the beach house. And she moved in down there around '67-'68. And she lived in the beach house till she died in 1974. And Auntie Girlie, she kinda was our surrogate hānai grandma. 'Cause my grandmother moved to the mainland I think just after I was born, just before I was born. She moved to the mainland and she never came home, she just came home for vacations. But Auntie Girlie, she took us in as her grandchildren. And she was only a mile away, and I spent all my time at the beach house. So, she's the one that used to tell us all the stories about her grandma, which she always said, Mary-Ann Kahalewai. If you talk to the Kahalewais, they'll tell you that we're related to the Cordes family. So, I believe Auntie Girlie's stories were true. So, Auntie Girlie, whose name was Wilhelmina, she was a real tom-boy. So, Uncle Sonny and all the brothers, there was Sonny, Wilhelm, and Teddy, they all respected her, 'cause if not she'd give um lickings. So she lived at the beach house for a good 5, maybe 6-7 years and she was as much of a grandmother to me as I've ever had in my life. I really love her. So, I used to spend all of my free time over there, my dad used to spend all of our time over there. Even if it was like this [rainy] weather, we'd be at the beach house. And it could be storming rain and we'd be there in the house, just sitting there while my dad would be there. And so Auntie Girlie would tell us all this stuff. She had like a little farm there, she came from Moloka'i. Her daughter and her son-in-law worked for Hawaiian Airlines, and he was a pilot, so he used to bring back all kind of animals. He used to bring back goats and things. He used to hunt there all the time. He brought back two baby goats, so we had a male goat and a female goat, and so they had milk, and then they had ducks, and chicken. And two houses down where Uncle Kui's house was, when Uncle Kui passed away, the lady, his ex-wife, Auntie Ah Lan, she was related to my father but I don't know how. She decided to rent the house out, so she rented it to this guy who started raising pigs. His name was Alfred AhLoo. So, those are all kind of animals. Alfred had a cow at one time. And then, Ted didn't, he didn't have pets. Animals were always for food. But, he had raised some things, he had a horse because his son, his brother-in-law was drunk one night and he promised to get a horse for the youngest son. And so, when the time came that he was supposed to, the son said, "I thought you gonna buy me a horse?" and he actually bought him a horse. And then, when the ranch that was kind of taking care of the horse, when they closed up, they brought the horse down to the beach. But, we never rode it, it was kind of an old horse.

LM: Because these were all acre lots, that's why?

HA: Yeah. And, almost every single lot, except for Uncle Kui's lot, the land, they didn't even use it all. The corral was small, it wasn't a big corral. And behind, there was a water tank and pump. But, by the time we came back from the mainland, they weren't using the water tank anymore. There were two wells.

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The Matsunaga family had a well and the Roxburg family had a well, but the water was brackish water so we couldn't drink it. So the water was only useful to irrigate the grass, and the land that I would say, a good quarter of the lots were just klawe. Haole koa and klawe. Just, you know, just real wild. And only the close part to the water was where we had opening area. And Uncle Sonny's was probably the one lot that had the most open area. And that was good so Auntie Girlie had lots of space. The two goats were like, they were a combination of like watch-dog and grass-cutters, 'cause they eat grass. That was a really good time. I really had a good time there while she was alive. She passed away in September of '74, and then after she passed away, Uncle Sonny decided to just come down every weekend, 'cause he was kinda getting old already and time was short. And then, after he died, his daughter Sylvia, who never, ever came down to the beach, she started coming down. And she came down every weekend until she had to give up the house. So, over time things evolved, but by then I was already married, then. I moved to town in 1982, so I've been living in town since '82. I only come out [to 'Ewa] to see my mom and dad and go beach. My father passed away in 2006.

LM: Who is your mom?

HA: My mother's name is June. She's from Japan.

LM: Ohh, okay.

HA: But, during the summers, from about the time we were 4th grade, 3rd or 4th grade, we didn't go to summer fun anymore. We went to the beach. And my mom would drop us off, and Auntie Girlie would take care of us, and we would just spend all day at the beach, go swimming all day long. We would hang out with Auntie Girlie, she would tell us stories about all kinds of stuff. She taught us basically what to do and it was good that she had kids around 'cause most of her grandkids were all Kailua side, or Maui, or Moloka'i. So, we spent a lot of time down there. Seen it change, seen it change a lot.

LM: And so, does your mom still live in the house in 'Ewa?

HA: She lives, yeah same house I grew up in. She's never gonna leave there. It's got too much emotional... it's actually, there's a lot of aloha in that yard. She has the best mangoes, I mean it, she has the best Haden mangoes that I've ever tasted. And at one time she had the best limes. The lime tree got messed up from white flies, so it's only about 3 feet tall now, used to be really big, but it still has really good fruit. I love the limes. And, everything my dad planted grew really well. But then he decided to concrete over the whole front, so a lot of the stuff we dug out. You know, I think there's just a lot of love in that yard, so if she goes, I don't think the trees are gonna be the same. There's something there.

LM: Yeah. So, in the blog, Swaylocks, you guys talk a lot about this surf club that you guys had...

HA: Yeah, like for us, for my father the ocean is about fishing.

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LM: So your dad was like a fisherman?

HA: My dad loved the ocean, but he was past playing in the ocean. And so, that's what we did, we played in the ocean. My dad liked to catch fish. But, what we used to do is they'd be used to catch fish with nets, so we would do the paipai nets, and what happens is they'd be sitting down and maybe watching the water and somehow they can see the fish. And, they could see the fish, I guess their tails or something. So they would wait and wait, and we'd have everything ready, and then all of a sudden they'd go, "Let's go!" and we'd all get together and they would take a big, huge airplane inner tube with the net, and they'd lay it out. And once they got it laid out, then they'd make us line up, and all of the kids would jump in the water and we would swim out and we would splash and splash and we would make a lot of noise. And then, in about 5 minutes, they would start pulling the net in, and you either catch, or you don't catch. And most of the time we'd catch limu. 'Cause 'Ewa beach is known for its limu, yeah? So we would spend the next hour cleaning the net of all the limu. And the fish in 'Ewa beach that we used to catch were huge. Like the fish eyes like this big, the net [about 4 inches wide].

LM: Wow...

HA: So, if the fish isn't that big, it's gonna go right through. So fish like palani and kala, they're generally pretty good sized fish. We catch awa and o'io, and you'll see some pictures in that blog if you actually look. The fish, generally like this [3 feet] long. And, it was either awa, o'io, and kala. Kala and palani were like this [2 feet] long. And then, sometimes we'd catch sharks. Wouldn't be on purpose, they'd just get caught. So that was the main way of fishing. And then the next level of fishing would be to go out in the water with scuba tanks. And so, they would go, and it was always only the men. So, we didn't do that till we got older, like high school age. But they would go out and they would be gone for an hour, maybe two hours, and they would come back and they would have a lot of fish. And the fish would be like 'aweoweo or mēpachi. Sometimes weke, occasionally they'd catch the squid. But they would be going way out, so normally you don't get the squid way out, it's usually close in. And then, we would catch crabs. Outside of the place called Hau Bush Beach, now everybody thinks this [points to the map] is Hau Bush, this is not Hau Bush. Hau Bush is over here [more towards Pu'uloa]. So between One'ula park, over here there's two really big parks. One park was the Del Monte park, which is the one next to it, and this is called CPC and that was for California Packing Company. And then 'Ewa Plantation had a park, which was right next to Uncle Kui's house. And 'Ewa Plantation park is where the Hau Bush grew, around the garden there was an area [about 12 feet long] that was from here to where that man is [pointing], it was Hau Bush trees. And they had a metal frame, and so the Hau Bush grew up along this metal frame. You could picnic underneath there and it would like a natural shade. And then next to it there was a metal

area, where you had open air with metal (?). And then after that was the Del Monte park. The Del Monte park had small, little cottages like 10 by 10 and like 5 or 6 of these cottages. I guess people could stay overnight and go fishing. Outside of that, they had really good fishing, crabbing. We used to go crabbing when I was really young. In one hour we could get a 5 gallon bucket of white crab. And that's only the male adults. We throw away all the little guys, we put um back in the water, and any of the women, the female crabs, you put it back in the water. You only take the big males, and if you do that, you still get a big bucket. Sometimes you even get two 5 gallon buckets. Come in, and we eat crab, the whole family, maybe like 20 of us, we eat crab for like till you get stuffed. So we did that every weekend. Uncle Kui would make a big, they had this big wok, and he would make chow fun every Saturday for lunch. And then whatever fish and stuff we catch, they had a stove outside and they could fry up like the 'aweoweo, mēpachi, pan fry um, right there. We had it good, man. We had it real good. And then everybody got old. 'Cause Uncle Kui was my dad's uncle's age, and he passed away first. And then one by one all the uncles. So, if you look at all the beach houses, the first house is the Ching family, and they were kinda, they had fence along their property, so they were kinda isolated. And he didn't live there, he rented it out, he had 5 houses on it. He rented out all 5 houses. And then you had Auntie Emma's house, and then you had Uncle Sonny's house, and then you had Jackie's house, which became the Farm's house, and then you had Uncle Kui's house and the 'Ewa Plantation, so there was another fence over here [pointing on the map]. So these four houses were like one 'ohana, and every weekend if Auntie Emma wasn't there, then her nephew, Mr. Matson, Bill Matson, he would come. And Uncle Bill had three sons, Billy, Michael, and Matt. And so he'd come down with his three sons and his wife Auntie Maude and they'd stay there the whole weekend. And then we would be at Uncle Sonny's house until Auntie Girlie moved in. And then, Uncle Ted was living here by the time we came home from the mainland. And he would be there and his wife's family is the Awai family from Hale'iwa, and on weekends, quite often, they would all come down. And that family included the Rosehill family and the Awais, and then he had a whole bunch of friends, like the Young family, which was Alfred Young, we called him Uncle Ah Hung he would come with his kids. And sometimes the Lee family, they all had kids about the same ages. We all went to Kamehameha at the same time, we're all 5-10 years in age difference, so multi-generational families. And then Uncle Kui who kinda was just him and his wife, so between these four houses we could have like 20 people spending the weekend. What we used to do is we only spent the day there, we would get down there like 8 or 9, and we would leave around 9 or 10, go home sleep, come back the next day. And everybody else would stay. And it was kinda how we spent our weekends. When Auntie Girlie came and lived there, we would go to her and stay there,

hang out, and even if it was raining, we would come down and we would hang out. And sometimes, my brother, sister and I, we would be wearing blue jeans and jackets, and we'd be walking outside, but we'd still be there. Just a really good time. And then, at the very end over here [pointing on the map], there was a chicken farm right here. That was owned by Mr. Joe Park. The Park family, interestingly, Joe Park's brother, Harry Park, and my father we really good friends. I'm named after Harry Park. So, we got to know Joe Park pretty well. His daughter Robin is my brother's age, and we're all calabash cousins. So, all of this area, we pretty much, to us it's just all a big family. That's kind of it. Anything else you want to talk about? Oh, the surf club?

LM: Yeah.

HA: The surf club is not from One'ula, the surf club is from the other end, and those guys... so the guys that started the surf club, they're all like 1960s graduates of high school. So, you have names like the Sadowsky brothers, there were several of them. You have names like the Moody, the Moody brothers. I think there's three or four of the Moody brothers.

LM: Yeah, you list all of them in your blog.

HA: Yeah. So the original members of the 'Ewa Beach surf club would be the Sadowsky brothers and the Moody brothers, the Silva family, they have a store called Silva Store and it's on 'Ewa Beach road. And you got this man, Lester Inamoto, and a few other guys. And they kinda just created this club, apparently they were all really good surfers. But they were before my time. They were from the other side of 'Ewa Beach. We stuck to this side, which was really just four beach houses. I knew all these kids that grew up here, but on that end, I only went there like when I was between 7th and 9th grade. And it's really down here, see Fort Weaver Road, it goes down and it turns into 'Ewa Beach Road and then the houses along the water. So, a lot of these guys, they graduated between 1965 and 1971. Some of them were like '73 or what not. But because I went to Kamehameha, I didn't really hang out on this side too much.

LM: So did you know Mark [Kahalekulu] at Kamehameha? What year did you graduate?

HA: Mark is a '74, I'm a '76. My brother's a '74. So, Mark, and my brother, and two other guys went to Kamehameha from 'Ewa Beach. And they all had to board. At one time Mark was one of my closest friends. We spent a lot of time together from about 1972 till around 1976 when I started working full time.

LM: Did you board, too?

HA: (Shakes head "no") When I went to Kamehameha they changed, the expanded the bus service.

LM: Ohh, so they had just changed it, like right before you.

HA: They did, they said they didn't want another Alama up there. (Jokingly)

LM: [laughing]

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HA: Nah, I think that because we paid for the buses, it made more economic sense because they could expand the school and have more kids versus just having boarding students. But I think boarding students was probably better. So anyway, they created that 'Ewa surf club with those guys and they actually did really well in the contests, but again like I said it was kind of before my time. But, I'd say a good handful of those guys were as good as anybody else on O'ahu as surfers. And they even won like the 'Akahi International Surf Contest, John Sadowsky and they said Lester [Inamoto] was one heck of a surfer. And several of the other guys. I knew a couple of the ones that were younger, a family that has been in 'Ewa Beach a long time is the Eaton family. And you may have gone to school with a couple of them.

LM: I've just heard their name a lot.

HA: Cal's kids and Clayton's kids, they're about your age. The youngest one is I think my daughter's age. And Cal is three years older than I am, so I knew him both from Kamehameha and from the beach. His brother is five years older than he is, so I only know him from the beach, and I didn't know him very well at all because he moved out of 'Ewa Beach when I was still in high school. But I just remember him because he's just this really big, spooky guy. And the other families, like the Philips family that used to watch the house, Tommy has quite a good memory about stuff, and they still like on Pāpipi Road. But they kinda moved down to 'Ewa Beach in '58 or so. Guys like Mark [Kahalekulu] I didn't realize how long his family's been here. Other families that would be like good value is the Mitsiatsu family. And, I think Myron still lives in 'Ewa Beach, John moved to Mililani. But if you go back and you look at the interview that Kepā did with the Parish lady, she talks about the Mitsiatus and they were here way back. They used to make charcoal or something. So, their connection to 'Ewa Beach goes way back. They're another family that had quite a bit of land in 'Ewa Beach. But I don't know exactly where they got the land. And then of course the Parish family who are the descendants of the Dowsetts. If you look at this map, the Parish family, they're all this side where 'Ewa Beach Road goes like this, that then there's Parish Drive like down here, and then the Mitsiatsu family, see this big open lot, that's their lot. But they owned all this land over here. They made houses and sold it. They're an old time family. We all grew up together, we all know each other and they're very involved in little league baseball when I was a kid. I'm not too sure about other really old time families. Most of the people lived along here, along here, and then along the beach, there's two roads. One called Pōhakupuna, that's the road that Mark's family. And then the other is Fort Weaver, so this came in later, so we had the two roads. Fort Weaver went all the way to Iroquois Point and then Pōhakupuna went all the way down, and then they built all these other houses. And see that park right here, my dad's house is like right there. I think it's the white roofed one. That's where I grew up there. So, this was the

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first increment. From here, along this street, this is the first increment and then this is the second increment [pointing on map]. Might be like second, third. So when I grew up 'Ewa Beach consisted of these houses, and these houses, and then the houses that were here...

LM: Along the beach.

HA: And right here is Campbell High School. This is North Road, so that Kulana Village thing that they built is around here. Is where they built the low-income housing. Then later on they built this really big area here called 'Ewa Beach Estates. It's bigger than this I think, it goes way back. And this was all sugarcane field we used to play in. And this was all sugarcane, this was all sugarcane, [pointing on map where houses are today]. There used to be, probably like over here somewhere, there used to be artesian ponds.

LM: Oh, yeah there still is I think.

HA: We used to go swimming in them. Not the salt water, the artesian ones. And it was somewhere around here, up higher. And we used to go swimming in those ponds, it was really cold water and used to have lily pads and used to have carp and we'd go swimming in there. And then way back here, way back here somewhere they had artesian ponds. This was like a big U shape, and this was like three separate ponds. We only swam in the one that was furthest, the other ponds had lots of fish and stuff and we didn't want to go swimming in them. The first one was probably like this [points to a small area about 5 feet wide] we had a hill so we'd come down this hill, and we'd ride our bikes and we'd launch um up in the air and we'd land in the water.

LM: [laughing] That sounds fun.

HA: Yeah...

LM: Do you miss it? The way that it was?

HA: Yeah, what I really miss is, before they built the bigger [housing] area, there still was a lot of open space in here. Like there's Makule Road and stuff which was a really old road, there still was a lot of open space. In fact, the Mitsiatsus owned a lot of this and they didn't develop it. And had really old, old buildings, and we used to say they were haunted. So, used to be spooky, you ride by it, and you might ride like the length of this building [the Zippy's restaurant in 'Ewa], with just kiawe trees and haole koa, and then there'd be this building but there was nobody living in it, real old, it was like for ghosts. And then, you gotta go past that to get back to the houses again. It was kinda like, everybody'd make up stories. But they built all houses on it, so along in this area, they developed it all. But when I was a little kid, they didn't develop it, had houses in here, and had houses along the beach, and this area over here didn't have too many houses. So, what I was getting to is they didn't have anything. I think there was like only 2,000 houses, max, this had like 1,000 or less (one section on map) and then all this was like 1,000 (another area on map). And so, on Halloween, we would go everywhere. Just get plenty candy. And the families would know,

like if you went twice, they'd throw rocks in your bag.

LM: [laughing] That's funny.

HA: [laughing] And if you were a bad boy, guarantee, that night your mom and dad would know about it. So, that's how you kinda take care of stuff. Everybody takes care of everybody, right? And it was good. I think a lot of the moms stayed home. Everybody, we were like I guess, I wouldn't say lower income levels, but we weren't like low class. You know when you're poor but you don't know you're poor?

LM: Yeah...

HA: You have everything you need, so it don't matter. That's how life was. And, most of the people worked for the military in one way or another. Either as a civilian, 'cause there was Barber's Point, there's Pearl Harbor, there's Hickam, and there's Schofield and Wheeler. So, everybody sorta worked for one of the military places, or worked for the plantations. And then a lot of the people over here, they were all business people, lotta haoles in this area. Local haoles. They were more like a different income level, a little higher income level, more business types. But we were all the same, we all grew up together, and probably the richest kid I knew was Timmy, whose father owned the bakery. But, you know, they weren't rich, they just were able to do a lot of stuff, you know, travel every year. And I spent most of my time staying with Timmy. Timmy's house is like right over here [pointing on map, close to his parents' house] 5 houses away. And I really liked growing up in 'Ewa Beach because it was small. And I used to get mad when people said I live in the country. Because it wasn't country, like I think of farms and stuff, it was just real regular houses and stuff, it's just that we were real isolated. But down here [by the beach] was country, 'cause one acre lots, that's kinda nice. That part I miss, I miss that a lot. The open space, we had our own private beach. One of things that's kinda sad is the sand movement is altered. I think it's a combination of the reef runway and the development of the deep-draft harbor, but in front of here there is very little sand. And if you go down to the One'ula Beach park now, there used to be big sand dunes at One'ula, right here. Big sand dunes, like maybe 20 feet high, right along the water. And there were like craters. We used to go down here when I was like in 5th grade, 4th grade, and we used to make fires and stuff inside there at night and hang out. And dad them, they'd all be down the beach house and you know we could sneak away. There were pillboxes all along the shore, there were like 7 pillboxes along the shore. And they were like as big as a car. And there were two separate rooms. The room that faced the ocean had this long slit window for the machine gun. And then the back room was higher. The first couple were kinda buried underneath the sand, so only half of them were sticking up. And there was so much sand in there you couldn't go in um. But as you got further down, there was less sand in um and you could actually go in um. And we used to play in there. Just really

different. But, they took all of the pillboxes out, sometime, I don't know when. They just tore um out. And then, I hadn't gone back here since high school time, so I don't know too much about the changes back in here. I know the road changed from going straight to having a big turn, it kinda went like this, but it used to be just one long straight road. And it was like, I can't describe it. I guess if you go down to like Sandy Beach, and you're driving along down by Queen's pond, where there's just no real roads, like that, but with really deep potholes. As big as this booth [about 4 feet by 3 feet], so it really kept the speed of the cars down.

LM: [laughing] That's good.

HA: And that's kind of it. One thing I regret, I always thought that, if anything ever happened I could live off the ocean. But, I don't think you could live off the ocean anymore. I don't think that there's enough food out there. And I don't think the food would be fine, you could eat it all. I think a lot of it has been contaminated by ciguatera. My friends catch a lot of octopus, but not quite as much fish. And, there's a lot of fish but they told me I can't tell people where. [laughing]

LM: Yeah, that's fine, I understand.

HA: I'd like to go out here one day [Ewa Beach] and try crabbing again, 'cause it's been a long time. And, if they came back it'd be interesting to find out. But I don't think people know anymore. Because at one time they built that pipeline, yeah? I think the pipe, there's a sewage treatment plant somewhere. So they built a pipeline that goes all the way through here. It went right through here, it's probably right around here [pointing on the map]. And it went all the way out, so I don't know how that affected it, but nobody's gone crabbing here since the '80s. Might be crabs out there. Have you ever had white crab? Haole crab? Sort of like a grayish shell with little spots.

LM: I don't think so...

HA: They get to be like this [1/2 a foot] big.

LM: Uh uh...

HA: Anything that's fresh.

LM: You just eat it raw?

HA: Yeah, anything that's fresh. If they're like this big [3 inches], they make um raw. **LM:** I've had little ones like that, like at parties and just you suck it out and it's so good.

HA: It's sweet, yeah? When you get the big ones, and you cook um, they're still sweet if they're just cooked. And they don't smell as bad.

LM: Yeah... [laughing]

HA: 'Cause that crab has a strong smell. I mean, it's not like a bad smell, it's just a real strong, fishy smell.

LM: Okay, so anything else you might just wanna share, like concerns you have or...

HA: Well, no, I think, at one time, and it really has nothing to do with this thing. Like

one time I was hoping that we could have a plaque down there somewhere like where all the houses were, where all the people that lived there could have their names. Like a big rock or something. From the old-timers like, I only know from the time that Uncle Sonny guys were there. But I know there's people that might have been there like before. And from the time that our families were there till today, it went through changes as well. So, you have the original 5-6 families, and then you have all the people that lived there, renting houses, like Mr. Farm rented his house for a while. Families that lived on Francis Ching's lot, like the Okamuras and the Huddys. I remember them when we were growing up, they were all part of this 'ohana. And it's sad 'cause you know when they bought the land [by the beach entrance], we had to park over here and walk all the way down. And it's a pretty good walk. But then my friend Joey lives at the first house, his wife grew up over there. So he gave me the combination to his house, so I can go there when I want. And I been doing that for the last year. But before that, I wasn't going down there too much. My brother would just go over here [further down west] and surf over here, but it's really different down this side.

LM: So, you still go surfing out over here [close to where he grew up at his family beach house]?

HA: Yeah. Whenever I can.

LM: And what do you guys call it?

HA: It's called Shark Country.

LM: Ohh, I see, that's Shark Country.

HA: So from the end where the houses are, there's a little point like this, you see the land goes like that?

LM: Yeah.

HA: This is like a big bay that goes from here to here, the reef is like that. So, from the very end of this side, this is called the Sea Wall because there's a little place where you can, there's a turn around and there's a wall, so that's called the Sea Wall. And that is the first break. And then Shark Country and Sea Wall are like next to each other, really close. And then after Shark Country, again, because of the way the reef is, Shark Country breaks out here. Hau Bush is in here. Hau Bush is the inside break. And then you have this place called Chicken Creek. Which is because of the chicken farm, and what used to happen was in the winter, the rain would come through and then go straight through the chicken farm. And all the chicken manure would get mixed in the rain water and go out. And that's why we called it Chicken Creek.

LM: Ohhh, ewww [laughing].

HA: Nobody ever surfed over there!

LM: Ohhh, [laughing].

HA: And next to that where the park starts is called Sand Tracks. And then after Sand Tracks, and that had the big sand dune right there, after Sand Tracks,

there's a couple of little spots that I never called anything. And then on the corner of the park is John's, and the name John's is from John Sadowsky.

LM: Ohhh.

HA: He was the number one surfer in 'Ewa Beach in the early '60s. John Sadowsky, he used to surf out here. I guess he used to surf out there a lot so we called it John's. Then you got The Cove right here, and then Tree Stumps. And then after Tree Stumps, I don't know what they call this area, and then you got Barber's Point which used to be called Officer's Beach. It's now called White Plains. So, there were the different places we surfed. And I never surfed from here to here, I never surfed anywhere [pointing specific areas on map]. But, over here is the empty lot side, and there's a bunch of different breaks. And the very end is the 'Ewa Beach park. Pu'uloa and Iroquois Point. But empty lots, and this area there's a whole bunch of places to surf, but I really only surfed over here. I surfed on this side when I was 7th grade, 8th grade, with my friend Timmy. But I figured, we go all the way over here, we'd have to take our bicycles and chain it up to the fence, and we don't live over there so when I go over here, I get fresh water, I can shower off. I can leave my clothes and change, so even though it seemed further, to me it took over as far as surfing. And to me, the waves are really nice on this side. I'm probably gonna miss, when they develop this, I'm gonna miss the emptiness that it has right now. 'Cause it's never been quite as empty as it's been in the last decade. Over here is pretty bad [pointing on map]. But it's gonna move as they start opening this part up, it's gonna move down 'cause there's just more places to surf. This side, if they make the marina, that would be a huge thing. But if they don't make the marina it's not gonna affect the ocean. The land was never ours anyway. This was, that wasn't, so when we went in here we were trespassing. So, to me it doesn't affect me. But it affects me that there's so many cars. In 1976 I started working at Channel 2. I worked night time. I got off at 9:30pm. When I came home after 9:30, not a single car on the road, not a single car. Nowadays, I don't think you can be alone anywhere...

LM: There's a lot of people.

HA: And the same thing for the freeway. At 10 o'clock at night, that road from Pearl City, as you're coming this way [west bound], very few cars in that section from Waipahu, down. They didn't have lights, either on the freeway. So, there's a lot of people in Hawai'i and my concern is I don't think we can support the volume of people now. This is not the end. They're talking about more houses up here [pointing on map] and they're talking about Kaka'ako, 500 foot towers. We're gonna be bringing in 98% of our food to support that. I would have loved to see this been kept in agriculture, but that's not my choice, and I can't tell them what to do. I just feel sad about it, 'cause this was real prime ag land, had the hot, hot sun, as long as you water it.

LM: Yeah...

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HA: So, it'll be interesting. And, I'd like to see that [the Lagoon Project] when it's done, if they allow outsiders. That would be kinda interesting to see what it looks like, but I can understand if they choose not to let anybody else in. They pay big money for those houses. I just kind of, I get a little upset that, what was once ours, it's no longer ours. We didn't own it, we were just using it. We used to get 7 kinds of seaweed in 'Ewa Beach. And I don't know what happened. It went from it being right on the ocean shore to having it go about 5 feet in, to having it go waist high, to having it go underwater. And I don't know if they're still there.

LM: Yeah, where's the limu?

HA: 'Cause, my mom used to make lots of different things. The pickled one, the Japanese style. And she used to, there was one called huluhulu waena, and that one is a real fine kind. And she used to make a nori style, not nori, you could buy it in bottles, sort of a heavier, sweet shoyu flavor, and you could put it on hot rice. And then there had one that looked like, we used to call it cabbage. The leaves were really broad and they were flat, and they were brown, brownish color like ogo, that color. And they had like, you like if you go and you buy spring mix at the store and it has that one leaf that looks like the weed that grows in your yard? I can't remember what that's called. When I try to think of names my mind goes blank. But, that's what it looks like. It has little edges, little scalloped like, and it has a broad leaf. But it has the same taste as other ogo, like manaua and stuff. But it just looks different. Had limu kohu if you were willing to go into the deeper water. 'Ewa Beach has so much sand, that you spend all of your time trying to clean it. 'Cause you know, the limu kohu is a unique kind, it just gets so full of that sand that you gotta spend to so much time. I think it changes the flavor. Then my uncle like the lipepe'e, that big, fat green one. Kinda almost as big as this, kinda grows like, kinda has like a feathery, like a mossy kinda exterior. I never liked that one. But, he liked that one. I just converted video that I had of Ted Farm, and he was doing Hawaiian foods. So I'll try to look and see, 'cause he did mention a couple of kinds of limu that he used to catch. It's too bad that he's not around. Nobody knew this area better than he did. Nobody spent as much time, he lived right on that beach from about 1976, '77 he retired, and he lived there and he fished, he lived off the ocean. And the stayed there until he passed away around 2004. I don't think anybody knew that ocean better than he did. He knew exactly where to go to get what. And it's too bad 'cause he was a unique person.

LM: Yeah, a lot of the stories are lost on those who have passed.

HA: Yeah, 'cause even his kids, as much as they know, they didn't live there every day. And he did. The other guy is Joey. Have you heard of Joe Gaynor? Joey still lives there. Joe and I are elementary school classmates. And Joe married the girl that grew up in that house, the first house, the Francis Ching lot. And he still lives there. And he's gonna be the last one. Joey has permission to stay

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there from Haseko. And if anybody knows what's happen to that ocean. Joey lives in Ocean Pointe, but they still have the beach house. Joey and his wife's name is Lori, and Lori's maiden name is Okamura. So, they would be a really good resource. Joey, his brother-in-law John. John goes down to the beach all the time. Joey lives there. He can tell you firsthand about what's changed. 'Cause he's been living on that beach with Lori for about 20 years plus. And Joey's older sister was at one time the vice president of Community Relations at Haseko.

LM: Ohhh, okay. Yeah, we'll see.

HA: He might be able to give you stories definitely about what's happened in this area. 'Cause he goes out in the water almost everyday. He takes out a surfboard and he'll fish from it. He spends a lot of time. If you go to Facebook, well you'd have to be his friend I think. Oh, did you see that Pu'uloa Forever Facebook site?

LM: Um... no.

HA: Pu'uloa Forever, I put it up there. Do you have a Facebook account?

LM: Umm hum.

HA: I can make you a member of that, 'cause I put this up there primarily to see the stuff I shot of the reunion we had. But there's been a lot of interesting stuff. Really, the resource to me that has everything is the Swaylocks [blog]. If you can go through everything and see the color.

A.3 Shibuya-Dayanan Family

Six members of the Shibuya-Dayanan family gathered together for a small family reunion at Kualaka'i-White Plains Beach in September 2012. Barbara Shibuya, one of the younger members of the family, coordinated the opportunity for the interview to take place. While a 33 year difference in ages between the eldest interviewee (born 1933) to the youngest (born 1966) existed, the interviewees shared strong familial connections, and memories with elders who have now passed on. The family kindly shared detailed information covering the lowlands of Honouliuli, from the Honouliuli taro lands and 'Ewa Plantation Camps to the waters of inland Pu'uloa and the southern shore of Honouliuli, in the region of 'Ewa Beach, One'ula, Kiku, and Kualaka'i-White Plains.

During the interview, participants discussed a wide range of topics, including, but not limited to, the following:

- Plantation life was hard, but fondly remembered. Plantation camps, including those where Japanese, Filipinos, and other nationalities lived, were centered around the 'Ewa Mill and extended into the former Honouliuli taro lands. The Hawaiian camp was in the vicinity of the present-day railroad center.
- Family fished the lochs of Pu'uloa and the outer Honouliuli coastline. *Kilimau* crabs, oysters, *limu* and fish were gathered or caught. The elder Zoilo Dayanan

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observed the Hawaiian custom of always giving an offering of the day's catch back to the ocean, and instructed his own children to do the same.

- Kiku Point (between One'ula and White Plains) was one of the significant fishing grounds visited by the family.
- *Limu* collected included *manuua* (ogo) and *lipoa*. The younger generation was always taught to pick carefully, leaving the roots in the reef for future growth. In their lifetime, they have noticed a significant decline in *limu*, and attribute the decline to various nationalities that have come in and taken without respect.
- These same practices of respect for the ocean were observed on the land. The elder Zoilo Dayanan had a couple acres of sugar land in Honouliuli that he worked (sort of as a share crop), and before each harvest time, he and his wife would prepare offerings, which would be left in the field when harvest was finished. The family members observed that their Tatai always had the sweetest sugarcane of all the patches.
- While the family members did not recall hearing traditions of the larger Honouliuli region, they all knew of the night marchers and the need to be respectful of place.
- Residents of the One'ula-Hau Bush and Kiku vicinity are named and activities described, with recollections of the former piggeries, chicken farm, and many outings in the region.

Interviewees Jose Dayanan (JD), Roxanne Marie Tagama (RT), Barbara

Shibuya (BaS), Mona Shibuya (MS), and Janice Trinidad (JT)

Interviewers Kepā Maly (KM) with Onaona Maly (OM)

Place Kualaka'i – White Plains

Date September 17, 2012

Transcribed by Leimomi Morgan, April 14, 2014

KM: We're gonna just talk story and I should go, if I could, just to get background so I can hear voices, I should start with the oldest, go to the youngest. Just so I hear your name, when born, so that I can hear your voice, okay? So uncle, you the oldest?

JD: Um hum.

KM: Could you please, what's your full name?

JD: Well my full name Jose Dayanan.

KM: Born?

JD: I been born in 'Ewa, September 3, 1933.

KM: Wow.

JD: Yeah. And I been working for the 'Ewa Plantation through many years.

KM: Wow.

JD: Well that's over, but after high school.

KM: Yes, yes. Wonderful.

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JD: Yeah.

KM: Uncle, do me a favor please. Spell your last name for me.

JD: Dayanan. D-A-Y-A-N-A-N.

KM: Oh, okay. Oh, good. Tell me real quickly. Your parents were from here or did they come?

JD: Oh, they're from the Philippines.

KM: Okay. Sakada, then? When did, Papa them must have come what in the '20s? or early '30s? Do you know?

JD: The '20s.

KM: '20s maybe.

JD: Well, I was born 1933.

KM: Yes, so very early. Did your father come to work at the plantation here?

JD: Yeah, they said at the beginning.

KM: Oh wow...

JD: They were cutting cane when I was young. But the plantation did not brought up right.

KM: Yes.

JD: From all of the labor...

KM: ...all of the labor of the people who worked the land.

JD: Even my mom, too, was working...

KM: Really? Wow.

JD: ...the plantation.

KM: Wow.

JD: Yeah.

KM: Did both of your parents come from the Philippines?

JD: [unintelligible]... Philippines.

KM: What area? Do you remember?

JD: From Cebu.

KM: Cebu, oh, okay.

JD: So, from there they came down Hawai'i.

KM: Yes. They came very early, because...

JD: They were the first ones.

KM: Yeah, among that first group, yeah?

JD: Yeah. First group, yeah.

KM: Yeah, because then in 1946 the HSPA brought a bigger group, yeah. Sakada, about 6,000 came. But your parents were early, because if you were born out here in '33...

JD: Yeah, so they must come around the '16 or '20...

KM: Yeah. 1920-ish. Sorta there.

JD: Yeah, there. Right, right.

RT: Yeah, grandma was born 1908.

KM: Wow.

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JD: Yeah, yeah. Right there.

KM: Your mama?

JD: Yeah.

KM: His mama, your grandmother?

RT: Yeah.

JD: Yeah.

KM: Wow, okay, wonderful.

JD: Yeah, could be around there.

KM: What was your father's full name?

JD: Ah... Zoilo Dayanan.

KM: Okay. And mama?

ID/RT: Juana Astacaan.

KM: Okay, oh, thank you. So we talked, so this is your niece, here?

JD: Yeah.

KM: And you're next in age?

RT: Down, yeah.

KM: Okay. Please, would you mind sharing your full name, date of birth?

RT: Date of birth and my name?

KM: Sure, and we should have your maiden name also.

RT: Um, Roxanne Marie Tagama.

KM: Okay.

RT: I'm the oldest of three of my siblings, right here. And, I was born and raised in 'Ewa, which was then called Fernandez Village.

KM: Fernandez?

RT: Fernandez Village.

KM: Oh, I'm sorry.

RT: Fernandez Village. That's the house right on the front of Renton Road.

KM: Okay. So...

RT: Because I've been there...

KM: So, Renton, and...?

RT: Just Renton on Fort Weaver, no?

KM: So right on Renton and Fort Weaver?

RT: Yeah.

JD: They used to have the Filipino Camp before.

KM: That was the Filipino Camp?

RT: We were called the Filipino Camp.

JD: That's, you know where the graveyard is? Those were the... those were the camp.

KM: Yes! So by the Catholic church? Is that where? Was the church there?

RT: That was called Fernandez. We had a lower village. Which my mom and my step-dad lived with my siblings. And that the part of the old 'Ewa Hospital, which no longer exists.

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KM: Yes, yes.
RT: And then we had a Korean camp, which was behind Fernandez Village.
KM: So behind Fernandez, mauka? Wai'anae?
RT: Ahh, mauka.
KM: Mauka. So, towards the up section, then?
RT: Correct.
KM: Korean Village? Korean Camp?
RT: That was Korean Camp. Why it was named that, I really don't know.
KM: No more Koreans at that time?
JD: Oh, used to have.
RT: Had Filipino!
KM: Ohh. Well you know, it must have started because when 'Ewa Plantation started in 1890, that's when they originally founded, yeah, 1890 as I understand.
JD: Yeah, they had all that...
KM: That's right. So they had different. Japanese, then Korean came, and then the Filipino came.
RT: Yeah, we had a lot, I mean. And we also had C Village.
KM: "C"?
RT: C Village where the piggery was.
KM: Oh... where was that?
RT: Right in front of Varona Village.
KM: Varona?
RT: Yeah Varona Village. Banana Camp they used to call it, now. It's still there.
BaS: I could take you riding one day.
KM: Oh, that would be great.
RT: But the village no longer exists.
BaS: It's there, it's there, but, people live there.
RT: People called it Banana Camp.
KM: Was there a reason?
RT: But Banana Camp versus C Village was opposite end.
BaS: Had a lot of bananas.
KM: I see.
RT: Where Varona Village still exists, but C Village is no longer there.
BaS: Yeah, that's not there anymore.
KM: Leveled out, or are there houses there now?
RT: Leveled out. And behind C Village, my parents used to live was called Mendonca Farm. And that little village consists of maybe 5 houses and a long building, you remember that?
BaS: Leland said that that was a horse, where they used to keep horses, yeah.
KM: Oh, the Stable Camp?
RT: Yeah. That's why it was long.
BaS: That's why it would look like what it looked like inside.

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RT: Really?
BaS: Yeah.
RT: Who owned that, Mendoncas?
xx: Mendonca's had one, two, three. Three sections.
KM: Really? Ohh...
RT: Yeah. And my mom and my dad lived, we went in circles around there.
BaS: Oh, yeah. We lived all over 'Ewa, honestly.
KM: Ohh.
BaS: Lower Camp had the best view, but.
RT: Yeah.
KM: Which view?
BaS: Lower Camp.
RT: That's where the keiki, family keiki center.
KM: Yes.
RT: Okay, right across the street there's like a hill. And that's where we used to live.
KM: Oh, so the one right on the main Fort Weaver Road now.
RT/BaS: Yes. You remember when the big tree standing in the middle of nowhere? They claimed that they can't cut the tree down because they hear babies crying. So that's why that big tree is still there.
KM: And sorry, was that connected with the hospital area, or not?
RT: No, because, what village was it I just said?
BaS: Lower Village.
RT: Yeah, Lower Village. But of course the hill brings you up there. And then the old 'Ewa Plantation Hospital was here, and if you go up Lower Village all the way to the tip, because there was a dead end. When you overlook the fence that's called Chocolate Beach.
KM: Chocolate?
RT: Chocolate Beach, where we went crabbing there. In our younger...
BaS: I could take you back there, too.
RT: Yeah, it's different.
KM: You know, we're gonna have to try and find, I'm sorry, usually I come and I bring maps to places. But, I couldn't find any old 'Ewa Plantation maps, so I gotta try look around because that would be good. Like when you're talking about Filipino Camp, Korean Camp, must have had Japanese Camp somewhere?
Group: Yeah. Tenney Village was Japanese Camp.
KM: I'm sorry, Tenney?
RT: T-E-N-E-Y. That's where I live still.
KM: Oh. So that was Japanese Village?
BaS: Yeah, used to have a lot of Japanese families.
KM: Was Tenney one of the managers or something?
RT: No, was Ed Bryan.

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Group: [discusses managers' names]
KM: Managers?
BaS: Yeah, they were like the luna, kind.
KM: Ohh. Yeah, because I think I've heard the name Tenney.
JD: Yeah, James Orrick, too... Yeah? The manager.
RT: See, hence Orrick Street, yeah, Bond Street...
KM: James Orrick?
JD: Yeah, James Orrick.
KM: Bond?
xx: It's a Bond, we have a Bond Street.
RT: Imelda, I don't know where Imelda Marcos came from but we have...
xx: That's in Fernandez.
RT: Filipino Village.
KM: Yes, yes. How interesting.
RT: Even Renton Road.
KM: What was Renton Road?
BaS: It's named after somebody, one of the workers.
KM: Oh, it's not a military person?
RT: No.
KM: Oh really, so it's older? I just assumed, like so many of the ones, they took it over made military names.
BaS: No, not 'Ewa. Not 'Ewa.
KM: Ohh, so really, 'Ewa Plantation, now where the old mill was is where the district park area is, the new building now, right, basically? So, from there, you folks stretched, the camp stretched...
RT: All the way out...
BaS: To where the choochoo-trains are at.
KM: To the trains?
RT: By the railway.
KM: Ohh.
RT: Hawaiian Camp.
KM: You said there's Hawaiian Camp?
RT: Hawaiian Camp. Because they used to be the workers for the railroad.
JD: Right, right.
KM: Ohh.
RT: And that used to be all Hawaiian families.
KM: Wow, interesting.
RT: Yeah, only Hawaiian families lived there.
xx: I could get you to speak to someone, that would be Gaelic them.
KM: Ohh, interesting. I will try, if I can find you folks some old maps to plantation, how it was laid out, it would be really beautiful because you know, all these things you're talking about, it's so nice when we can mark it on the maps and

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then actually commit it to a place, yeah?
Group: Umm hum [in agreement].
KM: How interesting. But at least you guys know what the modern stuff is.
RT: She knows a lot.
KM: Yeah.
RT: She's old that's why! [laughing]
Group: [laughing]
KM: And sorry, actually did, I don't know think you shared with me your date of birth?
RT: July 13, 1955.
KM: Ohh, okay.
RT: I was born in the 'Ewa Plantation Hospital.
KM: Okay. Just like uncle? Uncle, too, was born there?
JD: Yeah.
KM: Wow.
xx: She [gesturing to xx] was too!
RT: I was one of the last.
Sisters: We were, I was born in Wahiawa.
Sisters: I was born in Wahiawa General also.
Sisters: But that hospital was, even when we got World War II attack, my aunt was working there. Aunt Booning and I think she saw one of the planes or something?
KM: Aunt Booning?
RT: Yeah, she's gone though. He's [gesturing to uncle] the last surviving one.
KM: Ohh, interesting...
KM: So, I take it, you next?
xx: No me, this one.
KM: Oh, I'm so sorry!
MS: That's okay!
RT: They're only one year apart.
xx: Yeah.
RT: They travel together.
MS: So you need the name?
KM: Please, name and date of birth.
MS: Mona Claire Aiko Shibuya, October 7, 1958.
KM: Okay now, what's your connection here?
MS: We're sisters [with RT].
KM: So how did you come up?
RT: Half-sisters.
MS: I'm divorced, that's my maiden name.
KM: I'm sorry, yes. But you have a Japanese middle name.
MS: 'Cause I'm Japanese.

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RT: Half-sisters.
MS: Yeah, same mother.
RT: Different father.
KM: Yeah, I see. Okay, it's just, so you were born in '57?
MS: '58.
KM: So even by that time it's kind of unusual, particularly for Japanese to marry Filipino.
RT: To inter-marry.
MS: Yeah, to marry.
RT: Exactly.
KM: You know, even on Lana'i it was. When I was in school on Japanese, the parents never like the girl go with one haole boy.
Group: Yeah, yeah.
MS: It was so hard.
JD: Before, it was a land trust.
MS: We felt the difference.
RT: Especially within the Pearl Harbor.
JD: Ohh, yeah. [laughing]
KM: Ohh, and you said 1958, but you were born up Wahiawa Hospital, then?
MS: Wahiawa General.
KM: Okay.
MS: For whatever reason, mom and dad, I don't know.
KM: Yeah. But 'Ewa [Plantation] was still open because you were the youngest?
RT: Yeah, I was born there [in 1955].
KM: Well you know, you brought up an interesting point when you mentioned that people talk about, where was it, where they hear babies cry? The tree and they don't like?
MS: It's right there...
KM: It's by the child support...?
MS: Yeah, when you go down, there's this tree. It's just the tree just in the middle standing in nowhere.
JD: That's a landmark. [laughing]
KM: Yes. It is interesting because we know that in the earlier days, particularly through the '50s, but before, there was a very high infant mortality rate on the plantations. There were some good doctors, but there were some, you know, and families often said, "It wasn't until so-and-so came that finally our babies started living." So, it's interesting, you know that every child that was born in a plantation hospital is a survivor.
Group: Umm hum... [in agreement]
KM: That survived that.
MS: Well, my uncle them, in the old plantation graveyard. They have two brothers there. What did they die of uncle? Feliciano and... pneumonia. And they

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were babies, too, right?
RT: Yeah, they were 2 and 3 years old.
KM: So that's in the old graveyard that's on Fort Weaver?
Group: Yeah.
RT: Our grandfather is in there, too.
KM: Ohh.
MS: Yeah, his [indicating Jose] dad.
KM: Now, forgive my ignorance again. Catholic church, there was a Catholic cemetery, is that correct? Or not, was that plantation?
MS: No, plantation.
RT: Plantation.
KM: Okay, but where was the church relative to that? Close by?
MS: Still there, still there.
RT: We had only one church.
KM: Okay, so that's right in the camp, then?
JD: It's still there, still there.
RT: Yep.
KM: Ohh.
MS: Immaculate Conception is the Catholic church, and then 'Ewa Community is the Christian church.
KM: Ohh, okay.
MS: Right next to 'Ewa Elementary and the two churches.
KM: Yes. Ohh.
JT: But didn't they have another Catholic Church by Honouliuli and they grew too big and that's why they went build 'Ewa Church?
RT: That must be years ago.
RT: There is a history of an older one, you are correct. At Honouliuli there was a Catholic lot, but that lot was actually awarded... By the 1850s it's already there.
MS: Ho, that's a long time.
KM: And so that predated the plantation. When the plantation came, all of this, back then it was only a few Hawaiians who were being Catholics. But when the plantation came, particularly with the Filipino influx, yeah, it built up so they created interest. So you're absolutely right, by what used to be the taro lands, all at Honouliuli.
JT: But then I think the Catholic church also purchased property there, in Honouliuli, that's where our new church supposed to go.
KM: Oh really?
JT: But right now it's still...
RT: Pending.
JT: Yeah. I'm not sure.
KM: I wonder if it's on the same land, or if they bought new land. Interesting. That's

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actually old, there was old land for the church at one point.

JT: By the golf course area.

KM: So please, give me your full name and date of birth.

JT: My name is Janice Kiyoko Shibuya Trnidad, born January 2, 1960.

KM: And, Barbara [Shibuya], you're the baby of the whole family.

BaS: Um hum.

KM: Okay, when were you born?

BaS: March 25, 1966.

KM: Ohh, wow, big spread, yeah?

BaS: I know, that's why they used to make any kine to me.

KM: Yeah?

BaS: Yeah, beat me up, everything. [laughing]

KM: Lots of love, lots of love. [laughing]

RT: It's just the way she is cause she was just spoiled rotten.

BaS: That's okay. It's all good.

Group: [laughing]

KM: That's what they all say, it's like you guys started, no more new clothes, did you have rice bag undergarments or stuff like that?

MS: Oh, we all have stories.

BaS: I was blessed, I nice, nice clothes! They had the puka panties, not me!

RT: Holy smoke! I'm not gonna say anything about our underwear because we're being recorded!

Group: [laughing]

MS: Nobody's gonna hear it right?

KM: Oh, no, this is for you folks.

MS: Yeah, he can say it 'cause it's for us! He's not gonna go public. And even if he does with it, somewhere down the road, it'll leave a legacy for the ones we leave behind! [laughing]

KM: Kids don't realize how lucky they are now!

RT: When we were growing up, 'cause my mom and my dad was working, and I had my three sisters, being her that the youngest, I don't recall, but what I used to do is put this one [Barbara] in the middle and all us three would jump around the bed, if ever she fell down, and I got good licks.

KM: Ohhh.

BaS: See, and that's why, I'm a receptionist only 'cause they abused me!

Group: [laughing]

BaS: Tell 'um about duyan, they don't know what is a duyan.

RT: Oh, it's like a little baby hammock that's laid out on a rice bag. And it's attached to the wall, to the corner, like this, like a hammock. And then what my grandmother used to do is tie one end, strong, then I would put the pillow in and put her in...

BaS: And whip me around.

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RT: And just because I was tired, and she wouldn't go to sleep, I would tie the rope... [gestures pulling]

BaS: You guys are crazy! [laughing] No, but it makes the baby go to sleep.

KM: Yeah, of course! Yes, yes.

BaS: And today it's called "Shaken Baby Syndrome!"

Group: [laughing]

KM: Duyan?

Group: Yeah, duyan.

RT: It was made out of rice bag.

JD: [laughing]

RT: It was strong.

KM: Well of course, plenty guys had garments made out of rice bags, yeah?

JD: Yeah, at those days.

KM: Yeah.

JD: Yeah, used for shorts.

RT: And then what happened is his younger brother, when he was young, he was really naughty. He's no longer here with us.

JD: [laughing]

RT: And he was saying that one day, our grandpa told him to do something, he didn't listen, well his friends now came, called him, "Pato! Let's go play!" My grandpa said, "No." You know what my grandpa did, put dress on him, that was our mom's dress. And he went to the window and he said, "I no can, I get dress!"

Group: [laughing]

RT: I said, "Wow!"

KM: You have one of two choices, either he never did it again, or he like wearing dresses!

Group: [laughing]

MS: He never did it again!

RT: His pants got burned by a cigarette... you know the Pake store, in the back?

JD: Yeah.

RT: It was in somebody's garage. And I guess, he went to the store, 'cause he was sent there to go buy something, according to him, and he liked. 'Cause he would pick the buds on the ground. And he did not know that my grandpa was coming, and he saw my grandpa, he said he put the cigarette in, and it started to smoke out. Funny, he was dancing.

KM: So, you mentioned the store, so in your camp, did you have like sometime, did men go around the camp?

RT: Yes. We had a peddler.

KM: So, the peddler would go and...?

RT: Right, but this particular store, was built in someone's garage, and the one who ran that store, he was Chinese.

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MS: Mau.
RT: Yeah, Mau.
xx: Then the son took over.
MS: Because the father passed away.
KM: So did you folks have, you know, do you remember, uncle, you had bango?
JD: Yeah. Right, right.
MS: Yeah, they all had bango.
KM: So that's how you had to, you would go sign.
JD: You use it for charge.
RT: Even 'Ewa Store.
KM: Was it by...
Group: By the Post Office.
JT: Friendship Bible has taken over the building.
Group: Ohhhh.
JT: Yeah, that was the best store. They had the best barbeque meat, baloney...
JD: [laughing]
MS: Yeah, you could buy fresh meat there. You could choose what meat, it's not pre-packaged. So you could say, I want one pound of hamburger, one pound of barbeque meat, you know.
RT: All kinds.
MS: I miss that.
BaS: Yeah, and when we had parties, if we had pigs, they would let our father hang our pigs in there.
JT: Yeah, in the back room.
KM: Wow.
JT: You could buy the biggest block of ice for a quarter!
KM: Did you folks still have ice box, or you had regular refrigerator?
MS: Oh, that's only for parties. To hang our pig and they would get it in the morning. I miss those days, I reminisce...
KM: You miss those days, yeah? In the plantation days, when you were young, were the camps sort of isolated, like Filipinos stay here, Japanese there...?
JD: Yeah.
KM: So, there was kind of a separation between the groups?
BaS: Yeah, even until when I was growing up, my boyfriend that I'm dating now, we grew up together, but like I said, he moved away, came back 27 years later. He knew that I came from the Japanese Camp, and like I was off limits. Yeah.
JD: [laughing]
BaS: Yeah.
JT: We couldn't walk a certain street in 'Ewa, because that would be the luna's homes. And I remember my dad saying, "Don't walk down this certain street." But me and my sister walked down that street because that street had so much shade! And then, my dad got a call, well they went to his site, and they knew whose

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child, we belonged to, who's your parents. And then my dad said, "Don't you guys walk down that street," cause somebody turned us in.
KM: Amazing. Even in the 1960s. Who was the manager then, do you remember?
MS: Ed Bryan.
JD: No, had Orrick. Orrick, too.
MS: But I know Mr. Ed Bryan. I didn't know the other one.
KM: Orrick was earlier?
JD: That's right, when one of the old managers died, Bryan came.
MS: Ohh. Orrick and then Bryan.
JD: Yeah, James Orrick.
KM: Yeah, James Orrick? Wow.
JD: Yeah, before.
KM: Wow, it's so interesting how the sugar plantation was actually much more strict about that, than on Lana'i.
JD: Yeah, they're all really different. Really different.
KM: Different camp, different village. Were there even different stores, like you know, Filipinos shopped at this store, Japanese shopped there?
RT: No, no, it was just the good old, 'Ewa Shopping Basket.
KM: 'Ewa Shopping Basket. So that was...
MS: Well had Murata Store.
RT: Oh, that's right. We forgot about Murata Store. That was called Honouliuli Shokai.
KM: Honouliuli Shokai?
RT: They were run by Japanese.
MS: Honouliuli.
RT: Honouliuli, yeah. That's right... Shokai.
BaS: Chiuks, too, on the corner.
MS: There's, the building is still there, but it's all ugly now. I think it's still there.
BaS: Have you guys been back there on that street?
KM: No, we should go sometime.
BaS: I can take you.
KM: Yeah.
JD: Cause no more have the store, but the foundation.
BaS: Yeah, yeah. My uncle used to live back there for a little while that's why.
JD: I remember the owner of that place.
BaS: Was cute back there.
MS: Cute, was so cozy.
JD: They own a big lot down there in 'Ewa. I never know they own so many acres in there.
BaS: The Murata family. There was a Japanese internment camp back there, too.
KM: Ahh, that's where the internment camp was during the war?
BaS: Across the street, I believe, yeah.

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KM: Ohh. Let's talk, real quickly. How old do you think you were when you started...
What did you do, hoe hana in the sugar, or did you actually cut sugar or what?

JD: Umm... cut grass, and I cut cane.

JD: Umm, yeah.

KM: About how old do you think you were?

JD: Um, let's see. 18.

KM: Ohh, ohh. So, high school already?

JD: Yeah.

KM: Did any of you girls work plantation?

Group: No, no, no.

JT: Like I said, no, because he knew it was gonna fold up.

KM: Ohh. Did you folks know Bill, William Balfour?

Bas: Yeah, Bill Balfour.

MS: That was my dad's good friend, too.

Bas: Is that the kine, Don's uncle? Don, the one I dated.

RT: Bill Balfour. I worked for the brother, Dr. Balfour.

MS: Ohh, yeah, that's right. He was the luna before, too.

KM: Apparently, Balfour was the one who was working when the plantation closed.

MS: Yeah.

JT: His mother married that man.

Bas: I dated the step-son.

JT: [laughing] That's her fault.

MS: So he now works for the city, yeah?

KM: Yes, parks and rec.

RT: His wife's name was Dedra, I think.

KM: Dedra?

RT: Yeah, I met her once.

JT: That's Don's mom?

RT: I worked with him, 'cause Mr. Balfour's brother is Dr. Balfour for Straub...

KM: ... Well you know, it's so interesting, sounds like plantation... growing up when it was plantation, you folks sounds like you kinda, it was a good life, though. Sounds like it was good fun.

Group: Yeah, yeah [in agreement].

RT: Yeah, you don't get a lot of material things, but there was love. And you could just hop on your bike and just go, "Uh oh! The whistle blowing, gotta go home!"

KM: Ohh, so what time did your whistles blow?

RT: Three o'clock.

MS: Three thirty.

Bas: Seven and three, and eight o'clock.

RT: Ohh, gotta go sleep now! [laughing]

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MS: You can hear, it's really loud!

RT: Yeah! [Imitates sound of whistle] [laughing]

KM: So was the whistle on the mill? On the sugar mill?

RT: Yeah!

MS: It comes from the mill. So loud!

Bas: But 3 o'clock is like, "I gotta get my butt home 'cause I gotta put the hot water on the stove for dad's coffee." [laughing]

JD: [laughing]

Bas: The rice gotta be cooking.

KM: Was that pau hana?

Bas: And something gotta be thawed out. That's when they all grew up already and I had to take care of the chores.

KM: Ohhh.

Group: [laughing]

KM: So you had to pay your dues?

Bas: Back then, you respected your parents. You didn't have to get a whip for it. You knew what you needed to do and you did it.

RT: They hop onto the truck, sit on the bench, and then they're taken home. So, they park on one side, and all the old folks come down.

JD: [laughing]

RT: Then they go onto the next stop.

MS: It was nice!

OM: You guys have pictures from before at all?

Group: Umm, no... I don't think so.

Bas: Humm, but we can get, because we just had a...

KM: Well we should talk story about some photos, too. Did you folks used to go down to the beach on the Pearl Harbor side?

RT: Ohh, yeah! Used to have oysters stick out of the ground!

MS: When it was low tide, my dad would go over scoop um up, and fill up the big barrel.

JT: What was it, oysters?

MS: Yeah! Throw um the fire!

JD: Had clams! And everything.

Bas: And clams! And crab.

MS: And crabbing!

RT: That's a different kinda crabbing.

Bas: See, when my husband started going crabbing, when we started dating, "Ohh, we're gonna go crabbing!" They would go by the bridge and throw the nets in, and I'm like, "That's not crabbing!"

RT: We were raised where, you walk in the water! And it's dirty.

Bas: And then they lay out the crab nets with all our fish heads inside, by the time we line um up, then we walk all the way back, we dumping out already.

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KM: Samoan crab, or what?
Bas: Uh, no, just the regular one.
KM: They call kūhonu?
MS: Kūhonu crab.
KM: Are they about this big?
Group: Yeah!
RT: What you guys used to call uncle, Sand Crab?
MS: No, Blue Crab.
KM: Yeah, I think that's Haole Crab.
JD: The Blue One. And they have the Haole Crab. And they have dots on the top.
MS: You see, going out, we don't know get shark, yeah? In the water.
JD: [laughing]
RT: So, we're just going, following the "Big Baldee," we call it Big Baldee, and then uncle is in the front of us, with a big stick, and we get the Big Baldee...
MS: And we walking...
RT: All we thinking about, "Ohh, we gonna get crab tonight!"
JD: [laughing]
MS: And then we come out all itchy, itchy. 'Cause get like fiber glass, yeah.
RT: So, itchy, it's really funny.
MS: But ohh, that's okay!
KM: What was the itch from?
MS: The water is dirty! The chocolate beach.
JT: It's brackish water.
Bas: We call it Chocolate Beach.
JD: Brackish water, yeah.
RT: And then not knowing, cause you cannot see what's in the water...
MS: Yeah, it's murky, it's muddy.
KM: Did you folks never hear stories about sharks out there?
RT: They never told us.
Bas: They said hammerhead, no, Jan?
JT: Yeah, no, but there's a lot of hammerhead sharks out there...
JD: I think they did, but doesn't matter.
MS: They never told us.
KM: You know, it is interesting because Pu'uloa, the old Awalau, the old Pearl Harbor, was famed for one shark, that they called the shark goddess. And she actually protected people, no man-eating sharks, you folks never heard the story?
JD: No.
KM: No man-eating shark ever enter into from at Keahi, Iroquois Point, was kapu already in the old days. So people who lived within Pu'uloa, the Pearl Harbor area, they said, never had to be afraid of sharks. But you folks never heard stories, yeah?
JT: We never heard stories of anybody getting eaten.

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JD: [laughing]
RT: Because, we was like, "No problem!" [laughing]
KM: But uncle, you said one knocked you one time? One shark you felt went knock you?
JD: You can feel um, the hammerhead shark. You can feel the head, yeah?
KM: Yeah 'cause rough, kalakala, the skin, yeah? You can feel, like sandpaper.
RT: I think after that incident, when we went crabbing next time, there was a big barge, Chocolate Beach, we'd go on top that barge. So uncle said, "Put your aku head and go." Me, Vern, and Nina, went jump over the net, and we kept making big noise, so uncle got mad. We neva catch. That noise.
KM: Well, you know what? That's another interesting story for 'Ewa, they say that in Pu'uloa, in the old days they called it Awalau o Pu'uloa, Pearl Harbor, now. And, there was a kapu, you know the oyster, that you folks talk about?
Group: Uh-hmm.
KM: The old Hawaiian oyster they called pipi, and that oyster, if you made noise when you went fishing, it caused enough of a breeze, that the oysters would all go hide, they would be hidden, and you could never find them. So, even those kinds of stories, the practices that go on, you know. Like, your parents never told you, "Watch out for the shark."
MS: No.
KM: Then, when you go make noise, and then they come hūhū, they say "Tau, go home," right?
RT: Yeah. Only thing, his father, my grandpa, used to go to, what is it uncle, Kiku Point?
JD: Yeah, Kiku.
RT: And I was little, and I went fishing with my uncle, his older brother, and I was little. And I went, cause I got up early. They caught lotta, lotta fish, that my grandpa told my uncle, "Panyo..." that was my uncle's name, "I going throw one back." My uncle got mad, yeah? So my grandpa said, "You just no keep on taking, taking. You give back."
JD: Yes...
RT: Because we had three bucket full of fish, that my grandpa wen throw one, my uncle got hūhū, he was mad! So my grandpa said, "No, no, no, no, no, no, two is enough for, you know." And my mom them came, and my grandpa used to divide.
KM: Divide the share, yeah?
RT: Yeah. But always give back to the sea.
KM: That's such an important cultural practice.
RT: But it's like, grandpa, you know like, they work in the plantation. And had his own two acres of field by Honouliuli.
JD: Yeah, yeah, yeah.
RT: Okay. I was little, I was born and raised up by my grandma and grandpa.

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Because when I was little, when my mom met my step dad. Well to begin with, to make things short, my dad had another family.

Bas: Her real dad, now. Not my dad!

RT: [laughing]

MS: And they had a big, big age difference. My mom was only 19, my real dad was 41!

JT: Yeah, he was already married!

RT: And he didn't tell my mom, so of course, my grandpa I think was against it. But, when you're in love... they got married... [family discusses background of various families, one in Hawai'i and one in the Philippines]

After she had me, because all this commotion, she left me with these guys!

My uncle, my grandpa, they the one that brought me up! She went to the Big Island, and then she went to stay with Aunty Trini Jusul, yeah?

JD: Yeah, yeah.

RT: Then she met my step-dad, so they got...

KM: So Shibuya was from...?

MS: Yeah, Kea'au.

KM: Ohh, Kea'au.

MS: 'Ōla'a.

JT: Ohh, 'Ōla'a.

RT: Then, when my mom gave birth to this one, they came back because now my step-dad was now with the plantation because of grandpa!

JD: [laughing] Yeah, yeah.

RT: When they came over, and my mom now wanted to take me because now she's married, she's settled, and I have a...

KM: Yes, yes. So you have a sister.

RT: And my grandma said, "Leave me with them! Leave um with me."

JD: [laughing]

RT: Because now you guys live here, you could always, you know...

KM: Yes, yes.

RT: So, that's why I was brought up [by my grandparents.]

KM: So she was so attached to you folks...

RT: After that, cause you know my mom left me with them because of this.

KM: Yeah, of course. From young, yeah.

Bas: But we never considered each other as half; it's like, that's our loved. We're like, "What!? That's our sister!"

KM: That's how family is! That's how family is.

RT: Because I really didn't know my real father's side. Cause after I was brought up by my step-father, which he carried me under his medical, everything.

JT: Wow...

RT: So, that was the part of the story of my life and it's just so different. And, it's nice.

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KM: So, interesting, so Shibuya must have been working for 'Ōla'a Sugar Company, or...?

RT: Was it 'Ōla'a? I think so you know...

KM: In Kea'au. With the Shipmans.

JT: Well actually, they met at, I thought they met at Young Laundry?

MS: Yeah...

Bas: No, Ariyoshi's ah?

MS: Yeah, Ariyoshi's Laundry, yeah? Out there.

RT: Where, in the Big Island?

MS: No, here.

JT: Here.

Bas: Yeah, here.

RT: Where did? Because according to Nanai, when I asked her, then even mom, she said, "Ohh, no, we..." 'Cause she went to the Big Island, yeah, with uncle?

JD: Yeah.

RT: And she got married!

JD: [laughing; group discusses family and marriage background]

JT: As far as we know, that mom and dad met at the Ariyoshi Laundry. Dad was a driver and mom was a checker, I think.

JD: Oh.

JT: That's how they met.

RT: Then they moved to the Big Island?

JT: We went Big Island.

Bas: Well, maybe they were there at Big Island, cause that's where dad's family is! And stayed there for a while and then came back...!

MS: And so the first time I ever met aunty them, we was living lower camp, and they came and remember mom going, "Hey, get some Japanese ladies outside!" That's the first time mommy met.

JD: Oh...

Group: [laughing, continues discussing background and relationships]

KM: ...Interesting. So see, good thing we talk story!

Group: Yeah!

Bas: But this is good, because we don't have this when my mom was alive. Well, she had some awesome stories, that we wish we taped.

KM: Well you know, and then going back to your story, did you say, Kiku? Where did you say where you went with your Tatai?

Bas: Kiku Point!

KM: Where is that?

MS: Kiku, Kiku.

KM: Kiku?

MS: K-I-K-U.

RT: It wasn't too far from here, anyway.

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KM: Oh, I wonder why they call it Kiku Point?
JD: Yeah, yeah, that's a beach.
BS: Maybe it was a nickname.
RT: And then there was one Kahe Point, but that was toward Nānakuli area.
KM: Yeah, yeah Kahe Point.
MS: And Kahe Point is still there.
KM: Yes, Kahe Point is still there.
JT: But no more Kiku Point, I think this is Nimitz, already.
BS: But we used to pick ogo at Pu'uloa.
KM: Ohh, really?
BS: Yeah, we used to swim inside.
KM: So speaking of limu, how about out here and towards One'ula. When you were young, did you ever go out there?
RT: A lot! The seaweed, you talking about?
BS: Ohh, yeah!
MS: Sometimes we walk and just pick it up from the sea, and put it in your basket!
KM: Yeah, just right from the shore.
Group: Yeah!
JT: For us, that's rubbish.
KM: Lipoa.
JT: When we were growing up, my aunts would come down, from town, and they'd go, "Ohhhh! Look at all the ogo!" And we were like in the water, "That's rubbish!"
RT: [laughing]
MS: Why are they picking up the rubbish, uncle?!
JD: [laughing]
MS: 'Cause you need the fresh one, in the water! You just gotta go with your feet and you get all the patches!
JT: You could see um at low tide, too!
MS: And one time, my dad saw me, I went with, "Look, check this out!" I go with my toes, I pull um out! And they get the root!
JT: The shells!
MS: Ohh, my dad went ballistic! He said, "Don't you ever do that again! You go down, and you break it off!"
KM: Yeah.
MS: You pick it off! So after that, I was like, "Okay, I won't do it again!"
KM: 'Cause you look, now, hardly no more limu.
JD: Those Samoans take all the seaweed.
JT: Those Samoans, uncle?
MS: And the Filipinos, too.
JD: You go there, the thing is gone! When they came inside the water, what happened?

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KM: Well there is, even on Lana'i.
RT: They used to raid the mango trees, too. Cause I had four mango trees! And we had a fence!
JD: [laughing]
RT: And one day I was home I recall, because my baby was sick.
BS: The one family with the daughters? Is that the one yeah?
RT: Yeah. And then, I had a coconut tree. Okay? Then she go, "Hello, hello!" And we had a little dog that I would leave um, you know running around. And I go, "Yes?" and she go, "I can have some mango?!" And I said, "Yeah, you can." So I said, "When you done, you pick up all the rubbish!" There were three boxes! I said, "Excuse me! Try stop!" Pack! Pack! And then all of a sudden, I saw, one of the Samoan kids when climb my coconut. I said, "What you doin over there?" He took the hatchet and just, Bam! Bam! All the coconut came down. I said, after that, no more.
JD: [laughing]
RT: I said, "No! Enough!" And then they all bring you know the big bag. I said, "Wow! That's enough! Excuse me, that's enough!"
KM: Well, it is interesting like you said, how people, like you were describing, your Tatai, like he told even your uncle, "You give back." Or, you take what you need, not everything, yeah, kinda stuff, yeah?
RT: Ohh, that's what I was going to finish. Kay, my grandpa, they had, what was he, irrigation, yeah? No?
JD: Yeah.
RT: And they all had their own acres of fields, my Tatai, his dad, had about an acre and a half. And that was by Honouliuli, above by the, what is that, the water pump?
KM: Yes, yes.
RT: There's a water pump. Every three years, I remember, they would harvest our Tatai's field. But, after or before they did take away the cane, my grandma used to cook big pots of food and then the beer, and everything. And I look, how come no more. So, my grandpa, his brother, he comes home, my Tata he take a shower, my grandma gets all the stuff. 'Cause I was staying with them, right? And then we go. There was a hole that my grandpa made. My grandpa say something, and he throws all the food in this hole.
JD: Yeah. That like offering, yeah?
RT: Yeah. Whereas, the other Filipinos who had cane... skinny, no sugar. Ohh, the crop!
JT: Yeah, it goes about how sweet your sugar is.
MS: Yeah, and they would get a big payday, yeah?
RT: Yes, 1600, that was a fortune back then!
MS: And to them, that's big bucks!
RT: And our day, this other Filipino man told my grandpa, because they were jealous,

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now. They would harvest their crop, as I recall, they get only 800. My grandpa is like, at 2 grand. That's a lot of money before! So that's why they were jealous of my grandpa. My grandpa never tell 'um what he does.

KM: That's interesting. And you wonder how did you grandpa, how did you father, learn about that kind. You that you, you care for the land, you give back, it gives to you.

JD: I think he learn it from his dad, I think.

RT: And after that, all the food, chicken, everything, it's in there. He'll take a shovel, he'll cover it, and then around that little area, he would put beer.

KM: Interesting. So that's the one by the water pump.

MS: Above.

KM: The well?

RT: No more now, yeah? Okay, Honouliuli, not too far where we used to live. Was across. I don't know how you...

JT: Isn't before, didn't after daddy them when have that field?

RT: He did.

JT: Daddy had that field after.

MS: Yeah, he did. My dad did.

RT: And what dad used to do, too, is he would grow vegetables. Squash. All kind of vegetables, and mom used to take it to work and sell um, and the vegetables would be really nice vegetables. And then, maybe the Filipino lady who sold pastry, she would trade in vegetables. One of the Filipino ladies used to trade vegetables...

BaS: And then you and I we go hide from her in the banyo.

JT: Why, you was scared?

BaS: Yeah, I was!

JD: [laughing]

KM: So, did you folks, did you have separate banyo, or was it in the house?

MS: Yeah, was outhouse. And then the one and number two!

JT: We used to go to the bathroom, no problem, cause used to have the running water.

RT: They somebody was telling story that a man went go use the restroom, and the water get water rats, and he get bit, yeah?

MS: Ho! We used to hold, and hold, until we go to our Nanai's house!

RT: They had a regular toilet! So after that, my dad had to... as soon as the house opened with inside restroom, we were in that house! Because we were like, "Come on!!! Take us Nanai's house! We gotta go bathroom!!"

KM: Ohh, how funny! Aue!

RT: I refused to go use bathroom after that!

MS: All because we would listen to them talk story, the adults.

BaS: Those outhouse bathrooms were scary! They were scary looking!

MS: But we didn't know any better, though!

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BaS: Cause Aunt Jane them had. I never like that one.

MS: Until we listen to their stories.

RT: You can hear all kinds of stuff underneath there! You don't know what's in there.

MS: And you just hear the water running, too. Also the stench, too.

JT: But that's when we used to throw Pine-O.

RT: There was a board that we sat on, yeah, Jan?

JT: Yeah, but then after they go put toilet seat cover, but with even those never like use um!

Group: [laughing]

RT: And we used to pee in pots, yeah? You remember, night time?

JT: Yeah, because, who wants to walk all the way...

MS: It was outside.

JT: And there's no lights!

JD: [laughing]

KM: So, speaking of no light, and then we have to come back to the ocean in a moment, so you folks said, last night, Barbara said you folks was talking ghost stories. Did you folks ever hear any kine? Or did you? Like Night Marchers or anything? You know, they talk about?

RT: My house had. On Renton Road.

KM: Your house had?

MS: I've never. I've never seen um.

RT: The one that I was born and raised in.

JD: Yeah [chuckles]

BaS: No, but they said on the graveyard on Fort Weaver, some people can see, when it's like drizzling. There used to be cars that would just flip over out of nowhere.

And they said because a procession would be going across the street.

JT: But is it like Lynn's house? It is by, that's that path?

MS: That's the pathway.

BaS: From the church, to the graveyard.

JT: My cousins, they're not here, but their home is on the path. And they could hear, at night, you like chariot, oh you know, the horses.

RT: But you know that, even the Immaculate Conception Church, even the priest said, you can hear the galloping of the carriage. I would freak out. I would run away from it.

JD: Yeah, that's how before, yeah?

KM: Yeah.

JD: Get all kine stories, yeah.

KM: Yeah, well they say, the dry lands, from Pu'u o Kapolei, you know the hill. Kapolei Hill, come across here. In old, Hawaiian days, it was a place where the Akua, the ghost, used to run all over the place.

MS: Used to have here!

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BaS: Is it true that Honouliuli used to be a battle ground?
KM: There was a battle there. And there's a place in Honouliuli called Po'ohilo. It's one of the old land areas at Honouliuli by the taro lands, it's in the upper section where the old road cut across, the upper section is Po'ohilo. That's named because the defeated warrior, or king, from Hawai'i, Hilo, his head we put on top the stick right there.

Group: Ohh, wow. Eww.
BaS: Ohh, that's interesting.
KM: Yeah, but you know.
MS: Where was this?
KM: Po'ohilo at Honouliuli. Up at the taro, the wetlands.
JD: Ohh, I didn't know about that.
KM: So, you folks know, you said you would come out this side, gather limu and stuff.
MS: Yeah.
KM: Now, may I ask a question, and I know you're a little young. Uncle's the oldest one. You know, where what they call Hau Bush?
JD: Yeah, yeah. Used to get all the seaweed down there.
KM: Just between sort of Hau Bush and White Plains, the fence, midway, there's an old coral and cement, old Hawaiian-kine cement well. It's still there today.
RT: There was a lot, isn't it? That stone.
KM: Yes, yes. What I'm wondering is, up until the 1930s, if you look at old maps, there are two houses that were there. I'm wondering if you folks remember, where there any old houses still along the shore by your time when you came?
JD: On the shore?
KM: Along the shoreline.
JD: I don't remember.
MS: When is this?
KM: When you come out, when you leave what is Hau Bush, coming towards the fence at White Plains now, sort of mid-way between the One'ula Beach Park and the White Plains fence, basically where the lagoon marina was gonna puka out, but now no more, yeah?
Group: Yeah.
KM: There is a wall made of coral stone with, you know how they made cement before days, they would bake the coral, pound it, and then mix it to make mortar, yeah?
JD: Yeah.
KM: So it's that kind of an old, and there was a sinkhole, a puka in the coral rocks, that used to have water in it. Well, there used to be two houses there up until the 1930s and I'm really curious to see if we can find out who lived there. Did you folks ever hear of the Kahalekulu family? Worked for the ranch.
BaS: Well, I used to rent from the grandma. The granddaughter bought a house

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from us.
KM: Yeah, Marissa.
BaS: Yeah, yeah.
KM: Yeah, well define, Marissa's father's coming home, he's gonna be here on Wednesday. And we actually, we're gonna go walk the shoreline, too. But he's young like you, you know, he's 10 years older than you. But he's basically your age.
JT: Ohh, okay, okay, okay.
KM: You were born in...?
JT: '55.
KM: Yeah '55, yeah, so he's born in '56. So he's one year younger than you. But from their family stories, I'm curious, you know, had to be that we should be able to find who the families were that were still living there. We assume it must have been with the ranch, you know.
KM: But you know, it's so interesting, so important to talk story. And sometime, you know... So you're leaving, though, you're leaving you said, Sunday.
RT: Sunday.
KM: This coming Sunday? Yeah. You know this has been such a wonderful, just to skim the story to talk story, you know. What we should do is we should try and sit down and we should try and talk story again sometime.
JD: [laughing]
KM: So you goin keep coming home, you know.
Group: [laughing]
BaS: Their next trip back here hopefully will be February.
KM: Good, good. What I need to do is, you can give me aunty's and your sister them's, or your uncle them's mailing address so we can send a copy of the CD. So you'll have the recording, then, each of you will have the recording. What I'd like to do eventually, Onaona will transcribe the interview in a draft format. Well I'm going to close up now, but we'll transcribe this and send this to you... [recorder off]
Group: [continued discussion, and recorder turned back on]
KM: So the plantation, the plantation used to keep plenty records. The thing is, what we don't know, I don't know, is what happened to the plantation records. Now, where the management office was, there's something the historical society or something, it says...
BaS: I don't know, it's the sad part. We have the railway, well the choochoo-train, so the manager's house, they should make it like a museum.
KM: It is a historic landmark.
BaS: Because, you know where I live? It's a historical preservation.
KM: Yeah.
BaS: So it's like how Lāhaina they have all these museums, the choochoo-train running, but we don't have. Nobody wants to stop in 'Ewa and have shave ice.

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Group: [chuckles]
KM: Well, that's one of the things why. What we're trying to do with the Hoakalei Cultural Foundation, we have basically 30 acres of land that were set aside from Haseko's development that have the old Hawaiian sites on it, house sites, salt making areas, agricultural stuff like that. And also stuff from the war. So what we're hoping to do is we're gonna build a small community museum where we can save these stories and try to collect and gather, you know... 'Cause I'm sure that people have photographs probably working sugar fields I bet before even your father folks probably found Hawaiian stories and things like that, you know?

JD: Oh, yeah, yeah.

KM: ...So work with the community to build, and gather artifacts, photographs, the old plantation records and things like that. Fun stuff, you know, that's a part of the history. We know that bango number... like do you remember your bango?

JD: Ohh, I forgot already.

RT: Number 1365 was grandpa! Ahh! That was a long time ago! [laughing]

Bas: She's the one who made his bill high!

Group: [laughing]

RT: 'Cause every time I would go with grandpa, I mean grandma, used to go 'Ewa Plantation Shopping Basket, and then we go Murata's, then Kay would ask, "Okay, what the bango number?" I go, "1365!" Now I'm 58, "1365!" [laughing]

MS: And no one stole from each other, you know?

KM: Yeah, yeah. How different in those days, yeah?

MS: They didn't steal their number, they didn't steal anything.

KM: Well of course, they all knew, right, the store knew who everybody was. Everybody knew.

RT: How come you using 1365? Right? If you try use the wrong one.

KM: And even if you walk in the store, they knew who you was.

Bas: Yeah, her daughter ran away, at that age! They knew it was her daughter! She ran away from our house.

RT: That was horrible. And now how old is Nel? ...34?

MS: She's 38.

RT: And they watched her. Because normally they see other family members, yeah? But they noticed, "Ohh, look at the baby?" So she was busy walking around...

JT: While everybody was going hysterical!

RT: So one of the ladies saw her and just kept an eye on her. Until I came in and I was so angry 'cause we was looking high and low! Afraid because the plantation trucks, big kind of...

JT: She walked! It was a long walk.

RT: And when I saw her I just broke down.

JD: [laughing]

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RT: I was like, "Awww, are you okay?!"

MS: She wanted to go to church with them, because that's what my mom does, she helps with the church. So they, she went, and then baby, we supposed to be taking care of her, but one thought the other one was watching her.

JT: But dad was, too, he was fixing the car.

RT: But she went outside, and my dad was outside. And what happened was, when my dad was looking in the hood, that's when she went sneak out. So, he didn't know. We all didn't know, we all assumed.
MS: She was just determined to go to the store.

JT: Yeah, she had a little purse.

RT: But the danger part, going across the street. And how we found out, one of the residents saw her and was like, "That's the Shibuya granddaughter! Why is she walking by herself?!" So she came to our home and asked my dad, and all I hear is, "Jenny girl, where's Shan?" I go, "She stay with you!" "No she's not!" That's when everybody went out of the house flying!

JD: [laughing]

MS: Thank God it all worked out.

RT: 'Cause you could tell, anybody coming around, "Do you know where so-and-so lives?" "Ohh, yeah, just go down this road, they're like the third house." You know, now!

Bas: Yeah, now we don't know the neighbors.

MS: Yeah, it's horrible.

KM: Yeah, it is. It's junk.

MS: Sad, yeah.

Bas: But my son, he's 27, and he told me, "Mom, thank you for raising me here." Because he could run the fields and he could ride his bike because as he got older as a pre-teen he realized, because his friends were on the mainland and whatever, they didn't have the freedom that he had, and everybody knew him. I could call one sister, "Did you see Shannon?" Or call my cousin around the corner, "Did you see Shannon?" Somebody was always watching. But you know, for him to tell my thank you, especially me being a single parent, that really made me feel good.

JD: [laughing] Oh boy.

KM: Ohh, thank you folks so much, this is a really good start. Barb knows how to get a hold of me. But, what I need is, if you'll share, and your sisters, just the address just so we can have the CD and bring the CD back for you... [recorder off]

Group: [continued discussion, and recorder turned back on]

KM: Wait, you were talking about Papiapi, and that was old from when you, but that's '50s.

