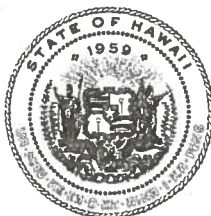


DAVID Y. IGE
GOVERNOR OF HAWAII



RECEIVED

'15 MAR 11 P3:10



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DANIEL S. QUINN
INTERIM FIRST DEPUTY

W. ROY HARDY
ACTING 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

REF: OCCL: AJR

MEMORANDUM

FILE COPY
MAR 23 2015

CDUA: HA-3727
SUSPENSE DATE: 21 Days from stamped date

TO: Jessica E. Wooley, Director
Office of Environmental Quality Control

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

MAR 11 2015

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT (FEA) FOR CONSERVATION DISTRICT
USE APPLICATION (CDUA) HA-3727 for the Love Single Family Residence (SFR)
Project located in the Puna District, Island of Hawaii, TMK: (3) 1-3-002:070

The Office of Conservation and Coastal Lands (OCCL) has reviewed the Final Environmental Assessment (FEA) for the proposed project. The Draft Environmental Assessment (DEA) for this proposal was published in the OEQC **January 23, 2015** issue of the Environmental Notice.

The FEA is being submitted to OEQC; it includes copies of the comments received and the corresponding responses from the applicant that were received during the 30-day public comment period on the DEA-AFONSI.

We have determined that this proposed use will not have significant environmental effects, and have therefore issued a Finding of No Significant Impact (FONSI). The FONSI does not constitute approval of the CDUA; authority to grant or deny the final permit lies with the Board of Land and Natural Resources (BLNR). Please publish this notice in the **March 23, 2015** issue of the OEQC bulletin the *Environmental Notice*. We have enclosed the applicants OEQC bulletin publication form, a CD with a copy of the FEA and publication form, and hardcopy of the FEA.

Please contact Alex J. Roy, M.Sc. of our Office of Conservation and Coastal Lands staff at 587-0316 should you have any questions.

Enclosures: One (1) CD with a copy of OEQC publication form, HA-3727 FEA
OEQC Bulletin Publication Form (hard copy)
FEA (Hard Copy)

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

RECEIVED

Project Name: Love New Single-Family Residence

Island: Hawaii

15 MAR 11 P3:10

District: Puna

FILE COPY
MAR 23 2015

**OFF. OF ENVIRONMENTAL
QUALITY CONTROL**

TMK: (3) 1-3-002:070

Permits: County of Hawai'i: Special Management Area Permit or Exemption, Plan Approval and Grubbing, Grading, and Building Permits. State of Hawai'i: Conservation District Use Permit

Approving Agency: Office of Conservation and Coastal Lands, Department of Land and Natural Resources, Kalanimoku Building, 1151 Punchbowl Street, Room 131, Honolulu, Hawaii 96813; Contact: Samuel J. Lemmo, Administrator; Telephone: (808) 587-0377

Applicant: Dr. Charles Love, 6000 University Ave., Ste. 350, West Des Moines, Iowa 50266

Consultant: Geometrician Associates, PO Box 396, Hilo HI 96721; Ron Terry (808) 969-7090

Status (check one only):

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

___Section 11-200-27
Determination

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

___Withdrawal (explain)

Summary:

Dr. Charles Love seeks a Conservation District Use Permit (CDUP) to build a single-family residence related improvements to replace an existing residence on his 7.34-acre partially shoreline property, makai of County Highway 137. The proposed home would be 2,884 square feet with 3 bedrooms, 2 ½ baths a family room and lanai. It will be set back a minimum of 71 feet from a pali (sea cliff) that marks the shoreline, approximately 25 feet above sea level, outside the flood zone. Other features include an Individual Wastewater System and a catchment water tank with capacity for water supply and fire flow.

Much of the lot was cleared many decades ago, which was followed by construction of a home and planting of an ornamental palm grove. The project would utilize the existing cleared area and would not intrude into these undisturbed areas, which support vegetation with some native elements. Except around the residence and driveway, existing vegetation will be left intact. No threatened or endangered plants are present, and impacts to endangered Hawaiian hoary bats and Hawaiian Hawks will be avoided through timing of vegetation removal and/or hawk nest survey. Archaeological and cultural survey have determined that no historic properties or cultural features are practices are present. Landclearing and construction activities would occur over less than half an acre, which would produce minor short-term impacts mitigated by Best Management Practices.

Final Environmental Assessment

**Love New Single-Family Residence in the
Conservation District at Kaueleau**

March 2015

TMK (3rd): 1-3-002:070
Kaueleau, Puna, County of Hawai'i, State of Hawai'i

APPLICANT:

Dr. Charles Love
6000 University Ave., Ste. 350
West Des Moines, Iowa 50266

**APPROVING
AGENCY:**

State of Hawai'i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai'i 96813

CONSULTANT:

Geometrician Associates LLC
P.O. Box 396
Hilo, Hawai'i 96721

**Final Environmental Assessment
Love New Single-Family Residence in the
Conservation District at Kaueleau**

TMK (3rd): 1-3-002:070
Kaueleau, Puna, County of Hawai‘i, State of Hawai‘i

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1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

CONSULTANT:

Geometrician Associates LLC
P.O. Box 396
Hilo, Hawai‘i 96721

CLASS OF ACTION:

Use of Land in Conservation District

This document is prepared pursuant to:
The Hawai‘i Environmental Protection Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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Love New Single-Family Residence at Kaueleau Environmental Assessment

TABLE OF CONTENTS

SUMMARY	ii
PART 1: PROJECT DESCRIPTION AND E.A. PROCESS	1
1.1 Project Description and Location	1
1.2 Environmental Assessment Process	7
1.3 Public Involvement and Agency Coordination	7
PART 2: ALTERNATIVES	8
2.1 Proposed Project, Alternative Sites and Alternative Uses	8
2.2 No Action	8
PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION	9
3.1 Physical Environment.....	9
3.1.1 Climate, Geology, Soils and Geologic Hazards.....	9
3.1.2 Flood Zones and Shoreline Setting.....	10
3.1.3 Water Quality.....	16
3.1.4 Flora and Fauna	19
3.1.5 Air Quality, Noise and Scenic Resources	24
3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions	24
3.2 Socioeconomic and Cultural.....	25
3.2.1 Land Use, Socioeconomic Characteristics and Recreation.....	25
3.2.2 Cultural and Historic Resources	26
3.3 Public Roads, Services and Utilities	33
3.3.1 Roads and Access	33
3.3.2 Public Utilities and Services	33
3.4 Secondary and Cumulative Impacts	34
3.5 Required Permits and Approvals.....	34
3.6 Consistency with Government Plans and Policies	34
3.6.1 Hawai‘i County General Plan.....	34
3.6.2 Hawai‘i County Zoning and Special Management Area	38
3.6.3 Conservation District.....	39
PART 4: DETERMINATION, FINDINGS AND REASONS.....	41
4.1 Determination	41
4.2 Findings and Supporting Reasons	41
REFERENCES	43
LIST OF TABLES	
TABLE 1 Plant Species on Love Property.....	20
LIST OF FIGURES	
FIGURE 1a Project Location Map	2
FIGURE 1b TMK Map.....	2
FIGURE 2 Project Site Photos	3
FIGURE 3 Site Plans	5
FIGURE 4 Flood Zone Map	10
FIGURE 5a Shoreline Features in the Southwest area of Love Property	14
FIGURE 5b View Seaward of Erosion-resistant Dense ‘A‘a of Headland.....	14
APPENDIX 1a Comments in Response to Early Consultation/SHPD Letters	
APPENDIX 1b Comments to Draft EA and Responses	
APPENDIX 2 Coastal Erosion Study	
APPENDIX 3 Archaeological Assessment Survey	
APPENDIX 4 Cultural Impact Assessment	

**SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS
AND MITIGATION MEASURES**

Dr. Charles Love (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 7.34-acre property to replace an existing single-family residence. The partly-shoreline frontage property is located *makai* of the County Road 137, the Kapoho-Kalapana Road (also known as the “Red Road”), southwest of the village of Opihikao, in the Puna District of the Island of Hawai‘i.

Much of the lot was cleared many decades ago, which was followed by construction of a home and planting of an ornamental palm grove. Less than about two acres of the property has not already been cleared. The project would utilize the existing cleared area and would not intrude into these undisturbed areas, which support vegetation with some native elements.

Archaeological survey has determined that no historic sites are present on any part of the property. The new home would replace the existing home on the property, which will be demolished as part of the project. The current home is not visible or barely visible from the Red Road or adjacent properties, which would be the goal for the proposed home as well.

The proposed two-story home will be 2,844 square feet in size and 24 feet high, and will include a great-room (comprising the kitchen, dining, and living room areas), 3 bedrooms, 2 ½ baths, a family room, and lanai areas. It will be set back a minimum of 71 feet from a *pali* (sea cliff) that marks the shoreline, approximately 25 feet above sea level, outside the flood zone. An Individual Wastewater System in compliance with State Department of Health regulations will be built. Other features include a driveway, a catchment water tank with a capacity of 12,000 gallons to provide both water supply and fire flow.

Landclearing, vegetation removal and construction activities would occur over less than an acre, which would produce minor short-term impacts to noise, air and water quality and scenery. These would be mitigated by Best Management Practices that are expected to be required as conditions of the Conservation District Use Permit and grading permit. The applicant will ensure that his contractor performs all earthwork and grading in conformance with applicable laws, regulations and standards. The site has been surveyed for threatened and endangered plants and none are present. Impacts to the island wide-ranging endangered Hawaiian hoary bat and Hawaiian Hawk will be avoided through timing of vegetation removal and/or hawk nest survey. Archaeological survey has determined that no sites are present, and research and consultation has revealed no cultural practices on the site. In the unlikely event that additional undocumented archaeological resources, including shell, bones, midden deposits, lava tubes, or similar finds, are encountered during construction within the project site, work in the immediate area of the discovery will be halted and the State Historic Preservation Division will be contacted to determine the appropriate actions. The proposed residential use will not interfere in any way with ongoing fishing access.

PART 1: PROJECT DESCRIPTION AND E.A. PROCESS

1.1 Project Description and Location

Dr. Charles Love (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 7.34-acre property with an existing single-family residence. The partly shoreline-frontage property is located *makai* of the County Road 137, the Kapoho-Kalapana Road (also known as the “Red Road”), southwest of the village of Opihikao, in the Puna District of the Island of Hawai‘i (see Figures 1a-1b).

Most of the lot was cleared many decades ago, which was followed by construction of a small home and planting of an ornamental palm grove (Figure 2). Less than about two acres of the property has not already been cleared. The project would utilize the existing cleared area and would not intrude into these undisturbed areas, which support vegetation with some native elements. Archaeological survey has determined that no historic sites are present on any part of the property. The new home would replace the existing home on the property, which will be demolished as part of the project. The current home is not visible or barely visible from the Red Road or adjacent properties, which would be the goal for the proposed home as well.

The proposed two-story home will be 2,844 square feet and 24 feet high, and will include a great-room (comprising the kitchen, dining, and living room areas), 3 bedrooms, 2 1/2 baths, a family room, and lanai areas. It will be set back a minimum of 71 feet from a *pali* that marks the shoreline, approximately 25 to 30 feet above sea level, outside the flood zone. An Individual Wastewater System in compliance with State Department of Health regulations will be built. Other features include a driveway, a catchment water tank with a capacity of 12,000 gallons to provide both water supply and fire flow.

The property abuts the shoreline on its southwest corner only. A small wedge of State-owned land to the north and east, a remnant of a 19th century Land Grant No. 13514 buffers the exposure of the property to the sea along the majority of the northeast sections of seaward property line (see Figure 2). From access trails to the southwest and northeast that connect the Red Road to the shoreline, fisherman access fishing spots perched on fingers of lava that are located on State property (see Figure 1b). In doing so they often traverse a path immediately *mauka* of the top of the *pali* on the Love Property and the State property. The proposed residential use will not interfere in any way with this continuing use. Dr. Love has been informed of the rights of the public to utilize these areas and the cultural and subsistence importance of these practices, and expects that conditions ensuring continued public access along the front of the property will be codified within the Conservation District Use Permit to make the access situation explicit. In response to a comment on the Draft EA from the Hawai‘i Island Land Division of DLNR (see Appendix 1b), a survey delineating the boundary with the State property is being conducted by the owner to insure that the proposed actions, including the removal of young, planted palm trees in this area, do not extend into any portion of the State property.

The house site was chosen to avoid disturbance to native shoreline vegetation and shoreline recreation activities and to take advantage of a corridor that could provide sunlight, breezes and views (see photos in

Love New Single-Family Residence at Kaueleau Environmental Assessment

Figure 1a Project Location Map

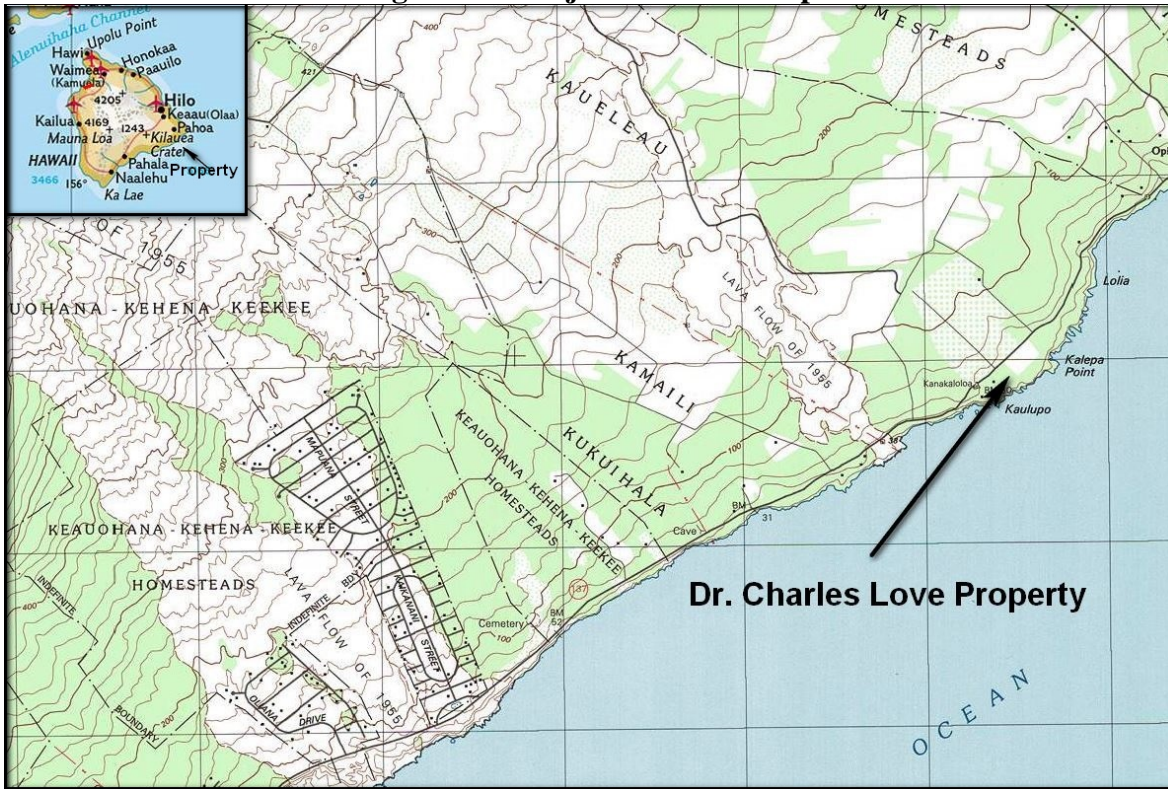


Figure 1b TMK Map (Plat 1-3-002, por.)

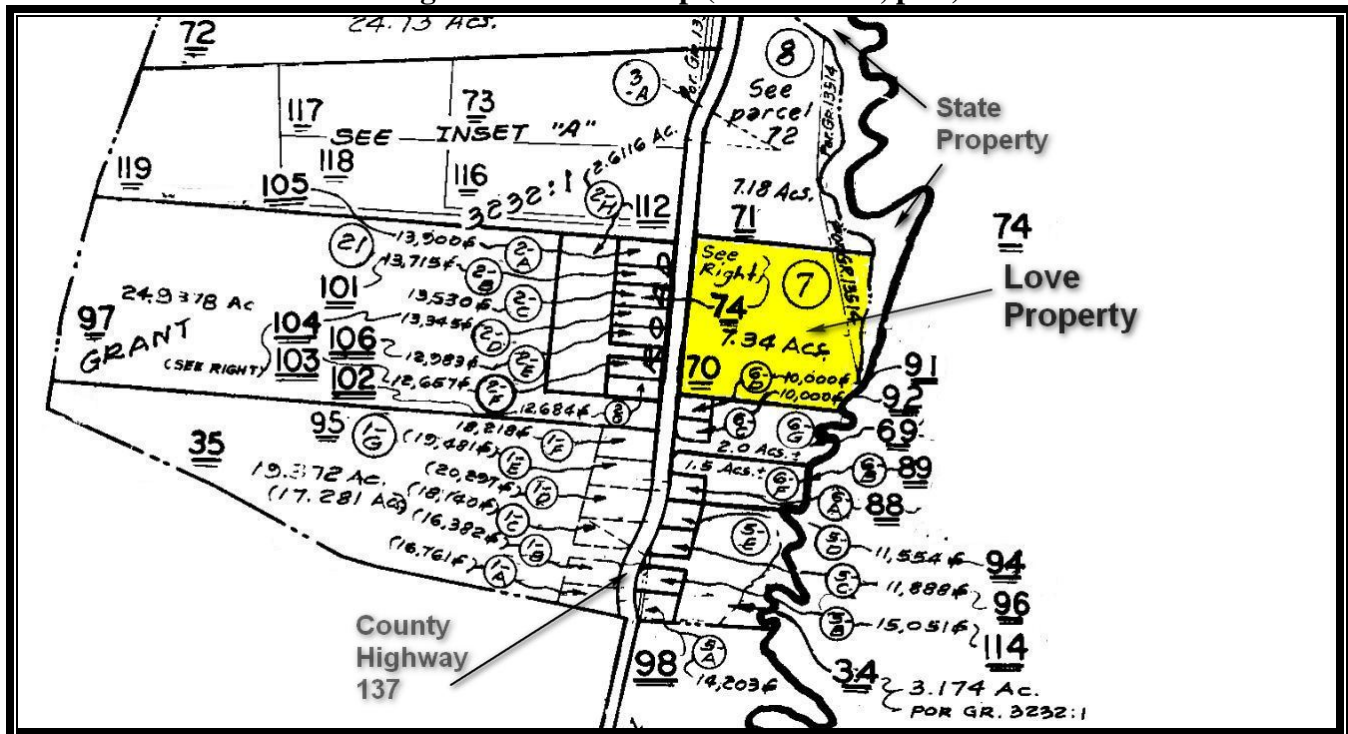


Figure 2a Site Photos



2a. Top: Annotated aerial View. 2b. Bottom: State shore makai and northeast of Love site pali



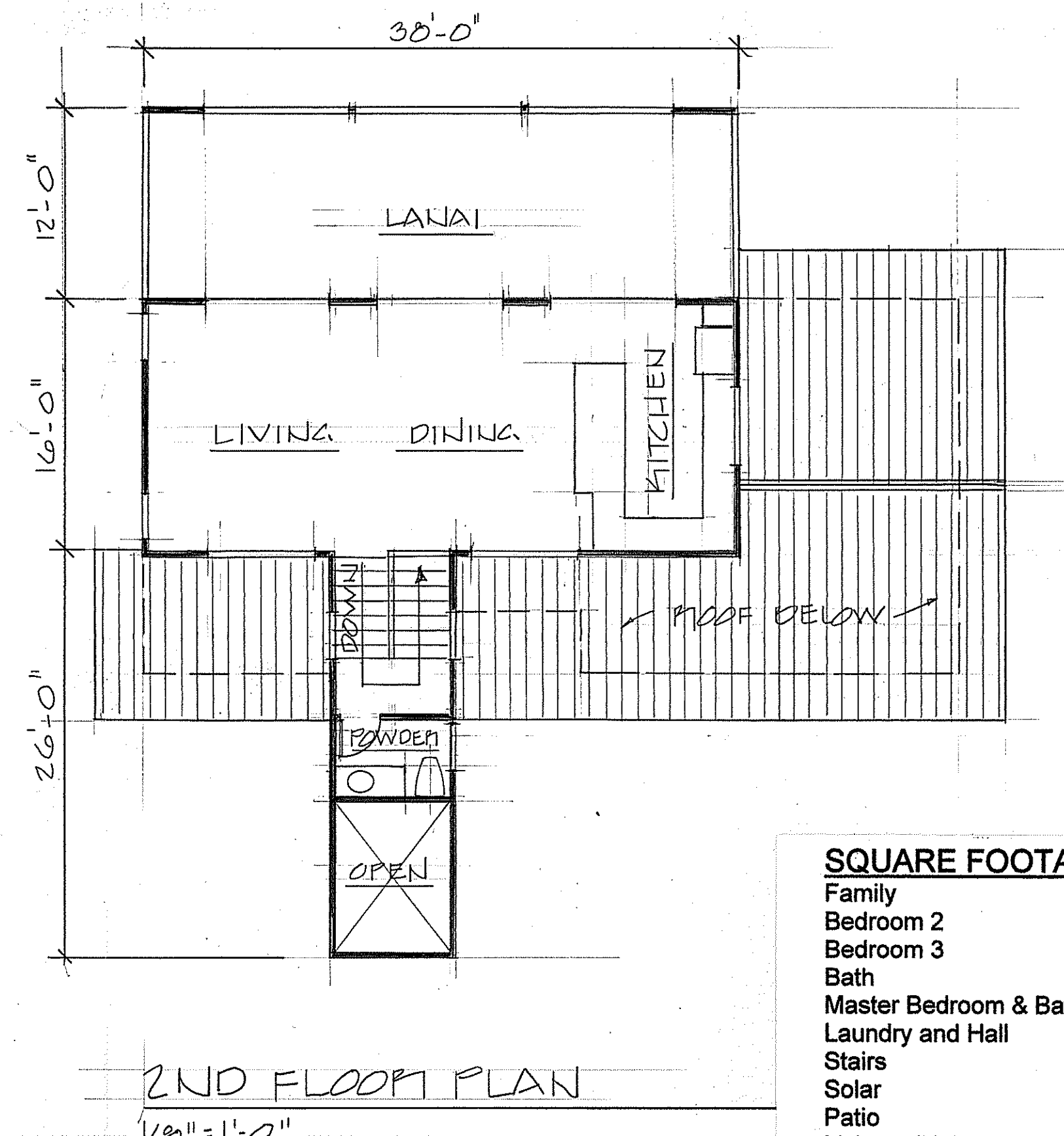
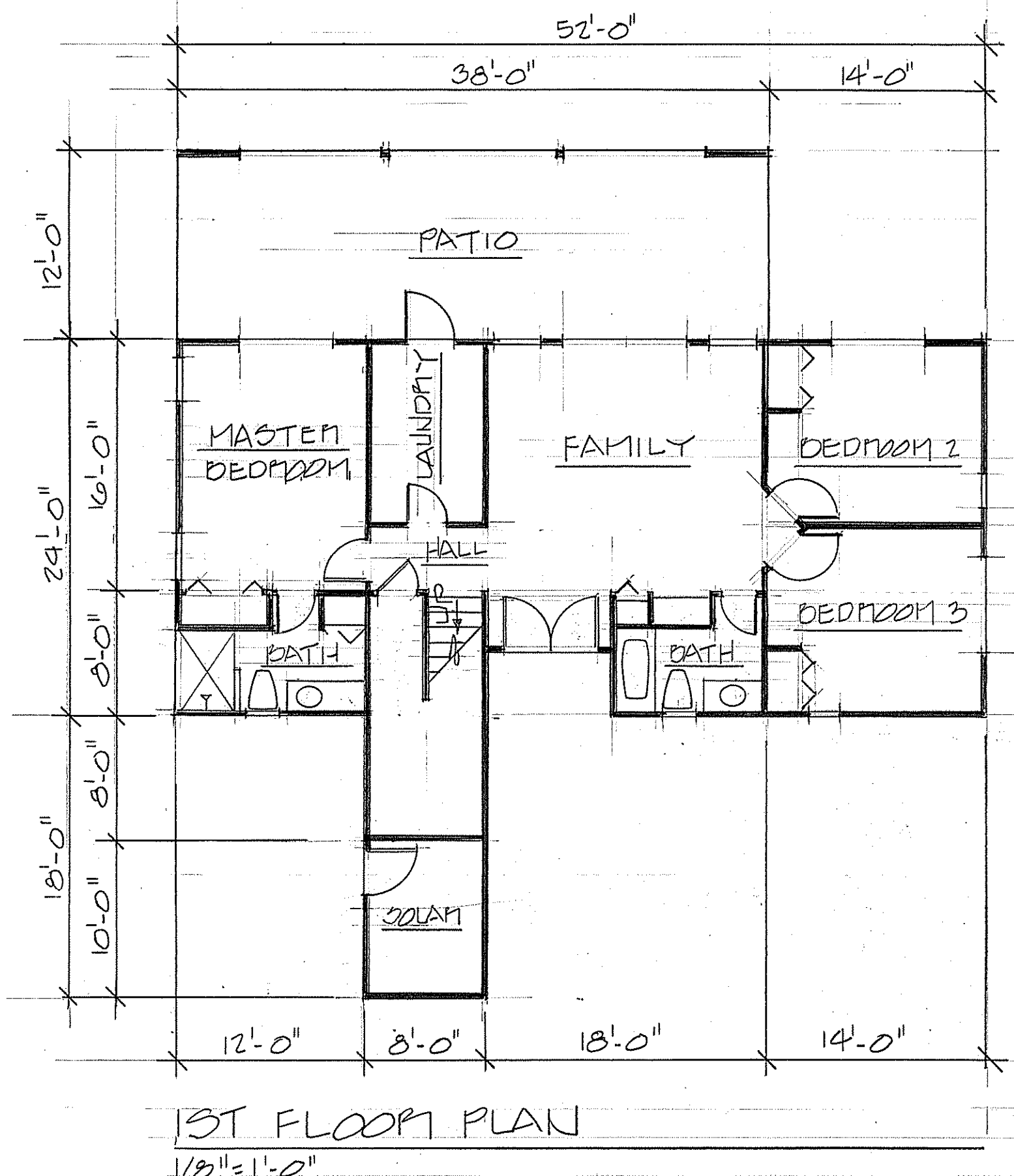
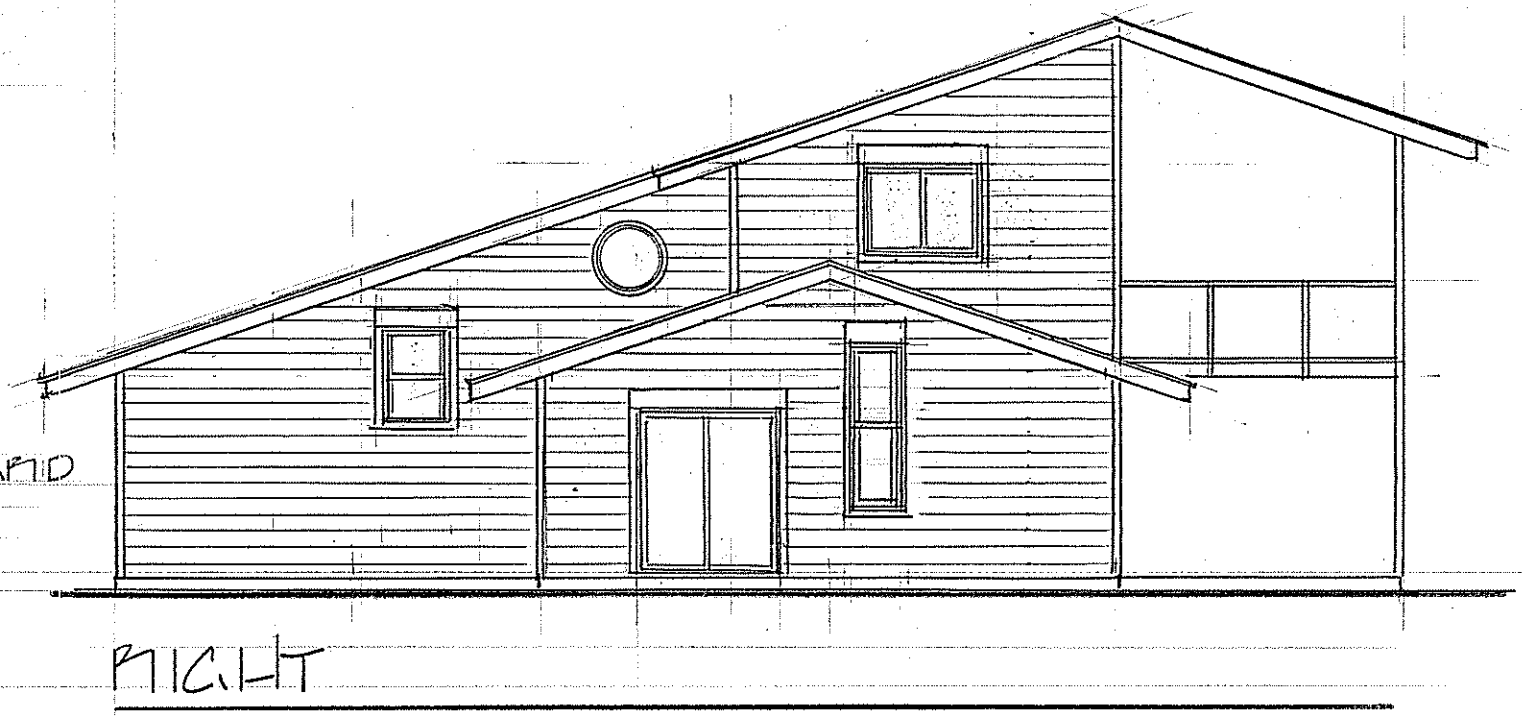
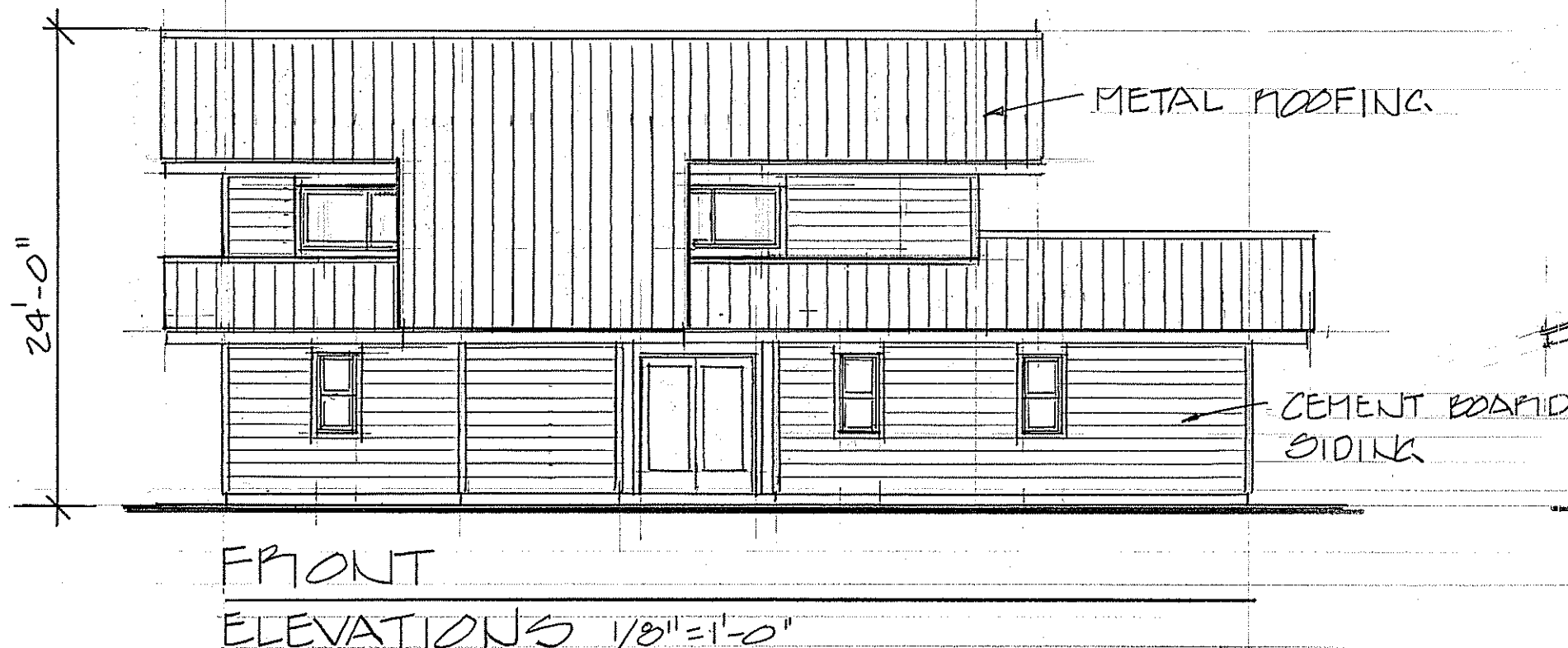
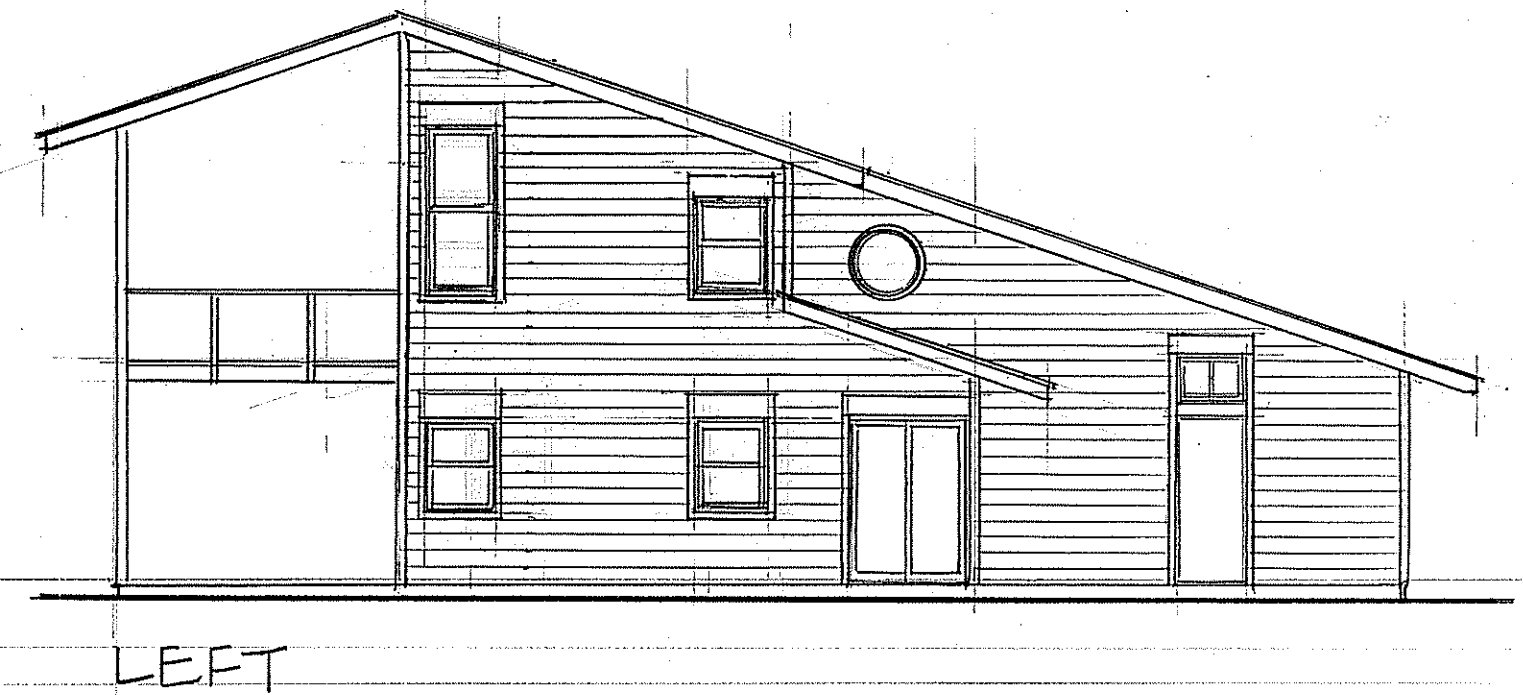
Figure 2. Site Photos



