DAVID Y. IGE
Governor

DOUGLAS S. CHIN
Lt. Governor

FILE COPY

JAMES J. NAKATANI
Executive Director

STATE OF HAWAII
AGRIBUSINESS DEVELOPMENT CORPORATION
235 S. Beretania Street, Room 205
Honolulu, HI 96813
Phone: (808) 586-0186 Fax: (808) 586-0189

April 11, 2018

Scott Glenn, Interim Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Mr. Glenn:

With this letter, the Hawai'i Department of Agriculture (HDOA), Agribusiness Development Corporation (ADC) hereby transmits the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI) for the Kea'au Zero Waste Facility for publication in the next available edition of the *Environmental Notice*. The proposed project will be located at TMK (3) 1-6-151: 002 in Kea'au Ahupua'a, Puna District on the Island of Hawai'i.

Enclosed is a completed OEQC Publication Form, a hard copy of the DEA-AFONSI and a CD containing the electronic files (e.g., an Adobe Acrobat PDF file of the DEA-AFONSI, the OEQC form in MS Word and the project summary).

If there are any questions, please contact Ken Nakamoto, Project Manager at 586-0087 or via email to Ken.T.Nakamoto@hawaii.gov.

Sincerely,

James J. Nakatani
Executive Director

RECEIVED
'18 APR 11 P1:55
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Enclosures: One (1) hard copy of DEA-AFONSI
One (1) hard copy of OEQC Publication Form
One (1) CD containing the DEA, OEQC Publication Form and summary

18-514

AGENCY
PUBLICATION FORM

Project Name:	Draft Environmental Assessment for the Department of Agriculture, Agribusiness Development Corporation Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island
Project Short Name:	DEA for Kea'au Zero Waste Facility
HRS §343-5 Trigger(s):	Use of government lands and funds
Island(s):	Hawai'i
Judicial District(s):	Puna
TMK(s):	(3) 1-6-151: 002
Permit(s)/Approval(s):	State of Hawai'i National Pollutant Discharge Elimination System Permit, Community Noise Permit and Variance, Non-Covered and/or Covered Source Permit (Air Quality), Lane Use Permit for Construction Work, Oversized and Overweight Vehicles on State Highways Permit; County of Hawai'i Building Permits, Grubbing/Grading/Stockpiling Permits, Permit to Work Within County Right-of-Way
Proposing/Determining Agency:	Department of Agriculture, Agribusiness Development Corporation
Contact Name, Email, Telephone, Address	Ken Nakamoto, Project Manager, Email: Ken.T.Nakamoto@hawaii.gov, Telephone: 586-0087, Address: 235 S. Beretania Street, Room 205, Honolulu, HI 96813
Accepting Authority:	(for EIS submittals only)
Contact Name, Email, Telephone, Address	
Consultant:	The Limtiaco Consulting Group
Contact Name, Email, Telephone, Address	Claire Oshiro, Environmental Planner, Email: claire@tlcghawaii.com, Telephone: 596-7790, Address: 1622 Kanakanui Street, Honolulu, HI 96817

Status (select one)	**Submittal Requirements**
__✓__ DEA-AFNSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the proposing agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
FEIS Statutory Acceptance	Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency actions.

____ Supplemental EIS Determination	The accepting authority simultaneously transmits its notice to both the proposing agency 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 or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary

Provide a description of the proposed action and purpose and need in 200 words or less.

The Department of Agriculture, Agribusiness Development Corporation (ADC) proposes to develop a new Zero Waste Facility at the W. H. Shipman Business Park near the town of Kea'au in the Puna District. The state-owned project site is immediately adjacent to the existing Big Island Biodiesel facility. ADC's Zero Waste Facility will be a demonstration project that aims to successfully grow algae on a commercial scale using the waste product from produce. ADC's project may ultimately help advance agriculture and energy initiatives by utilizing the waste product from locally grown produce. No animal waste will be used in the waste conversion process. If the algae can be successfully grown at the proposed facility, the process could then be used for the development of byproducts such as a locally-produced livestock feed (for fish, chicken, and hogs) and biofuels.

ADC's project involves the installation of a premanufactured building on an undeveloped site in an existing industrial area and related site improvements such as the construction of internal roadways, parking areas, utility systems and drywells. Driveway access and egress will be from Kipimana Street, which may be temporarily affected by construction activities. Perimeter fencing and manual gates at access points will be installed.

Draft Environmental Assessment for the Kea‘au Zero Waste Facility in Puna, Hawai‘i

Prepared For:

State of Hawai‘i
Department of Agriculture, Agribusiness Development Corporation

Department of Agriculture
STATE OF HAWAII

Prepared By:

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 2018

(This page intentionally left blank.)

Draft Environmental Assessment

for the

KEA‘AU ZERO WASTE FACILITY IN PUNA, HAWAI‘I

Tax Map Key (3) 1-6-151: 002, Lot #9073-B-2

This environmental document has been prepared pursuant to
Chapter 343, Hawai‘i Revised Statutes

Prepared For:

State of Hawai‘i
Department of Agriculture, Agribusiness Development Corporation

Prepared By:

The Limtiaco Consulting Group
Civil Engineering and Environmental Consultants
1622 Kanakanui Street
Honolulu, Hawai‘i 96817

April 2018

(This page intentionally left blank.)

TABLE OF CONTENTS

page

Table of Contents i
List of Figures ii
List of Appendices ii
List of Abbreviations iii
Project Summary v

1. Setting and Project Description 1-1
   1.1. Introduction and Background 1-1
   1.2. Project Need and Objectives 1-2
   1.3. Site Location and Description 1-2
   1.4. Historical Setting 1-5
   1.5. Technical Considerations 1-6
   1.6. Environmental Considerations 1-9
   1.7. Project Schedule and Cost 1-9
2. Description of Existing Environment, Project Impacts, and Mitigation 2-1
   2.1. Climate and Air Quality Considerations 2-1
   2.2. Topography, Geology and Soils 2-2
   2.3. Water Resources 2-5
   2.4. Solid Waste and Hazardous Materials 2-7
   2.5. Natural Hazards 2-8
   2.6. Floral and Faunal Resources 2-11
   2.7. Archaeological Resources 2-13
   2.8. Cultural Practices and Resources 2-14
   2.9. Visual Resources 2-15
   2.10. Noise 2-15
   2.11. Site Access, Circulation and Traffic 2-16
   2.12. Utilities (Water, Wastewater, Drainage) 2-17
   2.13. Power and Communications 2-19
   2.14. Socio-Economic Characteristics 2-20
   2.15. Emergency Service Facilities and Shelters 2-21
   2.16. Recreational Resources 2-21
3. Relationship to Plans, Policies, and Controls 3-1
   3.1. State Land Use District 3-1
   3.2. Hawai‘i State Plan 3-1
   3.3. County of Hawai‘i General Plan 3-2
   3.4. Puna Community Development Plan 3-4
   3.5. County of Hawai‘i Land Use Ordinance 3-4
   3.6. State Coastal Zone Management Program 3-4

TABLE OF CONTENTS (Continued)

page

4. Possible Alternatives 4-1
4.1. No-Action 4-1
4.2. Delayed Action 4-1
4.3. Construct Proposed Facility on Another Site 4-1
4.4. Construct Proposed Facility on Existing Site (the Preferred Alternative) 4-2
5. Permits and Approvals 5-1
6. Determination 6-1
7. Public Agency Review and Consultation 7-1
7.1. Pre-Assessment Consultation 7-1
7.2. Draft EA Consultation 7-2
8. References 8-1

LIST OF FIGURES

Figure 1 Project Location Map 1-3
Figure 2 State Land Use 1-4
Figure 3 County Zoning 1-7
Figure 4 Conceptual Site Layout 1-8
Figure 5 Soils and Topography 2-3
Figure 6 Flood Zone Map 2-9

LIST OF APPENDICES

Appendix A Site Photographs
Appendix B Flora and Fauna Survey Report
Appendix C Management Summary for the Archaeological Assessment Report
Appendix D Cultural Impact Assessment Report
Appendix E Flood Hazard Assessment Report
Appendix F Consultation and Comments

LIST OF ABBREVIATIONS

Abbreviation	Definition
AA	archaeological assessment
ADC	Department of Agriculture, Agribusiness Development Corporation
AFONSI	Anticipated Finding of No Significant Impact
ASYA	Aquifer System Area
BMPs	Best Management Practices
CIA	cultural impact assessment
CSH	Cultural Surveys Hawaii
CZM	Coastal Zone Management
DEM	Hawai‘i County, Department of Environmental Management
DLNR	State of Hawai‘i, Department of Land and Natural Resources
DLNR DFW	Department of Land and Natural Resources, Division of Forestry and Wildlife
DOH	State of Hawai‘i, Department of Health
DOH EPO	Department of Health, Environmental Planning Office
DPW	Hawai‘i County Department of Public Works
DWS	Hawai‘i County Department of Water Supply
EA	Environmental Assessment
E.U.	equivalent units
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
gpd	gallons per day
HAR	Hawai‘i Administrative Rules
HCC	Hawai‘i County Code
HELCO	Hawaiian Electric Light Company, Inc.
HRS	Hawai‘i Revised Statutes
LSB	Land Study Bureau (of the University of Hawai‘i)
LUO	Hawai‘i County Land Use Ordinance
LUPAG	Land Use Pattern Allocation Guide
MGD	million gallons per day
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System

LIST OF ABBREVIATIONS (Continued)

Abbreviation	Definition
OEQC	State of Hawai‘i, Office of Environmental Quality Control
OP	State of Hawai‘i, Office of Planning
ROD	Rapid *‘Ōhi‘a* Death
rPAE	Papai extremely stony muck, 3 to 25 percent slopes
SHPD	Department of Land and Natural Resources, Historic Preservation Division
SMA	Special Management Area
sq. ft.	square feet
SWD	Hawai‘i County Department of Environmental Management, Solid Waste Division
TMK	Tax Map Key
UIC	Underground Injection Control

PROJECT SUMMARY

Proposing/Determination Agency:	Hawai‘i Department of Agriculture, Agribusiness Development Corporation
Contact:	Mr. Ken Nakamoto
Location:	Puna District, Hawai‘i
Tax Map Key:	(3) 1-6-151: 002, Lot #9073-B-2
Land Area:	1.526 acres (approximately 66,473 square feet)
Recorded Fee Owner:	State of Hawai‘i
Existing Use:	Open (undeveloped)
Proposed Use:	Zero Waste Facility for demonstrating the process of growing algae on a commercial scale using the waste product from produce such as papaya and perhaps other off grade fruits and vegetables
Community Plan Region:	Puna District
Land Use Designations:	
State Land Use	Urban
Development Plan	Industrial
County Zoning	MG-20 General Industrial District
Action Requested:	The agency proposes to develop a new Zero Waste Facility as a demonstration project on an undeveloped state-owned parcel in Kea‘au in the Puna District. The new facility will be part of the agency’s initiative to address food and energy security issues in Hawai‘i. The project involves the installation of a premanufactured building on the undeveloped site and related site improvements such as the construction of internal roadways, parking areas, utility systems and drywells. Driveway access and egress will be from Kipimana Street, which may be temporarily affected by construction activities. Perimeter fencing and manual gates at access points will be installed.
Agency Determination:	Anticipated Finding of No Significant Impact (AFONSI)

(This page intentionally left blank.)

1. SETTING AND PROJECT DESCRIPTION

1.1. Introduction and Background

The State of Hawai‘i, Department of Agriculture, Agribusiness Development Corporation (ADC) proposes to develop a new Zero Waste Facility (hereafter, “proposed facility”) at the W. H. Shipman Business Park near the town of Kea‘au in the Puna District. The project site is an undeveloped state-owned parcel identified as Tax Map Key (TMK) 1-6-151: 002, Lot #9073-B-2, which is immediately adjacent to the existing Big Island Biodiesel facility (see Figure 1). ADC will own and operate the proposed facility that will be part of the agency’s initiative to address food and energy security issues in Hawai‘i. The proposed facility will be a demonstration project that aims to successfully grow algae on a commercial scale using the waste product from produce. No animal waste will be used in the waste conversion process. Successful algae growth may be used for the development of byproducts such as livestock feed and biofuels; however, ADC has no plans to develop feed or biofuels at its proposed facility.

The 1.526-acre project site is situated within a geographical area that was largely disturbed from cattle grazing operations in the late nineteenth century and intensive commercial agriculture during the first half of the twentieth century. The proposed facility will be located within the 485-acre W. H. Shipman Business Park, which was established in 1988. The W. H. Shipman Business Park transformed fallow cane fields that were overgrown with invasive species. The resulting industrial area has developed infrastructure including utilities, fiber optics connectivity and wide roadways to accommodate industrial traffic. The undeveloped project site is a level area covered with about 10 centimeters of base course. Four (4) drainage pits are located along the site boundaries. Grubbing probably occurred in the past and grubbed material appears to have been pushed to the site boundaries. Site photographs are included in Appendix A.

ADC’s project involves the installation of a pre-manufactured building of approximately 3,000 square feet (sq. ft.) and related site improvements such as the construction of internal roadways, parking areas, utility systems and drywells. Grading and construction-related activities will occur and driveway connections will be improved. Chain link fencing along the site perimeter and manual gates at access points will be installed as part of the project. Landscaping along the front property line is also proposed.

State of Hawai‘i lands and funds will be utilized for ADC’s project; therefore, the preparation of an Environmental Assessment (EA) pursuant to Chapter 343, HRS and associated Title 11, Chapter 200, Hawai‘i Administrative Rules (HAR) is required. This EA was prepared to examine potential project impacts and to provide for public participation as required and defined in the statutes. The project site is not located within the Special Management Area (SMA).

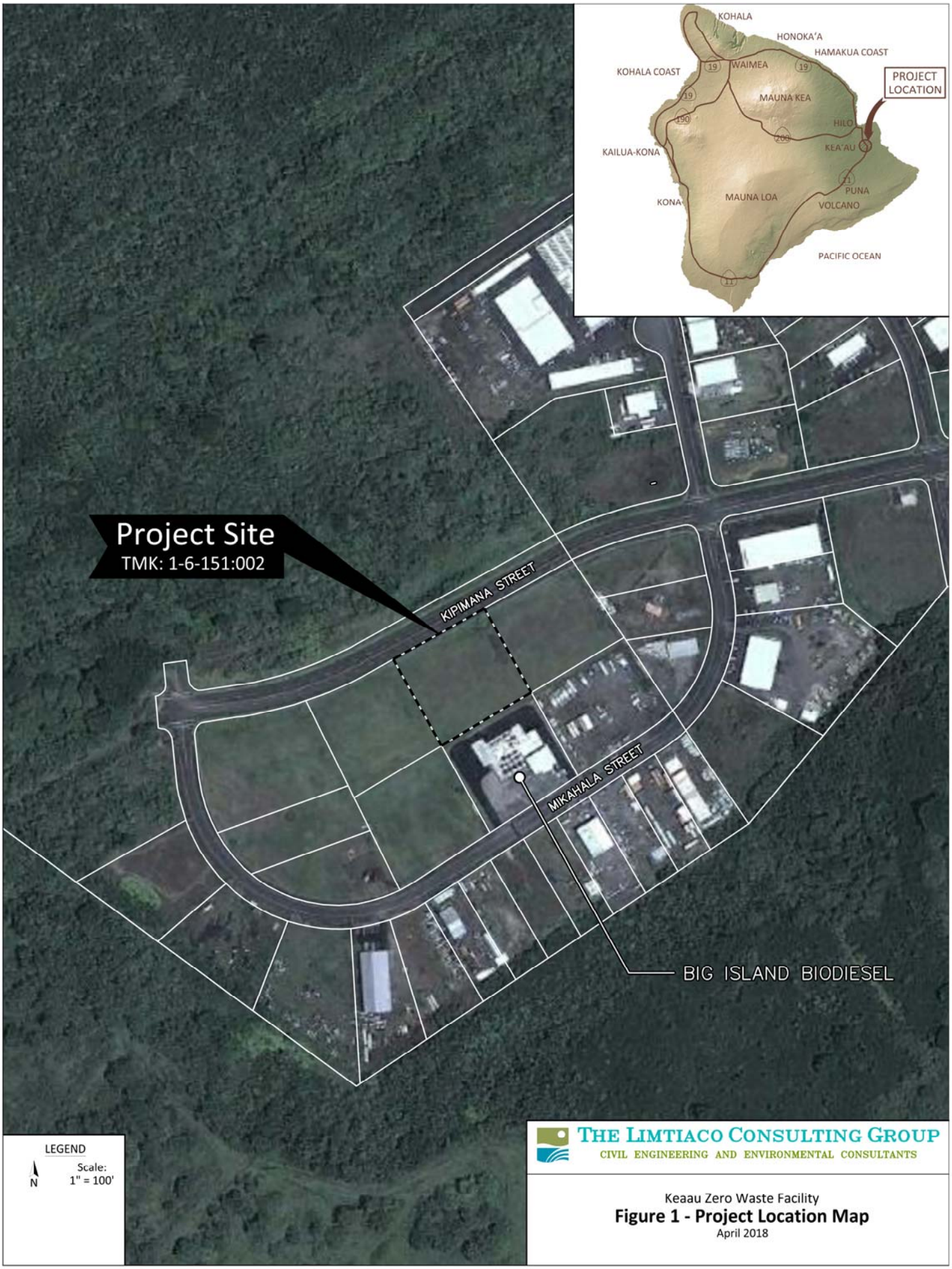
1.2. Project Need and Objectives

The proposed facility will function as a demonstration project for a zero waste conversion process that utilizes algae to convert off grade fruits and vegetables into livestock feed and oil. The high cost of importing feed contributed to the closing of many feedlots within the State of Hawai‘i (Fukunaga and Associates, Inc., 2010). “High costs related to land, labor, and energy; conflicting needs for fresh water; and frequent pest invasions all put pressure on Hawaii’s food supply” (Office of Planning, Department of Business, Economic Development and Tourism, 2012). The proposed facility will house specialized vats called bioreactors, which will be used to grow algae. The intent of ADC’s demonstration project is to successfully grow algae on a commercial scale using the waste product that may consist of papaya and perhaps other off grade fruits and vegetables grown on the Island of Hawai‘i. ADC’s project may ultimately help advance agriculture and energy initiatives by utilizing the waste product from locally grown produce. If the algae can be successfully grown at the proposed facility, the process could then be used for the development of byproducts such as a locally-produced livestock feed (for fish, chicken, and hogs) and biofuels.

1.3. Site Location and Description

The project site consists of relatively flat land located inland and approximately five miles from the Pacific Ocean. Kipimana Street is a wide, two-lane roadway that defines the northern site boundary. The existing Big Island Biodiesel facility abuts the state-owned parcel along the southern site boundary. Undeveloped parcels maintained as grassy areas abut the project site to the east and west. The proposed facility will be roughly 7.2 miles south of Hilo Harbor and the Hilo International Airport. The Kea‘au Town Center is roughly 1.7 miles south of the project site and has residential neighborhoods, schools, Kea‘au Shipman Park, businesses, a post office, a police station, a fire/EMS facility and private medical facilities.

The larger geographic area that contains the W. H. Shipman Business Park has experienced a long history of significant land-disturbing activities including several decades of large-scale agricultural use. Fallow cane fields overgrown with invasive species were graded and cleared for the establishment of the W. H. Shipman Business Park. Biologists from AECOS, Inc. surveyed the terrestrial flora and fauna in the project area. As stated in the survey report (see Appendix B), the project site contains no important biological resources or critical habitat that could harbor Federal or State of Hawai‘i listed species (Burr and Miranda, 2018). The archaeological investigation by Cultural Surveys Hawaii (CSH), which included fieldwork consisting of pedestrian sweeps and subsurface testing, revealed no historic properties and no cultural deposits (see Appendix C). CSH also initiated dialogue with Native Hawaiian Organizations, agencies, and community members (see Appendix D). The available knowledge gathered in from the outreach effort by CSH and from pre-assessment consultation for this EA suggests that the project site has not been utilized for traditional and cultural practices in recent times.



THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

Keaau Zero Waste Facility

Figure 1 - Project Location Map

April 2018

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

Keaau Zero Waste Facility

Figure 2 - State Land Use

April 2018

The State land use designation for the project site is Urban (see Figure 2). The Land Use Pattern Allocation Guide (LUPAG) Map designates the project site as Industrial. The County of Hawai‘i zoning designation is MG-20 General Industrial District (minimum land area of 20,000 square feet, required for each building site) as shown in Figure 3. The proposed facility is consistent with permitted uses in the MG-20 zone and may also be considered as a permitted use in any district pursuant to Hawai‘i County Code §25-4-11(c):

> *Public uses, structures and buildings and community buildings are permitted uses in any district, provided that the director has issued plan approval for such use*.

1.4. Historical Setting

The information for this section is summarized from the draft archaeological assessment (May 2017) prepared by CSH unless otherwise noted. Appendix C contains the management summary from the report that was submitted to the Department of Land and Natural Resources, Historic Preservation Division (SHPD) for review on September 28, 2017. The finalized report will be available to the public through the SHPD library.

There are very few mythological and traditional accounts that contribute to the understanding of pre-Contact history of Kea‘au and the *ahupua‘a* of Puna. Traditions imply that the Puna district was a wealthy agricultural region until volcanic eruptions from Kīlauea drastically altered the land. Legends suggest that habitation within the *ahupua‘a* of Puna occurred along the coast and resources were collected from upland areas. The exchange system utilized by the pre-Contact Hawaiian people distributed agricultural and marine resources among extended family members. The native Hawaiian people were self-sufficient and organized as a fairly rigid caste structure that incorporated communal subsistence. Research suggests that the Puna district did not consistently have a chief of its own, and at various times was under the rule of Hilo chiefs, descendants of the Hawai‘i Island chief, and Kona chiefs.

The first documented account of western contact with the Hawaiian people occurred in 1778 when British Captain James Cook traded with island inhabitants and went ashore at Waimea Bay on the Island of Kaua‘i (Juvik et al, 1998). The first documented observations of the different areas of Puna are from Captain Cook’s crew who explored the area in 1779. The second and third accounts of the Puna area, respectively, are from the British missionary William Ellis who toured the Island of Hawai‘i in 1823 and from Titus Coan, an American missionary who documented his first tours of Hilo and Puna in 1835. The American naval officer, Charles Wilkes, led a U.S. Exploring Expedition from 1838 to 1842, commonly known as the “Wilkes Expedition” that explored the summit of the Kīlauea Crater in 1840 and also included travel along the Puna coast.

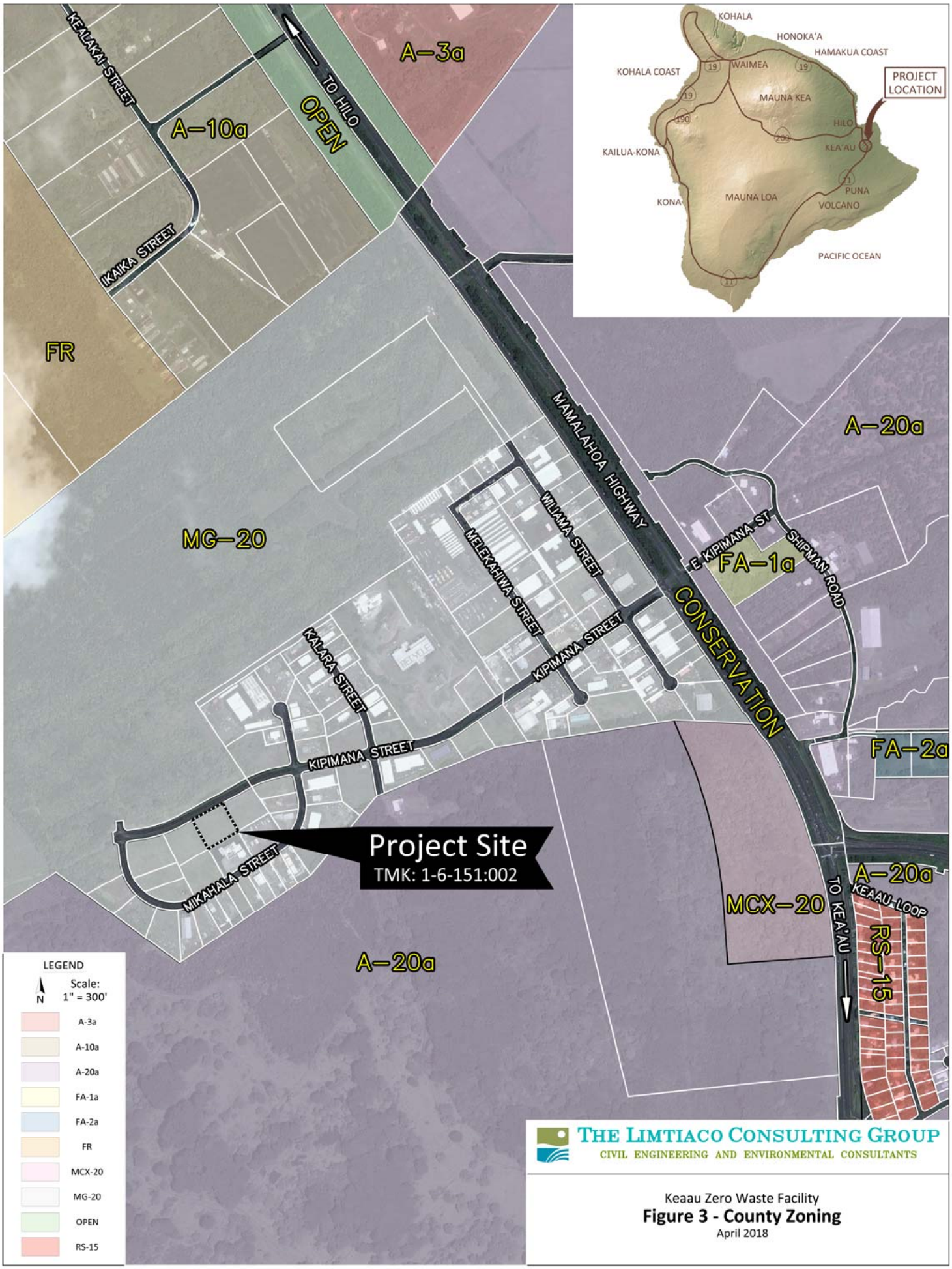
The early historic period following Western contact was characterized by trade, the introduction of Western arms, influence from Protestant missionaries, and the consolidation of power by Kamehameha I (Ibid.). Population shifts occurred as people moved to port cities or other trading areas and Puna reportedly lost a large portion of its population. The Kingdom of Hawai‘i initiated land reform known as the Mahele in 1848. The Kuleana Act of 1850 resulted in the award of lands to native tenants. The Kea‘au *Ahupua‘a* was granted as chief lands to William C. Lunalilo and one *kuleana* award of 13.64 acres in Kea‘au was granted to a native tenant. The Kea‘au *Ahupua‘a* was sold to Samuel Damon, William H. Shipman, and J. Elderts in 1882. By 1884, Shipman was the sole owner of the Kea‘au *Ahupua‘a* because he had acquired the interests of the other partners. The Shipman family lands have been utilized as pasture for grazing cattle and were leased by ‘Ōla‘a Sugar Company for sugarcane cultivation. Laborers for the sugarcane plantation were Japanese, Puerto Ricans, Chinese, Hawaiians, Portuguese and other Caucasians who lived in segregated camps along the old Plantation Road. In 1960, ‘Ōla‘a Sugar Company was given the Puna Sugar Company name.

The recent history of Puna includes the decline of the sugarcane industry, the closure of Puna Sugar Company in 1982, the development of diversified agriculture, the establishment of the Puna geothermal power plant, and the growth of urban centers including Kea‘au and Pahoa (County of Hawai‘i Planing Department, 2008). The Puna District has approximately 198,747 acres zoned for agricultural use and is a major papaya growing region in the State of Hawai‘i (County of Hawai‘i Planing Department, 2005). “The major agricultural businesses in Puna include macadamia nuts, flowers, foliage, papaya, bananas, tropical fruits and vegetable production” (Ibid.). The W. H. Shipman Business Park is a major industrial center for East Hawai‘i that is zoned to support heavy industrial uses such as power plants (Ibid.).

1.5. Technical Considerations

ADC is proposing to utilize the vacant project site for a modern facility that houses specialized vats called bioreactors to grow algae. The pre-fabricated building of approximately 3,000 sq. ft. will conform to building codes and required standards pertaining to life and safety. The undeveloped state-owned parcel requires on-site infrastructure and connections to the municipal water system. ADC’s project includes the development of internal roadways and parking lots for the proposed facility.

The demonstration project will utilize a specialized algae strain that can store as much as 60 percent its cellular weight in lipids when grown, in the absence of sunlight, on a diet of 35 percent papaya juice. While nearly all algae are capable of using energy from light to produce organic molecules from carbon dioxide and water, some algae, can also absorb organic molecules, such as sugars. After 14 days of feeding on papaya, the algae will be harvested using a centrifuge to separate the liquid (water and papaya juice) from the algae.

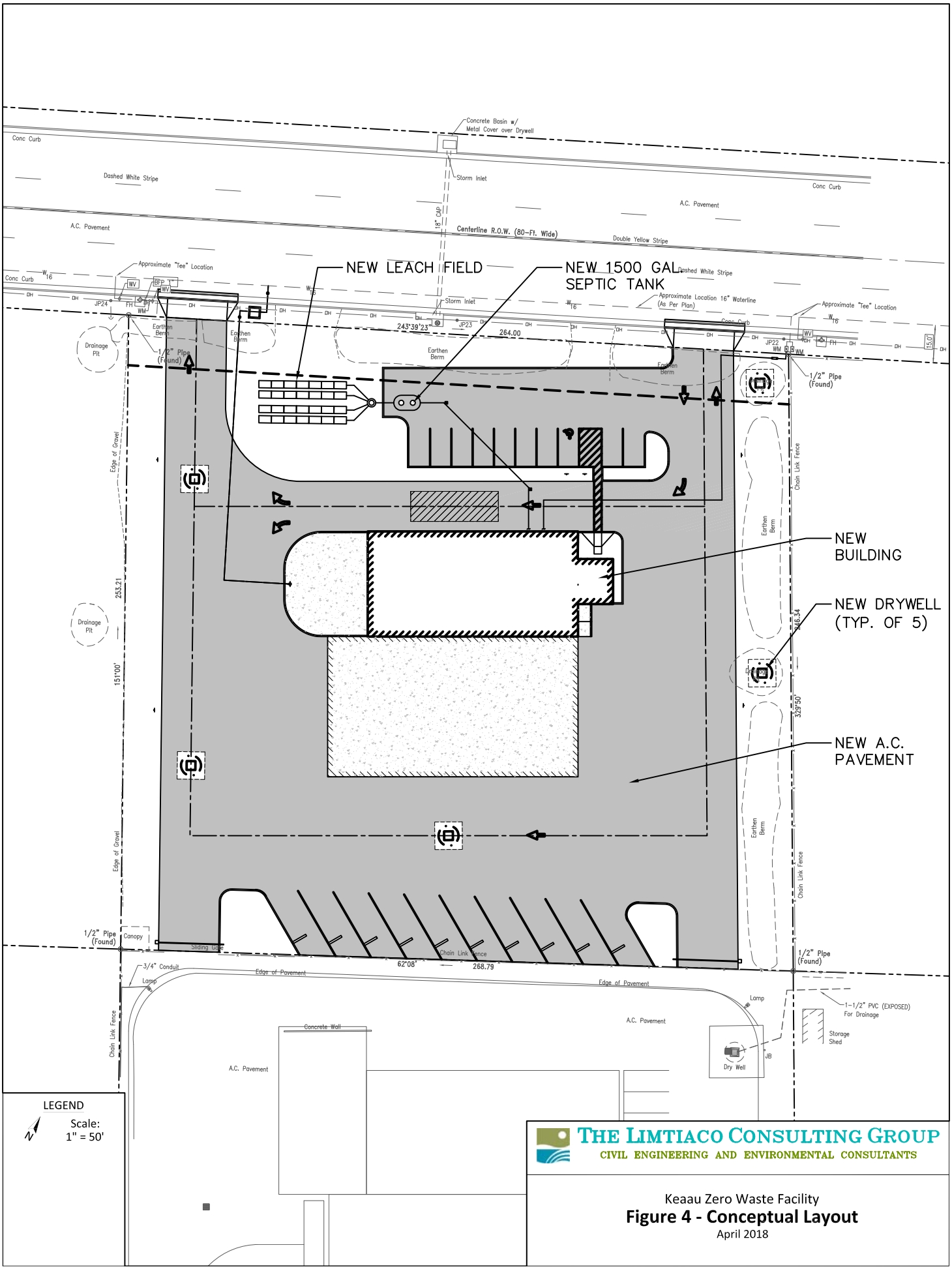


THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

Keaau Zero Waste Facility

Figure 3 - County Zoning

April 2018



THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

Keaau Zero Waste Facility

Figure 4 - Conceptual Layout

April 2018

No chemicals or solvents will be used, and no incinerating will occur at the proposed facility. Residual water will be separated from the algae, treated and discharged in accordance with all county, state, and federal laws. ADC’s project will strive to demonstrate that algae can be grown on a commercial scale using off grade papaya, and possibly other fruits and vegetables grown on Hawaii Island.

The proposed facility is expected to provide employment opportunities for approximately twelve (12) employees; six skilled employees and four to six laborers would staff the proposed facility in shifts. Figure 4 depicts a conceptual layout of the proposed facility.

1.6. Environmental Considerations

The proposed facility will utilize undeveloped, relatively flat, state-owned land in the district of Puna in East Hawai‘i. ADC’s commitment with regards to the project is to support the agriculture industry in Hawai‘i. The project site identified in this EA is within an established industrial zone in Kea‘au. The proposed facility appears to be consistent with nearby uses within the MG-20 (General Industrial) zone. There are no known concerns at the project site that pertain to biological resources, historic properties, cultural features, traditional cultural practices and hazardous materials.

The proposed facility will connect to developed water and communications infrastructure in the project area. Construction activities associated with the proposed facility would generate short-term effects such as fugitive dust, noise, intermittent traffic, solid waste, and potential disruptions to utility services that would cease upon project completion. Anticipated short-term impacts will be mitigated to the extent practical with the use of appropriate construction techniques and Best Management Practices (BMPs). ADC has consulted with neighboring and surrounding landowners about its proposed facility, which will be a demonstration project. ADC’s project represents a public use on government land that does not affect population levels or the housing supply.

1.7. Project Schedule and Cost

The environmental review process, which includes publication and public review of the EA, may be concluded by Fall 2018. The final design phase and acquisition of necessary permits and approvals may be completed by Fall 2019, whereby construction may be authorized to begin by the end of calendar year 2019. Funding opportunities and constraints may result in project completion through a multi-year approach for design and construction.

The estimated funding allotment for ADC’s project is $1.5 million; the timing and phasing of design and construction is expected to influence total costs. Design fees and the costs associated with permits and approvals are included in project costs.

(This page intentionally left blank.)

2. DESCRIPTION OF EXISTING ENVIRONMENT, PROJECT IMPACTS, AND MITIGATION

2.1. Climate and Air Quality Considerations

The climate throughout the State of Hawai‘i is generally characterized by mild temperatures with low daily and monthly variability, moderate humidity, persistent trade winds, and abundant sunshine. Annual rainfall in the project area is approximately 142 inches (Giambelluca, 2014). Average temperatures at the project site range from 69 degrees Fahrenheit in February to 74 degrees Fahrenheit in August (Ibid.). Temperatures may be higher due to the combined effects of solar heating and high humidity.

Air pollutant sources in the vicinity of the project site include non-stationary (or nonpoint) transportation emissions from vehicular activity and stationary industrial uses within the business park. Big Island Tree Service, Inc. stated the following concerns about air quality and smells in its letter to ADC, which was received on February 9, 2018:

> *We are located on the upwind side of your proposed plant. We already get a lot of bad air smell from the Biodiesel plant next to your proposed site. I have videotaped massive amounts of black smoke pouring out of there [sic] smokestacks on multiple occasions (mostly late in the afternoons when most business [sic] are wrapping up their day).*

In addition to the revised pre-assessment letter, ADC provided written clarification about its project to Big Island Tree Service, Inc. on March 6, 2018:

> *We want to inform you that the pre-assessment letter you received had some misinformation about the project and that a subsequent letter with the correct information was sent on February 9, 2018. The subsequent letter pointed out that the facility ADC is planning to construct is NOT a biofuel facility and NO animal waste will be used or stored at the facility.*

Natural pollutants such as plant pollens and spores, airborne dust, salt laden ocean spray, and volcanic haze (or vog) from Kīlauea also influences the air quality of the project area on a periodic basis. Prevailing northeast trade winds can circulate particulates between upland and downslope areas, carry emissions away from the project area and help to disperse airborne pollutants that would otherwise accumulate during calm conditions.

Impacts and Mitigation Measures

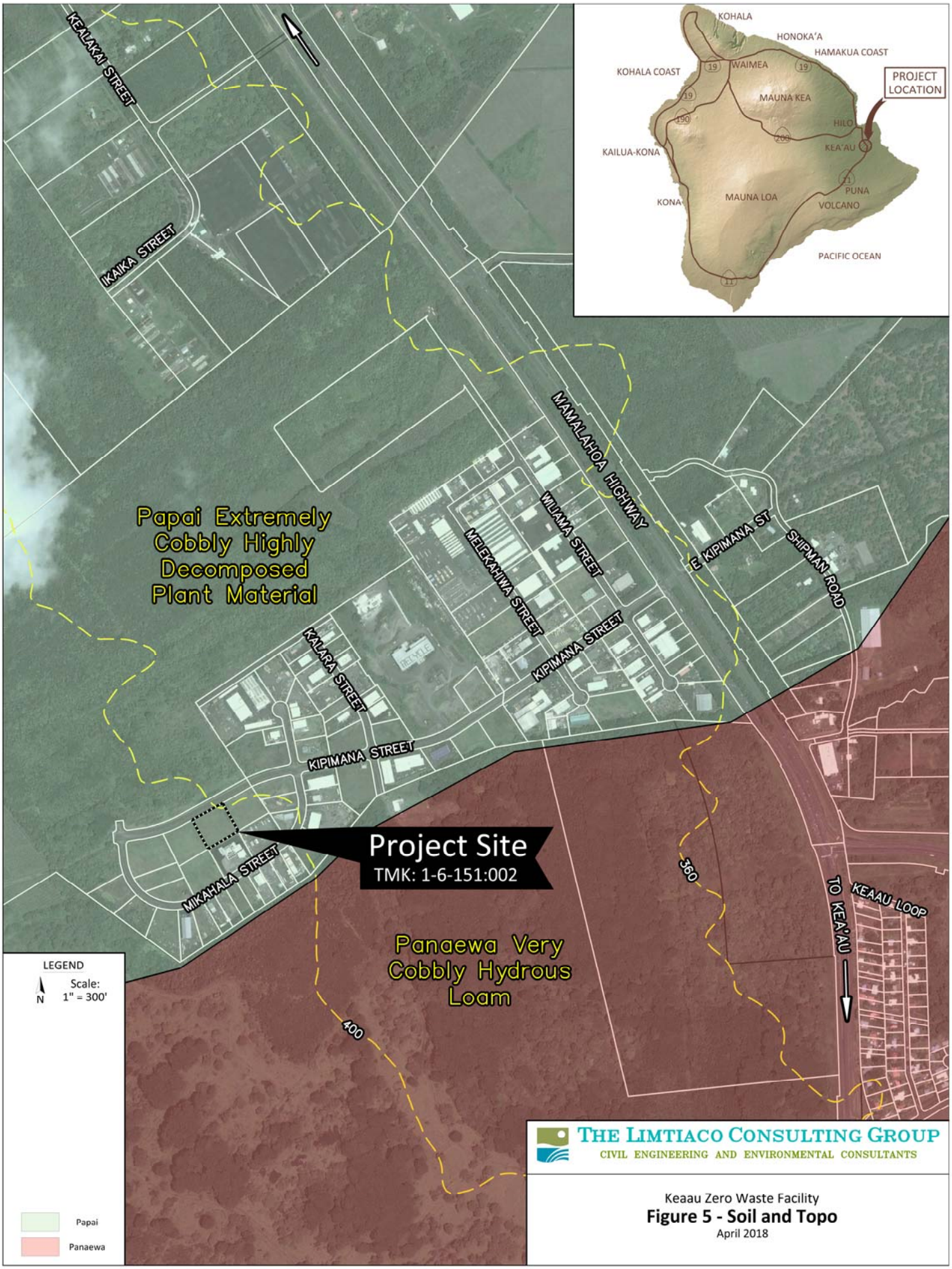
The proposed facility may include landscaping that helps to reduce the heat-island effects from urban sites. No measurable adverse effect on climatic conditions is anticipated from the development or operation of the proposed facility; therefore, no mitigation is warranted or proposed.

Algae that grows in bioreactors housed within a built enclosure is not expected to generate pollutant emissions that would noticeably affect local or regional air quality. Ambient air quality at the project site will be temporarily affected by construction-related vehicles, equipment and activities that would generate fugitive dust and emissions. The construction contractor will be responsible for complying with HAR, Chapter 11-60.1, “Air Pollution Control.” The contractor will be responsible for the implementation of erosion and dust control measures as necessary for compliance with the above-mentioned rules. The letter dated February 1, 2018 from the Department of Health, Environmental Planning Office (DOH EPO) mentions air pollution control measures including but not limited to “the use of water wagons, sprinkler systems, and dust fences.”

Construction equipment and vehicles shall be properly maintained in order to control vehicular emissions during the short-term construction period. In the long-term, nonpoint air quality impacts will occur from motor vehicles that travel to and from the proposed facility at intermittent intervals. No significant short-term or long-term impacts are anticipated from the project because exhaust emissions of carbon monoxide and nitrogen oxide emissions would be intermittent and readily dissipated.

2.2. Topography, Geology and Soils

The Island of Hawai‘i is the largest and youngest landmass of the Hawaiian chain. The undeveloped project site is located on the eastern side of the Island of Hawai‘i and south of Hilo. The state-owned parcel encompasses flat, previously graded land located roughly 400 to 406 feet above mean sea level (see Figure 5). Soil survey data gathered by Sato et al. and compiled for the *Soil Survey of Island of Hawai‘i, State of Hawai‘i* (U.S. Department of Agriculture, Soil Conservation Service, 1973) suggests that the predominant soil type in the vicinity of the project site is Papai extremely stony muck, 3 to 25 percent slopes (rPAE). The rPAE soils type consist of well drained, thin, extremely stony organic soils over fragmental *‘a‘ā* lava. According to the *Web Soil Survey* (U.S. Department of Agriculture, Natural Resources Conservation Service, 2017), the mapped soil type in the vicinity of the project site is 628—Papai extremely cobbly highly decomposed plant material, 2 to 10 percent slopes. This well drained soils type is classified as having low runoff qualities. The soil classifications are shown in Figure 5.



Keaau Zero Waste Facility

Figure 5 - Soil and Topo

April 2018

(This page intentionally left blank.)

From 1965 to 1972, the Land Study Bureau (LSB) of the University of Hawai‘i developed a detailed classification system for the major Hawaiian Islands that was intended as a rating of agricultural productivity based on soil properties and productive capabilities. Lands in the highest productivity agricultural categories were classified with the “A” or “B” rating; there are no “A” or “B” lands in the district of Puna (County of Hawai‘i Planning Department, 2008). Lands within the W. H. Shipman Business Park have no LSB classification.

Impacts and Mitigation Measures

Project actions would generally retain the overall topographic profile for most of the site and there are no obvious topographical features that would obstruct site preparation activities. Consequently, no mitigation is warranted or proposed with respect to topography.

The proposed facility will be properly designed with respect to subsurface conditions and geotechnical concerns within the footprint of construction. Areas affected by project actions will be stabilized and either paved or landscaped, which reduces the long-term potential for erosion and sediment transport. Project actions would therefore have no adverse impacts on the underlying geology and soils at the project site such that no mitigation is warranted or proposed.

Earth disturbing activities may create exposed areas and surface-generated sediment that may enter the groundwater if significant rainfall occurs during grading. The letter dated March 13, 2018 from the County of Hawai‘i, Department of Public Works states the following requirements:

All activities shall comply with the requirements of Hawaii County Code (HCC), Chapter 10, Erosion and Sedimentary Control.

All development-generated runoff shall be disposed of on site and not directed toward any adjacent properties.

2.3. Water Resources

The project site is within the Kea‘au Aquifer System Area (ASYA) that is part of the Northeast Mauna Loa Aquifer Sector Area. Ground water withdrawals as calculated from well production data are well below the *sustainable yield* for the Kea‘au ASYA, which is 393 million gallons per day (MGD). *Sustainable yield* refers to “the quantity of water that can be extracted from an aquifer indefinitely without diminishing the quantity or quality of the water withdrawn” (Department of Land and Natural Resources, Commission on Water Resource Management, 2008).

The Underground Injection Control (UIC) line as determined by the DOH Safe Drinking Water Branch demarcates the boundary and associated restrictions that apply to areas with non-drinking water aquifers or underground sources of drinking water. Injection well activity is more restricted in areas above the UIC line to protect underground sources of drinking water from injected fluids that may contain chemical, physical, radioactive, and biological contamination. The project site is above the UIC line.

There are no freshwater streams, rivers, ponds or other open water bodies within the project site. Wetlands (or marshes, swamps, bogs, etc.) are also not present. Storm run-off from the project site flows in the direction of the existing grade and naturally percolates into ground water.

Nonpoint source pollution from agricultural and urban activities including runoff containing nitrogen, phosphorus, and/or sediments is considered to be a threat to coastal ecosystems. Discharges of sediments and pollutants from sewage injection wells and defunct septic tanks may further contribute to harmful environmental impacts that may be noticeable in the nearshore environment.

Impacts and Mitigation Measures

Project actions are not expected to impact water resources, especially since the proposed facility does not involve the development of new potable water sources. No significant impacts to surface water quality would occur because the project site is devoid of such resources including wetlands, perennial streams, or other sensitive riparian habitats. No sewage injection wells will be installed; the proposed facility will have a septic tank and leach field. The proposed facility will direct drainage to five (5) drywells to reduce nonpoint source pollution concerns. Consequently, the long-term use of the project site is not anticipated to result in contamination of the underlying aquifer and groundwater sources.

A short-term and temporary impact of the project may occur from the generation of sediment-laden surface runoff during earth-disturbing activities, especially if heavy rains coincide with the activity. A National Pollutant Discharge Elimination System (NPDES) Permit for discharges of pollutants, including storm water runoff (e.g., construction dewatering effluent) is required for the disturbance of one acre or more of total land area pursuant to HAR Title 11, Chapter 55, “Water Pollution Control” effective December 6, 2013. The construction contractor will be responsible for implementing a storm water management plan to minimize erosion and sediment loss at the site.

2.4. Solid Waste and Hazardous Materials

The South Hilo Sanitary Landfill is approximately seven (7) miles north of the project site. The Kea‘au Recycling and Transfer Station is approximately three (3) miles south of the project site. The disposal of commercial or farm waste is not allowed at the transfer facility, which accepts household generated self-haul rubbish. Hawai‘i County continues to explore waste reduction strategies including composting and waste-to-energy facilities to avoid further landfill development. Waste recyclers divert recoverable material from the waste stream. No solid waste is currently generated at the project site in its undeveloped state.

There are no known concerns associated with past usage and/or storage of hazardous materials at the undeveloped project site. No visual remnants of vent or fill pipes, dispensers, etc. that are typically associated with underground or above-ground storage tanks were observed during the site reconnaissance by EnviroServices and Training Center, LLC on June 16, 2015 that was undertaken as part of the Phase I Environmental Site Assessment.

Written correspondence from Big Island Tree Service, Inc. that was received on February 9, 2018 states the owner’s concerns about “multiple spills of oil/grease” on the street in front of his business “from leaking containers being hauled away.” The letter suggests that containers are cleaned in a manner that causes fluids to collect on the side of the roadway.

In addition to the revised pre-assessment letter, ADC provided written clarification on March 6, 2018 to Big Island Tree Service, Inc. about waste from its project:

> *We want to point out that there will be no chemicals or solvents being [sic] used, or incinerating done at the facility. The only waste that will be produced at the facility is the water that is separated from the algae, which will be treated and discharged in accordance with all county, state and federal laws.*

Impacts and Mitigation Measures

The Hawai‘i County, Department of Environmental Management (DEM), Solid Waste Division (SWD) stated in its letter dated February 20, 2018 that ADC’s project “seems to support the idea of zero waste which was put forth in the County’s 2009 Integrated Resources Solid Waste Management Plan.” The following statements about a future compost facility are from its letter:

> *The SWD is currently in the process of evaluating sites for a future Compact Facility. Two of the three sites that are being evaluated are in close proximity to your subject parcel. The project you describe seems*

to fit in with the concept of a compost facility and the two facilities may have the potential to complement one another should they be constructed within close proximity.

Construction activities at the project site would temporarily increase the volume of solid waste such as excavated material that must be transported off-site for proper disposal. Waste material from construction will be collected and transported off-site by a commercial service provider for proper disposal. ADC is expected to ensure that appropriate waste management and disposal practices are implemented by the construction contractor. No adverse impacts are anticipated.

2.5. Natural Hazards

Natural hazards that may threaten life and property on the Island of Hawai‘i include tsunami inundation, tropical cyclones, earthquakes, floods, drought, volcanic activity, wildfires, sea level rise, high wind and landslides. Recent earthquakes and wind damage from storms have resulted in power outages for extended periods in localized areas on the Island of Hawai‘i. Recent lava flows from the active Kīlauea volcano have destroyed built structures and covered roads, which jeopardized access for affected communities.

In August 2014, Tropical Storm Iselle brought torrential rainfall and high winds that resulted in downed trees, widespread power outages, damaged homes and blocked roadways (Pape, 2014). In Puna, two polling places were closed due to storm damage and a geothermal plant released toxic hydrogen sulfide gas due to power loss (Ibid.). The U.S. Department of Agriculture issued a natural disaster declaration for Hawai‘i County due to the damage sustained to macadamia, coffee, floriculture and nursery crops in addition to severe destruction of an estimated 60 percent of statewide papaya production (Blair, 2014). Damage and losses to papaya farmers was estimated at over $50 million (Ibid.).

Tsunami Evacuation Zone maps for the State of Hawai‘i identify low lying areas where excavation is recommended since extensive damage to life and property may occur from seismic sea waves. The project site is approximately five (5) miles from the shoreline and outside the Tsunami Evacuation Zone.

The letter dated March 13, 2018 from the County of Hawai‘i, Department of Public Works states that the project site is designated Zone X on the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency. Zone X refers to inundation areas of low-to-moderate risk that are outside the 0.2 percent annual chance (or 500-year) floods. Figure 6 depicts the flood zone designation and Appendix E contains the Flood Hazard Assessment Report for the project site.

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

Keaau Zero Waste Facility

Figure 6 - Flood Zone Map

April 2018

(This page intentionally left blank.)

The area of Puna that contains the project site has a high volcanic hazard designation as assessed by the United States Geological Survey. The high hazard risk assigned to Puna is due to the presence of Mauna Loa, which is an active volcano. The project site is located within Zone 3, which represents areas that have had one to five percent of the land area covered by lava or ash flows since the year 1800 (Wright, 1992). Areas in south Puna to the general vicinity of Pahoa are in Zones 1 and 2, which represent higher hazard risk designations. The Zone 1 designation includes the summit and rift zones of Mauna Loa and Kīlauea, and the Zone 2 designation is for areas adjacent to and downslope of Zone 1 (Ibid.).

The project site consists of relatively flat land and there are no apparent rockfall hazards in the project vicinity. Threats from wildfires are unlikely but possible since the areas surrounding the W. H. Shipman Business Park are heavily vegetated. Drought conditions and high winds could exacerbate the fire hazard. Many wildfires are caused by human actions of an intentional nature or as a result of negligence.

Impacts and Mitigation Measures

The threats to humans and property from unpredictable natural events will always be present. Proposed activities at the project site would not affect the occurrence of naturally occurring hazards.

ADC’s project is not expected to significantly increase the risks to human health or property. Personnel at the proposed facility are expected to observe evacuation plans that address the safety of staff in the event of man-made and natural disasters.

2.6. Floral and Faunal Resources

The undeveloped project site was previously disturbed for the establishment of the W. H. Shipman Business Park, which encompasses 485 acres of former agricultural land. Large-scale agricultural endeavors that extend across a vast geographic area typically alter the natural environment as plant and animal habitat is cleared and replaced with desired crops. The survey report that describes the flora and fauna of the project area is included in Appendix B. The surveyed area included the project site and extended a short distance into adjacent lots. The project site contains no area of natural vegetation and the plant assemblage directly north of the project site is “an alien wet forest shrubland dominated by gunpowder (*Trema orientalis*) and macaranga (*Macaranga tanarius*) trees” (Burr and Miranda, 2018). The biologists from AECOS, Inc. observed no proposed or listed species of threatened or endangered plants in the project area during their surveys on March 31, 2017. No proposed or listed avian or mammalian species were detected and the project site contains no federally delineated critical habitat for any species. The endemic species of Newell’s shearwater (*Puffinus auricularis newelli*) or *‘a‘o* and the indigeneous

Band-rumped Storm-Petrel (*Oceanodroma castro*) or *‘akē‘akē* are seabirds that may fly over the project area.

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR DFW) indicated in its letter dated February 2, 2018 that the project site is “only 0.6 miles from forests that are displaying Rapid *‘Ōhi‘a* Death (ROD) like symptoms.” The letter from DLNR DFW also states that “three State and Federally protected endangered wildlife species are known to frequent, or are likely to be found in the project area.” Considerations noted by DLNR DFW that pertain to the three protected species are listed below:

Hawaiian goose (*Branta sandvicensis*) or *nēnē* - known to occasionally land in the area;

Hawaiian Hawk (*Buteo solitarius*) or *‘io* - known to frequent the area; and

Hawaiian hoary bat (*Lasirus cinereus semotus*) or *‘ōpe‘ape‘a* - likely to be found in the area.

Impacts and Mitigation Measures

ADC’s project is not expected to displace any federal or State of Hawai‘i listed species of plants or insects since the project site is devoid of these protected resources. Site preparation work such as clearing and grubbing is expected to involve the necessary removal of onsite vegetation, which is already sparse.

The project site and the immediately surrounding area contains no *Metrosideros collina subsp. polymorpha* or native *‘Ōhi‘a* trees and no host plants for two species of the fungal pathogen (*Ceratocystis huluohia* and *Ceratocystis lukuohia*) that spread ROD (Burr and Miranda, 2018). ADC’s project is not likely to introduce or help spread ROD “since there are no host plants and the ROD is not supportable” based on the resources present at the project site (Ibid.).

ADC’s project will have no negative impact on the Hawaiian goose, which forages “on mowed lawns in developed areas and are only occasional visitors in the area” (Ibid.). No negative impacts to the Hawaiian hawk or Hawaiian hoary bat are anticipated since there are no trees within the project site that may be used as a resource by these species. Seabirds, especially fledglings, that may fly at night in the summer and fall can become disoriented by exterior lighting. Outdoor lighting, if installed at the proposed facility, should be properly shielded and point light towards the ground.

2.7. Archaeological Resources

Research conducted by CSH provided the environmental, cultural, historic and archaeological background for the project area. CSH summarized its background research and predictive model regarding the expected types and locations of archaeological historic properties in the area:

> *Background research indicated the project area lands were used during the pre-Contact period primarily for the collection of resources. In the historic era, the vicinity was heavily disturbed for sugarcane cultivation. The project area lands also may have been impacted by the development of the industrial park in the latter part of the twentieth century. Given this history of known land use, little in the way of archaeological findings were anticipated.*

Fieldwork conducted on March 14 and 15, 2017 by Cultural Surveys Hawaii included a 100 percent-coverage pedestrian inspection and subsurface testing at three representative locations within the project site. Access and visibility were excellent during the survey. Testing results identified three distinct fill layers overlying basalt bedrock. The investigation by CSH is categorized as an archaeological assessment (AA) because no archaeological historic properties were identified. The absence of cultural deposits is consistent with the known history of land use in this area. The AA report was submitted to SHPD for review on September 28, 2017. The management summary from the report is included in Appendix C.

Impacts and Mitigation Measures

The proposed facility, which will serve a public purpose, is expected to result in no impacts to archaeological features within the project site. SHPD is expected to provide review comments that will be addressed in the final report. ADC has requested SHPD’s concurrence with “no historic properties affected” pursuant to HAR §13-275-7.

The mitigation recommendations from the AA report are noted below:

> *No further archaeological work is recommended. CSH does not recommend archaeological monitoring based on the absence of any historic properties and the nature of the project area lands. However, if subsurface features or deposits are encountered at any time during construction, CSH recommends construction activities cease in that area and that SHPD be contacted immediately.*

ADC is expected to ensure that its contractor will halt construction activities and immediately notify SHPD in the event of a discovery.

2.8. Cultural Practices and Resources

A cultural impact assessment (CIA) conducted by CSH to help identify the potential effect of ADC’s project on cultural beliefs, practices, and resources is included in Appendix D. In June 2017, CSH initiated its effort to contact and consult with Native Hawaiian Organizations, agencies, and community members including descendants of the area. The CIA report reflects the consultation effort by CSH that involved outreach via letters, email, telephone calls and in-person contact.

CSH noted in its report that one respondent who is *kama‘āina* (native born) of ‘Ōla‘a and not directly connected to the project area shared accounts of growing up in Kea‘au. He remembered gathering provisions from the shoreline with his family. Both of the respondent’s parents were employed as helpers on the Shipman Ranch and he has lived on Shipman property nearly all his life. His childhood memories included the sharing of freshly caught fish or pigs with other families that lived on or near the Shipman property. He recalled that there was a brackish water pond in Hā‘ena where the Shipman family lived. A stone near Hā‘ena Bay was treated as a shrine; however, the practice he described was of quiet respect and involved no offerings. The respondent could not recall whether or not there were pre-existing structures within the project area; he did remember a forested area with *‘ōhi‘a*. The knowledge shared with CSH provided no accounts of traditional and cultural practices at or near the project site within recent times.

Impacts and Mitigation Measures

The project site, which is away from the coastline and part of a larger area intentionally developed in 1988 for industrial uses, is not currently being used for traditional and cultural purposes. Historical research by CSH and the response to its consultation effort suggests that Hawaiian rights related to gathering, access or other customary activities will not be affected by ADC’s project. Furthermore, no adverse effect upon cultural practices or beliefs is anticipated from the proposed facility at the W. H. Shipman Business Park. The respondent’s concern with regards to ADC’s project is noted below:

> *His only concern with the proposed project is that the food resources he uses to feed his own livestock will now be used to create bio-diesel and that the project will take away those resources from people in the community*

2.9. Visual Resources

Visible urban development in Kea‘au is more concentrated along transportation routes near the original plantation center located about 1.7 miles south of the project site. The Kea‘au Town Center has commercial and light industrial uses that support the nearby low-density residential community. There are a few region-serving facilities in the Kea‘au Town Center such as the middle school and library, post office, police station, fire/EMS facility and medical clinics. Various points along Volcano Road provide unobstructed views of Mauna Kea and Mauna Loa. The visual character of the W. H. Shipman Business Park is influenced by existing industrial uses that reflect the growth of Kea‘au from a plantation town to a regional town center. Tall trees and vegetation along Volcano Road help to obscure outside views of the industrial area.

Impacts and Mitigation Measures

ADC’s project will contribute building elements along Kipimana Street that are generally in keeping with existing development within the W. H. Shipman Business Park. Landscaping may buffer or soften the visual impact of the proposed facility. No impacts to scenic vistas or view planes are anticipated from the proposed project such that no mitigation is warranted or proposed.

2.10. Noise

The project site is located within a developed area that is characterized by the sounds of human activity from industrial uses such as agricultural processing and from motor vehicles traveling along Volcano Road. The district of Puna is primarily an agricultural area that produces products for export and for local consumption. Background noise sources include vehicular traffic along Kipimana Street and other established travel routes within the W. H. Shipman Business Park. Other ambient noise is associated with human activities that occur during business hours at nearby developed areas.

Impacts and Mitigation Measures

Audible noise from construction vehicles, heavy equipment and impact tools is expected to fluctuate during the various phases of construction. The mitigation of noisy activities to inaudible levels will not be practical in all cases due to the intensity and exterior nature of the work. Quieter construction activities, such as building erection and equipment installation, may not be audible beyond the immediate vicinity of work area. Construction noise is temporary in nature and will cease upon completion of the project.

Project activities shall comply with the provisions of HAR Title 11, Chapter 46, “Community Noise Control.” The noise regulations require a noise permit if

the noise level from construction activity is expected to exceed allowable levels stated in the Chapter 11-46 rules. It shall be the contractor's responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment and to maintain noise levels within regulatory limits. If construction activities occur outside of the allowable timeframes designated for the noise permit (i.e., nighttime, Sunday, holiday) and exceed allowable noise levels, a noise variance must be obtained prior to commencement of construction activities, as required. The construction contractor will obtain the appropriate permit or approvals (e.g., Notice of Intent to Construct, Community Noise Permit, or Noise Variance). ADC will ensure that the contractor complies with all permit conditions. Potential noise impacts will also be mitigated by performing the majority of construction work during daytime hours (as opposed to night work), thereby avoiding the creation of construction noise impacts during the quieter nighttime hours.

The operation of the proposed facility is not expected to be a significant source of new background noise since many normal activities that occur indoors will be muffled by the building enclosure. Noise from human activity around the proposed facility is expected to be similar to the sounds emanating from nearby industrial uses and businesses. Landscaping within the project site may help to reduce or buffer the sounds from human activities at the proposed facility.

2.11. Site Access, Circulation and Traffic

Hawaii Belt Road or Volcano Road (State Highway Route 11) is a divided arterial highway that connects secondary urban centers in East Hawai‘i with the primary urban center in Hilo, which has major facilities such as Hilo Harbor, Hilo Airport and the University of Hawai‘i at Hilo. The posted speed limit along Volcano Road in the vicinity of the W. H. Shipman Business Park is 45 miles per hour (mph).

The County of Hawai‘i provides island-wide commuter and limited fixed-route bus services. The Hele-On bus operates two circuitous routes to the Puna area: Hilo-Volcano-Ka'u and Hilo-Pahoa-Pohoiki. There is no Hele-On bus service within the W. H. Shipman Business Park.

Bicycle and pedestrian facilities within Puna are limited. There is an overall lack of roadway connectivity between the various subdivisions in Puna that discourages walking and bicycling. None of the planned improvements for non-motorized travel are in the vicinity of the W. H. Shipman Business Park. The County's priority for walking and bicycling is the creation of safe routes to schools, parks and bus stops (County of Hawai‘i Planning Department, 2008). The effort to create connected routes for non-motorized travel is expected to be a lengthy process since rights-of-ways must be acquired first (Ibid.).

The project site is located along Kipimana Street, which is a four-lane roadway with a posted speed limit of 25 mph. Roadways within the W.H. Shipman Business Park are 60 to 80-feet wide to accommodate industrial traffic. The County of Hawai‘i Police Department stated in its letter dated January 23, 2018 that its staff “does not anticipate any significant impact to traffic and/or public safety concerns.” In a letter received on February 9, 2018, Big Island Tree Service, Inc. expressed support for green alternatives for waste but is concerned about the hauling of wastes to the project site.

Impacts and Mitigation Measures

Volcano Road and Kipimana Street will be utilized for the transportation of equipment and material to the project site. Disruptions to vehicular traffic during the various phases of construction will be intermittent and temporary in nature. Bus routes and bus stops along Volcano Road are not expected to be impacted by project actions. No impacts to bicycle and pedestrian traffic are anticipated since existing development patterns and the lack of multi-use pathways within the district of Puna largely discourage non-motorized travel. The transport of oversized and/or overweight materials and equipment on State highway facilities requires a permit from the State of Hawai‘i Department of Transportation. It will be determined during the design phase whether the operation or transportation of any oversized and/or overweight vehicles and loads will be required during construction.

