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JUL 23 2021

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LAND
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:RB

CDUA HA-3878

To: Keith Kawaoka, Acting Director
Office of Environmental Quality Control

From: Suzanne D. Case, Chairperson
Department of Land and Natural Resources

Subject: Draft Environmental Assessment (DEA) for Conservation Use District Application (CDUA) HA-3878 for the Holcomb Single Family Residence (SFR) and Related Improvements, Landscaping, and Signs located in Malamalama Iki, S. Hilo, Hawaii Tax Map Key (TMK): (3) 2-8-012:028

The Department of Land and Natural Resources has reviewed the subject draft EA for Conservation District Use Application (CDUA) HA-3877 and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the July 23, 2021 issue of The Environmental Notice.

If you have any questions, please contact Rachel Beasley at rachel.e.beasley@hawaii.gov or work cell at 808-798-6481.

22-003

From: webmaster@hawaii.gov
To: HI Office of Environmental Quality Control
Subject: New online submission for The Environmental Notice
Date: Friday, July 16, 2021 7:51:59 AM

Action Name

Holcomb Single-Family Residence in the Conservation District in Honomū

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

HRS §343-5(a) Trigger(s)

- (2) Propose any use within any land classified as a conservation district

Judicial district

South Hilo, Hawaiʻi

Tax Map Key(s) (TMK(s))

(3) 2-8-012:028

Action type

Applicant

Other required permits and approvals

County of Hawaiʻi: Special Management Area Permit or Exemption Plan Approval and Grubbing, Grading, and Building Permits State of Hawaiʻi: Conservation District Use Permit Wastewater System Approval Water Well Permit Chapter 6E SHPD Approval of Archaeological Survey

Discretionary consent required

Conservation District Use Permit for Single-Family Residence; Special Management Area Use Permit, Minor

Approving agency

Department of Land and Natural Resources

Agency contact name

Rachel Beasley

Agency contact email (for info about the action)

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Email address or URL for receiving comments

rachel.e.beasley@hawaii.gov

Agency contact phone

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Agency address

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Honolulu, HI 96813

United States
Map It

Applicant

Kelly Holcomb c/o Carlsmith Ball

Applicant contact name

RON TERRY

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arleneterry@hotmail.com

Applicant contact phone

(808) 987-4826

Applicant address

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Was this submittal prepared by a consultant?

Yes

Consultant

GEOMETRICIAN ASSOCIATES

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Ron Terry

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Action summary

Applicant proposes a home on his 6.485-acre property near Honomū. The 1-story home will be set back 130 feet from the sea cliff and will have 3,018 sf of interior space, 3 bedrooms and 3.5 baths, and a garage, lanai, pool, and utilities room. The off-grid home will have rooftop solar PV and a water well. The project would remove albizia and other invasive trees; native, Polynesian and non-invasive ornamentals along with fruit trees, herbs and vegetables would be planted. A century of sugarcane farming altered the original land and no threatened and endangered plants are present. Two sugarcane-era archaeological sites are present but no adverse effects will occur. Grading will be minimal and mitigated by BMPs. Clearing timing restrictions will help prevent impacts to Hawaiian hawks and endangered Hawaiian hoary bats. The cultural practice of descending the tall seacliff via ladders and ropes to fish will be preserved through access easements in favor of a local fishing association.

Reasons supporting determination

Chapter 11-200.1-13, Hawaiʻi Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

(a) In considering the significance of potential environmental effects, agencies shall consider and evaluate the sum of effects of the proposed action on the quality of the environment.

(b) In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected impacts, and the proposed mitigation measures. In most instances, an action shall be determined to have a significant effect on the environment if it may:

1. Irrevocably commit a natural, cultural, or historic resource. No valuable natural or cultural resource would be committed or lost. Several common native plants are present, especially near the cliffs where there will be no disturbance other than removal of invasive trees. No native ecosystems or valuable flora or fauna would be adversely affected. An archaeological inventory survey determined that two sites that lack physical integrity but are associated with former sugarcane cultivation were found. No adverse effects to historic sites would occur. A path to the top of a shoreline point accessed only by a series of now-defunct ladders but formerly used for shoreline fishing will be maintained. No valuable cultural resources and practices such as shoreline access, fishing, gathering, hunting, or access to ceremonial sites would be adversely affected in any way.

2. Curtail the range of beneficial uses of the environment. No restriction of beneficial uses would occur by residential use on this lot.

3. Conflict with the State's environmental policies or long-term environmental goals established by law. The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is environmentally benign and minor, and it is thus consistent with all elements of the State's long-term environmental policies.

4. Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State. The project would not have any substantial effect on the economic or social welfare of the Big Island community or the State of Hawaiʻi.

5. Have a substantial adverse effect on public health. 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. Involve adverse 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. Involve a substantial degradation of environmental quality. The project is minor and environmentally benign, and thus it would not contribute to environmental degradation.

8. Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions. The adverse effects of building a single-family residence are limited to very minor and temporary disturbance to traffic, air quality, noise, and visual quality during construction. This area is fairly isolated from sensitive receptors. There are no traffic issues associated with the highway access point, which provides for only a handful of lightly visited properties that generate only negligible traffic. There are no substantial government or private projects in construction or planning in the area, 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.

9. Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat. The site has been surveyed for threatened and endangered plants, and none are present. Other than Hawaiian hoary bats and Hawaiian hawks, island wide-ranging species that will experience no adverse impacts due to mitigation through seasonal timing of vegetation removal and seasonal hawk surveys as needed, no rare, threatened or endangered species of fauna are known to exist on or near the property, and none would be affected by any project activities. Only very minor exterior lighting is planned, and it will be shielded and will consist of blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin. This will reduce the risk that transiting threatened or endangered seabirds may be attracted to and then disoriented by the lighting.

10. Have a substantial adverse effect on 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. The context of the property's location, with no residences, parks, or other sensitive uses nearby, will help avoid noise impacts. Erosion and sedimentation impacts will be avoided by implementation of Best Management Practices during grading, which will occur in a very limited area.

11. Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters. The proposed home site is not located in a flood zone nor would it affect one. In general, geologic conditions do not impose undue constraints on the proposed action, as volcanic hazard is low and the home will meet or exceed all seismic hazard standards. The house would be set back a minimum of 130 feet from the edge of the pali, and will not be affected directly by sea level rise or the slow retreat of shoreline cliffs. The project has adapted to climate change by accounting for the potential for larger storms, through minimizing hard surfaces that generate runoff and removing nearby tall invasive trees. 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.

12. Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies. No protected scenic views are located nearby or would be affected in any way. The proposed use is consistent with other single-family residential and farming uses in the area. It will be in area barely not visible from the shoreline and barely visible from the sea, and not at all visible from the nearest State highway or any other public road. Only very minor exterior lighting is planned, and it will be shielded and will consist of blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin. This will protect dark skies reduce the risk that the threatened or endangered seabirds that may be attracted to and then disoriented by the lighting.

13. Require substantial energy consumption or emit substantial greenhouse gases. Negligible amounts of energy input and greenhouse gas emission would be required for construction and occupation of the residence. The residence is designed as a single structure supporting efficient use of energy and materials and facilitating natural ventilation and lighting. The home will also have roof-mounted photovoltaic and solar water heating panels, reducing energy use and greenhouse gas emissions. Energy-efficient appliances will be used throughout the house. A design that accommodates natural ventilation and an insulated roof structure will reduce potential solar gain to the home and reduce the need for air conditioning.

Attached documents (signed agency letter & EA/EIS)

- Draft-EA-Holcomb-Single-Family-Residence-in-CD-at-Honomu.pdf
- OEQC_DEA-Letter-Holcomb-SFR.pdf

Action location map

- Holcomb-Honomu-Property.zip

Authorized individual

RON TERRY

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

Draft Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

June 2021

TMK (3rd): 2-8-012:028
Honomū, South Hilo District, County of Hawai‘i, State of Hawai‘i

APPLICANT:

Kelly Holcomb
c/o Carlsmith Ball, LLP
121 Waianuenue Avenue
Hilo, Hawai‘i 96720

DETERMINING 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
10 Hina Street
Hilo, Hawai‘i 96720

Draft Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

TMK (3rd): 2-8-012:028
Honomū, South Hilo District, County of Hawai‘i, State of Hawai‘i

APPLICANT:

Kelly Holcomb
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121 Waianuenue Avenue
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1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

CONSULTANT:

Geometrician Associates LLC
10 Hina Street
Hilo, Hawai‘i 96720

CLASS OF ACTION:

Use of Land in Conservation District

This document is prepared pursuant to:
The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200.1, Hawai‘i Department of Health Administrative Rules (HAR)

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SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Kelly Holcomb (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence on his 6.485-acre shoreline property located *makai* of Highway 19 just southeast of Honomū in the Conservation District on the Island of Hawai‘i. The single-story home would have 3,018 square feet (sf) of interior space, with 3 bedrooms and 3.5 baths, and various other rooms. Together with the garage, a lanai, a swimming pool, a utilities room, and other features, the Total Development Area for the residence is 4,877 sf. The home will be off grid and powered by a rooftop photovoltaic system with a backup generator, with potable water from an on-site water well. Wastewater would be treated by an individual septic system located adjacent to the residence. The residence is designed as a single structure supporting efficient use of energy and materials and facilitating natural ventilation and lighting. The project includes landscaping removing highly invasive albizia, ironwood and fiddlewood trees and planting near the home with native, Polynesian and non-invasive ornamental trees, groundcover and ferns, along with some fruit trees, herbs and vegetables.