RT: Right. I was still about maybe, I was still going to high school.

KM: But you said that you would go down Papiapi Road?

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RT: Right.

KM: To get to Kiku?

RT: Kiku Point. That fishing area right there.

JT: Kiku Point!

JD: Yeah, yeah.

RT: So from Fort Weaver, we'd turn...

JD: All the way to the end.

RT: Pāpiti Road, yeah, coming down all the way. Past Hau Bush, past CPC Beach.

KM: Was it paved or was it...?

RT: It was rocky as can be! Go over the hump, keep on going, and we'd get to Kiku Point over there.

KM: That's not Kualaka'i, though?

RT: No, they called Kiku Point as far as I know. And then, going down, we coming this way, right? Our uncle, his younger brother, live in a little village on the right hand side, there were one, two, three... five houses.

BaS: Oh, that's the one with the big rock, yeah they had.

RT: Yeah.

KM: Oh, where was this? Towards Kiku or here?

RT: Here. Oh, okay, Pāpiti Road, okay, we're coming, we're going to the beach. This side get houses, we're coming, but here, there were lotta kiawe wood, but when you make that turn, my uncle house was the first. There was another house next to it. Behind there was a two-story house. Behind the two-story house was a piggery.

JD: Yeah.

KM: So this is where you're talking about, by the piggery, which is basically just past Pāpiti Road, right?

RT: Yes! That's the one. And then there was a little house, and two more houses around the corner.

JT: Waipā, Waipā. One Waipā?

RT: Yeah!

JT: They were the one the piggery people, right?

RT: They were the owners of the piggery.

MS: Is that where Uncle Rudy lived, Pōhakupuna Road?

RT: He said, he was so drunk one night, he couldn't find the key, he had to go bathroom. And so he went to pee at this big rock and somebody went go PATOCK [gestures, striking him]! And went come alive.

BaS: He was wide awake!

RT: After he do that he said he stumbled into the house, slam the door, and he fell asleep on the floor. Then the next day he go, "Wow! What was that?!" So he told our grandma, the mom, she said, "See what happened! You no do that! You just no go pee any kine place!"

MS: You have to say, "Excuse me!"

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KM: Yeah, you have to go excuse yourself, yeah.

RT: And after that, PATOCK!

KM: So, aunty, just to get an idea of what we're talking about, um. You come to Pāpiti, I know where the piggery was, and I've got a photo I can show you folks an aerial photograph. 'Cause, was a big area! Cement floors on the piggery.

RT: Yeah! They had like 2 piggeries, and my sister said they were run by the Waipā family.

JT: They were both Hawaiian, the husband...

MS: But wasn't the wife Japanese?

JT: And then the [husband] was Hawaiian and I think the wife was Japanese.

BaS: Yeah, they were big people.

JT: And, they lived right next to the piggery in the back. And there was another... they lived, and then next to my uncle, you go in up this way, I remember there was this two-story house, there were lot of crown flowers. And then you cross, and my uncle lived right there, right by the crossing of the road.

KM: You know where Lion's Club?

BaS: Yeah, the chicken farm.

KM: The chicken farm? Yeah was by there? The piggery was a little further down, yes?

RT: Yeah. And then sometimes the piggery, I guess when they let 'um go, they would come right behind my uncle's fence. They would come up there and go, "KAWW KAWW!" And I go, "Oh my God! Uncle, the pig, you better tell the man!" And then here comes the Waipā man, "Tiny!" That was my uncle's name. "No worry, no worry, I going let 'um go. I go pick 'um up." "You better 'cause he's snooching [gestures digging around]!" But, like I said, now, no more houses no more piggery.

KM: So Waipā had people working with him on the piggery, or?

RT: No. They had one daughter, only three of them. And they lived in the back, I wanna say my uncle's house, the two-story house, this way, and right behind the uncle's piggery, you had to walk further in.

JD: Yeah, yeah.

RT: You remember?

KM: I gotta get a map, so we can try to draw some of this out.

BaS: That site isn't there. Well the one I think we're thinking about, 'cause I think the Haseko wall is there now.

KM: Yes, but you know one of the preservation... you know, there's one of the three preservation areas. There's the one that's on the White Plains side, then there's the one in the middle. The kiawe is still there. And then there's the other one, where the Kuapapa houses going go. That one is, the piggery is in there, and the cement, some of the cement foundations. But there's also ancient Hawaiian house sites in there too.

OM: You better go take her.

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RT: Because, one time, I think my uncle was saying too, he saw a man by the big rock. That rock, though had words on it, you know? Because uncle used to, he had a little garage, you know parking there, we would just hang out. And behind that garage there was a fence where the Waipā's pigs, when he would let 'um go, would come up. But next to that, there was a driveway, and then the crown flower and then the two-story house, the Wāipā... Across used to be another Filipino family, the Bernadas. They lived in a little cute house. After the cute house, there were two more houses there. That's it. But, majority of the stones had writing on it.

KM: Ohh, interesting.

JD: [laughing]

MS: I remember which house, now, across from McAngus house.

RT: Yeah! That's the one!

MS: Okay.

KM: McAngus?

MS: It's a family name.

KM: Okay, that's their last name?

MS: Yeah, McAngus.

KM: Okay, McAngus.

JT: Related to the Gabucos, next to the next house.

KM: Related to...

MS: Gabuco.

KM: Gabuco.

BaS: They're gone, too, though.

RT: Yeah, and their grandpa was a boxer, way back. Manu used to go see him.

JD: He used to be a fighter. The plantation days.

KM: When are you back at work?

BaS: Thursday, Friday. Then I'm off again on the weekend.

KM: I'm gonna print a photograph, couple of photographs for you so you can show your sister folks. Because these are 1960, '60ish, aerial photographs, that show you piggery, a few of the houses you're talking about. But you can also see the wetland, you know, that's in the preservation area. The Kauhale preservation area.

BaS: Yes.

KM: So, it'll be nice for you to see because we can actually maybe see, "Ohh yeah, that must be the houses! Yeah?" So we can start to mark the houses a little bit.

RT: And you know, I was thinking about the chicken farm. When you're going along Fort Weaver Road, coming into Ewa Beach, the chicken farm was on the left-hand side.

KM: Yes. By Geiger?

RT: Yeah, yeah, yeah. That's the one.

KM: Yeah, by Geiger.

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RT: 'Cause I remember, our mom, we used to go pick eggs.

JD: [laughing]

RT: Ho! I was sick and tired, every Friday we'd pick eggs. Dozens galore, for the family. Eggs, eggs, eggs!

JD: [laughing]

RT: That's all we did!

KM: Ohhh.

RT: Yeah!

KM: Was the railroad track somewhere up there?

RT: Yes, right in front of our house.

JT: It was operating while we were still in elementary.

RT: We were so thrilled to see the train passing by.

BaS: But I can find out if anybody knows.

KM: And you mentioned, it was Hawaiian families who lived by where the train museum is now?

BaS: Yeah!

KM: And they, so that was Hawaiian camp?

JT: Ahuna.

BaS: I know two of the girls, I can have them, Ka'anehe and...

KM: Ka'anehe?

BaS: Um hum. That's one of my best friends.

MS: 'Ahia.

KM: 'Ahia?

Group: 'Ahia.

KM: It would be wonderful if we could see if there was any families around.

BaS: Yeah, I get them.

MS: Yeah! Auntie Jane is still alive.

KM: Jane...

MS: Querubin.

BaS: Auntie 'Ahia, was her maiden name.

KM: But she's not Kihewa, so she's not Kihewa.

BaS: Yeah, she's in 'Ewa.

KM: Okay, but not Auntie Jane Kihewa who works at... a different Jane. Yeah?

BaS: Yeah, 'Ahia Querubin.

KM: Oh, Querubin, okay. Ohh, okay. Sorry, I don't want to take your family's time anymore, this was good fun stuff. Thank you! [recorder off]

A.4 Arline Wainaha Ku'uleialoha Brede Eaton

The following information is a paraphrased summary of historical recollections collected during an informal interview conducted by Kepā Maly on March 4, 1997 with Arline Wainaha Ku'uleialoha Brede Eaton, a.k.a. Auntie Arline and Kupuna Eaton.

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Auntie Arline gave her permission for release of the interview records during the meeting and interview with Sister Thelma G. Parish on May 2, 1997. The information was collected as a part of the effort to develop a site preservation plan in conjunction with proposed development on a parcel of property on the 'Ewa Plain, in the land of Honouliuli.⁴⁹⁸ The property is generally situated on the coastal flats, between One'ula and Kualaka'i, and while the area has been impacted by cattle ranching and WWII military operations, a number of native Hawaiian cultural sites still remain on the property.

Born in 1927, Auntie Arline has lived in Pu'uloa nearly all of her life. Auntie's *hānai* parents had been going to the Pu'uloa vicinity for years—Papa Brede oversaw ranch operations for the Dowsetts—and by the time Auntie was born, had bought land and built a home at Pu'uloa. Initially the family spent weekends and holidays at Pu'uloa, living in Kalihi on weekdays. Auntie observed that many of her earliest memories are of her days at Pu'uloa, and today she is one of the oldest longtime native Hawaiian residents remaining on the land.

In those early days, Auntie recalls that they were among the few families living in the area. Besides her family, Dowsett Ranch had about 12 cowboys, all Hawaiians, and their families. Few other people lived in the area. When asked about her recollections of life and activities in those early years, Auntie Arline shared the following memories:

Interviewee Arline Wainaha Ku'uleialoha Brede Eaton (AE)

Interviewer Kepā Maly (KM)

Date March 4, 1997

The whole region was our playground, we'd go to Keahi, go by canoe to Laulaunui and fish, and in the other direction, we'd walk as far as Kalaeloa. As children, we'd never think twice about walking anywhere, the distance was nothing. We would walk from Pu'uloa to the shore at (Ke) One'ula, and then on to Kualaka'i, and along the way we would gather limu (sea-weed). There was limu kohu, lipoa, and 'ele'ele, and the fish were so plentiful, not like now. We'd catch 'o'io, kala, weke, moana, 'ū'ū, and all kinds of fish. It was a good place. Back when I was a child, there was more sand also, the entire shoreline was like the beach at Barber's Point. Today, the shoreline has all of that craggy coral, before had sand between the coral and the water. Things have changed now, I don't know why.

While no one was living full time out between Keone'ula and Kualaka'i, there were families that would come out for several months at a time. Sort of like my dad them, they'd work in town or somewhere else, and set up temporary residence on the beach. They didn't own the land, but they

⁴⁹⁸See also the interview with Sister Parish and Auntie Arline of May 2, 1997.

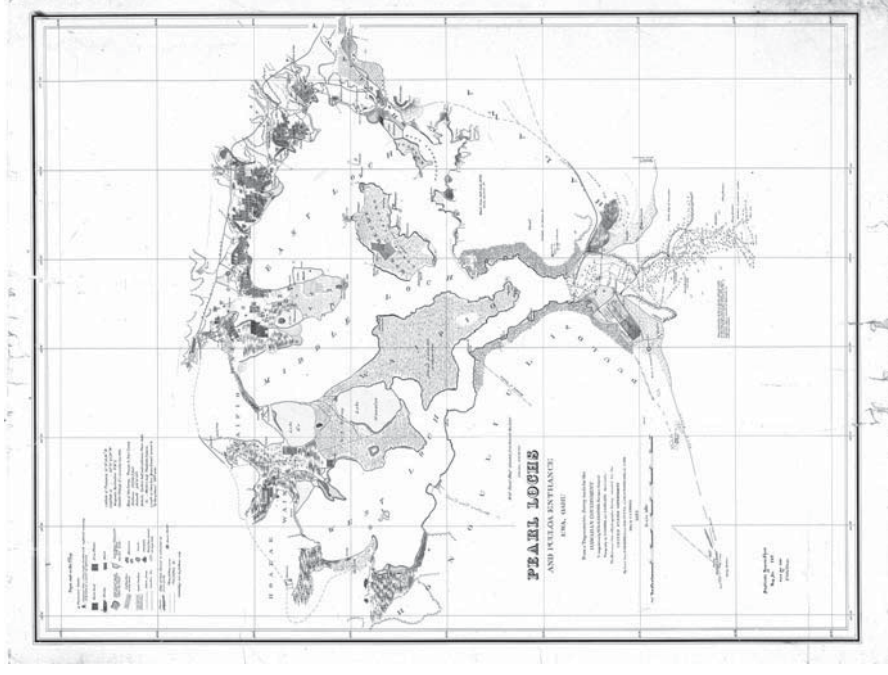


Figure 172: Map of the Pearl Lochs and Pu'uloa Entrance. Registered Map No. 1639, C. J. Lyons, et al., 1873.

would go out and stay for certain periods of time. The people would fish, gather limu, and make pa'akai (salt). Other than that though, there was no one living out here. There was not much activity in the area behind the shore. I don't remember that there were cattle back there, and the sugar ended further inland. The CPC had a camp down by Keone'ula, and in from there, there was an old piggery and the old chicken farm. The chicken farm was run from around the early 1930s to 1970.

In response to several questions, Aunty offered the following recollections and comments.

KM: When you'd go out into the area of the proposed Haseko development, did you ever hear your parents or any of the old cowboys speak about Hawaiian sites or any stories in the area?

AE: I don't remember hearing too much about any of the history in the area, but I do remember being told that there were some heiau in the area. I think that site (Site 3209) in the Haseko property, the one that will be included in the preservation plan, the coral stone platform is one of the heiau sites. I remember being told that the heiau in this area were good heiau, the kind used for fishing, rain, and agriculture.

KM: Where did people get water from when they were out there?

AE: There's water out there, its wai kai, but we were used to that water, not like today. You can tell that there's water there along the shore, you can see it bubbling up, and the limu 'ele'ele will only grow where there is fresh water coming out of the papa (reef flats). And you know, when I was young, there was a lot more water in the ponds back there. People don't believe me, but I remember when I was a child, there was a lot of water there.

KM: Do you remember the wetlands?

AE: Yes. That's the place where Captain Kealaka's mo'opuna and I would go play. The water went far across the flats there. If I'm not mistaking, I think it went all the way behind the Barber's Point beach area. The place was clean too, not like now. There were no kukū (thorns), and used to have plenty manu. We'd go swim in the ponds back there, it was pretty deep, about two feet, and the birds were all around. There were kōloa (native ducks) and āe'o (native stilts), and people don't believe this, but there were also 'iwa. I remember that when they were nesting, I would see their red chests puff out. It seems like when there were storms out on the ocean, we'd see them come into the shore, but they're not around anymore. The wet land would get bigger when there was a lot of rain, and we had so much fun in there, but now the water has nearly all dried up. They even used to grow wet-land taro in the field behind the elementary school area when I was young.

KM: Do you remember if people made salt out in the project area, maybe by the ponds, or along the shore? Or was it pretty much out at Pu'uloa?

AE: Well, the big salt making area had been at Pu'uloa, and some salt was still being made in the ponds there. I do remember that when we'd go fishing, we, and other families would gather salt from the Keone'ula area. The pa'akai was made in the natural kaheka (salt bowls) along the shore there.

KM: Are there any other kūpuna, or other old-timers that you could recommend for me to try and speak with about this land?

AE: I am one of the few older people still around. But as I mentioned to you before, Sister Parish (Ms. Thelma Parish) is a good friend of mine. She's a descendant of the Dowsett family, and is very knowledgeable about the area. I tried to call her last week to see if she could join us in the meeting today, but she's been away. The Mitsuyasu family are old time residents, they had the first store out here, and someone of them may have some information that could be useful. Also, Ted Farm is very knowledgeable about the marine and fishing resources. I'll try to find out if there is anyone else that might be around, and I'll also keep trying to contact Sister Parish.

KM: Would you be interested contributing some of your mana'o and recommendations to the development of the preservation plan to protect and interpret the cultural sites in the Haseko property?

AE: I am very interested in participating in the preservation plan. I feel that I need to because this is my home, and it is important to care for our cultural resources.

Kupuna Arline Eaton was born in Honolulu in 1927. Shortly after birth, she was taken by her *kūpuna*, Kaniela and Malia Kealoha, to be raised in the Keahi vicinity of Pu'uloa, near the entrance of Ke Awalau o Pu'uloa (Pearl Harbor). Her *kūpuna* had lived in the Pu'uloa-Honouliuli area for years, and from them, she learned about the land, storied places, practices and the importance of respecting the *āina* and *'āina*.

Kupuna Eaton is also tied to the Lāna'i families who helped raise Kepā Maly, and they have known one another for many years. She has participated in a number of oral history interviews with Maly, participated in the 1997 interview conducted by Maly with Sister Thelma Parish (sec. A.5). Both *kūpuna* were known to one another since childhood, though Sister Parish was the older of the two. Together, their stories confirm and share rich facets of history for the 'Ewa District.

This interview with Kupuna Eaton was conducted as part of a larger Traditional Cultural Properties Study for the larger 'Ewa District, but brings important traditional knowledge of Honouliuli, and shares native values for keeping history alive. Ku'uwaiani Eaton, *mo'opuna* of Kupuna Eaton, kindly assisted with the review and release of the oral history transcript. The interview was kindly released for public access on October 21, 2011.

The following is a summary of several topics that were discussed with Kupuna Eaton:

- Families lived through the practice of *kupuo*—fish, *limu*, and salt from the sea; taro and other vegetable crops from the land. Fishers and farmers exchange

- the products of their labor as sustained by the natural resources around them.
- *Kiipuna* were careful when discussing certain traditions and beliefs. They were particularly cautious about disclosing the locations of resource gathering/ collection sites for fear that others might hana 'ino the resources.
 - It was the practice of the *kiipuna* to take only what was needed, and leave the rest for another time. When more was taken from the ocean than needed, the practice of was engaged in. Things were never wasted.
 - It is important to speak the proper place names of the land. Don't change the names. The land will live when the history of the land is passed on and respected.
 - The shark goddess Ka'ahupāhau, was still known during Kupuna Eaton's childhood. Her elders took her to see Ka'ahupāhau, and visit noted places of the shark goddess's family.
 - Kupuna Eaton believes that it is best to leave *ilina* in place. If for some reason, this cannot happen, the families of the land should be involved in the decision-making process, and the reinterment should take place in an area close to the place of origin. They were placed in their *ilina* for a reason, and should be allowed to continue their journey in peace.
 - *Kiipuna* were usually buried on the *'aiina* where they came from, and they in turn guarded their descendants that followed on the *'aiina*.
 - The land is still sacred, even if sites have been altered or removed. The land remains important and is a part of the history of the Hawaiian people.

Interviewee Arline Wainaha Ku'uleialoha Brede Eaton

Interviewers Kepā Maly and Onaona Pomroy Maly

Date August 23, 2011

KM: [Provides Kupuna with background of the traditional cultural properties study; packet of maps; and oral history program.]

So, how can we ensure that the knowledge of places is passed on to future generations? Is it important that we continued to speak place names of the land? So may I just start... we'll maha'oi a little bit... please share with us your full name, date of birth, and how you came to be familiar with 'Ewa and Pu'uloa.

AE: Well, I was born at a lū'au. My mama, my biological mama came from Lāna'i, and they were invited to a lū'au, the Makini side. It was for their first child. The party was going to be at Kapālama, O'ahu. So my Tūtū papa, my mama's father, who was the skipper of a boat belong to the Robinson Gay family that owned Lāna'i brought mama and my three aunts over. Auntie Mānoa, Auntie Māhoe, and Auntie Hannah. So all four of them came to 1033 Morris Lane in Kapālama. And while the party was going on mama felt uncomfortable, so she asked my auntie and them, "let's go in the house." And low and behold, hānau 'ia ka pepē, seven and one half pounds, a baby girl, and that was me.

KM: 'Ae.

AE: So I understand that they cleaned me up, everything, and my Auntie, Jenny Kalehua Brede... she was a Douglas from Hawai'i. She married William Elia Brede. They were at the lū'au. And evidently, somewhere along the way, she had asked mama for the pepē. Hawaiian style is you never say no, especially if you are related. So she was there, and it was her that cleaned me, wrapped me up, and took me home to 1508 Kalihi Road. And I understand that I kept crying. And after a day or two... See that was on Saturday, and by Sunday, she said to my uncle — at that time they are auntie and uncle — "We better go down to Pu'uloa, to tūtū's place." Because he [Kaniela Kealoha] was a Kahuna Pule [Reverend]. So that's how I got down in that area, and they left me there. I stayed there until it was time for me to go to kula. I'd go back and forth. But all my early part of my years, I was there.

KM: Yes. So Kupuna, your full name?

AE: Arline Wainaha Ku'uleialoha Nākhehi Brede Eaton.

KM: 'Ae. And so this lū'au... When was your birth date?

AE: November 11, 1927.

KM: Hmm, you are so beautiful. So, do you recall hearing how you were brought out here to Pu'uloa, horse, canoe, train?

AE: The Brede 'ohana was pretty well off. They had a ka'a, so they drove all the way into the area. No more roads, so you just had to go around, and I don't know, that's what they said; and came all the way down to tūtū's place. Because once I got there, I realized when I got older, they didn't even have a ka'a. Tūtū papa would have a canoe, a two-man canoe, and that's how he went around. And I would go with him.

KM: From Pu'uloa?

AE: Yes.

KM: You folks lived... I'm going to pull out a map here [opening Registered Map No. 1639, fig. 172]. You lived near the ocean? Is that correct?

AE: Yes.

KM: So this is an 1873 map of Pu'uloa. We're down here by Kapākule, Iroquois Point.

AE: Uh-hmm.

KM: Here's Pu'uloa, the houses. And you said the church was nearby too?

AE: Yes. Oh, here's the windmill. So it was there.

KM: Tūtū papa had his canoe and you folks would go holoholo out here?

AE: Yes. The reason for that is he didn't have a ka'a, he was a fisherman. And over here, we didn't have that much water, so because of that, he would go into Laulauui, all the way up there, and trade.

KM: So all the way in here? Ahh, had taro people up here, yes?

AE: Yes. That's how they did it. Not that we didn't have. We had dryland taro, but we shared. We would share with them, that's how I understood it.

KM: 'Ae. So po'e lawai'a would gather from the ocean and pa'akai, fish, limu like that?

AE: Yes. And then they take it up there.

KM: What kind of fish, you remember?

AE: Oh yes. They had kala, moi, manini, all the different kinds of fish.

KM: There were two fish in particular, which the area was famous for?

AE: The 'anae, yes.

KM: They call the 'anae holo.

AE: Yes, yes.

KM: And there's a story about...

AE: The 'anae.

KM: Traveling?

AE: From there, going around.

KM: Around the island?

AE: Yes. Tūtū told me that. We would sit down, after pau, before going to moemoe. She would sit down and tell me stories. It wasn't that kind like you hear, they talk about fairytales. It was true stories.

KM: Yes, true. Even where you said up here at Laulaunui, there is a place where they called it Kapapāhūi?

AE: Yes, yes.

KM: And that famous in the story of the 'anae holo.

AE: Yes, that's where it comes from. But tūtū them, they don't talk about that to other people [pauses]. Because some people they come, take everything, or else they leave the place lepo.

KM: 'Ae, hana 'ino.

AE: Yes, he doesn't like that. If you do anything good, they are going to give you.

KM: So if you mālama?

AE: You mālama. Mālama ka 'aina, mālama i ke kai.

KM: 'Ae. So you take care of the land and the ocean?

AE: Yes, they care for you. That's why, I tell them, I ride with my tūtū on Ka'ahupāhau.

KM: Oh, so you remember the stories of Ka'ahupāhau?

AE: Oh yes. People think I'm crazy.

KM: So tūtū still...?

AE: That thing is sharp, you know. But my Tūtū mama put clothes for me, and I ride with tūtū on her back. [taps the table, like the side of a canoe] They go and they tap like that [taps four times].

KM: On the canoe?

AE: Yes, on the canoe. Then we go, I go right on top. Sit on top and we go all over.

KM: Because Ka'ahupāhau is...?

AE: She's the goddess.

KM: The shark?

AE: Yes, that's what my tūtū them say.

KM: Still mālama?

AE: Still mālama, take care of that.

KM: Wow!

AE: And I learned that. But like I say, when I tell people, they don't believe me.

KM: But Kupuna, the story that you lived, that you are telling of your young life, we know that that tradition has been passed down over the generations.

AE: That's how.

KM: To your tūtū papa's time and way before then.

AE: Oh, yes, yes, way before. And like I said, there were only two of us. After that, there was Kealaka'i.

KM: Kealaka'i, and the mo'opuna would come with you?

AE: Yes. They lived here too. But they were gone most of the time, him and the wife. She would teach hula. That's why, that picture of me with the hula skirt.

KM: Yes, yes.

AE: That's the reason why. Because she wanted me to learn how to [taps the table, like an ipu].

KM: Ah, 'ōlapa.

AE: I used to think, I look funny in that. They make me dress up, and he had to wear pants too [smiling]. But we never mind. We would run around in only our panties, or run around with nothing... [recalls sneaking to go swimming at the beach with Kealaka'i]

KM: These are such important histories and traditions to pass down. You've mentioned some of the fish. You mentioned Ka'ahupāhau. That still in your lifetime, she was an important presence on the 'aina.

AE: Yes.

KM: And the ocean of Pu'uloa – Ke Awalau o Pu'uloa.

AE: Yes.

KM: Do you remember the saying, "Alahula Pu'uloa..."?

AE: Yes [thinking], it's in the mele, oh I forget the line.

KM: "Alahula Pu'uloa, he alahele na Ka'ahupāhau."

AE: Yes.

KM: So you heard that as a young child?

AE: Oh yes.

KM: That's one of the famous traditions of this place.

AE: Yes.

KM: Ka'ahupāhau, and her brother Kahi'uka.

AE: Right.

KM: Oh, and one other fish, the 'ō'io?

AE: Yes. There was so much before. There are so many stories for that. But see, I wasn't the fisherman, it was Kealaka'i, Mekia, he was the one. But that fish was 'ono. It was only places that you go. Tūtū would tell, "go here, go there." Because you have to watch. The fish go to specific areas, and all the young

ones, you don't go over there. You would go to the other place where they were all grown up. And you don't take any more than you need. We didn't have ice box. You only take what you can eat. And if we have to, tūtū would go out there, get. Then tūtū would share.

KM: 'Ae. Well you mention that practice, tūtū would lawai'a out here, and then he would kuapo?

AE: Yes.

KM: Exchange with the po'e who would kanu...

AE: Yes.

KM: Kalo and other things like that?

AE: Yes.

KM: So in this area behind Kapapāhū, the Honouliuli taro lands?

AE: Yes. That's where he would go way up there, up in that area.

KM: Speaking then of these place names, there are so many traditions of how places were given their names. Is it important to pass traditional place names down?

AE: Yes, especially if you know it. We need to pass it on. Because otherwise, they are going to give different names. It's alright to have names, but they have to be the right names. Just like here, Iroquois.

KM: Is there a proper name here?

AE: Keahi. And you know what's out there?

KM: What?

AE: Kanuku. That's out there [gesturing towards that opening of Pu'uloa].

KM: Kanuku is the entry, yeah?

AE: Yes, coming into that. We're not too far away from there. And that's where I stayed, out there.

KM: Hmm.

AE: Right there where that entrance is coming in. And the thing is, even though we lived there, we moved on [gestures walking along the coast]. Tūtū would have a hale over there. Because certain kinds of fish, you go over there.

KM: So seasonally you knew where to go?

AE: Yes. Nobody else lived in the area, but we have to keep it clean. You cannot go in there with your dirty feet. Everything has to be clean. They always had another hale on the side, and that one, you can sit down and eat. And even that has to be clean.

KM: Sure, like hale kahumu, hale kuku?

AE: Yes.

KM: Where they would eat and prepare their food.

AE: Yes.

KM: So your hale moena would be separate where you would sleep?

AE: Yes. And you never needed door. Before, never had all kind bugs until much later. We didn't know what that was. We never had such a thing. Then they brought the pipi in. Sometimes they ask me why I don't eat meat. I say, we

only ate what was in the ocean. I didn't die.

KM: No.

AE: Even water. When I go down into kula, I had a hard time. I had to take my own water from there. It was brackish.

KM: Get flavor, yeah [chuckles]

AE: Yes. And then all of them teased me. [Describes going to school and old-style clothes made by her tūtū, which she wore, while others had modern clothes.]

KM: So Kupuna, you have this wonderful experience as a child, growing up in this area here. And tūtū would come into this section, West Loch, Laulaunui, the Honouliuli-Hō'ae section; did you folks travel to other places? And do you remember hearing stories... What they are planning is to build this rail which will go through various places. Much of it used to be kuleana, and now everything is all changed.

AE: Yes, that's right.

KM: So you mentioned once, the place names, as an example, Kalauao.

AE: Yes.

KM: You said you knew it by another name.

AE: Oh, we spoke about it before. I think it's written in a book, but you have to go look back. And that's how I knew that name, during that time. Not Kalauao. It's a river or a stream that came down.

KM: It is interesting. And on these maps that I'm leaving with you, they go back far, and they show traditional ahupua'a boundaries, which run from the kai for the lawai'a, all the way the way to the piko of the mountain.

AE: Yes.

KM: So they have the large names, and then there are the small names like Ka'ōnohi, Pa'aiau or Waipāhū, which is a small section in Waikele, yeah?

AE: Yes. Well, I still say that the area now called Waipāhū was named by the plantation manager. That's what my tūtū them said. That's why I keep saying, "It isn't Waipāhū. It's Waikele."

KM: Yes, the ahupua'a.

AE: That's what it is, that area. Well, if they want to name that little area. But now...

KM: Yes, they gave the whole name. Kupuna, when we go through the oldest, oldest mo'olelo and land records, we actually see that Waipāhū is a small spring...

AE: Yes, that's what it is.

KM: So when the plantation came in, they did just what your Tūtū papa said, they took that name. The mill was just a little above there. So they called the whole thing Waipāhū.

AE: Yes, that's right.

KM: So, is it important to speak the names of places?

AE: Yes. That's why I say Waikele, and Waipāhū is just that place. And Ka'ahupāhau used to go in that area. I remember that. Because we would go, my tūtū and I would go in that area, go and see. And you see her swimming around there.

KM: Manā? This big manā?
AE: Oh yes. Yes, that's why I was telling you. I would get on with my tūtū. But people don't believe me.
KM: Well, that's okay. Your mo'olelo is consistent with stories that have been handed down over the generations. And not only here, but other places too... All these stories.
AE: Yes, and it's beautiful. I don't think people understand that, the history.
KM: Yes. Because people don't understand the history and it is so important to pass it on [pauses]; if this rail project goes through, would a recommendation be to — Take the history from each of these lands and somehow include it into the stories that are being told. Like, they are going to have stations for where the train is going to stop.
AE: Yes.
KM: Should they put, like our little museum on Lana'i, should they put interpretive things that tell you the stories of the land and people?
AE: Yes.
KM: Maybe even in Hawaiian and English?
AE: Yes, yes.
KM: Like at Waimalu and the story of Maihea and his son who rode the whale from Pu'uloa.
AE: Maihea, yes. I like that because that way that area will live, it will still be there. It's not something, that's what it was before and nobody knows anything about it. Because as it is now, if you look around, everything we have is not ours.
KM: 'Ae, nalowale.
AE: Yes. So there we go. So some say, "Why do you tell them everything?" I say if we don't do it, they going wipe everything out. We tell so that our children will know. So when people come over here, they know what that area is [tapping the table for emphasis].
KM: So the time for hūnā is kind pau, yeah?
AE: Yes. Otherwise it will be gone. Then they tell me, "Oh, you getting paid by Haseko." I said "I don't get paid by them..." I fight them all the time. But then God told me, in my prayer, "Get over there. Get over there and find out how you can help."
KM: 'Ae, when you Kōkua...
AE: It's going to be good.
KM: Yes. So Kupuna, these place names like Waipi'o, Waikele, Waiawa...
AE: Waimano.
KM: Yes, and Mānana.
AE: See, like Mānana, they call that Pearl City. Different. I ask why? Why did they have to give other names like that? It has a name; there is a reason why each one was given. And I am sure that if Auntie Lahilahi [Webb] was living, she would really raise the roof.

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KM: 'Ae. Well, you will love the mo'olelo that we are compiling. [Discusses nature of research and collection of Hawaiian records into the study.]
AE: There is a reason for those names. Like go over there to the elementary school, and do a little presentation about the area, and they wanted me to sit down and write all that. So I don't mind telling them about all that. They should know what their area is about.
KM: Each place name tells a story.
AE: Yes.
KM: Is it true that place names were given for a reason?
AE: Yes, they are. Why do they give that name? Like they said, Pu'uloa. It doesn't have a hill or anything. But I said "no, doesn't mean because it's a hill." There is a reason for that. Why it comes like that. All the waters come, and there is a reason for it going around.
KM: 'Ae, Waiawa.
AE: Yes, the swirling waters. Each one has a name. Every single one has a name, and why. The swirling waters, the curving waters, you know.
KM: Yes. Waipi'o, Waimano, Waimalu.
AE: Yes, every single one. And I believe that if you really knew anything about it, you would know over there, you would see it. And that's why you would have all the oysters in that area.
KM: 'Ae, the pipi, nahawe, 'ōkupe.
AE: Yes, the pipi, good kind. [speaking softly and smiling] I used to go over there, carry the basket over there that tūtū them had. But it doesn't mean anything to anybody else. To me it does. [chuckles] I never looked at what was in there [the little pearls], for me it was what was in there to eat. That's what I liked, 'ono!
KM: Hmm. Well, the example of the story with the pipi like that, and they said that you had to "hāmau ka leo."
AE: Yes.
KM: You couldn't talk when you go.
AE: And it's true. Even when tūtū went out, even to go fishing, a'ole. [gestures, finger to her lips] Hāmau. And that's how you see it coming up, it's quiet. And it makes sense. You make big noise; they're all going to disappear. This way [quiet] they're all coming out, and you choose.
KM: So you take the one you need and leave the rest.
AE: Yes.
KM: And they say that there was a goddess, a mo'o?
AE: Yes.
KM: Kānekua'ana?
AE: Yes.
KM: And she controlled that.
AE: Yes. She watched, watched over that.

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KM: So amazing. This nice old map shows Moku'umé'ume, even with some of the planted fields, because people lived out here.

AE: Oh yes, had people out here. [looking at map depicting Moku'umé'ume] I used to like going over here. Because on this particular island, Pā ahana, the 'ōhana lived in this area.

KM: Pā ahana?

AE: Yes, you've heard of her. The one from the song.

KM: Yes, oh the one the song is about?

AE: Yes.

KM: What's the song, you remember?

AE: [thinking] Oh, you sing it for me.

KM: [singing] He mele kēia no Pā ahana, kaikamahine, noho kuahiwi...

AE: Yes, yes, that's it. Now you sing that, I'm going to cry. I cannot help; it reminds me... that's one of the places that we knew of. My tūtū always said, "You go there, mālama, take care." Like what Tūtū mama said, what they did to her, that's not right.

KM: Yes. And her name lives on in the song by speaking it, and the others are forgotten.

AE: Yes. That's right, still lives on. But you know, if I talk to anybody else, it doesn't mean anything to them. But I like it, I go to certain places, I sing. And my mo'opuna, tūtū sing that again.

KM: So relative to these 'āina of the 'Ewa District, did you ever hear of any heiau around the bays that you remember? And I know that they may not have always spoken about those things. But do you remember?

AE: I do, but I've never really talked about it, because people don't believe. No matter what I tell them, so I say, "no use." They're not interested in that. That's why when they have this fellow that talks and goes to the board [asks that his name not be used in the transcript]; he's telling this, this and that, all that kind. But I don't say anything. As long as he doesn't go fool around with my tūtū them.

KM: Yes.

AE: As long as he doesn't, I'm not saying a word. If he wants to go, go ahead. But I know different people that were buried in 'Ewa.

KM: Well, speaking of that, what are your thoughts about what happens if they are digging the rail and they find iwi? What should happen?

AE: Well to me, I'm thinking, I know that when the dig up, they are going to find. There was a reason for it being put there.

KM: Since there was a reason for them being buried there, is that a reason to leave them alone? To leave them in place?

AE: If they could do it, I would say yes. I know it's not easy, because how they going to work that rail? So something has to be done.

KM: To honor or to respect?

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AE: Yes, to respect them. Have something to honor them.

KM: A marker or something to indicate...?

AE: So if they take that iwi, give them a place where they can... Because they've been there, way before this thing ever came up.

KM: So Kupuna, e kala mai. Should they be...? If 'ōhana come together and agree, "Okay let's gather them respectfully, should they put near where they came from or move them down to "Lala land" somewhere else?

AE: If there is a way where they could be within that area, there's a reason for it. **KM:** So keep them close to where they belong?

AE: Many of them are buried in those areas because that's where they're from.

KM: Yes.

AE: And it was like they guarded that area for their 'ōhana.

KM: So even though they are dead, they are not gone?

AE: That's right.

KM: So their spirit, their aloha for family remains on the land?

AE: Yes.

KM: And they protect or watch out for their...

AE: Family.

KM: The generations.

AE: That's why in this area, they talk about they hear spirits and all kinds of stuff. Maybe they do. I don't hear it, but in this school, even them, they tell. I pull.

KM: Yes. This is your 'ōhana.

AE: That's why.

KM: So that also being said, that whole connection to Leilono at Āliamanu and Kapukakā, all the way to Honouliuli, the leaping place of the spirits.

AE: That's right.

KM: This was a place of spirits.

AE: I know.

KM: And if you hana 'ino them, what?

AE: Pilikia. I've seen some, and they tell me when you hana 'ino like that, you going be like that. Sometimes they get hō'ōio, you cannot be like that, because they are there. But they are the spirits; they probably had no place to go, so that's where they came.

KM: Yes, some, they 'auwana out at Kaupe'a, Kānehili.

AE: Yes. That's why I say, "If you don't hana 'ino them, they're good." But you have to know how. You have to pray, and you talk to them.

KM: Tūtū folks said mihi, mihi aku, mihi mai.

AE: Yes; that's how. And that's what I did with my kula [school]. In the beginning they were scared. But you cannot do that. If you want, they can help. I said, "I have no problem, it's you folks." Before, they hear the door slam, anything. But now, no more. And we don't say anything to the new people. They just go merrily along with us. But all of these things are very important.

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Oh, this map is wonderful [looking at Register Map No. 1639, fig. 172].
KM: Quite beautiful, 1873, of the Pu'uloa region. Entrance of the harbor, Kanuku, and where your tūtū lived. And across is Hālawā. Do you remember Water Town?

AE: Oh yes, by that... what do the call that military base over there?

KM: Hickam?

AE: Hickam, that's where Water Town was, as they called it.

KM: Do you remember hearing why Water Town was built?

AE: [thinking] During that period of time, it didn't come until... You know Moanalua?

KM: Yes.

AE: There was an overflow, so all people in that area. So they had to move down. How I know is because my dad and he [Damon] were good friends. That's why, even living in Kalihi, I wonder how we lived in that place, because it's all Kamehameha lands. Below and above.

KM: [reviews Honolulu region place names] Many of the place names refer to notable people of earlier times.

AE: You write a book about those types of things.

KM: Well, it's all from talking with kūpuna, like you, and when we sat down and spoke with Sister Parish.

AE: Yes.

KM: And then going through the old native newspapers like that. Your kūpuna were such prolific writers. And they were writing because they wanted the history remembered.

AE: Yes, that's what it was. That's what they wanted. They wanted people to know, it's our land. Even though you may have taken it away from us, we still know the area.

KM: So tūtū, as you said, even though it has been taken away, it is still your land.

AE: Yes.

KM: It is your kūpuna.

AE: Yes.

KM: So even if the physical remains of the heiau are gone, is the place still important?

AE: I look at it that way. A good example is, I just went out with this girl. She was looking at the place where Kapolei is. On the right hand they have the place where the kūpuna can go. They have a nice place over there. A community center. It's across the street, so this girl took me there, she wanted to know about that area. So I was telling here from the ocean, all the way up to where we were. I said, "there was a heiau right here." And the only reason why I know that is because we would have to go down there. Mekia and I. When we would go down to my auntie's place.

KM: That was by Kūalaka'i?

AE: Yes, the Kūalaka'i area, because we were going to Kalaeloa. So there was a heiau over there. And that's where, actually before, they were going fishing, and

they had an 'ahu out there. And I remember that. And Mekia would say, "we go over there, go swim." I would say "no, tūtū said we're not supposed to go over there." He'd say, "what tūtū?" "The one over there at Kalaeloa," Na'auao. That's the one married to Fred Robins. So he tells me "okay." But when I turn around a look, he's gone, going over there, and he waves at me, from where the heiau is. Had 'ahu in that area. But it was interesting. Even though they had that 'ahu over there, where the girl took me, I said, "You come right up to this area here, the heiau comes all the way."

KM: So at Pu'u o Kapolei, had the heiau there looking down to the ocean?

AE: Yes, yes, that's right. That's what I was trying to tell her. That's what I remembered. I don't know if anybody else knows about that, because it's all empty.

KM: Yes, when the military took over, and the plantation above cleared everything, so much was lost. Even when they began quarrying at Pu'u o Kapolei, they destroyed part of the heiau.

AE: Yes. All of that all went.

KM: They don't think.

AE: They don't.

KM: So tūtū, even if we don't see the physical remains there is still importance on the land?

AE: Oh yes.

KM: Do you remember when we were sitting with Sister Parish also, one of the very interesting things that she shared was the story about the priest Ka'ōpūlupulu?

AE: Oh yes.

KM: And his son, Kahulupue.

AE: That was true you know.

KM: And how Kahahana, the king...

AE: Yes.

KM: The father, Ka'ōpūlupulu ran here to Pu'uloa into the ocean.

AE: That's right.

KM: And what happened?

AE: You remember her talking to you about that time?

KM: Yes.

AE: When she was talking about that, I was surprised that she even told, shared it with other people.

KM: Yes.

AE: Afterwards I asked her, "How do you know all of this?" She just said, "Because I know, tūtū told me." And she said, "I believe in it."

KM: I remember that her tūtū, Mf'i, out Kualoa side was a kahuna.

AE: Yes, and that's who it was.

KM: [Reviews story of Kahekili, Kahahana, Ka'ōpūlupulu and Kahulupue and the prophecy of Pu'uloa. See account on p. 37.]

AE: That's why Kahahana got killed.
KM: That's right, he got killed here at Kalauao by the place, Kūki'i'āhu.
AE: Kūki'i'āhu. But I cannot talk to other people, because they do not know, yeah.
OW/KM: Yes.
AE: And now you talk about it, it brings back memories. In the beginning, I have to think about what you are talking about. But now I know. Sister Parish and I would sit down, and I've got her paper, you know.
KM: I'm so glad that you got them. She was working so hard because she wanted to publish her book, but she didn't live long enough. So it is very important that it not be lost. It was her passion.
AE: Yes. And she made sit there by the hours, reading... Beautiful.
KM: Yes, and I thought you would enjoy some of these different maps. They are good for some of the work that you do with the haumāna.
AE: Yes.
AE/KM: [Discusses genealogical background; work at the Kauhale preservation site on the shore of Honouliuli; and her own kūpuna buried at Kawaiaha'o. Looking through photos and talking story.]

A.5 Thelma Genevieve Parish

Thelma Genevieve Parish, a.k.a. Sister Parish, was born in 1918. She descended from prominent families in the history of Hawai'i, and shared generational ties to the 'ili of Pu'uloa in Honouliuli Ahupua'a. She was educated as an anthropologist, and became a Catholic nun serving for 50 years as a teacher and school administrator with the Order of Sacred Hearts. Sister Parish was a lifelong student of history and until her passing in 2004, she was working on a manuscript of Hawaiian history. Unfortunately her work has been left incomplete.

Sister Parish's knowledge of the Pu'uloa-Honouliuli lands and larger District of 'Ewa was rooted in her own family's ties to the land, and she was recognized as an important resource for historical information on 'Ewa. Her experiences and genealogy also connected with other places around O'ahu, and the interview transcript below includes important information pertaining to the sacred lands of windward O'ahu. One of the memories shared speaks of the Pohukaina cave complex, which in some accounts has an entrance near the area of the Waipahū spring.

Arrangements for the 1997 interview were facilitated with the assistance of Sister Parish's lifelong friend, Kupuna Arline Eaton and was originally conducted as a part of the preservation planning process for the Haseko cultural preserves along the Honouliuli shoreline. Release was granted on August 29, 1997, though readers are asked not to cite block quotes from this interview for any other purposes.

A summary of the topics discussed with Sister Parish are below:

- The land has undergone traumatic changes. With the passing of the sugar plantations, development has been allowed to occur without reason.

- The Dowsett/Parish family home and ranching complex was based out of Kūpaka, near the Pu'uloa coastline. The area was famed for many types of limu. Overharvesting and environmental change has caused much of the limu to disappear.
- Ka'ahupāhau was known as the shark goddess of Pu'uloa. People never feared sharks.
- It is important to speak traditional place names and to care for the history of the land. Understanding the history helps us to understand why and how places are sacred. There is a great deal of native lore from the 'Ewa District. Sister discussed the name Waipahū as an example of how names are changed, and history lost.
- Shares her *mana'o* on the significance of kapu (sacredness); management of resources as a way of traditional life; and the development of kuleana (responsibilities) for the land and resources in relationship to the pono (rights) which are being claimed in modern times.
- Pu'uloa was famous for the 'anae holo (traveling mullet), and the health of the Pu'uloa fishery enriched the fisheries all around O'ahu.
- Recalled that there are traditions of a class of Hawaiians known as the 'dog people.' These people resided in the caves and caverns of the coral flatlands of Honouliuli.
- Caves, caverns, and skylights on the coral plains were used traditionally (though Sister Parish did not have personal knowledge of burial sites in the region); in some traditions, the 'ulu was first planted on O'ahu in the open skylights of the Honouliuli Plains.

Interviewee Thelma Genevieve Parish (TGP), with Arline Wainaha Ku'uleialoha Brede Eaton (AE)

Interviewer Kepā Maly (KM)

Date and time May 2, 1997, 1:10 p.m.

KM: Aloha and mahalo.

TGP: Aloha nō!

KM: Please, if you would share your full name, date of birth, and then if you would keep telling your story then.

TGP: I'm Thelma Genevieve Parish and I was born on May the 26th, 1918. So I'm somewhat antiquated [chuckles].

KM: Blessed.

TGP: And I have known and taken a very vivid interest in my family, on both my father's side, which was the Dowsett side. And my mother's side which comes from the other side of the island in Waiāhole-Hakipu'u. So my grandmother, Mary Kaohinani Dowsett-Parish built one of the first homes in Kaimuki, when it was a very new subdivision in Honolulu. And as a member of the Dowsett

family, she had inherited acreage down here in the area that we now call 'Ewa Beach. We never referred to the area as 'Ewa Beach in my younger days. It was always Kūpaka [as pronounced].

KM: Kūpaka, and you heard that pronunciation?

TGP: Yes, Kūpaka. And whenever we children, on Friday afternoons, we'd get home from school, we had our little duffel bags all packed because we were going to go to Kūpaka, to spend the weekend. Now Kūpaka was part of the ahupua'a of Pu'uloa. And my great grandfather owned, and I have to use that word in quotation marks because it's refuted, or questioned as to the direct ownership. But he did, in quotes, own from the entrance to Pearl Harbor all the way to approximately, Campbell High School, [where it is located] today.

And he used that area which was quite barren, he used that area primarily as his fattening paddocks. Because he was into ranching and he had a ranch at 'Ulupalakua, on Maui, which he had acquired from the Makee family. And also, a ranch at Mikilua, which is below Luualalei. A part of the ahupua'a of Luualalei, on the other side of the Wai'anae mountain range, as it comes down to hit the sea on the southern coast. Then he also had a ranch in Leilehua. So these ranches were producing cattle and there were times when he would ship from Maui and would have to fatten the cattle before they could be slaughtered. Do you remember what the grazing material was then, down here, that made a good fattening ground?

KM: I guess the kiawe beans.

TGP: So just the kiawe beans?

KM: Kiawe beans and the haole koa.

TGP: Hmm. Was that the predominant growth throughout the Kūpaka-Pu'uloa, even into here, the Honouliuli area?

KM: Yes. Oh yes. It was primarily kiawe, the algarroba, and pā-nini, the klu [or *kolū*] bushes and the cactus, the haole koa, lots of it.

KM: This is from your memories as a child, or even pre...?

TGP: No, my memories as a child and it must have been a little more dense probably, previous to my knowing Kūpaka. However, the pasture seems unlikely in our terms today, because it's not meadow-like, but was just virgin country and the pipi, the cattle were turned loose. And then there were divisions so that you had one paddock following another paddock, following another paddock. So when we left Honouliuli, we were coming through the tail end of the cane lands, then we'd come to a gate, we'd have to stop and get out. My father was very persnickety about his Model T-Ford, so it wasn't to be scratched [chuckles], and so we had to break or hack-hack at the branches of the kiawe trees that had grown over the road after our last visit. And we'd come down, and I'd have to jump out of the car again, and open the next gate, wait until he'd gone through and close that gate. I think we had to do that three or four times.

KM: Hmm. So from Honouliuli boundary, with Pu'uloa, coming in?

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TGP: Yes.

KM: And was your roadway...?

TGP: Coral, one lane [chuckles].

KM: Uh-hmm. Were the gates, was it wire, uwea fencing? Or was it pā pohaku [stone walls] some, do you remember?

TGP: Mostly wire fencing. Primarily the barbed wire. Not the fancy squared off kinds of fencing, barbed wire. And strung from one kiawe wood post to the next kiawe wood post, to the next, and on down. And the gates were swung from larger posts, embedded in the coral. And the gate swung only in one direction, and you had to park and then drive through, wait and then close the gate, and then go on to the next gate. My grandmother's property was always... sort of located by the height of the windmill. She had the only windmill in the area and it was a landmark.

KM: You know, on the old map that we were looking at earlier?

TGP: Hmm.

KM: Alexander's 1873 map, Register Map number 618, we see [opening the map]... See the watering hole here? [pointing to sites identified on the map] In fact, see, this says "stone wall" coming in by the salt works?

TGP: Uh-hmm.

KM: Was Kūpaka the area of your houses, and was it on the shore also, or...?

TGP: Kūpaka is now, as I knew it then, is now Parish Drive.

KM: Ahh, okay, that's good to know.

TGP: And so we referred to that whole area... the area we went through, before reaching my grandmother's country home, was that of Mitsuyasu.

AE: Yes, that's right.

TGP: We had a charcoal area.

KM: Oh kiawe charcoal.

TGP: A charcoal burning establishment.

AE: What year did they come down here?

TGP: Mitsuyasu must have been here before 1925. I know, I found my grandmother's records, and she built her home in '25.

AE: So they had to come around that time.

TGP: And they must have been... Mitsuyasu could have been here before that.

KM: So your house area... [pointing to the locations on the map] if the salt works were up here, and this is a walled enclosure, and there are some small houses indicated here.

TGP: Uh-hmm.

KM: But your grandmother's place was down, you think, on this end?

TGP: Yes.

KM: [marking location on map] Towards the end of the stone wall here?

TGP: Uh-hmm.

KM: Ahh. And Mitsuyasu was doing the kiln...

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TGP: Charcoal.
KM: Yes. Was down in Pu'uloa also. As a lease from your grandmother, do you think?

TGP: No... well, he could have had a lease, from what we called then, "The Dowsett Company." Because the Dowsett Company, consisted of the heirs of my great grandfather, James Isaac Dowsett. His businesses were incorporated into what we knew as the Dowsett Company. Now, the Dowsett Company then, had control of the area from Fort Weaver, which was given to the United States, from the lands that my grandmother and grandfather owned. So it was [chuckles]... it was taken back. My guess is that my [great] grandfather acquired these lands primarily because the Ali'i, or the Kingdom needed money, he would advance money, or give them what they needed as they approached him and then he was repaid in land. And so we don't know the exactness of the titles, the land titles for the areas that we considered to have been his.

KM: Uh-hmm. As we look at the Pu'uloa area here, you see the ahupua'a boundary line that comes up, the fishponds, fisheries, the salt works, and if we come out towards One'ula, do you have recollections of some of the resources? Or were there families out here and things as well?

TGP: It was... my guess is, that there were few... it was very, very unpopulated. Not at all populated. And I often wondered where the Pu'uloa salt works were. My guess was, as I was growing up and heard about them, that they were to the south of Fort Weaver. But I'd been told recently that there were more, up off the West Loch.

KM: That's correct, yes.

TGP: And I do remember my family referring to West Loch as being grandpa's as well. Not so much the water part, but the lands across from West Loch. So that would bring us right directly to One'ula and a little bit further than Campbell High School.

AE: Uh-hmm.

KM: Yes. Was anyone still... what did you hear about the salt works, and was anyone still making salt when you were a child, anywhere out here?

TGP: That, I wouldn't know. I've accumulated a good deal of additional knowledge through my own research, and so now, it's hard for me to delineate and pinpoint what I knew as a child, and what I learned as an adult through research.

KM: Uh-hmm. [tape off, someone knocked on door; tape back on] We're back on, you'd mentioned that you have researched a great deal, so this is clear in our interview. You of course, because of your love of and interest in the land, as a Hawaiian and as a... Well, you've traveled quite a bit as well. In your understanding, was the salt works, did it play an important part in the history of this land?

TGP: Yes it did. In fact the salt works were the focal point of the ownership, of my great grandfather's ownership. E. B. Scott, in his *Saga of the Sandtooth Islands*

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mentions it, and he's quoting from someone else, that the salt works were a very prominent part of the economy and the early industrialization enterprises. **KM:** Sure, so was the salt used for hides and the salting and preparation of meats and things?

TGP: My great-grandfather commercialized in salt, and sold it. According to research, a good deal of the salt that was produced on O'ahu was sold to the fishing fleets that would come from Alaska and take it back to Alaska for the salting of the salmon.

KM: Ahh, interesting. When we were looking at this map a little earlier, it was also interesting to note that there was, what looks to be [marking on map], almost to be like a little kahe or weir or something that came in off of Pu'uloa. Had you heard at all, about how water was gathered into the salt ponds? Did they dig holes and make...?

TGP: No, this part I have never been able to research in depth, simply because we haven't had access to maps of this vintage. But this map seems to indicate, and I would say, in common sense, it would tell us that they had to bring the salt water in from the lower end, or away from the entrance to Pearl Harbor simply because the outer shoreline is too high. And they wouldn't have been able to flood the salt ponds from the south shore. But, bringing it in from the east shoreline, and into the salt pans, seems much more sensible.

KM: [copies of Register Map 618, were given to kūpuna Thelma and Arline] Looking at the map, it was interesting to see that it looks like there was this little channel or estuary like that fed into the area of the salt works.

TGP: Uh-hmm. I don't believe that anything remains today of the salt works.

KM: Hmm, yes, even many these fishponds along here have been destroyed. May I ask, if you've heard, because one of the things that I'll send to you, that I think you'll be very interested in... As I was going through the original Māhele texts, I found... and see the problem is, because the kuleana weren't awarded, they weren't recorded in the final Indices, and that why people don't think that any land was claimed in Pu'uloa. But I found a list of about 12 or 15 individuals who in the Native Register of claims, claimed 'āina along this area of Pu'uloa. But by the time the Native Testimonies for awards came up, all of these individuals relinquished their claims here and moved in, particularly, a lot of them moved into the Waikele-Waipii'o area, you know Loko 'Eo.

TGP: Ahh the Waipi'o area.

KM: Which I thought, was really interesting. Did you hear of any early families living anywhere out here at all, as a child?

TGP: Never. The only other habitation, if I can call it as such, was my cousin's country home, and she was the daughter of Samuel Dowsett. And Sam Dowsett had an old country home down in this area. And then beyond to the west of my grandmother's holdings was where the holdings of my grand uncle Alike, that's Alexander Cartwright Dowsett. And his old home was visible from the

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beach area outside my grandmother's home. So those were the only two homes I know of, other than Mitsuyasu who was further beyond.

KM: Uh-hmm. So coming out towards One'ula, like that, or even to Kualaka'i, did you hear...?

TGP: No, not that far. We weren't, no. I doubt... even now, in picking up some of the research, nothing seems to resemble anything that I had known as a child. It's all... well, this was all just wild country, all along the shoreline.

KM: Yes. Were there cattle then, all throughout your Pu'uloa lands, as you'd said, because they were using it as...?

KM: How about into the One'ula, or below the sugar fields and out towards even Lae Loa (Barber's Point), was someone running cattle out there also, that you recall?

TGP: I would say that it was a good possibility; however, you can't overstock the area. The area hadn't much to offer in the first place.

KM: Yes.

TGP: And so they'd probably move the cattle, pipi, for the pasture, and keep rotating. But maybe the present names, like we have the name Pa Pipi Road [cattle corral], which seems to indicate that that was used for pipi.

KM: Yes.

TGP: But it's really hard to determine just... well, it's hard for me to determine how much of this area was being utilized, and where. I asked Arline frequently what she remembers of her father and grandfather's experiences and she as a little girl coming down to what we knew of as Kūpaka, every weekend.

AE: Uh-hmm.

KM: Yes.

AE: But, you know, the cattle were around in this area too [pointing to the One'ula area of the map], but like you said, I'm just assuming that your grandfather owned that property because Papa had to bring the cattle down in this area.

KM: Hmm, even into Honouliuli.

TGP: Probably round 'um up and move them...

AE: Yes, move them, every weekend, he'd move them to different places.

TGP: Let the pasture come back.

KM: Was there a relationship between Dowsett and Campbell at all, that you ever heard of? Honouliuli was Campbell, eh?

TGP: Part of Campbell's.

AE: Part.

KM: And I imagine, that if your grandpa, or father them, on the Dowsett side, were going to use the land, they may have come to some agreement?

TGP: Well, maybe it was just like the old west, you just used what was not blocked off [chuckles].

KM: Hmm. But, it's obvious, in your description of coming in here, going through three or four gates...

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TGP: Yes.

KM: That there were obvious pa 'uwea, the wire fences or kinds of things like that.

TGP: Uh-hmm, yes.

AE: Yes.

TGP: And there was a definite scheduling.

KM: Hmm, rotating eh?

TGP: Rotating and scheduling. I don't know where grandpa Dowsett's slaughterhouse was, the old Hawaii Meat Company.

AE: Yeah, he had a slaughterhouse, the Hawaii Meat Company, that was part of his.

TGP: Wasn't that up in... [thinking]?

AE: Up near Middle Street. You know where the bus depot is?

TGP: That's a continuation of Pu'uloa. Because, they weren't able to haul these pipi anywhere, they had to drive them. So the slaughterhouse had to be at a convenient distance.

KM: Yes. As a child, do you remember, were there good areas for limu, like lipoa or, or fish like 'o'io...

TGP: Oh! 'Ewa, Kūpaka was noted for its limu. The limu banks would pile up as high as three feet along the shoreline.

KM: Along the area fronting here [pointing to the ocean shore fronting Kūpaka]. So there is a papa, a reef flats or something?

AE: Oh yes.

TGP: Yes, but it's not visible.

KM: Oh submerged?

TGP: Yes, in fact, you'd think there was no reef area because there is no line of breakers. But the limu was extremely plentiful [said with emphasis].

KM: So there was good limu; all kinds, or a particular variety?

TGP: All kinds.

AE: Yes.

TGP: And the manauea was particularly important.

KM: So manauea. Was there wāwae'iole?

AE: Yes.

TGP: Yes.

KM: Lipoa?

TGP: Plenty.

KM: Kohu?

AE: Yes, limu kohu.

TGP: Yes.

AE: There's still plenty when you go to Barber's Point, because nobody goes in. They don't have access. I just got some limu kohu, Mary went to make some.

KM: So was that a popular occurrence, friends and family might come down to gather limu or fish when you were young children?

TGP: Occasionally, it was almost untouched, as we knew it.

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KM: And you said it was a much as three feet thick?

TGP: Three feet above the sand level.

AE: Yes.

TGP: And beautiful white sand beaches in the Kūpaka area, what we would call Parish Drive now. That was all beautiful white sand beach. And then, noted for its limu and noted for its cat's eyes, those little shells, the little door that flaps, opens up.

KM: Yes, on the cone-type shell.

AE: Sister, all of that Hailipō and all of that, that was all Dowsett land eh?

TGP: Yes.

KM: Hailipō?

TGP: Hailipō.

AE: Because they had the sign out there when they first opened up the subdivision.

TGP: Well, also too, my grandmother was able to acquire a good deal more property than her original acreage in Kūpaka. So the area now flanking Pā Pipi Road, at the end of Pā Pipi Road, was all hers.

KM: The makai end?

TGP: All her development. Ching was the developer in that area, and it was all in leaschold.

AE: Uh-hmm.

TGP: So that was an additional area that my grandmother had.

KM: Towards One'ula?

TGP: Towards One'ula, what we call Hau Bush now. Before you get into Hau Bush, at the cul-de-sac, at the end of Pūpū Road. But she had that additional area.

KM: Did you folks, aside from gathering limu, and perhaps some fishing out here, did you remember traveling down along the coast into the One'ula area?

TGP: Not that far. It would be... see, the white sand beach ends, maybe two blocks, I'm estimating, two blocks beyond my grandmother's place. And then, there was a coral shelf.

KM: Yes.

TGP: And the coral begins, and that coral shelf runs all the way down to One'ula.

AE: Uh-hmm.

TGP: Before you begin to see some sandy beach areas again. And it was densely thick with wild [chuckles] vegetation, you just couldn't go through it. The cattle could, but it wasn't a place that we would be allowed to play. It was far too far away. And there was no purpose in anyone going down there. It was easier to go by boat, if we were going to go down the shoreline.

KM: Uh-hmm. Were there good fishing areas out here?

TGP: Lobsters. We had a Filipino yard man who would come periodically to clean up and all, and over the weekends, he would put on his tiny little goggles [gesturing single lenses over each eye], right up against his eyes, and his cotton gloves.

Then he'd go off with his big gunny sack and by the time he got back, the gunny sack was full of lobsters. All he had to do was reach into the lobster holes and pick them up. They were so plentiful.

AE: Yeah.

TGP: Lots and lots of fish and lots of lobsters. And I don't remember any sharks in the area. There was no reason for them to come in, there wasn't any pollution of any sort that would attract them.

KM: So, you've mentioned sharks, and of course, Pu'uloa is famed, 'Alahula Pu'uloa, he ala hele na Ka'ahupāhau" [The trails of Pu'uloa are those traveled by Ka'ahupāhau]

TGP: Uh-hmm.

KM: The shark goddess.

AE: Yes.

KM: Were there still stories at all being told?

TGP: Well yes, but that was into the Pearl Harbor area. I don't know of sharks being a threat when we went swimming, and we were always on the beach, and into the water.

AE: Yeah. But like sister said, the growth is all dense in this area. Mekia, Major Kealaka'i's boy, he and I would come walk up, you know where it's all rocky?

KM: 'Ae.

TGP: Uh-hmm, and you'd walk the shoreline.

AE: Yes the trails over here [pointing to the map in the area of One'ula-Kualaka'i].

TGP: That's right you used the pipi trails to come up.

KM: So Major Kealaka'i's mo'optuna?

AE: His son, we'd play together.

KM: His name was?

AE: Mekia was his name. He's passed away already.

KM: Were they still talking... Now your father's name was?

TGP: My father's name was James Arthur Parish, and he was the son of Mary Kaohinani Dowsett-Parish, and her husband, Leonard Arthur Charles Parish. And my grandfather Leonard came from Wales in England. He came out as a young man and wooed my grandmother I suppose [chuckles].

KM: Now, you'd mentioned that some of your 'ohana, was on this side, the Ragsdales of Hilo vicinity?

TGP: Yes, this was Annie Green Ragsdale was the wife of James Isaac Dowsett. And James Isaac Dowsett was the first Caucasian child born in Honolulu, that was of non-missionary stock. And his father and mother... his father was Captain Samuel Dowsett, and his mother was Mary Bishop Dowsett. And Captain Samuel Dowsett had resigned his commission in the British Navy and had gone to Australia and married Mary Bishop. He bought a boat and was leaving Australia, and his first child was born on Melville Island. So she was called Deborah Melville Dowsett, and that was the first of grandpa Dowsett's

generation. And then they came up here, intending to go on to the northwest United States, but instead, they came into Honolulu and never left. And so my grandpa Dowsett was born then, in Honolulu.

KM: Ohh. And your mother's name?

TGP: My mother's name was Libby Peck. She was from the other side of the island of O'ahu, Windward O'ahu. She was Libby Peck-Parish. She married the oldest of the oldest boy of Mary Kaohinani Dowsett-Parish, my father, who was James Arthur Parish. My mother hailed from the windward side, where she was hānai to the kahū, the kahuna nui who was in charge of all the sacred lands from Lae-o-ka-'oi'o in Kualoa, all the way along through to Waikāne, Waikāne-Waiāhole.

KM: So this hānai papa, grandfather...

TGP: Was the kahuna nui of that whole area. And that area has a good deal of history to it, a great deal of history.

KM: Hmm. May I ask, because you'd mentioned that mama's, I guess maiden name was Peck?

TGP: [smiling]

KM: What was the Hawaiian line that comes into here?

TGP: Mother's mother was Hattie Mi'i-Peck. And Mi'i was the family name of my grandmother's people, from Hakipu'u. And that would be my grandmother's parents, they passed away when the children were quite young, so they were divided up among other members of the family and were raised by others. And so my grandmother, my mother's mother was hānai, or raised by Ka-uku Kalā. And Ka-uku Kalā was the kahuna nui of the sacred lands [in the period ranging from around 1860 to 1890]. And his wife was Ka'akau-a-lani, and she was very, very petite. But, they lived in Waikāne, and raised my mother as a god-send so to speak. Simply because it was "a la mode" at that time to have a hapa haole child, a hapa haole mo'opuna. And Ka-uku Kalā wanted, by all means to have a hapa haole hānai [chuckles].

KM: [laughs] "A la mode."

AE: Cute yeah.

TGP: [chuckles] And so my grandmother, obligingly had an affair with this haole who was in love with her, but with whom she wanted nothing to do, and so to satisfy the hānai parents, she had an affair with this haole from Great Britain, and I, to this day, don't know his name. My mother was never able to find out, but he was a British businessman who came in and out of the islands, and somewhat kept tabs of mom as she was growing up, but never approached her, never spoke to her. So We don't really know who my mother's father was. But then after venturing with the second love of her life, who was my grandmother's He'eia boyfriend, who was pure Hawaiian, she had another son by him, who became, my mother's half-brother. And then the third person she married, married, question mark, was Solomon Peck. And Solomon Peck was

the youngest brother of the three Peck brothers, who had come from Germany and settled here. There was Uncle Eli Peck, and then my grandfather who was Solomon, and uncle [thinking], oh, we always referred to him as the Hilo uncle. He was manager of the bank, must have been Bishop Bank in Hilo. So those were the three Peck brothers.

KM: It's so interesting. I'm sure you must have been hearing stories, like the value of fisheries, or relationships of land, like, as mama was hānai to Ka-uku Kalā [pauses]. These histories are so important, and that we remember land use and relationships...

TGP: Ka-uku Kalā was very fond of mama, extremely fond of mama, she was his punahele. And he wanted to expose her to everything she know about her culture, without really teaching her in any formal manner, the intricacies of the kahuna line, the priesthood. And so he exposed her to all that she be aware of without really informing her. And we found out years later that he bestowed upon her the priesthood. We weren't ever sure of that, in fact, we hardly ever thought of it until we met her friend on the Big Island, who assured us that mama had received, had had this bestowed, the priesthood upon her. But she was never educated in the priesthood, temple trained or anything like that.

KM: 'Ae. What was the sense, even here, and this is appropriate, coming back to Pu'uloa, the relationship to the land, often the priesthood was associated with caring for, and calling upon the abundance, the growth, the proper rains so that the crops would grow. To call so that the abundance of the ocean, the limu or the fish, would come back. Was there a sense of...?

TGP: Caring, yes.

KM: In fact today, there is so much talk about "native rights," and...

TGP: Yes, but they are caring things, in my estimation, a little too far. Because the maka'āinana were never in possession of any "rights." They kept within, or had to keep within their areas and if they were allowed to go into the sacred lands or into the oceans and all, it was only with permission. They knew their areas. They kept within their areas. And they didn't, in my estimation, gather from here, there, and everywhere. They didn't take liberties. I don't think that their mode of life necessitated their going out of, or beyond their ahupua'a, where they were born.

KM: 'Ae. That makes sense, it falls in line with the writings of individuals like Kamakau or I'i and others.

TGP: Uh-hmm.

KM: You have rights of certain accesses within your own ahupua'a.

TGP: Right.

KM: But, the responsibility was that if you gather, you care for...

TGP: Yes.

KM: ...the resources. Is that right?

TGP: Yes, oh yes, yes.

KM: And you didn't go, "Ahh, look that limu is more 'ono over in Honouliuli, so I'm going to leave Pu'uloa now and take from Honouliuli."

TGP: I don't think that even entered their minds. This idea of gathering from here, there, or anywhere. And Ka-uku Kalā was a very, very famous fisherman. And he fished the waters from Mokoli'i all the way beyond to Kāne'ōhe Bay.

KM: So he fished all in to the Mōkapu, Kāne'ōhe Bay, and into the other side as well?

TGP: No, no, not that far. He would go the distance that he could go alone in his canoe, beyond Mokoli'i, into the deep water. And then the women gathered the limu and the shellfish and all from the area within their ahupua'a, because actually, the ahupua'a extended to the reef. But there was nothing of this transient gathering from here, there, and everywhere.

KM: Is this something that you remember hearing a little bit about also?

TGP: This idea of "gathering rights" sounds so extremely fictitious to me. I don't know... I think it has come about through the need of the present entertainers to go beyond what would normally be available to them.

AE: Uh-hmm.

TGP: And now are declaring that they had rights to go anywhere.

KM: Hmm. It is very different. This is interesting, when you talk about Ka-uku Kalā, this kupuna and his fishing. Because he was kahuna nui...

TGP: Uh-hmm.

KM: ...and he cared for these sacred lands. Was Kualoa a special place traditionally? Those five ahupua'a are the sacred lands of O'ahu. And they were Ka-uku Kalā's domain, they were his responsibility. He was the kahuna nui of the sacred lands and that priesthood had come to him. Now Kualoa is, in my estimation, a fabricated name.

KM: 'Oia [is that so]?

TGP: And I really wonder what its actual origin is [pauses to get something to drink]...

KM: So Ka-uku Kalā cared for those sacred lands, from Ka-lae-o-ka-'oi'o to Waiāhole, and the fisheries into the Kāne'ōhe Bay, up to Mōkapu. Did you ever hear anything about Mōkapu and the fisheries, or the lands there at all.

TGP: I've become interested in Mōkapu, simply because I've had to research Ko'olau Poko. I was asked to conduct a Hawaiian Civic Clubs Tour of the windward side, and they told me they thought we should go from the Pali down to Mōkapu. And I said, "You're not going to the sacred Lands?" And "Ohh!" I said, "Of course, you can't go to windward O'ahu via the Pali, without any kind of a tour having a beautiful climax at these sacred lands." And so that's how, I've come to research all of that Mōkapu area. And researched it simply because I had to know a little bit more than the people I was talking to [chuckles]. But I am bewildered at the amount of knowledge and no knowledge of Mōkapu.

The group that seems to claim some kind of priesthood relationship with

Mōkapu is the group that was headed by a Kahuna named Sam Lono, out of Ha'ikū. And I know them, and I've been very nicely treated by them, and respected, but I just don't know how... I can understand why they would pick Mōkapu as an important place, simply because the stories that center around Ulupa'u. Of Kāne having selected that spot to have created the first man and first woman, however, like many, many, many of our Hawaiian stories, we must take them with a barrel of salt.

KM: 'Ae. And the reason would be then, that this account of Kāne and the first man are perhaps...?

TGP: They probably originated long before the Hawaiians came here. And when the Hawaiians did reach areas, they remembered and then localized their stories.

KM: Ahh, so what you're saying is that this legendary account, possibly, may not have been directly associated Mōkapu, Ulupa'u, Kahakahaka, and...

TGP: Hawai'i Loa.

KM: 'Ae, Hawai'i Loa. But that the names were carried and brought and then...?

TGP: Attached.

KM: Attached to the areas. Have you heard, or what is your thought or consideration that some of these mo'olelo, possibly ka'ao have been influenced; just as the language is being influenced today, anglosized [from earlier comments by Auntie, regarding changes in the Hawaiian language today]. Is there a possibility that some of these mo'olelo, ka'ao bring in the Christian, some more recent beliefs or things...?

TGP: I don't think that we have anything that is pure today. Anything that is purely Hawaiian. What we have today, are the mere remnants of vast, vast knowledge that came with the Polynesians at various eras and turns through their history, and became a part of what we now fictitiously call "Hawaiiana." It became a part of Hawaiiana simply because Hawai'i had to have a beginning.

KM: 'Ae. You bring up such an interesting point [end Side A; begin Side B]... The fragments. Look at what John Papa I'i's title of his history was, I've gone through the Hawaiian-language newspaper and seen it. It was "Na Hunahuna Moolelo Hawaii," The fragments of Hawaiian History.

TGP: Uh-hmm.

KM: So even at his time, he saw that there was this great... and of course, in his time, they were watching thousands of the people die in short periods of time because of the diseases.

TGP: Uh-hmm.

KM: Of course, that's where Mōkapu comes in. Your hānai great grandfather...

TGP: Uh-hmm, Ka-uku Kalā.

KM: Yes Ka-uku Kalā was of a few survivors, particularly of a priestly line, it seems.

TGP: Uh-hmm.

KM: This kahuna nui that cared for these sacred lands. And it's obvious that it was important enough to his generation, even though so many transitions were

occurring in the Hawaiian history, and the condition of the people, that it was still passed on to him. And he sought to at least expose your mother to these histories.

TGP: Yes. And he wanted his punahele to have acquired something his, however, he told, when asked by his friends, he told his friends very definitely, that he “was not going to pass on the priesthood to any of his sons. And he had four sons.

Simply because it would be too dangerous. They would never live up to all the protocol, all the kapu. They could never, in their style of life, as it had changed, they could never be faithful to every iota of the priestly does and don'ts, all the kapu. And so he had 'oki the priesthood and he disposed of his gods. My mama was sitting up in her hau-tree tree house when Ka-uku Kalā took his gods, and she knew, just what he had done with them. But that was pau.

KM: Hmm. And mama them, were they living in Hakipu'u at that time, or...?

TGP: Mama was still in Waikāne. See, Ka-uku Kalā's home was at the end of Kamaka Lane. And Kamaka Lane is almost the division line between Waikāne and Hakipu'u.

AE: The stories are so beautiful.

KM: Yes. You'd mentioned that you took this group of people, the civic club, and you told them they had to “see the sacred lands also.”

TGP: Uh-hmm.

KM: And earlier, you had said that you had a thought that perhaps the name Kualoa was something that...?

TGP: I have wondered about the origin of that name, because in some of the references the original name was Pali-kū. And Pali-kū has a close relationship with the priesthood, because there was the priesthood of Pali-kū, and not necessarily because of the escarpment or the cliffs, but simply because the priesthood was called Pali-kū. Now another possibility of this Kualoa name, is, in my thinking, “Akua-loa.” And very often, just as we have in Kealakewa, “akua” is abbreviated to “kua.” And Akualoa was the god that was carried in the Makahiki, the large, or long god. And the Makahiki rights occurred in that area.

KM: That was the culminating point, yeah.

TGP: That's right. And Pohukaina, the great burial cave was entered from that end of the Kānehoalani range.

KM: Ahh, very interesting.

TGP: Sorry, we're far away from Pu'uloa [chuckling].

AE: I know, I told him, I said “She is so interesting.” She's going to run another tour. **KM:** Was Ka-uku Kalā, 'cause, you'd brought up the lineage, this priesthood of Pali-kū, was Ka-uku Kalā in your understanding perhaps the last formal kahu in that line?

TGP: Probably in... [thinking] I can say definitely, yes.

[Auntie coughing, tape off and back on]

KM: We were just talking a little bit about some of the Akua-loa, Kualoa, some of that thought about the priesthood and it's so interesting.

Of course we're bouncing around a little bit, and I'm thinking that maybe as we talk, other thoughts will come to mind. And while the tape was off, we were just talking once again, a little bit about some of the native “rights” or “traditional rights” in gathering, and you said that you noticed that Kūpaka now, as an example, whereas before there was three feet thick beds of limu, now...?

TGP: Nothing. There's... in fact, we've seen people walk the beach, or go along in the low tide on their tummies in the water, diving and plucking the very, very, tiniest of the limu growths.

KM: Hmm. So the old system of kapu, restricted seasons and gathering, and when you didn't go out, had some intelligence to it eh?

TGP: It was the real means of conservation, they would have nothing, had they not had their kapus. And they knew that, and no one resented these kapus and no one attempted to sneak around them.

KM: Hmm, they were working within their own lands, the places their families were associated with, traditionally.

TGP: Uh-hmm. If they didn't look after them, they had nothing. So they had to look after the resources and take care of them. And I don't think that our Hawaiian people were unhappy under the kapu system. They were perfectly content, they didn't know, they were not in a position to make comparisons. They didn't know there was a better way. It was their way.

KM: Was it better [chuckles]?

TGP: Well, they didn't... the point of comparison was eventually thrust upon them and they were taught and told that the old way was no good, and that they could no longer be the “pagans” that they were admitted to. Then they began to look to something else. But, I think that awareness was fostered and perhaps forced upon them. The awareness of, “Well, there's something else besides what we know.”

KM: Well, I think this is an important point also, coming back to how your kūpuna lived. They lived on an island, within an ahupua'a, and each island and ahupua'a had its wealth of resources, but it was limited. So you learned how to manage and care for it.

TGP: Uh-hmm.

KM: You take too much today, you starve tomorrow, it makes great sense. So today we see people come in to gather, even the smallest... pulling the rock, the limu, or take the last of the fish. And you'd mentioned the ula, the lobster that were out here and things, and of course there was this wealth of fishponds out here. Were you folks still gathering anae or awa, anything out in these areas? And did the cowboy's families go traveling places that you heard of and gather fish

or things like that?

TGP: Not... that would all be conjecture on my part. I would have to guess, simply because it didn't ever, ever come into my range of experience, having other people in the area. You see, by the time I was growing up, Pearl Harbor was already established and the old Hawai'i was long gone from the area.

KM: Yes. [Speaking to aunty Arline] Aunty did you share that you couldn't even take a canoe... Do you remember when you were a child, could you still go in here and canoe or boat or anything? Or had the closed down?

TGP: By the military.

AE: Uh-hmm. But I noticed, that they would allow the old... especially on your papa's ranch, they would let them net fish.

TGP: Yeah, in the old days.

AE: And they allowed them to go.

KM: 'Anae like that?

AE: Yeah. They'd go in there.

TGP: But then, Fort Weaver wasn't built up as it is today.

AE: Oh no.

TGP: And you had access to the fishponds.

AE: 'Cause you had to in among the kiawe trees and come along Waipahū and on down Honouliuli, so in this area was like nobody.

KM: So, where the salt works was and like where your house was, everything is bulldozed and knocked down? Is that correct, there's no walls or anything left of the salt works, that you know of?

TGP: I've often wondered in going through that area, where there salt works were located, and I think they were located somewhat in the vicinity of the firing ranges now. They have some practice ranges out there. And just studying the contour of the land and that's probably where they were located, and probably inland from the shoreline in that general area. Which is the entrance of Fort Weaver. And probably extended over into what is now the park.

AE: Yes.

KM: Which park?

TGP: The 'Ewa Beach Park.

AE: Pu'uloa Park, they've put the name back to Pu'uloa.

KM: 'Ae.

AE: We're trying to get Kimo Pelekāne put back too.

TGP: [chuckles] Kimo Pelekāne.

AE: That's her grandfather.

TGP: My great grandfather was known by the native as Kimo Pelekāne, and everyone called him Kimo Pelekāne. He knew Hawaiian as well as he knew English, and he was a member of the House of Lords, in the old legislature. He would caution the Hawaiians in their wanting to promulgate new laws, and record. "If you say it this way, be careful, because if you say it this way, it's going to

mean this to the po'e haole. But if you say it this way, this is what you mean, so you say it this way. This is your intent."

KM: Hmm. What is your sense, there are a few sites that appear to be ancient, or early Hawaiian sites.

TGP: Uh-hmm.

KM: Some kahua hale, like, some pā, small enclosures.

TGP: Uh-hmm.

KM: And at one place, and aunty Arline, I think you went there, there is a kahua [platform]...

AE: Yeah.

KM: [pointing out the size] ...elevated from this wall, where the door is, it's at least this big [roughly 12 x 12], squared. So you have a sense of... and this may be another part of it, did the sugar company, when they did their work, were they in the practice of building up nice stone mounds, or...?

TGP: Oh, well, it all depends. When they would clear sugar land, rather than cart the rock away, they would pile them up, and plant around them, so you weren't aware of those mounds of rock until the cane was cut or burned. Then you became aware of them. I remember this down in Kohala.

KM: Yes. Here, behind One'ula, among the various sites, one of the places is a kahua, an elevated platform, that is about this big.

AE: Yeah.

KM: In fact it's mostly this coral, limestone-type of walls, you know. Do you remember hearing anyone talk about any old Hawaiian sites that had been mentioned, or that the cowboys, you know, spoke of?

TGP: I'd never been personally involved in any of the ancientness of 'Ewa Beach. But, through my research, I can readily understand how it was. I don't believe it was a heavily populated area because of the lack of fresh water. So it could have been an area of periodic habitation.

KM: 'Ae, seasonal, coming down to...

AE: Like fishing.

TGP: Yes fishing.

AE: Spending time.

KM: Ahh, gather pa'akai.

TGP: Uh-hmm.

KM: Dry fish like that.

AE: Uh-hmm.

TGP: And at the proper seasons.

KM: 'Ae. It's interesting, and of course, the kūpuna were so na'auao, how they were able to live off of the land. Even what we wouldn't drink today, the wai kai...

TGP: Yes they could tolerate it.