Traffic control along Kipimana Street in the vicinity of the project site will be directed by construction personnel or county law enforcement, if necessary. Construction work and the moving of heavy equipment or construction-related supplies is expected to be scheduled during daytime hours (as opposed to night work). At night and when work is not occurring, all associated construction equipment will be secured and appropriately sited to prevent obstructions to traffic. The temporary increase in traffic due to construction vehicles and equipment accessing the project site will cease upon project completion.

ADC’s personnel will traverse roadways in the project area in the foreseeable future as part of normal operations at the project site. The project includes the construction of internal circulation routes and parking areas. The proposed facility will be an employment destination for approximately twelve (12) people. Some of the personnel at the proposed facility are expected to work in shifts. Staffing requirements at the proposed facility are expected to cause an insignificant increase in vehicle trips and traffic such that no mitigation is warranted. Construction of driveway access and any work within the County right-of-way shall comply with the HCC, Chapter 22, County Streets.

2.12. Utilities (Water, Wastewater, Drainage)

The undeveloped project site receives no utility service at this time but is located within an area served by the existing municipal water system. ADC’s water allocation will require approval from the Hawai‘i County Department of Water Supply (DWS) since the county agency administers and operates the potable water system. The letter from DWS dated February 7, 2018 indicates that “there is an existing 16-inch waterline fronting the subject parcel.” The letter also states that potable water service to the project site is limited to “one 1-inch meter assigned with two (2) equivalent units (E.U.) of water,” which is approximately equal to an average daily usage of 800 gallons.

Municipal wastewater collection and treatment facilities on the Island of Hawai‘i are administered by the Hawai‘i County Department of Environmental Management (DEM). The letter dated February 27, 2018 from the DEM states that “all wastewater treatment issues are the responsibility of the facility owner” because there is no public sewer system in the project area.

There are four drainage pits located along the perimeter of the project site. Two drainage pits along the eastern boundary are within the boundaries of the project site whereas two drainage pits along the western boundary are within the adjacent parcel. There are no improvements within the undeveloped project site that direct storm water to the existing drainage pits.

Impacts and Mitigation Measures

Connections or improvements to existing infrastructure (e.g., the municipal water system) and the installation of on-site infrastructure such as drywells, fire protection systems, and a septic tank and leach field may cause intermittent utility service disruptions near the project site during periods of work. This impact is expected to be short-term and temporary. There are no long-term impacts associated with establishing new utility connections to the proposed facility.

The maximum projected water demand for the proposed facility is estimated to be approximately 10,000 gallons per day. ADC will coordinate all necessary improvements for potable water service such as the installation of an on-site potable water storage tank, if necessary, with DWS. The final decision by DWS with regards to the availability of water will be confirmed when the building permit application is submitted for approval. The civil drawings will be reviewed by the Hawai‘i County Fire Department when the building permit application is submitted for approval to ensure that fire department access, water supply for on-site fire protection, and life safety requirements are met.

Wastewater from the proposed facility will be discharged to an on-site individual wastewater system consisting of a septic tank system that is sized to meet project demands. The septic tank and leach field provides wastewater treatment close to the generating source. The effluent from the septic system is conveyed to a leach field, which is a large area where treated wastewater is dispersed into the subsurface soils below the root zone. Adequately managed on-site wastewater treatment systems can be designed to achieve public health and safety objectives for small volumes of domestic wastewater. Septic tanks for waste treatment and leach fields for effluent disposal are under the authority of the State of Hawai‘i Department of Health. Compliance with HAR 11-62, Wastewater Systems is required.

Stormwater will be directed to five new drywells installed around the project site. Two existing drainage pits within the project site and along the eastern boundary will remain. The site drainage plan must comply with applicable Hawai‘i County Department of Public Works drainage standards and requirements. All of the drywells that serve the proposed facility will be sized to properly control and retain anticipated storm runoff.

A short-term and temporary impact of the project would occur from the generation of sediment-laden surface runoff during construction work. BMPs will be incorporated into a storm water management plan. Appropriate erosion control BMPs will be used to minimize the amount of sediment transported in stormwater runoff during construction activities. All construction activities will comply with applicable Federal, State and County regulations and rules for erosion control as previously discussed in Section 2.4, Water Resources. ADC’s project will increase impervious surfaces due to the installation of the proposed facility and the construction of paved roadways and parking areas within the project site; however, this anticipated impact will be offset by incorporating design methods that reduce storm water runoff from the site.

2.13. Power and Communications

The project area receives electrical power service provided by Hawaiian Electric Light Company, Inc. (HELCO). Telecommunications service including fiber optics connectivity is provided to the W. H. Shipman Business Park by Hawaiian Telcom and Oceanic Time Warner Cable (which is now Spectrum). Electrical power and communications infrastructure near the project site consists of overhead lines and underground duct lines along Kipimana Street. The letter dated February 5, 2018 from Hawai‘i Gas includes the company’s determination that the area is currently clear of utility gas facilities. The undeveloped project site does not require or receive power or communications service.

Impacts and Mitigation Measures

Proposed construction activity has the potential to be disruptive to power and communication systems in the vicinity of the project site but these effects are expected to be short-term and temporary. ADC’s project will be coordinated with HELCO, Hawaiian Telcom and other service providers as needed. The proposed facility does not represent a substantial increase in energy consumption. There are no long-term impacts associated with establishing new service connections. The project will incorporate sustainable building design concepts and energy efficient fixtures to the extent possible.

2.14. Socio-Economic Characteristics

The Puna District has been identified as an area “that is experiencing the fastest rate of growth of all the districts in the County of Hawai‘i” (County of Hawai‘i Planning Department, 2008). Strong population growth is projected to continue as a result of employment opportunities in agriculture, job opportunities in Hilo, and the affordability of residential parcels in the Puna District (County of Hawai‘i Planning Department, 2005).

The 2011 to 2015 estimated resident population for the Puna region is 44,363 inhabitants, which represents approximately 23 percent of the Hawai‘i Island population of 191,482 inhabitants (Department of Business, Economic Development and Tourism, 2017). The 2020 projection using a moderate growth rate suggests the resident population of the Puna District will be 58,246 inhabitants, which represents approximately 27 percent of the Hawai‘i Island population of 217,718 inhabitants (County of Hawai‘i Planning Department, 2008).

The Kea‘au Middle School and public library are located approximately 1.5 miles from the project site and near the Kea‘au Town Center. There is a post office, police station, fire facility and medical care facilities in the Kea‘au Town Center. Kea‘au Elementary School and Kea‘au High School are located further south and are approximately 2.3 miles and 2.6 miles, respectively, from the project site. No State agencies are in Kea‘au due to the relative proximity to Hilo.

Impacts and Mitigation Measures

ADC’s project is not expected to affect population levels, housing or schools. The various phases of construction will create short-term jobs for people in design and construction. The proposed facility will be staffed by approximately six skilled employees and four to six laborers who may already be working in East Hawai‘i. ADC’s project is expected to be a relatively insignificant source of new full-time employment opportunities in East Hawai‘i for the foreseeable future.

2.15. Emergency Service Facilities and Shelters

Law enforcement is provided by the County of Hawai‘i Police Department and fire protection services are provided by the County of Hawai‘i Fire Department. The Kea‘au Police Station and a 24-hour fire/EMS facility are located along Old Volcano Road in the Kea‘au Town Center, which is approximately 1.7 miles south of the project site.

Emergency service providers include critical care providers such as hospitals and clinics. There are two privately operated medical facilities in the Kea‘au Town Center: an urgent care center and a medical clinic. The nearest full service hospital facility is Hilo Medical Center, which is approximately 9.3 miles north of the project site.

The designated hurricane evacuation shelters in Kea‘au are the elementary, middle and high schools. Kea‘au High School is a pet-friendly hurricane evacuation shelter.

Impacts and Mitigation Measures

No significant adverse impacts to police, fire, medical or emergency shelter services will occur from the completion of the proposed facility. The civil drawings will be reviewed when the building permit application is submitted for approval to ensure that fire department access, water supply for on-site fire protection, and life safety requirements are met. The proposed facility would not need to be evacuated during tsunami warnings since the project site is outside of the tsunami zone.

2.16. Recreational Resources

The project site is located in the Puna District, which contains most of the Hawai‘i Volcanoes National Park that is managed by the Department of the Interior, National Park Service. The project site is about 22 miles from the visitor’s center within the national park. The MacKenzie State Recreation Area is a State-owned park that is also roughly 22 miles from the project site. The County of Hawai‘i Department of Parks and Recreation operates and maintains County park facilities including Shipman Park in Kea‘au and Kurtistown Park. Shipman Park has tennis courts, a pool, and a neighborhood center for meetings, programs and indoor recreational activities. This large, community park facility for active recreation is about 1.5 miles south of the project site. Kurtistown Park, which is about 4.0 miles from the project site, has outdoor recreation facilities including a ball field, tennis courts and playground.

Impacts and Mitigation Measures

The proposed project creates no additional demand for recreational facilities such that no mitigation is warranted. Project actions are expected to have no adverse impact on existing recreational resources.

3. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

3.1. State Land Use District

The State Land Use Law (Chapter 205, HRS) is intended to preserve, protect, and encourage the development of lands in the State for uses which are best suited to the public health and welfare for Hawaii’s people. All lands in the State are classified into four land use districts by the State of Hawai‘i, Land Use Commission: Urban, Agricultural, Conservation, and Rural. Urban areas are characterized by residential neighborhoods, commercial enterprises, industrial development, and community facilities including public buildings. The project site is entirely located within the Urban District and the proposed facility is a permitted use within the Urban District (refer to Figure 2).

3.2. Hawai‘i State Plan

The Hawai‘i State Plan (Chapter 226, HRS) outlines broad goals, policies and objectives to serve as guidelines for the future growth and development of the State. The excerpts below are pertinent Hawai‘i State Plan objectives, policies, and priority guidelines that pertain to ADC’s project. The proposed facility is strategically located in the Puna District, which is a major papaya growing region in the State of Hawai‘i. The project site is within a developed urban area that the County of Hawai‘i zoned for industrial purposes. ADC’s project represents the utilization of state-owned land and funds to investigate an innovative waste conversion process that could ultimately benefit the agriculture industry in Hawai‘i.

> *§226-7 Objectives and policies for the economy--agriculture.*
> *(a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:*
> *(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.*
> *(b) To achieve the agriculture objectives, it shall be the policy of this State to:*
> *(8) Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.*
> *(12) In addition to the State's priority on food, expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.*

§226-10 Objective and policies for the economy--potential growth and innovative activities.

(a) Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaii's economic base.

(b) To achieve the potential growth and innovative activity objective, it shall be the policy of this State to:

(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawaii through the export of services or products or substitution of imported services or products.

(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.

(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation.

§226-14 Objective and policies for facility systems--in general.

(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

(b) To achieve the general facility systems objective, it shall be the policy of this State to:

(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

§226-103 Economic priority guidelines.

(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:

(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.

3.3. County of Hawai‘i General Plan

The *County of Hawai‘i General Plan* (2005 edition, amended in 2014) is the policy document that encompasses the long-range goals, policies, standards, and courses of action for comprehensive physical development on the Island of Hawai‘i. The proposed facility will be located within a region that has various agricultural industrial uses. ADC’s demonstration project supports the goals and policies listed below.

General Plan - Economic

Goals:

Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.

Policies:

Continue to encourage the research, development and implementation of advanced technologies and processes.

Continue to encourage development and utilization of by-products from alternate energy conversion projects.

General Plan - Energy

Goals:

Establish the Big Island as a demonstration community for the development and use of natural energy resources.

Policies:

Encourage the development and use of agricultural products and by-products as sources of alternate fuel.

Strive to diversify the energy supply and minimize the environmental impacts associated with energy usage

General Plan - Environmental Quality

Goals:

Maintain and, if feasible, improve the existing environmental quality of the island.

Policies:

Encourage the concept of recycling agricultural, industrial, and municipal waste material.

The LUPAG map serves as a guide for the direction of future developments and indicates the general location of various land uses in relation to each other. The project site is entirely within an area designated as Industrial on the LUPAG map.

3.4. Puna Community Development Plan

The *Puna Community Development Plan* (2008, amended in 2011) includes the vision for managing growth and reshaping the development pattern within Puna to avoid negative consequences. More than half the land area in Puna is zoned for agriculture and the Puna district is a center for agricultural activity. ADC's proposed project is consistent with the general principle of retaining agriculture as a viable economic land use in Puna. ADC's project is also consistent with the energy sustainability goal identified below:

> *Energy Sustainability*
>
> *Goals:*
>
> *Puna lowers its dependence on fossil fuel as an energy source, becoming a demonstration area for alternative sources, systems and fuels.*

3.5. County of Hawai‘i Land Use Ordinance

Hawai‘i County's Land Use Ordinance (LUO) regulates land use in accordance with adopted land use policies, including the County's General Plan and Community Development Plans. The zoning for the project site is MG-20 General Industrial District (minimum land area of 20,000 square feet, required for each building site). The proposed facility is consistent with permitted heavy industrial uses in the MG-20 zone (e.g., agricultural processing, power plants, etc.) and may also be considered as a permitted use in any district pursuant to Hawai‘i County Code §25-4-11(c):

> *Public uses, structures and buildings and community buildings are permitted uses in any district, provided that the director has issued plan approval for such use.*

3.6. State Coastal Zone Management Program

Hawaii's Coastal Zone Management (CZM) program, established pursuant to the Hawai‘i Coastal Zone Management Act (Chapter 205A, HRS, as amended), is administered by the State of Hawai‘i, Office of Planning and provides for the beneficial use, protection, and development of the State's coastal zone. The CZM area consists of the entire State of Hawai‘i and the Act involves a system of permits to manage development within the coastal areas and encourages public participation. Any significant development within the SMA requires permit approval from the appropriate County. On the Island of Hawai‘i, the SMA permit process is administered by the County of Hawai‘i Department of Planning. The project site is outside the SMA and approximately five miles from the shoreline. No SMA permit is required for ADC's project.

4. POSSIBLE ALTERNATIVES

4.1. No-Action

No construction-related activities would occur at the undeveloped, state-owned project site as a result of maintaining status quo. No action implies that there would be no commitment of funding or capital improvement costs for the proposed facility. As a result of no action at this time, the undeveloped project site would continue to remain underutilized for the foreseeable future. No action represents an ineffective use of existing state-owned land in an area that is favorable to agricultural endeavors including industrial agriculture. Maintaining status quo is therefore less favorable than the proposed action from ADC’s perspective.

4.2. Delayed Action

A delayed action implies that a project of similar scope and size to the proposed action would occur at an unspecified future date. The environmental impacts resulting from a delayed action are generally expected to be the same as the proposed action so long as environmental conditions remain similar to the evaluated conditions described in this EA.

Construction of the proposed facility at a later date may result in increased construction costs due to inflation, changes in economic conditions or the labor supply. In addition, building materials and labor costs tend to increase with time. A delayed action may therefore necessitate a greater funding commitment for site improvements or a reduction in the scope and size of the project. Hence, ADC does not favor a delayed action.

4.3. Construct Proposed Facility on Another Site

Construction of the proposed facility at a different site would presumably require a similar environmental review process if state lands or funds are utilized. The investigation of another state-owned site implies that construction of the proposed facility occurs at a later date and may result in increased construction costs as mentioned above. A site that is currently in private ownership may require more state funding and delay to negotiate a lease or complete a land acquisition process. A site with no developed infrastructure may involve additional delay for the development of site infrastructure and more land disturbance, which increases the impacts on the environment as compared to the proposed action. The options to site the proposed facility at another location is therefore possible but less desirable than the proposed action. Consequently, ADC does not favor the construction of the proposed facility on another site.

4.4. Construct Proposed Facility on Existing Site (the Preferred Alternative)

Construction of the proposed facility would involve landform alterations and site work. The anticipated visual impact of the proposed facility is expected to be consistent with other urban development within the W. H. Shipman Business Park. Construction activities are expected to generate short-term environmental impacts such as fugitive dust, noise, intermittent traffic, solid waste, and potential disruptions to utility services that would cease upon project completion. Proposed mitigation that addresses anticipated project impacts is identified in this EA.

The proposed action addresses project objectives with minimal environmental harm. Constructing the proposed facility on the existing state-owned project site is a more practical and cost-effective use of existing resources than other alternatives. Completion of the proposed facility, which ADC has selected as its preferred alternative, would allow the utilization of an undeveloped, state-owned parcel in a strategic location for agricultural endeavors. The preferred alternative represents the commitment by ADC to investigate an innovative waste conversion process that could ultimately benefit the agriculture industry in Hawai‘i by utilizing agricultural waste to produce desired by-products and biofuel. For all of these reasons, ADC has determined that the proposed action represents ADC’s preferred alternative.

5. PERMITS AND APPROVALS

Although exact permitting and approval requirements will be determined during the design phase, the following list contains permits and approvals that may be required for the proposed project:

State of Hawaii

- National Pollutant Discharge Elimination System Permit
- Community Noise Permit
- Community Noise Variance
- Non-Covered and/or Covered Source Permit (Air Quality)
- Lane Use Permit for Construction Work
- Oversized and Overweight Vehicles on State Highways Permit

County of Hawaii

- Building Permit
- Grubbing, Grading, and Stockpiling Permit
- Erosion Control Plan/Best Management Practices
- Permit to Work Within County Right-of-Way

(This page intentionally left blank.)

6. DETERMINATION

A Finding of No Significant Impact (FONSI) determination is anticipated for the proposed project, which is not expected to have a significant impact on the physical or human environment. The supporting rationale for this finding as set forth in HAR Title 11, Chapter 200, Section 12 is discussed below.

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

The construction of the proposed facility is not expected to endanger any natural or cultural resources. ADC will ensure that its contractor stops work and contacts SHPD immediately if any unanticipated buried archaeological or cultural resources are encountered during construction.

(2) *Curtails the range of beneficial uses of the environment;*

No beneficial uses of the environment will be curtailed as a result of the proposed project, which represents the commitment by ADC to investigate an innovative waste conversion process that could ultimately benefit the agriculture industry in Hawai‘i. Completion of the proposed facility ensures the beneficial use of state-owned land that is in a strategic location for agricultural endeavors including industrial activity related to agriculture.

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

The proposed project would be in conformance with State Environmental Policy, inclusive of its individual policies, goals, and guidelines for population growth; natural resources; biological resources; transportation; energy; and culture, as discussed in the individual resource categories throughout this EA.

(4) Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;

The proposed project does not substantially or negatively affect the economic or social welfare and cultural practices of the community or State. The project creates short-term jobs for people in design and construction. Completion of the proposed facility represents the commitment by ADC to investigate an innovative waste conversion process that could ultimately benefit the agriculture industry in Hawai‘i.

(5) Substantially affects public health;

Public health will not be adversely affected during the construction phases of ADC’s project. Short-term and temporary effects such as surface runoff, fugitive dust, noise, intermittent traffic, solid waste, and potential disruptions to utility services are expected to cease upon project completion. The implementation of construction BMPs will minimize temporary impacts. Completion of the project would improve onsite infrastructure that is associated with the proposed facility.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

No secondary impacts such as population shifts are anticipated from the proposed facility, which is expected to provide employment opportunities for approximately twelve (12) people. Utility demands for potable water, wastewater disposal, solid waste disposal and power are expected to be insignificant due to the size and scope of the proposed facility.

(7) Involves a substantial degradation of environmental quality;

The proposed project is not expected to degrade environmental quality. Environmental impacts that may occur during the various phases of construction will be mitigated through the implementation of construction BMPs, as appropriate. Appropriate mitigation measures have been identified throughout this EA.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The proposed facility represents a long-term commitment by ADC investigate an innovative waste conversion process that could ultimately benefit the agriculture industry in Hawai‘i. The proposed project is not part of or associated with a supplemental future action because it is a demonstration project. Successful techniques must be developed before future actions can be considered.

(9) Substantially affects a rare, threatened, or endangered species, or its habitat;

No species listed by the U.S. Fish and Wildlife Service or in the Endangered Species Act are expected to be significantly impacted by ADC’s project. The project site does not contain habitat for proposed, candidate, or listed threatened or endangered species.

(10) Detrimentally affects air or water quality or ambient noise levels;

Short-term impacts to air quality, water quality or ambient noise levels may occur during construction. No State or Federal air quality or water quality standards should be violated during or after construction. Environmental impacts will be mitigated through proper construction techniques and compliance with applicable DOH rules and regulations. The proposed facility is not expected to negatively impact ambient air quality and background noise levels.

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

The project site is not situated within an environmentally sensitive area and is not anticipated to affect such areas.

(12) Substantially affects scenic vistas and view planes identified in county or state plans or studies; or

The proposed facility will not obstruct or affect scenic vistas and view planes in the project area. Landscaping may further reduce the visual impact of the proposed facility.

(13) Requires substantial energy consumption.

The proposed facility will be a modern building that is not anticipated to cause a substantial increase in energy consumption.

(This page intentionally left blank.)

7. PUBLIC AGENCY REVIEW AND CONSULTATION

7.1. Pre-Assessment Consultation

The consulted agencies, organizations, and individuals are listed below. Fifteen (15) interested parties including agencies provided formal correspondence in response to the pre-assessment consultation effort, as indicated by the ✓ below. Comments and responses are included in Appendix F.

Federal Agencies

U.S. Department of the Interior
- Fish and Wildlife Service

State of Hawai‘i

Department of Agriculture

Department of Land and Natural Resources
- ✓ Commission on Water Resource Management
- ✓ Division of Forestry and Wildlife
- Division of Forestry and Wildlife - Hawaii Branch
- ✓ Engineering Division
- Land Division
- ✓ Land Division - Hawaii District
- State Historic Preservation Division
- State Historic Preservation Division - Hawaii Island
- State Historic Preservation Division Cultural Historian

Department of Transportation
- Statewide Transportation Planning Office
- ✓ Highways Division - Hawaii District

Department of Business, Economic Development and Tourism
- ✓ Office of Planning

Department of Health
- ✓ Environmental Planning Office
- Hawaii District Health Office
- Office of Environmental Quality Control

Office of Hawaiian Affairs
- Office of the Administrator
- East Hawaii (Hilo)

Department of Hawaiian Home Lands
- Planning Office
- East Hawaii District Office

University of Hawaii at Manoa, Environmental Center

County of Hawai‘i

- ✓ Department of Environmental Management
  - Wastewater Division
  - ✓ Solid Waste Division
- Planning Department
- ✓ Fire Department
  - Fire Prevention Bureau
- ✓ Police Department
- Department of Public Works
  - ✓ Engineering Division
- ✓ Department of Water Supply

Utilities

- Hawaii Electric Light Company, Inc.
- Oceanic Time Warner Cable (Spectrum)
- Hawaiian Telcom
- ✓ The Gas Company, LLC (dba Hawaii Gas)

Neighboring or Nearby Property Owners and Recorded Lessees

- MSJR LLC
- Hilo Christian Broadcasting Corp
- Imua Energy LLC
- Big Island Biodiesel LLC
- Pacific Biodiesel
- W H Shipman LTD
- Carvalho Hawaii Properties LTD
- ✓ Big Island Tree Service Inc.
  - 1-6-148-036
  - 1-6-148: 021

7.2. Draft EA Consultation

ADC and its consultant, The Limtiaco Consulting Group, will continue to coordinate and consult with governmental agencies that will review the Draft EA. Agency review comments and responses will be published in the Final EA. Public comments received from organizations and interested parties during the 30-day statutorily-mandated comment period will also be responded to and published in the Final EA.

8. REFERENCES

Blair, Chad. 2014, September 4. “Delegates Praise USDA Disaster Declaration for Hawaii County.” *Civil Beat*. Retrieved from www.civilbeat.org/2014/09/delegates-praise-usda-disaster-declaration-for-hawaii-county/.

Burr, Susan and David Miranda. 2018. *Flora and fauna surveys of TMK (3)1-6-151:002 for a zero waste facility at W. H. Shipman Business Park, Kea‘au, Hawai‘i*. AECOS No. 1486. April 6.

County of Hawai‘i Planning Department. 2005. *County of Hawai‘i General Plan*. February. Amended July 2014. Downloadable file. Available from http://www.hiplanningdept.com/general-plan/.

County of Hawai‘i Planning Department. 2008. *Puna Community Development Plan*. September. Amended December 2011. Downloadable file. Available from http://www.hawaiicountycdp.info/puna-cdp.

Bautista, Oliver M., M. Wildey and H. Hammatt. 2017. *Draft Archaeological Assessment for the Proposed Kea‘au Zero Waste Facility Project, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, TMKs: [3] 1-6-151:002, 003, 006, and* 999. Prepared for The Limtiaco Consulting Group. Cultural Surveys Hawaii Job Code KEAAU 11. May.

Department of Business, Economic Development and Tourism. 2012. *Increased Food Security and Food Self-Sufficiency Strategy*. October. Prepared in cooperation with the Department of Agriculture. Downloadable file. Available from http://hdoa.hawaii.gov/meetings-reports/reports-listed-by-subject-matter/.

Department of Business, Economic Development and Tourism. 2017. *2016 State of Hawai‘i Databook.* Downloadable files. Available from http://dbedt.hawaii.gov/economic/databook/db2016/.

Department of Health, Safe Drinking Water Branch. 2013. “UIC Map for the Island of Maui.” Accessed March 6, 2018. Available from http://health.hawaii.gov/sdwb/underground-injection-control-program/ .

Fukunaga and Associates, Inc. 2010. *Hawai‘i County Water Use and Development Plan Update to the Hawaii Water Plan.* August. Downloadable files. Available from http://www.hawaiidws.org/7%20the%20water/wudp.htm.

Giambelluca, T.W., X. Shuai, M.L. Barnes, R.J. Alliss, R.J. Longman, T. Miura, Q. Chen, A.G. Frazier, R.G. Mudd, L. Cuo, and A.D. Businger. 2014. *Evapotranspiration of Hawai‘i.* Final report submitted to the U.S. Army Corps of Engineers - Honolulu District, and the Commission on Water Resource Management, State of Hawai‘i. “Interactive Map.” Accessed March 6, 2018. Available from http://evapotranspiration.geography.hawaii.edu/.

Hawai‘i - National Flood Insurance Program. n.d. “Flood Hazard Assessment Tool.” Accessed March 6, 2018. Available from http://gis.hawaiinfip.org/fhat/.

Hawai‘i State Civil Defense. n.d. “Tsunami Evacuation Zone Mapping Tool”. Accessed March 6, 2018. Available from http://www.scd.hawaii.gov/.

Juvik, Sonia P. and James O. Juvik (Eds.), and Thomas R. Paradise. 1998. *Atlas of Hawai‘i* (3rd Edition). Honolulu: University of Hawai‘i Press.

Pape, Eric. 2014, August 18. “Puna: 15 Minutes of Fame on Hawaii’s ‘Last Frontier.’” *Civil Beat*. Retrieved from www.civilbeat.org/2014/08/puna-15-minutes-of-fame-on-hawaiis-last-frontier/.

Spencer, Chantellee K., N. Ishihara and H. Hammatt. 2017. *Draft Cultural Impact Assessment for the Kea‘au Zero Waste Facility, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, TMKs: [3] 1-6-151:002 and portions of 003, 006, and* 999. Prepared for The Limtiaco Consulting Group. Cultural Surveys Hawaii Job Code KEAAU 12. November.

U.S. Department of Agriculture, Natural Resources Conservation Service, 2017. “Web Soil Survey.” Survey Area Data: Version 10, October 3, 2017. Accessed March 6, 2018. Available from http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawai‘i Agricultural Experiment Station. 1973. *Soil Survey of the Island of Hawai‘i, State of Hawai‘i.* December.

Wright, T.L., Chun, J.Y.F. ,Exposo, Jean, Heliker, Christina, Hodge, Jon, Lockwood, J.P., and Vogt, S.M. 1992. Map showing lava-flow hazard zones, Island of Hawaii: U.S. Geological Survey Miscellaneous Field Studies Map MF-2193, scale 1:250,000. Downloadable file. Available from https://pubs.usgs.gov/mf/1992/2193/.

APPENDIX A

Site Photographs

(This page intentionally left blank.)

Photo #1
View of the undeveloped project site from eastern boundary. Equipment sited at the Big Island Biodiesel facility is along the rear yard (upper left in photo).

Photo #2
View of project site from southernmost corner. There is no site access between the project site and the Big Island Biodiesel facility (right side of photo).

Photo #3
View of the undeveloped project site from Kipimana Street. The Big Island Biodiesel facility abuts the project site along the rear property line.

Photo #4
View of Kipimana Street in the vicinity of the project site. Roadways within the W. H. Shipman Business Park are wide to accommodate industrial traffic.

APPENDIX B

Flora and Fauna Survey Report by AECOS, Inc.

(This page intentionally left blank.)

Flora and fauna surveys of TMK (3)1-6-151:002 for a zero waste facility at W. H. Shipman Business Park, Kea‘au, Hawai‘i

April 6, 2018 *AECOS* No. 1486

Susan Burr and David Miranda
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne‘ohe, Hawai’i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: sburr@aecos.com

Introduction

Hawai‘i Department of Agriculture (HDOA) Agribusiness Development Corporation (ADC) proposes to develop a zero waste facility ("Project") at the W. H. Shipman Business Park, Kea‘au, Puna District, Island of Hawai‘i (Figure 1). The purpose of the zero waste facility is to expand the ADC program to convert waste produce into product biofuel. No animal waste products will be used in the conversion process. To develop the zero waste facility, ADC will need to make improvements to a 1.5-ac lot ("Project area"; Figure 2), which is adjacent to the existing Big Island Biodiesel facility. Improvements to the lot will include construction of internal roadways, parking areas, and utility systems to accommodate a premanufactured building of approximately 3,000 sq ft. Ancillary connections between the existing biodiesel facility and the new facility will be made. A chain link fence will be erected along the site perimeter and an area adjacent to Kipimana Street will be landscaped. This report[1] describes the findings of biological surveys of the Project site.

Methods

Botanical Survey — *AECOS* biologists conducted surveys (terrestrial flora and fauna) of the Project area on March 31, 2017 to support an Environmental Assessment for the zero waste facility. The botanist conducted a walking survey

[1] Report prepared for The Limtiaco Consulting Group for environmental entitlements and will become part of the public record for the Project.

Figure 1. Location of W. H. Shipman Business Park on the Island of Hawai‘i.

of the 1.5-ac parcel to identify terrestrial plants within the Project area[2]. Botanist identified and noted relative abundance of all ferns, fern allies, gymnosperms, and flowering plants growing in the survey area. Field notes were translated into a flora listing. For the most part, plant names given in the listing follow *Manual of the Flowering Plants of Hawai‘i* (Wagner et al., 1990, 1999) for native and naturalized flowering plants and *Hawai‘i's Ferns and Fern Allies* (Palmer, 2003) for ferns. Some names have been updated to reflect more recent taxonomic or nomenclatural changes as presented in Imada (2012).

Avian Survey — The avian survey included 6-minute surveys by the biologist at five stations in the Project vicinity (see Figure 2). Field observations were made with the aid of binoculars and by listening for vocalizations. The

[2] Nearly the entire lot was graded and surface soil piled along the north and east margins. Gravel has been laid on the ground surface and parked biodiesel tankers now occupy most of the lot. We extended the area for both surveys a short distance into adjacent lots to identify plants present on the lot as only seedlings or without flowers and to extend our sight range beyond the tankers for the avian survey.

Figure 2. Project area in W. H. Shipman Business Park with avian count station locations identified.

avian counts were conducted between 0630 and 0730 in the morning. Time not spent at point-count stations was used to search the rest of the site for species and habitats not detected during the point-counts and these avian species are recorded as "incidental sightings." Weather conditions were ideal, with no rain, unlimited visibility, and light winds. Avian phylogenetic order and nomenclature used in this report follows the *Checklist* of *North and Middle America Birds* by American Ornithological Society (AOS, 2017).

Terrestrial Mammal Survey — The survey of mammals and other fauna (i.e., notable insects, obvious reptiles) was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. Biologists kept a running tally of all terrestrial vertebrate mammalian species detected within the Project area and noted general abundances of other animals detected.

Results

Plants — The Project area (W. H. Shipman Business Park) is located on former agriculture land. The tanker parking lot supports only ruderal herbaceous species and seedlings on soil piles and along margins of the lot that were not graded (Figure 3). The plant assemblage growing adjacent to the east and west sides of the lot is a grassland dominated by Guinea grass (*Megathyrsus maximus*) and mowed frequently. Directly north of the Project area, across Kipimana Street, the plant assemblage is an alien wet forest dominated by gunpowder (*Trema orientalis*) and macaranga (*Macaranga tanarius*) trees.

Figure 3. Plants are growing only along the ungraded edges of the lot and on several soil piles.

A listing with qualitative abundance for all plants encountered in the survey is presented as Table 1. Entries are arranged alphabetically under plant family names and include scientific name, common name, and status of the species (i.e., native or non-native; see key at end of table), and a qualitative abundance value. "Status" reflects the state-wide distributional status of the species, so a native or naturalized species used as a landscape plant is marked by note "<1>".

Table 1. Flora listing for the Kea'au Zero Waste Project area.

Species listed by family	Common name	Status	Abundance	Notes
FERNS AND FERN ALLIES				
NEPHROLEPIDACEAE				
Nephrolepis multiflora (Roxb.) R. M. Jarrett ex C. V. Morton	swordfern	Nat	R	
FLOWERING PLANTS				
DICOTYLEDONES				
ASTERACEAE				
Ageratum conyzoides L.	*maile honohono*	Nat	O	
Bidens pilosa L.	*kī*	Nat	U	
Conyza bonariensis (L.) Cronq.	hairy horseweed	Nat	U	
Crassocephalum crepidioides (Benth.) S. Moore	---	Nat	U	
Emilia sonchifolia (L.) DC.	Flora's paintbrush	Nat	O	
Pluchea carolinensis (Jacq.) G. Don	sourbush	Nat	U	
CONVOLVULACEAE				
Ipomoea triloba L.	little bell	Nat	O	
CUCURBITACEAE				
Momordica charantia L.	wild bittermelon	Nat	R	
EUPHORBIACEAE				
Euphorbia heterophylla L.	*kaliko*	Nat	U	
Macaranga tanarius (L.) Müll. Arg.	---	Nat	O	
Phyllanthus debilis Klein ex Willd.	niruri	Nat	U	
FABACEAE				
Chamaecrista nictitans (L.) Moench	partridge pea	Nat	C	
Crotolaria pallida Aiton	smooth rattlepod	Nat	O	
Desmodium incanum DC.	Spanish clover	Nat	C	
Desmodium tortuosum (SW.) DC.	Florida beggarweed	Nat	C	
Mimosa pudica L.	sensitive plant	Nat	C	
Trifolium pretense L.	red clover	Nat	O	
LAMIACEAE				
Hyptis pectinata (L.) Poit.	comb hyptis	Nat	O	
LYTHRACEAE				
Cuphea carthagenesis (Jacq.) Macbr.	tarweed	Nat	O	
MELASTOMATACEAE				
Clidemia hirta (L.) D. Don	Koster's curse	Nat	R	
NYCTAGINACEAE				
Mirabilis jalapa L.	four-o'clock	Nat	R	

Table 1 (continued).

Species listed by family	Common name	Status	Abundance	Notes
POLYGALACEAE				
Polygala paniculata L.	bubble gum plant	Nat	C	
RUBIACEAE				
Paederia foetida L.	*maile pilau*	Nat	R	
RUBIACEAE (continued)				
Spermacoce assurgens Ruiz & Pav.	buttonweed	Nat	C	
SCROPHULARIACEAE				
Torenia asiatica L.	Ola'a beauty	Nat	R	
ULMACEAE				
Trema orientalis (L.) Blume	gunpowder tree	Nat	U	
URTICACEAEA				
Pilea microphylla (L.) Liebm.	artillery plant	Nat	C	
VERBENACEAE				
Stachytarpheta jamaicensis (L.) Vahl.	Jamaican vervain	Nat	O	
FLOWERING PLANTS				
MONOCOTYLEDONES				
AGAVACEAE				
Cordyline fruticosa (L.) A. Chev	*ki*, ti	**Pol**	R	<1>
COMMELINACEAE				
Commelina diffusa N. L. Burm.	*honohono*	**Pol?**	R	
CYPERACEAE				
Cyperus sp.	---	**--**	U	<2>
Cyperus gracilis R. Br.	McCoy grass	Nat	R	
Cyperus polystachyos Rottb.	---	**Ind**	U	
Kyllinga brevifolia Rottb.	*kili 'o'opu* green kyllinga	Nat	O	
Rhynchospora caduca Elliot	anglestem beakrush	Nat	A	
POACEAE				
Axonopus compressus (Swartz) P. Beauv.	brd-lv carpet grass	Nat	U	
Andropogon virginicus L.	broomsedge	Nat	O	
Chloris barbata (L.) Sw.	swollen fingergrass	Nat	O	
Eleusine indica (L.) Gaertn.	wiregrass	Nat	U	
Panicum repens L.	wainaku grass	Nat	R	
Paspalum conjugatum Bergius	Hilo grass	Nat	O	
Paspalum fimbriatum Kunth	Panama grass	Nat	U	
Sacciolepis indica (L.) Chase	Glenwood Grass	Nat	C	
Megathyrsus maximus (Jacq.) B.K. Simon & W.L. Jacobs	Guinea grass	Nat	AA	
Urochloa mutica (Forssk.) T.Q. Nguyen	California grass	Nat	U	

Table 1 (continued).

Legend to Table 1.

STATUS = distributional status for the Hawaiian Islands:

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.

Pol = An early Polynesian introduction. Introduced before 1778.

ABUNDANCE = occurrence ratings for plant species:

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.

NOTES: <1> – Plant is cultivated on site as an ornamental.

<2> – Plant lacking key diagnostic characteristics (flower, fruit); identification, therefore, uncertain.

The vascular flora of the project area comprises grasses and forbs totaling 46 separate taxa. Typically, only native (indigenous or endemic) plants have resource value or are of concern in assessing impacts of a project; others may have cultural or landscape values. Only one species (*Cyperus polystachyos*) in the list is indigenous; it is a widespread native sedge, uncommon in the survey area. Two others—*ki* (*Cordyline fruticosa*) and *honohono* (*Commelina fruticosa*)—are early Polynesian introductions. *Ki* is being grown in the Project area as an ornamental and *honohono* is a very common plant in wet areas and on wet ground. None of these native or Polynesian plants is of concern.

Birds — During the five 6-minute surveys, we identified 49 individual birds of 7 alien species representing 7 families (Table 2). Japanese White-eye (*Zosterops japonicus*), Common Myna (*Acridotheres tristis*), and Common Waxbill (*Estrilda astrild*) were the most common species observed in the Project vicinity. Spotted Dove (*Streptopelia chinensis*) were seen frequently flying over the Project site and alighting on adjacent power lines. We observed two House Sparrows (*Passer domesticus*) and a single House Finch (*Haemorhous mexicanus*) during the survey. A single Saffron Finch (*Sicalis flaveola*) was observed at Sta. 1 and a group of four, eating unidentified food matter off the road, were seen at Sta. 4.

The following additional species were observed and recorded as incidental observations (i.e., seen or heard by the biologists in the Project area, but not during the count surveys): domestic chicken (*Gallus* sp.), Cattle Egret (*Bubulcus ibis*), Zebra Dove (*Geopelia striata*), Hwamei (*Garrulax canorus*), and Northern Cardinal (*Cardinalis cardinalis*).

Table 2. Avian survey counts for March 31, 2017 at count stations.

Scientific name	Common name	Status	6-minute Counts Sta. 1	Sta. 2	Sta. 3	Sta. 4	Sta. 5	*RA* (total/Stas.)
			COLOMBIFORMES					
			COLUMBIDAE – Pigeons & Doves					
Streptopelia chinensis Scopoli	Spotted Dove	A	--	4	2	--	2	1.6
			ZOSTEROPIDAE – White-eyes					
Zosterops japonicus Temminck & Schlegel	Japanese White-eye	A	1	2	2	3	3	2.2
			STURNIDAE – Starlings					
Acridotheres tristis Linnaeus	Common Myna	A	2	2	1	3	3	2.2
			PASSERIFORMES					
			ESTRILDIDAE – Estrildid Finches					
Estrilda astrild Linnaeus	Common Waxbill	A	4	2	5	--	--	2.2
			FRINGILLIDAE –True Finches					
Haemorhous mexicanus Statius Muller	House Finch	A	--	--	--	1	--	0.2
			PASSERIDAE – Old World Sparrows					
Passer domesticus Linnaeus	House Sparrow	A	--	1	1	--	--	0.4
			THRAUPIDAE – Tanagers					
Sicalis flaveola Linnaeus	Saffron Finch	A	1	--	--	--	4	1.0

Legend to Table 2

Status = distributional status for the Hawaiian Islands:

A - Alien; introduced to the Hawaiian Islands by humans

RA Relative abundance: number of birds detected divided by number of count stations.

Mammals — We observed a single Small Indian Mongoose (*Herpestes a. auropunctatus*) in the Project area. Although not observed during our survey, any of the four rodents naturalized in the Hawaiian Islands (Family Muridae) are likely to inhabit the Project vicinity.

Discussion

Plants — No area of natural vegetation exists at the Project site. No plants proposed or listed as threatened or endangered as set forth in the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543; USFWS, 2017), were seen in our March 2017 survey. The state listing for plants follows the federal listing.

Rapid *'Ōhi'a* Death (ROD) is a devastating disease on the island of Hawai'i affecting approximately 75,000 acres of *'Ōhi'a* forest and has been reported as close as 0.6 miles from the Project site (Smith, 2018). The Department of Land and Natural Resources (DLNR) and other resource agencies are concerned with the rapid spread of this fungal disease. ROD is spread through broadcast spores that are dispersed by wind, animals, and humans through movement of infected wood, soil, *'ōhi'a* plant parts, insect frass, and possibly other yet unknown means. Initially it was thought that the fungal pathogen causing the disease was a mutation of *Ceratocystis fimbriata*. DNA testing led scientists to conclude that two previously unnamed species of *Ceratocystis* were causing ROD. The fungal pathogens, *Ceratocystis lukuohia* and *Ceratocystis huluohia,* have now been described and named with species names based on their significant symptoms (Barnes, et al., 2018). These two fungal pathogens are specific to the native species of 'ōhi'a (*Metrosideros collina* subsp. *polymorpha*).

No 'ōhi'a trees occur on the Project site or nearby. Plant species present are not hosts for *Ceratocystis* causing ROD. Developing the Project poses no detriment to nearby forest trees since there are no host plants and the ROD is not supportable within the Project area. The Project will not contribute to the introduction or spread of ROD to *'ōhi'a* growing in the wider vicinity of the Project site, where the disease is already present.

Avian and Mammalian Resources — The findings of the avian survey are consistent with what would be expected in a disturbed area at this elevation. The only birds observed in the Project area are alien, typically urban-dwelling birds. Of the species observed, Cattle Egret, Common Myna, Spotted Dove, and Japanese White-eye are listed as injurious species—animals known to be harmful to agriculture, aquaculture, indigenous wildlife including plants, or constitute a nuisance or health hazard (HDLNR, 2015). No species proposed or listed as state or federally endangered or threatened (HDLNR, 2015; USFWS, 2017) are present. The Project is not expected to adversely

impact avian resources extant in the Project vicinity.

Although none was detected during our survey, it is possible that seabirds over-fly the Project area. The endemic sub-species of Newell's Shearwater or *'a'o* (*Puffinus auricularis newelli*) and the indigenous Band-rumped Storm-Petrel or *'akē'akē* (*Oceanodroma castro*) may fly over the area to reach mountain burrows. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, these birds may collide with man-made structures, and either killed outright or injured to become easy prey for feral mammals. If the Project proposes to include installation of outdoor lights, fixtures should be properly shielded and point light towards the ground. Wildlife lighting guidelines can be found on-line (HDLNR-DOFAW, 2016).

The Hawaiian Hawk or '*io* (*Buteo solitaries*), a falconiform endemic to the Island of Hawai'i, is known to use foraging resources within the Project vicinity (David, 2013). The Hawaiian Hoary Bat or *'ōpae'ape'a* (*Lasiurus cinereus semotus*), endemic to Hawai'i, forages in open areas near edges of forests and roosts in foliage of trees (USFWS, 1995). Both species are listed as endangered (HDLNR, 2015; USFWS, 2017). Because there are no trees in the Project area and thus no useful habitat, the project will not have a negative effect on either of these species.

The Hawaiian goose or *nēnē* (*Branta sandvicensis*), endemic to Hawai'i, is occasionally known to land in the area. *Nēnē* are listed as endangered (HDLNR, 2015; USFWS, 2017), and currently under consideration for downlisting to threatened status (USFWS, 2018). Since *nēnē* forage on mowed lawns in developed areas and are only occasional visitors in the area, the Project will have no negative impact on this species. J. Mello (pers. comm. 2018) concurs that the Project will not have negative impacts on either *'io*, *'ōpae'ape'a,* or *nēnē* (pers. comm., 2018).

Critical Habitat — No federally delineated Critical Habitat for any species is present on, adjacent, or in the vicinity of the Project. Thus, any modification of habitats on all or any part of the site will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under state law.

References

American Ornithologists' Union (AOU). 2017. AOU Checklist of North and Middle American Birds (7th Edition and Supplements). Available online at: http://www.americanornithology.org/content/aou-checklist-north-and-middle-american-birds -7th-edition-and-supplements; last visited April 16, 2017.

Barnes, I., A. Fourie, M. J. Wingfield, T. C. Harrington, D. L. McNew, L. S. Sugiyama, B. C. Luiz, W.P. Heller, and L. M. Keith. 2018. New *Ceratocystis* species associated with rapid death of *Metrosideros polymorpha* in Hawai'i. *Persoonia*, 40, 2018: 154-181.

David, R. E. 2013. A Hawaiian Hawk audio playback survey conducted along a portion of the Kea'au-Pāhoa Road widening and improvement project. Rana Biological Consulting, Inc.

Hawai'i Department of Land and Natural Resources. (HDLNR). 2015. Hawai'i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 5 Forestry and Wildlife, Part 2 Wildlife, Chapter 124, Indigenous Wildlife, Endangered and Threatened Wildlife, Injurious Wildlife, Introduced Wild Birds, and Introduced Wildlife. February 17, 2015. 16 pp.

Hawai'i Department of Land and Natural Resources – Division of Wildlife and Forestry (HDLNR-DOFAW). 2016. Wildlife Lighting. Available online at URL: http://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf; last accessed on April 14, 2017.

Imada, C. T. 2012. Hawaiian Native and Naturalized Vascular Plants Checklist (December 2012 update). Bishop Museum Tech. Rept. 60. 380 pp.

Mello, J. 2018. East Hawaii Wildlife Manager, DLNR-DOFAW. Personal communication on April 5, 2018.

Palmer, D. D. 2003. *Hawai`i's ferns and fern allies*. University of Hawaii Press, Honolulu. 324 pp.

Smith, David G. 2018. Letter dated 2/18/2018 addressed to Ken Nakamoto, Agribusiness Development Corporation Project Manager regarding: Pre-assessment consultation for the proposed Kea'au Zero Waste Facility, TMK (3)1-6-151:002.

U.S. Fish and Wildlife Service (USFWS). 1995. Recovery plan for the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR. 50 pp.

_____. 2017. Endangered and Threatened Wildlife and Plants. 50 CFR 17:11 and 17:12. Available online at URL: http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=HI&s8fid=112761032792&s8fid=112762573902; last accessed on April 16, 2017.

U.S. Fish and Wildlife Service (USFWS). 2018. Endangered and Threatened Species: Reclassifying Hawaiian Goose from Endangered to Threatened. Open Docket Folder found at URL: https://www.regulations.gov/document?D=FWS-R1-ES-2017-0050-0001; last visited on April 6, 2018.

Wagner, W. L., D. R. Herbst and S. H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai'i: Volume I and II*. Bishop Museum Special Publication 83. University of Hawai'i Press. 1853 pp.

_____ and _____. 1999. *Supplement to the Manual of the flowering plants of Hawai'i*, pp. 1855-1918. *In:* Wagner, W. L., D. R. Herbst, and S. H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawaii Press and B.P. Bishop Museum.

(This page intentionally left blank.)

APPENDIX C

Management Summary for the Archaeological Assessment Report
by Cultural Surveys Hawaii

(This page intentionally left blank.)

Draft

Archaeological Assessment for the Proposed Kea‘au Zero Waste Facility Project, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island TMKs: [3] 1-6-151:002, 003, 006, and 999

Prepared for
The Limtiaco Consulting Group Inc.

Prepared by
Olivier M. Bautista, B.A.,
McKenzie Wildey, B.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: KEAAU 11)

September 2017

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Hawai‘i Office
399 Hualani St. Ste. 124
Hilo, Hawai‘i 96720
Ph.: (808) 965-6478
Fax: (808) 965-6582

Management Summary

Reference	Archaeological Assessment for the Proposed Kea‘au Zero Waste Facility Project, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, TMKs: [3] 1-6-151:002, 003, 006, and 999 (Bautista et al. 2017)
Date	September 2017
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: KEAAU 11
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological fieldwork permit number 17-08, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-282.
Agencies	SHPD
Land Jurisdiction	Private
Project Proponent	ADC (Agribusiness Development Corporation)
Project Funding	State
Project Location	The project area is located along Kipimana Street in W.H. Shipman Business Park (Lot #9073-B-2; TMK [3] 1-6-151:002), near the town of Kea‘au in Puna District on Hawai‘i Island. Adjacent parcels (TMKs: [3] 1-6-151:003, 006, and 999) may be affected by ancillary connections to existing infrastructure. The project area is depicted on a portion of the 1995 Hilo and 1994 Mountain View U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles.
Project Description	The proposed project involves the development of a new zero waste facility to be owned and operated by the ADC located in Kea‘au on Hawai‘i Island. The zero waste facility is part of ADC’s initiative to expand its sustainable program of converting animal waste to product biofuel. Development of ADC’s zero waste facility will require site improvements within an undeveloped approximately 1.5-acre lot adjacent to the existing Big Island Biodiesel facility. The project site will be improved with a pre-manufactured building of roughly 3,000 square feet (sq ft). Grading and construction-related activities would occur for the installation of infrastructure such as internal roadways, parking areas, and utility systems. There may be access controls between the existing Big Island Biodiesel facility and ADC’s new facility. A water line connection may entail minor disturbance of the roadway. Connections to off-site drywells may be needed or new on-site drywells may be constructed. Driveway connections would be improved. Additionally, chain link fencing along the site perimeter and manual gates at access points would be installed as part of the project. Landscaping along the front property line is also proposed.
Project Acreage	Total project acreage, including the 1.526-acre (0.617-hectare) subject parcel (TMK: [3] 1-6-151:002) and portions of adjacent parcels (TMKs:

	[3] 1-6-151:003, 006, and 999), is approximately 2.7 acres (1.1 hectares).
AIS Scope[i]	This AIS focused on archaeological historic properties and burial sites per the guidelines of HAR §13-276. The identification, documentation, and evaluation of in-use potential architectural historic properties such as historic buildings and structures was outside the scope of this AIS. Throughout this report the term “historic properties” is used and should be generally understood to refer to archaeological historic properties, unless otherwise stated.
Historic Preservation Regulatory Context[ii]	This archaeological assessment (AA) was designed to be compliant with Hawai‘i State historic preservation review legislation. No historic properties were identified in the project area; therefore, this investigation is termed an archaeological assessment, per HAR § 13-275-5(b)(5)(A). The proposed project is subject to Hawai‘i State environmental and historic preservation review legislation (Hawai‘i Revised Statutes [HRS] §343 and HRS §6E-8/HAR §13-275, respectively). It is also intended to support any project-related historic preservation consultation with stakeholders such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups.
Fieldwork Effort	Fieldwork was accomplished on 14–15 March 2017 by Olivier Bautista, B.A., and McKenzie Wildey, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. This work required approximately 3 person-days to complete.
Historic Properties Identified	None
Effect Recommendation[iii]	Under Hawai‘i State historic preservation (HAR §13-275-7) legislation CSH’s project-specific effect recommendation is “no historic properties affected”
Mitigation Recommendations	No further archaeological work is recommended. CSH does not recommend archaeological monitoring given the present lack of findings and the nature of the project area lands including assessment of the stratigraphy in the test excavations. However, if subsurface features or deposits are encountered at any time during construction, CSH recommends construction activities cease in that area and that SHPD be contacted immediately.

[i] An “archaeological inventory survey” is defined as “the process of identifying and documenting the archaeological historic properties and burial sites in a delineated area, gathering sufficient information to evaluate significance of the historic properties and burials, and compiling the information into a written report for review and acceptance by the department [SHPD]” (HAR §13-276-2). An archaeological inventory survey report must contain documentation, arguments and reasoning, and mitigation commitments to support the completion of historic preservation review steps one through four for archaeological historic properties.

[ii] The State of Hawai‘i historic preservation review process is designed to identify and mitigate a project's impacts to significant historic properties. Historic properties are defined as "any building, structure, object, district, area, or site, including *heiau* [temple] and underwater site, which is over fifty years old" (HAR §13-275-2). The six potential historic preservation review steps include the following: 1) identification and inventory, to determine if historic properties are present in the project's area and, if so, to identify and document (inventory) them; 2) evaluation of historic property significance; 3) determination of project effect (impact) on significant historic properties; 4) mitigation commitments that commit to acceptable forms of mitigation in order to properly handle or minimize impacts to significant historic properties; 5) detailed mitigation plan, scope of work to properly carry out the general mitigation commitments; and 6) verification of completion of detailed mitigation plan (HAR §13-275-3). A project's effect and potential mitigation measures are evaluated based on the project's potential impact to "significant" historic properties (those historic properties determined significant following their evaluation of significance [HAR §13-275-6]).

[iii] One of two effect determinations must be established: 1) "No historic properties affected," the project will have no effect on significant historic properties; or 2) "Effect, with agreed upon mitigation commitments," the project will affect one or more significant historic properties, and the effects will potentially be harmful. However, the agreed upon mitigation commitments involving one or more forms of mitigation will reasonably and acceptably mitigate the harmful effects (HAR § 13-275-7).

APPENDIX D

Cultural Impact Assessment Report by Cultural Surveys Hawaii

(This page intentionally left blank.)

Draft
Cultural Impact Assessment for the Kea‘au Zero Waste Facility, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island TMKs: [3] 1-6-151:002 and portions of 003, 006, and 999

Prepared for
The Limtiaco Consulting Group

Prepared by
Chantellee Konohia Spencer, B.A.,
Nicole Ishihara, B.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: KEAAU 12)

November 2017

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawai‘i 96793
Ph.: (808) 242-9882
Fax: (808) 244-1994

Management Summary

Reference	Cultural Impact Assessment for the Kea‘au Zero Waste Facility, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, TMKs: [3] 1-6-151:002 and portions of 003, 006, and 999 (Spencer et al. 2017)
Date	November 2017
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: KEAAU 12
Agencies	State of Hawai‘i, Department of Health, Office of Environmental Quality Control (DOH-OEQC)
Land Jurisdiction	State of Hawai‘i Department of Agriculture – Agribusiness Development Corporation (ADC)
Project Location	The project area is located along Kipimana Street in W.H. Shipman Business Park (Lot #9073-B-2; TMK [3] 1-6-151:002), near the town of Kea‘au in the Puna District on Hawai‘i Island. Adjacent parcels (TMKs: [3] 1-6-151:003, 006, and 999) may be affected by ancillary connections to existing infrastructure. The project area is depicted on a portion of the 1995 Hilo and 1994 Mountain View U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles.
Project Description	The Hawai‘i Department of Agriculture (HDOA), Agribusiness Development Corporation (ADC) received comments requesting clarification about its proposed Zero Waste Facility in Puna on the Island of Hawai‘i, which will be a demonstration project. The intent of ADC’s demonstration project is to successfully grow algae on a commercial scale using the waste product from produce. The waste product that the algae will consume may consist of papaya and perhaps other off grade fruits and vegetables. No animal waste will be used in the waste conversion process. Successful algae growth may be used for the development of byproducts such as livestock feed and biofuels; however, ADC has no plans to develop feed or biofuels at its Zero Waste Facility. ADC will own and operate the new Zero Waste Facility, which is part of ADC’s initiative to address food and energy security issues in Hawai‘i.
Project Acreage	The proposed project is approximately 2.7 acres.
Document Purpose	The purpose of this cultural impact assessment (CIA) is to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the project’s potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project’s potential impacts on cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control’s *Guidelines for Assessing Cultural Impacts*), which may include traditional cultural properties (TCPs). These TCPs may be significant

	historic properties under State of Hawai‘i significance Criterion e, pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that “have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity” (HAR §13-275-6 and§13-284-6). The document will likely also support the project’s historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS §6E-8 and HAR §13-284.
Results of Communtiy Consultation	CSH attempted to contact Native Hawaiian Organizations (NHOs), agencies, and community members. Consultation was received from the following community members: 1. Dennis Kau‘inui, *kama‘āina* (native born) of ‘Ōla‘a and long time resident on Shipman property.
Results of Background Research	Background for this project yielded the following results (presented in approximately chronological order): 1. The first noted *ali‘i nui* (high chief) dates back to AD 1200-1300. This *ali‘i nui* was Pili, a voyager from the ancestral land of Kahiki (Cordy 2000:160). 2. In the late 1500s, a descendant of Pili, Līloa, became *ali‘i nui* over the entire island of Hawai‘i. Upon his death, Līloa‘s youngest son, ‘Umi, rebelled against the rightful heir, his older brother Hakau, and after countless battles, united the island under one *ali‘i nui*. The Puna district did not have a distinct chief of its own, but most times was under the rule of the Hilo and Kona chiefs. 3. In 1760, Kalani‘ōpu‘u became *ali‘i nui* of Hawai‘i Island and his son, Kīwala‘ō, and favored nephew, Kamehameha, were to succeed his chiefly duties upon his death. During his reign, one of the few noted chiefs of Puna, ‘Īmakakoloa, rebelled against Kalani‘ōpu‘u and went into hiding. Kalani‘ōpu‘u’s men burned every village until ‘Īmakakoloa was found. 4. There were a few foreign accounts documenting the district of Kea‘au. In 1779, crew members from Captain Cook’s third voyage made a pass just beyond the Puna coast. In 1823, British missionary William Ellis made a side trip inland to Kīlauea crater and continued near the coast at the Ka‘ū/Puna border. Later in 1823, Titus Coan and members of the Hilo Mission Station also traveled to the eastern boundary in Puna.

	In 1826, the Wilkes made a similar trip to the crater and descended by way of Puna. 5. In the mid-1800s during the Māhele, Kea‘au Ahupua‘a was granted as chiefly lands to William C. Lunalilo. One *kuleana* (Native Hawaiian land rights) award comprising 13.64 acres was granted to Hewahewa and later sold to the Roman Catholic Church in 1865. 6. In 1854, Reverend William Cornelius Shipman sailed from Boston Harbor and eventually made Hawai‘i his home. His son, William Herbert (W.H.) Shipman, married Mary Elizabeth Kahiwaaiali‘i Johnson, granddaughter of John Davis. Her uncle, John Davis, was the trusted advisor to Kamehameha I (W.H. Shipman 2017). 7. In 1882, the King Lunalilo Estate sold the parcel of Hā‘ena (covering 70,000 acres from the Puna Coast to Kīlauea volcano) to W.H Shipman, J. Elderts, and S. Damon (W.H. Shipman 2017). Just a few years later, W.H. Shipman bought out his partners and owned the entire acreage. 8. In 1899, Olaa Sugar Company leased 3,182 acres of land from W.H Shipman for a term of 40 years. 9. The location of the Kea‘au Zero Waste Facility is within the W.H Shipman Business Park, established in 1988 (W.H. Shipman 2017). The purpose of this industrial park was to “meet current and projected industrial demand” (W.H. Shipman 2017). The industrial park covers a vast 485 acres within the *ahupua‘a* (traditional land division extending from the mountain to the sea) of Kea‘au.
Impacts and Recommendations	Based on information gathered from the cultural and historical background and the community consultation, potential impacts were identified and the following preliminary recommendations were made: 1. Although previous archaeological research did not indicate any burials found within or in the vicinity of the project area, project construction workers and all other personnel involved in the construction, maintenance, or any other relative activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the State Historic Preservation Division (SHPD) will be notified pursuant to HAR §13-280-3. In the event that *iwi kupuna* (ancestral bones) are identified, all earth-moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent

	discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended. 2. In the event that *iwi kupuna* and/or cultural finds are encountered, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Table of Contents

Management Summary i

Section 1 Introduction 1

1.1 Project Background 1
1.2 Document Purpose 1
1.3 Scope of Work 5
1.4 Environmental Setting 5
1.4.1 Natural Environment 5
1.4.2 Built Environment 7

Section 2 Methods 8

2.1 Archival Research 8
2.2 Community Consultation 8
2.2.1 Scoping for Participants 8
2.2.2 “Talk Story” Sessions 8
2.2.3 Interview Completion 9

Section 3 Ka‘ao and Mo‘olelo 10

3.1 Ka‘ao 11
3.1.1 Pele and Hi‘iaka in Kea‘au, Puna 11
3.1.2 Ka U‘i Keamalu (The Beauty Keamalu) 15
3.1.1 The Legend of Halemano 18
3.1.2 Pele and Kamapua‘a 32
3.1.3 Legend of Kumukahi 32
3.1.4 Legend of Kumukahi, a Chief of Puna 33
3.1.5 The Legend of Kahawali 33
3.1.6 The Legend of Papalauahi 34
3.1.7 The Legend of Keliikuku 34
3.1.8 The Legend of Kealohalani and Honolulu 35
3.2 Mo‘olelo 35
3.2.1 Kūka‘ōhi‘aakalaka 35
3.2.2 The Legend of Iwa 37
3.2.3 Law of Māmalahoe 45
3.2.4 Ka ‘alā pa‘a o Kaueleau 46
3.3 ‘Ōlelo No‘eau (Proverbs) 46
3.3.1 ‘Ōlelo No‘eau #624 47
3.3.2 ‘Ōlelo No‘eau # 1113 47
3.3.3 ‘Ōlelo No‘eau #1560 48
3.3.4 ‘Ōlelo No‘eau #1638 48
3.3.5 ‘Ōlelo No‘eau # 1668 48
3.3.6 ‘Ōlelo No‘eau #2070 48
3.4 Mele 48
3.4.1 Song for the Hula ‘Āla‘apapa (Ancient Dramatic Hula) 48
3.4.2 Noluna ka Halekai (From Mountain Retreat) 49
3.4.3 Pele and Hi‘iaka – Hi‘iaka Travels Through Pana‘ewa 50

Section 4 Historical Background 52

4.1 Pre-Contact History 52
4.2 Early Historic Period 53
4.2.1 Captain Cook’s Expedition, 1779 54
4.2.2 Ellis Missionary Tour, 1823 54
4.2.3 Titus Coan and the Hilo Mission Station 56
4.2.4 The Wilkes Expedition, 1826 57
4.3 The Māhele and Kuleana Awards 58
4.4 Mid- to Late 1800s 59
4.4.1 William Herbert Shipman Estate 59
4.4.2 Lunalilo’s Estate 59
4.4.3 1873 Boundary Commission Testimony 60
4.5 Early to Mid-1900s 79
4.5.1 Olaa Sugar Company 79
4.5.2 Contemporary Land Use 88
4.5.3 Hawaiian Paradise Park 88
4.6 Previous Archaeological Research 91

Section 5 Community Consultation 97

5.1 Introduction 97
5.2 Community Contact Letter 97
5.3 Kama‘āina Interviews 101
5.3.1 Dennis Kau‘inui 101

Section 6 Traditional Cultural Practices 103

6.1 Subsistence and Gathering 103
6.2 Ka‘ao and Mo‘olelo 103
6.3 Caves and Burials 103
6.4 Fishing 104

Section 7 Summary and Recommendations 105

7.1 Results of Background Research 105
7.2 Results of Community Consultations 106
7.3 Impacts and Recommendations 106

Section 8 References Cited 107

Appendix A Maly’s Oral Histories 113

List of Figures

Figure 1. Portion of the 1995 Hilo and 1994 Mountain View USGS 7.5-minute topographic quadrangles showing the location of the project area 2
Figure 2. Tax Map Key (TMK) [3] 1-6-151 showing the project area (Hawai‘i TMK Service 2014) 3
Figure 3. Aerial photograph showing the location of the project area (Google Earth 2013) 4
Figure 4. Overlay of Soil Survey of the State of Hawaii (Sato et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [USDA SSURGO] 2001) 6
Figure 5. Portion of map of Hawai‘i showing Newman’s (1971:337) reconstruction of the agricultural zones of the island in 1823, based on the observations in the journal of William Ellis 55
Figure 6. Portion of the 1901 map of Hilo Railroad, Olaa Division by C.H Kluegel, showing the project area in relation to features discussed in the text 81
Figure 7. Portion of the 1914 Waiakea and Mountain View USGS 7.5-minute topographic quadrangles showing the location of the project area in relation to features discussed in the text 82
Figure 8. Portion of the 1928 map of Hawai‘i Island by Walter E. Wall, showing the project area in relation to features discussed in the text 83
Figure 9. Portion of the 1963 Hilo and Moutain View USGS 7.5-minute topographic quadrangles showing the location of the project area, additional survey area, and high school in relation to features discussed in the text 84
Figure 10. 1977 USGS Orthophoto, showing the location of the project area in relation to features discussed in the text 85
Figure 11. 1928 Territory Survey Map of Hawai‘i Island by Walter E. Wall, overlain with the route of the Hawai‘i Consolidated Railway ca. 1945 (figure from Treiber 2005) 86
Figure 12. Portion of the 1944 map of Hawai‘i Island by H.T. Stearns showing the location of the project area in relation to the railroad system 87
Figure 13. Portions of 1994 Mountain View and 1995 Hilo USGS topographic quadrangles, showing previous archaeological studies in the vicinity of the project corridor 92
Figure 14. Community consultation letter, page one 99
Figure 15. Community consultation letter, page two 100

List of Tables

Table 1. Land Commission Awards in the Kea‘au Ahupua‘a 58
Table 2. Kea‘au Ahupua‘a place names 64
Table 3. Previous archaeological studies in the vicinity of the project area 93

Section 1 Introduction

1.1 Project Background

At the request of Limtiaco Consulting Group, on behalf of the State of Hawai‘i Department of Agriculture – Agribusiness Development Corporation (ADC), Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this cultural impact assessment for the proposed Kea‘au Zero Waste Facility, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, TMKs: [3] 1-6-151:002 and portions of 003, 006, and 999. The project area is depicted on a portion of the 1995 U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and a 2013 aerial photograph (Figure 3).