Over a century of commercial cultivation of sugarcane in all parts of the property substantially altered the original landscape and vegetation. The site was surveyed for threatened and endangered plants, and none are present, although some native plants are present in limited areas that will not be affected by the project. Impacts to the island wide-ranging Hawaiian hawks and endangered Hawaiian hoary bats will be avoided through seasonal timing of vegetation removal and seasonal hawk surveys as needed. An archaeological survey found only the former locations of the railroad and a sugarcane flume, of which no remnants are present. No further archaeological work is expected to be required. In the unlikely event that additional undocumented archaeological resources, including shell, bones, midden deposits, lava tubes, or similar finds, are encountered during construction, 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 home site is almost completely hidden from outside view by topography and groves of tall trees on the subject and adjacent properties, and will be set back more than 130 feet from the top of *pali* above the coastline. No streams or other water bodies are present on the property. Landclearing and construction activities would occur over less than an acre, with very minor short-term impacts to noise, air quality and scenery. These would be mitigated by Best Management Practices associated with the CDUP and grading permit. The applicant will ensure that all earthwork and grading conforms to applicable laws, regulations and standards, and there will be no adverse impacts to the adjacent shoreline or nearshore waters.

No cultural sites or practices would be adversely affected. The rocky shoreline fronting the property is at the foot of steep coastal sea cliffs from 120 to 170 feet tall. A fishing spot called “Ladders” was formerly accessed by fishermen who used wooden ladders for access. The ladders have deteriorated and fisherman only rarely rappel down the cliffs, but local fishermen wish to preserve access. The applicant proposes coastal access corridors and provision of a license to the Makahanaloa Fishing Association to provide access, assist in management, and mitigate the potential liability to the property owner from claims for injury that could occur when attempting to access the shoreline. A parking area will also be provided for daytime fishing and access at night for those actively engaged in night fishing activities through a registration system managed by the Association. Informational and warning signage will also be provided.

PART 1: PROJECT DESCRIPTION AND E.A. PROCESS

1.1 Project Description and Location

Kelly Holcomb (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence on his 6.485-acre shoreline property located *makai* of State Highway 19 just southeast of Honomū in the Conservation District on the Island of Hawai‘i (Figures 1-2). The property is bounded by the highway on the southwest, a private property on the southeast, and the sea on the northeast and northwest. The moderately sloping property, which is perched on a bluff from 120 to 170 above sea level, was cultivated for more than a century in sugarcane and is now covered almost entirely by invasive trees, shrubs and grasses. The only semi-natural vegetation is on the top and sides of the *pali*, which contain hala trees and a few other native shoreline species, along with a number of invasives such as ironwood. No streams, sensitive native plants or archaeological sites are present.

The plan for the residence (Figure 3) is a single-story structure with a maximum height of 21 feet above existing grade and 3,018 square feet (sf) of interior space. It will contain 3 bedrooms and 3.5 baths, an open living-dining room, a kitchen, laundry, pantry and entry room. In addition there will be a two-car garage; lanai; swimming pool; an area with the backup generator, propane storage and water well; utilities room for solar PV equipment, pool pump and chlorination equipment; and a 500-gallon water tank. The home will be powered by a photovoltaic system and backup generator, with potable water provided by an on-site water well and fire protection provided by sprinklers throughout the home. An overhead telephone line will connect to a utility pole in an unobtrusive location just west of the property. Total Development Area for the residence, per Title 13-5, HAR, Exhibit 4, which counts features such as lanai, swimming pools, and utility sheds, is 4,877 sf. Home materials include wood siding and lava rock veneer. The proposed home site is near the center of the property, a minimum of 130 feet *mauka* of the *pali*, largely hidden from outside view by topography and tall non-native trees on the subject and adjacent properties.

The residence is designed as a single structure supporting efficient use of energy and materials and facilitating natural ventilation and lighting. Energy-efficient appliances will be used and an insulated roof structure and the proper siting of trees and shrubs will reduce potential solar gain. This together with natural ventilation will reduce the need for air conditioning. The home will have roof-mounted photovoltaic panel and a propane gas system supplying two tankless gas-on-demand water heaters, reducing energy use and greenhouse gas emissions.

An individual septic system conforming with requirements of the State Department of Health at HAR 11-62 and located adjacent to the residence will treat wastewater. The septic system would have a tank capacity of 1,000 gallons and a 400-sf absorption field. Three shallow drywells would handle drainage. The project includes landscaping replacing non-native vegetation near the home site with native, Polynesian and non-invasive ornamental trees, groundcover and ferns, along with some fruit trees and a kitchen garden (see Landscape Plans in App. 7). The plan also includes removal of various non-native trees – especially ironwood and fiddlewood – to stabilize the cliff, promote native vegetation and open a view corridor to the north/northeast. In cooperation with the Big Island Invasive Species Council (BIISC) the applicant will gradually remove all albizia trees on the property, to the extent feasible.

Figure 1 Project Location Map

Figure 2 Site Photos

2a: Aerial Image from Google Earth © with Approximate Property Boundary and Easement

Figure 2 Site Photos

2b. Oblique aerial. Note highway on left and right, with roadcut in between. Home site is grassy area in middle of point. ▲
▼ 2c. Roadcut that borders property on southwest side and blocks views into property from highway.

Figure 2. Site Photos
Photos

2d. ▲ Building site.
▼ 2e. View from building site north towards sea.

Figure 2. Site Photos

2f. View approaching property from south with driveway access and start of easement. ▲

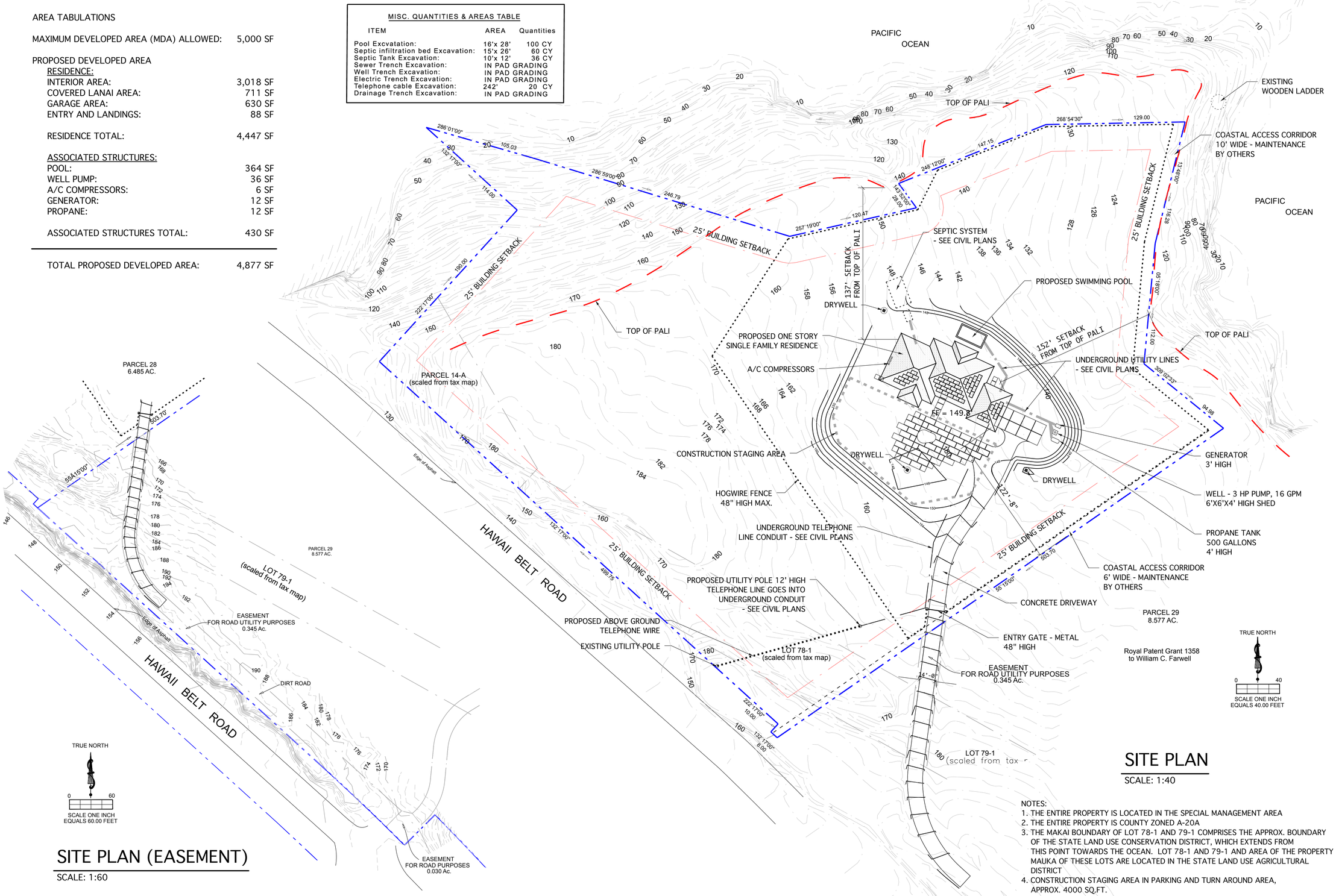
▼ 2g. Rockfall scars and contrast between rockfall prone areas infested with ironwoods and stable areas covered by hala.