AE: The brackish water.

TGP: They could tolerate the brackish water. I know that the area also, and this

is from research, was famous for its “dog people” [3]. You know, there was a caste, or a type of people, who had dog’s tails and this area was supposed to have been one of the areas that they inhabited. And they lived in the pits, underground.

KM: Ahh, and there are such things as hula ‘īlio, the dog chants and hula for the ‘īlio, like that.

TGP: Uh-hmm.

KM: And my understanding is that the ‘īlio was a form of Kū, they were Kū associated. The cloud forms of the dog like that.

TGP: These were actually people and they evidently... I was reading about their having been very, very ferocious warriors. So they would join the ranks of the chiefs in battle and then they were seen in some of the... seen by people who had the fortune or misfortune of viewing the ‘ō‘ō, the night marchers. And they were seen participating in the night march.

KM: Is Pu‘uloa a place that’s known for night marchers?

TGP: I don’t know, but I would certainly assume so.

KM: As a child, you never remembered hearing the huaka‘i pō come by, personally?

TGP: My mother, out at Niu. See, my parents moved from Kaimukī to Niu when I was 12 years old, and mama would hear the night marchers come down Hawai‘i Loa Ridge, which is very understandable. And then they would go along, right in front of the house. She got up and watched them, she wasn’t make‘u. But it isn’t... the huaka‘i pō is something we just grew up with. We weren’t frightened by it; there was no make‘u, it was just part and parcel of what we understood to be, the old folk’s way.

AE: Uh-hmm.

KM: ‘Ae.

AE: Sometimes the parents would scare you too, they’d tell you “Don’t go over there.”

TGP: Uh-hmm. And my mom would tell stories of having seen the akua lele, the fire balls, and they’d run down the beach, wondering where it was going to land.

[pause – someone comes to the door]

KM: What is your sense of this land, and then preservation of what’s left of the Hawaiian sites, and care for these places, and the proposed development that they are looking at with Haseko? Do you have a...?

TGP: I find... well, my personal reaction is that I don’t believe the type of development that Haseko has in mind, is necessary. I don’t see a point in it. They were able to acquire acreage, to put in a marina [pauses] which, in my mind, doesn’t have... it has neither beginning... neither head nor tail. Why a marina? Why in ‘Ewa? Why this tremendous undertaking at a tremendous risk, because we don’t know, as people have warned us, whether or not the aquifer would be disturbed or the drainage of the underground waters would occur. But I

just don’t see the reason for it, a good solid necessity in back of the Haseko move, I don’t see it. I can understand the housing, but not roof to roof as we see here today. And I can understand the preservation of the beach area, and a low-style condominiums along the beach. But I really question the marina and the dynamiting of the shoreline.

KM: Hmm. Were the ocean resources important then, and do they remain important to the people, you think?

TGP: I don’t think people really look to the resources as resources anymore. If they enjoy the beach, it’s because it’s available. If they go down to One‘ula, it’s primarily to fish. You don’t see them in groups in any large numbers there, other than to picnic.

KM: Hmm. The community has changed drastically hasn’t it? After your time as a child, it sounds like there was no one out.

TGP: That’s right.

KM: One‘ula, no one out here.

TGP: That’s right.

KM: When did the plantation housing and the village come up. Do you recall now? **TGP:** ‘Ewa Village was the last plantation area of this whole locale, and ‘Ewa Plantation was very much in the works, and they had their extensive cane fields, through Honouliuli and all the way around, along Farrington Highway, almost to Nānakuli. The cane lands and all, that was all kō. The changes have been tantamount, but they’ve come about primarily with the closing down of sugar.

KM: So as the sugar closed down, there was a need to make money in other ways and vast development was done? Like Ko‘olina, or any of these housing developments? You’d mentioned, roof to roof.

TGP: Uh-hmm.

KM: And of course as the population changed, I guess there’s not that sense of aloha. But you don’t really know which is the horse and which is the cart, which is before the other. Was it the closing down of the plantation that caused the overextended development? Or was the overextended development a part foreseen, and therefore, the plantations were closed down? Which came first?

It’s hard really to know, because private enterprise being what it is, the labor unions... Actually the advent of the labor unions was the beginning of the end of plantation life.

KM: Hmm. You had mentioned earlier, you are, of the old part Hawaiian resident of the Pu‘uloa-Honouliuli area, you are really amongst the last of the old timers that was here as a child.

TGP: I don’t know of anybody else, who’s older than I am, and who still resides here. And if there are people older than me, they came here after I had lived here.

KM: Hmm, that’s right. You folks have had a generational tie to this land also.

TGP: Yes.

KM: Is it important to care for traditional Hawaiian sites?

TGP: Yes, very. Very important. But it is also as important to care for as it is to know the history and probably, if possible, how they came to be, and what their significance is in the area. And this is what Arlene keeps insisting upon.

KM: Yes, yes.

TGP: We know that there are sites, and we are beginning to understand why. I mean, these pits that are gold mines for the fossil findings and for the bones.

KM: Yes, Well, you also brought up, that interesting story that there were a po'e 'īlio, you know, people that were of the dog clan.

TGP: Uh-hmm.

KM: Just like they have pueo, manō, and there were these 'īlio, people that were associated with the dog-like clan.

TGP: Uh-hmm.

KM: And you have read, or heard that they lived within these pits?

TGP: Yes. Now the actual evidence of this information is hard to come by, it's here and there. It's scattered. Now Mary Kawena Pukui did a collection of stories of this area, and she's quoted extensively in Elspeth Sterling and Catherine Summers's *Sites of O'ahu* [29]. And from that one volume, you can begin to deduct how much was known at the time, and how extensive the lore was for this area. There's a great deal of lore associated with this area of 'Ewa.

KM: Hmm. While you were still young, it appears that you were not hearing a great deal of the lore though.

TGP: Nothing.

KM: How about of the shark gods, or things like that?

TGP: I can't say that my father's side of the family, my haole side of the family, knew anything about it. I really don't believe they did. Perhaps great-grandpa Dowsett knew, because he was a student, and very astute type of person, and it could have been so well known, as not to have been something to seek after. It was just part and parcel of the place.

KM: 'Ae. Did you ever hear a story by chance, of a relationship between the Pu'u'loa fishery, and this comes back to where your Ka-uku Kalā was, and the fish migrating say between Pu'u'loa and...?

TGP: Oh, the mullet, yes. I know by research that that happens, and that it was extensive and it was seasonal, it happened every year. And I do know from my mother's telling, that there was an underground access for the mullet from Kahana Bay to Moli'i Fishpond.

KM: 'Ae, so you heard of that Huilua Pond and the cave underneath?

TGP: Uh-hmm. And mama was taken into Pohukama, into, and she has described the interior to me. But I don't usually divulge what she has told me, simply because I don't know how it is going to be understood.

KM: 'Ae.

TGP: It might sound a little far-fetched. And yet in my mind, it's perfectly logical.

KM: Of course.

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TGP: And I do know that Ka-uku Kalā possessed the special mana of the kahuna nui, because mom said that when he took her into the cave, they had to leave their horses at a distance and walk—this was at Ka-lae-o-ka-'oi'o—and walk towards the towering cliff at the northern point of what we know as Kanehoalani Range. 'Ae.

TGP: And then they went into a very, very narrow ravine, very narrow, and he picks up a stone, he knocks three times on the wall and the entrance appeared. And she was so astounded, she just grabbed his hand, and wondered what was happening.

KM: Hmm. Out of curiosity, did mama by chance, share with you, how did they see inside? Did it... I've heard from other people, not of that Pohukama, necessarily, but of other places, that when you 'oli, or you pule, and it would illuminate so you could see. Did mama say how they saw inside?

TGP: She just sort of took it for granted, she could see, and she never expounded. I've often wondered, just how they could see. However, what she saw in there would necessitate the entrance of sunlight. So there was a visibility.

KM: 'Ae. It interesting to see that there is a relationship shared between these fisheries here in Pu'u'loa and back to the windward side also. And then to hear about these caves, these subterranean accesses that may have existed, and perhaps still do.

TGP: Uh-hmm.

KM: Did Ka-uku Kalā call on the fish, did mama say? You'd said that he was a fisherman, a chief fisherman for this fishery there.

TGP: Uh-hmm. I don't know whether he called on the fish, but he had his shark, who led him to the fishing grounds. [smiling] Mom told a story of having begged him to take her out fishing with him, because he usually dropped her at the little bay on the outer side of Mokoli'i to spend the day while he went off fishing. And this one time, she asked to go along and while they were paddling, he says, "Now whatever you see, you mustn't be afraid." So she wondered, "What had she to be afraid of?" And they were paddling along, her paddle was on the ama or outrigger side, and her paddle hit something. And she was in far too deep water to hit anything. So when she looked there, and she must have been about six years old, and when she looked over, she saw this shark who was swimming with the canoe on the outrigger side. The fin was very visible to her, so she kept edging away from that shark side. She'd rotate as they had to paddle so many strokes on one side and so many strokes on the other side, and she kept edging her way until finally, she capsized the canoe.

KM: Oh my!

TGP: All Ka-uku Kalā did was to grab her by the hair and throw her on the shark, and she passed out. And when she came to, she was on Kualoa beach and she had to walk all the way home to Waikane.

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KM: Amazing.
TGP: So, we do know that he had his shark, and he was an 'aumakua, a family 'aumakua.

KM: 'Ae. Did he drive the fish?

TGP: It would lead him to the fishing spots. And then, mom had another very interesting experience as a little child. One day, she was at this little bay on the outside of Mōkōli'i and it was noon and hot, so she decided she was going to go dog paddle in the water. So she goes out and was on her toes in the ocean when she feels something in back of her. And all of the sudden, she was sitting on something. And the honu, a turtle had come in and lifted her up and seated her, and then took her for a ride in the bay, made the circuit of the little place several times, and then it eventually took her all the way around Mōkōli'i and back to the bay. And that honu befriended her for her lifetime. As long as she went back to Waikāne, the honu would come, and knew just exactly when to expect her. And when she arrived at Kamaka Lane, at Ka-uku Kalā's home, they would see the honu making his way up the embankment, which was quite a steep embankment, up to greet her. She'd say "Yes, I'm coming tomorrow." She'd promise, and the honu would turn around, and then she went swimming with her honu, the next day.

KM: Kūpāianaha! It's so wondrous, this relationship, you know. Out of curiosity, you were a Nun for 50 years.

TGP: Uh-hmm.

KM: Was mama brought up, also in association with the church? Did you choose the Catholic Church as yours? And how do you... as a Hawaiian of today, and you've lived, you know...?

TGP: [chuckles]

KM: ...nearly 80 years. And you grow up with these stories and understanding this deep relationship between nature and the environment...

TGP: But there is no conflict. There is absolutely no conflict between what is Hawaiian and what is non-Hawaiian, in me. Absolutely no conflict, and no... I don't demarcate in any way, between the Hawaiianess of my life and the non-Hawaiianess. So having become a Sister of the Sacred Hearts was just what I wanted to do after my graduation from the University of Hawai'i, with an anthropology degree. [chuckles] The Mother Superior asked me, "What are you going to do with anthropology if you're going to be a sister?" And I said, "Well suppose I don't make it as a Sister, I have something to fall back on." But that's how, I've always been interested in Hawaiiana, and in anthropology. Peter Buck was still alive in those days, and the anthropology department was brand new, and I had a reading knowledge of French so I did a lot of my research work in reading materials that were available at the Academy of Arts, in French. And the people in the department would come in and listen to my book reports, simply because they didn't know French. So there's no [pauses],

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in me there is absolutely no one part Hawaiian, one part, no Hawaiian. It's all blended.

KM: Uh-hmm. And the relationship between people and the creation, is compatible, whether it's in the Hawaiian or...?

TGP: Yes. Now people will ask me, "Do you believe in Pele, Madam Pele?" And I say, "Well, I don't disbelieve."

KM: Yes, uh-hmm, it's a part of God's creation.

TGP: It's a part of what we've always known and will always revere.

KM: Out of curiosity, and we were speaking earlier about Mōkapu, and that St. Katherine's had been built there around January of 1843. And there is a picture, I tried to get a copy of it this morning, because I wanted to show you. But there was a Dr. Arming that was here in the 1880s, and he has a picture of the ruins of St. Katherine's Church on Mōkapu.

TGP: Yes, you can't see anything now, it's all grown over.

KM: No, it's all gone. One of the things that's happened is that at Mōkapu, and this, what I'm leading into is, what is your sense then, as a Hawaiian, and as a person intertwining all of these skills, resources, knowledge, and spirituality? What is your sense of the burials? The rights of burials to the land, and Mōkapu of course, you mentioned Buck, you probably knew Kenneth Emory...

TGP: Uh-hmm.

KM: Going into anthropology. And you were an early Hawaiian in anthropology. Because there still aren't many Hawaiians in the field. What was the sense of burials and place, and returning, and do you recall anything about Mōkapu burials, by chance?

TGP: I really got into detail in Mōkapu burials, in planning for this tour, which was fairly recent. I've known about the Mōkapu burials for a long time. I just can't understand why so much had to be done to these burials, just for the sake of giving people at the university a taste of archaeological pursuit. I just can't see it. What did they expect to accomplish? And now, as they look back, there was nothing gained from it. Most of the positions of the remains were in positions that they'd already known about. They didn't find anything new. They didn't find any new artifacts. [chuckles] They didn't find artifacts of any great extent. It was [sigh in exasperation], it was in my mind, as I look back at it, it was nonsensical to have ever done that.

KM: So Hawaiians in their burial customs and practices, what do you think then? As you'd said, nonsensical, this thing about Mōkapu and stuff. Should they just originally be left in the ground, where they came from? And did you hear stories, in fact here at Pu'uloa, with all the these lua yeah? Did you ever hear stories about burial out here?

TGP: [shaking head]

KM: No. Interesting eh.

TGP: I don't think this area was a long time area of habitation, although the legends

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would say to the contrary, because this is where the 'ulu was brought. But I just don't know how to interpret it...

TGP/KM: [brief discussions regarding transposition of place names in some historical texts]

KM: ... There are obvious remnants of remains. You know the salt works were important, and in the earlier days where the kāheka, the natural salt beds.

TGP/AE: Uh-hmm.

KM: And like aunty Arline was saying when we'd met previously, there was this area where the ponds are back here, and the old house sites and wetlands [in the vicinity of Sites 3201, 3202, and 3205]. Water was such an important resource, and we were wondering about salt works, or making there. If the people didn't live down here permanently, where did they live? Where were the people coming from that made use of these resources out here?

TGP: As I sort of surmise now, I think the large areas of habitation were Waikele and then down through the lower part of what we call Waipahū. Now Waipahū is not a proper name. It's neither an area or an ahupua'a, it's just a gushing well.

KM: Ahh, yes, Wai-pahū, one site eh.

TGP: Uh-hmm.

AE: That's right.

KM: [looking at Register Map 618] See where it says "Church" here?

TGP: Uh-hmm.

KM: This is in Honouliuli, right on the edge. There was all this taro land up here

yeah?

TGP: Uh-hmm.

KM: Do you think that that's where the main people were living?

TGP: These taro lands of Honouliuli supplied the chiefs primarily. There weren't any other taro lands, that I know of.

AE: Not over there.

TGP: And that's why now, if the taro was here, the people were living not too far away from their taro lands. They had to work them, and the chiefly compound, at Waikele was conveniently close. Then, you also have Waipi'o with its ponds.

AE: Uh-hmm.

TGP: So I would say that the main area of population circled the West Loch.

KM: 'Ae. That's interesting, and probably...?

TGP: Probably during seasons, they would come camp over here. They would have to bring their fresh water. Their tolerance of salt water could not extend for too long. [chuckles] You can't do that for lengths of time.

AE: Uh-hmm.

KM: And of course, it's also very likely that before the cattle deforested a great deal of area here, that the water table into these lua meki, these pits and things, may have been, possibly, different also. There may have been a little more fresh water with good native ground cover, not like kiawe and stuff.

TGP: Well, the kiawe came in, in the 1820s.

KM: Yeah, real early.

AE: They brought it in.

KM: Now, if the people then possibly were coming down here and fishing seasonally and then going back, this sounds like a practice. I think Aunty Arline, was saying that... Like the work that Tūtū Kawena did, Eli Williamson, as a child yeah, she would come down to Kualaka'i...

AE: Yeah.

KM: Seasonally, families were coming down and fishing, yeah.

AE: Yeah.

KM: That was still happening.

AE: That was.

TGP: And it was a practice that was, I think, what you would call "Statewide." You know the Kona area on the Big Island, 'Anaeho'omalū, all the way to Kalāhuipua'a, and then even further towards Kohala.

KM: Oh yes, and to Ka'ūptilehu and Kekaha also.

TGP: Uh-hmm. But the people from Anahulu came down and spent portions of the year at the shore.

KM: Yes, like Alapa'i mā.

TGP: Right. And they had their shelters in these caves and they would bring only what was necessary and they would always take back their partially crystallized kai and finish making their salt mauka. So it was done, these seasonal treks to other areas.

KM: So that's what you visualize as being the practice here?

TGP: Yes, rather than a permanent settlement of any sort here. I've never heard of... I think the permanency, the settlement was in the Waikele area. There are more legends related to that area.

KM: 'Ae. It's so interesting.

TGP: [chuckling]

KM: This has been a rich kūkā kama'ilio, talking story here about a variety of things. As a child, what are your fond recollections of this place? What are some of the activities that stand out?

TGP: I loved my grandmother. I was the oldest grandchild, and "Ama" was the name I gave her...

[end Side B, Tape 1; begin Side A, Tape 2]

TGP: [continues discussing her grandmother and her relationship to the Parkers] ... grandmother, Mary Parish.

KM: And what was her relationship to the Parkers?

TGP: She was the sister of Tootsie, or Elizabeth Jane Dowssett-Parker, who later married Knight, and then later married Woods. But as Parker's wife, she gave birth to Thelma Parker, her first and only child. Who in turn, became the mother of Richard Smart.

AE: That's so interesting.
TGP: So my grandmother and Richard's grandmother are sisters, and so Richard and I are third cousins. And my father and Thelma Parker were in love with one another, and had they not been first cousins, they would probably have married [chuckles].

KM: [chuckling] it didn't stop a lot of people.

TGP: Yes, but I think Aunt Tootsie had more to say about that [laughing].

KM: Ahh. So, you loved coming down here?

TGP: Yes. And Ama would go to Kamuela almost every year, with Aunt Tootsie when Aunt Tootsie would come from her home in Los Gatos, and spend time on Parker Ranch. And then Ama would come back to us here with the lauhala hats that she would purchase at Do Ching Store in Kamuela, and then she would line them. I had the blue lining, a bandanna, and my brother had the red lining. And so we always had our lauhala hats when we were playing on the beach. We didn't dare go without a hat, it was "Where's your hat? Go get your hat." [chuckles] I think, I our lauhala hats and our sausage bag 'eke, were really what I remember most about Kūpaka [chuckling].

KM: Hmm. Were there any Hawaiian, permanent residents, cowboys, down here at all, or was the ranch pretty much pau?

TGP: I don't remember anyone living here, any of that.

KM: So papa them would come down weekends?

AE: Weekends.

KM: So basically, the ranching operation itself, didn't require a big labor force, there weren't a bunch of paniolo?

TGP: No, no, no.

KM: How do you say the word "paniolo," or "paniola"?

TGP: Paniolo.

KM: Okay.

TGP: No, this skeleton crew, I'm going through some letters that I have.

AE: No, not too many.

TGP: No. Now, these letters were written between my grandmother and my great grandfather, when my grandfather acquired Ulupalakua Ranch on Maui. And my grandmother and her husband, Leonard Parish went up to run the ranch for my great grandfather. And the letters indicate just how... well, all the goings on at Ulupalakua and again here at Kūpaka on Pu'uloa. And they always refer to the area as Pu'uloa in the letters. And they refer to James Dowsett Jr. as recuperating here.

AE: So we're not sure yeah, from what.

TGP: And I know it was in the area, but I don't know where. Probably, and if get together...

AE: [pointing to the Pu'uloa houses marked on the map] Probably those houses down there.

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KM: There's little houses indicated down here, in amongst these walled enclosures.
TGP: Oh, uh-hmm.

KM: You'll see it better on your map. But, it's very interesting.

TGP: There was nothing mauka?

KM: Well, there were, but see, this map is 1873, so it doesn't reflect what occurred a little later, you know?

TGP: Uh-hmm.

KM: You know, I just look at this land, the rich fisheries, you know that there had to be activity, even if it was people coming across occasionally.

TGP: Yeah.

KM: And still, the Honouliuli taro farmers were still active at that time.

TGP: Uh-hmm.

AE: You know, sister, I can't remember the name, but I'll find out, somebody told me that there was a ranch right across here, right next to the shopping center. They gave me the name of the family, but I don't recognize it.

TGP: Uh-hmm.

AE: I'll find out for sure from Amber.

KM: That [looking at the map] Robinson Ranch, was somewhere makai.

AE: I remember you'd said that.

KM: Where would you place us, where we're sitting, on this map? If this is One'ula, we're just a little bit over here?

TGP: Yeah, Haseko takes in this area.

KM: Yeah, it comes behind One'ula.

TGP/AE: Uh-hmm.

KM: Did you remember ever hearing this name, "Kualaka'i" or "Kualakai," as a place name here?

AE: That's where the lighthouse was.

TGP: [shaking head no]

KM: So you don't remember hearing that name?

TGP: No. It was only Barber's Point, Ewa Village, and One'ula, above use.

KM: Very interesting.

TGP: Mary Pukui came down in this area. She talks about those dogs.

AE: Her dog.

KM: And the huaka'i eh.

AE: Uh-hmm.

KM: Oh, mahalo. Thank you so much for just being willing to talk story.

AE/TGP: [brief discussion of how place names are being mispronounced and im- properly translated]
[tape off, then back on]

KM: [the aunts were talking about new place names in the Ewa District, and how inappropriate they were, some not even of Hawaiian origins] ...Haseko's

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looking at place names. What do you feel about that? If they're going to this development, shall they just name it whatever they like, "anywheresville" or try to use names that are...?

TGP: There's no excuse for them not to research and find names applicable to the area. There's no excuse for their not finding applicable names.

AE: I believe that they got Keone Nunes to come in and sit in, and talk to about that. Like Keone says, he doesn't come from this area, and I know that Rubellite [Johnson] did the names in Kapolei, and I made mention of this, that if there was anything of... You know, because she does extensive research work. Somebody that knows, not just any old body, making a name for here. That's what happened with that Gentry, they just... look at the names they have.

TGP: It reflects a good deal of the po'e haole thinking.

KM: 'Ae.

AE: 'Uh-hmm.

KM: That's back of all of this kind of development.

AE: [chuckles] She's telling that, every time I hear her, I think "Oh oh, there's sister now talking about the po'e haole."

KM: But you know, it's true, if they were so in love with El Dorado and all this stuff, maybe they should go back and live there.

AE: Yeah.

TGP: It's so stupid! To have to put up with this nonsensical names.

AE: In fact, when we were going to the council for Haseko, and that fellow that helps with that development, that Japanese fellow from Gentry, he was there. And I asked him, "Where do you folks get your names from? Don't you research? There are so many beautiful names, why?" And he said "We don't do anything with it, there's a department." I said, you're in charge of these things, aren't you interested in what's going on?" Well, it ended up with giving us some money. But you know, the money didn't have anything to do with it. We put it into the community foundation and all that, but still, you know. And I know that Haseko has lost quite a bit of money, millions of dollars.

TGP: Well, just these delays, every day costs something.

AE: They're not shrewd or anything, they're just losing the money.

KM: Ah-well, mahalo. Thank you, thank you so much.

TGP: You're welcome.

KM: For being willing to talk story.

TGP: It's been a pleasure.

KM: This mana'o is very important, and I see it for broader things. I look forward to seeing you again. And if there is anything I can do to be of help, please let me know.

Following the interview, Sister Parish shared several other short historical recollections, among them was the tradition of Kahahana having his priest Ka'opulupu

killed and the prophecy at Pu'uloa:

Pu'u kāhea in the Wai'anae District is a very important place in the history of O'ahu. It is where the chief Kahahana was when he ordered the death of the high priest Ka'opulupu and his son, Kahulupu'e. At Nānākuli, Kahahana failed to acknowledge the calls of his priest, and it was from that area, that Ka'opulupu then instructed his son to run to the ocean, for their revenge would come from across the sea. Ka'opulupu was killed at Pu'uloa. A short while after that, Kahahana himself was killed by his uncle Kahekili of Maui, who had turned him against the aged priest Ka'opulupu. Thus the prophecy was fulfilled.

Glossary

anchialine A type of shoreline pond or pool without surface connection to the sea but having waters of measurable salinity and showing tidal fluctuations.

bivalve Any member of the class Bivalvia of the mollusks, with a right and left shell valve hinged at the dorsal line, e.g., clam. See also *mollusk*.

chain A unit of length equal to 66 ft. Some surveyors in Hawai'i used chains 50, 75, or 100 ft. long, a practice that causes confusion.

clay Fine earth particles less than 0.002 mm.

coconut The palm, *Cocos nucifera*.

Contact A period in Hawaiian history marked by the arrival of Captain James Cook in 1778 and characterized by the social changes that eventually brought about the end of traditional Hawai'i.

dower That which a man gives to his wife at the church door at the time of his marriage.

eucalyptus The historically introduced gum tree, genus *Eucalyptus*, at least 30 species of which have been introduced to Hawai'i, primarily for reforestation.

fathom A unit of length equal to 6 ft.

fee simple An estate of inheritance, held without limitation to a particular class of heirs; unconditional inheritance.

guava The historically introduced tree or shrub, *Psidium guajava*, common in Hawai'i today.

ironwood A historically introduced large tree, *Casuarina equisetifolia*.

mollusk Any member of the phylum Mollusca of invertebrate animals with a soft unsegmented body usually enclosed in a calcareous shell.

pre-contact Prior to AD 1778 and the first written records of the Hawaiian Islands made by Captain James Cook and his crew.

sisal A plant, *Agave sisalana*, cultivated for its stiff fibers.

site The fundamental unit of archaeological investigation, a location that exhibits material evidence of past human activity.

stone Rock fragment ranging from 250 mm to less than 600 mm.

sugarcane A grass, *Saccharum officinarum*, widely grown in warm regions as a source of sugar. See also *kā*.

Hawaiian Terms

‘a‘ā Basaltic lava flows typified by a rough, jagged, spinose, clinkery surface. See also *pūhoehoe*.

‘ae Yes.

ae‘o A bird, *Himantopus mexicanus*, the Hawaiian stilt.

āholehole The Hawaiian flagtail fish, *Kuhlia sandticensis*.

ahu Heap, pile; altar, shrine, cairn.

ahupua‘a Traditional Hawaiian land division, usually extending from the uplands to the sea.

‘ai kapu To eat under taboo, to observe eating taboos.

‘āina Land, earth.

‘aka‘akai A native grass, *Schoenoplectus lacustris*.

‘ākau Right (not left). North (when one faces west, the direction of the sun’s course, the right hand is to the north).

akua God, goddess, spirit, ghost, devil, image, corpse.

akua‘ele Meteor, fireball. Meteors were thought to be gods that flew through the air.

ala Path, trail, road.

ali‘i Chief, chiefess, officer, ruler, monarch, peer, head man, noble, aristocrat, king, queen, commander.

ali‘i ‘ai moku Chief who rules a *moku*.

aloha Love, affection, compassion, mercy, sympathy, etc.

ama Outrigger float; port hull of a double canoe, so called because it replaces the float.

‘ama‘ama Mullet (*Mugil cephalus*), a very choice fish.

‘anae Full-sized ‘ama‘ama mullet fish. See also ‘ama‘ama.

‘a‘ole No, not to be none, to have none.

‘aumakua Family or personal gods, deified ancestors who might assume the shape of animals, rocks, clouds, or plants.

‘auwai Ditch.

‘awa A shrub, *Piper methysticum*, the root of which is the source of a narcotic drink of the same name used in ceremonies, prepared formerly by chewing, later by pounding.

awa The milkfish, *Chanos chanos*, an important food fish traditionally reared in ponds

in Hawai‘i.

awa‘ala Tenpounder, or tarpon, fish, *Elops hawaiiensis*.

‘āweoweo Various Hawaiian species of *Priacanthus*, red fishes, sometimes called bigeye.

e kala mai “Pardon me”.

‘eke Sack, pocket, bag; bag-shaped fish net.

‘ele‘ele Long, filamentous, green, edible seaweeds, *Enteromorpha* spp. Some kinds are among the most popular in Hawai‘i, being eaten raw as condiments at feasts.

enenue Rudder or pilot fish, *Kyphosus fuscus*.

haku‘āina Landowner, landlord.

hala An indigenous tree, *Pandanus tectorius*, whose leaves were used for mat making, canoe sails, baskets, and thatching.

hālau Long house, as for canoes or hula instruction.

hale House, building, station, hall.

hale kāhunu Cookhouse.

hale kuku House for beating *kapa*.

hali‘a aloha A beloved recollection.

hānau ka leo “Keep the voice quiet”.

hana Work, labor, job, duty, office.

hana ‘ino To mistreat, mutilate, abuse, treat cruelly or carelessly.

hānau To give birth, to lay (an egg); born; offspring, child, childbirth; productive, fertile.

haole White person, American, Englishman, Caucasian; American, English; formerly, any foreigner.

hapa haole Part-white person; of part-white blood; part-white and part-Hawaiian, as an individual or phenomenon.

hānai Foster child, adopted child; foster, adopted.

hāpai Pregnant.

hau A native tree, *Hibiscus tiliaceus*, which was highly valued for a variety of uses: the bark was used for cordage; the light wood was used in canoe construction, to make floating containers, fishing floats, adze handles, fireworks, spears, and to mark fishing grounds; the wood was also rubbed together with *olomea* to make fire; and the flowers and the slimy sap were used medicinally. See also *olomea*.

haumana Student, pupil, apprentice, recruit, disciple.

he‘e Octopus.

helau Traditional Hawaiian place of worship.

helu To count, number, compute, take a census, figure enumerate, list, include, impute; to assess, as taxes; to chant a list of names, as of genealogy; including, counting, enumeration, census, list, rate, number, figure, total, inventory; statistics.

hinālea Small- to moderate-sized brightly colored wrasses of the family Labridae. *Hinālea* was eaten raw as an aftertaste for kava. It was prepared in the *i'a ho'onetu* fashion with *kukui* nuts and chili pepper.

hoa'āina Tenant, caretaker, as on a *kuleana*. See also *kuleana*.

holoholo To go for a walk, ride, or sail; to go out for pleasure.

hōlua Sled, especially the ancient sled used on grassy slopes; the sled course.

honu General name for turtle and tortoise, as *Chelonia mydas*.

hō'olo To show off; to assume an air of superiority; conceited; affectation, conceit.

huaka'i pō Procession of ghosts of a departed chief and his company. Also called *oi'o* and commonly known as night marchers.

hūhū To bulge, effervesce. Used colloquially to mean angry, mad.

huluhulu waena An irregularly branching, dark red seaweed, *Grateloupia filicina*, with many narrow segments. It is commonly eaten and sold in some markets.

hūnā To hide, conceal, disguise.

i'a Fish or any marine animal; meat or any flesh food; any food eaten as a relish with the staple, including meat, fish, vegetable, or even salt.

'ili A land section, next in importance to *dhupua'a*, and usually a subdivision of an *dhupua'a*.

'ilima An indigenous shrub, *Sida fallax*. Traditionally, the flower was used in *lei* making, both the flower and the root were used medicinally; the stems of the large plants were used as slats in house construction, and the stems of smaller plants were used in rough basketry.

ilina Grave, tomb, sepulcher, cemetery, mausoleum, plot in a cemetery.

'ilio Dog.

imu Underground oven.

'inamona Relish made of the cooked kernel of *kukui* mashed with salt. See also *kukui*.

'iole Hawaiian rat, *Rattus exulans*.

ipu The gourd, *Lagenaria siceraria*.

'iwa Frigate or man-of-war bird, *Fregata minor palmerstoni*.

iwi Bone.

ka'a Vehicle, carriage, wagon, automobile, car.

ka'ao Legend, tale, usually fanciful; fiction; to tell a fanciful tale.

kahakai Beach, seashore, seacoast, seaside, strand.

kāheka Pool, especially a rock basin where the sea washes in through an opening and salt forms.

kahiki Tahiti, foreign land.

kahu Honored attendant, guardian, nurse, keeper of *'unilipili* bones, regent, keeper, administrator, warden, caretaker, master, mistress; pastor, minister, reverend, or preacher of a church, one who has a dog, cat, pig, or other pet. See also *'unilipili*.

kāhua Foundation, base, site, location, grounds, background, platform, as of a house; an open place, as for camping or for sports.

kahua hale House foundation or site.

kahuna Priest, sorcerer, magician, wizard, minister, expert in any profession.

kai Sea, sea water; area near the sea, seaside, lowlands.

kai lawai'a Fishing grounds.

kālāulu Community, neighborhood, village.

kala A generic name for fish in the Unicornfish genus *Naso*. It is generally caught in nets or with a spear. The flesh has a strong odor and is rarely eaten raw; it is often broiled or partially dried and broiled.

kalakala Craggy, thorny, knotty. Figuratively, rough in language, rude, harsh.

kalana Division of land smaller than a *moku* or district. See also *moku*.

kalo The taro, *Colocasia esculenta*, was a staple food in traditional Hawai'i and all parts of the plant were used. The rootstock was baked or steamed, then eaten sliced or pounded to make *poi*, raw taro was also grated and mixed with coconut milk to make desserts, the leaves, leaf stems and flowers were also used in cooking. Medicinally the leaves and rootstock were used to treat many ailments. The plant was also used ritually, as bait for fish, glue, and to make dye.

kama'āina Native-born, one born in a place, host.

kanaaka maoli An indigenous Polynesian person or people of the Hawaiian Islands.

kānāwai Law, code, rule, statute.

kāne Male, husband, male sweetheart, man; brother-in-law of a woman.

kanikau Dirge, lamentation, chant of mourning.

kanu To plant, bury.

kapa Tapa cloth, as made from *wauke* or *māmaki* bark.

kapu Taboo, prohibition; special privilege or exemption from ordinary taboo; sacredness; prohibited, forbidden; sacred, holy, consecrated; no trespassing, keep out.

kauhale Group of houses comprising a Hawaiian home, formerly consisting of men's eating house, women's eating house, sleeping house, cooking house, canoe house, etc.

kauna'oa The native vine, *Cuscuta sandwicensis*, or dodder.

kī A woody shrub, *Cordyline terminalis*, in the lily family. Traditionally the leaves were used for a variety of purposes, such as wearing apparel, thatching, food, fishing, and religious purposes. The root was eaten in times of famine and was the basis in historic times for *'ōkolehuo*, a fermented drink.

kīawe The algaroba tree, *Prosopis* sp., a legume from tropical America, first planted in Hawai'i in 1828.

kīhāpai Small land division, smaller than a *paukii*; cultivated patch, garden, orchard, field, small farm.

kīlu A small gourd or coconut shell, usually cut lengthwise, as used for storing small, choice objects, or to feed favorite children from.

kinolau The many forms taken by a supernatural body. Pete, for example, could at will become a flame, a young girl, or an old hag.

kō Sugarcane, *Saccharum officinarum*, was introduced to Hawai'i by Polynesian settlers, who cultivated it widely. The stalk was chewed between meals for its sweetness, brought on long journeys to ease hunger, and eaten in times of famine; juice from the stalk was fed to nursing babies, and used as a sweetening agent in medicinal herbal concoctions; the leaves were used as thatching for houses; the leaf midrib was used for plaiting braids that were made into hats; the stem of the flower was used to make darts for a child's game.

ko'a Shrine, often consisting of circular piles of coral or stone, built along the shore or by ponds or streams, used in ceremonies as to make fish multiply; also built on bird islands, and used in ceremonies to make birds multiply.

koa A tree, *Acacia koi*, one of the largest endemic trees in Hawai'i. Wood used for canoes, paddles, and surfboards.

koa haole A historically introduced small tree, *Leucaena glauca*.

ko'i A cutting tool with a blade of stone, shell, or sometimes bone, typically hafted to a wooden handle and used to work wood.

ko'i lipi Adze, axe, hatchet.

kōkua To help, assist, support.

ko'oa maoli A bird, *Anas wyvilliana*, the Hawaiian duck.

kolū A historically introduced shrub or tree, *Acacia farnesiana*.

konohiki Head man of an *ahupua'a* land division under the chief; land or fishing rights under control of the *konohiki*. See also *ahupua'a*.

kou A native tree, *Cordia subcordata*, with a wood prized for its grain and ease of carving. It was used for carving a wide variety of objects from platters to images of gods; the leaves were made into dye and the flowers were also used in lei making.

Kū The god of war in Hawaiian mythology.

kuapo To swap, exchange, trade. In ancient Hawai'i, resources were often exchanged between those who lived in the mauka areas of an *ahupua'a* and those who lived near the sea, e.g. sweet potatoes for fish.

kūhonu An edible spotted-back crab, *Portunus sanguinolentus*.

kūkā kama'ilio Interview, conference; to hold such.

kuku The candlenut tree, *Aleurites moluccana*, introduced to Hawai'i by Polynesian settlers. The outer husk of the fruit or nut was used to make a black dye for tapa and tattooing; sap from the fruit was used as medicine to treat thrush, and used as a purgative; the hard shell of the nut was used in lei making; the kernel of the nut was the source of an oil that was burned for illumination and also used as a wood varnish for surfboards and canoes; the kernel was also chewed and spit on rough seas to calm the ocean and baked kernels were mixed with salt and chili pepper to make a relish (*'inamona*); the trunk was used to make canoes and floats for fishing nets; a reddish dye was made from the bark and/or root; a gum exuded from wounded bark was used to treat tapa; the flower was mixed with sweet potato to treat thrush; the leaves were

used in a poultice for swelling and infection.

kula 1. Plain, field, open country; pasture; land with no water rights. 2. School.

kulaiwi Native land, native.

kuleana Right, property, portion, responsibility, jurisdiction, authority, interest, claim, ownership.

kumu Bottom, base, foundation. Or, teacher, tutor, manual, primer, model, pattern.

kupalanaha Surprising, strange, wonderful, extraordinary, unaccountable, marvelous.

kupapa'u Corpse, cadaver, dead body.

kūpua A fish, *Chellio inermis*.

kupua Demigod or culture hero, especially a supernatural being possessing several forms.

kupukupu General name for ferns on a single stem, such as the sword fern, *Nephrolepis exaltata*, a long, narrow fern with many lateral divisions.

kupuna Grandparent, ancestor, relative, or close friend of the grandparent's generation, grandaunt, granduncle.

lala Small bait fish.

lau hala Pandanus leaf, especially as used in plaiting.

lawai'a Fisherman; to catch fish.

lehua The flower of the 'ōhi'a tree, *Metrosideros polymorpha*; also the tree itself. See also 'ōhi'a lehua.

lei Garland, wreath.

lele Sacrificial altar or stand.

lepe-o-Hina A red seaweed, *Halymenia formosa*, with a wide, thin, branching thallus. Also called *lepe'āhina*.

lepo Dirt, earth, group, filth, excrement (euphemism); dirty, soiled.

limu A general name for all kinds of plants living under water, both fresh and salt; also, algae growing in any damp place in the air, as on the ground, on rocks, and on other plants; also mosses, liverworts, lichens.

limu koku A soft, succulent, small, red seaweed, *Asparagopsis sanfordiana*, narrow, cylindrical, tufted. It is one of the best known and best liked of edible seaweeds.

lipe'epe'e Some native species of a genus of edible red seaweeds, *Laurencia*, that are small, narrow, stiff, branching, and knobbed. This seaweed was taboo to those learning *hula* because *pe'e* means to hide, and the gods would hide their secrets from those eating the seaweed.

lipoa Bladelike, branched, brown seaweeds with conspicuous midrib on blade, unique aroma and flavor; highly prized on all islands.

lo'i A single irrigated taro patch; irrigated terrace, especially for taro.

lo'i kalo Irrigated taro patch. See also *lo'i*.

loko Pond, lake, pool.

lua 1. Hole, pit, grave, den, cave, mine, crater. 2. A type of dangerous hand-to-hand fighting in which the fighters broke bones, dislocated bones at the joints, and inflicted severe pain by pressing on nerve centers.

lua meki Deep pit or cave.

luakini *Héiau* of the ruling chiefs where human sacrifices were offered. See also *héiau*.

lú'au Hawaiian feast, named for the taro tops always served at one; this is not an ancient name, but goes back to at least 1856.

mahalo Thanks, gratitude.

mahamoe An edible bivalve.

maha'oi Be nosy, ask questions; bold, impertinent, presumptuous.

Máhele The mid-nineteenth century land division responsible for the introduction of fee simple land title in Hawai'i.

maika Ancient Hawaiian game suggesting bowling.

maile A native twining shrub, *Alyxia olivaeformis*, used in traditional Hawaiian religion to evoke Laka, the goddess of hula. *Maile* sticks gummed with lime were used as part of a rig to catch birds.

maka'āinana Commoner, populace, people in general.

makahiki Ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war.

makai Seaward.

maka'u Fear; frightened, afraid.

makua A parent or any relative of the parents' generation (uncles and aunts).

māla Garden, plantation, patch, cultivated field.

mālama To take care of, care for, preserve; to keep or observe, as a taboo; caretaker, custodian.

malihini Stranger, newcomer, guest; one unfamiliar with a place or custom; new, unusual, rare, or of foreign origin, for the first time.

māmaki A small native tree, *Pipturus albidus*, also called *māmaka*; the berry was used as a laxative, a dressing for wounds, and a tonic for general debility; the berry was fed to children to treat thrush; the bark was used to make tapa cloth.

mana Supernatural or divine power; spiritual, miraculous power.

mana'o Thought, idea, opinion, theory, meaning; mind; desire, want; to think, suppose, meditate, deem, consider.

manauaea A kind of small red seaweed, *Gmclária coronopifolia*, with stiff, cylindrical, succulent stem and branches.

mānienie A grass, a.k.a. Bermuda grass, *Cynodon dactylon*, that has been introduced and naturalized in Hawai'i.

manini The convict surgeonfish, *Acanthurus triostegus*.

manō Shark. In Hawaiian culture, there are two classes of sharks. *Manō kānaka* are sharks with human affiliations, and *manō i'a* are wild sharks. *Manō kānaka* were revered and cared for, and were *akua* or 'aumakua.

manu Bird; any winged creature.

ma'o A native shrub, *Gossypium tomentosum*, the leaf of which was traditionally used to make a green dye.

mauka Inland, upland, toward the mountain.

mele Song, anthem, or chant of any kind.

Menehune Legendary race of small people who worked at night, building fish ponds, roads, temples; if the work was not finished in one night, it remained unfinished.

mihī Repent.

mihī aku Give forgiveness.

mihī mai Ask for forgiveness.

milo A tree or arborescent shrub, *Thespesia populnea*, either indigenous or introduced by Polynesians for its wood and fiber.

moa Chicken, red jungle chicken (*Gallus gallus*), fowl, as brought to Hawai'i by Polynesians; for some people, an 'aumakua.

moemoe Sleep.

mō'i King, queen, sovereign, monarch, or a rank of chiefs who could succeed to the government but who were of lower rank than chiefs descended from the god Kane.

moi The threadfin, *Polydactylus sexfilis*, is found in schools along sandy shores and at sandy holes in rocky shores, where it reaches a length of 45 cm. It is caught with a hook and line and with nets. It is a delicious food fish and was reportedly reserved for chiefs, the commoners prohibited from eating it.

moku District, island, section; forest, grove.

mo'o 1. Narrow strip of land, smaller than an 'ili; 2. Lizard, reptile of any kind, dragon, serpent; water spirit.

mo'olelo A story, tale, myth, history, tradition, legend, fable, chronicle, or record.

mo'opuna Grandchild; great-niece or nephew; relatives two generations later, whether blood or adopted; descendant; posterity.

muliwai River, river mouth, pool near mouth of a stream, as behind a sand bar, enlarged by ocean water left there by high tide; estuary.

na'auao Learned, intelligent, enlightened.

nahawele A bivalve of the family Isognomonidae. On O'ahu, the *Perna costellata*, *Atrina* sp.

nalowale Lost, gone, forgotten, vanished; disappeared.

nehu An anchovy, *Stolephorus purpureus*.

niho palaoa Whale tooth, whale-tooth pendant, a symbol of royalty.

niu The coconut palm was widely used in traditional Hawai'i. The base of the trunk was used to make calabashes and drums; the trunk was used to make canoes and posts for houses; leaves were used for thatching, plaited to make baskets and fans; and used to beat the water to scare fish into nets; the base of the leaf was used to pound the banks of taro patches; the midribs of the leaves were used to make brooms, string kukui nut kernels for lights, make shrimp snares, and as musical instruments. The fruit's fibers were used to make sennit; the shell of the fruit was used to make bowls, spoons, and knee drums; the flesh

of the fruit was eaten at all stages of maturity and used in various dishes; milk and oil were made from the flesh, the oil was used on the body and hair, and also used to calm water; the water from the fruit was drunk.

nohu Indigenous prostrate to ascending perennial herbs. *Tribulus cistoides*, found on coasts of tropical regions.

noni The Indian mulberry, *Morinda citrifolia*, a small tree or shrub in the coffee family, native to Asia, Australia, and the Pacific Islands. In Hawai'i, *noni* was used for medicines and dyes.

'ohai A native shrub, *Sesbania tomentosa*.

'ohana Family, relative, kin group.

'ōhi'a Various kinds of forest trees in the family Myrtaceae, either in the genus *Metrosideros* or *Syzygium*.

'ōhi'a lehua A native plant, *Metrosideros polymorpha*, that ranges in habit from prostrate shrubs to tall trees and is distributed from sea level to 2,200 m elevation on all the main Hawaiian Islands.

'ōhūa 1. Retainers, dependents, servants, inmates, members (of a family), visitors or sojourners in a household; passengers, as on a ship; 2. Young of such fish as *hihiākea*, *kala*, *kupou*, *manini*, *pūahu*, and *uluu*.

'ōiō The bonefish, genus *Albula*.

'oi'o Procession of ghosts of a departed chief and his company. See also *huaka'i pō*.

o'io'ina Resting place for travelers, such as a shady tree or rock.

'oki To cut, sever, separate.

'ōkupe A bivalve, *Spondylus tendrosus*.

oli Chant that was not danced to, especially with long phrases chanted in one breath, often with a trill ('i') at the end of each phrase; to chant thus.

olomea A native shrub or small tree, *Perrottetia sandwicensis*, the wood of which was used in conjunction with the softer *lau* wood to produce fire by rubbing. See also *hiu*.

olonā A native shrub, *Touchardia latifolia*, whose bark was valued as the source of a strong, durable fiber for fishing nets, for nets to carry containers, and as a base for ti-leaf raincoats and feather capes.

'ono Delicious, tasty, savory.

'ōpae A general term for shrimp of several kinds.

'ōpala Trash, rubbish, refuse, litter, garbage.

pā Fence, wall, corral, pen, sty, enclosure, courtyard, patio, arena, (house) lot, yard, extremity.

pā'ahao Prisoner, convict. As a land term, *pā'ahao* lots were those which were worked by prisoners or others who were repaying some debt to society.

pā'akai Salt. A traditional Hawaiian method of making salt is to evaporate sea water in salt pans. Salt is valued in Hawaiian culture for its cleansing power.

pāhale House lot, yard, fence.

pāhoehoe Basaltic lava flows typified by smooth, billowy, or ropy surface. See also

'ā'ā.

pala A native fern (*Marattia douglasii*), with a short trunk and large, long-stemmed, much divided, dark green fronds. In time of famine, the thick, starchy, hoof-shaped bases of the frond stems, which cover the short trunk, were eaten after being baked in an *imu* overnight. The mucilaginous water resulting from slicing and soaking the raw stems in water was used medicinally. Pieces of the fronds mixed with *maile lei* enhanced their fragrance. The fern was also used in *lei*au ceremonies.

palani A surgeonfish, *Acanthurus dussumieri*, famous for a strong odor.

pali Cliff, precipice, steep hill or slope suitable for *olonā* or *uuuke*.

pana pua Shooting with bow and arrow; archery.

pānini A cactus, *Opuntia megacantha*, introduced to Hawai'i in the 1800s. The Hawaiian name means "unfriendly wall." Hawaiians made a fermented drink from the fruits and also ate them raw.

pāniolo Cowboy.

pau Finished, ended, completed, over, all done.

paukū A land section smaller than a *mo'ō*.

pēpē Baby.

piko Navel, navel string, umbilical cord.

pili A native grass, *Heteropogon contortus*, whose leaves were used traditionally as house thatch.

pilikia Trouble of any kind, great or small; tragedy, nuisance, bother, distress, accident, difficulty, inconvenience, lack; in trouble; troubled, bothered, camped, crowded.

pipi 1. Hawaiian pearl oyster, *Pinctada radiata*. In songs this is known as the *i'a hūmau leo o 'Ewa*, 'Ewa's silent sea creature—it was believed that talking would cause a breeze to ripple the water and frighten the *pipi*. 2. Cattle.

po'e People, persons, assemblage; group of, company of, number.

po'e haole Foreigner.

pōhaku Rock, stone, mineral.

poi The Hawaiian staff of life, made from cooked taro corms, or rarely breadfruit, pounded and thinned with water.

pono Goodness, uprightness, morality, moral qualities, correct or proper procedure, excellence, well-being, prosperity, welfare, benefit, behalf, equity, righteous, completely, properly.

po'olua Child sired by other than the husband, but accepted by both husband and sire; this acceptance increased the number of relatives of the child who gave their loyalty to him as kinsmen; it thus fostered the prestige of children of chiefs.

pōpolo A native shrub, *Solanum nelsonii*.

pualu A species of surgeonfish about eight inches in length and brown or dull-gray in color. It resembles the *palani* in tough skin and strong smell but may be

distinguished from the latter by a blue line across the soft part of the fin.
pueo Hawaiian short-eared owl, *Asio flammeus sandwicensis*, sometimes regarded as a deity.

pūhi Any eel.

puka Hole.

pule Prayer, magic spell, incantation, blessing.

punahale A favorite; to treat as a favorite. In ancient Hawaiian culture, children were often treated as favorites, getting special treatment from parents and grandparents.

pu'u Any kind of a protuberance from a pimple to a hill; hill, peak, cone, hump, mound, bulge, heap, pile, etc.

ta'ape The blue-lined snapper, *Lutjanus kasmira*, introduced to Hawai'i in 1956.

'uala The sweet potato, *Ipomoea batatas*, introduced to Hawai'i by Polynesian settlers, was a staple food. The tuber was cooked whole and eaten or it was made into poi and mixed with coconut milk to make a dessert; it was used as bait for mackerel fishing; and to make a fermented drink called 'uala 'awa'awa. The vine made a lei which was worn by nursing mothers to ensure a good flow of milk; when dried, the vine was also used as padding underneath floor mats. All parts of the plant were used as food for pigs. Kamapua'a was the god of the sweet potato.

uhu An adult fish in the family Scoridae.

'ūkēkē A musical bow indigenous to Hawai'i, fifteen inches to two feet long and about an inch and a half wide, with two or commonly three strings drawn through holes at one end. The strings were strummed and the mouth cavity acted as a resonance chamber.

ula Hawaiian lobster, *Panulirus japonicus*.

'ulu 1. Discoidal, smooth stone as used in 'ulu maika game; 2. Breadfruit, *Artocarpus altilis*.

'ulu maika Stone used in the maika game. See also maika.

ulua An adult of various Carangid fishes.

'unihipili Spirit of a dead person, sometimes believed present in bones or hair of the deceased and kept lovingly.

'ū All squirrelfishes of the genus *Myripristis*.

uwea Wire.

wahi pana Legendary place.

wahine Woman, lady, wife; sister-in-law, female cousin-in-law of a man.

wai Water, liquid of any kind other than sea water.

wai kai Brackish water.

waihou 1. A *hiau* where hogs, bananas, and coconuts were sacrificed, but not human beings; 2. A small, tight bundle.

wauke A small tree or shrub, *Broussonetia papyrifera*, whose bark was made into kapa cloth. The inner bark was used to make cordage, and the shoots were used to

treat childhood diseases. The leaves, along with banana and taro leaves, were used ceremonially to wrap the bodies of *ali'i* after death.

wāwae'iole A cosmopolitan tropical club moss, *Lycopodium cernuum*, a far-creeping mosslike plant, growing one to five feet high. Its stems and many branches are covered with short, narrow-pointed leaves, and are made into Christmas wreaths.

weke Certain species of Mullidae, surmulletts, or goatfish, which have large scales and are usually found in reefs. Red and light-colored *wēke* were popular as offering to the gods.

williwili A native tree with reddish, papery bark, *Erythrina sandwicensis*, the wood from which was used to make net floats, outriggers for canoes, and surfboards. The seeds were also used in lei making.

Abbreviations

AD *Anno Domini*, the Christian era in the Gregorian calendar, starting from the year AD 1 as the calculated year in which Christ was born.

LCA Awards issued by the Board of Commissioners to Quiet Land Titles between 1846 and 1855 to persons who filed claims to land between 1846 and 1848.

USGS A federal agency that provides reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect the quality of life.

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APPENDIX M. HOAKALEI RESORT & LAGOON ECONOMIC ANALYSIS REVIEW

Hoakalei Resort and Lagoon Economic Analysis Review

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May 2014

Hoakalei Resort and Lagoon Economic Analysis Review

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May 2014

1. Introduction

Economic analyses were prepared by TZ Economics for Haseko in 2011 and updated in 2013 on quantitative and qualitative impacts of Hoakalei Resort and Lagoon. The reports estimated multiplier impacts using the State of Hawaii’s input-output (I-O) model, calibrated to the project’s characteristics, size and scope, public infrastructure investment and operational commitment.¹ The 2011 report also sketched other economic impacts of Hoakalei, including: (a) public-access recreational amenities; (b) augmenting tourism capacity and broadening the destination experience; (c) Oahu’s housing cycle context; (d) mitigating tourism risk exposure. Subsequent sections review the first three of these topics; the last is not reviewed here.

Investment by Haseko Development at Hoakalei Resort and Lagoon in transient accommodation development, other commercial development and residential development as well as future tourist and resident consumption comprise more than \$1.12 billion in direct outlays associated with nearly \$2.18 billion in total output and more than 14,400 jobs through multiplier effects. Nearly \$129 million in State tax revenues and an incremental \$10 million in property tax revenues—in addition to \$10 million in property tax revenues extant in 2011—are identified with Hoakalei, in constant 2010 dollars. These economic impacts are summarized in Tables 1 and 2 below, reproduced from the original 2011 report.

The 2011 report was written after Haseko had abandoned an original plan to develop a marina, a plan conceived by earlier owners nearly a half century ago. Changing economic circumstances, the demographic transition in Oahu’s population towards older cohorts, evolving recreational preferences between the 1970s and 20-teens, the absence of demand at currently underutilized private marinas on Oahu, combined with boating market distortions caused by subsidized slip pricing at public marinas, and the imminence of permit expiration for marina development, are among reasons cited by Haseko for its decision to develop a recreational lagoon. This review also summarizes an economic analysis from February 2014 suggesting that uncertainty and irreversibility may interact to make marina investment worth deferring to the future. A recreational lagoon investment preserves the option of future marina development.

¹ *Economic Impacts of Hoakalei Resort Development* (October 2011), laid out the basic economic impact analysis. Aspects related to changing macroeconomic conditions in the ensuing two years were considered in *Hoakalei Resort Development Economic Impacts: 2013 Update* (May 2013). Both were prepared by TZ Economics. Methodological details are described in the original reports.

Table 1. Input-output (I-O)-based Hoakalei economic impacts
(in million 2010 dollars and numbers of jobs)

	Outlay	Total output	Jobs	Tax revenue
Construction impacts (short-run)				
Hotel/resort/recreation	378.5	738.9	4,513	42.9
Housing (resident)	341.5	666.8	4,073	38.7
Short-run impacts	\$ 720.0	\$ 1,405.8	8,585	\$ 81.6
Tourism, consumption impacts (long-run)				
Tourism	347.0	667.7	5,063	41.2
Resident consumption (incl. recreation)	55.2	103.3	767	5.7
Long-run impacts	\$ 402.2	\$ 771.0	5,830	\$ 47.0
Total impacts	\$ 1,122.2	\$ 2,176.8	14,416	\$ 128.6

Table 2. Hoakalei property tax revenue estimates
(in 2010 dollars)

	Upon completion	Incremental
Hotel	\$ 5,939,600.00	\$ 5,939,600.00
Residential	13,968,000.00	3,571,200.00
Resort commercial	357,000.00	357,000.00
Country Club	77,400.00	77,400.00
Total	\$ 20,342,000.00	\$ 9,945,200.00

2. Private production of public recreational amenities

In the 2013 update to the original 2011 economic impact analysis, Hoakalei Resort's contributions to recreational productive capacity were examined at greater length. In addition to its private golf course, a club good with private recreational benefits available to members with privileges customarily extended to resort guests in transient accommodations, what distinguishes Hoakalei is a commitment to *private provision of public recreational amenities*. Hoakalei returns Oahu resort development to its original model, Waikiki, from a more exclusive model embraced by Ko Olina. There is no guard at the gate in Waikiki, nor is one intended at Hoakalei. Hoakalei Resort and Lagoon's recreational and cultural amenities are intended to be an attractor for area residents and tourists alike, driving commercial business opportunity the way a shopping mall relies on open-access and extensive parking to mobilize retail volume.

Like Hoakalei Country Club itself, Hawaii resort development in recent decades has moved towards the model of a privately-produced club good. In such resorts, benefits are "consumed" by members and guests. Such consumption is *excludable*: consumers pay to enjoy the recreational benefits. Such consumption also is *non-rival*: one's enjoyment does not diminish the amount available to others, up to a congestion externality. Excludability and rivalry provide a reference point for understanding the unique contribution to social welfare made by Hoakalei's recreational, open-access lagoon. Hoakalei Lagoon and its associated shoreline improvements uniquely are privately-produced *public* goods. Hoakalei is intended to be *non-excludable and non-rival*. Typically, public goods are produced by the public sector. At Hoakalei Resort, Haseko *intends* to provide public access to recreational amenities as part of its resort development strategy. In contrast to Ko Olina, which is designed to minimize public access, Hoakalei Resorts intends to maximize public access.

These characteristics of Hoakalei Lagoon and associated shoreline improvements are categorized in Figures 1 and 2, below. The private benefits of Hoakalei through generation of employment, income, and taxes were evaluated in the 2011 economic impact study. The public benefits of Hoakalei's recreational amenities are pertinent for several reasons: (1) increasing recreational use conflicts elsewhere on Oahu; (2) rising Oahu employment, incomes, and wealth, which raise the implied value of leisure time and open-access recreational amenities; (3) the dearth of publicly-provided recreational amenities, and challenges the public sector faces maintaining existing recreational resources.

One form of public benefit arises from *agglomeration externalities* the unintended, uncompensated benefits to one party from being located near another party. These can be commercial benefits, such as the co-location of retailers, food services or recreational services providers (e.g. ocean kayak rentals) around Hoakalei Lagoon. These also can be non-commercial benefits that co-location provides to canoe clubs or to hula halau that coalesce around a recreational location. They can comprise the safety and security that families with small children may feel in a protected cove.

Figure 1. Rivalry and excludability, private and public goods

		Rival in consumption?	
		Yes	No
Excludable?	Yes	Private goods <i>Your lunch</i>	Natural monopoly <i>Hoakalei Country Club</i>
	No	Common resources <i>Kailua Beach*</i>	Public goods <i>Hoakalei Lagoon</i>

*Rival because of conflicts between private commercial and public recreational users

Figure 2.
Innovative (Hoakalei) vs. customary (Ko Olina) resort concepts

Innovative, Hoakalei approach <ul style="list-style-type: none">• Commercial/resort development• Public-access beach, lagoon• Adequate public parking (200+)• Maximize recreational services• Integrated shoreline access• Open-access cultural resources• Extensive shopping/dining• Integrated into community	Customary, Ko Olina approach <ul style="list-style-type: none">• Commercial/resort development• Restricted-access beach, lagoons• Limited public parking• Minimize recreational uses• Interdicted shoreline• Exclusive cultural activities• Limited shopping/dining• Guard at the gate
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These types of benefits are commonly associated with shopping malls, which are also privately-produced. They are consistent with the resort development concept Haseko has for Hoakalei.²

A second form of public benefits comprises the difference between what consumers would have to be *compensated for the loss* of ocean recreation access and what consumers are *willing to pay* for ocean recreation access. The former is greater than the latter: the public’s willingness to accept compensation to forego recreational opportunity is greater than its willingness to pay to acquire recreational opportunity. This problem confronts public provision of recreational resources generally, as at Oneula Beach Park in Ewa Beach. Based on the public’s willingness to pay, only minimal public recreational development exists along Ewa coast. In contrast, Haseko’s intended shoreline improvements, integrated with Hoakalei Lagoon as an open-access recreational amenity, is intended to maximize public use. Public use means more business for commercial operators. The private benefits to these operators are included in the economic impact analysis, but the public benefits are not.

Rising incomes from job and productivity growth, and rising wealth from appreciating stock and housing values, all raise the implicit value of recreational amenities to the public: they increase what the public would have to be compensated to forego recreational access. The public values of Hoakalei Resort development *increase* over time. The public benefits of open-access, ocean recreation and cultural amenities of Hoakalei Lagoon and associated shoreline improvements may be the *most* valuable economic contribution of Hoakalei Resort development.

3. Hoakalei and the economic recovery

The original 2011 report had noted that, “crudely dichotomized into ‘before’ and ‘after’ the...acceleration—*say, before and after 2013* [emphasis added]—Oahu’s economy will reach a moment of inflection...when economic growth will gradually be constrained by the lack of regulatory ‘bandwidth,’ and where resource constraints eventually lead to higher prices and wages. ...Sometime in the 20-teens the economy will tighten up.” The 2011 report anticipated that Honolulu’s fixed rail development, new offshore investment, improving credit conditions and tightening existing home inventories all would contribute to changing economic conditions, “before and after 2013.” *Capacity-building* aspects of Hoakalei Resort development, during the transition from recovery to full-employment, gradually would dominate over multiplier impacts from jobs and incomes associated with construction. The 2013 economic update catalogued how changing economic conditions were influencing the impacts of Hoakalei Resort development.

² Just as Hoakalei Lagoon and shoreline improvements are privately-produced public goods, the Hilton Hawaiian Village Friday night fireworks, or the performance venues and gathering spaces often found at major shopping centers, are intended to increase customer volume by creating public-access recreational opportunity. Open space in dense concentrations of high-rise urban structures, such as Bishop Square in Downtown Honolulu, achieve the same thing: they serve as an attractor for private commercial activity based on public recreational activity. Quantifying *only* the private benefit to commercial operators as in the original, 2011, Hoakalei economic impact analysis ignores benefits to the public of the recreational amenities themselves. The values of these latter benefits increase as incomes and wealth rise.

From comparative-static impact effects, the influence was transitioning to dynamic contributions, particularly those associated with capacity-building aspects of capital formation.

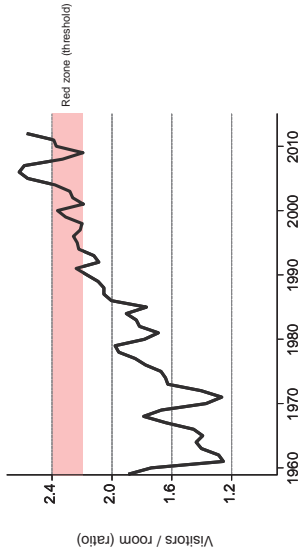
This section carries forward that assessment another year, with particular attention to the arc of economic recovery on Oahu. As in the 2013 update, capacity-building attributes of Haseko's development plans at Hoakalei remain notable. Recent tourism performance trends and Oahu residential development trends are especially important. The capacity constraints anticipated in the 2011 report and 2013 update gradually have come to bind, as anticipated.

Tourism in Hawaii and on Oahu is now constrained primarily by limits on lodging capacity, and secondarily by air seat capacity. The latter can be remediated in the short-run, but long-run lodging capacity growth has been stifled by the Politics of NIMBY and popular concerns about tourism sustainability. Remedies have been various regulatory limitations on tourism capacity-building.³ Because Oahu has run out of headroom for tourism growth, the modest capacity increment from the *last* economic expansion (roughly 1998-2008, punctuated by 9/11) relieved only temporarily the constraint now binding from lodging and air lift. Four trends are aggravated by this binding constraint: (1) maxed out persons per room; (2) low to no growth in tourism volume; (3) declining long-term real tourism receipts; (4) increasing exposure to risk and volatility.

Details may be found in the original 2011 report and 2013 update, from which Figure 3, below, is reproduced. Because lodging capacity has not grown materially in Hawaii since the 1980s, a threshold has been reached at which capacity cannot handle significant growth in tourism volumes. This was first exhibited from 2005-2007, following a fifteen-year period (from 1992) during which Hawaii's visitor plant inventory did not grow, on net. After rising over 45 years from 1,570 rooms in 1947 to 73,089 rooms in 1992, Hawaii's visitor plant inventory remained essentially unchanged over the next fifteen years, through 2007, at 73,200 rooms. Including the more recent construction of Disney's Aulani Resort and Marriott timeshare properties at Ko Olina, and extensive timeshare development at the Hilton Hawaiian Village in Waikiki, the inventory in 2012 was only 74,650 rooms. Oahu's inventory has declined from 39,010 rooms in 1986 to 35,126 rooms in 2012. As a consequence, Oahu "sells out" quickly.

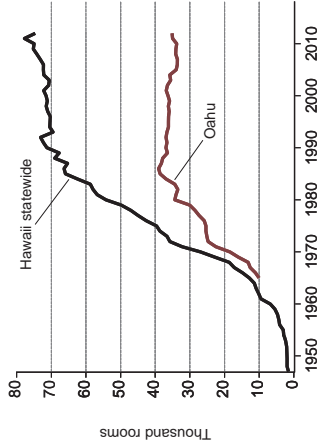
³ Examples include: (1) Maui's *de facto* ban on new timeshare development; (2) the fact that all new resort development areas intended for transient accommodation capacity growth on the Big Island identified in the 1980s either have been developed (Mauna Lani, Waikoloa, Hualalai), or have been given over entirely to residential development (Kukio, Hukulia, Keanohou, Kohalaiki), and that no new resort development areas have been planned since the 1980s; (3) Kauai's 2008 county charter amendment limiting transient accommodation development to 1.5 percent of the existing inventory annually—less than physical depreciation—with no exemption for tropical cyclonic event risks to the existing inventory, despite two realized episodes in the last 32 years (Hurricanes Iwa and Iniki); (4) Honolulu City Council considering, at the time of this writing, at second reading, an ordinance to ban hotel room conversion to condominium for transient rental occupancy, even though the predominant trend in the lodging industry is towards securitization (fractionalizing lodging inventory from buildings into condominium units, and fractionalizing units into fixed and variable intervals) and notwithstanding the fact that virtually all recent tourism lodging development is in securitized formats with the sole exception of hotels integrated into hybrid commercial structures integrating hotel, condo, and timeshare units, and the proliferation of individual vacation units (IVUs).

Figure 3. Hawaii average visitors/room (statewide)



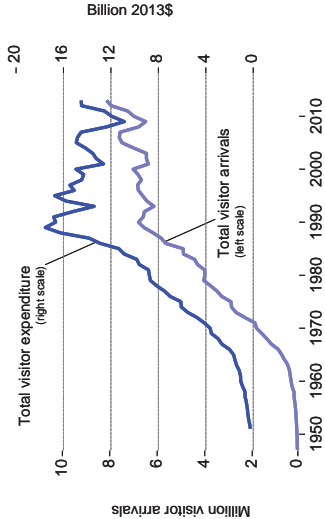
Sources: Hawaii DBEDT; Hawaii Visitors (and Convention) Bureau, PKF Hospitality Advisors LLC; Bank of Hawaii; calculation by TZE

Figure 4. Oahu visitor plant inventory has declined since the 1980s



Sources: Hawaii Tourism Authority, Hawaii Department of Business, Economic Development and Tourism

Figure 5. Arrivals growing slowly while expenditures decline on trend



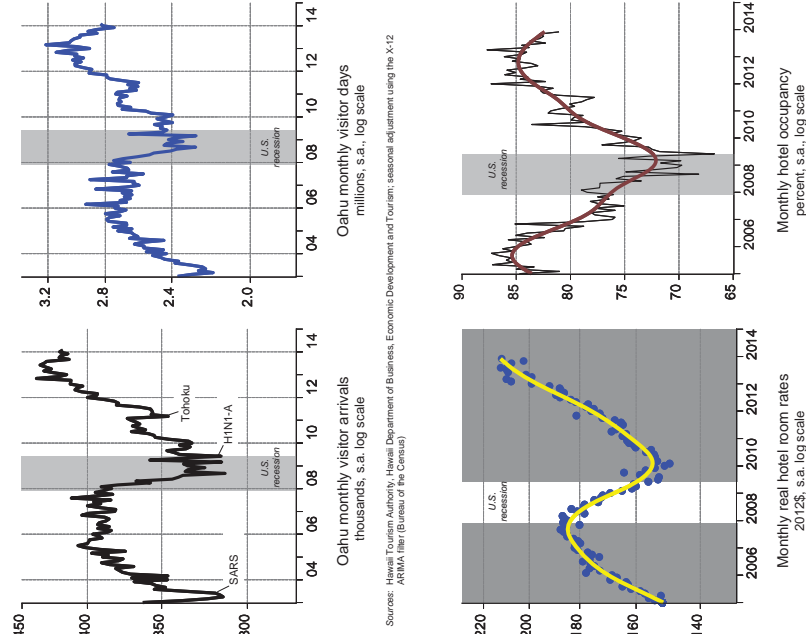
Sources: Hawaii Tourism Authority, Hawaii Department of Business, Economic Development and Tourism; deflation using Honolulu CPI-U by TZE Economics

Arrivals growth since 2009 has pressured lodging capacity and increased implied room densities (see Figure 3),⁴ especially on Oahu where the lodging inventory has been stagnant for a quarter century (Figure 4). Since the 1980s real tourism receipts have been declining on trend despite some growth in visitor arrivals, as illustrated above in Figure 5. The growth in volume has been insufficient to offset a long-run decline in real visitor outlays over time. Currently, real hotel room rates are rising on Oahu faster than at any time previously for a given rise in occupancy. This has induced shrinkage in average stay length and total visitor days, as illustrated in Figure 6 on the next page (and in Appendix 1). Around 2012, the upper bound on Oahu capacity appears to have been reached. Seasonally-adjusted monthly visitor arrivals and visitor days declined in 2013, along with hotel capacity utilization. As anticipated in the 2011 report, “‘before’ and ‘after’ the...acceleration—say, before and after 2013—Oahu’s economy will reach a moment of inflection...when economic growth will gradually be constrained by the lack of regulatory ‘bandwidth.’” This is precisely how things have played out for tourism in recent years. The regulatory environment for development has tightened, limiting the growth of tourism capacity, imposing a binding constraint on tourism performance.

Hoakalei Resort and Lagoon provide significant incremental tourism capacity in a part of Oahu that will broaden the destination experience while contributing to the community’s recreational aspirations. It’s win-win for tourism (Oahu’s main export) and for residents.

⁴ Calculated by dividing total visitor days by average length of stay, and dividing that ratio by the visitor plant inventory, as in Figure x, a ratio of about 2.5 persons per room historically has marked the capacity constraint.

Figure 6. Oahu tourism has been declining since 2012, mostly



Sources: Hawaii Tourism Authority, Hawaii Department of Business, Economic Development and Tourism; seasonal adjustment using the X-12 ARIMA filter (Bureau of the Census)

Sources: TZE database (from Parnell Ker Foster and PKF Hawaii); Hospitality Advisors LLC; seasonal adjustment using the X-12 ARIMA filter; deflation using the chain-weighted personal consumption expenditure deflator (PCE), and Honolulu Report (1997) base trend by TZE

The other major area of dynamic impacts Hoakalei was anticipated having on Oahu was in the area of housing. The housing cycle was at the forefront of the early-2000s economic expansion on Oahu and at the epicenter of the financial crisis and the Great Recession. The housing market was an important facet of relative Oahu economic resilience throughout this turbulent period. However, in the current economic recovery it became clear that housing inventories were unusually tight for the early stages of economic recovery. With new homebuilding at the lowest levels on Oahu since World War II, prospects for a supply response to rising housing demand seemed slim. Indeed, prospects for housing development have been impaired by many of the same political crosscurrents and regulatory impediments constraining the growth of lodging capacity.

In the 2011 report, Hoakalei residential development was identified as important quantitatively in terms of material contributions to Oahu housing needs. Hoakalei was identified as qualitatively important as well, leaning into the incipient acceleration of home prices that would accompany the recovery in housing demand. The 2013 update observed that Oahu home prices were beginning to accelerate and that initial conditions for the next housing cycle were unusually tight. In 2014 existing home for sale inventories remain low, around 3 months remaining, and production is the lowest in 70-80 years but is beginning to rise. Only the anticipated return to monetary policy normalcy by the Federal Reserve, and the associated rise in long-term interest rates, have dampened slightly the housing upswing. Hoakalei residential development will continue to be important in meeting the island's housing needs: major housing subdivisions at Koa Ridge and Ho'opili remain engaged in off-site infrastructure development or are still seeking regulatory approval. Neither those large projects nor Kakaako high-rise condominium development will dampen significantly Oahu's housing needs.⁵ Only a substantial new housing supply response, to which Hoakalei is contributing materially, can dampen what will otherwise be an acceleration of home price increases that undermines affordability. Only with substantial new homebuilding on Oahu will the existing new housing shortfall be narrowed. Residential development at Hoakalei, and elsewhere, will expand the property tax base at a critical time for Honolulu's infrastructure financing needs.

Both in the case of Oahu's principle export, tourism, and in Oahu's primary area of capital formation, housing investment, Hoakalei makes significant contributions to mitigating constraints on economic growth by adding capacity. Traditional economic impact analysis tends to emphasize comparative statics effects, the way the economy changes before and after the development project. These familiar impacts were documented using the state's input-output model. However, it is important to understand that there are dynamic macroeconomic

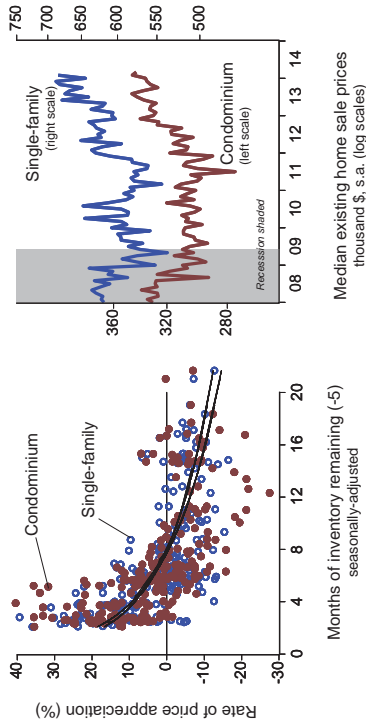
⁵ An estimated 5,500 new high-rise condominium units are either proposed, planned, or under construction in Kakaako (for all time) on an island in which the 2,424 new housing units authorized by building permit in 2013 were 1,500 units short of Oahu's *annual* housing needs simply from new household formation. Using a recent calculation published by Hawaii DBEDT in 2013, approximately 5,200 new housing units are needed statewide in Hawaii each year, ignoring cumulative shortfalls. For Oahu, representing three-quarters of the state's economy and population, 2013 production—the highest since 2007—was well short of the 3,900 units needed annually based on the DBEDT math. Oahu was last closest to this amount of new home production in 2005, at 3,821 units, but the cumulative shortfall since then is more than 15,000 housing units. See Hawaii DBEDT, *Construction and Hawaii's Economy: an analysis of the past and forecast of the future* (February 20, 2014).

consequences arising from Hoakalei's development. In early phases of economic recovery, when input-output multipliers were at their most potent, construction put underutilized labor and other resources back to work on Oahu. The direct, indirect, and induced effects of augmenting economic activity are summarized by the multipliers. Over time, as Oahu has progressed towards fuller employment conditions, dynamic impacts loom larger.

Oahu's unemployment rate has settled to 4.1-4.2 percent in the first several months of 2014, making the case for job creation less compelling than when the unemployment rate on Oahu was over 6 percent, in 2009, and more than 5.5 percent when the 2011 report was written. Even as the labor market firms, other areas of Oahu's economy are even more capacity-constrained. Tourism on Oahu stopped growing after 2012 by a variety of dimensions, in real terms, after inflation adjustment, in terms of arrivals, visitor days, and visitor expenditure. Lodging capacity is so tight on Oahu that at 85 percent seasonally-adjusted occupancy, in 2012, room rates began rising fast enough to erode tourism gains.

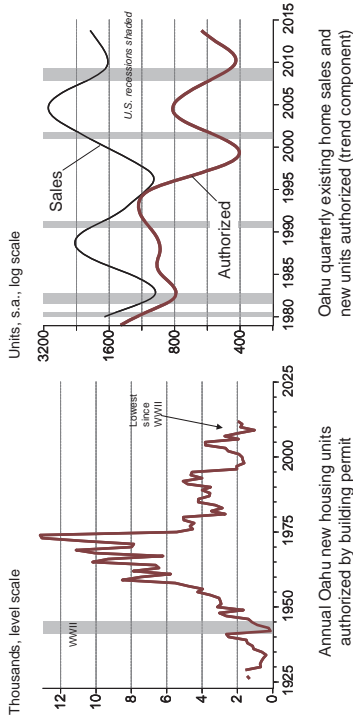
Similarly, Oahu's housing market enters the current investment cycle with three months of existing home inventory remaining, and production that in the first decade of the new century was already tens of thousands of new housing units behind Oahu new home absorption, based solely on new household formation.

Figure 7. Oahu housing market statistics



Source: Honolulu Board of Realtors; seasonal adjustment, regression estimates by TZ Economics

Figure 8. Oahu new homebuilding lowest in 80 years, outstripped by existing home sales



Source: Honolulu Board of Realtors, Honolulu City & County Department of Planning and Permitting, Hawaii BREDT, Robert C. Schmitt, Federal Reserve of Atlanta (1996), seasonal adjustment, Hottelink-Peacock filter (trend estimation) TZ Economics

Hoakalei's resort development and residential development contribute significantly to relieving constraints on Oahu tourism and Oahu housing, and contribute to the extension of the current economic expansion. An investment cycle in which inadequate homebuilding precipitates an acceleration of home prices, eroding affordability so quickly that the cycle is self-limiting, will prematurely end the current economic expansion and leave Oahu's housing needs far from satisfied.

Earlier reports have observed a more nuanced aspect of Hoakalei resort's plans for up to 950 visitor accommodation units and associated retail, commercial, and recreational economic activity. In Oahu's existing primary destinations, Waikiki and Ko Olina, less room for expansion remains. The growing underground vacation rental market on Oahu, all across the island, is one casual indicator of the impact of capacity constraints. Individual vacation units also evidence a growing interest in tourism-oriented activities that are not concentrated in existing destination resort communities. There is growing interest in a tourism that is more integrated into Oahu communities. Meanwhile, vacation rentals and timeshares at Disney Aulani are equally popular among tourists and Hawaii residents. So-called staycations are becoming an increasingly popular form of tourism and recreation for locals. Hoakalei provides dimensionality in spatial terms—uniquely in the Ewa Plain—and in terms of its recreational focus, in conjunction with existing shoreline and beach park amenities, not available elsewhere on the island. Its shoreline lagoon configuration is equally important, as a potential attractor for resident recreational and cultural activities and a community resource in one of the fastest-urbanizing areas on Oahu, as it is important as a tourism attractor.

4. Recreational lagoon investment retains the option of a marina investment

The most recent economic report by TZ Economics for Haseko framed Hoakalei's recreational lagoon as an investment that preserves the option of waiting to see if *future* economic circumstances warrant profitable but irreversible marina development in the presence of uncertainty. Under uncertainty, an irreversible investment decision faces a higher net present value threshold than a deterministic calculation that can ignore the value of the option to wait. The net present value (NPV) threshold includes not just the cost of investing in the marina, but the opportunity cost of waiting to see if the marina will be profitable in the future.

A marina is an irreversible investment, breaching the shoreline and requiring an ocean channel. An investment mistake today cannot be reversed. Low utilization at market prices in existing private marinas, and excess demand at artificially low slip rates at existing public marinas, suggest that the probability of high utilization and high rents at yet another private Oahu marina is low. Only expected values matter under uncertainty—the probability of high rent, times the rent if you can get it. It's uncertain if the present value of expected rents exceed a marina's investment cost but, even if expected rent recoup a marina's investment cost, the correct NPV threshold includes the sum of investment cost *and* the value of the option to wait.

For example, assuming that marina development costs \$60 million, that two possible marina revenue streams are equally probable (\$10 million and \$5 million), and given a 7 percent discount rate, the NPV of proceeding with lagoon development—which preserves the option of marina development in the future—is higher than the NPV of proceeding with marina development and ignoring the value of the option to wait. For these parameterizations, the probability of the "high" revenue outcome would have to be 93 percent to make proceeding with marina development optimal, an outcome unlikely with only two-thirds utilization in at least one nearby private marina on Oahu.

A simplified example highlights the key issues. All values are expressed in millions of dollars. Suppose that the initial cost to build the marina is $I_0 = 60$.⁶ There are two states of the future. In state a the marina earns high annual rent, $R_h = 10$. In state b the marina earns low annual rent, $R_l = 5$. Upon investing in a marina, in any period, one of the two revenue streams accrues with certainty thereafter. If the investor builds the marina, which state follows—high rent or low rent—is revealed in the next period. If the investor waits one period, the future state will be revealed: it will be revealed in any event. Suppose both states of the future are equally likely. Then, the probabilities $P(R_h) = q = 0.5$ and $P(R_l) = (1 - q) = 0.5$ are equal. Assume that the discount rate is 7 percent, so the discount factor is 1.07.⁷

⁶ The \$60 million estimate is evolved from the author's original, unpublished (2011) calculations, not Haseko's.