The Hawai‘i Department of Agriculture (HDOA), Agribusiness Development Corporation (ADC) received comments requesting clarification about its proposed Zero Waste Facility in Puna on the Island of Hawai‘i, which will be a demonstration project. The intent of ADC’s demonstration project is to successfully grow algae on a commercial scale using the waste product from produce. The waste product that the algae will consume may consist of papaya and perhaps other off grade fruits and vegetables. No animal waste will be used in the waste conversion process. Successful algae growth may be used for the development of byproducts such as livestock feed and biofuels; however, ADC has no plans to develop feed or biofuels at its Zero Waste Facility. ADC will own and operate the new Zero Waste Facility, which is part of ADC’s initiative to address food and energy security issues in Hawai‘i.

The approximately 2.7-acre (1.1-hectare) project area comprises the 1.526-acre (0.617-hectare) subject development parcel (TMK: [3] 1-6-151:002) as well as portions of adjacent parcels (TMKs: [3] 1-6-151:003, 006, and 999).

1.2 Document Purpose

The purpose of this cultural impact assessment (CIA) is to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the project’s potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project’s potential impacts on cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control’s *Guidelines for Assessing Cultural Impacts*), which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai‘i significance Criterion e, pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that “have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity” (HAR §13-275-6 and §13-284-6). The document will likely also support the project’s historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to

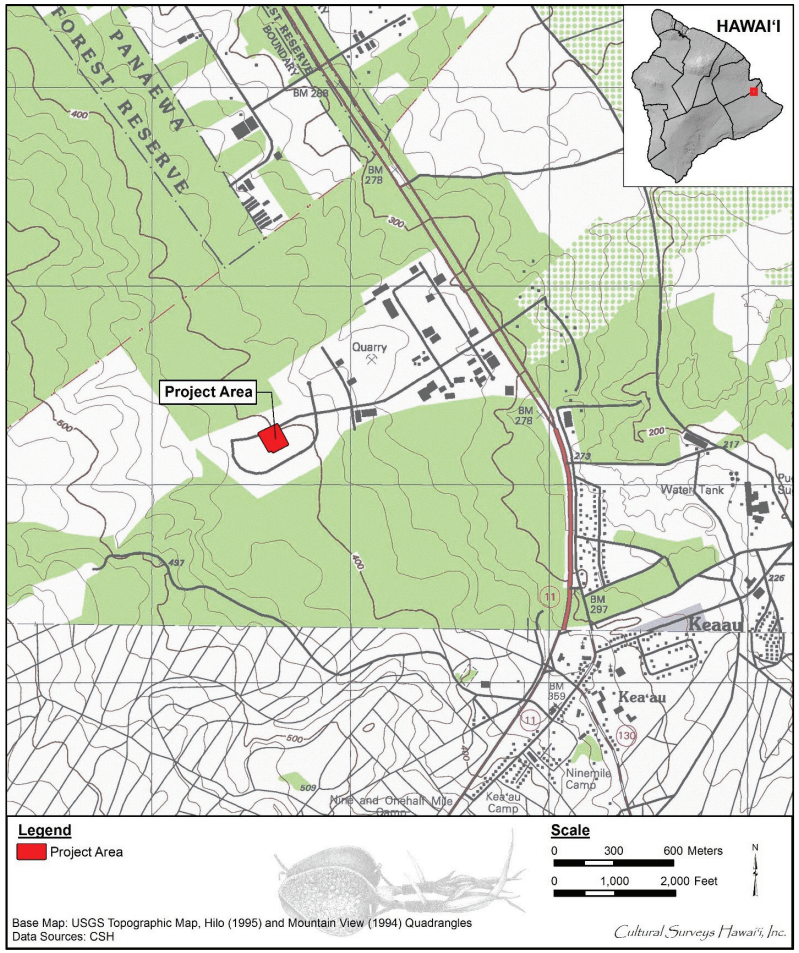


Figure 1. Portion of the 1995 Hilo and 1994 Mountain View USGS 7.5-minute topographic quadrangles showing the location of the project area

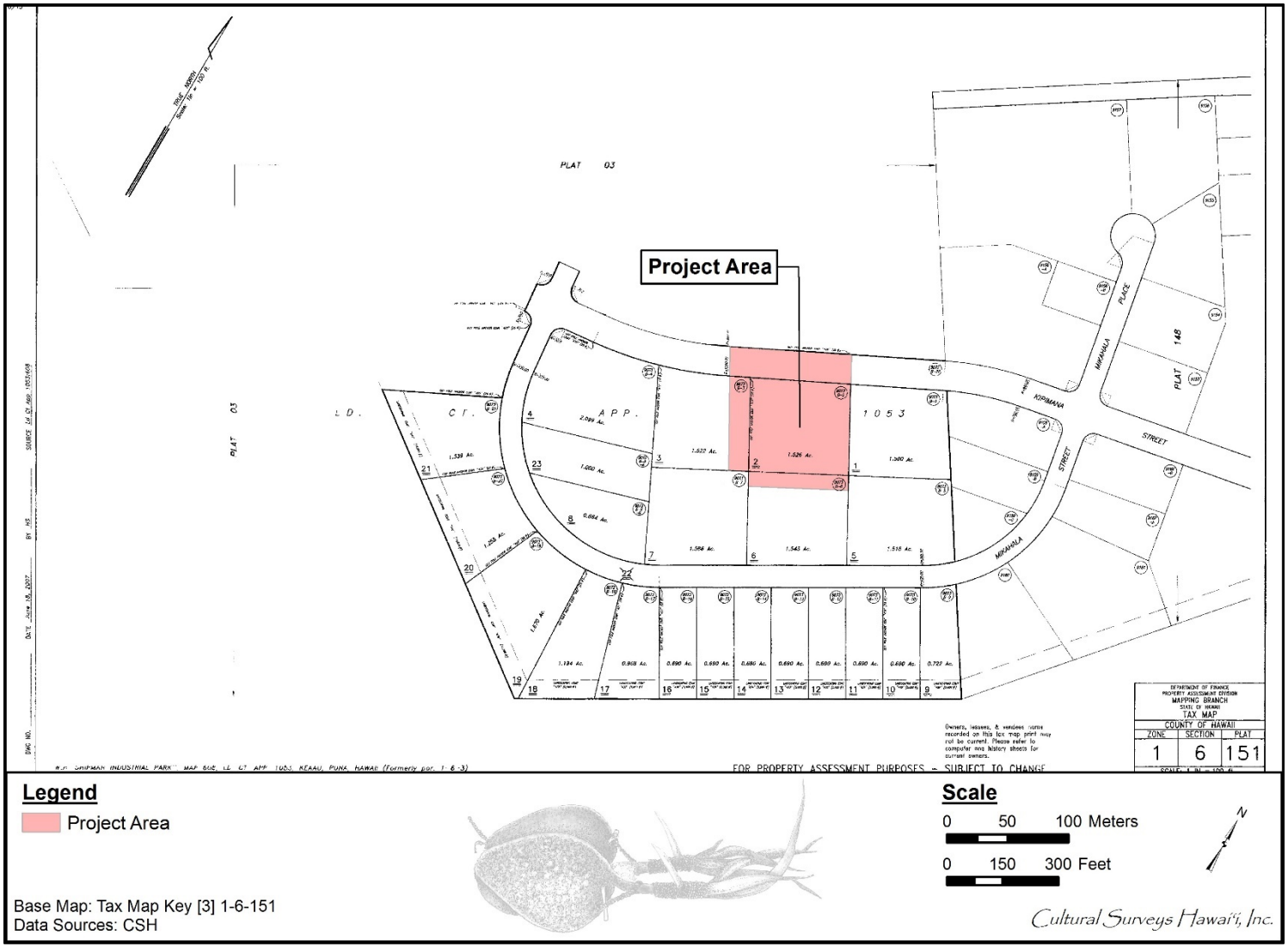


Figure 2. Tax Map Key (TMK) [3] 1-6-151 showing the project area (Hawai‘i TMK Service 2014)

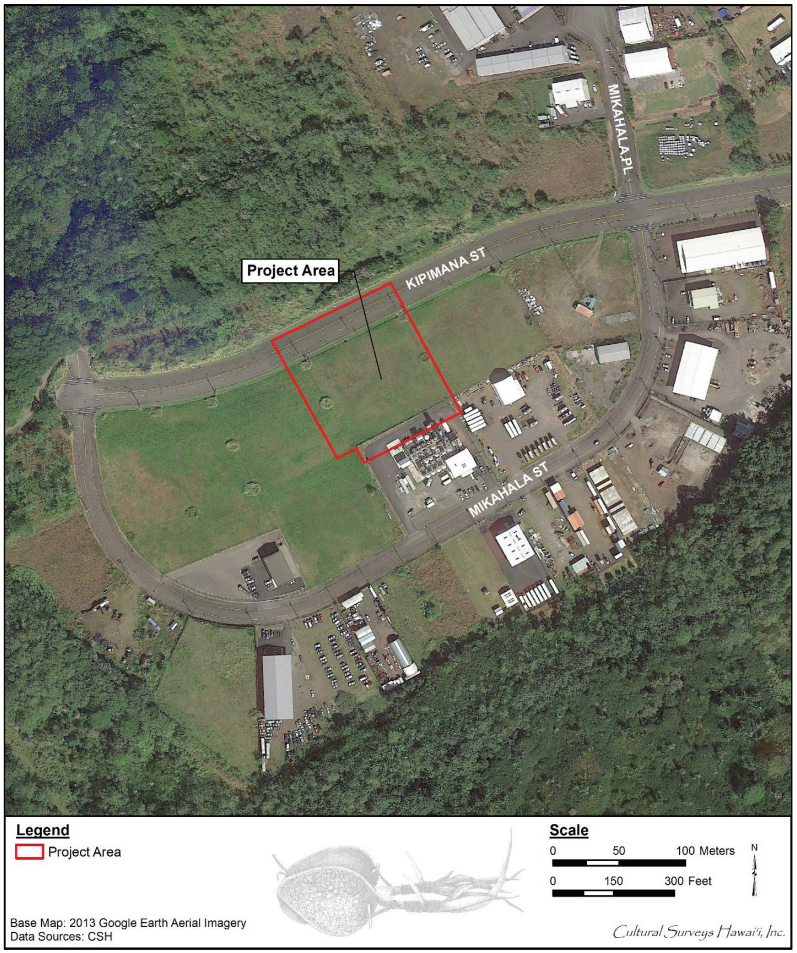


Figure 3. Aerial photograph showing the location of the project area (Google Earth 2013)

support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS §6E-8 and HAR §13-284.

1.3 Scope of Work

The scope of work for this CIA includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.
4. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.

Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 Natural Environment

The project area is approximately 7.8 km (4.9 miles) from the coast, at an elevation of approximately 400 ft above mean sea level (amsl). The Kea‘au area receives approximately 4,000 mm (157 inches) of rainfall per year (Giambelluca et al. 1986:34), which is more than sufficient for non-irrigated agriculture. The project area lies within previously developed lands and consists of a level graveled area which may have been bulldozed in the past. Aside from some grass on the margins of the property, no vegetation is present.

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Sato et al. (1973), the project area’s soils consist of Papai extremely stony muck, 3 to 25% slopes (rPAE) (Figure 4). Papai series soils are described as follows:

> . . . well-drained, thin, extremely stony organic soils over fragmental Aa lava. These soils are gently sloping to moderately steep. They are on uplands at an elevation ranging from near sea level to 1,000 feet and receive from 90 inches to more than 150 inches of rainfall annually. Their soil temperature is between 72 and 74 F. The natural vegetation consist of ohia, tree fern, uluhe fern, and guava . . .
>
> Papai soils are used mostly for woodland. Small areas are used for pasture, orchards, and truck crops.
>
> Papai extremely stony muck, 3 to 25 percent slopes (rPAE).—This soil is low on the windward side of Mauna Kea.

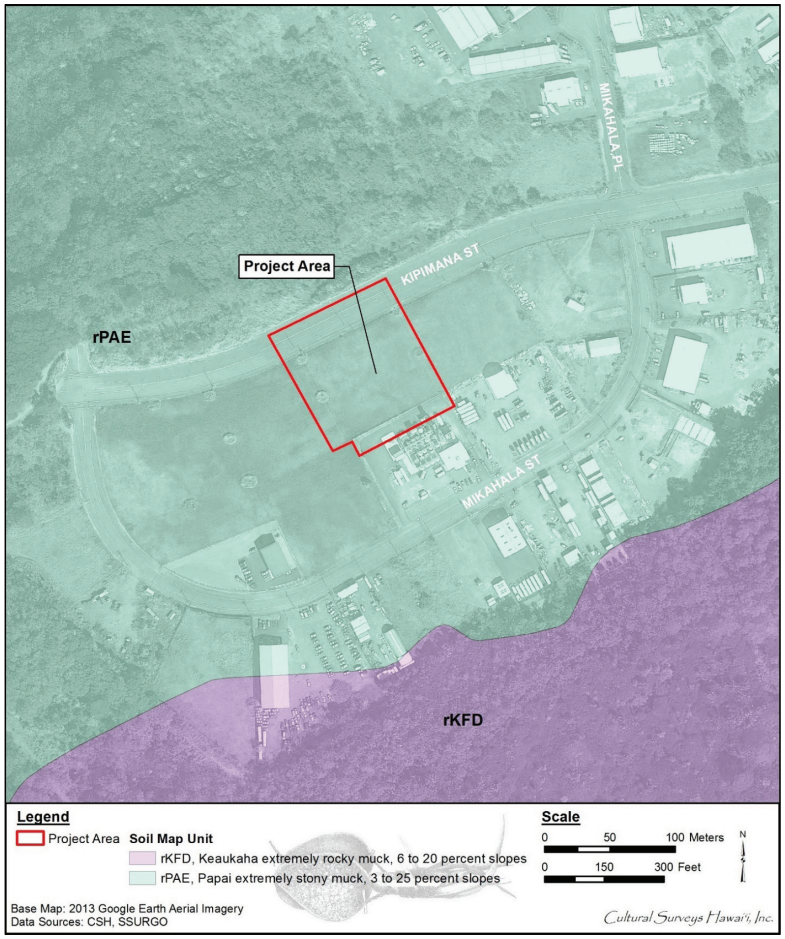


Figure 4. Overlay of *Soil Survey of the State of Hawaii* (Sato et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [USDA SSURGO] 2001)

> In a representative profile the surface layer is very dark brown extremely stony muck about 8 inches thick. [Sato et al. 1973:46]

‘Ōhi‘a (*Metrosideros polymorpha*), tree fern, *uluhe* fern (*Dicranopteris linearis*), and guava are the most common natural vegetation found in this type of soil.

1.4.2 Built Environment

The project area is in the W.H. Shipman Business Park. It is bound to the north by Kipimana Street, to the south by Big Island Biodiesel, and to the east and west by previously disturbed, maintained grassy areas. Fence lines demarcate the eastern and southern property boundaries. The project area is presently being used to store multiple biofuel tankers.

Shipman Business Park is situated along Highway 11, a major area thoroughfare. It is approximately 1.2 miles north of Kea‘au town, which comprises commercial establishments, residential neighborhoods, a post office, park, and school campuses. All the lands within W.H. Shipman Business Park have been previously cleared and used for agriculture.

Section 2 Methods

2.1 Archival Research

Research centers on Hawaiian activities including *ka‘ao* (legends), *wahi pana* (storied places), *‘ōlelo no‘eau* (proverbs), *oli* (chants), *mele* (songs), traditional *mo‘olelo* (stories), traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawai‘i State Archives, the Bishop Museum Archives, the University of Hawai‘i at Mānoa’s Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau.org 2014), the State Historic Preservation Division (SHPD) Library, the State of Hawai‘i Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona ‘Aina Corporation’s Māhele database (Waihona ‘Aina 2000), the Office of Hawaiian Affairs (OHA) Papakilo Database (Office of Hawaiian Affairs 2015), and the Ava Konohiki Ancestral Visions of ‘Āina website (Ava Konohiki 2015).

2.2 Community Consultation

2.2.1 Scoping for Participants

The cultural department commences our consultation efforts by utilizing our previous community contact list to facilitate the interview process. We then review an in-house database of *kūpuna* (elders), *kama‘āina* (native born), cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior’s NHO list), and community groups. CSH also contacts agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response on the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts.

2.2.2 “Talk Story” Sessions

Prior to the interview, CSH cultural researchers explain the role of a CIA, how the consent process works, the project purpose, the intent of the study, and how their *‘ike* (knowledge) and *mana‘o* (thought, opinion) will be used in the report. The interviewee is given an Authorization and Release Form to read and sign.

“Talk Story” sessions range from the formal (e.g., sit down and *kūkā* [consultation, discussion] in the participant’s place of choice over set interview questions) to the informal (e.g., hiking to cultural sites near the study area and asking questions based on findings during the field outing). In some cases, interviews are recorded and transcribed later.

CSH also conducts group interviews, which range in size. Group interviews usually begin with set, formal questions. As the group interview progresses, questions are based on interviewees’ answers. Group interviews are always transcribed and notes are taken. Recorded interviews assist the cultural researcher in 1) conveying accurate information for interview summaries, 2) reducing misinterpretation, and 3) adding missing details to *mo‘olelo*.

CSH seeks *kōkua* (assistance) and guidance in identifying past and current traditional cultural practices of the study area. Those aspects include general history of the *ahupua‘a*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana*, archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*ka‘ao* and *mo‘olelo*); referrals; and any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area.

2.2.3 Interview Completion

After an interview, CSH cultural researchers transcribe and create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the transcription and interview summary to the interviewee for review and ask that they make any necessary edits. Once the interviewee has made those edits, CSH incorporates their *‘ike* and *mana‘o* into the report. When the draft report is submitted to the client, cultural researchers then prepare a finalized packet of the participant’s transcription, interview summary, and any photos taken during the interview. We also include a thank you card and honoraria.

It is important that CSH cultural researchers cultivate and maintain community relationships. The CIA report may be completed, but CSH researchers continuously keep in touch with the community and interviewees throughout the year—such as checking in to say hello via email or by phone, volunteering with past interviewees on community service projects, and sending holiday cards to them and their *‘ohana* (family). CSH researchers feel this is an important component to building relationships and being part of an *‘ohana* and community.

“*I ulu no ka lālā i ke kumu*—the branches grow because of the trunk,” is an *‘ōlelo no‘eau* (#1261) shared by Mary Kawena Pukui with the simple explanation: “Without our ancestors we would not be here” (Pukui 1983:137). As cultural researchers, we often lose our *kūpuna* but we do not lose their wisdom and words. We routinely check obituaries and gather information from other community contacts if we have lost our *kūpuna*. CSH makes it a point to reach out to the *‘ohana* of our *kūpuna* who have passed on and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference.

Section 3 *Ka‘ao* and *Mo‘olelo*

Hawaiian storytellers of old were greatly honored; they were a major source of entertainment and their stories contained teachings while interweaving elements of Hawaiian lifestyles, genealogy, history, relationships, arts, and the natural environment (Pukui and Green 1995:IX). According to Pukui and Green (1995), storytelling is better heard rather than read for much becomes lost in the transfer from the spoken to the written word and *ka‘ao* (legends) are often full of *kaona* or double meanings.

Ka‘ao are defined by Pukui and Elbert as a “legend, tale […], romance, [and/or], fiction” (Pukui and Elbert 1986:108). *Ka‘ao* may be thought of as oral literature or legends, often fictional or mythic in origin, and have been “consciously composed to tickle the fancy rather than to inform the mind as to supposed events” (Beckwith 1970:1). Conversely, Pukui and Elbert define *mo‘olelo* as a “story, tale, myth, history, [and/or] tradition” (Pukui and Elbert 1986:254). The *mo‘olelo* are generally traditional stories about the gods, historic figures or stories that cover historic events and locate the events with known places. *Mo‘olelo* are often intimately connected to a tangible place or space.

In differentiating *ka‘ao* and *mo‘olelo* it may be useful to think of *ka‘ao* as expressly delving into the *wao akua* (realm of the gods), discussing the exploits of *akua* in a primordial time. However, it is also necessary to note there are exceptions, and not all *ka‘ao* discuss gods of an ancient past. *Mo‘olelo* on the other hand, reference a host of characters from *ali‘i* (chief), to *akua* and *kupua* (supernatural beings), to finally *maka‘āinana* (commoners), and discuss their varied and complex interactions within the *wao kānaka* (realm of man). Beckwith elaborates, “In reality, the distinction between ka‘ao as fiction and mo‘olelo as fact cannot be pressed too closely. It is rather in the intention than in the fact” (Beckwith 1970:1). Thus, a so-called *mo‘olelo*, which may be enlivened by fantastic adventures of *kupua*, “nevertheless corresponds with the Hawaiian view of the relation between nature and man” (Beckwith 1970:1).

Both *ka‘ao* and *mo‘olelo* provide important insight into a specific geographical area, adding to a rich fabric of traditional knowledge. The preservation and passing on of these stories through oration remains a highly valued tradition. Additionally, oral traditions associated with the study area communicate the intrinsic value and meaning of a place, specifically its meaning to both *kama‘āina* as well as others who also value that place.

The following section presents traditional accounts of ancient Hawaiians living in the vicinity of the Kea‘au Zero Waste Facility project area. Many relate an age of mythical characters whose epic adventures inadvertently lead to the Hawaiian race of *ali‘i* and *maka‘āinana*. The *ka‘ao* in and around the Kea‘au Zero Waste Facility project area shared below are some of the oldest Hawaiian stories that have survived; they still speak to the characteristics and environment of the area and its people.

3.1 *Ka‘ao*

3.1.1 Pele and Hi‘iaka in Kea‘au, Puna

The excerpts below are from the story of *Pele and Hi‘iaka, A Myth from Hawai‘i* by Nathaniel B. Emerson (2005). Hi‘iakaikapoliopele is named among the patron deities of the *hula*. Her older sister, Pele, did not dance but the movement of the lava flows are often compared to the *hula*. The following scene is laid in lower Puna when Hi‘iaka is given the art of *hula*:

> Once, when Pele was living in the pit of Kīlauea, she roused up from her couch on the rough hearth-plate and said to her sisters, ‘Let us make an excursion to the ocean and enjoy ourselves, open the opihi shells and sea-urchins, hunt for small squid and gather sea-moss.’
>
> To this all joyfully assented saying, ‘Yes, let us go.’
>
> The sisters formed quite a procession as they tramped the narrow downhill path until they came to the hill Pu’u-Pahoehoe—a place in the lower lands of Puna. Pele herself did not visibly accompany them on this journey; that was not according to her custom: she had other ways and means of travel than to plod along a dusty road. When, however, the party arrived at the rendezvous, there, sure enough, they found Pele awaiting them, ready for the business at hand.
>
> In the midst of their pleasuring Pele caught sight of Hopoe and Haena as they were indulging in an al fresco dance and having a good time by the Puna Sea. She was greatly pleased and, turning to her sisters, said, ‘Come, haven’t you also got some dance that you can show off in return for this entertainment by Hopoe and her companion?’
>
> They all hung their heads and said, ‘We have no hula.’
>
> Hi‘iaka, the youngest, had stayed behind to gather lehua flowers, and when she came along laden with wreaths, Pele said to her jestingly, ‘I’ve just been proposing to your sisters here to dance a hula in response to that of Hopoe and her fellow, but they decline, saying they have not the art. I suppose it’s of no use to ask you, you are so small; but, perhaps, you’ve got a bit of a song.’
>
> ‘Yes, I have a song,’ Hiiaka answered, to the surprise of all. ‘Let us have it, then; go on!’ said Pele.
>
> Then the little girl, having first decorated all of her sisters with the wreaths, beginning with Pele, sang as follows:

Ke ha‘a la Puna i ka makani,	Puna’s a-dance in the breeze,
Ha‘a ka ulu hala i Kea‘au.	The hala groves of Keaau shaken.
Ha‘a Ha‘ena me Hopoe,	Ha‘ena and Hopoe are swaying,
Ha‘a ka wahine,	The thighs of the dancing nymph,
‘Ami i kai o Nana-huki, la-	Quiver and sway, down at Nana-huki,

Hula le‘a wale,	A dance most sighly and pleasing,
I kai o Nana-huki, e-e!	Down by the sea Nana-huki.

Pele was delighted. ‘Is that all you have?’ she asked. ‘I have something more,’ said the girl. ‘Let us hear it then.’ Hi‘iaka put even more spirit into the song as she complied:

O Puna kai kuwa i ka hala	The voice of Puna’s sea resounds
Pae ka leo o ke kai,	Through the echoing hala groves,
Ke lu, la i na pua lehua.	The lehua trees cast their bloom.
Nana i kai o Hōpoe,	Look at the dancing girl Hōpoe;
Ka wahine ‘ami i kai	Her graceful hips swing to and fro,
O Nana-huki la.	A dance on the beach Nana-huki.
Hula le‘a wale,	A dance that is full of delight,
I kai o Nana-huki e!	Down by the sea Nana-huki.

At the conclusion of this innocent performance—the earliest mention of the hula that has reached us—Hiiaka went to stay with her friend Hopoe, a person whose charm of character had fascinated the imagination of the susceptible girl and who had already become her dearest intimate, her inspiring mentor in those sister arts, song, poesy and the dance. [Emerson 2005:1, 2]

After Hiiaka’s song Pele went to lie down in a cave of pāhoehoe. Before she slept she commanded her sisters not to wake her, if they must awaken her to summon her little sister Hi‘iaka. It was in her sleep that Pele heard the far off beating of hula drums, and her spirit body pursued the sound. This sound led her clear across the channel of the Hawaiian islands to the little village of Ha‘ena the northernmost point of the island of Kaua‘i. It was here that Pele first lays eyes on the Prince Lohiau. The following paragraphs pertain to the waking of Pele by her sister Hi‘iaka:

Though it was many days since Pele had lain down to sleep, and though they feared the consequences if she continued thus, they dared not disturb her. When that was proposed, the sister in charge objected. ‘If it must be done, we shall have to send for Hiiaka the beloved.’

The girl Hiiaka saw the messenger that had been dispatched to fetch her, while as yet she was in the dim distance,—it was her nurse, Pa‘u-o-pala‘e—and there came to her a premonition of what it all meant, a vision, a picture, of the trouble that was to come; yet, overmastering her, was a feeling of affection and loyalty for her elder sister.

Arrived at Lau-pahoehoe (This Laupahoehoe is to be distinguished from that in Hilo), Hiiaka found her sister in great consternation, fearing for the life of Pele if

she were allowed to continue her long sleep. Her spirit, it is true, had come back to her body; but it was merely hovering about and had not entered and taken possession, so that there were no signs of animation or life. It seemed to be waiting for the voice of Hiiaka, the beloved, to summon it back and to make it resume consciousness. [Emerson 2005:9–12]

Emerson continues in the lands of Puna as Pele is awakened by Hi‘iaka’s song. Pele and her sister return to Kīlauea. The day after Pele’s awakening she makes a proposition to her sisters:

That same day Pele and the other sisters retuned to Kīlauea while Hiiaka went back to resume her visit with Hopoe, each party reaching its destination at about the same time. Early the next morning Pele called to her sister Hiiaka-i-ka-ale-i (Hiiaka-of-the-choppy sea) and said, ‘I want you to go on an errand for me.’ ‘No doubt I shall agree to do when you have told me what it is,’ was the answer of the young woman.

‘You are to journey to Kaua‘i and escort hither our lover—yours and mine. While on the way you are not to lie with him; you are not to touch noses with him; you are not to fondle him or snuggle close to him. If you do any such thing I will kill both of you. After your return, for five days and five nights, I will have him to myself, and after that he shall be your lover.’

On hearing this, the young woman hung her head and wept. Pele then made the same proposal to each of the other sisters in turn. Not one of them would consent to undertake the mission. They knew full well the perils of the undertaking; the way was beset with swarms of demons and dragons, with beings possessed with powers of enchantment; and Pele did not offer to endow them with the power that would safeguard them on their journey.

Pele called to Pa‘u-o-pala‘e and bade her go straightway to Haena and fetch Hiiaka.

Now the girl, whose full name was Hiiaka-i-ka-poli-o-Pele, was the youngest of the sisters, and, by reason of her loveliness and accommodating disposition, she was Pele’s favorite. She was, moreover, gifted with a quick intuition and a clairvoyant perception of distant happenings and coming events. [Emerson 2005:12–13]

It is while Hi‘iaka is surfing in the company of Hopoe that the matter of the proposed journey to fetch Pele’s lover comes to her in a vision. Hi‘iaka and Hopoe and travel through the lands of Puna back to the pit of Kīlauea to join Pele and her sisters:

Hiiaka arrived at the Pit in good time to partake with the others of the frugal fest ordered by Pele. At its conclusion, Pele turned to the girl Hiiaka and put the question in her blunt way, ‘Will you be my messenger to fetch our lover—yours and mine—from Kauai? Your sisters here’—she glanced severely about the group—‘have refused to go. Will you do this for me?’

The little maid, true to her sense of loyalty to the woman who was her older sister, the head of the family, and her alii, to the surprise and dismay of her other sisters, answered, ‘Yes, I will go and bring the man.’

> Hiiaka, though a novice in diplomacy, as shown by her instant and unconditional acceptance of Pele's proposition, having once got her second breath, now exacted of Pele a condition that proved her to be, under the discipline of experience, and apt pupil in the delicate art of diplomacy. 'I am gong to bring our lover, while you remain at home. If during my absence you go forth on one of your raids, you are welcome to ravage and consume the lands that are common to us both; but, see to it that you do not consume my forests of lehuas. And, again, if the fit does come upon you and you must ravage and destroy, look to it that you harm not my friend Hopoe.' [Emerson 2005:15–18]

Pele readily agrees to Hi‘iaka's condition. Pele designates Pā‘ū-o-pala‘ē (or Pā‘ū-o-pala‘ā) as Hi‘iaka's attendant. Hi‘iaka makes ready for the journey, traveling with her companions:

> Pele designated a good-natured waiting woman as her attendant, who had the poetical name of Pa‘u-o-pala‘e (or Pa‘u-o-pala‘a). This faithful creature heartily accepted the trust, that of kahu—a servant with the pseudo responsibility of a guardian—and, having expressed her fealty to her new mistress, she at once took her station. Thus everything seemed arranged for a start on the eventful journey.
>
> Night shut down upon them at Kuolo, a place just on the border of Pana-ewa. Pa‘u-o-pala‘e proposed that they should seek a resting place for the night with the people of the hamlet.
>
> In the morning while it was still dark, they roused and started afresh. Their way led through lehua groves of the most luxuriant growth, the bloom of which crimsons and landscape to this day, exuding a honey that is most attractive to the birds of heaven.
>
> At the sight of Hiiaka's party, the lively flower-girls made a rush, as if to capture and appropriate their friendly acquaintance for individual possession. The most vivacious and forward of the whole party was Pa-pulehu, their leader, a buxom young woman, of good family, who at once took possession of Hiiaka for herself, crowned and bedecked her with wreaths and garlands, with many expressions of enthusiastic admiration: 'This is my friend!—What a beauty!—How the scarlet lehua becomes her!—Just look, girls!—And now you are to come and be my guest.—The feast is set for this very day.—But you are all welcomed.' [Emerson 2005:19–27]

During the feast Hi‘iaka called upon her allies, the Sun, the Moon, the Stars, the elements and all the gods to come to the feast and eat. The tables were cleared of food and Hi‘iaka bade farewell to the people and resumed her journey through Puna**,** taking with her Pa-pulehu**:**

> Their journey still lay through Puna. They were at Kalalau, not far from Haena (at the place where, centuries afterwards, Kamehameha was struck with the well-nigh fatal blow by an outraged fisherman). Some fishermen were hauling in their nets full of fish. The sight was too much for Pa-pulehu. 'I hunger for fish,' she exclaimed. 'These fish belong to my father. Oh, if I only were at home! How I would eat until I was satisfied!'

> Hiiaka thought it best to indulge the appetite of this novice in her service. From a little knoll overlooking the ocean, she descried the canoe of a fisherman named Pahulu floating in the offing, but already well stocked with fish. Hiiaka used her power and drove away the school of fish that would have come to his net. The man was so intent on his work that he had no eyes for what was passing on shore; but his assistant exclaimed, 'Look at the beautiful woman standing on the shore and watching us!'
>
> This brought the two fishermen ashore who thereupon willingly parted with some of their fish to Hiiaka, coupling the gift, however, with a proposition insulting to the honor of the two women. The fishermen, imagining they had the two women under their power, were soon after seen lying in the open embracing two figures of stone which they, in their insane infatuation, fancied were the two women, thus exposing themselves to the jeers and derision of their fellows.
>
> Pa-pulehu cooked and ate the fish, but her manner of eating was lacking in due punctilio, in that she did not dispose properly of the unconsumed parts—the tails, fins, bones and scales—of the fish. This neglect was highly offensive to Pele and caused her to withdraw from Pa-pulehu the protection she otherwise would have given her.
>
> Two routes offered themselves for Hiiaka's choice, a makai road, circuitous but safe, the one ordinarily pursued by travelers; the other direct but bristling with danger, because it traversed the territory of the redoubtable witch-mo‘o, Pana-ewa. [Emerson 2005:28–31]

In additional tales, Hi‘iaka's battles with Pana‘ewa in Kea‘au. Pana‘ewa turns himself into a *kukui* (candlenut; *Aleurites molucanna*) tree. The fate of Pana‘ewa was most tragic. In the disguise of a *kukui* tree he found himself entangled with meshes of parasitic growth; he could neither fight nor fly. The spot on which he stood sank and became a swamp. Pana‘ewa, swallowed up in the gulf, was swept out to sea and perished in the waves. A reef is pointed out in the ocean opposite of Pāpa‘i in Kea‘au which is the remains of the body of the *mo‘o* (lizard, water spirit) Pana‘ewa (Emerson 2005:45).

3.1.2 Ka U‘i Keamalu (The Beauty Keamalu)

In the beautiful uplands of ‘Ōla‘a, Puna lived a chiefess named Keamalu. This story refers to a beautiful spring located in ‘Ōla‘a named Pūnāwai o Keamalu. The following story is taken from *Folktales of Hawai‘i, He Mau Ka‘ao Hawai‘i*, collected and translated by Mary Pukui with help from Laura C.S. Green (1995):

> No Paliuli ‘o Keamalu, no kēlā ‘āina kamaha‘o i noho ‘ia e Lā‘iekawai. E like nō me ka hānai punahele ‘ia ‘ana o Lā‘iekawai, pēlā nōko Keamalu hānai punahele ‘ia ‘ana. Na nā manu i kia‘i iā ia, a i hānai ia ia i nā hua lama, pi‘oi, māmaki a me ka wai o ka lehua,. ‘A‘ohe ona ‘ai i nā mea ‘ē a‘e, ‘o nā maea wale nō a nā manu i hānai mai ai iā ia.

He pūnāwai ko ke kuahiwi o ‘Ōla‘a i kappa ‘ia ka ‘pūnāwai o Keamalu,’ a i laila i hele ai ‘o Keamalu e ‘au‘au. Iā ia e noho ana ma kapu o ka pūnāwai i kekahi lā, ua ‘ō‘ili maila kekahi kanaka ‘ōpio a i kona ‘ike ‘ana iā Keamalu, kona koi akula nō ia i wahine nāna. Ua hō‘ole mai ‘o Keamalu, ‘a‘ohe ona makemake i kāne ‘o ia nāna, a no ka pa‘akikī loa o kēia kanaka ‘ōpio, ua iho main ā manu a ‘o ka lilo nō ia o ua kaikamahine nei i luna o ko lākou mau ‘ēheu.

Ua ho‘i akula ke kanaka ‘ōpio i Puna me kāna ipo aloha, me Kalehua‘ula. ‘Oiai kona kino i Puna me kēlā wahine u‘i, aia nō na‘e kona no‘ono‘o i ka uka o ‘Ōla‘a. A no ka loa‘a ‘ole iā ia o ka maha ma ka na‘au, ua ‘imi hele ‘ia e ia ka nahele o ‘Ōla‘a i nā manawa a pau. A ka loa‘a ‘ole ‘ana o Keamalu iā ia, ua ho‘i akula ‘oia me Kalehua‘ula. Ua noho mālie nō ‘o Keamalu i ka hale no kekahi manawa lō‘ihi no kona maka‘u o ‘ike hou ‘ia mai ‘o ia e ke kanaka ‘ōpio.

Ua lohe nā mākua o Kalehua‘ula i ka ‘imi o kēia ‘ōpio iā Keamalu a nīnau mai nei me ke ‘ano ho‘onāukiuki. ‘He u‘i anei kēlā wahine āu e ‘imi nei?’ ‘‘Ae, he u‘i maoli,’ I pane mai ai ka ‘ōpio. ‘O kā māua nō ka u‘i. No hea ia pālau‘eka o kuahiwi i loa‘a mai ai kā māua?’ He mea ‘oia‘i‘o nō, he u‘i ‘o Kalehua‘ula, koe na‘e ke kūkona o nā maka.

Ua noho ‘o Keamalu a mana‘o no ka lō‘ihi loa o kona pe‘e ‘ana ua poina kēlā kanaka ‘ōpio iā ia, a no laila, ua hele hou main ō ia i ka pūnāwai ‘au‘au ona. Iā ia nō a hiki iho, ‘o ka pa‘a nō ia i ka pūliki ‘ia, a i hemo wale nō ‘o ia i ke kiko ‘ia ‘ana o ka helehelena a me nā lima o ke kanaka ‘ōpio e ka ‘io a lilo hou ‘o Keamalu i nā manu.

Ua lohe nā kahu hānai kupua o Keamalu i ka ‘ōlelo kīkoi a nā mākua o Kalehua‘ula a no laila, u ho‘oholo lākou e ho‘okūkū i ka u‘i o kā lākou me ka u‘i o Puna. Ua ho‘ouna ‘ia ke kanaka e hō‘ike i ko lākou nei mana‘o i nā mākua o Kalehua‘ula. I ko lāua lohe‘ana, ua ‘ae mai lāua me ke kānalua ‘ole, no ka mean, ua kaulana ka u‘i o kā lāua kaikamahine a puni ‘o Puna.

‘A‘ohe lāua i ‘ike he hānai ‘o Keamalu na nā kupua o Paliuli. Aea ka mea mua i ho‘oholo ‘ia, e ‘ako ‘o Keamalu i kāna pua a ho‘okomo i loko o kekahi ‘umeke nui, a ‘o Kalehua‘ula i kāna pua a ho‘okomo i loko o kāna ‘umeke, a ‘o ka ‘umeke e pōhai ‘ia ana e nā manu lā, ‘o kā ka u‘i ia.

I ka hiki ‘ana mai o ka lā ho‘o kūkū, ua piha kā Kalehua‘ula ‘umeke i ka hīnano a me ka lehua ‘ula, a ‘o kā Keamalu i ka maile a me ka lehua kea. Ua pōhai ‘ia ka ‘umeke a Keamalu e ka ‘i‘iwi a ‘o kā Kalehua‘ula ho‘i, ho‘okahi nō wahi nalo keleawe i lele mai a kau i luna o kāna mau pua. Ua nui a ho‘ohalahala o nā mākua o Kalehua‘ula i kēia a koi aku nei e ho‘okūkū a‘e i nā kaikamāhine. ‘O ka makemake nō ia o nā kupua a ua ‘ae lākou.

I kahi lā mai, ua kno ‘ia nā po‘e a pau e hele mai nei e nānā i kēia ho‘okūkū nui. I ka hō‘ea ‘ana mai o Kalehua‘ula, ua nui ka mahalo ‘ia o kona u‘i e nā kānaka, akā, i ka lawe ‘ia ‘ana mai o Keamalu e kona mau kahu hānai, ua ‘ike ‘ia a ‘ela ua ‘oi kona u‘i ma mua o nā u‘i ‘ē a‘e a lākou i ‘ike ai.

Ua ho‘ōho a ‘ela lākou i ka u‘i o kēia kaikamahine a ua ‘ā‘ume‘ume nā kānaka no kahi a lākou e ‘ike pono aku ai i kēia nani kamaha‘o. Ua hoka loa nā mākua o Kalehua‘ula a ho‘i me ka hilahila i kā lāua noho ‘ana i ka uka o Paliuli.

‘O ka pūnāwai o Keamalu, ua nalowale, a he kāka‘ikahi loa ka po‘e i hō‘ike ‘ia kēlā pūnāwai. [Pukui and Green 1995:120 and 121]

Translation:

Keamalu, or Clear Shade, lived in Paliuli, that wonderful land where Lā‘iekawai dwelt. She was brought up as carefully as Lā‘iekawai. Birds guarded her and fed her with lama, pi‘oi, and māmaki berries, and with the honey of lehua blossoms. She did not eat ordinary food; she was brought up on the food of birds.

A spring in the mountains of ‘Ōla‘a is called Pūnāwai o Keamalu, Spring of Clear Shade, and there Keamalu went to bathe. One day as she sat by the spring, a young man appeared to her and asked her to become his wife. She refused, for she did not want to marry, and when he insisted, the birds came and took the girl away on their wings. The young man returned to Puna, to his sweetheart Kalehua‘ula, the Red Lehua Blossom. While his body remained in Puna with that handsome woman, his thoughts were in the uplands of ‘Ōla‘a. Again and again he visited the uplands, finding no rest for his passion. Not finding Keamalu, he went back to Kalehua‘ula. Keamalu remained hidden in the house for fear of meeting the young man.

The parents of Kalehua‘ula heard how he was running after Keamalu, and they asked him teasingly, ‘Is the girl really so beautiful?’

‘Yes, she is really beautiful,’ replied the young man.

‘Our daughter is indeed beautifully formed. How can that common girl of the forest be compared to our daughter?’ Now it was true that Kalehua‘ula was beautiful, but her eyes were sullen.

Keamalu remained hidden until she thought that the young man had forgotten her; then she returned to the spring. But she was seized by the youth and released only when the hawk had scratched his face and arms. Then the birds carried her away once more. Keamalu’s guardian kupua heard of the slighting remarks made by the parents of Kalehua‘ula, and they determined to have a test of beauty between their child and the beauty of Puna. They sent a messenger to her parents, who accepted without hesitation, for their daughter was famous for her beauty all over Puna. They did not know that her opponent was the foster child of the kupua of Paliuli. Thus it was decided; Keamalu was to pick her flowers and place them inside a certain big gourd, and Kalehua‘ula was to place her flowers inside a gourd, and the gourd over which the birds hovered would be the winner.

When the day came for the contest, the Puna girl put pandanus blossoms and red lehua into her gourd; Keamalu filled hers with maile vine and white lehua. ‘I‘iwi hung over Keamalu’s flowers, while only a fly flew over those of Kalehua‘ula. The parents were angry and insisted that the girls themselves should be compared. This

was just what the foster parents wanted. Everyone was invited to come on that day and witness the great contest. When Kalehua‘ula appeared, all praised her beauty, but when Keamalu was brought forward by her foster parents, the people saw that she was more lovely than anyone they had ever seen. They struggled for places to see this incomparable beauty. The parents of Kalehua‘ula turned away in shame. The young man’s proposal for Keamalu was accepted, and the two were married and lived happily in the uplands of Paliuli.

As for the spring of Keamalu, it was hidden and is shown to very few people. [Pukui and Green 1995:32 and 33]

3.1.1 The Legend of Halemano

The legend of Halemano is told in the collections of Abraham Fornander’s *Collections of Hawaiian Antiquities and Folk-lore* (1916-1919). In this legend Halemano is stricken with love through a dream infatuation and dies. He is later restored to life by his sister Laenihi. Laenihi visits the lands of Puna in search of Halemanao’s *wahine o ka pō* or dream woman. This legend is filled with place names associated with the lands of Puna. Each place name has taken on a character role in this legend:

O Wahiawa ka makuakane, o Kukaniloko ka makuahine, O Kaukaalii ka makuahine o Kukaniloko, o Halemano e pili la me Lihue ka aina, i Waianae. Ma ka noho ana o Wahiawa me kana wahine o Kukaniloko, ua hanau ka laua mau keiki eono, eha, kane, elua whaine. Eia na inoa o na keiki a laua: maeaea ka mua, he hane ia; Kaiaka kona muli iho; Anahulu ka hope iho; Halemano ka pokii o lakou; Pulee he wahine ia; Laenihi he wahine akua ia.

O Laenihi ka mua, a o Halemano ka hope, oia ka mea nona keia kaao. I Kaaukahi i hanai ia ai o Halemano a nui, he kanaka maikai o Halemano ma kona kino, aohe puu, aohe kee, pali ke kua, mahina ke alo.

Ia Halemano e noho ana me kona kupunawahine me Kaukaalii, ma Kaau i Waianae, ua loaa ia Halemano ka moe uhane ma ia noho ana no Kamalalawalu. Oia ke kaikamahine a Hanakaulua me Haehae, no Kapoho i Puna, Hawaii. He mau alii na makua, no ia aina, a na laua o Kamalalawalu. He wahine maikai loa ia ke nana aku, a he wahine i oi mamua o ko Puna a me ko Hilo, he puupaa, a he kapu loa, aohe kanaka ike ia ia, aohe hoa noho, he kaikunane wale no kona hoa noho, o Kumukahi ka inoa; he mau ilio elua lau, ko lau amau hoa noho.

Ia wa e noho ana o Huaa he ‘lii no Puna, a o Kulukulua no Hilo, o laua e elua, e hookuli ana ia Kamalalawalu, i ka waiwai o Puna a me Hilo, me ko laua manao, na laua e wahi ke kapu o Kamalalawalu.

Ma ke moe mua a Halemano ma ka po akahi ua halawai uhane laua me Kamalalawalu ma Kaau, pela ko laua launa pinepine ana, a aloha o Halemano ia Kamalalawalu. No ke aloha o Halemano, ua waiho oia i ka ai a me ka ia, a ua pau kona manao i na mea e ae, o Kamalalawalu wale no kona manao nui i na la a pau loa; no keia manao pono ole ia ia, ua nawaliwali kona kino a make iho la.

No Laenihi, oia ko Halemano mua ponoi, ua hele oia ma na wahi a pau o keia mau kaapuni a pau, e imi i wahi na Halemano, kona kaikunane. Ua hele no hoi oia a kokoke i Puna, lohe e oia i ka make o Halemano, hoi e ia i kaau, ma Waianae, i Oahu nei; nolaila, loaa ole o Kamalalawalu ia ia. A hiki o Laenihi i Kaau, ma Waianae ma Oahu nei, he mana ko Laenihi e hooloa i na mea make, nolaila, ola hou o Halemano.

A ola o Halemano, ninau aku Laenihi: ‘Heaha ke kumu o kou make ana?’ I mai o Halemano: ‘He wahine. Eia kea no ke hiki mai, he wahine maikai loa o na maka a me ke kino, he lauoho kalole eleele, he wahine kiekie hanohano, kohu alii, ke nana e like me ke pele o Kauai a me ka mahina, a he pa-u nahenahe ulaula ma hope, he lei hala, me ka lehua ko ke poo, a me ko ka ai.’ I aku o Laenihi: ‘No Puna a me Hilo ka lehua, no Puna ka ouholowai o Laa, nolaila no ka pukohukohu, no Puna ko wahine, aole no ke komohana a ka la. Ina o ka wahine i lohe wale ai i Puna, o Kamalalawalu, he wahine maikai io no,’ pela aku o Laenihi ia Halemano.

Ninau aku o Laenihi i Halemano: ‘Ahea hiki ko wahine?’ I mai o Halemano: ‘Aia a moe iho wau, o ka manawa ia e hui ai maua; e hoolohe no auanei oukou i ke kamailio a maua, ke moe ae au.’ ‘Ae,’ wahi a Laenihi. ‘I moe olua auanei me ko wahine, e ninau aku oe i ko wahine, i kona aina a me kona inoa.’

A lohe o Halemano i na olelo a kona kaikuahine a Laenihi, mahope o laila, moe iho la laua me Kamalalawalu. Ma keia moe ana, ninau aku o Halemano ia Kamalalawalu. Mahope o laila, ala ae la o Halemano a olelo aku ia Laenihi, a lohe o Laenihi, olelo aku la iaia Halemano: ‘E ai oe i ka ai, e kii au i ko wahine i Hawaii.’ Ae mai o Halemano.

Mamua ae o ka holo ana o Laenihi i Hawaii, e kii ia Kamalalawalu, olelo aku ia na ouli o kona hele ana, a hope e hooiaio aku ai kona kii ana. Malaila ka loaa a me ka ole o Kamalalawalu. Eia na ouli a Laenihi olelo aku ai: ‘I ua ka ua, aia au i Molokai; olapa ka uwila, aia au i Maui; kui ka hekili, aia au i Kohala: nei ke olai, aia au i Hamakua; kahe ka wai ula, aia au i Puna. Alaila, loaa ko wahine ia‘u, nolaila e noonoo oukou i keia mau mea a‘u e olelo nei, o poina auanei.’ A pau ka olelo ana a Laenihi, hele mai la ia ma ke kino ia, o ia kela ia o Laenihi a hiki i keia la.

Holo mai la o Laenihi i ke ahiahi, a hiki i Haleolono ma Palaau i Molokai, ua ka ua. Kahaha o hope no ka hikiwawae loa. Malaila aku a Hanakaieie, ma Kahikinui i Honuaula, ma Maui, olapa ka uwila. Kahaha hou o hope no ka emo ole loa. Mai Maui aku a Umiwai, ma Kohala i Hawaii, kui ka hekili; malaila aku a Pololikamanu, ma waho o Mahiki i Hamakua, nei keolai. Malaila aku a hala o Hilo, a komo i loko o Panaewa, a hiki i Kukulu ma waho o Puna, kahe ka wai ula. Alaila, moomoo o hope nei, ua loaa o Kamalalawalu.

Ma keia hiki ana o Laenihi i Kapoho ma Puna i Hawaii, noonoo iho la ia i ka mea e ike ai ia Kamalalawalu, i loko o konakapu e paa ana, a loaa iho la. Eia kea no: Hoala mai la oia i ka makani, makai o Puna, he unuloa ka inoa o ia makani, a ala mai la ke kai mai kona lana malie ana, a hai a nalu iho la ma waho o Kaimu. Oia

kahi hee nalu mau in a wa a pau loa. I ke kakahiaka nui, hai mai la ka nalu mua, ala ae la na kanaka, a nana aku la me ka uwa nui loa, ma keia uwa ana, lohe aku la o Kumukahi, ke kaikunane o Kamalalawalu, hele mai la ia e nana i ka hai o ka nalu, a ike hoi aku la olelo ia Kamalalawalu. A lohe o Kamalalawalu, ala ae la ia a hele.

Olelo hoakaka no Kumukahi; ke kaikunane o Kamalalawalu. He punahele o Kumukahi i kona kaikuahine, aohe ana olelo hookahi e hole ia, e hiki i ka na kaikuahine kea e i na mea a pau a kona kaikunane e olelo ai, aole e hole, mai ka mea nui a ka mea liilii.

Hele aku la o Kamalalawlu eheenalu ma Kaimu; ia ia i hiki aku ai ma ka ae one, nana aku la ia i ka nalu i ka hai mai. Ku ka nalu mua, he kakala ka nalu mua, a ai ia, he pakaiea ka nalu alua, a hala ia, he opuu ka nalu akolu, a hala na nalu ekolu, au aku la o Kamalalawalu, e heenalu. A hiki i kahi o ka nalu e hai ana, hee mai la ia, ekolu nalu i hala ma kana hee ana, pio loa iho la ka nalu, aohe nalu o ia wa; kakali iho la ia, me ka manao e ku hou mai ua nalu hou, pela kona lana ana a opili ia, manao iho la e hoi i uka.

Ia wa hoala hou o Laenihi i ka nalu, a ike o Kamalalawalu, hee hou iho la ia, a kokoke e pae i uka, ililo iho la ka nalu ana i hee ai i ia, pau ae la ka nalu. O keia ia, o Laenihi no ia, ua lilo iho la ia, i ia, ia wa. A ike o Kumukahi ke kaikunane aloha a Kamalalawalu i ka ia, kahea aku la ia, penei: ‘E Kamalalawalu e! Kuu puni o ka ia.’ Aole e hiki ia Kamalalawalu ke hole, no ka mea, he leo no kona kaikunane. Lalau iho la i ka ia a hoi aku la i ka hale, hoo iho la i loko o ka ipu wai a lilo ae la ia i milimili na kona kaikunane.

I ka po, ka moe ana o loko o ka hale, lilo ae la o Laenihi mai ke kino ia, a ke kino moa, ia wa lele ae la a ma ka haka moa o waho kani, pela kona kani ana, a pau na moa elima. Wehe mai la ka alaula o ke kakahiaka nui, iho aku la ia me ke kino moa a hiki i kahakai, lilo ae la i kino wahine. Pii mai la o Laenihi me ke kino wahine a hiki i ka hale o Kamalalawalu ma e noho ana. Ninau aku o Kamalalawalu: ‘Mahea mai oe?’ ‘Maanei mai nei.’ ‘Aohe o onei wahine e like me oe, a ina no hoi no anei aku nei, aole no e hele mai ianei, he kapu o anei, he make.’ Wahi a Laenihi: ‘Makai mai nei.’ ‘Ae, ina pela kau olelo, he oiaio, e ae aku wau.’ Ninau hoohuahualau aku o Laenihi: ‘Aole au kane i moe i ka uhane?’ ‘Aole,’ wahi a Kamalalawalu. I hou aku o Laenihi: ‘Aole ou lei i lei ai a maloo?’ He lei no, aole nae e loaa aku ia oe, mamuli au make ia oe. I mai o Laenihi: ‘Heaha la hoi e haawi mai oe ia‘u, a i mai oe, kii ae no ia‘u e hele mai e lapaau ia oe, aia ko‘u wahi i Kaimu, o Nawahinemakaakai ko‘u inoa.’ Lilo ka lei ia Laenihi, nonoi hou o Laenihi i ka pa-u, haawi no o Kamalalawalu, alua mea e lilo ia Laenihi.

A loaa keia mau mea ia Laenihi, hoi mai la ia mai Hawaii mai a hiki i Waialua, a kahi o Halemano e noho ana, hoike aku la o Laenihi i ka lei, a me ka pau, ia wa, wikiwiki iho la o Halemano e holo i Hawaii, hoole mai o Laenihi: ‘Aole e loaa pela. Eia ka mea e loaa ai, e hana i milimili na ke kaikunane punahele o Kamalalawalu, o Kumukahi ka inoa, no ka mea, ua ike aku nei au, o kana mea e olelo ai, oia ka

kona kaikuahine e hana ai, aole ia e hoole i na leo a pau a kona kaikunane e pane ai.’

Nolaila, olelo o Laenihi, e kalai kii, mai Waialua a Waianae, e paele i ka alaea a me ke nanahu, a e hana i moa laau, hooholoholo i luna o ka nalu, a i koieie i luna o ka wai, a i lupe hoolele i luna. I waa ula, i kanaka ula, i la ula, he hoe ula, he haulaula, a he waa nui, a he waa iki. A makaukau keia mau mea a pau loa, holo aku la lakou a hiki i Puna ma Hawaii, he mau aina liilii e pili ana i Puna, o Makuu, o Popoki; i laila hoolele ka lupe, uwa o uka i keia mea lele.

Ia lakou e uwa ana, lohe aku la o Kumukahi, ke kaikunane o Kamalalawalu, hele mai la ia e nana, a like ia, holo mai la a kae one e pili ana me ke kai, kahea mai la i na kanaka o luna o ka waa: ‘Na‘u ka mea lele.’ I aku o Laenihi ia Halemano: ‘Haawi ia aku na ke keiki.’ A lilo ka lupe ia Kumukahi. Hookuu ka waa liilii i luna o ka nalu, uwa hou o uka; alaila, kii hou o Kumukahi, a nonoi aku penei: ‘E kela waa, keia waa, e na mea i luna o ka pola, na‘u ka waa liilii.’ Ae aku o Laenihi. Pela wale no ka hana ana a hiki i ke kii, hoolale ae ana o Laenihi i na waa a pau, e kukulu kii o kela waa kei waa, ma keia ku ana o na kii a pau loa, huli hou o Kumukahi a nonoi hou i na waa, nana na kii.

Olelo aku o Halemano a me Laenihi: ‘He punahele no oe i ko kaikuahine?’ ‘Ae,’ pela mai o Kumukahi; ‘ma ka‘u e olelo ai, malaila ia.’ ‘Kahea ia hoi ha.’ Kahea o Kumukahi: ‘E Kamalalawalu e! Hele mai, aia ka a hele mai oe, alaila, loaa kuu milimili.’ A hiki o Kamalalwalu, olelo hou lakou la: ‘He punahele no auanei oe i ko kaikuahine, ke olelo aku oe e huli aku kea lo mahope, a o ke kua mamua nei?’ ‘Ae,’ A huli kua aku la o Kamalalawalu, nana aku lakou ma ke kua, ahoe puu, ahoe kee. A pau ko lakou nana ana, olelo hou lakou i ke kaikunane. ‘He punahele no oe i ko kaikuahine ke olelo aku e huli mai kea lo i mua nei?’ ‘Ae,’ a huli mai la kea lo o Kamalalawalu.

Ia wa, pii o Kamalalawalu i luna o na waa; a hiki ia i luna, kahea o Halemano i ka poe hoewaa e hoe, ia wa lilo laua elua i Oahu nei. Hahai mai la o Puna a me Hilo, aohe launa mai, hao mai la ka mana o na waa o Halemano a me Laenihi.

Ma keia holo ana, pae ae la kekahi waa me Kumukahi i Hauula ma koolauloa. Ilaila kekahi kii e ku ana, o Malaekahana ka inoa, hoohihi iho la o Kumukahi i ke kii, noho iho la i laila. O Halemano, holo loa aku la lakou a pae ma Waialua i Ukoa, me Kamalalwalu. Ma keia pae ana, ua holo koke ka luna kala a puni o Waialua a me Waianae, e hele mai laua e hookupu ia Kamalalawalu.

A pau ka hookupu ana, ekolu la i hala, haohao o Kamalalawalu ia Kumukahi i ka ike ole ia aku. Ninau aku la ia ia Halemano a me Laenihi: ‘Auhea O Kumukahi?’ ‘Aia i Hauula, ua noho ia puni ana o ke kii.’ I aku o Kamalalawalu: ‘E kii aku a hoi mai.’ A hoi mai la o Kumukahi, olelo aku la o Kamalalawalu: ‘E hoi oe me ka waiwai i Hawaii, i na makua o kaua a me na makaainana, o poino mai kekahi o lakou.’ Ia wa, hoi aku la o Kumukahi i Hawaii.

Ia wa ma kēia mo‘olelo, no ka lohe ‘ana o ‘Ainkanaka, ka mō‘ī o O’ahu, i ko Kamalalwalu u‘i, ki‘i ia ‘oia. No kona ko‘oko ‘ole ‘ana i ke Kauoha, ho‘ouna o ‘Aikanaka i ka pū‘ali koa e kaua iā Halemano. Me ka wahine a me ka kupunawahine, he‘e lākou i Moloka‘i, alaila, i Kaupō, Kohala a me Hilo. Lawe ‘ia ‘O Kamalalawalu e Hua‘a. Ho‘i ‘O Halemano i Kohala. Hahai kana wahine. Puni hei ‘ia ‘O Kamalalawalu. Ko Halemano make ‘ana. Ho‘ōla hou ‘ia e Laenihi, kona kaikuahine kupua. No ko Halemano ho‘ōla hou ‘ia ‘ana. ‘Imi ‘O Halemano i wahi e ho‘i mai ai kana wahine. Komo ‘oia ike kilu ‘ana eo iāia. Kā‘ili ‘ia e Kikeka‘ala mai a Kamalalawalu:

A pau ka olelo ana no ka pili alaila, hoolei mai la o Kikekaala i ke kilu, aole i pa i ka pahu, lalau iho la o Halemano, a paa i ka lima, nana aku la a o ka noho mai a ka wahine, o Kamalalawalu me kona nani mae ole, hu mai la ke aloha ia Halemano no ka noho ana ia Puna me ka wahine. Nolaila, kau aku la o Halemano i keia kau olioli, no Kamalalawalu, penei:

Alahula Puna i ke ahi a Laka,

E halaoa mai ana i kuu maka.

Ka ulu hala i kai o Kookoolau,

He ane lalau ko‘u ia oe;

O keia mea o ka hilahila, hoi no ai.

Auwe kuu wahine – a!

Kuu wahine mai ke kai nui o Puna

Ke kapi ae la i na pali kahakai.

Kaha ke aloha hoolalau i Kaimu,

Mu ka waha heahea ole mai.

Kuu wahine o ka hale makamaka ole,

O ia hale kuleana ole a‘u i alo ai,

I pukui aku ai au me ka la i Maliu – e!

E maliu i kuu leo uwalo!

Kuu wahine hoi – e – a.

A pau ke oli ana a Halemano, pehi aku la ia i ke kilu, a pa i ka pahu, alaila helu mai la ka helu ai, penei: ‘Auwe! Auwe! Akahi kaua i lalo la.’ Lalau hou o Halemano i ke kilu a paa i ka lima, nana aku la no i ka wahine a o ka noho mai, aohe like o ka maikai me ko na wahine e ae, he oioi wale no kela o ka nani a me ke kelekela, nolaila, nana aku la a kulu haloiloi iho ka waimaka. Hu mai la ke aloha o ka wahine, i ka hele i ka hala o Puna, a me ka heenalu i Kaimu, alaila, oli aku la:

Ke kua ia mai la e ke kai ka hala o Puna,

E halaoa ana me he kanaka la,

Lulumi iho la i ke kai o Hilo – e,

Hanuu ke kai i luna o Mokuola.