AREA TABULATIONS

MAXIMUM DEVELOPED AREA (MDA) ALLOWED:	5,000 SF
PROPOSED DEVELOPED AREA	
RESIDENCE:	
INTERIOR AREA:	3,018 SF
COVERED LANAI AREA:	711 SF
GARAGE AREA:	630 SF
ENTRY AND LANDINGS:	88 SF
RESIDENCE TOTAL:	4,447 SF
ASSOCIATED STRUCTURES:	
POOL:	364 SF
WELL PUMP:	36 SF
A/C COMPRESSORS:	6 SF
GENERATOR:	12 SF
PROPANE:	12 SF
ASSOCIATED STRUCTURES TOTAL:	430 SF
TOTAL PROPOSED DEVELOPED AREA:	4,877 SF

MISC. QUANTITIES & AREAS TABLE

ITEM	AREA	Quantities
Pool Excvatation:	16'x 28'	100 CY
Septic infiltration bed Excavation:	15'x 26'	60 CY
Septic Tank Excavation:	10'x 12'	36 CY
Sewer Trench Excavation:	IN PAD GRADING	
Well Trench Excavation:	IN PAD GRADING	
Electric Trench Excavation:	IN PAD GRADING	
Telephone cable Excavation:	242'	20 CY
Drainage Trench Excavation:	IN PAD GRADING	



SITE PLAN

SCALE: 1:40

SITE PLAN (EASEMENT)

SCALE: 1:60

NOTES:
1. THE ENTIRE PROPERTY IS LOCATED IN THE SPECIAL MANAGEMENT AREA
2. THE ENTIRE PROPERTY IS COUNTY ZONED A-20A
3. THE MAKAI BOUNDARY OF LOT 78-1 AND 79-1 COMPRISES THE APPROX. BOUNDARY OF THE STATE LAND USE CONSERVATION DISTRICT, WHICH EXTENDS FROM THIS POINT TOWARDS THE OCEAN. LOT 78-1 AND 79-1 AND AREA OF THE PROPERTY MAUKA OF THESE LOTS ARE LOCATED IN THE STATE LAND USE AGRICULTURAL DISTRICT
4. CONSTRUCTION STAGING AREA IN PARKING AND TURN AROUND AREA, APPROX. 4000 SQ.FT.

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4/30/22
Expiration Date
Signature
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PROPOSED SINGLE FAMILY RESIDENCE FOR:
KELLY HOLCOMB
28-3426 HAWAII BELT ROAD
HONOMU, HAWAII 96728
TMK: 2-8-012-028

REVISIONS

NO	DATE

DRAWINGS:
SITE PLAN

DATE: 3/19/21
SCALE: AS NOTED
DRAWN: MG

DRAWING NUMBER
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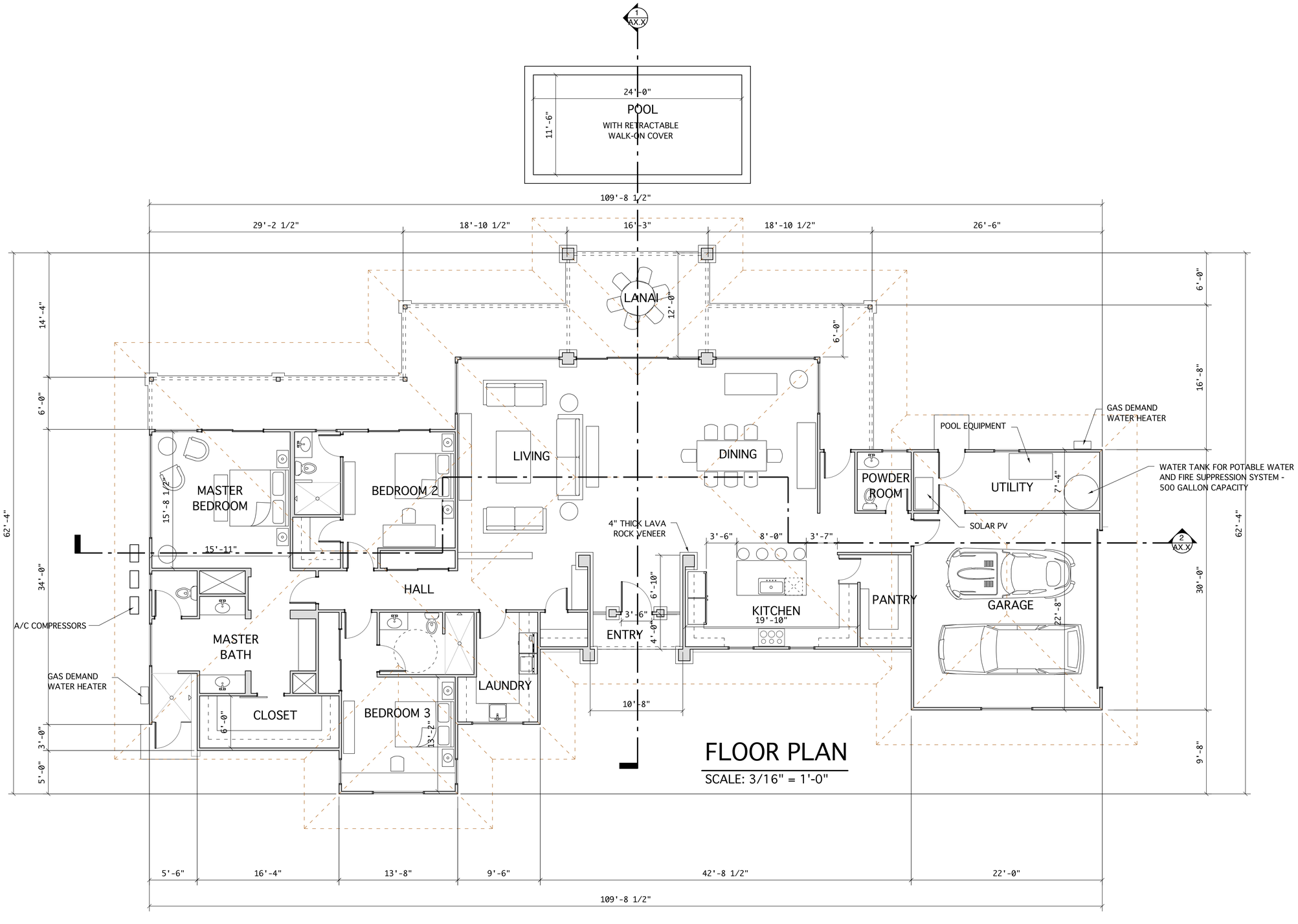

FLOOR PLAN

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

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Signature Expiration Date

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MATTHEW M. GRAVES
LICENSED PROFESSIONAL ARCHITECT
No. AR-14033
HAWAII, U.S.A.

PROPOSED SINGLE FAMILY RESIDENCE FOR:

KELLY HOLCOMB

28-3426 HAWAII BELT ROAD
HONOMU, HAWAII 96728
TMK: 2-8-012-028

REVISIONS

NO	DATE

DRAWINGS:
FLOOR PLAN

DATE: 3/1/21
SCALE: 3/16" = 1'-0"
DRAWN: MG

DRAWING NUMBER

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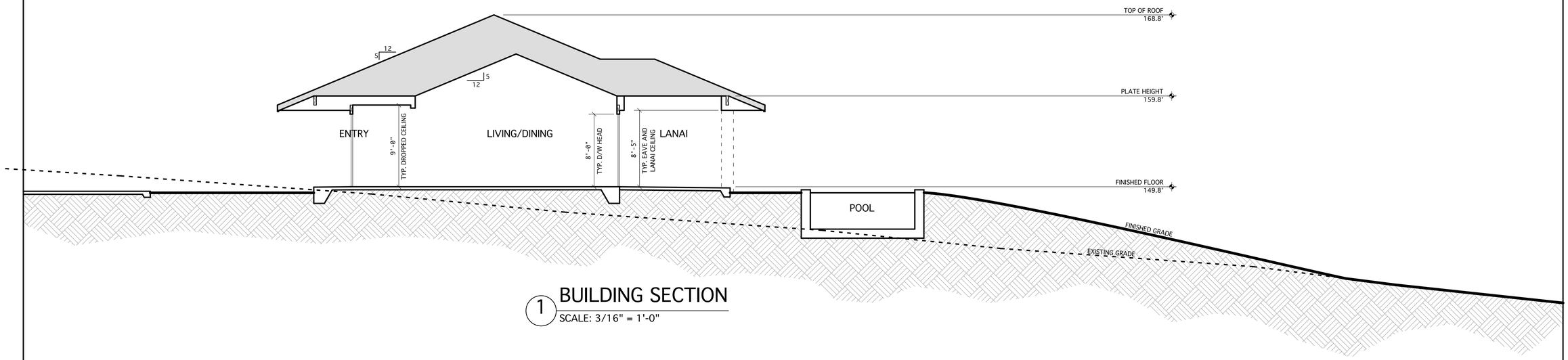
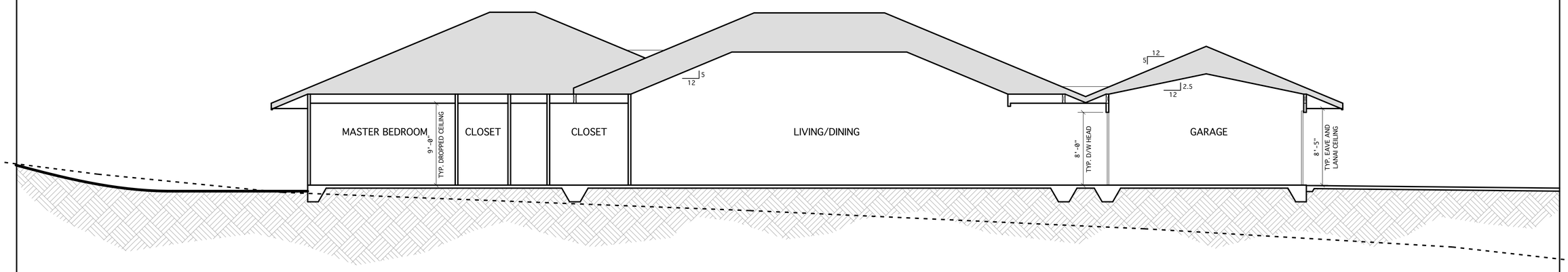