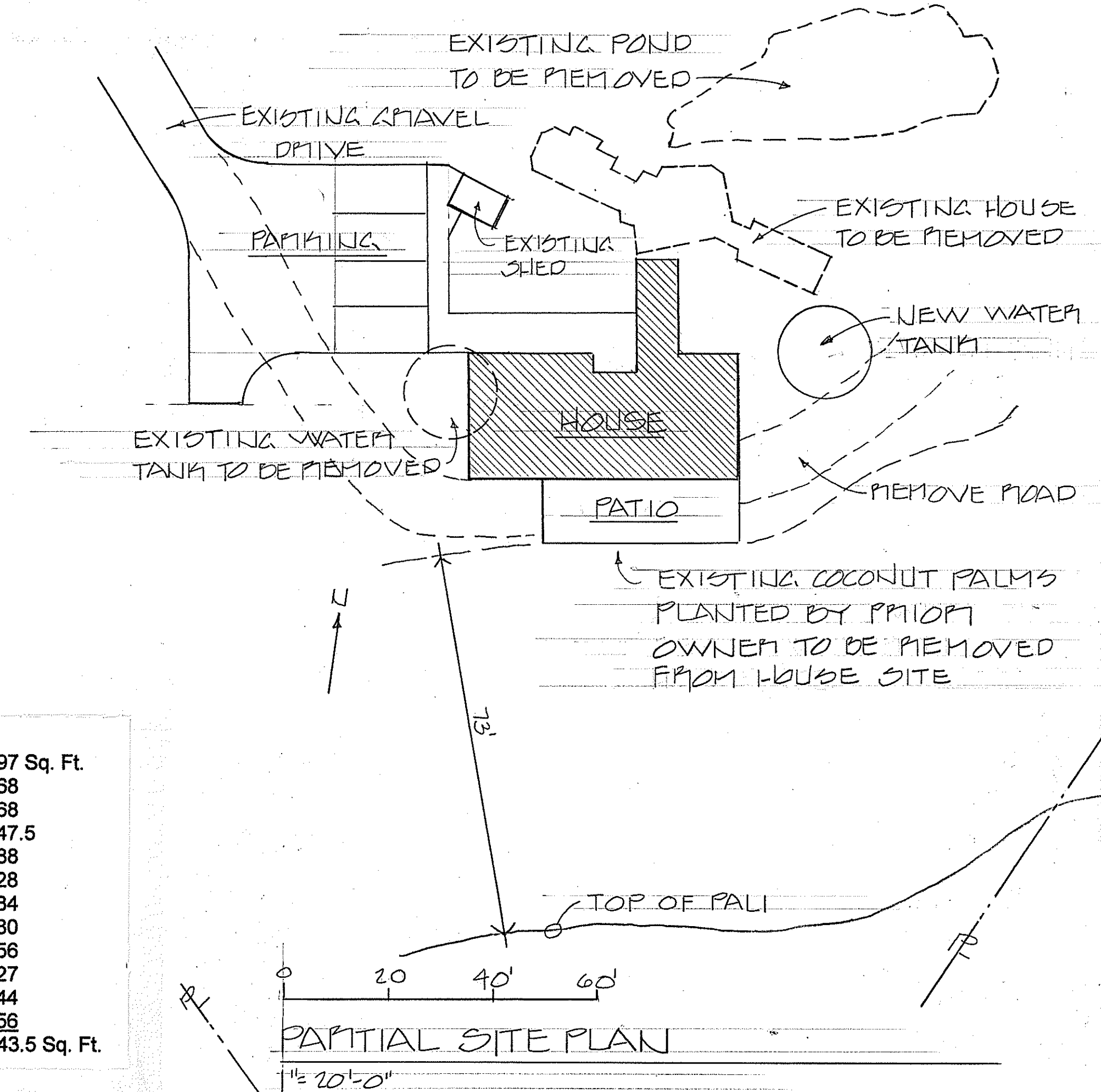
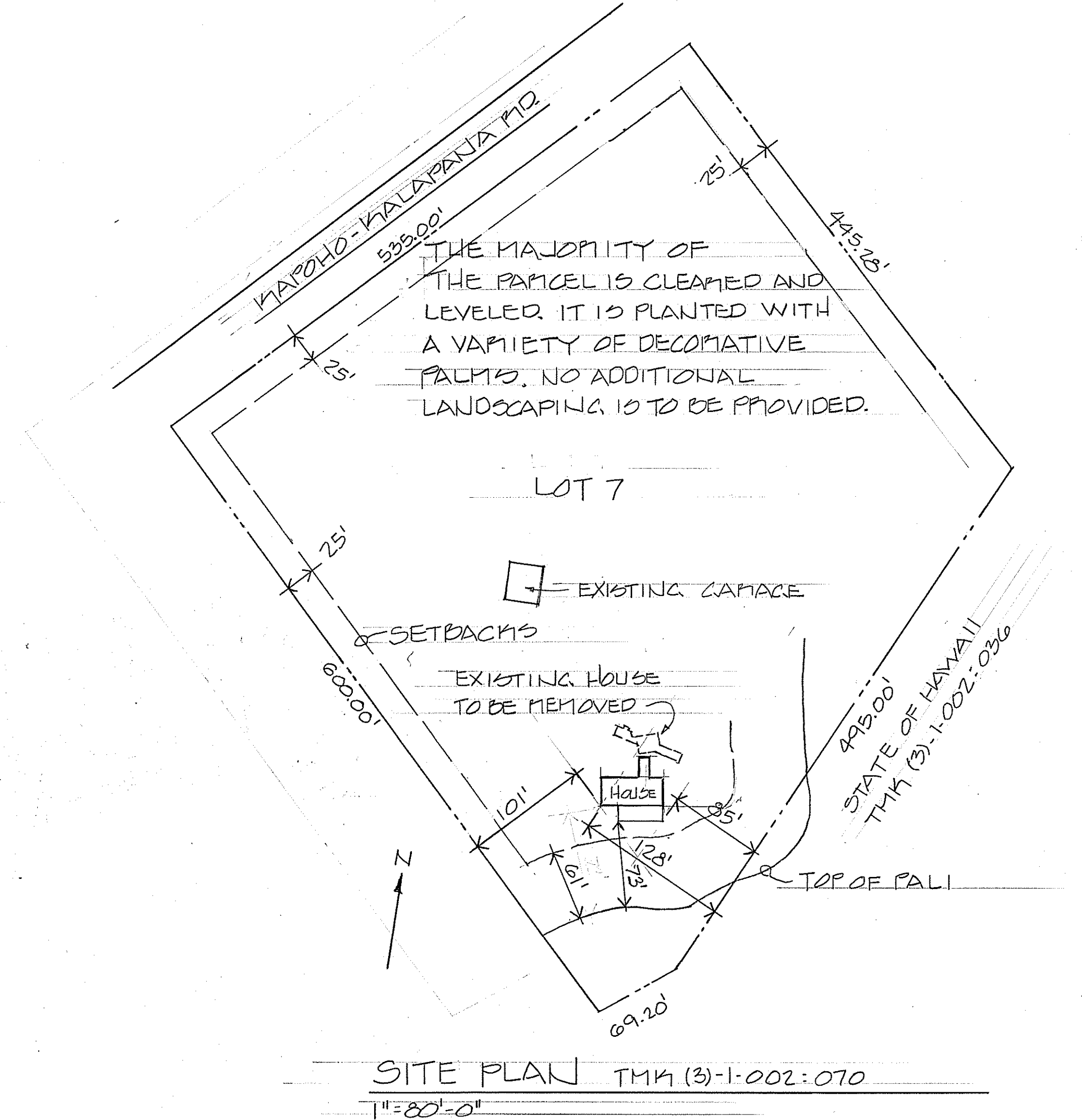
2c. Top: Existing home on RT, area for new on LF. 2d. Bottom: Planted coco grove makai of home



REVISIONS	BY



SQUARE FOOTAGE	
Family	16'-0" x 18'-0" = 297 Sq. Ft.
Bedroom 2	12'-0" x 14'-0" = 168
Bedroom 3	14'-0" x 14'-0" = 196
Bath	5'-0" x 9'-6" = 47.5
Master Bedroom & Bath	12'-0" x 24'-0" = 288
Laundry and Hall	8'-0" x 16'-0" = 128
Stairs	8'-0" x 10'-6" = 84
Solar	8'-0" x 10'-0" = 80
Patio	12'-0" x 38'-0" = 456
Living - Dining - Kitchen	16'-0" x 38'-0" = 627
Powder	5'-6" x 8'-0" = 44
Lanai	12'-0" x 38'-0" = 456
Total	2,843.5 Sq. Ft.



DENNIS PRESTON DAVIS
ARCHITECT

PO BOX 401, PAHOA, HI 96778
(808) 217-2508

NEW RESIDENCE FOR
THE LOVE FAMILY

13-5523 KAPOHO KALAPANA BEACH ROAD
KAUKELEAU, PUNA, HAWAII

Date	9-9-14
Scale	NOTED
Drawn	
Job	
Sheet	1
Of	1 Sheets

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Love New Single-Family Residence at Kaueleau Environmental Assessment

Figure 2). Approximately four ‘ohi‘a and seven hala trees just *makai* of the existing house will be removed to accommodate the footprint of the new house. *Makai* of the proposed house the owner will thin out a small grove of young coconut trees planted by the former owner to provide a view corridor towards the ocean

1.2 Environmental Assessment Process

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact assessment process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur, based on the preliminary findings for each criterion made by the consultant in consultation with the Hawai‘i State Department of Land and Natural Resources, the approving agency. If, after considering comments to the Draft EA, DLNR concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to proceed with other necessary permits. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared.

1.3 Public Involvement and Agency Coordination

The following agencies, organizations and individuals have been consulted during the Environmental Assessment Process:

County:

Planning Department	County Council	Fire Department
Department of Public Works	Police Department	

State:

Department of Health
Department of Land and Natural Resource (DLNR)
Office of Hawaiian Affairs

Private:

Sierra Club	Malama O Puna	Eight Adjacent/Nearby Property Owners
-------------	---------------	---------------------------------------

Copies of communications received during early consultation are contained in Appendix 1a. Notice of the availability of the Draft EA was published in the January 23, 2015 OEQC Environmental Notice. Appendix 1b contains written comments on the Draft EA and the responses to these comments. Various places in the EA have been modified to reflect input received in the comment letters; additional or modified non-procedural text is denoted by double underlines, as in this paragraph.

PART 2: ALTERNATIVES

2.1 Proposed Project, Alternative House Sites and Alternative Uses

The proposed project and its location are described in Section 1.1 above and illustrated in Figures 1-3. The location of the home site, 71 feet from the shoreline, was chosen in order to enjoy coastal breezes and views on a property that in its inland section is vegetated with ornamental palms, while avoiding the actual shoreline area and its resources and hazards.

A number of other locations on the property could also serve as the site for a residence, but none have the advantages of the proposed site in terms of breezes and views while avoiding impacts to native shoreline vegetation. There is no known environmental or other reason for seriously considering other sites on the property.

No other alternative uses for the property such as farming or commercial tourism uses are currently desired by the applicant, and thus none are addressed in this EA.

2.2 No Action

Under the No Action Alternative, the residence would not be built. The lot would remain unused. This EA considers the No Action Alternative as the baseline by which to compare environmental effects from the project.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION

The 7.34-acre property is located between the Red Road, County Road 137, and the shoreline on the southwestern side and another State property with shoreline frontage on the northeastern side (see Figure 1b). The shoreline in this area is neatly defined by the edge of a steep dropoff into the ocean about 20 to 30 feet above sea level, *mauka* of which the ground is fairly flat and is densely vegetated with trees and shrubs (see Figure 2). *Mauka* of this area is the existing residence, for which a CDUP was obtained in 1980, as well as a garage/shed structure, and about five acres of ornamental vegetation, mainly various species of palms, planted in the last four decades. U.S. Geological Survey maps indicate that the flatter portions of the property vary from about 25 to 50 feet above sea level.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The property is located on the flank of Kilauea, an active volcano, in the District of Puna, in the *ahupua'a* of Kaueleau. This area receives an average of about 97 inches of rain annually, with a mean annual temperature of approximately 75 degrees Fahrenheit (Giambelluca et al 2014; UH Hilo-Geography 1998:57). The lava flows of this area are all derived from eruptive vents on Kilauea volcano's East Rift

Love New Single-Family Residence at Kaueleau Environmental Assessment

Zone, located immediately upslope from the project site. The specific lava flow that underlies the entire Love property was erupted from Pu‘u Kaliu, an extensively quarried prehistoric cinder cone 3.1 miles to the north. The age of this flow was estimated at between 400 and 750 years by Moore and Trusdell (1991). Soil in the area is classified with the Malama series, which consists of deep and very deep, well drained soils consisting of organic material over fragmental ‘a‘a lava substrata at a shallow depth. The specific soil is Malama extremely cobbly highly decomposed plant material. It has a soil subclass of VIIIs, which means it has limitations that make it unsuitable for cultivation and restrict its use to pasture, range, woodland or wildlife. (U.S. Soil Conservation Service 1973).

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of Puna is Zone 2 on a scale of ascending risk 9 to 1 (Heliker 1990:23). The relatively high hazard risk is because Kilauea is an active volcano. Zone 2 includes areas adjacent to and downslope of active rift zones. About 15 to 25 percent of the area has been covered by lava since 1800, and about 25-75 percent has been covered in the last 750 years. As such, there is a not insubstantial risk of lava inundation over a 50-year project span. Several towns and villages in Puna, including Pāhoa, Kalapana and Kapoho, are within Zone 2.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (*Uniform Building Code, 1997 Edition*, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built. The project site does not appear to be subject to subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

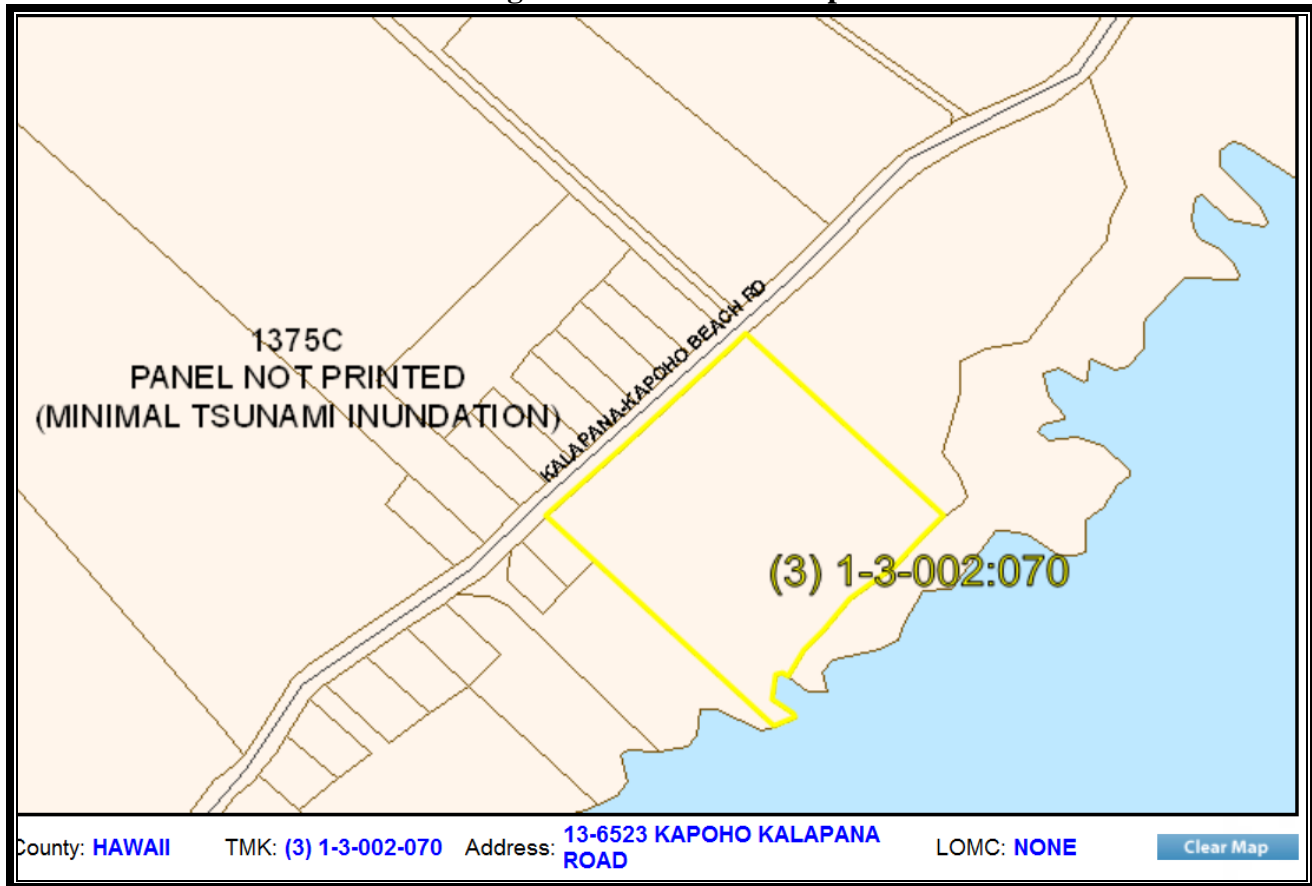
In general, geologic conditions do not impose undue constraints on the proposed action, as much of the Puna District faces similar volcanic and seismic hazard and yet continues to be the fastest growing region of the State. The applicant understands that there are hazards associated with homes in this geologic setting, and has made the decision that a residence is not imprudent to construct or inhabit.

3.1.2 Flood Zones and Shoreline Setting

Floodplain Environmental Setting, Impacts and Mitigation Measures

Floodplain status for many areas of the island of Hawai‘i has been determined by the Federal Emergency Management Agency (FEMA), which produces the National Flood Insurance Program’s Flood Insurance Rate Maps (FIRM). No flood map for the project area has been printed. The home building site is classified in Flood Zone X, areas outside the mapped 500-year floodplain, with minimal tsunami inundation (Figure 4).

Figure 4. Flood Zone Map



Source: Hawai'i DLNR: <http://gis.hawaiiinfip.org/fhat/>

The home would be located at least 25 feet above sea level, 71 feet back from the top of the *pali* that marks the shoreline here (and over a hundred feet from open water), with no evidence of tsunami inundation, out of the flood zone. Other than mega-tsunami of the type that would inundate all of Hilo and Honolulu, the site is not at risk of tsunami. The proposed site for the residence is also completely out of the area affected by high waves. During Tropical Storm Iselle, which hit the Puna coastline on August 8, 2014, there was only minor damage from the toppling of a large autograph tree along the southeast boundary. The tops of a few 'ōhi'a and hala, were also broken off but there was no damage to the house or other structures on the property, and no flooding or visible shoreline change or erosion.

Coastal Erosion Issues: Background

Property near the shoreline is subject to natural coastal processes including erosion and accretion, which can be affected by human actions such as removal of sand or shoreline hardening. Erosion may adversely affect not only a lot owner's improvements but also State land and waters, along with the recreational and ecosystem values they support. Development of shoreline properties also exposes residents and visitors to increased risk of hazardous high waves and tsunami.

Love New Single-Family Residence at Kaueleau Environmental Assessment

In the case of this property, the project does not involve any shoreline hardening or use of areas subject to beach processes. Access to the home will be by a driveway from County Highway 137 at the back of the property. As discussed above, the proposed home would be outside the Flood Zone, at a minimum distance of 71 feet from the shoreline.

The amendments to Title 13, Chapter 5, Hawai‘i Administrative Rules (Conservation District), adopted at the BLNR meeting of August 12, 2011, specify the procedures for determining the shoreline setback. Exhibit 4 of the rules state:

“The shoreline setback line shall be established based on a setback distance from the certified shoreline of 40 feet plus 70 times the average annual coastal erosion rate, based on a coastal erosion study as defined in this chapter. No shoreline setback shall be established for any lot subject to this chapter unless the application for a shoreline setback line includes a shoreline survey certified by the department not more than 12 months prior to submission of the permit application. The shoreline setback line shall be based on the average lot depth (ALD) measured from the current shoreline. For lots with an ALD of two hundred feet or less, the shoreline setback line shall be established based on the ALD of the lot, as provided in Table 1, or based on 40 feet plus 70 times the annual erosion rate. The applicant may choose the lesser of the two methods, but in no case shall the shoreline setback line be calculated to be less than 40 feet. The department may waive the requirement for coastal erosion study based on supportive documentation from the applicant. Such documentation may include, but is not limited to, county or State approved coastal erosion rate data provided through the University of Hawaii, School of Ocean, Earth Science, and Technology, or evidence that the erosion rate is zero.”

Coastal Erosion Analysis

A coastal erosion analysis performed for the property by geologist John P. Lockwood, Ph.D., is attached as Appendix 2 and summarized below. The property was inspected on March 28 and April 9, 2014. The average tide level during the inspections was +1.4 feet, and there was a northeast swell with a 3-foot height and a 9-second period.

As discussed above, the Love property abuts the shoreline on its southwest corner only. A small wedge of State owned land to the north and east that buffers the exposure of the property to the sea along the majority of the northeast sections of seaward property line. The Property only extends directly to the coastline in one narrow, 100-foot wide projection on the southwestern boundary (see Figure 1b).

The entire southeastern Puna coastline in this area is characterized by steep rocky cliffs bounded by steep submarine slopes, and no beaches or shallow offshore areas are present. Beaches play an important role in protecting rocky cliffs from erosion, by acting to absorb the lateral impact forces of incoming waves; their absence in this area exposes sea cliffs to direct wave action.

The lava flows that underlie the project site are dense ‘a‘a, distinguished by the presence of minor, but conspicuous, plagioclase feldspar crystals in all samples. The ‘a‘a flow is very thick here, a minimum of 50 feet, as evidenced by exposures in adjacent sea cliffs. The upper half of exposed portions of the flow

Love New Single-Family Residence at Kaueleau Environmental Assessment

typically consist of unconsolidated, loose “clinkers”, which are highly susceptible to erosion by storm waves. Lower portions of the flow consist of durable “blue rock” that is highly resistant to erosion, and protect against erosion by normal sea waves and surf.

This report divides the analysis of erosive processes affecting the coastline into two localized areas fronting the Love property (see Figure 1). The SW Area is dominated by erosional embayments where focused wave energy has an acute affect. The NE Area is more linear in plan, more broadly affected by wave energy, and presents itself as a steeper sea cliff.

Where it has not been impacted by the erosive power of storm waves, a thick, rubbly layer of loose ‘a‘a breccia forms the land inland from the coast and underlies the flat, soil-covered areas that typify most of the Property. Where it is subject to the erosive power of storm or tsunami waves at the coastline, however, the upper rubbly layer of the flow is presently undergoing significant alteration due to erosion by waves that overtop the lower “blue rock” at the sea cliff base. This erosion is indicated by the fact that no vegetation is able to colonize the steep (39 degree angle of repose) cliff face. The instability of this slope is further attested to by exposed roots of vegetation (*Casuarina* sp.) along the top edge (see Figure 3 of Appendix 2). This is an area where wave energy is focused by the embayment that borders the western property boundary. Even the “blue rock” core of this flow is undergoing wave erosion, as evidenced by the fresh angular blocks beneath the sea cliff. Storm waves are able to toss angular blocks of the “blue rock” ‘a‘a core above the sea cliff, and in places narrow berms of storm-tossed ‘a‘a debris as much as three feet high are found immediately adjacent to the cliff top.

The original seaward extent of this lava flow cannot be known, but the presence of a remnant of the flow as a small island 120 feet offshore indicates at least this much lateral erosion has occurred since emplacement of the flow 400 to 750 years ago (Moore and Trusdell, 1991). This would indicate a minimum, long-term average erosion rate of between 0.16 and 0.3 feet per year (from 2 to 4 inches), or an average of .23 ft/yr, depending on the precise age of the flow. Additionally, this long-term rate would be expected to slow with time as the system approaches equilibrium.

The most critical part of the study area is near the southwest edge of the property boundary, where the Love property borders the sea and the area of the proposed residence (Figure 5a). This area is mostly formed by a headland projecting into the sea, bounded by two embayments, one to west about 150 feet deep, and one to the east about 100 feet deep. The headland area consists of dense, internally contorted ‘a‘a blue rock, and is bounded by the coastal embayments that were eroded into weaker rocks that filled paleo-channels in the original flow. Remnants of these weaker rocks consist of partially welded ‘a‘a breccia, which are more easily eroded than bordering blue rock. These embayments define the areas where future erosion will occur at the highest rates, and are likely to increase in length over time. The western embayment is aligned with a lineament that extends for a few hundred feet inland along the Property’s western border, and coincides with a depression that may indicate the presence of an original lava flow channel. Analogous parallel channel margins and embayments along this section of coast are similarly vulnerable to erosion by focused wave energy.

Love New Single-Family Residence at Kaueleau Environmental Assessment

Although outside the area fronting the proposed residence that is of direct concern, the 500-foot wide area of State-owned land that bounds the southeastern section of the Love Property is clearly undergoing erosion. This is occurring both by the wash of storm waves that reach the upper portions of the sea-cliff, as well as by waves that directly impact the steep lower face of the cliff. Efforts to measure the landward migration of the shoreline along this area from available aerial photographs were unsuccessful, implying that any migration has been less than 25' (the minimum resolution possible on these photographs) since the earliest available aerial photo (1954). Undercutting of the sea cliff was noted at the eastern end of this zone, indicating that future failure of wide blocks of the sea cliff along this section of State land is likely.

Boak and Turner (2005:689) suggest there are two basic proxies for assessing shoreline erosion-accretion trends. These include the use of visually discernible imagery and/or an evaluation of the intersection between a tidal datum with a coastal profile. Hwang (2005:64), which is referred to in HAR §13-5, relies exclusively on the former category of indicator data. Hwang's method is tailored to the evaluation of situations of far more active beach dynamics including situations influenced by the movement, deposition and removal of sandy sediments and active aeolian dune migrations. He suggests that the vegetation line (shoreline) and beach toe positions be measured relative to a reference point over the course of an entire year. The combined observational and historical data are to be analyzed statistically with linear regression methods, plots, and assessments of variability over time including standard deviations.