Ua ola ae nei loko i ko aloha –e,

He kokua ka inaina o ke kanaka;

Hele kuewa au i ke alanui e,

Pela, peia, pehea au e ke aloha?

Auwe kuu wahine –a!

Kuu hoa o ka ulu hapapa o Kalapana,

O ka la hiki anuanu ma Kumukahi.

Akahi ka mea aloha o ka wahine,

Ke hele nei a wela kuu manawa,

A huihui kuu piko i ke aloha,

He aie kuu kino na ia la –e.

Hoi mai kaua, he a‘u koolau keia.

Kuu wahine hoi e, hoi mai.

Hoi mai kaua e hoopumehana,

Kamakamaka o ia aina makua ole.

A waiho o Kamalalawalu i ke oli ana, huli ae la ia a nana aku i ke kane ia Halemano, i nana aku ka hana, e nanahu mai ana o Kikekaala i ka aoaao o Halemano, kau hou aku la o Kamalalawalu i keia oli:

Hoolawehala ka nanahu a ke kupa,

Akaaka ka malihini he mea hewa ia,

Puni hoi i kua awa a ka wahine,

I wahine au i kane oe,

Kuu kane o ka ua kanikani lehua o Makaulele

Ke haki manua mai la i ka lae o Kumukahi;

Akahi la a ke aloha i hiki ai.

Ke olewa nei ka nuku wai o Ohele,

Ke kaoo ae la ia uka o Piihonua,

Kuu kane hoi o ka hale wai anu o Hilo e!

A pau keia oli ana a Kamalalawalu, lawe aku la na ilamuku o Kikekaala a ma kahi e hoonoho, alaila, oli hou Kamalalawalu, penei:

A pa ka makani he Koolauwahine,

E ike aku auanei oe ia Haili,

Haili kula lehua i wilia e ka manu;

Ke lawe la ke awa kau laau o Puna,

Ka oo kani leo lea i ka nahele,

E ano wale mai ana no i ke ahiahi.

Kuu hoa o ka hale wai anu o Hilo,

O ia hale koekoe a kaua i alo ai,

Auwe kuu kane aloha e!

A pau ke oli ana a Kamalalawlu, olelo aku o Kikekaala: ‘Aole au kane, no ka mea, he wahine haalele kane oe, a eia ka e kii hou mai ana; aole e hoi aku ke kane me oe.’

Ma‘ane‘i kakou e ike ai ma ka mokuna a‘e ka ho‘i o Halemano i O‘ahu, alaila, i Kaua‘i. Hahai ‘O Kamalalawalu iāia, alaila, noho a ho‘okahuahale ‘oia ma O‘ahu. Ho‘ouna o Hua‘a a me ke ali‘i o Hilo i kekahi pū‘ali e ki‘i iāia. Mahope o ka luku ‘ia ‘ana o ko O‘ahu mau kanaka, ho‘iho‘i ‘ia ‘oia i Hawai‘i:

I aku o Huaa ke ‘lii o Puna ia Kulukulua: ‘E, o na kahuna a me ke kilo, ke kuhikuhi puuone, ke hai mai i ka pono o keia hele ana aku.’ A hiki lakou i mua o na ‘lii, olelo mai na ‘lii: ‘O ka oukou ike ke olelo mai.’ Olelo aku ke kilo o Kalapana: ‘E moe hou kakou i anei, i keia la a me ka po, apopo kakou holo.’ Ae mai na ‘lii; moe lakou a ao ae, hai aku ke kilo, i kana olelo ike, penei: ‘I holo kakou i ka moana, a i uhi ka noe ma ka hikina, na kakou ka make, a ina i pamaloo a pae kakou i uka, na O’ahu ka make. Eia ka lua: i halii ka ua koko i ka moana a hiki i ka aina, hee o Oahu ia kakou.’

A pau ka olelo ana a ke kilo, holo aku la lakou, a pae ma Makapuu, hoonoho ke kaua. Ma keia holo ana i ka moana, ua uhi ia e ka noe, a me ka ua koko, e like me ka maka ke kaua, ma ia kaua ana, ua hee honua o Oahu nei, a ua luku ia o Waiahole, a o Kamalalawalu hoi kai loaa aku e ola ana, a hoi ae la ia me na ‘lii o Hawaii, o ia o Huaa a me Kulukulua, a hoi aku la lakou i Hawaii. [Fornander 1918:5:228–262]

Translation:

Wahiawa and Kukaniloko were the father and mother of Halemano. Kaukaalii was the mother of Kukaniloko, and the land of Halemano, which is next to Lihue in Waianae, is the place where Halemano was born. Through the married life of Wahiawa and Kukaniloko, his wife, six children were born to them, four males and two females. The names of the children were as follows: Maeaea, the first, was a

male; Kaiaka, the second, was also a male; Anahulu, the third, was another male; Halemano, the youngest of the children, was another male; Pulee was a female; Laenihi was a female with supernatural powers.

Laenihi was the eldest, and Halemano, the youngest [of the family], and the hero of this story. He was nurtured in Kaau until he grew up, and became a very handsome man, perfect in form, without pimples or deformity, with straight back, and open countenance. While Halemano was living with his grandmother, Kaukaalii, at Kaau, in Waianae, he was subject to dreams.

Concerning Kamalalawalu: she was the daughter of Hanakaulua and Haehae of Kapoho. She was a very beautiful woman to behold, far superior to all the women of Puna and Hilo, a virgin, brought up under very strict kapu; no person was allowed to see her and she had no companion other than her own brother, Kumukahi. These two had eight hundred dogs for their companions.

At this time Huaa was the king of Puna, and Kulukulua was the king of Hilo. Both of these kings were courting Kamalalawalu, giving her large quantities of properties from Puna and Hilo, with the idea that in time one of them would win her hand and take her to wife.

In Halemano’s first dream, he dreamed that he met Kamalalawalu in Kaau. After that he met her in his dreams frequently, and this happened so often that he fell deeply in love with the object of his dreams. Because of this great love, Halemano refused to take food and meat, and he denied himself everything; his whole mind was centered on Kamalalawalu, both night and day. And because of this he became very ill and finally died.

Laenihi, who was the elder of Halemano, in the meantime was traveling from place to place in search of a site for Halemano her brother. In her search she went until near Puna, when she was recalled upon hearing of the death of Halemano which forced her to return to Kaau in Waianae, Oahu. Because of this she failed to meet Kamalalawalu. When Laenihi arrived at Kaau, through her power to restore the dead to life, Halemano was again brought back to life.

Shortly after Halemano was restored to life, Laenihi asked him: ‘What was the cause of your death?’ Halemano replied: ‘It is because of a woman. This is the manner of her appearance [in my dreams]: she is very beautiful; her eyes and body are perfect; she has long, straight, black hair; is tall, dignified, and seems to be of very high rank like a chieftess.’ Laenihi again asked him: ‘What is the nature of her outward dress?’ ‘Her dress seems to be scented with pele and mahuna of Kauai, and her pa-u is made of some very light material dyed red. She wears a hala wreath and a lehua wreath on her head and around her neck.’ Laenihi then said: ‘It is in Puna and Hilo that the lehua blossoms are found. It is in Puna that the ouholowai of Laa and the pukohukohu are found; therefore, your lover must be a woman of Puna; she is not of the west. If it is Kamalalawalu, the woman I heard so much of while in Puna, then she must be very beautiful indeed.’ Laenihi then again asked:

‘How do you meet her?’ Halemano replied: ‘When I fall asleep we meet very soon after, and you could hear us talk if you should listen; even now you could hear us if I fall asleep.’ Laenihi then said: ‘Yes, you may go to sleep now. If you should meet your lover, ask her to give you her name and the name of the land in which she lives.’

After Halemano had received these instructions he fell asleep and again met Kamalalawalu. In this dream Halemanao asked Kamalalawalu: ‘What is the name of the land of your birth and what is your name?’ ‘Kapoho in Puna, Hawaii, is the land of my birth; it is where the sun rises, and not in the west. My name is Kamalalawalu.’ Shortly after this Halemano awoke from his sleep, and he told Laenihi of his dream. When Laenihi heard this she said: ‘You must partake of some food and I will go and bring you your lover from Hawaii.’ Halemano then consented and took some food.

Before Laenihi set out for Hawaii to bring Kamalalawalu, she told of the signs of her going so as to make known to those behind of her arrival and coming home, whereby they could tell whether her mission was a success or not. The signs were as follows: ‘If it rains then I am at Molokai. If the lightning flashes, then I am at Maui. If it thunders, I am at Kohala. If you feel an earthquake, I am at Hamakua. If the red water flows, I am at Puna. If the signs show that I am at Puna, then you can be sure that I will be able to get your lover. You must consider these things I am telling you, else you will forget.’ Soon after this Laenihi went off in the form of a fish; and the fish called Laenihi is named after her. This is the name of the fish to this day.

It was in the evening that Laenihi set out and when she was off the coast of Haleolono in Palaau, Molokai, it began to rain [in Oahu]. Those with whom she had left the instructions were surprised at the speed she was traveling. From this place she next passed off Hanakaieie at Kahikinui in Honuaula, Maui, and the lightning flashed. The people were again greatly amazed at her great speed. From Maui she next passed off Umiwai in Kohala, Hawaii, when the people heard the roar of the thunder; then when she was off the coast of Pololikamanu outside of Mahiki, Hamakua, the people felt an earthquake. Next she passed Hilo and then off the coast of Panaewa, then off Kukulu, directly outside of Puna, when the red water flowed. At sight of this the last sign the people knew that Laenihi had reached Kamalalawalu.

When Laenihi arrived at Kapoho in Puna, Hawaii, she began to devise a way by which she would be able to meet Kamalalawalu, as she was then within the confines of her kapu place. At last Laenihi hit upon a plan. She, through her power, first caused the wind from the sea to blow, called the unuloa, which caused the sea to be aroused from its calm repose and the surf off Kaimu began to roll in. It is here that the people at all times go in surf riding. Early that morning the surf began to roll in. When the people rose from their sleep and saw the surf, they all began to shout and yell. While the people were shouting, Kumukahi, the brother of Kamalalawalu

heard it and he came out to see the cause, and saw that it was the surf; so he returned and told Kamalalawalu of the matter. On hearing this she rose and prepared to go out [surfing riding].

A few words in relation to Kumukahi the brother of Kamalalawalu. Kumukahi was a great favorite with his sister, not a single request would be refused by his sister that she could comply with, from the greatest to the smallest.

When Kamalalwalu saw the surf rolling in at Kaimu she started out for the beach. Upon arriving at the place she stood on the sand and watched for a chance to swim out. She allowed the first roller, known as the kakala, to come in until it reached the shore; then the second, known as the pakaiea; the third, the opuu; as soon as this roller reached the shore, she plunged in and swam out to the place where the rollers began to curve up. When she arrived at this place she took the first roller that came along and rode in on it. This she repeated three times, when the surf began to grow smaller till after a short while there was none to be seen. She then waited with the hope of again seeing the surf grow larger; but after waiting until she was almost stiff with the cold not a single surf could be seen; so she concluded to return to the shore.

At about this time, Laenihi caused the surf to rise again and it began to roll in. When Kamalalawalu saw this she again returned and took the first surf and rode in, but before she reached the shore it ceased and the surf again disappeared. Just as she reached the shallow water she saw a fish and Kumukahi at the same time called out to her: ‘Kamalalawalu, take up my favorite, the fish.’ This fish was Laenihi herself. Kamalalawalu could not refuse the request of her brother; so she took up the fish and returned home. After arriving at the house the fish was put into a calabash of salt water and it became a plaything for Kumukahi.

That night after everybody had fallen asleep, Laenihi transformed herself from a fish to a rooster; it then flew onto the roosting place outside and began to crow. The crowing was kept up until the dawn began to break. The rooster then proceeded down to the seashore where it transformed itself into a woman. Laenihi then returned to the house where Kamalalawalu was living. When she arrived at the house Kamalalawalu was living. When she arrived at the house Kamalalawalu asked her: ‘Where are you from?’ ‘I am from near here.’ ‘There is no woman like you near here, and even if you belonged to any place near, you would not come, because they all know that people are forbidden from coming here on pain of death.’ Laenihi then proceeded to speak of her errand: ‘Have you ever met a man in your dream?’ ‘No,’ said Kamalalawalu. Laenihi again asked: ‘Have you no wreath that you have worn until withered?’ ‘I have a wreath, but I am not going to give it to you, for you may cause my death with it.’ Laenihi replied: ‘All right, you give it to me and in case you should become ill, come for me and I will come and cure you. I am living at Kaimu; my name is Nawahinemakaakai.’ Laenihi took the wreath and then asked for the pa-u of Kamalalawalu which was also given up.

After Laenihi had received these things she returned from Hawaii to Waialua and from there on to where Halemano was living. Laenihi then showed him the wreath and pa-u. Upon seeing these things Halemano hastily prepared himself to go to Hawaii; but Laenihi rebuked him, saying: ‘You will not be able to get her in that way. Here is the way to get her: You must first make some playthings for the favorite brother of Kamalalawalu, Kumukahi by name; because I have seen that whatever things he desires his sister would always do; she will deny nothing that her brother requests of her.’

Laenihi then instructed the people of Waialua to Waianae that wooden idols be hewed out and that they be painted red and black. Orders were also issued that wooden chickens be made to ride on the surf, also koieie floaters, and kites to fly above; also that a red canoe be prepared and red men be had to paddle the canoe. The men should be provided with red paddles and the canoe must be rigged with red cords, and they set out for Puna, Hawaii. Upon their arrival off of Makuu and Popoki, two small pieces of land next to Puna, the kite was put up. When the people on the shore saw this flying object they all shouted with joy.

While the people were shouting Kumukahi, the brother of Kamalalawalu, heard it and he came out to see the cause of the shouting. When he saw the kite he ran to the beach and called out to the men in the canoe: ‘Let me have the thing that flies.’ Laenihi said to Halemano: ‘Let the boy have the kite,’ and it was then given to Kumukahi. The small canoe was then let down and as it floated through the surf the people ashore again shouted with joy. Kumukahi turned back and called out to those in the canoe, saying: ‘Let me have that small canoe.’ Laenihi gave her consent. He then requested all the things exhibited by the people until the idols were the only things left. Laenihi then ordered that the idols be made to stand up in all the canoes. When Kumukahi saw the idols he asked that they all be given to him.

At this Laenihi and Halemano said: ‘Are you a favorite with your sister?’ ‘Yes,’ answered Kumukahi, ‘She will do anything I ask of her.’ ‘Call for her then.’ Kumukahi then called out: ‘Kamalalawalu, come here. I cannot get these playthings unless you come.’ Upon the arrival of Kamalalawalu another request was made of Kumukahi: ‘Are you a favorite with your sister, and would she mind if you asked her to turn her back this way?’ ‘Yes.’ Kamalalawalu then turned her back toward the canoes. The people then looked at her and saw that she was neither humped back nor deformed in any way. After inspecting her they said to the brother: ‘Are you a favorite with your sister, and would she obey you if you request of her to turn her face this way?’ ‘Yes,’ Kamalalawalu then faced toward the canoes.

Soon after this Kamalalawalu went aboard one of the canoes; whereupon Halemano gave orders to the paddlers that they start on their return, and the two were thus carried off to Oahu. The people of Puna and Hilo pursued them but could not come near them, as by the power of Halemano and Laenihi they were soon left far to the rear.

In this flight to Oahu on canoe, the one in which was Kumukahi, landed at Hauula, Koolauloa. There was at this place an image standing, Malaekahana by name: upon seeing this image, Kumukahi took such a fancy to it that he remained there. Halemano and the others, together with Kamalalawalu, continued on their way and landed at Ukoa at Waialua. As soon as the canoe in which Kamalalawalu was a passenger landed, a crier was sent out to make a circuit of Waialua and Waianae with orders to the people to come and give presents to Kamalalawalu.

About three days after the hookupu, Kamalalwalu for the first time missed Kumukahi, so she asked of Halemano and Laenihi: ‘Where is Kumukahi?’ ‘He is at Hauula where he is enraptured by an image that is there.’ Kamalalawalu then said: ‘Go and bring him here.’ When Kumukahi arrived, Kamalalawalu said to him: ‘You had better return to Hawaii with the presents to our parents and to our people, else some of them will feel troubled over us.’ Kumukahi in obedience to his sister returned to Hawaii.

At about this time in this legend Aikanaka, King of O‘ahu, hearing of Kamalalwalu’s beauty, sends for her. Refusing to comply with the mandate, Aikanaka sends an army against Halemano. With his wife and grandmother, they flee to Moloka‘i, thence to Kaupō, Kohala, and Hilo. Kamalalawalu is taken by Huaa. Halemano returns to Kohala. His wife follows. Later Kamalalawalu is enticed away. Halemano dies. He is brought to live again by Laenihi, his supernatural sister. Halemano seeks to win his wife back. Engaging in a kilu contest and is victorious Kamalalawalu is supplanted by Kikekaala:

As soon as his wager was settled Kikekaala began by throwing the kilu at the mark; but it missed and Halemano picked it up. As he looked and saw Kamalalawalu sitting there in all her grace, his mind went back to the days when he and his wife lived in Puna; so he chanted a few lines to Kamalalawalu as follows:

A kapu is placed over the roads of Puna by the fire of Laka,

For I see its reflection in my eyes.

It is like the breadfruit in the lowlands of Kookoolau;

I am almost tempted to pick it;

Being repelled by shame, I touch it not.

Alas, my love!

My love from the big sea of Puna

Whose waves beat on the sea cliffs.

You forget your lover while went astray in Kaimu,

Your mouth was closed, refusing to call.

My love of the home where we were friendless,

That home to which we had no claim, though I made no complaint,

Where I drew warmth from the sun at Maliu.

Take heed to my supplications

My own, my love!

At the close of the chant of Halemano, he threw the kilu and it hit the mark, where at the game keeper said: ‘Alas, alas, we count one downs!’ Halemano again picked up the kilu and held it in his hand; then looked at his wife, whom he saw was not like the other women, being far superior in looks, therefore his eyes were filled with tears, and a great love for his wife came over him as he remembered their walks amidst the hala trees of Puna, and their surf riding at Kaimu; he therefore chanted the following lines:

The sea is cutting down the hala trees of Puna,

They stand up like people,

Like a multitude in the lowlands of Hilo.

The sea is rising by steps to flood Mokuola.

Life is once more alive within me for love of you,

For anger is a helper to man.

As I roamed over the highways friendless,

That way and this way, what of me my love?

Alas, my own dear love!

My companion of the low hanging breadfruit of Kalapana,

Of the cold sun that rises at Kumukahi.

The love of a wife is indeed above all else,

For my temples are burning,

And my middle is cold because of your love,

And my body is under bonds to her.

Come back to me, for this is a Koolau sphere,

My love, come back.

When Kamalalawalu ceased chanting, she turned and looked at Halemano. When she did, she saw Kikekaala biting Halemano on the side, so she chanted the following lines:

The bite of a native is a sign of treachery;

The stranger laughs, for it is a sign of evil;

For you are then surrounded by fine rain from the goddess.

I must be your wife and you my husband,

My husband of the Kanikani rain of the lehua trees of Makaulele.

It is being broken in large pieces at Kumukahi Point,

For love has come for the first time this day.

Like the mouth of the Ohele stream, it is changeable,

For the clouds are gathering in the uplands of Piihonua,

O my love of the cold, watery home of Hilo!

At the close of the chant, Kamalalawalu was removed by force by the officers of Kikekaala to some other place. As she was being led away she chanted these lines:

The wind is blowing, it is the Koolauwahine.

You will surely see Haili,

Haili the plain of lehua entwined by the birds;

They are carrying away the awa of Puna that grows on trees,

The sweet notes of the oo of the forest,

Whose sweet notes can be heard at eventide.

My companion of the cold, water home of Hilo,

That cold wet home where you and I lived,

O my own beloved husband!

At the end of this chant Kamalalawalu, Kikekaala said to her: ‘You have no husband because you are a woman who has deserted her husband. I see that you have come back to him, but he will not go back to you.’

Here we shall see in the next chapter Halemano returns to O‘ahu, thence to Hawai‘i. Kamalalawalu follows him, thence she leaves and settles on O‘ahu. Hua‘a and the King of Hilo send an army to secure her. After a slaughter of O‘ahu forces she is taken to Hawai‘i:

On the next day Huaa, the king of Puna, said to Kulukulua: ‘Let us consult the priests, the astrologers and diviners as to our proper course and also as to the outcome of this expedition.’ When the priest, astrologers and diviners came in the presence of the two kings, they were asked: ‘Let us hear what you have to say as to our future course?’ The astrologer from Kalapana then spoke out: ‘Let us again spend this day and night in this place and tomorrow we may continue on our journey.’ The two kings consented to this and another night was spent at the place. On the next day the astrologer said: ‘If after we set out a thick fog comes from the east, we will win the day; but if hot, warm weather is encountered all the way until

> we land, Oahu will be victorious. The second sign is this: if we encounter a heavy rain and the rainbow is seen and these things keep up until we reach land, we will route Oahu.'
>
> At the end of the astrologer's predictions, the canoes once more set sail and landed at Makapuu, where the armies were placed in line of battle. In coming across the channel they encountered a thick fog and rain, the signs of victory predicted by the astrologer. After the armies were placed in line they advanced overland, going by way of Kaneohe. At Kaneohe proper they met the enemy and the fighting began. Early in the battle Oahu was routed and a great slaughter took place at Waiahole. After the battle Kamalalawalu was found, still alive, and she was taken by the kings of Hawaii, Huaa and Kulukulua, to Hawaii. [Fornander 1918:5:228–262]

3.1.2 Pele and Kamapua‘a

This Pele and Kamapua‘a legend was written in serial form in the Hawaiian newspaper *Ka Leo O Ka Lāhui* from 22 June 1891 to 23 July 1891, and portions were recently compiled and translated by Lilikalā K. Kame‘eleihiwa (1996).

Kamapua‘a traveled to the Puna District in Hawai‘i to seduce the Hawaiian goddess Pele, but she spurned him and tried to chase him away with her lava flows.

> Then Kamapua‘a began to run in this pig form. He sprang forward through the great *lehua* forest, from the mountains to the sea. . . . Pele began to eat. All of these trees were destroyed in the mystical eating by Pele. The upper heavens became very dark with smoke. No one could be seen. Kamapua‘a could only cling to a clump of *‘ama‘uma‘u* fern. The fires burned until they found the bristles, that is, the curly pig bristles. The stench of burning pig bristles went out and surrounded the islands. [Kame‘eleihiwa 1996:95]

Kamapua‘a escaped to another area of Puna, where the people were enjoying riding down a *hōlua* slide, but Pele soon followed:

> Pele saw her opponent run into the distant forest, so she sent her fire on before her with great force. It chased after this little pig until he was very close to the water's edge. There was no hope for his life.
>
> This one [Kamapua‘a] leaped into the sea, changing his body into the *humuhumuāpua‘a* [a variety of triggerfish]. Pele's people, the Hi‘iaka sisters, stood upon the plain. Pele's people had indeed been thwarted. [Kame‘eleihiwa 1996:103]

3.1.3 Legend of Kumukahi

Kumukahi is briefly mentioned in several legends and has different personalities. The compilation below creates a story from varying sources with characters named after famous places in the district of Puna. Kumukahi, the easternmost cape of Hawai‘i Island, is named for a migratory hero from Kahiki who stopped here and who is represented by a red stone. Two of his wives, also in the form of stones, manipulate the seasons by pushing the sun back and forth between them. (Pukui et al. 1984:390–391).

Kumukahi and his brother Palamoa came from Kahiki to Hawai‘i long ago in the time when the gods still walked on earth. Some say he was a relative of Pele (Beckwith 1970:119). Others say he came with his older brother, the great chief Moikeha (Fornander 1918:4:114). With their sister Kahikinaakala "the sunrise," they took the form of mortals and settled in Puna at the most easterly point of land in the Hawaiian Islands, Cape Kumukahi (Komori 1987:17).

Kumukahi had four wives: Kanono, Pa‘upo‘ulu, Ha‘eha‘e, and Kanaka‘ulua (some say Ha‘eha‘e was Kumukahi's youngest brother [Fornander 1918:4:114]) The wives manipulated the seasons by pushing the sun back and forth. They were later seen as four large stones spaced evenly apart at Cape Kumukahi, and were used to calculate the solstices of the sun. The literal translation of "Kumukahi" is "first beginning" (Pukui et al. 1974:124).

Sun worshipers brought their sick to be healed at Cape Kumukahi. Along with the lake at Kapoho Crater, Kawaiapele, it was one of the stops on the "journey of health" frequently made by those who had recovered from illness (Westervelt 1916:28–29).

At some point Pele destroyed Kumukahi and his family as mortal beings. However, they were powerful *‘aumakua* (family guardians). Kumukahi could take the form of a man or a *kōlea* bird (the migrant plover). Palamoa could take the form of a rooster (Komori 1987:17).

3.1.4 Legend of Kumukahi, a Chief of Puna

A chief of Puna who delights Pele and later ridicules her is covered by lava and formed into Cape Kumukahi:

> Kumukahi was a chief who pleased Pele. According to the legends he was tall, well built, and handsome, and a great lover of the ancient games. Apparently he had known Pele only as a beautiful young chifess; for one day, when he was playing with the people, an old woman with fiery eyes came to him demanding a share in the sport. He ridiculed her. She was very persistent. He treated her with contempt. In a moment her anger flashed out in a great fountain of volcanic fire. She chased the chief to the sea, caught him on the beach, heaped up a great mound of broken lava over him, and poured her lava flood around thim and beyond him far out into the ocean.
>
> The tradition says Cape Kumukahi, the southeast point of the island of Hawaii, was formed. Here kings, chiefs, and priests have come for ages to build great piles of lava rock with many ceremonies. [Westervelt 1916:27–28]

3.1.5 The Legend of Kahawali

This legend takes place in the lands of Kapoho, Puna on a hill famed for the racing of the *hōlua* or sleds:

> The chief of Puna and his favorite companion, Ahua race their holua down the side of a hill in Kapoho. At the bottom of the race course, Kahawali sticks his broad spear into the ground, and then climbs the hill called Kahelokamahina.
>
> Back at the top of the slide, Pele, in the form of a woman, challenges Kahawali to a race and loses. She then asked him for his sled. Not realizing the deity is Pele,

> Kahawali abruptly refuses and sleds off down the hill. Enraged, Pele stamps her foot, causing an earthquake and chases Kahawali with streams of lava.
>
> At the bottom of the hill, Kahawali looks back and sees Pele. He grabs his spear and with Ahua flees for his life. The spectators and entertainers at the race are overwhelmed by Pele's lava as she pursues Kahawali. In his flight, he pauses at Pu‘ukea, where he throws off his ki leaf cloak. He then bids farewell to his favorite pig Alo‘ipua‘a, to his mother at Kūki‘i, to his wife Kanakawahine, to his children Poupoulu and Kaohe, and finally, after crossing a deep chasm, to his sister Koai in Kula. Kumukahi and Ahua escape in a canoe, despite the large rocks Pele throws at them from the shore. [Westervelt 1916:40–43]

3.1.6 The Legend of Papalauahi

Pele rages again upon another chief of Puna, Papalauahi. Defeated in a sled race by the chief, Pele transforms him, neighboring chiefs, and spectators into pillars of stone:

> The chief of Puna, Papalauahi, was also challenged to a holua race by Pele, appearing this time in the form of a beautiful woman. He won and Pele stamped on the ground, letting loose floods of lava. Paplauahi and many of the neighboring chiefs attending the games were destroyed as they fled, and the spectators on the plains below were turned into pillars of lava. [Westervelt in Komori 1987:18]

3.1.7 The Legend of Keliikuku

This legend gives a glimpse into the abundance of natural beauty that once covered Puna—a land once laden with beautiful *‘ōhi‘a* and *hala* (pandanus; *Pandanus odoratissimus*) trees, a land where everything grew. Chief Kaliikuku, so fond of his homelands, boasts to a prophet of Pele of the beauty of his lands. Later he is ridiculed by the prophet that Pele has devoured his lands and all on it:

> This legend tells of a chief of Puna, Keliikuku, who is very proud of his homeland. While on O'ahu he boasts to a prophet of Pele, Kaneakalau, ‘My country is charming. Abundance is found there. Rich, sandy plains are there, where everything grows wonderfully' (Westervelt 1916:31). The prophet ridicules him, saying that Pele has desolated Puna. ‘The trees have descended from the mountains to the sea. The ohi‘a and puhala are on the shore. The houses of your people are burned. Your land is unproductive. You have no more people.' (Westervelt 1916:31–32). Keliikuku heads home. He comes around the eastern side of Hawai‘i, lands his canoe, and climbs the highest point for a view of Puna. He sees his fertile plains covered with black lava still pouring out clouds of smoke. The remnant of forests is still burning. Pele had heard Keliikuku boasting and had demonstrated that the land around her pit of fire is not secure against her will. Keliikuku hangs himself. [Westervelt in Komori 1987:19]

3.1.8 The Legend of Kealohalani and Honolulu

Pele's anger is shown again in this legend of a Puna chief, Kealohalani. Kealohalani courts one of Pele's sisters. Chased by Pele, Kealohalani dives into the ocean losing his helmet to a sand hill. After this, Pele turns him and his helmet into stone:

> A Puna chief named Kealohalani angers Pele by courting one of her sisters. Pele chases him and, as he dives into the ocean, his helmet falls off onto a sand hill. Pele changes man and helmet into stone. Kealohalani can be seen below the sand hill as the red stone formation of a man lying in the water.
>
> The sand hill became known as Honolulu, because the chief Honolulu, one of Kealohalani's retainers, composed the chant of this story. Later he settled in O‘ahu.
>
> The helmet stone, also called the Honolulu stone or the bell stone for its shape, was moved first to Kalapana and then to Olaa. [Mrs. Anne Hall in Emory; also cited in Komori 1987:19]

3.2 *Mo‘olelo*

3.2.1 Kūka‘ōhi‘aakalaka

Kūka‘ōhi‘aakalaka or Kū of the *‘ōhi‘a* forest and his sister Kauakuahine left their homelands of Kahiki to come to the island of Hawai‘i and live at Kea‘au and ‘Ōla‘a in the district of Puna. Kūka‘ōhi‘aakalaka is one of the gods worshiped by those who go up into the forest to hew out canoes or timber for building (Malo 1903:113 and 169). The following legend is taken from *Folktales of Hawai‘i, He Mau Ka‘ao Hawai‘i*, collected and translated by Mary Pukui with help from Laura C.S. Green (1995):

> ‘O Kūka‘ōhi‘aakalaka ke kaikunāne a ‘o Kauakuahine ke kaikuahine. Mai Kahiki mai lāua a noho i Hawai‘i, Kauakuahine i ‘Ōla‘a me kāna kāne, a ‘o Kūka‘ōhi‘aakalaka i Kea'au me kāna wahine. ‘A‘ohe keiki a Kūka‘ōhi‘aakalaka, a ‘o ke kaikuahine ho‘i, he mau keiki nō. He mahi ‘ai ka hana a ke kaikuahine i ‘Ōla‘a a he lawai‘a kā ke kaikunāne i Kea‘au.
>
> I kēlā a me kēia manawa, ua iho ‘o Kauakuahine me ka ‘ai i kahakai na ke kaikunāne a ‘o ka i‘a kāna e ho‘iho‘i mai ai na kona ‘ohana. Ua kauoha ‘o Kūka‘ōhi‘aakalaka i kāna wahine e hā‘awi a nui i ka i‘a malo‘o i kona kaikuahine i nā wā a pau āna e iho mai ai me ka ‘ai. Ua nānā ihola ka wahine i ka i‘a malo‘o a minamina, a ho‘iho‘i aku nei ma lalo o nā moena a hūnā ai.
>
> I ka iho ‘ana mai o Kauakuahine me ka ‘ai, ua hala ke kaikunāne i ka lawai‘a. ‘Ōlelo aku nei ke kaiko‘eke, ‘‘A‘ohe i‘a a maua lā. E nānā a‘e nō ‘oe i kauhale nei, ua nele. ‘O ka pa‘akai wale nō kahi mea i loa‘a.' Hele nō ‘o Kauakuahine a loa‘a ka līpahapaha, ‘o ko iala ho‘i nō ia. I ka iho hou ‘ana mai o Kauakuahine, ‘o ia ana nō, ‘o ka ho‘i nō me ka nele. I ahona nō i kahi līpahapaha.
>
> No ka pī mau o ke kaiko‘eke, ua lilo ia i mea ho‘okaumaha iā Kauakuahine. I kekahi ho‘i ‘ana āna me ka līpahapaha, ua mana‘o ia he mea makehewa ka ho‘oluhi ‘ana

iā ia iho e lawe mau aku i ka ‘ai i Kea‘au a ‘o ka līpahapaha wale nō ka i‘a e ho‘iho‘i aku ai na kāna kāne ho‘omanawanui a me nā keiki a lāua.

I ke kokoke ‘ana aku ona i ka hale o lākou ua holo maila ke kāne a me nā keiki e ‘ike iā ia. Ua pa‘ipa‘i pākahi akula ‘o ia iā lākou a lilo lākou i mau ‘iole. ‘O ka ‘iole māhuahua, ka makua kāne ia; ‘o nā ‘iole makali‘i, ‘o nā keiki nō ia. No Kauakuahine, ua lilo ‘o ia i pūnāwai me ka ua kilihune e helele‘i ana ma laila.

I ke kaikunāne e lawai‘a ana, ua hiki akula ka hō‘ike a nā akua iā ia i ke pī o ka wahine i ka i‘a a i ka lilo o ke kaikuahine i wai a ‘o ka ‘ohana i pua ‘ole. Ua lilo kēia i mea kaumaha i kona no‘ono‘o a ho‘i aku nei i kauhale nīnau aku i ka wahine, “Ua hā‘awi anaei ‘oe i i‘a na nā pōki‘i o kāua?” “‘Ae, ke hā‘awi mau nei nō au i ka i‘a.”

‘O ko Kūka‘ōhi‘aakalaka lālau akula nō ia in nā moena o ka hale o lāua a hāpai a‘ela i luna. ‘Ike a‘ela ‘o ia i nā i‘a malo‘o, ua ho‘onoho papa ‘ia ma lalo a‘e o ka moena, a e hoholo a‘e ana nā pu‘u. Ua piha loa ‘o ia i ka inaina, a ‘ī aku nei i ka wahine, “He keu ‘oe a ka wahine loko ‘ino. Pō‘ino ku‘u pōki‘i iā ‘oe.” A me kēia mau hua ‘ōlelo ua pepehi ‘ia kēlā wahine a make loa.

Ua pi‘i akula ‘o ia i ‘Ōla‘a i kahi a ke kaikuahine a ‘ike aku nei ‘o ia i ka hoholo mai o nā ‘iole i kauhale a kulu io nei kona waimaka aloha no ke kaiko‘eke a me nā keiki. Hele pololei aku nei ‘o ia a ka pūnāwai a ihoiho nei ke po‘o i lalo i loko o ka wai, a ‘o ke kino, ua lilo a‘ela i kumu ‘ōhi‘a.

He ‘elua wale nō pu ao kēia kumu ‘ōhi‘a i nā wā a pau, a ke haki ka lālā, kahe mai ke koko mai kona kino mai. [Pukui and Green 1995:111 and 112]

Translation:

Kūka‘ōhi‘aakalaka, Kū the ‘Ōhi‘a of the Forest, was the brother, and Kauakuahine, the Sister Rain, was the sister. They came from Kahiki and lived in Hawai‘i, the sister in ‘Ōla‘a with her husband, and the brother at Kea‘au with his wife. The brother had no children, the sister had a flock of them. Her husband was a farmer in ‘Ōla‘a, the brother a fisherman in Kea‘au.

The sister often brought vegetables to the shore for her brother and returned with fish for her family. The brother told his wife to give his sister an abundance of dried fish when she came with the vegetables. The wife hated to give up the fish and laid it under the sleeping mats. While the husband was out fishing, the sister came with vegetables and the wife said, ‘We have no fish, as you can see for yourself; all we have is salt.’ The sister went and gathered coarse seaweed to take the place of fish. Again she came with vegetables and went back without anything. She was lucky to get the seaweed. This constant stinginess of her sister-in-law vexed the sister. It seemed to her useless to burden herself with carrying vegetables and to return with only seaweed for her patient husband and children. One day when she came close to the house and her husband and children ran out to meet her, she gave them each

a slap and changed them into rats, the husband into a large rat and the children into young rats. She herself became a spring of water where fine rain fell.

While the brother was out fishing, the gods showed him how stingy his wife had been and how his sister had become a spring and her family had changed into rats. He was much distressed and returned home and asked his wife, ‘Did you give fish to our dear sister?’

‘Yes, I always give her fish.’

He saw the dried fish laid flat beneath the sleeping mats and what a heap of them there were. He was very angry with this wife. ‘What a cruel woman you are! You have brought misfortune upon our little sister!’ And with many words of reproach, he beat his wife to death.

He ascended to his sister’s place in ‘Ōla‘a and saw the rats scampering about where the house had stood, and he shed tears of love for his brother-in-law and the children. He went straight to the spring, plunged in headlong, and was changed into an ‘ōhi‘a tree.

This tree bears only two blossoms to this day, and when a branch is broken off, blood flows from the body of the tree. [Pukui and Green 1995:19 and 20]

3.2.2 The Legend of Iwa

Fornander (1918) places this legend in Kea‘au, Puna. There once lived a man by the name of Kea‘au, who owned two *leho* (cowries) shells called Kalokuna. This story takes place in the time when ‘Umi-a-Līloa unified the districts of the island of Hawai’i under his rule in the mid-sixteenth century:

. . . I ka wa e holo ai i ka luu hee, wehe ae la i ka leho a hoike iho, na ka hee no e pii a komo ka waa. Pele mau ka Keaau hana i na la a pau. Kukui aku la ka lohe ia Umi a hiki i Kona. Ia wa hoouna mai la o Umi i na elele i o Keaau la, a lawe ia aku la na leho. A lilo na leho ia Umi, hoaa ia o Keaau i ke aloha i na leho. Hoomakaukau iho la ia i ka waa, ka puaa, ka awa, ke kapa ouholowai Ola‘a a me ka eleuli, a loko o ka hokeo. Ia wa holo ia e kaapuni ana ia Hawaii. O keia holo ana e imi ana i aihue nana e kii na leho ia Umi.

A hiki i Puna aohe aihue akamai, hiki i Kau, aole no, hiki i Kona, aole no, hiki i Kohala, Hamakua, Hilo, aole o he aihue akamai. Haalele o Keaau ia Hawaii, holo i Maui e kaapuni ai, a puni o Maui, oia ana no, he aihue no aole nae e loaa na leho. Holo i Lanai e huli ai, oia ana no, holo i Molokai, kaapuni ia a hiki i Ka-lae-o-Kalaau, i laila, loaa he kamaaina e lawaia ana, ninau mai: ‘E holo ana kou waa i hea?’ I aku o Keaau: ‘E imi an au i kanaka aihue e loaa ai a‘u leho ia Umi, a oia keia waiwai o luna o ka waa, he makana i ka aihue e loaa ai o a‘u leho.’

Olelo mai ke kamaaina: ‘Ua loaa, e holo oe a hiki i Makapuu, a hala ia mahope ou, kau pono aku ko waa i na moku manu a me Mokapu, a ku pono i laila nana aku i

ka pali e halehale mai ana, he luna ia, he lalo ka pohai kukui, aia i laila o Iwa, keiki aihue a Kukui.’

(No Iwa, he wahi keiki uuku o Iwa, i loko no o ka opu, hele e aihue, a he oi o Iwa mai ka akamai ia hana.)

‘A hiki oe, nana aku i kahi keiki uuku e lewalewa ana kahi mai, e holo ana i ka lae kahakai, o Iwa ia. Uhau aku oe i ka puaa, a haawi aku i na waiwai a pau loa, mai hoopoina oe, o pau ka waiwai i ka aihue ia e Iwa.’

Aohe o Keaau i na olelo a ke kamaaina, holo aku la ia a hala hope na wahi i olelo ia maluna, hiki aku la ia i kahi o Iwa. I nana aku ka hana e holoholo mai ana neia wahi keiki i ka lae kahakai e lewalewa ana kahi mai. Ninau aku la keia: ‘O Iwa oe?’ Hoole mai la kela: ‘Aole, ei aku no o Iwa i ka hale,’ a hiki keia i ka hale e noho ana o Kukui, ka makuakane o Iwa. Ninau aku la keia: ‘Auhea O Iwa?’ I mai la o Kukui: ‘Aohe wahi keiki uuku i loaa mai la ia i ka lae kahakai e lewalewa ana kahi mai?’ ‘He wahi keiki no.’ ‘O hoi a uhau aku i ko puaa ia ia.’ A lohe keia, hoi aku la a hiki, olelo aku o Keaau ia Iwa: ‘O Iwa no ka hoi oe la, kuhikuhi lalau oe ia‘u.’ Uhau aku la ia i ka puaa ma keia lo o Iwa: ‘A make na Iwa na ke keiki aihue a Kukui, o ka waiwai o kuu waa nau ia a pau loa a me ka waa.’

Olelo mai o Iwa: ‘Hoi aku kaua i ka hale.’ A hiki laua, kalua ka puaa, mama ka awa, ai a pau, ninau mai o Iwa: ‘Heaha kau huakai o ka hele ana mai?’ Wahi a Keaau. ‘He mau leho na‘u, ua kina mai e ko makou alii e Umi, a lilo ia ia. Aa ia au i ke aloha, oia ko‘u kuleana i hiki mai nei i ou la.’ ‘Pela iho,’ wahi a Iwa, ‘a kakahiaka maopopo.’

Moe laua a ao, kau maluna o ka waa a holo i ka moana. O Iwa mahope o ka waa me kana hoe o Kapahi. O Keaau mamua. Kahea iho o Iwa. ‘Kapahi ka moana i kai e Iwa.’ (O kea no o ia hookahi mapuna hoe.) Hele ana laua nei ma ke kowa o Niihau me Kauai. Ninau aku o Iwa: ‘Hiki kaua?’ ‘Aole keia o Hawaii, o Kauai keia me Niihau.’ Uli hou o Iwa i ka hope o ka waa. Kahea hou i ua hoe nei ana ia Kapahi. ‘Kapahi ka moana i kai e Iwa.’ A kai ka hoe a Iwa, hele ana laua nei ma waho o Kawaihoa. Ninau aku ia Keaau: ‘Hiki kaua i Hawaii?’ ‘Aole;’ pela mai o Keaau. Lalau hou o Iwa i ka hoe ana o Kapahi, hoe hou, holo laua nei a hala hope o Molokai me Lanai, hele ana laua nei ma ke kowa o Molokini me Pohakueaea, he lae ia e nana ala ia Hawaii. I aku o Iwa: ‘Hiki kaua?’ ‘Ae,’ pela mai o Keaau, ‘aia nae i kela puali la, e kau la kea o i ke kuahiwi, aia ma ke komohana, aia i laila o Umi.’ Lalau hou o Iwa i kana hoe o Kapahi a hoe, hele ana laua ma waho o Kalaeakeahole, he lae ia e nana ana ia Kailua, kahi a Umi e noho ana. I nana aku ka hana, e lana mai ana no o Umi makai o Laua nei i aku o Iwa a Keaau: ‘Aia o Umi me ka waa a me na leho, e hoemi ka waa o kaua i hope a nalowale o Umi.’ A kaawale laua nei mai ia Umi mai, olelo aku o Iwa: ‘E Keaau, maanei oe e lana ai a loaa mai ia‘u.’ Lana o Keaau, luu o Iwa, a hiki i ka honua o lalo, hele a hiki malalo o kahi a Umi e lana nei, pii keia mai lalo ae a kokoke ia Umi. E iho ana na leho mawaho o ka waa o Umi. E apo ae ana o Iwa, lilo ia ia nei i lalo, a ke koa hawele o Iwa i kea ho a paa. Luu aku la a loaa o Keaau e lana ana ea ae la me na leho. Ia wa, hoi laua a

pae ma Leleiwi i Hilo, noho o Keaau me Iwa ma laila. O ka Keaau hana ka holo e luu hee ma ua mau leho nei, me Kalokuna. Ka ka hee hana ka pii a e komo ka waa, hoi i uka.

(Ma keia wahi e waiho ka olelo ana, a e hoi hou mahope ia Umi.)

A lilo mai na leho ia Iwa, noho o Umi me ka minamina, e manao ana he mau maoli ko na leho i lalo i ke koa. Nolaila, ku moe o Umi i ke kai me na waa, a me na kanaka, noho ai, a ia, hookahi hana he luu i na leho. Kii ia aku la na kanaka aho loa i ka luu. I ka luu ana ekou kaau anana e pau, aole e hiki aku i lalo i ke koa i paa ai ke kaula, pela ka hana ana a hala he hepekoma okoa. Hoouna o Umi i na kukini, e kaapuni ia Hawaii i loaa ke kanaka aho loa, e pau ai ke koa i ka luu a loaa na leho. Ia kaapuni ana, loaa o Iwa ma Leleiwi e pili la me Kumukahi, i waena o Puna a me Hilo. A lohe o Iwa i ka olelo a ka elele kukini, hai mai o Iwa, aohe leho, he aho wale no ia e paa laa i ke koa. Ua lilo mai na leho ia Keaau. Ma keia olelo a Iwa i ka elele, lawe ia aku la a mua o Umi. Ninau mai o Umi ia Iwa, no na leho. Hai aku o Iwa e like me na olelo i ka elele, a pau ia olelo mai o Umi. Loaa no ia o eke kii, ae aku o Iwa. ‘Ae.’ Hele aku la o Iwa a hiki i o Keaau la, ma Leleiwi.

He mea mau ia Keaau, ka huna i na leho ai, oia o Kalokuna ma. Ma ka loha o ka hale o waho, e pili ana i ka hio kala, a o na leho ai ole, i loko pono lakou o ka hale e kau ai.

A poeleele, hoopuka loa aku la o Iwa i ka hale, lalau aku la i na leho a loaa, hoi aku la i o Umi la i Kona. Haawi aku la o Iwa i na leho ia Umi, a ike o Umi, olioli ia, a olelo mai ia Iwa: ‘Akamai oe i ka aihue,’ Alia nae au e mahalo i aoe, a loaa kuu wahi koi, aia i lalo i Waipio, i ka heiau o Pakaalana, o Waipu ka inoa. Olelo aku o Iwa: ‘Loaa paha ia‘u, aole paha? Aka, e hoao wau.’

(Maanei kakou e luaana iki iho ai no na olelo e pili ana i ke koi, a me na hana a na kiai.)

O ua wahi koi nei o Waipu, he mau luahine elua na kiai, ua hana ia he kaula, paa he poo i ka ai o kekahi luahine, a o kekahi poo hoi i kekahi luahine, ma waena ke koi e lewalewa ai.

He kapu hoi, aohe kanaka maalo, aohe puaa holo, aohe ilio aoa, aohe moa kani, mai Waipio ke kapu a Puuepa, ma waena o Waimea a me Kawaihae, alaila pau. Aia a noenoe poeleele o ke ahiahi, holo ka luna kala, mai Puuepa a ka pali o Puaahuku i Waipio, he oloa ma ka lima akua, ma waena o ka iwi kano a me ka peahi, o ia ka Lepa. Penei e kala ai: ‘E moe e! E moe i ke koi o Umi e! Kapu ke kanaka a o e hele, kapu ka ilio a o e aoa, kapu ka moa a o e kani, kapu kapuaa aole e holo, emoe e!’ Elima hele ana a keia luna ao ka po.

A pau ka olelo ana a Umi me Iwa, aui ka la. Hele mai la o Iwa, a ahiahi poeleele, hiki i Puuepa, holo o Iwa me ke kahea ana e like me ka luna holo mau mamua aku, me ka oloa i ka lima. A hiki i Puaahuku, he pali ia e kiei ana ia Waipio. Ma keia kahea ana a Iwa, moe na kanaka a me ka luna mua, ala no make, hele o make.

Nolaila, oia nei wale no ke kanaka hele. O na kanaka a pau, ke manao nei no o ka luna mua. No ka mea, aohe wahi lilo, oia okoa no, na kino, na oloa, na leo, na mama.

Holo aku la O Iwa mai luna o ka pali a ka heiau o Pakaalana, kahea aku loa: ‘Ke moe nei no olua?’ ‘O,’ pela mai na luahine, ‘aole maua i moe, kala aku nei no.’ Olelo malie aku o Iwa: ‘Auhea haki koi e haha aku wau?’ ‘Eia no,’ wahi a na luahine. ‘E neenee mai olua a kokoke i launa aku kuu lima, o ka haha wale aku ka!’ Ia nee ana mai a na luahine a kokoke loaa pono aku la ke koi i ko ianei mau lima, e huki mai ana keia lilo. Kahea na lunahine: ‘He aihue ka keia e! Ua lilo ke koi a ke ‘lii e! Make maua e! Kai no he kanaka pono keia e!’ Lohe na mea a pau, ala mai la alualu. Kahea na luahine, kau o Iwa iluna o Puaahuku me ke koi. Hiki ka hahai i laila, hele ana o Iwa i Mahiki, pela no ka holo ana a hiki o Iwa i Puuepa. Hiki ka hahai i laila, hele ana o Iwa i Puako. Alaila, pau ka hahai, pau mai la ke kapu, hoi aku la o Iwa a hiki ia Kona, moe a ao, a hiki i ka wa ai o Umi, noho ana o Iwa, a ike o Umi ia Iwa. Hoomaoe mai la: ‘Aole no paha e loaa ia oe kuu wahi koi?’ I aku o Iwa: ‘Pela, aka, e nana mai oe, oia paha nei, aole paha?’ A ike o Umi, olelo mai la: ‘Ka! Kupanaha, e kuhi ana au aole e loaa ia oe, eia ka loaa ana, akamai oe,’ Olelo hou mai o Umi ia Iwa: ‘Eia ko‘u manao ia oe, e aho e hoao oe me ka‘u poe aihue eono. Elua hale, aia ka piha i ka po hookahi; hookahi ou, hookahi o lakou. Ina i piha ole kou hale, make oe, a pela hoi lakou.’ ‘Ae,’ aku o Iwa, ‘heaha la hoi, o ko lakou hale no ke piha, he hui lakou, a o e piha ko‘u, he hookahi.’

Eono moku o Hawaii, eono aihue akamai. I ka la okoa hele lakou, a ahiahi poeleele hiki. Lawe mai la i ka waiwai a ko lakou hale waiho, pela ka lakou hana ana a hiki i ka moa mua o ke kani ana. Koe iki ka hale. Ia wa ala o Iwa, e aihue ahu kela i ka waiwai a kela poe aihue, ko Umi, na kanaka, na wahine, na keiki, na waa, na holoholona aole i pau na mea piha ko ianei hale. Ao ae la, aole i piha ka hale o ka Umi poe aihue, ia wa pau lakou i ka make, koe o Iwa. [Fornander 1918:5:284-294]

Translation:

. . . Whenever the possessor of these shells went out squid fishing all that was necessary to do was to take and expose them and the squids would come up and enter the canoe. This was Keaau’s regular occupation every day. The existence of these extraordinary shells was in time carried to Umi, who was then living in Kona. Whereupon he ordered his messengers to go to the home of Keaau and obtain possession of them, and at their demand the shells were given up and the messengers returned with them to the king.

After the shells were secured by Umi, a deep yearning sprang up in the breast of Keaau for them. After studying for a time for means of recovering the shells, he one day prepared his canoe for sea, procured a pig, some awa and ouholowai and eleuli, kapa of ‘Ōla‘a. The kapa he put into calabash and then the pig the awa and the calabash were placed into the canoe, which he then boarded and set out on a

journey around Hawaii in search of some one who could steal back his shells from Umi.

All through the district of Puna he found no smart thief. He next traveled through the district of Kau, without success; then through Kona, still unable to find his man. He next touched at Kohala, and on through that district and the district of Hamakua and Hilo, meeting with the same failure; he found no one smart enough. Keaau then left Hawai’i for Maui and traveled around that island; still he met the same disappointment. He found men good in the art of stealing, but none smart enough to recover his shells. He next set out for Lanai and traveled around that island, but he met the same fate. He then set out for Molokai and journeyed around it till, off the point of Kaleokalaau, he met a man of that island who was fishing. The man upon seeing him called out, saying: ‘Where is your canoe sailing for?’ Keaau replied: ‘I am in search of a person who can steal back my leho shells from Umi. I have here with me in my canoe several valuable things which I shall give as presents to the thief who could return my shells to me.’ The man replied: ‘You have found him. You sail on until you come to Makapuu and after you have passed the place steer your canoe for a point between the bird islands and Mokapu. When you reach that point look for the cliff which resembles the roof of a house, above, and directly below the cliff you will see a grove of kukui trees; there you will find Iwa, the thieving son of Kukui.’

(Iwa was a small boy at this time, but while he was yet in his mother’s womb he used to go out stealing. He was the greatest thief in his day.)

‘When you come to land, look for a small boy who goes about along the beach without a loin cloth; that is Iwa. Take out your pig and the other articles of value and lay them before him. Don’t forget this; else all your things will be stolen from you by Iwa.’

After receiving these instructions, Keaau set out, and after he had sailed past the different points he came to the landing below the home of Iwa. Upon touching land he looked about him and saw a small boy without his loin cloth running along the beach. Keaau then called out to him: ‘Is your name Iwa?’ The boy replied: ‘No, Iwa is at the house.’ When Keaau arrived at the house he found Kukui, the father of Iwa. Keaau then asked him: ‘Where is Iwa?’ Kukui replied: ‘Did you not meet a small boy on the beach running about without his loin cloth?’ ‘Yes, there was such a small boy.’ ‘Go back and present him your pig.’ When Keaau heard this, he returned and said to Iwa: ‘There, you are Iwa after all; you misdirected me.’ Keaau then took the pig and presented it to Iwa saying: ‘Here, I present this to Iwa, the thieving son of Kukui, together with the articles of value in my canoe and the canoe itself.’ Iwa then said to Keaau: ‘Let us return to the house.’ When they arrived at the house, the pig was killed and put into the oven, and the awa was prepared. After the meal was over, Iwa turned and asked of Keaau: ‘What is the object of your journey that has brought you here?’ Keaau replied: ‘I had two shells which were taken away from me by orders from the king, Umi, and he has them in his

possession now. I value these shells so much that I am distracted, and that is the reason of my being present here.' 'We must wait until tomorrow morning,' said Iwa.

They retired for the night and on daylight the next day they boarded the canoe and set out to sea. Iwa took the stern of the canoe with his paddle called Kapahi, while Keaau took the seat at the bow. After they were seated in the canoe, Iwa called out: 'Kapahi, take Iwa out to sea,' at the same time he dipped his paddle into the sea. (This is meant that one stroke of the paddle was all that was needed.) With this one stroke, they passed between Niihau and Kauai. Iwa then asked; 'Have we arrived?' 'This is not Hawaii, these islands are Kauai and Niihau.'

Iwa then turned the stern of the canoe around and again called out to his paddle, Kapahi: 'Kapahi, take Iwa out to sea.' When Iwa drew his paddle out of the sea they were passing outside of Kawaihoa. He then asked of Keaau: 'Have we arrived at Hawaii?' 'No,' said Keaau. Again Iwa took up his paddle and gave one stroke and they left Molokai and Lanai to their rear and they went floating between the island of Molokini and Pohakueaea, a point of land looking toward Hawaii. Iwa then asked: 'Have we arrived?' 'Yes,' replied Keaau, 'but it is at that point of land where the cloud hangs over the mountain that we want to go; it is to the west of the point that Umi is now living.'

Iwa then took up his paddle, Kapahi, and gave one stroke and they arrived outside of Kalaeakeahole, a point of land looking toward Kailua, where Umi had his residence. When they looked about they saw Umi just below them, in his canoe. Iwa then said to Keaau: 'There is Umi in his canoe with the shells. Let us get our canoe to the rear and out of sight of Umi.' When they were some distance from Umi, Iwa said: 'Say, Keaau, you must float right at this spot until I return with your shells.' Keaau therefore kept his canoe floating on the same spot while

Iwa dove down and swam until he had reached the bottom of the ocean, then walked under water to the place where the canoe of Umi was floating, then swam up until he was almost up to the surface; and as the shells were being let down on the side of the canoe, Iwa grabbed them and took them down with him to a large coral, there he fastened the fish-line, then he took the shells and swam under water until he reached their canoe and got into it.

The two then returned and landed at Leleiwi, in Hilo, where they made their home. Upon the recovery of his shells Keaau again took up his favorite occupation, that of squid fishing, taking along his shells, Kalokuna. The squids at sight of the shells climbed and entered the canoe until it was loaded down when they returned to the shore.

(We will here leave Keaau and let us return to Umi.)

After the shells were taken by Iwa and the line fastened to a coral, Umi after a time pulled up on his line, but to his surprise it would not yield and thinking that the line was entangled to the coral he did not wish to pull very strong, thinking the line

would break and he would lose the shells. Fearing he would lose them he remained in his canoe all day, and that night he slept out at sea with his men, and for some days he lived there, while his men dove down to untangle the fish-line and thus recover the much valued shells.

Men noted for being able to stay under water a long time were sent for, and these men were told to go down, but the best they could do was to go down three times forty fathoms, seven hundred and twenty feet, not deep enough to reach the bottom where the line was tangled. This kept up for a week.

Umi then sent out his runners to make a circuit of Hawaii to look for a man who could stay under water long enough to recover the shells. In this trip around the island of Hawaii, Iwa was found at Leleiwi, the point of land adjoining Kumukahi, between Puna and Hilo. When Iwa heard the king's wish through his runner, Iwa said to him: 'There are no shells at the end of the line. The line only is fastened to some coral in the bottom of the ocean. The shells have been recovered by Keaau.'

When the runners heard this he returned to Umi taking Iwa with him and told Umi of what he had heard from Iwa. Umi then asked Iwa regarding the shells and Iwa told Umi just what the runner had told him. At the close of the report Umi asked Iwa: 'Can you get these shells for me if you should go for them?' Iwa replied: 'Yes,' Iwa then journeyed back to the home of Keaau in Leleiwi.

It was Keaau's custom to hide these shells on the end of the house, up next to the curve of the rafters; and the other shells, the ones that he did not care so much for, he kept them in the house hung up on a cord.

About dusk Iwa made his appearance near the house and knowing where the shells were secreted he went up and removed them from the place they were hidden and he then returned to Kona, and handed them over to Umi. When Umi saw the shells he was made very happy and he then said to Iwa: 'You are a smart thief, but I am not going to praise you just yet, not until you can produce my axe, which is being kept in Waipio in the temple of Pakaalana. The name of the axe is Waipu.' Iwa then made reply: 'I don't know whether I will be able to steal it or not, but I shall try.'

(We will here speak a few words relating to the axe and how it was kept by it guards.)

This axe, Waipu, was kept by two old women. It was fastened to the middle of a piece of rope and the ends of the rope were fastened around the necks of the two old women allowing the axe to dangle between the two.

There was a very strict kapu placed on this axe; no person was allowed to pass near the place, and during the period of time when the kapu was in force, the pigs were not allowed to run about, the dogs were not allowed to bark, and even the roosters were kept from crowing. The kapu was extended from Waipio to Puuepa, a hill between Waimea and Kawaihae. At dusk, just before it gets real dark in the evening the crier, would run from Puuepa to the cliff of Puaahuku overlooking Waipio,

carrying olonā kapa in his right hand, held between the palm of the hand and the wrist as a flag and would cry out: ‘Sleep ye, sleepy because of the axe of Umi. Persons are kapu from walking about, the dogs are kapu from barking, the roosters are kapu from crowing the pigs are kapu from running about. Sleep ye.’ The crier was required to make five trips back and forth before daylight.

After Umi had told Iwa what he wanted, the sun was past the meridian. Iwa did not, however, wait for further directions but started out on his way to Waipio. Just before dusk he arrived at Puuepa and immediately started running and crying out like the king’s crier with a flag in his hand. He continued running until he reached the cliff of Puaahuku, looking down into Waipio. In calling out the way he did, the crier, whose duty it was to make the cry, was forced to go to sleep like the rest of the people, for to get up and go about meant death. Because of this Iwa was the only one about, all the people believed it was the usual crier and the crier himself believed that the king had appointed some one else to take his place. Furthermore the people could not recognize any difference; the build was the same, the flag looked the same, the voice sounded the same and the speed in running was the same.

Iwa continued running from the top of the cliff down to the temple of Pakaalana and then he called out: ‘Are you two still asleep?’ The old women replied: ‘No, we are not asleep, we are still awake.’ Iwa then asked quietly: ‘Where is the axe? Let me feel of it.’ ‘Here it is,’ answered the old women. ‘You must come nearer so that I can touch it with my hand. I just want to feel of it.’ When the old women drew nearer to Iwa, he reached out and pulled at the axe, getting it away from them. The old women then called out: ‘Here is a thief! The king’s axe is gone! We are killed! We had thought this was a good man!’ When the people heard this, they all got up and gave chase.

When the old women made the first outcry, Iwa had reached the top of Puaahuku with the axe in hand. When the pursuers reached there he had reached Mahiki. This chase was kept up until Iwa reached Puuepa. When those in pursuit reached this place, he was at Puako. They therefore gave up the chase as the country beyond that place was outside of the kapu area, while Iwa continued on until he arrived in Kona. He then slept until daylight the next day. When it was about time for Umi to have his morning meal, Iwa went up to him. When Umi saw Iwa he asked jokingly: ‘I don’t think you have been able to get my axe.’ Iwa then replied: ‘Perhaps not, but I want you to look at this axe and see if it is not yours.’ When Umi saw it, he said: ‘How strange! I thought you never would be able to get it; but here you have gotten it. You are smart.’ After this Umi said to Iwa: ‘Here is my thought regarding you. I want you try with my six best thieves. There are two houses to be filled in one night, one for you and one for them. If you will not be able to fill yours first, you will be killed; so shall it be with the others.’ Iwa then replied: ‘Yes, not doubt the others will fill theirs first for there are six of them. Mine will not be filled because I am alone.’

There are six districts in the island of Hawaii and Umi had six expert thieves. While it was still daylight the six thieves went out to see what things they could steal; and when it became dark they began to steal and to carry everything they could lay their hands on into their houses. At about this same time Iwa woke up and as soon as the six men went to sleep he proceeded to steal the things stolen by them of Umi’s men, men, women, children, canoes, animals and various other things. Before he could remove all the things into his house there was no space left, so he had to leave some of them. When it was daylight the next day they found that the house belonging to the six men was almost empty, while Iwa’s house was filled with the different things. The six men were therefore declared beaten and were killed in place of Iwa. [Fornander 1918:5:284–294]

Frequently mentioned in Hawaiian tradition is certain *kapa* (tapa) of ‘Ōla‘a, Puna. These *kapa* were treasurable products of high value. The *ouholowai kapa* was made from the bark of the *mamaki* (*Pipturus albidus*), dyed differently on its two sides. The *eleuli* is described as a perfumed *kapa*, rarely found (Fornander 1918:5:284–294).