1 BUILDING SECTION
SCALE: 3/16" = 1'-0"



2 BUILDING SECTION
SCALE: 3/16" = 1'-0"

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Expiration Date
Signature
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PROPOSED SINGLE FAMILY RESIDENCE FOR:
KELLY HOLCOMB
28-3426 HAWAII BELT ROAD
HONOMU, HAWAII 96728
TMK: 2-8-012-028

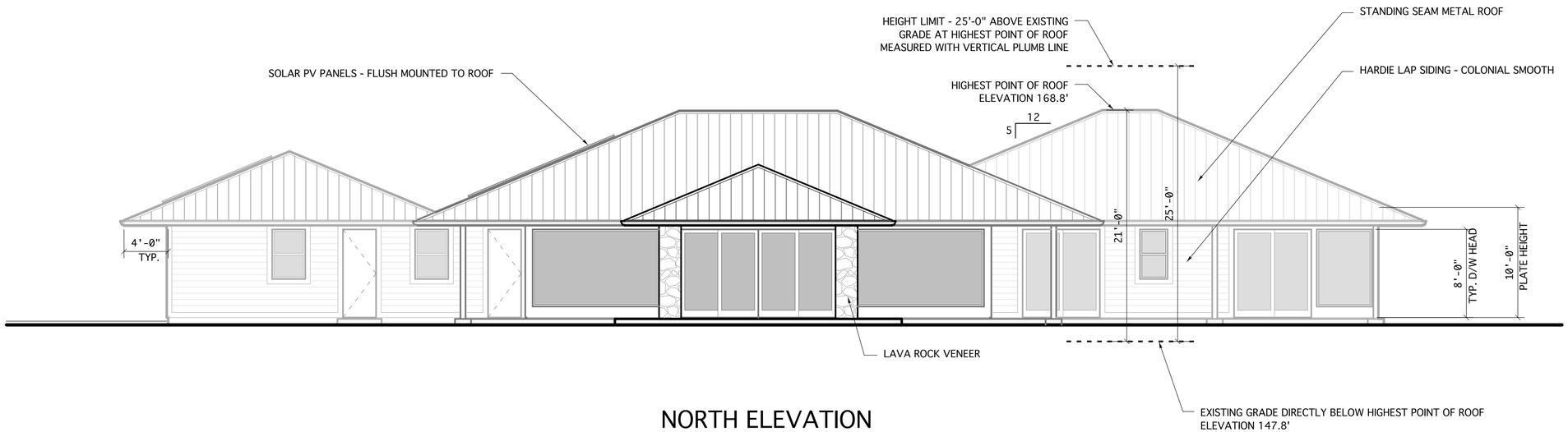
REVISIONS

NO	DATE

DRAWINGS:
BUILDING SECTIONS

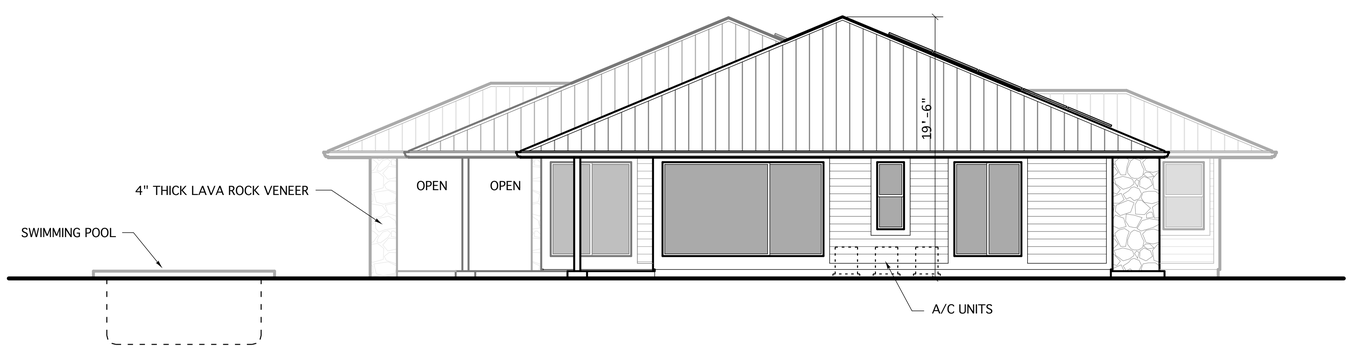
DATE: 3/1/21
SCALE: 3/16" = 1'-0"
DRAWN: MG

DRAWING NUMBER
A4.0



NORTH ELEVATION

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



WEST ELEVATION

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

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4/30/22
Signature Expiration Date

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PROPOSED SINGLE FAMILY RESIDENCE FOR:

KELLY HOLCOMB

28-3426 HAWAII BELT ROAD
HONOMU, HAWAII 96728
TMK: 2-8-012-028

REVISIONS

NO	DATE

DRAWINGS:
EXTERIOR ELEVATIONS

DATE: 3/1/21

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

DRAWN: MG

DRAWING NUMBER

A3.1

Land clearing and construction activities would occur over just less than an acre, including approximately 484 sf of shallow trenching for utility lines and connections, with very minor short-term impacts to noise, air, and water quality and scenery. These would be mitigated by Best Management Practices associated with the CDUP and grading permit. For trenching, extracted materials will be used to refill the trenched areas and to blend the areas with the surrounding topography.

The rocky shoreline fronting the property is located at the foot of steep coastal sea cliffs from 120 to 170 feet tall. Located *makai* at the northern point of the peninsula, northeast and outside the *makai* boundary of the property, is a fishing spot knows as "Ladders." The site was formerly used by area shoreline fishermen who used the wooden ladders or rappelled to descend the cliff to the shoreline below. Due to deterioration of the ladders and resultant cessation of use over time, the wooden ladders are not usable and shoreline access can presently only be accomplished by fishermen with the expertise needed to rappel the steep coastal cliffs to the shoreline.

In order to facilitate lateral pedestrian access to and along the top of the *pali* fronting the property and to the "Ladders" fishing site, the applicant is proposing two (2) pedestrian coastal access corridors (collectively the "coastal access corridor"), as described below, as illustrated in Figure 3:

1. A 6-foot wide *mauka–makai* corridor along the southeastern boundary of the property, roughly 500 feet in length along the common property boundary with TMK: (3) 2-8-012:029; and
2. A 10-foot wide lateral corridor along the eastern boundary of the Property out to the point at the "Ladders" fishing site, approximately 323 feet in length.

The Applicant intends to keep the coastal access corridor in private ownership and does not intend to dedicate the coastal access corridor to the County. However, the applicant is committed to ensuring that the coastal access corridor will be kept free of structures to allow for access by shoreline fishermen who obtain the applicant's permission to access the coastal access corridors across the property to the coastal resources located down at the shoreline.

In furtherance of the access for shoreline fishermen, the applicant has reached a general understanding with the Makahanaloa Fishing Association, an organization representing a large group of fishermen from the Hamakua area ("Association"). It is contemplated that the Association would assist with the management of the coastal access corridor to allow for managed shoreline fishing access to minimize overuse of the finite coastal resources in the area, and to mitigate the potential liability to the property owner from claims for injury that could occur when attempting to access the shoreline from the property. The applicant intends to execute a License for Shoreline Access over the coastal access corridor ("License") with the Association to govern the Association members' assumption of risk and indemnification of the applicant and its affiliated parties, while also ensuring that the coastal corridor is used lawfully.

The applicant is planning to provide an on-site parking area for 2 to 3 cars for use by the Association and its members, immediately *mauka* of the proposed driveway to the residence. This will provide a secure area for the fishermen's vehicles when accessing the shoreline, while also mitigating the traffic and safety concerns resulting from the parking of vehicles along Highway 19, which is currently the practice.

The pedestrian coastal access corridor will be open to invitees of the applicant, including the members of the Association, every day during daylight hours (from sunrise or 6:00 a.m., whichever is earlier, to one-half hour past sunset, or 6:00 p.m., whichever is later), seven (7) days a week. Access for night fishing past 6:00 p.m. shall be allowed for those individuals who are actively engaged in night fishing activities through a registration system managed by the Association, and will not include overnight camping within the property.

The applicant also proposes to install shoreline access signs along the length of the roadway easement and the coastal access corridor to inform the public that they are on private property and warn of the steep coastal sea cliffs. Informational and warning signage will be limited to 6 to 8 signs to preserve the natural character of the area.