Stereographic inspection of aerial photographs taken in 1954, and 1965 (see Table 2 of Appendix 2) and comparison with recent Google Earth views revealed no measureable changes in the position of rocky shorelines fronting this property during this 58 year period. Scale limitations, poor resolution and internal distortion of the analog aerial photographs, and uncertainties of shoreline location (due to differing surf

Figure 5a Shoreline features in the southwest area of Love Property

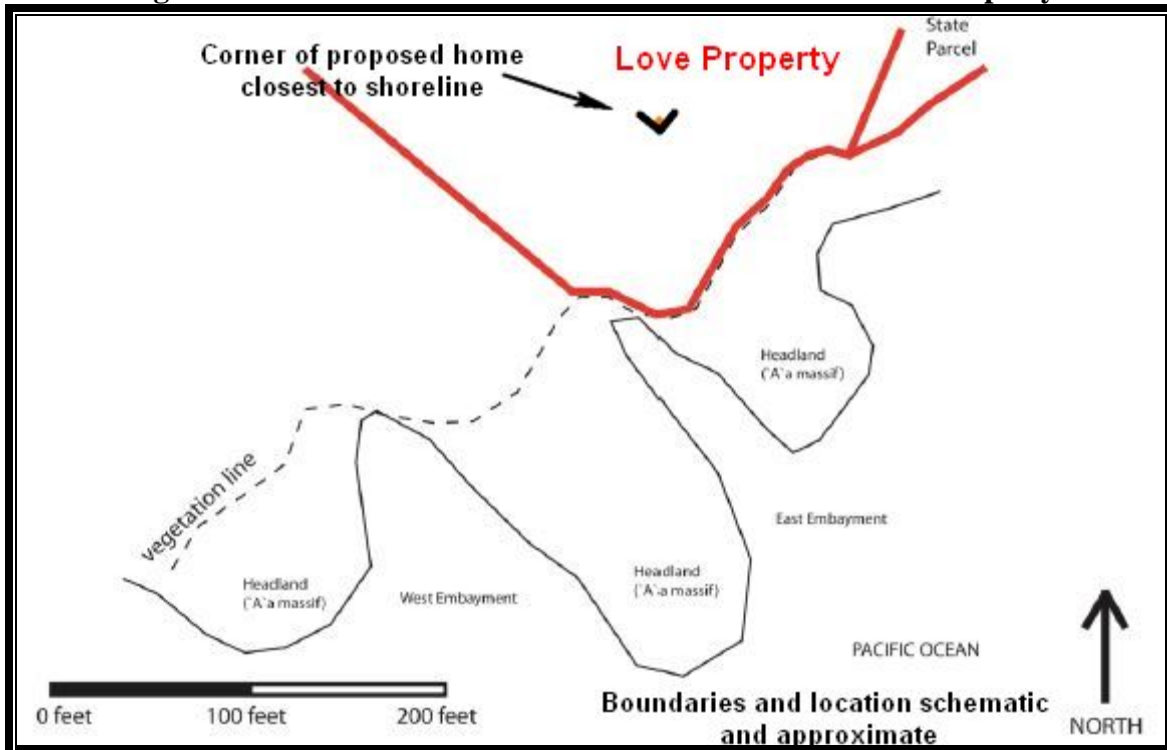


Figure 5b. View seaward of erosion-resistant dense 'a'a of headlands



Love New Single-Family Residence at Kaueleau Environmental Assessment

conditions) make accurate quantitative measurements difficult. Attempts to fix shoreline positions relative to any internal standard failed. The coastal geologist determined after examining the property and available photographs that rigorously quantitative overall erosion rate for the shoreline here was not feasible. Erosion has not been great enough to contribute to a measureable displacement of the shoreline fronting the property in the last 60 years, the period of time since the earliest available aerial photographs. The photogrammetric analysis showed that no shoreline erosion greater than the best possible resolution of the historic photos has occurred over this period. That resolution is estimated at 25 feet. Therefore, a short-term maximum rate of 0.43 ft. per year over the past six decades can be inferred.

As discussed above, long-term erosion rates are between 0.3 and 0.16 ft. per year and are declining. Erosion is highly locally specific along this coastline, occurring episodically and sometimes dramatically as major failure events. Erosion is also clearly less advanced on more resistant headlands and progressing more quickly within local embayments. The mid-point between the estimated minimum (0.16 ft./yr) and maximum (0.43 ft./yr.) rates discussed above gives an overall average rate of 0.30 feet per year for the project area. If this rate was in effect over 70 years, the shoreline might advance as much as 21 feet. Applying the standard of 40 feet plus 70 times the average annual coastal erosion rate, the shoreline setback would need to be 61 feet, as opposed to the 70 feet plus proposed by the applicant.

Although calculation of an erosion rate is a required and understandable goal of DLNR regulators, it is perhaps more important for the landowner to take into account the specific dynamics of erosion at the specific site. It must be emphasized that whatever the rate is, it is not consistent over time or space. The overall retreat of the coastal sea cliff is by piecemeal or stochastic failure of individual blocks. Erosion that does occur on rocky coastal cliffs such as these is typically episodic (Rosser et al 2013). Meaningful erosion rates are impossible to calculate over the short-term in this instance, as rock failure depends on highly localized variables. Erosion rates over the long term are inferred to be higher at the heads of localized embayments. The susceptibility of these embayments to erosion, conspicuous in the southwest area of the property near the proposed residence, is related to the presence of breccias and loose ‘a‘a in these areas, whereas projecting headlands are formed of more dense, blue rock. Erosion in the embayments is compounded by the fact that storm wave energy is refracted and focused in the resulting coves. In addition, some of these “valleys” form incipient drainages from landward, and are impacted by episodic terrestrial water run-off as well. Furthermore, future migration of the shoreline will be impacted predominantly by unpredictable and episodic events including subsidence due to volcanic seismicity or accretion due to future eruptions of Kilauea. Considering all of these factors reason, it is advisable to maintain a reasonable distance from the edge of the *pali* that forms the shoreline.

Effects of Subsidence and Sea Level Rise on Shoreline

An overall rise in sea level of 3.3 feet by the end of the 21st century has been proposed by Fletcher (2010) and others. Hwang et al (2007) use a figure of .16 in/yr in their assessments, resulting in an estimate of 13.9 inches of rise in the next 87 years.

Love New Single-Family Residence at Kaueleau Environmental Assessment

Relative sea-level rise, of course, is a result of the combined water rise and land fall. The 1975 Kalapana earthquake on Kilauea's rift caused land in Kapoho to drop 0.8 feet (based on Hawaiian Volcano Observatory data in Hwang et al. 2007:6). This episodic seismic induced subsistence is difficult to anticipate or measure over long periods of time. On the basis of InSAR (Synthetic Aperture Radar Interferometry) remote sensing data, Hwang et al (Ibid) state that the coastline at Kapoho may be subsiding at a continuous rate of between .31–.67 in/yr. Rates of subsidence at the Love property, are possibly similar, as it is also on the unsupported, seaward flank of Kilauea. Therefore, the combined effects of subsidence and rising ocean levels may cause an overall (relative) drop in the shoreline elevation of up to an inch a year. The elevation of the proposed residence, at least 25 feet above sea level, ensures that combined sea level change at current expected levels and land subsidence will not cause significant shoreline transgression (horizontal movement) in this area.

Although a scenario of modest sea level rise would likely not substantially affect the integrity or use of the proposed residence, substantially larger increases, particularly in a case of sudden onset, could perhaps eventually affect it. If so, this residence would be among thousands, or perhaps tens of thousands, to be affected in what would be the largest disaster to affect the Hawaiian Islands since human settlement. As sea level rise is gradual, there would probably be an opportunity for the owner to consider relocating or scrapping the structure for re-use of its valuable materials should sea level rise sufficiently to endanger the structure. The owner would agree to a CDUP and/or deed condition that would prevent any future request for shoreline hardening to protect the residence, regardless of hardship, and a condition requiring moving or dismantling the home if sea level rise eventually threatens the integrity of the structure.

3.1.3 Water Quality

The portion of the property to be used for the residence is adjacent to the sea but the house would be set back a minimum of 71 feet from the shoreline and no grading activities would occur *makai* of this area. No water features such as streams, springs, or anchialine ponds are found on or near the property.

Land clearing and construction activities would occur on an area of less than an acre, including the driveway. A County grading permit will be required. After actual grading plans are developed, the applicant and engineer will determine whether the area of disturbance is sufficiently large to require a National Pollutant Discharge Elimination System permit. Grading for the driveway and house lot will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters. The applicant will ensure that their contractor shall perform all earthwork and grading in conformance with:

- (a) “Storm Drainage Standards,” County of Hawai‘i, October, 1970, and as revised.
- (b) Applicable standards and regulations of Chapter 27, “Flood Control,” of the Hawai‘i County Code.
- (c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
- (d) Applicable standards and regulations of Chapter 10, “Erosion and Sedimentation Control,” of the Hawai‘i County Code.

Love New Single-Family Residence at Kaueleau Environmental Assessment

- (e) Conditions of an NPDES permit, if required, and any additional best management practices required by the Board of Land and Natural Resources.

In addition, as part of construction, the applicant will require that the construction contractor implement the following practices:

- The total amount of land disturbance will be minimized. The construction contractor will be limited to the delineated construction work areas within the lot.
- The contractor will not allow any sediment to leave the site, particularly towards the ocean.
- Construction activities with the potential to produce polluted runoff will not be allowed during unusually heavy rains or storm conditions that might generate storm water runoff.
- Cleared areas will be replanted or otherwise stabilized as soon as possible.

The general area already supports several homes and is utilized by residents and property owners to park vehicles and fish, and there are no reported water quality problems from these uses. Upon their completion, the homes will be similar to the homes on shoreline lots in the area, and they would not be expected to contribute to sedimentation, erosion, and pollution of coastal waters. However, in an April 14, 2014 letter in response to early consultation, the DLNR Division of Aquatic Resources stated (see Appendix 1a for full comment – note: quote corrected from one supplied in Draft EA):

“DAR has substantial concerns regarding the potential impacts of development occurring in such close proximity to nearshore coastal waters and coral reefs. An increasing number of studies indicate rapid movement of groundwater from land to nearby coastal regions, creating a substantial connectivity between land use practices, water quality and coastal health. ~~On-going studies by the UH strongly suggest large scale disposal of wastewater provides nutrients to nearshore waters that can promote substantial algal blooms~~ Nutrient enrichment beyond background ocean levels can lead to potentially explosive growth of certain undesirable algae which can permanently kill coral and negatively impact coral reef fishes and other reef inhabitants. The effect of such nutrient enrichment is likely cumulative and we need to minimize additional inputs in sensitive coastal areas. There are a number of ways to dispose of residential wastewater, without the use of cesspools or septic systems. Such an alternative needs to be incorporated in the construction of this home, even if initially more expensive, because of the long-term impacts to the health of coastal regions. Protection of groundwater and coastal waters from pollution is essential if we are to maintain sustainable and resilient ecosystems and the health of our coasts and ocean food supply.”

~~The characterization of wastewater from one single-family residence as “large scale” substantially overstates the impact of the replacement of an existing single-family residence on the lot.~~ The applicant will construct an individual wastewater system (IWS) in conformance with DOH requirements that exceeds the current level of treatment on the property and will represent a net benefit to water quality. There are dozens of existing homes scattered along this extremely high energy coastline, and there is no indication of compromised water quality. The proposed replacement of the home would not contribute to sedimentation, erosion, and pollution of coastal waters.

Love New Single-Family Residence at Kaueleau Environmental Assessment

In a comment letter on the Draft EA, the DAR correctly noted that their letter did not reference a large-scale development (the quote has been corrected above), and also made the following comments (see Appendix 1b for full letter and response of applicant):

“Rather it was noted that nutrient enrichment from impacted groundwater is likely cumulative. Cumulative both from an individual project and from other projects in similarly sensitive shoreline areas. To dismiss DAR’s concerns regarding this single project misses the point of the negative impacts of a multitude of single projects. It’s stated that the applicant “will construct an individual wastewater system (IWS) in conformance with DOH requirements that exceeds the current level of treatment on the property and will represent a net benefit to water quality.” No details are provided as to what type of IWS will be constructed nor is there any information to support the latter assertion of a net benefit to water quality in the area. Thus it remains unclear as to whether this project will contribute additional nutrient inputs into sensitive coastal areas with the potential to negatively impact nearshore waters. This uncertainty needs to be addressed.”

The architect, in coordination with a wastewater engineer that has been retained for the home construction and has coordinated with the Department of Health, expects to utilize a 1,000-gallon Chem-Tainer septic tank. The tank would provide primary treatment of the wastewater before distributing the treated sewage into the absorption bed. In the interest of providing maximum effectiveness, the architect proposes that three feet of native material beneath the leach field be removed and replaced with a sandy soil or cinder soil. With soils of this type and depth, 40%-90% of total N and P can be removed from residential effluent. In addition, recognizing that plants can be efficient collectors of N and P that has been converted to available forms by soil microbes and thus prevent those nutrients from contaminating ground or surface waters, the leach field area will be maintained with low, herbaceous or grassy vegetation.

The reason that the septic tank will improve water quality relative to the existing situation is that currently, like many existing homes in Puna built many decades ago, there is only a cesspool for wastewater. An IWS in conformance with DOH standards will presumably remove more nutrients and pathogens from the water than a cesspool. This is the principal reason that the Department of Health recently proposed a rule amendment to require conversion of cesspools to septic tanks – as opposed to any alternative form of wastewater treatment – statewide. Although it true that this single family home may be just one among many that cumulatively degrade water quality, it must be recognized that there are very few lots along this coastline, and virtually no potential to subdivide given the State Land Use District, County zoning, General Plan designation, and subdivision code infrastructure requirements. Many of the lots already contain homes, and allowing them to rebuild their homes and conditioning this upon upgrading their IWS to modern standards is one mechanism for addressing water quality issues. It should also be noted that the water off this shoreline is extremely deep and the constant large waves provide an extreme high energy environment with maximum mixing. Although it is well known that there are water quality problems in Kapoho, where the housing density is at least 20 times that of this coastline and the homes are situated at or near sea level around a semi-protected bay, research for this EA was unable to uncover any evidence of water quality problems in the coastal waters off far less densely populated Kaueleau.

3.1.4 Flora and Fauna

Environmental Setting: Flora

Prior to human settlement of Hawai‘i, the natural vegetation of this part of this part of Puna shoreline was mostly coastal forest and strand vegetation, dominated by *naupaka* (*Scaevola taccada*), *hala* (*Pandanus tectorius*), ‘*ōhi‘a* (*Metrosideros polymorpha*), *nanea* (*Vigna marina*) and various sedges and coastal herbs (Gagne and Cuddihy 1990). The site was systematically inspected for plants by Dr. Ron Terry on two occasions in 2014. Special attention was paid in these surveys and subsequent field visits by the author of this EA to the presence of endangered species, particularly *Ischaemum byrone*, a State and federally listed endangered grass known to grow in the general area.

As discussed above, much of the lot was cleared many decades ago, which was followed by construction of a residence and planting of an ornamental palm grove (see Figure 2). Less than two acres of the property has not already been cleared. Nearly all the flora is non-native, aside from three trees, a shrub, two sedges, and a fern and fern ally, all of which are very common in the area. A minimum of 200 *hala* and 100 ‘*ōhi‘a* are present on the margins of the Love Property. An area northeast of the proposed home containing the last remnant of barely disturbed vegetation, with *hala*, ‘*ōhi‘a* and *lama*, will not be removed or affected. Approximately four ‘*ōhi‘a* and seven *hala* trees just *makai* of the existing house will be removed to accommodate the footprint of the new house. *Makai* of the proposed house the owner will thin out a small grove of young coconut trees planted by the former owner to provide a view corridor towards the ocean. No *Ischaemum byrone* or any other rare, threatened or endangered plant species was found on or near the property. A list of all species detected on the property itself is found in Table 1.

Environmental Setting: Fauna

During site visits, we observed Common Myna (*Acridotheres tristis*), Northern Cardinal (*Cardinalis cardinalis*), Spotted Dove (*Streptopelia chinensis*), Japanese White-eye (*Zosterops japonicus*), and House Finch (*Carpodacus mexicanus*). No native birds were identified, and it is unlikely that many native forest birds would be expected to use the project site due to its low elevation, alien vegetation and lack of adequate forest resources. It is likely that the Hawai‘i ‘Amakihi (*Hemignathus virens*) are sometimes present, as some populations of this native honeycreeper appear to have adapted to the mosquito borne diseases of the Hawaiian lowlands. Common shorebirds, such as Golden Plover (*Pluvialis fulva*), Ruddy Turnstone (*Arenaria interpres*), and Wandering Tattler (*Heteroscelus incanus*), are often seen on the Puna coastline feeding on shoreline resources. These were not observed during site visits but undoubtedly occasionally visit, despite the minimal habitat offer by the cliffy coast. They would be unlikely to make much use of the property itself, which is densely vegetated and offers no habitat for them. The seabird Black Noddy (*Anous minutus melanogenys*) was observed flying near the cliffs and over the nearshore waters, as it frequently does in cliffed coasts of the main Hawaiian Islands. It nests in crevices and caves in lava (especially pahoehoe) seacliffs; no Black Noddy nests were observed on the property.

Love New Single-Family Residence at Kaueleau Environmental Assessment

Table 1. Plant Species Observed on Love Property

Scientific Name	Family	Common Name	Life Form	Status
<i>Ageratum conyzoides</i>	Asteraceae	Ageratum	Herb	A
<i>Aleurites moluccana</i>	Euphorbiaceae	Kukui	Tree	A
<i>Allamanda cathartica</i>	Apocynaceae	Allamanda	Vine	A
<i>Aloe vera</i>	Agavaceae	Aloe	Shrub	A
<i>Andropogon virginicus</i>	Poaceae	Broomsedge	Herb	A
<i>Araucaria columnaris</i>	Araucariaceae	Cook Island pine	Tree	A
<i>Archontophoenix alexandrae</i>	Arecaceae	Alexandra palm	Tree	A
<i>Arundina graminifolia</i>	Orchidaceae	Bamboo orchid	Herb	A
<i>Axonopus compressus</i>	Poaceae	Wide-leafed carpet grass	Grass	A
<i>Begonia reniformis</i>	Begoniaceae	Grape-leaf begonia	Herb	A
<i>Bismarckia nobilis</i>	Arecaceae	Bismarckia palm	Tree	A
<i>Blechnum appendiculatum</i>	Blechnaceae	Blechnum	Fern	A
<i>Bougainvillea glabra</i>	Nyctaginaceae	Bougainvillea	Shrub	A
<i>Breynia disticha</i>	Phyllanthaceae	Snowbush,	Shrub	A
<i>Carica papaya</i>	Caricaceae	Papaya	Tree	A
<i>Carissa macrocarpa</i>	Apocynaceae	Natal Plum	Shrub	A
<i>Caryota spp.</i>	Arecaceae	Fish-tail palm	Tree	A
<i>Casuarina equisetifolia</i>	Casuarinaceae	Ironwood	Tree	A
<i>Chamaecrista nictitans</i>	Fabaceae	Partridge pea	Herb	A
<i>Cibotium spp.</i>	Dicksoniaceae	Hapu'u tree fern	Fern	E
<i>Clusia rosea</i>	Clusiaceae	Autograph tree	Tree	A
<i>Cocos nucifera</i>	Aracariaceae	Coconut	Tree	A
<i>Codiaeum variegatum</i>	Euphorbiaceae	Croton	Shrub	A
<i>Commelina diffusa</i>	Commelinaceae	Honohono	Herb	A
<i>Convolvulus arvensis</i>	Convolvulaceae	Field bindweed	Vine	A
<i>Cordyline fruticosa</i>	Agavaceae	Ti	Shrub	A
<i>Crassocephalum crepidioides</i>	Asteraceae	Crassocephalum	Herb	A
<i>Crinum spp. asiaticum</i>	Amaryllidaceae	Spider lily	Herbs	A
<i>Cucurbita pepo</i>	Cucurbitaceae	Squash, pumpkin	Vine	A
<i>Cycas revoluta</i>	Cycadaceae	Sago palm	Shrub	A
<i>Cynodon dactylon</i>	Poaceae	Bermuda grass	Grass	A
<i>Cyperus polystachyos</i>	Cyperaceae	Cyperus	Sedge	I
<i>Cyrtostachys renda</i>	Arecaceae	Sealing wax palm	Tree	A
<i>Desmodium triflorum</i>	Fabaceae	Desmodium	Herb	A

Love New Single-Family Residence at Kaueleau Environmental Assessment

Table 1, continued				
Scientific Name	Family	Common Name	Life Form	Status
<i>Desmodium uncinatum</i>	Fabaceae	Spanish clover	Herb	A
<i>Digitaria sp.</i>	Poaceae	Crabgrass	Grass	A
<i>Diospyros sandwicensis</i>	Ebenaceae	Lama	Tree	E
<i>Dracaena marginata</i>	Agavaceae	Money tree	Tree	A
<i>Dracaena massangeana</i>	Agavaceae	Corn plan	Tree	A
<i>Drymaria cordata</i>	Caryophyllaceae	Pipili	Herb	A
<i>Dypsis decaryi</i>	Arecaceae	Triangle palm	Tree	A
<i>Emilia sonchifolia</i>	Asteraceae	Pualele	Herb	A
<i>Emilia fosbergii</i>	Asteraceae	Flora's paintbrush	Herb	A
<i>Eucalyptus a.f. saligna</i>	Myrtaceae	Eucalyptus	Tree	A
<i>Eugenia uniflora</i>	Myrtaceae	Surinam cherry	Shrub	A
<i>Fagraea berteriana</i>	Loganiaceae	Pua kenikeni	Tree	A
<i>Ficus microcarpa</i>	Moraceae	Chinese banyan	Tree	A
<i>Fimbristylis dichotoma</i>	Cyperaceae	Fimbristylis	Herb	I
<i>Gardenia taitensis</i>	Rubiaceae	Tiare	Shrub	A
<i>Hibiscus sp.</i>	Malvaceae	Ornamental hibiscus	Shrub	A
<i>Ixora sp.</i>	Rubiaceae	Ixora	Shrub	A
<i>Kyllinga brevifolia</i>	Cyperaceae	Sedge	Herb	A
<i>Lantana camara</i>	Verbenaceae	Lantana	Shrub	A
<i>Litchi chinensis</i>	Sapindaceae	Lychee	Tree	A
<i>Livistona chinensis</i>	Arecaceae	Chinese fan palm	Tree	A
<i>Mangifera indica</i>	Anacardiaceae	Mango	Tree	A
<i>Melastoma candidum</i>	Melastomataceae	Asian melastome	Shrub	A
<i>Melochia umbellata</i>	Sterculiaceae	Melochia	Tree	A
<i>Metrosideros polymorpha</i>	Myrtaceae	'Ohi'a	Tree	E
<i>Mimosa pudica</i>	Fabaceae	Sensitive plant	Herb	A
<i>Morinda citrifolia</i>	Rubiaceae	Noni	Tree	A
<i>Murraya paniculata</i>	Rutaceae	Mock orange	Shrub	A
<i>Musa x paradisiaca</i>	Musaceae	Banana	Shrub	A
<i>Nephrolepis multiflora</i>	Nephrolepidaceae	Sword fern	Fern	A
<i>Oplismenus hirtellus</i>	Poaceae	Basket grass	Grass	A
<i>Pachira aquatica</i>	Bombaceae	Malabar chestnut	Shrub	A
<i>Paederia foetida</i>	Rubiaceae	Maile pilau	Vine	A
<i>Pandanus tectorius</i>	Pandanaceae	Hala	Tree	I

Love New Single-Family Residence at Kaueleau Environmental Assessment

Table 1, continued				
Scientific Name	Family	Common Name	Life Form	Status
<i>Paspalum conjugatum</i>	Poaceae	Hilo grass	Herb	A
<i>Persea americana</i>	Lauraceae	Avocado	Tree	A
<i>Philodendron sp</i>	Araceae	Philodendron	Vine	A
<i>Phoenix roebelinii</i>	Arecaceae	Dwarf date palm	Shrub	A
<i>Phyllanthus debilis</i>	Euphorbiaceae	Niruri	Herb	A
<i>Phymatosorus grossus</i>	Polypodiaceae	Maile Scented Fern, Laua'e	Fern	A
<i>Pluchea symphytifolia</i>	Asteraceae	Sourbush	Shrub	A
<i>Plumeria sp.</i>	Apocynaceae	Plumeria	Shrub	A
<i>Pritchardia thurstonii</i>	Arecaceae	Fiji fan palm	Tree	A
<i>Psidium cattleianum</i>	Myrtaceae	Strawberry guava	Tree	A
<i>Psidium guajava</i>	Myrtaceae	Common guava	Tree	A
<i>Psilotum nudum</i>	Psilotaceae	Moa	Fern ally	I
<i>Pteris cretica</i>	Pteridaceae	'Oali	Fern	I
<i>Pterolepis glomerata</i>	Melastomataceae	Pterolepis	Herb	A
<i>Ravenala madagascariensis</i>	Musaceae	Travelers palm	Tree	A
<i>Roystonea regia</i>	Arecaceae	Royal palm	Tree	A
<i>Sacciolepis indica</i>	Poaceae	Glenwood grass	Herb	A
<i>Samanea saman</i>	Fabaceae	Monkeypod	Tree	A
<i>Scaevola sericea</i>	Goodeniaceae	Naupaka	Shrub	I
<i>Schefflera actinophylla</i>	Araliaceae	Octopus tree	Tree	A
<i>Schinus terebinthifolius</i>	Anacardiaceae	Christmas berry	Shrub	A
<i>Solanum americanum</i>	Solanaceae	Black nightshade	Shrub	I
<i>Solanum sodomium</i>	Solanaceae	Sodom apple	Shrub	A
<i>Spathodea companionata</i>	Bignoniaceae	African tulip	Tree	A
<i>Spathoglottis plicata</i>	Orchidaceae	Philippine ground orchid	Herb	A
<i>Sphagneticola trilobata</i>	Asteraceae	Wedelia	Shrub	A
<i>Sporobolus africanus</i>	Poaceae	Smutgrass	Herb	A
<i>Stachytarpheta jamaicensis</i>	Verbenaceae	Jamaican vervain	Shrub	A
<i>Strelitzia reginae</i>	Strelitziaceae	Bird of paradise	Herb	A
<i>Synedrella nodiflora</i>	Asteraceae	Synedrella	Herb	A
<i>Syzygium cumini</i>	Myrtaceae	Java plum	Tree	A
<i>Syzygium malaccense</i>	Myrtaceae	Mountain apple	Tree	A
<i>Tevetia peruviana</i>	Apocynaceae	Be-still tree	Tree	A

Love New Single-Family Residence at Kaueleau Environmental Assessment

Table 1, continued				
Scientific Name	Family	Common Name	Life Form	Status
<i>Tamarindus indica</i>	Fabaceae	Tamarind	Tree	A
<i>Tradescantia spathacea</i>	Commelinaceae	Oyster plant	Herb	A
<i>Trema orientalis</i>	Ulmaceae	Gunpowder tree	Tree	A
<i>Urochloa mutica</i>	Poaceae	California grass	Herb	A
<i>Veitchia merrillii</i>	Arecaceae	Manila palm	Tree	A
<i>Vigna luteola</i>	Fabaceae	Hairy pod cowpea	Herb	A
<i>Zamia sp.</i>	Zamiaceae	Zamia	Shrub	A

* A = alien; I = indigenous; E = endemic. Also unknown bromeliads (Bromeliaceae). Not all ornamentals listed.

As with all of East Hawai‘i, several endangered native terrestrial vertebrates may be present in the general area and may overfly, roost, nest, or utilize resources of the property. These include the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell’s Shearwater (*Puffinus newelli*).

Other mammals in the project area are all introduced species, including feral cats (*Felis catus*), feral pigs (*Sus scrofa*), small Indian mongooses (*Herpestes a. auro-punctatus*) and various species of rats (*Rattus* spp.). None are of conservation concern and all are deleterious to native flora and fauna.

The coastal and marine fauna and flora are typical of the high-energy coasts of Puna, which are young ecosystems with limited coral growth but a variety of algae, fish and invertebrates. Marine mammals and reptiles, some of them endangered, also visit the Puna coastal waters.

Impacts and Mitigation Measures

Except where minor clearing or thinning on non-native plants for the residence and a view corridor towards the shoreline is necessary, the existing vegetation will be left intact. Over 95 percent of the *hala* and *‘ōhi‘a* on the site are being avoided.

Because of the minor nature of the project and the lack of sensitive terrestrial ecosystems and threatened or endangered plant species, construction and use of the single-family residence are not likely to cause adverse biological impacts. The precautions for preventing effects to water quality during construction listed above in Sections 3.1.1 and 3.1.6 will reduce adverse impact on aquatic biological resources in coastal waters to negligible levels.

In order to avoid impacts to the endangered but regionally widespread terrestrial vertebrates listed above, the applicant will commit to conditions that are proposed for the CDUP. Specifically, construction will commit to refrain from activities that disturb or remove the vegetation between June 1 and September 15, when Hawaiian hoary bats may be sensitive to disturbance. If landclearing occurs between the months of

Love New Single-Family Residence at Kaueleau Environmental Assessment

March and September, inclusive, a pre-construction hawk nest search by a qualified ornithologist using standard methods will be conducted. If Hawaiian Hawks are present, no land clearing will be allowed until October, when hawk nestlings will have fledged. Finally, the applicant agrees to shield any exterior lighting from shining upward, in conformance with Hawai'i County Code § 14 – 50 et seq., to minimize the potential for disorientation of seabirds.

3.1.5 Air Quality, Noise, and Scenic Resources

Environmental Setting

Air quality in the area is generally excellent, due to its rural nature and minimal degree of human activity, although vog, sulfur dioxide and particulate matter from Kilauea volcano is occasionally blown into this part of Puna. Noise on the site is low, and is derived from natural sources (such as surf and wind) due to the very rural nature of the area.

The area shares the quality of scenic beauty along with most of the Puna coastline. The County of Hawai'i General Plan contains Goals, Policies and Standards intended to preserve areas of natural beauty and scenic vistas from encroachment. The General Plan discusses the black sand beaches and tidal ponds as noted features of natural beauty in Puna, but among specific examples of natural beauty does not identify any features or views in the *ahupua'a* of Kaueleau or near the project site. Coastal views from the Red Road of the residence area are totally by a fence and several hundred feet of dense vegetation.

Impacts and Mitigation Measures

The project would not affect air quality or noise levels in any substantial ways. Brief and minor adverse effects would occur during construction. However, there are virtually no sensitive noise receptors in the vicinity, and given the small scale of the project, noise mitigation will likely not be necessary.

Because all grading and construction would occur, at the closest, 71 feet from the *makai* edge of the property, and over 450 feet of the *mauka* edge of the property, with dense intervening vegetation on all sides, construction and occupation of the single-family home would have virtually no visual impacts.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Based on onsite inspection and the lack of any known former and current uses on the property, it appears that the site contains no hazardous or toxic substances and exhibits no other hazardous conditions. In addition to the measures related to water quality detailed in Section 3.1.3, in order to ensure to minimize the possibility for spills of hazardous materials, the applicant proposes the following conditions of the CDUP:

- Unused materials and excess fill will be removed and disposed of at an authorized waste disposal site.
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will be

Love New Single-Family Residence at Kaueleau Environmental Assessment

asked to adhere to “Good Housekeeping” for all appropriate substances, with the following instructions:

- Onsite storage of the minimum practical quantity of hazardous materials necessary to complete the job;
- Fuel storage and use will be conducted to prevent leaks, spills or fires;
- Products will be kept in their original containers unless unresealable, and original labels and safety data will be retained;
- Disposal of surplus will follow manufacturer’s recommendation and adhere to all regulations;
- Manufacturers’ instructions for proper use and disposal will be strictly followed;
- Regular inspection by contractor to ensure proper use and disposal;
- Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance to minimize leakage;
- Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean
- All spills will be cleaned up immediately after discovery, using proper materials that will be properly disposed of;
- Regardless of size, spills or toxic or hazardous materials will be reported to the appropriate government agency;
- Should spills occur, the spill prevention plan will be adjusted to include measures to prevent spills from re-occurring and for modified clean-up procedures.

3.2 Socioeconomic and Cultural

3.2.1 Land Use, Socioeconomic Characteristics and Recreation

Existing Environment

Because of the gradual occupation of lots developed during widespread land subdivision about fifty years ago, the Puna District has been the Big Island’s fastest-growing district over the last thirty years. Population as measured in the 2010 U.S. Census was 45,326, a 66 percent increase over the 2000 count of 27,232. Despite a lack of basic infrastructure such as paved roads and water in most subdivisions, the relatively inexpensive lots, which typically range in size from one to three acres, have attracted residents from the U.S. mainland and other parts of the State of Hawai‘i seeking more affordable property. The basis of the economy of Puna has evolved from cattle ranching and sugar to diversified agriculture, various services for the growing populations, commuting to Hilo, and tourism, which has been stimulated by being home to Kilauea, one of the world’s most active volcanoes.

Some Puna subdivisions, especially between Pahoa and Hilo, are now essentially bedroom communities for Hilo’s workforce, as evidenced by the heavy flow of Hilo-bound traffic during the AM rush hour.

The Love property is bordered by the shoreline to the southeast, by the Red Road to the northwest, and by lots with homes on them to the northeast and southwest. Across the Red Road are a number of other lots,

many of them with homes.