3.2.3 Law of Māmalahoe

During Kamehameha’s conquest to gain control over Hawai‘i he battled against many *ali‘i* (chiefs) on Hawai‘i Island. During one of his battles with Keawema‘uhili and Keoua the infamous event of the “Law of Māmalahoe” took place in Puna. In *The Ruling Chiefs*, Samuel M. Kamakau recalls how this law came about:

Since Keawe-ma‘u-hili and Keoua had joined forces against Kamehameha there was no place for him in Hilo; he camped his men at Laupahoehoe in Hilo Paliku (Hilo by the cliff). Afterwards Kamehameha and Ka-haku‘i paddled to Papa‘i and on to Kea‘au in Puna where some men and women were fishing, and a little child sat on the back of one of the men. Seeing them about to go away, Kamehameha leaped from his canoe intending to catch and kill the men, but they all escaped with the women except two men who stayed to protect the man with the child. During the struggle Kamehameha caught his foot in a crevice of the rock and was stuck fast; and the fishermen beat him over the head with a paddle. Had it not been that one of the men was hampered with the child and their ignorance that this was Kamehameha with whom they were struggling; Kamehameha would have been killed that day. This quarrel was named Ka-lele-iki, and from the striking of Kamehameha’s head with a paddle came the law of Mamala-hoe (Broken paddle) for Kamehameha. [Kamakau 1961:125–126]

At the time when he became ruling chief over all Hawaii, there were brought to him those men who had struck him with a paddle, together with their wives and children. All the chiefs said, ‘Let them be stoned to death!’ Kamehameha replied, ‘The law of the broken paddle is declared: no chief or officer of execution is to take their lives. It is I who should by right be stoned.’ What a wonderful thing for a chief thus to meet out justice toward those who had injured him! [Kamakau 1992:181]

3.2.4 Ka ‘alā pa‘a o Kaueleau

There are no legends that mention Kauaea or Kaueleau, but there is one saying that refers to Kaueleau. Mary Pukui recorded this poetical saying:

> *Ka ‘alā pa‘a o Kaueleua.*
>
> The Hard rock of Kaueleau.
>
> A dollar, or a hard, unyielding person. There is a rock at Kaueleau, Puna, Hawaii, called the *‘alā pa‘a.* [Pukui 1983:140]

The word *pa‘a* has many meanings, but in this instance, it probably means solid, hard or stubborn (Pukui and Elbert 1986:298). *‘Alā* is the Hawaiian term for a dense waterworn volcanic stone used to make adzes, *poi* pounders, and sling stones (Pukui and Elbert 1986:16). It is probably this last use, for sling stones, that led to the reference to “the hot stones of Kaueleau” in the recounting of one of the many battles conducted by Kamehameha during his conquest of Hawai‘i. During a visit by Kamehameha to the *ali‘i* of Hāmākua and Kohala at Hakalau, a Maui chief named Kahāhāwai learned of his whereabouts and decided to try to ambush his forces, but Kamehameha was forewarned of the coming attack. He prepared for this attack:

> . . . and the army called Hunalele was readied. These were people very accomplished with sling stones, led by Kalawa the famous warrior of Hālawa at North Kohala. They were quickly sent to the stream, where it emerged at the sea, to gather hard stones to let fly when they met the enemy. At this time also the Huelokū were readied. They were very skillful at hurling spears and at seizing them and they were led by Puniawa, a famous warrior of Makahanaloa, close to Hakalau. He was a daring man accomplished in warfare. Kamehameha ordered the warriors of this division to follow quickly after the Hunalele after they had thrown their hard basaltic stones which made a cracking sound when they struck. [Desha 2000:68]

When Kamehameha’s Hunalele warriors had prepared their sling stones they proceeded to the place where they would meet the Maui warriors led by that *pā‘ele kū* (black, referring to tattooing) warrior of the Bays of Pi‘ilani. The Maui warriors were sure Kamehameha was not aware of their secret attack and they came down thinking that Kamehameha was taking his ease. However they met with something undreamed of: the hot stones of Kaueleau (unyielding forces).

Compare this saying with that discussed by Pukui (1983:141, #1278): “There is a rock at Kaueleau, Puna, Hawai‘i, called the ‘alapa‘a.” This saying can refer to an unyielding person (Desha 2000:68).

3.3 *‘Ōlelo No‘eau* (Proverbs)

Hawaiian knowledge was shared by way of oral histories. Indeed, one’s *leo* (voice) is oftentimes presented as *ho‘okupu* (“to cause growth,” a gift given to convey appreciation, to strengthen bonds); the high valuation of the spoken word underscores the importance of the oral tradition (in this case, Hawaiian sayings or expressions), and its ability to impart traditional Hawaiian “aesthetic, historic, and educational values” (Pukui 1983:vii). Thus, in many ways these expressions may be understood as inspiring growth within reader or between speaker and listener:

> They reveal with each new reading ever deeper layers of meaning, giving understanding not only of Hawai‘i and its people but of all humanity. Since the sayings carry the immediacy of the spoken word, considered to be the highest form of cultural expression in old Hawai‘i, they bring us closer to the everyday thoughts and lives of the Hawaiians who created them. Taken together, the sayings offer a basis for an understanding of the essence and origins of traditional Hawaiian values. The sayings may be categorized, in Western terms, as proverbs, aphorisms, didactic adages, jokes, riddles, epithets, lines from chants, etc., and they present a variety of literary techniques such as metaphor, analogy, allegory, personification, irony, pun, and repetition. It is worth noting, however, that the sayings were spoken, and that their meanings and purposes should not be assessed by the Western concepts of literary types and techniques. [Pukui 1983:vii]

Simply, *‘ōlelo no‘eau* may be understood as proverbs. The Webster dictionary notes it as “a phrase which is often repeated; especially, a sentence which briefly and forcibly expresses some practical truth, or the result of experience and observation.” It is a pithy or short form of folk wisdom. Pukui equates proverbs as a treasury of Hawaiian expressions (Pukui and Green 1995:xii). Oftentimes within these Hawaiian expressions or proverbs are references to places. This section draws from the collection of author and historian Mary Kawena Pukui and her knowledge of Hawaiian proverbs describing *‘āina* (land), chiefs, plants, and places. The following proverbs concerning Kea‘au come from Mary Kawena Pukui’s *‘Ōlelo No‘eau* (Pukui 1983).

3.3.1 *‘Ōlelo No‘eau* #624

The following proverb talks of the characteristics of a Puna man in comparison to the hala fruit of Kea‘au:

> *He iki hala au no Kea‘au, ‘a‘ohe pōhaku ‘alā e nahā ai.*
>
> I am a small hala fruit of Kea‘au, but there is no rock hard enough to smash me.
>
> The boast of a Puna man—I am small, perhaps, but mighty. [Pukui 1983:71]

3.3.2 *‘Ōlelo No‘eau* # 1113

The following proverb makes mention of Hōpoe, a beloved friend of Hi‘iaka who taught her the art of hula:

> *Hōpoe, ka wahine lewa i ke kai.*
>
> Hōpoe, the woman who dances in the sea.
>
> Hōpoe was a dancer of Kea‘au, Puna, in that long ago day when gods mingled with men. Because of her dancing and her kindly nature, Hōpoe was taken by the goddess Hi‘iaka as a favorite friend. When Pele sent Hi‘iaka to Kaua‘i to fetch Lohi‘au, the first request Hi‘iaka made to Pele was to be kind to her friend Hōpoe. After a time, when Hi‘iaka did not return as expected, Pele in a fit of rage destroyed Hi‘iaka’s grove and the beloved Hōpoe. The latter was changed into a balancing stone that seemed to dance in the sea. [Pukui 1983:119]

3.3.3 *‘Ōlelo No‘eau* #1560

The following proverb describes the beauty of the rain of Kea‘au that blankets the pandanus groves in the area:

Ka ua kāhiko hala o Kea‘au.

The rain that adorns the pandanus trees of Kea‘au.

Refers to the pandanus grove of Kea‘au, Puna, Hawai‘i. [Pukui 1983:168]

3.3.4 *‘Ōlelo No‘eau* #1638

The following proverb mentions Kā‘ana, a place where *lei lehua* were made and gifted to a loved one:

Kauwā ke aloha i na lehua o Kā‘ana.

Love is a slave to the lehus blossoms of Kā‘ana.

Kā‘ana is a place between Kea‘au and ‘Ōla‘a where travelers used to rest and make lei of lehua. It took many blossoms and much patience to complete a lei. The lei was after given to a loved one. [Pukui 1983:177]

3.3.5 *‘Ōlelo No‘eau* # 1668

The following proverb speaks of the many pebbles that cover the shores in Kea‘au:

Kea‘au, i ke kai nehe i ka ‘ili‘ili.

Kea‘au, where the sea murmurs over the pebbles.

Kea‘au, Hawai‘i. [Pukui 1983:180]

3.3.6 *‘Ōlelo No‘eau* #2070

The following proverb is a poetic reference to the chain of Hawaiian islands, from Puna to Kaua‘i:

Mai ke kai kuwā e nū ana i ka ulu hala o Kea‘au a ka ‘āina kā‘ili lā o lalo o ka Waikū‘auhoe.

From the noisy sea that moans to the hala groves of Kea‘au, to the land that snatches away the sun, below Waikū‘auhoe.

From Puna, Hawai‘i, where the sun was said to rise, to Lehua, beyond Waikū‘auhoe, where it vanishes out of sight. [Pukui 1983:225]

3.4 *Mele*

3.4.1 Song for the *Hula ‘Āla‘apapa* (Ancient Dramatic Hula)

In the story of Hi‘iakaikapoliopele, she was tasked by her older sister, Pele, to fetch Lohi‘au, Pele‘s dream lover and the prince of Kaua‘i. Before setting out on her journey, she asked Pele to watch over her dear *lehua* forests in her absence. Hi‘iaka was met with many obstacles on her journey that prolonged her return home and thus Pele assumed Hi‘iaka had taken Lohi‘au for

herself. Filled with the rage of jealousy, Pele ravaged the forests and when Hi‘iaka returned, she found her beloved forests ablaze. This *mele* describes the desolation caused by Pele.

Kua loloa Kea-au i ka nahele;	Kea‘-au is a long strip of wildwood;
Hala kua hulu-hulu Pana-ewa i ka laau;	Shag of pandanus mantles Pan‘-ewa;
Inoino ka maha o ka ohia o La‘a.	Scraggy the branching of Laa‘s ohias;
Ua ku kepakepa k amaha o ka lehua;	The lehua limbs at sixes and sevens—
Ua po-po‘ohina i ka wela a ke Akua.	They are gray from the heat of the goddess.
Ua u-ahi Puna i ka oloka‘a pohaku,	Puna smokes mid the bowling of rocks—
I ka huna pa‘a ia e ka wahine.	Wood and rock the She-god heaps in confusion
Nanahu ahi ka papa o Olu-ea;	The pain Oluea‘s one bed of live coals;
Momku ahi Puna hala i Apua;	Puna is strewn with fires clean to Apus,
Ulu-ā ka nahele me ka laau.	Thickets and tall trees a-blazing
Oloka‘a kekahi ko‘i e Papa-lau-ahi;	Sweep on, oh fire-ax, they flame-shooting flood!
I eli ‘a kahi ko‘i e Ku-lili-kaua.	Smit by this ax is Ku-lili-kaua.
Kai-ahea a hala i Kali‘u;	It‘s a flood tide of lava clean to Kali‘u,
A eu e, e ka La, ka malama-lama.	And the Sun, the light giver, is conquered.
O-na-naka ka piko o Hilo ua me ke one,	The bones of wet Hilo rattle from drought;
I huli i uka la, i hulihia i kai;	She turns for comfort to mountain, to sea,
Ua wa-wahi ‘a, ua na-ha-hā	Fissured and broke, resolved into dust.
Ua he-hele-lei!	[Emerson 1997:62–63]

3.4.2 *Noluna ka Halekai* (From Mountain Retreat)

This particular *mele* was taught to Hi‘iaka by her dear friend and lover of *hula*, Hōpoe. As mentioned above in the previous *mele*, in a fit of jealousy Pele destroyed the beloved *lehua* forests entrusted to her by Hi‘iaka and furthermore turned dear Hōpoe into stone. This stone could be seen in the sea at Kea‘au but was moved by the 1946 tidal wave (Pukui et al. 1974:52).

No-luna ka Hale-kai, no ka ma‘alewa,	From mountain retreat and root-woven ladder

Nana ka maka ia Moana-nui-ka-lehua.	Mine eye looks down on goddess Moana-Lehua
Noi au i ke Kai, e mali‘o.	I beg of the Sea, Be thou calm;
Ina ku a‘e la he lehua ilaila!	Would there might stand on thy shore a lehua-
Hopoe-lehua kiekie.	Lehua-tree tall of Hopoe.
Maka‘u ka lehua i ke kānaka,	The lehua is fearful of man;
Lilo ilalo e hele ai, e-e,	It leaves him to walk on the ground below.
A ilalo hoi.	To walk the ground far below.
O Kea-au ili-ili nehe ke kai,	The pebbles at Ke‘-au grind in the surf.
Hoo-lono ke kai o Puna	The sea at Ke‘-au shouts to Puna‘s palms,
I ka ulu hala la, e-e,	
Kai-ko‘o Puna.	“Fierce is the sea of Puna.”
Ia hooneenee ia pili mai kaua, e ke hoa.	Move hither, snug close, companion mine;
Ke waiho e mai la oe ilaila.	You lie so aloof over there.
Eia ke mea ino la, he anu,	Oh what a bad fellow is cold!
A he anu me he mea la iwaho kaua, e ke hoa;	‘Tis as if we were out on the wold;
Me he wai la ko kaua ili.	Our bodies so clammy and chill, friend!
	[Emerson 1997:63–64]

3.4.3 Pele and Hi‘iaka – Hi‘iaka Travels Through Pana‘ewa

In the saga of Pele and Hi‘iaka, Hi‘iaka, along with her companions, are presented with an obstacle. In order to continue on their journey, they have two paths to choose from. The first, not a direct route but used frequently by travelers and confirmed to be safe, the second, direct, but through the territory of the *mo‘o*, Pana‘ewa. Pana‘ewa sent his spies to follow the women and with true courage, Hi‘iaka belted *mele* after *mele* to calm her companions. The *mele* below is a *kāhoahoa* described as “a confident prediction of victory and an appeal to the gods” (Emerson 1915:34).

Kua loloa Keaau i ka nahele hala;	Long is the reach of Keaau‘s palms;
Kua huluhulu Pana-ewa i ka laau:	Bristly-backed Pana‘ewa‘s woodlands;
Inoino ka maha, ka ohi‘a o La‘a, e;	Spoiled are the resful groves of La‘a;
Ku kepakepa ka maha o ka laau,	Ragged and patchy the tree-clumps—
U-a po‘ohina i ka wela a ke Akua;	Gray their heads from the ravage of fire.
U-a-uahi Puna o ka oloka‘a pohaku ia,	A blanket of smoke covers Puna—

I ka huna pa‘a ia e ka Wahine.	All paved with the dump from Her stone-yard.
Nanahu ahi ka ka papa o Oluea:	The Goddess‘ fire bites Olu-ea—
Momoku ahi Puna, hala i Apua;	One cinder-heap clean to Apua;
Uaua-a ka nahele me ka laau:	Food for Her oven are wildwood and brush—
Ka ke kahiko ia o Papa-lau-ahi.	The finish that to Lau-ahi‘s glory:
	Her robe now is changed to jetty black,
Ele-i (a) kahiko, e Ku-lili-kaua;	At the onset of Ku—lili-kaua,
Ka ia, (b) hea (c) hala o Ka-li‘u;	Kali‘us palms plucked root and branch.
E ne (d) ka La, ka malama;	The Sun and the Moon are blotted out;
Onakaka ka piko (e) o Hilo i ke one,	Hilo is shaken to its foundation,
I hu-la (f) ia aku la e, hulihia i kai.	It‘s lands upheaved, despoiled to the sea
Ua wawahia, ua nahaha,	Shattered, fissured, powdered, reduced;
Ua he-helelei ka papa i Pua-le‘i, e!	It‘s paint is ashes and dust!

(a) *Ele-i*. One Hawaiian says this rare word means blue-black, shiny black (J. W. P.): another says it means rich, choice, select (T. J. P.)
(b) *Ka*, to remove, clean up entirely, as in bailing a canoe.
(c) *Hea,* destroyed, flattened out.
(d) *Ne,* an elided poetical form of nele, meaning gone, blotted out.
(e) *Piko,* the navel. The belly, or piko, of a fish was the choicest part. “I ka piko no oe, lihaliha.” Eat of the belly and you shall be satiated. (Old saying.)
(f) *Hu-la.* (Notice the accent to distinguish it from hula.) To dig up, as a stone out of the ground. [Emerson 1915:34–35]

Section 4 Historical Background

4.1 Pre-Contact History

In the early history of Hawai‘i there were many chiefs, each ruling one or several *ahupua‘a*, entire districts, or several districts. Emory provides an explanation of why there is a comparative lack of traditional political history surrounding Puna:

> We find that Puna, as a political unit, played an insignificant part in shaping the course of the history of Hawai‘i island. Unlike the other districts of Hawai‘i, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon the conquering of Puna itself, but rather upon control of the adjacent districts, Ka‘ū and Hilo. An attempt to follow in detail the course of Puna‘s history is bound up with the fortunes of the ruling families on either side of her. [Emory et al. 1959:15]

In the late 1500s, the government was united under the rule of Līloa, who became the *ali‘i nui* (high chief) over the entire island. He was a descendant of Pili, probably a high chief in the AD 1200-1300s period (Cordy 2000:160), who was said to be a voyager from the ancestral land of Kahiki. Līloa proclaimed an elder son, Hākau, to be his heir, but gave unto a younger son, ‘Umi (Umi-a-Līloa), the care of the god Kūkā‘ilimoku and his *heiau* (pre-Christian place of worship). After Līloa‘s death, ‘Umi rebelled against the rightful heir, his older brother Hākau. The district chiefs refused to acknowledge his island-wide rights, and each chief went back to rule their respective district (or districts). ‘Umi fought endless battles and finally triumphed over all of these chiefs, including a chief of Puna named Hua‘a. He then united the island once again under one *ali‘i nui*.

> Hua-‘a was the chief of Puna, but Puna was seized by ‘Umi and his warrior adopted sons, Pi‘i-mai-wa‘a, ‘Oma‘o-kamau, and Ko‘i. . . . Hua-‘a was killed by Pi‘i-mai-wa‘a on the battlefield of Kuolo in Kea‘au, and Puna became ‘Umi-a-Liloa‘s. [Kamakau 1961:18]

After his death (ca. AD 1620), the chiefs reestablished their authority over the separate districts of Hawai‘i. Puna does not seem to have had a district chief of its own; instead, it was at various times under the domination of the Hilo (district to the north) chiefs, descendants of ‘Umi and his wife Pi‘ikea, and the Kona (district to the south) chiefs, descendants of ‘Umi and his wife Kapukini.

In 1760, the chief Kalani‘ōpu‘u defeated the last of his enemies, and became the *ali‘i nui* of Hawai‘i. After these victories, Kalani‘ōpu‘u sent for his son, Kīwala‘ō, and his favored nephew, Kamehameha. In an act reminiscent of Līloa and his two sons (Hākau and ‘Umi), Kalani‘ōpu‘u made the son his heir, with the right to perform the ritual to dedicate a *heiau*, but gave his god, Kūkā‘ilimoku, into the care of Kamehameha.

One warrior who had originally fought on Kalani‘ōpu‘u‘s side was a chief of Puna:.

> . . . ‘o ‘Īmakakoloa ka pū ‘awa hiwa hīnalo o Puna; . . . [Kamakau 1996:22]
>
> ‘Īmakakoloa, the dark ‘awa among the hala blossoms of Puna; . . . [translation in Kamakau 1961:86]

This warrior rebelled against the rule of Kalani‘ōpu‘u.

> ‘O ‘Īmakakoloa ke ali‘i o Puna, ua kipi a‘ela ‘o ia; a ‘o nā waiwai o ke aupuni, ‘o ka pua‘a, ‘o ka ‘eleuli, ‘o ka mamaki, ‘o ka ‘ahu hīnalo me ka ‘ahu ‘ao, ‘o ka hulu ‘ō‘ō me ka mamo o Puna, ua hao a‘ela ‘o ‘Īmakakolao, ka pū ‘awa hiwa hīnalo o Puna. [Kamakau 1996:58]
>
> It was I-maka-koloa, a chief of Puna, who rebelled, I-maka-koloa the choice young ‘awa [favorite son] of Puna. He seized the valuable products of this district, which consisted of hogs, gray tapa cloth (*‘eleuli*), tapas made of *mamaki* bark, fine mats made of young pandanus blossoms (*‘ahu hinalo*), mats made of young pandanus leaves (*‘ahuao*), and feathers of the *‘o‘o* and *mamo* birds of Puna. [translation in Kamakau 1961:106]

Kalani‘ōpu‘u moved with his court from Waiākea to Ka‘ū and erected Pakini Heiau in anticipation of ‘Īmakakoloa‘s capture. Almost a year went by and ‘Īmakakoloa still lived in hiding with the help of his loyal followers of Puna. Kalani‘ōpu‘u sent a war party, led by his *kahu* (honored attendant), Puhili, into the villages of Puna where they set fire to every village until they found ‘Īmakakoloa, hidden on an islet off the Puna coast. ‘Īmakakaloa was taken to Ka‘ū, where his body was to be presented as a sacrifice (Kamakau 1961:108). The dedication of his body was to be made at Hālauwilua Heiau near South Point by Kīwala‘ō, son of Kalani‘ōpu‘u (Cordy 2000:296).

It was here that Kamehameha made his bid for ascendancy over his cousin, the rightful heir, by seizing the body of ‘Īmakakoloa during the dedication ceremony and offering it to the gods himself, thus completing the dedication of the *heiau*, a duty that Kalani‘ōpu‘u had reserved for his son (Kamakau 1961:109). Kīwala‘ō was later killed during a battle with Kamehameha‘s forces, in a battle titled Moku‘ohai, and Ka‘ū and Puna were then under the order of Keoua (Kamakau 1961:121–122).

4.2 Early Historic Period

The number of foreign accounts documenting the district of Kea‘au are relatively high considering it was not a major city center in ancient times. Through each account, the landscape of Kea‘au slowly diminishes from lush vegetation to a desolate, barren land transformed by lava flows. The first and earliest account comes from crew members on board Captain Cook‘s ship who made note of the difference in population and fruitfulness of the land. Later, British missionaries on their way to Kīlauea crater also noted the same characteristics. Missionary Titus Coan also mentions the beautiful forests of Kea‘au and not until the Wilkes Expedition of 1826 did the land transform to an empty and treacherous land of lava.

4.2.1 Captain Cook’s Expedition, 1779

The first foreigners to see the Puna coast were crewmembers of Captain Cook’s third voyage to the Pacific in 1779. They were the first to note the differences in population and cultivation between the southwestern section of Puna and the more easterly area.

> The East part of Opoona [Puna] is flat, covered with Coco nut trees, and the land far back is of a Moderate height. As well as we could judge this is a very fine part of the Island, perhaps the best.
>
> On the SW extremity of Opoona the hills rise abruptly from the Sea side, leaving but a narrow border, and although the sides of the hills have a fine verdure, yet they do not seem Cultivated and when we sailed pretty near and along this end of Opoona, we did not observe that it was equally populous with the eastern parts. [Beaglehole 1967:606]

4.2.2 Ellis Missionary Tour, 1823

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM)—Asa Thurston and Artemas Bishop—toured the island of Hawai‘i. After touring Ka‘ū District, they made a side trip inland to the Kīlauea crater, then returned back to shore near the Ka‘ū/Puna border. Mr. Ellis kept a detailed journal of his travels and was the second foreigner to note the differences in population and cultivation of the various areas of Puna.

T. Stell Newman (1971) reviewed the journal of William Ellis for his 1823 tour of Hawai‘i Island to reconstruct the environmental characteristics of aboriginal agricultural lands on different parts of the island. Based on Ellis’ observations, there were two main types of dryland farming in Hawai‘i, either in field systems or in scattered fields. As seen on Newman’s map (Figure 5), Ellis recorded only scattered fields on the northern coast of Puna, as opposed to the more organized field systems of the southern Puna coast.

Within the western beginning of this field system, around Kaimū, Ellis approved of the “extent of cultivation in the neighborhood [*sic*], together with the decent and orderly appearance of the people,” and contemplated making Kaimū the location of a new mission. The next day, the party traveled on to Keouohana to preach, then to the villages of Kehena and Kama‘ili, where they rested. They next traveled to ‘Opihikao, not making any mention of the *ahupua‘a* of Kaueleau, suggesting there was not a large enough population in that area to stop for a sermon. They gave a sermon at ‘Opihikao, which Ellis describes as a “populous village, situated within a short distance of the sea” (Ellis 1963:200). They continued east along the coastal trail: “We then proceeded about two miles, principally through cultivated grounds, to Kauaea. About 300 people, excited by curiosity, soon collected around us, to whom Mr. Thurston preached” (Ellis 1963:201).

Their stay in the *ahupua‘a* of Kauaea was brief, so there is little description of the area. The group next traveled to the *ahupua‘a* of Malama and then to Keahialaka, the residence of Kinao, the governor of the Puna District. The party split up at Keahialaka, with Ellis remaining with the sick chief of Puna, Kinao, and the rest of the party continuing north to the village of Pu‘ala‘a.

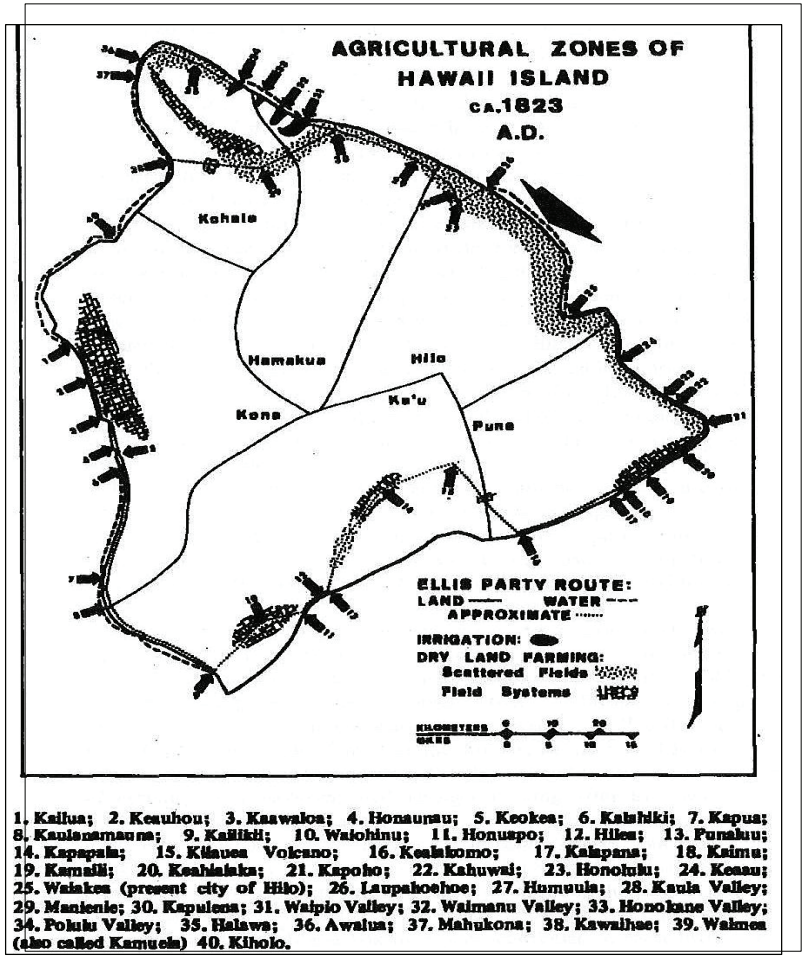


Figure 5. Portion of map of Hawai‘i showing Newman’s (1971:337) reconstruction of the agricultural zones of the island in 1823, based on the observations in the journal of William Ellis

> When they reached Pualaa, the above-mentioned village, they were kindly welcomed by the head man, who soon had the people of the place collected at their request, and to them Mr. Thurston proclaimed the news of salvation through Jesus Christ. The chief furnished the travelers with a hospitable supper and comfortable lodgings . . .
>
> About half-past eleven we took leave of them, and directed our way across the eastern point. A most beautiful and romantic landscape presented itself on our left, as we traveled out of Pualaa. The lava covered with a tolerably thick layer of soil, and the verdant plain, extending several miles toward the foot of the mountains, was agreeable diversified by groups of picturesque hills, originally craters, but now clothed with grass, and ornamented with clumps of trees. [Ellis 1963:205]

Barrere (1971:10) believes there may have been less than 100 people in the crowd that came to hear the missionaries at Pu‘ala‘a, since Ellis always gave an estimate of the audience when it was greater than 100 people. The chief of Puna, Kinao, visited by Ellis, may be Kinau, a son of Kamehameha, who was at one time considered his principal heir. Kamehameha instead selected a younger son, Liholiho, to be next *ali‘i nui* of the islands (‘Ī‘ī 1959:33, 37).

The missionary groups traveled to Kapoho and then past Kula, sometimes traveling “on the top of a wall four feet high and about three feet wide, formed of fragments of lava that had been collected from the surface of the enclosures which these walls surrounded” (Ellis 1963:211). They reached Kahuwai in the afternoon where they met with an assembled group of about 150 people, then traveled up the coast to Honolulu Landing to spend the night and continued to Waiakahiula in the morning. Bishop left the group to continue the tour traveling along the coast to Kea‘au, and Ellis and Thurston followed the next day:

> Being somewhat recovered by noon, I was able to proceed with Mr. Thurston. The country was populous, but the houses stood singly, or in small clusters, generally on the plantations, which were scattered over the whole country. Grass and herbage were abundant, vegetation in many places luxuriant, and the soil, though shallow, was light and fertile.
>
> Soon after five p.m. we reached Kaau [Kea‘au], the last village in the division of Puna. It was extensive and populous, abounding with well-cultivated plantations of taro. Sweet potatoes, and sugar-cane; and probably owes its fertility to a fine rapid stream of water, which, descending from the mountains, runs through it into the sea. . . . [Ellis 1963:212]

4.2.3 Titus Coan and the Hilo Mission Station

Later in 1823, a mission station opened in Hilo, which was responsible for the districts of Hilo, Puna, and part of Ka‘ū. In 1833, two churches were dedicated, one in Hilo, and one in Kuoloa, on the eastern boundary in Puna (Hilo Station Report, June 1833). The missionary Titus Coan became head of the Hilo Station in 1835, and took his first tours through Hilo and Puna with his fellow preacher Mr. Lyman in the same year. Mr. Coan reported the following:

> Soon after, I made a tour with him into Puna, one wing of our field, and then through the district of Hilo, in an opposite direction. These tours introduced me to the people for whom I was to labor, and with whom I had a burning desire to communicate freely, and helped me greatly in acquiring the language. . . .
>
> For many years after our arrival there were no roads, no bridges, and no horses in Hilo, and all my tours were made on foot. These were three or four annually through Hilo, and as many in Puna; the time occupied in making them was usually ten to twenty days for each trip. [Coan 1882:20]

In describing the district of Puna, Coan emphasized the abundant rainfall, the many evidences of volcanic activity, and the fields of vegetables and fruits grown in those regions with both deep soils and access to water.

> Its [Puna‘s] shore line, including its bends and flexures, is more than seventy miles in extent. For three miles inland from the sea it is almost a dead level, with a surface of pahoehoe or field lava, and a-a or scoriaceous lava, interspersed with more or less rich volcanic soil and tropical verdure, and sprinkled with sand-dunes and a few cone and pit-craters. . . . The rains are abundant, and subterranean fountains and streams are numerous, carrying the waters down to the sea level, and filling caverns, and bursting up along the shore in springs and rills, even far out under the sea . . .
>
> Puna has many beautiful groves of the cocoa-palm, also breadfruit, pandanus, and ‘ōhi‘a, and where there is soil it produces under cultivation, besides common vegetables, arrowroot, sugar-cane, coffee, cotton, oranges, citrons, limes, grapes, and other fruits. On the highlands, grow wild strawberries, cape gooseberries, and the ohelo, a delicious berry resembling our whortleberry. [Coan 1882:26]

4.2.4 The Wilkes Expedition, 1826

The Wilkes Expedition made a trip to the summit of the Kīlauea Crater in 1826, then returned along the Puna coast, descending from the crater to Kapoho.

This excursion to Kīlauea Crater was followed by others in the same manner. Nordhoff, in his guide to the Hawaiian Islands, suggests “your pleasantest plan is to ride from Hilo by the direct road to the crater, and return by way of Puna” over the 70 miles back along the coastal path to Hilo.

> Almost the whole of it [Puna] is a land of desolation. A narrow trail across unceasing beds of lava, a trail which in spots was actually hammered down to make it smooth enough for horses’ feet, and outside of whose limits in most places your horse will refuse to go, because he knows it is too rough for beast or man; this is your road. [Nordhoff 1874:41]

Most of these early visitors followed an ancient coastal foot trail, which in the late nineteenth century was made into a horse trail, called the “Old Government Road” (Lass 1997:15). To improve these paths for horses, the variously spaced paving stones that marked the foot trail were removed, and curb stones, to mark the edges of the trail and guide the horses, were added. It is

uncertain exactly when the foot trail was altered into an “improved road.” Alfred Hudson thought it was constructed right before the Wilkes expedition of 1840-41, since Wilkes states “In some places they have taken great pains to secure a good road or walking path; thus, there is a part of the road from Nanavalie [Nānāwale] to Hilo which is built of pieces of lava. . . .” However, Lass does not believe this was a horse trail, since Wilkes also states that “the road is exceedingly fatiguing to the stranger, as the lumps are so arranged that he is obliged to take a long and a short step alternatively, but this the natives do not seem to mind, and they pass over the road with great facility . . .” (Wilkes 1845:191). This suggests the trail was made of variously spaced paving stones. During a tour of Puna in 1848 by the missionaries Henry Lyman and Titus Coan, no mention of an improved road is made. Lass believes the present form of the Old Government Road was constructed around the early 1870s (Lass 1997:17).

4.3 The Māhele and Kuleana Awards

In the mid-1800s, Kamehameha III decreed a division of lands called the Māhele. Lands were divided into three portions: crown lands, government lands, and lands set aside for the chiefs. Individual plots, called *kuleana* awards, were granted within these divided lands to native inhabitants who lived on and farmed these plots. Researching the claims and testimonies that were given in the mid-1800s can sometimes assist in forming a settlement pattern for the region at that time and possibly earlier. The Land Commision Awards (LCA) located within the *ahupua‘a* of Kea‘au are listed in Table 1.

The Kea‘au Ahupua‘a was granted as chief lands to William C. Lunalilo as a portion of LCA 8559-B designated *‘āpana* (piece, slice, portion, land parcel) 16. Only one *kuleana* award, comprising 13.64 acres, was granted in Kea‘au: LCA 8081, RP 4360, to Hewahewa. The claim indicated the land was unfenced with no house, and that coffee was being grown (Hurst and Schilz 1994:12–13, 17). This parcel was sold to the Roman Catholic Church in 1865.

Table 1. Land Commission Awards in the Kea‘au Ahupua‘a

Claimant	LCA Number	*‘Ili*	Land Use
Hewahewa	8081	Hapaiolaa	Coffee cultivation

The lack of *kuleana* awards in Kea‘au may indicate the paucity of habitation in the region during the mid-1800s. The lack of *kuleana* awards along the coast, wherein numerous villages were documented by travelers in the early part of the century, may be due to a tsunami (Japanese for tidal wave) devastating the coast of East Hawai‘i sometime before 1846 (Hurst and Schilz 1994:12–13, 17). However, the lack of *kuleana* awards may be more related to political and/or other social factors than a total absence of inhabitants. Thus *kuleana* data cannot be utilized to reconstruct mid-1800s settlement patterns for Kea‘au.

4.4 Mid- to Late 1800s

4.4.1 William Herbert Shipman Estate

The following information was gathered from the website operated by members and employees of the Shipman family (W.H. Shipman 2017). The folllowing passages give detail to the early life and establishment of the Shipman family in Hawai‘i:

> In 1854 the Reverend William Cornelius Shipman and his wife Jane sailed from Boston Harbor, dispatched by the American Board of Foreign Missions to serve in the Pacific. They arrived in Lāhainā, Maui 135 days later and shortly thereafter a son, William Herbert (W.H.) Shipman, was born. The following year Reverend Shipman filled a vacancy in Ka‘ū, on Hawai‘i Island, and the family made Hawaii its permanent home.
>
> W.H. Shipman, called Willie, grew up on Hawai‘i Island and as a young man attended Punahou School on Oahu and Knox College in Illinois. He returned to Hawai‘i to manage Kapapala Ranch in Ka‘u. In 1879 he married Mary (Mele) Elizabeth Kahiwaaiali‘i Johnson of Kona, grand daughter of John Davis whose uncle, Isaac Davis, was a trusted advisor to King Kamehameha I . . . Shortly after their marriage, William and Mary moved to Kapoho to run the family ranch.
>
> Kapoho was 23 miles from the Hilo business district over rough trails. The main trail, the King‘s Highway along the Puna coast, took the Shipmans past Hā‘ena Beach frequently. Mary would remark that she would like to make their home near the beautiful beach and protect the area for future generations.
>
> Hā‘ena was part of the Ahupua‘a of Kea‘au (Lands of Kea‘au) covering 70,000 acres from the Puna coast (12 miles frontage) to Kīlauea Volcano. In 1882 the King Lunalilo Estate sold the lands to W.H. Shipman, J. Elderts, and S. Damon. Over the next two years Willie bought out his partner‘s interests and became sole owner of the Lands of Kea‘au. [W.H. Shipman 2017]

The W.H. Shipman lands under were used as pasture for grazing cattle, stock for the Hilo Meat Market and Waiakea Stock Ranch, also owned by Shipman. In 1889, a 40-ft right-of-way was granted by Shipman for the construction of Volcano Road. The road was completed sometime after 1893.

4.4.2 Lunalilo’s Estate

The guardians of Lunalilo’s estate mortgaged Kea‘au Ahupua‘a to Honolulu banker Charles C. Bishop in the 1860s. In September 1872, 60,020 acres of Kea‘au were leased from the Lunalilo estate to O.B. Spencer. In September 1874 the lease was reassigned to Rufus A. Lyman (Hurst and Shilz 1994:13). Lyman completed a survey of his lands in 1875, at which time he recorded landmarks, vegetation zones, features, and “an old heiau named Kawiakawa” (located at the border of Kea‘au and Wai‘akea Ahupua‘a at the shore), although no clear evidence of this *heiau* was found by Bishop Museum during a 1974 survey (Ewart and Luscomb 1974:52). It is reported that in the late-1800s, W.H. Shipman removed some of the stones for a cattle pen (Ewart and Luscomb

1974:12). One place name was recorded by Lyman at the east side of Puna and Hilo roads called “Kaluaike water” (Ewart and Luscomb 1974:13).

4.4.3 1873 Boundary Commission Testimony

In 1873, according to Boundary Commission testimony, Kea‘au was a place with *‘ōhi‘a, koa (Acacia koa)*, and *‘īliahi* (*Santalum freycinetianum*) forest areas, banana and coconuts growing along the shoreline near fresh water springs and a pond, numerous caves (including defensive and habitation caves), and several areas utilized by specialists and others for capturing birds, harvesting *olonā (Touchardia latifolioa)* bark for cordage, and other traditional cultural practices. Appendix A also includes excerpts from Maly‘s (1999) oral history interviews regarding the vicinity of Kea‘au. The full text of the Kea‘au Ahupua‘a Boundary Commission testimony is presented below. These place names, some with known meanings, are also presented in Table 2.

> June 4, 1873: Uma K., Sworn
>
> I was born at Keauhou at Keaau Puna, at the time of the return of Kamehameha 1st from Kaunakakai, Molokai [ca. 1791]; I have always lived there and know the boundaries between Keaau and Waikahekahe
>
> My parents pointed them out to me when we went after birds and sandal wood. Waikahekahe Nui joins Keaau at sea shore at Keahuokaliloa, a rock that looks like a human body, which is between two points, the point on the Waikahekahe is called Kaluapaa [*sic*] and the one on Keaau, Keahuokaliloa.
>
> Thence the boundary runs mauka to place called Koolauo. The pahoehoe on the north side is Keaau and the good ground where cocoanut trees grow is on Waikahekahe. In past days there was a native village at this place.
>
> Thence mauka to Haalaaniani (He kupua) when the old road from Kalapana used to run to Keaau, thence the boundary runs to Wahikolau, two large caves, the boundary runs between them.
>
> Thence mauka to another cave called [page 191] Oliolimanienie, where people used to hide in time of war. At this cave Waikahekahe Nui ends and Waikahekahe Iki joins Keaau.
>
> Thence the boundary runs along Waikahekahe Iki, mauka to Laeopuula, an old kauhale, he ahua pahoehoe. Keaau on the Hilo side of the road running mauka, thence to Kikinui, an old Kauhale for bird catchers, thence to Hoolapehu, another old village, thence to Alaalakeiki, which is the end of Waikahekahe Iki and Kahaualea joins Keaau. This place is at an old kauhale manu [bird catchers compound] (opposite a rise of ground, above the seventeen mile post, on the Volcano Road, about two miles above Kanekoa), thence mauka to Palauhulu, an ahua [rise] on the road to Kīlauea, at the place where the road to Panau branches off. The boundary between Keaau and Kahaualea is on the South east side of Palauhulu about as far away from Hilo Court House to seashore.

> Thence the boundary runs mauka to Omaolaulau (he oioina [a resting place] on pahoehoe) near the woods at Reeds bullock pen, the boundary of Keaau is about as far from the Government road as from the Hilo Court House to the Government School house, thence mauka to Keekee, Kauhale kahi olona [house for stripping olonā bark for cordage] in ‘Ōla‘a. The boundary is a short distance from the Government road on the South East side.
>
> Thence to Kauwaanahunalii (he oioina) this place is on Keaau and the boundary runs to the South East side of it. This is at the high ground where you can look down in the woods where the bullock pen is, thence to Kawaiaeae a large water pond (South East side of the road). The boundary of Keaau and Kahaualea is close to the pond, on the south east side, thence mauka to Kalaninauli, the land on the south east side being only about six chains wide thence to Puuenaena (large ‘ōhi‘a trees on the road makai of the koa woods) a short distance South East of the Government road.
>
> Thence the boundary runs mauka to a place called Pohakuloa, a small cave south east of the Government road, and a very short distance above the koa woods, on the Government road to Kīlauea. Thence Keaau is cut off by Keauhou. ‘Ōla‘a bounds Keaau on the north west side. Keauhou cuts Keaau off to Government road to Kīlauea, then runs makai along the old [page 192] Government road, through the koa woods. ‘Ōla‘a being on the North side of the road and Keaau on the South east side.
>
> Thence down the road passing these points Palauhulu and to Kapueuhi, thence makai to Kahooku thence to Kanekoa, the houses on the South East side of the road are on Keaau; those on the other side are on ‘Ōla‘a, thence to Kamahiki (14 mile post).
>
> Thence to Kalehinapuoa (where there is a mauka road which goes to Hawelu’s) thence to Kaahakanaka, on the outer road passed Hawelu’s thence to Kaluakaiole (Kaakeakaiole) mauka of where Haanio road to Kukulu leaves the present traveled road, thence to Mahinaakaaka on the outer road, out side of Kahuku, thence down to where Kahopuaku’s houses used to be (Makaulele) along the old road, this is as far as I know the boundaries between ‘Ōla‘a and Keaau. Kahopuaku’s houses were on ‘Ōla‘a.
>
> Have heard that Mawae is the boundary between Waiakea and Keaau, on the Government road to Puna, and also to ‘Ōla‘a.
>
> Have heard that Kawiokawaa is the boundary at sea shore between these two lands. I have not seen this place, the sea bounds Keaau on the makai side. Ancient fishing rights, including the uhu which was Konohiki fish extending out to sea. CXd [1873 Boundary Commission for Kea‘au Ahupua‘a].

June 4, 1873: Puaa K. Sworn

I live on Ponahawai, was born in Kau at time of Keouamua (one of Kamehameha I's battles).

I came to Keaau and lived there two years when I was a boy. Have lived on Waiakea a great many years, in 1860 I returned to Keaau and had charge of the land for five years. While in charge [page 193], I heard what some of the boundaries were, and went and saw them.

Uma, the last witness and Kalimakahili now at Keaau, and Kaoo, *Kamaaina* of Waikahekahe (who is now sort of *opulepule*), went with me. I never heard any dispute about boundaries between Keaau and Waikahekahe 1st. At the boundary between Keaau and Waikahekahe is the land of a place Keahuokaliloa, thence *mauka* along Waikahekahe to *pahoehoe*, on Hilo side of a place called Kukuikea where the natives cultivated food, and where breadfruit trees grow.

Thence to Hilo side of Waianohu a large place that fills with water in the rainy season. Thence to Koolauo, the *pahoehoe* on the Hilo side of it is Keaau; the soil is on Waikahekahe Nui. Thence *mauka* along the road to Halaaniani, Keaau on the Hilo side of road. Halaaniani is a *puu pahoehoe* [*pähoehoe* hill] in a grove of ohia trees, called Keakui, about as far as from Hilo Court House to Wailuku bridge, on Hilo side of Halaaniani, on Keaau, thence two holes or caves where people used to live.

The boundary running between these caves, *mauka* to Oliolimanienie, *he oioina* [trail side resting place] on Puna side of a cave called Olioliana, where people used to hide in time of war. Thence Waikahekahe Nui ends and Waikahekahe Iki joins Keaau, and bounds it.

I have been to a place on the boundary between Waikahekahe Iki and Keaau, but I do not remember the name of the place, do not know where Waikahekahe Iki ends. Keaau ends a little above the cave at Pohakuloa, and is cut off by Keauhou.

Uma told me this. Nailima of ‘Ōla‘a told me Keaau ended at Halaaniani, he told me this when I was Konohiki of Keaau. Some of the ‘Ōla‘a people told me Keaau ended at Palauhulu. Kaoo K. told me that Kahaualea cut both Waikahekahe's off. I think at a point outside of Kanekoa, he did not tell me where. Have heard that Waikahekahe Iki runs clear to Kīlauea.

Kaoo is a *kamaaina* of Waikahekahe, have always been told that the road from Hilo is between Keaau and ‘Ōla‘a, until you get to Makaulele, below Kahopuaku's houses to a place called Kilohana where oranges are growing. Thence the boundary of Keaau and ‘Ōla‘a leaves the Volcano road and runs *mauka* above these orange trees, thence to an *ohia* grove called Puaaehu, thence to Waiaele& [page 194] &a place in the woods on the old road to ‘Ōla‘a. I have only been there once, ‘Ōla‘a is on the *mauka* side of this place, and Keaau is on the *makai* side and Waiakea on the Hilo side at Mawae. Waiaele, a water spring with banana trees growing near it used

to be an old *kauhale*. Mawae is on the Hilo side of Waiaele, about as far from here to Kalepolepo. It is a large crack that runs from the upper edge of the woods to shore and is the boundary between Keaau and Waiakea. Keaau is *makai* of the road from Waiaele to Mawae, and ‘Ōla‘a is *mauka*.

Mawae is the boundary between Keaau and Waiakea from this point to the sea shore. Mawae is a large crack running across the Government road (*makai* road) to Puna, and thence to Kawiakawa, a sort of *awaawa* [gulch or depression] at shore, point of Kalipala at Papai, and point of Paukupahu. The *mawai* runs between these two. Kawiakawa is some distance on the Puna side of the cocoanut trees on Paukupahu, Alae and others whose names I do not remember, told me these things boundaries when we used to travel over the old road to ‘Ōla‘a. I went through there once, the road used to go from Pooholua to ‘Ōla‘a. The persons I went with are all dead. CXd. [Volume A No. 1:193–195]

June 4, 1873: Kanoi K. Sworn

I was born at Kapapala in Kau, at the time of the building of Kiholo [ca. 1811] lived there until a few years since know the land of Keaau and the boundaries on the mountain adjoining Kahaualea. The upper end of Keaau is bounded on the South East-side by Kahaualea, and on the *mauka* side by Keauhou and on the Northwest side by ‘Ōla‘a; Kaheana, Kaihe Kaheana 2, and Makanui my Kupuna showed me some of the boundaries of these lands.

Kaheana was from Panau Puna, and Kaihe was from Kau. These two men, with others from Kapapala showed me boundaries between Keauhou and Kahaualea where we went after the oo on Keauhou. Went after sandalwood on Kahaualea.

Keauhou cuts Keaau off at Pohakuloa, the *huina alanui* [road intersection], where the marks or sign board is at the junctions of the Hilo and Puna [196] roads this side of the Kīlauea House, the name of this place is Halemaumau.

The boundary of Keaau runs *makai* along the Puna road to Kaluaiki, a small crater, at a place where the road runs between two craters. On to the *mauka* side of crater Kaluaiki, said crater is on Kahaualea and Keauhou is on the South side of the road. Keaau and Kahaualea lay side and side, from Kaluaiki to Nawailoloa, a place on the road from Palauhulu to Panau. Kaluaiki is about as far Pohakuloa as from Hilo Court House to Kaina's house at Alenaio.

Nawailoloa and Kilohana, two ponds of water, on the road to Panau from Palauhulu, from Nawailoloa the boundary between these two lands runs *mauka* to a grove of *Ohia* trees called Namauuokalahili, thence *mauka* to Puukea a hill in the woods where we used to go after sandal wood, thence *mauka* to Namamokalei where we used to catch *uwao* [*‘ua‘u*–petrels].

This place is opposite to Kauanahunahu, *mauka* of Keekee about a mile. Thence to Kaluaiki. I have often been to these points from Waiuli to Pohakuloa. I have always heard that the old Government road to Kīlauea is the boundary between Keaau and ‘Ōla‘a, I do not know the *makai* boundaries. CXd. [Volume A No. 1:195–196]

June 4, 1873: Naipo K. Sworn

Was born at Waiakea at time of the Peleleu [ca. 1795]. Have always lived on Waiakea and Keaau. Keliinohopuu, my father, Ku his brother, and Kapulii (all dead) showed me boundaries, They told me Kapohakuau, a large rock on the point at shore is the boundary between Waiakea and Keaau, thence mauka [page 197], along Waiakea to Kawiakawaa, a small cave where natives worshipped Idols.

The boundary runs up mauka in awaawa Keaau on the Puna side and Waiakea on Hilo side to Mawae on the lower Government road to Puna, boundary at the bottom of the pali. Thence up along Mawae to mauka Government road to ‘Ōla‘a. I have not been along this Mawae but have always heard that it runs from lower to upper road. My parents told me Keaau ended at Waiaele. Naaue [Naue] is between Mawae and Waiaele, it is a place where people used to flee and live in time of war.

I have been told Waiakea joins ‘Ōla‘a at Waiaele. The sea bounds Keaau on the makai side and the land has ancient fishing rights extending out to the sea. Do not know the boundaries on the other side of the land. CXd. [Volume A No. 1:197–198]

Table 2. Kea‘au Ahupua‘a place names

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Ā‘alāmanu	Lex.: ā‘alā-manu Lit.: dense pebbles [gathered by the birds]	Situated on shore to south of Kaiko‘o
Alaalakeiki	Lex.: ‘ala‘ala-keiki	Boundary point between Kea‘au, Waikehakeha Iki, and Kahauale‘a Ahupua‘a; at old *kauhale manu* [bird catcher‘s compound] between Hoolapehu and Kanekoa (opposite a rise of ground, above 17 mile post, on Volcano Rd, about 2 miles above Kanekoa). Source: Boundary Commission Testimony 1:192. Quad: 10-54. North 223,700 East, 630,000 Evel. 2280ft
Anapuka	Lit.: cave entry or underground passage, cave with holes	Area in the *‘ili* of Pōka‘ī (in Waiākea); also a *heiau* and associated features
Auwae		Area in the *‘ili* of Pōka‘ī (in Waiākea); also a *heiau* and associated features; a

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
		cave. Source: USGS 1963. Quad: 10-36 North: 324,3000 East: 673,500
Eight and Half Mile Camp		Plantation camp
Eleven Mile Homestead		Homestead, village. Source: USGS 1963. Quadrangle: 10-44 North 281,000 East: 646,500
Government Rd (Old)		Coastal road; main access road through Puna in the past; formerly part of Ala Loa (ancient road/trail that circuits island)
Haanio Rd	Lex.: Ha‘anio or Hauanio	Boundary point, place
Hā‘ena	Lit.: red hot; raging wrathful (descriptive of the raging sea -pers comm. M.K. Pukui, 1976)	Point and flats fronting C. Fisher‘s residence; beach between Makua Reef to the east and Hauwa Reef to the west, across the road from Maniniholo Cave (Clark 2002:85)
Halaaniani	Lex.: Hala-aniani	Kea‘au/Waikahekahe Nui boundary runs “mauka to Haalaniani [*sic*] (he kupua [shapeshifter]) where the old road from Kalapana used to run to Koolauo” (p.191) “Halaaniani is a puu pahoehoe in a grove of ohia trees called Keakui” [with two habitation caves] (p. 194) between Koolauo and Laeopuula Source: Boundary Commission Testimony 1:191,194. Quadrangle: 10-44
Halauloa	Lex.: hālau-loa Lit.: long canoe house	*‘Ili ‘āina* (or *‘ili*, land area) in Kea‘au; LCAs 3996 and 8081; described as garden; LCA 8081:2 to Hewahewa, 13.64 acres, at Halauloa. Source: Indicies of Awards, Land Commission 152,500; Land Commission, Awards Book 5:389; Land Commission, Native Testimony 4:471. Quadrangle: 10-?. See also Hapaiolaa below

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Hāpaiolaa	Lex: Hāpai-‘ōla‘a Lit: elevate, or lift up ‘Ōla‘a	Kīhāpai (or Kīhāpai ‘āina one of smallest land divisions, about size of a grove, garden); LCA 8081 by Hewahewa describes it as a coffee tree grove; Land Commission Award 8081 is in Halauloa. Source: Land Commission, Native Register 8:704. Quadrangle: 10-? (http://ulukau.org/) (see also Halauloa above)
Hawelu, Hawelu’s Place, Hawelu’s Road, Road to Hawelu’s		Hawelu’s Hotel in ‘Ōla‘a; Mr Hawelu was Mr. Shipman’s foreman
Hinamakanui or Wahinemakanui	Lex.: Hina-maka-nui or Wahine-maka-nui Lit.: big-eyed Hina, or big-eyed-woman	Stone in the ocean north of Kahului. Hina is earth and fisherman‘s deity
Honolulu Landing	Lit.: protected bay	Landing, probably in Nānāwale. Source: USGS 1965. Quadrangle: 10-45 North: 263,700 East: 712,300
Hoolapehu (Holapehu)	Lex.: ho‘ōla-pehu; ho‘ōla: to save; pehu: swollen	The Kea‘au/Waikahekahe Iki boundary runs *mauka* “to Hoolapehu, another old village” between Kikinui and Alaalakeiki. Source: Boundary Commission Testimony 1:192. Quadrangle: 10-54
Hoolapehu		Boundary point, *kauhale*
Hoolauo		Old inland village on boundary between Kea‘au and Waikahekahe
Hōpoe	Lex.: Hōpoe Lit.: fully developed	Lava flats and forest, extending between points of Ka‘īlio and Kaloli; “Stone formerly in the sea at Kea‘au . . . believed to be Hi‘iaka‘s companion (deity of the lehua forest and dancers) turned to stone by Pele; it was moved by the tidal wave of 1946.” Source: Pukui et al. 1974. Quadrangle: 10-36

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Iwasaki Camp		Plantation camp; village; formerly plantation residentail area. Elev. about 650 ft. Souce: USGS 1963. Quadrangle” 10-44. North 280,750. East: 650,500/
Kaahakanaka	Lex.: ka-‘aha-kanaka Lit.: the assembly [of] men	Boundary point; Kea‘au/‘Ōla‘a boundary runs *mauka* “to Kaahakanaka on the outer road passed Hawelu’s” between Kaluakaiole and Kalehuapuaa
Kahooku	Lex.: ka-ho‘okū Lit.: to stand, in the state of standing	Boundary point, place; Kea‘au boundary runs along ‘Ōla‘a to a point “in the road at place called Kahooku where some neneleau [nele-au. Rhus sandwincensis, a native Hawaiian sumach shrub/tree] Also neneleau. Trees are growing, and from where the houses at Kanekoa can first be seen in coming down from the volcano.” Elev. 1849 ft. Source: Boundary Certificate No. C 61 (Vol. 3: pp114). Quadrangle: 10-44. North: 245,500. East: 630,300
Kahului	Lex.: Ka-hului Lit.: the fishnet bag Interpretive: the winning	Place; old village site north of Kea‘au Bay; point in northern section of Kea‘au; possibly an *‘ili ‘āina* (land division whose chief pays tribute to the chief of the *ahupua‘a* of which it is a part, rather than directly to the king) at the shore. Source: USGS 1963; Tax Map 1601. Quadrangle: 10-36. North: 303,000. East: 677,000
Ka‘īlio	Lex.: Ka-‘īlio Lit.: the dog	Point to south of Keauhou
Kaiko‘o	Lex.: Kai-ko‘o Lit.: high or rough seas	Area between Pākī and Keauhou
Kalaihina	Lex: Kalai-hina. Lit: Kalai: to carve. Hina; name of a Hawaiian earth and fishermen deity	*‘Ili ‘aina*; named in LCA 2327 to Barenaba, 11.32 acres. Source: Indicies of Awards, Land Commission 152,500. Land Commission, Awards Book 5:390. Quadrangle: 10-?.
Kalaninauli	Lex: Kalani-na-uli. Lit: the dark heavens	A place, less than six chains wide

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Kalehina	Lex: Kalei-hina. Lit: the lei (flower wreath) of Hina	*‘Ili ‘aina* in Kea‘au; LCA 4658
Kalehuapuaa	Lex: Ka-lehua-pua‘a Lit: the lehua (flower) pig	Boundary point, place. The Kea‘au/‘Ōlaa boundary runs mauka “to Kalehuapuaa (where there is a mauka road which goes to Hawelu’s),” between Kaahakanaka and Kamakihi. Source: Boundary Commission Testimony 1:193. Quadrangle: 10-44
Kaleinamalule	Lex: Ka-leina-malule Interpretive: the leaping place of the weak one; leina is a place of “leaping” or “throwing”; place where spirits leaped into the nether world; can also be place to throw things, like as a trash heap (Pukui et al. 1986)	On south side of Kaloli
Kalele	Lex: Ka-lele Lit. the leap, the flight or the altar	Point south of Hā‘ena; perhaps an *‘ili ‘āina* at the shore. Source: USGS 1963. Quadrangle: 10-36. North: 294,000. East: 679,500
Kalipalu (Kalipala)	Lex: ka-līpalu. Lit: seaweed much like hulu ‘īlio 3, and perhaps the same	Point at Papa‘i Bay where māwae begins; “Point of Kalipalu at Papai.” Source: Boundary Commission Testimony 1:195. Quadrangle: 10-36
Kaloaokaoma	Lex: Ka-loa-o-ka-‘oma Lit: the length of the oven	“Ancient surfing area, Ke-au [*sic*] . . . ” Source: Pukui et. al. 1976. Quadrangle: 10-36
Kaloli (Kaloli Point)	Lex: Kaloli Interpretive: the changed one	Now referenced as point on which Hōpoe is situated. Source: USGS 1965. Quadrangle: 10-45. North: 287,000. East: 690,000

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Kaluaiki	Lex: ka-lua-iki. Lit: the small pit	In Keauhou Ahupua‘a; small crater at place where road runs between two craters; on *mauka* side: Kahaualea and Kea‘au Ahupua‘a, Puna; on South side, Keauhou Ahupua‘a, Ka‘ū: “. . . a crater on the east side of the road on Kahaualea . . . ” (p.445); “The boundary of Keaau runs makai along the Puna road to Kaluaiki, a small crater, at a place where the road runs between two craters” (p.196); called “Twin Craters” on USGS 10-53. Elev. about 3920 ft. Source: Boundary Certificate No.62 (3:117); Boundary Certificate No. 171 (4:91); Boundary Commission Testimony 1:196,445, 2:303. Quadrangle: 10-53. North: 212,300. East: 589,050
Kaluakaiole (Ka‘akeaka‘iole)	Lex: ka-lua-ka-‘iole Lit: the pit [of] the rat	Kea‘au/‘Ōla‘a boundary runs *mauka* “to Kaluakaiole (Kaakeakaiole) mauka of where Haanaia road to Kukulu leaves the present traveled road,” between Mahinaakaka and Kaahakanaka. Source: Boundary Commission Testimony 1:193. Quadrangle: 10-44
Kaluapa‘a (Kaluapuaa)	Lex: Ka-lua-pua‘a Lit: the pit [of] the pig	Point on south side marking boundary between Kea‘au and Waikahekahe Nui
Kamakihi	Lex: ka-makihi. Lit: Cressa cretica [a small prostrate perennial herb]	Kea‘au/‘Ōla‘a boundary runs *mauka* “to Kamakihi (14 mile post)”, between Kalehuapuaa and Kanekoa. Source: Boundary Commission Testimony 1:193. Quadrangle: 10-44
Kamokuna	Lit. the cut off section	Ocean side boundary between Waiākea and Kea‘au
Kanekoa	Lex: kāne-koa Lit: the koa of the God Kāne; Kāne’s koa	Kea‘au/‘Ōla‘a boundary runs *mauka* to Kanekoa “the houses on the southeast side of the road are on Keaau, those on the other side are on Olaa”; between Kamakihi and Kahooku. Source: Boundary Commission Testimony 1:193. Quadrangle: 10-44

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Kapohakuau	Lex: Ka-pohaku-au Interpretive: the anchor	Large rock situated onshore, marking boundary between Waiakea and Kea‘au.
Kaulekou	Lex: Ka‘uleko‘u Lit. the potent penis	Coastal place; on shore between Anapuka and Pakaiea
Kauwaanahunalii (Kauwoanahunali‘i)	*(he oioina)* [a resting place] at high ground where you can look down in woods where bullock pen was located	Kauwaanahunalii (Kauwoanahunali‘i)
Kawaiaeae	Lex: Ka-wai-a‘ea‘e; the mixed (as in different colors) water	Large water pond (southeast side of road); boundary of Kea‘au and Kahaualea is close to pond
Kāwī-kāwā or Kāwī-o-kāwā	Lex: Kāwī-kāwā or Kāwī-o-kāwā, or Kāwī-a-kāwā Interpretive: squeezed through a channel or opening	Boundary point, place; Kea‘au boundary runs along Waiakea “to an old heiau named Kawiakawa” at shore. (Boundary Certificate) “Kawiakawa, a sort of awaawa [gulch or depression] at shore . . .” (p.195); “Kawaiakawaa [*sic*] is at the sea shore” (p. 197); “Kawiakaawa [*sic*], a small cave where natives worshipped idols” (p.198). Source: Boundary Certificate No. 61 (Vol.3:pp. 114); Boundary Commision Testimony 1:193,195,197,198. Quadrangle: 10-36 North: 322,000 East: 674,200
Kea‘au	Lex: Kea‘au Lit.: White current; lit. the rippling of the sea (Clark 2002:175)	*Ahupua‘a* in Puna district and a beach; Retained by Lunalilo (LCA 8559-B:16) at the Māhele; “. . . the land has ancient fishing rights extending out to sea” (Boundary Commission Testimony). Source: Mahele Book 25; Indices of Awards, Land Commission 77; Boundary Commission Testimony 1:198; USGS 1965. Quadrangle: 10-36. North: 300,000 East: 674,000
Keaau (now called Shipman’s) Beach	Lex: Kea‘au Lit.: White current; lit. the rippling of the sea (Clark 2002:175)	Town; formerly headquarters of Olaa (later Puna) Sugar Co. Elev. about 300 ft. Source: USGS 1963. Quadrangle: 10-35 North: 288,000 East: 658,000