⁷ This can be thought of as a risk-free yield of 4% and a risk premium of 3%, for example. A lower discount rate may be appropriate for public benefit-cost analysis, but our example pertains to a private investor.

Conventional investment appraisal uses a simple decision rule: invest if the net present value of the project is greater than zero. The net present value is the present value of the stream of future incomes, discounted from future values (at 7 percent), minus the initial cost (−60). Since the initial cost is known with certainty in the present, we can write the net present value as −60 plus the sum of discounted future rents. The net present values of two equally probable outcomes, one high (a) and one low (b) are:

$$(a) \quad NPV_a = -60 + \sum_{t=1}^{\infty} \frac{10}{(1.07)^t} \equiv (-60 + 142) = 83$$

$$(b) \quad NPV_b = -60 + \sum_{t=1}^{\infty} \frac{5}{(1.07)^t} \equiv (-60 + 71) = 11.$$

The *expected* net present value of the marina investment is the probability-weighted average of the two outcomes. The probabilities are equal, one-half, so the expected net present value of investing in the marina is:

$$NPV_{average} = [0.50(83)] + [0.50(11)] = 47.$$

If the investor waits one period for the future to be revealed, and invests *only if* it turns out that conditions support the high marina rent outcome, $R_h = 10$, the investment cost (60) is incurred next period and must be discounted to present value. The known revenues begin to accrue in the following period. The net present value of waiting to see what the future reveals and *then* investing is:

$$NPV_{waiting} = \left[\frac{-60}{(1.07)^1} + \sum_{t=2}^{\infty} \frac{10}{(1.07)^t} \right] = 77 > 47.$$

Waiting one period and investing *only* if the high rent outcome turns out to be the case yields an expected net present value that is *higher* than the expected net present value of investing initially, facing uncertainty about which revenue outcome will occur thereafter. *Waiting pays off.*

Turn this same problem around to answer the question: what would the probability have to be of the high revenue outcome (a) in order for investing in the marina initially to *match* the value of waiting one period for the future to be revealed and then investing? If we wait one

period, allow the uncertainty to resolve itself, and then invest, the value is $NPV_{waiting} = 77$. To achieve this by investing today, the probability of the high revenue outcome (q) would have rise until $NPV_{average}$ was at least as high as 77, leaving the investor indifferent between waiting and investing. The problem is to solve for q so that $NPV_{average} \geq NPV_{waiting} = 77$. The solution is:

$$NPV_{average} = [q(83) + (1 - q)(11)] = [(0.92)(83) + (0.08)(11)] \geq 77.$$

Subjectively, the investor would have to believe that the high revenue outcome was at least 92 percent probable to make the expected net present value of investing no less than waiting for one period to see what the future reveals. The odds would have to be about 11.5 to 1, which seems unlikely given that a nearby private marina is one-third vacant.

Essentially, the option to wait to see what the future reveals *itself has value*. Its value is rooted in the facts that the investment is irreversible, and that revenue outcomes are inherently uncertain. Under certainty, with perfect foresight, the investment decision rule ordinarily compares the present values of revenues and costs, and implies “proceed” if their difference (net present value) is positive. With uncertainty and irreversibility of the investment decision, a modified present value rule is required: invest only if the present value of revenues exceeds the present value of costs *plus* the value of the option of waiting to see what the future reveals.

This suggests another approach to the analysis: including the value of the foregone option to wait one period with the cost of investing, and comparing that *complete* cost to the present value of revenues.

- Waiting to see if the high revenue outcome occurs and *then* investing tomorrow has the payoff $NPV_{waiting} = 77$. That's the value of the option of waiting, the *opportunity cost* of investing today.⁸ The *complete* cost of investing today is 60 (the investment cost) plus 77 (the option value), or $(60 + 77) = 137$.
- The benefit from investing today is 142 if the high revenue outcome occurs, and 71 if the low outcome occurs, in present value. Given even probabilities of high and low outcomes, the expected future revenue is the average of those two possible streams, $(142 + 71)/2 = 106.5$.
- The present value of revenue is 106.5. The present value of costs is 137, including the value of the option to wait along with the cost of investing in the marina. Total cost exceeds total revenue in present value terms, so investing is not the optimal decision.

⁸ If we wait and the low outcome occurs, we still hold the option to invest tomorrow.

The net present value rule must be modified to take into account the interaction of uncertainty and irreversibility of investment. For the marina investment to be worthwhile, the expected present value of its benefits must exceed the present value of all costs. These costs include *both* the cost of building the marina *and* the opportunity cost of waiting to see if better conditions warrant a marina investment later on. Keeping the option open to build a marina in the future can be optimal if there is sufficient uncertainty about the future. Uncertainty and irreversibility of marina investment may give sufficient value to the option of waiting to warrant an alternative, ocean recreation lagoon investment in the present.

The economic rationality of developing the lagoon and preserving the option of future marina development is illustrated only for specific assumptions, and more generally is subject to other sources of uncertainty that would require full stochastic analysis. These sources of uncertainty include: (a) different marina investment costs; (b) different slip rental rates; (c) different probabilities of prospective marina revenues; (d) generalized changes in uncertainty over prices (revenues) or costs; (e) changing the discount rate; (f) incorporating uncertain lagoon development costs; (g) incorporating public benefits of contiguous shoreline recreation access; (h) differential assumptions regarding commercial spillovers; (i) environmental risks; (j) extension to continuous time; (k) extension to include covariation and contagion across risk factors. Monte Carlo simulation can provide insights in these instances on investment responses.

5. Directions for future research in recreation at Hoakalei

As defined by the Bureau of Economic Analysis, U.S. Department of Commerce: “The Arts, Entertainment, and Recreation NAICS sector includes a wide range of establishments that operate facilities or provide services to meet varied cultural, entertainment, and recreational interests of their patrons. This sector comprises: (1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure time interests.”⁹

The impacts of investment in recreation facilities also can be estimated using the State of Hawaii’s input-output model, as have been analyzed construction and tourism impacts of Hoakalei Resort. Some overlap with tourism outcomes requires careful delineation of resident and visitor consumption in this case. Inter-industry linkages, forward to downstream industries and backward to suppliers, are summarized in a matrix summarizing those impacts in a way that is internally consistent, “adding up” to the economy’s total final output. In this way, additional expenditure in arts, entertainment, and recreation, as well as in other industrial impacts of development, can be traced from their origins to their economy-wide consequences. Total income or output, as well as employment, are linked across industries in input-output models.

⁹ NAICS definitions in the GDP accounts (<http://www.bea.gov/regional/index.htm>).

Given the pivotal role of Hoakalei Lagoon in future Hoakalei Resort development, fitting recreation to the input-output analysis will correct an error of omission in the existing quantitative assessment of the project’s economic impacts. The evolution of day-trip tourism in Kailua Town, on Oahu’s windward side, provides some guidance for calibration to private, entrepreneurial, recreation-oriented business start-ups. Recreation can be analyzed in the same way that construction and tourism impacts were assessed. Among the seventy or so individual industry sectors enumerated in Hawaii’s input-output table, the sector comprising arts, entertainment and recreation is associated with one of the larger job multipliers. This is because, in general, industries that source locally and provide local outputs have the most extensive inter-industry linkages and largest inter-industry effects. (Sourcing from outside Hawaii’s economy, in contrast, dissipates some of those impacts overseas.) The direct, indirect, and induced effect of expenditure on arts, entertainment, and recreation on Hawaii total output has a multiplier of 1.92, compared to an unweighted 1.96 multiplier for all industries, but its job multiplier is *three times* that of construction activity. The pivotal role of Hoakalei lagoon and associated shoreline improvements, as ocean recreation-oriented attractors and drivers for resort commercial success at Hoakalei and its planned venues for performances and cultural practices, suggests that this area of economic activity could be fruitfully analyzed.

Figure 9. Hoakalei will be a major ocean recreation resource



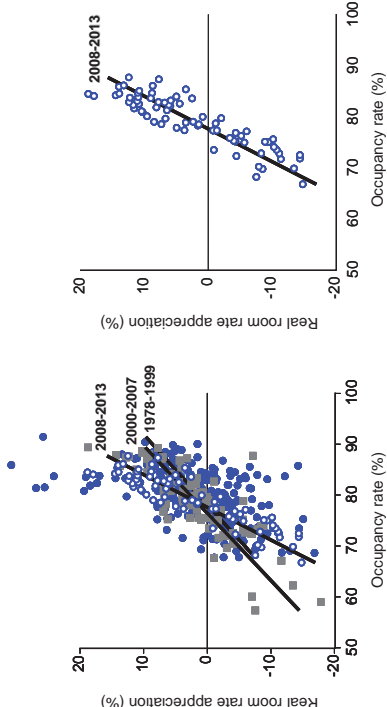
Source: Hasiko Development

Appendix 1: Oahu hotels grabbing yield

Hotel occupancy and real room rate appreciation vary directly. Higher capacity utilization is associated with faster rates of room rate increase, adjusted for consumer price inflation. The change in real room rates with respect to changing occupancy rates has increased in the last six years (2008-2013 inclusive), relative to the prior eight years or the preceding two decades. A larger real room rate change for a given change in occupancy implies a smaller supply elasticity for lodging. *Inelastic* room supply means that room rates rise more quickly as lodging demand increases, and *vice versa*. Absent new rooms, more of the change in utilization goes into pricing changes, than quantitative responses.

Increasingly, more of the tourism recovery since the recession ended in 2009 has gone into higher yields for hotel operators than in increased volumes or real tourism receipts. Both volumes and real receipts have been declining on Oahu ever since hotel occupancy reached 85 percent (s.a.) at the end of 2012. While it is optimal for individual hotels to extract as much yield as possible, it is not optimal for the destination to price itself into shorter stay lengths, decreasing tourism volumes, or shrinking real receipts. Less is not more. Additional lodging capacity can mitigate some of these untoward destination outcomes, even as individual properties rationally exploit opportunities for yield maximization. Hoakalei is one of few prospects for new lodging capacity on Oahu since Disney's Aulani Resort opened in 2011.

Figure A-1. Oahu real hotel room rate appreciation directly related to hotel occupancy



Source: Raw data from PKF Hawaii and Hospitality Advisors LLC; deflation and regressions by TZE

Appendix 2. Changing input-output model-based economic impacts of Hoakalei

This appendix reviews some of the input-output model-based estimates for Hoakalei construction and economic impacts. Table 1, on the next page, is the same table used in the body of the text of this report on page 2. It reports the original estimates of impacts for Hoakalei Resort and Lagoon calculated in 2011 using the State of Hawaii's 2005 input-output model.¹⁰ Table A-1, which follows, reports the original estimates of impacts for Hoakalei Resort and Marina, as estimated in an unpublished study prior to Haseko Development's decision to focus the project on a recreational lagoon and associated shoreline improvements.¹¹ At the time, for the economic impact analysis, the lagoon investment decision was a change order, in a manner of speaking, one that modified the construction assumptions. Presuming that the change reflected the developer's optimal strategy to achieve its long-term economic objectives at the time, it was assumed that the decision would *not* change the longer-term tourism and consumption impacts of the outcome. Thus, Table 1 and Table A-1 differed *only* in the smaller construction impact associated with not building the marina at the time, a difference of approximately \$37 million.¹²

The construction impacts reported in Table 1 excluded a marina but did not include lagoon or related development costs at that time (2011). One year later, in testimony to the Zoning and Planning Committee of the Honolulu City Council, the author testified that, "finishing out Hoakalei Lagoon will involve \$25-30 million in construction activity," partly because costs of lagoon development, certain shoreline amenities and water quality engineering requirements were, by then, identified.¹³ Two years later, in the real options analysis summarized in section 4

¹⁰ See http://dbedt.hawaii.gov/economic/reports/studies/2005_state_io/, *The 2005 State Input-Output Study For Hawaii* (August 2008), published by the Research and Economic Analysis Division of the Hawaii Department of Business, Economic Development, and Tourism was the basis for the original TZ Economics economic impact calculations for Hoakalei (see http://files.hawaii.gov/dbedt/economic/data_reports/2005_state_io/2005-input-output-study.pdf). That model has been updated. Input-output model revisions published in *The Hawaii State Input-Output Study: 2007 Benchmark Report* (Revised December 2013) is currently being used to update economic impact estimates (see <http://dbedt.hawaii.gov/economic/reports/studies/2007-io/>). Results may not be strictly comparable, not just because multiplier estimates have evolved but also because project attributes have evolved, and greater clarity with respect to construction costs is now available.

¹¹ This investment decision was not one which TZ Economics was asked to analyze at the time, nor did TZ Economics participate otherwise in the investment decision.

¹² Construction *impact*, technically, is not the same thing as construction *outlay*, although in the Tables (and often in text references) the terms are used interchangeably. In the 2005 I-O model used in the 2011 estimates of impact effects, for each \$1.00 of final investment expenditure (physical capital formation, a.k.a. construction)—transmitted through inter-industry linkages—about 82 cents of intermediate inputs are used and about 18 cent of imports are used. Impacts of the latter are vented overseas. Thus, in Table 1 and Table A-1 the construction impacts can be thought of as the portion of outlays having an impact on the Hawaii economy, taking imported inputs into account.

¹³ Paul H. Browbaker, letter to Ikaika Anderson, Chair, Zoning and Planning Committee, Honolulu City Council Re: Bill 65 (2012)—To Adopt the Revised Ewa Development Plan (October 5, 2012) (received October 9, 2012 by the office of the City Clerk).

Table 1. Input-output (I-O)-based Hoakalei economic impacts
(in million 2010 dollars and numbers of jobs)

	Outlay	Total output	Jobs	Tax revenue
Construction impacts (short-run)				
Hotel/resort/recreation	378.5	738.9	4,513	42.9
Housing (resident)	341.5	666.8	4,073	38.7
Short-run impacts	\$ 720.0	\$ 1,405.8	8,585	\$ 81.6
Tourism, consumption impacts (long-run)				
Tourism	347.0	667.7	5,063	41.2
Resident consumption (incl. recreation)	55.2	103.3	767	5.7
Long-run impacts	\$ 402.2	\$ 771.0	5,830	\$ 47.0
Total impacts	\$ 1,122.2	\$ 2,176.8	14,416	\$ 128.6

Table A-1. Input-output (I-O)-based Hoakalei economic impacts
(in million 2010 dollars and numbers of jobs)

	Outlay	Total output	Jobs	Tax revenue
Construction impacts (short-run)				
Hotel/resort/marina	415.6	811.4	4,956	47.1
Housing (resident)	341.5	666.8	4,073	38.7
Short-run impacts	\$ 757.1	\$ 1,478.3	9,028	\$ 85.8
Tourism, consumption impacts (long-run)				
Tourism	347.0	667.7	5,063	41.2
Resident consumption (incl. recreation)	55.2	103.3	767	5.7
Long-run impacts	\$ 402.2	\$ 771.0	5,830	\$ 47.0
Total impacts	\$ 1,159.3	\$ 2,249.2	14,858	\$ 132.8

Table 1 (reproduced from page 2), above, includes original published estimates of Hoakalei Resort economic impacts without a marina, calculated without inclusion of lagoon development cost estimates. Unpublished estimates with a marina, also from 2011, are in Table A-1, and they included the author's marina construction cost estimates, excluding shoreline breakout costs.

of this report, a marina investment cost estimate of \$60 million was used in a heuristic example, partly because additional construction costs *common* to either a lagoon or marina were identifiable in addition to the original hypothetical marina construction cost estimates. (The developer estimates that marina construction cost was closer to \$80 million.)

Among the things that evolved between the first (2011), second (2012), and third (2013), sets of estimates was the broadened scope of recreational amenity development to which Haseko Development became committed in conjunction with the lagoon. The project by then was committed to integrating continuous shoreline improvement at the City's Oneula Beach Park in a consolidated upgrade stretching to White Sands Beach. The current estimate of lagoon development, including the Kauhale Preserve and shoreline trail, is \$49 million, *not* including certain water-quality engineering investments.

In 2011, estimates of more than \$1.1 billion in total construction, tourism, and resident consumption impacts, nearly \$2.2 billion in final output, more than 14,000 jobs and nearly \$130 million in tax revenues were associated with incremental development of Hoakalei Resort and Lagoon. The user is cautioned to understand the methodological limitations of the original analysis, and of input-output modeling in general. Still, the magnitudes of these estimated impacts convey the economic importance of the project, even without further quantification of qualitative economic contributions at Hoakalei that, over time, have come to be better understood. As more details of the project's development unfold, as greater clarity on costs and benefits become available, and as revisions to the I-O model occur, the opportunity to improve the analysis of economic impacts should be exploited.

APPENDIX N. TRANSPORTATION MASTER PLAN UPDATE

Transportation Master Plan Update

Ocean Pointe/Hoakalei



Prepared For
Haseko, Inc.

Prepared By
Wilson Okamoto
Corporation
W-Trans

May 2013

TRANSPORTATION MASTER PLAN UPDATE

FOR THE

OCEAN POINTE/HOAKALEI DEVELOPMENT

Prepared for:

Haseko, Inc.

Prepared by:

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May 2013

PREFACE

This report is an update of the "Traffic Assessment Report: A Technical Memorandum Update for the Ocean Pointe Master Plan" prepared in March 2006. The traffic evaluation contained herein incorporates the completion of portions of the Ocean Pointe/Hoakalei development in Ewa on the island of Oahu, revisions to the Master Plan for the remainder of the development, other planned developments in the vicinity, and the incorporation of alternate modes of travel into the Master Plan.

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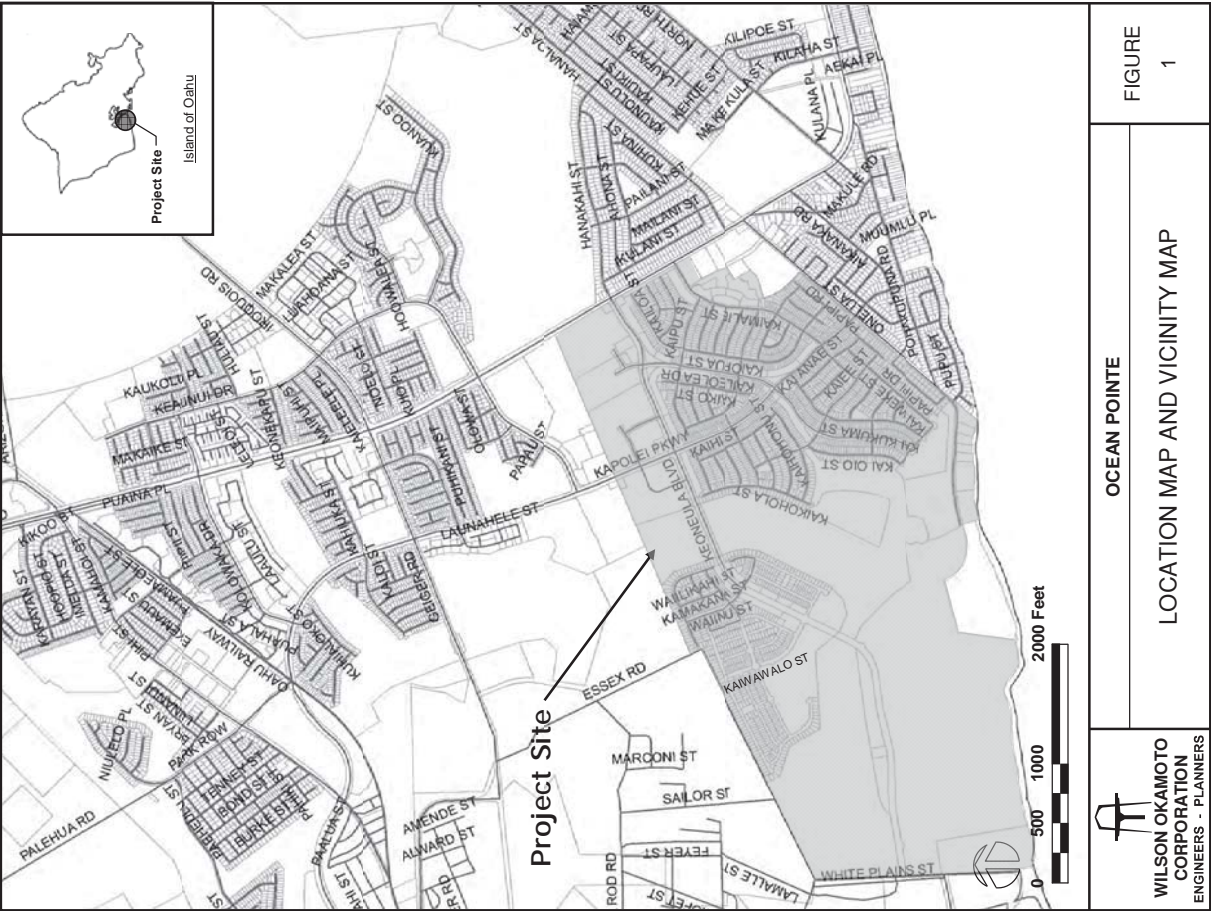
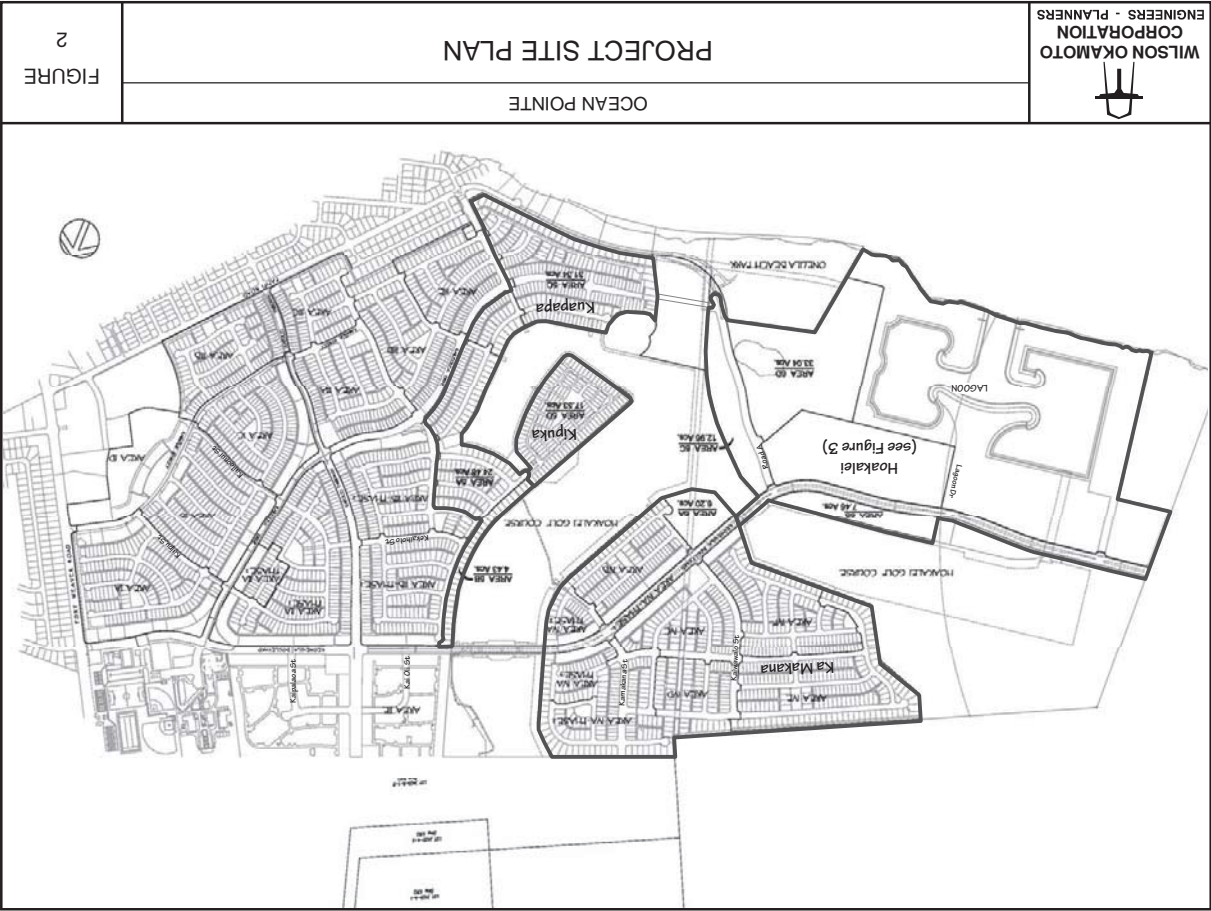
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I. INTRODUCTION

The purpose of this plan is to identify and assess traffic operations in the vicinity of the Ocean Pointe/Hoakalei development in Ewa on the island of Oahu. This report is an update of the "Traffic Assessment Report: A Technical Memorandum Update for the Ocean Pointe Master Plan" prepared in March 2006. The traffic evaluation contained herein incorporates the completion of portions of the Ocean Pointe/Hoakalei development in Ewa on the island of Oahu, revisions to the Master Plan for the remainder of the development, other planned developments in the vicinity, and the incorporation of alternate modes of travel into the Master Plan.

II. PROJECT DESCRIPTION

The proposed Ocean Pointe/Hoakalei development is located adjacent to Fort Weaver Road north of Papipi Road (see Figure 1 for location map) and is anticipated to be fully built out by the Year 2020. The development will ultimately include six residential areas consisting of single and multi-family homes, an 18-hole golf course, and a lagoon area that includes a resort with commercial/retail and office areas (see Figures 2 and 3 for master plan). To date, three of the six areas within the development have been completed with construction still on-going in Areas 4 and 5 and development expected to begin on Area 6 and the lagoon area within the near future. Area 4, subsequently named "Ka Makana," is still under development with approximately 150 single-family homes under construction. Within Area 5, "Kipuka" (Area 5D) and "Kuapapa" (Areas 5A, 5B, and 5C) have approximately 131 single-family homes and 412 single-family homes, respectively, still under construction. Area 6 is expected to include approximately 874 multi-family homes with the lagoon area expected to include a resort with a 150-room hotel, 800 timeshare units, and approximately 500,000 square feet of commercial uses. The development has already constructed the majority of its internal roadway network with connections provided to Kapolei Parkway, Fort Weaver Road, and Papipi Road. The next phases of the development are expected to include the extension of Keoneula Boulevard further west and construction of additional internal roadways within the vicinity of the lagoon.



III. AREA ROADWAY SYSTEM

The project site is bordered by Fort Weaver Road to the east, a State of Hawaii roadway that serves as the main collector roadway through Ewa and Ewa Beach from the H-1 Freeway to Iroquois Point. In the vicinity of the project site, Fort Weaver Road is a predominantly two-way, four-lane roadway generally oriented in the north-south direction with exclusive turning lanes provided at major intersections. To the south, the project site is bordered by Papipi Road, a predominantly two-way, two-lane City and County of Honolulu roadway generally oriented in the east-west direction that provides access to Oneula Beach Park and the residential neighborhoods along its alignment.

The existing internal roadway network within the Ocean Pointe/Hoakalei development includes east-west major streets such as Keoneula Boulevard and Kaileolea Drive, and also north-south major streets such as Kapolei Parkway. Keoneula Boulevard and Kaileolea Drive serve as the main east-west thoroughfares in the project and Kapolei Parkway serves as the main north-south thoroughfare in the project. These major streets are predominantly two-way, four-lane roadways with raised landscaped medians.

Other constructed minor roadways within the Ocean Pointe/Hoakalei development and within the study area include Kai Oli Street, Kaiwawalo Street, Kamakana Street, Kaipalaoa Street, Kekaiohola Street, Kaileonui Street, Kaipu Street, and Kaimalie Street, all of which are predominantly two-way two-lane roadways that meander through the project site providing access to the residential neighborhoods along their alignments.

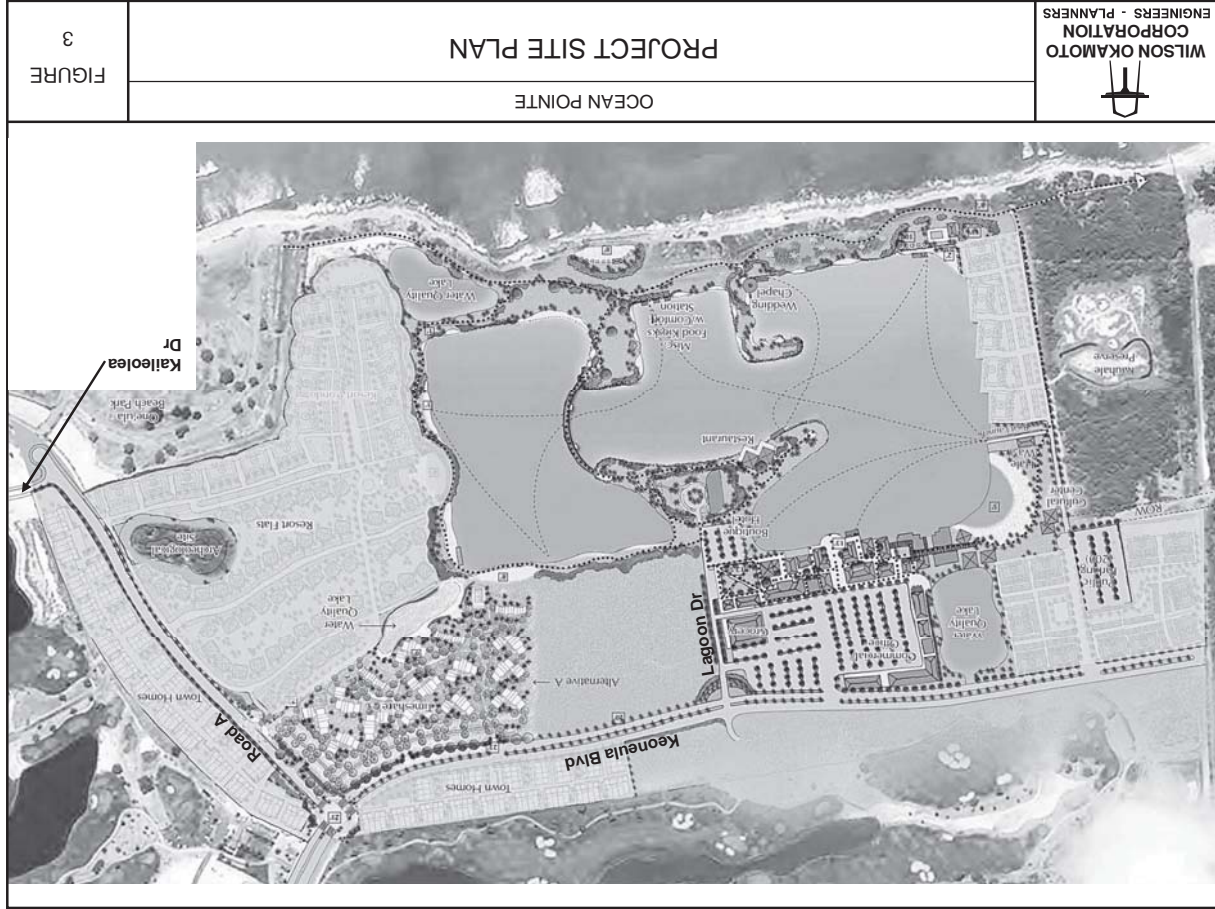
The locations of the study intersections with the existing lane configurations and controls are shown in Figures 4 and 5.

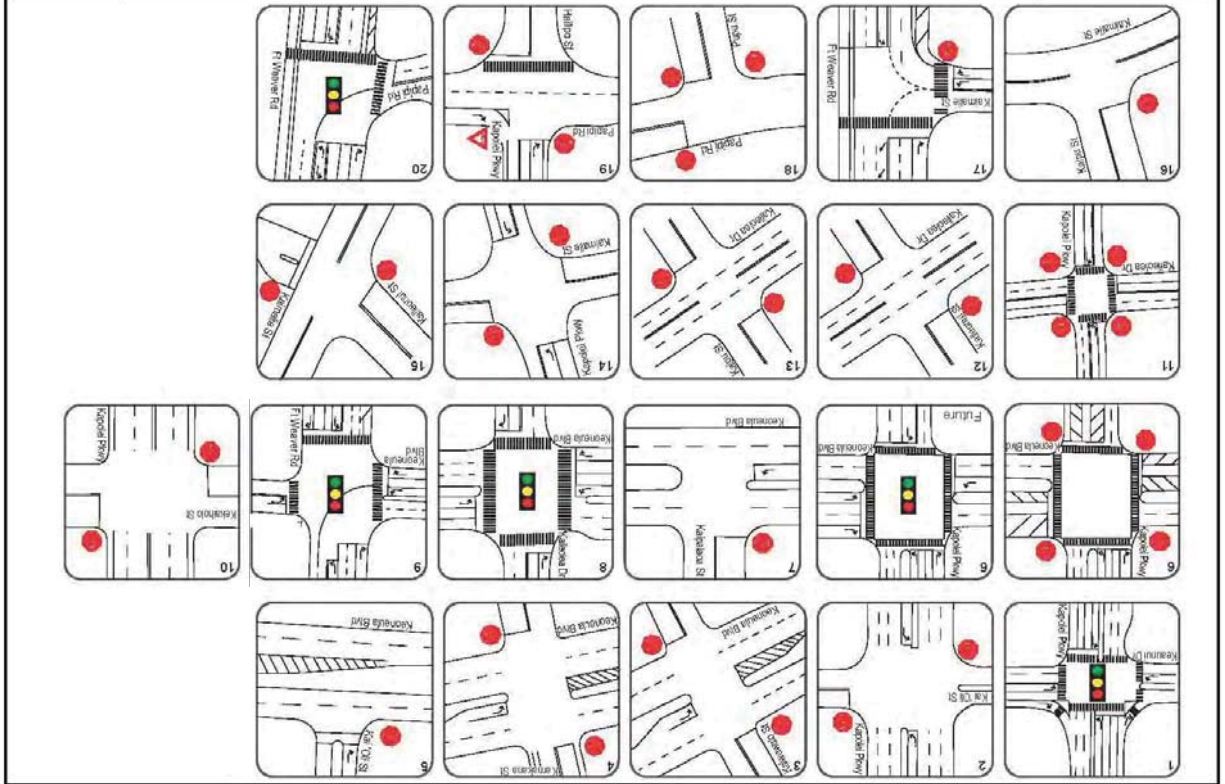
IV. EXISTING CONDITIONS

A. Field Investigation

Field investigations were conducted in September 2012 and consisted of manual turning movement count surveys during the morning peak hours of 6:00 AM and 9:00 AM and afternoon peak hours of 3:00 PM and 6:00 PM at the following intersections:

- Kapolei Parkway/Keaunui Drive
- Kapolei Parkway/Kai Oli Street
- Fort Weaver Road/Keoneula Boulevard/Hanakahi Street





- Keoneula Boulevard/Kaileolea Drive
- Keoneula Boulevard/Kaipalaoa Street
- Keoneula Boulevard/Kapolei Parkway
- Keoneula Boulevard/Kai Oli Street
- Keoneula Boulevard/Kamakana Street
- Keoneula Boulevard/Kaiawalo Street
- Kapolei Parkway/Kekaiholo Street
- Kaileolea Drive/Kaipu Street
- Kaileolea Drive/Kaileonui Street
- Kapolei Parkway/Kaileolea Drive
- Fort Weaver Road/Kaimalie Street
- Kaimalie Street/Kaipu Street
- Kaimalie Street/Kaileonui Street
- Kapolei Parkway/Kaimalie Street
- Fort Weaver Road/Papipi Road
- Kapolei Parkway/Hailipo Street/Papipi Road
- Pupu Street/Papipi Road

In addition, 24-hour mechanical traffic count surveys were conducted along Fort Weaver Road and Kaimalie Street in the vicinity of the intersection of those two roadways. Appendix A includes the existing traffic count data.

B. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and performed by the "Synchro" software, developed by Trafficware of Albany, California. The analysis is based on the concept of Level of Service (LOS).

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F". LOS "A" represents ideal or free-flow traffic operating conditions and LOS "F" represents unacceptable or potentially congested traffic operating conditions. LOS "B", "C", "D", and "E" represent the intermediate traffic operational characteristics between the two extremes of LOS "A" and LOS "F". The LOS definitions are included in Appendix B.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the roadway carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 generally indicates that the traffic demand exceeds the road's carrying capacity.

C. Existing Traffic Conditions

The AM and PM peak hours of traffic vary between individual intersections but generally occur between the hours of 7:00 AM and 8:00 AM during the morning peak period and between the hours of 4:00 PM and 5:00 PM during the afternoon peak period. The analysis of individual intersections is based on the absolute peak hour periods to evaluate the intersection service operations with the Ocean Pointe/Hoakalei development. The existing AM and PM peak hour traffic and operating conditions at the study intersections are shown on Figure 6 and summarized in Table 1. The existing conditions include the completion of Areas 1, 2, and 3, as well as portions of Areas 4 and 5 within the Ocean Pointe/Hoakalei development. In addition, they include construction-related traffic destined for areas still under construction. LOS calculations are included in Appendix C.

Table 1: Existing LOS Traffic Operating Conditions

Intersection	Approach/ Critical Movement	AM	PM
Kapolei Pkwy/ Kaanui Dr	Eastbound	C	C
	Westbound	A	B
	Northbound	B	A
Kapolei Pkwy/ Kai Oli St	Southbound	B	B
	Eastbound	F	D
	Westbound	C	B
	Northbound	A	B
Fort Weaver Rd/ Keoneula Blvd/ Hanakahi St	Southbound	B	A
	Eastbound	E	D
	Westbound	E	D
	Northbound	D	C
Keoneula Blvd/ Kaileolea Dr	Southbound	C	B
	Eastbound	B	A
	Westbound	B	A
	Northbound	B	B
	Southbound	B	B

Table 1: Existing LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach/ Critical Movement	AM	PM
Keoneula Blvd/ Kaipalaoa St	Eastbound	A	A
	Southbound	C	B
Keoneula Blvd/ Kapolei Pkwy	Eastbound	C	C
	Westbound	C	B
Keoneula Blvd/ Kai Oli St	Northbound	C	C
	Southbound	B	B
Keoneula Blvd/ Kamakana St	Southbound	A	A
	Eastbound	A	A
Keoneula Blvd/ Kaiwawalo St	Westbound	A	A
	Northbound	A	A
Kapolei Pkwy/ Kekaiholo St	Eastbound	C	C
	Westbound	B	B
Kaileolea Dr/ Kaipu St	Northbound	A	A
	Southbound	A	A
Kaileolea Dr/ Kaileonui St	Eastbound	B	B
	Westbound	B	A
	Northbound	A	A
	Southbound	A	A

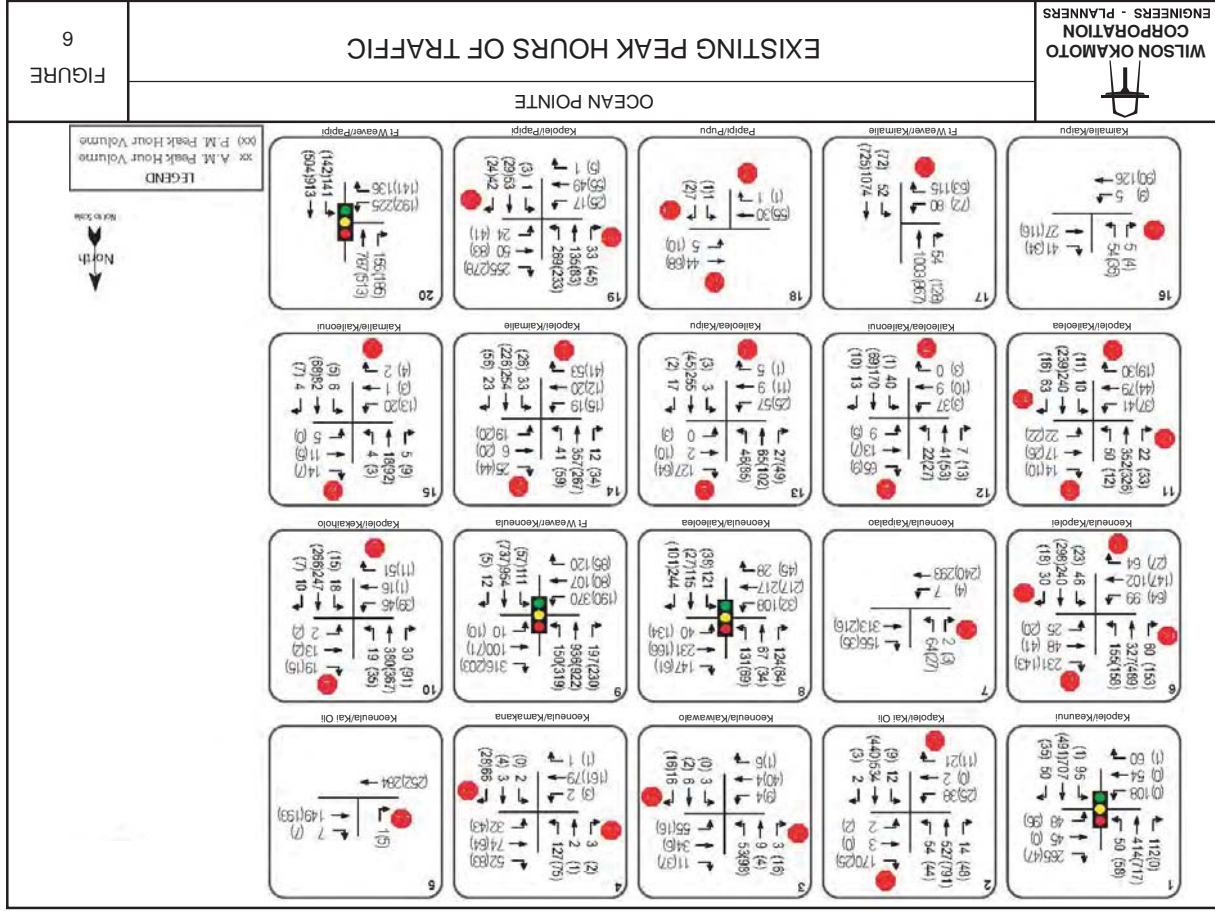


Table 1: Existing LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach/ Critical Movement	AM	PM
Kapolei Pkwy/ Kaileolea Dr	Eastbound	B	A
	Westbound	A	A
	Northbound	C	B
Fort Weaver Rd/ Kaimalie St	Southbound	C	B
	Eastbound	C	C
	Northbound	B	B
Kaimalie St/ Kaipu St	Eastbound	A	A
	Southbound	B	B
Kaimalie St/ Kaileonui St	Eastbound	A	A
	Westbound	A	A
	Northbound	A	A
	Southbound	A	A
Kapolei Pkwy/ Kaimalie St	Eastbound	C	B
	Westbound	C	B
	Northbound	A	A
	Southbound	A	A
Fort Weaver Rd/ Papipi Rd	Eastbound	D	D
	Northbound	A	A
	Southbound	B	A
	Eastbound	A	A
Kapolei Pkwy/ Papipi Rd/ Hailipo St	Westbound	A	A
	Northbound	B	B
	Southbound	C	C
	Eastbound	A	A
Papipi Rd/ Pupu St	Eastbound	A	A
	Westbound	A	A
	Northbound	A	A

In general, traffic operations in the vicinity of the Ocean Pointe/Hoakalei development operate at acceptable levels of service during both peak periods. The approaches or critical movements at the study intersections along Kaileolea Drive, Kaimalie Street, and Kapolei Parkway operate at LOS "C" or better during both peak periods with the exception of the intersection of Kapolei Parkway and Kai Oli Street. The eastbound approach of the Kapolei Parkway and Kai Oli Street intersection operates at LOS "F" and LOS "D" during the AM and PM peak periods, respectively. Along Keoneula Boulevard, the approaches or critical movements at the study intersections operate at LOS "C" or better during both peak periods with the exception of the intersection of Keoneula Boulevard with Fort Weaver Road and Hanakahi Street. The eastbound and westbound approaches of the intersection of Keoneula Boulevard with Fort Weaver Road and Hanakahi Street operate at LOS "E" and LOS "D" during the AM and PM peak periods, respectively, while the northbound approach operates at LOS "D" during the AM peak period. At the south end of the study area, the approaches of the intersection of Papipi Road with Fort Weaver Road operate at LOS "D" or better during both peak periods while those at the intersection with Pupu Street operate at LOS "A" during both peak periods.

V. PROJECTED CONDITIONS

A. Trip Generation and Distribution

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 9th Edition," 2012. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit or 1,000 square feet of development. As stated previously, there are several residential areas already completed within the development, but the remaining phases of the development are expected to generate additional trips during the AM and PM peak periods. Table 2 summarizes the additional project site trip generation characteristics applied to the AM and PM peak hours of traffic.

Table 2: Peak Hour Trip Generation

SINGLE-FAMILY DETACHED HOUSING			PROJECTED TRIP ENDS
INDEPENDENT VARIABLE:		Dwelling Units = 713 units	
AM PEAK	ENTER		133
	EXIT		402
	TOTAL		535
PM PEAK	ENTER		453
	EXIT		268
	TOTAL		721
APARTMENT (MULTI-FAMILY UNITS)			PROJECTED TRIP ENDS
INDEPENDENT VARIABLE:		Dwelling Units = 874 units	
AM PEAK	ENTER		89
	EXIT		357
	TOTAL		446
PM PEAK	ENTER		351
	EXIT		191
	TOTAL		542
RESORT HOTEL (HOTEL/TIMESHARE)			PROJECTED TRIP ENDS
INDEPENDENT VARIABLE:		Rooms = 950 rooms	
AM PEAK	ENTER		212
	EXIT		83
	TOTAL		295
PM PEAK	ENTER		171
	EXIT		228
	TOTAL		399
SHOPPING CENTER (COMMERCIAL)			PROJECTED TRIP ENDS
INDEPENDENT VARIABLE:		1,000 sf of development = 500	
AM PEAK	ENTER		243
	EXIT		155
	TOTAL		398
PM PEAK	ENTER		916
	EXIT		954
	TOTAL		1,870

Table 2: Peak Hour Trip Generation (Cont'd)

TOTALS		
AM PEAK	ENTER	677
	EXIT	997
	TOTAL	1,674
PM PEAK	ENTER	1,891
	EXIT	1,641
	TOTAL	3,532

The trip generation methodology developed by ITE also includes provisions for internal capture of trips within multi-use developments to account for interaction among different uses on the same site. The peak hour trip generation for the proposed project was adjusted for internal capture trips utilizing guidelines published in "Trip Generation Handbook" 2001. Table 3 shows the adjusted trip generation totals applied to the AM and PM peak hours of traffic.

Table 3: Adjusted Peak Hour Trip Generation Totals

TOTALS		
AM PEAK	ENTER	641
	EXIT	974
	TOTAL	1,615
PM PEAK	ENTER	1,754
	EXIT	1,498
	TOTAL	3,252

The trip distribution for these additional trips was based on the existing turning movements at the study intersections with consideration given to the location of likely destinations (such as employment centers, schools, shopping centers, services, etc.). As such, the additional trips were distributed through the roadway network based upon their assumed origin/destination, direction of travel, and route. Figure 7 shows the distribution of additional site-generated vehicular trips at the study intersections during the AM and PM peak hours of traffic.

B. Through Traffic Forecasting Methodology

The travel forecast is based upon historical traffic count data obtained from the State DOT, Highways Division at a survey station located along Fort Weaver Road in the project vicinity. The historical data were analyzed by linear regression techniques to obtain an annual traffic growth rate. However, historical trends indicate relatively stable or declining traffic demands in the project vicinity. For the purpose of this study, however, a 0.5% per year growth was conservatively assumed to account for the potential of traffic increases in the vicinity. A growth factor of 1.04 was applied to the existing through traffic movements along Fort Weaver Road to achieve the projected Year 2020 traffic demands.

C. Other Considerations

At the time of the field investigation, the intersection of Keoneula Boulevard and Kapolei Parkway was an all-way stop intersection. However, the intersection is currently under construction to install a traffic signal system and modify the existing lane use. The modified intersection is expected to have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane on the eastbound approach of Keoneula Boulevard, and exclusive turning lanes and two through lanes on the westbound approach. The northbound approach of Kapolei Parkway is expected to have a left-turn lane, one through lane, and a shared through and right-turn lane while the southbound approach is expected to have exclusive turning lanes and two through lanes. The planned improvements at the intersection are expected to be completed by the Year 2013 and, as such, the intersection of Keoneula Boulevard and Kapolei Parkway is hereinafter assumed to be modified and signalized.

D. Traffic Signal Warrant

The installation of a traffic signal at an intersection may be justified by one or more of the nine warrants outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways," 2009 Edition (MUTCD). These warrants take into account factors such as eight-hour vehicular volumes (Warrant 1), four-hour vehicular volumes (Warrant 2), peak hour volumes (Warrant 3), pedestrian volumes (Warrant 4), the presence of a school crossing or coordinated signal system (Warrants

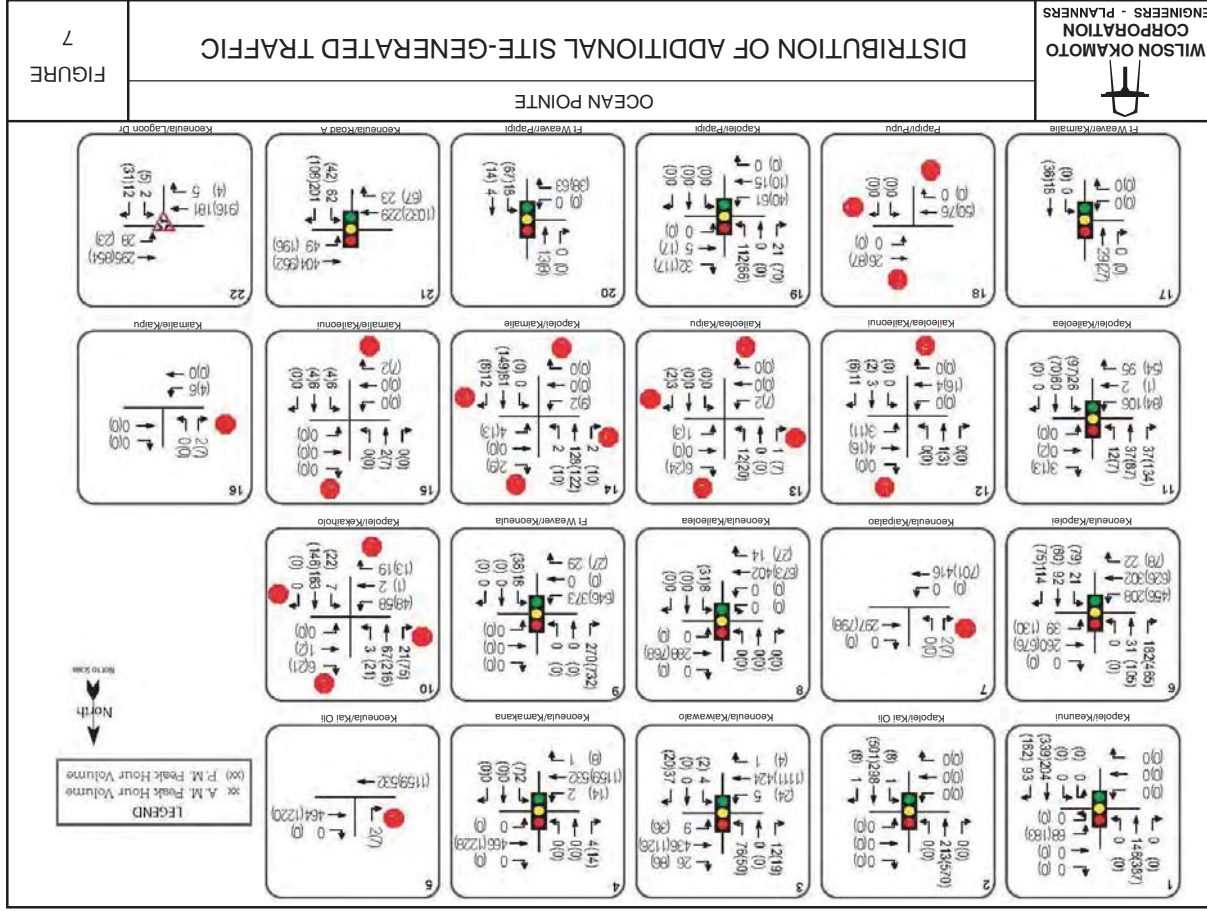


FIGURE 7

5 and 6), crash experience (Warrant 7), other characteristics of the roadway network (Warrant 8), and the presence of railroad crossings (Warrant 9).

Traffic volumes at the intersection of Fort Weaver Road and Kaimalie Street may currently be high enough to warrant the installation of a traffic signal system at that intersection. As such, a Traffic Signal Warrant Study was prepared for the subject intersection (see Appendix D). The existing traffic volumes at the intersection of Fort Weaver Road with Kaimalie Street are high enough to satisfy the Eight-Hour (Warrant 1), Four-Hour Volume Warrant (Warrant 2), and the Peak Hour Warrant (Warrant 3). As such, a traffic signal system is recommended and that intersection is hereinafter assumed to be signalized.

In addition, some of intersections within the Ocean Pointe/Hoakalei development may warrant the installation of a traffic signal system under future conditions. As such, the projected peak hour traffic conditions were assessed at key locations to determine if traffic volumes at those locations might warrant the installation of a traffic signal system. Warrant 3, the "Peak Hour Warrant," consists of several conditions that may justify the installation of a traffic signal at an intersection where vehicles experience high traffic delay due to large volumes of intersecting traffic during the peak hour periods. One of the conditions is based upon the relationship between the traffic volumes along the major and minor streets. If the traffic volumes along the minor street exceed the thresholds shown in Figure 4C-3 of the MUTCD, a traffic signal system may be warranted. Under projected conditions, the traffic volumes at the following intersections satisfy Warrant 3 (see Appendix E):

- Keoneula Boulevard and Kaiwawalo Street
- Keoneula Boulevard and Kamakana Street
- Keoneula Boulevard and Road A
- Kapolei Parkway and Kai Oli Street
- Kapolei Parkway and Kaileolea Drive

As such, for the purpose of this report, these intersections are assumed to be monitored and then signalized when warranted prior to the completion of the development.

In addition, the intersection of Kapolei Parkway with Papipi Road and Hailipo Street was also assessed to determine if the installation of a traffic signal system might be warranted under projected conditions. The traffic volumes at this intersection were not high enough to satisfy Warrant 3 under projected conditions.

However, to accommodate the anticipated traffic distribution at the intersection and alleviate projected traffic operating conditions, the intersection of Kapolei Parkway with Papipi Road and Hailipo Street is assumed to be converted from a two-way stop controlled intersection to an all-way stop controlled intersection.

E. Projected Traffic Conditions With Project

The Year 2020 cumulative AM and PM peak hour traffic volumes and conditions with the full build out of the Ocean Pointe/Hoakalei development are shown in Figure 8, and summarized in Table 4. The lane usage and intersection control at the study intersections are assumed to have been modified to accommodate the projected traffic volumes. The cumulative volumes consist of site-generated traffic superimposed over Year 2020 projected traffic demands. The existing conditions are provided for comparison purposes. LOS calculations are included in Appendix F.

Table 4: Existing and Year 2020 LOS Traffic Operating Conditions

Intersection	Approach/ Critical Movement	AM		PM	
		Exist	Year 2020	Exist	Year 2020
Kapolei Pkwy/ Keaumui Dr	Eastbound	C	C	C	C
	Westbound	A	B	B	C
	Northbound	B	B	A	B
	Southbound	B	B	B	B
Kapolei Pkwy/ Kai Oli St*	Eastbound	F	B	D	C
	Westbound	C	B	B	C
	Northbound	A	A	B	A
	Southbound	B	A	A	A

*Traffic signal system installed.

Table 4: Existing and Year 2020 LOS Traffic Operating Conditions

Intersection	Approach/ Critical Movement	AM		PM	
		Exist	Year 2020	Exist	Year 2020
Fort Weaver Rd/ Keoneula Blvd*	Eastbound	E	D	D	D
	Westbound	E	D	D	D
	Northbound	D	D	C	D
Keoneula Blvd/ Kaileolea Dr	Southbound	C	C	B	C
	Eastbound	B	B	A	A
	Westbound	B	B	A	A
Keoneula Blvd/ Kaipalaoa St	Northbound	B	B	B	B
	Southbound	B	B	B	B
	Eastbound	A	A	A	B
Keoneula Blvd/ Kapolei Pkwy**	Southbound	C	C	B	C
	Eastbound	C	C	C	C
	Westbound	C	C	C	D
Keoneula Blvd/ Kai Oli St	Northbound	C	C	C	D
	Southbound	B	C	B	C
	Eastbound	A	A	A	B
Keoneula Blvd/ Kamakana St***	Southbound	A	A	A	A
	Eastbound	A	A	A	A
	Westbound	A	A	A	C
Keoneula Blvd/ Kaiwawalo St***	Northbound	A	B	A	C
	Southbound	C	B	B	C
	Eastbound	A	A	A	A
Keoneula Blvd/ Road A	Westbound	A	A	A	A
	Eastbound	-	A	-	B
	Northbound	-	B	-	C

*Intersection and traffic signal modifications implemented.
 **Traffic signal system installed and intersection modifications implemented.
 ***Traffic signal system installed.

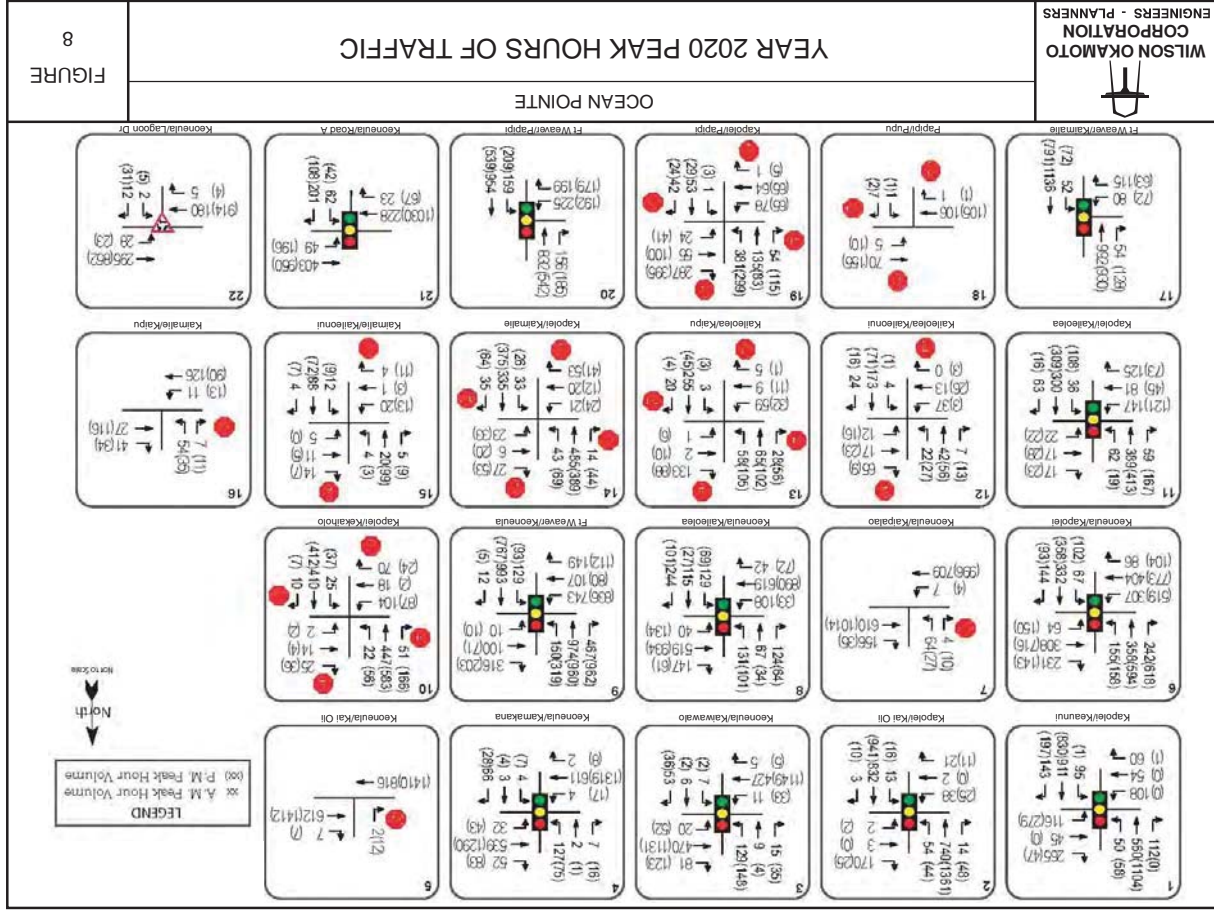


Table 4: Existing and Year 2020 LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach/ Critical Movement	AM		PM	
		Exist	Year 2020	Exist	Year 2020
Kapolei Pkwy/ Lagoon Dr	Eastbound	-	A	-	D
	Westbound	-	A	-	C
	Northbound	-	A	-	B
Kapolei Pkwy/ Kekaholo St	Eastbound	C	D	C	D
	Westbound	B	B	B	B
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Kaileolea Dr/ Kaipu St	Eastbound	C	C	B	B
	Westbound	B	B	A	B
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Kaileolea Dr/ Kaileonui St	Eastbound	B	B	B	B
	Westbound	B	B	A	B
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Kapolei Pkwy/ Kaileolea Dr*	Eastbound	A	A	A	A
	Westbound	A	A	A	B
	Northbound	C	A	B	A
	Southbound	C	A	B	A
Fort Weaver Rd/ Kaimalie St*	Eastbound	C	D	C	D
	Northbound	B	A	B	A
	Southbound	-	A	-	A
	Eastbound	A	A	A	A
Kaimalie St/ Kaipu St	Southbound	B	B	B	B
	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A
Kaimalie St/ Kaileonui St	Southbound	A	A	A	A
	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A

*Traffic signal system installed.

Table 4: Existing and Year 2020 LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach/ Critical Movement	AM		PM	
		Exist	Year 2020	Exist	Year 2020
Kapolei Pkwy/ Kaimalie St	Eastbound	C	C	B	C
	Westbound	C	D	B	C
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Fort Weaver Rd/ Papipi Rd	Eastbound	D	D	D	D
	Northbound	A	A	A	A
	Southbound	B	B	A	A
	Eastbound	A	B	A	B
Kapolei Pkwy/ Papipi Rd/ Hailipo St*	Westbound	A	A	A	A
	Northbound	B	A	B	A
	Southbound	C	C	C	B
	Eastbound	A	A	A	A
Papipi Rd/ Pupu St	Westbound	A	A	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
	Eastbound	A	A	A	A

*Intersection control converted to all-way stop control.

Traffic operations with the full development of the Ocean Pointe/Hoakalei development are generally expected to remain similar to existing conditions due to the implementation of intersection modifications and installation of traffic signal systems at key intersections. The approaches or critical movements at the study intersections along Kaileolea Drive and Kaimalie Street are expected to continue operating at LOS "C" or better during both peak periods with the exception of the intersections of Kaimalie Street with Fort Weaver Road and Kapolei Parkway which are expected to operate at LOS "D" or better during both peak periods. Along Kapolei Parkway, the approaches or critical movements at the intersections with Keaunui Drive and Kai Oli Street are expected to operate at LOS "C" or better during both peak periods while those at the intersections with Keoneula Boulevard, Kekaholo Street, and Papipi Road are expected to operate at LOS "D" or better during both peak periods. At the west end of the project site, the intersection of

Keoneula Boulevard with Road A is expected to operate at LOS "B" or better during the AM peak period and LOS "C" or better during the PM peak period while the intersection with Lagoon Drive is expected to operate at LOS "A" during the AM peak period and LOS "D" or better during the PM peak period. The remaining study intersections along Keoneula Boulevard are expected to continue operating at LOS "C" or better during both peak periods with the exception of the intersection with Fort Weaver Road and Hanakahi Street. The approaches or critical movements at the intersection of Keoneula Boulevard with Fort Weaver Road and Hanakahi Street are expected to operate at LOS "D" or better during both peak periods. At the south end of the study area, the approaches of the intersection of Papipi Road with Fort Weaver Road are expected to continue operating at LOS "D" or better during both peak periods while those at the intersection with Pupu Street are expected to continue operating at LOS "A" during both peak periods.

VI. ALTERNATE MODES OF TRAVEL

A. Bicycle Facilities

A network of bicycle facilities have already been included in the areas of the Ocean Pointe/Hoakalei development that have been completed. These facilities include:

- Bike path on the north side of Keoneula Boulevard from Fort Weaver Road to the western end of the roadway
- Bike lanes on both sides of Kapolei Parkway between Keoneula Boulevard and Papipi Road
- Bike lanes on both side of Kaileolea Drive between Keoneula Boulevard and the western end of the roadway

These facilities connect to other existing bicycle facilities in the project vicinity which include:

- Multi-use path on the east side of Kapolei Parkway north of Keoneula Boulevard
- Bike lanes on both sides of Fort Weaver Road south of Keoneula Boulevard

In addition, the *Oahu Bike Plan* by the City and County of Honolulu details future potential facilities in the vicinity of the Ocean Pointe/Hoakalei development (see Figure 9) including the following:

- Extension of the existing bike path along Keoneula Boulevard further west

- Bike lanes on Kaimalie Street between Fort Weaver Road and Kaie'e Street
- Bike route along Papipi Road from Fort Weaver Road to Oneula Beach Park
- Bike path through Oneula Beach Park
- Extension of the existing bike lanes along Kapolei Parkway further north to supplement the existing multi-use path on the east side of the roadway
- Bike path along Fort Weaver Road to supplement the existing bike lanes along that roadway
- Bike route along Pohakupuna Road between Papipi Road and Fort Weaver Road
- Bike lanes between Papipi Road and Keoneula Boulevard west of Kapolei Parkway

Currently, the master plan for the Ocean Pointe/Hoakalei development includes the extension of the bike path along Keoneula Boulevard. The other future bicycle facilities within the proposed development are currently under consideration and may be incorporated in the future. Figure 10 shows the proposed bike facilities through the Ocean Pointe/Hoakalei development.



Figure 9: Oahu Bike Plan

B. Pedestrian Facilities

Sidewalks have been provided on both sides of all completed roadways within the Ocean Pointe/Hoakalei development. As the remaining roadways within the development are completed, sidewalks will be provided on both sides of these roadways as well. Figure 11 shows the pedestrian facilities through the Ocean Pointe/Hoakalei development.

C. Bus Routes

The completed portions of the Ocean Pointe/Hoakalei development are currently serviced by TheBus, operated by Oahu Transit Services. Regional transit service is provided by Routes 41, 42, 91, 101, E, and W1, with stops along Fort Weaver Road. Route 41 operates daily between 5:00 a.m. and 10:00 p.m. with service between Ewa Beach and Kapolei Transit Center. Headways on Route 41 during weekdays are between 30 minutes and one hour and on weekends approximately one hour. Routes 42, 91, E, and W1 provide transit service between Ewa Beach and Honolulu. Routes 42 and E operate daily between Ewa Beach and Honolulu, with headways of between 30 minutes and one hour. Route 42 stops along local destinations between Ewa Beach and Honolulu and operates between 4:00 a.m. and 12:45 a.m., while Route E provides limited-stop express bus service between Ewa Beach and Honolulu and operates between 4:00 a.m. and 9:30 p.m. Routes 91 and W1 provide weekday commuter express transit service toward Honolulu. Route 91 operates between 4:30 a.m. and 7:00 a.m. with approximately 20-minute headways and Route W1 operates between 4:45 a.m. and 6:00 a.m. with approximately 20-minute headways.

Local transit service is provided by Route 44, with service between Ewa Beach and the Waipahu Town Center via Ewa Villages. Route 44 runs daily between 4:30 a.m. and 11:30 p.m. and stops along Papipi Road, Fort Weaver Road, Keonula Boulevard, Kapolei Parkway, and Kaileolea Drive. This route is expected to be expanded or supplemented to service the remaining areas within the Ocean Pointe/Hoakalei development. Figure 12 shows the existing and potential future bus routes within the vicinity of the project.

D. Traffic Calming Measures

The Ocean Pointe/Hoakalei development includes the implementation of traffic calming measures such as roundabouts. There is an existing single-lane roundabout located within Area 4 or "Ka Makana" along Kaiwalowalo Street north of Keoneula Boulevard. In addition, a future roundabout is planned at the intersection of Keoneula Boulevard with Lagoon Drive. The provision of traffic calming measures such as this along internal roadways encourages drivers to maintain speeds appropriate for the surrounding land uses, as well as, provides a safer environment for motorists and pedestrians. Figure 13 includes a typical layout for a roundabout.

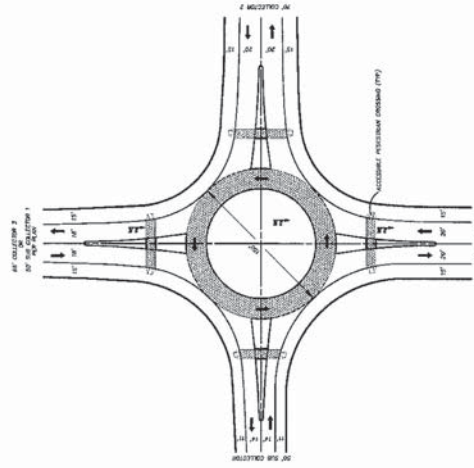


Figure 13: Roundabout Typical Layout

VII. RECOMMENDATIONS

Based on the analysis of the traffic data and the proposed master plan, the following are the recommendations of this study. The implementation schedule for these recommendations is dependent on the development schedule of the various areas.

1. Provide adequate turning radii at project roadways and intersections to avoid or minimize vehicle encroachments to oncoming traffic lanes.

2. Maintain adequate sight distances for motorists to safely enter and exit all roadways.
3. Update the Traffic Assessment Report periodically, perhaps after the completion of each major area, to verify projected conditions.
4. Install a traffic signal system at the intersection of Fort Weaver Road and Kaimalie Street. The traffic signal is warranted under existing conditions at that intersection.
5. Monitor traffic operations at the following intersection and install a traffic signal system when warranted:
 - Keoneula Boulevard and Kamakana Street
 - Keoneula Boulevard and Kaiwalowalo Street
 - Keoneula Boulevard and Road A
 - Kapolei Parkway and Kai Oli Street
 - Kapolei Parkway and Kaileolea Drive
6. Modify the existing lane use at the intersection of Fort Weaver Road, Keoneula Boulevard, and Hanakahi Street to provide two exclusive left-turn lanes with a shared through and right-turn lane on the eastbound approach and a channelized free right-turn on the southbound approach for vehicles turning from Fort Weaver Road onto Keoneula Boulevard. The traffic signal phasing and timing should be modified to accommodate the recommended intersection modifications, as well as, provide an overlap phase for the westbound right-turn movement from Hanakahi Street to accommodate the anticipated increases in traffic at that intersection.
7. Modify the lane use at the intersection of Keoneula Boulevard and Kapolei Parkway to provide two exclusive left-turn lanes, one through lane, and a shared through and right-turn lane on the eastbound approach. The traffic signal phasing and timing should be modified to accommodate the recommended intersection modifications, as well as, provide an overlap phase for the southbound right-turn traffic movement from Kapolei Parkway Street to accommodate the anticipated increases in traffic at that intersection.
8. Modify the intersection control at the intersection of Kapolei Parkway with Papipi Road and Haliipo Street to convert the intersection from a two-way stop controlled intersection to an all-way stop controlled intersection.
9. Install a single-lane roundabout at the intersection of Keoneula Boulevard and Lagoon Drive. Provide the appropriate laneage modifications upstream and downstream of the intersection to accommodate the roundabout. The use of bypass lanes could be considered to improve the operation of the recommended roundabout.
10. At the intersection of Keoneula Boulevard with Road A, provide an exclusive left-turn lane and two through lanes on the westbound approach, one through lane and a shared through and right-turn lane on the eastbound approach, and exclusive turning lanes on the northbound approach.

11. In conjunction with the extension of Keoneula Boulevard further west, extend the existing bike path along the north side of Keoneula Boulevard to the west end of the development.
12. In conjunction with the extension of Kaileolea Drive further west to Road A, extend the existing bike lanes on both sides of that roadway to Road A.
13. In conjunction with the development of Road A, provide bike lanes along that roadway between Kaileolea Drive and Keoneula Boulevard.
14. Consider installing bike lanes along Kaimalie Street between Fort Weaver Road and Kaie'e Street, as well as, bike lanes between Papipi Road and Kaileolea Drive as recommended in the Oahu Bike Plan.
15. Update the Transportation Master Plan periodically, perhaps every 2-3 years, to verify the projected conditions and accommodate any unforeseen traffic conditions.

VIII. CONCLUSION

The proposed Ocean Pointe/Hoakalei development will include six residential areas consisting of single and multi-family homes, an 18-hole golf course, and a lagoon area that includes a resort with commercial/retail and office areas. To date, three of the six areas within the development have been completed with construction still on-going in Areas 4 and 5 and development expected to begin on Area 6 and the lagoon area within the near future. In addition, a portion of the internal roadway network connecting to Fort Weaver Road, Papipi Road, and Kapolei Parkway has been completed. To accommodate the anticipated increases in traffic in the project vicinity due to the completion of the Ocean Pointe/Hoakalei development, modifications are recommended to the existing lane use and traffic signal timing at the intersections of Keoneula Boulevard with Fort Weaver Road/Hanakahi Street and Kapolei Parkway, as well as, to the intersection control at the intersection of Kapolei Parkway with Papipi Road/Hailipo Street. In addition, several key intersections along Keoneula Boulevard and Kapolei Parkway are assumed to be monitored and traffic signal systems installed at those intersections when warranted to improve traffic operating conditions. With the implementation of these recommendations, traffic conditions in the project vicinity are generally anticipated to remain similar to existing conditions. In addition, modifications to and extensions of the existing facilities for bicycles, pedestrians, and public transit, as well as, traffic calming elements are expected to be incorporated into the on-going

project development plan. Finally, due to the extended development schedule for this project, it is recommended that the Transportation Master Plan for the Ocean Pointe/Hoakalei development be updated the periodically, perhaps every 2-3 years, to verify the projected conditions and accommodate any unforeseen traffic conditions.