Like all other areas in Puna, there is a high demand for coastal recreation here. Despite the long coastline, there are few beaches in Puna, and in most location, ocean recreation consists primarily of fishing from the cliffs and enjoying limited bathing in tidepools. There is relatively little use of the rough and irregular shoreline in this area. Maps of public accesses provided by the County of Hawai‘i do not indicate any nearby official *mauka-makai* shoreline public accesses from the Red Road (<http://www.hawaiiicounty.gov/pl-shoreline-access-big-island>). However, from informal access trails to the southwest and northeast that connect the Red Road to the shoreline, fisherman and *opihi* pickers access fishing spots perched on fingers of lava (see Figure 2). In doing so they often traverse a crude, path running along the top of the cliff on the Love Property and the State property that lies *makai* of the northeastern part of the Love Property.

Impacts and Mitigation Measures

No adverse socioeconomic impacts are expected to result from the project. The project will have a very small positive economic impact for the County of Hawai‘i. The residence and associated improvements will not adversely affect recreation, as access along the shoreline will not be affected. The proposed residential use will not interfere in any way with this continuing use. Dr. Love has been informed of the rights of the public to utilize these areas and the cultural and subsistence importance of these practices, and expects that conditions ensuring continued public access along the front of the property will be codified within the Conservation District Use Permit to make the access situation explicit.

3.2.2 Cultural and Historic Resources

An archaeological assessment survey and a cultural impact assessment were prepared for the property and are attached as Appendices 3 and 4, respectively. Research for this report included primary fieldwork, consultation of archaeological and ethnographical studies and primary documents including maps and Mahele testimony, and consultation of informants. In the interest of readability, the summary below does not include all scholarly references; readers interested in extended discussion and sources may consult Appendix 3. Separately, the Office of Hawaiian Affairs and Malama O Puna were consulted to determine whether they had any information on natural or cultural resources that might be present or affected, and additional research on cultural resources and impacts was conducted.

Historical and Cultural Background

The first inhabitants of Hawai‘i were believed to be settlers who had undertaken difficult voyages across the open ocean. For many years, researchers have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai‘i were underway by A. D. 300, although recent work suggests that Polynesians may not have arrived in Hawai‘i until at least A. D. 1000 (Kirch 2012).

The initial inhabitants of Hawai‘i are believed to have come from the southern Marquesas Islands and settled initially on the windward side, eventually expanding to leeward areas. Early Hawaiian farmers

developed new strategies and tools for their new environment (Kirch 2012; Pogue 1978). Societal order was maintained by their traditional philosophies and by the conical clan principle of genealogical seniority (Kirch 2012). Universal Polynesian customs brought from their homeland included the observance of major gods *Kane*, *Ku*, and *Lono*; the *kapu* system of law and order; cities of refuge, various superstitions, and the concepts of *mana* and the *'aumakua* (Fornander 1969).

The Development Period, believed under Kirch's new concept to have occurred from A. D. 1100 to 1350, brought an evolution of traditional tools, including a variation of the adze (*ko'i*), and some new Hawaiian inventions such as the two-piece fishhook and the octopus-lure breadloaf sinker. That was followed by the Expansion Period (A. D. 1350 to 1650) which saw greater social stratification, intensive land modification, and population growth. This period was also the setting for the second major migration to Hawai'i, this time from Tahiti. Also established during this period was the *ahupua'a*, a land-use concept that incorporated all of the eco-zones from the mountains to the shore and beyond. The usually wedge-shaped *ahupua'a* provided a diverse subsistence resource base (Hommon 1986) and added another component to what was already becoming a well-stratified society (Kirch 2012).

Ahupua'a were ruled by *ali'i 'ai ahupua'a* or lesser chiefs and managed by a *konohiki*. *Ali'i* and *maka'ainana*, or commoners, were not confined to the boundaries of *ahupua'a* as resources were shared when a need was identified. *Ahupua'a* were further divided into smaller sections such as *'ili*, *mo'o'aina*, *pauku'aina*, *kihapai*, *koele*, *hakuone* and *kuakua*. The chiefs of these land units have their allegiance to a territorial chief or *mo'i* (literally translated as king) (Hommon 1986). The project site is located within Keonepoko Iki *Ahupua'a*, a land unit of the District of Puna, one of six major districts on the island of Hawai'i.

As population grew during the following centuries so did the reach of inland cultivation in the upland environmental zones and consequent political and social stresses. During the Proto-Historic Period (A. D. 1650-1795), wars reflective of a complex and competitive social environment are evidenced by *heiau* building. During this period, sometime during the reign of Kalaniopu'u (A. D. 1736-1758), Kamehameha I was born in North Kohala.

As McGregor stated, "Puna is where new land is created and new growth and new life sprout. The new land is sacred, fresh, clean, and untouched. After vegetation begins to grow upon it, it is ready for human use." (2007:145). In Precontact and early Historic times the people lived in a small number of small settlements along the coast where they subsisted on marine resources and agricultural products. Each of the villages, McEldowney noted:

"...seems to have comprised the same complex of huts, gardens, windbreaking shrubs, and utilized groves, although the form and overall size of each appear to differ. The major differences between this portion of the coast and Hilo occurred in the type of agriculture practiced and structural forms reflecting the uneven nature of the young terrain. Platforms and walls were built to include and abut outcrops, crevices were filled and paved for burials, and the large numbers of loose surface stones were arranged into terraces. To supplement the limited and often spotty deposits of soil, mounds were built of gathered soil, mulch, sorted sizes of stones, and in many circumstances, from burnt brush and surrounding the gardens.

Love New Single-Family Residence at Kaueleau Environmental Assessment

Although all major cultigens appear to have been present in these gardens, sweet potatoes, ti (*Cordyline terminalis*), noni (*Morinda citrifolia*), and gourds (*Lagenaria siceraria*) seem to have been more conspicuous. Breadfruit, pandanus, and mountain apple (*Eugenia malaccensis*) were the more significant components of the groves that grew in more disjunct patterns than those in Hilo Bay” [1979:17].

Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne. Because of the relatively young geological history and persistent volcanic activity, the region has a strong association with Pele. However, the connection to Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests. It is said that before Pele migrated to Hawai‘i from Kahiki, Puna was esteemed the most beautiful place in the islands by many. Contributing to that beauty were the groves of fragrant hala and forests of ‘ōhi‘a lehua for which Puna was famous. The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving.

Traditional life in Hawai‘i took a sharp turn on January 18, 1778 with the arrival of British Capt. James Cook in the islands. On a return trip to Hawai‘i ten months later, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawai‘i Island. Cook exchanged gifts with Kalaniopu‘u at Kealahakua Bay the following January, and Cook left Hawai‘i in February. However, Cook’s ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealahakua, setting the stage for his death on the shores of the bay.

During the Proto-Historic Period there was a continuation of the trend toward intensification of agriculture, *ali* ‘i-controlled aquaculture, settling of upland areas and development of traditional oral history. The *Ku* cult, *luakini heiau* and the *kapu* system were at their peaks, but the influence of western civilization was being felt in the introduction of trade for profit and a market-system economy. By 1810, the sandalwood trade established by Europeans and Americans twenty years earlier was flourishing. That contributed to the breakdown of the traditional subsistence system, as farmers and fishermen were required to toil at logging, which resulted in food shortages and a decline in population.

The rampant sandalwood trade resulted in the first Hawaiian national debt, as promissory notes and levies granted by American traders were enforced by American warships. The assimilation of western ways continued with the short-lived whaling industry to the production of sugarcane, which was more lucrative but carried a heavy environmental price.

Following the death of Kamehameha I in 1819, the customary relaxing of *kapu* took place. But with the introduction of Christianity shortly thereafter, his successor, Kamehameha II, renounced the traditional religion and ordered that *heiau* structures either be destroyed or left to deteriorate. The family worship of ‘aumakua images was allowed to continue.

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai‘i scouting communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a

journal (Ellis 1963). His writings contain descriptions of residences and practices elsewhere in Puna that are applicable to the general study area:

“As we approached the sea, the soil became more generally spread over the surface, and vegetation more luxuriant. About two p.m. we sat down to rest. The natives ran to a spot in the neighbourhood, which had formerly been a plantation, and brought a number of pieces of sugar-cane, with which we quenched our thirst, and then walked on through several plantations of sweet potato belonging to the inhabitants of the coast . . . (Ellis 1963:182-183)

The population in this part of Puna, though somewhat numerous, did not appear to possess the means of subsistence in any great variety or abundance; and we have often been surprised to find desolate coasts more thickly inhabited than some of the fertile tracts in the interior; a circumstance we can only account for, by supposing that the facilities which the former afford for fishing, induce the natives to prefer them as places of abode; for they find that where the coast is low, the adjacent water is usually shallow.

We saw several fowls and a few hogs here, but a tolerable number of dogs, and quantities of dried salt fish, principally albacores and bonitos. This latter article, with their *poē* [*poi*] and sweet potatoes, constitutes nearly the entire support of the inhabitants, not only in this vicinity, but on the sea coasts of the north and south parts of the island.

Besides what is reserved for their own subsistence, they cure large quantities as an article of commerce, which they exchange for the vegetable productions of Hilo and Mamakua [Hāmākua], or the *mamake* and other tapas of Ora [‘Ōla‘a] and the more fertile districts of Hawaii.

When we passed through Punau [Pānau], Leapuki [Laeapuki], and Kamomoa [Kamoamo], the country began to wear a more agreeable aspect. Groves of coca-nuts ornamented the projecting points of land, clumps of kou-trees appeared in various directions, and the habitations of the natives were also thickly scattered over the coast . . .” (Ellis 1963:190-191).

A year after Ellis’ visit, in 1824, the ABCFM established a base church in Hilo. From that church (Haili), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman, who came to Hawai‘i in 1832, and Titus Coan who arrived in 1835, were two of the most influential Congregational missionaries in Puna and Hilo. As part of their duties they compiled census data for the areas within their missions. In 1835, 4,800 individuals were recorded as residing in the district of Puna; the smallest total district population on the island of Hawai‘i. In 1841, Titus Coan recorded that most of the 4,371 recorded residents of Puna lived near the shore, the site of the Love property, though there were hundreds of individuals who lived inland.

The *Mahele ‘Aina* took place in 1848, placing all land in Hawai‘i into three categories: Crown Lands, Government Lands and Konohiki Lands. Ownership rights were “subject to the rights of the native tenants,” or those individuals who lived on the land and worked it for their subsistence and for their chiefs. Kaueleau Ahupua‘a was awarded to Victoria Kamamalu Ka‘ahumanu IV as Land Commission

Love New Single-Family Residence at Kaueleau Environmental Assessment

award (LCA) 7713:13. Victoria Kamamalu was the daughter of Ka‘ahumanu II and granddaughter of King Kamehameha. Victoria was raised on O‘ahu by her father, Kekuanao‘a who was the royal governor of O‘ahu. She was a close childhood friend of Queen Lili‘uokalani. Victoria was made Kuhina Nui in 1855, proceeding over the King's Privy Council. She died in 1866 at the age of twenty seven. Much of her land holdings passed to her father, and then to her half-sister Ke‘elikolani. Bernice Pauahi Bishop inherited the majority of the land and that land is now held by Kamehameha Schools.

Land use in the Puna District changed quickly in the late 19th century. The Hawaiian government surveyed and began selling homestead lots in Puna in the 1880s. The project site was part of Grant 3232 to Naahumakua. Soon, however, the native system of agricultural had nearly completely disappeared as a result the drastic population decline, and ranching, sugarcane, coffee, and lumber became the dominant industries. The Keaau Ranch had begun grazing cattle as early as the 1850s and ranching operations continued to expand during this time. A wharf was built north of the project area in Pohoiki in the 1870s. The Olaa-Puna Sugar Company was established in 1900 at Kapoho, and sugarcane fields were planted and tended inland to the west and southwest of the current project area. The Olaa and Puna Sugar Companies operated in Puna from 1900 until the 1980s.

The newly established agricultural businesses and influx of homesteaders and employees necessitated the upgrade of existing transportation routes and the construction of new routes. The construction of new travel routes influenced where people settled and lived. There is an historic trail that leads from the modern day Lili‘uokalani Gardens area to Hā‘ena along the Puna coast. The trail is often called the old Puna Trail and/or Puna Road. There is an historic trail/cart road that is also called the Puna Trail (Ala Hele Puna) and/or the Old Government Road that continues from the south end of the Puna Trail through Kaueleau Ahupua‘a heading to points south. A portion of the Old Government Road later was paved over for the Kapoho-Kalapana Road, which borders the northwest edge of the Love property.

Beginning in 1900, railroad tracks were laid by the Hawaii Railway Company for hauling sugarcane (and passenger travel) from the fields in lower Puna to the mills in Pahoa and Kea‘au. Surveyor Walter Wall's 1927 Hawaii Government Survey Map of Puna, Keauohana and Malama-iki Forest Reserve showed that the railroad line that extended to Kapoho was expanded to the east as far as Kaueleau Ahupua‘a (at about the 400 foot elevation; a portion is still shown on current USGS topographic maps). All railroads in Puna ceased operations after the devastating tsunami of 1946 wiped out the central hub of Hilo. As the 20th century advanced, the Puna District underwent further and even more drastic changes. By 1950, most inhabitants of this part of the Puna coast moved away.

A constant through all these eras of history that the well-developed Hawaiian traditions of fishing and collecting food from the ocean continue to be practiced. This orientation to the coast and the traditional practices developed in Hawai‘i are still passed down generation to generation and persist today. Many fishermen catch *pūhi* to fish for *‘ulua* along the cliffs of Puna. Whether they use a hand-line or rod and reel, they use knowledge and techniques of past fishermen to select fishing locations, proper bait, and technique. Fishermen throw net, fish by rod and reel, or spear fish at different locations along the shoreline to catch specific fish such as *āholehole*, *‘āweoweo*, *kala*, *kole*, *kūmū*, *manini*, *mamo*, *moana* and many other types of fish. Many people still fish with rod and along the shore on this coastline, including in front of the subject property, or fish by boat out of Pohoiki for *akule*, *kawele‘ā*, *mahimahi*, *ono*,

Love New Single-Family Residence at Kaueleau Environmental Assessment

‘ōpakapaka, and other species. In addition, the traditional collection of ‘ōpihi, ‘a‘ama, and limu along the rocky shoreline is still practiced. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by State law.

Archaeological Investigations and Resources

Three archaeological investigations have been conducted in nearby areas of Kaueleau Ahupua‘a. Bevacqua and Dye (1972) identified Pua‘akanu Cemetery (Site 2534) northeast of the current project area and a portion of the King's trail along the coast during the course of an archaeological reconnaissance survey for the Kapoho-Kalapana Road (project area follows current road). Haun and Henry (2002) conducted an Archaeological Inventory Survey of Parcel 071 adjacent to the northeast side of the current project area property. No archaeological sites or historic properties were identified in that study.

Haun & Association conducted an Archaeological Assessment of the project site, which is contained in full in Appendix 3. The archaeologist found that most of the property has been significantly impacted by bulldozer disturbance. This disturbance occurred over the last four decades, prior to the purchase of the parcel by the current landowner. The majority of the parcel has been mechanically leveled and covered in cinders and is landscaped in introduced species, as discussed above. This mechanically leveled area is bordered on the northwest and southeast by bulldozed berms of stones and soil. Two water catchment tanks, a potting shed/garage and a small kennel are also present in this area. A modern house and pond are located in this area in the southern portion of the project area. No archaeological sites or historic properties were identified in the study.

Impacts to Archaeological Resources

Given the absence of archaeological resources on the property, the archaeologist concluded that the proposed development of a single family residence would not significantly impact any known historic properties. No further historic preservation work was recommended. The archaeological assessment survey was filed with the State Historic Preservation Division (SHPD) on March 21, 2014. By letter of January 29, 2015, SHPD determined that no historic properties would be affected by the proposed action (see Appendix 1b).

In the unlikely event that any unanticipated resources are unearthed during development activities, the applicant will ensure that SHPD will be contacted, as outlined in HAR 13§13–280.

Cultural Resources and Practices

When assessing potential cultural impacts to resources, practices, and beliefs, input gathered from community members with genealogical ties and/or long-standing residency relationships to the study area is vital. It is precisely these individuals who ascribe meaning and value to traditional resources and practices. Community members may also retain traditional knowledge and beliefs unavailable elsewhere in the historical or cultural record of a place.

Love New Single-Family Residence at Kaueleau Environmental Assessment

As detailed in Appendix 4, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs; Kauanoë Hoomanawanui, SHPD Burial Sites Specialist; Kino Lee, Jr., Chairman of the Hawai‘i Island Burial Council; Rick Gmirkin, Ala Kahakai National Historic Trail, NPS Archaeologist; and Howard Konanui, area *‘ohana* member. Inquiries were also made to members of the community who are familiar with the project area lands through cultural, professional, or historical work, or are long-time residents of the area. Public notices were published in the Office of Hawaiian Affairs *Ka Wai Ola Newspaper*, and were published in the Honolulu Star Advertiser and the Hawai‘i Tribune Herald. Those individuals who had knowledge of the project area lands responded that they were not aware of any cultural resources or ongoing cultural practices or beliefs associated with those lands.

The investigations of the property and its history did not reveal any cultural resources or practices aside from these resources. The consulted individuals with ties to and history with the area did not have any information concerning the specific property, but one did discuss traditional gathering and fishing on the shoreline. Fishing and gathering still occur on the shoreline *makai* of the property in an area. While some users are newcomers simply engaging in recreation and/or collecting food, others have deeper ties and are undertaking cultural practices as well. The Love property does not contain any springs, *pu‘u*, or caves that might be important cultural sites. No gathering of plant material is noted from the property, and aside from a shoreline strip that includes a native portion that will not be disturbed in any way, all vegetation on is either non-native weeds or ornamental plantings. There are no cultural values or associations related to this vegetation.

Impacts and Mitigation Measures for Cultural Resources

Shoreline access and the cultural activities this affords will not be affected. It is reasonable to conclude, based upon the limited range of resources and the proposed mitigation to all affected resources, that the exercise of native Hawaiian rights related to gathering, access or other customary activities will not be affected, and there will be no adverse effect upon cultural practices or beliefs. This Draft EA was distributed to agencies and groups who might have knowledge in order to confirm this finding. No party reviewing the Draft EA supplied any cultural information.

3.3 Public Roads, Services and Utilities

3.3.1 Roads and Access

Existing Environment, Impacts and Mitigation Measures

The sole road access to the project site is via an existing driveway from County Road 137, the Kapoho-Kalapana Road (also known as the “Red Road”), (see Figure 1a and 1b). No driveway or road improvements are planned or needed, other than the expansion of the existing gravel driveway in the area of the new house site to provide an area for parking and turn-around.

3.3.2 Public Utilities and Services

Environmental Setting, Impacts and Mitigation Measures

No electric or telephone poles are present on this portion of the Red Road. Dr. Love plans to live off-grid utilizing solar photovoltaic and cellular telephones.

Domestic water supply would be through catchment, the most common method used by thousands of properties both along Government Beach Road and in Puna’s largest subdivisions, including 9,000-lot Hawaiian Paradise Park. The catchment water tank would have a capacity of 12,000 gallons to provide both water supply and fire flow in accordance with standards at 18.3.8 of the Hawai‘i Fire Code, including sections (1)-(3) and (5)-(6) apply, dealing with minimum tank size, pipe sizes, tank and valve construction and location, and inspection and maintenance. The applicant will provide a minimum 12,000-gallon water tank devoted expressly for firefighting purposes. It should be noted that when water variances to allow the use of water catchment system are issued by the County of Hawai‘i Planning Department, the Department – based on input from the Water and Fire Departments – require a minimum 9,000 gallon water storage system, 6,000 gallons of which would be for potable purposes and the remaining 3,000 for firefighting and emergency purposes. Further, the location and capacity of the emergency water system, including the necessary compatible connector system, has to meet with the approval of the Hawai‘i County Fire Department. The applicant will abide by these standards.

Wastewater would be treated with a septic system in conformance with requirements of the State Department of Health (see Figure 3 for location). No parks, schools or other public facilities are present nearby. Police, fire and emergency medical service are available about ten road miles away at new facilities on Highway 130 in Pahoehoe.

There will be no adverse impact to any public or private utilities. The addition of one single-family home will have no measurable adverse impact to or additional demand on public facilities such as schools, police or fire services, or recreational areas. Dr. Love applicant acknowledges and understand that this lot, along with almost all other residences in the Puna District, is not located within a mile of emergency services.

3.4 Secondary and Cumulative Impacts

Due to its small scale, the proposed project would not produce any major secondary impacts, such as population changes or effects on public facilities.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. No substantial government or private projects are known to be occurring or in planning for this portion of Puna. There are hundreds of single-family homes located on the Red Road between Pohoiki and Kalapana, and occasionally there are two or more homes under construction simultaneously. The adverse effects of building a single-family residence in this context are very minor and involve temporary disturbances to air quality, noise, traffic and visual quality during construction. It should again be noted that the proposed home is in a somewhat isolated, sparsely populated area, and no accumulation of adverse construction effects would be expected. Other than the precautions for preventing adverse impacts during construction listed above in Sections 3.1.3 and 3.1.6, no special mitigation measures should be required to counteract the small adverse cumulative effect.

3.5 Required Permits and Approvals

County of Hawai‘i:

Special Management Area Permit or Exemption
Plan Approval and Grubbing, Grading, and Building Permits

State of Hawai‘i:

Conservation District Use Permit
Wastewater System Approval

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i County General Plan

The *General Plan* for the County of Hawai‘i is the document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005. The General Plan’s Land Use Allocation Guide Map designates the subject parcel as Open. The *General Plan* is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i. Below are pertinent sections followed by a discussion of conformance.

ECONOMIC GOALS

- (a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
- (b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.
- (d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.

Discussion: The proposed construction and occupation of a single-family home is in balance with the natural, cultural and social environment of the County, would create temporary construction jobs for local residents, and would indirectly boost the economy through construction industry purchases from local suppliers. A multiplier effect takes place when these employees spend their income for food, housing, and other living expenses in the retail sector of the economy. Such activities are in keeping with the overall economic development of the island.

ENVIRONMENTAL QUALITY GOALS

- (a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
- (b) Maintain and, if feasible, improve the existing environmental quality of the island.
- (c) Control pollution.

ENVIRONMENTAL QUALITY POLICIES

- (a) Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

- (a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
- (b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
- (c) Federal and State environmental regulations shall be adhered to.

Discussion: The proposed construction and occupation of a single-family home would not have a substantial adverse effect on the environment and would not diminish the valuable natural resources of the region. The home and associated improvements would be compatible with the existing rural single-family homes and recreational uses in the area. Pertinent environmental regulations would be followed, including those for mitigation of water quality impacts.

Love New Single-Family Residence at Kaueleau Environmental Assessment

HISTORIC SITES GOALS

- (a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.
- (b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

- (a) Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
- (b) Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.
- (c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
- (d) Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: An archaeological assessment survey properly documented that no historic properties are present. There are no known cultural resources or known or expected cultural uses on the lot.

FLOOD CONTROL AND DRAINAGE GOALS

- (a) Protect human life.
- (b) Prevent damage to man-made improvements.
- (c) Control pollution.
- (d) Prevent damage from inundation.
- (e) Reduce surface water and sediment runoff.
- (f) Maximize soil and water conservation.

FLOOD CONTROL AND DRAINAGE POLICIES

- (a) Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
- (g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

FLOOD CONTROL AND DRAINAGE STANDARDS

- (a) "Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
- (b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
- (c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).

Love New Single-Family Residence at Kaueleau Environmental Assessment

- (d) Applicable standards and regulations of Chapter 10, “Erosion and Sedimentation Control,” of the Hawaii County Code.
- (e) Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The property is within Zone X, or areas outside of the 500-year floodplain as determined by detailed methods in the Flood Insurance Rate Maps (FIRM). The project will conform to applicable drainage regulations and policies of the County of Hawai‘i.

NATURAL BEAUTY GOALS

- (a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
- (b) Protect scenic vistas and view planes from becoming obstructed.
- (c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

- (a) Increase public pedestrian access opportunities to scenic places and vistas.
- (b) Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.

Discussion: The improvements are minor and consistent with traditional uses of the land and will not cause scenic impacts or impede access.

NATURAL RESOURCES AND SHORELINES GOALS

- (a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.
- (b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
- (c) Protect and promote the prudent use of Hawaii’s unique, fragile, and significant environmental and natural resources.
- (d) Protect rare or endangered species and habitats native to Hawaii.
- (e) Protect and effectively manage Hawaii’s open space, watersheds, shoreline, and natural areas.
- (f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

- (a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
- (c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.

Love New Single-Family Residence at Kaueleau Environmental Assessment

- (d) Protect the shoreline from the encroachment of man-made improvements and structures.
- (h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
- (p) Encourage the use of native plants for screening and landscaping.
- (r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
- (u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The home would be set back 71 feet from the shoreline at an elevation of about 25 feet above sea level, and would not affect shoreline resources or be damaged by waves or tides.

PUNA COMMUNITY DEVELOPMENT PLAN

The Puna Community Development Plan (CDP) encompasses the judicial district of Puna, and was developed under the framework of the February 2005 County of Hawai‘i General Plan. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area.

The Puna CDP does not specify land use in the project area, but contains the following Goals for Managing Growth that are relevant to the action.

3.1.1 Goals (for Managing Growth)

- a. Puna retains a rural character while it protects its native natural and cultural resources.
- b. The quality of life improves and economic opportunity expands for Puna’s residents.
- d. Exposure to high risk from natural hazards situations is reduced.
- f. Native vegetation, coastal and historic resources are provided new forms of protection.

Discussion: The proposed single-family home helps the area retain a rural character and through provision of housing and expansion of a market for local goods and services, it improves the quality of life and economy. The lot shares the same volcanic and seismic hazard as all of Puna, the by virtue of the home’s proposed location on the lot, coastal hazard is avoided. No native vegetation, rare species, coastal resources or historic sites will be adversely affected. The replacement of a single-family home is not inconsistent with the Puna CDP.

3.6.2 Hawai‘i County Zoning and Special Management Area

The State Land Use District for the area for the area of the property proposed for the single-family home is Conservation. *Mauka* of this coastal portion the property is within the State Land Use Agricultural District. The entire property is zoned by the County of Hawai‘i as within the Agricultural District, minimum lot size of one acre (A-1a), although County zoning does not apply in the Conservation District portion of the property. No aspect of the project appears to be inconsistent with County zoning.

Love New Single-Family Residence at Kaueleau Environmental Assessment

The entire property is within the Special Management Area. Single-family residences may be determined to be an exempt action under the County's Special Management Area (SMA) guidelines. The County of Hawai'i Planning Department requires preparation of an SMA Assessment Application, in which SMA issues are expressly dealt with. A summary of consistency is provided below.

The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled *Coastal Zone Management*. Single-family residences may be determined to be an exempt action under the County's Special Management Area (SMA) guidelines. The proposed use would be consistent with Chapter 205A because it would not affect public access to recreational areas, historic resources, scenic and open space resources, coastal ecosystems, economic uses, or coastal hazards.

The proposed improvements are not likely to result in any substantial adverse impact on the surrounding environment. The house site is set back from the shoreline and will not restrict any shoreline uses such as hiking, fishing or water sports. Lateral pedestrian use of the shoreline area will not be impacted and there will be no effect on the public's access to or enjoyment of this shoreline area. Furthermore, viewplanes towards the project site will not be adversely impacted in any substantial way, as views from the Red Road are totally blocked by trees. It is expected that the project will not result in any impact on the biological or economic aspects of the coastal ecosystem. The project site is not situated over any natural drainage system or water feature that would flow into the nearby coastal system. The property contains mostly non-native and a few common native plants. No floodplains are present in the area. In terms of beach protection, construction is set back from the shoreline and would not affect any beaches nor adversely affect public use and recreation of the shoreline in this area. No impacts on marine resources are likely to occur. No historic sites are present and there are no known cultural resources or practices.

The Planning Director has been asked to make the determination that the proposed development of a single-family home is not considered a "development" under Special Management Area Rules and Regulations of the County of Hawai'i, Section 9-4 (10) (B) and is otherwise not subject to an SMA Major Permit.

3.6.3 Conservation District

The State Land Use District for the Love property is Conservation. Its subzone is Resource, for which, according to Hawai'i Administrative Rules (HAR) §13-5-15, a single-family residence is an identified use. The portion of the property proposed for use is in the State Land Use Conservation District, Resource subzone. Any proposed use must undergo an examination for its consistency with the goals and rules of this district and subzone. The applicant has concurrently prepared a Conservation District Use Application (CDUA), to which this EA is an appendix. The CDUA includes a detailed evaluation of the consistency of the project with the criteria of the Conservation District permit process. Briefly, the following individual consistency criteria should be noted:

1. The proposed land use is consistent with the purpose of the Conservation District;

Love New Single-Family Residence at Kaueleau Environmental Assessment

The development of the single-family residence is in conformance with the purpose of the Conservation District. The proposed use of the subject property for a single-family residence is an identified use within the Conservation District, requiring a Board Permit for such use. A commitment by the applicant to management of the site will conserve, protect and preserve the natural features on the subject property. The proposed use will not impact the lateral public access or the public's ability to utilize the coastal resources that front this property. Additionally, due to the careful and limited nature of the proposed development, there would be no significant impacts to the natural or cultural resources of the area.

2. The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;

The objective of the Resource subzone "...is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." This identified use, which conforms to the design standards in 13-5-41, will ensure the sustained use of the natural resources in the project area by mitigating potential impacts as outlined in this document. Single-family residences are an identified use in the Resource subzone under HAR 13-5-24, R-8.

3. The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawaii Revised Statutes (HRS), entitled "Coastal Zone Management," where applicable;

The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled *Coastal Zone Management*, as discussed above in Section 3.6.2.

4. The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region;

Because of the relatively minor nature of the project and the lack of native terrestrial ecosystems and threatened or endangered plant species, the replacement of a single-family residence is not likely to cause adverse biological impacts. Impacts to the island wide-ranging endangered Hawaiian hoary bat and Hawaiian Hawk will be avoided through timing of vegetation removal and/or hawk nest survey. The applicant is planning to leave the existing landscape in place except where clearing is necessary for the house pad, accessory structures and shoreline view/breeze corridor, which will minimize the visual impact of the structure as seen from adjacent public areas. No effect on any coastal ecosystem will occur, because of the extensive vegetated area fronting the proposed home site, and the planned precautions for preventing soil runoff during constructions. The proposed action will also have no impact on the public's current access to or use of the shoreline area.

5. The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

The proposed use is consistent with single-family residential use in the area. The proposed two-story home will be 24 feet high 2,844 square feet in size and will be set back a minimum of 71 feet from a *pali* that marks the shoreline, approximately 25 to 30 feet above sea level, outside the flood zone. It will be in

Love New Single-Family Residence at Kaueleau Environmental Assessment

area not visible to the public. This identified use, which conforms to the design standards in HAR 13-5-41, will ensure the sustained use of the natural resources in the project area by mitigating impacts. The use will not adversely affect the surrounding properties or how these properties are utilized.

6. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;

The proposed continued use of the subject property for a single-family residence and commitment to management of the site will help conserve, protect and preserve the natural features of the area.

7. Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District;

The proposed action does not involve or depend upon subdivision and will not lead to any increase in intensity of use beyond the requested single-family residence.

8. The proposed land use will not be materially detrimental to the public health, safety and welfare.

The general area is already in use for recreation by the public and the proposed single-family residence will not be detrimental to the public health, safety, and welfare.

PART 4: DETERMINATION, FINDINGS AND REASONS

4.1 Determination

Based on the findings below, and upon consideration of comments to the Draft EA, the applicant expects that the State of Hawai'i, Department of Land and Natural Resources, will determine that the proposed action will not significantly alter the environment, as impacts will be minimal, and that this agency will accordingly issue a Finding of No Significant Impact (FONSI).

4.2 Findings and Supporting Reasons

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resource would be committed or lost. Common native plants are present but native ecosystems would not be adversely affected. No archaeological sites or other historic properties are present. No valuable cultural resources and practices such as coastal access, fishing, gathering, hunting, or access to ceremonial sites would be affected in any way.