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Keaau Camp	Lex: Kea‘au Lit.: White current; lit. the rippling of the sea (Clark 2002:175)	Village; formerly plantation residential area. Elev. about 410 ft. Source: USGS 1963. Quadrangle: 10-44 North: 286,500 East: 656.500
Keaau Ranch	Lex: Kea‘au; no translation	Place. Source: USGS 1963. Quadrangle: 10-36 North: 294,700 East: 675,500
Ke-ahi-lele	Lex: Ke-ahi-lele Lit.: the flying fire (fire ball)	Area near intersection of Puna Trail and boundary wall
Keahakanaka (Kaahakanaka)	Lex: Ke-‘aha-kanaka Interpretive: a meeting place for people	Boundary point, place
Keahuakaliloa (Keahuokaliloa)	Uncertain: if pronounced as Ke-ahu-a-ka-lilo-‘ā, can be translated as ‘The mound of the one turned to stone.’ See site description given to Boundary Commission in 1873 (see text in this study)	Boundary on ocean, between Kea‘au and Waikahekahe Nui Described in Boundary Commission testimony as appearing to look like a human body (see Uma K. testimony, this section)
Keanahe	Uncertain: if pronounced Ke-ana-hē, may be translated as meaning “The-burial-cave”	South of Punalu‘u
Keakui (Keaukui)		Grove: “Halaaniani is a puu pahoehoe in a grove of ohia trees called Keakui” between Koolauo and Laeopuula. Cf. Keaukui. Source: Boundary Commission Testimony 1:194. Quadrangle: 10-44
Keauhou	Lex: Ke-au-hou. Lit.: the new era or the new current	Place; possibly *‘ili ‘āina* at shore; shoreline bay and village site between Waiakahekahe and Kea‘au. Source: USGS 1963. Quadrangle: 10-36. North: 288,000. East: 685,000
Kikinui		Kauhale boundary point between Kea‘au and Waikahekahe Iki (house of bird catchers)

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Kilohana	Lex: Kilohana Lit.: lookout point	Boundary point; “. . . a place called Kilohana, where orange trees are growing, there the boundary of Keaau and Olaa leaves the Volcano road and runs mauka above these orange trees . . . to an ohia grove called Puaaehu,” between Makaulele and Puaaehu. Source: Boundary Commission Testimony 1:194. Quadrangle: 10-44
Kings Landing	Formerly Pāpa‘i	Place; “New name for Pāpa‘i . . . in honor of Ka-mehameha’s accident there (Law of the Splintered Paddle)”; see Papai. Source: Pukui et al. 1976:112. Quadrangle: 10-36
Kīpaepae	Lex: Kīpaepae; stone pavement or steps for entering a house	Area inland and between Pākī and Keauhou; *‘ili ‘āina* at shore. Source: USGS 1963. Quadrangle: 10-26 North: 289,000 East: 682,000
Kīpū	Lit.: hold back	Point north of Cape Kumukahi
Koolauo		Boundary between Kea‘au and Waikahekahe Nui “. . . runs mauka to place called Koolauo. The pahoehoe on the north side is Keaau and the good ground where cocoanut trees grow is on Waikahekahe. In past days there was a native village at this place”; between Waiamahu and Halaaniani. Source: Boundary Commission Testimony 1:191. Quadrangle: 10-45
Kuhalau	Lex: Kū-hālau; possible meaning: Kū’s (the deity) meeting house	Boundary point, place; Kea‘au boundary runs from ‘Ōla‘a to Kuhalau. Elev. 2215 ft. Source: BC 61 (3:113). Quadrangle: 10-53. North: 235,600. East: 622,300

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Kukuikea	Lex: Kukui-kea Lit.: white candlenut	Boundary point, *mahina ‘ai* (truck farm), agricultural plots, breadfruit trees; according to Boundary Commission Testimony (1:194): “mauka along Waikahekahe [nui] to pahoehoe on Hilo side of a place called Kukuikea where the natives cultivate food and where breadfruit trees grow” between Keahuokaliloa and Waiamahu. Quadrangle: 10-45
Kuolo	Lex: Kuolo Lit.: to rub, scrub; to tremble	Place; “Area near Kea‘au . . . where the Puna chief, Hua‘ā, was defeated, thus giving control of Puna to ‘Umi.” Source: PEM 125. Quadrangle: 10-45
Kurtistown		Town; according to Pukui et. al. (1974:125): “. . . named for A.G. Curtis, a pioneer at ‘Ōla‘a in 1902 when the Olaa Sugar Company began operations.” Source: USGS 1963. Quadrangle: 10-44. North: 278,000 East: 652,000
Laeopuula	Lex: Lae-o-pū-‘ula Lit.: point of red conch shell	Boundary point; Kea‘au/Waikahekahe Iki boundary runs “mauka to Laeopuula, an old kauhale (on pahoehoe rise) he ahua pahoehoe, Keaau on the Hilo side of the road” between Oliolimanienie and Kikinui. Kauhale boundary point Source: Boundary Commisssion Testimony 1:192. Quadrangle: 10-54
Mahinaakaka	Lex: Mahina-akaka Lit.: clear moon	Boundary point, grove located outside Kahuku; Kea‘au/‘Ola‘a boundary runs mauka “to Mahinaakaka on the outer road, outside of Kahukul between Makaulele and Kaluakaiole.” Source: Boundary Commisssion Testimony 1:193. Quadrangle: 10-44

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Makaulele	Lex: perhaps makau-lele Lit.: flying fishhook	Boundary point; Kea‘au boundary runs along ‘Ola‘a to Makaulele. [Boundary Certificate 61 (3:114)] “. . . where Kahopuaku's houses used to be (Makaulele) along the old road.” (Boundary Commission Testimony 1:193) Elev. 550 ft. Quadrangle: 10-44. North: 278,000. East: 655,000
Mānowai-po‘o	Lex: Mānowai-po‘o. Lit.: source of water	Pond on shore at Paukūpahu
Mawae	Lex: Māwae Lit.: fissure, cleft, crevice, fracture, crack	Long fissure in lava, rising from Pāpa‘i Bay, crossing old government road, and proceeding to vicinity of Kea‘au-Waiākea boundary at upper edge of woods; place where law of the splintered paddle was born (Kanawai Māmalahoa); “Mawai [*sic*] . . . is a large crack that runs from the upper edge of the woods to shore and is the boundary between Keaau and Waiakea” (Boundary Commission Testimony). Source: Boundary Certificate No. C 61 (3:114); Boundary Commission Testimony 1:195. Quadrangle: 10-35
Nānāhuki	Lex: Nānāhuki Lit.: to pull away from	Sea fronting region between Hā‘ena and Hōpoe
Namamookalei	Lex: Nā-mamo-o-Ka-Lei Lit.: descendant, posterity; Nā mamo o ‘Ikera‘ela (Puk. 1.13), the children of Israel (Pukui et. al. 1974)	Place opposite Kauanohunohu where *‘owao* (*‘ua‘u, ‘uwao*) petrels were caught

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Namauuokalahili	Uncertain; meaning changes with lexicology. Nā-mau‘u-o-kala-hili: the rough, twisted grasses. Nā-mau‘u-o-Kalahili: the grasses of Kalahili. Nā-ma‘ūma‘ū-o-Kalahili: Kala-hili: the loosening of bark used for dying. Ma‘ūma‘ū: to moisten. Interpretive: the action of loosening and moistening bark used for dying	Grove of *‘ōhi‘a* trees
Naue (Naaue)	Lit.: shaking, moving	Area between Māwae and Waiaele; formerly a place of refuge
Nawailoloa	Lex: Nā-wai-loloa Lit.: very, very long/many waters	Place; pond of water
Nine and One Half Mile Camp		Village; plantation camp at about 480 ft elev. Source: USGS 1963. Quadrangle: 10¬44. North: 287,250. East: 654,750
Ninemile Camp		Village; plantation camp at about 380 ft elev. Source: USGS 1963. Quadrangle: 10¬44. North: 286,500. East: 657,000
‘Ōla‘a Dispensary		Village; plantation camp at about 560 ft elev. Source: USGS 1963. Quadrangle: 10¬44. North: 283,000. East: 655,000
Olioliana	Lex: ‘Oli‘oli-ana Lit.: chanting/singing cave	Boundary point, refuge cave
Oliolimanienie	Lex: ‘Oli‘oli-mānienie: empty chanting/singing (cave echo?)	Boundary point, *mahina ‘ai*; trailside resting place marking boundary point between Kea‘au and Waikahekahe Nui and Iki on Puna side of cave called Olioliana (see above) where people used to hide in time of war

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Omao	Lex: ‘Ōma‘o Lit.: 1) Green as in plants 2) Hawaiian thrush name 3) A ti leaf bundle of food	Boundary point, grove; Kea‘au boundary runs along ‘Ōla‘a to a point “in the Omao woods”; at or near BM 2791. Cf. Omaolaulau, Olaa Forest Park Reserve. (see next entry) Source: Boundary Certificate No. 61 (3:113). Quadrangle: 10-53
‘Ōma‘o-laulaia	Lex: ‘Ōma‘o Lit.: Green wrapped package/bundle (*laulau*)	*He oioina* (resting place) on *pāhoehoe* and *mauka* boundary point for Kea‘au (see previous entry)
Pakaiea	Type of seaweed (*limu*) [the green sea lettuce called līpahapaha]; a variety of sugar cane (*halāli‘i,* named after seaweed); a variety of taro; name of a type of wave at Kai-mū, Hawai‘i (in Puna District)	Shoreline fronting Pōka‘ī Heiau
Pākī	Lex: Pākī (Pākī Bay) Lit.: smashed, broken to pieces	Shoreline bay and village site; south of Hā‘ena in Kea‘au Ahupua‘a. Source: USGS 1963. Quadrangle: 10-36. North: 290,400. East: 682,000
Palauhulu	Lex: Pālau-hulu Meaning: to take all of fish catch for chief instead of dividing it	Boundary point; *ahua* (rise) on road to Kīlauea where road to Panau branches off; boundary point of Kea‘au and Kahaualea, between Alaalakeiki and Omaolaulau. Source: Boundary Commission Testimony 1:192. Quadrangle: 10-53
Panau	Lex: Pānau; to move up and down as a seesaw; restless, uneasy, to flip along, a gad about; vulgar gesture	*Ahupua‘a* in Puna; Panau Nui, Iki

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Pāpa‘i (now called Kings Landing)	Lex: Pāpa‘i Lit.: crab fishermen’s shed	Land section; old village site on shore and coastal point of Kea‘au, near Paukūpahu; “This quarrel was named Ka-lele-iki, and from the striking of Kamehameha’s head with a paddle came the law of Mamala-hoe (Broken paddle) for Kamehameha”; name changed to Kings Landing in honor of the accident. Source: Pukui et al. 1976:112, Kamakau 1961:125. Quadrangle: 10-36
Pā-pua‘a	Lit.: pig pen	Old village site and coastal point north of Kahului; *‘ili ‘āina* at shore. USGS 1963. Quadrangle: 10-36. North: 306,000. East: 676,700
Paukūpahu	Lex: Paukū-pahu Lit.: Section of land cut off (cf. Pukui et al. 1974); section cut off short	Point and *‘ili* of Kea‘au where coconut trees grow and *māwae* ends; *māwae* runs between here and Kalipala at Papa‘i Bay. Source: USGS 1963, Boundary Commission Testimony 1:195. Quadrangle 10-36. North: 321,300. East: 674,500
Pōhākau	Lex.: Pōhākau Lit.: stone that travelers rest on	Point and flat lands in vicinity of Kāwīakāwā; Puna Trail passes inland section. See Kawikawa, this table
Pōhaku-‘alaea	Lex: Pōhaku-‘alaea Lit.: red stone	Point between Pākī and Keauhou
Pohakuloa	Lex.: Pōhaku-loa Lit.: large stone	Place that sits on border with Keauhou; small cave located here.
Pōka‘ī	Lex: Pōka‘ī Interpretive: night of the supreme one	An *‘ili* of Waiākea (Hilo *ahupua‘a* that borders Kea‘au), and name of *heiau* on shore
Po‘oholua	Lex.: Po‘ohōlua Lit.: the beginning of a sled course	Place, boundary point

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Puaaehu	Lex: Pua‘a-‘ehu Lit.: the red-haired pig	Boundary point; “the boundary of Keaau and Olaa leaves the Volcano road and runs mauka above these orange trees [at Kilohana] . . . to an ohia grove called Puaaehu”; between Kilohana and Waiaele. Source: Boundary Commission Testimony 1:194. Quadrangle: 10-44
Punalu‘u	Lex: Punalu‘u Lit.: diving spring (fresh water gotten by diving into salt water	Village and *heiau* south of Kalele; cannibalistic *mo‘o*, Kaikapu (hag), lived here; killed by Laka and his helpers
Puuenaena	Lex: Pu‘u-‘ena‘ena Lit.: raging/hot (as in angry) hill	Boundary point; large *‘ōhi‘a* grove on road *makai* of *koa* woods along boundary
Puukea	Lex: Pu‘u-kea Lit: white hill	Hill/cinder cone covered in sandalwood
Uhu-nui	Lex.: Uhu-nui Lit.: large parrot fish	Point between Pāpa‘i and Kāwīakāwā
Wahine ‘Ami or Wahine ‘Ami o Hōpoe	Lex: Wahine ‘Ami or Wahine ‘Ami o Hōpoe Lit.: dancing woman; Hōpoe the dancing woman	Lava flats on south side of Kea‘au Bay
Wahinemakanui	Lex: Wahine-maka-nui Lit.: big-eyed woman	Islet off Kea‘au; “An islet (about 0.18 acre, 40 feet elevation) . . . ” (Pukui et. al. 1974:218); about 0.4 mile offshore Kahului. Source: USGS 1963. Quadrangle: 10-36. North: 302,350. East: 679,300
Wai-a-‘eli or Waiaele)	Lex: Wai-a-‘eli, Wai-a-‘ele Interpretive: water made (gotten) by digging; water looks *‘eli* (dark) from dirt	*Kauhale* (traditional Hawaiian house consisting of a group or houses; a village); place with a spring near Māwae and Kea‘au-Waiākea boundary on road to ‘Ōla‘a; banana trees growing nearby; used to be old here. Source: Boundary Commission Testimony 1:194,195. Quadrangle: 10-44
Waianohu	Uncertain. Lex: Wai-‘ano-hū: the swelling water; other meanings seem less likely, but not ruled out based on other lexicology	Name of large place that fills with water during rainy season. Source: Boundary Commission Testimony, Uma K., Section 4.4.3

Place Name	Lexicology (Lex.), Literal Translation (Lit.), Interpretive Meaning	Description and Location
Waiamahu	Interpretive: the water that prattles and talks when it swells/spurts	Kea‘au/Waikahekahenui boundary runs *mauka* —”Hilo side of Waiamahu, a large place that fills with water in the rainy season” between Kukuikea and Koolauo. Source: Boundary Commission Testimony 1:194. Quadrangle: 10-45
Waihikolau	Uncertain	Two caves marking inland boundary point between Kea‘au and Waikahekahe Nui
Waipahoehoe	Wai-pāhoehoe Lit.: *pāhoehoe* (smooth lava) water	Place; “The line here debauches from the old Volcano Road, running over smooth lava until Waipahoehoe is reached. This is a broad flat of a mile in width of open land surrounded with Pahoehoe and covered with considerable soil, evidently accumulated from the denudation of several cones, which still exists on the upper end . . . ” Elev. 176 ft. at road junction. Source: USGS 1963. Quadrangle: 10-44. North: 280,000. East: 669,000
Waiuli	Lex.: Wai-uli Lit.: dark water	Boundary point, place; Kea‘au boundary runs along ‘Ōla‘a “to a pile of stones by the side (east side) of the road a little below Waiuli”; elev. about 1130 ft at boundary point. Source: Boundary Certificate No. C 61 (3:114). Quadrangle: 10-44. North: 265,200. East: 649,500

4.5 Early to Mid-1900s

4.5.1 Olaa Sugar Company

In May 1899, Olaa Sugar Company leased 3,182 acres of land in ‘Ōla‘a (a large, landlocked *ahupua‘a* upland of Kea‘au) from W.H. Shipman for a term of 40 years. Several more land exchanges were made the same year. The lands were cleared by horse and mule for the cane fields, preserving only certain fruit trees on the property (Hurst and Shilz 1994:14–15). In 1901, Olaa Sugar Company is recorded as having 4,000 acres of land under cane cultivation, and employing 1,100 men (Hurst and Shilz 1994:16–17). Laborers at that time included Japanese, Puerto Ricans, Chinese, Portuguese, Caucasians, and Hawaiians living in segregated areas within camps along the old Plantation Road.

According to Dorrance and Morgan (2000:106), “[b]y 1905 Olaa Sugar Company had a modern mill and 7,676 acres under cultivation serviced by the only standard gauge plantation railway in Hawai‘i.” Figure 6, Figure 7, and Figure 8 show the location of the project area in relation to the mill near Kea‘au Village (also called ‘Ōla‘a) as early as 1901. The ‘Ōla‘a mill also processed cane from Puna Sugar Company, an affiliate of Olaa Sugar Company with cane fields located in Kapoho to the southeast (Dorrance and Morgan 2000:107).

This industrial expansion in Kea‘au marks the beginning of massive landscape alterations and clearing operations, which would have obliterated most, if not all, archaeological sites present on the leased lands. In the 1930s, over 15,000 acres were under cultivation. Dorrance and Morgan (2000:107) write that “[i]n 1935 the plantation housed 5,648 workers and dependents in 1,086 company-supplied houses distributed over 15 camps or villages . . . [and] . . . some 230 homesteaders lived and grew cane on family plots.”

During the early 1900s, cane was transported to the mill primarily by flume, and hauled by mules in remote fields. Soon, the harvested cane was also hauled by railway. The carts were loaded manually until industrial machinery took over in the 1940s. Cranes for loading, trucks for hauling, and tractors for plowing replaced the manual labor force, railway, and livestock.

A 1955 lava flow impacted Puna Sugar Company’s fields at Kapoho. According to Dorrance and Morgan (2000:107), in 1960 Olaa Sugar Company was given the Puna Sugar Company name “at the urging of landowner Herbert Shipman,” and the company “struggled on.” The wet weather, rocky soil, and large distances between some of the fields and the mill made profitability difficult, and ultimately the company closed in 1982. This closure negatively impacted many small businesses in Kea‘au that had serviced the mill camps and homesteads (Dorrance and Morgan 2000:106). The extent of the town and plantation holdings in the latter half of the twentieth century, including planting fields and associated roadways and labor camps, are depicted on Figure 9 and Figure 10.

A 40-ft right-of-way crossing Kea‘au was granted to Hilo Railroad Company (later reorganized as the Hawaiian Consolidated Railway, Ltd.) in December 1899. The right-of-way would revert to Shipman when the railway was no longer in use. In 1900, a 17-mile coastal extension was constructed, passing through Kea‘au and Kahuwai Ahupua‘a to the sugarcane fields near Kapoho. Spurs were built inland to additional fields in Pāhoa and Kama‘ili (Figure 11 and Figure 12. Portion of the 1944 map of Hawai‘i Island by H.T. Stearns showing the location of the project area in relation to the railroad system). In 1901, the railway was extended from 8½ mile camp (located near the mill) to Mountain View, at the 17-mile mark of Volcano Road (Condé and Best 1973:92–94).

Wood from the lands cleared for the right-of-way was sold to the railroad companies for ties. In 1907, the Hawaiian Mahogany Lumber Company (later called the Pahoa Lumber Company) was founded, initially for the purpose of making *‘ōhi‘a* wood rail ties for the railroad. Much woodland was cleared in ‘Ōla‘a, but the woodcutting was also conducted in other areas of Puna:

> Most of the ties for this contract will be cut in the Puna District on homestead lots above Olaa on lands of the Puna plantation that are being cleared for cane, and on other lands in Puna on which rubber will be planted. The ties will be shipped from

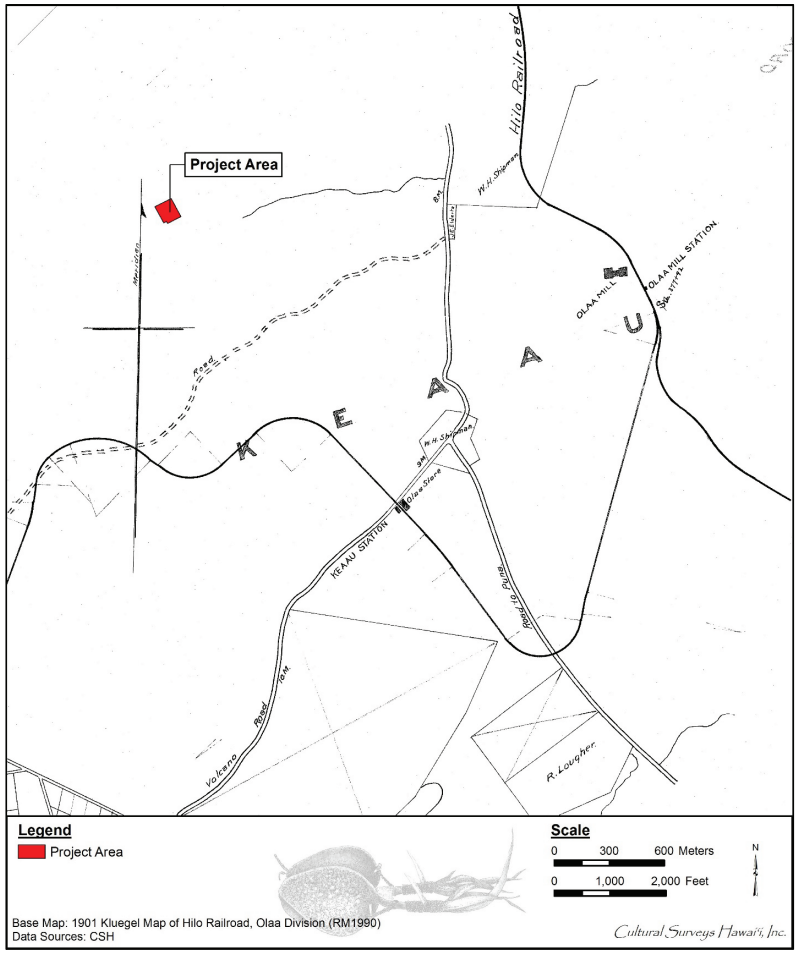


Figure 6. Portion of the 1901 map of Hilo Railroad, Olaa Division by C.H Kluegel, showing the project area in relation to features discussed in the text

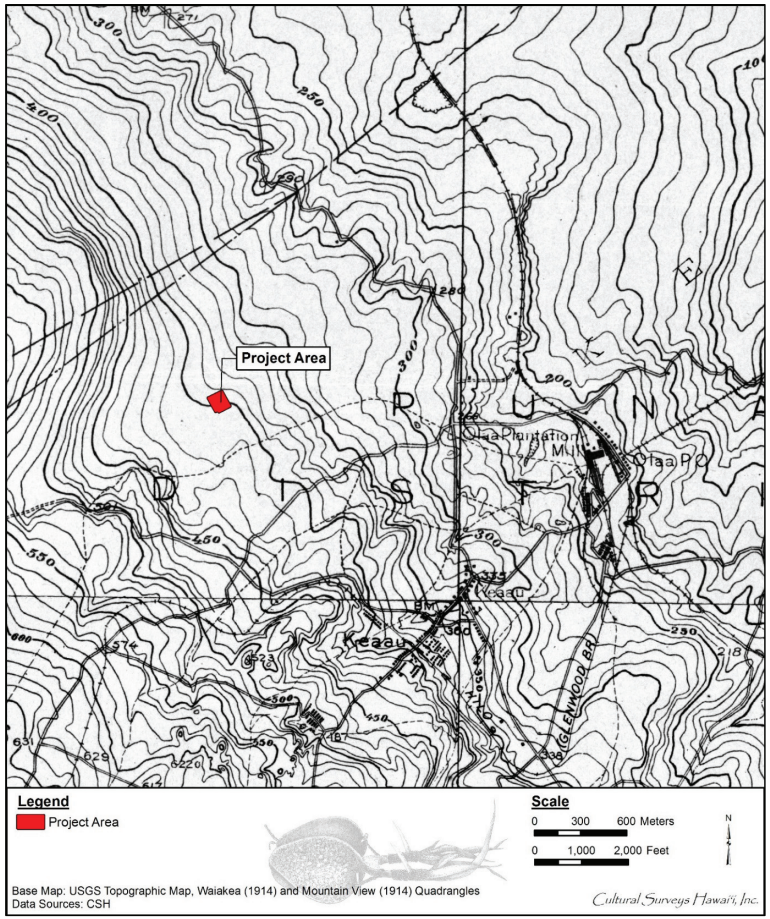


Figure 7. Portion of the 1914 Waiakea and Mountain View USGS 7.5-minute topographic quadrangles showing the location of the project area in relation to features discussed in the text

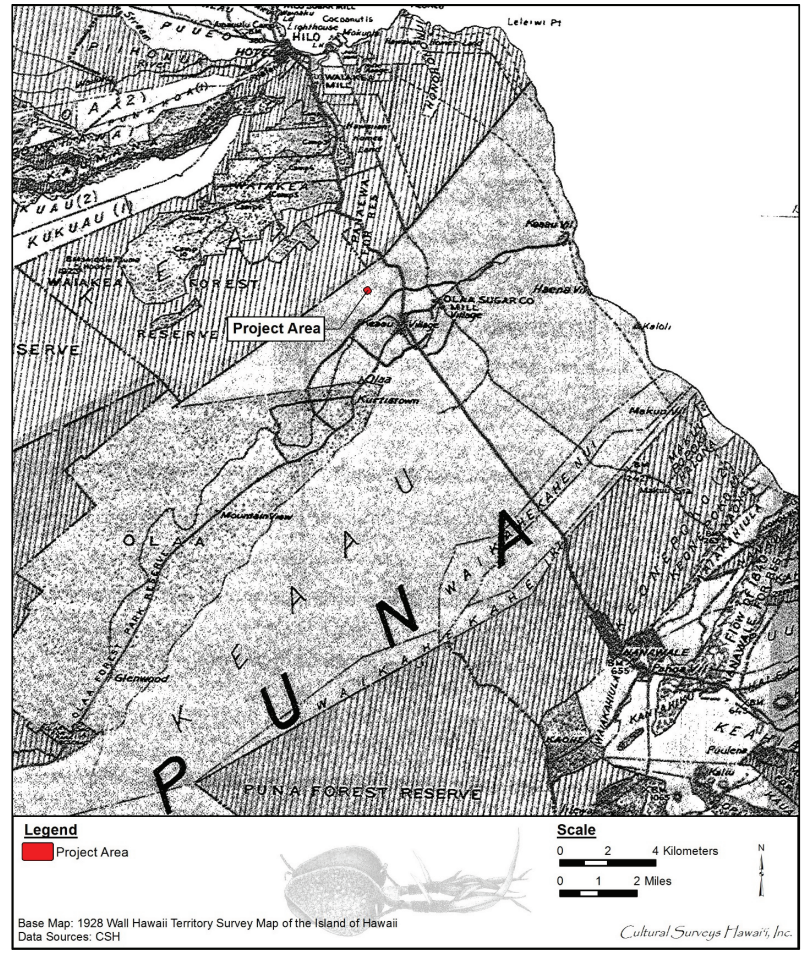


Figure 8. Portion of the 1928 map of Hawai‘i Island by Walter E. Wall, showing the project area in relation to features discussed in the text

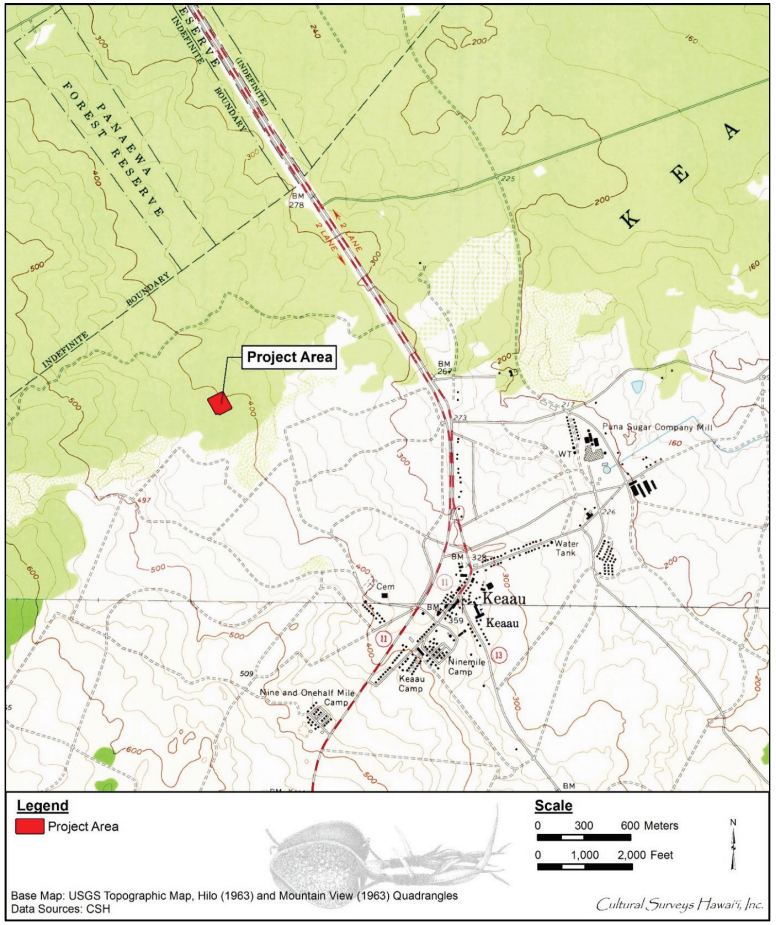


Figure 9. Portion of the 1963 Hilo and Moutain View USGS 7.5-minute topographic quadrangles showing the location of the project area, additional survey area, and high school in relation to features discussed in the text

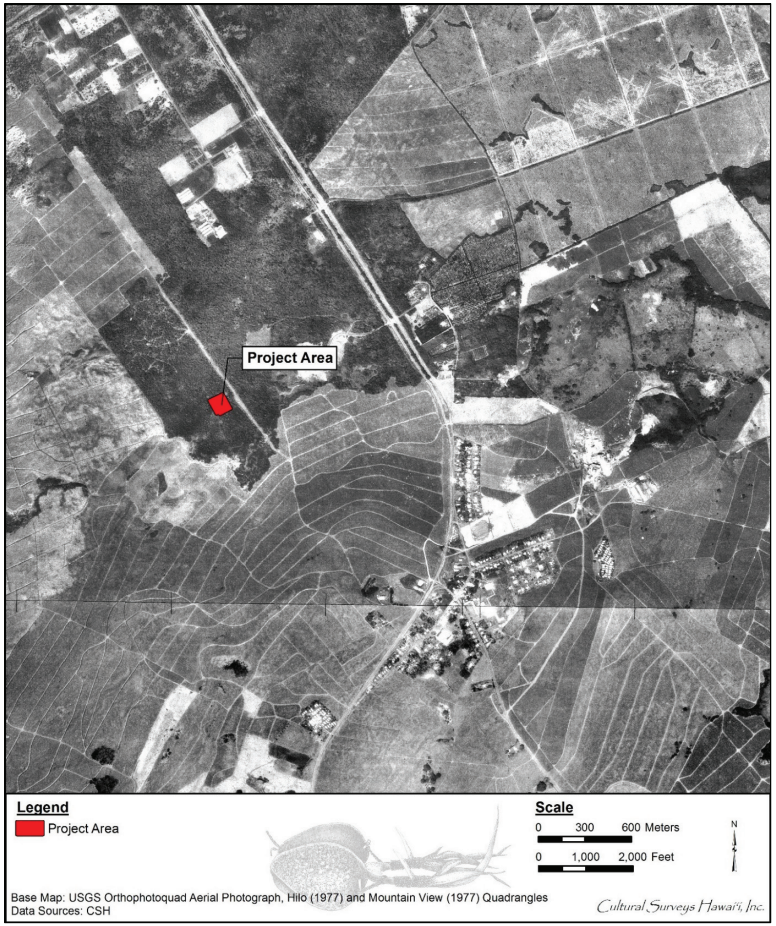


Figure 10. 1977 USGS Orthophoto, showing the location of the project area in relation to features discussed in the text

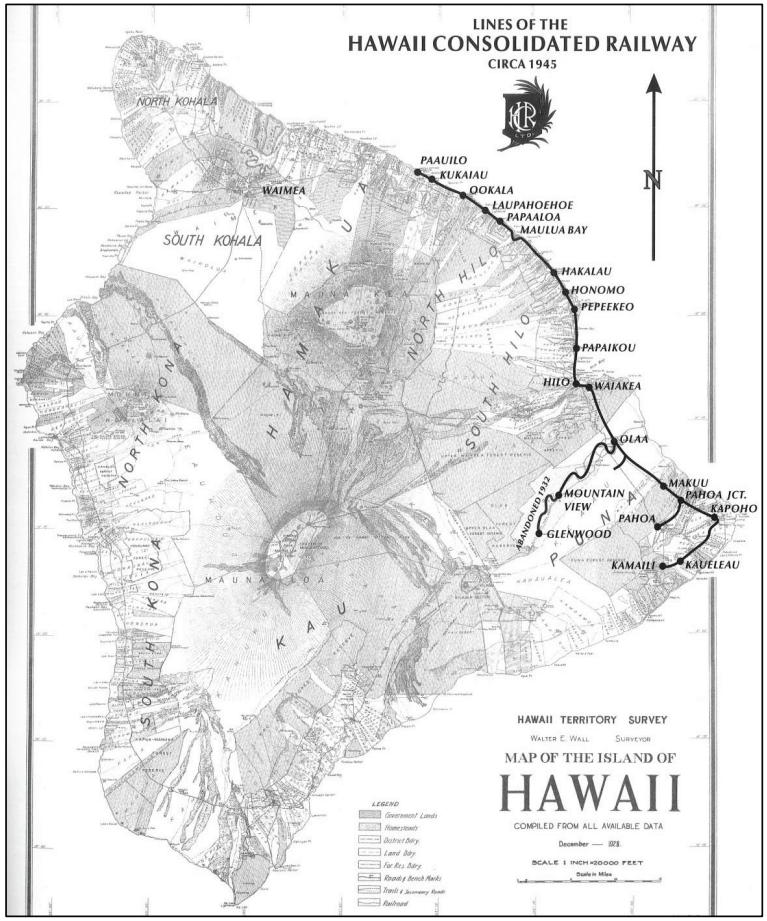


Figure 11. 1928 Territory Survey Map of Hawai‘i Island by Walter E. Wall, overlain with the route of the Hawai‘i Consolidated Railway ca. 1945 (figure from Treiber 2005)

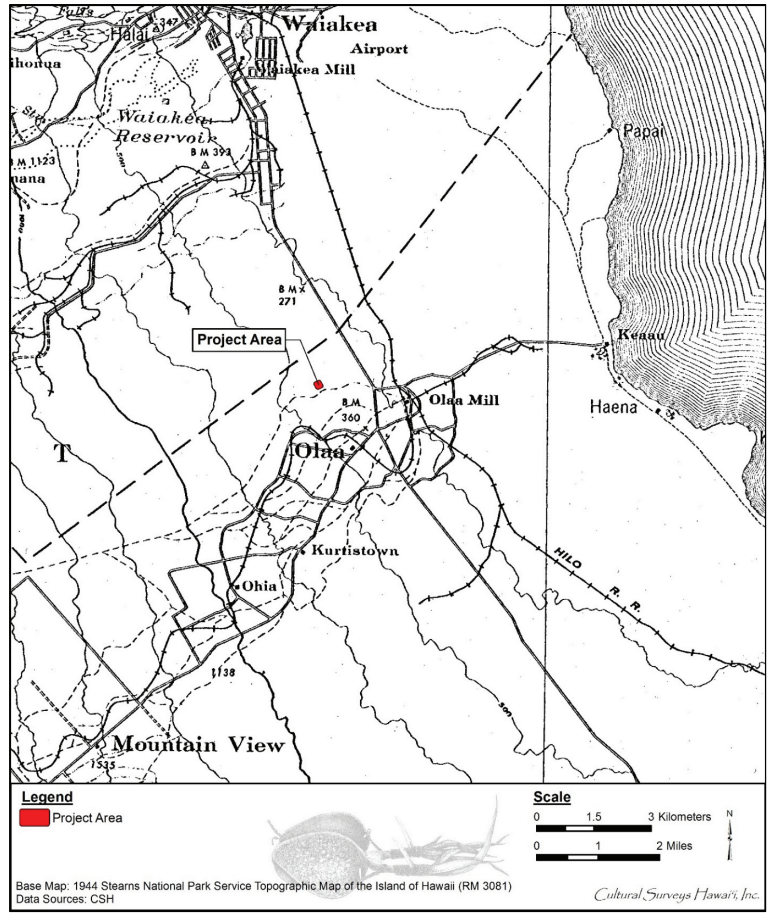


Figure 12. Portion of the 1944 map of Hawai‘i Island by H.T. Stearns showing the location of the project area in relation to the railroad system

> Hilo by steamers and sailing vessels, the first shipment being sometime in the spring of 1908. [Board of Commissioners of Agriculture and Forestry 4th report in Condé and Best 1973:101]

The rail transportation occurred primarily from the ‘Ōla‘a, Pāhoa, and Kapoho fields. Portable tracks were used in the cane fields until 1945; however, prior to using these tracks, loaded carts were pulled by mule to the main line. On 1 April 1946, a tsunami inundated the railway on the Hāmākua Coast and in Hilo, forcing the Hawaii Consolidated Railway Company out of business (Condé and Best 1973:99, 211, 388). However, portions of the Puna Division continued to be operated by the Olaa Sugar Company until 1948, when trucks took over the transportation of the sugarcane (Treiber 2005:59).

4.5.2 Contemporary Land Use

The town center of Kea‘au is currently undergoing considerable development in response to a substantial population increase in nearby residential subdivisions over the last two decades. The W.H. Shipman Business Park was established in 1988. Prior to its construction, the land was fallow cane field overgrown with invasive species. The industrial park contains a variety of businesses, including the Big Island Biodiesel facility located directly adjacent to the project area.

4.5.3 Hawaiian Paradise Park

The website for Hawaiian Paradise Park includes a history of the subdivision, written by its first permanent inhabitant, Rick Edwards. This history first appeared in an article entitled “Paradise Park-Past and Present” in the August 1978 issue of *The Hawaiian Conch*, the newsletter for the subdivision. Edwards notes the lands of Paradise Park changed ownership from the Shipman family to the Watumull family before Hawaii‘s statehood:

> I do know that it was in anticipation of statehood that these lots started to be marketed . . . Oddly enough, some of the local people who turned up their noses, today are buying now that the prices are greatly increased over what it was at the end of the 1950’s and beginning of the 1960’s. There was a promotion at the very beginning, (I was not here at this time but several people told me about it). During this promotion lots were made available only to people on the island, next to people within the state, and then it was thrown open to the people on the mainland . . . I bought my first lot in a snow storm in New York City, back in 1959 and it was a sight unseen kind of thing . . . I was the only resident, so I guess I am the first permanent resident, of the sub-division. I was here a couple of years before the next families came . . . Originally there was only one entry into the sub-division and that was Paradise Drive. It was kept closed, with a chain to protect the fishing area. But the main reason, people would come in to picnic, and became careless like they do any place, I suppose, and it got to be a major problem with people throwing out their rubbish along the road . . . Another reason for the chain was that people used this as an access to get into the Shipman estate from Block 10 roads near the ocean. Some people did a little bit of cattle rustling from the Shipman estate and brought out some free hamburgers . . .

> I also think it is significant to note in 1960 there was only one house in the sub-division. It took five years from 1960 to 1965 to go from one to ten houses, a thousand percentage increase, it’s not very much numerically but it’s quite a percentage increase. Oddly enough between 1965 and 1970 it increased another thousand percent. It went from ten houses to one hundred houses . . .
>
> Earlier I mentioned that this land had been used for cattle grazing. Mr. Shipman told me at one time that his brother was responsible for frequently setting fires in this area to prevent trees from growing. The old grass would be burned out so new green grass could grow up for the cattle. It also made it easier for the cowhands to see the surface of the ground—you know how irregular and full of cracks it is. It was easier for them to ride and see without vegetation . . .
>
> . . . [I]t should be pointed out, that the road that everyone knows as Old Railroad is called that because at one time a railroad went over this road alignment. In the very beginning, the only means of communication was either by canoe along the coast or along the Mamalahoa. I do know, from some of the old time Kalapana Hawaiians, that they used to have pig roundups, and they would drive the pigs to market in Hilo. They would follow along the Mamalahoa, spending the night several times along the way, because they couldn’t make all that much time with so many pigs to be concerned with. Then the TRAIN was put in from Hilo to Puna. One spur went up into Pahoa; it was like a dagger into the forest. I’m told this is how Pahoa got its name. (Pahoa means dagger). The other spur went all the way around to Opihikao and almost to Kalapana, and one branch of it went down to Kapoho to the rock quarry. The bulk of the rocks for the Hilo breakwater came from there and were shipped over that railroad to Hilo.
>
> I am told that one of the first businesses in Pahoa was a lumber mill where they did logging of ‘ōhi‘a trees. These were cut into square railroad ties that were shipped to California, and a lot of the ties that exist to this day in the Union Pacific and Southern Pacific Railroads are ‘ōhi‘a logs which came from the Pahoa area.
>
> Later on sugar began to expand so that a lot of the sugar cane made its way on the train. About that time World War II came along, there was more and more effort to go by truck, and from the 1946 tidal wave, which destroyed part of the track, the train started to be phased out, and more and more trucking came into the picture as the main means of transportation. Highway 13 [now—Highway 130] or the Pahoa government road as we know it today was one of the main routes. Things have been swinging inland from originally being along the coast to the railroad which is midway between the coast and Highway 13, and now Highway 13 [now—Highway 130]. Now I see signs that perhaps the future may swing back to having the bulk of the activity close to the ocean. I don‘t know—time will tell on that. The reason I am mentioning this about the railroad is when I first came here there was a concrete platform on Lot 130 in Blk 6 with bamboo and orange amaryllis plants. This was the remains of a railroad station called Makuu Station. Can you imagine, a train station there which served this area, I know that some of the old-timers who lived

in Pahoa and Kalapana areas used to go to school in Hilo. They rode the train back and forth along with anything else that had to be shipped, including sugar cane. Oddly enough you can see sugar cane growing here and there where some of it spilled off along the right-of-way of the old railroad.

In the old days the Puna land was pretty much divided between two families—The Shipman's and the Lyman's. The Shipman domain extended from the Hilo boundary all the way to the Hawaiian Beaches and Parks area, which is where the Lyman family's interests began. Fortunately Mr. Shipman's father was very wise in legal matters. He went to the trouble of having the bulk of the land, which fell within his area of interest, registered with the land court which was the Torrance Land system. This is the best kind of land system there is. It means you can't even lose it to squatters rights, or adverse possession, without due cause, and that's why to this day we are fortunate enough to have all our lots recorded with the Hawaii State Land Court, as well as the Bureau of Conveyances. All the lots in this sub-division fall into that category, thanks to the foresight of Mr. Shipman in the old days.

. . . [O]ff Road 22 on the mauka side between Paradise Dr. and Kaloli, there is an entrance to a lava tube. The lava tube goes on for quite some distance in the mauka direction before it runs into collapsed rock near Road 29. This lava tube apparently served two different purposes since there are one or two branches off this tube. One of them was sealed with lava rock and is not too high at all, and contains the remains of quite a few burials. It was very important to the Hawaiians to bury their loved ones in a place that couldn't be found by anyone else, so that the grave couldn't be desecrated. This cave was used for, number one, that purpose, and number two, defense purposes, because in the early sixties within this cave were found the rotted remains of spears and sling stones and some of the largest opihi shells that I have ever seen which were used to collect water. Upon coming in and out of the sunlight into this cave and looking into the dark you are blinded. You are on loose rock to begin with, therefore, it is an area that can be defended easily (only a few can come in at a time; it only takes a few whose eyes are already adjusted to the light to defend it) . . .

. . . PARADISE DRIVE, I feel positive was named because the corporation, Hawaiian Paradise Corp. started this sub-division. SHOWER DRIVE was named because there were several attempts to plant shower trees along it, but when they were not attended, they would not grow.

The words POHAKU CIRCLE, I think, are kind of significant. The story behind that is Lot 8323 originally belonged to Louis Stone. I'll never forget that name because Louis Stone was the name of the man that played the father in Andy Hardy movies when I was a kid growing up. Some of you may remember that. Louis Stone and his mother owned that lot, before there were any houses on that street. He came here and made a big issue of going to build a house. But (if) they built a house, they expected the street to be named after them. I phone David Watumull and told him

the story. We both recalled the word for stone, or rock, in Hawaiian was POHAKU, so we said,—O.K., we will name the street after you, go ahead and build your house. The street was named for him, and like quite a few false starters in the beginning, it turned out to be just talk. Subsequently Louis Stone sold the lot and moved someplace else. I think it is rather interesting that it was a trivia type reason how POHAKU CIRCLE got its name. For anyone who is curious, that is the story behind it. [Hawaiian Paradise Park 2009]

4.6 Previous Archaeological Research

Relatively few archaeological studies have been carried out in Puna District. Early archaeological investigations in the area were part of island-wide surveys by Thomas G. Thrum (1908) and John F.G. Stokes (1919; see also Stokes and Dye 1991), and Alfred Hudson‘s (1932) study of eastern Hawai‘i Island (Table 3). These early investigations were typically limited to the old trails between towns and along the coast, focusing mainly on *heiau* and other major sites. Emory's (1945) work at Shipman Cave in Kea‘au provided the first evidence of traditional lava tube use for refuge and burial placement in the Puna district. Since these earliest studies, several archaeological investigations have been conducted in the vicinity of the current project area. These studies are outlined in Table 3 and shown on Figure 13.

In Hudson's survey of sites in East Hawai‘i for the Bishop Museum, he indicated it was difficult to obtain information about sites in Puna because "most of [the sites] are located along the coast between Keaau and Kapoho where no one now lives, and it is difficult to locate descendants of the former Hawaiian population of the area who might be able to shed light on the nature and function of certain sites" (Hudson 1932:304). Hudson noted some sites in the vicinity of Pāpa‘i at the coast east of the project area, where Kamehameha declared the "Law of the Splintered Paddle." In his findings he also mentions an upright stone a little over 2 ft high that is sacred to the fish god Keakuaualo at Kea‘au beach. Hudson also refers to the stone form of the *lehua* (*‘ōhi‘a* tree blossom) grove goddess, Hōpoe: "dancing woman, Wahine Ami o Hopoe, [which] lies in the breaking surf. This is a large triangular rock with a round head-like projection, which is said to dance up and down in the surf . . . Nearby stands her servant, a cubical block of basalt. These are the petrified remains of characters in the famous legend of Pele and Hi‘iaka" (Hudson 1932:307).

Kenneth Emory (1945) conducted an exploration survey of "Shipman Cave," State Inventory of Historic Places (SIHP) # 50-10-36-20678, located approximately 12 miles outside Hilo toward the southern boundary of Kea‘au Ahupua‘a. Several segments of lava tube, thought to be part of a single tube system, were explored and found to contain evidence of refuge in time of war and human burials. Emory concluded the cave "extends probably miles upland and clear to the sea," and that it was the first lava tube of this type "for refuge and for burials [recorded] on this side of Hawaii," noting that the tube appeared too damp for permanent habitation (Emory 1945:7, 9).

In 1982, Paul H. Rosendahl, Inc. (PHRI) conducted an archaeological reconnaissance of approximately 490 acres for the proposed W.H. Shipman Industrial Park, in which the present project area is situated (Rosendahl 1982). Rosendahl (1982:2) noted the project area was bisected by a cinder road running parallel to the highway, and that "cane fields of Puna Sugar Co. border the parcel." The reconnaissance confirmed the approximately 170-acre portion of the project area

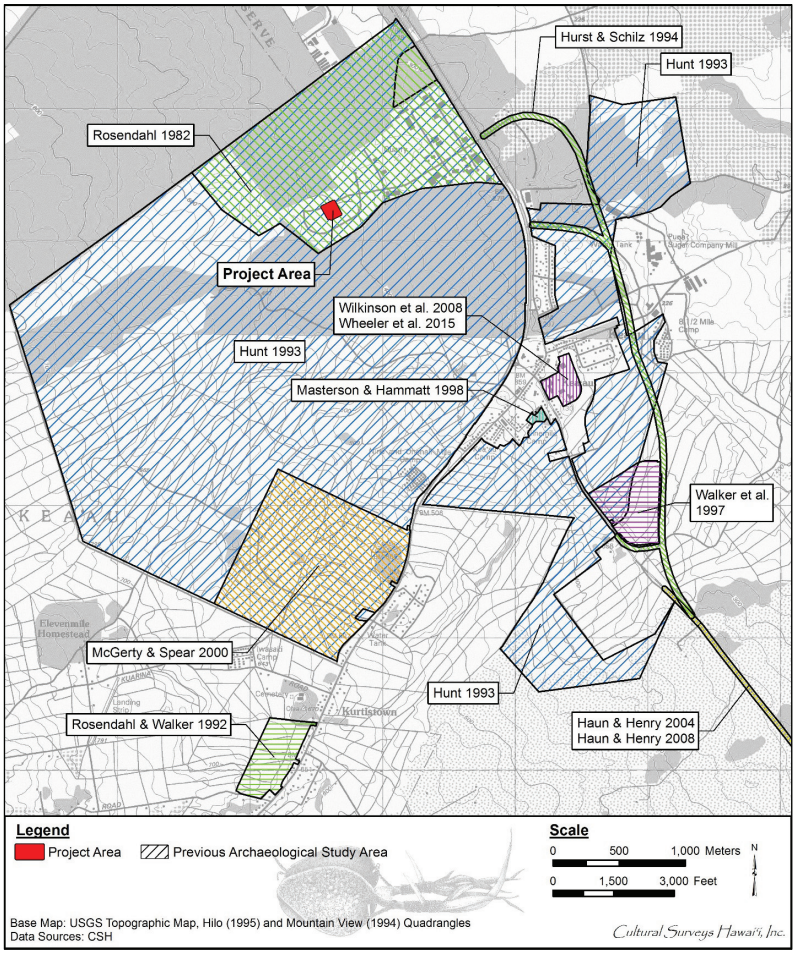


Figure 13. Portions of 1994 Mountain View and 1995 Hilo USGS topographic quadrangles, showing previous archaeological studies in the vicinity of the project corridor

Table 3. Previous archaeological studies in the vicinity of the project area

Reference	Type of Study	Location	Results
Thrum 1908	Survey of *heiau*	Hawai‘i Island	Documented 18 *heiau* in Puna, none within Kea‘au
Stokes 1919	Survey of *heiau*	Hawai‘i Island	Documented 12 *heiau* in Puna, many previously identified by Thrum (1908); none within Kea‘au
Hudson 1932	Archaeological survey	Eastern Hawai‘i Island	Documented sites along coast in Puna, including some in vacinity of Pāpa‘i where Kamehameha declared the “Law of the Splintered Paddle” (not shown in Fig. 12)
Emory 1945	Archaeological exploration	Shipman Cave, Kea‘au, TMK: [3] 1-6	SIHP # 50-10-36-20678 (“Shipman Cave”), a lava tube used for refuge and burial (not shown in Fig. 12)
Rosendahl 1982	Archaeological reconnaissance survey	Shipman Industrial Park, Kea‘au, TMK: [3] 1-6-003:012 por.	No historic properties or cultural materials identified (not shown in Fig. 12)
Rosendahl and Walker 1992	Archaeological reconnaissance survey	46 acres in ‘Ōla‘a, TMK: [3] 1-7-017:003	No historic properties or cultural materials identified
Hunt 1993	Archaeological reconnaissance survey	600 acres of Shipman lands in Kea‘au, TMKs: [3] 1-6-003:003, 007, 008, 011, 012, 027, 029, 058, 073, 075, 084, 086, and 090	Identified 50 archaeological features (not assigned SIHP numbers) in areas less impacted by cane cultivation, likely associated with historic plantation activities; features included walls, platforms, and mounds; features concentrated near Kea‘au town away from current project area
Hurst and Schilz 1994	Archaeological inventory survey	Kea‘au-Pāhoa Road, Kea‘au, TMK: [3] 1-6-003	No historic properties or cultural materials identified
Walker et al. 1997	Archaeological inventory survey	75 acres for Kea‘au High School site, TMKs: [3] 1-6-003:003 (por.), 015 (por.), 084 (por.)	Documented SIHP # 50-10-44-21191, Hilo Railway Co Right-of-Way (ROW)

Reference	Type of Study	Location	Results
Masterson and Hammatt 1998	Archaeological inventory survey	2.46 acres for Kea‘au Elderly Housing project, Kea‘au, TMKs: [3] 1-6-143:018 and 039 (por.)	No historic properties or cultural materials identified; modern Filipino Camp noted
McGerty and Spear 2000	Archaeological inventory survey	300 acres for proposed KSBE East Hawai‘i Campus, Kea‘au, TMK: [3] 1-6-003:012 (por.)	Documented SIHP # 50-10-44-21823 comprising seven mounds related to sugarcane clearing activities; no further work recommended
Haun and Henry 2004	Archaeological inventory survey	2-mile-long Kea‘au-Pāhoa Rd Shoulder Lane Conversion project, Kea‘au, multiple TMKs	No historic properties or cultural materials identified
Haun and Henry 2008	Archaeological inventory survey	8 acres in Kea‘au, TMKs: [3] 1-6-004:011, 047–053, 055, 056 and 1-6-064:266–269, 283–286	Documented SIHP # 50-10-44-26874 (Waipāhoheoe Stream Bridge), historic-era concrete bridge
Wilkinson et al. 2008	Archaeological monitoring	Kea‘au Middle School, TMKs: [3] 1-6-002:001 and 1-6-003:059	No historic properties or cultural materials identified
Wheeler et al. 2015	Archaeological field inspection	Kea‘au Middle School, TMKs: [3] 1-6-002:001 and 1-6-003:059	Buildings B, C, D, and E found to be greater than 50 years old; consultation with SHPD Architecture Branch recommended; portion of an *‘auwai* (irrigation ditch) documented adjacent to Buildings D and G

mauka of the cinder road, likely containing the present project area lands, had been previously bulldozed. The remaining lands *makai* (seaward) of the cinder road were found to contain a quarry, abandoned cane field, and an area of undisturbed forest. No archaeological sites were encountered and no further work was recommended.

In 1992, PHRI conducted an archaeological field inspection of an approximately 46-acre parcel located south of the present project area in ‘Ōla‘a Ahupua‘a (Rosendahl and Walker 1992; see Figure 13). The inspection found the entire parcel had been modified by sugarcane cultivation. No archaeological sites were encountered and no further work was recommended.

In 1993, Terry Hunt undertook an archaeological inventory survey (AIS; negative results recorded as an archaeological assessment [AA]) of 600 acres of Shipman Company lands in Kea‘au surrounding and overlapping the present project area (Hunt 1993; see Figure 13). No archaeological features were observed throughout the majority of the survey area, which had been heavily impacted by cane cultivation, including the lands of the current project area. However, 50 features including walls, mounds, platforms, and multi-feature complexes were documented within five areas that were not heavily impacted, located closer to Kea‘au Town. Hunt (1993:11–12) interpreted these features as likely “associated with historic plantation activities, such as field clearing, and other cultivation work. It is possible that some features may date to earlier, prehistoric times, but further research, including test excavations would be needed to evaluate such an hypothesis.” Archaeological inventory survey was recommended for areas of future development in which resources were identified (Hunt 1993:14).

Ogden Environmental and Energy Services, Inc. (OGDEN) performed an AIS of the Kea‘au Town section of the Kea‘au-Pāhoa Road east of the present project area (Hurst and Schilz 1994; see Figure 13). They reported the proposed bypass routes had been heavily impacted by agricultural use of the areas for sugarcane fields, macadamia tree orchards, and more recent residential development. No significant cultural remains were found; however, remnants of wooden fencing related to the 8½ mile plantation camp were observed (Hurst and Schilz 1994:33). The report also provides an in-depth historical background of Kea‘au and old ‘Ōla‘a town.

PHRI conducted historical and archaeological research of the proposed Kea‘au High School site, located southeast of the present project area (Walker et al. 1997; see Figure 13). The survey revealed the project area was formerly heavily impacted by sugarcane activities, consisting at the time of survey of “fallow sugar cane land and a portion of a macadamia nut farm” (Walker et al. 1997:1). The study identified SIHP # 50-10-44-21191, which is the Hilo Railroad Company right-of-way (ROW). Walker et al. (1997:5) assessed SIHP # -21191 as being significant for its information content, specifically regarding “transportation networks and changes in the modes of production, over time, of the sugar industry on the Big Island.” Noting that all of the site’s information had been collected, no further work was recommended (Walker et al. 1997:5).

CSH conducted an AIS of approximately 2.5 acres in Kea‘au southeast of the present project area (Masterson and Hammatt 1998; see Figure 13). While no archaeological finds were reported, a modern camp was documented in the western portion of the project area. This camp appears to represent a Filipino camp utilized during the 1980s.

In 2000, Scientific Consultant Services, Inc. (SCS) surveyed the proposed Kamehameha Schools Bishop Estate (KSBE) East Hawai‘i Campus, located *mauka* or upslope of Kea‘au Town and south of the present project area (McGerty and Spear 2000; see Figure 13). This survey “resulted in the identification and re-identification of several historic surface features [SIHP # 50-10-44-21823] related to clearing of the land for the sugar cane industry” (McGerty and Spear 2000:i).

In 2004, Haun and Associates undertook an AIS along a 2.2-mile section of the Kea‘au-Pahoa Road southeast of the present project area (Haun and Henry 2004; see Figure 13). The survey examined a 5.4-m (18.0-ft) wide strip on the *makai* side of the road and some adjacent areas. No archaeological sites or features were identified during the survey; therefore, the study was termed an archaeological assessment.

In 2007, CSH monitored construction for sewage upgrades at Kea‘au Middle School southwest of the present project area (Wilkinson et al. 2008; see Figure 13). Despite substantial ground disturbance, no significant cultural materials were encountered. Excavations exposed fill sediments up to 2.5 m deep. Archaeological monitoring was recommended for any future ground-disturbing projects at the school, given the potential for historic subsurface features associated with the early founding of the town and the school.

That same year, Haun and Associates completed an AIS along a 2.4-mile section of the Kea‘au-Pahoa Road southeast of the present project area (Haun and Henry 2008; see Figure 13). This survey investigated a 30-ft wide strip along the *mauka* side of the road. One historic property was documented: SIHP # 50-10-44-26874, the historic Waipāhoehoe Stream Bridge, located inland of the modern stream crossing. No further work was recommended.

In 2015, CSH reported the findings of a literature review and field inspection for a demolition project at Kea‘au Middle School southeast of the present project area (Wheeler et al. 2015; see Figure 13). Research and consultation with school staff indicated the four buildings proposed for demolition were constructed sometime between 1900 and 1939. Consultation with the SHPD Architecture Branch was recommended. In addition, an *‘auwai* (irrigation ditch) was observed along the northwestern boundary of the campus. This feature was interpreted as a likely remnant of the historic sugarcane industry in Kea‘au and a potential historic property. Archaeological monitoring was recommended for all project-related ground disturbance.

Section 5 Community Consultation

5.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with Native Hawaiian Organizations (NHO), agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise/and or knowledge of the *ahupua‘a* where the project areas are located. CHS initiated its outreach effort in June 2017 through letters, email, telephone calls, and in-person contact. CSH completed the community consultation in September 2017.

5.2 Community Contact Letter

Letters (Figure 14 and Figure 15) along with a map and aerial photograph of the project were mailed with the following text:

> At the request of The Limtiaco Consulting Group, on behalf of the State of Hawai‘i Department of Agriculture – Agribusiness Development Corporation (ADC), Cultural Surveys Hawai‘i, Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed Kea‘au Zero Waste Facility, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, Tax Map Key (TMK) [3] 1-6-151:002. Adjacent parcels (TMKs [3] 1-6-151: 003, 006, and 999) may be affected by ancillary connections to existing infrastructure. Please see attached maps (USGS and aerial). The total project acreage is approximately 2.7 acres.
>
> The proposed project is the development of a new zero waste facility to be owned and operated by the ADC located in Kea‘au. The zero waste facility is part of ADC’s initiative to expand its sustainable program of converting animal waste to product biofuel.
>
> Development of ADC’s zero waste facility will require site improvements within an undeveloped 1.5-acre lot adjacent to the existing Big Island Biodiesel facility. The project site will be improved with a pre-manufactured building of roughly 3,000 square feet. Grading and construction-related activities would occur for the installation of infrastructure such as internal roadways, parking areas, and utility systems. There may be access controls between the existing Big Island Biodiesel facility and ADC’s new facility. A waterline connection may entail minor disturbance of the roadway. Connections to off-site drywells may be needed or new on-site drywells may be constructed. Driveway connections would be improved. Chain link fencing along the site perimeter and manual gates at access points would be installed as part of the project. Landscaping along the front property line is also proposed.
>
> The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgeable about this area. The research and interviews assist us when assessing potential impacts to the cultural resources, cultural practices, and beliefs

identified as a result of the planned project. We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

- **General history and present and past land use of the project area.**
- **Knowledge of cultural sites –for example, historic sites, archaeological sites, and burials.**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing.**
- **Cultural associations of the project area, such as legends and traditional uses.**
- **Referrals of *kūpuna* or elders and *kama‘āina* (Native-born) who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua‘a* (traditional land division extending from the mountains to the sea) lands.**
- **Any other cultural concerns the community might have related to cultural practices within or in the vicinity of the project area.**

On 20 February 2018, CSH was contacted by The Limtiaco Consulting Group, acting on behalf of the State of Hawai‘i Department of Agriculture – Agribusiness Development Corporation (ADC), regarding a change to the project description. Below is the new project description:

> The Hawai‘i Department of Agriculture (HDOA), Agribusiness Development Corporation (ADC) received comments requesting clarification about its proposed Zero Waste Facility in Puna on the Island of Hawai‘i, which will be a demonstration project. The intent of ADC's demonstration project is to successfully grow algae on a commercial scale using the waste product from produce. The waste product that the algae will consume may consist of papaya and perhaps other off grade fruits and vegetables. No animal waste will be used in the waste conversion process. Successful algae growth may be used for the development of byproducts such as livestock feed and biofuels; however, ADC has no plans to develop feed or biofuels at its Zero Waste Facility. ADC will own and operate the new Zero Waste Facility, which is part of ADC's initiative to address food and energy security issues in Hawai‘i.

Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

399 Hualani Street, Suite 124 Hilo, Hawai‘i 96720 Ph: (808) 965-6478 Fax: (808) 965-6582
Job code: KEAAU 12 nishihara@culturalsurveys.com www.culturalsurveys.com

April 2017

Aloha,

At the request of The Limtiaco Consulting Group, on behalf of the State of Hawai‘i Department of Agriculture – Agribusiness Development Corporation (ADC), Cultural Surveys Hawai‘i, Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed Kea‘au Zero Waste Facility, Kea‘au Ahupua‘a, Puna District, Hawai‘i Island, Tax Map Key (TMK) [3] 1-6-151:002. Adjacent parcels (TMKs [3] 1-6-151: 003, 006, and 999) may be affected by ancillary connections to existing infrastructure. Please see attached maps (USGS and aerial). The total project acreage is approximately 2.7 acres.

The proposed project is the development of a new zero waste facility to be owned and operated by the ADC located in Kea‘au. The zero waste facility is part of ADC's initiative to expand its sustainable program of converting animal waste to product biofuel.

Development of ADC's zero waste facility will require site improvements within an undeveloped 1.5-acre lot adjacent to the existing Big Island Biodiesel facility. The project site will be improved with a pre-manufactured building of roughly 3,000 square feet. Grading and construction-related activities would occur for the installation of infrastructure such as internal roadways, parking areas, and utility systems. There may be access controls between the existing Big Island Biodiesel facility and ADC's new facility. A waterline connection may entail minor disturbance of the roadway. Connections to off-site drywells may be needed or new on-site drywells may be constructed. Driveway connections would be improved. Chain link fencing along the site perimeter and manual gates at access points would be installed as part of the project. Landscaping along the front property line is also proposed.

The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgeable about this area. The research and interviews assist us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

- **General history and present and past land use of the project area.**
- **Knowledge of cultural sites –for example, historic sites, archaeological sites, and burials.**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing.**
- **Cultural associations of the project area, such as legends and traditional uses.**
- **Referrals of *kūpuna* or elders and *kama‘āina* (Native-born) who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua‘a* (traditional land division extending from the mountains to the sea) lands.**

Figure 14. Community consultation letter, page one

KEAAU 12 – CIA for the Proposed Kea‘au Zero Waste Facility

Page 2

- **Any other cultural concerns the community might have related to cultural practices within or in the vicinity of the project area.**

Please contact Nicole Ishihara, at (808) 965-6478, or send me an e-mail at nishihara@culturalsurveys.com if you have any information you would like to share.