APPENDIX A
EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: RJ, GH
Counter: D4-3888, D4-3889
Weather: Clear

File Name : KapKea AM
Site Code : 00000004
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway Southbound					Ewa Middle School Driveway Westbound					Kapolei Parkway Northbound					Keanui Drive Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	6	35	2	0	43	6	0	26	7	39	0	115	16	0	131	0	0	0	1	1	214
06:15 AM	10	62	2	0	74	11	0	21	4	36	0	126	20	1	147	0	0	0	0	0	257
06:30 AM	20	81	5	9	115	18	1	16	18	53	3	116	14	3	136	1	3	2	0	6	310
06:45 AM	23	102	12	19	156	22	5	24	13	64	4	128	12	4	148	9	5	3	19	36	404
Total	59	280	21	28	388	57	6	87	42	192	7	485	62	8	562	10	8	5	20	43	1185
07:00 AM	5	90	28	28	151	21	13	20	20	74	9	161	17	31	218	21	10	8	21	60	503
07:15 AM	14	94	49	31	188	18	23	43	13	97	26	148	11	30	215	37	27	22	20	106	606
07:30 AM	18	127	48	16	209	13	18	59	28	118	56	174	13	28	271	48	19	24	13	104	702
07:45 AM	7	111	14	0	132	12	3	61	9	85	11	193	18	2	224	22	8	13	2	45	486
Total	44	422	139	75	680	64	57	183	70	374	102	676	59	91	928	128	64	67	56	315	2297
08:00 AM	11	82	1	0	94	5	1	102	4	112	2	192	8	1	203	1	0	1	0	2	411
08:15 AM	10	94	1	0	105	8	1	43	6	58	0	137	13	0	150	1	0	0	0	1	314
08:30 AM	6	58	1	0	65	8	1	14	2	25	0	111	15	2	128	1	0	0	1	2	220
08:45 AM	9	74	0	0	83	7	0	10	4	21	0	105	9	0	114	0	0	0	2	2	220
Total	36	308	3	0	347	28	3	169	16	216	2	545	45	3	595	3	0	1	3	7	1165
Grand Total	139	1010	163	103	1415	149	66	439	128	782	111	1706	166	102	2085	141	72	73	79	365	4647
Approch %	9.8	71.4	11.5	7.3		19.1	8.4	56.1	16.4		5.3	81.8	8	4.9		38.6	19.7	20	21.6		
Total %	3	21.7	3.5	2.2	30.4	3.2	1.4	9.4	2.8	16.8	2.4	36.7	3.6	2.2	44.9	3	1.5	1.6	1.7	7.9	

Kapolei Parkway Southbound					Ewa Middle School Driveway Westbound					Kapolei Parkway Northbound					Keanui Drive Eastbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total			
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 07:15 AM																				
07:15 AM	14	94		157	18	23	43	84	26	148	11	185	37	27	22	86	512			
07:30 AM	18	127	48	193	13	16	59	90	56	174	13	243	48	19	24	91	617			
07:45 AM	7	111	14	132	12	3	61	76	11	193	18	222	22	8	13	43	473			
08:00 AM	11	82	1	94	5	1	102	108	2	192	6	202	1	0	1	2	406			
Total Volume	50	414	112	576	48	45	265	358	95	707	50	852	108	54	60	222	2006			
% App. Total	8.7	71.9	19.4		13.4	12.6	74		11.2	63	5.9		48.6	24.3	27					
PHF	.694	.815	.571	.746	.667	.489	.650	.829	.424	.916	.694	.877	.563	.500	.625	.610	.814			

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: RJ, GH
Counter: D4-3889, D4-3888
Weather: Clear

File Name : KapKea PM
Site Code : 00000004
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway Southbound					Keanui Drive Westbound					Kapolei Parkway Northbound					Ewa Middle School Driveway Eastbound					
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03:30 PM	28	158	0	0	186	20	1	29	1	51	1	150	16	1	168	1	0	0	1	2	407
03:45 PM	24	159	3	0	186	18	0	12	5	35	0	115	10	2	127	1	1	0	3	5	353
Total	88	600	12	0	700	66	4	79	16	165	3	435	49	14	501	10	4	1	5	20	1386
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Total	44	690	2	4	740	87	1	42	11	141	2	472	38	1	513	2	0	3	3	8	1402
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05:45 PM	10	137	0	2	149	28	0	7	21	56	1	99	7	0	107	1	0	0	1	2	314
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Approach %	9.1	90	0.7	0.3	50.7	1	33.5	14.9			0.4	91	7.6	1	39.4	15.2	12.1	33.3			
Total %	4.6	45.9	0.3	0.1	51	6.3	0.1	4.2	1.9	12.5	0.1	32.5	2.7	0.4	35.7	0.3	0.1	0.1	0.3	0.8	

	Kapolei Parkway Southbound					Keanui Drive Westbound					Kapolei Parkway Northbound					Ewa Middle School Driveway Eastbound					
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	14	187	0	201		15	0	7	22		0	129	9	138		0	0	0	0	361	
04:45 PM	9	188	0	197		28	0	14	42		1	109	9	119		0	0	1	1	359	
05:00 PM	13	190	0	193		20	0	16	36		0	126	9	135		0	0	0	0	364	
05:15 PM	22	162	0	184		33	0	10	43		0	127	8	135		0	0	0	0	362	
Total Volume	58	717	0	775		96	0	47	143		1	491	35	527		0	0	1	1	1446	
% App. Total	7.5	92.5	0			67.1	0	32.9			0.2	93.2	6.6			0	0	100			
PHF	.659	.953	.000	.964		.727	.000	.734	.831		.250	.952	.972	.955		.000	.000	.250	.250	.999	

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: PA, BD
Counter: D4-5672, D4-5675
Weather: Clear

File Name : KapKai AM
Site Code : 00000003
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																					
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06:15 AM	1	72	1	0	74	0	0	11	0	11	1	129	0	0	130	14	0	3	0	17	232
06:30 AM	3	92	3	5	103	0	1	13	5	19	0	104	3	0	107	9	0	0	0	9	238
06:45 AM	6	116	1	2	125	0	0	11	7	18	0	121	0	0	121	12	3	5	1	21	285
Total	10	326	5	7	348	0	1	46	12	59	2	459	3	0	464	49	3	8	1	61	932
07:00 AM	9	111	2	15	137	0	2	18	4	24	1	137	1	3	142	9	0	1	7	17	320
07:15 AM	10	139	4	36	189	1	1	42	17	61	1	122	1	8	132	14	0	5	2	21	403
07:30 AM	29	149	3	40	221	0	0	63	6	69	2	130	0	0	132	9	2	13	0	24	446
07:45 AM	6	128	5	6	145	1	0	47	4	52	8	145	0	0	153	6	0	2	0	8	358
Total	54	527	14	97	692	2	3	170	31	206	12	534	2	11	559	38	2	21	9	70	1527
08:00 AM	13	80	2	6	101	0	0	26	3	29	2	159	0	0	161	5	1	1	0	7	298
08:15 AM	4	95	5	3	107	2	1	13	12	28	0	108	3	0	111	4	0	0	0	4	250
08:30 AM	4	74	2	1	81	0	0	10	1	11	0	101	0	0	101	10	0	2	0	12	205
08:45 AM	2	75	3	2	82	1	0	4	7	12	0	84	0	0	84	7	0	2	0	9	187
Total	23	324	12	12	371	3	1	53	23	80	2	452	3	0	457	26	1	5	0	32	940
Grand Total	87	1177	31	116	1411	5	5	269	66	345	16	1445	8	11	1480	113	6	34	10	163	3399
Approach %	6.2	83.4	2.2	8.2		1.4	1.4	78	19.1		1.1	97.6	0.5	0.7		69.3	3.7	20.9	6.1		
Total %	2.6	34.6	0.9	3.4	41.5	0.1	0.1	7.9	1.9	10.2	0.5	42.5	0.2	0.3	43.5	3.3	0.2	1	0.3	4.8	

	Kapolei Parkway Southbound					Kai Oli Street Westbound					Kapolei Parkway Northbound					Kai Oli Street Eastbound					
Start Time	Left	Thru	Right	Peds	App.Total	Left	Thru	Right	Peds	App.Total	Left	Thru	Right	Peds	App.Total	Left	Thru	Right	Peds	App.Total	Int.Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	9	111	2	15	137	0	2	18	4	24	1	137	1	3	142	9	0	1	7	17	320
07:15 AM	10	139	4	36	189	1	1	42	17	61	1	122	1	8	132	14	0	5	2	21	403
07:30 AM	29	149	3	40	221	0	0	63	6	69	2	130	0	0	132	9	2	13	0	24	446
07:45 AM	6	128	5	6	145	1	0	47	4	52	8	145	0	0	153	6	0	2	0	8	358
Total Volume	54	527	14	97	692	2	3	170	31	206	12	534	2	11	559	38	2	21	9	70	1527
% App.Total	7.8	78.2	2	14	1	1	1.5	82.5	15		2.1	85.5	0.4	2	54.3	2.9	30	12.9			
PHF	.466	.884	.700	.806	.783	.500	.375	.675	.456	.746	.375	.921	.500	.344	.913	.679	.250	.404	.321	.729	.856

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:PA MD
Counter:D4-5672, D4-5675
Weather:Clear

File Name : KapKai PM
Site Code : 00000003
Start Date : 9/12/2012
Page No : 1

Groups Printed: Unshifted

	Kapolei Parkway Southbound					Kali Oil Street Westbound					Kapolei Parkway Northbound					Kali Oil Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	7	110	14	8	139	2	1	3	9	15	0	86	1	0	87	3	0	1	6	10	251
03:15 PM	9	173	5	7	194	0	1	6	12	19	0	80	1	0	81	0	0	3	4	7	301
03:30 PM	8	160	8	11	187	0	0	10	11	21	3	129	3	0	135	7	0	2	3	12	355
03:45 PM	9	167	6	4	186	0	1	6	6	13	6	111	3	0	120	9	0	2	0	11	330
Total	33	610	33	30	706	2	3	25	38	68	9	406	8	0	423	19	0	8	13	40	1237
04:00 PM	10	153	6	2	171	1	0	8	3	12	1	115	1	3	120	4	0	3	5	12	315
04:15 PM	12	175	12	10	209	0	1	9	10	20	3	93	1	1	98	2	0	1	4	7	334
04:30 PM	10	207	5	5	227	0	0	4	3	7	2	107	2	0	111	6	0	1	4	11	356
04:45 PM	8	210	16	4	238	1	0	7	6	14	4	99	0	0	103	4	0	0	7	11	366
Total	40	745	39	21	845	2	1	28	22	53	10	414	4	4	432	16	0	5	20	41	1371
05:00 PM	11	184	13	3	211	0	0	6	9	15	2	123	1	1	127	7	0	8	5	20	373
05:15 PM	15	190	14	2	221	1	0	8	6	15	1	111	0	0	112	8	0	2	3	13	361
05:30 PM	13	180	11	4	208	1	0	8	10	19	5	93	0	0	102	10	2	1	1	5	334
05:45 PM	13	151	7	1	172	0	0	6	14	20	3	84	0	1	88	10	0	3	4	17	297
Total	52	705	45	10	812	2	0	28	39	69	11	415	1	2	429	26	2	14	13	55	1365
Grand Total	125	2060	117	61	2363	6	4	81	99	190	30	1235	13	6	1284	61	2	27	46	136	3973
Approach %	5.3	87.2	5	2.6		3.2	2.1	42.6	52.1		2.3	96.2	1	0.5		44.9	1.5	19.9	33.8		
Total %	3.1	51.8	2.9	1.5	59.5	0.2	0.1	2	2.5	4.8	0.8	31.1	0.3	0.2	32.3	1.5	0.1	0.7	1.2	3.4	

	Kapolei Parkway Southbound				Kali Oli Street Westbound				Kapolei Parkway Northbound				Kali Oli Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	10	207	5	222	0	0	4	4	2	107	2	111	6	0	1	7	344
04:45 PM	8	210	16	234	1	0	7	8	4	99	0	103	4	0	0	4	349
05:00 PM	11	184	13	208	0	0	6	6	2	123	1	126	7	0	8	15	355
05:15 PM	15	190	14	219	1	0	8	9	1	111	0	112	8	0	2	10	350
Total Volume	44	791	48	883	2	0	25	27	9	440	3	452	25	0	11	36	1398
% App. Total	5	89.6	5.4		7.4	0	92.6		2	97.3	0.7		69.4	0	30.6		
PHF	.733	.942	.750	.943	.500	.000	.781	.750	.563	.894	.375	.897	.781	.000	.344	.600	.985

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MN
Counter:D4-3890, D4-5673
Weather:Clear

File Name : FtWeaKeo AM
Site Code : 00000001
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

	Ft. Weaver Road Southbound					Hanakahi Street Westbound					Ft. Weaver Road Northbound					Keolu Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	14	67	17	0	98	6	18	70	2	96	8	167	2	1	178	93	2	5	0	100	472
06:15 AM	28	123	28	0	179	0	15	79	2	96	11	174	2	8	195	84	1	6	2	93	563
06:30 AM	34	103	36	0	173	2	17	75	4	98	16	154	2	5	177	90	12	6	2	110	558
06:45 AM	39	174	38	0	251	1	21	57	5	84	13	186	0	12	211	92	10	15	5	122	668
Total	115	467	119	0	701	9	71	281	13	374	48	681	6	26	761	359	25	32	9	425	2261
07:00 AM	38	204	30	0	272	4	17	76	14	111	19	219	2	9	249	73	22	15	0	110	742
07:15 AM	42	258	57	0	357	3	24	82	20	129	30	228	2	5	265	76	29	36	1	142	893
07:30 AM	39	289	76	0	404	2	29	74	11	116	27	238	7	9	281	124	37	42	5	208	1009
07:45 AM	31	185	34	0	250	1	30	84	8	123	35	269	1	5	310	97	19	27	2	145	828
Total	150	936	197	0	1283	10	100	316	53	479	111	954	12	28	1105	370	107	120	8	605	3472
08:00 AM	23	131	23	0	177	1	15	79	1	96	11	264	0	3	278	70	9	12	3	94	645
08:15 AM	19	109	26	0	154	1	12	62	0	75	9	143	5	1	158	54	9	11	4	78	465
08:30 AM	23	106	22	0	151	0	14	64	1	79	2	146	1	1	150	45	3	9	0	57	437
08:45 AM	24	90	31	0	145	1	7	45	1	54	2	139	4	4	149	37	7	14	2	60	408
Total	89	436	102	0	627	3	48	250	3	304	24	692	10	9	735	206	28	46	9	289	1955
Grand Total	354	1839	418	0	2611	22	219	847	69	1157	183	2327	28	63	2601	935	160	198	26	1319	7688
Approach %	13.6	70.4	16	0		1.9	18.9	73.2	6		7	89.5	1.1	2.4		70.9	12.1	15	2		
Total %	4.6	23.9	5.4	0	34	0.3	2.8	11	0.9	15	2.4	30.3	0.4	0.8	33.8	12.2	2.1	2.6	0.3	17.2	

	Ft. Weaver Road Southbound				Hanakahi Street Westbound				Ft. Weaver Road Northbound				Keoneula Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	38	204	30	272	4	17	76	97	19	219	2	240	73	22	15	110	719
07:15 AM	42	258	57	357	3	24	82	109	30	228	2	250	76	29	36	141	867
07:30 AM	39	289	76	404	2	29	74	105	27	238	7	272	124	37	42	203	984
07:45 AM	31	185	34	250	1	30	84	115	35	269	1	305	97	19	27	143	813
Total Volume	150	936	197	1283	10	100	316	426	111	954	12	1077	370	107	120	597	3383
% App. Total	11.7	73	15.4		2.3	23.5	74.2		10.3	88.6	1.1		62	17.9	20.1		
PHF	.893	.810	.648	.794	.625	.833	.940	.926	.793	.887	.429	.883	.746	.723	.714	.735	.866

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MN
Counter::D4-3890, D4-5673
Weather:Clear

File Name : FtWeaKeo PM
Site Code : 00000001
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

	Ft. Weaver Road Southbound					Hanskahli Street Westbound					Ft. Weaver Road Northbound					Keoneula Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App.Total	Left	Thru	Right	Peds	App.Total	Left	Thru	Right	Peds	App.Total	Left	Thru	Right	Peds	App.Total	Int.Total
03:00 PM	72	205	49	0	326	2	8	44	4	58	10	192	0	0	202	38	22	15	2	77	663
03:15 PM	64	200	37	0	301	2	10	47	10	69	17	140	1	7	165	54	24	26	0	104	639
03:30 PM	60	205	57	0	322	2	9	49	6	66	15	172	3	8	198	92	18	16	9	135	721
03:45 PM	69	210	46	0	325	2	17	51	3	73	18	172	1	3	194	57	18	22	3	100	692
Total	265	820	189	0	1274	8	44	191	23	266	60	676	5	18	759	241	82	79	14	416	2715
04:00 PM	82	251	70	0	403	1	18	39	3	61	10	197	2	0	209	36	26	27	1	90	763
04:15 PM	90	250	58	0	398	6	18	55	0	79	17	182	1	4	204	45	20	15	1	81	762
04:30 PM	78	211	56	0	345	1	18	58	2	79	12	186	1	4	203	52	16	21	0	89	716
04:45 PM	83	194	55	0	312	1	19	42	4	66	14	130	1	7	152	51	28	21	0	100	630
Total	313	906	259	0	1458	9	73	194	9	285	53	695	5	15	768	184	90	84	2	360	2871
05:00 PM	77	224	65	0	366	1	10	41	1	53	13	131	2	1	147	47	31	24	3	105	678
05:15 PM	82	224	67	0	373	0	9	55	4	68	11	157	4	1	173	47	24	21	2	94	701
05:30 PM	66	275	61	0	402	6	20	52	8	86	11	158	3	6	178	38	18	10	5	73	737
05:45 PM	70	213	52	0	335	2	10	44	4	60	7	147	5	10	169	35	15	12	1	53	617
Total	295	936	245	0	1476	9	49	192	17	267	42	593	14	18	667	157	88	67	11	323	2737
Grand Total	773	2662	673	0	4208	26	166	577	49	818	155	1964	24	51	2194	582	260	230	27	1099	8319
Approch %	20.7	63.3	16	0		3.2	20.3	70.5	6		7.1	89.5	1.1	2.3		5.3	23.7	20.9	2.5		
Total %	10.5	32	8.1	0	50.6	1.3	2	6.9	0.6	9.8	1.9	23.6	0.3	0.6	26.4	7	3.1	2.8	0.3	13.2	

	Ft. Weaver Road Southbound				Hanakahi Street Westbound				Ft. Weaver Road Northbound				Keolu Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	69	210	46	325	2	17	51	70	18	172	1	191	57	18	22	97	683
04:00 PM	82	251	70	403	1	16	39	58	10	197	2	209	36	26	27	89	759
04:15 PM	90	250	58	398	6	16	55	79	17	182	1	200	45	20	15	80	757
04:30 PM	78	211	56	345	1	16	58	77	12	186	1	199	52	16	21	89	710
Total Volume	319	922	230	1471	10	71	203	284	57	737	5	799	190	80	85	355	2909
% App. Total	21.7	62.7	15.6		3.5	25	71.5		7.1	92.2	0.6		53.5	22.5	23.9		
PHF	.886	.918	.821	.913	.417	.966	.875	.899	.792	.935	.625	.956	.833	.769	.787	.915	.956

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:TO
Counter:T-1841
Weather:Clear

File Name : KeoKai AM Parking Lot Driveway
Site Code : 00000004
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

	School Driveway Southbound					Keoneula Boulevard Westbound					Northbound	Eastbound	Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	App. Total	
Start Time													
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	3	0	3	0	0	3
06:30 AM	0	0	0	2	2	0	0	2	0	2	0	0	4
06:45 AM	0	0	2	1	3	0	0	5	0	5	0	0	8
Total	0	0	2	3	5	0	0	10	0	10	0	0	15
07:00 AM	0	0	3	6	9	0	0	9	0	9	0	0	18
07:15 AM	0	0	3	0	3	0	0	13	0	13	0	0	16
07:30 AM	0	0	20	9	29	0	0	67	0	67	0	0	96
07:45 AM	0	0	35	0	35	0	0	15	0	15	0	0	50
Total	0	0	61	15	76	0	0	104	0	104	0	0	180
08:00 AM	0	0	4	0	4	0	0	5	0	5	0	0	9
08:15 AM	0	0	1	2	3	0	1	0	0	1	0	0	4
08:30 AM	0	0	0	0	0	0	0	2	0	2	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	5	2	7	0	1	7	0	8	0	0	15
Grand Total	0	0	68	20	88	0	1	121	0	122	0	0	210
Approach %	0	0	77.3	22.7		0	0.8	99.2	0				
Total %	0	0	32.4	9.5	41.9	0	0.5	57.6	0	58.1	0	0	

	School Driveway Southbound				Keoneula Boulevard Westbound				Northbound	Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:00 AM											
07:00 AM	0	0	3	3	0	0	9	9	0	0	12
07:15 AM	0	0	3	3	0	0	13	13	0	0	16
07:30 AM	0	0	20	20	0	0	67	67	0	0	87
07:45 AM	0	0	35	35	0	0	15	15	0	0	50
Total Volume	0	0	61	61	0	0	104	104	0	0	165
% App. Total	0	0	100		0	0	100				
PHF	.000	.000	.436	.436	.000	.000	.388	.388	.000	.000	.474

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: RJ, EV
Counter: TU-0653, TU-0652
Weather: Clear

File Name : KeoKai AM
Site Code : 00000004
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kalieloleo Street Southbound					Keoneula Boulevard Westbound					Kalieloleo Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	5	0	4	2	11	9	33	7	0	49	6	2	53	1	62	2	36	1	0	39	161
06:15 AM	7	0	4	0	11	11	35	7	0	53	4	4	51	4	63	5	37	2	1	45	172
06:30 AM	9	0	9	5	23	20	37	17	1	75	6	3	48	2	59	8	49	3	5	65	222
06:45 AM	14	8	9	5	36	14	32	26	5	77	7	13	62	4	86	21	49	1	6	77	276
Total	35	8	26	12	81	54	137	57	6	254	23	22	214	11	270	36	171	7	12	226	831
07:00 AM	23	6	16	2	47	8	48	14	2	72	21	19	49	24	113	22	47	4	24	97	329
07:15 AM	34	9	25	14	82	8	58	42	16	124	21	27	51	20	119	29	55	1	48	133	458
07:30 AM	41	27	48	26	142	7	70	62	31	170	38	53	90	35	217	27	63	14	77	181	710
07:45 AM	33	25	35	11	104	17	55	29	5	106	40	16	54	6	116	30	52	9	19	110	436
Total	131	67	124	53	375	40	231	147	54	472	121	115	244	85	565	108	217	28	168	521	1933
08:00 AM	17	3	6	4	30	16	30	11	2	59	11	6	41	3	61	8	35	6	9	58	208
08:15 AM	5	2	4	3	14	7	23	10	4	44	5	2	41	2	50	6	34	7	0	47	155
08:30 AM	4	2	9	1	16	10	26	8	0	44	7	2	25	4	38	8	24	7	10	49	147
08:45 AM	9	3	5	1	18	8	22	8	0	38	4	2	23	0	29	3	28	4	1	36	121
Total	35	10	24	9	78	41	101	37	6	185	27	12	130	9	178	25	121	24	20	190	631
Grand Total	201	85	174	74	534	135	469	241	66	911	171	149	588	105	1013	169	509	59	200	937	3395
Approch %	37.6	15.9	32.6	13.9		14.8	51.5	26.5	7.2		16.9	14.7	58	10.4		18	54.3	6.3	21.3		
Total %	5.9	2.5	5.1	2.2	15.7	4	13.8	7.1	1.9	26.8	5	4.4	17.3	3.1	29.8	5	15	1.7	5.9	27.6	

Start Time	Kalieloleo Street Southbound					Keoneula Boulevard Westbound					Kalieloleo Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	23	6	16	2	47	8	48	14	2	70	21	19	49	24	113	22	47	4	24	97	277
07:15 AM	34	9	25	14	82	8	58	42	16	124	21	27	51	20	119	29	55	1	48	133	380
07:30 AM	41	27	48	26	142	7	70	62	31	170	38	53	90	35	217	27	63	14	77	181	541
07:45 AM	33	25	35	11	104	17	55	29	5	106	40	16	54	6	116	30	52	9	19	110	395
Total Volume	131	67	124	53	375	40	231	147	54	472	121	115	244	85	565	108	217	28	168	521	1573
% App. Total	40.7	20.8	38.5			9.6	55.3	35.2			25.2	24	50.8			30.6	61.5	7.9			
PHF	.799	.620	.646		.694	.588	.625	.593		.752	.756	.542	.678		.659	.900	.861	.500		.849	.727

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: RJ, EV
Counter: TU-0653, TU-0652
Weather: Clear

File Name : KeoKai PM
Site Code : 00000004
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kalieloleo Street Southbound					Keoneula Boulevard Westbound					Kalieloleo Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	13	2	8	0	23	20	26	19	0	65	9	5	23	0	37	9	50	7	0	66	191
03:15 PM	19	7	14	0	40	33	23	9	0	65	8	4	22	0	34	11	63	8	4	86	225
03:30 PM	18	8	12	4	42	30	36	11	2	79	9	8	35	2	54	7	68	10	6	91	266
03:45 PM	16	9	16	4	45	26	48	20	1	95	11	6	25	5	47	7	61	13	4	85	272
Total	66	26	50	8	150	109	133	59	3	304	37	23	105	7	172	34	242	38	14	328	954
04:00 PM	17	8	14	0	39	39	41	16	2	98	8	5	21	4	38	7	45	11	0	63	238
04:15 PM	18	9	22	1	50	39	41	14	2	96	10	8	20	1	39	11	43	11	2	67	252
04:30 PM	24	9	16	1	50	39	35	18	0	92	10	6	20	1	37	6	40	9	9	64	243
04:45 PM	13	11	6	3	33	31	39	16	3	89	7	4	28	3	42	8	54	12	0	74	238
Total	72	37	58	5	172	148	156	64	7	375	35	23	89	9	156	32	182	43	11	268	971
05:00 PM	20	7	17	1	45	34	33	19	1	87	11	8	26	1	46	6	54	13	5	78	256
05:15 PM	19	10	10	2	41	37	32	20	3	92	12	4	19	2	37	7	53	19	9	88	258
05:30 PM	6	10	5	0	21	45	46	6	2	99	7	1	20	4	32	2	42	11	7	62	214
05:45 PM	6	1	9	8	24	38	28	3	5	74	8	3	14	5	30	2	31	10	3	46	174
Total	51	28	41	11	131	154	139	48	11	352	38	16	79	12	145	17	180	53	24	274	902
Grand Total	189	91	149	24	453	411	428	171	21	1031	110	62	273	28	473	83	604	134	49	870	2827
Approch %	41.7	20.1	32.9	5.3		39.9	41.5	16.6	2		23.3	13.1	57.7	5.9		9.5	69.4	15.4	5.6		
Total %	6.7	3.2	5.3	0.8	16	14.5	15.1	6	0.7	36.5	3.9	2.2	9.7	1	16.7	2.9	21.4	4.7	1.7	30.8	

Start Time	Kalieloleo Street Southbound					Keoneula Boulevard Westbound					Kalieloleo Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	18	8	12	38	30	36	11	77	9	8	35	52	7	68	10	85					252
03:45 PM	16	9	16	41	26	48	20	94	11	6	25	42	7	61	13	81					258
04:00 PM	17	8	14	39	39	41	16	96	8	5	21	34	7	45	11	63					232
04:15 PM	18	9	22	49	39	41	14	94	10	8	20	38	11	43	11	65					246
Total Volume	69	34	64	167	134	166	61	361	38	27	101	166	32	217	45	294					986
% App. Total	41.3	20.4	38.3			37.1	46	16.9			22.9	16.3	60.8			10.9	73.8	15.3			
PHF	.958	.944	.727	.852	.859	.865	.763	.940		.864	.844	.721	.798		.727	.798	.865		.865		.957

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL
Counter: TU-0651
Weather: Clear

File Name : KeoKai AM
Site Code : 00000001
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																	
	Kaipalaoa Street Southbound					Keoneula Boulevard Westbound					Northbound	Keoneula Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	8	0	0	0	8	0	27	4	0	31	0	0	0	0	0	0	39
06:15 AM	11	0	1	0	12	0	38	2	0	40	0	1	0	0	0	1	53
06:30 AM	12	0	0	0	12	0	38	4	0	42	0	1	0	0	0	1	55
06:45 AM	8	0	0	0	8	0	39	3	0	42	0	0	0	0	0	0	50
Total	39	0	1	0	40	0	142	13	0	155	0	2	0	0	0	2	197
07:00 AM	15	0	1	0	16	0	54	11	0	65	0	1	0	0	0	1	82
07:15 AM	12	0	0	0	12	0	70	30	0	100	0	0	0	0	0	0	112
07:30 AM	38	0	0	0	38	0	83	61	0	144	0	3	0	0	0	3	185
07:45 AM	9	0	2	0	11	0	94	48	0	142	0	2	0	0	0	2	155
Total	74	0	3	0	77	0	301	150	0	451	0	6	0	0	0	6	534
08:00 AM	5	0	0	0	5	0	66	17	0	83	0	2	0	0	0	2	90
08:15 AM	6	0	2	0	8	0	42	0	0	43	0	0	0	0	0	0	51
08:30 AM	9	0	0	0	9	0	35	4	0	39	0	0	0	0	0	0	48
08:45 AM	1	0	0	0	1	0	29	4	0	33	0	2	0	0	0	2	42
Total	21	0	2	0	23	0	172	26	0	198	0	4	0	0	0	4	231
Grand Total	134	0	6	0	140	0	615	189	0	804	0	12	0	0	0	12	962
Apprch %	91.8	0	4.1	0		0	76.5	23.5	0		0	100	0	0	0		
Total %	13.9	0	0.6	0	15.2	0	63.9	19.6	0	83.6	0	1.2	0	0	0	1.2	

	Kaipalaoa Street Southbound					Keoneula Boulevard Westbound					Northbound	Keoneula Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	12	0	0	0	12	0	70	30	0	100	0	0	0	0	0	0	112
07:30 AM	38	0	0	0	38	0	83	61	0	144	0	3	0	0	0	3	185
07:45 AM	9	0	2	0	11	0	94	48	0	142	0	2	0	0	0	2	155
08:00 AM	5	0	0	0	5	0	66	17	0	83	0	2	0	0	0	2	90
Total Volume	64	0	2	0	66	0	313	156	0	469	0	7	0	0	0	7	542
% App. Total	97	0	3	0		0	66.7	33.3	0		0	100	0	0	0		
PHF	.421	.000	.250		.434	.000	.802	.639		.814	.000	.583	.000	.000		.583	.732

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL
Counter: TU-0651
Weather: Clear

File Name : KeoKai PM
Site Code : 00000001
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																	
	Kaipalaoa Street Southbound					Keoneula Street Westbound					Northbound	Keoneula Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	5	0	0	0	5	0	30	3	0	33	0	0	0	0	0	0	38
03:15 PM	7	0	0	2	9	0	29	7	0	36	0	2	0	0	0	2	47
03:30 PM	4	0	0	2	6	0	47	8	0	55	0	0	0	0	0	0	61
03:45 PM	2	0	1	1	4	0	31	10	0	41	0	0	0	0	0	0	45
Total	18	0	1	5	24	0	137	28	0	165	0	2	0	0	0	2	191
04:00 PM	4	0	0	0	4	0	52	6	0	58	0	1	0	0	0	1	63
04:15 PM	7	0	0	1	8	0	52	10	0	62	0	1	0	0	0	1	71
04:30 PM	8	0	0	1	9	0	50	7	0	57	0	2	0	0	0	2	68
04:45 PM	5	0	2	0	7	0	37	8	0	45	0	1	0	0	0	1	53
Total	24	0	2	2	28	0	191	31	0	222	0	5	0	0	0	5	255
05:00 PM	7	0	1	1	9	0	47	10	0	57	0	0	0	0	0	0	66
05:15 PM	4	0	0	5	9	0	38	11	0	49	0	2	0	0	0	2	60
05:30 PM	6	0	0	6	12	0	53	7	0	60	0	1	0	0	0	1	73
05:45 PM	5	0	1	9	15	0	24	6	0	30	0	0	0	0	0	0	45
Total	22	0	2	21	45	0	162	34	0	196	0	3	0	0	0	3	244
Grand Total	64	0	5	28	97	0	490	93	0	583	0	10	0	0	0	10	690
Apprch %	66	0	5.2	28.9		0	84	16	0		0	100	0	0	0		
Total %	9.3	0	0.7	4.1	14.1	0	71	13.5	0	84.5	0	1.4	0	0	0	1.4	

	Kaipalaoa Street Southbound					Keoneula Street Westbound					Northbound	Keoneula Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	7	0	0	0	7	0	52	10	0	62	0	1	0	0	0	1	70
04:30 PM	8	0	0	0	8	0	50	7	0	57	0	2	0	0	0	2	67
04:45 PM	5	0	2	7	14	0	37	8	0	45	0	1	0	0	0	1	53
05:00 PM	7	0	1	8	16	0	47	10	0	57	0	0	0	0	0	0	65
Total Volume	27	0	3	23	53	0	186	35	0	221	0	4	0	0	0	4	255
% App. Total	90	0	10			0	84.2	15.8			0	100	0	0			
PHF	.844	.000	.375		.938	.000	.894	.875		.891	.000	.500	.000	.000		.500	.911

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MN
Counter:D4-5676, D4-5677
Weather:Clear

File Name : KapKeo AM
Site Code : 00000002
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway Southbound					Keoneula Boulevard Westbound					Kapolei Parkway Northbound					Keoneula Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	10	25	10	2	47	0	5	25	4	34	4	61	6	0	71	21	24	2	2	49	201
06:15 AM	8	32	35	2	77	2	10	23	3	48	6	73	11	0	90	28	21	1	2	52	257
06:30 AM	18	33	41	4	96	0	11	24	8	43	12	77	8	1	98	12	18	9	4	43	280
06:45 AM	26	61	32	4	123	2	5	28	5	40	6	69	7	4	86	22	24	5	5	56	305
Total	62	151	118	12	343	4	31	100	20	155	28	280	32	5	345	83	87	17	13	200	1043
07:00 AM	35	55	17	10	117	2	7	46	10	65	12	63	7	4	86	21	21	13	17	72	340
07:15 AM	47	86	11	15	159	4	8	48	18	78	14	56	2	14	86	27	23	22	46	118	441
07:30 AM	50	100	10	20	180	7	12	55	15	89	10	40	10	7	67	26	24	30	29	109	445
07:45 AM	30	97	28	9	164	9	13	59	12	93	12	55	6	3	76	32	16	11	7	66	399
Total	162	338	66	54	620	22	40	208	55	325	48	214	25	28	315	106	84	76	99	365	1625
08:00 AM	28	44	11	7	90	5	15	69	3	92	10	89	12	0	111	14	14	1	2	31	324
08:15 AM	15	65	18	11	109	2	7	41	5	55	4	76	4	5	89	14	10	5	1	30	283
08:30 AM	18	49	12	1	80	3	6	23	4	36	7	60	4	0	71	22	13	8	1	44	231
08:45 AM	20	39	14	5	78	3	9	27	5	44	7	49	7	7	70	16	14	4	3	37	229
Total	81	197	55	24	357	13	37	160	17	227	28	274	27	12	341	66	51	18	7	142	1067
Grand Total	305	686	239	90	1320	39	108	468	92	707	104	768	84	45	1001	255	222	111	119	707	3735
Apprch %	23.1	52	18.1	6.8		5.5	15.3	66.2	13		10.4	76.7	8.4	4.5		36.1	31.4	15.7	16.8		
Total %	8.2	18.4	6.4	2.4	35.3	1	2.9	12.5	2.5	18.9	2.8	20.6	2.2	1.2	26.8	6.8	5.9	3	3.2	18.9	

	Kapolei Parkway Southbound				Keoneula Boulevard Westbound				Kapolei Parkway Northbound				Keoneula Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	47	86	11	144	4	8	48	60	14	56	2	72	27	23	22	72	348
07:30 AM	50	100	10	160	7	12	55	74	10	40	10	60	26	24	30	80	374
07:45 AM	30	97	28	155	9	13	59	81	12	55	6	73	32	16	11	59	368
08:00 AM	28	44	11	83	5	15	69	89	10	89	12	111	14	14	1	29	312
Total Volume	155	327	60	542	25	48	231	304	46	240	30	316	99	77	64	240	1402
% App. Total	28.6	60.3	11.1		8.2	15.8	76		14.6	75.9	9.5		41.2	32.1	26.7		
PHF	.775	.818	.536	.847	.694	.800	.837	.854	.821	.674	.625	.712	.773	.802	.533	.750	.937

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MN
Counter:D4-5676, D4-5677
Weather:Clear

File Name : KapKeo PM
Site Code : 00000002
Start Date : 9/12/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway Southbound					Keoneula Boulevard Westbound					Kapolei Parkway Northbound					Keoneula Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	23	80	21	1	125	5	6	21	1	33	7	55	2	1	65	16	15	13	5	49	272
03:15 PM	39	96	34	2	171	1	9	17	5	32	7	49	6	0	62	13	25	22	5	65	330
03:30 PM	31	93	26	2	154	4	11	33	1	49	9	83	4	1	97	28	50	13	1	92	392
03:45 PM	47	96	37	1	181	3	5	22	2	32	5	78	4	4	91	18	25	8	0	51	355
Total	140	365	120	6	631	13	31	93	9	146	28	265	16	6	315	75	115	56	11	257	1349
04:00 PM	44	87	26	1	158	3	3	45	2	53	4	73	3	1	81	11	14	4	3	32	324
04:15 PM	47	95	29	2	173	10	10	31	1	52	7	60	5	1	73	8	14	6	1	29	327
04:30 PM	45	125	31	0	201	9	11	36	0	56	10	72	2	1	85	9	10	2	4	25	367
04:45 PM	35	133	43	2	213	5	10	23	3	41	1	72	2	0	75	14	10	7	5	36	365
Total	171	440	129	5	745	27	34	135	6	202	22	277	12	3	314	42	48	19	13	122	1383
05:00 PM	43	116	42	4	205	5	12	29	2	48	6	80	7	0	93	16	12	7	4	39	385
05:15 PM	35	115	37	7	194	1	8	30	1	40	6	74	7	2	89	15	10	6	3	34	357
05:30 PM	44	95	38	5	182	10	15	30	8	63	8	65	6	1	80	6	8	3	1	18	343
05:45 PM	30	83	39	3	165	2	8	15	9	34	5	60	3	1	69	14	12	0	6	32	300
Total	152	419	156	19	746	18	43	104	20	185	25	279	23	4	331	51	42	16	14	123	1385
Grand Total	463	1224	405	30	2122	58	108	332	35	533	75	821	51	13	960	168	205	91	38	502	4117
Apprch %	21.8	57.7	19.1	1.4		10.9	20.3	62.3	6.6		7.8	85.5	5.3	1.4		33.5	40.8	18.1	7.6		
Total %	11.2	29.7	9.8	0.7	51.5	1.4	2.6	8.1	0.9	12.9	1.8	19.9	1.2	0.3	23.3	4.1	5	2.2	0.9	12.2	

	Kapolei Parkway Southbound					Keoneula Boulevard Westbound					Kapolei Parkway Northbound					Keoneula Boulevard Eastbound					
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	45	125	31	201		9	11	36	56		10	72	2	84		9	10	2	21	362	
04:45 PM	35	133	43	211		5	10	23	38		1	72	2	75		14	10	7	31	355	
05:00 PM	43	116	42	201		5	12	29	46		6	80	7	93		16	12	7	35	375	
05:15 PM	35	115	37	187		1	8	30	39		6	74	7	87		15	10	6	31	344	
Total Volume	158	489	153	800		20	41	118	179		23	296	16	339		54	42	22	118	1436	
% App. Total	19.8	61.1	19.1			11.2	22.9	65.9			6.8	87.9	5.3			45.8	35.6	18.6			
PHF	.878	.919	.890	.948		.556	.854	.819	.799		.575	.931	.843	.911		.844	.875	.786	.843	.957	

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MO
Counter:D4-5673, D4-5671
Weather:Clear

File Name : KeoKai AM
Site Code : 00000001
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted																	
	Ka'oli Street From North					Keoneula Boulevard From East					From South	Keoneula Boulevard From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		App. Total	Right	Thru	Left	Peds	
06:00 AM	0	0	0	4	4	1	22	0	0	23	0	0	48	0	0	48	75
06:15 AM	2	0	0	5	7	0	45	0	0	45	0	0	38	0	0	38	90
06:30 AM	0	0	0	6	6	0	60	0	0	60	0	0	48	0	0	48	114
06:45 AM	0	0	0	2	2	1	34	0	0	35	0	0	51	0	0	51	88
Total	2	0	0	17	19	2	161	0	0	163	0	0	185	0	0	185	367
07:00 AM	0	0	0	5	5	1	47	0	0	48	0	0	55	0	0	55	108
07:15 AM	0	0	0	14	14	3	21	0	0	24	0	0	90	0	0	90	128
07:30 AM	0	0	0	10	10	1	35	0	0	36	0	0	85	0	0	85	131
07:45 AM	0	0	0	5	5	2	46	0	0	48	0	0	54	0	0	54	107
Total	0	0	0	34	34	7	149	0	0	156	0	0	284	0	0	284	474
08:00 AM	0	0	0	7	7	0	39	0	0	39	0	0	30	0	0	30	76
08:15 AM	1	0	0	4	5	3	30	0	0	33	0	0	19	0	0	19	57
08:30 AM	0	0	0	1	1	1	15	0	0	16	0	0	35	0	0	35	52
08:45 AM	0	0	0	1	1	0	30	0	0	30	0	0	28	0	0	28	59
Total	1	0	0	13	14	4	114	0	0	118	0	0	112	0	0	112	244
Grand Total	3	0	0	64	67	13	424	0	0	437	0	0	581	0	0	581	1085
Approch %	4.5	0	0	95.5		3	97	0	0			0	100	0	0		
Total %	0.3	0	0	5.9	6.2	1.2	39.1	0	0	40.3	0	0	53.5	0	0	53.5	

Start Time	Ka'oli Street From North					Keoneula Boulevard From East					From South	Keoneula Boulevard From West					Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	App. Total	Right		Thru	Left	App. Total			
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	1	47	0	48	0	0	55	0	55	103			
07:15 AM	0	0	0	0	3	21	0	24	0	0	90	0	90	114			
07:30 AM	0	0	0	0	1	35	0	36	0	0	85	0	85	121			
07:45 AM	0	0	0	0	2	46	0	48	0	0	54	0	54	102			
Total Volume	0	0	0	0	7	149	0	156	0	0	284	0	284	440			
% App. Total	0	0	0	0	4.5	95.5	0			0	100	0					
PHF	.000	.000	.000	.000	.563	.793	.000	.613	.000	.000	.789	.000	.789	.909			

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:00 AM

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MO
Counter:D4-5673, D4-5671
Weather:Clear

File Name : KeoKai PM
Site Code : 00000001
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted																	
	Ka'oli Street From North					Keoneula Boulevard From East					From South	Keoneula Boulevard From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	0	0	0	1	1	1	31	0	0	32	0	0	53	0	0	53	86
03:15 PM	0	0	0	0	0	0	48	0	0	48	0	0	76	0	0	76	124
03:30 PM	1	0	0	1	2	0	47	0	0	47	0	0	101	0	0	101	150
03:45 PM	2	0	0	2	4	1	59	0	0	60	0	0	48	0	0	48	112
Total	3	0	0	4	7	2	185	0	0	187	0	0	278	0	0	278	472
04:00 PM	2	0	0	4	6	1	39	0	0	40	0	0	47	0	0	47	93
04:15 PM	0	0	0	3	3	2	42	0	0	44	0	0	36	0	0	36	83
04:30 PM	1	0	0	4	5	1	48	0	0	49	0	0	42	0	0	42	96
04:45 PM	0	0	0	9	9	3	61	0	0	64	0	0	21	0	0	21	94
Total	3	0	0	20	23	7	190	0	0	197	0	0	146	0	0	146	366
05:00 PM	0	0	0	8	8	1	50	0	0	51	0	0	28	0	0	28	87
05:15 PM	0	0	0	9	9	0	40	0	0	40	0	0	35	0	0	35	84
05:30 PM	0	0	0	1	1	1	65	0	0	66	0	0	38	0	0	38	105
05:45 PM	0	0	0	11	11	2	37	0	0	39	0	0	29	0	0	29	79
Total	0	0	0	29	29	4	192	0	0	196	0	0	130	0	0	130	355
Grand Total	6	0	0	53	59	13	567	0	0	580	0	0	554	0	0	554	1193
Approch %	10.2	0	0	89.8		2.2	97.8	0	0			0	100	0	0		
Total %	0.5	0	0	4.4	4.9	1.1	47.5	0	0	48.6	0	0	46.4	0	0	46.4	

		Ka'oli Street From North				Keoneula Boulevard From East				From South	Keoneula Boulevard From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	App. Total	Right	Thru	Left	App. Total	Int. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1															
Peak Hour for Entire Intersection Begins at 03:15 PM															
03:15 PM	0	0	0	0	0	48	0	48	0	0	76	0	76	124	
03:30 PM	1	0	0	1	0	47	0	47	0	0	101	0	101	149	
03:45 PM	2	0	0	2	1	59	0	60	0	0	48	0	48	110	
04:00 PM	2	0	0	2	1	39	0	40	0	0	47	0	47	89	
Total Volume	5	0	0	5	2	193	0	195	0	0	272	0	272	472	
% App. Total	100	0	0		1	99	0			0	100	0			
PHF	.625	.000	.000	.625	.500	.818	.000	.813	.000	.000	.673	.000	.673	.792	

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 03:15 PM

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RJ
Counter:D4-3890
Weather:Clear

File Name : KeoKam AM
Site Code : 00000002
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakana Street Southbound					Keoneula Boulevard Westbound					Kamakana Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	34	1	1	3	39	2	14	7	3	26	0	0	9	0	9	0	9	0	0	9	83
06:15 AM	20	0	0	3	23	4	34	6	0	44	0	0	7	0	7	0	9	0	1	10	84
06:30 AM	32	0	1	2	35	8	39	14	3	64	0	0	7	3	10	0	9	0	1	10	119
06:45 AM	23	1	0	1	25	2	23	7	0	32	1	0	13	3	17	0	14	0	1	15	89
Total	109	2	2	9	122	16	110	34	6	166	1	0	36	6	43	0	41	0	3	44	375
07:00 AM	27	1	0	7	35	13	26	11	2	52	0	1	14	3	18	0	15	0	1	16	121
07:15 AM	57	0	0	5	62	5	11	10	3	29	1	1	19	0	21	0	30	0	0	30	142
07:30 AM	22	1	2	4	29	5	19	5	0	29	0	1	25	0	26	2	23	1	0	26	110
07:45 AM	21	0	1	4	26	9	18	26	1	54	1	0	8	0	9	0	11	0	0	11	100
Total	127	2	3	20	152	32	74	52	6	164	2	3	66	3	74	2	79	1	1	83	473
08:00 AM	11	1	0	0	12	7	18	13	0	38	0	0	6	3	9	1	15	0	2	18	77
08:15 AM	12	0	1	16	29	8	9	16	0	33	0	0	4	5	9	0	12	1	0	13	84
08:30 AM	10	0	0	0	10	2	10	11	2	25	0	1	8	0	9	0	13	0	1	14	58
08:45 AM	14	0	3	3	20	12	12	9	0	33	1	0	8	1	10	0	6	0	0	6	69
Total	47	1	4	19	71	29	49	49	2	129	1	1	26	9	37	1	46	1	3	51	288
Grand Total	283	5	9	48	345	77	233	135	14	459	4	4	128	18	154	3	166	2	7	178	1136
Apprch %	82	1.4	2.6	13.9		16.8	50.8	29.4	3.1		2.6	2.6	83.1	11.7		1.7	93.3	1.1	3.9		
Total %	24.9	0.4	0.8	4.2	30.4	6.8	20.5	11.9	1.2	40.4	0.4	0.4	11.3	1.6	13.6	0.3	14.6	0.2	0.6	15.7	

Start Time	Kamakana Street Southbound					Keoneula Boulevard Westbound					Kamakana Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	27	1	0	0	28	13	26	11	2	52	0	1	14	3	18	0	15	0	0	15	108
07:15 AM	57	0	0	0	57	5	11	10	3	29	1	1	19	0	21	0	30	0	0	30	134
07:30 AM	22	1	2	4	29	5	19	5	0	29	0	1	25	0	26	2	23	1	0	26	106
07:45 AM	21	0	1	4	26	9	18	26	1	54	1	0	8	0	9	0	11	0	0	11	95
Total Volume	127	2	3	132		32	74	52	6	164	2	3	66	3	74	2	79	1	1	83	443
% App. Total	96.2	1.5	2.3			20.3	46.8	32.9			2.6	4.2	93			2.4	96.3	1.2			
PHF	.557	.500	.375		.579	.615	.712	.500		.745	.500	.750	.660		.683	.250	.658	.250		.683	.826

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RJ
Counter:D4-3890
Weather:Clear

File Name : KeoKam PM
Site Code : 00000002
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakana Street Southbound					Keoneula Boulevard Westbound					Kamakana Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	14	1	2	0	17	6	17	13	2	38	0	3	5	0	8	1	32	0	0	33	96
03:15 PM	18	0	0	1	19	12	13	19	0	44	0	1	8	4	13	0	47	0	4	51	127
03:30 PM	25	0	0	0	25	8	15	25	2	50	0	0	7	0	7	2	59	1	0	62	144
03:45 PM	18	0	0	5	23	17	19	26	4	66	0	0	8	2	10	0	23	0	0	23	122
Total	75	1	2	6	84	43	64	83	8	199	0	4	28	6	38	3	161	1	4	169	489
04:00 PM	16	0	0	0	16	13	7	22	0	42	1	0	8	1	10	0	15	1	1	17	85
04:15 PM	19	1	1	5	26	6	12	23	0	41	0	0	4	0	4	1	14	0	0	15	86
04:30 PM	15	1	1	0	17	20	12	24	2	58	0	1	7	0	8	2	12	0	0	14	97
04:45 PM	11	0	0	7	18	7	12	34	1	54	2	2	4	2	10	0	7	0	4	11	93
Total	61	2	2	12	77	46	43	103	3	195	3	3	23	3	32	3	48	1	5	57	361
05:00 PM	9	0	0	9	18	8	13	35	2	58	0	0	4	0	4	0	12	0	2	14	94
05:15 PM	14	0	1	2	17	7	9	24	2	42	0	0	4	0	4	0	15	3	1	19	82
05:30 PM	16	1	0	0	17	9	13	35	2	59	0	0	6	2	8	0	13	2	0	15	99
05:45 PM	12	0	0	5	17	17	15	14	1	47	1	1	10	5	17	0	11	1	7	19	100
Total	51	1	1	16	69	41	50	108	7	206	1	1	24	7	33	0	51	6	10	67	375
Grand Total	187	4	5	34	230	130	157	294	18	599	4	8	75	16	103	6	260	8	19	293	1225
Apprch %	81.3	1.7	2.2	14.8		21.7	26.2	49.1	3		3.9	7.8	72.8	15.5		2	88.7	2.7	6.5		
Total %	15.3	0.3	0.4	2.8	18.8	10.6	12.8	24	1.5	48.9	0.3	0.7	6.1	1.3	8.4	0.5	21.2	0.7	1.6	23.9	

Start Time	Kamakana Street Southbound					Keoneula Boulevard Westbound					Kamakana Street Northbound					Keoneula Boulevard Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	14	1	2	0	17	6	17	13	2	38	0	3	5	0	8	1	32	0	0	33	94
03:15 PM	18	0	0	1	19	12	13	19	0	44	0	1	8	4	13	0	47	0	4	51	118
03:30 PM	25	0	0	0	25	8	15	25	2	50	0	0	7	0	7	2	59	1	0	62	142
03:45 PM	18	0	0	5	23	17	19	26	4	66	0	0	8	2	10	0	23	0	0	23	111
Total Volume	75	1	2	16	84	43	64	83	8	199	0	4	28	6	38	3	161	1	4	169	465
% App. Total	96.2	1.3	2.6			22.6	33.7	43.7			0	12.5	67.5			1.8	97.6	0.6			
PHF	.750	.250	.250		.780	.632	.842	.798		.766	.000	.333	.875		.889	.375	.682	.250		.665	.819

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RF
Counter:D4-5675
Weather:Clear

File Name : KeoKaw AM
Site Code : 00000003
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted																				
Start Time	Kaiwawalo Street From North					Keoneula Boulevard From East					Kaiwawalo Street From South					Keoneula Boulevard From West				
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total
06:00 AM	1	0	8	0	9	10	4	1	4	19	1	0	0	1	2	0	0	0	0	0
06:15 AM	0	1	6	0	7	13	19	3	4	39	1	1	0	0	2	0	2	1	0	3
06:30 AM	2	2	9	0	13	21	19	1	2	43	2	0	0	0	2	1	0	0	0	1
06:45 AM	0	0	11	1	12	14	7	1	5	27	3	2	0	0	5	1	0	0	0	1
Total	3	3	34	1	41	58	49	6	15	128	7	3	0	1	11	2	2	1	0	5
07:00 AM	0	4	9	0	13	14	6	5	1	26	5	2	2	0	9	1	3	3	0	7
07:15 AM	1	3	24	1	29	6	2	4	2	14	6	2	1	0	9	1	1	3	0	5
07:30 AM	0	2	16	0	18	10	1	4	0	15	2	3	0	0	5	0	1	2	0	3
07:45 AM	0	1	9	1	11	13	1	3	0	17	0	1	0	0	1	0	1	1	0	2
Total	1	10	58	2	71	43	10	16	3	72	13	8	3	0	24	2	6	9	0	17
08:00 AM	2	2	5	1	10	10	2	6	2	20	5	3	2	0	10	0	4	1	0	5
08:15 AM	1	1	6	2	10	4	0	5	6	15	2	3	2	0	7	0	1	1	0	2
08:30 AM	2	2	9	0	13	7	0	3	0	10	2	3	0	0	5	1	1	2	0	4
08:45 AM	3	2	7	0	12	8	1	7	1	17	1	0	1	0	2	0	0	0	0	0
Total	8	7	27	3	45	29	3	21	9	62	10	9	5	0	24	1	6	4	0	11
Grand Total	12	20	119	6	157	130	62	43	27	262	30	20	8	1	59	5	14	14	0	33
Apprch %	7.6	12.7	75.8	3.8		49.6	23.7	16.4	10.3		50.8	33.9	13.6	1.7		15.2	42.4	42.4	0	
Total %	2.3	3.9	23.3	1.2	30.7	25.4	12.1	8.4	5.3	51.3	5.9	3.9	1.6	0.2	11.5	1	2.7	2.7	0	6.5

Groups Printed- Unshifted																				
Start Time	Kaiwawalo Street From North					Keoneula Boulevard From East					Kaiwawalo Street From South					Keoneula Boulevard From West				
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total
06:30 AM	2	2	9	0	13	21	19	1	4	41	2	0	0	0	2	1	0	0	0	1
06:45 AM	0	0	11	1	11	14	7	1	1	22	3	2	0	0	5	1	0	0	0	1
07:00 AM	0	4	9	0	13	14	6	5	2	25	5	2	2	0	9	1	3	3	0	7
07:15 AM	1	3	24	1	29	6	2	4	2	14	6	2	1	0	9	1	1	3	0	5
Total Volume	3	9	53	2	65	55	34	11	10	100	16	6	3	0	25	4	4	6	0	14
% App. Total	4.6	13.8	81.5	0.6		55	34	11	10		64	24	12	0		28.6	28.6	42.9	0	
PHF	.375	.563	.552		.580	.655	.447	.560		.610	.667	.750	.375		.694	1.00	.333	.500		.895

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 06:30 AM

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RF
Counter:D4-5675
Weather:Clear

File Name : KeoKaw PM
Site Code : 00000003
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted																				
Start Time	Kaiwawalo Street From North					Keoneula Boulevard From East					Kaiwawalo Street From South					Keoneula Boulevard From West				
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total
03:00 PM	9	3	17	0	29	7	3	4	0	14	6	1	0	0	7	1	7	3	0	11
03:15 PM	5	0	27	0	32	12	0	2	0	14	6	0	0	0	6	0	11	3	0	14
03:30 PM	1	1	40	0	42	8	2	5	2	17	1	0	0	0	1	0	19	2	0	21
03:45 PM	1	0	14	0	15	10	1	5	0	16	3	1	0	0	4	0	3	1	0	4
Total	16	4	98	0	118	37	6	16	2	61	16	2	0	0	18	1	40	9	0	50
04:00 PM	1	1	10	0	12	4	1	1	1	7	6	0	0	0	6	0	1	0	1	2
04:15 PM	0	0	6	0	6	8	0	5	2	15	6	0	0	0	6	0	0	1	0	1
04:30 PM	0	3	10	0	13	8	1	2	5	16	2	0	0	0	2	0	0	0	0	0
04:45 PM	0	0	3	0	3	13	0	2	0	15	6	0	0	0	6	1	0	0	0	1
Total	1	4	29	0	34	33	2	10	8	53	20	0	0	0	20	1	1	1	1	4
05:00 PM	0	2	7	0	9	6	0	5	0	11	2	0	0	0	2	0	0	0	0	0
05:15 PM	0	0	10	3	13	7	1	3	0	11	11	0	0	0	11	0	0	0	3	3
05:30 PM	0	1	7	0	8	10	0	2	4	16	5	1	0	0	6	0	0	0	0	0
05:45 PM	0	1	5	0	6	13	1	1	3	18	5	1	0	0	6	0	0	0	1	1
Total	0	4	29	3	36	36	2	11	7	56	23	2	0	0	25	0	0	0	4	4
Grand Total	17	12	156	3	188	106	10	37	17	170	59	4	0	0	63	2	41	10	5	58
Apprch %	9	6.4	83	1.6		62.4	5.9	21.8	10		93.7	6.3	0	0		3.4	70.7	17.2	8.6	
Total %	3.5	2.5	32.6	0.6	39.2	22.1	2.1	7.7	3.5	35.5	12.3	0.8	0	0	13.2	0.4	8.6	2.1	1	12.1

Groups Printed- Unshifted																				
Start Time	Kaiwawalo Street From North					Keoneula Boulevard From East					Kaiwawalo Street From South					Keoneula Boulevard From West				
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total
03:00 PM	9	3	17	0	29	7	3	4	0	14	6	1	0	0	7	1	7	3	0	11
03:15 PM	5	0	27	0	32	12	0	2	0	14	6	0	0	0	6	0	11	3	0	14
03:30 PM	1	1	40	0	42	8	2	5	2	15	1	0	0	0	1	0	19	2	0	21
03:45 PM	1	0	14	0	15	10	1	5	0	16	3	1	0	0	4	0	3	1	0	4
Total Volume	16	4	98	0	118	37	6	16	2	61	16	2	0	0	18	1	40	9	0	50
% App. Total	13.6	3.4	83.1	0		62.7	10.2	27.1	10		88.9	11.1	0	0		2	80	18	0	
PHF	.444	.333	.613		.702	.771	.500	.800		.922	.667	.500	.000		.643	.250	.526	.750		.775

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 03:00 PM

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: PA, BD
Counter: D4-5673, D4-5671
Weather: Clear

File Name : KapKek AM
Site Code : 00000004
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted																					
Start Time	Kapolei Parkway Southbound					Kekaiholo Street Westbound					Kapolei Parkway Northbound					Kekaiholo Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	2	20	2	1	25	0	0	4	5	9	4	58	1	3	66	32	0	0	0	32	132
06:15 AM	3	31	1	4	39	0	0	11	7	18	1	58	0	1	60	28	0	3	0	31	148
06:30 AM	1	35	2	3	41	0	0	7	3	10	1	60	0	0	61	22	1	1	0	24	136
06:45 AM	1	43	6	6	56	0	0	3	6	9	0	74	1	2	77	22	0	5	5	32	174
Total	7	129	11	14	161	0	0	25	21	46	6	250	2	6	264	104	1	9	5	119	590
07:00 AM	2	75	7	2	86	0	0	3	11	14	5	71	1	3	80	20	1	4	9	34	214
07:15 AM	4	96	1	1	102	1	12	9	3	25	0	44	0	4	48	18	5	14	7	44	219
07:30 AM	7	122	11	0	140	0	1	3	5	9	7	61	5	0	73	4	7	24	2	37	259
07:45 AM	6	87	11	0	104	1	0	4	7	12	6	71	4	1	82	4	3	9	3	19	217
Total	19	380	30	3	432	2	13	19	26	60	18	247	10	8	263	46	16	51	21	134	909
08:00 AM	1	46	8	2	57	0	0	5	11	16	4	61	3	2	70	16	1	4	0	21	164
08:15 AM	1	30	6	0	37	0	0	5	1	8	1	49	2	0	52	13	1	2	0	16	111
08:30 AM	3	30	9	0	42	2	0	7	1	10	0	36	0	0	36	13	2	1	0	16	104
08:45 AM	3	29	3	0	35	0	0	6	1	7	1	49	1	0	51	15	0	3	0	18	111
Total	8	135	26	2	171	2	0	23	14	39	6	195	6	2	209	57	4	10	0	71	490
Grand Total	34	644	67	19	764	4	13	67	61	145	30	692	18	16	756	207	21	70	26	324	1989
Apprch %	4.5	84.3	8.8	2.5		2.8	9	46.2	42.1		4	91.5	2.4	2.1		63.9	6.5	21.6	8		
Total %	1.7	32.4	3.4	1	38.4	0.2	0.7	3.4	3.1	7.3	1.5	34.8	0.9	0.8	38	10.4	1.1	3.5	1.3	16.3	

	Kapolei Parkway Southbound					Kekaiholo Street Westbound					Kapolei Parkway Northbound					Kekaiholo Street Eastbound					
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	2	75	7	84		0	0	3	3		5	71	1	77		20	1	4	25	189	
07:15 AM	4	96	1	101		1	12	9	22		0	44	0	44		18	5	14	37	204	
07:30 AM	7	122	11	140		0	1	3	4		7	61	5	73		4	7	24	35	252	
07:45 AM	6	87	11	104		1	0	4	5		6	71	4	81		4	3	9	16	206	
Total Volume	19	380	30	429		2	13	19	34		18	247	10	275		46	16	51	113	851	
% App. Total	4.4	88.6	7			5.9	38.2	55.9			6.5	89.8	3.6			40.7	14.2	45.1			
PHF	.679	.779	.682	.766		.500	.271	.528	.386		.643	.870	.500	.849		.575	.571	.531	.764	.844	

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: PA, CM
Counter: D4-5673, D4-5671
Weather: Clear

File Name : KapKek PM
Site Code : 00000004
Start Date : 9/18/2012
Page No : 1

Groups Printed- Unshifted																							
Start Time	Kapolei Parkway Southbound					Kekaiholo Sreet Westbound					Kapolei Parkway Northbound					Kekaiholo Sreet Eastbound					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total			
03:00 PM	7	68	12	0	87	0	1	5	0	6	4	44	1	4	53	10	0	5	0	15	0	161	161
03:15 PM	8	85	17	0	110	0	0	3	2	5	5	57	1	1	64	14	0	2	0	16	0	195	195
03:30 PM	12	84	14	0	110	0	2	5	0	7	3	74	0	0	77	12	1	5	0	18	0	212	212
03:45 PM	8	76	19	3	103	1	2	8	3	14	5	90	0	0	95	5	0	2	0	7	3	219	222
Total	35	313	62	3	410	1	5	21	5	32	17	265	2	5	289	41	1	14	0	56	3	787	790
04:00 PM	5	78	20	1	103	0	0	2	3	5	1	60	1	0	62	8	0	3	0	11	1	181	182
04:15 PM	7	67	10	1	84	0	1	1	0	2	8	78	0	2	88	7	0	2	0	9	1	183	184
04:30 PM	13	93	29	1	135	0	1	5	2	8	5	82	2	2	91	15	1	2	0	18	1	252	253
04:45 PM	6	88	21	0	115	1	0	4	2	7	6	61	1	0	68	4	0	1	0	5	0	195	195
Total	31	326	80	3	437	1	2	12	7	22	20	281	4	4	309	34	1	6	0	43	3	811	814
05:00 PM	4	86	19	0	109	1	1	2	2	6	1	71	2	0	74	11	0	1	0	12	0	201	201
05:15 PM	12	100	22	0	134	0	0	4	6	10	3	52	2	2	59	9	0	7	0	16	0	219	219
05:30 PM	9	82	22	0	113	0	1	5	3	9	5	89	2	1	97	14	1	5	0	20	0	239	239
05:45 PM	10	76	21	2	107	1	0	7	6	14	6	56	0	0	62	9	0	3	0	12	2	195	197
Total	35	344	84	2	463	2	2	18	17	39	15	268	6	3	292	43	1	16	0	60	2	854	856
Grand Total	101	983	226	8	1310	4	9	51	29	93	52	814	12	12	890	118	3	38	0	159	8	2452	2460
Apprch %	7.7	75	17.3			4.3	9.7	54.8	31.2		5.8	91.5	1.3	1.3		74.2	1.9	23.9	0				
Total %	4.1	40.1	9.2		53.4	0.2	0.4	2.1	1.2	3.8	2.1	33.2	0.5	0.5	36.3	4.8	0.1	1.5	0	6.5	0.3	99.7	

	Kapolei Parkway Southbound					Kekaiholo Sreet Westbound					Kapolei Parkway Northbound					Kekaiholo Sreet Eastbound				
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 04:30 PM																				
04:30 PM	13	93	29	135		0	1	5	6		5	82	2	89		15	1	2	18	248
04:45 PM	6	88	21	115		1	0	4	5		6	61	1	68		4	0	1	5	193
05:00 PM	4	86	19	109		1	1	2	4		1	71	2	74		11	0	1	12	199
05:15 PM	12	100	22	134		0	0	4	4		3	52	2	57		9	0	7	16	211
Total Volume	35	367	91	493		2	2	15	19		15	266	7	288		39	1	11	51	851
% App. Total	7.1	74.4	18.5			10.5	10.5	78.9			5.2	92.4	2.4			75.5	2	21.6		
PHF	.673	.918	.784	.913		.500	.500	.750	.792		.625	.811	.875	.809		.650	.250	.393	.708	.858

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MN
Counter:D4-3890, D4-5674
Weather:Clear

File Name : KaiKai AM
Site Code : 00000001
Start Date : 9/13/2012
Page No : 1

Groups Printed- Unshifted																
	kaipu Street Southbound					Kaimalie Street Westbound					Northbound	Kaimalie Street Eastbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	Int. Total
06:00 AM	9	1	0	1	11	0	8	7	3	18	0	0	30	0	0	30
06:15 AM	5	0	0	0	5	0	2	2	2	6	0	0	25	0	1	26
06:30 AM	11	0	1	0	12	0	8	4	3	15	0	1	19	0	2	22
06:45 AM	8	0	2	2	12	0	3	3	0	6	0	1	25	0	0	26
Total	33	1	3	3	40	0	21	16	8	45	0	2	99	0	3	104
07:00 AM	12	0	3	0	15	0	6	12	8	26	0	2	30	0	2	34
07:15 AM	8	0	0	2	10	0	5	8	3	16	0	0	28	0	2	30
07:30 AM	25	0	2	0	27	0	5	9	11	25	0	0	44	0	2	46
07:45 AM	9	0	0	0	9	0	11	12	8	31	0	3	24	0	0	27
Total	54	0	5	2	61	0	27	41	30	98	0	5	126	0	6	137
08:00 AM	10	0	1	0	11	0	16	4	2	22	0	0	16	0	0	16
08:15 AM	9	0	0	1	10	0	12	5	1	18	0	0	17	0	0	17
08:30 AM	3	0	1	0	4	0	9	7	1	17	0	1	13	0	0	14
08:45 AM	6	0	3	0	9	0	3	6	2	11	0	1	13	0	5	19
Total	28	0	5	1	34	0	40	22	6	68	0	2	59	0	5	66
Grand Total	115	1	13	6	135	0	88	79	44	211	0	9	284	0	14	307
Apprch %	85.2	0.7	9.6	4.4		0	41.7	37.4	20.9		0	2.9	92.5	0	4.6	
Total %	17.6	0.2	2	0.9	20.7	0	13.5	12.1	6.7	32.3	0	1.4	43.5	0	2.1	47

	kaipu Street Southbound					Kaimalie Street Westbound					Northbound	Kaimalie Street Eastbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 07:00 AM																
07:00 AM	12	0	3	0	15	0	6	12	0	18	0	2	30	0	0	32
07:15 AM	8	0	0	0	8	0	5	8	0	13	0	0	28	0	0	28
07:30 AM	25	0	2	0	27	0	5	9	0	14	0	0	44	0	0	44
07:45 AM	9	0	0	0	9	0	11	12	0	23	0	3	24	0	0	27
Total Volume	54	0	5	0	59	0	27	41	0	68	0	5	126	0	0	131
% App. Total	91.5	0	8.5	0		0	39.7	60.3	0		0	3.8	96.2	0	0	
PHF	.540	.000	.417	.546		.000	.614	.854	.739		.000	.417	.716	.000	.744	.759

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, MN
Counter:D4-3890, D4-5673
Weather:Clear

File Name : KaiKai PM
Site Code : 00000001
Start Date : 9/13/2012
Page No : 1

Groups Printed- Unshifted																
	Kaipu Street Southbound					Kaimalie Street Westbound					Northbound	Kaimalie Street Eastbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	Int. Total
03:00 PM	3	0	0	0	3	0	24	7	2	33	0	1	5	0	1	7
03:15 PM	7	0	2	0	9	0	28	8	11	47	0	2	18	0	5	25
03:30 PM	8	0	1	0	9	0	20	4	0	24	0	1	16	0	1	18
03:45 PM	10	0	0	2	12	0	30	12	1	43	0	1	20	0	0	21
Total	28	0	3	2	33	0	102	31	14	147	0	5	59	0	7	71
04:00 PM	9	0	1	0	10	0	24	4	0	28	0	0	16	0	0	16
04:15 PM	6	0	0	0	6	0	37	4	1	42	0	3	28	0	4	35
04:30 PM	12	0	2	2	16	0	23	10	1	34	0	2	25	0	0	27
04:45 PM	6	0	1	0	7	0	26	9	0	35	0	3	19	0	0	22
Total	35	0	4	2	41	0	110	27	2	139	0	8	88	0	4	100
05:00 PM	9	0	1	2	12	0	30	11	6	47	0	1	18	0	2	21
05:15 PM	7	0	2	2	11	0	36	7	0	43	0	0	15	0	0	15
05:30 PM	7	0	2	1	10	0	19	11	0	30	0	2	13	0	0	15
05:45 PM	9	0	0	3	12	0	29	15	0	44	0	1	12	0	1	14
Total	32	0	5	8	45	0	114	44	6	164	0	4	58	0	3	65
Grand Total	95	0	12	12	119	0	326	102	22	450	0	17	205	0	14	236
Apprch %	79.8	0	10.1	10.1		0	72.4	22.7	4.9		0	7.2	86.9	0	5.9	
Total %	11.8	0	1.5	1.5	14.8	0	40.5	12.7	2.7	55.9	0	2.1	25.5	0	1.7	29.3

	Kaipu Street Southbound					Kaimalie Street Westbound					Northbound	Kaimalie Street Eastbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 04:15 PM																
04:15 PM	6	0	0	0	6	0	37	4	0	41	0	3	28	0	0	31
04:30 PM	12	0	2	0	14	0	23	10	0	33	0	2	25	0	0	27
04:45 PM	6	0	1	0	7	0	26	9	0	35	0	1	18	0	0	19
05:00 PM	9	0	0	0	9	0	30	11	0	41	0	1	18	0	0	19
Total Volume	35	0	4	0	39	0	116	34	0	150	0	9	90	0	0	99
% App. Total	89.7	0	10.3	0		0	77.3	22.7	0		0	9.1	90.9	0	0	
PHF	.729	.000	.500	.696		.000	.784	.773	.915		.000	.750	.804	.000	.798	.923

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL, RF
Counter: D4-05671, D4-5673
Weather: Clear

File Name : KamKai AM
Site Code : 00000002
Start Date : 9/13/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kaileonui Street Southbound					Kaimalie Street Westbound					Mariners Place Driveway Northbound					Kaimalie Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	4	0	0	0	4	0	6	0	0	6	2	3	4	0	9	1	13	0	0	14	33
06:15 AM	1	0	0	1	2	0	1	0	0	1	0	1	3	0	4	1	15	0	0	16	23
06:30 AM	2	1	0	0	3	1	6	1	0	8	0	1	3	0	4	2	17	1	0	20	35
06:45 AM	0	0	0	5	5	1	5	1	0	7	2	2	3	0	7	2	19	0	0	21	40
Total	7	1	0	6	14	2	18	2	0	22	4	7	13	0	24	6	64	1	0	71	131
07:00 AM	5	0	0	2	7	0	6	1	0	7	1	0	4	0	5	2	16	0	0	18	37
07:15 AM	8	0	2	3	13	3	1	0	0	4	1	5	3	0	9	1	18	2	0	21	47
07:30 AM	7	0	0	2	9	0	6	3	0	9	1	4	4	0	9	1	29	2	0	32	59
07:45 AM	3	1	1	1	6	1	3	0	0	4	1	1	0	0	2	1	14	5	0	20	32
Total	23	1	3	8	35	4	16	4	0	24	4	10	11	0	25	5	77	9	0	91	175
08:00 AM	3	1	2	1	7	1	6	2	0	9	1	1	1	0	3	0	12	1	0	13	32
08:15 AM	3	0	1	0	4	0	7	3	0	10	1	1	1	0	3	2	6	3	0	11	28
08:30 AM	1	0	1	0	2	1	9	1	0	11	3	1	2	0	6	0	9	2	0	11	30
08:45 AM	3	0	1	2	6	0	3	1	0	4	0	0	0	0	0	1	11	2	0	14	24
Total	10	1	5	3	19	2	25	7	0	34	5	3	4	0	12	3	38	8	0	49	114
Grand Total	40	3	8	17	68	8	59	13	0	80	13	20	28	0	61	14	179	18	0	211	420
Apprch %	58.8	4.4	11.8	25		10	73.8	16.2	0		21.3	32.8	45.9	0		6.6	84.8	8.5	0		
Total %	9.5	0.7	1.9	4	16.2	1.9	14	3.1	0	19	3.1	4.8	6.7	0	14.5	3.3	42.6	4.3	0	50.2	

Start Time	Kaileonui Street Southbound				Kaimalie Street Westbound				Mariners Place Driveway Northbound				Kaimalie Street Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:45 AM																	
06:45 AM	0	0	0	0	1	5	1	7	2	2	3	7	2	19	0	21	35
07:00 AM	5	0	0	5	0	6	1	7	1	0	4	5	2	16	0	18	35
07:15 AM	8	0	2	10	3	1	0	4	1	5	3	9	1	18	2	21	44
07:30 AM	7	0	0	7	0	6	3	9	1	4	4	9	1	29	2	32	57
Total Volume	20	0	2	22	4	18	5	27	5	11	14	30	6	62	4	92	171
% App. Total	90.9	0	9.1		14.8	66.7	18.5		16.7	36.7	46.7		6.5	89.1	4.3		
PHF	.625	.000	.250	.550	.333	.750	.417	.750	.625	.550	.875	.833	.750	.707	.500	.719	.750

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL, RF
Counter: D4-5671, D4-5673
Weather: Clear

File Name : KamKai PM
Site Code : 00000002
Start Date : 9/13/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kaileonui Street Southbound					Kaimalie Street Westbound					Mariners Place Driveway Northbound					Kaimalie Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	0	2	0	0	2	2	17	3	0	22	0	0	0	0	0	0	6	1	0	7	31
03:15 PM	3	1	3	3	10	0	17	3	0	20	0	0	1	0	1	0	14	2	0	16	47
03:30 PM	2	1	1	1	5	1	14	1	0	16	1	0	0	0	1	1	14	0	0	15	37
03:45 PM	2	0	0	2	4	0	18	5	0	23	0	0	1	0	1	1	15	0	0	16	44
Total	7	4	4	6	21	3	66	12	0	81	1	0	2	0	3	2	49	3	0	54	159
04:00 PM	4	2	1	0	7	1	22	1	0	24	0	0	0	0	0	0	11	1	0	12	43
04:15 PM	2	0	0	2	4	0	29	2	0	31	0	0	2	0	2	0	24	3	0	27	64
04:30 PM	5	2	2	0	9	1	16	2	0	19	0	1	1	0	2	3	16	2	0	21	51
04:45 PM	2	0	1	1	4	0	22	1	0	23	0	0	3	0	3	0	12	2	0	14	44
Total	13	4	4	3	24	2	89	6	0	97	0	1	6	0	7	3	63	6	0	74	202
05:00 PM	4	1	1	1	7	2	25	4	0	31	0	4	1	0	5	2	16	0	0	18	61
05:15 PM	1	0	0	1	2	4	23	4	0	31	3	0	3	0	6	0	12	0	0	12	51
05:30 PM	3	0	1	0	4	4	14	1	0	19	0	0	0	0	0	2	15	2	0	19	42
05:45 PM	2	1	2	2	7	4	19	1	0	24	1	0	1	0	2	0	8	2	0	10	43
Total	10	2	4	4	20	14	81	10	0	105	4	4	5	0	13	4	51	4	0	59	197
Grand Total	30	10	12	13	65	19	236	28	0	283	5	5	13	0	23	9	163	15	0	187	558
Apprch %	46.2	15.4	18.5	20		6.7	83.4	9.9	0		21.7	21.7	56.5	0		4.8	87.2	8	0		
Total %	5.4	1.8	2.2	2.3	11.6	3.4	42.3	5	0	50.7	0.9	0.9	2.3	0	4.1	1.6	29.2	2.7	0	33.5	

	Kaileonui Street Southbound					Kaimalie Street Westbound					Mariners Place Driveway Northbound					Kaimalie Street Eastbound					
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	2	0	0	2		0	29	2	31		0	0	2	2		0	24	3	27	62	
04:30 PM	5	2	2	9		1	16	2	19		0	1	1	2		3	16	2	21	51	
04:45 PM	2	0	1	3		0	22	1	23		0	0	3	3		0	12	2	14	43	
05:00 PM	4	1	1	6		2	25	4	31		0	4	1	5		2	16	0	18	60	
Total Volume	13	3	4	20		3	92	9	104		0	5	7	12		5	68	7	80	216	
% App. Total	65	15	20			2.9	86.5	8.7			0	41.7	56.3			6.2	85	8.8			
PHF	.650	.375	.500	.556		.375	.793	.563	.839		.000	.313	.583	.600		.417	.708	.583	.741	.871	

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted RJ, PA
Counter:TU-0650, TU-0654
Weather:Clear

File Name : KapKam AM
Site Code : 00000003
Start Date : 9/13/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway Southbound					Kaimalie Street Westbound					Kapolei Parkway Northbound					Kaimalie Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	1	13	1	1	16	1	1	9	2	13	4	42	3	0	49	4	12	4	1	21	99
06:15 AM	5	30	0	0	35	1	1	2	4	8	2	37	2	1	42	3	8	2	2	15	100
06:30 AM	1	30	0	0	31	5	0	11	7	23	5	47	2	1	55	3	5	10	4	22	131
06:45 AM	6	43	1	0	50	1	1	9	2	13	2	37	3	2	44	5	6	12	1	24	131
Total	13	116	2	1	132	8	3	31	15	57	13	163	10	4	190	15	31	28	8	82	461
07:00 AM	5	56	2	0	63	3	1	8	8	20	3	52	1	8	64	3	4	5	7	19	166
07:15 AM	3	97	2	1	103	3	1	8	11	23	2	47	3	17	69	10	6	23	4	43	238
07:30 AM	17	120	3	2	142	9	1	7	9	26	14	59	9	4	86	0	6	18	7	31	285
07:45 AM	16	84	5	0	105	4	3	2	6	15	14	76	10	5	105	6	4	7	3	20	245
Total	41	357	12	3	413	19	6	25	34	64	33	234	23	34	324	19	20	53	21	113	934
08:00 AM	7	42	1	0	50	5	3	7	2	17	7	54	2	3	66	4	3	6	3	16	149
08:15 AM	2	36	2	1	41	4	1	4	1	10	3	33	5	0	41	7	4	3	0	14	106
08:30 AM	6	20	4	1	31	2	3	10	2	17	2	37	2	2	43	3	3	3	1	10	101
08:45 AM	3	21	1	0	25	2	1	3	4	10	3	24	6	2	35	2	3	3	5	13	83
Total	18	119	8	2	147	13	8	24	9	54	15	148	15	7	185	16	13	15	9	53	439
Grand Total	72	592	22	6	692	40	17	80	58	195	61	545	48	45	699	50	64	96	38	248	1834
Apprch %	10.4	85.5	3.2	0.9		20.5	8.7	41	29.7		8.7	78	6.9	6.4		20.2	25.6	38.7	15.3		
Total %	3.9	32.3	1.2	0.3	37.7	2.2	0.9	4.4	3.2	10.6	3.3	29.7	2.6	2.5	38.1	2.7	3.5	5.2	2.1	13.5	

	Kapolei Parkway Southbound					Kaimalie Street Westbound					Kapolei Parkway Northbound					Kaimalie Street Eastbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total				
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	5	56	2	63	3	1	8	12	3	52	1	56	3	4	5	12	143				
07:15 AM	3	97	2	102	3	1	8	12	2	47	3	52	10	6	23	39	205				
07:30 AM	17	120	3	140	9	1	7	17	14	59	9	82	0	6	18	24	263				
07:45 AM	16	84	5	105	4	3	2	9	14	76	10	100	6	4	7	17	231				
Total Volume	41	357	12	410	19	6	25	50	33	234	23	290	19	20	53	92	842				
% App. Total	10	87.1	2.9		38	12	50		11.4	80.7	7.9		20.7	21.7	57.6						
PHF	.603	.744	.600	.732	.528	.500	.761	.735	.589	.770	.575	.725	.475	.833	.576	.590	.800				

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RJ, PA
Counter:TU-0650, TU-0654
Weather:Clear

File Name : KapKam PM
Site Code : 00000003
Start Date : 9/13/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway Southbound					Kaimalie Street Westbound					Kapolei Parkway Northbound					Kaimalie Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	10	62	3	1	76	2	8	6	0	16	1	46	3	1	51	4	1	3	0	8	151
03:15 PM	7	61	5	0	73	4	7	4	8	23	4	47	4	0	55	5	2	0	4	11	162
03:30 PM	12	72	7	4	95	7	5	8	4	24	6	53	7	6	72	2	3	4	6	15	206
03:45 PM	10	64	9	0	83	2	6	7	3	18	10	69	7	0	86	1	4	1	3	9	196
Total	39	259	24	5	327	15	26	25	15	81	21	215	21	7	264	12	10	8	13	43	715
04:00 PM	9	61	10	2	82	6	4	8	7	25	5	53	7	2	67	4	3	5	3	15	189
04:15 PM	13	62	3	1	79	2	8	16	5	31	8	59	11	2	80	3	6	2	4	15	205
04:30 PM	17	70	17	0	104	4	4	6	0	14	3	53	8	0	64	4	2	4	1	11	193
04:45 PM	12	67	9	0	88	3	4	11	3	21	8	64	4	0	76	3	3	5	3	14	199
Total	51	260	39	3	353	15	20	41	15	91	24	229	30	4	287	14	14	16	11	55	786
05:00 PM	17	68	5	1	91	6	4	11	7	28	7	50	8	0	65	5	1	5	2	13	197
05:15 PM	10	67	11	3	91	5	2	21	2	30	9	46	6	5	66	2	2	7	3	14	201
05:30 PM	19	72	4	0	95	2	4	7	7	20	6	55	6	4	71	2	2	2	7	13	199
05:45 PM	6	50	7	1	64	3	3	11	2	19	9	54	10	5	78	5	2	2	9	18	179
Total	52	257	27	5	341	16	13	50	18	97	31	205	30	14	280	14	7	16	21	58	776
Grand Total	142	776	90	13	1021	46	59	116	48	269	76	649	81	25	831	40	31	40	45	156	2277
Apprch %	13.9	76	8.8	1.3		17.1	21.9	43.1	17.8		9.1	78.1	9.7	3		25.6	19.9	25.6	28.8		
Total %	6.2	34.1	4	0.6	44.8	2	2.6	5.1	2.1	11.8	3.3	28.5	3.6	1.1	36.5	1.8	1.4	1.8	2	6.9	

	Kapolei Parkway Southbound				Kaimalie Street Westbound				Kapolei Parkway Northbound				Kaimalie Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	13	62	3	78	2	8	16	26	8	59	11	78	3	6	2	11	193
04:30 PM	17	70	17	104	4	4	6	14	3	53	8	64	4	2	4	10	192
04:45 PM	12	67	9	88	3	4	11	18	8	64	4	76	3	3	5	11	193
05:00 PM	17	68	5	90	6	4	11	21	7	50	8	65	5	1	5	11	187
Total Volume	59	267	34	360	15	20	44	79	26	226	31	283	15	12	16	43	765
% App. Total	16.4	74.2	9.4		19	25.3	55.7		9.2	79.9	11		34.9	27.9	37.2		
PHF	.668	.954	.500	.665	.625	.625	.688	.760	.813	.883	.705	.907	.750	.500	.800	.977	.991

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL, SO, TC
Counter: D4-5674, D4-5671
Weather: Clear

File Name : FtWeaKai AM
Site Code : 00000002
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Ft. Weaver Road Southbound					Westbound App. Total	Ft. Weaver Road Northbound					Kaimalie Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	0	69	4	6	79	0	8	158	0	0	166	35	0	8	3	46	291
06:15 AM	0	118	6	0	124	0	4	154	0	0	158	30	0	10	4	44	326
06:30 AM	0	114	6	1	121	0	6	163	0	0	169	22	0	8	3	33	323
06:45 AM	0	166	13	1	180	0	6	153	0	0	159	32	0	16	3	51	390
Total	0	467	29	8	504	0	24	628	0	0	652	119	0	42	13	174	1330
07:00 AM	0	205	14	4	223	0	5	229	0	0	234	19	0	16	7	42	499
07:15 AM	0	282	9	1	292	0	10	258	0	0	268	21	0	31	2	54	614
07:30 AM	0	326	11	3	340	0	11	290	0	0	301	26	0	39	8	73	714
07:45 AM	0	190	20	0	210	0	26	297	0	0	323	14	0	29	3	46	579
Total	0	1003	54	8	1065	0	52	1074	0	0	1126	80	0	115	20	215	2406
08:00 AM	0	110	20	0	130	0	22	209	0	0	231	14	0	15	2	31	392
08:15 AM	1	101	22	1	125	0	7	122	0	0	129	23	0	9	3	35	289
08:30 AM	0	114	13	0	127	0	9	137	0	0	146	18	0	10	2	30	303
08:45 AM	0	97	11	0	108	0	5	136	0	0	141	15	0	12	1	28	277
Total	1	422	66	1	490	0	43	604	0	0	647	70	0	46	8	124	1261
Grand Total	1	1892	149	17	2059	0	119	2306	0	0	2425	269	0	203	41	513	4997
Approach %	0	91.9	7.2	0.8		0	4.9	95.1	0	0		52.4	0	39.6	8		
Total %	0	37.9	3	0.3	41.2	0	2.4	46.1	0	0	48.5	5.4	0	4.1	0.8	10.3	

	Ft. Weaver Road Southbound				Westbound	Ft. Weaver Road Northbound				Kaimalie Street Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	0	205	14	219	0	5	229	0	234	19	0	16	35	488
07:15 AM	0	282	9	291	0	10	258	0	268	21	0	31	52	611
07:30 AM	0	326	11	337	0	11	290	0	301	26	0	39	65	703
07:45 AM	0	190	20	210	0	26	297	0	323	14	0	29	43	576
Total Volume	0	1003	54	1057	0	52	1074	0	1126	80	0	115	195	2378
% App. Total	0	94.9	5.1			4.6	95.4	0		41	0	59		
PHF	.000	.769	.675	.784	.000	.500	.904	.000	.872	.769	.000	.737	.750	.846

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL, SO, TO
Counter: D4-5674, D4-5671
Weather: Clear

File Name : FtWeaKai PM
Site Code : 00000002
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Ft. Weaver Road Southbound					Westbound App. Total	Ft. Weaver Road Northbound					Kaimalie Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	0	191	31	3	225	0	25	191	0	0	216	26	0	23	6	55	496
03:15 PM	0	203	28	0	231	0	19	147	0	0	166	19	0	16	8	43	440
03:30 PM	0	197	28	1	226	0	12	177	0	0	189	19	0	13	6	38	453
03:45 PM	0	218	17	1	236	0	18	177	0	0	195	24	0	14	6	44	475
Total	0	809	104	5	918	0	74	692	0	0	766	88	0	66	26	180	1864
04:00 PM	0	235	32	1	268	0	14	198	0	0	212	17	0	18	6	41	521
04:15 PM	0	220	44	1	265	0	25	170	0	0	195	11	0	17	1	29	489
04:30 PM	0	194	35	0	229	0	15	180	0	0	195	20	0	14	1	35	459
04:45 PM	0	182	41	0	223	0	12	133	0	0	145	19	0	21	5	45	413
Total	0	831	152	2	985	0	66	681	0	0	747	67	0	70	13	150	1882
05:00 PM	0	213	33	1	247	0	15	136	0	0	151	22	0	14	2	38	436
05:15 PM	0	204	36	0	240	0	19	140	0	0	159	18	0	27	3	48	447
05:30 PM	0	213	53	0	266	0	20	151	0	0	171	14	0	21	5	40	477
05:45 PM	0	193	46	0	239	0	12	97	0	0	109	8	0	28	1	37	385
Total	0	823	168	1	992	0	66	524	0	0	590	62	0	90	11	163	1745
Grand Total	0	2463	424	8	2895	0	206	1897	0	0	2103	217	0	226	50	493	5491
Approach %	0	85.1	14.6	0.3		0	9.8	90.2	0	0		44	0	45.8	10.1		
Total %	0	44.9	7.7	0.1	52.7	0	3.8	34.5	0	0	38.3	4	0	4.1	0.9	9	