2. *The proposed project will not curtail the range of beneficial uses of the environment.* No restriction of beneficial uses would occur by continued residential use on this lot.

3. *The proposed project will not conflict with the State's long-term environmental policies.* The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy

Love New Single-Family Residence at Kaueleau Environmental Assessment

are to conserve natural resources and enhance the quality of life. The project is minor and basically environmentally benign, and it is thus consistent with all elements of the State's long-term environmental policies.

4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project would not have any substantial effect on the economic or social welfare of the Big Island community or the State of Hawai'i.

5. *The proposed project does not substantially affect public health in any detrimental way.* The project would not affect public health and safety in any way. Wastewater will be disposed of in conformance with State Department of Health regulations.

6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* The small scale of the proposed project would not produce any major secondary impacts, such as population changes or effects on public facilities.

7. *The proposed project will not involve a substantial degradation of environmental quality.* The project is minor and environmentally benign, and thus it would not contribute to environmental degradation.

8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* Thorough survey has determined that no endangered plant species are present. Other than bats and hawks, island wide-ranging species that will experience no adverse impacts due to mitigation in the form of timing of vegetation removal and/or hawk nest survey, no rare, threatened or endangered species of fauna are known to exist on or near the project site, and none would be affected by any project activities.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The adverse effects of building a single-family residence are very minor and temporary disturbance to traffic, air quality, noise, and visual quality during construction. This area is fairly isolated from sensitive receptors other than similar single-family residences. There are no substantial government or private projects in construction or planning, and no accumulation of adverse construction effects would be expected. Other than the precautions for preventing adverse effects during construction listed above, no special mitigation measures should be required to counteract the small adverse cumulative effect.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No substantial effects to air, water, or ambient noise would occur. Brief, temporary effects would occur during construction and would be mitigated.

11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* The proposed home is not located in a flood zone. The project site is 71 feet from the shoreline at an elevation of about 25 feet from the shoreline, outside

Love New Single-Family Residence at Kaueleau Environmental Assessment

the area historically affected by tsunami.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic views are located nearby or would be affected in any way. Coastal views from the Red Road are totally obstructed by a fence and several hundred feet of dense vegetation. The attractive design of the home and the landscaping, given the existing context in which the home would not be visible from public vantage points, would not materially degrade the scenery of the project area.

13. *The project will not require substantial energy consumption.* Negligible amounts of energy input would be required for construction.

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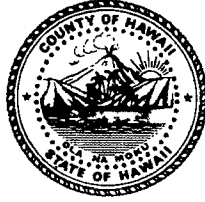
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**Environmental Assessment
Love Single-Family Residence in the
Conservation District at Kaueleau**

**APPENDIX 1a
Comments in Response to Early Consultation/SHPD Letters**

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William P. Kenoi
Mayor



Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT

349 Kapi`olani Street • Hilo, Hawai`i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

April 10, 2014

Mr. Ron Terry, Principal
Geometrician Associates
P. O. Box 396
Hilo, HI 96721

Dear Mr. Terry:


Subject: Environmental Assessment Early Consultation for Proposed Single-Family Residence in the Conservation District, Puna District, TMK 1-3-002:70

Staff has reviewed the request and does not anticipate any significant impact to traffic and/or other public safety concerns.

Thank you for allowing us the opportunity to comment.

If there are any questions, please contact Captain Samuel Jelsma, Commander of the Puna District, at 965-2716.

Sincerely,


HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

SJ:lli
140229

William P. Kenoi
Mayor



Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAII FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

April 10, 2014

Mr. Ron Terry
Geometrician Associates, LLC
PO Box 396
Hilo, Hawai'i 96721

Dear Mr. Terry,

RE: Early Consultation for Environmental Assessment for Proposed Single-Family
Residence in the Conservation District, Puna District
TMK: 1-3-002:070

In regards to the above-mentioned Early Consultation for Environmental Assessment, the following shall be in accordance:

NFPA 1, UNIFORM FIRE CODE, 2006 EDITION

Note: NFPA 1, Hawai'i State Fire Code with County 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 400ft² (37 m²) 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 accessways 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

Ron Terry
April 10, 2014
Page 9

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.

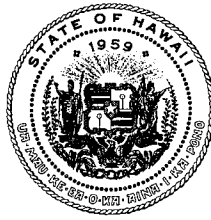
If there are any questions regarding these requirements, please contact the Fire Prevention Bureau at (808) 932-2913.

A handwritten signature in black ink, appearing to read "D. Rosario", with a stylized flourish at the end.

DARREN J. ROSARIO
Fire Chief

RP/lc

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



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

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

JESSE K. SOUKI
FIRST DEPUTY

WILLIAM M. TAM
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

REF: OCCL: AJR

COR: HA-14-175
APR 23 2014

Ron Terry
c/o Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

SUBJECT: INFORMATION REGARDING THE PROPOSED CONSTRUCTION OF A SINGLE FAMILY RESIDENCE (SFR) IN THE CONSERVATION DISTRICT
Puna District, Island of Hawaii
TMK: (3) 1-3-002:070

The Office of Conservation and Coastal Lands (OCCL) is in receipt of your letter regarding a proposal to construct a Single Family Residence (SFR) on the subject parcel which is located within the State Land Use Conservation District Resource Subzone.

According to the information provided to this office, you are at the initial planning stages of this proposed project and are requesting comments and/or concerns regarding the construction of a SFR on the subject parcel.

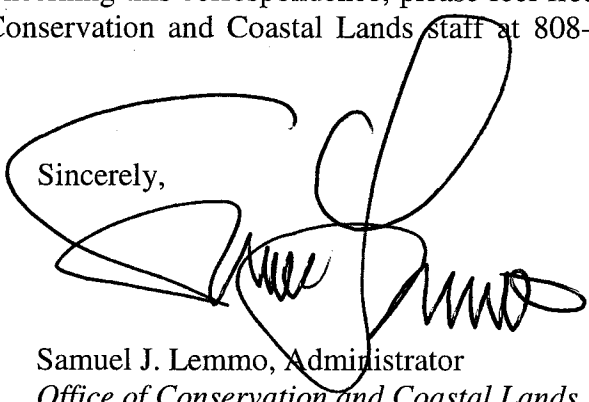
The construction of a SFR is an identified land use in the Conservation District Resource Subzone pursuant to Hawaii Administrative Rules (HAR) §13-5-24, R-7 SINGLE FAMILY RESIDENCE (D-1) *a single family residence that conforms to design standards as outlined in this chapter*;

In order to apply for a SFR on the subject parcel the applicant/landowner will be required to submit a Draft Environmental Assessment (EA) document as part of the Conservation District Use Application (CDUA). Additionally, a shoreline certification will be required to determine the appropriate shoreline setbacks for the proposed land uses. Similarly, the subject parcel is located within the County of Hawaii Special Management Area (SMA) so an SMA determination will also be required from the County of Hawaii Department of Planning.

In order to adequately process your request, and to ensure that all existing uses on the subject parcel have been authorized, the OCCL is requesting that the applicant submit with the CDUA a general inventory survey of the parcels existing buildings, landscaping, horticulture, cleared areas and other appurtenances. Additionally, the OCCL further requests that site photographs of all the existing land uses be submitted as part of the application packet. Also note that the existing SFR on the parcel will be required to be removed prior to the start of construction of the new SFR and associated land uses.

Should you have any questions concerning this correspondence, please feel free to contact Alex J. Roy, M.Sc. of our Office of Conservation and Coastal Lands staff at 808-587-0316 or via email at alex.j.roy@hawaii.gov

Sincerely,



Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

CC: *Chairperson*
DLNR – HDLO
DLNR – DOFAW
County of Hawaii – Planning Department

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
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

May 1, 2014

Geometrician Associates
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Environmental Assessment Early Consultation for Proposed Single-Family Residence in the Conservation District, Geometrician Associates, LLC for Dr. Charles Love, Applicant, Puna, Hawaii, TMK: (3) 1-3-002:070

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

At this time, enclosed are comments from the (i) Engineering Division, (ii) Hawaii District Land Office, and (iii) the Division of Aquatic Resources on the subject matter. Should you have any questions, please feel free to call Kevin Moore at (808) 587-0426. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
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

April 8, 2014

MEMORANDUM

TO: FR

DLNR Agencies:

- ☒ Div. of Aquatic Resources
- ☐ Div. of Boating & Ocean Recreation
- ☒ Engineering Division
- ☐ Div. of Forestry & Wildlife
- ☐ Div. of State Parks
- ☐ Commission on Water Resource Management
- ☒ Office of Conservation & Coastal Lands
- ☒ Land Division – Hawaii District
- ☒ Historic Preservation

TO:

FROM:

SUBJECT:

Stouffer Center for the Built Environment

Russell Y. Tsuji, Land Administrator

Environmental Assessment Early Consultation for Proposed Single-Family Residence in the Conservation District

LOCATION:

Puna, Hawaii, TMK: (3) 1-3-002:070

APPLICANT:

Geometrician Associates, LLC for Dr. Charles Love

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by April 29, 2014.

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 Kevin Moore at 587-0426. Thank you.

Attachments

- ☐ We have no objections.
- ☐ We have no comments.
- ☒ Comments are attached.

Signed: _____

Print name: _____

Cory S. Chong, Chief Engineer

Date: _____

cc: Central Files

14 APR 9 PM 3:42 ENGINEERING

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

LD/ Russell Y. Tsuji

Ref.: EA Early Consultation for Proposed Single-Family Residence in the Conservation District,
Puna
Hawaii.023

COMMENTS

- () We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ____.
- (X) **Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in an area of minimal tsunami inundation. The National Flood Insurance Program does not have any regulations for developments within this area.**
- () Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ____.
- () Please note that the project site must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- () Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
 - () Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.
 - () Mr. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.
 - () Mr. Stanford Iwamoto at (808) 241-4896 of the County of Kauai, Department of Public Works.
- () The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
 - () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

() Additional Comments: _____

() Other: _____

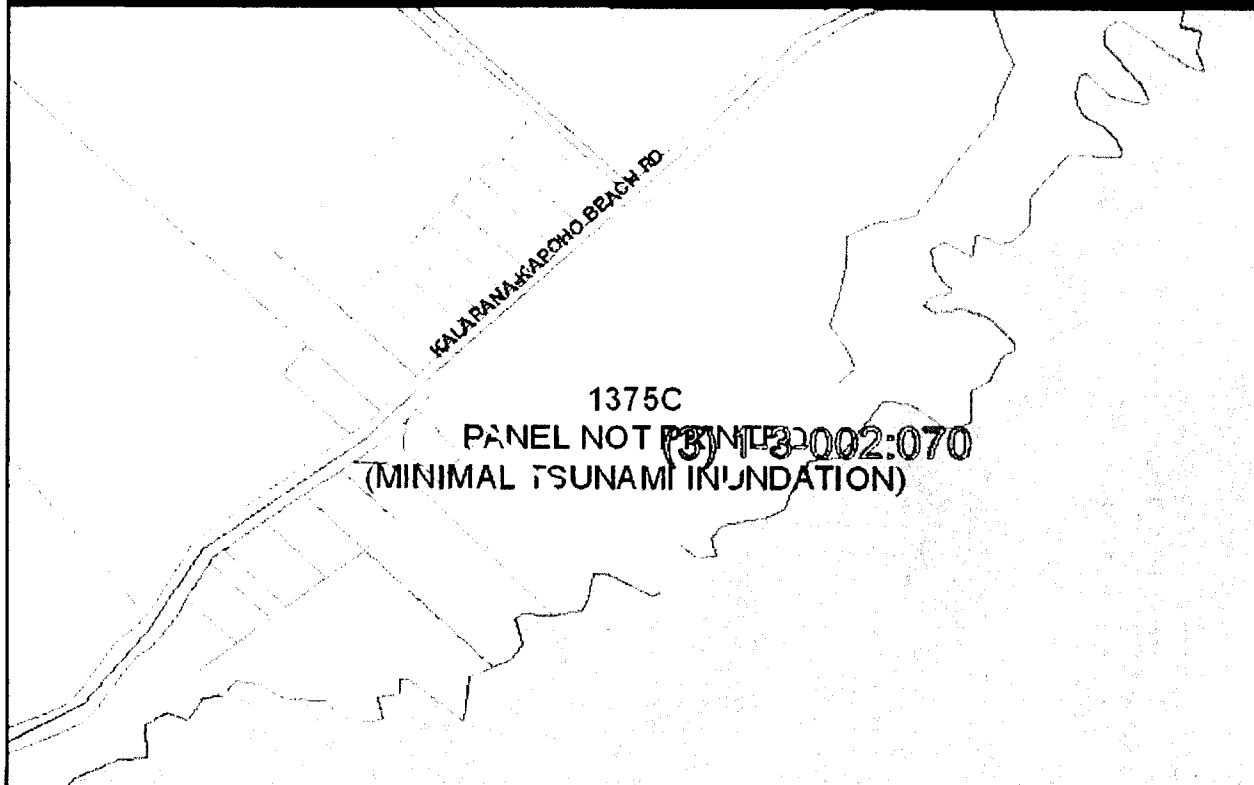
Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 4/11/14 _____



State of Hawaii FLOOD HAZARD ASSESSMENT REPORT



FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard 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 requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY: HAWAII
TMK NO: (3) 1-3-002-070
PARCEL ADDRESS: 13-6523 KAPOHO KALAPANA ROAD
PAHOA, HI 96778
FIRM INDEX DATE: APRIL 02, 2004
LETTER OF MAP CHANGE(S): NONE
FEMA FIRM PANEL(S): 1551661375C
PANEL EFFECTIVE DATE: PANEL NOT PRINTED

PARCEL DATA FROM: JUNE 2013
IMAGERY DATA FROM: MAY 2005

IMPORTANT PHONE NUMBERS

County NFIP Coordinator
County of Hawaii
Frank DeMarco, CFM (808) 961-8042
State NFIP Coordinator
Carol Tyau-Beam, P.E., CFM (808) 587-0267

Disclaimer: The Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR from any liability which may arise from its use.

If this map has been identified as 'PRELIMINARY' or 'UNOFFICIAL' please note that it is being provided for informational purposes and is not to be used for official/legal decisions, regulatory compliance, or flood insurance rating. Contact your county NFIP coordinator for flood zone determinations to be used for compliance with local floodplain management regulations.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.
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

2014 APR 10 P 1:14

RECEIVED
LAND DIVISION
HILO, HAWAII

April 8, 2014

MEMORANDUM

TO: DLNR Agencies:
☒ Div. of Aquatic Resources
☐ Div. of Boating & Ocean Recreation
☒ Engineering Division
☐ Div. of Forestry & Wildlife
☐ Div. of State Parks
☐ Commission on Water Resource Management
☒ Office of Conservation & Coastal Lands
☒ Land Division – Hawaii District
☒ Historic Preservation
Stouffer Certification Group

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: *Environmental Assessment Early Consultation for Proposed Single-Family Residence in the Conservation District*

LOCATION: Puna, Hawaii, TMK: (3) 1-3-002:070

APPLICANT: Geometrician Associates, LLC for Dr. Charles Love

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by April 29, 2014.

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 Kevin Moore at 587-0426. Thank you.

Attachments

- () We have no objections.
(☒) We have no comments.
() Comments are attached.

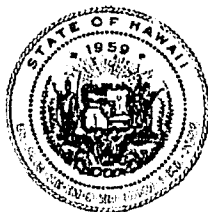
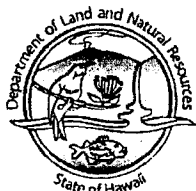
Signed: *Gordon C. Heit*

Print name: *GORDON C. HEIT*

Date: *4/17/14*

cc: Central Files

NEIL ABFRCROMBIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813
Telephone: 587-0100

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
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BUREAU OF CONSERVATION
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KAHOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

Date: (Apr 14, 2014)
DAR # (DAR 4959)

MEMORANDUM

TO: Frazer McGilvray, DAR Administrator (RF) APR 14 2014
FROM: William j Walsh Ph.D, Aquatic Biologist (Wjw)
THRU: Jo-Anne N. Kushima, Aquatic Biologist
SUBJECT: Early Consultation for Proposed Single-Family Residence in the Conservation District

Comment	Date	Request	Receipt	Referral	Due Date
	(Apr 14, 2014)	(Apr 07, 2014)	(Apr 10, 2014)	(Apr 11, 2014)	(Apr 29, 2014)

Requested by: Russell Y. Tsuji, Land Administrator

Summary of Proposed Project

Title: Environmental Assessment Early Consultation for Proposed Single-Family Residence in the Conservation District

Project by: Geometrician Associates, LLC for Dr. Charles Love

Location: Puna, Hawaii, TMK: (3) 1-3-002:070

Brief Description: proposal to construct a single story family dwelling on a 7.34-acre property located makai of County Road 137, the Kapoho-Kalapana Road (also known as the "Red Road"), southwest of the village of Opihikao in the Puna District of the island of Hawai'i. The property is within the State Land Use Conservation District.

Comments: DAR has substantial concerns regarding the potential impacts of development occurring in such close proximity to nearshore coastal waters and coral reefs. An increasing number of studies indicate rapid movement of groundwater from land to nearby coastal regions creating a substantial connectivity between land use practices, water quality and coastal health. Nutrient enrichment beyond background ocean levels can lead to potentially explosive growth of certain undesirable algae which can permanently kill coral and negatively impact coral reef fishes and other reef inhabitants. The effect of such nutrient enrichment is likely cumulative and we need to minimize additional inputs in sensitive coastal areas. There are there are a number of ways to dispose of residential wastewater, without the use of cesspools or septic systems. Such an alternative needs to be incorporated in the construction of this home, even if initially more expensive, because of the long-term

impacts to the health of coastal regions. Protection of groundwater and coastal waters from pollution is essential if we are to maintain sustainable and resilient ecosystems and the health of our coasts and ocean food supply.

Given the ever increasing threats to our highly valuable coral reefs concerted efforts must also be taken in this sensitive area to reduce/eliminate the potential deleterious effects of sedimentation impacts, even if they are infrequent.

Thank you for providing DAR the opportunity to review and comment on the proposed project. Please provide notice of the availability of the EA when it is completed.

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**Environmental Assessment
Love Single-Family Residence in the
Conservation District at Kaueleau**

**APPENDIX 1b
Comments to Draft EA Responses**

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

75 Aupuni Street, Room 204
Hilo, Hawaii 96720
PHONE: (808) 961-9590
FAX: (808) 961-9599

January 15, 2015

MEMORANDUM

TO: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

FROM: Candace Martin, Land Agent, HDLO 

SUBJECT: Request For Comments – Conservation District Use Application (CDUA)
HA-3727 and Draft Environmental Assessment (DEA) for the *Love Single Family Residence* (SFR) Project, Puna District, Island of Hawaii, TMK:
(3) 1-3-002:070.

In response to your request for comments on the subject matter referenced above, we offer the following:

The subject parcel is part of a consolidation of Grant 3232 Apana 2 and Government remnant B, which was the result of a land exchange between the Territory of Hawaii and the owners of Grant 3232 Apana 2 as evidenced by Land Office Deed No. 15,323 and Land Patent Grant No. 13,514, recorded July 21, 1958.

The southeasterly boundary of Government remnant B became a portion of the makai boundary of Grant 3232 Apana 2. Land Patent Grant No. 13,514 reserved unto the Territory of Hawaii an "easement 20-feet wide within and parallel to the southeasterly boundary" of Government remnant B. The metes and bounds description of the southeasterly boundary is defined as following the "top of pali".

Later subdivision of Grant 3232 Apana 2, created the subject parcel with a makai boundary that follows the top of pali, reserving to the State of Hawaii a 20-foot easement as described in Land Patent Grant No. 13,514. Subsequent surveys have updated the makai metes and bounds description in response to the change in the top of pali resulting from erosion as illustrated in the Coastal Erosion Study.

While it may be presumed the easement is to allow for unimpeded access to the coast, the verbiage does not limit the scope of purpose. Therefore, both the current and future alignment of

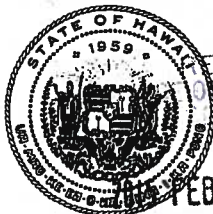
the easement must be considered relative to the development of this project. Since the defined boundary of this easement is in lockstep with the makai boundary of the subject parcel, which is in flux with the natural change of terrain, a current survey is in order to determine the boundary of the easement.

If you have any questions, please feel free to contact me at (808) 961-9590. Thank you.

DAVID Y. IGE
GOVERNOR OF HAWAII



DAR #5057



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STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL: AJR

CDUA HA-3727

180 Day Expiration Date: July 5, 2015

MEMORANDUM:

JAN 12 2015

TO:

___ HDLO
___ DOFAW
☒ DAR
___ CWRM
___ OHA

___ State Historic Preservation Division (SHPD)
___ County of Hawaii - Dept. of Planning
___ County of Hawaii - Dept. of Public Works
___ Hawaii County Fire Dept.

FROM:

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT:

Request For Comments - Conservation District Use Application (CDUA) HA-3727 and Draft Environmental Assessment (DEA) for the *Love Single Family Residence* (SFR) Project

LOCATION:

Puna District, Island of Hawaii

TMK:

(3) 1-5-010:028 70

Please find Conservation District Use Application (CDUA) HA-3727 for the proposed Love Single Family Residence (SFR) located in the Puna District, Island of Hawaii. We would appreciate a review of the proposal and any comments your agency or office has on the application.

Please contact Alex J. Roy of the Office of Conservation and Coastal Lands at 808-587-0316, should you have any questions on this proposal. If no response is received by the suspense date of **February 8, 2015**, we will assume there are no comments.

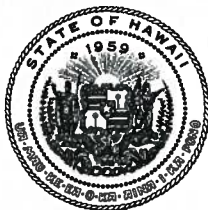
☒ Comments Attached

☐ No Comments

Signature

Attachments: Cover Letter; CDUA HA-3727, DEA

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813
Telephone: 587-0100

CARTY S. CHANG.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
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WILLIAM M. TAM
DEPUTY DIRECTOR - WATER
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

Date: (Jan 26, 2015)
DAR # (DAR 5057)

MEMORANDUM

TO: Carty S. Chang, DLNR Interim Chairperson (a, 2/5/15)
FROM: William j Walsh Ph.D, Aquatic Biologist (wjw)
THRU: Jo-Anne N. Kushima, Aquatic Biologist
SUBJECT: Conservation District Use Application (CDUA) and Draft Environmental Assessment (DEA) for the Love Single-Family Residence (SFR) Project

Comment	Date	Request	Receipt	Referral	Due Date
	(Jan 26, 2015)	(Jan 12, 2015)	(Jan 13, 2015)	(Jan 19, 2015)	(Feb 8, 2015)

Requested by: Samuel J. Lemmo, Administrator *Office of Conservation and Coastal Lands*

Summary of Proposed Project

Title: Conservation District Use Application (CDUA) HA-3727 for Proposed Love Single-Family Residence in the Conservation District

Project by: JM Leonard Planning, LLC for Dr. Charles Love

Location: Puna, Hawaii, TMK: (3) 1-5-010:028??? Actually (3) 1-3-002:070

Brief Description: proposal to construct a single story family dwelling on a 7.34-acre property located makai of County Road 137, the Kapoho-Kalapana Road (also known as the "Red Road"), southwest of the village of Opihikao in the Puna District of the island of Hawai'i. The property is within the State Land Use Conservation District.

Comments: In our April 2014 Environmental Assessment Early Consultation letter, DAR expressed concerns regarding the potential impacts of development occurring in such close proximity to nearshore coastal waters and coral reefs. We noted in that letter that "An increasing number of studies indicate rapid movement of groundwater from land to nearby coastal regions creating a substantial connectivity between land use practices, water quality and coastal health. Nutrient enrichment beyond background ocean levels can lead to potentially explosive growth of certain undesirable algae which can permanently kill coral and negatively impact coral reef fishes and other reef inhabitants. The effect of such nutrient enrichment is likely cumulative and we need to minimize additional inputs in sensitive coastal areas. There are there are a number of ways to dispose of residential wastewater, without the use of cesspools or septic systems. Such an alternative needs to be incorporated in the construction of this home, even if initially more expensive, because of the long-term impacts

to the health of coastal regions. Protection of groundwater and coastal waters from pollution is essential if we are to maintain sustainable and resilient ecosystems and the health of our coasts and ocean food supply."

In response to these comments the applicant states that "The characterization of wastewater from one single-family residence as "large scale "substantially overstates the impact of the replacement of an existing single-family residence on the lot"

There was no reference in the April DAR letter to the project being "large scale." Rather it was noted that nutrient enrichment from impacted groundwater is likely cumulative. Cumulative both from an individual project and from other projects in similarly sensitive shoreline areas. To dismiss DAR's concerns regarding this single project misses the point of the negative impacts of a multitude of single projects.

It's stated that the applicant "will construct an individual wastewater system (IWS) in conformance with DOH requirements that exceeds the current level of treatment on the property and will represent a net benefit to water quality." No details are provided as to what type of IWS will be constructed nor is there any information to support the latter assertion of a net benefit to water quality in the area. Thus it remains unclear as to whether this project will contribute additional nutrient inputs into sensitive coastal areas with the potential to negatively impact nearshore waters. This uncertainty needs to be addressed.

DAVID Y. IGE
GOVERNOR OF HAWAII



**HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

CARTY CHANG
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LAND
STATE PARKS

January 29, 2015

Samuel J. Lemmo
Office of Conservation and Coastal Lands
PO Box 621
Honolulu, Hawai'i 96809
Attn. Alex J. Roy

Dear Mr. Lemmo:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –
CDUA (HA-3727) for a Proposed Single-Family Residence
Kaueleau Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-3-002:070 por.**

LOG NO: 2015.00198
DOC NO: 1501SN19

Archaeology

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

2015 FEB - 6 P 8: 1

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AND COASTAL LANDS

Thank you for the opportunity to provide comment on the CDUA application for the proposed construction of a single-family residence on the aforementioned parcel. The application indicates that a 2,844 sq. ft. two-story residence will be constructed on a portion of the 7.34-acre parcel. It also states that an archaeological assessment survey (Haun 2014) was completed for the parcel. A review of our records confirms completion of the historic preservation review process for the parcel (*Log No. 2014.01340, Doc. No. 1405SN11*). The archaeological assessment identified no historic properties within the parcel. Based on the above information, SHPD determines that **no historic properties will be affected by this project.**

Please contact Sean Nāleimaile at (808) 933-7651 or at Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Susan A. Lebo

Susan A. Lebo, PhD
Acting Archaeology Branch Chief

DAVID Y. IGE
GOVERNOR OF HAWAII



PLANNING DEPARTMENT
COUNTY OF HAWAII

2015 JAN 14 PM 3:07

CARTY S. CHANG
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL: AJR

CDUA HA-3727

180 Day Expiration Date: July 5, 2015

MEMORANDUM:

JAN 12 2015

TO:

___ HDLO
___ DOFAW
___ DAR
___ CWRM
___ OHA

___ State Historic Preservation Division (SHPD)
☒ County of Hawaii - Dept. of Planning
___ County of Hawaii - Dept. of Public Works
___ Hawaii County Fire Dept.

FROM:

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT:

Request For Comments - Conservation District Use Application (CDUA) HA-3727 and Draft Environmental Assessment (DEA) for the *Love Single Family Residence* (SFR) Project

LOCATION:

Puna District, Island of Hawaii

TMK:


(3)-1-5-010-028- 1-3-002:070

Please find Conservation District Use Application (CDUA) HA-3727 for the proposed Love Single Family Residence (SFR) located in the Puna District, Island of Hawaii. We would appreciate a review of the proposal and any comments your agency or office has on the application.

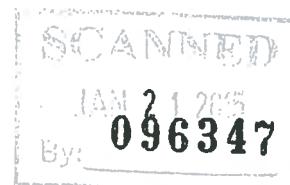
Please contact Alex J. Roy of the Office of Conservation and Coastal Lands at 808-587-0316, should you have any questions on this proposal. If no response is received by the suspense date of **February 8, 2015**, we will assume there are no comments.

() Comments Attached

☒ No Comments


Signature

Attachments: Cover Letter; CDUA HA-3727, DEA



geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

March 5, 2015

Sam Lemmo, Administrator
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

Subject: Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Love New Single-Family Residence in the Conservation District at Kaueleau, Puna District, Island of Hawai'i, TMK (3rd.) 1-3-002:070

I was forwarded a copy of the March 4, 2015 email from OCCL Planner Alex Roy to project planner James Leonard informing us that the four comments transmitted by earlier emails were all the comments received by your office. We also did not receive any additional comments. Accordingly, we are providing this letter to respond to the substantive comments from DLNR agencies and to note the disposition of other comments.

First, we acknowledge the *no-comment* remarks of the Hawai'i County Planning Department, for which we assume no response is necessary. We also acknowledge and appreciate the comment from the State Historic Preservation Division providing a letter of no-effect to historic properties. We have referenced and included this letter in the Final EA.

Concerning the recommendation by the Hawai'i Island Land Division office for a current boundary survey, Dr. Love has hired surveyors to delineate the boundary with the State property to insure that the proposed actions, including the removal of some of the planted young palm trees, do not extend into any portion of the State property. Delineating this boundary will also define the *mauka* boundary of the easement that extends along the State's property. This information has been added to the Final EA.

In regard to the comment letter by the Division of Aquatic Resources, I would first like to apologize for misquoting their early consultation letter regarding large scale development, which came from a letter on a different project. Secondly, the fact that the IWS for the proposed project will meet with all current requirements of the Hawai'i State Department of Health is important, as this level of treatment is the exception rather than the rule for older homes in Puna, where many if not most homes currently use cesspools. The DOH requirements were imposed in order to assure adequate

treatment of wastewater and assist with maintaining water quality. The architect, in coordination with a wastewater engineer who has been retained for the home construction and has coordinated with the Department of Health, expects to utilize a 1,000-gallon Chem-Tainer septic tank. The tank would provide primary treatment of the wastewater before distributing the treated sewage into the absorption bed. In the interest of maximum effectiveness, the architect proposes that three feet of native material beneath the leach field be removed and replaced with a sandy soil or cinder soil. With soils of this type and depth, 40%-90% of total N and P can be removed from residential effluent. In addition, recognizing that plants can be efficient collectors of N and P that has been converted to available forms by soil microbes and thus prevent those nutrients from contaminating ground or surface waters, the leach field area will be maintained with low, herbaceous or grassy vegetation.

The reason that the septic tank will improve water quality relative to the existing situation is that currently, like many existing homes in Puna built many decades ago, there is only a cesspool for wastewater. An IWS in conformance with DOH standards will presumably remove more nutrients and pathogens from the water than a cesspool. This is the principal reason that the Department of Health recently proposed a rule amendment to require conversion of cesspools to septic tanks – as opposed to any alternative form of wastewater treatment – statewide. While we agree that this single family home may be just one among many that can potentially cumulatively degrade water quality, there are very few lots along this coastline, and virtually no potential to subdivide given the State Land Use District, County zoning, General Plan designation, and subdivision code infrastructure requirements. Many of the lots already contain homes, and allowing them to rebuild their homes and conditioning this upon upgrading their IWS to modern standards is one mechanism for addressing water quality issues. It should also be noted that the water off this shoreline is extremely deep and the constant large waves provide an extreme high energy environment with maximum mixing. Although it is well known that there are water quality problems in Kapoho, where the housing density is at least 20 times that of this coastline and the homes are situated at or near sea level around a semi-protected bay, research for the EA was unable to uncover any evidence of water quality problems in the coastal waters off far less densely populated Kaueleau. This information has been added to the Final EA.

Thank you for circulating the EA and CDUA for review by DLNR agencies. If you have any questions about the EA, please contact me at (808) 969-7090; for questions about the project or CDUA, please contact James Leonard, Project Planner, at (808) 896-3459.

Sincerely,

A handwritten signature in black ink that reads "Ron Terry". The signature is stylized with a large, looped "R" and a trailing flourish.