1.2 Environmental Assessment Process

This Environmental Assessment (EA) 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 200.1, 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 finding that no significant impacts are expected to occur, based on the findings for each criterion made by the consultant in consultation with the Hawai‘i State Department of Land and Natural Resources, the determining 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 to 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	Civil Defense Agency
Fire Department	Department of Public Works	Police Department

State:

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

Private:

Sierra Club
Hawai‘i Island Chamber of Commerce
Three Adjacent Property Owners: Nejfeld, Parisi, Acosta
Makahanaloa Fishing Association

Copies of communications received during early consultation are contained in Appendix 1a.

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 in the interior of the property was chosen in order to enjoy coastal breezes and views on the property while avoiding shoreline hazards and interfering with shoreline processes and recreation.

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 three factors: breezes, views and shoreline hazard avoidance. Furthermore, the proposed location already has a long-established cane road/driveway reinforced in the plantation days with large gravel, which helps provide stability in the ash-derived soils. There are no known environmental or other reasons for seriously considering other sites on the property.

No other alternative uses for the property that are identified in the Conservation District Rules, such as a commercial farm or tourist nature park, are 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, except for perhaps temporary camping and picnicking by the owner and his guests. 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

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

Temperatures are warm year-round at the property, with slightly cooler winters, and annual rainfall is about 132 inches. Winds are generally trade winds from the east/northeast, often with light downslope land breezes at night (UH Hilo Dept. of Geography 1998; Giambelluca et al. 2013).

There is a scientific consensus that the earth is warming due to manmade increases in greenhouse gases in the atmosphere, according to the United Nations' Intergovernmental Panel on Climate Change (UH Manoa Sea Grant 2014). Global mean air temperatures are projected to increase by at least 2.7°F by the end of the century. This will be accompanied by the warming of ocean waters, expected to be highest in tropical and subtropical seas of the Northern Hemisphere. Wet and dry season contrasts will increase, and wet tropical areas in particular are likely to experience more frequent and extreme precipitation. For Hawai'i, where warming air temperatures are already quite apparent, not only is the equable climate at risk but also agriculture, ecosystems, the visitor industry and public health. Guidance to federal agencies for addressing climate change issues in environmental reviews was released in August 2016 by the Council on Environmental Quality (US CEQ 2016). The guidance urged that when addressing climate change, agencies should consider: 1) the potential effects of a proposed action on climate change as indicated by assessing greenhouse gas emissions in a qualitative, or if reasonable, quantitative way, and 2) the effects of climate change on a proposed action and its environmental impacts. It recommends that agencies consider the short- and long-term effects and benefits in the alternatives and mitigation analysis in terms of climate change effects and resiliency to the effects of a changing climate. Although this guidance has since been withdrawn for political reasons, the State of Hawai'i in Hawai'i Revised Statutes §226-109 encourages a similar analysis, and both Act 17 of the 2018 Hawai'i Legislature and Title 11, Chapter 200.1 now require analysis of sea-level rise and greenhouse gases in environmental impact statements. In terms of climate, it is possible, and even likely, that warmer temperatures and larger and more frequent tropical storms and hurricanes will affect the Hawaiian Islands in the future. In addition, as discussed in Section 3.1.2, accelerating sea level rise is expected.

Geologically, this part of the island is located on the lower flank of Mauna Kea, an inactive volcano. The surface consists of weathered soils derived from regional ash deposits and alkalic basalt lava flows dated at 65,000-200,000 years before the present (Wolfe and Morris 1996). Elevations on the useable part of this moderately sloping shoreline property drop from about 185 to 120 feet above sea level, surrounded on three sides by 50 to 100 foot tall sea cliffs. The area receives an average annual rainfall of about 132 inches (Giambelluca et al 2013). The soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Hilo hydrous silty clay loam, 10 to 20 percent slopes. This soil is formed from ash fields on lava flows and if irrigated can be considered prime farmland. This type of soil was formerly used mostly for sugarcane cultivation (U.S. Soil Conservation Service 1973) and now supports diversified agriculture, secondary forest, or pasture.

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 on the northeast flank of Mauna Kea is 8 on a scale of ascending risk 9 to 1 (Heliker 1990). Mauna Kea has erupted several times in the last 10,000 years, most recently about 4,500 years ago. This volcano is considered inactive but not extinct. Zone 8 includes the lower slopes of Mauna Kea. The project area has not been affected by lava flows for the past 10,000 years.

The Island of Hawai‘i experiences high seismic activity and is at risk from earthquake damage (USGS 2000), especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 2006 and the 6.9-magnitude quake of May 2018 demonstrated. The area proposed for the home and driveway is moderately sloped and near the center of the property. There are appropriate setbacks to steep slopes and the home is at least 130 feet from the nearest edge of the *pali*. There does not appear to be a substantial risk at the home site from subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In order to deal with the potential for larger and more frequent tropical storms that could be part of a changing climate, the home has been designed to withstand hurricane force winds. All trees with the potential to fall on the house will be removed. The implications of climate change and resulting sea level rise and coastal erosion are dealt with in the next section. In general, geologic conditions do not impose undue constraints on the proposed action. 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). The flood zones for this region were recently mapped, and digital maps are available from the Department of Land and Natural Resources at http://gis.hawaiinfip.org/fhat/ (Figure 4). The entire property above the *pali* is classified in Flood Zone X, areas with minimal flood hazards, including tsunami inundation.

Figure 4. Flood Zone Map

Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	HAWAII
TMK NO:	(3) 2-8-012:028
WATERSHED:	HONOMU; LAIMI
PARCEL ADDRESS:	ADDRESS NOT DETERMINED PEPEEKEO, HI 96783

Notes:

Flood Hazard Information

FIRM INDEX DATE:	SEPTEMBER 29, 2017
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1551660700F
PANEL EFFECTIVE DATE:	SEPTEMBER 29, 2017

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 200 400 ft

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

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

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A**: No BFE determined.
- **Zone AE**: BFE determined.
- **Zone AH**: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO**: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V**: Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE**: Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF**: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded)**: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X**: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D**: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

Source: Hawai‘i DLNR: http://gis.hawaiinfip.org/fhat/

Sea Level Rise and 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.

Single Family Residential permitting in Conservation Districts in the State of Hawai‘i is regulated by State of Hawai'i Administrative Rules governing Conservation Districts (Title 13, Subtitle 1 Chapter 5, adopted August 12, 2011). Applications to permit shoreline residential construction in the Conservation District must consider rates of coastal erosion. The State DLNR requires an estimate of annual erosion rate in the form of a Coastal Erosion Study for any property for which construction is proposed. Such a study integrates on-site quantitative measurements by a credentialed specialist, inspection of available aerial and satellite imagery taken over a period of time, and a review of geological literature.

A Coastal Erosion Study that also considered other coastal hazards was prepared for the property by T.E. Scheffler, Ph.D., and J.P. Lockwood, Ph.D. The full report is attached as Appendix 4 and summarized briefly below. The reader is referred to the report for additional detailed description, maps and photos.

Sea Level Rise

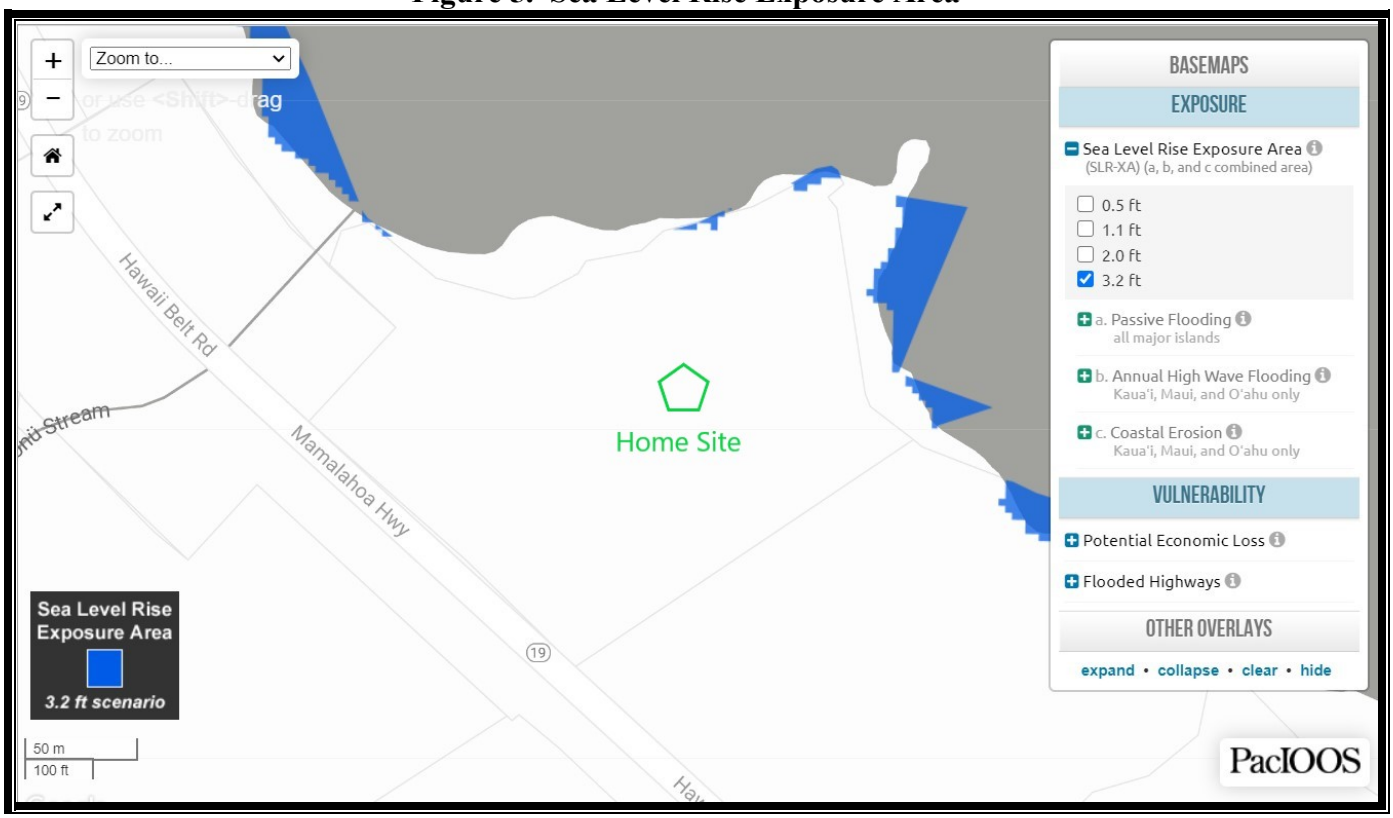
Because the proposed use of a single-family residence on this coastal property has an expected useful lifetime of 40 to 70 years, it is important to first examine the potential for future sea level rise. Sea level rise also factors into future rates of coastal retreat and erosion.