Me ka ha‘aha‘a,

Nicole Ann Nāhōkūlaniahiahi Ishihara
Project Director & Cultural Researcher
Cultural Surveys Hawai‘i

Figure 15. Community consultation letter, page two

5.3 *Kama‘āina* Interviews

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *mana‘o* and *‘ike* with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors be reproduced accurately and in no way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

5.3.1 Dennis Kau‘inui

CSH interviewed Mr. Dennis Kau‘inui on 25 April 2017. The sit-down interview took place near the wharf at Hilo Bay in the *‘ili* (land division within an *ahupua‘a*) of Makaokū.

Born at ‘Ōla‘a Hospital and raised in Kea‘au, Mr. Kau‘inui is one of five children. His mother was originally from Wainaku and his father from Hōnaunau. Their connection with Kea‘au began when his mother and father were employed as helpers on the Shipman Ranch. The family lived outside the plantation near Shipman Beach where they spent a lot of time gathering provisions from the nearby shoreline.

According to Mr. Kau‘inui, Hā‘ena was the gated area where the Shipman family lived. There was a brackish water pond there where they would gather *‘o‘opu* (general name for fishes included in the families *Eleotridae*, *Gobiidae*, and *Blennidae*) and he remembers eating *sabao*, a Filipino fish soup made with garlic, ginger, onions, lemongrass, shrimp, and tomatoes, made with *‘o‘opu*. He mentioned that near where he lived there were many stones. Though he could not recollect the *mo‘olelo* associated with the stones, he briefly mentioned they was used as weapons, like sling stones, as people in the old days were “hijacked” in this area. He mentioned another stone near Hā‘ena Bay that was treated as a shrine although he said nothing was offered to this stone; they sat near it almost as if to pay respect, then they’d proceed with fishing or diving.

In recalling his childhood, he remembers as a family they caught “all the best” fish such as mullet (*Mugil cephalus*), *kūmū* (*Paurupeneus porphyreus*), *limu* (seaweed), *‘opihi* (*Cellana sandwicensis*), *‘a‘ama* (*Grapsus tenuicrustatus*), *loli* (*Phylum echinodermata*), and *he‘e* (squid). They also had pigs and cattle which they’d feed fruits from their *ulu* (breadfruit; *Artcocarpus altilis*), pear, and avocado trees as well as *honohono* (*Commelina diffusa)* grass. He remembers as a child that there were a number of cooks and helpers and their families that lived on or near the property. As a kind gesture, Mr. Shipman provided transportation to and from school for the children of these workers. The workers there shared all they gathered including freshly caught fish or pigs.

Another memory of his childhood was growing up around the Shipman family. With only kind words, he remembered a colorful upbringing with the Shipman *‘ohana* (family). According to Mr. Kau‘inui, Mr. Shipman was a very smart man who could speak fluent Hawaiian. They did things up *mauka* as a family, which included catching pigs and helping out on the Shipman Ranch near Mauna Kea at Pu‘u Huluhulu, Pu‘u Kala, and in another area called ‘Āinahou. They‘d gather *kukui* nut and make *‘inamona* (a type of Hawaiian relish) and his mother would take time to make and sell *lei* (flower garlands). Up *mauka* they also made *kālua* pig (pig steamed in an underground

oven) using banana stumps from the area and also planted *kalo* (taro; *Colocasia esculenta*) up in the mountains too.

In regards to the project area, Mr. Kau‘inui is not directly connected to that location but he has lived on Shipman property nearly all his life. According to him, there are about 18-20 homes still on Shipman property directly across from the project area on East Kipimana Street. There was also a slaughterhouse in this same area but whether it is still in use today he did not mention. He can't recall if there were any pre-existing structures within the project area but as far as he can remember, it was always a forested area with *‘ōhi‘a.* His only concern with the proposed project is that the food resources he uses to feed his own livestock will now be used to create bio-diesel and that the project will take away those resources from people in the community.

Section 6 Traditional Cultural Practices

6.1 Subsistence and Gathering

Early accounts of Puna District noted the many groves of coconut trees and *hala* along with cultivated crops of common vegetables, arrowroot, sugarcane, coffee, cotton, and citrus fruits. Titus Coan, a missionary who traveled to the Hilo and Puna region in the early 1800s, recalls wild strawberries, gooseberries, and *‘ōhelo* (*Vaccinum reticulatum*) in the *mauka* regions.

A few testimonies submitted to the Boundary Commission in 1873 describes a vibrant and flourishing ‘Ōla‘a forest. The forests of ‘Ōla‘a were once famous for the many native birds that thrived in these parts and there were many bird hunters that roamed the forests. The *‘ua‘u* bird was commonly seen in this area. *Olonā* was also harvested in the *mauka* region, which was used for cordage and other cultural practices. *Ulu* and even oranges could be found in the *mauka* region. Coconuts and banana could be found along the shoreline, while *‘ōhi‘a*, *koa*, and *‘īliahi* were grown in the uplands.

In Dennis Kau‘inui's interview he recalls when he and his family would gather plants and hunt in the *mauka* regions. In the heavy forested area of ‘Ōla‘a, *kukui* grew along side *‘ōhi‘a.* As a child, Mr. Kau‘inui recalls his mother gathering *kukui* to make *inamona*, a relish made from the nut and mixed with salt used as an accompaniment in dishes. In this same region they would cultivate *kalo* and also hunt for wild pigs.

6.2 *Ka‘ao* and *Mo‘olelo*

The story of Hi‘iakaikapoliopele is famed for its library of knowledge; there is mention of winds, rains, and place names no longer used today. Kea‘au is referenced quite often in this story as Hā‘ena, located on the coast, was a favorite place where Hi‘iaka would meet Hōpoe, her beloved *aikāne* (friend). They‘d gather at Hā‘ena to surf and this is where Hōpoe taught Hi‘iaka the art of *hula.*

Also mentioned in this story is the unfortunate demise of Hōpoe. While still out on her journey to retrieve Lohi‘au from Kaua‘i, Pele grew impatient and was convinced Hi‘iaka had taken Lohi‘au for herself. In a fit of rage, she sent rivers of lava to cover the *lehua* groves and Hōpoe. In a previous archaeological study by Hudson (1932), he mentions this stone form of Hōpoe as "a large triangular rock with a round head-like projection." It was known to move to and fro with the surf but was displaced during the *tsunami* of 1946.

6.3 Caves and Burials

In the story Hi'iakaikapoliopele, Pele and her sisters spend some time in Kea'au, both *mauka* and *makai.* After a day at the beach, they all return to a cave of *pāhoehoe* where Pele wishes to sleep undisturbed. The location of this particular cave is unknown but it may or may not be one of the caves mentioned in the recorded testimonies.

The Land Boundary Commission Testimonies of 1873 mention many caves throughout Kea’au. A number of these caves were used for burials and one in particular named Oliolimanienie was used for protection in times of war.

One previous archaeological study conducted by Emory (1945) revelead that Shipman Cave (SIHP # 50-10-36-20678) was a lava tube that was utilized for refuge and for burials. Emory concluded the study saying that the cave “extends probably miles upland and clear to the sea,” noting that the tube was too damp for permanent habitation (Emory 1945:7,9).

6.4 Fishing

Early accounts do not mention this particular area of Kea‘au being heavily inhabited. Likewise, there is no mention of these lands being cultivated in ancient times. The majority of the population was concentrated near the coast where provisions were abundant. In an interview with Dennis Kau‘inui, a long time resident of Kea‘au, he mentioned growing up in Hā‘ena. This area was purchased by the Shipman family in 1882. At a brackish water pond there they would gather *‘o‘opu* and cook it up as *sabao*, a type of Flipino fish soup. While at the coast, they‘d fish for *kūmū* and also gathered *limu*, *‘opihi, ‘a‘ama*, *loli,* and *he‘e*.

Section 7 Summary and Recommendations

CSH undertook this CIA at the request of Limtiaco Consulting Group, on behalf of the State of Hawai‘i Department of Agriculture – Agribusiness Development Corporation (ADC). The research broadly covered the entire *ahupua‘a* of Kea‘au, including the current project area.

7.1 Results of Background Research

Background research for this study yielded the following results:

1. The first noted *ali‘i nui* dates back to AD 1200-1300. This *ali‘i nui* was Pili, a voyager from the ancestral land of Kahiki (Cordy 2000:160).
2. In the late 1500s, a descendant of Pili, Līloa, became *ali‘i nui* over the entire island of Hawai‘i. Upon his death, Līloa‘s youngest son, ‘Umi, rebelled against the rightful heir, his older brother Hakau, and after countless battles, united the island under one *ali‘i nui*. The Puna district did not have a distinct chief of its own, but most times was under the rule of the Hilo and Kona chiefs.
3. In 1760, Kalani‘ōpu‘u became *ali‘i nui* of Hawai‘i Island and his son, Kīwala‘ō, and favored nephew, Kamehameha, were to succeed his chiefly duties upon his death. During his reign, one of the few noted chiefs of Puna, ‘Īmakakoloa, rebelled against Kalani‘ōpu‘u and went into hiding. Kalani‘ōpu‘u’s men burned every village until ‘Īmakakoloa was found.
4. There were a few foreign accounts documenting the district of Kea‘au. In 1779, crew members from Captain Cook’s third voyage made a pass just beyond the Puna coast. In 1823, British missionary William Ellis made a side trip inland to Kīlauea crater and continued near the coast at the Ka‘ū/Puna border. Later in 1823, Titus Coan and members of the Hilo Mission Station also traveled to the eastern boundary in Puna. In 1826, the Wilkes made a similar trip to the crater and descended by way of Puna.
5. In the mid-1800s during the Māhele, Kea‘au Ahupua‘a was granted as chiefly lands to William C. Lunalilo. One *kuleana* award comprising 13.64 acres was granted to Hewahewa and later sold to the Roman Catholic Church in 1865.
6. In 1854, Reverend William Cornelius Shipman sailed from Boston Harbor and eventually made Hawai‘i his home. His son, William Herbert (W.H.) Shipman, married Mary Elizabeth Kahiwaaiali‘i Johnson, granddaughter of John Davis. Her uncle, John Davis, was the trusted advisor to Kamehameha I (W.H. Shipman 2017).
7. In 1882, the King Lunalilo Estate sold the parcel of Hā‘ena (covering 70,000 acres from the Puna Coast to Kīlauea volcano) to W.H Shipman, J. Elderts, and S. Damon (W.H. Shipman 2017). Just a few years later, W.H. Shipman bought out his partners and owned the entire acreage.
8. In 1899, Olaa Sugar Company leased 3,182 acres of land from W.H Shipman for a term of 40 years.
9. The location of the Kea‘au Zero Waste Facility is within the W.H Shipman Business Park, established in 1988 (W.H. Shipman 2017). The purpose of this industrial park was to “meet current and projected industrial demand” (W.H. Shipman 2017). The industrial park covers a vast 485 acres within the *ahupua‘a* of Kea‘au.

7.2 Results of Community Consultations

CSH attempted to contact NHOs, agencies, and community members. Below is a list of individuals who shared their *mana‘o* and *‘ike* about the project area and Kea‘au Ahupua‘a:

1. Dennis Kau‘inui, *kama‘āina* of ‘Ōla‘a and long time resident on Shipman property.

7.3 Impacts and Recommendations

Based on information gathered from the cultural and historic background, the proposed project may potentially impact undetected *iwi kupuna*. CSH identifies potential impacts and makes the following recommendations:

1. Although previous archaeological research did not indicate any burials found within or in the vicinity of the project area, project construction workers and all other personnel involved in the construction, maintenance, or any other relative activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the State Historic Preservation Division (SHPD) will be notified pursuant to HAR §13-280-3. In the event that *iwi kupuna* are identified, all earth-moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended.
2. In the event that *iwi kupuna* and/or cultural finds are encountered, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Section 8 References Cited

Ava Konohiki
2015 Ancestral Visions of ‘Āina website. Available online at http://www.avakonohiki.org/.

Barrere, Dorothy B.
1971 Historical Survey: Pualaa, Puna, Hawaii. In *Archaeological and Historical Survey of the Ahupua‘a of Pu‘ala‘a, Puna District, Island of Hawai‘i*, by S. Neal Crozier and Dorothy B. Barrere, p. 7–21. Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Beaglehole, John C.
1967 *The Journals of Captain Cook on His Voyages of Discovery.* Vol. 3: *The Voyage of the Resolution and Discovery 1776-1780,* Parts 1 and 2. University Press, Cambridge, Massachusetts.

Beckwith, Martha W.
1970 *Hawaiian Mythology*. University of Hawaii Press, Honolulu.

Board of Commissioners
1929 Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Star-Bulletin Publishing, Honolulu.

Boundary Commission Testimony
1873-1905 Microfilm Collection of the University of Hawai‘i at Hilo, Mo‘okini Library.

Clark, John R. K.
2002 *Hawai‘i Place Names: Shores, Beaches, and Surf Sites.* University of Hawaii Press, Honolulu.

Coan, Titus
1882 *Life in Hawaii: An Autobiographic Sketch of Mission Life and Labors 1835-1881.* Randolph, New York.

Condé, Jesse C. and Gerald M. Best
1973 *Sugar Trains.* Glenwood Publishers, Felton, California.

Cordy, Ross
2000 *Exalted Sits the Chief: The Ancient History of Hawai‘i Island.* Mutual Publishing, Honolulu.

Desha, Stephen L.
2000 *Kamehameha and His Warrior Kekūhaupi‘o.* Francis N. Frazier, translator. First published in the Hawaiian language newspaper *Ka Hoku o Hawai‘i* in a series of articles from 16 December 1920 to 11 September 1924. Kamehameha Schools Press, Honolulu.

Dorrance, William H. And Francis S. Morgan
2000 *Sugar Islands: The 165-Year Story of Sugar in Hawai‘i.* Mutual Publishing, Honolulu.

Ellis, William
1963 *Journal of William Ellis: Narrative of a Tour through Hawaii, or Owhyhee; With Observations on the Natural History of the Sandwich Islands, and Remarks on the Manners, Customs, Traditions, History, and Language of their Inhabitants.* Advertiser Publishing Company, Honolulu.

Emerson, Nathaniel B.
1915 *Pele and Hi‘iaka: A Myth from Hawai‘i.* Honolulu Star-Bulletin Press, Honolulu.
1997 *Unwritten Literature of Hawaii The Sacred Songs of the Hula.* Ai Pōhaku Press, Honolulu.
2005 *Pele and Hi‘iaka*. Edith Kanaka‘ole Foundation, Hilo, Hawai‘i.

Emory, Kenneth P.
1945 *Exploration of Herbert C. Shipman Cave, Keaau Division of Puna, Hawaii, Sept. 13 and 14, 1945.* Bernice Pauahi Bishop Museum, Honolulu.

Emory, K.P., J.H. Cox, W. Bonk, Y. Sinoto, and D. Barrere
1959 *Natural and Cultural History Report on the Kalapana Extension of the Hawai‘i National Park,* Vol. 1. Prepared for the National Park Service, Ms. Dept. of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Ewart, Ned D. and Margaret L.K. Luscomb
1974 *Archaeological Reconnaissance of Proposed Kapoho-Keaukaha Highway, District of Puna, Island of Hawai‘i.* Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Fornander, Abraham.
1916-1919 *Fornanders Collection of Hawaiian Antiquities and Folk-Lore*. Bishop Museum Memoirs IV, V, and VI. Bishop Museum Press, Honolulu.

Giambelluca, Thomas W., Michael A. Nullet, and Thomas A. Schroeder
1986 *Rainfall Atlas of Hawai‘i, Report R76.* Department of Land and Natural Resources, Honolulu.

Google Earth
2013 Aerial photographs of Hawai‘i. Google Inc., Mountain View, California. Available online at www.google.com/earth.html.

Haun, Alan E. and Dave Henry
2004 *Archaeological Assessment Survey Keaau-Pahoa Road Shoulder Lane Conversion Land of Keaau, Puna District, Island of Hawaii.* Haun & Associates, Kea‘au, Hawai‘i.
2008 *Archaeological Inventory Survey Portions of TMK (3) 1-6-04: 11, 47-53, 55, 56 and 1-6-64:266-269, 283-286 Land of Kea‘au Puna District, Island of Hawaii.* Haun & Associates, Kea‘au, Hawai‘i.

Hawai‘i TMK Service
2014 Tax Map Key [3] 1-6-151. Hawai‘i TMK Service, Honolulu.

Hawaiian Paradise Park
2009 *The History of Hawaiian Paradise Park: Interview with Mr. Rick Edwards*. Hawaiian Paradise Park Owners Association. Electronic document, http://hawaiianparadisepark.org (accessed 27 May 2009).

Hilo Station Reports
1833 *Hilo Station Report.* Microfilm at Hawaiian Mission Children’s Museum, Honolulu.

Hudson, Alfred E.
1932 The Archaeology of Eastern Hawai‘i. Manuscript. Prepared for the Bishop Museum, Honolulu. Copy on file at Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai‘i.

Hunt, Terry L.
1993 *Archaeological Assessment of Shipman Lands in Kea‘au, Puna, Island of Hawai‘i.* University of Hawai‘i, Honolulu.

Hurst, Gwen and Allan Schilz
1994 *Archaeological Survey of the Kea‘au Pahoa Road, Keaau Town Section*. Ogden Environmental and Energy Services Company, Inc., Honolulu.

‘Ī‘ī, John Papa
1959 *Fragments of Hawaiian History*. Bishop Museum Press, Honolulu.

Kamakau, Samuel Manaiakalani H.
1961 *Ruling Chiefs of Hawai‘i*. Kamehameha Schools Press, Honolulu.
1992 *Ruling Chiefs of Hawai‘i*. Revised edition. Kamehameha Schools Press, Honolulu.
1996 *Ke Kumu Aupuni: ka Moolelo Hawaii no Kamehameha Ka nai Aupuni a me Kana Aupuni I Hookumu ai.* ‘Ahakui ‘Olelo Hawai‘i. Honolulu ‘Ahakui ‘Olelo Hawai‘i, Honolulu.

Kame‘eleihiwa, Lilikalā K.
1996 *A Legendary Tradition of Kamapua‘a, the Hawaiian Pig-God.* Bishop Museum Press, Honolulu.

Kluegel
1901 Map of Hilo Railroad, Olaa Division. Registered Map 1990. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Komori, Eric
1987 *Cultural and Biological Resources Survey of the Pohoiki to Puna-Substation 69KV Transmission Corridor, Kapoho to Kea‘au, Puna, Hawai‘i Island.* Bernice Pauahi Bishop Museum, Honolulu.

Lass, Barbara
1997 *Reconnaissance Survey Along the Old Government Road, Kea‘au, Puna, Island of Hawai‘i.* Department of Anthropology, University of Hawai‘i-Hilo, Hawai‘i.

Malo, David
1903 *Hawaiian Antiquities*. Hawaiian Gazette Company, Honolulu.

Maly, Kepā
1999 *The Historical Puna Trail- Old Government Road (Kea‘au Section) Archival-Historical Documentary Research, Oral History and Consultation Study, and Limited Site Preservation Plan Ahupua‘a of Kea‘au, Puna District, Island of Hawai‘i.* Copy on file at Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai‘i.

Masterson, Ian A. and Hallett H. Hammatt
1998 *Archaeological Inventory Survey for the Proposed Kea‘au Elderly Housing Project, Kea‘au, Puna District, Hawai‘i Island (TMK: 1-6-143: por. of 18 & 39).* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

McEldowney, Holly
1979 *Archaeological and Historical Literature Search and Research Design, Lava Flow Control Study, Hilo, Hawai‘i: Inventory of Archaeological and Historical Resources.* Bishop Museum Press, Honolulu.

McGerty, Leann and Robert Spear
1999 *FINAL: An Archaeological Inventory Survey of the proposed K.S.B.E. East Hawai‘i Campus, Kea‘au Ahupua‘a, Puna District, Island of Hawai‘i TMK:1-6-03:12.* Scientific Consultant Services, Inc., Honolulu.

Newman, T. Stell
1971 Hawaii Island Agricultural Zones, circa A.D. 1823: An Ethnohistorical Study. *Ethnohistory* 18(4):335–351.

Nordhoff, Charles
1874 *Northern California, Oregon and the Sandwich Islands.* Harper, New York.

Office of Hawaiian Affairs
2015 *Papakilo Database.* Office of Hawaiian Affairs cultural and historical database. Electronic document, http://papakilodatabase.com/main/index.php.

Pukui, Mary Kawena
1983 *‘Ōlelo No‘eau, Hawaiian Proverbs and Poetical Sayings.* Bishop Museum Press, Honolulu.

Pukui, Mary and Laura C.S. Green
1995 *Folktales of Hawai‘i, He Mau Ka‘ao Hawai‘i.* Bishop Museum Special Publication 87. Bishop Museum Press, Honolulu.

Pukui, Mary Kawena, Samuel H. Elbert, and Esther T. Mookini
1974 *Place Names of Hawaii.* University of Hawaii Press, Honolulu.

Pukui, Mary Kawena and Samuel H. Elbert
1984 *Hawaiian Dictionary: Hawaiian-English English-Hawaiian.* Includes Supplement B. Glossary of Hawaiian Gods, Demigods, Family Gods and a Few Heroes:381-398, and Supplement C. Specializations of Hawaiian Gods and Common Forms They Assumed:399-400. University of Hawaii Press, Honolulu.
1986 *Hawaiian Dictionary.* Second edition. University of Hawaii Press, Honolulu.

Rosendahl, Margaret L.K.
1982 *Archaeological Reconnaissance Survey, Proposed W.H. Shipman Industrial Park TMK 3-1-6-03:Portion 12.* Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawai‘i.

Rosendahl, Paul H. and Alan T. Walker
1992 *Archaeological Field Inspection of TMK:3-1-7-17:3 Land of Ola‘a, Puna District Island of Hawaii.* Paul H. Rosendahl, Inc., Hilo, Hawai‘i.

Sato, H. Warren Ikeda, Robert Paeth, Richard Smythe, and Minoru Takehiro, Jr.
1973 *Soil Survey of the Island of Hawaii.* U.S. Department of Agriculture and Univ. of Hawaii Agricultural Experiment Station.

Stearns, H.T.
1944 National Park Service topographic map of Hawaii Island. Registered Map 3081. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Stokes, John F.G.
1991 *Heiau of the Island of Hawai‘i.* Tom Dye, editor. Bishop Museum Press, Honolulu.

Thrum, Thomas G.
1908 Heiaus and Heiau Sites Throughout the Hawaiian Islands: Completing the series which began in the Annual of 1907. *Hawaiian Almanac and* Annual *for 1909*. Thos. G. Thrum, Honolulu.
1909 Heiaus: Their Kinds, Construction, Ceremonies, Etc. In *Hawaiian Annual for 1910*. Compiled by Thos. G. Thrum. Thos. G. Thrum, Honolulu.

Treiber, Gale E.
2000 *Hawaiian Railway Album. Volume 2. Along the Main Lines of the Oahu Railway and Land Co. and the Hawaii Consolidated Railway.* Hawaiian Railway Society and the Railroad Press, Hanover, Pennsylvania.

Ulukau
2014 *Māhele Database.* Hawaiian Electronic Library, http://ulukau.org/cgi-bin/vicki?l=en..

USDA (U.S. Department of Agriculture)
2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/.

USGS (U.S. Geological Survey)
1914 Waiakea and Mountain View USGS 7.5-minute topographic quadrangles. USGS Information Services, Denver, Colorado.
1963 Hilo and Mountain View USGS 7.5-minute topographic quadrangles. USGS Information Services, Denver, Colorado.
1977 USGS Orthophoto, Hilo and Mountain View Quadrangles. USGS Information Services, Denver, Colorado.

1994 Mountain View USGS 7.5-minute topographic quadrangle. USGS Information Services, Denver, Colorado.

1995 Hilo USGS 7.5-minute topographic quadrangle. USGS Information Services, Denver, Colorado.

Waihona ‘Aina

2000 *The Māhele Database*. Electronic document, http://waihona.com

Walker, Alan T., Kepa Maly, and Paul H. Rosendahl

1997 *Archaeological and Historical Research of the Proposed Kea‘au High School Site, Puna District, Island of Hawai‘i.* Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawai‘i.

Wall, Walter E.

1928 Hawaii Territorial Survey Map of Island of Hawaii. Hawai‘i Land Survey Division, State of Hawai‘i, Department of Accounting and General Services, Honolulu.

Westervelt, William D.

1916 *Hawaiian Legends of Volcanoes*. G.H. Ellis Press, Boston, Massachusetts.

Wheeler, Momi, Sarah Wilkinson, and Hallett H. Hammatt

2015 *Archaeological Literature Review and Field Inspection for Buildings B, D, E and G Demolition Project at Kea‘au Middle School, Kea‘au Ahupua‘a, Puna District, Island of Hawai‘i TMK [3] 1-6-002:001 and 1-6-003:059.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Wilkes, Charles

1845 *Narrative of the U.S. Exploring Expedition during the Years 1838-1842,* Vol. IV. Lea and Blanchard, Philadelphia, Pennsylvania.

Wilkinson Sarah, Rosanna Runyon, and Hallett H. Hammatt

2015 *Archaeological Monitoring Report for Kea‘au Middle School, Hawai‘i Inter-Island DOE Cesspool Project, Kea‘au Ahupua‘a, Puna District, Island of Hawai‘i TMK: [3] 1-6-002:001 and 1-6-003:059.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

W.H. Shipman

2017 W.H. Shipman Limited website. Available online, http://www.whshipman.com/about-whs/history/

Appendix A Maly’s Oral Histories

(http://www.planetpuna.com/Puna%20Trails%20Draft%20Page/Kepa/Kepa-23-Oral%20History%20Interviews.html) (in Maly 1999, Appendix A)

The following is an excerpt from Kepā Maly‘s research on the Old Government Roa in Puna. He interviewed old time *kūpuna* (elders) from the Kea‘au-Waikahekahe vicinity regarding the road, cultural sites, lifestyle, trails, etc. Many of the place names in his ora history interviews are within the *ahupua‘a* that fall within the region of this report‘s study area, however locations are generally outside of this project‘s physical APE. These ora histories were included as a part of this report because many of the descendants or relatives of those persons listed here were among those that CSH was referred to by others to interview, and were unable or unwilling to participate in our interview process.

John Ka‘iewe Jr.

Oral History Interview of July 16, 1998

and Walk Along the Puna Trail- Old

Government Road (November 16, 1998)

John Ka‘iewe Jr. was born at Kea‘au, in 1929. He has lived at Kea‘au all his life, and his family has lived in the Kea‘au-Maku‘u vicinity for many generations. John's elders lived at Maku‘u, Keauhou, Pākī, and Kea‘au- Hā‘ena, and as a child he traveled along the old Government Road and mauka-makai trails with his family to their various places of residence and on fishing journeys. He and his elders traveled the Puna Trail (and smaller mauka-makai trails in between the shore and the main trail) all the way from Kaloli-Keauhou in the south to Pāpa‘i in the north. Also, as a youth, John's Tūtū Ma‘i, still lived at the place of his birth, Pākī Bay, and today, John is among the last few individuals alive, to have lived at Pākī with his elders. This interview provides readers with important historical accounts of the relationship that native families shared with the land.

From his grandfather, Solomon Ka‘iewe, John learned that his family used to live at Keauhou Bay. They had houses there, fished the ocean and cultivated taro, sweet potatoes and other crops in the area between the shore and the Government Road, and on the mauka side of the road as well. There were other relatives living between Keauhou and Pākī as well. When John was young, Tūtū Ma‘i and some of the other old-timers were still cultivating mixed crops in walled enclosures in the pu‘e (mulched, mound planting) style, behind Pākī. The 1946 tsunami had a significant impact on this section of the Puna shoreline. Tūtū Ma‘i’s house was destroyed, as were a number of stone wall features on the makai side of the government road. John recalls that in his youth, and as he was told, in the preceding years, there was a close relationship between his family and the Shipmans (that relationship is still important to family members to this day). In those early years, John described a Konohiki type relationship between the families and the rights which they were

granted for use and care of the land, ocean and various resources necessary for sustaining the well-being of the native families. One example shared by John in regards to accessand collection of marine resources, was in the area of the present-day collection, “wiping out of ‘ōpihi for sale. John noted that before – “they don't do that. They come in, they pick up, and then when my uncle comes down, he sees them over there, he’d tell them "What you fellas get now, you folks take. Take what you get.” That's all. But because of the boundaries, he [Shipman] had from Keauhou. From Keauhou side all the way to Pāpa‘I & People didn‘t just come into Kea‘au.”

He observed that before there were all kinds of fish, ‘ōpihi, wana and limu, but now, because so many people take so much, the place has been cleaned out. John suggested that there be some sort of rules like before days, to manage how much and when fish can be taken from along the Kea‘au-Puna Coast.

In speaking about the old government road and some of the mauka-makai trails, John noted that the mango trees were purposefully planted by his family and others who traveled the trails. The trees provided shelter, and in season, mangoes were always appreciated by those who traveled the trails. Also, Tūtū Ma‘i and a few other elder members of his family continued to do repair work on sections of the old government road that they traveled until about 1942 - when World War II broke out, access was restricted for a while, and the section of the road from Kaloli to Hā‘ena was opened up for military vehicles. John noted that it was the custom of the people who traveled the roads to take care of them. He remembers many trips where he and elder family members would carry ‘ili‘ili to fill in the road, and that they would also set the larger stones back in place.

When asked his thoughts about increased use of the old government road and the care of native Hawaiian sites, John commented that the trail was very special to him, and urged that the trail be restored in a traditional manner-that it not be paved as some people have suggested-and that the Hawaiian sites be:

“Taken care of, as much as possible. I would like to see those things left just as they are&. Within the government's rights, if they're going to make the road, we can't stop progress, you know. But, if they can kind of respect the area& If they could leave it as a historical area, that other people, like interpreters could tell people about.”

John did not recall ever hearing of a specific site between Kea‘au Bay to Pākī that was a heiau, but he does recall that there were special places that were respected by the old people-there were places with mana (spiritual power). He also had not seen any burials exposed, but from conversations with various elders, he feels that there are burial sites along the coast-some belonging to his kūpuna who lived at various places between Kea‘au to Maku‘u in ancient times. In this century, some members of his family have been buried at the Kea‘au (Shipman) Cemetery near the shore.

Further north along the shore line, at Pāpa‘i John has heard of heiau and burial sites, and he recalls that there is one area along the trail (not far from the old boundary wall) that the family was always cautious about because peculiar things would happen there.

John recalled that at Pākī, the names etched in the stone (the petroglyphs) were written by several of the old families that lived in the area. His mother also told him that some times, people who were visiting the families living on the shore would etch their names into the stone. It was quite a custom among the people at the time, "Pākī was famous for the names on top of the rocks."

Roy Shipman Blackshear

Oral History Interview at Kea'au Beach, Puna

July 23, 1998 and Site Visit of September 24, 1998 - with Kepä Maly

Roy Shipman Blackshear was born in 1923, at the Shipman family home in Hilo. Roy's grandparents, William H. and Mary Elizabeth Johnson- Shipman (a descendant of the Kauwē-Davis lines) first traveled along Kea‘au Beach and the Puna shoreline-between Hilo and Kapoho-on the "King's Trail" in the early 1870s. In the later 1870s, W.H. Shipman and partners in the Hawaiian Agricultural Company entered into a series of lease agreements with the estate of King William Lunalilo for the ahupua‘a of Kea‘au where ranching operations agricultural interests were being developed. The Shipmans have owned most of the ahupua‘a of Kea‘au since ca. 1882.

Roy has lived along the shore of Kea‘au for much of his life, either as a full-time or part-time resident. During his youth, he traveled along the old Government Road and coastal lands of Kea‘au with his family and other Hawaiian and part-Hawaiian families who have lived on the land for many generations. The interview transcript includes rich descriptions of the landscape, practices of the families who called Kea‘au home, and historical events, which he learned from elders, or personally experienced.

In his early years, Roy learned about and saw various Hawaiian sites in the coastal region of Kea‘au. Among the important places that he discussed in the interview, and which were always respected by his family and the few other Hawaiian families that lived there were:

-The Kea‘au Fishpond and mākāhā (rights to gathering fish from the pond were based upon work done to repair the pond features and keep the pond in working order).

-Two kū‘ula (fish god stones) on Kea‘au Bay.

-The famous stone Hōpoe, which was lost in the 1946 tidal wave.

-A possible burial site above the Hōpoe vicinity, on the mauka (towards the mountain) side of the Puna Trail.

-The old sweet potato cultivating field behind Hā‘ena Point.

-Old house sites and walls along the Old Government Road from Hā‘ena to Pākī and Keauhou.

-South of a paddock-boundary wall (Site 21269) are two ancient petroglyphs in the forms of a turtle and fish near the high water line.

-The old heiau and burial sites crossed by the Puna Trail in Waikahekahe Nui. Roy noted that he never heard of any other heiau sites in the Kea‘au Bay-Hā‘ena vicinity, and during his youth no one from outside of the immediate Hawaiian families of Kea‘au made offerings at any sites in the coastal region of the ahupua‘a.

-The māwae (crack crevice) where Kamehameha I was attacked, and numerous other sites between the coast and Puna Trail, extending from Kahului to Pāpa‘i in the north.

When asked what he'd heard about the early residents in the coastal region of Kea‘au, Roy shared what he remembered of his grandfather's description of the area, and the relationship of the native tenants to the land in the 1870s-1880s:

RSB: —I asked my grandfather, "When you first bought the property, were there very many Hawaiian living around here?" And he said, "Not very many." So where the population of Hā‘ena went, I don't know. But he said, "There weren't too many." But he was telling me this fresh water pond out here, he said that after he bought the property, "The Hawaiians that were around here, asked him if they could fish in the pond." I think that it had been restricted before.‖

KM: “Sure, the Konohiki (chief in charge of the ‘ahupua‘a) fishery rights of Lunalilo.”

RSB: “Yes. And he said, "Yes, you can fish in the pond." And he said, "For everyday that you fish in the pond, you give me one day of building stone walls around the edge of the pond." So that's how the walls were built. So that worked out pretty good.”

In discussing the Puna Trail-Old Government Road, protection of resources (both cultural and natural), and public access, Roy shared that his family has worked hard to keep the land intact, and in it's natural state:

RSB: “Over the years, you know, we've had people come up to me and say, "You know, you have such a beautiful place down there, I' surprised you don't have hotels and condos and everything else." And I said, "That's why it is a beautiful place. Because we don't have all of that. This is one of the natural spots on the island."

The family is very concerned about growing public access and proposals to pave the trail. Roy shared that much of the concern lies in the fact that already, he and other family members are cleaning up the rubbish left behind by people who carry

in what they want, but fail to pack it back out. Also, since 1918, the family has been involved in a nēnē (Hawaiian goose) breeding program, the oldest of its kind, and one that is significantly responsible for keeping the endemic Hawaiian nënë from becoming extinct. People who approach the nēnē-or worse yet, their dogs-can impact the breeding cycle and in the worst case, loose animals can destroy birds. On the shore, it is not uncommon to see turtles and seals hauled out as well. People and loose animals also impact them. Roy also noted that not too long ago, someone had cut the head off of one of the turtles on the shore, and just left the dead turtle there. In these matters, the family has maintained a long-term resource stewardship program with the DLNRDOFAW (Department of Land and Natural Resources-Division of Forestry and Wildlife), and all cases are reported to the department. Roy feels strongly that the cultural and natural resources need to be protected, and he understands that the Old Government Road is a public right-of-way, that is ten (10) feet wide. He feels it is important that people know about and respect the sensitive cultural and natural resources, and it is hoped, that trail users will also respect the property rights of the Shipmans.

Albert Kahiwahiwaokalani Haa Sr. (AKH)

and Albert K. Haa Jr. (AH)

November 10, 1998

Oral History Interview with Kepā Maly

Albert Kahiwahiwaokalani Haa Sr., was born at Kapoho, Puna, in 1930, and raised at Kea‘au. His father's family had worked for the Shipman family almost since the Shipman's arrival in Hawai‘i in the 1850s. Living at Kea‘au Beach, members of the Haa family worked the lands of the Shipman Ranch, including Kea‘au, Keauhou, and Mauna Kea (the Pu‘u ‘ō‘ō-Pua ‘Ākala vicinity). Mr. Haa's great grandfather was the often spoken of “Ioane.”

Ioane was a close friend and steady companion of Willie Shipman (see interview with Roy Shipman Blackshear), Eben Low, and many families who had ties to activities in Puna and various lands on Hawai'i. Ioane was known as a healer, and by all accounts, he was very knowledgeable of sites, practices, and customs associated with the land.

During his youth and teen years, Mr. Haa lived at Kea‘au, and it was in those years that he heard some of his elders speaking about Kea‘au. During the interview, the elder Mr. Haa was joined by his son Albert K. Haa Jr. The younger Haa was raised by his tūtū (Edward Haa) at Kea‘au makai (and later inland). Together, father and son shared some of their family history and thoughts about Kea‘au, protection of Hawaiian cultural sites, and travel along the Puna Trail-Old Government Road.

Recalling things he'd heard as a youth, Mr. Haa Sr. shared that in the last century, a number of people lived between Pākī and Keauhou, that there was even a school

there. Tūtū Ma‘i was the last resident in the area, and Mr. Haa often stayed at Pākī with the elder Ma‘i. Mr. Haa also traveled the entire shore line of Kea‘au, fishing. When asked about walking the Old Government Road, Mr. Haa said he almost never walked on the government road, instead he walked the shoreline trail from Hā‘ena to the Pākī vicinity. Going to the north (Hilo side of Kea‘au), he recalled that he and his father mā (and others) traveled the entire trail from Kea‘au Beach past Pāpa‘i, almost to Pu‘umaile in Waiākea, they ran cattle through most of the makai (oceanward) lands. His father told him about a large cave some where along the coast line, that was so big a plane could go inside (Mr. Haa was never taken to the cave).

Mr. Haa also shared his recollections of the two kū‘ula (a stone god used to attract fish) in front of Kea‘au Beach; he heard that it was his father who set them there to protect them. Ho‘okupu (offerings) were still made by his father and others throughout his youth. When asked about heiau (temple) at Kea‘au, Mr. Haa commented:

“Well, my father tells us, but he didn't tell me the location. Like I told you, the special, important things, he didn't say too much.” “…to them, it's a secret that goes with them.”

Later, Mr. Haa did say that he had been told about heiau near Pāpa‘i and Pāpua‘a. Both father and son urge that people not be maha‘oi (intrusive - nosy), that they leave the Hawaiian places alone. Proposals to pave the old trail are unacceptable to them.

In response to a question about making public access to the Puna Trail more widely known, father and son both expressed concerns, referencing some of the recent activities that have received media attention. The elder Mr. Haa summed it up in a very personal Hawaiian manner, as one who's family is buried on the land:

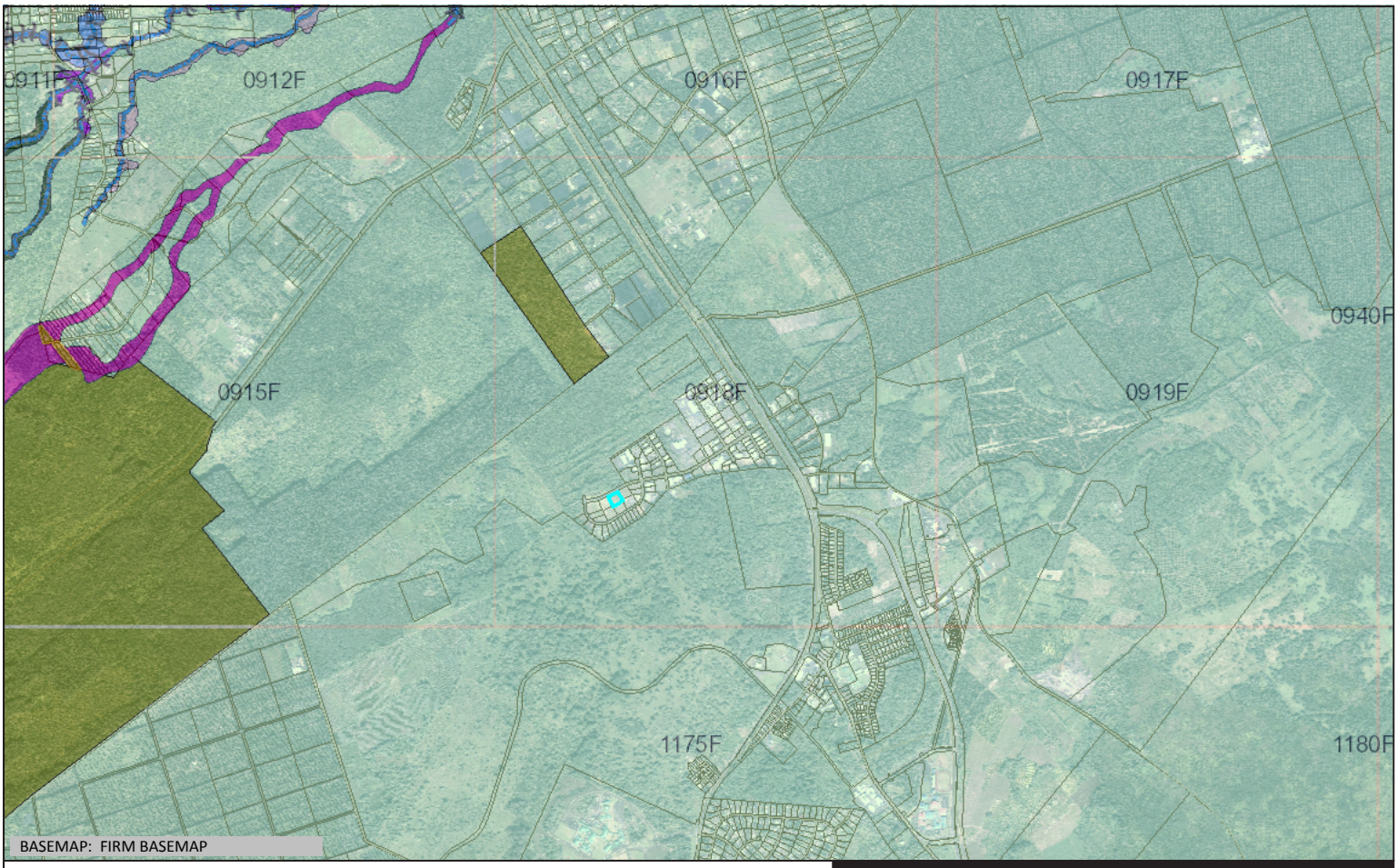
AH: Kea‘au, I don't like people to go over there, leave 'em alone. They don't know what they are doing. These guys that have been going down there, they make any kind heiau and praying. But they don't belong there.

AKH: [tears welling up in his eyes] We see that and that's kāpulu,(careless, unclean) that's not what our folks did. My family, we have been at Kea‘au for a long time. My uncle Henry Haa is buried there in the Shipman Cemetery, and we are attached to the land for eternity.

APPENDIX E

Flood Hazard Assessment Report of Flood Hazard Information from
FEMA FIRM Panel No. 1551660918F for Hawaiʻi (effective September 29, 2017)

(This page intentionally left blank.)



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	HAWAII
TMK NO:	(3) 1-6-151:002
WATERSHED:	KAAHAKINI
PARCEL ADDRESS:	UNKNOWN ADDRESS KEAAU, HI 96749

Notes:

Flood Hazard Information

FIRM INDEX DATE:	SEPTEMBER 29, 2017
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1551660918F
PANEL EFFECTIVE DATE:	SEPTEMBER 29, 2017

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 0.60 1.20 mi

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(*Note: legend does not correspond with NFHL)*

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

(This page intentionally left blank.)

APPENDIX F

Consultation and Comments

(This page intentionally left blank.)

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

February 9, 2018

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

Dear Sir or Madam,

This request for your comments replaces the letter dated January 19, 2018. The Hawai'i Department of Agriculture (HDOA), Agribusiness Development Corporation (ADC) received comments requesting clarification about its proposed Zero Waste Facility in Puna on the island of Hawai'i, which will be a demonstration project. The intent of ADC's demonstration project is to successfully grow algae on a commercial scale using the waste product from produce. The waste product that the algae will consume may consist of papaya and perhaps other off grade fruits and vegetables. No animal waste will be used in the waste conversion process. Successful algae growth may be used for the development of byproducts such as livestock feed and biofuels; however, ADC has no plans to develop feed or biofuels at its Zero Waste Facility.

The Limtiaco Consulting Group is preparing the Environmental Assessment (EA) for ADC's project. ADC will own and operate the new Zero Waste Facility, which is part of ADC's initiative to address food and energy security issues in Hawai'i. ADC is the fee owner of the undeveloped project site, which is located adjacent to the existing Big Island Biodiesel facility within the W. H. Shipman Business Park and near the town of Kea'au. We are soliciting comments on behalf of ADC for the pre-assessment consultation phase of the EA pursuant to Chapter 343, Hawai'i Revised Statutes and Title 11, Chapter 200, Hawai'i Administrative Rules of the Department of Health.

ADC proposes to install a premanufactured building of approximately 3,000 square feet on the 1.5-acre project site at Tax Map Key (TMK) (3) 1-6-151: 002. ADC's new facility will require associated improvements such as the construction of internal roadways, parking areas, utility systems and drywells that may affect adjacent parcels (e.g., TMKs 1-6-151: 003, 006 and 999). Driveway access and egress will be from Kipimana Street, which may be temporarily affected by construction activities if a new water line connection to the project site is installed. Site drainage for ADC's new facility may require connections to existing off-site drywells or the construction of new on-site drywells. Access controls (e.g., gates) may be installed between the existing Big Island Biodiesel facility and ADC's new Zero Waste Facility. Chain link fencing along the site perimeter and manual gates at access points will be installed as part of the project. Landscaping along the front property line is also proposed.

The larger geographic area that contains the W. H. Shipman Business Park has experienced a long history of significant land-disturbing activities including several decades of large-scale agricultural use. Fallow cane fields overgrown with invasive species were graded and cleared for the establishment of the W. H. Shipman Business Park. The project site contains no important biological resources or critical habitat that could harbor Federal or State of Hawai'i

listed species. Initial fieldwork consisting of pedestrian sweeps and subsurface testing revealed no historic properties and no cultural deposits. The outreach effort to Native Hawaiian Organizations, agencies, and community members was initiated by Cultural Surveys Hawaii. The available knowledge gathered thus far suggests that the project site has not been utilized for traditional and cultural practices within recent times.

We would greatly appreciate input from you or your organization that will assist us and project stakeholders in determining appropriate mitigation measures that may be warranted due to ADC's project. The enclosed location map is provided for your reference.

You are welcome to provide input on the project at this time. The response deadline has been extended to Friday, March 9, 2018 due to clarification provided in this letter.

Please send comments to:

Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, HI 96813
email: Ken.T.Nakamoto@hawaii.gov

And please provide a copy to:

Claire Oshiro, Environmental Planner
The Limtiaco Consulting Group
1622 Kanakanui Street
Honolulu, HI 96817

Thank you for your interest and participation in the environmental review process. Should you have any questions, please contact me at (808) 596-7790.

Best regards,
The Limtiaco Consulting Group, Inc.

Claire Oshiro

Claire Oshiro, Environmental Planner
Project Manager

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

January 19, 2018

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

Dear Sir or Madam,

The Limtiaco Consulting Group is preparing the Environmental Assessment (EA) for a proposed zero waste facility in Puna on the island of Hawai'i. The Hawai'i Department of Agriculture (HDOA), Agribusiness Development Corporation (ADC) will own and operate the new facility, which is part of ADC's initiative to expand its sustainable program of converting animal waste to product biofuel. ADC is the fee owner of the undeveloped project site, which is located adjacent to the existing Big Island Biodiesel facility within the W. H. Shipman Business Park and near the town of Kea'au. We are soliciting comments on behalf of ADC for the pre-assessment consultation phase of the EA pursuant to Chapter 343, Hawai'i Revised Statutes and Title 11, Chapter 200, Hawai'i Administrative Rules of the Department of Health.

ADC proposes to install a premanufactured building of approximately 3,000 square feet on the 1.5-acre project site at Tax Map Key (TMK) (3) 1-6-151: 002. The new biofuel facility will require associated improvements such as the construction of internal roadways, parking areas, utility systems and drywells that may affect adjacent parcels (e.g., TMKs 1-6-151: 003, 006 and 999). Driveway access and egress will be from Kipimana Street, which may be temporarily affected by construction activities if a new water line connection to the project site is installed. Site drainage for ADC's new facility may require connections to existing off-site drywells or the construction of new on-site drywells. Access controls (e.g., gates) may be installed between the existing Big Island Biodiesel facility and ADC's new facility. Chain link fencing along the site perimeter and manual gates at access points will be installed as part of the project. Landscaping along the front property line is also proposed.

The larger geographic area that contains the W. H. Shipman Business Park has experienced a long history of significant land-disturbing activities including several decades of large-scale agricultural use. Fallow cane fields overgrown with invasive species were graded and cleared for the establishment of the W. H. Shipman Business Park. The project site contains no important biological resources or critical habitat that could harbor Federal or State of Hawai'i listed species. Initial fieldwork consisting of pedestrian sweeps and subsurface testing revealed

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

no historic properties and no cultural deposits. The outreach effort to Native Hawaiian Organizations, agencies, and community members was initiated by Cultural Surveys Hawaii. The available knowledge gathered thus far suggests that the project site has not been utilized for traditional and cultural practices within recent times.

We would greatly appreciate input from you or your organization that will assist us and project stakeholders in determining appropriate mitigation measures that may be warranted due to ADC's project. The enclosed location map is provided for your reference.

You are welcome to provide input on the project at this time. We would appreciate your response to this letter by Friday, February 16, 2018.

Please send comments to:

Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, HI 96813
email: Ken.T.Nakamoto@hawaii.gov

And please provide a copy to:

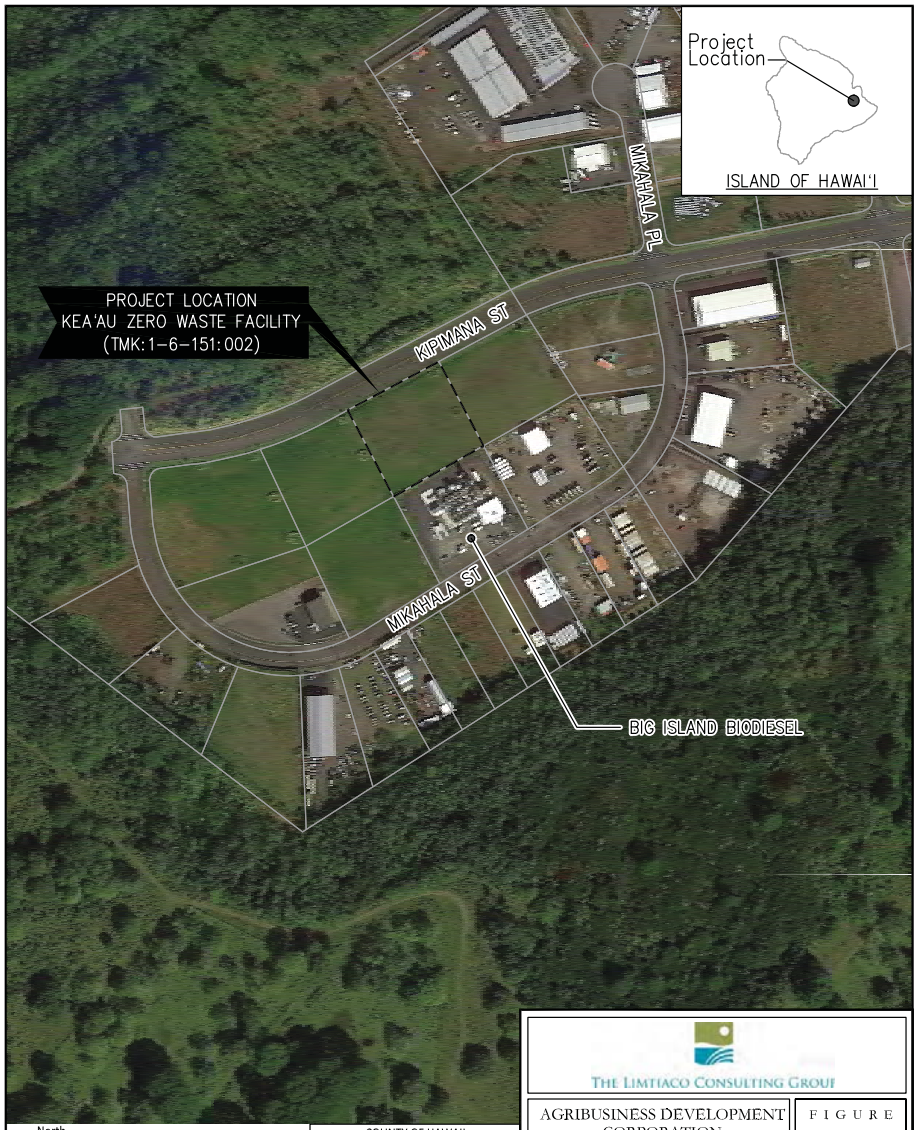
Claire Oshiro, Environmental Planner
The Limtiaco Consulting Group
1622 Kanakanui Street
Honolulu, HI 96817

Thank you for your interest and participation in the environmental review process. Should you have any questions, please contact me at (808) 596-7790.

Best regards,
The Limtiaco Consulting Group, Inc.

Claire Oshiro

Claire Oshiro, Environmental Planner
Project Manager



North

COUNTY OF HAWAII		
ZONE	SECTION	PLAT
1	6	151

THE LIMTIACO CONSULTING GROUP

AGRIBUSINESS DEVELOPMENT CORPORATION
KEA'AU ZERO WASTE FACILITY
Project Location Map

FIGURE
1

(This page intentionally left blank.)

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Paul Ferreira, Police Chief
County of Hawai'i
Police Department
349 Kapiolani Street
Hilo, HI 96720-8865

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Chief Ferreira,

Thank you for your department's letter dated 01/23/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. We acknowledge that your department does not anticipate any significant impact to traffic and/or public safety concerns.

The Draft Environmental Assessment is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

Harry Kim
Mayor

Paul K. Ferreira
Police Chief

Kenneth Bugado Jr.
Deputy Police Chief

County of Hawai`i
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

January 23, 2018

01-30-18A07:49 RCVD

Mr. Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, HI 96813
Ken.T.Nakamoto@hawaii.gov

Dear Mr. Nakamoto:

Subject: **Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au, Ahupua'a Puna District, Hawai'i Island Tax Map Key (3) 1-6-151:002**

Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Samuel Jelsma, Puna District, at 965-2716.

Sincerely,

M. Kanehailua

MITCHELL K. KANEHAILUA, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS

SJ:lli/180074

c: Claire Oshiro, Environmental Planner

"Hawai`i County is an Equal Opportunity Provider and Employer"

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Laura McIntyre, Chief
State of Hawai'i
Department of Health, Environmental Planning Office
2827 Waimano Home Road, Hale Ola Rm 109
Pearl City, HI 96782

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Chief McIntyre,

Thank you for your department's letter dated 02/01/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. We entrust that your office distributed the pre-assessment letter to other Department of Health (DOH) divisions, branches and offices, as necessary.

We acknowledge the example your agency provided regarding safe pedestrian corridors that can promote community well-being. At this time, bicycle and pedestrian facilities within Puna are limited. There is an overall lack of roadway connectivity between the various subdivisions in Puna that discourages walking and bicycling. None of Hawaii County's planned improvements for non-motorized travel are in the vicinity of the W. H. Shipman Business Park.

Wastewater from the proposed facility will be discharged to an on-site septic tank and leach field. We are aware that the wastewater system must conform to applicable rules.

We have reviewed the Standard Comments found on your department's website and acknowledge the requirement to adhere to applicable comments. The project will incorporate best management practices for avoidance and minimization of impacts to the extent possible. We appreciate the links and information available from the Hawaii Environmental Health Portal and the list of sources that provide strategies to support sustainable healthy design of communities and buildings.

The Draft Environmental Assessment is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro

Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 18-024

February 1, 2018

Ms. Claire Oshiro, Environmental Planner
The Limtiaco Consulting Group
1622 Kanakanui Street
Honolulu, Hawaii 96817

Dear Ms. Oshiro:

SUBJECT: Pre Assessment Consultation Environmental Assessment (PAC EA) for the Proposed Keaau Zero Waste Facility in Puna, Keaau Ahupuaa, Puna District, Hawaii
TMK: (3) 1-6-151:002

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your PAC EA dated January 19, 2018 to our office on January 29, 2018.

We understand from the PAC EA that *"ADC proposes to install a premanufactured building of approximately 3,000 square feet on the 1.5-acre project site at Tax Map Key (TMK) (3) building 1-6-151: of 002. The new 3,000 biofuel facility will require associated improvements such as the construction of internal roadways, parking areas, utility systems and drywells that may affect adjacent parcels (e.g. TMKs 1-6-151: 003, 006 and 999). Driveway access and egress will be from Kipimana Street, which may be temporarily affected by construction activities if a new water line connection to the project site is installed. Site drainage for ADC's new facility may require connections (e.g., gates) may be installed between the existing Big Island Biodiesel facility and ADC's new facility. Chain link fencing along the site perimeter and manual gates at access points will be installed as part of the project. Landscaping along the front property line is also proposed.*

The larger geographic area that contains the W.H. Shipman Business Park has experienced a long history of significant land-disturbing activities including several decades of large-scale agricultural use. Fallow cane fields overgrown with invasive species were graded and cleared for the establishment of the W.H. Shipman Business Park. The project site contains no important biological resources or critical habitat that could harbor Federal or State of Hawaii listed species. Initial fieldwork consisting of pedestrian sweeps and subsurface testing revealed no historic properties and no cultural deposits. The outreach effort to Native Hawaiian Organizations, agencies, and community members was initiated by Cultural Surveys Hawaii. The available knowledge gathered thus far suggests that the project site has not been utilized for traditional and cultural practices within recent times."

Hawaii's environmental review laws require Environmental Assessments (EAs) and Environmental Impact Statements (EISs) to consider health in the discussion and the mitigation measures to reduce negative impacts. In its definition of 'impacts,' §11-200-2, Hawaii Administrative Rules (HAR) includes health effects, whether primary (direct), secondary (indirect), or cumulative. Further, §11-200-12(b)(5), HAR, lists public health as one of the criteria for determining whether an action may have a significant impact on the environment.

We advocate that you consider health from a broad perspective; one that accounts for the social, economic, and environmental determinants of health and wellbeing. Community well-being can be impacted by access to physical activity, health care, feelings of social connectedness and safety. Design solutions that take these factors into consideration positively contribute to the social determinants of health in a community, improving the well-being of

those who live there by influencing health promoting behaviors. Social determinants contribute to preventable chronic diseases such as asthma, diabetes, obesity, and cardiovascular disease.

An example of social influences include access to safe pedestrian corridors such as pathways, sidewalks, bike lanes, greenways and open space. §11-200-17(h), HAR, says EISs must discuss how proposed actions may conform or conflict with any policies for the affected area. This includes Hawaii's 2009 Complete Streets law, which requires the state and counties to establish policies to accommodate all users of the road, no matter age, ability, or mode of transportation. In 2015, Hawaii passed Act 97 which amended Hawaii's Renewable Portfolio Standards by setting a goal for Hawaii to become one hundred percent renewable by the year 2045. To reach this goal Hawaii should transform its transportation sector from the use of fossil fuels to renewable fuel, electric vehicles (EV)s, and public transit systems including bikeshare programs. To address "range anxiety" and facilitate the adoption of EVs, it is essential that EV charging stations be added to any planned parking areas open to the EV driving public. Plans should strive to encourage the use of personal bicycles though the development of designated bike lanes and class A bike trails. All efforts should be made to reduce harmful vehicle emissions, reduce vehicle miles travelled (VMT's), encourage alternative modes of transport and increase physical activity.

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments to support sustainable healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

If you haven't already, EPO recommends that you review the new Healthy Communities Policy Guide: https://planning-org-uploaded-media.s3.amazonaws.com/document/Healthy-Communities-Policy-Guide.pdf, Plan4health website: http://plan4health.us and the free, on-demand, six part Plan4Health webinar series available on the American Planning Association website.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

We suggest you review the requirements of the Clean Water Branch (Hawaii Administrative Rules {HAR}, Chapter 11-54-1.1, -3, 4-8) and/or the National Pollutant Discharge Elimination System (NPDES) permit (HAR, Chapter 11-55) at: http://health.hawaii.gov/cwb. If you have any questions, please contact the Clean Water Branch (CWB), Engineering Section at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov. If your project involves waters of the U.S., it is highly recommended that you contact the Army Corps of Engineers, Regulatory Branch at: (808) 835-4303.

Injection wells used for the subsurface disposal of wastewater, sewage effluent, or surface runoff are subject to environmental regulation and permitting (HAR, Chapter 11-23, "Underground Injection Control {UIC}"). DOH approval must be obtained before any injection well construction commences. A UIC permit must be issued before any injection well operation occurs. For specific questions please email sdwb@doh.hawaii.gov or call (808) 586-4258.

Please note that all wastewater plans must conform to applicable provisions (HAR, Chapter 11-62, "Wastewater Systems"). We reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please review online guidance at: http://health.hawaii.gov/wastewater and contact the Planning and Design Section of the Wastewater Branch (WWB) at (808) 586-4294.

If temporary fugitive dust emissions could be emitted when the project site is prepared for construction and/or when construction activities occur, we recommend you review the need and/or requirements for a Clean Air Branch (CAB) permit (HAR, Chapter 11-60.1 "Air Pollution Control"). Effective air pollution control measures need to be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures could include, but are not limited to, the use of water wagons, sprinkler systems, and dust fences. For questions contact the Clean Air Branch via e-mail at: Cab.General@doh.hawaii.gov or call (808) 586-4200.

Any waste generated by the project (that is not a hazardous waste as defined in state hazardous waste laws and regulations), needs to be disposed of at a solid waste management facility that complies with the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The open burning of any of these wastes, on or off site, is strictly prohibited. You may wish you review the Minimizing Construction & Demolition Waste Management Guide at: http://health.hawaii.gov/shwb/files/2016/05/constdem16.pdf Additional information is accessible at: http://health.hawaii.gov/shwb. For specific questions call (808) 586-4226.

If noise created during the construction phase of the project may exceed the maximum allowable levels (HAR, Chapter 11-46, "Community Noise Control") then a noise permit may be required and needs to be obtained before the commencement of work. Relevant information is online at: http://health.hawaii.gov/irhb/noise EPO recommends you contact the Indoor and Radiological Health Branch (IRHB) at (808) 586-4700 with any specific questions.

A phase I Environmental Site Assessment (ESA) and site investigation should be conducted for residential development or redevelopment projects in current or formerly used industrial areas and on formerly and currently zoned agricultural land used for growing sugar, pineapple or other agricultural products. If the investigation shows that a release of petroleum, hazardous substance, pollutants or contaminants may have occurred at the site, the site should be properly characterized through an approved Hawaii State Department of Health (DOH)/Hazard Evaluation and Emergency Response Office (HEER) soil and/or groundwater sampling plan. Please refer to Sections 3 and 4 of the HEER Office Technical Guidance Manual http://www.hawaiidoh.org.

If the site is found to be contaminated, then all removal and remedial actions to clean up hazardous substance or oil releases by past and present owners/tenants must comply with State Law (HRS, Chapter 128D, "Environmental Response Law", Chapter 451, "State Contingency Plan"). To identify HEER records related to the property, visit http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/public-records. For information on site assessment and cleanup programs review: http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/site-assessment-and-cleanup-programs. Any specific questions should be directed to the HEER office at (808) 586-4249.

The property may harbor vectors which may disperse to the surrounding areas when the site is cleared. In accordance with Title 11, HAR, Chapter 11-26, "Vector Control", the applicant shall ascertain the presence or absence of rodents on the property. Should the presence of vectors be determined, the applicant shall eradicate the vectors prior to clearing the site.