Ron Terry, Principal
Geometrician Associates

Cc: DLNR Division of Aquatic Resources
DLNR Hawaii District Land Office
DLNR State Historic Preservation Division
James Leonard

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**Environmental Assessment
Love Single-Family Residence in the
Conservation District at Kaueleau**

APPENDIX 2

Coastal Erosion Study

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GEOHAZARDS CONSULTANTS INTERNATIONAL, INC.

Appraisal of hazards - reduction of risk

COASTAL EROSION STUDY

Love Property

Kaueleau Ahupua'a, Puna District, Hawai'i.

TMK: (3) 1-3-002:070

John P. Lockwood, Ph.D., CPG No. 9806

Timothy E. Scheffler, Ph.D.



June, 2014

Contents

Introduction:	4
Physical Setting and the Geologic Environment:	5
General Evidence of Coastal Erosion:	7
Erosion Processes in the SW Area.....	10
Erosion Processes in the NE Area	13
Erosion Rate Evaluation:	15
Other Potential Coastal Zone Hazards:.....	16
Conclusion:.....	17
References Cited:.....	18

List of Figures

Figure 1 Tax Map Key with subject parcel and State land indicated.	5
Figure 2 Approximate boundaries of the Love Property, showing relation to coastline.....	6
Figure 3. Tree roots exposed by erosion of the upper sea cliff near the southwest boundary of the Property.	7
Figure 4. View of the coastline to the northeast, showing mechanical erosion of the basal sea cliff.....	8
Figure 5. Storm-tossed angular boulders lying above the sea cliff inland of the SW Area.....	8
Figure 6. View of a small offshore island fronting the Property.....	9
Figure 7 Coastline features at the SW Area of the subject property.....	10
Figure 8 View seaward of the erosion-resistant dense 'a'a that forms the headlands.	11
Figure 9 Partially welded breccia in lava channels that border the denser 'a'a found on the headlands.	12
Figure 10 View of the NE Area.	13
Figure 11 Typical coastal profile across State-owned land (see a-a` in figure 1).....	14

List of Tables

Table 1 Coastal zone hazards as summarized by Fletcher and others (2002:153)	16
Table 2 Aerial photographs and imagery inspected	17

Introduction:

The Hawaii DLNR Hawaii Administrative Rules, Chapter 13-5 (Adopted August 12, 2011) states that for Single Family Residential construction in coastal Conservation Districts, Applicants must consider rates of coastal erosion affecting their properties, in order to determine minimum shoreline setbacks for permitting (Fletcher *et al.*, 2010). DLNR established a requirement that Annual Coastal Erosion Rates must be determined, based on formal “Coastal Erosion Studies”.

This report documents the nature of erosion and shoreline migration for the coastal frontage of the Love property, 1 mile southeast of Opihikao. The study is based on field inspection, measurement, mapping and office study of aerial photography, satellite imagery, and geologic literature.

Field Inspection information:

Date of inspection:	28 March, 9 April, 2014
Time:	12:00-15:00 HST (9 April)
Ocean tide state (approximate ¹):	Average: + 1.4 ft.
Sea state ² :	“Steep” northeast swell (3ft. @ 9sec. waves).

¹ From: www.tideasandcurrents.noaa.gov; accessed April 27, 2014.

² From: www.ndbc.noaa.gov; accessed May 23, 2014.

Physical Setting and the Geologic Environment:

The Love Property (TMK: (3) 1-3-002:070– hereafter “the Property”, is a 7.3 acre parcel adjacent to the coastline nine miles southwest of Cape Kumukahi, the easternmost point on Hawaii Island. The property abuts the shoreline on its southwest corner only. A small wedge of State owned land to the north and east, a remnant of an historic land grant (#13514) buffers the exposure of the property to the sea along the majority of the northeast sections of seaward property line (see Figure 1).

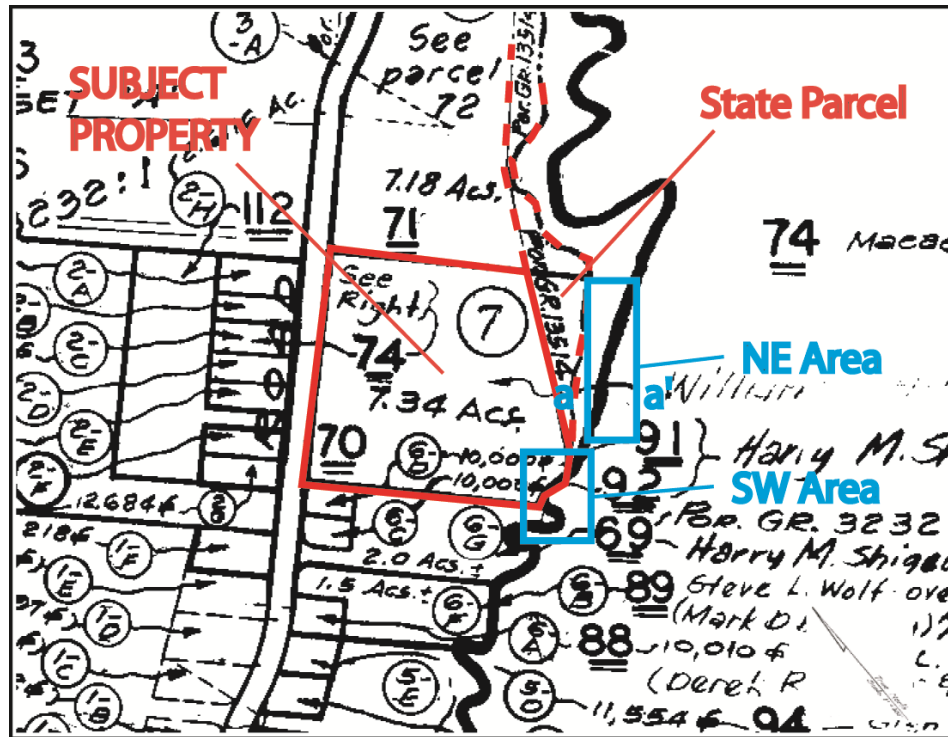


Figure 1 Tax Map Key with subject parcel and State land indicated.

The lava flows of this area are all derived from eruptive vents on Kilauea volcano’s East Rift Zone, located immediately upslope from the Property. The specific lava flow that underlies the entire Property was erupted from Pu’u Kaliu, an extensively quarried prehistoric cinder cone 3.1 miles to the north. The age of this flow was estimated to be 400-750 years by Moore and Trusdell (1991). The flow is composed entirely of dense ‘a’a in this area, and is distinguished by the presence of minor, but conspicuous, plagioclase feldspar crystals in all samples. The ‘a’a flow is very thick here, a minimum of 50 feet thick, as evidenced by exposures in adjacent sea cliffs. The upper half of exposed portions of the flow typically consist of unconsolidated, loose ‘a’a “clinkers”, which are highly susceptible to erosion by storm waves. Lower portions of the flow consist of durable “blue rock” ‘a’a that are highly resistant to erosion, and protect against erosion by normal sea waves and surf. These features will be discussed in detail below.

The Property only extends directly to the coastline in one narrow, 100’-wide projection on the southwestern boundary (Figure 1 and 2). Most of the Property lies inland of the coast.

This report divides the analysis of erosive processes affecting the coastline into two localized areas fronting the Love property (see Figure 1). The SW Area is dominated by erosional embayments where focused wave energy has an acute affect. The NE Area is more linear in plan, more broadly affected by wave energy, and presents itself as a steeper sea cliff.



Figure 2 Approximate boundaries of the Love Property, showing relation to coastline

General Evidence of Coastal Erosion:

The entire southeastern Puna coastline in this area is characterized by steep rocky cliffs bounded by steep submarine slopes, and no beaches or shallow offshore areas are present. As pointed out by Lee (2008), beaches play an important role in protecting rocky cliffs from erosion (by acting to absorb the lateral impact forces of incoming waves); their absence in this area exposes sea cliffs to direct wave action.

Where it has not been impacted by the erosive power of storm waves, a thick, rubbly layer of loose ‘a’ breccia forms the land inland from the coast and underlies the flat, soil-covered areas that typify most of the Property. Where it is subject to the erosive power of storm or tsunami waves at the coastline, however, the upper rubbly layer of the flow is presently undergoing significant alteration due to erosion by waves that overtop the lower “blue rock” at the sea cliff base. This erosion is indicated by the fact that no vegetation is able to colonize the steep (39 degree angle of repose) cliff face. The instability of this slope is further attested to by exposed roots of vegetation (*Casuarina* sp.) along the top edge (Figure 3). This is an area where wave energy is focused by the embayment that borders the western Property boundary. Even the “blue rock” core of this flow is undergoing wave erosion, as shown by the fresh angular blocks beneath the sea cliff (Figure 4). Storm waves are able to toss angular blocks of the “blue rock” ‘a’ core above the sea cliff (Figure 5), and in places narrow berms of storm-tossed ‘a’ debris as much as three feet high are found immediately adjacent to the cliff top.



Figure 3. Tree roots exposed by erosion of the upper sea cliff near the southwest boundary of the Property.



Figure 4. View of the coastline to the northeast, showing mechanical erosion of the basal sea cliff



Figure 5. Storm-tossed angular boulders lying above the sea cliff inland of the SW Area.

The original seaward extent of this lava flow cannot be known, but the presence of a remnant of the flow as a small island 120 feet offshore (Figure 6) indicates at least this much lateral erosion has occurred since emplacement of the flow 400-750 years ago (Moore and Trusdell, 1991). This would indicate a minimum, long-term average erosion rate of between .16 and .3 feet per year (from 2 - 4 inches, or an average of .23 ft/yr), depending on the precise age of the flow. Additionally, this long-term rate would be expected to slow with time as the system approaches equilibrium. However, see below on “erosion rates”.



Figure 6. View of a small offshore island fronting the Property.

Erosion Processes in the SW Area

The boundaries of this area are shown in Figures 1 and 7. This area is mostly formed by a headland projecting into the sea, bounded by embayments about 150' long to the west and 100' long to the east. The headland area consists of dense, internally contorted 'a'a "blue rock" (Figure 7), and is bounded by coastal embayments that were eroded into weaker rocks that filled paleo-channels in the original flow. Remnants of these weaker rocks consist of partially welded 'a'a breccia (Figure 9), which are more easily eroded than bordering "blue rock".

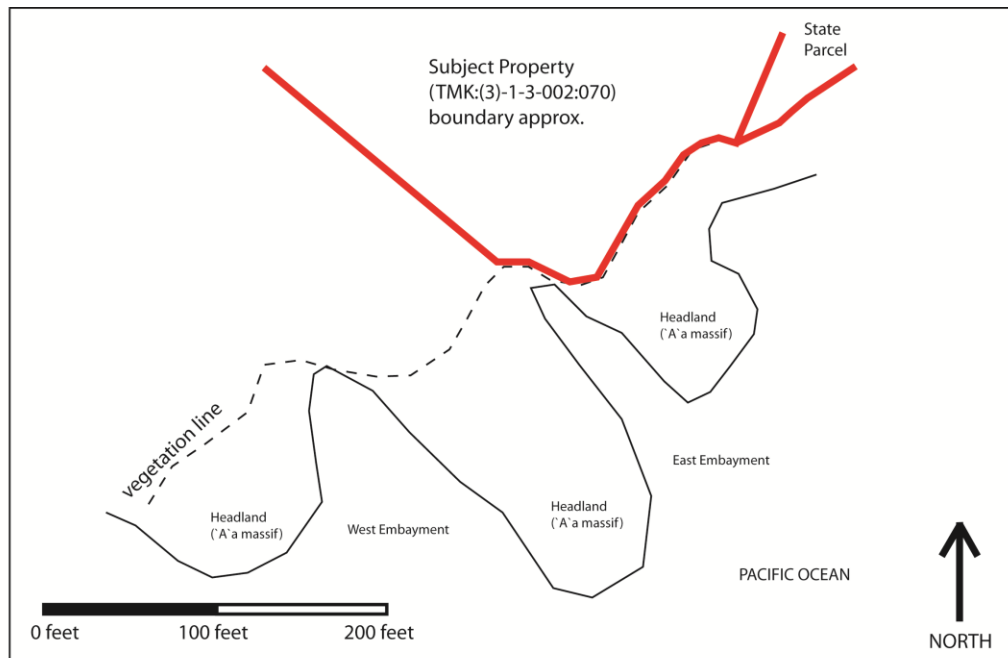


Figure 7 Coastline features at the SW Area of the subject property.



Figure 8 View seaward of the erosion-resistant dense 'a'a that forms the headlands.

Note the loose 'a'a rubble overlying the headland in Figure 8 protected from erosion by the high headland rocks. The angular blocks in the foreground have been thrown above the 'a'a rubble by storm waves channeled into the embayments – seen on both sides of the headland.



Figure 9 Partially welded breccia in lava channels that border the denser 'a'a found on the headlands.

Note the breccias in Figure 9 are the subject of preferential erosion by wave action. These weaker less consolidated and dense zones form the embayments bordering the headland spits.

These embayments define the areas where future erosion will occur at the highest rates, and are likely to increase in length over time. The western embayment is aligned with a lineament that extends for a few hundred feet inland along the Property's western border, and coincides with a depression that may indicate the presence of an original lava flow channel. Analogous parallel channel margins and embayments along this section of coast are similarly vulnerable to erosion by focused wave energy.

Erosion Processes in the NE Area

The 500' wide area of State-owned land that bounds the southeastern section of the Property is clearly undergoing erosion, both by the wash of storm waves that reach the upper portions of the sea-cliff, as well as by waves that directly impact the steep lower face of the cliff. Efforts to measure the landward migration of the shoreline along this area from available aerial photographs were unsuccessful, implying that any migration has been less than 25' (the minimum resolution possible on these photographs) since the earliest available aerial photo (1954). Undercutting of the sea cliff was noted at the eastern end of this zone, indicating that future failure of wide blocks of the sea cliff along this section of state land is likely.



Figure 10 View of the NE Area.

The lack of vegetation on the upper zone of rubble indicates this cliff face is subject to the frequent impact of storm waves - which cause erosion of this friable zone, up to 50' above sea level. The lower zone of more resistant "blue rock" (to the right) forms a vertical sea cliff up to 20' high, but is also subject to erosion. The sea cliff top is marked by a berm of naupaka-covered, storm-tossed debris up to 3' high and 10' wide in this area.

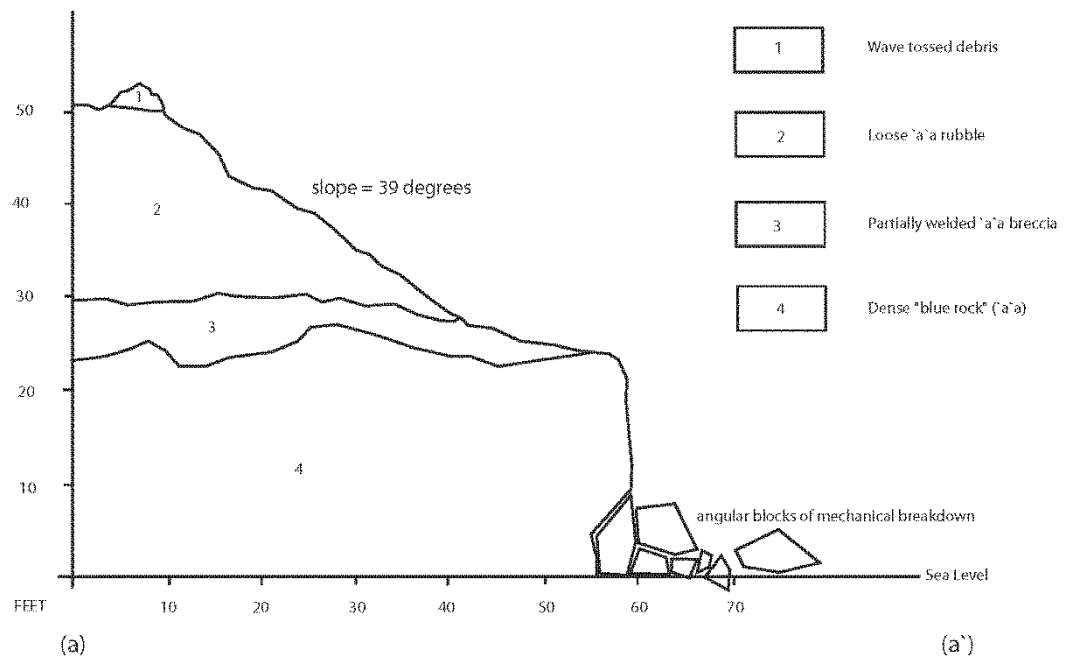


Figure 11 Typical coastal profile across State-owned land (see a-a' in figure 1).

Erosion Rate Evaluation:

A rigorously quantitative overall erosion rate for the shoreline fronting this property is not feasible. While a long-term average rate of between 0.3 and 0.16 feet/year can be calculated (see above), it must be emphasized that the rate is not consistent over time nor in space. The overall retreat of the coastal sea cliff is by piecemeal or stochastic failure of individual blocks (as shown in Figure 4). Erosion that does occur on rocky coastal cliffs such as these is typically episodic (Rosser *et al.*, 2013). Meaningful erosion rates are impossible to calculate over the short-term in this instance as rock failure depends on highly localized variables. Erosion has not been great enough to contribute to a measureable displacement of the shoreline fronting the property in the last 60 years (period of time since the earliest available aerial photographs).

Erosion rates over the long term are inferred to be higher at the heads of localized embayments. The susceptibility of these embayments to erosion, conspicuous in the SW Area, is related to the presence of breccias and loose rock in these areas, whereas projecting headlands are formed of more dense, blue rock. Erosion in the embayments is compounded by the fact that storm wave energy is refracted and focused in the resulting coves. In addition, some of these “valleys” form incipient drainages from landward, and are impacted by episodic terrestrial water run-off as well.

It can also be inferred that future failures of the sea cliff (*ie.* short-term rates) are more likely in those areas which are currently undercut, as is typical of the NE Area. The steep linear frontage of the NE Area is more susceptible to significant near-term collapse events.

Despite local variations, an attempt was made to arrive at an average long-term rate for the entire project area. These estimates are provided in the Conclusion, below.

Other Potential Coastal Zone Hazards:

Hwang (2005) recommends that all hazards facing coastal areas should be considered when planning for land-use zoning in Hawaii, and not just erosion. The Fletcher and others (2002, 2010) portray generalized hazards assessments for long areas of coastlines. They rate this area of the Puna coastline to be at moderate risk (4 on a 1-7 scale), with specific hazards rated as shown on Table 1:

Hazard Type	Relative Hazard	Scale (1-4)
Tsunami	Medium-high	3
Stream Flooding	Medium-high	3
High Waves	High	4
Storms	High	4
Erosion	Medium-high	3
Sea Level change	High	4
Volcanic / seismic	High	4

Table 1 Coastal zone hazards as summarized by Fletcher and others (2002:153)

The “high” ratings for sea level change hazards given in Table 1 for this section of the coastline do not apply to this particular property. The steepness of the coastal sea cliff ensures that combined sea level change and land subsidence will not cause significant shoreline transgression in this area for the next few centuries. Subsidence, as reported by Hwang (2007) in the Kapoho region six miles to the northeast, could be as high as 10 mm/yr. The overall rise in sea level by 3.3 ft. by the end of the 21st century proposed by Fletcher, et al. (2010) is similarly negligible.

Because the coastal sea cliff offers protection from most storm and tsunami waves, the principal hazard facing the area is not coastal erosion, but the threat of future lava flows. These flows would be derived from Kilauea’s East Rift Zone, specifically from an area of the rift zone between 8-900’ elevation, some 3 miles upslope. The Property lies within Lava Flow Hazard Zone 2 of Wright and others (1992), as does the entire 35 mile-long Puna coastline from Cape Kumukahi to beyond Apua Point. A 1955 East Rift Zone lava flow reached the coastline less than a mile west of the Property in only a few hours after eruption, which indicates that the area should probably be evacuated at the first indication that renewed East Rift Zone eruptive activity is imminent. Calculation of lava flow recurrence intervals in this area is beyond the scope of this report – but is probably less than 500 years – not overly threatening for low-density residential development.

Conclusion:

Stereographic inspection of aerial photographs taken in 1954, and 1965 (Table 2) and comparison with recent Google Earth views revealed no measureable changes in the position of rocky shorelines fronting this property during this 58 year period. Scale limitations, poor resolution and internal distortion of the analog aerial photographs, and uncertainties of shoreline location (due to differing surf conditions) make accurate quantitative measurements difficult. Attempts to fix shoreline positions relative to any internal standard failed.

The photogrammetric analysis showed that no shoreline erosion greater than the best possible resolution of the historic photos has occurred over this period. That resolution is estimated at 25 ft. Therefore, a short-term maximum rate of 0.43 ft. per year over the past six decades can be inferred.

Long-term erosion rates (discussed above) are between 0.3 and 0.16 ft. per year and are declining. Erosion is highly locally specific along this coastline, occurring episodically and sometimes dramatically as major failure events. Erosion is also clearly less advanced on more resistant headlands and progressing more quickly within local embayments.

The mid-point between the estimated minimum (0.16 ft./yr) and maximum (0.43 ft./yr.) rates discussed above gives an overall average rate of 0.30 feet per year for the project area.

Date	Agency	Flight Line	Frames	Approx. Scale
1954 (November 12)	USN-USGS	023	127, 128	1:42,860
1965 (February 6)	USDA	EKL-12CC	18, 19	1:23,440
2012 (December 14)	Google Earth	n/a	n/a	Variable

Table 2 Aerial photographs and imagery inspected

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**Environmental Assessment
Love Single-Family Residence in the
Conservation District at Kaueleau**

APPENDIX 3 Archaeological Assessment Survey

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FINAL
ARCHAEOLOGICAL ASSESSMENT

TMK: (3) 1-3-02:070



LAND OF KAUELEAU, PUNA DISTRICT
ISLAND OF HAWAI'I

HAUN & ASSOCIATES

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FINAL
ARCHAEOLOGICAL ASSESSMENT
TMK: (3) 1-3-02:70
LAND OF KAUELEAU, PUNA DISTRICT
ISLAND OF HAWAI'I

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INTRODUCTION

At the request of Dr. Charles Love, Haun & Associates conducted an archaeological survey of TMK: (3) 1-3-02:70, a 7.34-acre parcel located in the Land of Kaueleau, Puna District, Island of Hawaii (**Figures 1 and 2**). The objective of the survey was to satisfy historic preservation regulatory review requirements of the Department of Land and Natural Resources-Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (2003).

No archaeological sites or features were identified during the survey, therefore the project is documented as an archaeological assessment pursuant to Chapter 13-284-5(5A). As required, this report contains a description of the project area, field methods, background and findings.

Project Area Description

The project area consists of a 7.34-acre, roughly rectangular-shaped parcel located in the Land of Kaueleau at elevations ranging from c. 20 to 55 ft (**Figure 3**). The parcel is bordered on the northwest by the Kapoho-Kalapana Road, on the southeast by State of Hawaii Conservation Lands and on the northeast by a landscaped area and on the southwest by undeveloped land. A driveway is located along the southwestern boundary of the parcel with a wooden gate present adjacent to the Kapoho-Kalapana Road. Rainfall in the area ranges from 60 to 100 inches per year (Juvik and Juvik 1998:57).

The project area has been significantly impacted by bulldozer disturbance). This disturbance occurred more than a decade ago, prior to the purchase of the parcel by the current landowner. The majority of the parcel has been mechanically leveled and covered in cinders and is landscaped in introduced species including African Tulip (*Spathodea campanulata*), plumeria (*Plumeria acuminata* Ait.), noni (*Morinda citrifolia* L.), and numerous varieties of palm trees (**Figure 4**). This mechanically leveled area is bordered on the northwest and southeast by bulldozed berms of stones and soil. Two water catchment tanks, a potting shed/garage (**Figure 5**) and a small kennel are also present in this area.

The seaward portion of the project area is relatively undisturbed and is comprised of uneven terrain with vegetation consisting of pandanus (*Pandanus odoratissimus* L. f.), ohia (*Metrosideros collina* {Forst.} Gray), ironwood (*Casuarina equisetifolia* L.) and ferns and vines (**Figure 6**). A modern house and pool are located in this area in the southern portion of the project area (**Figure 7**). This house was present when the current landowner purchased the parcel more than 15 years ago. The area to the southeast of this portion of the parcel is comprised of State of Hawaii conservation land, bordered by 5 to 10 m high coastal bluffs.

Geologically, the project area is situated on Kilauea lava flows that date to between 400 and 750 years before present (Wolfe and Morris 1996). The soil within the project area is comprised of Malama extremely stony muck on 3-15% slopes (Sato et al. 1973:37). This soil is typified by a thin (3") very dark brown very stony muck over fragmented a'a lava. It has a rapid permeability, a slow runoff and a slight erosional hazard. Sato et al. indicate that this soil is most commonly used for woodland, pasture and orchards (1973:37). The lava substrate in this area consists of a Holocene Era flow from Kilauea (Wolfe and Morris 2001).

Field Methods

The field work portion of the project was conducted on December 3, 2007 by Dr. Alan Haun and Project Supervisor Dave Henry B.S. The field work portion of the project required 0.5-labor days to complete. The project area was subjected to 100% surface examination with the surveyors spaced at varying intervals



Figure 1. Portion of 1994 Pahoa South 7.5' quadrangle showing project area

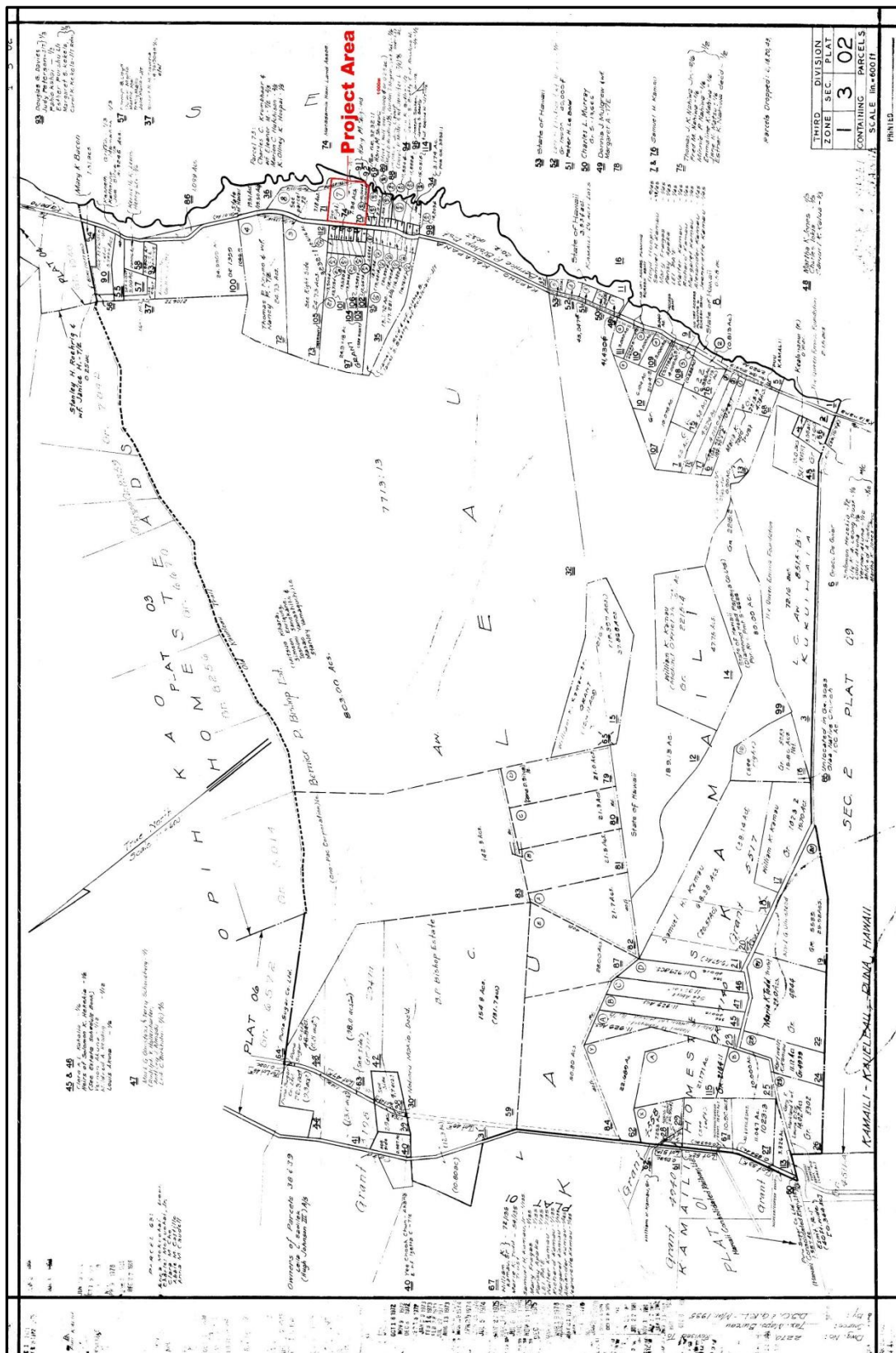


Figure 2. Tax Map Kev 1-3-02 showing project area

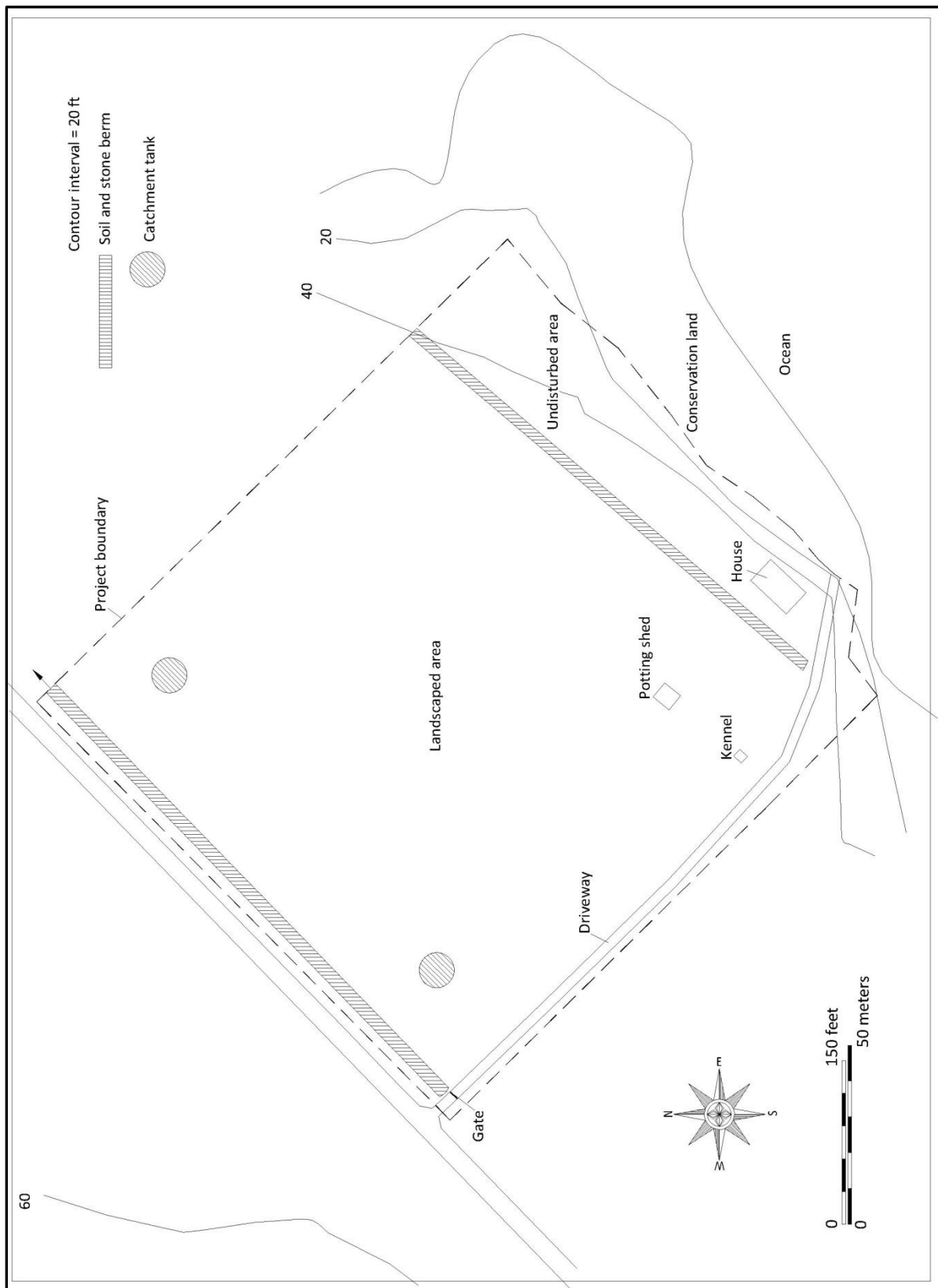


Figure 3. Site location map



Figure 4. Landscaped area (view to northeast)



Figure 5. Potting shed/garage (view to southwest)



Figure 6. Undisturbed portion of project area (view to southeast)



Figure 7. Modern house (view to southeast)

depending on the degree of the disturbance. The surveyors were spaced at 20.0 m intervals in the landscaped portion of the parcel due to the excellent ground surface visibility. In the coastal portion of the parcel, which had not been mechanically level, the surveyors were spaced at 5.0 m intervals. No archaeological sites or features were identified.