Start Time	Ft Weaver Southbound				Westbound App. Total	Ft Weaver Northbound				Kaimalie Eastbound				Int. Total
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 03:45 PM														
03:45 PM	0	218	17	235	0	18	177	0	195	24	0	14	38	468
04:00 PM	0	235	32	267	0	14	198	0	212	17	0	18	35	514
04:15 PM	0	220	44	264	0	25	170	0	195	11	0	17	28	487
04:30 PM	0	194	35	229	0	15	180	0	195	20	0	14	34	458
Total Volume	0	867	128	995	0	72	725	0	797	72	0	63	135	1927
% App. Total	0	87.1	12.9			9	91	0		53.3	0	46.7		
PHF	.000	.922	.727	.932	.000	.720	.915	.000	.940	.750	.000	.875	.888	.937

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: PA, RJ
Counter: D4-5673, D4-5671
Weather: Clear

File Name : KaiKap AM
Site Code : 00000001
Start Date : 9/19/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kaipu Street From North					Kalieloa Drive From East					Kaipu Street From South					Kalieloa Drive From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	0	3	11	2	16	0	11	2	0	13	20	2	0	2	24	1	23	0	2	26	79
06:15 AM	0	3	10	0	13	3	12	2	1	16	18	1	1	0	20	0	26	0	1	27	78
06:30 AM	0	2	12	0	14	1	14	5	1	21	16	1	0	0	17	0	33	0	2	35	87
06:45 AM	0	3	16	2	21	0	10	5	5	20	21	0	2	6	29	1	42	0	4	47	117
Total	0	11	49	4	64	4	47	14	7	72	75	4	3	8	90	2	124	0	9	135	361
07:00 AM	0	3	14	17	34	1	14	6	6	27	29	1	0	9	39	3	41	1	3	46	148
07:15 AM	1	1	9	12	23	3	10	8	11	32	40	0	0	17	57	1	76	0	9	86	196
07:30 AM	2	3	23	10	38	13	22	9	2	46	35	0	0	10	45	12	101	0	1	114	243
07:45 AM	2	2	11	5	20	10	19	23	4	56	23	1	0	2	26	1	37	2	1	41	143
Total	5	9	57	44	115	27	65	46	23	161	127	2	0	38	167	17	255	3	14	289	732
08:00 AM	0	3	10	2	15	2	17	7	0	26	16	1	0	1	18	2	41	0	0	43	102
08:15 AM	1	1	9	2	13	2	7	2	1	12	17	2	1	1	21	0	15	0	2	17	63
08:30 AM	0	1	11	3	15	4	9	4	0	17	13	1	0	4	16	2	9	0	1	12	62
08:45 AM	0	1	5	1	7	2	8	4	1	15	13	3	0	3	19	0	9	0	1	10	51
Total	1	6	35	8	50	10	41	17	2	70	59	7	1	9	76	4	74	0	4	82	278
Grand Total	6	26	141	56	229	41	153	77	32	303	261	13	4	55	333	23	453	3	27	506	1371
Approch %	2.6	11.4	61.6	24.5		13.5	60.5	25.4	10.6		78.4	3.9	1.2	16.5		4.5	89.5	0.6	5.3		
Total %	0.4	1.9	10.3	4.1	16.7	3	11.2	5.6	2.3	22.1	19	0.9	0.3	4	24.3	1.7	33	0.2	2	36.9	

	Kaipu Street From North				Kalieloa Drive From East				Kaipu Street From South				Kalieloa Drive From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	3	14	17	1	14	6	21	29	1	0	30	3	41	1	45	113
07:15 AM	1	1	9	11	3	10	8	21	40	0	0	40	1	76	0	77	149
07:30 AM	2	3	23	28	13	22	9	44	35	0	0	35	12	101	0	113	220
07:45 AM	2	2	11	15	10	19	23	52	23	1	0	24	1	37	2	40	131
Total Volume	5	9	57	71	27	65	46	138	127	2	0	129	17	255	3	275	613
% App. Total	7	12.7	80.3		19.6	47.1	33.3		88.4	1.6	0		6.2	92.7	1.1		
PHF	.625	.750	.620	.634	.519	.739	.500	.663	.784	.500	.000	.606	.354	.631	.375	.608	.697

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: PA, RJ
Counter: D4-5673, D4-5671
Weather: Clear

File Name : KaiKap PM
Site Code : 00000001
Start Date : 9/19/2012
Page No : 1

Groups Printed- Unshifted																					
Start Time	Kaipu Street From North					Kaieloea Drive From East					Kaipu Street From South					Kaieloea Drive From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	1	1	4	1	7	2	14	19	2	37	9	1	1	1	12	0	17	1	3	21	77
03:15 PM	3	1	2	0	6	12	17	8	1	38	15	2	0	0	17	2	15	1	2	20	81
03:30 PM	0	3	6	1	10	12	20	18	2	52	15	0	1	0	16	2	19	1	6	28	106
03:45 PM	0	0	4	0	4	9	23	25	2	59	9	0	0	0	9	0	15	3	2	20	92
Total	4	5	16	2	27	35	74	70	7	186	48	3	2	1	54	4	66	6	13	89	356
04:00 PM	1	0	13	0	14	9	26	15	2	52	11	0	0	0	11	0	19	1	2	22	99
04:15 PM	0	0	5	0	5	12	22	18	6	58	12	0	2	0	14	4	10	1	5	20	97
04:30 PM	1	4	4	2	11	14	24	22	3	63	17	1	1	3	22	0	20	1	3	24	120
04:45 PM	2	2	5	2	11	12	16	13	2	43	21	1	1	2	25	2	17	1	5	25	104
Total	4	6	27	4	41	47	88	68	13	216	61	2	4	5	72	6	66	4	15	91	420
05:00 PM	0	3	4	2	9	13	28	17	1	59	16	1	1	5	23	1	13	1	0	15	106
05:15 PM	0	2	9	0	11	9	28	16	0	53	19	1	0	1	21	0	10	1	1	12	97
05:30 PM	1	4	5	5	15	17	17	26	3	63	18	7	2	5	32	1	8	0	3	12	122
05:45 PM	0	2	7	5	14	10	29	26	1	66	11	1	0	4	16	0	14	1	2	17	113
Total	1	11	25	12	49	49	102	85	5	241	84	10	3	15	92	2	45	3	6	56	438
Grand Total	9	22	68	18	117	131	264	223	25	643	173	15	9	21	218	12	177	13	34	236	1214
Approch %	7.7	18.8	58.1	15.4		20.4	41.1	34.7	3.9		78.4	6.9	4.1	9.6		5.1	75	5.5	14.4		
Total %	0.7	1.8	5.6	1.5	9.6	10.8	21.7	18.4	2.1	53	14.3	1.2	0.7	1.7	18	1	14.6	1.1	2.8	19.4	

	Kaipu Street From North				Kalieloa Drive From East				Kaipu Street From South				Kalieloa Drive From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	3	4	7	13	28	17	58	16	1	1	18	1	13	1	15	98
05:15 PM	0	2	9	11	9	28	18	53	19	1	0	20	0	10	1	11	95
05:30 PM	1	4	5	10	17	17	26	60	18	7	2	27	1	8	0	9	106
05:45 PM	0	2	7	9	10	29	26	65	11	1	0	12	0	14	1	15	101
Total Volume	1	11	25	37	49	102	85	236	64	10	3	77	2	45	3	50	400
% App. Total	2.7	29.7	67.6		20.8	43.2	36		83.1	13	3.9			4	90	6	
PHF	250	688	694	841	721	679	817	908	842	357	375	713	500	804	750	833	943

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:BD, MO
Counter:D4-5675, D4-5674
Weather:Clear

File Name : KaiKal AM
Site Code : 00000002
Start Date : 9/19/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kaleonui Street From North					Kaleolea Drive From East					Kaleonui Street From South					Kaleolea Drive From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	0	0	2	1	3	0	8	1	0	9	6	1	1	0	8	0	12	0	0	12	32
06:15 AM	1	0	1	1	3	0	11	2	2	15	10	3	0	0	13	0	16	0	0	16	47
06:30 AM	2	0	6	0	8	0	14	0	0	14	8	2	1	0	11	1	20	0	0	21	54
06:45 AM	0	1	5	2	8	0	13	0	2	15	15	8	4	0	27	1	22	0	0	23	73
Total	3	1	14	4	22	0	46	3	4	53	39	14	6	0	59	2	70	0	0	72	206
07:00 AM	0	0	4	4	8	0	12	3	2	17	21	4	2	1	28	1	20	0	0	21	74
07:15 AM	0	0	10	6	16	3	5	2	6	16	16	6	3	6	31	5	52	1	4	62	125
07:30 AM	0	4	22	3	29	3	9	10	1	23	26	2	2	4	34	3	63	0	6	72	158
07:45 AM	0	3	2	0	5	0	13	7	0	20	10	1	1	3	15	2	28	0	0	30	70
Total	0	7	38	13	58	6	39	22	9	76	73	13	8	14	108	11	163	1	10	185	427
08:00 AM	0	2	3	1	6	1	14	3	1	19	13	4	3	0	20	3	27	3	0	33	78
08:15 AM	0	3	3	0	6	0	8	1	0	9	7	2	0	0	9	1	5	1	0	8	32
08:30 AM	0	2	0	0	2	2	7	0	1	10	2	3	1	4	10	4	9	1	1	15	37
08:45 AM	1	0	0	2	3	1	5	1	0	7	5	0	1	0	6	1	4	0	2	7	23
Total	1	7	6	3	17	4	34	5	2	45	27	9	5	4	45	9	46	5	3	63	170
Grand Total	4	15	58	20	97	10	119	30	15	174	139	36	19	18	212	22	279	6	13	320	803
Approch %	4.1	15.5	58.8	20.6		5.7	68.4	17.2	8.6		65.6	17	9	8.5		6.9	87.2	1.9	4.1		
Total %	0.5	1.9	7.2	2.5	12.1	1.2	14.8	3.7	1.9	21.7	17.3	4.5	2.4	2.2	26.4	2.7	34.7	0.7	1.6	39.9	

Start Time	Kaleonui Street From North					Kaleolea Drive From East					Kaleonui Street From South					Kaleolea Drive From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	10		10	3	5	2		10	16	6	3		25	5	52	1		58	103
07:30 AM	0	4	22		26	3	9	10		22	26	2	2		30	3	63	0		66	144
07:45 AM	0	3	2		5	0	13	7		20	10	1	1		12	2	28	0		30	67
08:00 AM	0	2	3		5	1	14	3		18	13	4	3		20	3	27	3		33	76
Total Volume	0	9	37		46	7	41	22		70	65	13	9		87	13	170	4		187	390
% App. Total	0	19.6	80.4			10	58.6	31.4			74.7	14.9	10.3			7	90.9	2.1			
PHF	.000	.563	.420		.442	.583	.732	.550		.795	.625	.542	.750		.725	.650	.675	.333		.708	.677

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:MD, MO
Counter:D4-5675, D4-5674
Weather:Clear

File Name : KaiKal PM
Site Code : 00000002
Start Date : 9/19/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Kaleonui Street From North					Kaleolea Drive From East					Kaleonui Street From South					Kaleolea Drive From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	1	5	2	1	9	2	9	3	0	14	0	0	0	0	0	0	0	0	0	0	23
03:15 PM	1	4	0	0	5	1	14	7	0	22	3	3	2	0	8	4	16	0	0	20	55
03:30 PM	1	1	1	1	4	3	12	5	2	22	3	2	2	0	7	2	20	0	0	22	55
03:45 PM	0	3	0	0	3	5	11	7	0	23	1	0	0	0	1	1	17	1	0	19	46
Total	3	13	3	2	21	11	46	22	2	61	7	5	4	0	16	7	53	1	0	61	179
04:00 PM	1	2	2	1	6	4	16	8	0	28	2	2	1	0	5	3	16	0	0	19	58
04:15 PM	1	1	1	0	3	1	15	9	0	25	1	3	2	2	8	4	13	1	0	18	54
04:30 PM	0	1	1	3	5	7	14	4	4	29	3	4	2	1	10	0	14	1	0	15	59
04:45 PM	2	4	0	0	6	0	13	6	1	20	3	4	0	1	8	5	9	1	0	15	49
Total	4	8	4	4	20	12	58	27	5	102	9	13	5	4	31	12	52	3	0	67	220
05:00 PM	2	6	0	1	9	1	20	9	1	31	4	0	2	4	10	4	9	0	0	13	63
05:15 PM	1	1	1	1	4	5	8	12	1	26	1	2	1	2	6	5	9	3	1	18	54
05:30 PM	1	2	1	1	5	6	12	6	1	25	0	3	4	2	9	3	2	0	0	5	44
05:45 PM	2	3	3	1	9	2	16	9	3	30	4	4	3	4	15	4	8	0	1	13	67
Total	6	12	5	4	27	14	56	36	6	112	9	9	10	12	40	16	28	3	2	49	228
Grand Total	13	33	12	10	68	37	160	85	13	295	25	27	19	16	87	35	133	7	2	177	627
Approch %	19.1	48.5	17.6	14.7		12.5	54.2	28.8	4.4		28.7	31	21.8	18.4		19.8	75.1	4	1.1		
Total %	2.1	5.3	1.9	1.6	10.8	5.9	25.5	13.6	2.1	47	4	4.3	3	2.6	13.9	5.6	21.2	1.1	0.3	28.2	

Start Time	Kaleonui Street From North					Kaleolea Drive From East					Kaleonui Street From South					Kaleolea Drive From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:15 PM																					
03:15 PM	1	4	0		5	1	14	7		22	3	3	2		8	4	16	0		20	55
03:30 PM	1	1	1		3	3	12	5		20	3	2	2		7	2	20	0		22	52
03:45 PM	0	3	0		3	5	11	7		23	1	0	0		1	1	17	1		19	46
04:00 PM	1	2	2		5	4	16	8		28	2	2	1		5	3	16	0		19	57
Total Volume	3	10	3		16	13	53	27		93	9	7	5		21	10	69	1		80	210
% App. Total	18.8	62.5	18.8			14	57	29			42.9	33.3	23.8			12.5	86.2	1.2			
PHF	.750	.825	.375		.800	.650	.828	.844		.830	.750	.583	.625		.656	.625	.863	.250		.909	.921

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:GC, MA
Counted By:D4-3889, D4-3890
Weather:Clear

File Name : KapKai PM
Site Code : 00000003
Start Date : 9/19/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway From North					Kalleolea Drive From East					Kapolei Parkway From South					Kalleolea Drive From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	17	58	4	4	83	1	9	2	0	12	1	56	2	2	61	1	13	7	5	26	182
03:15 PM	13	74	3	3	93	3	8	9	2	22	4	55	3	0	62	5	10	8	1	24	201
03:30 PM	8	92	3	0	103	3	5	5	0	13	1	70	4	0	75	7	12	15	2	36	227
03:45 PM	5	79	2	1	87	2	6	1	0	9	6	51	2	0	59	6	10	7	1	24	179
Total	43	303	12	8	366	9	28	17	2	56	12	232	11	2	257	19	45	37	9	110	789
04:00 PM	7	81	4	0	92	2	7	7	0	16	5	63	2	0	70	1	12	7	0	20	198
04:15 PM	12	79	3	0	94	1	10	4	1	16	6	53	2	0	61	3	7	4	4	18	189
04:30 PM	10	84	1	1	96	1	5	4	0	10	1	46	2	0	49	3	13	6	1	23	178
04:45 PM	10	75	5	2	92	2	5	6	2	15	7	55	3	0	65	3	5	4	1	13	185
Total	39	319	13	3	374	6	27	21	3	57	19	217	9	0	245	10	37	21	6	74	750
05:00 PM	15	78	4	2	99	3	11	5	1	20	5	69	0	2	76	1	7	6	2	16	211
05:15 PM	11	77	6	3	97	2	5	3	4	14	6	53	6	1	66	1	4	0	4	9	186
05:30 PM	12	88	6	3	109	2	5	6	1	14	1	52	1	2	56	2	0	2	0	4	183
05:45 PM	16	72	3	3	94	3	13	4	3	23	4	59	3	4	70	3	5	2	0	10	197
Total	54	315	19	11	399	10	34	18	9	71	16	233	10	9	268	7	16	10	6	39	777
Grand Total	136	937	44	22	1139	25	89	56	14	184	47	682	30	11	770	36	98	68	21	223	2316
Apprch %	11.9	82.3	3.9	1.9		13.6	48.4	30.4	7.6		6.1	88.6	3.9	1.4		16.1	43.9	30.5	9.4		
Total %	5.9	40.5	1.9	0.9	49.2	1.1	3.8	2.4	0.6	7.9	2	29.4	1.3	0.5	33.2	1.6	4.2	2.9	0.9	9.6	

	Kapolei Parkway From North				Kaileolea Drive From East				Kapolei Parkway From South				Kaileolea Drive From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	13	74	3	90	3	8	9	20	4	55	3	62	5	10	8	23	195
03:30 PM	8	92	3	103	3	5	5	13	1	70	4	75	7	12	15	34	225
03:45 PM	5	79	2	86	2	6	1	9	6	51	2	59	6	10	7	23	177
04:00 PM	7	81	4	92	2	7	7	16	5	63	2	70	1	12	7	20	196
Total Volume	33	326	12	371	10	26	22	58	16	239	11	266	19	44	37	100	795
% App. Total	8.9	87.9	3.2		17.2	44.8	37.9		6	89.8	4.1		19	44	37		
PHF	.635	.886	.750	.900	.633	.813	.611	.725	.667	.854	.668	.887	.679	.917	.617	.735	.883

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:GC, MA
Counted By:D4-3889, D4-3890
Weather:Clear

File Name : KapKai AM
Site Code : 00000003
Start Date : 9/19/2012
Page No : 1

Groups Printed- Unshifted																					
	Kapolei Parkway From North					Kaleoilea Drive From East					Kapolei Parkway From South					Kaleoilea Drive From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	4	18	1	0	23	1	8	1	0	10	2	51	4	0	57	3	12	4	1	20	110
06:15 AM	4	26	1	0	31	0	8	2	2	12	3	56	3	0	62	0	11	8	1	20	120
06:30 AM	7	35	0	2	44	3	14	0	3	20	7	48	1	2	58	2	15	23	5	45	167
06:45 AM	8	52	2	2	64	4	9	3	2	18	5	38	7	0	50	8	16	7	2	33	165
Total	23	131	4	4	162	8	39	6	7	60	17	193	15	2	227	13	54	42	9	118	567
07:00 AM	3	53	3	10	69	4	4	5	4	17	5	48	2	1	56	3	11	20	4	38	180
07:15 AM	3	88	14	2	107	5	2	3	8	18	24	50	1	3	78	13	20	15	10	58	261
07:30 AM	2	127	28	3	160	3	3	7	2	15	16	58	2	1	77	13	25	13	11	62	314
07:45 AM	4	73	6	0	83	3	4	8	2	17	11	67	6	0	84	2	12	7	2	23	207
Total	12	341	51	15	419	15	13	23	16	67	56	223	11	5	295	31	68	55	27	181	962
08:00 AM	13	64	2	1	80	3	8	4	5	20	12	65	1	2	80	2	22	6	1	31	211
08:15 AM	4	41	0	0	45	1	3	4	3	11	4	46	1	1	52	1	5	6	2	14	122
08:30 AM	1	29	5	2	37	2	5	2	13	22	2	35	0	6	43	2	5	10	3	20	122
08:45 AM	3	31	2	2	38	2	4	2	16	24	1	27	1	5	34	0	2	9	0	11	107
Total	21	165	9	5	200	8	20	12	37	77	19	173	3	14	209	5	34	31	6	76	562
Grand Total	56	637	64	24	781	31	72	41	60	204	92	589	29	21	731	49	156	128	42	375	2091
Apprch %	7.2	81.6	8.2	3.1		15.2	35.3	20.1	29.4		12.6	80.6	4	2.9		13.1	41.6	34.1	11.2		
Total %	2.7	30.5	3.1	1.1	37.4	1.5	3.4	2	2.9	9.8	4.4	28.2	1.4	1	35	2.3	7.5	6.1	2	17.9	

	Kapolei Parkway From North				Kalleolea Drive From East				Kapolei Parkway From South				Kalleolea Drive From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	3	88	14	105	5	2	3	10	24	50	1	75	13	20	15	48	238
07:30 AM	2	127	28	157	3	3	7	13	16	58	2	76	13	25	13	51	297
07:45 AM	4	73	6	83	3	4	8	15	11	67	6	84	2	12	7	21	203
08:00 AM	13	64	2	79	3	8	4	15	12	65	1	78	2	22	6	30	202
Total Volume	22	352	50	424	14	17	22	53	63	240	10	313	30	79	41	150	940
% App. Total	5.2	83	11.8		26.4	32.1	41.5		20.1	76.7	3.2		20	52.7	27.3		
PHF	.423	.693	.446	.675	.700	.531	.688	.883	.656	.896	.417	.932	.577	.790	.683	.735	.791

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RF, PA
Counter:TU-0650, TU-0654
Weather:Clear

File Name : FtWeaPap AM
Site Code : 00000003
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Ft. Weaver Road Southbound					Westbound App. Total	Ft. Weaver Road Northbound					Papipi Road Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	0	71	9	0	80	0	28	127	0	7	162	20	0	6	6	32	274
06:15 AM	0	99	13	0	112	0	25	112	0	5	142	26	0	11	10	47	301
06:30 AM	0	91	15	0	106	0	22	107	0	14	143	32	0	16	22	70	319
06:45 AM	0	99	19	0	118	0	24	95	0	30	149	33	0	33	50	116	383
Total	0	360	56	0	416	0	99	441	0	56	596	111	0	66	88	265	1277
07:00 AM	0	162	28	0	190	0	21	169	0	48	238	52	0	32	27	111	539
07:15 AM	0	201	53	0	254	0	21	198	0	83	302	61	0	30	104	195	751
07:30 AM	0	250	44	0	294	0	36	245	0	76	357	43	0	40	61	144	795
07:45 AM	0	174	31	0	205	0	63	301	0	19	383	69	0	34	24	127	715
Total	0	787	156	0	943	0	141	913	0	226	1280	225	0	136	216	577	2800
08:00 AM	0	85	20	0	105	0	25	141	0	16	182	52	0	19	20	91	378
08:15 AM	0	54	16	0	70	0	19	79	0	4	102	25	0	15	5	45	217
08:30 AM	0	75	19	0	94	0	12	72	0	3	87	37	0	15	10	62	243
08:45 AM	0	46	17	0	63	0	22	68	0	1	91	58	6	21	7	92	246
Total	0	260	72	0	332	0	78	360	0	24	462	172	6	70	42	290	1084
Grand Total	0	1407	284	0	1691	0	318	1714	0	306	2338	508	6	272	346	1132	5161
Apprch %	0	83.2	16.8	0		0	13.6	73.3	0	13.1		44.9	0.5	24	30.6		
Total %	0	27.3	5.5	0	32.8	0	6.2	33.2	0	5.9	45.3	9.8	0.1	5.3	6.7	21.9	

Start Time	Ft. Weaver Road Southbound				App. Total	Westbound App. Total	Ft. Weaver Road Northbound				App. Total	Papipi Road Eastbound				Int. Total
	Left	Thru	Right				Left	Thru	Right			Left	Thru	Right		
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 07:00 AM																
07:00 AM	0	162	28		190	0	21	169	0	190	52	0	32		84	464
07:15 AM	0	201	53		254	0	21	198	0	219	61	0	30		91	584
07:30 AM	0	250	44		294	0	36	245	0	281	43	0	40		83	658
07:45 AM	0	174	31		205	0	63	301	0	364	69	0	34		103	672
Total Volume	0	787	156		943	0	141	913	0	1054	225	0	136		361	2358
% App. Total	0	83.5	16.5			0	13.4	86.6	0		62.3	0	37.7			
PHF	.000	.787	.736		.802	.000	.560	.758	.000	.724	.815	.000	.850		.876	.877

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RF, PA
Counter:TU-0650, TU-0654
Weather:Clear

File Name : FtWeaPap PM
Site Code : 00000003
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Ft. Weaver Road Southbound					Westbound App. Total	Ft. Weaver Road Northbound					Papipi Road Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	0	125	35	0	160	0	17	118	0	49	184	64	0	26	18	108	452
03:15 PM	0	130	46	0	176	0	25	96	0	18	139	60	0	22	13	95	410
03:30 PM	0	100	41	0	141	0	39	127	0	15	181	43	0	29	10	82	404
03:45 PM	0	135	49	0	184	0	32	116	0	20	168	50	0	42	15	107	459
Total	0	490	171	0	661	0	113	457	0	102	672	217	0	119	56	392	1725
04:00 PM	0	118	41	0	159	0	49	152	0	25	226	49	0	26	13	88	473
04:15 PM	0	146	43	0	189	0	31	109	0	25	165	52	0	39	3	94	448
04:30 PM	0	114	52	0	166	0	30	127	0	19	176	41	0	34	13	88	430
04:45 PM	0	128	29	0	157	0	30	89	0	23	152	42	0	31	20	93	402
Total	0	506	165	0	671	0	140	487	0	92	719	184	0	130	49	363	1753
05:00 PM	0	143	36	0	179	0	41	114	0	21	176	39	0	36	5	80	435
05:15 PM	0	141	42	0	183	0	29	104	0	9	142	37	0	45	9	91	416
05:30 PM	0	157	36	0	193	0	33	114	0	38	185	40	0	34	19	93	471
05:45 PM	0	124	30	0	154	0	29	112	0	9	150	60	0	42	14	116	420
Total	0	565	144	0	709	0	132	444	0	77	653	176	0	157	47	380	1742
Grand Total	0	1561	480	0	2041	0	385	1388	0	271	2044	577	0	406	152	1135	5220
Apprch %	0	76.5	23.5	0		0	18.8	67.9	0	13.3		50.8	0	35.8	13.4		
Total %	0	29.9	9.2	0	39.1	0	7.4	26.6	0	5.2	39.2	11.1	0	7.8	2.9	21.7	

	Ft. Weaver Road Southbound				Westbound App. Total	Ft. Weaver Road Northbound				Papipi Road Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 03:45 PM														
03:45 PM	0	135	49	184	0	32	116	0	148	50	0	42	92	424
04:00 PM	0	118	41	159	0	49	152	0	201	49	0	26	75	435
04:15 PM	0	146	43	189	0	31	109	0	140	52	0	39	91	420
04:30 PM	0	114	52	166	0	30	127	0	157	41	0	34	75	398
Total Volume	0	513	185	698	0	142	504	0	646	192	0	141	333	1677
% App. Total	0	73.5	26.5			22	78	0		57.7	0	42.3		
PHF	.000	.878	.889	.923	.000	.724	.829	.000	.803	.923	.000	.839	.905	.964

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, RJ
Counter:D4-3889, D4-3890
Weather:Clear

File Name : KapPap AM
Site Code : 00000002
Start Date : 9/20/2012
Page No : 1

Groups Printed- Unshifted																					
Start Time	Kapolei Parkway From North					Papipi Road From East					Halipo Street From South					Papipi Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	3	8	15	3	29	33	6	3	1	43	9	9	1	1	20	1	10	4	1	16	108
06:15 AM	3	6	23	1	33	25	7	2	2	36	10	11	0	1	22	0	6	5	0	11	102
06:30 AM	3	7	47	6	65	36	7	4	0	49	9	18	0	0	27	1	6	8	0	15	156
06:45 AM	2	5	38	3	48	29	6	2	2	39	8	14	0	2	24	0	11	7	0	18	129
Total	11	26	123	15	175	125	26	11	5	167	36	52	1	4	93	2	33	24	1	60	495
07:00 AM	1	14	53	0	68	27	6	2	0	35	8	16	0	2	26	0	14	7	0	21	150
07:15 AM	5	29	87	11	132	40	9	5	2	56	8	15	0	3	26	0	19	2	0	21	235
07:30 AM	9	52	85	18	164	74	13	4	0	91	13	13	0	2	28	1	16	4	0	21	304
07:45 AM	10	44	66	8	128	90	20	7	0	117	14	13	0	1	28	0	7	4	0	11	284
Total	25	139	291	37	492	231	48	18	2	299	43	57	0	8	108	1	56	17	0	74	973
08:00 AM	9	10	31	6	56	51	8	8	0	67	7	12	0	0	19	0	7	7	0	14	156
08:15 AM	5	11	26	1	43	25	12	3	0	40	6	12	0	0	18	1	14	9	0	24	125
08:30 AM	5	5	16	0	26	24	10	4	0	38	9	17	0	0	26	3	12	4	0	19	109
08:45 AM	4	4	24	1	33	36	10	2	0	48	6	3	0	1	10	2	6	9	0	17	108
Total	23	30	97	8	158	136	40	17	0	193	28	44	0	1	73	6	39	29	0	74	498
Grand Total	59	195	511	60	825	492	114	46	7	659	107	153	1	13	274	9	128	70	1	208	1966
Approch %	7.2	23.6	61.9	7.3		74.7	17.3	7	1.1		39.1	55.8	0.4	4.7		4.3	61.5	33.7	0.5		
Total %	3	9.9	26	3.1	42	25	5.8	2.3	0.4	33.5	5.4	7.8	0.1	0.7	13.9	0.5	6.5	3.6	0.1	10.6	

Groups Printed- Unshifted																					
Start Time	Kapolei Parkway From North				Papipi Road From East				Halipo Street From South				Papipi Road From West				Int. Total				
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total					
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	5	29	87	121	40	9	5	54	8	15	0	23	0	19	2	21	219				
07:30 AM	9	52	85	146	74	13	4	91	13	13	0	26	1	16	4	21	284				
07:45 AM	10	44	66	120	90	20	7	117	14	13	0	27	0	7	4	11	275				
08:00 AM	9	10	31	50	51	8	8	67	7	12	0	19	0	7	7	14	150				
Total Volume	33	135	269	437	255	50	24	329	42	53	0	95	1	49	17	67	928				
% App. Total	7.6	30.9	61.6		77.5	15.2	7.3		44.2	55.8	0		1.5	73.1	25.4						
PHF	.825	.649	.773	.748	.708	.625	.750	.703	.750	.883	.000	.880	.250	.645	.607	.798	.817				

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:GC, RJ
Counter:D4-3889, D4-3890
Weather:Clear

File Name : KapPap PM
Site Code : 00000002
Start Date : 9/20/2012
Page No : 1

Groups Printed- Unshifted																					
Start Time	Kapolei Parkway From North					Papipi Road From East					Halipo Street From South					Papipi Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	8	11	41	4	64	48	16	9	0	73	10	12	0	0	22	2	14	5	0	21	180
03:15 PM	7	19	49	3	78	50	14	10	1	75	6	13	0	1	20	1	6	4	0	11	164
03:30 PM	10	20	63	3	96	68	18	6	0	92	7	3	0	3	13	0	13	6	0	19	220
03:45 PM	10	16	63	6	95	87	27	14	0	128	4	13	3	1	21	4	12	5	0	21	265
Total	35	66	216	16	333	253	75	39	1	368	27	41	3	5	76	7	45	20	0	72	849
04:00 PM	13	27	48	1	89	61	21	11	1	94	8	7	0	0	15	1	15	6	0	22	220
04:15 PM	12	20	59	1	92	62	17	10	0	89	5	6	0	0	11	0	15	8	0	23	215
04:30 PM	6	15	46	0	67	67	18	8	0	93	4	11	1	1	17	0	20	8	0	28	205
04:45 PM	16	17	63	1	97	66	13	10	0	89	8	7	0	0	15	0	9	8	0	17	218
Total	47	79	216	3	345	256	69	39	1	365	25	31	1	1	58	1	59	30	0	90	858
05:00 PM	7	33	56	1	97	64	15	4	0	83	4	6	0	1	11	0	14	9	0	23	214
05:15 PM	6	22	51	1	80	55	9	13	0	77	4	6	1	0	13	1	8	6	0	15	185
05:30 PM	10	17	57	0	84	70	16	6	0	92	10	8	1	1	20	2	10	6	0	18	214
05:45 PM	10	20	46	6	82	48	25	6	1	80	9	9	0	0	18	2	13	8	0	23	203
Total	33	92	210	8	343	237	65	29	1	332	27	31	2	2	62	5	45	29	0	79	816
Grand Total	115	237	642	27	1021	746	209	107	3	1065	79	103	6	8	196	13	149	79	0	241	2523
Approch %	11.3	23.2	62.9	2.6		70	19.6	10	0.3		40.3	52.6	3.1	4.1		5.4	61.8	32.8	0		
Total %	4.6	9.4	25.4	1.1	40.5	29.6	8.3	4.2	0.1	42.2	3.1	4.1	0.2	0.3	7.8	0.5	5.9	3.1	0	9.6	

Groups Printed- Unshifted																					
Start Time	Kapolei Parkway From North				App. Total	Papipi Road From East				App. Total	Halipo Street From South				App. Total	Papipi Road From West				App. Total	Int. Total
	Right	Thru	Left			Right	Thru	Left			Right	Thru	Left			Right	Thru	Left			
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	10	20	63	93	68	18	6	92	7	3	0	10	0	13	6	19	214				
03:45 PM	10	16	63	89	67	27	14	128	4	13	3	20	4	12	5	21	258				
04:00 PM	13	27	48	88	61	21	11	93	8	7	0	15	1	15	6	22	218				
04:15 PM	12	20	59	91	62	17	10	89	5	6	0	11	0	15	8	23	214				
Total Volume	45	83	233	361	278	83	41	402	24	29	3	56	5	55	25	85	904				
% App. Total	12.5	23	64.5		69.2	20.6	10.2		42.9	51.8	5.4		5.9	64.7	29.4						
PHF	.865	.769	.925	.970	.799	.769	.732	.785	.750	.558	.250	.700	.313	.917	.781	.924	.875				

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RF
Counter:D4-5675
Weather:Clear

File Name : PapPup AM
Site Code : 00000001
Start Date : 9/20/2012
Page No : 1

Groups Printed- Unshifted

	From North		Papipi Road From East				Pupu Street From South					Papipi Road From West					
Start Time	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	0	6	1	0	7	1	0	0	0	1	0	3	0	0	3	1
06:15 AM	0	0	7	1	1	9	1	0	0	0	1	0	0	0	0	0	10
06:30 AM	0	0	8	1	0	9	2	0	0	2	4	0	4	0	0	4	17
06:45 AM	0	0	3	0	2	5	1	0	1	1	3	0	1	1	0	2	10
Total	0	0	24	3	3	30	5	0	1	3	9	0	8	1	0	9	48
07:00 AM	0	0	1	1	1	3	3	0	0	0	3	0	0	0	0	0	6
07:15 AM	0	0	6	0	1	7	2	0	3	0	5	0	4	0	0	4	16
07:30 AM	0	0	9	3	0	12	1	0	1	0	2	0	4	1	0	5	19
07:45 AM	0	0	15	2	2	19	2	0	0	3	5	0	3	0	0	3	27
Total	0	0	31	6	4	41	6	0	4	3	15	0	11	1	0	12	68
08:00 AM	0	0	11	1	1	13	1	0	0	2	3	0	12	0	5	17	33
08:15 AM	0	0	6	2	0	8	2	0	0	0	2	1	9	0	0	10	20
08:30 AM	0	0	12	0	0	12	2	0	0	0	2	0	6	0	0	6	20
08:45 AM	0	0	9	1	0	10	1	0	0	0	1	0	8	0	3	11	22
Total	0	0	38	4	1	43	6	0	0	2	8	1	35	0	8	44	95
Grand Total	0	0	93	13	8	114	19	0	5	8	32	1	54	2	8	65	211
Approach %	0	0	81.6	11.4	7	59.4	0	15.6	25	15.2	1.5	83.1	3.1	12.3	30.8		
Total %	0	0	44.1	6.2	3.8	54	9	0	2.4	3.8	0.5	25.6	0.9	3.8			

	From North		Papipi Road From East			Pupu Street From South				Papipi Road From West				
Start Time	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:45 AM														
07:45 AM	0	0	15	2	17	2	0	0	2	0	3	0	3	22
08:00 AM	0	0	11	1	12	1	0	0	1	0	12	0	12	25
08:15 AM	0	0	6	2	8	2	0	0	2	1	9	0	10	20
08:30 AM	0	0	12	0	12	2	0	0	2	0	6	0	6	20
Total Volume	0	0	44	5	49	7	0	0	7	1	30	0	31	87
% App. Total		0	89.8	10.2		100	0	0		3.2	96.8	0		
PHF	.000	.000	.733	.625	.721	.875	.000	.000	.875	.250	.625	.000	.646	.870

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By:RF
Counter:D4-5675
Weather:Clear

File Name : PapPup PM
Site Code : 00000001
Start Date : 9/20/2012
Page No : 1

Groups Printed- Unshifted

Start Time	From North	Papipi Road From East					Pupu Street From South					Papipi Road From West					Int. Total
	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	0	10	0	0	10	2	0	0	0	2	0	5	0	1	8	18
03:15 PM	0	0	5	6	1	12	2	0	0	0	2	0	6	0	1	7	21
03:30 PM	0	0	15	1	0	16	5	0	1	2	8	0	11	0	0	11	35
03:45 PM	0	0	24	2	0	26	0	0	0	0	0	0	13	0	0	13	39
Total	0	0	54	9	1	64	9	0	1	2	12	0	35	0	2	37	113
04:00 PM	0	0	13	3	0	16	2	0	0	1	3	1	15	0	0	16	35
04:15 PM	0	0	15	1	0	16	0	0	0	0	0	0	14	0	0	14	30
04:30 PM	0	0	16	4	0	20	0	0	1	0	1	0	13	0	0	13	34
04:45 PM	0	0	5	2	0	7	1	0	0	0	1	0	5	0	0	5	13
Total	0	0	49	10	0	59	3	0	1	1	5	1	47	0	0	48	112
05:00 PM	0	0	13	3	0	16	1	0	1	0	2	1	11	0	0	12	30
05:15 PM	0	0	11	3	0	14	0	0	0	0	0	0	11	0	0	11	25
05:30 PM	0	0	9	3	2	14	2	0	0	0	2	0	9	0	0	9	25
05:45 PM	0	0	13	3	0	16	1	0	0	0	1	0	6	0	0	6	23
Total	0	0	46	12	2	60	4	0	1	0	5	1	37	0	0	38	103
Grand Total	0	0	149	31	3	183	16	0	3	3	22	2	119	0	2	123	328
Approach %	0	0	81.4	16.9	1.6		72.7	0	13.6	13.6		1.6	96.7	0	1.6		
Total %	0	0	45.4	9.5	0.9	55.8	4.9	0	0.9	0.9	6.7	0.6	36.3	0	0.6	37.5	

	From North		Papipi Road From East			Pupu Street From South				Papipi Road From West				
Start Time	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 03:45 PM														
03:45 PM	0	0	24	2	26	0	0	0	0	0	13	0	13	39
04:00 PM	0	0	13	3	16	2	0	0	2	1	15	0	16	34
04:15 PM	0	0	15	1	16	0	0	0	0	0	14	0	14	30
04:30 PM	0	0	16	4	20	0	0	1	1	0	13	0	13	34
Total Volume	0	0	68	10	78	2	0	1	3	1	55	0	56	137
% App. Total		0	87.2	12.8		66.7	0	33.3		1.8	98.2	0		
PHF	.000	.000	.708	.625	.750	.250	.000	.250	.375	.250	.917	.000	.875	.878

APPENDIX B LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10.0
B	>10.0 and ≤20.0
C	>20.0 and ≤35.0
D	>35.0 and ≤55.0
E	>55.0 and ≤80.0
F	>80.0

Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group.

Level of Service A describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

Table 1: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤ 10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

CAPACITY ANALYSIS CALCULATIONS

1: Kapolei Pkwy & Keaunui Dr

Measure	EB	EBT	EBR	WBL	WBT	WBR	REL	NBL	NBR	SBL	SBR
Lane Configurations											
Volume (vph)	108	54	60	48	45	265	95	707	50	50	414
ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.91	1.00
Frb. ped/bikes	1.00	0.90	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.94	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.92	1.00	1.00	0.85	1.00	0.85	0.99	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Said Flow (prot)	1770	1543	1770	1863	1497	1770	1770	4990	4621	1770	4621
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Said Flow (perm)	1770	1543	1770	1863	1497	1770	1770	4990	4621	1770	4621
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	133	67	74	59	56	327	117	873	62	62	511
RTOR Reduction (vph)	0	46	0	0	0	0	0	8	0	0	49
Lane Group Flow (vph)	133	95	0	59	56	327	117	927	0	62	860
Confl. Pcnts. (#/hr)		147				145			56		131
Turn Type	Split	NA	Split	NA	Free	Prot	NA	Prot	NA	Prot	NA
Protected Phases	4	4	8	8	5	2	5	2	1	1	6
Permitted Phases						Free					
Actuated Green, G (s)	10.7	10.7	6.2	6.2	66.9	7.8	25.9	4.1	22.2	4.1	22.2
Effective Green, g (s)	10.7	10.7	6.2	6.2	66.9	7.8	25.9	4.1	22.2	4.1	22.2
Actuated g/C Ratio	0.16	0.16	0.09	0.09	1.00	0.12	0.39	0.06	0.33	0.06	0.33
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	283	246	164	172	1497	206	1931	106	1533	106	1533
v/s Ratio Prot	0.08	0.08	0.03	0.03	0.03	0.07	0.19	0.04	0.13	0.04	0.13
v/s Ratio Perm					0.22						
v/c Ratio	0.47	0.39	0.36	0.33	0.22	0.57	0.48	0.57	0.39	0.57	0.39
Uniform Delay, d1	25.5	25.2	28.5	28.4	0.0	28.0	15.4	30.6	17.2	30.6	17.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.0	1.4	1.1	0.3	3.6	0.2	7.2	0.2	7.2	0.2
Delay (s)	26.8	26.2	29.8	29.5	0.3	31.5	15.6	37.7	17.3	37.7	17.3
Level of Service	C	C	C	C	A	C	B	D	B	D	B
Approach Delay (s)		26.5		8.0			17.4		19.1		19.1
Approach LOS		C		A			B		B		B
Accession Summary											
HCN 2000 Control Delay			17.2	HCN 2000 Level of Service				B			
HCN 2000 Volume to Capacity ratio			0.51								
Actual Cycle Length (s)			66.9	Sum of lost time (s)				20.0			
Intersection Capacity Utilization			44.4%	ICU Level of Service				A			
Analysis Period (min)			15								
Critical Lane Group											

HCM Signalized Intersection Capacity Analysis

1: Kapolei Pkwy & Keaunui Dr

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗
Volumes (vph)	0	0	1	96	0	47	1	491	35	58	717	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frpb, ped/bikes	0.97	1.00	1.00	0.97	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.85	1.00	1.00	0.85	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1536	1770	1770	1539	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1536	1770	1770	1539	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	1	97	0	47	1	496	35	59	724	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	7	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	97	0	47	1	524	0	59	724	0	0	0
Conf. Peds. (#/hr)	19	55	55	55	55	55	51	51	51	51	51	51	51	51
Turn Type	Split	NA	Split	8	8	8	Free	Prot	NA	Prot	NA	Prot	NA	Prot
Protected Phases	4	4	8	8	8	8	Free	5	2	1	6	1	6	6
Permitted Phases	4	4	8	8	8	8	Free	5	2	1	6	1	6	6
Actuated Green, G (s)	0.7	6.6	6.6	52.1	0.8	21.9	0.8	21.9	2.9	24.0	2.9	24.0	2.9	24.0
Effective Green, g (s)	0.7	6.6	6.6	52.1	0.8	21.9	0.8	21.9	2.9	24.0	2.9	24.0	2.9	24.0
Actuated g/C Ratio	0.01	0.13	0.13	1.00	0.02	0.42	0.06	0.46	0.06	0.46	0.06	0.46	0.06	0.46
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	20	224	224	1539	27	2102	27	2102	98	2342	98	2342	98	2342
v/s Ratio Prot	0.00	c0.05	c0.05	c0.03	0.00	0.10	c0.03	c0.14	0.00	0.10	c0.03	c0.14	0.00	0.10
v/s Ratio Perm	0.00	0.43	0.43	0.03	0.04	0.25	0.03	0.25	0.60	0.31	0.60	0.31	0.60	0.31
Uniform Delay, d1	25.4	21.0	21.0	0.0	25.3	9.8	0.0	25.3	24.0	8.8	24.0	8.8	24.0	8.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.3	1.3	0.0	0.6	0.1	0.0	0.6	10.0	0.1	10.0	0.1	10.0	0.1
Delay (s)	25.4	22.4	22.4	0.0	25.8	9.8	0.0	25.8	34.0	8.9	34.0	8.9	34.0	8.9
Level of Service	C	C	C	A	C	A	A	C	C	A	C	A	C	A
Approach Delay (s)	25.4	15.1	15.1	0.0	25.8	9.8	0.0	25.8	10.8	8.9	10.8	8.9	10.8	8.9
Approach LOS	C	B	B	A	C	A	A	C	B	A	B	A	B	A
Intersection Summary														
HCM 2000 Control Delay	10.9													
HCM 2000 Level of Service	B													
HCM 2000 Volume to Capacity ratio	0.38													
Actuated Cycle Length (s)	52.1													
Sum of lost time (s)	20.0													
Intersection Capacity Utilization	42.8%													
ICU Level of Service	A													
Analysis Period (min)	15													
Critical Lane Group	c													

HCM Unsignalized Intersection Capacity Analysis

2: Kapolei Pkwy & Kai 'Oli St

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4	4	1	96	0	47	1	491	35	58	717	0	0	
Volume (veh/h)	38	2	21	2	3	170	12	534	2	54	527	14	14	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	
Hourly flow rate (vph)	44	2	24	2	3	198	14	621	2	63	613	16	16	
Pedestrians	106	128	128	128	128	128	128	128	128	128	128	128	128	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Percent Blockage	10	12	12	12	12	12	12	12	12	12	12	12	12	
Right turn flare (veh)														
Median type														
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked	1415	1632	360	1175	1639	464	735	751	751	751	751	751	751	
VC, conflicting volume	1415	1632	360	1175	1639	464	735	751	751	751	751	751	751	
VC1, stage 1 conf vol	1415	1632	360	1175	1639	464	735	751	751	751	751	751	751	
VC2, stage 2 conf vol	1415	1632	360	1175	1639	464	735	751	751	751	751	751	751	
VCu, unblocked vol	1415	1632	360	1175	1639	464	735	751	751	751	751	751	751	
IC, single (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
IC, 2 stage (s)	15	98	96	98	97	59	98	92	92	92	92	92	92	
IC queue free %	52	114	609	127	113	480	779	750	750	750	750	750	750	
IC capacity (veh/h)	71	253	14	243	245	177	53	145	244	145	244	145	244	
Volume Left	44	2	14	0	0	0	0	0	0	0	0	0	0	
Volume Right	24	198	0	0	0	2	0	0	0	0	16	16	16	
CSH	78	442	779	1700	1700	1700	750	1700	1700	1700	1700	1700	1700	
Volume to Capacity	0.91	0.46	0.02	0.15	0.15	0.07	0.08	0.14	0.14	0.08	0.14	0.08	0.14	
Queue Length 95th (ft)	119	59	1	0	0	0	7	0	0	0	0	0	0	
Control Delay (s)	171.7	19.9	9.7	0.0	0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	
Lane LOS	F	C	A	A	A	B	B	B	B	B	B	B	B	
Approach Delay (s)	171.7	19.9	0.2	0.0	0.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
Approach LOS	F	C	C	A	A	B	B	B	B	B	B	B	B	
Intersection Summary														
Average Delay	10.6													
Intersection Capacity Utilization	55.8%													
ICU Level of Service	B													
Analysis Period (min)	15													
User Entered Value														

HCM Unsignalized Intersection Capacity Analysis

2: Kapolei Pkwy & Kai 'Oli St

2/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBB
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	25	0	11	2	0	25	9	440	3	44	791	48
Sign Control	Stop	0%	Stop	0%	Stop	0%	Free	0%	Free	0%	Free	0%
Grade	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Peak Hour Factor	27	0	12	2	0	27	10	478	3	48	860	52
Hourly flow rate (vph)	41	43	43	43	43	43	26	26	26	26	43	43
Pedestrians	120	120	120	120	120	120	120	120	120	120	120	120
Lane Width (ft)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3	2	2	2	2	2	2
Right turn flare (veh)	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh
Median type	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)	Upstream signal (ft)
Upstream signal (ft)	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked	pX platoon unblocked
pX platoon unblocked	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume	VC, conflicting volume
VC, conflicting volume	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol	VC1, stage 1 conf vol
VC1, stage 1 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol	VC2, stage 2 conf vol
VC2, stage 2 conf vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol	VCU, unblocked vol
VCU, unblocked vol	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)	IC, single (s)
IC, single (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)	IC, 2 stage (s)
IC, 2 stage (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)	IF (s)
IF (s)	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %	p0 queue free %
p0 queue free %	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)	GM capacity (veh/h)
GM capacity (veh/h)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)	Intersection Delay (s)
Intersection Delay (s)	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total	Volume Total
Volume Total	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left	Volume Left
Volume Left	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right	Volume Right
Volume Right	cSH	cSH	cSH	cSH	cSH	cSH	cSH	cSH	cSH	cSH	cSH	cSH
cSH	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity	Volume to Capacity
Volume to Capacity	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)	Queue Length 95th (ft)
Queue Length 95th (ft)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)	Control Delay (s)
Control Delay (s)	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS	Lane LOS
Lane LOS	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)	Approach Delay (s)
Approach Delay (s)	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS	Approach LOS
Approach LOS	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay	Average Delay
Average Delay	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization	Intersection Capacity Utilization
Intersection Capacity Utilization	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)
Analysis Period (min)	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value	* User Entered Value

HCM Signalized Intersection Capacity Analysis

9: Fort Weaver Rd & Keoneula Blvd/Hanakahi St

2/19/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBB
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Volume (vph)	370	107	120	10	100	316	111	954	12	150	936	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.80	1.00	0.96
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	0.97	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1722	1454	1854	1563	1770	3539	1273	1770	3539	1520	1520
Flt Permitted	0.95	0.97	1.00	1.00	1.00	1.00	1.00	0.11	1.00	1.00	0.09	1.00
Satd. Flow (perm)	1681	1722	1454	1854	1563	1770	3539	1273	1770	3539	1520	1520
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	430	124	140	12	116	367	129	1109	14	174	1088	229
RTOR Reduction (vph)	0	0	115	0	0	97	0	0	9	0	0	138
Lane Group Flow (vph)	275	279	25	0	128	270	129	1109	5	174	1088	91
Conf. Peds. (#/hr)	35	35	35	35	35	35	35	35	35	35	35	35
Turn Type	Split	NA	Perm	Split	NA	Perm	pm-pt	NA	Perm	pm-pt	NA	Perm
Protected Phases	8	8	8	8	8	8	5	2	2	1	6	6
Permitted Phases	19.4	19.4	19.4	19.4	19.4	19.4	20.1	47.0	41.0	41.0	51.0	43.0
Actuated Green, G (s)	19.4	19.4	19.4	19.4	19.4	19.4	20.1	47.0	41.0	41.0	51.0	43.0
Effective Green, g (s)	19.4	19.4	19.4	19.4	19.4	19.4	20.1	47.0	41.0	41.0	51.0	43.0
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.43	0.38	0.38	0.47	0.40
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vphpl)	300	307	259	343	293	376	1337	481	199	1402	602	602
v/s Ratio Prot	0.16	0.16	0.16	0.07	0.07	0.04	0.31	0.06	0.31	0.06	0.31	0.06
v/s Ratio Perm	0.92	0.91	0.10	0.02	0.02	0.17	0.28	0.00	0.35	0.06	0.35	0.06
Uniform Delay, d1	43.8	43.7	37.2	38.7	43.4	22.3	30.6	21.1	22.8	28.6	21.0	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	28.8	0.2	0.7	32.7	14.6	6.1	0.0	31.9	4.3	0.5	0.5
Delay (s)	74.7	72.5	37.4	39.4	76.1	36.8	36.7	21.1	54.7	32.8	21.6	21.6
Level of Service	E	E	D	D	E	D	D	C	D	C	C	C
Approach Delay (s)	66.3	66.3	66.6	66.6	66.6	66.6	36.5	36.5	36.5	36.5	36.5	36.5
Approach LOS	E	E	E	E	E	E	D	D	D	D	C	C
Intersection Summary												
HCM 2000 Control Delay	44.5											
HCM 2000 Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	108.5											
Intersection Capacity Utilization	71.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 9: Fort Weaver Rd & Keoneula Blvd/Hanakahi St

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Volume (vph)	190	80	85	10	71	203	57	737	5	319	922	230	190	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	0.98	1.00	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1734	1512	1852	1583	1770	3539	1440	1770	3539	1523	1681	1734	1512
Flt Permitted	0.95	0.98	1.00	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1734	1512	1852	1583	1770	3539	1440	1770	3539	1523	1681	1734	1512
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	198	83	89	10	74	211	59	768	5	332	960	240	198	198
RTOR Reduction (vph)	0	0	78	0	0	155	0	0	0	3	0	0	0	112
Lane Group Flow (vph)	139	142	11	0	84	56	59	768	2	332	960	128	139	139
Confl. Peds. (#/hr)	18	18	18	18	18	18	23	23	18	18	18	18	18	18
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA
Protected Phases	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Permitted Phases	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	12.8	12.8	12.8	10.2	10.2	45.2	41.4	41.4	62.3	53.5	53.5	53.5	12.8	12.8
Effective Green, g (s)	12.8	12.8	12.8	10.2	10.2	45.2	41.4	41.4	62.3	53.5	53.5	53.5	12.8	12.8
Actuated g/C Ratio	0.13	0.13	0.13	0.10	0.10	0.45	0.41	0.41	0.62	0.53	0.53	0.53	0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	214	221	192	188	180	289	1460	594	477	1887	812	214	214	214
v/s Ratio Prot	c0.08	0.08	0.01	c0.05	0.01	0.22	c0.11	c0.11	0.27	0.08	0.08	0.01	c0.08	0.08
v/s Ratio Perm	0.01	0.01	0.01	0.04	0.04	0.08	0.00	0.32	0.00	0.32	0.08	0.01	0.01	0.01
Uniform Delay, d1	0.85	0.64	0.06	0.45	0.35	0.20	0.53	0.00	0.70	0.51	0.16	0.85	0.85	0.85
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	6.3	0.1	1.7	1.3	0.4	1.4	0.0	4.4	1.0	0.4	6.6	6.6	6.6
Delay (s)	48.3	47.8	38.6	44.1	43.3	16.0	23.5	17.3	16.1	16.0	12.3	48.3	48.3	48.3
Level of Service	D	D	D	D	D	B	C	B	B	B	B	D	D	D
Approach Delay (s)	45.8	45.8	45.8	43.5	43.5	22.9	22.9	22.9	15.4	15.4	15.4	45.8	45.8	45.8
Approach LOS	D	D	D	D	D	C	C	C	B	B	B	D	D	D
Intersection Summary														
HCM 2000 Control Delay	23.9													
HCM 2000 Volume to Capacity ratio	0.68													
Actuated Cycle Length (s)	100.3													
Intersection Capacity Utilization	64.6%													
Analysis Period (min)	15													
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis 8: Kaalelea Dr & Keoneula Blvd

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Volume (vph)	108	217	28	40	231	147	121	115	244	131	67	124	190	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.94	1.00	0.94	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.94	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	1.00
Satd. Flow (prot)	1770	3539	1432	1770	3190	1709	1480	1764	1303	1770	3539	1432	1770	3539
Flt Permitted	0.43	1.00	1.00	0.57	1.00	1.00	0.71	1.00	0.59	1.00	0.59	1.00	0.59	1.00
Satd. Flow (perm)	807	3539	1432	1063	3190	1299	1480	1068	1303	807	3539	1432	807	3539
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	148	297	38	55	316	201	166	158	334	179	92	170	190	190
RTOR Reduction (vph)	0	0	25	0	99	0	0	0	128	0	0	92	0	92
Lane Group Flow (vph)	148	297	13	55	418	0	324	205	0	271	78	148	148	148
Confl. Peds. (#/hr)	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Effective Green, g (s)	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	285	1252	506	376	1129	568	679	490	597	285	1252	506	285	1252
v/s Ratio Prot	c0.18	0.08	0.01	0.05	0.13	c0.26	0.14	0.25	0.06	c0.18	0.08	0.01	c0.18	0.08
v/s Ratio Perm	0.52	0.24	0.03	0.15	0.37	0.57	0.30	0.55	0.13	0.52	0.24	0.03	0.52	0.24
Uniform Delay, d1	13.7	12.2	11.3	11.8	12.8	10.6	9.1	10.5	8.3	13.7	12.2	11.3	13.7	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.0	0.2	0.2	1.4	0.3	1.4	0.1	1.6	0.1	0.0	1.6	0.1
Delay (s)	15.3	12.3	11.3	11.9	13.0	12.0	9.3	11.8	8.4	15.3	12.3	11.3	15.3	12.3
Level of Service	B	B	B	B	B	B	A	B	A	B	B	B	B	A
Approach Delay (s)	13.1	13.1	12.9	12.9	12.9	10.6	10.5	10.5	10.5	13.1	13.1	12.9	13.1	13.1
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary														
HCM 2000 Control Delay	11.8													
HCM 2000 Volume to Capacity ratio	0.55													
Actuated Cycle Length (s)	53.4													
Intersection Capacity Utilization	58.0%													
Analysis Period (min)	15													
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

8: Kalleolea Dr & Keoneula Blvd

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗	↖	↗	↖
Volume (vph)	32	217	45	134	166	61	38	27	101	69	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.96	1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Satd. Flow (prot)	1770	3539	1554	1770	3369	1798	1554	1795	1544	1795	1544
Flt Permitted	0.60	1.00	1.00	0.61	1.00	0.76	1.00	0.76	1.00	0.76	1.00
Satd. Flow (perm)	1126	3339	1554	1138	3369	1404	1554	1403	1544	1403	1544
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	226	47	140	173	64	40	28	105	72	35
RTOR Reduction (vph)	0	0	24	0	32	0	0	0	88	0	56
Lane Group Flow (vph)	33	226	23	140	205	0	68	17	0	107	11
Conf. Peds. (#/hr)	12	12	12	12	12	12	12	12	12	12	24
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	8	2	2	6	6	6	6
Permitted Phases	14.4	14.4	14.4	14.4	14.4	4.7	4.7	4.7	4.7	4.7	4.7
Actuated Green, G (s)	14.4	14.4	14.4	14.4	14.4	4.7	4.7	4.7	4.7	4.7	4.7
Effective Green, g (s)	0.49	0.49	0.49	0.49	0.49	0.16	0.16	0.16	0.16	0.16	0.16
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	557	1751	768	563	1667	226	250	226	249	226	249
v/s Ratio Prot	0.06	0.01	0.01	0.01	0.06	0.05	0.01	0.05	0.01	0.05	0.01
v/s Ratio Perm	0.06	0.13	0.03	0.25	0.12	0.30	0.07	0.30	0.07	0.30	0.04
Uniform Delay, d1	3.8	4.0	3.8	4.2	4.0	10.8	10.3	11.1	10.3	11.1	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	0.0	0.2	0.0	0.8	0.1	0.8	0.1	0.8	0.1
Delay (s)	3.9	4.0	3.8	4.5	4.0	11.5	10.5	12.6	10.4	12.6	10.4
Level of Service	A	A	A	A	A	B	B	B	B	B	B
Approach Delay (s)	4.0	4.2	4.0	4.2	4.0	10.9	10.9	11.8	11.8	11.8	11.8
Approach LOS	A	A	A	A	A	B	B	B	B	B	B
Intersection Summary											
HCM 2000 Control Delay	6.5										
HCM 2000 Volume to Capacity ratio	0.30										
Actuated Cycle Length (s)	29.1										
Intersection Capacity Utilization	41.2%										
Analysis Period (min)	15										
Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

7: Keoneula Blvd & Kaipalaoa St

2/19/2013

Movement	EBL	EBT	EBL	WBL	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗
Volume (veh/h)	7	293	313	156	64	2
Sign Control	Free	Free	Free	Stop	Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	
Hourly flow rate (vph)	10	401	429	214	88	3
Pedestrians		10	10		10	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		1	1		1	
Right turn flare (veh)		None	None			
Median type		None	None			
Median storage (veh)			896			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	652				775	341
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC, unblocked vol	652				775	341
tC, single (s)	4.1				5.8	5.9
tC, 2 stage (s)						
tE (s)	2.2				3.5	3.3
p0 queue free %	99				78	100
cM capacity (veh/h)	921				406	709
Direction Summary						
Volume Total	10	201	201	286	357	90
Volume Left	10	0	0	0	0	88
Volume Right	0	0	0	0	214	3
cSH	921	1700	1700	1700	1700	411
Volume to Capacity	0.01	0.12	0.12	0.17	0.21	0.22
Queue Length 95th (ft)	1	0	0	0	0	21
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	16.2
Lane LOS	A	A	A	A	C	C
Approach Delay (s)	0.2			0.0		16.2
Approach LOS						C
Intersection Summary						
Average Delay	1.4					
Intersection Capacity Utilization	27.1%					
Analysis Period (min)	15					
User Entered Value						

HCM Unsignalized Intersection Capacity Analysis

7: Keoneula Blvd & Kaipalaoa St

2/19/2013



Movement	EBL	EBT	WBT	WBL	SR	SPR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	4	240	216	35	27	3
Sign Control	Free	Free	Free	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	4	264	237	38	30	3
Pedestrians		21	21		21	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		None	None		None	
Median storage (veh)						
Upstream signal (ft)			896			
pX platoon unblocked						
YC conflicting volume		297			439	180
YC2, stage 1 cont vol						
YC2, unblocked vol		297			439	180
YC, single (s)		4.1			5.8	5.9
YC, 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		100			95	100
CM capacity (veh/h)		1239			596	846
Volume Left		4	112	130	11	30
Volume Right		0	0	0	0	38
CSH		1239	1700	1700	1700	614
Volume to Capacity		0.00	0.08	0.08	0.07	0.05
Queue Length 95th (ft)		0	0	0	0	4
Control Delay (s)		7.9	0.0	0.0	0.0	11.2
Lane LOS		A			B	
Approach Delay (s)		0.1		0.0	11.2	B

Intersection Summary		
Average Delay	0.7	
Intersection Capacity Utilization	25.4%	A
Analysis Period (min)	15	

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

6: Kapolei Pkwy & Keoneula Blvd

2/19/2013



Movement	EBL	EBT	WBT	WBL	SR	SPR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	99	102	64	25	48	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	105	109	68	27	51	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX platoon unblocked						
YC conflicting volume		282	323	336	165	174
YC2, stage 1 cont vol		105	27	49	165	0
YC2, unblocked vol		68	246	32	0	0
YC, single (s)		-0.04	-0.41	0.01	0.53	0.03
YC, 2 stage (s)						
IF (s)		7.0	6.5	6.9	7.9	7.4
p0 queue free %		0.55	0.59	0.65	0.36	0.36
CM capacity (veh/h)		466	502	474	408	436
Control Delay (s)		18.0	18.3	21.8	14.2	13.3
Approach Delay (s)		18.0	18.3	21.8	13.7	
Approach LOS		C	C	C	B	
Volume Left		105	27	49	165	0
Volume Right		68	246	32	0	0
Departure Headway (s)		7.0	6.5	6.9	7.9	7.4
Degree Utilization, x		0.55	0.59	0.65	0.36	0.36
Capacity / veh/h		466	502	474	408	436
Control Delay (s)		18.0	18.3	21.8	14.2	13.3
Approach Delay (s)		18.0	18.3	21.8	13.7	
Approach LOS		C	C	C	B	
Intersection Summary						
Delay					17.9	
Level of Service					C	
Intersection Capacity Utilization					84.1%	E
Analysis Period (min)					15	

HCM Unsignalized Intersection Capacity Analysis

6: Kapolei Pkwy & Keoneula Blvd

2/20/2013

Volume	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SSB
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	99	102	64	25	48	231	46	240	30	0	164
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	105	109	68	27	51	246	49	255	32	0	174
Directional Lane	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SSB	SSB	SSB
Volume Total (vph)	282	323	336	174	163						
Volume Left (vph)	105	27	49	0	0						
Volume Right (vph)	68	246	32	0	163						
Had (s)	-0.04	-0.41	0.01	0.03	-0.67						
Departure Headway (s)	6.8	6.4	6.8	7.4	6.6						
Degree Utilization, x	0.53	0.57	0.64	0.36	0.30						
Capacity (veh/h)	473	510	492	436	479						
Control Delay (s)	17.4	17.6	21.0	13.2	11.3						
Approach Delay (s)	17.4	17.6	21.0	12.2							
Approach LOS	C	C	C	B							
Intersection Summary											
Delay				17.1							
Level of Service				C							
Intersection Capacity Utilization				84.1%							
Analysis Period (min)				15							

HCM Unsignalized Intersection Capacity Analysis

6: Kapolei Pkwy & Keoneula Blvd

2/19/2013

Volume	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SSB
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	64	147	27	20	41	143	23	298	18	158	245
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	67	153	28	21	43	149	24	310	19	165	255
Directional Lane	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SSB	SSB	SSB
Volume Total (vph)	248	213	353	165	255						
Volume Left (vph)	67	21	24	165	0						
Volume Right (vph)	28	149	19	0	0						
Had (s)	0.02	-0.37	0.02	0.53	0.03						
Departure Headway (s)	6.8	6.5	6.4	7.3	6.8						
Degree Utilization, x	0.47	0.39	0.63	0.33	0.48						
Capacity (veh/h)	476	480	527	464	491						
Control Delay (s)	15.6	13.6	19.8	12.8	14.8						
Approach Delay (s)	15.6	13.6	19.8	14.0							
Approach LOS	C	B	C	B							
Intersection Summary											
Delay				15.9							
Level of Service				C							
Intersection Capacity Utilization				68.2%							
Analysis Period (min)				15							

HCM Unsignalized Intersection Capacity Analysis

6: Kapolei Pkwy & Keoneula Blvd

2/20/2013

[illegible]

HCM Unsignalized Intersection Capacity Analysis

5: Keoneula Blvd & Kai 'Oli St

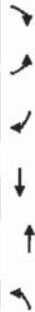
2/19/2013

Movement	EB	EB	WB	WB	SB	SB
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	0	284	149	7	0	1
Sign Control		Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	312	164	8	0	1
Pedestrians		30	10		30	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		3.5	3.5		3.5	
Percent Blockage		3	1		3	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
YC, conflicting volume	201				364	146
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	201				364	146
IC, single (s)	4.1				6.8	5.9
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
pd queue free %	100				100	100
CM capacity (veh/h)	1329				586	861
Directional Capacity						
Volume Total	156	156	109	62	1	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	8	1	
Volume SH	1700	1700	1700		861	
Volume to Capacity	0.09	0.09	0.06	0.04	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	9.2	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.2	
Approach LOS					A	
Intersection Summary						
Average Delay					0.0	
Intersection Capacity Utilization					26.4%	ICU Level of Service
Analysis Period (min)					15	A
User Entered Value						

HCM Unsignalized Intersection Capacity Analysis

5: Keoneula Blvd & Kai 'Oli St

2/19/2013



Movement	EB	EBT	WB	WBT	WB	WB	SB	SB
Lane Configurations		↑↑		↑↑			↑	
Volume (veh/h)	0	252	193	7	0	5		
Sign Control		Free	Free	Free	Stop			
Grade		0%	0%	0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92			
Hourly flow rate (vph)	0	274	210	8	0	5		
Pedestrians		30	10		30			
Lane Width (ft)		12.0	12.0		12.0			
Walking Speed (ft/s)		4.0	4.0		4.0			
Percent Blockage		3	1		3			
Right turn flare (veh)								
Median type		None		None				
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
VC, conflicting volume	247				391	169		
VC1, stage 1 conf vol								
VC2, stage 2 conf vol								
VC, unblocked vol	247				391	169		
IC, single (s)	4.1				6.8	5.9		
IC, 2 stage (s)								
IF (s)	2.2				3.5	3.3		
p0 queue free %	100				100	99		
cM capacity (veh/h)	1283				566	844		
Intersection Summary								
Volume Total	137	137	140	78	5			
Volume Left	0	0	0	0	0			
Volume Right	0	0	0	0	8	5		
cSH	1700	1700	1700	1700	844			
Volume to Capacity	0.08	0.08	0.08	0.05	0.01			
Queue Length 95th (ft)	0	0	0	0	0			
Control Delay (s)	0.0	0.0	0.0	0.0	9.3			
Lane LOS					A			
Approach Delay (s)	0.0		0.0		9.3			
Approach LOS					A			
Intersection Summary								
Average Delay					0.1			
Intersection Capacity Utilization					26.8%		ICU Level of Service	A
Analysis Period (min)					15			
User Entered Value								

HCM Unsignalized Intersection Capacity Analysis

4: Kamakana St & Keoneula Blvd

2/19/2013



Movement	EB	EBT	EBF	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	4P			1P			4P			4P	
Volume (veh/h)	2	79	1	32	74	52	2	3	66	127	2
Sign Control	Free			Free			Stop			Stop	
Grade	0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	2	95	1	39	89	63	2	4	80	153	2
Pedestrians	23			26			15			26	
Lane Width (ft)	12.0			12.0			12.0			12.0	
Walking Speed (ft/s)	3.5			3.5			3.5			3.5	
Percent Blockage	2			2			1			2	
Right turn flare (veh)											
Median type	None			None							
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked	178			111			265	371	89	383	340
vC, conflicting volume	178			111			265	371	89	383	340
vC1, stage 1 conf vol	4.1			4.1			6.5	5.5	5.9	6.5	5.5
vC2, stage 2 conf vol	2.2			2.2			3.5	4.0	3.3	3.5	4.0
IC, unblocked vol	100			97			100	99	92	70	100
IC, single (s)	1361			1455			654	580	938	505	598
IC, 2 stage (s)											
IF (s)											
p0 queue free %											
cM capacity (veh/h)											
Intersection Summary											
Volume Total	50	49	39	59	92	86	159				
Volume Left	2	0	39	0	0	2	153				
Volume Right	0	1	0	0	63	80	4				
cSH	1361	1700	1455	1700	1700	904	511				
Volume to Capacity	0.00	0.03	0.03	0.03	0.05	0.09	0.31				
Queue Length 95th (ft)	0	0	2	0	0	8	33				
Control Delay (s)	0.4	0.0	7.5	0.0	0.0	9.4	15.2				
Lane LOS	A	A	A	A	A	A	C				
Approach Delay (s)	0.2		1.5			9.4	15.2				
Approach LOS						A	C				
Intersection Summary											
Average Delay	6.6						A				
Intersection Capacity Utilization	32.0%						A				
Analysis Period (min)	15										
User Entered Value											

HCM Unsignalized Intersection Capacity Analysis

4: Kamakana St & Keoneula Blvd

2/19/2013

Movement	EBL	EBT	EBP	WBL	WBT	WBP	NBL	NBT	NBP	SBL	SBP	SRT
Lane Configurations	4T	4T	1	43	64	83	0	4	28	75	1	2
Volume (veh/h)	3	161	1	43	64	83	0	4	28	75	1	2
Sign Control	Free	Free		Free	Free		Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%		0%	0%		0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	4	196	1	52	78	101	0	5	34	91	1	2
Pedestrians	26			23			17				26	
Lane Width (ft)	12.0			12.0			12.0				12.0	
Walking Speed (ft/s)	4.0			4.0			4.0				4.0	
Percent Blockage	2			2			1				2	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked	205			215			394	531	139	425	481	142
VC, conflicting volume												
vC1, stage 1 conf vol	205			215			394	531	139	425	481	142
vC2, stage 2 conf vol	4.1			4.1			7.5	5.5	5.9	6.5	5.5	5.9
vC, unblocked vol												
IC, single (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
IC, 2 stage (s)												
IF (s)	100			96			100	99	96	82	100	100
p0 queue free %	1334			1334			488	487	890	501	513	878
cM capacity (veh/h)												
Analysis Summary	EBL	EBT	WBL	WBT	WBP	NBL	NBT	SBL	SBP			
Volume Total	102	99	52	52	127	39	95					
Volume Left	4	0	52	0	0	0	91					
Volume Right	0	1	0	0	101	34	2					
cSH	1334	1700	1334	1700	1700	806	507					
Volume to Capacity	0.00	0.06	0.04	0.03	0.07	0.05	0.19					
Queue Length 95th (ft)	0	0	3	0	0	4	17					
Control Delay (s)	0.3	0.0	7.8	0.0	0.0	9.7	13.7					
Lane LOS	A	A	A	A	A	B	B					
Approach Delay (s)	0.2	1.8		9.7	13.7							
Approach LOS				A	B							
Intersection Summary												
Average Delay	3.7											
Intersection Capacity Utilization	40.5%											
Analysis Period (min)	15											
User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

3: Kaiwawalo St & Keoneula Blvd

2/19/2013

Movement	EBL	EBT	EBP	WBL	WBT	WBP	NBL	NBT	NBP	SBL	SBT	SBP
Lane Configurations	4P	4	4	4	11	34	55	3	6	16	53	9
Volume (veh/h)	6	4	4	4	11	34	55	3	6	16	53	9
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	4	4	4	12	38	61	3	7	18	59	10
Pedestrians	10			18			18		18		18	
Lane Width (ft)	12.0			12.0			12.0		12.0		12.0	
Walking Speed (ft/s)	3.5			3.5			3.5		3.5		3.5	
Percent Blockage	1			2			2		2		2	
Right turn flare (veh)												
Median type	None			None			None					
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked	117			27			100		179	40	165	151
VC, conflicting volume												
vC1, stage 1 conf vol	117			27			100		179	40	165	151
vC2, stage 2 conf vol	4.1			4.1			6.5		5.5	5.9	5.5	5.9
vC, unblocked vol												
IC, single (s)	2.2			2.2			3.5		4.0	3.3	4.0	3.3
IC, 2 stage (s)												
IF (s)	100			99			100		99	98	92	99
p0 queue free %	1444			1558			831		717	999	747	737
cM capacity (veh/h)												
Analysis Summary												
Volume Total	9	7	12	25	74	28	72					
Volume Left	7	0	12	0	0	3	59					
Volume Right	0	4	0	0	61	18	3					
cSH	1444	1700	1558	1700	1700	893	753					
Volume to Capacity	0.00	0.00	0.01	0.01	0.04	0.03	0.10					
Queue Length 95th (ft)	0	0	1	0	0	2	8					
Control Delay (s)	5.6	0.0	7.3	0.0	0.0	9.2	10.3					
Lane LOS	A	A	A	A	A	B	B					
Approach Delay (s)	3.2	0.8		9.2	10.3							
Approach LOS				A	B							
Intersection Summary												
Average Delay	5.0											
Intersection Capacity Utilization	27.8%											
Analysis Period (min)	15											
User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

2/19/2013

3: Kaiwalo St & Keoneula Blvd

Approach	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4P	4P	1	1	1	1	1	1	1	1	1	1	1	1
Volume (veh/h)	9	40	1	16	6	37	0	2	16	98	4	16		
Sign Control	Free	Free	0%	0%	Free	0%	Stop	0%	Stop	0%	Stop	0%	Stop	0%
Grade														
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	12	51	1	21	8	47	0	3	21	126	5	21		
Pedestrians	10				10			10			10			
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1				1			1			1			1
Right turn flare (veh)														
Median type	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume														
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	65	63	63	163	191	46	163	168	168	48				
IC, single (s)	4.1	4.1	4.1	7.5	5.5	5.9	6.5	5.5	5.5	5.9				
IC, 2 stage (s)														
IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3	4.0	3.3			
p0 queue free %	99	99	99	100	100	98	94	99	98	99	98			
cM capacity (veh/h)	1522	1522	1522	732	715	1010	770	732	1008					
Approach	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT						
Volume Total	37	27	21	5	50	23	151							
Volume Left	12	0	21	0	0	0	126							
Volume Right	0	1	0	0	47	21	21							
cSH	1522	1700	1526	1700	1700	965	794							
Volume to Capacity	0.01	0.02	0.01	0.00	0.03	0.02	0.19							
Queue Length 95th (ft)	1	0	1	0	0	2	18							
Control Delay (s)	2.3	0.0	7.4	0.0	0.0	8.8	10.6							
Lane LOS	A	A	A	A	A	A	B							
Approach Delay (s)	1.4	2.0	8.8	10.6										
Approach LOS			A	B										
Intersection Summary														
Average Delay			6.5											
Intersection Capacity Utilization			29.3%											
Analysis Period (min)			15											

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

2/21/2013

10: Kapolei Pkwy & Kekaholo St

Approach	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4P	4P	1	1	1	1	1	1	1	1	1	1	1	1
Volume (veh/h)	46	16	51	2	18	19	247	10	19	380	30			
Sign Control	Stop	Stop	0%	0%	Free	0%	Stop	0%	Stop	0%	Stop	0%	Stop	0%
Grade														
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	55	19	61	2	15	23	294	12	23	452	36			
Pedestrians	35				40			34			40			
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	3				4			3			4			4
Right turn flare (veh)														
Median type	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume	811	939	313	759	951	233	523							
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	811	939	313	759	951	233	523							
IC, single (s)	6.1	5.5	5.9	6.1	5.5	5.9	4.1							
IC, 2 stage (s)														
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2							
p0 queue free %	82	94	91	99	95	97	98							
cM capacity (veh/h)	289	307	689	238	303	761	1005							
Approach	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT						
Volume Total	45	2	21	0	23	0								
Volume Left	61	23	0	12	0	36								
Volume Right	405	456	1005	1700	1164	1700								
cSH	0.33	0.09	0.02	0.09	0.02	0.15								
Volume to Capacity	36	7	2	0	1	0								
Queue Length 95th (ft)	18.3	13.7	1.3	0.0	0.9	0.0								
Control Delay (s)	C	B	A	A	A	A								
Lane LOS	C	B	A	A	A	A								
Approach Delay (s)	16.3	13.7	0.7	0.4										
Approach LOS			B											
Intersection Summary														
Average Delay			3.4											
Intersection Capacity Utilization			46.9%											
Analysis Period (min)			15											

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

10: Kapolei Pkwy & Kekaiholo St

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Volume (veh/h)	39	1	11	2	2	15	15	266	7	35	367	91
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	45	1	13	2	2	17	17	309	8	41	427	106
Pedestrians	10	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1	1	1	1	1	1	1	1	1	1	1	1
Right turn flare (veh)	2	2	2	2	2	2	2	2	2	2	2	2
Median type	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None	None	None	None	None	None	None
Upstream signal (ft)	799	945	298	700	994	201	543	339	339	339	339	339
pX, platoon unblocked	799	945	298	700	994	201	543	339	339	339	339	339
vC, conflicting volume	5.1	5.5	5.9	6.1	5.5	5.9	4.1	4.1	4.1	4.1	4.1	4.1
vC1, stage 1 conf vol	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
vC2, stage 2 conf vol	87	100	98	99	99	98	98	97	97	97	97	97
vCu, unblocked vol	340	316	741	384	300	825	1014	1194	1194	1194	1194	1194
IC, single (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
IC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
p0 queue free %	87	100	98	99	99	98	98	97	97	97	97	97
pM capacity (veh/h)	340	316	741	384	300	825	1014	1194	1194	1194	1194	1194
Volume Total	59	22	172	163	254	319	319	319	319	319	319	319
Volume Left	45	2	17	0	41	0	0	0	0	0	0	0
Volume Right	13	17	0	8	0	106	106	106	106	106	106	106
CSH	384	632	1014	1700	1194	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.15	0.03	0.02	0.10	0.03	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Queue Length 95th (ft)	14	3	1	0	3	0	0	0	0	0	0	0
Control Delay (s)	16.1	10.9	1.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	B	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	16.1	10.9	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Approach LOS	C	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
Average Delay	1.8											
Intersection Capacity Utilization	45.8%											
Analysis Period (min)	15											
User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

13: Kailelea Dr & Kaipu St

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	5	0	2	127	3	255	17	46	65	27
Volume (veh/h)	Stop	Stop	Stop	0%	0%	0%	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Peak Hour Factor	70	11	6	0	2	157	4	315	21	57	80	33
Hourly flow rate (vph)	67	12.0	61	61	61	61	58	58	12.0	12.0	12.0	67
Pedestrians	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lane Width (ft)	6	6	6	6	6	6	6	6	6	6	6	6
Walking Speed (ft/s)	None	None	None	None	None	None	None	None	None	None	None	None
Percent Blockage	None	None	None	None	None	None	None	None	None	None	None	None
Right turn flare (veh)	None	None	None	None	None	None	None	None	None	None	None	None
Median type	None	None	None	None	None	None	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None	None	None	None	None	None	None
Upstream signal (ft)	667	682	182	617	688	296	181	397	397	397	397	397
pX, platoon unblocked	667	682	182	617	688	296	181	397	397	397	397	397
vC, conflicting volume	6.5	5.5	5.9	7.5	5.5	5.9	4.1	4.1	4.1	4.1	4.1	4.1
vC1, stage 1 conf vol	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
vC2, stage 2 conf vol	71	97	99	100	99	77	100	95	95	95	95	95
vCu, unblocked vol	243	376	773	282	374	673	1303	1091	1091	1091	1091	1091
IC, single (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
IC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
p0 queue free %	71	97	99	100	99	77	100	95	95	95	95	95
pM capacity (veh/h)	243	376	773	282	374	673	1303	1091	1091	1091	1091	1091
Intersection Summary												
Average Delay	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Intersection Capacity Utilization	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%	63.4%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