The Hawaii Disability and Communication Access Board (DCAB) recommends the inclusion of access for persons with disabilities through all phases of design and construction. New construction and alteration work shall comply with all applicable accessibility requirements. Projects covered by §103-50, Hawaii Revised Statutes, and HAR Title 11 Chapter 216 shall seek advice and recommendations from DCAB on any construction plans prior to commencing with construction. If you have any questions please contact DCAB at (808) 586-8121 or dcab@doh.hawaii.gov.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

To better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed an environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We hope this information is helpful. If you have any questions please contact us at DOH.epo@doh.hawaii.gov or call us at (808) 586-4337. Thank you for the opportunity to comment.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office

LM:nn

c: Ken Nakamoto, Project Manager, Agribusiness Dev. Corp. (via email: Ken.T.Nakamoto@hawaii.gov)
DOH: DHO HI, CWB, WWB, CAB, SHWB, IRHB, HEER {via email only}

Attachment: U.S. EPA EJSCREEN Report for Project Area

Attachment: U.S. EPA EJSCREEN Report for Project Area

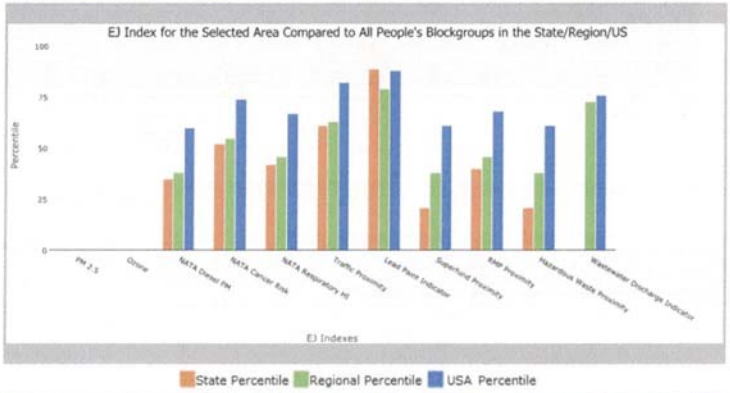
EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.633608,-155.053989, HAWAII, EPA Region 9

Approximate Population: 28

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	35	38	60
EJ Index for NATA* Air Toxics Cancer Risk	52	55	74
EJ Index for NATA* Respiratory Hazard Index	42	46	67
EJ Index for Traffic Proximity and Volume	61	63	82
EJ Index for Lead Paint Indicator	89	79	88
EJ Index for Superfund Proximity	21	38	61
EJ Index for RMP Proximity	40	46	68
EJ Index for Hazardous Waste Proximity	21	38	61
EJ Index for Wastewater Discharge Indicator	N/A	73	76



State Percentile Regional Percentile USA Percentile

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.633608,-155.053989, HAWAII, EPA Region 9

Approximate Population: 28

Input Area (sq. miles): 3.14

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.633608,-155.053989, HAWAII, EPA Region 9

Approximate Population: 28

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.9	N/A	9.14	N/A
Ozone (ppb)	N/A	N/A	N/A	41.8	N/A	38.4	N/A
NATA* Diesel PM (µg/m³)	0.0258	0.149	17	0.978	<50th	0.938	<50th
NATA* Cancer Risk (lifetime risk per million)	25	34	13	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.53	1	11	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	210	1000	52	1100	45	590	63
Lead Paint Indicator (% Pre-1960 Housing)	0.4	0.16	85	0.24	72	0.29	69
Superfund Proximity (site count/km distance)	0.0027	0.1	2	0.15	0	0.13	0
RMP Proximity (facility count/km distance)	0.088	0.39	21	0.98	8	0.73	13
Hazardous Waste Proximity (facility count/km distance)	0.0028	0.1	2	0.12	0	0.093	0
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.04	N/A	13	59	30	40
Demographic Indicators							
Demographic Index	69%	51%	92	47%	79	36%	88
Minority Population	93%	77%	78	59%	86	38%	92
Low Income Population	45%	26%	87	36%	65	34%	70
Linguistically Isolated Population	38%	6%	98	9%	97	5%	98
Population With Less Than High School Education	26%	9%	95	17%	72	13%	84
Population Under 5 years of age	3%	6%	18	7%	20	6%	22
Population over 64 years of age	27%	16%	90	13%	93	14%	92

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

(This page intentionally left blank.)

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Darren J. Rosario, Fire Chief
County of Hawai'i
Hawai'i Fire Department
25 Aupuni Street
Suite 2501
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Chief Rosario,

Thank you for your department's letters dated 02/06/18 and 03/07/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. We acknowledge the information provided in your letter with regards to *Hawaii State Fire Code, National Fire Protection Association 2006 version, with County of Hawaii Amendments*. The civil drawings will be submitted for review during the building permit application process to ensure that fire department access, water supply for on-site fire protection, and life safety requirements are met.

The Draft Environmental Assessment is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

Harry Kim
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

March 7, 2018

Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, Hawai'i 96813

Dear Mr. Nakamoto,

SUBJECT: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupuaa, Puna District, Hawai'i Island Tax Map Key (3) 1-6-151:002

In regards to the above-referenced Pre-Assessment Consultation application, the following shall be in accordance:

NFPA 1, UNIFORM FIRE CODE, 2006 EDITION
Note: Hawai'i State Fire Code, National Fire Protection Association 2006 version, with County of Hawaii amendments. County amendments are identified with a preceding "C~" of the reference code.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

For occupancies of an especially hazardous nature, or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or areas where there is an inadequate fire flow, or inadequate fire hydrant spacing, and the AHJ may require additional safeguards including, but not limited to, additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved.

18.1.1 Plans.

18.1.1.1 Fire Apparatus Access. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

18.1.1.2 Fire Hydrant Systems. Plans and specifications for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

C~ 18.1.1.2.1 Fire Hydrant use and Restrictions. No unauthorized person shall use or operate any Fire hydrant unless such person first secures permission or a permit from the owner or representative of the department, or company that owns or governs that water supply or system. Exception: Fire Department personnel conducting firefighting operations, hydrant testing, and/or maintenance, and the flushing and acceptance of hydrants witnessed by Fire Prevention Bureau personnel.

18.2 Fire Department Access.

18.2.1 Fire department access and fire department access roads shall be provided and maintained in accordance with Section 18.2.

18.2.2* Access to Structures or Areas.

18.2.2.1 Access Box(es). The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to or within a structure or area is difficult because of security.

18.2.2.2 Access to Gated Subdivisions or Developments. The AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

18.2.2.3 Access Maintenance. The owner or occupant of a structure or area, with required fire department access as specified in 18.2.2.1 or 18.2.2.2, shall notify the AHJ when the access is modified in a manner that could prevent fire department access.

18.2.3 Fire Department Access Roads. (*may be referred as FDAR)

18.2.3.1 Required Access.

18.2.3.1.1 Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

18.2.3.1.2 Fire Department access roads shall consist of roadways, fire lanes, parking lots lanes, or a combination thereof.

18.2.3.1.3* When not more than two one- and two-family dwellings or private garages, carports, sheds, agricultural buildings, and detached buildings or structures 400ft^2 (37 m^2) or less are present, the requirements of 18.2.3.1 through 18.2.3.2.1 shall be permitted to be modified by the AHJ.

18.2.3.1.4 When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

18.2.3.2 Access to Building.

18.2.3.2.1 A fire department access road shall extend to within in 50 ft (15 m) of at least one exterior door that can be opened from the outside that provides access to the interior of the building. Exception: 1 and 2 single-family dwellings.

18.2.3.2.1.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.1 shall be permitted to be increased to 300 feet.

18.2.3.2.2 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 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

18.2.3.2.2.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).

18.2.3.3 Multiple Access Roads. More than one fire department access road shall be provided when it is determined by the AHJ that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

18.2.3.4 Specifications.

18.2.3.4.1 Dimensions.

C~ 18.2.3.4.1.1 FDAR shall have an unobstructed width of not less than 20ft with an approved turn around area if the FDAR exceeds 150 feet. **Exception:** FDAR for one and two family dwellings shall have an unobstructed width of not less than 15 feet, with an area of not less than 20 feet wide within 150 feet of the structure being protected. An approved turn around area shall be provided if the FDAR exceeds 250 feet.

C~ 18.2.3.4.1.2 FDAR shall have an unobstructed vertical clearance of not less then 13ft 6 in.

C~ 18.2.3.4.1.2.1 Vertical clearances may be increased or reduced by the AHJ, provided such increase or reduction does not impair access by the fire apparatus, and approved signs are installed and maintained indicating such approved changes.

18.2.3.4.1.2.2 Vertical clearances shall be increased when vertical clearances or widths are not adequate to accommodate fire apparatus.

C~ 18.2.3.4.2 Surface. Fire department access roads and bridges shall be designed and maintained to support the imposed loads (25 Tons) of the fire apparatus. Such FDAR and shall be comprised of an all-weather driving surface.

18.2.3.4.3 Turning Radius.

C~ 18.2.3.4.3.1 Fire department access roads shall have a minimum inside turning radius of 30 feet, and a minimum outside turning radius of 60 feet.

18.2.3.4.3.2 Turns in fire department access road shall maintain the minimum road width.

18.2.3.4.4 Dead Ends. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

18.2.3.4.5 Bridges.

18.2.3.4.5.1 When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with county requirements.

18.2.3.4.5.2 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

18.2.3.4.5.3 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

18.2.3.4.6 Grade.

C~ 18.2.3.4.6.1 The maximum gradient of a Fire department access road shall not exceed 12 percent for unpaved surfaces and 15 percent for paved surfaces. In areas of the FDAR where a Fire apparatus would connect to a Fire hydrant or Fire Department Connection, the maximum gradient of such area(s) shall not exceed 10 percent.

18.2.3.4.6.2* The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by the AHJ.

18.2.3.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

18.2.3.4.7 Traffic Calming Devices. The design and use of traffic calming devices shall be approved the AHJ.

18.2.3.5 Marking of Fire Apparatus Access Road.

18.2.3.5.1 Where required by the AHJ, approved signs or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof of both.

18.2.3.5.2 A marked fire apparatus access road shall also be known as a fire lane.

18.2.4* Obstruction and Control of Fire Department Access Road.

18.2.4.1 General.

18.2.4.1.1 The required width of a fire department access road shall not be obstructed in any manner, including by the parking of vehicles.

18.2.4.1.2 Minimum required widths and clearances established under 18.2.3.4 shall be maintained at all times.

18.2.4.1.3* Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

18.2.4.1.4 Entrances to fire departments access roads that have been closed with gates and barriers in accordance with 18.2.4.2.1 shall not be obstructed by parked vehicles.

18.2.4.2 Closure of Accessways.

18.2.4.2.1 The AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other accessways not including public streets, alleys, or highways.

18.2.4.2.2 Where required, gates and barricades shall be secured in an approved manner.

18.2.4.2.3 Roads, trails, and other access ways that have been closed and obstructed in the manner prescribed by 18.2.4.2.1 shall not be trespassed upon or used unless authorized by the owner and the AHJ.

18.2.4.2.4 Public officers acting within their scope of duty shall be permitted to access restricted property identified in 18.2.4.2.1.

18.2.4.2.5 Locks, gates, doors, barricades, chains, enclosures, signs, tags, or seals that have been installed by the fire department or by its order or under its control shall not be removed, unlocked, destroyed, tampered with, or otherwise vandalized in any manner.

18.3 Water Supplies and Fire Hydrants

18.3.1* 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. For on-site fire hydrant requirements see section 18.3.3.

EXCEPTIONS:

1. When facilities or buildings, or portions thereof, are completely protected with an approved automatic fire sprinkler system the provisions of section 18.3.1 may be modified by the AHJ.
2. When water supply requirements cannot be installed due to topography or other conditions, the AHJ may require additional fire protection as specified in section 18.3.2 as amended in the code.
3. When there are not more than two dwellings, or two private garage, carports, sheds and agricultural. Occupancies, the requirements of section 18.3.1 may be modified by AHJ.

18.3.2* Where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

18.3.3* The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on a fire apparatus access road on the site of the premises or both, in accordance with the appropriate county water requirements.

18.3.4 Fire Hydrants and connections to other approved water supplies shall be accessible to the fire department.

18.3.5 Private water supply systems shall be tested and maintained in accordance with NFPA 25 or county requirements as determined by the AHJ.

18.3.6 Where required by the AHJ, fire hydrants subject to vehicular damage shall be protected unless located within a public right of way.

18.3.7 The AHJ shall be notified whenever any fire hydrant is placed out of service or returned to service. Owners of private property required to have hydrants shall maintain hydrant records of approval, testing, and maintenance, in accordance with the respective county water requirements. Records shall be made available for review by the AHJ upon request.

C~ 18.3.8 Minimum water supply for buildings that do not meet the minimum County water standards:

Buildings up to 2000 square feet, shall have a minimum of 3,000 gallons of water available for Firefighting.

Buildings 2001- 3000 square feet, shall have a minimum of 6,000 gallons of water available for Firefighting.

Buildings, 3001- 6000 square feet, shall have a minimum of 12,000 gallons of water available for Firefighting.

Buildings, greater than 6000 square feet, shall meet the minimum County water and fire flow requirements.

Multiple story buildings shall multiply the square feet by the amount of stories when determining the minimum water supply.

Commercial buildings requiring a minimum fire flow of 2000gpm per the Department of Water standards shall double the minimum water supply reserved for firefighting.

Fire Department Connections (FDC) to alternative water supplies shall comply with 18.3.8 (1)-(6) of *this code.*

NOTE: In that water catchment systems are being used as a means of water supply for firefighting, such systems shall meet the following requirements:

1) In that a single water tank is used for both domestic and firefighting water, the water for domestic use shall not be capable of being drawn from the water reserved for firefighting;

2) Minimum pipe diameter sizes from the water supply to the Fire Department Connection (FDC) shall be as follows:
   a) 4" for C900 PVC pipe;
   b) 4" for C906 PE pipe;
   c) 3" for ductile Iron;
   d) 3' for galvanized steel.

3) The Fire Department Connection (FDC) shall:
   a) be made of galvanized steel;
   b) have a gated valve with 2-1/2 inch, National Standard Thread male fitting and cap;
   c) be located between 8 ft and 16 ft from the Fire department access. The location shall be approved by the AHJ;
   d) not be located less than 24 inches, and no higher than 36 inches from finish grade, as measured from the center of the FDC orifice;
   e) be secure and capable of withstanding drafting operations. Engineered stamped plans may be required;
   f) not be located more than 150 feet of the most remote part, but not less than 20 feet, of the structure being protected;
   g) also comply with section 13.1.3 and 18.2.3.4.6.1 of *this code.*

4) Commercial buildings requiring a fire flow of 2000gpm shall be provided with a second FDC. Each FDC shall be independent of each other, with each FDC being capable of flowing 500gpm by engineered design standards. The second FDC shall be located in an area approved by the AHJ with the idea of multiple Fire apparatus'conducting drafting operations at once, in mind.

5) Inspection and maintenance shall be in accordance to NFPA 25.

6) The owner or lessee of the property shall be responsible for maintaining the water level, quality, and appurtenances of the system.

EXCEPTIONS TO SECTION 18.3.8:

1) Agricultural buildings, storage sheds, and shade houses with no combustible or equipment storage.

2) Buildings less than 800 square feet in size that meets the minimum Fire Department Access Road requirements.

3) For one and two family dwellings, agricultural buildings, storage sheds, and detached garages 800 to 2000 square feet in size, and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 1000 feet.

4) For one and two family dwellings, agricultural buildings, and storage sheds greater than 2000square feet, but less than 3000 square feet and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 500 feet.

5) For buildings with an approved automatic sprinkler system, the minimum water supply required may be modified.

If there are any questions regarding these requirements, please contact the Fire Prevention Bureau at (808) 932-2911.

DARREN J. ROSARIO
Fire Chief

RP:ds

cc: Claire Oshiro, Environmental Planner

Harry Kim
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i

HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

February 6, 2018

02-07-18P01:13 RCVD

Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, Hawai'i 96813

Dear Mr. Nakamoto,

SUBJECT: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupuaa, Puna District, Hawai'i Island Tax Map Key (3) 1-6-151:002

In regards to the above-referenced Pre-Assessment Consultation application, the following shall be in accordance:

NFPA 1, UNIFORM FIRE CODE, 2006 EDITION
Note: Hawai'i State Fire Code, National Fire Protection Association 2006 version, with County of Hawaii amendments. County amendments are identified with a preceding "C~" of the reference code.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

For occupancies of an especially hazardous nature, or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or areas where there is an inadequate fire flow, or inadequate fire hydrant spacing, and the AHJ may require additional safeguards including, but not limited to, additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved.

18.1.1 Plans.

18.1.1.1 Fire Apparatus Access. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

18.1.1.2 Fire Hydrant Systems. Plans and specifications for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

C~ 18.1.1.2.1 Fire Hydrant use and Restrictions. No unauthorized person shall use or operate any Fire hydrant unless such person first secures permission or a permit from the owner or representative of the department, or company that owns or governs that water supply or system. Exception: Fire Department personnel conducting firefighting operations, hydrant testing, and/or maintenance, and the flushing and acceptance of hydrants witnessed by Fire Prevention Bureau personnel.

18.2 Fire Department Access.

18.2.1 Fire department access and fire department access roads shall be provided and maintained in accordance with Section 18.2.

18.2.2* Access to Structures or Areas.

18.2.2.1 Access Box(es). The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to or within a structure or area is difficult because of security.

18.2.2.2 Access to Gated Subdivisions or Developments. The AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

18.2.2.3 Access Maintenance. The owner or occupant of a structure or area, with required fire department access as specified in 18.2.2.1 or 18.2.2.2, shall notify the AHJ when the access is modified in a manner that could prevent fire department access.

18.2.3 Fire Department Access Roads. (*may be referred as FDAR)

18.2.3.1 Required Access.

18.2.3.1.1 Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

18.2.3.1.2 Fire Department access roads shall consist of roadways, fire lanes, parking lots lanes, or a combination thereof.

18.2.3.1.3* When not more than two one- and two-family dwellings or private garages, carports, sheds, agricultural buildings, and detached buildings or structures 400ft^2 (37 m^2) or less are present, the requirements of 18.2.3.1 through 18.2.3.2.1 shall be permitted to be modified by the AHJ.

18.2.3.1.4 When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

18.2.3.2 Access to Building.

18.2.3.2.1 A fire department access road shall extend to within in 50 ft (15 m) of at least one exterior door that can be opened from the outside that provides access to the interior of the building. Exception: 1 and 2 single-family dwellings.

18.2.3.2.1.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.1 shall be permitted to be increased to 300 feet.

18.2.3.2.2 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 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

18.2.3.2.2.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).

18.2.3.3 Multiple Access Roads. More than one fire department access road shall be provided when it is determined by the AHJ that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

18.2.3.4 Specifications.

18.2.3.4.1 Dimensions.

C~ 18.2.3.4.1.1 FDAR shall have an unobstructed width of not less than 20ft with an approved turn around area if the FDAR exceeds 150 feet. **Exception:** FDAR for one and two family dwellings shall have an unobstructed width of not less than 15 feet, with an area of not less than 20 feet wide within 150 feet of the structure being protected. An approved turn around area shall be provided if the FDAR exceeds 250 feet.

C~ 18.2.3.4.1.2 FDAR shall have an unobstructed vertical clearance of not less then 13ft 6 in.

C~ 18.2.3.4.1.2.1 Vertical clearances may be increased or reduced by the AHJ, provided such increase or reduction does not impair access by the fire apparatus, and approved signs are installed and maintained indicating such approved changes.

18.2.3.4.1.2.2 Vertical clearances shall be increased when vertical clearances or widths are not adequate to accommodate fire apparatus.

C~ 18.2.3.4.2 Surface. Fire department access roads and bridges shall be designed and maintained to support the imposed loads (25 Tons) of the fire apparatus. Such FDAR and shall be comprised of an all-weather driving surface.

18.2.3.4.3 Turning Radius.

C~ 18.2.3.4.3.1 Fire department access roads shall have a minimum inside turning radius of 30 feet, and a minimum outside turning radius of 60 feet.

18.2.3.4.3.2 Turns in fire department access road shall maintain the minimum road width.

18.2.3.4.4 Dead Ends. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

18.2.3.4.5 Bridges.

18.2.3.4.5.1 When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with county requirements.

18.2.3.4.5.2 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

18.2.3.4.5.3 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

18.2.3.4.6 Grade.

C~ 18.2.3.4.6.1 The maximum gradient of a Fire department access road shall not exceed 12 percent for unpaved surfaces and 15 percent for paved surfaces. In areas of the FDAR where a Fire apparatus would connect to a Fire hydrant or Fire Department Connection, the maximum gradient of such area(s) shall not exceed 10 percent.

18.2.3.4.6.2* The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by the AHJ.

18.2.3.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

18.2.3.4.7 Traffic Calming Devices. The design and use of traffic calming devices shall be approved the AHJ.

18.2.3.5 Marking of Fire Apparatus Access Road.

18.2.3.5.1 Where required by the AHJ, approved signs or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof of both.

18.2.3.5.2 A marked fire apparatus access road shall also be known as a fire lane.

18.2.4* Obstruction and Control of Fire Department Access Road.

18.2.4.1 General.

18.2.4.1.1 The required width of a fire department access road shall not be obstructed in any manner, including by the parking of vehicles.

18.2.4.1.2 Minimum required widths and clearances established under 18.2.3.4 shall be maintained at all times.

18.2.4.1.3* Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

18.2.4.1.4 Entrances to fire departments access roads that have been closed with gates and barriers in accordance with 18.2.4.2.1 shall not be obstructed by parked vehicles.

18.2.4.2 Closure of Accessways.

18.2.4.2.1 The AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other accessways not including public streets, alleys, or highways.

18.2.4.2.2 Where required, gates and barricades shall be secured in an approved manner.

18.2.4.2.3 Roads, trails, and other access ways that have been closed and obstructed in the manner prescribed by 18.2.4.2.1 shall not be trespassed upon or used unless authorized by the owner and the AHJ.

18.2.4.2.4 Public officers acting within their scope of duty shall be permitted to access restricted property identified in 18.2.4.2.1.

18.2.4.2.5 Locks, gates, doors, barricades, chains, enclosures, signs, tags, or seals that have been installed by the fire department or by its order or under its control shall not be removed, unlocked, destroyed, tampered with, or otherwise vandalized in any manner.

18.3 Water Supplies and Fire Hydrants

18.3.1* 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. For on-site fire hydrant requirements see section 18.3.3.

EXCEPTIONS:

1. When facilities or buildings, or portions thereof, are completely protected with an approved automatic fire sprinkler system the provisions of section 18.3.1 may be modified by the AHJ.
2. When water supply requirements cannot be installed due to topography or other conditions, the AHJ may require additional fire protection as specified in section 18.3.2 as amended in the code.
3. When there are not more than two dwellings, or two private garage, carports, sheds and agricultural. Occupancies, the requirements of section 18.3.1 may be modified by AHJ.

18.3.2* Where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

18.3.3* The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on a fire apparatus access road on the site of the premises or both, in accordance with the appropriate county water requirements.

18.3.4 Fire Hydrants and connections to other approved water supplies shall be accessible to the fire department.

18.3.5 Private water supply systems shall be tested and maintained in accordance with NFPA 25 or county requirements as determined by the AHJ.

18.3.6 Where required by the AHJ, fire hydrants subject to vehicular damage shall be protected unless located within a public right of way.

18.3.7 The AHJ shall be notified whenever any fire hydrant is placed out of service or returned to service. Owners of private property required to have hydrants shall maintain hydrant records of approval, testing, and maintenance, in accordance with the respective county water requirements. Records shall be made available for review by the AHJ upon request.

C~ 18.3.8 Minimum water supply for buildings that do not meet the minimum County water standards:

Buildings up to 2000 square feet, shall have a minimum of 3,000 gallons of water available for Firefighting.

Buildings 2001- 3000 square feet, shall have a minimum of 6,000 gallons of water available for Firefighting.

Buildings, 3001- 6000 square feet, shall have a minimum of 12,000 gallons of water available for Firefighting.

Buildings, greater than 6000 square feet, shall meet the minimum County water and fire flow requirements.

Multiple story buildings shall multiply the square feet by the amount of stories when determining the minimum water supply.

Commercial buildings requiring a minimum fire flow of 2000gpm per the Department of Water standards shall double the minimum water supply reserved for firefighting.

Fire Department Connections (FDC) to alternative water supplies shall comply with 18.3.8 (1)-(6) of *this code.*

NOTE: In that water catchment systems are being used as a means of water supply for firefighting, such systems shall meet the following requirements:

1) In that a single water tank is used for both domestic and firefighting water, the water for domestic use shall not be capable of being drawn from the water reserved for firefighting;

2) Minimum pipe diameter sizes from the water supply to the Fire Department Connection (FDC) shall be as follows:
   a) 4" for C900 PVC pipe;
   b) 4" for C906 PE pipe;
   c) 3" for ductile Iron;
   d) 3' for galvanized steel.

3) The Fire Department Connection (FDC) shall:
   a) be made of galvanized steel;
   b) have a gated valve with 2-1/2 inch, National Standard Thread male fitting and cap;
   c) be located between 8 ft and 16 ft from the Fire department access. The location shall be approved by the AHJ;
   d) not be located less than 24 inches, and no higher than 36 inches from finish grade, as measured from the center of the FDC orifice;
   e) be secure and capable of withstanding drafting operations. Engineered stamped plans may be required;
   f) not be located more than 150 feet of the most remote part, but not less than 20 feet, of the structure being protected;
   g) also comply with section 13.1.3 and 18.2.3.4.6.1 of *this code.*

4) Commercial buildings requiring a fire flow of 2000gpm shall be provided with a second FDC. Each FDC shall be independent of each other, with each FDC being capable of flowing 500gpm by engineered design standards. The second FDC shall be located in an area approved by the AHJ with the idea of multiple Fire apparatus'conducting drafting operations at once, in mind.

5) Inspection and maintenance shall be in accordance to NFPA 25.

6) The owner or lessee of the property shall be responsible for maintaining the water level, quality, and appurtenances of the system.

EXCEPTIONS TO SECTION 18.3.8:

1) Agricultural buildings, storage sheds, and shade houses with no combustible or equipment storage.

2) Buildings less than 800 square feet in size that meets the minimum Fire Department Access Road requirements.

3) For one and two family dwellings, agricultural buildings, storage sheds, and detached garages 800 to 2000 square feet in size, and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 1000 feet.

4) For one and two family dwellings, agricultural buildings, and storage sheds greater than 2000square feet, but less than 3000 square feet and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 500 feet.

5) For buildings with an approved automatic sprinkler system, the minimum water supply required may be modified.

If there are any questions regarding these requirements, please contact the Fire Prevention Bureau at (808) 932-2911.

DARREN J. ROSARIO
Fire Chief

KV:ds

cc: Claire Oshiro, Environmental Planner

(This page intentionally left blank.)

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Keith K. Yamamoto, Manager
Hawai'i Gas
Engineering Department
945 Kalanianaole Street
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Yamamoto,

Thank you for your company's letter dated 02/05/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. We acknowledge that Hawaii gas has determined the site is clear of utility gas facilities.

The Draft Environmental Assessment is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

February 5, 2018

02-03-18P02:04 RCVD

Mr. Ken Nakamoto
Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, Hawaii 96813

Dear Mr. Nakamoto:

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'I Island, Tax Map Key (3) 1-6-151:002

In response to your letter dated January 19, 2018, it has been determined that the area is currently clear of utility gas facilities.

Should there be any questions, or if additional information is desired, please feel free to call Jeremy Santiago at 594-5552.

Sincerely,

Hawaii Gas

Keith K. Yamamoto
Manager, Engineering

KKY:krs

cc: Ms. Claire Oshiro, Environmental Planner, The Limtiaco Consulting Group

P.O. Box 3000 | Honolulu, Hawai'i 96802-3000 | www.HawaiiGas.com

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Ryan E. Carvalho, President/Owner
Big Island Tree Service, Inc.
16-260 Mikahala Street
Keaau, HI 96749

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Carvalho,

Thank you for your company's letter to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna, which was received on 02/09/18. We acknowledge your stated concerns and we are aware that ADC sent a response to you via email on 03/06/18 to clarify project information and address specific concerns. Your concerns about air quality and smells along with ADC's response will be included in the Environmental Assessment (EA) in Section 2.1. Climate and Air Quality Considerations. Your observations pertaining to multiple spills of oil/grease on the street from leaking containers being hauled away will be included in Section 2.4. Solid Waste and Hazardous Materials along with ADC's clarification that no chemicals or solvents will be used at the proposed facility. Lastly, your statement of support for green alternatives for waste along with your concerns about the hauling of wastes to the project site will be included in Section 2.11. Site Access, Circulation and Traffic.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

Claire Oshiro

From: Nakamoto, Ken T <Ken.T.Nakamoto@hawaii.gov>
Sent: Tuesday, March 6, 2018 5:13 PM
To: bigislandtree@hawaiiantel.net
Cc: Claire Oshiro
Subject: Zero Waste Facility in Keaau - Pre-Assessment Comments

Aloha Mr. Carvalho,

Good afternoon. We write in response to your pre-assessment comments we received regarding the Agribusiness Development Corporation's (ADC) proposed zero waste facility in Keaau. We want to inform you that the pre-assessment letter you received had some misinformation about the project and that a subsequent letter with the correct information was sent on February 9, 2018. The subsequent letter pointed out that the facility ADC is planning to construct is NOT a biofuel facility and NO animal waste will be used or stored at the facility.

The new zero waste facility is part of the State's initiative to make agriculture more profitable and address food and energy security issues in Hawaii. Zero waste conversion is a process that converts off grade fruits and vegetables into livestock feed (mainly fish, chicken, and hog) and oil. The zero waste facility will house specialized vats called bioreactors, which will be used to grow algae. The team plans to use a specialized algae strain that can store as much as 60 percent its cellular weight in lipids when grown, in the absence of sunlight, on a diet of 35 percent papaya juice. While nearly all algae are capable of using energy from light to produce organic molecules from carbon dioxide and water, some algae, can also absorb organic molecules, such as sugars.

The purpose of this project is to demonstrate that the algae can be grown on a commercial scale using off grade papaya, and possibly other fruits and vegetables grown on Hawaii Island. After 14 days of feeding on papaya, the algae will be harvested using a centrifuge to separate the liquid (water and papaya juice) from the algae. We want to point out that there will be no chemicals or solvents being used, or incinerating done at the facility. The only waste that will be produced at the facility is the water that is separated from the algae, which will be treated and discharged in accordance with all county, state, and federal laws.

If the ADC can successfully grow the algae at the facility, the algae could then be used for the development of byproducts such as livestock feed and biofuels. However, the ADC has no plans to develop feed or biofuels at the zero waste facility in Keaau. Any development of such will be done at a separate facility. Apologize for the confusion. If you have any questions or concerns, please feel free to give me a call.

Mahalo,
Ken Nakamoto
Agribusiness Development Corporation
Ph: (808) 586-0087

This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the system manager. This message contains confidential information and is intended only for the individual named. If you are not the named addressee you should not disseminate, distribute or copy this e-mail. Please notify the sender immediately by e-mail if you have received this e-mail by mistake and delete this e-mail from your system. If you are not the intended recipient you are notified that disclosing, copying, distributing or taking any action in reliance on the contents of this information is strictly prohibited.

Please consider the environment before printing this email

02-09-18P01:25 RCVD

Big Island Tree Service, Inc.

Islandwide Service

16-260 Mikahala Street, Keaau, Hawaii 96749
License No. C-26658 Certified Arborist
Hilo: (808) 966-6997 Waimea: (808) 885-1881
Kona: (808) 326-1222 Fax: (808) 982-9067
Email: bigislandtree@hawaiiantel.net

Aloha Claire Oshiro,

We have received your letter concerning the Keaau zero waste facility that will be located on the makai side of our business (Big Island Tree Service, Inc.).

First of all, what exactly will you be processing at this plant? What kind of animal waste? What would be the air quality around your plant? We are located on the upwind side of your proposed plant. We already get a lot of bad air smell from the Biodiesel plant next to your proposed site. I have videotaped massive amounts of black smoke pouring out of there smokestacks on multiple occasions (mostly late in the afternoons when most business are wrapping up their day). I hope we are not going to have any of this, I heard the board of health has been called on multiple occasions by other businesses to investigate this.

There have been multiple spills of oil/grease fronting our business on the street from leaking containers being hauled away that have been cleaned with heaven knows what kind of cleaners and just washed to the side of the road. Will your plant be doing any hauling of this kind of wastes? How are you going to prevent our area from this kind of contamination?

Our main concern is the smell from the products you are processing. We are all for green alternatives for waste, but we all live and work in this area, but find it hard to tolerate our air quality smelling like a slop or worst yet, animal feces or dead animals.

Please give me your feedback so we can better understand your proposed business. As of right not, we are against the building of a animal waste facility next to our business.

Ryan E. Carvalho
President/Owner
Big Island Tree Service Inc.
16-260 Mikahala Street
Keaau, Hawaii 96749
(808) 966-6997

(This page intentionally left blank.)

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Keith K. Okamoto, Manager - Chief Engineer
County of Hawai'i
Department of Water Supply
345 Kekūanaō'a Street, Suite 20
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Okamoto,

Thank you for your department's letters dated 02/07/18 and 03/12/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. The Environmental Assessment (EA) will include information provided in your letter about existing infrastructure and water service limitations in Section 2.12. Utilities (Water, Wastewater, Drainage).

The maximum projected water demand for the proposed facility is estimated to be approximately 10,000 gallons per day. Coordination with your department for all necessary improvements such as the installation of an on-site potable water storage tank, if necessary, will continue as the civil engineering plans are developed.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

March 12, 2018

03-16-18A08:13 ARNV

Mr. Ken Nakamoto
Agribusiness Development Corporation
235 South Beretania Street, Room 205
Honolulu, HI 96813

Dear Mr. Nakamoto:

Subject: Pre-Environmental Assessment Consultation
Proposed Kea'au Zero Waste Facility
Tax Map Key 1-6-151:002

This is in response to your second Pre-Environmental Assessment letter dated February 9, 2018.

Our comments from our letter to you dated February 7, 2018, still stand; and we have no additional comments at this time.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

Keith K. Okamoto, P.E.
Manager-Chief Engineer

RQ:dfg

copy – Ms. Claire Oshiro, Limtiaco Consulting Group

. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .

The Department of Water Supply is an Equal Opportunity provider and employer.

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

February 7, 2018

02-12-18P02:21 ARNV

Mr. Ken Nakamoto
Agribusiness Development Corporation
235 South Beretania Street, Room 205
Honolulu, HI 96813

Dear Mr. Nakamoto:

Subject: Pre-Environmental Assessment Consultation
Proposed Kea'au Zero Waste Facility
Tax Map Key 1-6-151:002

This is in response to your Pre-Environmental Assessment letter dated January 19, 2018.

Please be informed that there is an existing 16-inch waterline fronting the subject parcel. The water service to the subject parcel is currently limited to one l-inch meter assigned with two (2) equivalent units (E.U.) of water. For your information, one unit of water is equal to an average daily usage of 400 gallons.

Currently, the Department cannot provide additional water beyond the two (2) E.U.'s for the proposed development at this time. Extensive improvements and additions, including, but not limited to, source, storage, transmission, booster pumps, and distribution facilities, may be required.

The Department will request that estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, be submitted to show that the proposed water demand can be met by the existing water service.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

for Keith K. Okamoto, P.E.
Manager-Chief Engineer

RQ:dfg

copy - Ms. Claire Oshiro, The Limtiaco Consulting Group

. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .

The Department of Water Supply is an Equal Opportunity provider and employer.

(This page intentionally left blank.)

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Donald L. Smith, Hawai'i District Engineer
State of Hawai'i
Department of Transportation, Hawai'i District
50 Maka'ala Street
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Smith,

Thank you for your department's letter dated 01/26/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. We acknowledge your department's recommendation to discuss and evaluate the project's contribution to the cumulative traffic impacts on State Highway Route 11 via Kipimana Street.

The proposed facility will be an employment destination for approximately 12 people. Some of the personnel at the proposed facility are expected to work in shifts. The staffing requirements at the proposed facility are expected to cause an insignificant increase in vehicle trips and traffic.

The Draft Environmental Assessment is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
INTERIM DIRECTOR

Deputy Directors
ROY CATALANI
ROSS M. HIGASHI
EDWIN H. SNIFFEN
DARRELL T. YOUNG

IN REPLY REFER TO:
HWY-H 18-2.0014

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HAWAII DISTRICT
50 MAKAALA STREET
HILO, HAWAII 96720
TELEPHONE: (808) 933-8866 • FAX: (808) 933-8869

January 26, 2018

02-15-18P01:51 RCVD

Ms. Claire Oshiro
Environmental Planner
The Limtiaco Consulting Group, Inc.
1622 Kanakanui Street
Honolulu, Hawai'i 96817

Dear Ms. Oshiro:

SUBJECT: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility
Project No. F-011-2(2) OBL
Route 11, M.P. 6.18±
Kipimana Street
T.M.K. 3rd Div. 1-6-151:002
Kea'au , Puna, Island of Hawai'i, Hawai'i

We received your letter with attachment dated January 19, 2018 and have the following comments to offer:

The project will access State Highway Route 11 via Kipimana Street. The assessment should include the anticipated volume and type of vehicles expected to impact this location along with mitigation measures provided by the development.

If you have any questions please call me at (808) 933-8866.

Sincerely,

Donald L. Smith
Hawai'i District Engineer

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Greg Goodale, Solid Waste Division Chief
County of Hawai'i
Department of Environmental Management, Solid Waste Division
345 Kekūanaō'a Street, Suite 41
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Goodale,

Thank you for your department's letter dated 02/20/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. The statement that ADC's project does not seem to conflict with any of the programs planned by the Solid Waste Division will be included in the Environmental Assessment (EA) in Section 2.4. Solid Waste and Hazardous Materials. This section will also include the statements from your letter about a future compost facility.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE DIVISION
COUNTY OF HAWAI'I- 345 KEKŪANĀO'A ST., STE 41- HILO, HI 96720
Tel: (808) 961-8270 Fax: (808) 961-8553
Website: www.hawaiizerowaste.org

February 20, 2018

02-27-18P 01:14 CEDL

Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, HI 96813

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, TMK (3)1-6-151:002

Dear Mr. Nakamoto,

Thank you for the opportunity to review and comment on your subject plan. The project that you have described within your letter does not seem to conflict with any of the programs that the Solid Waste Division (SWD) has planned in the immediate or distant future. This project seems to support the idea of zero waste which was put forward in the County's 2009 Integrated Resources Solid Waste Management Plan.

The SWD is currently in the process of evaluating sites for a future Compost Facility. Two of the three sites that are being evaluated are in close proximity to your subject parcel. The project you describe seems to fit in with the concept of a compost facility and the two facilities may have the potential to complement one another should they be constructed within close proximity.

Thank you again for the opportunity to comment on this proposed project.

Should you have any questions, please feel free to contact me a (808) 961-8515.

Regards,

Greg Goodale, Solid Waste Division Chief

cc: Claire Oshiro, Limtiaco Consulting Group

Hawai'i County is an equal opportunity provider and employer.

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

William A. Kucharski, Director
County of Hawai'i
Department of Environmental Management
345 Kekūanaō'a Street, Suite 41
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Kucharski,

Thank you for your department's letter dated 02/27/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. Statements from your letter that all wastewater treatment issues are the responsibility of the facility owner because the project area in Kee'au is not sewered will be included in the Environmental Assessment (EA) in Section 2.12. Utilities (Water, Wastewater, Drainage).

Wastewater from the proposed facility will be discharged to an on-site septic tank and leach field. We acknowledge that the wastewater system must conform to applicable rules.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

Harry Kim
Mayor

Wilfred M. Okabe
Managing Director

William A. Kucharski
Director

Diane A. Noda
Deputy Director

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
345 Kekūanāo'a Street, Suite 41 · Hilo, Hawai'i 96720
Ph: (808) 961-8083 · Fax: (808) 961-8086
cohdem@co.hawaii.hi.us
http://www.hawaiicounty.gov/environmental-management/

February 27, 2018

02-27-18P03:54 RCVD

Via email only: ken.t.nakamoto@hawaii.gov

Mr. Ken Nakamoto, Project Manager
Agribusiness Development Corporation
235 S. Beretania Street, Room 205
Honolulu, HI 96813

Re: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151:002

Dear Mr. Nakamoto:

Thank you for forwarding the EA description for your proposed facility in Kea'au. Mr. Goodale, County of Hawai'i Solid Waste Division Chief, has responded under separate cover concerning the solid waste perspective of this facility.

As far as wastewater issues, this area of Kea'au is not sewered; therefore, all wastewater treatment issues are the responsibility of the facility owner, and all such permits are under the authority of the State of Hawai'i Department of Health. The County of Hawai'i has authority for construction permits from the Department of Public Works.

Thank you again for the pre-assessment consultation opportunity.

Sincerely,

William A. Kucharski
Director

WK:mef
cc: Claire Oshiro, Environmental Planner for the Limtiaco Consulting Group

County of Hawai'i is an Equal Opportunity Provider and Employer

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Russell Y. Tsuji, Land Administrator
State of Hawai'i
Department of Land and Natural Resources, Land Division
PO Box 621
Honolulu, HI 96809

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Tsuji,

Thank you for your department's letter dated 03/09/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna and for collecting the comments from several divisions. We acknowledge that the Engineering Division provided contact information for the County of Hawaii National Flood Insurance Program coordinating agency; the Division of Forestry and Wildlife (DFW) provided information on Rapid 'Ōhi'a Death (ROD) and State and Federally protected endangered species; the Commission on Water Resource Management (CWRM) provided water resource conservation recommendations and other suggestions; and the Hawai'i District Land Office provided no comments. We appreciate the consultation and resources made available to us in your letters. ADC's project will incorporate best management practices (BMPs) for avoidance and minimization of impacts to the extent necessary.

Engineering Division
We acknowledge the comments from the Engineering Division about including the water demand and infrastructure requirements to meet project needs. The maximum projected water demand for the proposed facility is estimated to be approximately 10,000 gallons per day. ADC will continue to discuss water service connections and improvements (e.g., an on-site potable water storage tank, if necessary) with the County of Hawai'i, Department of Water Supply (DWS). The letter we received from DWS included the following information that will be included in the Environmental Assessment (EA) in Section 2.12. Utilities (Water, Wastewater, Drainage):

- There is an existing 16-inch waterline fronting the subject parcel;
- Potable water service is limited to one 1-inch meter assigned with two (2) equivalent units (E.U.) of water, which is approximately equal to an average daily usage of 800 gallons; and
- The project site is in Zone X on the Flood Insurance Rate Map.

Division of Forestry and Wildlife
The comments from DFW are addressed in the flora and fauna survey report that is appended to the EA. ADC's project is not expected to displace any federal or State of Hawai'i listed species of

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

plants or insects since the project site is devoid of these protected resources. According to the survey report (Burr and Miranda, 2018), ADC's project is not likely to introduce or help spread ROD "since there are no host plants and the ROD is not supportable" based on the resources present at the project site.

Commission on Water Resource Management (CWRM)
We have reviewed the recommendations and comments from CWRM and appreciate the links and recommendations available on the Environmental Protection Agency, Hawaii Green Business Program and Landscape Industry Council of Hawaii websites. We will consider recommendations for minimizing water usage, using alternative water sources, participating in the Hawaii Green Business Program, and adopting landscape irrigation conservation BMPs.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro

Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 9, 2018

Agribusiness Development Corporation
Attn: Mr. Ken Nakamoto, Project Manager
235 S. Beretania Street, Room 205
Honolulu, Hawaii 96813

via email: ken.t.nakamoto@hawaii.gov

Dear Mr. Nakamoto:

SUBJECT: ***Revised*** Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility** located at Puna, Island of Hawaii; TMK: (3) 1-6-151:002

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on March 9, 2018, enclosed are comments from the (a) Engineering Division on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at (808) 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure
cc: Central Files
The Limtiaco Consulting Group (w/copies)
Attention: Ms. Claire Oshiro (via email: claire@tlcghawaii.com)

DAVID Y. IGE
GOVERNOR OF HAWAII

'18 FEB 15 AM 10:50 ENGINEERING

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 15, 2018

MEMORANDUM

~~TO:~~ FROM

DLNR Agencies:
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

RECEIVED LAND DIVISION 2018 MAR -9 AM 11:13 DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

~~FROM:~~ TO: Russell Y. Tsuji, Land Administrator
SUBJECT: ***Revised*** Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility**
LOCATION: Puna, Island of Hawaii; TMK: (3) 1-6-151:002
APPLICANT: The Limtiaco Consulting Group on behalf of the Hawaii Department of Agriculture, Agribusiness Development Corporation

Transmitted for your review and comment is a ***revised*** Pre-Assessment Consultation letter dated February 9, 2018 regarding information on the above-referenced subject matter. If you already submitted comments and would like to revise your comments, or if you still wish to submit comments, please do so by **March 7, 2018.**

If no revised responses are received by this date, we will assume your agency wishes not to amend its original comments or your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

( ) We have no objections.
(✓) We have no additional comments.
( ) Comments are attached.

Signed:
Print Name: Carty S. Chang, Chief Engineer
Date: 3/2/18

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 9, 2018

Agribusiness Development Corporation
Attn: Mr. Ken Nakamoto, Project Manager
235 S. Beretania Street, Room 205
Honolulu, Hawaii 96813

via email: ken.t.nakamoto@hawaii.gov

Dear Mr. Nakamoto:

SUBJECT: ***Revised*** Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility** located at Puna, Island of Hawaii; TMK: (3) 1-6-151:002

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, as revised, pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division, (b) Division of Forestry & Wildlife, (c) Commission on Water Resource Management, and (d) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at (808) 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files
The Limtiaco Consulting Group (w/copies)
Attention: Ms. Claire Oshiro (via email: claire@tlcghawaii.com)

DAVID Y. IGE
GOVERNOR OF HAWAII

18 JAN 29 AM 10:45 ENGINEERING

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 25, 2018

RECEIVED
LAND DIVISION
2018 FEB -1 AM 10:55
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO:

FROM

To

DLNR Agencies:
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility**
LOCATION: Puna, Island of Hawaii; TMK: (3) 1-6-151:002
APPLICANT: The Limtiaco Consulting Group on behalf of the Hawaii Department of Agriculture, Agribusiness Development Corporation

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments by **February 14, 2018.**

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 Darlene Nakamura at 587-0417. Thank you.

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

Signed:

Print Name: Carty S. Chang, Chief Engineer

Date: 1/31/18

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility, Puna, Island of Hawaii; TMK: (3) 1-6-151:002

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

The applicant should include water demands and infrastructure required to meet project needs. Please note that the projects within State lands requiring water service from their local Department/Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

The applicant is required to provide water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update projections.

Signed: CARTY S. CHANG, CHIEF ENGINEER

Date: 1/31/18

18106

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 15, 2018

MEMORANDUM

TO: FR:

DLNR Agencies:
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

RECEIVED
LAND DIVISION
2018 FEB 23 AM 10:51
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO:

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: ***Revised*** Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility**
LOCATION: Puna, Island of Hawaii; TMK: (3) 1-6-151:002
APPLICANT: The Limtiaco Consulting Group on behalf of the Hawaii Department of Agriculture, Agribusiness Development Corporation

Transmitted for your review and comment is a ***revised*** Pre-Assessment Consultation letter dated February 9, 2018 regarding information on the above-referenced subject matter. If you already submitted comments and would like to revise your comments, or if you still wish to submit comments, please do so by **March 7, 2018.**

If no revised responses are received by this date, we will assume your agency wishes not to amend its original comments or your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

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

Signed: **DAVID G. SMITH, Administrator**

Print Name:

Date: 2/22/18

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

February 2, 2018

TO: KEN NAKAMOTO
AGRIBUSINESS DEVELOPMENT CORPORATION, PROJECT MANAGER

FROM: DAVID G. SMITH
FORESTRY AND WILDLIFE, ADMINISTRATOR

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR THE PROPOSED KEA'AU ZERO WASTE FACILITY, TMK (3) 1-6-151:002

Thank you for the opportunity to provide comments during the pre-assessment consultation for the proposed zero waste facility at TMK (3) 1-6-151:002. The subject parcel is only 0.6 miles from forests that are displaying Rapid 'Ōhi'a Death (ROD) like symptoms. This disease is caused by the fungus *Ceratocystis fimbriata* and there is no known cure. Based on ongoing aerial surveys about 75,000 acres of 'ōhi'a forest currently show symptoms of ROD, and thus far has only been detected on the island of Hawai'i. This devastating disease should be considered in the environmental assessment for this project. More information on ROD and how to prevent it's spread can be found at www.rapidohiadeath.org.

Additionally, three State and Federally protected endangered wildlife species are known to frequent, or are likely to be found in the project area. These three species should also be considered during the environmental assessment, and they are:

- *Branta sandvicensis* - nēnē or Hawaiian goose (known to occasionally land in the area)
- *Buteo solitarius* - 'io or Hawaiian hawk (known to frequent the area)
- *Lasirus cinereus semotus* - 'ōpe'ape'a or Hawaiian hoary bat (likely to be found in the area)

Thank you again for the opportunity to review and comment on the special permit application. Please contact Joey Mello the East Hawai'i Wildlife Manager, at (808) 974-4221 or by email at Joey.S.Mello@hawaii.gov if you have any questions or would like to follow-up on our comments.

cc. Claire Oshiro, The Limtiaco Consulting Group

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2018 MAR -7 P 10:14
DEPT. OF LAND AND NATURAL RESOURCES
STATE OF HAWAII
COMMISSION ON WATER RESOURCE MANAGEMENT

2018 FEB 15 PM 2:35

February 15, 2018

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: ***Revised*** Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility**
LOCATION: Puna, Island of Hawaii; TMK: (3) 1-6-151:002
APPLICANT: The Limtiaco Consulting Group on behalf of the Hawaii Department of Agriculture, Agribusiness Development Corporation

Transmitted for your review and comment is a ***revised*** Pre-Assessment Consultation letter dated February 9, 2018 regarding information on the above-referenced subject matter. If you already submitted comments and would like to revise your comments, or if you still wish to submit comments, please do so by **March 7, 2018.**

If no revised responses are received by this date, we will assume your agency wishes not to amend its original comments or your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

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

Signed: /s/ Jeffrey T. Pearson, P.E.

Print Name: Deputy Director

Date: March 6, 2018

Attachments
cc: Central Files

RFD. 4778.8
19538

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
KAMANA BEAMER, PH.D.
MICHAEL G. BUCK
NEIL J. HANNAHS
PAUL J. MEYER
VIRGINIA PRESSLER, M.D.

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR

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

March 5, 2018

REF: RFD.4778.8

TO: Mr. Russell Tsuji, Administrator
Land Division

FROM: Jeffrey T. Pearson, P.E., Deputy Director
Commission on Water Resource Management

SUBJECT: Revised Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Keaau Zero Waste Facility

FILE NO.: RFD.4778.8
TMK NO.: (3) 1-6-151:002

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

Our comments related to water resources are checked off below.

☐ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☒ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

☒ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.

☒ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/

☒ 6. We recommend the use of alternative water sources, wherever practicable.

☒ 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.

☒ 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at

http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

☐ 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

☐ 11. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.

☐ 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 14. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.

☐ 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

☐ 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☒ 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER: The DEA should discuss the water requirements for the project, both potable and non-potable, and provide the calculations used to derive the estimated water needs. The DEA should also identify the proposed sources of water to serve the project and any permits that are needed.

If you have any questions, please contact Lenore Ohye of the Commission staff at 587-0216.

Doc Review RFD.4778.8 Keaau Zero Waste Facility

Adobe Sign Document History 03/07/2018

Created:	03/05/2018
By:	Kathy Yoda (kathy.s.yoda@hawaii.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAAhjEYk5WmXT_LiZmZwyRd8-hOpSFF3Fdk

"Doc Review RFD.4778.8 Keaau Zero Waste Facility" History

Document created by Kathy Yoda (kathy.s.yoda@hawaii.gov)
03/05/2018 - 2:19:11 PM HST- IP address: 132.160.239.30

Document emailed to Jeffrey Pearson (jeff.pearson@hawaii.gov) for signature
03/05/2018 - 2:21:21 PM HST

Document viewed by Jeffrey Pearson (jeff.pearson@hawaii.gov)
03/07/2018 - 8:29:04 AM HST- IP address: 132.160.239.30

Document e-signed by Jeffrey Pearson (jeff.pearson@hawaii.gov)
Signature Date: 03/07/2018 - 8:31:01 AM HST - Time Source: server- IP address: 132.160.239.30

Signed document emailed to all eligible parties.
03/07/2018 - 8:31:01 AM HST

ETS
STATE OF HAWAII

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2018 FEB 20 P 12: 25
RECEIVED
LAND DIVISION
HILO, HAWAII

February 15, 2018

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
__Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: *Revised* Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed **Kea'au Zero Waste Facility**
LOCATION: Puna, Island of Hawaii; TMK: (3) 1-6-151:002
APPLICANT: The Limtiaco Consulting Group on behalf of the Hawaii Department of Agriculture, Agribusiness Development Corporation

Transmitted for your review and comment is a *revised* Pre-Assessment Consultation letter dated February 9, 2018 regarding information on the above-referenced subject matter. If you already submitted comments and would like to revise your comments, or if you still wish to submit comments, please do so by **March 7, 2018.**

If no revised responses are received by this date, we will assume your agency wishes not to amend its original comments or your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

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

Signed: [signature]

Print Name: GORDON C. HOYT

Date: 3/5/18

3/6/18 - Email To: Darlene Nakamura
From: HDLO

Attachments
cc: Central Files

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Leo R. Asuncion, Director
State of Hawai'i
Office of Planning
PO Box 2359
Honolulu, HI 96804

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Asuncion,

We received email from your agency on 02/12/18 indicating there were no comments for the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. We subsequently received your agency's letter dated 03/06/18 and we acknowledge your comments pertaining to the Hawai'i State Plan (Chapter 226, Hawai'i Revised Statutes), the coastal zone management (CZM) area and impacts to surface water and marine resources.

Hawai'i State Plan
The objectives, policies and priority guidelines that pertain to ADC's project are described in the Environmental Assessment (EA) in Section 3.2. Hawaii State Plan. The proposed facility is strategically located in the Puna District, which is a major papaya growing region in the State of Hawai'i. The project site is within a developed urban area that the County of Hawai'i zoned for industrial purposes. ADC's project represents the utilization of state-owned land and funds to investigate an innovative waste conversion process that could ultimately benefit the agriculture industry in Hawai'i.

Coastal Zone Management Program
As stated in Section 3.6. State Coastal Zone Management Program of the EA, the project site is outside the Special Management Area (SMA) and approximately five miles from the shoreline. No SMA permit is required for ADC's project.

Surface Water and Marine Resources
As stated in Section 2.3. Water Resources of the EA, no significant impacts to surface water quality would occur because the project site is devoid of such resources including wetlands, perennial streams, or other sensitive riparian habitats. The proposed facility will have a septic tank and leach field. Site drainage will be directed to five (5) drywells to reduce nonpoint source pollution concerns.

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

We appreciate the links to the *Hawaii Watershed Guidance*, *Stormwater Impact Assessments* and *Low Impact Development (LID), A Practitioners Guide*. ADC will consider LID design practices and its construction contractor will be responsible for implementing a storm water management plan that prevents a concentration of runoff from flowing into neighboring areas.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro
Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

OFFICE OF PLANNING
STATE OF HAWAII

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

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

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

DTS 201803061233RI

March 6, 2018

To: Mr. Ken Nakamoto, Project Manager
Agribusiness Development Corporation

03-08-18P02:55 RCVD

From: Leo R. Asuncion, Director
Office of Planning

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Keaau Zero Waste Facility in Puna, Keaau, Ahupuaa, Puna District, Hawaii Island;
TMK: (3) 1-6-151: 002

Thank you for the opportunity to provide comments on the pre-consultation request for the preparation of a Draft Environmental Assessment (Draft EA) on the Keaau Zero Waste Facility in Puna, Hawaii. The pre-consultation review material was transmitted to our office via letter dated February 9, 2018.

It is our understanding that this the zero waste facility is a demonstration project being established at an undeveloped site located near the Big Island Biodiesel Facility within the W.H. Shipman Business Park in Keaau. The project proposes growing algae on a commercial scale from the waste product of fruits and vegetables. The byproduct of the algae will be used as livestock feed and biofuels. The facility improvements taking place on and near the project site that will increase impervious surfaces include the construction of internal roadways, parking areas, and utility systems.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. Pursuant to Hawaii Administrative Rules (HAR) § 11-200-10(4) – general description of the action's technical, economic, social, and environmental characteristics, this project must demonstrate that it is consistent with a number of state environmental, social, economic goals, and policies. Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Planning Act, provides goals, objectives, policies, planning coordination and implementation, and priority guidelines for growth, development, and allocation of resources throughout the state.

The Draft EA should include a discussion on the project's ability to meet all parts of HRS Chapter 226. The analysis should examine consistency with these statutes or clarify where it is in conflict with them. If any of these statutes are not applicable to the project, the analysis should affirmatively state such determination, followed by discussion paragraphs.

2. The coastal zone management (CZM) area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" (HRS § 205A-1).

   HRS Chapter 205A-5(b) requires all state and county agencies to enforce the CZM objectives and policies. The Draft EA should include an assessment as to how the proposed action conforms to each of the goals and objectives as listed in HRS § 205A-2. Compliance with HRS § 205A-2 is an important component for satisfying the requirements of HRS Chapter 343.

3. Pursuant to HAR § 11-200-10(6) – identification and summary of impacts and alternatives considered; in order to ensure that the surface water and marine resources near the Puna area of Hawaii County remain protected, the negative effects of stormwater inundation, potentially caused by the proposed development activities, should be evaluated in the Draft EA.

   Issues that may be examined include, but are not limited to, project site characteristics in relation to flood and erosion prone areas, open spaces, the potential vulnerability of surface water resources, drainage infrastructure currently in place, soil absorption characteristics of the area, and examining the amount of permeable versus impervious surfaces. These items should be considered when developing mitigation measures for the protection for surface water resources and the coastal ecosystem, pursuant to HAR § 11-200-10(7).

   OP has developed a number of resources and recommends consulting these guidance documents and stormwater evaluative tools when developing strategies to address polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place and prevent nearshore water contamination while considering the best management practices (BMP) suited for the project and the types of contaminants affecting the project area.

According to the review material, the project's drainage plan will incorporate dry wells which are consistent with low impact development (LID). The Draft EA should include an examination on the use of LID design features incorporated for this project. The evaluative tools developed by OP that may assist in the creation of stormwater mitigation strategies include:

- Hawaii Watershed Guidance provides direction on mitigation strategies for urban development activities that will safeguard watersheds and implement watershed plans http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed Guidance Final.pdf

- Stormwater Impact Assessments can be used to identify and analyze information on hydrology, sensitivity of coastal and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area. http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_stormwater_impact_assessments_guidance.pdf

- Low Impact Development (LID), A Practitioners Guide covers a range of structural BMPs for stormwater control management, onsite infiltration techniques, water reuse methods, and building layout designs that minimize negative environmental impacts. http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Joshua Hekekia of our office at (808) 587-2845.

c: Claire Oshiro, Environmental Planner, The Limtiaco Consulting Group

Claire Oshiro

From: Oberding, Tomas J <tomas.j.oberding@hawaii.gov>
Sent: Monday, February 12, 2018 10:12 AM
To: Claire Oshiro
Cc: Nakamoto, Ken T; Funakoshi, Rodney Y
Subject: RE: Pre-Assessment for Proposed Kea'au Zero Waste Facility in Puna

Aloha Ms. Oshiro and Mr. Nakamoto,

Thank you for the prompt reply.

The OP has no comments on the pre-assessment.

Please keep us informed and if you have any questions, please feel free to contact me.

Mahalo
-Tomas

Tomáš J Oberding
Planner
Office of Planning, State of Hawaii
Honolulu, HI 96804
tomas.j.oberding@hawaii.gov
Phone: (808) 587-2883

From: Claire Oshiro [mailto:claire@tlcghawaii.com]
Sent: Monday, February 12, 2018 10:08 AM
To: Oberding, Tomas J <tomas.j.oberding@hawaii.gov>
Cc: Nakamoto, Ken T <Ken.T.Nakamoto@hawaii.gov>
Subject: Pre-Assessment for Proposed Kea'au Zero Waste Facility in Puna

Hi Tomas Oberding: I was informed that you called in response to our request for comments.

You are welcome to reply to this message to acknowledge that your department has no comments.

As indicated in our pre-assessment letter, Ken Nakamoto is the agency's project manager.

He is copied on this message. Thanks.

Claire Oshiro
(808) 596-7790 x241
THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

THE LIMTIACO CONSULTING GROUP
CIVIL ENGINEERING AND ENVIRONMENTAL CONSULTANTS

April 10, 2018

Ben Ishii, Division Chief
County of Hawai'i
Department of Public Works, Engineering Division
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, HI 96720

Subject: Pre-Assessment Consultation, Preparation of the Environmental Assessment for the Proposed Kea'au Zero Waste Facility in Puna, Kea'au Ahupua'a, Puna District, Hawai'i Island, Tax Map Key (3) 1-6-151: 002

To Mr. Ishii,

Thank you for your department's letter dated 03/13/18 to the Agribusiness Development Corporation (ADC) regarding its proposed Kea'au Zero Waste Facility in Puna. Statements from the letter that the project site is in Zone X on the Flood Insurance Rate Map will be included in the Environmental Assessment (EA) in Section 2.5. Natural Hazards. The requirements that pertain to erosion and runoff will be included in Section 2.2. Topography, Geology and Soils.

We acknowledge that construction of driveway access and any work within the County right-of-way shall comply with Hawaii County Code, Chapter 22, County Streets. We also acknowledge that affecting adjacent parcels will require prior approval from each property.

The Draft EA is anticipated to be published and available for public review by May 2018. You may continue to send questions or concerns to ADC's project manager, Ken Nakamoto. We kindly ask that you contact me at 596-7790 if you intend to provide additional comments.

Sincerely,
The Limtiaco Consulting Group, Inc.

Claire Oshiro

Claire Oshiro
Environmental Planner

cc: Ken Nakamoto, Project Manager, Agribusiness Development Corporation

1622 Kanakanui Street • Honolulu, Hawaii 96817
(808) 596-7790 • tlcghawaii.com

Harry Kim
Mayor

Wil Okabe
Managing Director

Allan G. Simeon, P.E.
Acting Director

Merrick H. Nishimoto
Acting Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiicounty.gov

MARCH 13, 2018

ATTN: KEN NAKAMOTO
AGRIBUSINESS DEVELOPMENT CORPORATION
235 S. BERETANIA STREET, ROOM 205
HONOLULU, HAWAII 96813
(via email to Ken.T.Nakamoto@hawaii.gov)

SUBJECT: PRE-ASSESSMENT CONSULTATION
PREPARATION OF THE ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED KEA'AU ZERO WASTE FACILITY
PUNA, KEA'AU AHUPUA'A, PUNA DISTRICT, HAWAII ISLAND
TMK: (3) 1-6-151:002

We received the subject dated February 9, 2018 and have the following comments:

The subject parcels are in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA). Zone X is an area determined to be outside the 500-year floodplain.

All activities shall comply with the requirements of Hawaii County Code (HCC), Chapter 10, Erosion and Sedimentary Control.

All development-generated runoff shall be disposed of on site and not directed toward any adjacent properties.

Construction of driveway access and any work within the County right-of-way shall comply with HCC, Chapter 22, County Streets.

Affecting adjacent properties will require prior approval from each property.

Should there be any questions concerning this matter, please contact Ms. Robyn Matsumoto in our Engineering Division at (808) 961-8924.

BEN ISHII, Division Chief
Engineering Division

RM

cc: Claire Oshiro, The Limtiaco Consulting Group (via email only to claire@tlcghawaii.com)

County of Hawai'i is an Equal Opportunity Provider and Employer