BACKGROUND RESEARCH

The project area is situated in the *ahupua'a* of Kaueleau in Puna District. The *ahupua'a* covers 1,822 acres and extends from the coast to approximately 1,100 ft elevation. The USGS quadrangle and tax maps both give the same spelling for the *ahupua'a* (Kaueleau). During the Mahele, the entire *ahupua'a* was awarded to Victoria Kamamalu (LCA 7713:13). The Indices of Awards (Indices 1929), Native Register (NR n.d; 440-444v5), and Foreign Testimony (FT n.d; 408-411v3) all indicate that the *ahupua'a* name was Kauwalehua.

There is no mention of Kaueleau or Kauwalehua in Hawaiian traditional and legendary accounts. Crozier and Barrere (1971) note that in Puna, few pre-missionary traditions and legends survived because of intensive mission work by Reverend Titus Coan between 1835 and the 1870s. Emory et al. (1959) suggest that Puna's traditional history is difficult to follow because of the dominating influence of the ruling families in the neighboring districts of Hilo and Ka'u. Handy and Handy (1972:542) state that Hawaiian traditions suggest that Puna "was once Hawaii's richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land".

Hua'a was the chief of Puna when it was seized by 'Umi-a-Liloa, unifying his control over the Island of Hawaii (Kamakau 1961). Hua'a was killed during a battle with one of 'Umi's warrior sons, Pi'i-mai-wa'a, at Kuolo in Kea'au. Kalani'opu'u unified his control over Hawaii Island when he gained control of Ka'u and Puna following Alapa'i's defeat in a battle at Mahinaakaka. During Kalani'opu'u's rule, the Puna chief, I-maka-koloa, attempted a rebellion and seized the valuable products of the district including 'o'o and *mamo* bird features, hogs, fine mats made from pandanus blossoms and from young pandanus leaves, gray tapa cloth, and tapa cloth made from *mamaki* bark (Kamakau 1961).

Following the death of Kalani'opu'u, in 1782, a dispute over ascendancy ensued culminating in the battle of Moku'ohai (Kamakau 1961, Kuykendall 1938). Following the battle, control over the island was divided between Keoua Ku'ahulu'ula, who held Ka'u and a portion of Puna; Keawema'uhili, who controlled the remainder of Puna, Hilo, and southern Hamakua; and Kamehameha, who controlled northern Hamakua, Kohala, and Kona. A feud between Keoua and Keawema'uhili in 1785 resulted in Keawema'uhili's death and the expansion of Keoua's territory, including the unification of Puna. The island was finally re-unified in 1791 when Kamehameha killed Keoua at Kawaihae. In 1790, a lava flow extended diagonally across Kaueleau from the northeast above Opihikao to the coast at Kamaili (Wolfe and Morris 2001).

Early historic accounts document that Puna was well populated and intensively cultivated. In 1823, Ellis (1963) traveled along the coast from Kaimu to Kapoho, probably passing through, or very close to, the project area. At Kaimu, there was a sandy beach and village with an estimated 725 occupants. Also described, are plantations and groves of coconuts and *kou*. Ellis estimated that the population of Kaimu and nearby villages was approximately 2,000. Ellis described a village surrounded by plantations at Kamaili, which is immediately south of Kaueleau, where they were given taro and potatoes. Other crops noted by Ellis in Puna included bananas and sugar cane. In 1841, the Wilkes Expedition passed through in inland portion of Kaueleau (Burtchard 1994).

During the Mahele, Kaueleau was awarded to Victoria Kamamalu (LCA 7713:13). The following summarizes Burtchard (1994) discussion of Puna's later history. Prior to the 1870s, foreign influence in Puna primarily was limited to missionaries. In the late 1870s, Robert Rycroft moved to Pohoiki and built a home, wharf, sawmill, jail and courthouse. He later began growing coffee in the area and built a coffee mill. In the mid-1880s, the government began selling land in Puna for homesteads. Most of the homestead land was acquired for coffee cultivation in the 1890s.

Puna Sugar Company was established in 1900 at Kapoho. Between 1900 and the 1930s, the population of the region grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments. In the early 1900s, the Hilo Railroad Company developed a rail system from Hilo Town to Puna. A section of the railway extended through the inland portion of Kaueleau (Burtchard 1994: Figure 11). In 1907, the Hawaiian Mahogany Lumber Co. was established by James B. Castle to provide railroad ties to the mainland United States. A mill was built at Pahoa and lands being cleared for sugar cane cultivation provided a steady supply of timber. The mill lost its contract to provide railroad ties in 1913 because the ties did not last as long as anticipated. The mill was leased for sugar plantation use in 1917.

By the late 1920s, concern over forest depletion and watershed maintenance lead to the creation of the Puna, Nanawale, and Malama-Ki Forest Reserves. Handy and Handy (1972) citing oral historical sources, indicate that in the 1930s there were homesteading areas in 'Opihikao, Kaueleau, Kamaili, Ke'eke'e, Kehena, and Keauohana. Dry land taro was grown throughout the inland portions of these *ahupua'a*. A particular taro cultivation method, *pa-hala*, is described for the area from Kalapana to Kamaili. The method involved excavating a hole in a'a lava in a pandanus grove. The hole was then filled with weeds, which were allowed to rot for six weeks or more. A taro cutting (*huli*) was wrapped in pandanus leaves and planted in the hole. After the cutting produced three or four leaves, the pandanus branches were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the pandanus leaves were sufficiently dry, the leaves were burned reducing them ash that provided nourishment to the taro plant, which grew tall enough to hide a man beneath the leaves.

Puna Sugar Company continued in operation until the early 1980s. Beginning in the late 1950s, real estate development, along with tourism and diversified agriculture gradually replaced plantation agriculture in Puna. Today, most of the project area is landscaped in introduced trees consisting predominately of palms.

FINDINGS

As stated, large portions of the parcel have been mechanically leveled and it is currently landscaped with introduced vegetation species. The remaining coastal portion of the parcel is relatively undisturbed however no sites or features were present in this area. The absence of traditional sites in the undisturbed portion of the parcel is likely due to several factors: (a) the presence of coastal bluffs seaward of the parcel that would make landing a canoe difficult, (b) prior disturbance associated with the historic utilization of the parcel for agricultural activity and the modern use of the project area for agriculture and habitation; and (c) the very thin soil (3" thick) present throughout the study area.

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**Environmental Assessment
Love Single-Family Residence in the
Conservation District at Kaueleau**

APPENDIX 4 Cultural Impact Assessment

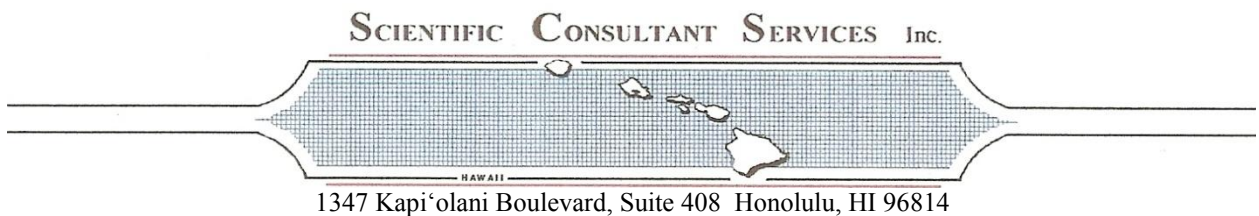
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**A CULTURAL IMPACT ASSESSMENT OF COASTAL LANDS IN
KAUELEAU AHUPUA‘A, NEAR ‘OPIHIKAO,
PUNA DISTRICT, ISLAND OF HAWAI‘I
[TMK: (3) 1-3-002:070]**

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DRAFT Report
July 2014

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TABLE OF CONTENTS

TABLE OF CONTENTS.....	I
LIST OF FIGURES	II
LIST OF TABLES.....	II
INTRODUCTION	1
METHODOLOGY	6
ARCHIVAL RESEARCH	8
INTERVIEW METHODOLOGY	8
PROJECT AREA NATURAL ENVIRONMENT	9
HISTORICAL AND CULTURAL CONTEXTS	11
TRADITIONAL SETTLEMENT PATTERNS, SUBSISTENCE, AND LAND-USE ...	11
THE <i>MĀHELE</i> OF 1848 AND LAND COMMISSION AWARDS	12
CHANGING RESIDENTIAL AND LAND-USE PATTERNS (1845–1865).....	14
THE PUNA TRAIL AND OLD GOVERNMENT ROAD.....	14
SUGARCANE AND THE RAILROAD	16
FISHING PRACTICES	22
PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS	22
CULTURAL INFORMANT INTERVIEWS	24
SUMMARY	24
CIA INQUIRY RESPONSE.....	25
CULTURAL ASSESSMENT	26
REFERENCES CITED.....	27

LIST OF FIGURES

Figure 1: Hawai‘i Island Map Showing Project Area Location.	1
Figure 2: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area (Pāhoa South Quad, National Geographic Topo!, 2003).	2
Figure 3: Portion of TMK: (3) 1-3-002 Map Showing Location of Project Area (Hawai‘i County Planning Department 2013).	3
Figure 4: Aerial Photograph Showing Project Area Location and Existing Development (ESRI, 2012).	4
Figure 5: Parcel 70 Plat Map Showing Existing Improvements (Haun and Henry 2014:4).	10
Figure 6: Portion of Puna District Map Showing Location of Project Area, Land Boundaries, Roads, and Trails (adapted from Cook 1902).	13
Figure 7: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area and Haun and Henry 2002 Study Area (Pāhoa South Quad, National Geographic Topo!, 2003).	23

LIST OF TABLES

Table 1: Individuals Responding to CIA.	24
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INTRODUCTION

At the request of Dr. Charles Love, Scientific Consultant Services, Inc. (SCS) conducted a Cultural Impact Assessment (CIA) of a 7.34-acre parcel [TMK: (3) 1-3-002:070] located in the *ahupua'a* of Kaueleau, Puna District, Island of Hawai'i (Figures 1, 2, and 3). The project area is located approximately 1.5 kilometers southwest of 'Opihikao and is bounded by Kapoho-Kalapana Road (Route 137) to the northwest, by residential property to the northeast and southwest, and by the Pacific Ocean to the southeast. The parcel currently contains a small dwelling, agricultural fields, and undeveloped land. The CIA was undertaken as part of the landowner's, Dr. Charles Love, application for a Special Management Area (SMA) permit.

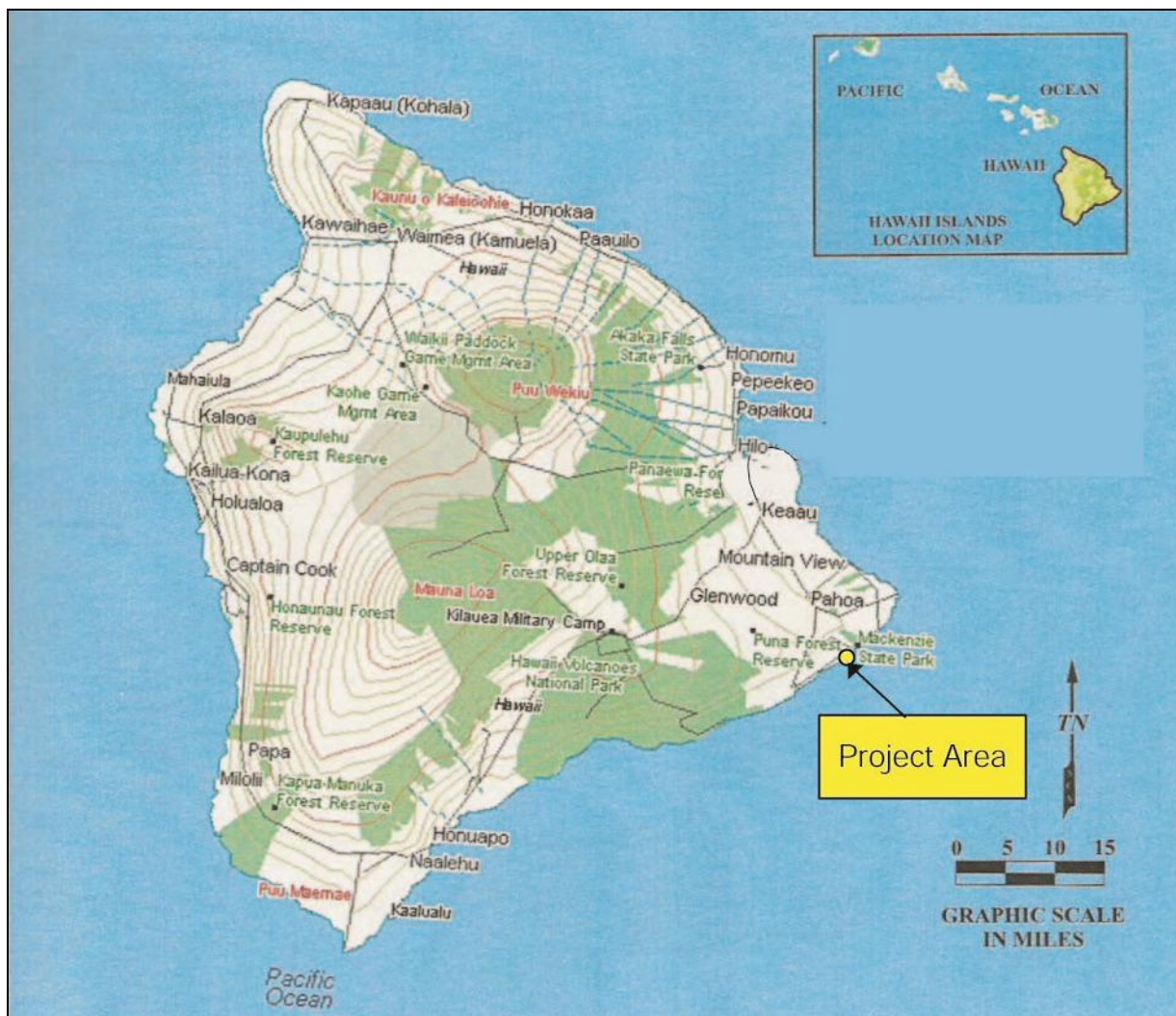


Figure 1: Hawai'i Island Map Showing Project Area Location.

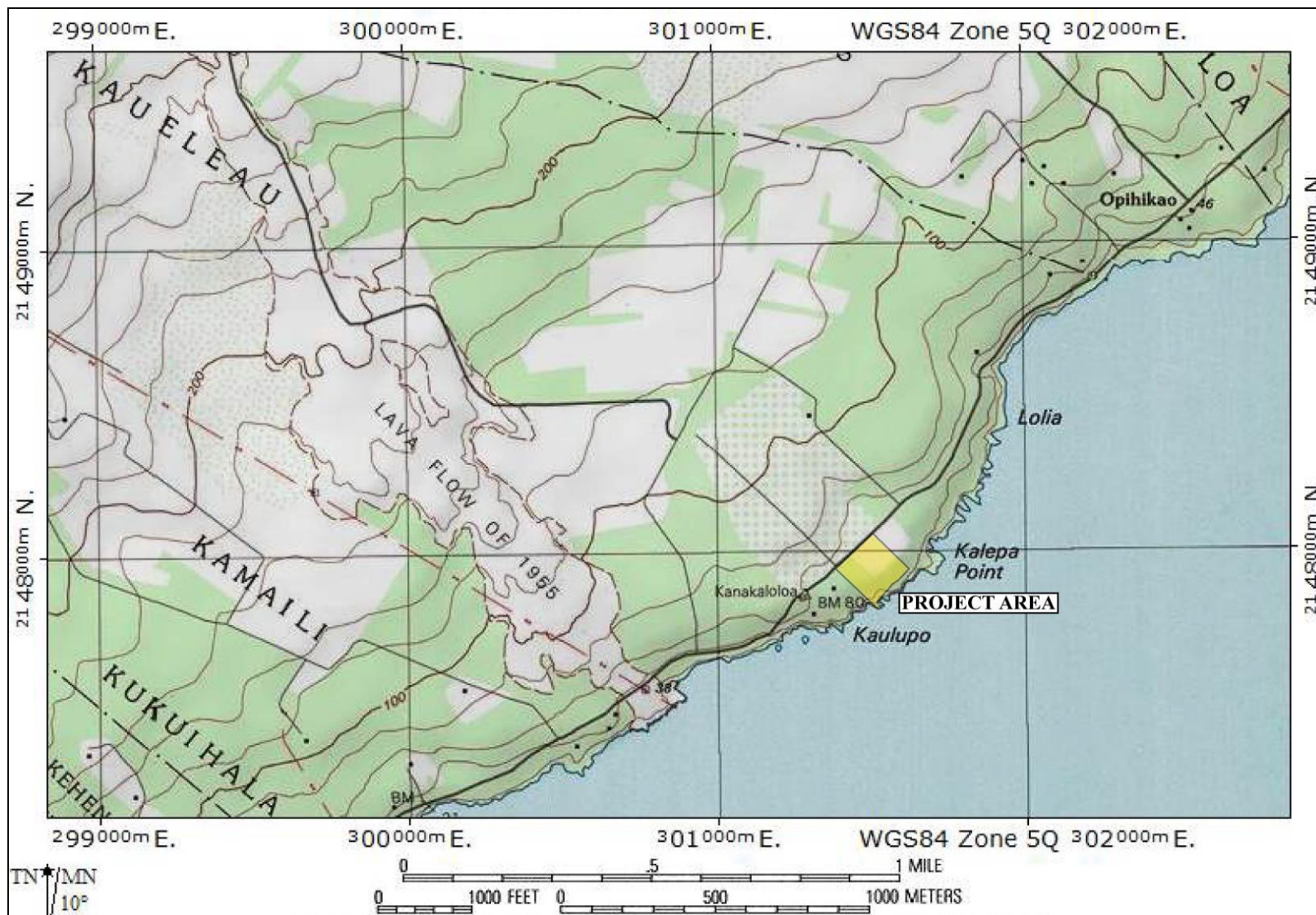


Figure 2: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area (Pāhoa South Quad, National Geographic Topo!, 2003).

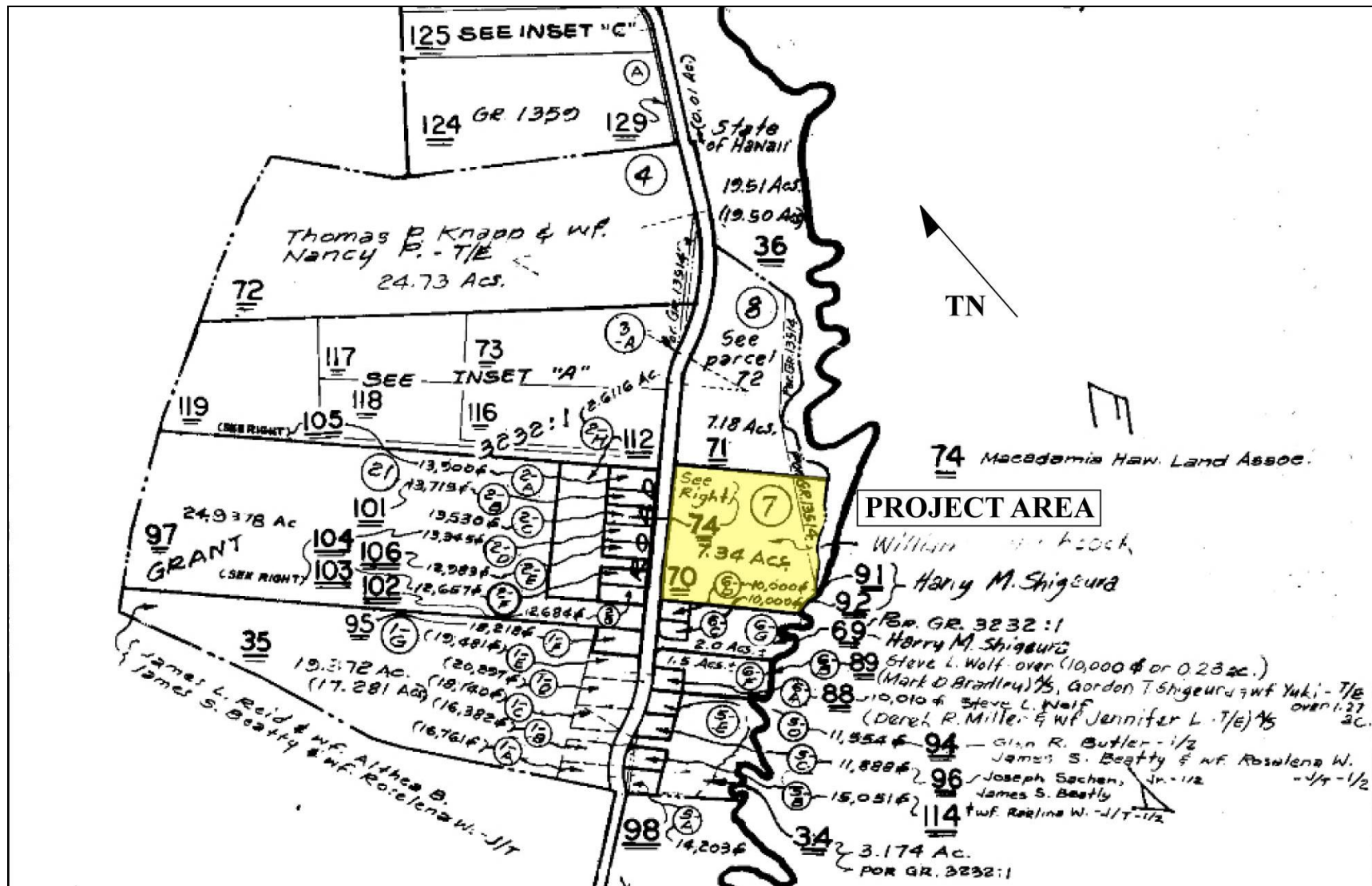


Figure 3: Portion of TMK: (3) 1-3-002 Map Showing Location of Project Area (Hawai'i County Planning Department 2013).



Figure 4: Aerial Photograph Showing Project Area Location and Existing Development (ESRI, 2012).

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

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

...there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai‘i’s culture, and traditional and customary rights... [H.B. NO. 2895].

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the “cultural practices of the community and State” as part of the HRS Chapter 343 environmental review process (2001).

Its purpose has broadened, “to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other ethnic groups, and it also amends the definition of ‘significant effect’ to be re-defined as “the sum of effects on the quality of the environment including actions that are...contrary to the State’s environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State” (H.B. 2895, Act 50, 2000).

Thus, Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized

by using, as an example, “the broad geographical area, e.g. district or *ahupua‘a*” (OEQC 1997). It was decided that the process should identify ‘anthropological’ cultural practices, rather than ‘social’ cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997): The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, which support such cultural beliefs.

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

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the “Cultural Impact Assessment Methodology”, the OEQC states: ...information may be obtained through scoping, community meetings, ethnographic interviews and oral histories... (1997).

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

- (1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained;
- (2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;
- (3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;
- (4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;
- (5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;
- (6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;
- (7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;
- (8) an explanation of confidential information that has been withheld from public disclosure in the assessment;
- (9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;
- (10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;
- (11) the inclusion of bibliography of references, and attached records of interviews, which were allowed to be disclosed.

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

ARCHIVAL RESEARCH

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

INTERVIEW METHODOLOGY

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

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua'a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, letters briefly outlining the development plans along with maps of the project area were sent to individuals and organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs; Kauanoë Hoomanawanui, SHPD Burial Sites Specialist; Kimo Lee, Jr. Chairman of the Hawai‘i Island Burial Council; Rick Gmirkin, Ala Kahakai National Historic Trail, NPS Archaeologist; and Howard Konanui, area ‘*ohana* member. If cultural resources are identified based on the information received from these organizations and/or additional informants, an assessment of the potential effects on the identified cultural resources in the project area and recommendations for mitigation of these effects can be proposed. Public Notices were placed in the Office of Hawaiian Affairs (OHA) Ka Wai Ola Newspaper, the Honolulu Star Advertiser, and the Hawai‘i Tribune Herald.

PROJECT AREA NATURAL ENVIRONMENT

The project area is a partially developed parcel [TMK: (3) 1-3-02:070] situated on level land between 0 m (0 feet) to 15 m (50 feet) above mean sea level (amsl). The project area substrate is a single Kīlauea lava flow dated to between 400 and 750 years before present (ybp) (Wolfe and Morris 1996). Soils in the project area belong to the Malama (rMAD) series characterized as extremely stony muck (Sato 1973:37). Rainfall in the project area is high, ranging between 203 and 305 centimeters (80 and 120 inches) per year (Kelly *et al.* 1981). Natural drainage in the area runs from northwest to southeast. There are no seasonal gulches or drainage spillways in the immediate area.

A 1965 aerial photograph shows the mauka portion of the property was partially cleared and partially used for agriculture. Roughly 80% of the property was grubbed, covered with cinder, graded, and landscaped more than 25 years ago (Figure 5). Two earthen berms created at that time border the northwest and southeast edges of the improved portion of the property. The improved portion of the parcel has been planted with introduced tree species including African Tulip (*Spathodea campanulata*), plumeria (*Plumeria obtusa*), noni (*Morinda citrifolia*), and varieties of palm trees. Grass has been planted under the trees in the improved portion of the parcel and two catchment tanks, a potting shed, and a kennel are located there.

Approximately 20% of the parcel, along the coastal edge of the property, is undisturbed undulating terrain with *hala* (*Pandanus amaryllis*), ‘*ōhia* (*Metrosideros sp.*), ironwood (*Casuarina equisetifolia*) and fern varieties. A modern house and small adjacent shed was constructed there more than 25 years ago (see Figure 5).

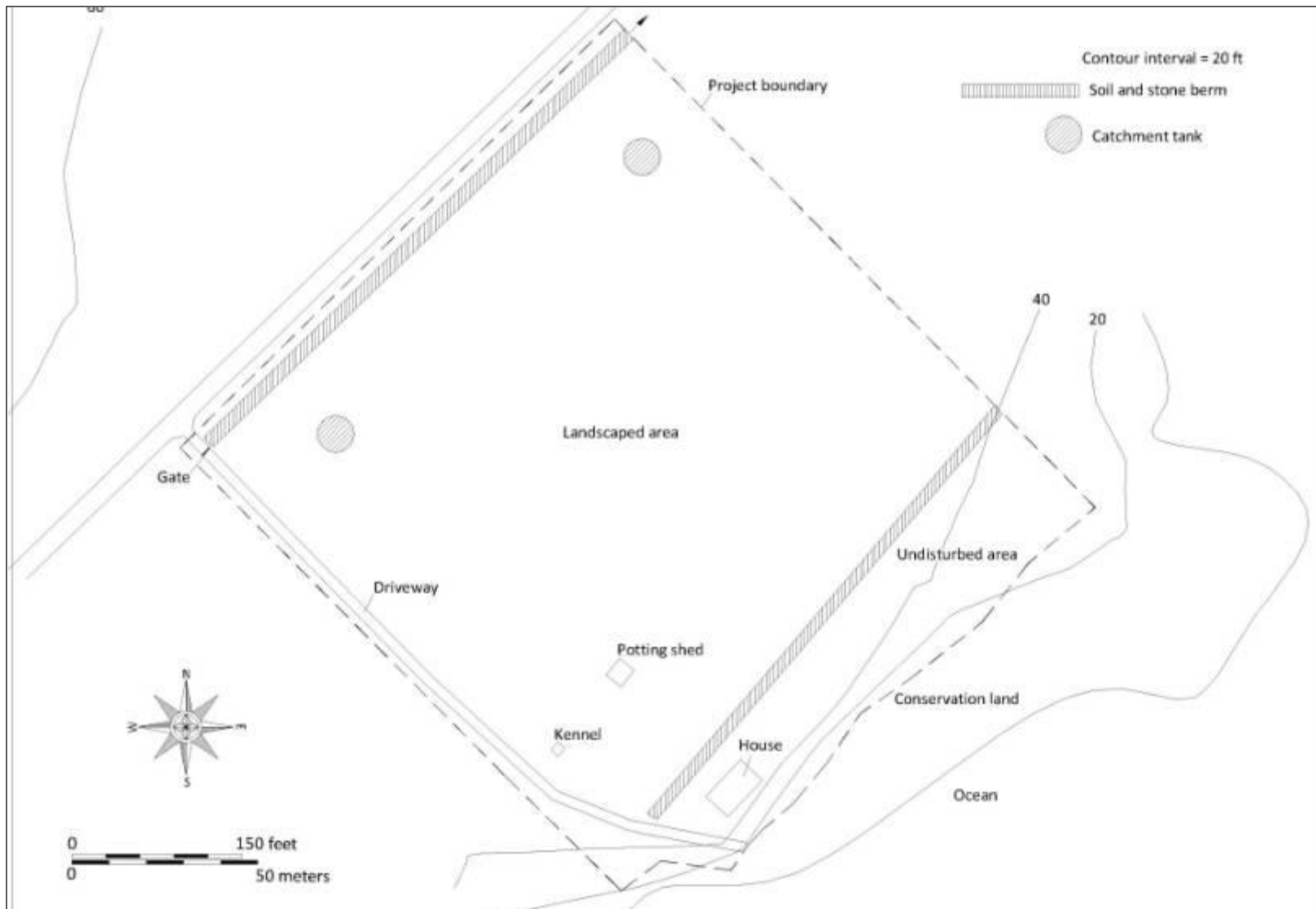


Figure 5: Parcel 70 Plat Map Showing Existing Improvements (Haun and Henry 2014:4).

HISTORICAL AND CULTURAL CONTEXTS

Archaeologists have long thought Hawai‘i Island was first settled between around A.D. 700 by people sailing from the Marquesas (Cordy 2000:104-109). Recently, there has been debate surrounding the archaeological dating of the initial settlement of Hawai‘i. An article published in the *Journal of Archaeological Science* reviewing radiocarbon dates recovered at archaeological sites on the Island of Hawai‘i suggests that, by relying on only carbon samples from short-lived plant remains, the most reliable dates point to initial Polynesian colonization of Hawai‘i Island occurring between AD 1220 and 1261 (Rieth et al. 2011:2747).

Early settlers established settlements on the windward shores in likely places such as Waipi‘o, Waimanu, and Hilo Bay. People at these locations were able to sustain themselves through inshore and pelagic fishing, gathering shellfish from the shore and strand, plant and animal husbandry, and the utilization of natural terrestrial flora and fauna (Kirch and Kelly 1975; Pearson *et al.* 1971; Kirch 1985). The pattern of this early settlement is thought to have consisted of widely spaced, permanent home bases that gradually expanded to form a nearly continuous zone of permanent settlement along the windward coasts as local populations grew.