An overall global (or eustatic, meaning not attributable to local factors) rise in sea level of 3.3 feet by the end of the 21st century was proposed by Fletcher (2010) and others. More recent scientific assessments (e.g., Rahmstorf et al. 2012) posit 4 feet as a reasonable upper bound. Some recent research that concentrates on the potential for Antarctic melting to contribute more to sea level than generally modeled envisions as much as an additional 3 feet of sea level rise (DeConto and Pollard 2016). Not only the magnitude of sea level rise but also the timing is the subject of debate. According to the Hawai‘i Climate Change Mitigation and Adaptation Commission (HCCMAC) (2017:v):

> While the IPCC's "business as usual" scenario, where GHG emissions continue at the current rate of increase, predicts up to 3.2 feet of global sea level rise by year 2100 (IPCC 2014), recent observations and projections suggest that this magnitude of sea level rise could occur as early as year 2060 under more recently published highest-end scenarios...

The HCCMAC report goes on to state that the Island of Hawai‘i is in many senses the least vulnerable of the main Hawaiian Islands to the impacts of sea level rise, but also that certain areas – particularly Kona, Puakō, Kapoho and Hilo Bay ".....face serious threats. It is estimated that at least 130 existing structures would experience chronic flooding if there were 3.2 feet of sea level rise."

Figure 5. Sea Level Rise Exposure Area



Source: Adapted from https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/

Relative sea-level rise is a result of the combined eustatic water rise and land subsidence. In some locations, the effects of eustatic sea level rise can be magnified substantially. The 1975 Kalapana earthquake on Kilauea's rift caused land in Kapoho to drop 0.8 feet (based on Hawaiian Volcano Observatory (USGS) data in Hwang et al. (2007:6). This episodic, seismic-induced subsistence is difficult to estimate over human-scale time periods. On the basis of InSAR (Synthetic Aperture Radar Interferometry) remote sensing data, Hwang et al. (ibid.) state that the coastline in the vicinity of Kapoho may be subsiding at a continuous rate of between 0.31-0.67 in/yr. Rates of subsidence at the Holcomb property are certainly much lower as a result of its location on Mauna Kea. The rate of subsidence for Hāmākua has been estimated at about 0.1 inches/year (Moore 1970). A highly conservative estimate of overall sea level change by the year 2100, accounting for a eustatic rise of 5 feet and local tectonic sinking of about 3 feet, is 8 feet. The greatest rate of SLR will take place during the second half of this century according to recent modeling (e.g., Cazenave and Le Cozannet 2014).

The elevation of the home at approximately 149 feet above mean sea level ensures that even when sea level rises five or more feet above its current level, the home will continue to remain well out of the effective flood zone (see sea level rise exposure area in Figure 5). Even extremely large rises in sea level of the type that would essentially require the relocation of much of downtown Hilo and Honolulu would not inundate affect the home anywhere on this property.

Coastal Erosion: Physical Setting

The Holcomb property is on a small, unnamed promontory immediately south of the mouth of the Honomū Stream, midway between Lehuawehi Point (to the northwest) and Koholā Point (southeast), which define Honomū Bay (see Figures 1-2). The coastline for a dozen miles in both directions consists of rocky headlands with small embayments at stream mouths. Heavy stream discharge along the windward slope of Mauna Kea provides the shoreline with ample volcanic detrital material, which forms small pebble and cobble beaches where wave energy and coastal slope permit. These same sediment laden streams also prevent the formation of extensive nearshore coral reefs.

The coast of this part of the island of Hawai‘i faces the open ocean with no barrier of offshore reefs or bars. The submarine slope is approximately 1,300 feet/mile for a distance of roughly 6 miles. Along the Hāmākua coast, large waves are predominantly related to trade winds, though the shoreline is also somewhat exposed to North Pacific swells. The largest waves come from the north-north-east, north or north-north-west direction. The property's north side faces essentially directly north, where North Pacific swells can reach significant heights of 20 feet or more and are a major contributor to coastal erosion and storm damage. The southern portion faces SSE and is well shadowed from the direct onslaught of the waves. The mean range of tidal change (MN) is 1.67 feet. with a Great Diurnal Range (GT) of 2.4 feet Tidal heights are given as positive and negative values relative to the Mean Lowest Low Water (3.92 ft.) and Mean Highest High Water (6.32 ft.). The tidal variation throughout the year is important, as a simple "snapshot" of the coastline at a given tide can be misleading on the whole. The effects of tides are dependent on beach slope. For example, 2.4 feet of tide will move the tideline 24 feet horizontally on a 10% slope. This can have dramatic effects, changing the location and breadth of active weathering.

Understanding the sequence of geological events on site provides a fundamental framework on which inferences concerning erosion rates are based. The surficial geology consists of 2-3 inches of disturbed, mostly brown colored soil that was repeatedly churned by historic sugar operations. This loose material overlies deeply weathered, but stable, yellow-tan ash deposits derived from multiple volcanic eruptions from Mauna Kea volcano. Weathering that has taken place over many thousands of years in the moist, warm, tropical climate of this area has converted these ash deposits almost entirely to secondary minerals including the alumina mineral gibbsite, with lesser amounts of amorphous allophane and very minor quartz (derived from distant sources). These ash deposits overlie deeply weathered Mauna Kea lava flows of the Hāmākua Volcanic Series between 65-200,000 years in age (Stearns and Macdonald 1946). There are several poorly-defined subunits within the Hāmākua Volcanic Series lava flows, and the contacts between them are commonly marked by ash and soil deposits (Wolfe et al 1997). These lavas are deeply weathered high on coastal cliffs, which are almost entirely altered to clays directly below the ash layer. The lavas transition gradationally with depth to relatively fresh, dense pāhoehoe flows at the base of sea cliffs. The property is surrounded by steep cliffs in excess of 45 degrees on all sides, ranging in height from 120 to 170 feet tall. The pāhoehoe lavas exposed at the shoreline consist of multiple lobes of relatively resistant layered basalt. The massive "basal" lava flow on which the property's upper flows rest is the linchpin controlling erosion of those overlying rocks. There appears to be some considerable passage of time between emplacement of that basal unit and the overlying, more erosion-susceptible flows - complete with a rarely seen erosional unconformity.

At the base of the cliffs is a zone of rubble from cliff collapse, beyond which are massive blocks armoring the base and/or well-rounded boulders, seaward of which are offshore lava benches. This is the zone of slow, but active erosion of the massive basal flows that support the cliffs. Appendix 4 provides maps and profiles of the various conditions here around the base of the property in map and photo figures. Several key processes are at work contributing to erosion here and on most "hard" coasts. Wave energy impacting the bluff loosens masses of rock by compressing air within fractures (hydraulic ramming), while the drag of moving water, boulders and cobbles abrasively grinds smaller fragments into sand at the shore. Wind and gravity can loosen free pieces of rock and redeposit them as breccia, though none were found on the property. Storm seas coincident with extreme tides can be especially erosive. There is no way to definitely quantify the relative contributions of these processes, though it is reasonable to say that the energy released by wave action is probably the main cause of shoreline retreat at this locality.

Retreat of the upper cliff edge – as opposed to the strong base – is almost entirely caused by rock fall. Several rock fall scars investigated during field inspection appear to have been caused by failure of the deeply weathered lava flows of the Hāmākua Series, which are characterized by a system of joints (rock fractures) that mostly parallel the cliff face. In most examples studied, the rock falls are derived from the deeply weathered lavas and do not involve the underlying solid lava flows exposed at the shoreline. Once the cliff faces are destabilized by either erosion from below or by the impact of tree roots, the actual rock falls appear to be initiated by two primary factors: times of prolonged heavy rainfall, and regional earthquakes. Rainfall contributes to rock falls in two ways: the increased weight of the water saturated rocks and soil on the cliff face, and, more importantly, the increased intergranular pore pressure exerted by rainwater as it infiltrates cracks within rocks. Flights along the Hāmākua coastline following periods of heavy, prolonged rainfall will always reveal fresh scars on the sides of cliffs that have been caused by similar rainfall-induced rock falls and landslides.