13: Kaileolea Dr & Kaipu St

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	25	11	1	3	10	64	3	45	2	85
Sign Control	Stop	Stop	0%	0%	Stop	Stop	0%	0%	Free	Free
Grade										
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	12	1	3	11	70	3	49	2	92
Pedestrians	27	12	1	3	11	70	3	49	2	92
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	2	2	3	3	3	3	3	3	2	2
Right turn flare (veh)										
Median type										
Median storage (veh)										
Upstream signal (ft)										
pX, platoon unblocked										
VC, conflicting volume	483	437	139	364	462	84	191			81
VC1, stage 1 conf vol										
VC2, stage 2 conf vol										
VCu, unblocked vol	483	437	139	364	462	84	191			81
IC, single (s)	6.5	5.5	5.9	6.5	5.5	5.9	4.1			4.1
IC, 2 stage (s)										
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2
p0 queue free %	94	98	100	99	98	93	100			94
SM capacity (veh/h)	427	517	877	539	504	936	1349			1477
Intersection Summary										
Volume Total	40	84	28	27	148	109				
Volume Left	27	3	3	0	92	0				
Volume Right	1	70	0	2	0	53				
cSH	457	821	1349	1700	1477	1700				
Volume to Capacity	0.09	0.10	0.00	0.02	0.06	0.06				
Queue Length 95th (ft)	7	8	0	0	5	0				
Control Delay (s)	13.6	9.9	0.9	0.0	4.9	0.0				
Lane LOS	B	A	A	A	A	A				
Approach Delay (s)	13.6	9.9	0.5	2.8						
Approach LOS	B	A								
Intersection Summary										
Average Delay					4.9					
Intersection Capacity Utilization					30.6%					
Analysis Period (min)					15					
* User Entered Value										

HCM Unsignalized Intersection Capacity Analysis

12: Kaileolea Dr & Kaileonui St

2/19/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	37	9	0	9	13	65	4	170	13	22
Sign Control	Stop	Stop	0%	0%	Stop	Stop	0%	0%	Free	Free
Grade										
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	54	13	0	13	19	96	6	250	19	32
Pedestrians	23	23			24	24			23	23
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	2	2			2	2			2	2
Right turn flare (veh)										
Median type										
Median storage (veh)										
Upstream signal (ft)										
pX, platoon unblocked										
VC, conflicting volume	418	458	82	421	454	182	94			293
VC1, stage 1 conf vol										
VC2, stage 2 conf vol										
VCu, unblocked vol	418	458	82	421	454	182	94			293
IC, single (s)	6.5	5.5	6.9	6.5	5.5	5.9	4.1			4.1
IC, 2 stage (s)										
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2
p0 queue free %	88	97	100	97	96	89	100			97
SM capacity (veh/h)	456	527	918	516	529	836	1466			1236
Intersection Summary										
Volume Total	54	13	13	144	54	40				
Volume Left	0	96	0	19	0	10				
Volume Right	468	726	1466	1700	1236	1700				
cSH	0.14	0.18	0.00	0.08	0.03	0.02				
Volume to Capacity	13	16	0	0	2	0				
Queue Length 95th (ft)	14.0	11.0	0.4	0.0	4.2	0.0				
Control Delay (s)	B	B	A	A	A	A				
Lane LOS	B	B	A	A	A	A				
Approach Delay (s)	14.0	11.0	0.2	2.6						
Approach LOS	B	B								
Intersection Summary										
Average Delay					4.7					
Intersection Capacity Utilization					37.1%					
Analysis Period (min)					15					
* User Entered Value										

HCM Unsignalized Intersection Capacity Analysis

12: Kaileolea Dr & Kaileonui St

2/19/2013

Movement	EBL	EBT	EBL	EBR	WBL	WBT	WBL	WBR	NBL	NBT	NBL	NBR	SBL	SBR	SBL	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Volume (veh/h)	3	10	3	5	7	9	1	69	10	27	53	13	13	13	13	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	11	3	5	8	10	1	75	11	29	58	14	14	14	14	14
Pedestrians	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Right turn flare (veh)																
Median type																
Median storage (veh)																
Upstream signal (ft)																
pX, platoon unblocked																
VC, conflicting volume	205	239	60	211	241	79	82					104				
VC1, stage 1 conf vol																
VC2, stage 2 conf vol																
VCu, unblocked vol	205	239	60	211	241	79	82					104				
TC, single (s)	6.5	5.5	5.9	5.5	5.5	5.9	4.1					4.1				
TC, 2 stage (s)																
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2				
p0 queue free %	100	98	100	99	99	99	100					98				
GM capacity (veh/h)	723	677	990	717	676	958	1301					1463				
Directional Saturation	EBL	EBT	EBL	EBR	WBL	WBT	WBL	WBR	NBL	NBT	NBL	NBR	SBL	SBR	SBL	SBR
Volume Total	17	23	39	48	58	43										
Volume Left	3	5	1	0	29	0										
Volume Right	3	10	0	11	0	14										
cSH	729	786	1501	1700	1463	1700										
Volume to Capacity	0.02	0.03	0.00	0.03	0.02	0.03										
Queue Length 95th (ft)	2	2	0	0	2	0										
Control Delay (s)	10.1	9.7	0.2	0.0	3.9	0.0										
Lane LOS	B	A	A	A	A	A										
Approach Delay (s)	10.1	9.7	0.1	2.2												
Approach LOS	B	A	A													
Average Delay	2.8															
Intersection Capacity Utilization	24.1%															
Analysis Period (min)	15															

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

11: Kapolei Pkwy & Kaileolea Dr

2/19/2013

Movement	EBL	EBT	EBL	EBR	WBL	WBT	WBL	WBR	NBL	NBT	NBL	NBR	SBL	SBR	SBL	SBR
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Volume (veh/h)	41	79	30	22	17	14	10	240	63	50	352	22	22	22	22	22
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	52	100	38	28	22	18	13	304	80	63	446	28	28	28	28	28
Directional Saturation	EBL	EBT	EBL	EBR	WBL	WBT	WBL	WBR	NBL	NBT	NBL	NBR	SBL	SBR	SBL	SBR
Volume Total	102	88	39	28	13	384	63	473								
Volume Left	52	0	28	0	13	0	63	0								
Volume Right	0	38	0	18	0	80	0	28								
Had (s)	0.29	-0.27	0.39	-0.40	0.53	-0.11	0.53	-0.01								
Departure Headway (s)	7.3	6.7	7.6	6.9	6.5	5.9	6.4	5.8								
Degree Utilization, x	0.21	0.16	0.08	0.05	0.02	0.63	0.11	0.77								
Capacity (veh/h)	458	492	425	469	527	586	545	602								
Control Delay (s)	10.9	9.8	10.1	9.0	8.5	17.2	9.0	24.2								
Approach Delay (s)	10.4		9.7	16.9			22.4									
Approach LOS	B		A	C			C									
Intersection Summary																
Delay	17.9															
Level of Service	C															
Intersection Capacity Utilization	45.8%															
Analysis Period (min)	15															

HCM Unsignalized Intersection Capacity Analysis

11: Kapolei Pkwy & Kaileolea Dr

2/19/2013

Movement	EBL	EBT	EBB	EBL	WBL	WBT	WBB	NBL	NBT	NBB	SBL	SBT	SBB
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	37	44	19	22	26	10	11	239	16	12	326	33	33
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	42	50	22	25	30	11	12	272	18	14	370	38	38
Drainage Area (ac)	55.3	66.2	33.1	37.2	44.8	16.7	18.3	382.2	24.8	19.5	492.2	50.8	50.8
Volume Total (vph)	67	47	40	26	13	290	14	408					
Volume Left (vph)	42	0	25	0	13	0	14	0					
Volume Right (vph)	0	22	0	11	0	18	0	38					
Head (s)	0.35	-0.29	0.35	-0.27	0.53	-0.01	0.53	-0.03					
Departure Headway (s)	6.8	6.1	6.8	6.2	6.0	5.5	5.9	5.3					
Degree Utilization, x	0.13	0.08	0.08	0.05	0.02	0.44	0.02	0.61					
Capacity (veh/h)	488	534	475	519	574	638	585	660					
Control Delay (s)	9.5	8.4	9.2	8.3	8.0	11.5	7.8	15.0					
Approach Delay (s)	9.1	8.9	8.9	8.3	8.0	11.4	7.8	14.8					
Approach LOS	A	A	A	A	B	B	B	B					
Intersection Summary													
Delay	12.5												
Level of Service	B												
Intersection Capacity Utilization	36.8%												
Analysis Period (min)	15												
ICU Level of Service	A												

HCM Unsignalized Intersection Capacity Analysis

17: Fort Weaver Rd & Kaimalie St

2/21/2013

Movement	EBL	EBT	EBB	EBL	WBL	WBT	WBB	NBL	NBT	NBB	SBL	SBT	SBB
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (veh/h)	80	115	52	1074	1003	54							
Grade	0%	0%	0%	0%	0%	0%							
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85							
Hourly flow rate (vph)	94	135	61	1264	1180	64							
Pedestrians	28												
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0							
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5							
Percent Blockage	3												
Right turn flare (veh)		11											
Median type													
Median storage (veh)		2											
Upstream signal (ft)													
pX, platoon unblocked	0.73	0.73	0.73										
VC, conflicting volume	1990	638	1272										
VC1, stage 1 conf vol	1208												
VC2, stage 2 conf vol	782												
VCu, unblocked vol	1626	0	648										
IC, single (s)	6.8	6.9	4.1										
IC, 2 stage (s)	5.8												
IF (s)	3.5	3.3	2.2										
p0 queue free %	64	82	91										
cM capacity (veh/h)	262	761	668										
Intersection Summary													
Volume Total	229	61	632	632	590	590	64						
Volume Left	94	61	0	0	0	0	0						
Volume Right	135	0	0	0	0	0	64						
cSH	638	668	1700	1700	1700	1700	1700						
Volume to Capacity	0.36	0.09	0.37	0.37	0.35	0.35	0.04						
Queue Length 95th (ft)	41	8	0	0	0	0	0						
Control Delay (s)	17.1	10.9	0.0	0.0	0.0	0.0	0.0						
Lane LOS	C	B											
Approach Delay (s)	17.1	0.5											
Approach LOS	C												
Intersection Summary													
Average Delay	1.6												
Intersection Capacity Utilization	49.8%												
Analysis Period (min)	15												
ICU Level of Service	A												

HCM Unsignalized Intersection Capacity Analysis

17: Fort Weaver Rd & Kaimalle St

2/21/2013

Movement	EB	WB	NB	SB	EB	WB	NB	SB
Lane Configurations	72	63	72	725	867	128		
Volume (veh/h)	72	63	72	725	867	128		
Sign Control	Stop	0%	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	77	67	77	771	922	136		
Pedestrians	31			26	31			
Lane Width (ft)	12.0			12.0	12.0			
Walking Speed (ft/s)	4.0			4.0	4.0			
Percent Blockage	3			2	3			
Right turn flare (veh)								
Median Type								
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked	0.86	0.86	0.86					
VC, conflicting volume	1523	518	1090					
VC1, stage 1 conf vol	953							
VC2, stage 2 conf vol	570							
VCu, unblocked vol	1280	110	775					
IC, single (s)	6.8	6.9	4.1					
IC, 2 stage (s)	5.8							
IF (s)	3.5	3.3	2.2					
p0 queue free %	76	91	89					
CM capacity (veh/h)	322	755	700					
Intersection Summary	EB	WB	NB	SB	EB	WB	NB	SB
Volume Total	144	77	386	461	461	136		
Volume Left	77	0	0	0	0	0		
Volume Right	67	0	0	0	0	136		
cSH	604	700	1700	1700	1700	1700		
Volume to Capacity	0.24	0.11	0.23	0.27	0.27	0.08		
Queue Length 95th (ft)	23	9	0	0	0	0		
Control Delay (s)	15.2	10.8	0.0	0.0	0.0	0.0		
Lane LOS	C	B						
Approach Delay (s)	15.2	1.0		0.0				
Approach LOS	C							
Intersection Summary	EB	WB	NB	SB	EB	WB	NB	SB
Average Delay								
Intersection Capacity Utilization								
Analysis Period (min)								

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

16: Kaimalle St & Kaipu St

2/19/2013

Movement	EB	WB	NB	SB	EB	WB	NB	SB
Lane Configurations	4	4	4	4	4	4	4	4
Volume (veh/h)	5	126	27	41	54	5		
Sign Control	Free	0%	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	7	166	36	54	71	7		
Pedestrians	10	33			33			
Lane Width (ft)	12.0	12.0			12.0			
Walking Speed (ft/s)	3.5	3.5			3.5			
Percent Blockage	1	3			3			
Right turn flare (veh)								
Median Type								
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
VC, conflicting volume	122				307	106		
VC1, stage 1 conf vol								
VC2, stage 2 conf vol								
VCu, unblocked vol	122				307	106		
IC, single (s)	4.1				5.4	5.2		
IC, 2 stage (s)								
IF (s)	2.2				3.5	3.3		
p0 queue free %	100				90	99		
CM capacity (veh/h)	1419				698	938		
Intersection Summary	EB	WB	NB	SB	EB	WB	NB	SB
Volume Total	172	89	78					
Volume Left	7	0	71					
Volume Right	0	54	7					
cSH	1419	1700	713					
Volume to Capacity	0.00	0.05	0.11					
Queue Length 95th (ft)	0	0	9					
Control Delay (s)	0.3	0.0	10.7					
Lane LOS	A	B						
Approach Delay (s)	0.3	0.0	10.7					
Approach LOS	B							
Intersection Summary	EB	WB	NB	SB	EB	WB	NB	SB
Average Delay								
Intersection Capacity Utilization								
Analysis Period (min)								

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

16: Kaimale St & Kaipu St

2/19/2013



Movement	EB	WB	NB	SB	EB	WB	NB	SB
Lane Configurations	4	4	4	4	4	4	4	4
Volume (veh/h)	9	90	116	34	35	4		
Sign Control	Free	Free	Free	Stop	0%	0%		
Grade	0.92	0.92	0.92	0.92	0.92	0.92		
Peak Hour Factor	10	98	126	37	38	4		
Hourly flow rate (vph)	15	22	22					
Pedestrians	12.0	12.0	12.0					
Lane Width (ft)	4.0	4.0	4.0					
Walking Speed (ft/s)	1	2	2					
Percent Blockage	None	None	None					
Right turn flare (veh)	None	None	None					
Median Type	None	None	None					
Median storage (veh)	None	None	None					
Upstream signal (ft)	185			306	182			
pX, platoon unblocked								
VC, conflicting volume	185			306	182			
VC1, stage 1 conf vol	4.1			5.4	5.2			
VC2, stage 2 conf vol	2.2			3.5	3.3			
VCu, unblocked vol	99			95	100			
IC, single (s)	135.4			7.16	8.79			
IC, 2 stage (s)								
IF (s)								
p0 queue free %								
CM capacity (veh/h)								
Peak Hour Factor	108	163	42					
Volume Total	10	0	38					
Volume Left	0	37	4					
Volume Right	1364	1700	730					
cSH	0.01	0.10	0.06					
Volume to Capacity	1	0	5					
Queue Length 95th (ft)	0.7	0.0	10.2					
Control Delay (s)	A	B	B					
Lane LOS	0.7	0.0	10.2					
Approach Delay (s)								
Approach LOS								
Average Delay				1.6				
Intersection Capacity Utilization				26.2%				
Analysis Period (min)				15				

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

15: Kaimale St & Kailenoui St/Mainer's Place Driveway

2/19/2013



Movement	EB	WB	NB	SB	EB	WB	NB	SB
Lane Configurations	4	4	4	4	4	4	4	4
Volume (veh/h)	20	1	2	5	11	14	6	4
Sign Control	Stop	Stop	Stop	Free	0%	0%		
Grade	0.75	0.75	0.75	0.75	0.75	0.75		
Peak Hour Factor	27	1	3	7	15	19	8	5
Hourly flow rate (vph)	10	10	10					
Pedestrians	12.0	12.0	12.0					
Lane Width (ft)	3.5	3.5	3.5					
Walking Speed (ft/s)	1	1	1					
Percent Blockage	None	None	None					
Right turn flare (veh)	None	None	None					
Median Type	None	None	None					
Median storage (veh)	None	None	None					
Upstream signal (ft)	212	189	47	189	189	132	41	
pX, platoon unblocked								
VC, conflicting volume	212	189	47	189	189	132	41	
VC1, stage 1 conf vol	6.1	5.5	5.2	6.1	5.5	5.2	4.1	
VC2, stage 2 conf vol	3.5	4.0	3.3	3.5	4.0	3.3	2.2	
VCu, unblocked vol	96	100	100	99	98	98	99	
IC, single (s)	733	724	1016	778	724	934	1554	
IC, 2 stage (s)								
IF (s)								
p0 queue free %								
CM capacity (veh/h)								
Peak Hour Factor	31	40	123	36				
Volume Total	27	7	8	5				
Volume Left	3	19	5	7				
Volume Right	751	819	1554	1448				
cSH	0.04	0.05	0.01	0.00				
Volume to Capacity	3	4	0	0				
Queue Length 95th (ft)	10.0	9.6	0.5	1.1				
Control Delay (s)	A	A	A	A				
Lane LOS	10.0	9.6	0.5	1.1				
Approach Delay (s)								
Approach LOS								
Average Delay				3.5				
Intersection Capacity Utilization				21.8%				
Analysis Period (min)				15				

* User Entered Value

2/19/2013

[illegible]

HCM Unsignalized Intersection Capacity Analysis 14: Kapolei Pkwy & Kaimalie St

2/19/2013

[illegible]

HCM Unsignalized Intersection Capacity Analysis

14: Kapolei Pkwy & Kaimali St

2/19/2013

Movement	EBL	EBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	15	12	41	20	20	44	26	226	56	267
Sign Control	Stop	Stop	0%	0%	0%	0%	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	15	12	41	20	20	44	26	226	56	267
Pedestrians	35	35	32	32	35	35	35	35	35	35
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Percent Blockage	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Right turn flare (veh)	3	3	3	3	3	3	3	3	3	3
Median type	None	None	None	None	None	None	None	None	None	None
Median storage (veh)										
Upstream signal (ft)										
pX platoon unblocked										
VC, conflicting volume	802	810	357	812	799	315	339			317
VC1, stage 1 conf vol										
VC2, stage 2 conf vol										
VCu, unblocked vol	802	810	357	812	799	315	339			317
IC, single (s)	6.1	5.5	5.2	6.1	5.5	5.2	4.1			4.1
IC, 2 stage (s)										
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2
p0 queue free %	95	97	94	93	94	94	98			95
SV capacity (veh/h)	294	347	717	294	351	756	1185			1210
Approach Delay (s)	13.8	14.6	8.1	0.0	8.1	0.0	0.0			0.0
Lane LOS	B	B	A	A	A	A	A			A
Approach Delay (s)	13.8	14.6	0.7	1.3	1.3	1.3	1.3			1.3
Approach LOS	B	B	A	A	A	A	A			A
Average Delay	3.5									
Intersection Capacity Utilization	41.1%									
Analysis Period (min)	15									

* User Entered Value

HCM Signalized Intersection Capacity Analysis

20: Fort Weaver Rd & Papipi Rd

2/19/2013

Movement	EBL	EBR	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (vph)	225	136	141	913	787	156				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0				
Lane Util. Factor	0.97	1.00	0.95	0.95	1.00	1.00				
Flpb. ped/bikes	0.79	1.00	1.00	1.00	1.00	1.00				
Flpb. ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00				
Flt. Protected	0.94	1.00	1.00	1.00	1.00	1.00				
Satd. Flow (prot)	2622	1738	3539	3539	724	724				
Flt. Permitted	0.97	0.25	1.00	1.00	1.00	1.00				
Satd. Flow (perm)	2622	453	3539	3539	724	724				
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88				
Adj. Flow (vph)	256	155	160	1038	894	177				
RTOR Reduction (vph)	99	0	0	0	0	0				
Lane Group Flow (vph)	312	0	160	1038	894	134				
Conf. Peds. (#/hr)	226	226								
Turn Type	NA	pm-plt	NA	NA	NA	Perm				
Protected Phases	4	5	2	6						
Permitted Phases		2								
Actuated Green, G (s)	16.8	72.1	72.1	58.8	58.8					
Effective Green, g (s)	16.8	72.1	72.1	58.8	58.8					
Actuated g/C Ratio	0.17	0.73	0.73	0.59	0.59					
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	445	438	2573	2704	430					
v/s Ratio Prot	c0.12	0.03	c0.29	c0.25						
v/s Ratio Perm		0.24								
v/c Ratio	0.70	0.37	0.40	0.42	0.31					
Uniform Delay, d1	38.7	5.4	5.1	10.9	10.0					
Progression Factor	1.00	1.00	1.00	1.00	1.00					
Incremental Delay, d2	5.0	0.5	0.5	0.6	1.9					
Delay (s)	43.6	5.9	5.6	11.5	11.9					
Level of Service	D	A	A	B	B					
Approach Delay (s)	43.6		5.7	11.6						
Approach LOS	D		A	B						
Intersection Summary										
HCM 2000 Control Delay	13.8									
HCM 2000 Level of Service	B									
HCM 2000 Volume to Capacity ratio	0.49									
Actuated Cycle Length (s)	98.9									
Sum of lost time (s)	15.0									
Intersection Capacity Utilization	55.8%									
ICU Level of Service	B									
Analysis Period (min)	15									
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis 20: Fort Weaver Rd & Papipi Rd

2/19/2013

Movement	EB	WB	NB	SB	Signal
Lane Configurations	W	W	W	W	
Volume (vph)	192	141	142	513	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	1.00	0.95	0.95	1.00
Frb, ped/bikes	0.87	1.00	1.00	1.00	0.83
Frb, ped/bikes	1.00	0.98	1.00	1.00	1.00
Frb	0.94	1.00	1.00	1.00	0.85
Flt Protected	0.97	0.95	1.00	1.00	1.00
Satd. Flow (prot)	2869	1730	3539	3539	1307
Flt Permitted	0.97	0.41	1.00	1.00	1.00
Satd. Flow (perm)	2869	738	3539	3539	1307
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	200	147	148	525	193
RTOR Reduction (vph)	127	0	0	0	63
Lane Group Flow (vph)	220	0	148	525	130
Conf. Peds. (#/hr)	102	56			56
Turn Type	NA	pr+pt	NA	NA	Perm
Protected Phases	4	5	2	6	
Permitted Phases		2		6	
Actuated Green, G (s)	12.1	68.1	68.1	55.5	55.5
Effective Green, g (s)	12.1	68.1	68.1	55.5	55.5
Actuated g/C Ratio	0.13	0.75	0.75	0.62	0.62
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	394	640	2671	2177	804
v/s Ratio Prot	0.08	0.02	0.15	0.15	
v/s Ratio Perm		0.15		0.10	
v/c Ratio	0.57	0.23	0.20	0.25	0.16
Uniform Delay, d1	36.6	3.2	3.2	7.9	7.4
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.2	0.2	0.3	0.4
Delay (s)	38.7	3.4	3.3	8.1	7.8
Level of Service	D	A	A	A	A
Approach Delay (s)	38.7		3.4	8.1	
Approach LOS	D		A	A	
Intersection Summary					
HCM 2000 Control Delay	12.3				
HCM 2000 Volume to Capacity ratio	0.30				
Actuated Cycle Length (s)	90.2				
Intersection Capacity Utilization	47.9%				
Analysis Period (min)	15				
Critical Lane Group					
					B
					15.0
					A

HCM Unsignalized Intersection Capacity Analysis 19: Hailipo St/Kapolei Pkwy & Papipi Rd

2/19/2013

Movement	EB	WB	EB	WB	WB	NB	NB	SB	SB
Lane Configurations	4		4	4	4	4	4	4	4
Volume (veh/h)	17	49	1	24	50	255	1	53	42
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	21	60	1	29	61	311	1	65	51
Pedestrians	38	42		42		13		328	40
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	4	4	4	4	4	1		4	
Right turn flare (veh)									
Median type	None	None	None	None	None	None	None	None	None
Median storage (veh)									
Upstream signal (ft)									
pX, platoon unblocked									
vC, conflicting volume	103	74	74	395	276	115	389	277	141
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	103	74	74	395	276	115	389	277	141
IC, single (s)	4.1	4.1	4.1	5.5	5.2	5.2	5.2	5.5	5.2
IC, 2 stage (s)									
IF (s)	2.2	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99	98	98	100	90	94	31	74	96
CM capacity (veh/h)	1429	1507	1507	429	625	918	478	625	873
Intersection Summary									
Volume Total	82	311	117	328	205				
Volume Left	21	29	0	1	328	0			
Volume Right	1	0	311	51	0	40			
CSH	1429	1507	1700	723	478	662			
Volume to Capacity	0.01	0.02	0.18	0.16	0.69	0.31			
Queue Length 95th (ft)	1	1	0	14	129	33			
Control Delay (s)	2.0	2.5	0.0	10.9	27.5	12.9			
Lane LOS	A	A	B	D	B	B			
Approach Delay (s)	2.0	0.6	10.9	21.8					
Approach LOS			B	C					
Intersection Summary									
Average Delay	11.7								
Intersection Capacity Utilization	44.2%								
Analysis Period (min)	15								
User Entered Value									

HCM Unsignalized Intersection Capacity Analysis

19: Halilipo St/Kapolei Pkwy & Papipi Rd

2/19/2013

Movement	EB	WB	NB	SB	EB	WB	NB	SB
Lane Configurations	4	4	4	4	4	4	4	4
Volume (veh/h)	25	55	83	278	3	29	24	233
Sign Control	Free	Free	0%	0%	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	28	62	94	316	3	33	27	265
Pedestrians	17	17	10	10	10	10	10	10
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1	1	1	1	1	1	1	1
Right turn flare (veh)	None	None	None	None	None	None	None	None
Median type	None	None	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None	None	None
Upstream signal (ft)	None	None	None	None	None	None	None	None
pX platoon unblocked	111	78	435	337	92	387	340	128
VC, conflicting volume	111	78	435	337	92	387	340	128
VC1, stage 1 conf vol	4.1	4.1	6.1	5.5	5.2	6.1	5.5	5.2
VC2, stage 2 conf vol	2.2	2.2	3.5	4.0	3.3	3.5	4.0	3.3
IC, single (s)	98	97	99	94	97	51	84	94
p0 queue free %	1458	1508	462	597	968	546	595	929
CM capacity (veh/h)	1458	1508	462	597	968	546	595	929
Delay (s)	97	141	316	64	265	145	28	47
Volume Left	6	0	316	27	0	51	1458	1508
Volume Right	0	0	0	0	0	0	0	0
cSH	1458	1508	1700	701	546	681	0.02	0.03
Volume to Capacity	0.02	0.03	0.19	0.09	0.49	0.21	1	2
Queue Length 95th (ft)	2	0	7	66	20	2	2.3	2.6
Control Delay (s)	A	A	B	C	B	C	A	A
Lane LOS	A	A	B	C	B	C	A	A
Approach Delay (s)	2.3	0.8	10.6	15.5	7.4	42.4	15	7.4
Approach LOS	B	C	B	C	B	C	A	A
Average Delay	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Intersection Capacity Utilization	42.4%	42.4%	42.4%	42.4%	42.4%	42.4%	42.4%	42.4%
Analysis Period (min)	15	15	15	15	15	15	15	15

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

18: Pupu St & Papipi Rd

2/19/2013

Movement	EB	WB	NB	SB	EB	WB	NB	SB
Lane Configurations	4	4	4	4	4	4	4	4
Volume (veh/h)	30	1	5	44	1	7	0.87	0.87
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	1	6	51	1	8	0.87	0.87
Delay (s)	36	56	9	0	6	1	0.01	0.05
Volume Total (vph)	36	56	9	0	6	1	0.01	0.05
Volume Left (vph)	0	0	0	0	0	0	0.01	0.05
Volume Right (vph)	36	56	9	0	6	1	0.01	0.05
Had (s)	0.01	0.05	-0.47	4.0	4.0	3.6	0.04	0.06
Departure Headway (s)	0.04	0.06	0.01	893	891	956	7.1	7.3
Degree Utilization, x	893	891	956	7.1	7.3	6.7	7.1	7.3
Capacity (veh/h)	893	891	956	7.1	7.3	6.7	7.1	7.3
Control Delay (s)	7.1	7.3	6.7	7.1	7.3	6.7	7.1	7.3
Approach Delay (s)	7.1	7.3	6.7	7.1	7.3	6.7	7.1	7.3
Approach LOS	A	A	A	A	A	A	A	A
Intersection Capacity Utilization	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%
Analysis Period (min)	15	15	15	15	15	15	15	15

Intersection Summary

Delay

Level of Service

Intersection Capacity Utilization

Analysis Period (min)

HCM Unsignalized Intersection Capacity Analysis 18: Pupu St & Papipi Rd

2/19/2013

Approach	EB	WB	WB	WB	WB	WB
Lane Configurations	EB	WB	WB	WB	WB	WB
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	55	1	10	68	1	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	62	1	11	77	1	2
Directional Saturation Flow (sf)	1800	1800	1800	1800	1800	1800
Volume Total (vph)	64	89	3			
Volume Left (vph)	0	11	1			
Volume Right (vph)	1	0	2			
Adj (s)	0.02	0.06	-0.30			
Departure Headway (s)	4.0	4.0	3.9			
Degree Utilization, x	0.07	0.10	0.00			
Capacity (veh/h)	887	887	874			
Control Delay (s)	7.3	7.5	6.9			
Approach Delay (s)	7.3	7.5	6.9			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.4			
Level of Service			A			
Intersection Capacity Utilization			23.6%			
Analysis Period (min)			15			

APPENDIX D TRAFFIC SIGNAL WARRANT FORT WEAVER ROAD AND KAIMALIE STREET

TRAFFIC SIGNAL WARRANT STUDY

FOR THE INTERSECTION OF

FORT WEAVER ROAD AND KAIMALIE STREET

Prepared for:
Haseko Development, Inc.
1001 Kaimalie Street, Suite 205
Ewa Beach, Hawaii 96706-6250

Prepared by:
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref. #7265-09

October 2012

**Traffic Signal Warrant Study for the Intersection of
Fort Weaver Road and Kaimalie Street**

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Traffic Signal Warrant Study for the Intersection of Fort Weaver Road and Kaimalie Street

I. INTRODUCTION

The purpose of this study is to determine if a traffic signal system is currently warranted at the intersection of Fort Weaver Road and Kaimalie Street located near the Ocean Pointe subdivision in Ewa on the island of Oahu (see Figure 1). Development within Ocean Pointe is currently ongoing and the increased traffic volumes at this intersection may warrant the installation of a traffic signal system.

II. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

In the vicinity of the project site, Fort Weaver Road is a predominantly four-lane, two-way roadway that provides access through the Ewa area. At the unsignalized T-intersection with Kaimalie Street, the northbound approach of Fort Weaver Road has an exclusive left-turn lane and two through lanes while the southbound approach has two through lanes and an exclusive right-turn lane. In addition, a northbound refuge lane is provided along Fort Weaver Road to facilitate left-turn movements from Kaimalie Street. Kaimalie Street is a predominantly two-way, two-lane roadway generally oriented in the east-west direction providing access to the Ocean Pointe subdivision. At the intersection with Fort Weaver Road, the Kaimalie Street approach has two stop-controlled lanes that serve left-turn and right-turn traffic movements.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted in September 2012 at the intersection of Fort Weaver Road and Kaimalie Street. The investigations consisted of manual turning movement count surveys conducted during the morning peak period between 6:00 AM and 9:00 AM, and the afternoon peak period between 3:00 PM and 6:00 PM. In addition, 24-hour mechanical count surveys were conducted along Fort



*Traffic Signal Warrant Study for the Intersection of
Fort Weaver Road and Kaimalie Street*

Weaver Road and Kaimalie Street for all approaches of the

intersection. Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Synchro", developed by Trafficware. The analysis is based on the concept of Level of Service (LOS) to identify the traffic operations associated with traffic demands during the peak hours of traffic.

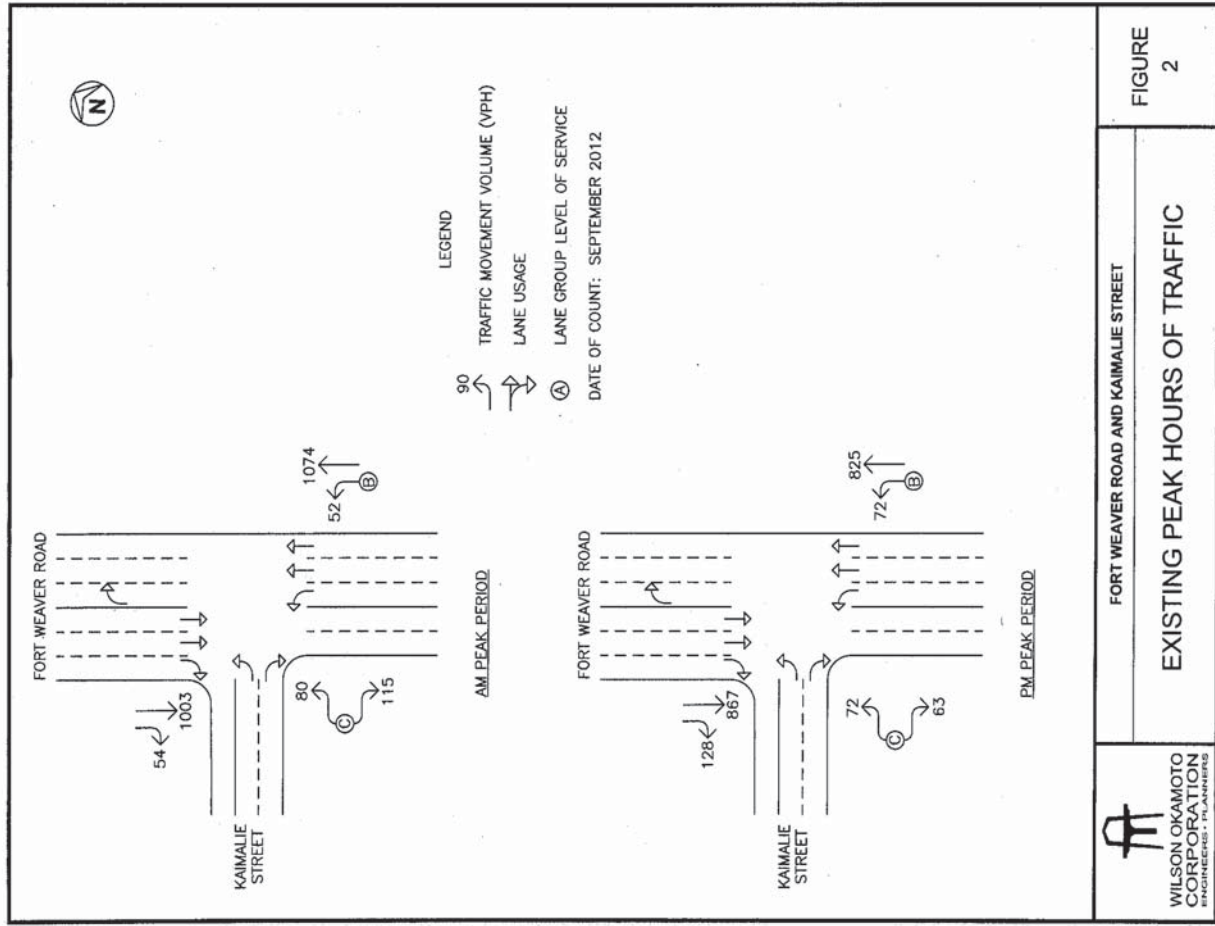
LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

2. Existing Peak Hour Traffic

Figure 2 shows the existing peak hour traffic volumes and conditions at the intersection of Fort Weaver Road and Kaimalie Street. The AM peak hour of traffic occurs between 7:00 AM and 8:00 AM in the vicinity of the subject intersection. The PM peak hour of traffic occurs between 3:45 PM and 4:45 PM. LOS calculations are included in Appendix C.

At the intersection with Kaimalie Street, Fort Weaver Road carries 1,126 vehicles northbound and 1,057 vehicles southbound during the AM peak period of traffic. During the PM peak period, traffic volumes are less



with 797 vehicles traveling northbound and 995 vehicles traveling southbound. The critical movement at the intersection is the Kaimalie Street approach which operates at LOS "C" during both peak periods. Pedestrian crossing are provided across both roadways at this intersection. 8 pedestrians and 3 pedestrians were observed crossing Fort Weaver Road on the north side during the AM and PM peak periods, respectively. 20 pedestrians and 24 pedestrians were observed crossing Kaimalie Street during the AM and PM peak periods, respectively.

III. TRAFFIC SIGNAL WARRANTS

A. General

The installation of a traffic signal at an intersection may be justified by one or more of the nine warrants outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways," 2009 Edition (MUTCD). These warrants take into account factors such as eight-hour vehicular volumes (Warrant 1), four-hour vehicular volumes (Warrant 2), peak hour volumes (Warrant 3), pedestrian volumes (Warrant 4), the presence of a school crossing or coordinated signal system (Warrants 5 and 6), crash experience (Warrant 7), other characteristics of the roadway network (Warrant 8), and the presence of railroad crossings (Warrant 9). The primary applicable Warrants 1, 2, 3, and 4 are assessed in this study to determine if a traffic signal system is warranted at the intersection of Fort Weaver Road and Kaimalie Street.

B. Warrant 1

Warrant 1, the "Eight-Hour Volume Warrant," consists of two conditions that may justify the installation of a traffic signal at an intersection where vehicles experience high traffic delay due to large volumes of intersecting traffic during any eight hours of an average day. The first condition is the "Minimum Vehicular Volume Condition" and the second is the "Interruption of Continuous Traffic Condition." Warrant 1 can be satisfied either by meeting the thresholds shown in the 100% columns of either condition of Table 4C-1 of the MUTCD or by meeting the

thresholds shown in the 80% columns for both conditions of Table 4C-1 of the MUTCD. Under existing conditions, the traffic volumes entering the intersection of Fort Weaver Road with Kaimalie Street meet the thresholds during any eight hours of the day and, as such, satisfy Warrant 1 for minor street approaches with two lanes and high traffic volumes on the major street (see Appendix D).

C. Warrant 2

Warrant 2, the "Four-Hour Volume Warrant," consists of several conditions that may justify the installation of a traffic signal at an intersection where vehicles experience high traffic delay due to large volumes of intersecting traffic during any four hours of an average day. One of the conditions is based upon the relationship between the traffic volumes along the major and minor street. If the traffic volumes along the minor street exceed the thresholds shown in Figure 4C-1 of the MUTCD, a traffic signal system may be warranted. Under existing conditions, the traffic volumes entering the intersection of Fort Weaver Road with Kaimalie Street meet the thresholds during any four hours of the day and, as such, satisfy Warrant 2 for minor street approaches with two lanes and high traffic volumes on the major street (see Appendix E).

D. Warrant 3

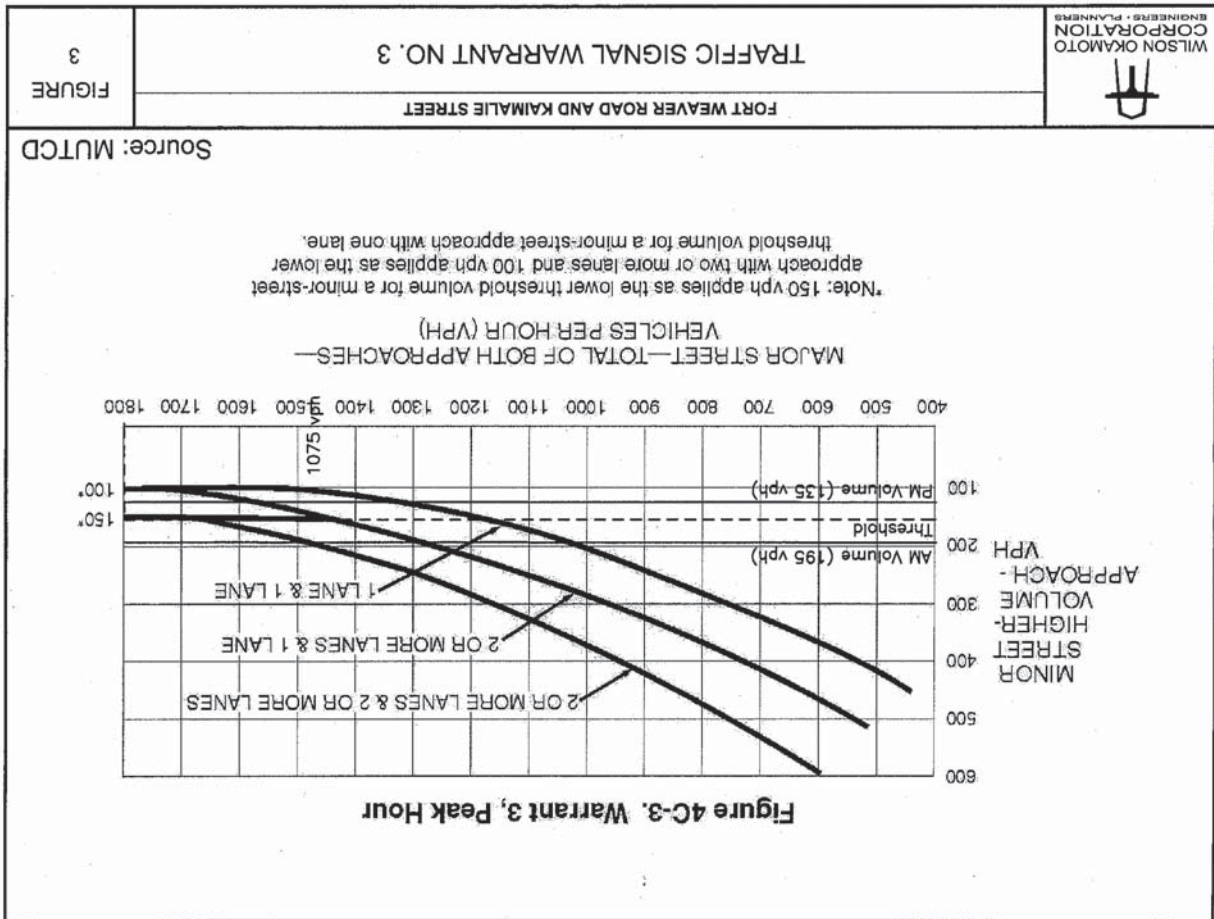
Warrant 3, the "Peak Hour Warrant," consists of several conditions that may justify the installation of a traffic signal at an intersection where vehicles experience high traffic delay due to large volumes of intersecting traffic during the peak hour periods. One of the conditions is based upon the relationship between the traffic volumes along the major and minor streets. If the traffic volumes along the minor street exceed the thresholds shown in Figure 4C-3 of the MUTCD, a traffic signal system may be warranted. Under existing conditions, the traffic volumes entering the intersection of Fort Weaver Road with Kaimalie Street meet the thresholds during the AM peak period of traffic and, as such, satisfy Warrant 3 for minor street approaches with two lanes and high traffic volumes on the major street (see Figure 3).

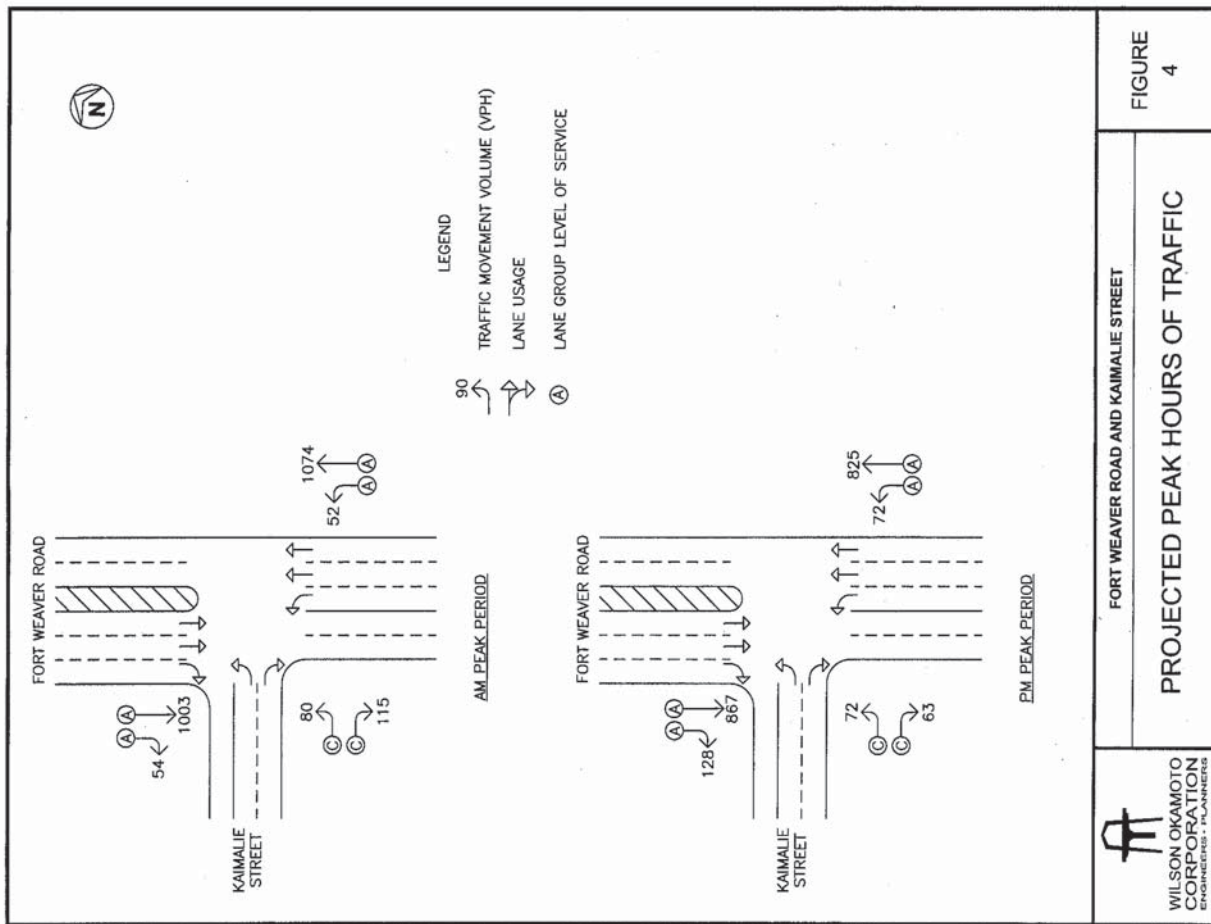
E. Warrant 4

Warrant 4, the "Pedestrian Volume Warrant," consists of several conditions that may justify the installation of a traffic signal at an intersection where pedestrians experience excessive delay in crossing a major street due to large volumes of traffic during the peak hour periods. The first condition is the "Four-Hour Volume Condition" and the second is the "Peak Hour Volume Condition." Warrant 4 can be satisfied by either exceeding the thresholds shown in Figure 4C-5 or Figure 4C-7 of the MUTCD. Under existing conditions, the pedestrian volumes at the intersection of Fort Weaver Road with Kaimalie Street do meet the thresholds during the peak periods and, as such, do satisfy Warrant 4.

IV. CONCLUSION

Development within the Ocean Pointe subdivision is currently ongoing and, as such, traffic volumes within the project vicinity have accordingly increased steadily. The existing traffic conditions at the intersection of Fort Weaver Road and Kaimalie Street were assessed to determine if a traffic signal system is warranted at that intersection based on procedures identified and outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways," 2009 Edition (MUTCD). The existing traffic volumes at the intersection of Fort Weaver Road with Kaimalie Street are high enough to satisfy the Eight-hour (Warrant 1), Four-Hour Volume Warrant (Warrant 2), and the Peak Hour Warrant (Warrant 3). As such, a traffic signal system is recommended at the intersection of Fort Weaver Road and Kaimalie Street. With the installation of a traffic signal system at that intersection, all traffic movements are expected to operate at LOS "C" or better during the peak periods of traffic (see Figure 4). The associated LOS calculations are included in Appendix F).





APPENDIX A EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL, SO, TC
Counter: D4-5674, D4-5671
Weather: Clear

File Name : FtWeaKai AM
Site Code : 00000002
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Ft. Weaver Road Southbound					Westbound App. Total	Ft. Weaver Road Northbound					Kaimalie Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	0	69	4	6	79	0	8	158	0	0	166	35	0	8	3	46	291
06:15 AM	0	118	6	0	124	0	4	154	0	0	158	30	0	10	4	44	326
06:30 AM	0	114	6	1	121	0	6	163	0	0	169	22	0	8	3	33	323
06:45 AM	0	186	13	1	180	0	6	153	0	0	159	32	0	16	3	51	390
Total	0	467	29	8	504	0	24	628	0	0	652	119	0	42	13	174	1330
07:00 AM	0	205	14	4	223	0	5	229	0	0	234	19	0	16	7	42	499
07:15 AM	0	282	9	1	292	0	10	258	0	0	268	21	0	31	2	54	614
07:30 AM	0	326	11	3	340	0	11	290	0	0	301	26	0	39	8	73	714
07:45 AM	0	190	20	0	210	0	26	297	0	0	323	14	0	29	3	46	579
Total	0	1003	54	8	1065	0	52	1074	0	0	1126	80	0	115	20	215	2406
08:00 AM	0	110	20	0	130	0	22	209	0	0	231	14	0	15	2	31	362
08:15 AM	1	101	22	1	125	0	7	122	0	0	129	23	0	9	3	35	289
08:30 AM	0	114	13	0	127	0	9	137	0	0	146	18	0	10	2	30	303
08:45 AM	0	97	11	0	108	0	5	136	0	0	141	15	0	12	1	28	277
Total	1	422	66	1	490	0	43	604	0	0	647	70	0	46	8	124	1261
Grand Total	1	1892	149	17	2059	0	119	2306	0	0	2425	269	0	203	41	513	4997
Apprch %	0	91.9	7.2	0.8		0	4.9	95.1	0	0		52.4	0	39.6	8		
Total %	0	37.9	3	0.3	41.2	0	2.4	48.1	0	0	48.5	5.4	0	4.1	0.8	10.3	

Start Time	Ft. Weaver Road Southbound				Westbound App. Total	Ft. Weaver Road Northbound				Kaimalie Street Eastbound				Int. Total
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	0	205	14	219	0	5	229	0	234	19	0	16	35	488
07:15 AM	0	282	9	291	0	10	258	0	268	21	0	31	52	611
07:30 AM	0	326	11	337	0	11	290	0	301	26	0	39	65	703
07:45 AM	0	190	20	210	0	26	297	0	323	14	0	29	43	576
Total Volume	0	1003	54	1057	0	52	1074	0	1126	80	0	115	195	2378
% App. Total	0	94.9	5.1			4.6	95.4	0		41	0	59		
PHF	.000	.769	.675	.784	.000	.500	.904	.000	.872	.769	.000	.737	.750	.846

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counted By: GL,SO,TO
Counter: D4-5674, D4-5671
Weather: Clear

File Name : FtWeaKai PM
Site Code : 00000002
Start Date : 9/11/2012
Page No : 1

Groups Printed- Unshifted

Start Time	Ft. Weaver Road Southbound					Westbound App. Total	Ft. Weaver Road Northbound					Kaimalie Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	0	191	31	3	225	0	25	191	0	0	216	26	0	23	6	55	496
03:15 PM	0	203	28	0	231	0	19	147	0	0	166	19	0	16	8	43	440
03:30 PM	0	197	28	1	226	0	12	177	0	0	189	19	0	13	6	38	453
03:45 PM	0	218	17	1	236	0	18	177	0	0	195	24	0	14	6	44	475
Total	0	809	104	5	918	0	74	692	0	0	766	88	0	66	26	180	1864
04:00 PM	0	235	32	1	268	0	14	198	0	0	212	17	0	18	6	41	521
04:15 PM	0	220	44	1	265	0	25	170	0	0	195	11	0	17	1	29	489
04:30 PM	0	194	35	0	229	0	15	180	0	0	195	20	0	14	1	35	459
04:45 PM	0	182	41	0	223	0	12	133	0	0	145	19	0	21	5	45	413
Total	0	831	152	2	985	0	66	681	0	0	747	67	0	70	13	150	1882
05:00 PM	0	213	33	1	247	0	15	136	0	0	151	22	0	14	2	38	436
05:15 PM	0	204	36	0	240	0	19	140	0	0	159	18	0	27	3	48	447
05:30 PM	0	213	53	0	266	0	20	151	0	0	171	14	0	21	5	40	477
05:45 PM	0	193	46	0	239	0	12	97	0	0	109	8	0	26	1	37	395
Total	0	823	168	1	992	0	66	524	0	0	590	62	0	90	11	163	1745
Grand Total	0	2463	424	8	2895	0	206	1997	0	0	2103	217	0	226	50	493	5491
Apprch %	0	85.1	14.6	0.3		0	9.8	90.2	0	0		44	0	45.8	10.1		
Total %	0	44.9	7.7	0.1	52.7	0	3.8	34.5	0	0	38.3	4	0	4.1	0.9	9	

Start Time	Ft Weaver Southbound				Westbound App. Total	Ft Weaver Northbound				App. Total	Kaimalie Eastbound				App. Total	Int. Total
	Left	Thru	Right			Left	Thru	Right			Left	Thru	Right			
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 03:45 PM																
03:45 PM	0	218	17		235	0	18	177	0	195	24	0	14		38	468
04:00 PM	0	235	32		267	0	14	188	0	212	17	0	18		35	514
04:15 PM	0	220	44		264	0	25	170	0	195	11	0	17		28	487
04:30 PM	0	194	35		229	0	15	180	0	195	20	0	14		34	458
Total Volume	0	867	128		995	0	72	725	0	797	72	0	63		135	1927
% App. Total	0	87.1	12.9				9	91	0		53.3	0	46.7			
PHF	.000	.922	.727		.932	.000	.720	.915	.000	.940	.750	.000	.875		.888	.937

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
Kaimali Street West Leg
Latitude: 0° 0.000 Undefined

Start Time	26-Sep-12 Wed		Direction 2		Hour Totals		Combined Totals	
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00								
12:15								
12:30								
12:45								
01:00								
01:15								
01:30								
01:45								
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09:30								
09:45								
10:00								
10:15								
10:30								
10:45								
11:00								
11:15								
11:30								
11:45								
Total	0	1145	0	3	0	1148	0	1148
Percent	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
Kaimali Street West Leg
Latitude: 0° 0.000 Undefined

Start Time	27-Sep-12 Thu		Direction 2		Hour Totals		Combined Totals	
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00								
12:15								
12:30								
12:45								
01:00								
01:15								
01:30								
01:45								
02:00								
02:15								
02:30								
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09:30								
09:45								
10:00								
10:15								
10:30								
10:45								
11:00								
11:15								
11:30								
11:45								
Total	1189	1502	0	0	1189	1502	1189	1502
Percent	43.1%	56.9%	0.0%	0.0%	43.1%	56.9%	43.1%	56.9%

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Page 3

Site Code:
Station ID:
Kaimali Street West Leg
Latitude: 0' 0.000 Undefined

Start Time	28-Sep-12 Fri	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Direction 2 Morning	Direction 2 Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00						0	0				
12:15		4									
12:30		3									
12:45		1		11	0					11	0
01:00		2									
01:15		1									
01:30		4									
01:45		3		10	0					10	0
02:00		1									
02:15		2									
02:30		4		9	0					9	0
02:45		2									
03:00		2									
03:15		13									
03:30		11		27	0					27	0
03:45		3									
04:00		18									
04:15		14									
04:30		14		49	0					49	0
04:45		48									
05:00		33									
05:15		38									
05:30		51		160	0					160	0
05:45		31									
06:00		31									
06:15		40		153	0					153	0
06:30		37									
06:45		40									
07:00		40									
07:15		67		191	0					191	0
07:30		41									
07:45		32									
08:00		35									
08:15		33		141	0					141	0
08:30		34									
08:45		26									
09:00		30									
09:15		38		128	0					128	0
09:30		36									
09:45		32									
10:00		21		107	0					107	0
10:15		18									
10:30		18									
10:45		18									
11:00		18									
11:15		18									
11:30		18									
11:45		18									
12:00		18									
Total	986	2125	2847	986	2847	0	0	986	2847	986	2847
Percent	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%
Grand Total	986	2125	2847	986	2847	0	0	986	2847	986	2847
Percent	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%
ADT	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641	ADT 2,641

Page 1

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
Fl. Weaver Road NB
Latitude: 0' 0.000 Undefined

Start Time	18-Sep-12 Tue	NB Morning	NB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Channel 2 Morning	Channel 2 Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00											
12:15											
12:30											
12:45											
01:00											
01:15											
01:30											
01:45											
02:00											
02:15											
02:30											
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09:45											
10:00											
10:15											
10:30											
10:45											
11:00											
11:15											
11:30											
11:45											
12:00											
Total	4194	6088	59.2%	4194	6088	0.0%	0.0%	4194	6088	4194	6088
Percent	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
Ft. Weaver Road NB
Latitude: 0' 0.000 Undefined

[illegible]

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
FL Weaver Road SB
Latitude: 0' 0.000 Undefined

Start Time	19-Sep-12 Tue	SB		Hour Totals		Channel 2		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon		
12:00			146								
12:15		*				*					
12:30		*	143			*					
12:45		*	150			*					
13:00		*	156			*					
13:15		*	149		595	*			0	0	595
13:30		*	151			*					
13:45		*	187			*					
14:00		*	192		679	*			0	0	679
14:15		*	200			*					
14:30		*	235			*					
14:45		*	236			*					
15:00		*	233			*					
15:15		*	196		900	*			0	0	900
15:30		*	216			*					
15:45		*	215			*					
16:00		*	211			*					
16:15		*	211		886	*			0	0	886
16:30		*	232			*					
16:45		*	232			*					
17:00		*	220			*					
17:15		*	282			*					
17:30		*	225		959	*			0	0	959
17:45		*	237			*					
18:00		*	241			*					
18:15		*	53			*					
18:30		*	58		984	*			0	0	984
18:45		*	242			*					
19:00		*	211			*					
19:15		*	185			*					
19:30		*	127			*					
19:45		*	228		865	*			0	0	865
20:00		*	233			*					
20:15		*	227			*					
20:30		*	278			*					
20:45		*	320			*					
21:00		*	155		1091	*			0	0	1091
21:15		*	260			*					
21:30		*	131			*					
21:45		*	122			*					
22:00		*	129			*					
22:15		*	98		501	*			0	0	501
22:30		*	106			*					
22:45		*	109			*					
23:00		*	119			*					
23:15		*	86			*					
23:30		*	133		427	*			0	0	427
23:45		*	131			*					
24:00		*	93			*					
24:15		*	106			*					
24:30		*	107			*					
24:45		*	104		295	*			0	0	295
25:00		*	62			*					
25:15		*	42			*					
25:30		*	134			*					
25:45		*	36			*					
26:00		*	139			*					
26:15		*	135		156	*			0	0	156
26:30		*	31			*					
Total			3526	7989			0.0%		0	0	3526
Percent			30.6%	69.4%			0.0%		0	0	30.6%

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
Ft. Weaver Road SB
Latitude: 0° 0.000 Undefined

Start Time	19-Sep-12 Wed	SB	Hour Totals	Channel 2	Hour Totals	Combined Totals
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	37	138	0	0	0	0
12:15	24	154	0	0	0	0
12:30	31	186	0	0	0	0
12:45	17	194	0	0	0	0
01:00	17	192	0	0	0	0
01:15	18	192	0	0	0	0
01:30	9	218	0	0	0	0
01:45	14	219	0	0	0	0
02:00	7	165	0	0	0	0
02:15	12	232	0	0	0	0
02:30	9	200	0	0	0	0
02:45	12	193	0	0	0	0
03:00	9	173	0	0	0	0
03:15	5	220	0	0	0	0
03:30	5	188	0	0	0	0
03:45	7	257	0	0	0	0
04:00	16	220	0	0	0	0
04:15	27	225	0	0	0	0
04:30	31	245	0	0	0	0
04:45	34	235	0	0	0	0
05:00	52	235	0	0	0	0
05:15	34	247	0	0	0	0
05:30	59	254	0	0	0	0
05:45	67	261	0	0	0	0
06:00	88	240	0	0	0	0
06:15	80	220	0	0	0	0
06:30	85	213	0	0	0	0
06:45	201	228	0	0	0	0
07:00	229	226	0	0	0	0
07:15	283	234	0	0	0	0
07:30	328	180	0	0	0	0
07:45	230	175	0	0	0	0
08:00	166	125	0	0	0	0
08:15	111	131	0	0	0	0
08:30	124	129	0	0	0	0
08:45	112	130	0	0	0	0
09:00	112	130	0	0	0	0
09:15	103	121	0	0	0	0
09:30	114	102	0	0	0	0
09:45	115	125	0	0	0	0
10:00	92	89	0	0	0	0
10:15	100	84	0	0	0	0
10:30	117	69	0	0	0	0
10:45	116	56	0	0	0	0
11:00	122	56	0	0	0	0
11:15	135	50	0	0	0	0
11:30	157	43	0	0	0	0
11:45	165	37	0	0	0	0
Total	4052	8237	0	0	4052	8237
Percent	33.0%	67.0%	0.0%	0.0%	33.0%	67.0%

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Site Code:
Station ID:
Ft. Weaver Road SB
Latitude: 0° 0.000 Undefined

Start Time	20-Sep-12 Thu	SB	Hour Totals	Channel 2	Hour Totals	Combined Totals
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	40	143	0	0	0	0
12:15	28	146	0	0	0	0
12:30	32	141	0	0	0	0
12:45	15	130	0	0	0	0
01:00	21	141	0	0	0	0
01:15	11	141	0	0	0	0
01:30	11	188	0	0	0	0
01:45	15	188	0	0	0	0
02:00	15	222	0	0	0	0
02:15	12	263	0	0	0	0
02:30	6	210	0	0	0	0
02:45	9	220	0	0	0	0
03:00	8	204	0	0	0	0
03:15	7	265	0	0	0	0
03:30	2	251	0	0	0	0
03:45	10	251	0	0	0	0
04:00	13	233	0	0	0	0
04:15	19	228	0	0	0	0
04:30	29	233	0	0	0	0
04:45	37	229	0	0	0	0
05:00	44	275	0	0	0	0
05:15	48	275	0	0	0	0
05:30	39	246	0	0	0	0
05:45	63	216	0	0	0	0
06:00	75	239	0	0	0	0
06:15	86	201	0	0	0	0
06:30	111	217	0	0	0	0
06:45	179	247	0	0	0	0
07:00	218	193	0	0	0	0
07:15	279	199	0	0	0	0
07:30	301	176	0	0	0	0
07:45	296	170	0	0	0	0
08:00	150	152	0	0	0	0
08:15	95	169	0	0	0	0
08:30	103	107	0	0	0	0
08:45	110	119	0	0	0	0
09:00	117	118	0	0	0	0
09:15	117	106	0	0	0	0
09:30	114	111	0	0	0	0
09:45	95	79	0	0	0	0
10:00	103	92	0	0	0	0
10:15	118	111	0	0	0	0
10:30	134	62	0	0	0	0
10:45	120	72	0	0	0	0
11:00	145	52	0	0	0	0
11:15	148	49	0	0	0	0
11:30	152	50	0	0	0	0
11:45	129	36	0	0	0	0
Total	4032	8107	0	0	4032	8107
Percent	33.2%	66.8%	0.0%	0.0%	33.2%	66.8%

Site Code:
Station ID:
Ft. Weaver Road SB
Latitude: 0' 0.000 Undefined

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

[illegible]

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

Table 1: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10.0
B	>10.0 and ≤20.0
C	>20.0 and ≤35.0
D	>35.0 and ≤55.0
E	>55.0 and ≤80.0
F	>80.0

Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group.

Level of Service A describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS EXISTING PEAK HOUR TRAFFIC ANALYSIS

Lane Configurations	↖	↑	↓	↗
Volume (veh/h)	80	115	52	103
Sign Control	Stop	Free	Free	Free
Grade	-0%	-0%	-0%	-0%
Peak Hour Factor	0.85	0.85	0.85	0.85
Hourly Flow Rate (vph)	96	135	61	124
Pedestrians				
Lane Width (ft)				
Walking Speed (ft/s)				
Percent Backlog				
Right turn flare (veh)	16			
Median type		TW/LT	TW/LT	
Median storage (veh)		2	2	
Upstream signal (ft)				
pX platoon unblocked	1934	590	1244	
X-conflicting volume	1180			
VCI, stage 1 conf vol				
VCI, stage 2 conf vol	754			
VCI, unblocked vol	1934	590	1244	
(C) stages (s)	16.8	6.9	14.1	
IC, 2 stage (s)	5.8			
FISL	3.5	3.3	2.2	
p0 queue free %	55	70	89	
max capacity (veh/m)	210	451	556	
Volume Total	229	61	632	590
Volume Left	94	61	0	0
Volume Right	135	0	0	0
csh	512	556	1700	1700
Volume to Capacity	0.45	0.11	0.37	0.35
Queue Length 95th (ft)	57	9	0	0
Control Delay (s)	24.1	12.3	0.0	0.0
Lane LOS	C	B		
Approach Delay (s)	24.1	0.6	0.0	
Approach LOS	C	A		
Average Delay	22			
Intersection Capacity Utilization	45.5%			
Analysis Period (min)	15			

Lane Configurations	72	63	72	77	77	77	77
Volume (veh/h)	857	857	128				
Sign Control	Stop	Free	Free	Free	Free	Free	Free
Grade (%)	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	77	67	77	77	77	77	77
Pedestrians							
Walking Speed (ft/s)							
Right turn lane (veh)	16						
Median type	TNLT - TWLTL	2	2				
Median storage (veh)							
Upstream signal (ft)	1461	461	1059				
pX platoon unblocked	922						
vC1, stage 1 conf vol	539						
vC2, stage 2 conf vol	1461	461	1059				
vCn, unblocked vol	88	69	47				
G, signal(s)	5.8						
C, 2 stage (s)	3.5	33	22				
F (s)	74	88	88				
pQ queue free %	292	567	354				
M capacity (veh/h)							
Volume Left	77	77	0	0	0	0	0
Volume Right	67	0	0	0	0	0	0
CSH	548	654	1700	1700	1700	1700	1700
Volume to Capacity	0.26	0.12	0.23	0.27	0.27	0.27	0.27
Queue Length 95th (ft)	26	10	0	0	0	0	0
Control delay (s)	17.4	11.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	B					
Approach delay (s)	17.4	11.2	0.0	0.0	0.0	0.0	0.0
Approach LOS	C	B					
Average Delay	1.6						
Intersection Capacity Utilization	41.9%						
Analysis Period (min)	15						

APPENDIX D
WARRANT 1
EIGHT HOUR VOLUME WARRANT

**Warrant 1
8-Hour Volumes (:00)**

Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
0:00	51	162	3	13	0	0	0	0
0:15	38	137	6	11				
0:30	42	133	3	6				
0:45	31	112	1	9				
1:00	26	101	1	8	0	0	0	0
1:15	34	90	1	8				
1:30	21	79	6	7				
1:45	20	80	0	3				
2:00	15	85	1	5	0	0	0	0
2:15	23	95	0	6				
2:30	22	101	2	13				
2:45	25	102	2	15				
3:00	25	109	2	18	0	0	0	0
3:15	29	150	7	26				
3:30	23	202	4	33				
3:45	32	305	5	48				
4:00	66	402	10	69	0	0	0	0
4:15	81	512	14	95				
4:30	126	620	19	129				
4:45	129	696	26	138				
5:00	176	780	36	150	0	0	0	1
5:15	189	858	48	176				
5:30	202	916	28	165				
5:45	213	942	38	168				
6:00	254	1085	62	180	0	1	1	1
6:15	247	1251	37	155				
6:30	228	1529	31	170				
6:45	356	1913	50	203				
7:00	420	2127	37	208	1	1	1	1
7:15	525	2121	52	208				
7:30	612	1856	64	204				
7:45	570	1526	55	182				

Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
8:00	414	1215	37	146	0	1	0	1
8:15	260	1059	48	135				
8:30	282	1046	42	117				
8:45	259	1043	19	104				
9:00	258	1030	26	111	0	1	0	1
9:15	247	1005	30	115				
9:30	279	987	29	106				
9:45	246	967	26	107				
10:00	233	972	30	104	0	1	0	1
10:15	229	979	21	103				
10:30	259	1029	30	115				
10:45	251	1083	23	113				
11:00	240	1137	29	127	0	1	0	1
11:15	279	1198	33	133				
11:30	313	1203	28	130				
11:45	305	1241	37	131				
12:00	301	1303	35	123	0	1	0	1
12:15	284	1346	30	112				
12:30	351	1416	29	122				
12:45	367	1480	29	119				
13:00	344	1554	24	125	0	1	0	1
13:15	354	1551	40	144				
13:30	415	1602	26	148				
13:45	441	1660	35	154				
14:00	341	1620	43	150	0	1	0	1
14:15	405	1601	44	143				
14:30	473	1599	32	140				
14:45	401	1460	31	148				
15:00	322	1488	36	150	0	1	0	1
15:15	403	1571	41	141				
15:30	334	1571	40	145				
15:45	429	1656	33	143				
16:00	405	1635	27	149	0	1	0	1
16:15	403	1649	45	163				
16:30	419	1647	38	151				

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Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
16:45	408	1632	39	155				
17:00	419	1613	41	153	0	1	0	1
17:15	401	1597	33	162				
17:30	404	1577	42	181				
17:45	389	1526	37	192				
18:00	403	1523	50	191	0	1	1	1
18:15	381	1473	52	199				
18:30	353	1456	53	193				
18:45	386	1379	36	167				
19:00	353	1264	58	176	0	1	1	1
19:15	364	1140	46	156				
19:30	276	1024	27	138				
19:45	271	974	45	145				
20:00	229	933	38	126	0	1	0	1
20:15	248	904	28	109				
20:30	226	866	34	117				
20:45	230	809	26	102				
21:00	200	770	21	97	0	0	0	1
21:15	210	715	36	84				
21:30	169	640	19	63				
21:45	191	637	21	51				
22:00	145	537	8	39	0	0	0	0
22:15	135	478	15	36				
22:30	166	422	7	27				
22:45	91	319	9	27				
23:00	86	283	5	23	0	0	0	0
23:15	79		6					
23:30	63		7					
23:45	55		5					
# of Periods Warrant Satisfied					1	15	4	17

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Warrant 1
8-Hour Volumes (:15)

Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
0:00	51	162	3	13				
0:15	38	137	6	11	0	0	0	0
0:30	42	133	3	6				
0:45	31	112	1	9				
1:00	26	101	1	8				
1:15	34	90	1	8	0	0	0	0
1:30	21	79	6	7				
1:45	20	80	0	3				
2:00	15	85	1	5				
2:15	23	95	0	6	0	0	0	0
2:30	22	101	2	13				
2:45	25	102	2	15				
3:00	25	109	2	18				
3:15	29	150	7	26	0	0	0	0
3:30	23	202	4	33				
3:45	32	305	5	48				
4:00	66	402	10	69				
4:15	81	512	14	95	0	0	0	0
4:30	126	620	19	129				
4:45	129	696	26	138				
5:00	176	780	36	150				
5:15	189	858	48	176	0	0	1	1
5:30	202	916	28	165				
5:45	213	942	38	168				
6:00	254	1085	62	180				
6:15	247	1251	37	155	0	1	0	1
6:30	228	1529	31	170				
6:45	356	1913	50	203				
7:00	420	2127	37	208				
7:15	525	2121	52	208	1	1	1	1
7:30	612	1856	64	204				
7:45	570	1526	55	182				

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Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
8:00	414	1215	37	146				
8:15	260	1059	48	135	0	1	0	1
8:30	282	1046	42	117				
8:45	259	1043	19	104				
9:00	258	1030	26	111				
9:15	247	1005	30	115	0	1	0	1
9:30	279	987	29	106				
9:45	246	967	26	107				
10:00	233	972	30	104				
10:15	229	979	21	103	0	1	0	1
10:30	259	1029	30	115				
10:45	251	1083	23	113				
11:00	240	1137	29	127				
11:15	279	1198	33	133	0	1	0	1
11:30	313	1203	28	130				
11:45	305	1241	37	131				
12:00	301	1303	35	123				
12:15	284	1346	30	112	0	1	0	1
12:30	351	1416	29	122				
12:45	367	1480	29	119				
13:00	344	1554	24	125				
13:15	354	1551	40	144	0	1	0	1
13:30	415	1602	26	148				
13:45	441	1660	35	154				
14:00	341	1620	43	150				
14:15	405	1601	44	143	0	1	0	1
14:30	473	1599	32	140				
14:45	401	1460	31	148				
15:00	322	1488	36	150				
15:15	403	1571	41	141	0	1	0	1
15:30	334	1571	40	145				
15:45	429	1656	33	143				
16:00	405	1635	27	149				
16:15	403	1649	45	163	0	1	1	1
16:30	419	1647	38	151				

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Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
16:45	408	1632	39	155				
17:00	419	1613	41	153				
17:15	401	1597	33	162	0	1	1	1
17:30	404	1577	42	181				
17:45	389	1526	37	192				
18:00	403	1523	50	191				
18:15	381	1473	52	199	0	1	1	1
18:30	353	1456	53	193				
18:45	386	1379	36	167				
19:00	353	1264	58	176				
19:15	364	1140	46	156	0	1	0	1
19:30	276	1024	27	138				
19:45	271	974	45	145				
20:00	229	933	38	126				
20:15	248	904	28	109	0	1	0	1
20:30	226	866	34	117				
20:45	230	809	26	102				
21:00	200	770	21	97				
21:15	210	715	36	84	0	0	0	0
21:30	169	640	19	63				
21:45	191	637	21	51				
22:00	145	537	8	39				
22:15	135	478	15	36	0	0	0	0
22:30	166	422	7	27				
22:45	91	319	9	27				
23:00	86	283	5	23				
23:15	79		6					
23:30	63		7					
23:45	55		5					
# of Periods Warrant Satisfied					1	15	5	16

**Warrant 1
8-Hour Volumes (:30)**

Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
0:00	51	162	3	13				
0:15	38	137	6	11				
0:30	42	133	3	6	0	0	0	0
0:45	31	112	1	9				
1:00	26	101	1	8				
1:15	34	90	1	8				
1:30	21	79	6	7	0	0	0	0
1:45	20	80	0	3				
2:00	15	85	1	5				
2:15	23	95	0	6				
2:30	22	101	2	13	0	0	0	0
2:45	25	102	2	15				
3:00	25	109	2	18				
3:15	29	150	7	26				
3:30	23	202	4	33	0	0	0	0
3:45	32	305	5	48				
4:00	66	402	10	69				
4:15	81	512	14	95				
4:30	126	620	19	129	0	0	0	0
4:45	129	696	26	138				
5:00	176	780	36	150				
5:15	189	858	48	176				
5:30	202	916	28	165	0	1	1	1
5:45	213	942	38	168				
6:00	254	1085	62	180				
6:15	247	1251	37	155				
6:30	228	1529	31	170	0	1	1	1
6:45	356	1913	50	203				
7:00	420	2127	37	208				
7:15	525	2121	52	208				
7:30	612	1856	64	204	1	1	1	1
7:45	570	1526	55	182				

Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
8:00	414	1215	37	146				
8:15	260	1059	48	135				
8:30	282	1046	42	117	0	1	0	1
8:45	259	1043	19	104				
9:00	258	1030	26	111				
9:15	247	1005	30	115				
9:30	279	987	29	106	0	1	0	1
9:45	246	967	26	107				
10:00	233	972	30	104				
10:15	229	979	21	103				
10:30	259	1029	30	115	0	1	0	1
10:45	251	1083	23	113				
11:00	240	1137	29	127				
11:15	279	1198	33	133				
11:30	313	1203	28	130	0	1	0	1
11:45	305	1241	37	131				
12:00	301	1303	35	123				
12:15	284	1346	30	112				
12:30	351	1416	29	122	0	1	0	1
12:45	367	1480	29	119				
13:00	344	1554	24	125				
13:15	354	1551	40	144				
13:30	415	1602	26	148	0	1	0	1
13:45	441	1660	35	154				
14:00	341	1620	43	150				
14:15	405	1601	44	143				
14:30	473	1599	32	140	0	1	0	1
14:45	401	1460	31	148				
15:00	322	1488	36	150				
15:15	403	1571	41	141				
15:30	334	1571	40	145	0	1	0	1
15:45	429	1656	33	143				
16:00	405	1635	27	149				
16:15	403	1649	45	163				
16:30	419	1647	38	151	0	1	0	1

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Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
16:45	408	1632	39	155				
17:00	419	1613	41	153				
17:15	401	1597	33	162				
17:30	404	1577	42	181	0	1	1	1
17:45	389	1526	37	192				
18:00	403	1523	50	191				
18:15	381	1473	52	199				
18:30	353	1456	53	193	0	1	1	1
18:45	386	1379	36	167				
19:00	353	1264	58	176				
19:15	364	1140	46	156				
19:30	276	1024	27	138	0	1	0	1
19:45	271	974	45	145				
20:00	229	933	38	126				
20:15	248	904	28	109				
20:30	226	866	34	117	0	0	0	1
20:45	230	809	26	102				
21:00	200	770	21	97				
21:15	210	715	36	84				
21:30	169	640	19	63	0	0	0	0
21:45	191	637	21	51				
22:00	145	537	8	39				
22:15	135	478	15	36				
22:30	166	422	7	27	0	0	0	0
22:45	91	319	9	27				
23:00	86	283	5	23				
23:15	79		6					
23:30	63		7					
23:45	55		5					
# of Periods Warrant Satisfied					1	15	5	16

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Warrant 1
8-Hour Volumes (:45)

Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
0:00	51	162	3	13				
0:15	38	137	6	11				
0:30	42	133	3	6				
0:45	31	112	1	9	0	0	0	0
1:00	26	101	1	8				
1:15	34	90	1	8				
1:30	21	79	6	7				
1:45	20	80	0	3	0	0	0	0
2:00	15	85	1	5				
2:15	23	95	0	6				
2:30	22	101	2	13				
2:45	25	102	2	15	0	0	0	0
3:00	25	109	2	18				
3:15	29	150	7	26				
3:30	23	202	4	33				
3:45	32	305	5	48	0	0	0	0
4:00	66	402	10	69				
4:15	81	512	14	95				
4:30	126	620	19	129				
4:45	129	696	26	138	0	0	0	0
5:00	176	780	36	150				
5:15	189	858	48	176				
5:30	202	916	28	165				
5:45	213	942	38	168	0	1	1	1
6:00	254	1085	62	180				
6:15	247	1251	37	155				
6:30	228	1529	31	170				
6:45	356	1913	50	203	1	1	1	1
7:00	420	2127	37	208				
7:15	525	2121	52	208				
7:30	612	1856	64	204				
7:45	570	1526	55	182	0	1	1	1

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Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
8:00	414	1215	37	146				
8:15	260	1059	48	135				
8:30	282	1046	42	117				
8:45	259	1043	19	104	0	1	0	1
9:00	258	1030	26	111				
9:15	247	1005	30	115				
9:30	279	987	29	106				
9:45	246	967	26	107	0	1	0	1
10:00	233	972	30	104				
10:15	229	979	21	103				
10:30	259	1029	30	115				
10:45	251	1083	23	113	0	1	0	1
11:00	240	1137	29	127				
11:15	279	1198	33	133				
11:30	313	1203	28	130				
11:45	305	1241	37	131	0	1	0	1
12:00	301	1303	35	123				
12:15	284	1346	30	112				
12:30	351	1416	29	122				
12:45	367	1480	29	119	0	1	0	1
13:00	344	1554	24	125				
13:15	354	1551	40	144				
13:30	415	1602	26	148				
13:45	441	1660	35	154	0	1	0	1
14:00	341	1620	43	150				
14:15	405	1601	44	143				
14:30	473	1599	32	140				
14:45	401	1460	31	148	0	1	0	1
15:00	322	1488	36	150				
15:15	403	1571	41	141				
15:30	334	1571	40	145				
15:45	429	1656	33	143	0	1	0	1
16:00	405	1635	27	149				
16:15	403	1649	45	163				
16:30	419	1647	38	151				

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Time	Fort Weaver Rd		Kaimalie St		100%		80%	
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Condition A	Condition B	Condition A	Condition B
16:45	408	1632	39	155	0	1	0	1
17:00	419	1613	41	153				
17:15	401	1597	33	162				
17:30	404	1577	42	181				
17:45	389	1526	37	192	0	1	1	1
18:00	403	1523	50	191				
18:15	381	1473	52	199				
18:30	353	1456	53	193				
18:45	386	1379	36	167	0	1	1	1
19:00	353	1264	58	176				
19:15	364	1140	46	156				
19:30	276	1024	27	138				
19:45	271	974	45	145	0	1	0	1
20:00	229	933	38	126				
20:15	248	904	28	109				
20:30	226	866	34	117				
20:45	230	809	26	102	0	0	0	1
21:00	200	770	21	97				
21:15	210	715	36	84				
21:30	169	640	19	63				
21:45	191	637	21	51	0	0	0	0
22:00	145	537	8	39				
22:15	135	478	15	36				
22:30	166	422	7	27				
22:45	91	319	9	27	0	0	0	0
23:00	86	283	5	23				
23:15	79		6					
23:30	63		7					
23:45	55		5					
# of Periods Warrant Satisfied					1	15	5	16