TRADITIONAL SETTLEMENT PATTERNS, SUBSISTENCE, AND LAND-USE

Situated along the windward coast of Hawai‘i Island, Puna is a verdant and abundant district with good rainfall and rich soils. However, it is also subject to volcanic eruptions and has been covered by new lava in many places over the last 1,000 years (Cordy 2000:17, and 22). Much of the district's coastal areas has thin soils, and there are no good deep water harbors. The ocean along the Puna coast is often rough and wind-blown.

As a result of these two factors, settlement patterns in Puna tend to be dispersed and without major population centers. Villages in Puna tended to be spread out over larger areas and were, at times, inland and away from the coast, where the soil is better for agriculture (Cordy 2000: 45). The lack of population centers also had an effect on the development of a hierarchy of district rulers. Puna was often not strongly tied together by a tight web of allegiances between *ali‘i* and *konohiki*. As a result, Puna was often conquered and ruled by stronger district leaders in Hilo or Ka‘ū (Kamakau 1992:17 and 77).

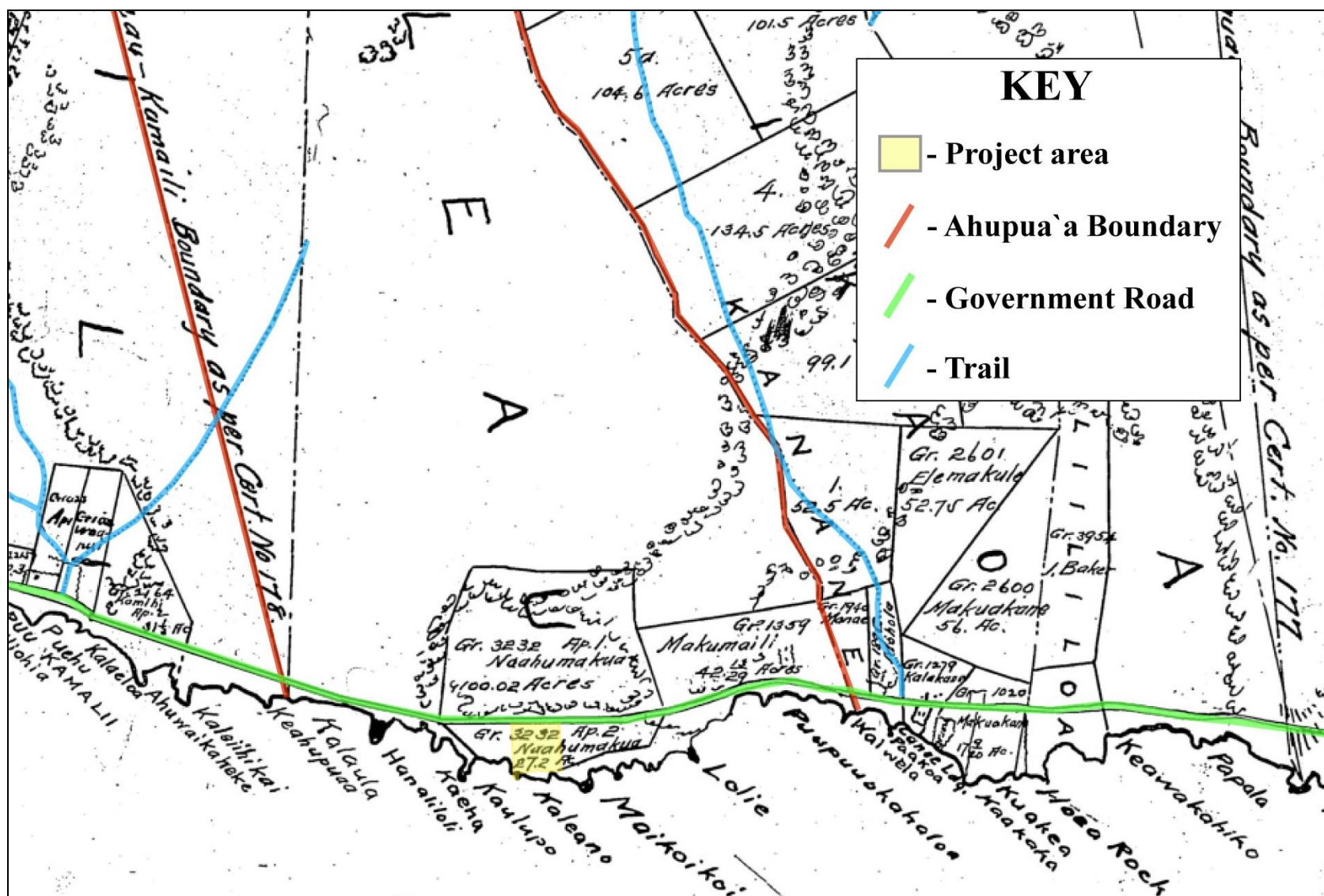
Puna was famous as a district for some of its valuable products, including "hogs, gray tapa cloth (*'eleuli*), tapas made of *mamaki* bark, fine mats made of young pandanus blossoms (*'ahuhinalo*), mats made of young pandanus leaves (*'ahuao*), and feathers of the *'o'o* and *mamo* birds" (Kamakau 1992:106).

Historical accounts pertaining to Kaueleau and the project area region are scarce but provide some information on traditional residence patterns, land-use, and subsistence horticulture in the area. Kaueleau is literally translated as the season of dark tide (wehewehe.org). William Ellis passed through Kaueleau Ahupua'a in 1823 while travelling along the coast from Kilauea to Waiākea Ahupua'a, Hilo.

Ellis mentions numerous canoes and fishing nets in the populous village of Kahena southwest of the project area (Ellis 1963:276-277). He described how the Hawaiians had built a large ladder for carrying their light, one-man canoes up the rocky cliffs. Ellis also mentions the village of Kamā'ili, in Kamā'ili Ahupua'a, adjacent to Kaueleau Ahupua'a (Figure 6). Along the way northeast from Kamā'ili Village, his guide pointed out Kalepa *heiau*, a *heiau* dedicated to Ku and Lono (Ellis 1963:278). Thrum recorded that Kalepa *heiau*, or Kalelepa, was used during the time of Keawema'uhili (ruler of Hilo, 1782-1790) and was "almost wholly destroyed; its stones taken for roads" (Thrum 1908:39). Ellis made no further mention of the lands of the project area as he passed through.

THE MĀHELE OF 1848 AND LAND COMMISSION AWARDS

With the Māhele of 1848 and the two Acts of 1850, authorizing the sale of land in fee simple to resident aliens and the award of *kuleana* lands to native tenants, land tenure in Hawaii arrived at a significant turning point (Chinen 1961:13). Kaueleau Ahupua'a was awarded to Victoria Kamāmalu Ka'ahumanu IV as Land Commission award (LCA) 7713:13. Victoria Kamāmalu was the daughter of Ka'ahumau II and granddaughter of King Kamehameha. Victoria was raised on 'Oahu by her father, Kekūanā'ō who was the royal governor of 'Oahu. She was a close childhood friend of Queen Lili'uokalani. Victoria was made Kuhina Nui in 1855, proceeding over the King's Privy Council. She died in 1866 at the age of twenty seven. Much of her land holdings passed to her father, and then to her half-sister Ke'elikōlani. Bernice Pauahi Bishop inherited the majority of the land and that land is now held by Kamehameha Schools.



CHANGING RESIDENTIAL AND LAND-USE PATTERNS (1845–1865)

Between 1845 and 1865, traditional land-use and residential patterns underwent a change. In particular, the regular use of Hilo Bay by foreign vessels, the whaling industry, the establishment of missions in the Hilo area, the introduction of the sandalwood trade, the legalization of private land ownership, the introduction of cattle ranching, and the introduction of sugar cane cultivation all brought about changes in settlement patterns and long-established land-use patterns (Kelly *et al.* 1981).

Hilo became the center of population and village settlements in outlying regions declined or disappeared. While food was still grown for consumption, greater areas of land were continually given over to the specialized cultivation and processing of commercial foodstuffs for export. Sugar cane plantations, coffee plantations, and processing facilities were established in areas that were once upland agricultural areas and coastal settlements, respectively. With the establishment of new commercial agricultural enterprises and new employment opportunities in the outlying regions, people began to resettle around the nascent commercial centers.

Honolulu Landing was constructed just south of the project area in Honolulu Ahupua‘a and used from the late 1800s through the early 1900s. A wharf was built north of the project area in Pohoiki in the 1870s. The ‘Ōla‘a/Puna Sugar Company was established in 1900 at Kapoho and sugarcane fields were planted and tended inland to the west and southwest of the current project area. The Hawaiian government surveyed and began selling homestead lots in Puna in the 1880s. The newly established agricultural businesses and influx of homesteaders and employees necessitated the upgrade of existing transportation routes and the construction of new routes. The construction of new travel routes influenced where people settled and lived.

THE PUNA TRAIL AND OLD GOVERNMENT ROAD

There is an historic trail that leads from the modern day Lili‘uokalani Gardens area to Hā‘ena along the Puna coast. The trail is often called the old Puna Trail and/or Puna Road. There is an historic trail/cart road that is also called the Puna Trail (*Ala Hele* Puna) and/or the Old Government Road that continues from the south end of the Puna Trail through Kaueleau Ahupua‘a heading to points south. Lass also refers to the entire route from Hilo to Ka‘ū as the Puna-Ka‘ū trail. A portion of the Old Government Road is now named Kapoho-Kalapana Road and borders the northwest edge of the current project parcel (see Figure 6).

Whatever name the trail/cart road alignment is referred to by, it likely incorporated segments of the traditional Hawaiian trail system often referred to as the *ala loa* or *ala hele* (Hudson 1932:247, Kuykendall 1966:23-25, Lass 1997:15, and Maly 1999:5). Lass suggests the full length of the Puna Trail, or Old Government Road, might have been constructed or improved just before 1840 (Lass 1997:15). The trail was called the Old Government Road, or *Ala Nui Aupuni* (Maly 1999:5).

A general description of the area between the Old Government Road and the newer upper road from Hilo through Keaʻau to Pahoa was recorded in 1889 by the Surveyor General of the Hawaiian Government Survey. The description affords a glimpse into inland and coastal settlement patterns and land use.

The first settlement met with after leaving Hilo by the sea coast road, is at Keaau, a distant 10 miles where there are less than a dozen inhabitants; the next is at Makuu, distant 14 miles where there are a few more, after which there is occasionally a stray hut or two, until Halepuaa and Koae are reached, 21 miles from Hilo, at which place there is quite a village; thence to Kaimu there are only a few scattered settlements here and there. A good many of those living along the lower road have their cultivating patches in the interior, along or within easy accessibility to the new road (Alexander 1891, cited in Maly 1999:107).

The 1889 description suggests a depopulation along the majority of the Puna near-coastal area, in contrast with Ellis' description of 1823 (above). In 1889 people were cultivating small patches of *kalo*, *awa*, and coffee as well as other food items in the inland gardens. The patches were placed in pockets of soil in holes amidst the lava flows. Additionally, sweet potatoes were grown on rock mounds. By 1889, it appears that very few people lived along the Old Government Road (Maly 1999:6). The Surveyor General stated,

The old sea coast road cannot be kept in repair with the means now at its disposal and its condition each year is becoming more unsafe and ruinous, there is but little travel over it; it has been shown that there is little land capable of cultivation or development either side of it and whatever travel there is now over it would soon be entirely diverted to the upper road (Alexander 1891, cited in Maly 1999:107).

The new road being constructed from Hilo through Kea‘au to Pāhoa was designed to allow access to the more arable inland areas. People who traditionally had lived along the Puna coast were moving toward Hilo and into the more fertile upland areas of Puna in order to find paid work and to produce cash crops for local markets and for export. In particular, people began to work in the inland areas to grow sugarcane.

SUGARCANE AND THE RAILROAD

By 1901 sugar dominated the island’s industry, and Hilo was the epicenter of production and export. Railroads connected sugar mills and sugar plantations in Hilo, the Hāmākua and Puna. The railroad also connected the mills to the wharves at Hilo Bay. The railroad began operation in the Hilo area in 1899, and was abandoned in 1946 (Kelly *et al.* 1981). A main railroad line and several feeder lines were constructed in the early 1900s from Kea‘au to locations in lower Puna District. The major line ran from Hilo through Kea‘au to the Kapoho area. This line passed some distance *mauka* (south) of the current project area. The junction of the Hilo to Kapoho line and the Pāhoa branch was located in Waiakahiula Ahupua‘a. The trains provided transportation for sugarcane as well as for passengers traveling through Puna and on to other destinations such as Hilo and the Hāmākua coast.

Early on, one of the major export items transported by the railroad was timber. The Hawaiian Mahogany Company began cutting timber in Puna District in 1907. Trees were felled in areas to be cleared for sugarcane agriculture. The logs were brought to Pāhoa Town to be milled, sent to Hilo Harbor, and eventually shipped to the U.S. Mainland as railroad ties for the Santa Fe Railroad. The lumber mill facilities and the railroad line that served them were located just east of the current project area, where the present day Pāhoa Farmer’s Market is held and where the Akebono Theater is located.

In 1909, the company was renamed Pāhoa Lumber Company. In 1913 the main mill facilities burned to the ground. That same year, the mill was rebuilt and the company was renamed the Hawaiian Hardwood Company. The company’s main export was milled ‘ōhia lumber. The company had several large clients in California and even sold lumber to the U.S. Navy. The company closed down in 1916 when the Santa Fe Railroad ended its contract to buy lumber. The defunct company then leased its mill facilities, buildings, and railroad tracks to the expanding ‘Ōla‘a Sugar Company.

The 'Ōla'a Sugar Company, established in 1899, soon became the largest sugarcane plantation and milling operation in Puna District. According to the Hawai'i Sugar Planter's Association, Plantation Archives,

[The] Olaa Sugar Company was located on the Island of Hawaii just nine miles from Hilo on the road to Volcano and the National Park [Figure 9]. The plantation fields extended for ten miles along both sides of this highway as well as in the Pahoia and Kapoho areas of the Puna District. The elevation of the land ranged from sea level to 2,200 feet. The area was in the wet belt of Hawaii amid forests of fern trees and ohia with an average monthly rainfall of 18-30 inches. Finding varieties of cane that would thrive on forest soil in a cloudy district at various elevations was a major problem.

In 1899, B.F. Dillingham, Lorrin A. Thurston, Alfred W. Carter, Samuel M. Damon, and Wm. H. Shipman pooled their resources and started what they believed would become Hawaii's largest and most prosperous sugar plantation. Their original plan was that Olaa would be instrumental in bringing about the Americanization of Hawaii by fostering a home owning class of small farmers who would grow cane for the mill. The venture was planned as a demonstration of a plantation as small farming enterprise in which a large portion of the crop would be cared for by laborers on shares. L.A. Thurston believed that Hawaii's future prosperity depended in the long run on the production of crops by small independent farmers who owned or leased the land they cultivated. The corporation would operate the mill and assure a market for produce. The promoters predicted that Olaa would become the banner plantation for all Hawaii. This was a radical departure from the ideas of the old plantation system, which opposed both independent cane growers and diversification.

On May 3, 1899, the Olaa Sugar Company was incorporated. With a \$5,000,000 investment, the promoters purchased 16,000 acres in fee simple land and nearly 7,000 acres in long leasehold from W.H. Shipman. They also purchased 90% of the stock in the adjacent Puna Plantation, adding another 11,000 acres to the holdings. Olaa Sugar Company began as one of Hawaii's largest sugar plantations with much of its acreage covered in trees.

The task of setting up the plantation was enormous. Before 1900, coffee was the chief agricultural crop in the area. Over 6,000 acres of coffee trees were owned by approximately 200 independent coffee planters and 6 incorporated companies. The coffee trees were uprooted to make way for cane. Ohia forests had to be cleared, field rock piled, land plowed by mules or dug up by hand with a pick, quarters for laborers and staff had to be built, the mill constructed, and the first cane planted.

On July 1, 1899, active operations began under the management of Frank B. McStocker. In his first report, he stated, "As soon as the planting of the main crop begins, which will be about the month of March [1900], arrangements will be made by which a large portion of the crop will be cared for by laborers on shares." From this early start of "share planting," the company branched out into the leasing of land to individuals to raise cane and to making contracts to purchase cane from persons who owned or leased their own land. In most cases, the company carried the financial burden for the planter until he was paid for his cane and then recovered the advances made. Other independent cane farmers lived in their own homes, used their own work animals and tools, and supplied their own fertilizers.

In 1900, a twelve-roller, 2,000 ton mill was erected at Olaa. The mill was planned for a 60,000-ton crop and was of a size to accommodate future expansion. Everything was planned for a large-scale production, unlike most sugar companies, which expanded as the output increased.

The cane from the adjacent plantation, the Puna Plantation, was ground at the Olaa mill. Puna Plantation Company, established in the late 1890s, was taken over by Olaa Sugar Company in 1905.

A succession of experiments molded the history of Olaa Sugar Company. Because of heavy rains, numerous cane varieties were tried out. Lahaina cane was abandoned early because of being particularly susceptible to root diseases due to moisture. New varieties were constantly being planted. The weather was also conducive to the growth of weeds. An experiment in paper mulching was started in 1916. The object of the paper mulch was to suppress the weed growth and keep

the soil warm. But it also reduced labor costs for hoeing by 50% and provided an extra application of fertilizer.

In 1919, Olaa Sugar Company had the distinction of operating the first bagasse paper mill in the Territory and the only one of its kind in the United States at that time. The mill was erected alongside the sugar factory where bagasse was converted into mulching paper. C.F. Eckart, manager, originated the idea. The mill produced enough paper daily to cover 9 to 11 acres, with about 1,600 lbs. of paper per acre. The paper was used over the young ratoons, which pierced their way through to the light, while the weeds died. This asphalt-saturated paper used at Olaa became a forerunner of mulch paper developed for use in Hawaii's pineapple industry. Eventually the paper mill was dismantled, but mulching was still used for weed control.

The cane was transported to the mill by fluming and by railroad. Although Olaa Sugar Company had 72 miles of flumes, it had no dependable water source for their operation. The railroad was relied upon for delivery of 60% of the cane. In addition to its own standard gauge 35 miles of railway track, the company ran cars over the Consolidated Railway tracks to bring its cane in from more distant fields. The history of Olaa Sugar Company is closely connected with the southern branches of the Hawaii Consolidated Railway Co. because they were interdependent from the start. The cane fields were in four widely separated areas cut off from each other by stretches of barren lava. The railroad was therefore vital to the plantation, which in turn helped support the railroad. When a tidal wave on April 1, 1946 destroyed much of the Hawaii Consolidated Railway Company's tracks, it ceased operations. The plantation was then forced to convert to trucks in order to transport sugar and molasses to the Hilo wharf.

Fortunately, under the management of Wm. L.S. Williams, a major road-building program had been started in 1939 for the purpose of eliminating the portable track. He started the plantation on its way to modernization by laying a network of 500 miles of roads for hauling cane. Since 1948, all the cane hauling has been by truck.

By the end of 1947, Olaa Sugar Company owed it agents, American Factors, Ltd., \$2,000,000. Sugar prices, the tariff, rationing, epidemics of

leafhoppers and armyworms, and volcanic eruptions had taken their toll on company profits. Manager C.E. Burns surmised that the only way for the plantation to stay alive was to mechanize harvesting operations. Because of the rocky and uneven condition of the land, Olaa was one of the last sugar companies to eliminate hand-cutting of cane. This conversion to mechanical harvesting was a turning point in cost reduction in the fields, but became a problem in the mill as a result of all the trash and rocks coming in with the cane. Cane cleaners were installed but the conventional cleaners could not remove the fine volcanic cinders. Olaa Sugar Company solved the grit problem with an ingenious flotation tank.

Another problem, which resulted when mechanical harvesting went into effect, was a need to layoff laborers. Manager Burns worked out an equitable schedule of layoffs. The first severance pay and repatriation formulas, which were later to serve as patters for the sugar and pineapple industries, were agreed to. In addition, both management and union members located new jobs in the Islands for most of those who were laid off. As a result, the transition from hand to mechanical harvesting was achieved without labor grievances.

Attention to employee welfare was demonstrated by Olaa Sugar Company in the housing program, free medical attention, and recreational facilities. Manager A.J. Watt modernized the housing by building new family units and relocating outlying houses scattered about the plantation into nine main villages. They became miniature towns with running water, electric lights, schools, churches, stores, clubhouses, theaters, parks and ball fields. The plantation roads radiated from these nine camps to cover the cane areas where the men worked. The 1930 plantation census noted a total of 5,999 men, women and children residing in 1,098 houses at Olaa.

In spite of Olaa Sugar Company's efforts to reduce operating costs, the plantation was still in debt. In 1953, a minority stockholders' suit was brought against American Factors, Ltd. The suit alleged that the plantation company paid "excessive" commissions to AMFAC and insufficient dividends to stockholders. By this time Olaa Sugar Co. was over \$4.1 million in debt to the agency and possible liquidation of the company was being considered. After six years of litigation, the suit was finally dismissed by the court in 1959. In the wake of statehood, it was decided that the company would take advantage of the land

boom and sell some of its fee simple land. By this time, the plantation had accumulated 35,700 acres of which 22,000 were used by Olaa and the remainder by independent planters. They also offered employees the opportunity to purchase their houses.

On March 28, 1960, a name change from Olaa Sugar Company, Ltd. to Puna Sugar Company, Ltd. was voted on at a stockholders meeting. Apparently, the directors felt "Olaa" was jinxed and that a name change might erase the failures of the past. With a new name and the monies accrued from land sales, the company did make a comeback and by 1963 had the best year ever with a 36% profit gain. In 1966, Puna Sugar Company was free of debt for the first time in its history. The reduction in the cost of operations and the improvements in the field and mill were regarded throughout the industry as a major accomplishment. American Factors offered to buy out the minority shareholders and by 1969 Puna Sugar Company was a wholly owned AMFAC subsidiary.

AMFAC launched an expansion program by converting to the diffusion method of cane processing and by installing a modern steam generating facility. A \$4.5 million power plant was built at Puna, which used bagasse and trash fuel to generate 15,000 kilowatts of electricity. Hilo Electrical Light Co. contracted to purchase 12,500 kilowatts.

The 1980's brought bleak prospects to the company once again. The sugar industry could no longer depend on government subsidies or tax breaks. High fructose corn syrup, a low cost substitute, and artificial sweeteners were hurting the sugar market. On January 7, 1982, AMFAC announced that it would be shutting down Puna Sugar Company.

The chore of closing down was phased out over a two-year period. It involved negotiating leases and contracts, disposing of equipment, and the most difficult of all, working out employee layoffs. Once again in an unprecedented move, AMFAC included in the severance package a gift of five acres of land for each employee. They also donated \$2 million towards improvement costs of the land and offered to help locate other agricultural related jobs for the employees, if they desired. The last worker was gone by December 1, 1984. The entire sugar

mill was sold to Fiji Sugar Corporation, Ltd. in 1988 and Hawaiian Electric Light Company took over the power plant (Campbell and Ogburn 2004).

The growth of the 'Ōla'a Sugar Company impacted the development of regional land-use, tenure, and the transportation network. Homestead lots and agricultural plots were surveyed and cleared from the surrounding forests. Sugar camps, housing and facilities for workers, were constructed. Over time, many of the smaller agricultural lots initially purchased by private owners to grow sugarcane were bought up by the large sugar plantation.

FISHING PRACTICES

Ellis' descriptions of the people he met and the villages he travelled through along the Puna coast in 1823 illustrate the long and well developed Hawaiian traditions of fishing and collecting food from the ocean. This orientation to the coast and the traditional practices developed in Hawai'i are still passed down generation to generation and persist today (Maly and Maly 2004).

Many fishermen catch *pūhi* to fish for 'ulua along the cliffs of Puna. Whether they use a hand-line or rod and reel, they use knowledge and techniques of past fishermen to select fishing locations, proper bait, and technique. Fishermen throw net, fish by rod and reel, or spear fish at different locations along the shoreline to catch specific fish such as *āholehole*, *āweoweo*, *kala*, *kole*, *kūmū*, *manini*, *mamo*, *moana*, *moi*, *mū*, *palani*, *ta'ape*, *uhu*, *ū'ū*, *uouoa*, *weke'ā*, and *weke'ula*. Many people still fish with rod and along the shore at Pohoiki, or fish by boat out of Pohoiki for *akule*, *kaweke'ā*, *mahimahi*, *ono*, *ōpakapaka*, *'ula'ula*, and other species. In addition, the traditional collection of *ōpihi*, *'a'ama*, and *limu* along the rocky shoreline is still practiced. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by state law.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Three archaeological investigations have been conducted near to the project parcel within Kaueleau Ahupua'a (Figure 7). Bevacqua and Dye (1972) identified Pua'akanu Cemetery (Site 2534) northeast of the current project area and a portion of the King's trail along the coast during the course of an Archaeological Reconnaissance Survey for the Kapoho-Kalapana Road (project area follows current road).

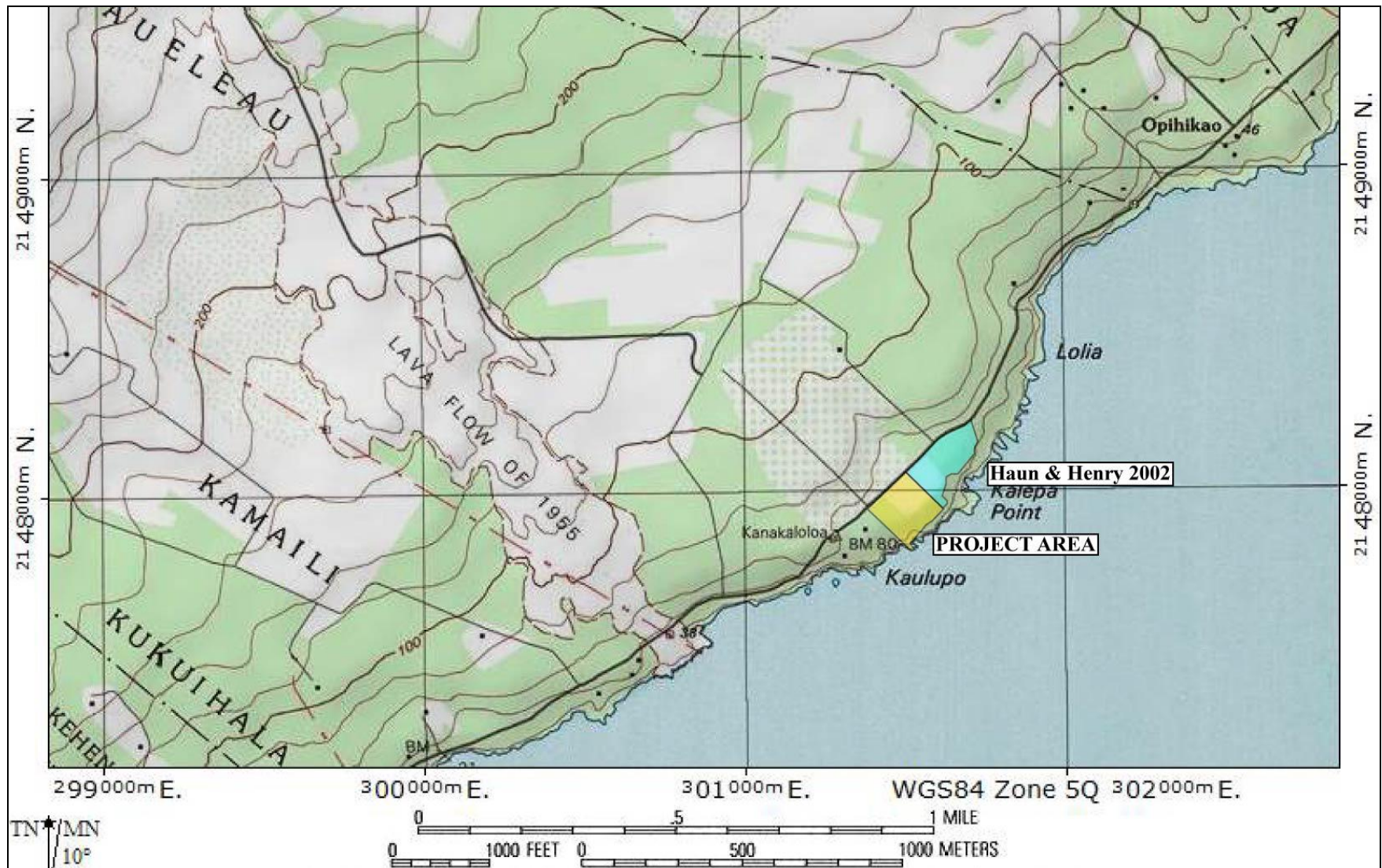


Figure 7: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area and Haun and Henry 2002 Study Area (Pāhoa South Quad, National Geographic Topo!, 2003).

Haun and Henry (2002) conducted an Archaeological Inventory Survey of Parcel 071 adjacent to the northeast side of the current project area property. No archaeological sites or historic properties were identified in that study. Haun and Henry (2014) conducted an Archaeological Assessment of the current project area. No archaeological sites or historic properties were identified in that study.

CULTURAL INFORMANT INTERVIEWS

SCS, Inc contacted five individuals who either work for the Office of Hawaiian Affairs, are the SHPD Burial Sites Specialist (HIBC), are familiar with the project area lands through cultural, professional, or historical work, or are long-time residents of the area (Table 1). None of the individuals were aware of past or ongoing cultural activities conducted on the subject parcels.

Table 1: Individuals Responding to CIA.

Name	Affiliation	Responded	Has Knowledge	Cultural Practices
Kai Markell	Office of Hawaiian Affairs	No	-	-
Kauanoë Hoomanawanui	SHPD Burial Sites Program	No	-	-
Kimo Lee Jr.	Chairman, HIBC	No	-	-
Rick Gmirkin	Ala Kahakai NHT, NPS	No	-	-
Howard Konanui	Area 'Ohana	Yes	Yes	No

SUMMARY

The “level of effort undertaken” to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential.

In the case of the present parcel, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs; Kauanoë Hoomanawanui, SHPD Burial Sites Specialist; Kino Lee, Jr. Chairman of the Hawai‘i Island

Burial Council; Rick Gmirkin, Ala Kahakai National Historic Trail, NPS Archaeologist; and Howard Konanui, area *'ohana* member. Inquiries were also made to members of the community who are familiar with the project area lands through cultural, professional, or historical work, or are long-time residents of the area.

Public notices were published in the Office of Hawaiian Affairs Ka Wai Ola Newspaper, and were published in the Honolulu Star Advertiser and the Hawai'i Tribune Herald.

Historical and cultural source materials were extensively used and can be found listed in the References Cited portion of the report. Such scholars as I'i, Kamakau, Chinen, Kame'eiehiwa, Fornander, Kuykendall, Kelly, Handy and Handy, Puku'i and Elbert, Thrum, and Cordy have contributed, and continue to contribute to our knowledge and understanding of Hawai'i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona 'Aina 2007 Data Base.

CIA INQUIRY RESPONSE

As suggested in the "Guidelines for Accessing Cultural Impacts" (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

As stated above, consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs; Kauanoe Hoomanawanui, SHPD Burial Sites Specialist; Kino Lee, Jr. Chairman of the Hawai'i Island Burial Council; Rick Gmirkin, Ala Kahakai National Historic Trail, NPS Archaeologist; and Howard Konanui, area *'ohana* member. None of the organizations or individuals that responded were aware of ongoing or past cultural resources or practices associated with lands of the project area. Those individuals who had knowledge of the project area lands responded that they were not aware of any cultural resources or ongoing cultural practices or beliefs associated with those lands.

Analysis of the potential effect of the project on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). To our knowledge, the project area has not been used for traditional cultural purposes within recent times. Based on historical research and the responses from the above listed contacts, it is reasonable to conclude that Hawaiian rights related to gathering, access or other customary activities within the project area will not be affected and there will be no direct adverse effect upon cultural practices or beliefs. There will be no visual impact of the project from surrounding vantage points.

CULTURAL ASSESSMENT

Based on the results of an Archaeological Assessment of the project area, the results of previous archaeological studies, as well as organizational response, individual cultural informant responses, and archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on this parcel. No cultural activities were identified within the project area, and the proposed undertaking will not produce adverse effects to any native Hawaiian cultural practices.

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