Ironwood trees (*Casuarina equisetifolia*) infest the slopes at the tip of the property and along the eastern facing side. The deep roots of ironwoods exploit cracks and joints in bedrock in the cliff face and contribute to mechanical instability by fragmenting and loosening otherwise cohesive rocks. During high winds, the ironwood foliage acts as a sail to capture mechanical energy. This is then exerted in the trunks of the ironwood, which behave as levers to uproot fragmented rock. Native plants such as naupaka (*Scaevola taccada*) and hala (*Pandanus tectorius*) have shallow roots and can aid in the stabilization of slopes. Established groves of these native plants can in fact be convincing indicators of relative stability. The presence of mature hala trees indicate that no rock falls have occurred for a very long time. This is the case for the northwest section of the property's shoreline, from the flume-cut to the cobble beach. The contrast between slopes covered in native versus invasive species is particularly vivid in Figure 2g (note the hala on the right and fresh scars below the ironwoods on the left).

Coastal Erosion Rate

Most shoreline studies in Hawai'i and elsewhere focus on erosion of "soft" coasts, for the obvious reasons that erosion rates are faster (sometimes over 3 feet per year) and thus more observable and consequential for human occupation. The shoreline is legally defined in Hawai'i as "the upper reaches of the wash of the

waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves, ...” (HAR §13-5-2). The exact position of the shoreline is often difficult to establish on cliffed coasts, where there may be stable vegetation out of the reach of waves at the base of the cliffs in one location, while directly adjacent there may be wave action extending up dozens of feet above sea level, scouring away all vegetation. These conditions can change through time. For the purposes of siting the home, the landward edge of the cliff where the slope begins to dramatically steepen is utilized in order to be highly conservative. To analyze coastal erosion, however, one must look at cliff retreat as a whole, from the base to the top.

Per methodology outlined in the administrative rules, the geologist inspected airphotos and digital aerial imagery of the property from 1954, 1965, and 1977 and compared them with large-scale maps from the plantation era and modern imagery and field observations, as discussed in detail in Appendix 4. Photo resolution limited change detection to at least 10 feet. Time of day variations caused shading differences that obscured even large features such as a shifted boulder or collapsed ledge. Tide and wave differences also contributed to a lack of precision.

Consideration of these sources spanning a period of 90 years yielded no apparent changes in the configuration of the headland or of any major changes in coastal morphology. Very small changes were apparent on the headland seaward of the flume trench. In 1954 the cliff edges are distinct and crisp, seemingly approaching vertical. However, the series of photos reveal that by 1970s the vegetation is changing and soil loss may be occurring, and the slopes have become more gradual and rounded. However, this surficial erosion does not seem to have had any effect on the water’s edge; in fact, this wasted material may have provided some buffer to any erosion at the base of the cliffs. Given the lack of measurable changes on the photos, the minimum Average Annual Erosion Rate (AAER) for the property may be zero. However, photographic resolution precludes the identification of any changes smaller than a single pixel (estimated to resolve to ~10 square feet.) Conversely, then a maximum average annual rate of erosion of 0.15 ft. per year is possible.

Calculating a future erosion rate for the cliffs here is problematic because the rate will constantly change with conditions. Over geologic time coastlines go through periods of relative stability followed by rapid change. Sea levels rise will have dramatic consequences for future erosion rates. Future combined sea level change and land subsidence is likely to cause an increase in block failures in this area over the long term (100-year scale). These changes will slowly and episodically increase the erosive action of storm waves at higher and higher elevations over the next several decades.

Fletcher et al. 2002 Coastal Hazard Assessment of Property

Hwang (2005) recommended that all hazards facing coastal areas – not just erosion – should be considered when planning for zoning in Hawai‘i. In a USGS-sponsored study, Fletcher et al. (2002) portrayed generalized hazards assessments for long sections of Hawai‘i’s coastlines; the ratings of the specific hazards for the section of the South Hilo coastline including the property are shown in Table 1. These hazards are much more applicable for properties at low elevation near the sea (e.g., Kolekole Beach Park) than for uses on uplands that are set back from the cliff edges, which are essentially immune from

any direct effects to tsunami, high waves and sea level change. But because all of these can contribute to erosion and rock fall, the importance of establishing a conservative setback from the cliff edge is emphasized.

Table 1. Natural Hazards Impacting Property's Coastline

Hazard Type	Relative Threat	Fletcher et al. Rating (1-4)
Tsunami	Medium-high	3
Stream Flooding	Low	1
High Waves	Medium-high	3
Storms	Medium-high	3
Erosion	Medium High	3
Sea Level Change	High	4
Volcanic/Seismic	High	4
Overall Hazard Assessment	Medium	4 (on scale of 1-7)

After Fletcher et al. 2002, p.150).

Overall Assessment of Coastal Hazard: Impacts and Mitigation Measures

Although actual erosion of the cliffs has been modest in the past, with an absolute maximum value of 0.15 feet per year, and an actual value that is likely less, several factors dictated a more conservative approach to location of the proposed residence with relationship to the sea cliff. First, global sea levels are rising, and the island is slowly subsiding, and if this proceeds relatively rapidly, erosion may approach higher levels above the massive basal rocks. Furthermore, the frequency and severity of tropical storms is likely to increase due to warming oceans and climate change. These factors may increase the erosion "work" of the ocean and accelerate cliff retreat.

For these reasons, applicant Kelly Holcomb has chosen to locate the home a minimum of 130 feet back from edge of the *pali* at an elevation of about 149 feet above sea level, well outside both the flood zone and areas subject to erosion. This will situate the residence in a zone that should be safe for at least a century and likely many, under any likely future scenario. In order to ensure that the public interest in avoiding shoreline modification is safeguarded, 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 house would be set back a minimum of 130 feet from the *pali* edge, and grading activities would occur no closer than 80 feet from the edge of *pali*, where the septic system is proposed for installation. No streams, springs, or anchialine ponds are found on or near the proposed home site or any affected area.

With home construction, the primary activity with potential to affect water quality is grading. Overall, the proposed improvements will require relatively little grading due to the location of the proposed home and

driveway. Landclearing for construction activities would occur for the house pad, the turnaround area, the driveway and gate, and placement of the underground utilities lines connecting to the potable water and septic systems. Installing fences on the property will not require grading. The current grading plan indicates that grading will occur over an area of just less than an acre. Grading has been planned and will be conducted to balance cut and fill material for the graded area in order to avoid the need to import or export of soils from the site. For trenching required for the septic system, extracted materials (spoils) will be used to refill the trenched areas and to blend the areas with the surrounding topography.

A County grading permit will be required. After final grading plans are developed, the applicant will determine whether the area of disturbance is sufficiently large to require a National Pollutant Discharge Elimination System permit, although currently none is anticipated. Grading for the driveway and home site will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters. The applicant will ensure all earthwork and grading is conducted 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.
(e) Conditions of an NPDES permit, if required, and
(f) Any additional best management practices required by the Board of Land and Natural Resources.

The applicant will require that the construction contractor implement the following practices:

- Minimizing the total amount of land disturbance required, which will be delineated to the contractor prior to the commencement of any onsite work. The *makai* limits of grading will be marked and fenced at the construction areas to avoid any possible disturbance to the ground or vegetation within *makai* area during construction activities.
- No concrete truck washout or equipment servicing will be allowed on site.
- The contractor will take special precautions so as to not allow any sediment to leave the work areas, particularly towards the sea.
- Construction activities with the potential to produce stormwater run-off will not be allowed during periods of unusually heavy rains or storm conditions.
- As shown in Sheet C2 of Appendix 7, prior to the start of construction, contractors will implement erosion and dust control measures, including silt fences along the lower margin of grading, silt barriers (snakes) around stockpiles, protecting drainage sumps from siltation, etc., to prevent any sediment from leaving the construction areas, especially towards the ocean.
- Graded areas will be replanted or otherwise stabilized following grading activity.

The Hāmākua Coast between Hilo and Kukuihaele already supports hundreds of homes and there are no reported water quality problems from these uses. Upon its completion, the home would appear similar to the homes on shoreline lots in the area, and it would be not expected to contribute to sedimentation, erosion, and pollution of coastal waters.

3.1.4 Flora and Fauna

The entire property was subject to a biological survey by Dr. Ron Terry in August 2020, the report for which is attached as Appendix 5 and summarized below.

Environmental Setting: Vegetation and Flora

In the *Manual of the Flowering Plants of the Hawaiian Islands*, Gagne and Cuddihy (1990) classified the natural, pre-human vegetation nearby areas with similar geology, elevation and rainfall as Lowland Wet Forest. Dominant species were likely ʻōhiʻa (*Metrosideros polymorpha*) and hala trees (*Pandanus tectorius*) and uluhe (*Dicranopteris linearis*) and hapuʻu ferns (*Cibotium* spp.), with a large variety of trees, shrubs, ferns, sedges, grasses and herbs. Cliff fringes likely contained naupaka (*Scaevola taccada*) and nanea (*Vigna marina*) in addition to hala and ʻōhiʻa. On the property itself, U.S. Department of Agriculture and Geological Survey airphotos from 1954, 1965 and 1977 indicate that virtually the entire property was formerly cultivated in sugarcane. After the cessation of sugarcane cultivation in the 1980s, the property was reportedly used for cattle pasture and raising pigs. Tree cover has rapidly increased since that time and now makes up over half the vegetation cover, although sections dominated by various grasses still persist, as shown in the photos in Figure 2.