APPENDIX E
WARRANT 2
FOUR HOUR VOLUME WARRANT

**Warrant 2
4-Hour Volumes (:00)**

Time	Fort Weaver Road		Kaimalie Street		Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	
0:00	159	774	18	94	
0:15	141	873	23	92	
0:30	238	971	25	91	
0:45	236	986	28	88	
1:00	258	988	16	92	
1:15	239	935	22	102	
1:30	253	968	22	103	
1:45	218	976	32	98	
2:00	225	1084	26	93	
2:15	272	1135	23	100	
2:30	261	1120	17	110	
2:45	326	1125	27	121	
3:00	276	1055	33	123	
3:15	257	1059	33	125	
3:30	266	1095	28	124	
3:45	256	1101	29	132	
4:00	280	1135	35	152	
4:15	293	1117	32	165	
4:30	272	1088	36	172	
4:45	290	1084	49	172	
5:00	262	1097	48	160	
5:15	264	1120	39	143	
5:30	268	1122	36	129	
5:45	303	1130	37	124	
6:00	285	1075	31	107	1
6:15	266	1058	25	105	
6:30	276	1056	31	108	
6:45	248	1065	20	99	
7:00	268	1161	29	117	1
7:15	264	1183	28	119	
7:30	285	1195	22	130	
7:45	344	1140	38	161	
8:00	290	1067	31	164	1
8:15	276	1080	39	176	
8:30	230	1113	53	175	
8:45	271	1174	41	155	
9:00	303	1208	43	156	
9:15	309	1187	38	150	
9:30	291	1110	33	139	
9:45	305	1051	42	126	
10:00	282	978	37	116	
10:15	232	924	27	102	
10:30	232	905	20	95	
10:45	232	885	32	100	
11:00	228	855	23	88	
11:15	213	825	20	86	
11:30	212	784	25	83	

Time	Fort Weaver Road		Kaimalie Street		Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Above Min	
11:45	202	710	20	0	
12:00	198	633	21	0	
12:15	172	569	17	0	1
12:30	138	480	16	0	
12:45	125	449	11	0	
13:00	134	436	13	0	1
13:15	83	428	17	0	
13:30	107	436	11	0	
13:45	112	421	13	0	
14:00	126	385	22	0	1
14:15	91	330	21	0	
14:30	92	328	20	0	
14:45	76	303	20	0	
15:00	71	270	15	0	1
15:15	89	232	37	0	
15:30	67	169	21	0	
15:45	43	127	18	0	
16:00	33	102	20	0	1
16:15	26	95	28	0	
16:30	25	82	15	0	
16:45	18	68	6	0	
17:00	26	57	7	0	1
17:15	13	36	17	0	
17:30	11	29	6	0	
17:45	7	20	3	0	
18:00	5	22	7	0	1
18:15	6	18	7	0	
18:30	2	15	1	0	
18:45	9	17	0	0	
19:00	1	12	1	0	1
19:15	3	19	0	0	
19:30	4	21	0	0	
19:45	4	22	0	0	
20:00	8	36	2	0	
20:15	5	37	0	0	
20:30	5	47	3	0	
20:45	18	80	0	0	
21:00	9	118	1	0	
21:15	15	164	0	0	
21:30	38	211	1	0	
21:45	56	271	5	0	
22:00	55	343	10	0	
22:15	62	391	3	0	
22:30	98	493	2	0	
22:45	128	569	6	0	
23:00	103	628	5	0	
23:15	164		6		
23:30	174		7		
23:45	187		11		11

**Warrant 2
4-Hour Volumes (:15)**

Time	Fort Weaver Road		Kaimalie Street			Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Above Min	
0:00	159	774	18	94	0	
0:15	141	873	23	92	0	
0:30	238	971	25	91	0	
0:45	236	986	28	88	0	
1:00	258	968	16	92	0	
1:15	239	935	22	102	0	
1:30	253	968	22	103	0	
1:45	218	976	32	98	0	
2:00	225	1084	26	93	0	
2:15	272	1135	23	100	0	
2:30	261	1120	17	110	0	
2:45	326	1125	27	121	1	
3:00	276	1055	33	123	1	
3:15	257	1059	33	125	1	
3:30	266	1095	28	124	1	
3:45	256	1101	29	132	1	
4:00	280	1135	35	152	1	
4:15	293	1117	32	165	1	
4:30	272	1088	36	172	1	
4:45	290	1084	49	172	1	
5:00	262	1097	48	160	1	
5:15	264	1120	39	143	1	
5:30	268	1122	36	129	1	
5:45	303	1130	37	124	1	
6:00	285	1075	31	107	0	
6:15	266	1058	25	105	0	1
6:30	276	1056	31	108	0	
6:45	248	1065	20	99	0	
7:00	268	1161	29	117	1	
7:15	264	1183	28	119	1	1
7:30	285	1195	22	130	1	
7:45	344	1140	38	161	1	
8:00	290	1067	31	164	1	
8:15	276	1080	39	176	1	
8:30	230	1113	53	175	1	
8:45	271	1174	41	155	1	
9:00	303	1208	43	156	1	
9:15	309	1187	38	150	1	
9:30	291	1110	33	139	1	
9:45	305	1051	42	126	1	
10:00	282	1116	37	116	1	
10:15	232	924	27	102	0	
10:30	232	905	20	95	0	
10:45	232	885	32	100	0	
11:00	228	855	23	88	0	
11:15	213	825	20	86	0	
11:30	212	784	25	83	0	

Time	Fort Weaver Road		Kaimalie Street			Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	Above Min	
11:45	202	710	20	74	0	
12:00	198	633	21	65	0	
12:15	172	569	17	57	0	
12:30	138	480	16	57	0	
12:45	125	449	11	52	0	
13:00	134	436	13	54	0	
13:15	83	428	17	63	0	1
13:30	107	436	11	67	0	
13:45	112	421	13	76	0	
14:00	126	385	22	83	0	
14:15	91	330	21	76	0	1
14:30	92	328	20	92	0	
14:45	76	303	20	93	0	
15:00	71	270	15	91	0	
15:15	89	232	37	96	0	1
15:30	67	169	21	87	0	
15:45	43	127	18	81	0	
16:00	33	102	20	69	0	
16:15	26	95	28	56	0	1
16:30	25	82	15	45	0	
16:45	18	68	6	36	0	
17:00	26	57	7	33	0	
17:15	13	36	17	33	0	1
17:30	11	29	6	23	0	
17:45	7	20	3	18	0	
18:00	5	22	7	15	0	
18:15	6	18	7	9	0	1
18:30	2	15	1	2	0	
18:45	9	17	0	1	0	
19:00	1	12	1	1	0	
19:15	3	19	0	2	0	
19:30	4	21	0	2	0	
19:45	4	22	0	5	0	
20:00	8	36	2	5	0	
20:15	5	37	0	4	0	
20:30	5	47	3	4	0	
20:45	18	80	0	2	0	
21:00	9	118	1	7	0	
21:15	15	164	0	16	0	
21:30	38	211	1	19	0	
21:45	56	271	5	20	0	
22:00	55	343	10	21	0	
22:15	62	391	3	16	0	
22:30	98	493	2	19	0	
22:45	128	569	6	24	0	
23:00	103	628	5	29	0	
23:15	164		6			
23:30	174		7			
23:45	187		11			8

**Warrant 2
4-Hour Volumes (:30)**

Time	Fort Weaver Road		Kaimalle Street		Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	
0:00	159	774	18	94	
0:15	141	873	23	92	
0:30	238	971	25	91	
0:45	236	986	28	88	
1:00	258	968	16	92	
1:15	239	935	22	102	
1:30	253	968	22	103	
1:45	218	976	32	98	
2:00	225	1084	26	93	
2:15	272	1135	23	100	
2:30	261	1120	17	110	
2:45	326	1125	27	121	
3:00	276	1055	33	123	
3:15	257	1059	33	125	
3:30	266	1095	28	124	
3:45	256	1101	29	132	
4:00	280	1135	35	152	
4:15	293	1117	32	165	
4:30	272	1088	36	172	
4:45	290	1084	49	172	
5:00	262	1097	48	160	
5:15	264	1120	39	143	
5:30	268	1122	36	129	
5:45	303	1130	37	124	
6:00	285	1075	31	107	
6:15	266	1058	25	105	
6:30	276	1056	31	108	
6:45	248	1065	20	99	
7:00	268	1161	29	117	
7:15	264	1183	28	119	
7:30	285	1195	22	130	
7:45	344	1140	38	161	
8:00	290	1067	31	164	
8:15	276	1080	39	176	
8:30	230	1113	53	175	
8:45	271	1174	41	155	
9:00	303	1208	43	156	
9:15	309	1187	38	150	
9:30	291	1110	33	139	
9:45	305	1051	42	126	
10:00	282	116	37	116	
10:15	232	924	27	102	
10:30	232	905	20	95	
10:45	232	885	32	100	
11:00	228	88	23	88	
11:15	213	825	20	86	
11:30	212	784	25	83	

Time	Fort Weaver Road		Kaimalle Street		Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	
11:45	202	710	20	74	
12:00	198	633	21	65	
12:15	172	569	17	57	
12:30	138	480	16	57	
12:45	125	449	11	52	
13:00	134	436	13	54	
13:15	83	428	17	63	
13:30	107	436	11	67	
13:45	112	421	13	76	
14:00	126	385	22	83	
14:15	91	330	21	76	
14:30	92	328	20	92	
14:45	76	303	20	93	
15:00	71	270	15	91	
15:15	89	232	37	96	
15:30	67	169	21	87	
15:45	43	127	18	81	
16:00	33	102	20	69	
16:15	26	95	28	56	
16:30	25	82	15	45	
16:45	18	68	6	36	
17:00	26	57	7	33	
17:15	13	36	17	33	
17:30	11	29	6	23	
17:45	7	20	3	18	
18:00	5	22	7	15	
18:15	6	18	7	9	
18:30	2	15	1	2	
18:45	9	17	0	1	
19:00	1	12	1	1	
19:15	3	19	0	2	
19:30	4	21	0	2	
19:45	4	22	0	5	
20:00	8	36	2	5	
20:15	5	37	0	4	
20:30	5	47	3	4	
20:45	18	80	0	2	
21:00	9	118	1	7	
21:15	15	164	0	16	
21:30	38	211	1	19	
21:45	56	271	5	20	
22:00	55	343	10	21	
22:15	62	391	3	16	
22:30	98	493	2	19	
22:45	128	569	6	24	
23:00	103	628	5	29	
23:15	164		6		
23:30	174		7		
23:45	187		11		
# of Periods Warrant Satisfied					9

**Warrant 2
4-Hour Volumes (:45)**

Time	Fort Weaver Road		Kaimalle Street		Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	
0:00	159	774	18	94	
0:15	141	873	23	92	
0:30	238	971	25	91	
0:45	236	986	28	88	
1:00	258	988	16	92	
1:15	239	935	22	102	
1:30	253	968	22	103	
1:45	218	976	32	98	
2:00	225	1084	26	93	
2:15	272	1135	23	100	
2:30	261	1120	17	110	
2:45	326	1125	27	121	
3:00	276	1055	33	123	
3:15	257	1059	33	125	
3:30	266	1095	28	124	
3:45	256	1101	29	132	
4:00	280	1135	35	152	
4:15	293	1117	32	165	
4:30	272	1088	36	172	
4:45	290	1084	49	172	
5:00	262	1097	48	160	
5:15	264	1120	39	143	
5:30	268	1122	36	129	
5:45	303	1130	37	124	
6:00	285	1075	31	107	
6:15	266	1058	25	105	
6:30	276	1056	31	108	
6:45	248	1065	20	99	
7:00	268	1161	29	117	
7:15	264	1183	28	119	
7:30	285	1195	22	130	
7:45	344	1140	38	161	
8:00	290	1067	31	164	
8:15	276	1080	39	176	
8:30	230	1113	53	175	
8:45	271	1174	41	155	
9:00	303	1208	43	156	
9:15	309	1187	38	150	
9:30	291	1110	33	139	
9:45	305	1051	42	126	
10:00	262	978	37	116	
10:15	232	924	27	102	
10:30	232	905	20	95	
10:45	232	885	32	100	
11:00	228	855	23	88	
11:15	213	825	20	86	
11:30	212	784	25	83	

Time	Fort Weaver Road		Kaimalle Street		Warrant Satisfied
	15 Min Count	Hourly Total	15 Min Count	Hourly Total	
11:45	202	710	20	74	
12:00	198	633	21	65	
12:15	172	569	17	57	
12:30	138	480	16	57	
12:45	125	449	11	52	
13:00	134	436	13	54	
13:15	83	428	17	63	
13:30	107	436	11	67	
13:45	112	421	13	76	
14:00	126	385	22	83	
14:15	91	330	21	76	
14:30	92	328	20	92	
14:45	76	303	20	93	
15:00	71	270	15	91	
15:15	89	232	37	96	
15:30	67	169	21	87	
15:45	43	127	18	81	
16:00	33	102	20	69	
16:15	26	95	28	56	
16:30	25	82	15	45	
16:45	18	68	6	36	
17:00	26	57	7	33	
17:15	13	36	17	33	
17:30	11	29	6	23	
17:45	7	20	3	18	
18:00	5	22	7	15	
18:15	6	18	7	9	
18:30	2	15	1	2	
18:45	9	17	0	1	
19:00	1	12	1	1	
19:15	3	19	0	2	
19:30	4	21	0	2	
19:45	4	22	0	5	
20:00	8	36	2	5	
20:15	5	37	0	4	
20:30	5	47	3	4	
20:45	18	80	0	2	
21:00	9	118	1	7	
21:15	15	164	0	16	
21:30	38	211	1	19	
21:45	56	271	5	20	
22:00	55	343	10	21	
22:15	62	391	3	16	
22:30	98	493	2	19	
22:45	128	569	6	24	
23:00	103	628	5	29	
23:15	164		6		
23:30	174		7		
23:45	187		11		
# of Periods Warrant Satisfied					10

APPENDIX F CAPACITY ANALYSIS CALCULATIONS PROJECTED PEAK HOUR TRAFFIC ANALYSIS

HCM Signalized Intersection Capacity Analysis 3: Kaimalie & Fort Weaver

10/12/2012



Lane Configurations	80	115	52	1074	1003	54
Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	50	50	50	50	50	50
Total Lost time (s)	1.00	1.00	1.00	0.95	0.95	1.00
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.15	1.00	1.00	1.00
Satd Flow (perm)	1770	1583	282	3539	3539	1583
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj Flow (vph)	94	135	61	282	1580	64
RTOR Reduction (vph)	0	116	0	0	0	28
Lane Group Flow (vph)	94	19	61	1580	1580	38
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Rotated Phases	1	5	2	6		
Permitted Phases	4	2				6
Actuated Green, G (s)	9.2	9.2	44.8	44.8	35.6	35.6
Effective Green, g (s)	9.2	9.2	44.8	44.8	35.6	35.6
Actual Cycle Ratio	0.14	0.14	0.70	0.70	0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	254	227	295	2477	1968	880
Vol Ratio	0.05	0.01	0.01	0.036	0.033	
v/s Ratio Perm	0.01	0.13				0.02
Vol Ratio	0.37	0.09	0.21	0.51	0.60	0.04
Uniform Delay, d1	24.8	23.8	5.0	4.5	9.5	6.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.2	0.3	0.2	0.5	0.0
Delay(s)	25.7	23.9	5.4	4.7	10.0	6.5
Level of Service	C	C	A	A	A	A
Approach Delay(s)	24.6		3.7	3.8		
Approach LOS	C		A	A		
HCM 2000 Control Delay			8.6			A
HCM 2000 Volume-to-Capacity ratio			0.57			
Actuated Cycle Length (s)			64.0			15.0
Intersection Capacity Utilization			48.0			A
Analysis Period (min)			15			
Critical Lane Group						

	7.7	HCM 2000 Level of Service	A
HCM 2000 Control Delay	0.39		
HCM 2000 Volume to Capacity Ratio	54.2	Sum of lost time (s)	15.0
Actuated Cycle Length (s)	44.3 %	Level of Service	A
Intersection Capacity Utilization	15		
Analysis Period (min)			
Grain Size (ft)			

INTERSECTION APPROACH SUMMARY-WARRANT ANALYSIS

East-West Street: Keoneula Blvd
 North-South Street: Kamakana St
 Count Date: _____
 Ref count: _____

Lanes/Approach
 ← Major Street 2
 Minor Street 1

IS THE 70% CONDITION SATISFIED?
 (If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000.)

Peak Hour	Keoneula Blvd EB	Keoneula Blvd WB	Kamakana St SB	Kamakana St NB	TOTAL MAJOR	TOTAL MINOR	TOTAL	ENT VEH	TOTAL WARRANT MET?
AM	617	623	136	73	1240	136	1376		<input checked="" type="checkbox"/>
PM	1344	1416	92	39	2760	131	2891		<input type="checkbox"/>

Keoneula Blvd at Kamakana St

WARRANT 3 - Peak Hour

PART A or PART B SATISFIED

PART A
 (All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two lane approach **AND**

2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes **AND**

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Yes ☒ No ☐

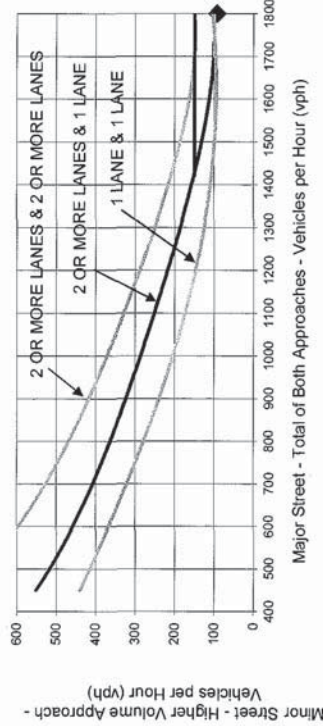
SATISFIED Yes ☒ No ☐

PART B

Approach Lanes	One	2 or More
Both Approaches-Major Street	92	2740
Highest Approach-Minor Street		

SATISFIED Yes ☐ No ☒

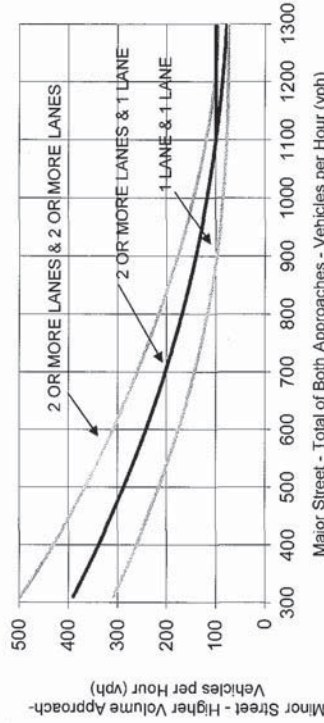
Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 mph OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

INTERSECTION APPROACH SUMMARY-WARRANT ANALYSIS

East-West Street: Keoneula Boulevard
 North-South Street: Kaiwawalo Street
 Count Date:
 Ref count:
 Lanes/Approach: 2 1
 ← Major Street
 Minor Street

IS THE 70% CONDITION SATISFIED?
 (If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000.)

Peak Hour	Keoneula Boulevard EB	Keoneula Boulevard WB	Kaiwawalo Street SB	Kaiwawalo Street NB	TOTAL MAJOR	TOTAL MINOR	TOTAL ENT	TOTAL VEH	WARRANT MET?
AM	443	571	156	66	1014	222	1236	1236	<input type="checkbox"/>
PM	1187	1306	187	40	2493	227	2720	2720	<input checked="" type="checkbox"/>

Keoneula Boulevard at Kaiwawalo Street

WARRANT 3 - Peak Hour

PART A or PART B SATISFIED

Yes ☒ No ☐

PART A

(All parts 1, 2, and 3 below must be satisfied)

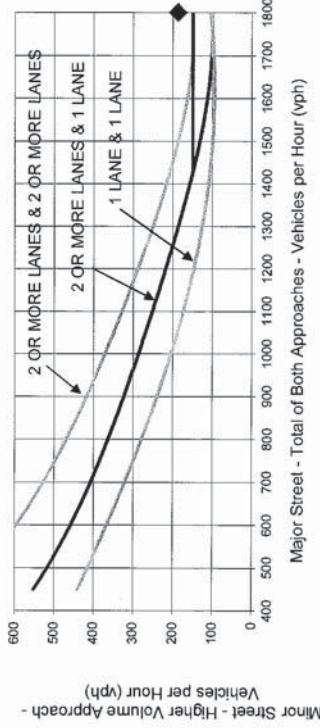
- The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two lane approach **AND**
- The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes **AND**
- The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

PART B

SATISFIED Yes ☒ No ☐

Approach Lanes	One	2 or More
Both Approaches-Major Street	187	2493
Highest Approach-Minor Street		

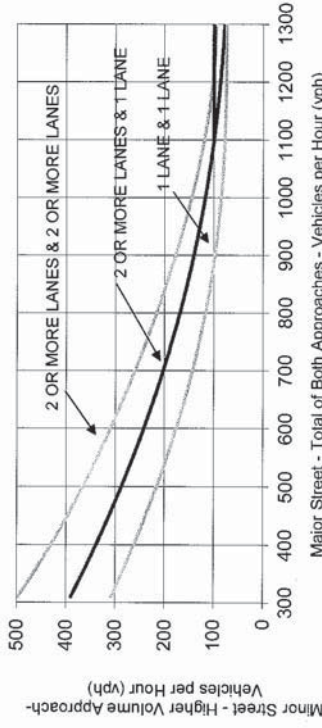
Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION, OR ABOVE 70 mph OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

INTERSECTION APPROACH SUMMARY-WARRANT ANALYSIS

East-West Street: Keoneula Blvd
 North-South Street: Road A
 Count Date:
 Ref count:
 Lanes/Approach: 2 1
 ←Major Street
 Minor Street

IS THE 70% CONDITION SATISFIED?
 (If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000.)

Peak Hour	Keoneula Blvd EB	WB	SB	NB	MAJOR	MINOR	TOTAL	TOTAL	ENT VEH	WARRANT MET?
AM	617	623	0	73	1240	136	2243	150	1376	<input type="checkbox"/>
PM	1097	1146	0	150	2243	150	2393		2393	<input checked="" type="checkbox"/>

Keoneula Blvd at Road A

WARRANT 3 - Peak Hour

PART A or PART B SATISFIED

PART A
 (All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two lane approach **AND**

2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes **AND**

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Yes ☒ No ☐

SATISFIED Yes ☐ No ☒

Yes ☐ No ☒

Yes ☒ No ☐

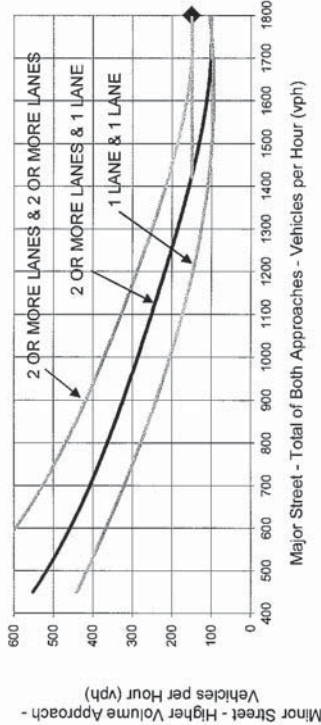
Yes ☐ No ☒

SATISFIED Yes ☒ No ☐

PART B

Approach Lanes	One	2 or More
Both Approaches-Major Street	2243	
Highest Approach-Minor Street	150	

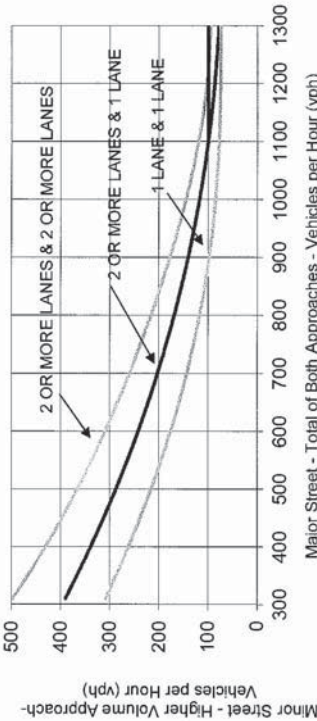
Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 hmi/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

INTERSECTION APPROACH SUMMARY-WARRANT ANALYSIS

East-West Street: Kai 'Oli Street Minor Street
 North-South Street: Kapolei Parkway ← Major Street
 Count Date: Ref count: IS THE 70% CONDITION SATISFIED?
 (If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000.)

Peak Hour	Kai 'Oli Street	Kapolei Parkway	SB	NB	MAJOR	MINOR	TOTAL	TOTAL	ENT VEH	WARRANT MET?
AM	61	175	808	848	1656	236	1892			<input checked="" type="checkbox"/>
PM	36	27	967	1453	2420	63	2483			<input type="checkbox"/>

Kapolei Parkway at Kai 'Oli Street

WARRANT 3 - Peak Hour

PART A
 (All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two lane approach **AND**

2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes **AND**

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

PART B

PART A or PART B SATISFIED

SATISFIED Yes ☒ No ☐

SATISFIED Yes ☐ No ☒

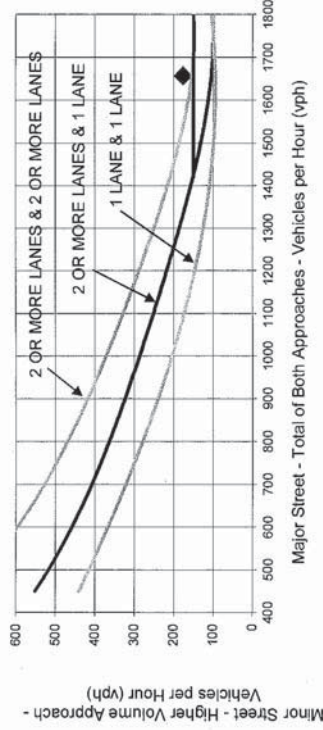
SATISFIED Yes ☐ No ☒

SATISFIED Yes ☒ No ☐

SATISFIED Yes ☒ No ☐

Approach Lanes	One	2 or More
Both Approaches-Major Street	175	1656
Highest Approach-Minor Street		

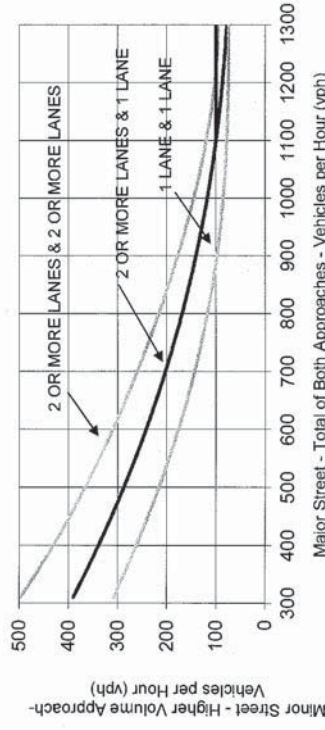
Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 mph OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

INTERSECTION APPROACH SUMMARY-WARRANT ANALYSIS

East-West Street: Kapolei Parkway
 North-South Street: Kapolei Parkway
 Count Date: _____
 Ref count: _____

Lanes/Approach: 2 Minor Street
 2 <--Major Street

IS THE 70% CONDITION SATISFIED?
 (If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000.)

NO

Peak Hour	Kaileolea Dr EB	WB	Kapolei Parkway SB	NB	TOTAL MAJOR	TOTAL MINOR	TOTAL ENT VEH	WARRANT MET?
AM	353	56	510	399	909	409	1892	<input type="checkbox"/>
PM	239	73	599	433	1032	312	1344	<input checked="" type="checkbox"/>

Kapolei Parkway at Kaileolea Dr

WARRANT 3 - Peak Hour

PART A or PART B SATISFIED

PART A
 (All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two lane approach AND

2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes AND

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Yes ☒ No ☐

SATISFIED Yes ☒ No ☐

Yes ☒ No ☐

Yes ☒ No ☐

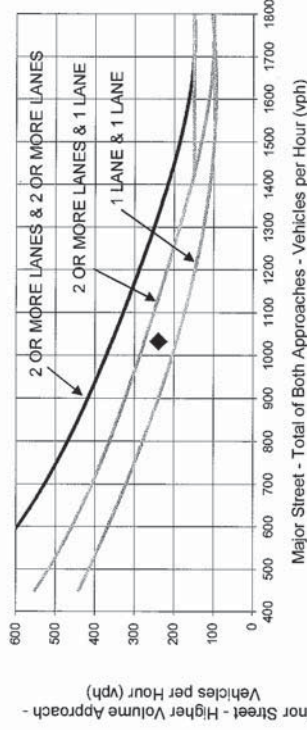
Yes ☒ No ☐

Yes ☒ No ☐

PART B

Approach Lanes	One	2 or More
Both Approaches-Major Street	1656	
Highest Approach-Minor Street	353	

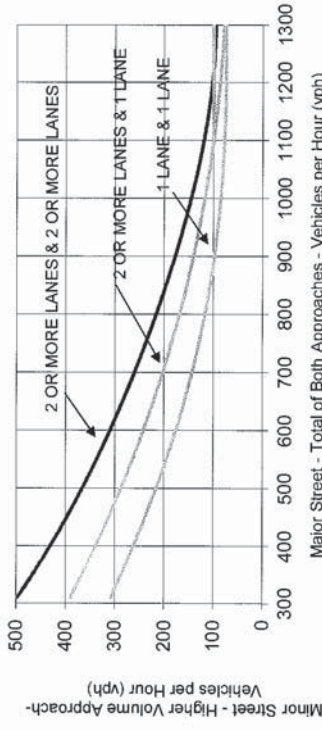
Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION, OR ABOVE 70 hmi/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

HCM Signalized Intersection Capacity Analysis

1: Kapolei Pkwy & Keaunui Dr

[illegible]

HCM Signalized Intersection Capacity Analysis 1: Kapolei Pkwy & Keaunui Dr

2/21/2013

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Lane Configurations	→	→	→	↖	←	↖	↖	↖	↖
Volume (vph)	0	0	1	279	0	47	1	830	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.91	1.00
Flpb, ped/bikes	0.97	1.00	1.00	0.97	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.85	1.00	1.00	0.85	1.00	0.97	1.00	1.00	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1529	1770	1539	1770	1770	1770	1770	1770	1770
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1529	1770	1539	1770	1770	1770	1770	1770	1770
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	1	282	0	47	1	838	199
RTOR Reduction (vph)	0	1	0	0	0	0	38	0	0
Lane Group Flow (vph)	0	0	0	282	0	47	1	999	0
Confl. Peds. (#/hr)	19	55	55	51	51	51	51	51	10
Turn Type	Split	NA	Split	Free	Prot	NA	Prot	NA	NA
Protected Phases	4	4	8	8	5	2	1	6	
Permitted Phases	Free								
Actuated Green, G (s)	0.8	15.1	64.3	0.6	25.3	3.1	27.8		
Effective Green, g (s)	0.8	15.1	64.3	0.6	25.3	3.1	27.8		
Actuated g/C Ratio	0.01	0.23	1.00	0.01	0.39	0.05	0.43		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	19	415	1539	16	1898	85	2198		
v/s Ratio Prot	0.00	c0.16	c0.03	0.00	0.21	c0.03	c0.22		
v/s Ratio Perm	0.00	0.68	0.03	0.06	0.53	0.69	0.51		
w/C Ratio	31.4	22.4	0.0	31.6	14.9	30.1	13.3		
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.0	4.4	0.0	1.6	0.3	21.7	0.2		
Delay (s)	31.4	26.8	0.0	33.2	15.2	51.9	13.5		
Level of Service	C	C	A	C	B	D	B		
Approach Delay (s)	31.4	23.0	15.2	15.2	15.2	15.4	15.4		
Approach LOS	C	C	B	B	B	B	B		
HCM 2000 Summary									
HCM 2000 Control Delay	16.3								
HCM 2000 Level of Service	B								
HCM 2000 Volume to Capacity ratio	0.60								
Actuated Cycle Length (s)	64.3								
Sum of lost time (s)	20.0								
Intersection Capacity Utilization	59.3%								
ICU Level of Service	B								
Analysis Period (min)	15								
Critical Lane Group									

HCM Signalized Intersection Capacity Analysis 2: Kapolei Pkwy & Kai 'Oli St

2/21/2013

Movement	EB	WB	EB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB
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HCM Signalized Intersection Capacity Analysis

2: Kapolei Pkwy & Kai 'Oli St

2/21/2013

Movement	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	1513	1514	1515	1516	1517	1518	1519	1520	1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	1537	1538	1539	1540	1541	1542	1543	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595	1596	1597	1598	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HCM Signalized Intersection Capacity Analysis 9: Fort Weaver Rd & Keoneula Blvd/Hanakahi St

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEB	SEB
Lane Configurations	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEB	SEB
Volume (vph)	836	80	112	10	71	203	93	767	5	319	960	962
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.91	1.00	0.85	1.00	1.00	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	3433	1654	1851	1583	1770	3539	1437	1770	3539	1558	1558	1558
Flt Permitted	0.95	1.00	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	3433	1654	1851	1583	1770	3539	1437	1770	3539	1558	1558	1558
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	880	84	118	11	75	214	98	807	5	336	1011	1013
RTOR Reduction (vph)	0	45	0	0	0	52	0	0	4	0	0	0
Lane Group Flow (vph)	880	157	0	0	86	162	98	807	1	336	1011	1013
Conf. Peds. (#/hr)	18							23				14
Turn Type	Split	NA	Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	Free	Free
Protected Phases	8	8	4	4	1	5	2	2	6	1	6	6
Permitted Phases	28.7	28.7	8.6	24.7	34.2	29.2	29.2	29.2	50.3	40.3	102.6	102.6
Effective Green, G (s)	28.7	28.7	8.6	24.7	34.2	29.2	29.2	29.2	50.3	40.3	102.6	102.6
Actuated g/c Ratio	0.28	0.28	0.08	0.24	0.33	0.28	0.28	0.28	0.49	0.39	1.00	1.00
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	980	462	155	381	184	1007	408	350	1390	1558	1558	1558
v/s Ratio Prot	c0.26	0.10	0.05	0.07	0.03	0.23	0.00	c0.15	0.29	c0.65	c0.65	c0.65
v/s Ratio Perm	0.92	0.34	0.55	0.42	0.53	0.80	0.00	0.96	0.73	0.65	0.65	0.65
Uniform Delay, d1	35.8	29.4	45.2	32.9	24.7	34.0	26.3	26.6	26.5	0.0	0.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.1	0.4	4.3	0.8	2.9	6.7	0.0	37.1	3.4	2.1	2.1	2.1
Delay (s)	48.9	29.9	49.4	33.7	27.7	40.7	26.3	63.7	29.8	2.1	2.1	2.1
Level of Service	D	C	D	C	C	D	C	D	E	C	A	A
Approach Delay (s)	45.3		38.2			39.2			23.1			
Approach LOS	D		D			D			C			
HCM 2000 Control Delay	32.4											
HCM 2000 Volume to Capacity ratio	0.96											
Actuated Delay Length (s)	102.6								20.0			
Intersection Capacity Utilization	61.0%								D			
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 8: Kalleolea Dr & Keoneula Blvd

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEB	SEB
Lane Configurations	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SEB	SEB
Volume (vph)	108	619	42	40	519	147	129	115	244	131	67	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.97	1.00	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.97
Satd. Flow (prot)	1770	3539	1445	1770	3345	1705	1488	1762	3328	1762	3328	1762
Flt Permitted	0.94	1.00	1.00	0.97	1.00	1.00	1.00	0.73	1.00	1.00	1.00	0.66
Satd. Flow (perm)	1770	3539	1445	1770	3345	1705	1488	1762	3328	1762	3328	1762
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	652	44	42	546	155	136	121	257	138	71	131
RTOR Reduction (vph)	0	0	25	0	25	0	0	0	62	0	0	81
Lane Group Flow (vph)	114	652	19	42	676	0	0	257	195	0	209	50
Conf. Peds. (#/hr)	85							55	168		54	168
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	6
Permitted Phases	20.1	20.1	20.1	20.1	20.1	20.1	18.3	18.3	18.3	18.3	18.3	18.3
Effective Green, G (s)	20.1	20.1	20.1	20.1	20.1	20.1	18.3	18.3	18.3	18.3	18.3	18.3
Actuated g/c Ratio	0.42	0.42	0.42	0.42	0.42	0.42	0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	263	1469	600	286	1389		482	562	452	502		502
v/s Ratio Prot	0.18		0.01	0.06	c0.20		c0.20	0.13	0.17	0.04		0.04
v/s Ratio Perm	0.43	0.44	0.03	0.15	0.49		0.53	0.35	0.46	0.10		0.10
Uniform Delay, d1	10.1	10.1	8.4	8.8	10.4		11.7	10.8	11.3	9.7		9.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.1	0.2	0.0	0.2	0.3		1.1	0.4	0.8	0.1		0.1
Delay (s)	11.2	10.4	8.4	9.0	10.6		12.9	11.2	12.1	9.8		9.8
Level of Service	B	B	A	A	B		B	B	B	A		A
Approach Delay (s)	10.4		10.5				12.0		11.2			11.2
Approach LOS	B		B				B		B			B
HCM 2000 Control Delay	10.9											
HCM 2000 Volume to Capacity ratio	0.51											
Actuated Delay Length (s)	48.4								10.0			
Intersection Capacity Utilization	62.2%								B			
Analysis Period (min)	15											
c Critical Lane Group												

2/21/2013

c Critical Lane Group

2/21/2013

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

7: Keoneula Blvd & Kaipalaoa St

2/21/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	4	996	1014	35	27	10
Sign Control	Free	Free	Free	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	1048	1067	37	28	11
Pedestrians	21	21	21	21	21	21
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	2	2	2	2	2	2
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	655	896				
Upstream signal (ft)	0.98					
pX, platoon unblocked	1125					
IC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1089					
IC, single (s)	4.1					
IC, 2 stage (s)						
IF (s)	2.2					
p0 queue free %	99					
IC capacity (veh/h)	614					
Intersection Summary	553	1077	1067	37	28	11
Volume Total	4	524	524	712	393	39
Volume Left	4	0	0	0	0	28
Volume Right	0	0	0	0	37	11
CSH	614	1700	1700	1700	1700	228
Volume to Capacity	0.01	0.31	0.31	0.42	0.23	0.17
Queue Length 95th (ft)	1	0	0	0	0	15
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	24.3
Lane LOS	B					C
Approach Delay (s)	0.0					24.3
Approach LOS						C
Intersection Summary						
Average Delay				0.5		
Intersection Capacity Utilization				44.2%		
Analysis Period (min)				15		
* User Entered Value						

HCM Signalized Intersection Capacity Analysis

6: Kapolei Pkwy & Keoneula Blvd

2/22/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (vph)	307	404	86	64	308	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.78	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.97	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3332	1770	3539	1228	3248
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3332	1770	3539	1228	3248
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	323	425	91	67	324	243
RTOR Reduction (vph)	0	20	0	0	196	0
Lane Group Flow (vph)	323	496	0	67	324	47
Conf. Peds. (#/hr)	153	127	83	154	82	83
Turn Type	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4	3	8	5	2
Permitted Phases						
Actuated Green, G (s)	11.8	20.2	6.2	14.6	6.3	17.0
Effective Green, g (s)	11.8	20.2	6.2	14.6	6.3	17.0
Actuated g/C Ratio	0.16	0.27	0.08	0.19	0.08	0.23
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	539	896	146	688	238	735
v/s Ratio Prot	c0.09	c0.15	0.04	0.09	0.04	c0.14
v/s Ratio Perm						
v/c Ratio	0.60	0.55	0.46	0.47	0.20	0.48
Uniform Delay, d1	29.4	23.6	32.9	26.8	25.3	32.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.7	2.3	0.5	0.4	1.4
Delay (s)	31.2	24.3	35.1	27.3	25.8	34.3
Level of Service	C	C	D	C	C	C
Approach Delay (s)	27.0		27.6		28.4	
Approach LOS			C		C	
Intersection Summary						
HCM 2000 Control Delay			26.3			
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			75.1			
Intersection Capacity Utilization			62.7%			
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 6: Kapolei Pkwy & Keoneula Blvd

2/22/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	TH	TH	TH	TH	TH	TH	TH	TH	TH	TH
Volume (vph)	519	773	104	150	716	143	102	358	93	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.93	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prt	1.00	0.98	1.00	1.00	0.85	1.00	0.97	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd Flow (prot)	3483	3458	1770	3539	1465	1770	3392	1770	3539	1529
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd Flow (perm)	3433	3458	1770	3539	1465	1770	3392	1770	3539	1529
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	546	814	109	158	754	151	107	377	98	166
RTOR Reduction (vph)	0	11	0	0	115	0	26	0	0	0
Lane Group Flow (vph)	546	912	0	158	754	36	107	449	0	166
Confl. Peds. (#/hr)	33	20	26	39	20	26	39	26	39	33
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Prot	NA	perm
Protected Phases	7	4	3	8	5	2	1	6	7	6
Permitted Phases	18.7	28.9	10.4	20.6	20.6	7.5	17.5	10.6	20.6	39.3
Actuated Green, G (s)	18.7	28.9	10.4	20.6	20.6	7.5	17.5	10.6	20.6	39.3
Effective Green, g (s)	0.21	0.33	0.12	0.24	0.24	0.09	0.20	0.12	0.24	0.45
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	734	1143	210	834	345	151	679	214	834	774
v/s Ratio Prot	0.16	c0.26	0.09	c0.21	0.06	0.13	c0.09	0.18	c0.17	0.23
v/s Ratio Perm	0.74	0.80	0.75	0.90	0.10	0.71	0.66	0.78	0.75	0.78
Uniform Delay, d1	32.1	26.6	37.3	32.4	26.2	39.9	32.2	37.2	31.0	20.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	4.0	14.1	13.1	0.1	14.1	2.4	16.0	3.7	5.1
Delay (s)	36.2	30.6	51.4	45.5	26.3	53.0	34.7	53.3	34.7	25.5
Level of Service	D	C	D	D	C	D	C	D	C	C
Approach Delay (s)	32.7		43.7		38.0		32.7		32.7	
Approach LOS	C		D		D		C		C	
Analysis Period (min)	15		15		15		15		15	
Intersection Capacity Utilization	79.1%		87.4		79.1%		87.4		79.1%	
Sum of lost time (s)	20.0		20.0		20.0		20.0		20.0	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D		D		D		D		D	
Analysis Period (min)	15		15		15		15		15	
ICU Level of Service	D									

HCM Unsignalized Intersection Capacity Analysis

5: Keoneula Blvd & Kai 'Oli St

2/21/2013

Movement	EB	WB	NB	SB	SPR
Lane Configurations	FF	FF	FF	FF	SPR
Volume (veh/h)	0	1410	1412	7	0
Sign Control	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1484	1486	7	0
Pedestrians	30	10	30	30	30
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0
Percent Blockage	4.0	4.0	4.0	4.0	4.0
Right turn flare (veh)	3	1	3	3	3
Median type	None	None	None	None	None
Median storage (veh)					
Upstream signal (ft)					502
PX platoon unblocked	0.80				0.80
YC conflicting volume	1524				2272
YC1, stage 1 conf vol					807
YC2, stage 2 conf vol					
VCu, unblocked vol	1157				2091
IC, single (s)	4.1				6.8
IC, 2 stage (s)					5.9
IF (s)	2.2				3.5
p0 queue free %	100				98
CM capacity (veh/m)	488				35
CM capacity (veh/m)					605
Volume Total	742	742	991	503	13
Volume Left	0	0	0	0	0
Volume Right	0	0	0	7	13
CSH	1700	1700	1700	1700	605
Volume to Capacity	0.44	0.44	0.58	0.30	0.02
Queue Length 95th (ft)	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	11.1
Lane LOS					B
Approach Delay (s)	0.0	0.0	0.0	11.1	
Approach LOS				B	
Average Delay				0.0	
Intersection Capacity Utilization				55.6%	
Analysis Period (min)				15	
* User Entered Value					

HCM Signalized Intersection Capacity Analysis

4: Kamakana St & Keoneula Blvd

2/21/2013

Movement	EB	WB	EB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB
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2/21/2013

Line Configurations	Line Configurations											
	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total lost time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	3533	1765	3494	1628	1899	1899	1899	1899	1899	1899	1899	1899
Said. Flow (prot)	3375	288	3494	1530	1306	1306	1306	1306	1306	1306	1306	1306
Said. Flow (perm)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	18	1388	8	45	1358	87	7	4	28	79	1	17
Adj. Flow (vph)	0	0	0	5	0	0	25	0	0	10	0	10
RTOR Reduction (vph)	0	0	0	5	0	0	15	0	0	87	0	87
Lane Group Flow (vph)	0	1414	0	45	1440	0	0	15	0	0	87	0
Confl. Peds. (#/hr)	26	17	14	23	17	23	17	14	23	23	17	26
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	43.4	43.4	43.4	43.4	43.4	43.4	8.2	8.2	8.2	8.2	8.2	8.2
Effective Green, g (s)	43.4	43.4	43.4	43.4	43.4	43.4	8.2	8.2	8.2	8.2	8.2	8.2
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70	0.13	0.13	0.13	0.13	0.13	0.13
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2307	202	2461	203	173	173	203	203	173	173	173	173
v/s Ratio Prot	0.41	0.41	0.41	0.41	0.41	0.41	0.01	0.01	0.01	0.01	0.01	0.01
v/s Ratio Perm	0.43	0.16	0.16	0.16	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07
v/c Ratio	0.61	0.22	0.59	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Uniform Factor, u1	4.7	3.2	4.6	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4
Progression Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	5.2	3.8	4.9	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	5.2	4.9	4.9	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Phase Sequence Summary												
HCW 2000 Control Delay	6.0	HCW 2000 Level of Service	A									
HCW 2000 Volume to Capacity ratio	0.60	Sum of lost time (s)	10.0									
Actuated Cycle Length (s)	61.6	ICU Level of Service	C									
Intersection Capacity Utilization	69.9%	Analysis Period (min)	15									
Critical Lane Group												

2/21/2013

[illegible]

HCM Signalized Intersection Capacity Analysis

3: Kaiwawalo St & Keoneula Blvd

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4T	4T	5	5	2	2	2	2	2	2	36	148	4	35
Volume (vph)	33	1149	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost time (s)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.99	0.98	0.99	0.98	0.99	0.98	0.99	0.98	0.99	0.98	0.99	0.98
Flt Permitted	3491	3491	1770	1770	3491	3491	1770	1770	3491	3491	1770	1770	3491	3491
Satd. Flow (perm)	3123	3123	1561	1561	3123	3123	1561	1561	3123	3123	1561	1561	3123	3123
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	35	1209	5	55	1191	129	2	2	2	2	38	156	4	37
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	0	0	0	0	0	10
Lane Group Flow (vph)	0	1249	0	55	1311	0	0	13	0	0	0	187	0	0
Conf. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	2	2	2	6	6	2	2
Permitted Phases	4	4	8	8	2	2	2	2	2	2	6	6	2	2
Actuated Green, G (s)	38.1	38.1	38.1	38.1	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	38.1	38.1	38.1	38.1	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1888	1888	189	2100	373	373	373	373	373	373	373	373	373	373
v/s Ratio Prot	c0.40	c0.40	0.18	0.38	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
v/s Ratio Perm	0.66	0.66	0.28	0.62	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Uniform Delay, d1	8.2	8.2	6.0	7.9	18.5	18.5	18.5	18.5	18.5	18.5	21.4	21.4	21.4	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.9	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay (s)	9.1	9.1	6.8	8.5	18.6	18.6	18.6	18.6	18.6	18.6	24.4	24.4	24.4	24.4
Level of Service	A	A	A	A	B	B	B	B	B	B	C	C	C	C
Approach Delay (s)	9.1	9.1	8.4	8.4	18.6	18.6	18.6	18.6	18.6	18.6	24.4	24.4	24.4	24.4
Approach LOS	A	A	A	A	B	B	B	B	B	B	C	C	C	C
Intersection Summary														
HCM 2000 Control Delay	10.0													
HCM 2000 Volume to Capacity ratio	0.64													
Actuated Cycle Length (s)	63.0													
Intersection Capacity Utilization	81.5%													
Analysis Period (min)	15													
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

50: Road A & Keoneula Boulevard

2/20/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4T	4T	5	5	2	2	2	2	2	2	36	148	4	35
Volume (vph)	33	1149	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost time (s)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.99	0.98	0.99	0.98	0.99	0.98	0.99	0.98	0.99	0.98	0.99	0.98
Flt Permitted	3491	3491	1770	1770	3491	3491	1770	1770	3491	3491	1770	1770	3491	3491
Satd. Flow (perm)	3123	3123	1561	1561	3123	3123	1561	1561	3123	3123	1561	1561	3123	3123
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	249	249	25	53	439	67	218	218	218	218	218	218	218	218
RTOR Reduction (vph)	8	8	0	0	0	0	170	0	0	0	0	0	0	0
Lane Group Flow (vph)	266	266	0	53	439	115	0	0	0	0	0	0	0	0
Turn Type	NA	NA	pm-pt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	2	2	1	6	8	8	8	8	8	8	8	8	8	8
Permitted Phases	2	2	1	6	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	10.6	10.6	17.7	17.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Effective Green, g (s)	10.6	10.6	17.7	17.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Actuated g/C Ratio	0.30	0.30	0.50	0.50	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1042	1042	429	1764	382	382	382	382	382	382	382	382	382	382
v/s Ratio Prot	0.08	0.08	0.01	0.12	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07
v/s Ratio Perm	0.25	0.25	0.12	0.25	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Uniform Delay, d1	9.5	9.5	5.0	5.1	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	9.6	9.6	5.1	5.2	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Level of Service	A	A	A	A	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	9.6	9.6	5.2	5.2	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Approach LOS	A	A	A	A	B	B	B	B	B	B	B	B	B	B
Intersection Summary														
HCM 2000 Control Delay	8.2													
HCM 2000 Volume to Capacity ratio	0.34													
Actuated Cycle Length (s)	35.5													
Intersection Capacity Utilization	38.7%													
Analysis Period (min)	15													
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis 50: Road A & Keoneula Boulevard

2/20/2013

Movement	EB	WB	NB	SB
Lane Configurations	←	←	←	←
Volume (vph)	1032	67	196	950
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	1.00	0.95	1.00
Flt Protected	1.00	0.95	1.00	0.99
Satd. Flow (prot)	3507	1770	3539	1659
Flt Permitted	1.00	0.12	1.00	0.99
Satd. Flow (perm)	3507	231	3539	1659
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1122	73	213	1033
RTOR Reduction (vph)	5	0	0	102
Lane Group Flow (vph)	1190	0	213	1033
Turn Type	NA	pm+pt	NA	NA
Protected Phases	2	1	6	8
Permitted Phases		6		
Actuated Green, G (s)	31.6	45.7	45.7	8.2
Effective Green, g (s)	31.6	45.7	45.7	8.2
Actuated g/C Ratio	0.49	0.72	0.72	0.13
Clearance Time (s)	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1734	384	2531	212
v/s Ratio Prot	0.034	0.008	0.29	0.004
v/s Ratio Perm		0.32		
v/c Ratio	0.69	0.55	0.41	0.29
Uniform Delay, d1	12.4	7.5	3.7	25.2
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.7	0.1	0.8
Delay (s)	13.5	9.3	3.8	26.0
Level of Service	B	A	A	C
Approach Delay (s)	13.5		4.7	26.0
Approach LOS	B		A	C

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Roundabout 51: Lagoon Central Drive & Keoneula Boulevard

2/20/2013

Intersection				
Intersection Delay, s/veh	5.8			
Intersection LOS	A			
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	202	351	351	15
Demand Flow Rate, veh/h	206	358	358	15
Vehicles Circulating, veh/h	31	2	201	36
Vehicles Exiting, veh/h	329	214	3186	3186
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.1	6.4	A	4.0
Approach LOS	A	A	A	A

Desired Min Gap	TR	LT	LT	LR
Assured Min Gap	TR	LT	LT	LR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193	5.193
Entry Flow, veh/h	206	358	358	15
Cap Entry Lane, veh/h	1095	1128	924	924
Entry HV Adj Factor	0.981	0.979	1.000	1.000
Flow Entry, veh/h	202	351	351	15
Cap Entry, veh/h	1074	1104	924	924
V/C Ratio	1.88	3.17	0.16	0.16
Control Delay, s/veh	5.1	6.4	4.0	4.0
LOS	A	A	A	A
95th %ile Queue, veh	0.1	0.1	0.0	0.0

HCM 2010 Roundabout

51: Lagoon Central Drive & Keoneula Boulevard

2/20/2013

Intersection		27.8	
Intersection Delay, s/veh		D	
Intersection LOS		D	
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj. Approach Flow, veh/h	1000	953	39
Demand Flow Rate, veh/h	1020	973	40
Vehicles Circulating, veh/h	25	5	1016
Vehicles Exiting, veh/h	952	1051	29
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj.	1.000	1.000	1.000
Approach Delay, s/veh	32.1	24.1	10.5
Approach LOS	D	C	B
Design	EB	WB	NB
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	1020	973	40
Cap Entry Lane, veh/h	1102	1124	409
Entry HV Adj Factor	0.980	0.980	0.975
Flow Entry, veh/h	1000	953	39
Cap Entry, veh/h	1081	1102	399
V/C Ratio	9.26	8.65	0.98
Control Delay, s/veh	32.1	24.1	10.5
LOS	D	C	B
95th %ile Queue, veh	1.5	1.2	0.0

HCM Unsignalized Intersection Capacity Analysis

10: Kapolei Pkwy & Kekaihole St

2/21/2013

[illegible]

HCM Unsignalized Intersection Capacity Analysis 10: Kapolei Pkwy & Kekaihole St

2/21/2013

Approach	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBL	SBT
Volume (veh/h)	87	2	24	2	4	36	37	412	7	56	583	166
Sign Control	Stop	0%	0%	0%	Stop	0%	0%	0%	Free	Free	Free	Free
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	92	2	25	2	4	38	39	434	7	59	614	175
Pedestrians	10				22				22			20
Lane Width (ft)	12.0				12.0				12.0			12.0
Walking Speed (ft/s)	4.0				4.0				4.0			4.0
Percent Blockage	1				2				2			2
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
VC, conflicting volume	1184	1370	426	1010	1454	263	798					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	961	1170	110	766	1264	263	528					
VCu, unblocked vol	61	55	59	61	55	59	41					
IC, single (s)												
IC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
IF (s)	60	99	97	99	98	95	96					
p0 queue free %	228	211	825	298	190	756	914					
CM capacity (veh/h)												
Volume Total	1114	44	256	224	144	452						
Volume Left	92	2	39	0	59	0						
Volume Right	25	38	0	7	0	175						
cSH	269	562	914	1700	1074	1700						
Volume to Capacity	0.44	0.08	0.04	0.13	0.05	0.28						
Queue Length 95th (ft)	53	6	3	0	4	0						
Control Delay (s)	28.5	12.0	1.8	0.0	1.9	0.0						
Lane LOS	D	B	A	A	A	A						
Approach Delay (s)	28.5	12.0	0.9	0.8								
Approach LOS	D	B										
Average Delay			3.4									
Intersection Capacity Utilization			59.6%									
Analysis Period (min)			15									
* User Entered Value												

HCM Unsignalized Intersection Capacity Analysis 13: Kaaleolea Dr & Kaipu St

2/21/2013

Approach	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBL	SBT
Volume (veh/h)	59	9	5	1	2	133	3	265	20	58	65	28
Sign Control	Stop	0%	0%	0%	Stop	0%	0%	0%	Free	Free	Free	Free
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	62	9	5	1	2	140	3	268	21	61	68	29
Pedestrians	67				61				58			67
Lane Width (ft)	12.0				12.0				12.0			12.0
Walking Speed (ft/s)	3.5				3.5				3.5			3.5
Percent Blockage	6				6				6			6
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
VC, conflicting volume	621	629	174	571	633	273	165					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol	621	629	174	571	633	273	165					
VCu, unblocked vol	65	55	59	65	55	59	41					
IC, single (s)												
IC, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
IF (s)	77	98	99	100	99	80	100					
p0 queue free %	270	397	781	360	395	692	1321					
CM capacity (veh/h)												
Volume Total	77	143	137	155	95	64						
Volume Left	62	1	3	0	61	0						
Volume Right	5	140	0	21	0	29						
cSH	295	660	1321	1700	1135	1700						
Volume to Capacity	0.26	0.21	0.00	0.09	0.05	0.04						
Queue Length 95th (ft)	26	20	0	0	4	0						
Control Delay (s)	21.5	11.7	0.2	0.0	5.5	0.0						
Lane LOS	C	B	A	A	A	A						
Approach Delay (s)	21.5	11.7	0.1	3.3								
Approach LOS	C	B										
Average Delay			5.8									
Intersection Capacity Utilization			63.5%									
Analysis Period (min)			15									
* User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

13: Kailelea Dr & Kaipu St

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	32	11	1	6	10	88	3	45	4	105	102	58
Sign Control	Stop	0%	0%	0%	Stop	0%	0%	0%	0%	Free	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	12	1	6	11	93	3	47	4	111	107	59
Pedestrians	27	12	30	30	30	30	30	30	30	28	28	28
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	2	3	3	3	3	3	3	3	3	2	2	2
Right turn flare (veh)												
Median type	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh
Upstream signal (ft)												
pX, platoon unblocked												
IC, conflicting volume	541	473	140	397	500	84	193					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	541	473	140	397	500	84	193					
IC, single (s)	6.5	5.5	5.9	6.5	5.5	5.9	4.1					
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
p0 queue free %	91	98	100	99	98	90	100					
CM capacity (veh/h)	381	492	876	510	479	935	1346					
Median storage veh	46	109	27	28	164	113						
Volume Total	34	6	3	0	111	0						
Volume Left	1	93	0	4	0	59						
Volume Right	409	821	1346	1700	1476	1700						
cSH	0.11	0.13	0.00	0.02	0.07	0.07						
Volume to Capacity	9	11	0	0	6	0						
Queue Length 95th (ft)	14.9	10.1	0.9	0.0	5.3	0.0						
Control Delay (s)	B	B	A	A	A	A						
Lane LOS	B	B	A	A	A	A						
Approach Delay (s)	14.9	10.1	0.5	3.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay					5.5							
Intersection Capacity Utilization					31.3%							
Analysis Period (min)					15							
* User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

12: Kailelea Dr & Kaileonui St

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	37	13	0	12	17	65	4	173	24	22	42	7
Sign Control	Stop	0%	0%	0%	Stop	0%	0%	0%	0%	Free	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	39	14	0	13	18	68	4	182	25	23	44	7
Pedestrians	23	23	24	24	24	24	24	24	24	23	23	23
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	2	2	2	2	2	2	2	2	2	2	2	2
Right turn flare (veh)												
Median type	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh	Median storage veh
Upstream signal (ft)												
pX, platoon unblocked												
IC, conflicting volume	317	357	73	326	348	151	75					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	317	357	73	326	348	151	75					
IC, single (s)	6.5	5.5	6.9	6.5	5.5	5.9	4.1					
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
p0 queue free %	93	98	100	98	97	92	100					
CM capacity (veh/h)	550	589	931	591	594	867	1489					
Median storage veh	53	99	95	116	45	29						
Volume Total	39	13	4	0	23	0						
Volume Left	0	68	0	25	0	7						
Volume Right	559	759	1489	1700	1303	1700						
cSH	0.09	0.13	0.00	0.07	0.02	0.02						
Volume to Capacity	8	11	0	0	1	0						
Queue Length 95th (ft)	12.1	10.5	0.3	0.0	4.1	0.0						
Control Delay (s)	B	B	A	A	A	A						
Lane LOS	B	B	A	A	A	A						
Approach Delay (s)	12.1	10.5	0.2	2.5								
Approach LOS	B	B										
Intersection Summary												
Average Delay					4.3							
Intersection Capacity Utilization					37.2%							
Analysis Period (min)					15							
* User Entered Value												

HCM Unsignalized Intersection Capacity Analysis

12: Kalleolea Dr & Kalleonui St

2/21/2013

Volume	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (veh/h)	3	26	3	16	23	9	1	16	27	56
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	27	3	17	24	9	1	17	28	59
Pedestrians	10	18	18	14	14	14	14	14	18	18
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1	1	1	1	1	1	1	1	1	1
Right turn flare (veh)										
Median type	None	None	None	None	None	None	None	None	None	None
Median storage (veh)										
Upstream signal (ft)										
pX, platoon unblocked										
vC, conflicting volume	212	244	60	220	243	82	83			110
vC1, stage 1 conf vol										
vC2, stage 2 conf vol										
vCu, unblocked vol	212	244	60	220	243	82	83			110
IC, single (s)	6.5	5.5	5.9	6.5	5.5	5.9	4.1			4.1
IC, 2 stage (s)										
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2
p0 queue free %	100	96	100	96	96	99	100			98
AM capacity (veh/h)	703	674	990	635	875	955	1500			1456
Volume Total	34	51	38	54	58	43				
Volume Left	3	17	1	0	28	0				
Volume Right	3	9	0	17	0	14				
C/S	698	722	1500	1700	1456	1700				
Volume to Capacity	0.05	0.07	0.00	0.03	0.02	0.03				
Queue Length 95th (ft)	4	6	0	0	1	0				
Control Delay (s)	10.4	10.4	0.2	0.0	3.8	0.0				
Lane LOS	B	B	A	A	A	A				
Approach Delay (s)	10.4	10.4	0.1	2.2						
Approach LOS	B	B								
Average Delay										
Intersection Capacity Utilization										
Analysis Period (min)										
User Entered Value										

HCM Signalized Intersection Capacity Analysis

11: Kapolei Pkwy & Kalleolea Dr

2/21/2013

Volume	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Volume (vph)	147	81	125	22	17	17	36	300	63	389
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fit Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	3172	3172	3172	3172	3172	3172	3172	3172	3172	3172
Fit Permitted	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Satd. Flow (perm)	2653	2653	2653	2653	2653	2653	2653	2653	2653	2653
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	155	85	132	23	18	18	38	316	66	409
RTOR Reduction (vph)	0	87	0	0	13	0	0	11	0	8
Lane Group Flow (vph)	0	285	0	0	46	0	38	371	0	463
Conf. Peds. (#/hr)	42	41	51	51	52	41	51	52	51	42
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		8		2		6	
Permitted Phases	4		8		8		2		6	
Actuated Green, G (s)	9.9		9.9		9.9		15.9		15.9	
Effective Green, g (s)	9.9		9.9		9.9		15.9		15.9	
Actuated g/C Ratio	0.28		0.28		0.28		0.44		0.44	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	733		710		710		350		424	
v/s Ratio Prot	0.11		0.02		0.05		0.21		0.07	
v/s Ratio Perm	0.39		0.06		0.11		0.46		0.15	
Uniform Delay, d1	10.5		9.5		9.5		7.0		5.9	
Progression Factor	1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.3		0.0		0.1		0.4		0.2	
Delay (s)	10.8		9.6		9.6		7.4		6.1	
Level of Service	B		A		A		A		A	
Approach Delay (s)	10.8		9.6		9.6		7.3		8.1	
Approach LOS	B		A		A		A		A	
Intersection Summary										
HCM 2000 Control Delay			8.7		HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.50							
Actuated Cycle Length (s)			35.8		Sum of lost time (s)				10.0	
Intersection Capacity Utilization			61.1%		ICU Level of Service				B	
Analysis Period (min)			15							
c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis

11: Kapolei Pkwy & Kaileolea Dr

2/21/2013

Volume	EBL	EBR	ELB	ELR	WBL	WBR	NBL	NBR	SBL	SBR	SPB	SPB
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Volume (vph)	121	45	73	22	28	23	108	309	16	19	413	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	3229	3229	3229	3229	3229	3229	3229	3229	3229	3229	3229	3229
Flt Permitted	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Satd. Flow (perm)	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	47	77	23	29	24	114	325	17	20	435	176
RTOR Reduction (vph)	0	57	0	0	19	0	0	3	0	0	22	0
Lane Group Flow (vph)	0	194	0	0	57	0	114	339	0	20	589	0
Confl. Peds. (#/hr)	20	18	18	18	20	18	18	18	20	18	20	20
Turn Type	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Effective Green, g (s)	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	573	573	573	573	573	573	573	573	573	573	573	573
v/s Ratio Prot	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07
v/s Ratio Perm	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
v/c Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Uniform Delay, d1	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
c Critical Lane Group												
HCM 2000 Control Delay	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
HCM 2000 Volume to Capacity ratio	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Actuated Cycle Length (s)	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Intersection Capacity Utilization	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15

HCM Signalized Intersection Capacity Analysis

17: Fort Weaver Rd & Kaimalie St

2/21/2013

Volume	EBL	EBR	ELB	ELR	WBL	WBR	NBL	NBR	SBL	SBR	SPB	SPB
Lane Configurations	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P	4P
Volume (vph)	121	45	73	22	28	23	108	309	16	19	413	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	3229	3229	3229	3229	3229	3229	3229	3229	3229	3229	3229	3229
Flt Permitted	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Satd. Flow (perm)	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	47	77	23	29	24	114	325	17	20	435	176
RTOR Reduction (vph)	0	57	0	0	19	0	0	3	0	0	22	0
Lane Group Flow (vph)	0	194	0	0	57	0	114	339	0	20	589	0
Confl. Peds. (#/hr)	20	18	18	18	20	18	18	18	20	18	20	20
Turn Type	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Effective Green, g (s)	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	573	573	573	573	573	573	573	573	573	573	573	573
v/s Ratio Prot	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07	c0.07
v/s Ratio Perm	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
v/c Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Uniform Delay, d1	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
c Critical Lane Group												
HCM 2000 Control Delay	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
HCM 2000 Volume to Capacity ratio	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Actuated Cycle Length (s)	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Intersection Capacity Utilization	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15

HCM Signalized Intersection Capacity Analysis 17: Fort Weaver Rd & Kaimalie St

2/21/2013

Movement	EB	WB	NB	SB	SP	SR
Lane Configurations						
Volume (vph)	72	63	72	791	930	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Flpb. ped/bikes	1.00	0.94	1.00	1.00	1.00	0.88
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1488	1765	3539	3539	1401
Flt Permitted	0.95	1.00	0.25	1.00	1.00	1.00
Satd. Flow (perm)	1770	1488	462	3539	3539	1401
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	76	66	76	833	979	135
RTOR Reduction (vph)	0	61	0	0	0	36
Lane Group Flow (vph)	76	5	76	833	979	99
Conf. Peds. (#/hr)	31	26	26			31
Turn Type	NA	Perm	pm-pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2		6	
Actuated Green, G (s)	8.3	8.3	82.1	82.1	71.8	71.8
Effective Green, g (s)	8.3	8.3	82.1	82.1	71.8	71.8
Actuated g/C Ratio	0.08	0.08	0.82	0.82	0.72	0.72
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	146	123	446	2893	2530	1001
v/s Ratio Prot	c0.04	0.01	c0.24	c0.28		
v/s Ratio Perm		0.00	0.13		0.07	
v/c Ratio	0.52	0.04	0.17	0.29	0.39	0.10
Uniform Delay, d1	44.1	42.4	2.5	2.2	5.6	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.1	0.2	0.3	0.4	0.2
Delay (s)	47.5	42.5	2.7	2.4	6.1	4.6
Level of Service	D	D	A	A	A	A
Approach Delay (s)	45.2		2.5	5.9		
Approach LOS	D		A	A	A	
Intersection Summary						
HCM 2000 Control Delay	7.0			HCM 2000 Level of Service		
HCM 2000 Volume to Capacity ratio	0.40			A		
Actuated Cycle Length (s)	100.4			Sum of lost time (s)		
Intersection Capacity Utilization	51.6%			ICU Level of Service		
Analysis Period (min)	15			A		
Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 16: Kaimalie St & Kaipu St

2/21/2013

Movement	EB	EBT	WB	WBH	SP	SR
Lane Configurations	4	4	4	4	4	4
Volume (veh/h)	11	126	27	41	54	7
Sign Control	Free	Free	Free	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	133	28	43	57	7
Pedestrians	10	33			33	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	1	3			3	
Right turn flare (veh)						
Median type	None	None	None	None	None	None
Median storage (veh)						
Upstream signal (ft)					732	
pX, platoon unblocked						
vC, conflicting volume	105				272	93
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	105				272	93
IC, single (s)	4.1				5.4	5.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	99				92	99
SW capacity (veh/h)	1440				721	950
Intersection Summary						
Volume Total	144	72	84			
Volume Left	12	0	57			
Volume Right	0	43	7			
CSH	1440	1700	742			
Volume to Capacity	0.01	0.04	0.09			
Queue Length 95th (ft)	1	0	7			
Control Delay (s)	0.7	0.0	10.3			
Lane LOS	A	B	B			
Approach Delay (s)	0.7	0.0	10.3			
Approach LOS	B		B			
Intersection Summary						
Average Delay	2.7			ICU Level of Service		
Intersection Capacity Utilization	26.9%			A		
Analysis Period (min)	15					
* User Entered Value						

HCM Unsignalized Intersection Capacity Analysis

16: Kaimalie St & Kaipu St

2/21/2013

Movement	EBL	EBT	WBL	WBT	SL	SR
Lane Configurations	4	4	4	4	4	4
Volume (veh/h)	13	90	116	34	35	11
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	95	122	36	37	12
Pedestrians	15	22	22	22	22	22
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1	2	2	2	2	2
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	732	732	732	732	732	732
pX, platoon unblocked	180	180	180	180	306	177
VC, conflicting volume	180	180	180	180	306	177
VC1, stage 1 conf vol	180	180	180	180	306	177
VC2, stage 2 conf vol	180	180	180	180	306	177
VCu, unblocked vol	180	180	180	180	306	177
IC, single (s)	4.1	4.1	4.1	4.1	5.4	5.2
IC, 2 stage (s)	2.2	2.2	2.2	2.2	3.5	3.3
IF (s)	2.2	2.2	2.2	2.2	3.5	3.3
p0 queue free %	99	99	99	99	95	99
CM capacity (veh/h)	1370	1370	1370	1370	714	883
Stationing	108	158	48	37	714	883
Volume Total	14	0	37	12	714	883
Volume Left	14	0	37	12	714	883
Volume Right	14	0	37	12	714	883
CSH	1370	1700	748	0.06	714	883
Volume to Capacity	0.01	0.09	0.06	0.06	714	883
Queue Length 95th (ft)	1	0	5	5	714	883
Control Delay (s)	1.0	0.0	10.1	10.1	714	883
Lane LOS	A	A	B	B	714	883
Approach Delay (s)	1.0	0.0	10.1	10.1	714	883
Approach LOS	A	A	B	B	714	883
Intersection Summary						
Average Delay	1.9					
Intersection Capacity Utilization	29.6%					
Analysis Period (min)	15					
User Entered Value						

HCM Unsignalized Intersection Capacity Analysis

15: Kaimalie St & Kaileonui St/Mariner's Place Driveway

2/21/2013

Movement	EBL	EBT	WBL	WBT	SL	SR
Lane Configurations	4	4	4	4	4	4
Volume (veh/h)	20	1	4	5	11	14
Sign Control	Stop	Stop	Stop	Stop	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	1	4	5	12	15
Pedestrians	10	10	10	10	10	10
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	3.5	3.5	3.5	3.5	3.5	3.5
Percent Blockage	1	1	1	1	1	1
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
VC, conflicting volume	193	174	44	177	175	115
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	193	174	44	177	175	115
IC, single (s)	6.1	5.5	5.2	6.1	5.5	5.2
IC, 2 stage (s)						
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97	100	100	99	98	99
CM capacity (veh/h)	755	733	1020	788	733	950
Stationing	26	32	109	31	31	31
Volume Total	21	5	13	4	4	4
Volume Left	4	15	4	5		
Volume Right						
CSH	787	831	1559	1470		
Volume to Capacity	0.03	0.04	0.01	0.00		
Queue Length 95th (ft)	3	3	1	0		
Control Delay (s)	9.7	9.5	0.9	1.0		
Lane LOS	A	A	A	A		
Approach Delay (s)	9.7	9.5	0.9	1.0		
Approach LOS	A	A				
Intersection Summary						
Average Delay	3.5					
Intersection Capacity Utilization	23.0%					
Analysis Period (min)	15					
User Entered Value						

HCM Unsignalized Intersection Capacity Analysis 15: Kaimalie St & Kaileonui St/Mariner's Place Driveway

2/21/2013

	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Lane Configurations	4	3	11	0	5	7	9	72	7	3	99
Volumes (veh/h)	Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sign Control	Stop	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	3	12	0	5	7	9	76	7	3	104
Pedestrians	10	10	10	10	10	10	10	10	10	10	10
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	1	1	1	1	1	1	1	1	1	1	1
Right turn flare (veh)											
Median type											
Median storage (veh)											
Upstream signal (ft)											
pX, platoon unblocked											
VC, conflicting volume	244	237	129	247	238	99	124				93
VC1, stage 1 conf vol											
VC2, stage 2 conf vol											
VCu, unblocked vol	244	237	129	247	238	99	124				93
IC, single (s)	6.1	5.5	5.2	7.1	5.5	5.2	4.1				4.1
IC, 2 stage (s)											
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2
p0 queue free %	98	100	99	100	99	99	99				100
cM capacity (veh/h)	724	692	939	671	691	967	1451				1489
Intersection Summary											
Volume Total	28	13	93	117							
Volume Left	14	0	9	3							
Volume Right	12	7	7	9							
cSH	794	829	1451	1489							
Volumes to Capacity	0.04	0.02	0.01	0.00							
Queue Length 95th (ft)	3	1	0	0							
Control Delay (s)	9.7	9.4	0.8	0.2							
Lane LOS	A	A	A	A							
Approach Delay (s)	9.7	9.4	0.8	0.2							
Approach LOS	A	A	A	A							
Intersection Summary											
Average Delay	2.0										
Intersection Capacity Utilization	26.6%										
Analysis Period (min)	15										
User Entered Value											

HCM Unsignalized Intersection Capacity Analysis 14: Kapolei Pkwy & Kaimalie St

2/21/2013

Intersection Summary												
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HCM Unsignalized Intersection Capacity Analysis

14: Kapolei Pkwy & Kaimali St

2/21/2013

Movement	EB	WB	NB	SB	WB	NB	SB	EB	SB
Lane Configurations	4	4	4	4	4	4	4	4	4
Volume (veh/h)	24	12	41	33	20	53	26	64	389
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (veh)	25	13	43	35	21	56	27	67	389
Pedestrians	35	35	32	32	35	35	35	35	35
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3	3	3	3
Right turn flare (veh)									
Median type									
Median storage (veh)									
Upstream signal (ft)									
Px platoon unblocked									
VC, conflicting volume									
VC1, stage 1 conf vol									
VC2, stage 2 conf vol									
VCu, unblocked vol									
IC, single (s)									
IC, 2 stage (s)									
IF (s)									
p0 queue free %									
cM capacity (veh/h)									
Approach Delay (s)									
Volume Total									
Volume Left									
Volume Right									
cSH									
Volume to Capacity									
Queue Length 95th (ft)									
Control Delay (s)									
Lane LOS									
Approach Delay (s)									
Approach LOS									
Average Delay									
Intersection Capacity Utilization									
Analysis Period (min)									

* User Entered Value

HCM Signalized Intersection Capacity Analysis

20: Fort Weaver Rd & Papipi Rd

2/21/2013

Lane Configurations	EB	WB	NB	SB	WB	NB	SB	EB	SB
Volume (veh/h)	225	199	190	190	190	190	190	190	190
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (veh)	225	199	190	190	190	190	190	190	190
Pedestrians	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (ft)	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Walking Speed (ft/s)	0.97	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Percent Blockage	2437	2437	1735	3539	3539	3539	3539	3539	3539
Right turn flare (veh)	0.97	0.97	0.25	1.00	1.00	1.00	1.00	1.00	1.00
Median type									
Median storage (veh)									
Upstream signal (ft)									
Px platoon unblocked									
VC, conflicting volume									
VC1, stage 1 conf vol									
VC2, stage 2 conf vol									
VCu, unblocked vol									
IC, single (s)									
IC, 2 stage (s)									
IF (s)									
p0 queue free %									
cM capacity (veh/h)									
Approach Delay (s)									
Volume Total									
Volume Left									
Volume Right									
cSH									
Volume to Capacity									
Queue Length 95th (ft)									
Control Delay (s)									
Lane LOS									
Approach Delay (s)									
Approach LOS									
Average Delay									
Intersection Capacity Utilization									
Analysis Period (min)									

* User Entered Value

HCM Signalized Intersection Capacity Analysis 20: Fort Weaver Rd & Papipi Rd

2/21/2013

Movement	EBL	EBR	NSL	NSR	SEB	SEB
Lane Configurations	W	W	W	W	W	W
Volume (vph)	192	179	203	539	542	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	1.00	0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.85	1.00	1.00	1.00	1.00	0.82
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00
Flt	0.93	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.97	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	2785	1735	3539	3539	1303	1303
Flt Permitted	0.97	0.98	1.00	1.00	1.00	1.00
Satd. Flow (perm)	2785	702	3539	3539	1303	1303
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	202	188	220	567	571	195
RTOR Reduction (vph)	162	0	0	0	0	58
Lane Group Flow (vph)	228	0	220	567	571	137
Confl. Peds. (#/hr)	102	56				56
Turn Type	NA	prn+pl	NA	NA	NA	Perm
Protected Phases	4	5	2	6		
Permitted Phases			2		6	
Actuated Green, G (s)	12.6	69.1	69.1	55.2	55.2	
Effective Green, g (s)	12.6	69.1	69.1	55.2	55.2	
Actuated g/C Ratio	0.14	0.75	0.75	0.60	0.60	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	382	629	2666	2130	784	
v/s Ratio Prot	0.08	0.03	0.16	0.16		
v/s Ratio Perm		0.23		0.11		
v/c Ratio	0.60	0.35	0.21	0.27	0.18	
Uniform Delay, d1	37.2	3.6	3.3	8.7	8.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	0.3	0.2	0.3	0.5	
Delay (s)	39.7	3.9	3.5	9.0	8.6	
Level of Service	D	A	A	A	A	
Approach Delay (s)	39.7	3.6	8.9			
Approach LOS	D	A	A	A		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 19: Hailipo St/Kapolei Pkwy & Papipi Rd

2/21/2013

Movement	EBL	EBR	SEB	SEB	NSL	NSR	SEB	SEB
Lane Configurations	W	W	W	W	W	W	W	W
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Volume (vph)	78	64	1	24	55	287	1	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	67	1	25	58	302	1	56
Approach Delay (s)	10.7	9.9	7.4	9.2	18.1	9.0		
Approach LOS	B	A	A	A	C			
Level of Service								
Intersection Capacity Utilization				49.2%				
Analysis Period (min)				15				

Massachusetts

HCM Unsignalized Intersection Capacity Analysis

19: Hailipo St/Kapolei Pkwy & Papipi Rd

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	WBL	WBT	NBL	NBT	NBL	NBT	SBL	SBT	SBL	SBT
Lane Configurations	4				4				4				4			
Sign Control	Stop				Stop				Stop				Stop			
Volume (vph)	65	65	5	41	100	395	3	29	24	299	83	115				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	68	68	5	43	105	416	3	31	25	315	87	121				
Directional Capacity	EBL				WBL				NBL				SBL			
Volume Total (vph)	142	148	416	59	315	208										
Volume Left (vph)	68	43	0	3	315	0										
Volume Right (vph)	5	0	416	25	0	121										
Had (s)	0.11	0.09	-0.57	-0.21	0.53	-0.37										
Departure Headway (s)	5.7	5.6	3.2	5.3	6.0	5.1										
Degree Utilization, x	0.22	0.23	0.37	0.09	0.52	0.29										
Capacity (veh/h)	591	593	1114	618	586	691										
Control Delay (s)	10.3	10.3	8.1	8.8	14.1	8.9										
Approach Delay (s)	10.3	8.7		8.8	12.0											
Approach LOS	B	A		A	B											
Intersection Summary																
Delay					10.2											
Level of Service					B								A			
Intersection Capacity Utilization					51.5%											
Analysis Period (min)					15											

HCM Unsignalized Intersection Capacity Analysis

18: Pupu St & Papipi Rd

2/21/2013

Movement	EBL	EBT	EBL	EBT	WBL	WBT	WBL	WBT	NBL	NBT	NBL	NBT
Lane Configurations	4				4				4			
Sign Control	Stop				Stop				Stop			
Volume (vph)	106	1	5	70	1	7						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95						
Hourly flow rate (vph)	112	1	5	74	1	7						
Directional Capacity	EBL				WBL				NBL			
Volume Total (vph)	113	79	8									
Volume Left (vph)	0	5	1									
Volume Right (vph)	1	0	7									
Had (s)	0.03	0.05	-0.47									
Departure Headway (s)	4.0	4.1	3.8									
Degree Utilization, x	0.13	0.09	0.01									
Capacity (veh/h)	885	874	884									
Control Delay (s)	7.6	7.5	6.9									
Approach Delay (s)	7.6	7.5	6.9									
Approach LOS	A	A	A									
Intersection Summary												
Delay					7.5							
Level of Service					A							
Intersection Capacity Utilization					20.7%							
Analysis Period (min)					15							

HCM Unsignalized Intersection Capacity Analysis

18: Pupu St & Papi Rd

2/21/2013

Movement	EB	WB	NB	SB
Lane Configurations	EB	WB	NB	SB
Sign Control	Stop	Stop	Stop	Stop
Volume (vph)	105	1	10	155
Peak Hour Factor	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	111	1	11	163
Directional Analysis	EB	WB	NB	SB
Volume Total (vph)	112	174	3	
Volume Left (vph)	0	11	1	
Volume Right (vph)	1	0	2	
Head (s)	0.03	0.05	-0.30	
Departure Headway (s)	4.1	4.1	4.2	
Degree Utilization, x	0.13	0.20	0.00	
Capacity (veh/h)	866	879	794	
Control Delay (s)	7.7	8.0	7.2	
Approach Delay (s)	7.7	8.0	7.2	
Approach LOS	A	A	A	
Level of Service	A	A	A	
Intersection Capacity Utilization	28.2%	ICU Level of Service	A	
Analysis Period (min)	15			