Over most of the property, a wide variety of robust grasses dominate the grass layer, including guinea grass (*Megathyrsus maximus*), California grass (*Urochloa mutica*), and Lyon's grass (*Themeda villosa*), as well as smaller grasses, especially crabgrasses (*Digitaria* spp.). The tree layer is dominated by fiddlewood (*Citharexylum caudatum*), common guava (*Psidium guajava*), African tulip (*Spathodea campanulata*), and Alexander palms (*Archontophoenix alexandrae*), although many other tree species are present, notably gunpowder tree (*Trema orientalis*), macaranga (*Macaranga mappa*), albizia (*Falcataria moluccana*) and Chinese banyan (*Ficus microcarpa*). In forested areas there is a variable understory consisting of tree saplings, shrubs, herbs, ferns and vines, almost all of them alien. Most represented are the shrubs Asian melastome (*Melastoma candidum*), strawberry guava (*Psidium cattleianum*) and night-blooming jasmine (*Cestrum nocturnum*); the herbs rattlepod (*Crotalaria* spp.) and Koster's curse (*Clidemia hirta*); and the vines pilau maile (*Paederia foetida*) and white thunbergia (*Thunbergia fragrans*). One native shrub is found sparingly but prominently: neneleau (*Rhus sandwicensis*). This attractive native sumac is present in a few areas, especially surrounding the easement. Ferns vary with the micro-environment and are all aliens (Figure 2e). The downy wood fern (*Christella dentata*) and sword fern (*Nephrolepis multiflora*) are present in and around grassy spots, while shadier margins and forests support warabi (*Diplazium esculentum*) and *Blechnum appendiculatum*. Trees have several epiphytic ferns including maile-scented fern (*Phymatosorus grossus*) and golden polypody (*Phlebodium aureum*). The shady cliff edges and the deep cuts formed by the old flume route and the railroad line support maidenhair fern (*Adiantum raddianum*) and holly fern (*Cyrtomium falcatum*). A full plant species list is contained in

Table 1 of Appendix 5. Overall, there no uniquely valuable habitats. No existing or proposed federally designated terrestrial critical habitat for plants (or animals) is present on or near the property.

The *pali* edge and the seacliffs exhibit a different vegetation than the rest of the property. They still include fiddlewood – the dominant tree of the rest of the property – as well as Chinese fan palm (*Livistona chinensis*), warabi ferns, and various other plants, but they are dominated by ironwood (*Casuarina equisetifolia*) and the natives hala, naupaka and nanea. The understory includes tree seedlings and herbs but is generally covered by a thick layer of ironwood needles. Ironwoods suppress native vegetation and contribute to slope instability. While natives act to stabilize the slopes, ironwood trunks and branches capture the wind like a sail and their roots act as levers, forcing out boulders. Ironwood needles tend to function as a blanket and suppress the growth of the natives.

All plant species found on the property during the survey are listed in Table 1 of Appendix 5. Of the 74 species detected, 6 were indigenous (native to the Hawaiian Islands and elsewhere), while only one – neneleau – was endemic (found only in the Hawaiian Islands). Each of the indigenous plants is very common throughout the Hawaiian Islands and elsewhere, and neneleau is reasonably common in the South Hilo District. No threatened or endangered or rare or unusual native plant species were present. Two common Polynesian introductions were also present: ti (*Cordyline fruticosa*) and ʻawapuhi (*Zingiber zerumbet*).

Environmental Setting: Fauna

A total of eight bird species were observed during the botanical surveys and the specific bird observation periods, all of them common non-natives of urban, suburban and rural areas (see Table 2 of Appendix 5). Most common were Japanese white-eyes (*Zosterops japonicus*), common mynas (*Acridotheres tristis*), and striped doves (*Geopilia striata*).

Although not observed on the property, which is restricted to the area at the top and inland of the sea cliffs, various migratory shorebirds and one seabird would likely be present on the cliffs and rocky tidepools just *makai* of the property. These would include the migratory birds wandering tattler or ʻulili (*Tringa incana*), the ruddy turnstone or ʻakekeke (*Arenaria interpres*), and the Pacific golden-plover or kolea (*Pluvialis fulva*), as well as the seabird black noddy (*Anous minutus melanogenys*), which may nest in the cliffs below the property. The proposed actions would not affect these birds.

Also not observed on the property, despite numerous visits, was the formerly endangered Hawaiian hawk (*Buteo solitarius*). This raptor hunts in all parts of the Hāmākua Coast, including coastal areas. Some of the tall trees on the property could provide nesting habitat, although the non-native species and their location between the highway and the sea are not ideal or usual nesting sites.

The endangered Hawaiian goose or nēnē (*Branta sandwicensis*) has become very common on many Hawaiian islands and can be found at elevations ranging from sea level to sub-alpine areas above 7,000 feet. Historically, flocks moved between high-elevation feeding habitats and lowland nesting areas. Nests consist of a shallow scrape lined with plant material and down. Breeding pairs usually return to the

previous year's nest site, typically in dense vegetation. Nēnē have an extended breeding season, and nesting may occur in all months except May, June, and July. Because of the lack of water bodies, the property appeared to be unlikely habitat for nēnē and particularly for nesting. Surveys did not observe any signs of nēnē, although they are perhaps occasionally present.

As with all of the island of Hawai'i, several threatened or endangered seabirds may overfly the Honomū area between the months of May and November, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). These seabirds hunt over the ocean during the day and fly to higher elevations at night to nest. The Hawaiian petrel was formerly common on the Island of Hawai'i. This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea, as well as at the mid-to-high elevations of Hualālai. It has within recent historic times been reduced to relict breeding colonies located at high elevations on Mauna Loa, Kohala and, possibly, Hualālai. The Hawaiian petrel (as well as the band-rumped storm petrel) generally nest on the Big Island well above 5,000 feet in elevation. Some Hawaiian petrel nests have recently been found at lower elevations on Kohala volcano. Both the Newell's shearwater and Hawaiian petrel are known to burrow under ferns on forested mountain slopes. These burrows are used year after year, usually by the same pair of birds. Although capable of climbing shrubs and trees before taking flight, they need an open downhill flight path through which they can become airborne. Although once abundant on all the main Hawaiian islands, most Newell's shearwater colonies today are found in the steep terrain between 500 to 2,300 feet on Kaua'i. Band-rumped storm petrels have recently been discovered to be nesting on the Mauna Loa side of the saddle between this mountain and Mauna Kea. **Although each of these seabirds may fly over on their way to and from mountain nesting areas and the open ocean, no suitable nesting habitat for any of them is present on the property.**

The primary cause of mortality in these seabird species in Hawai'i is thought to be predation by alien mammals at the nesting colonies. Collision with man-made structures is another significant cause. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals including cats and mongooses.

It is highly likely that Hawaiian hoary bats (*Lasiurus cinereus semotus*), the only native Hawaiian land mammals, are sometimes present on the property. They have been found throughout the Hāmākua coast and in most areas on the island of Hawai'i. Bats may forage for flying insects on the property on a seasonal basis and may also roost in trees and large shrubs. Bats are often visible while they are feeding on flying insects near dusk and dawn at various locations around the island of Hawai'i. The presence of these bats can also be verified by ultrasound detectors or radar. If a bat is detected during a night's study, this merely indicates that they were present in the area. Determination of bat populations or usage patterns requires much more sophisticated, long term studies. Conversely, the absence of bat detections does not indicate an absence of bats, which may have been absent for only a night, a week, or a season, or may have simply gone undetected. No bats were observed in our survey, which took place in full daylight and did not use any detection equipment. For the purposes of this assessment, it is assumed that Hawaiian hoary bats are present at least some of the time, as they have been frequently seen and detected by

ultrasound and radar in ironwood, African tulip and groves of other species. Hawaiian hoary bats are vulnerable to disturbance during the summer pupping season and require special mitigation measures.

Only one non-native mammal was observed on the property – what appeared to be semi-feral pigs (*Sus scrofa*). It is likely that small Indian mongooses (*Herpestes a. auropunctatus*), mice (*Mus* spp.), rats (*Rattus* spp.), cats (*Felis catus*) and domestic dogs (*Canis f. familiaris*) are also sometimes present. None of these alien mammals have conservation value and all are deleterious to native flora and fauna.

There are no native terrestrial reptiles or amphibians in Hawai‘i. No reptiles were seen but there are probably various species of skink (Family: Scincidae) and gecko (Gekkonidae) present. The highly invasive coqui frogs (*Eleutherodactylus coqui*) was heard chirping at several locations. It is possible that bufo toads (*Bufo marinus*) and perhaps other amphibians are also present.

No invertebrate survey was undertaken as part of the survey, but in general, rare native invertebrates tend to be associated with native vegetation and are very unlikely to be present. No rare invertebrates would be expected from this property.

Impacts and Mitigation Measures

The history of continuous disturbance coupled with a location in the lowlands has resulted in a flora and vegetation on most of the property that has little value in terms of conserving native vegetation or threatened or endangered plant species. In general, no adverse botanical impacts are expected as a result of developing a single-family home and accessory uses, including the proposed driveway re-establishment on the old cane road. The applicant will ensure that the native plants hala, naupaka and neneleau are preserved and has developed a landscape plan featuring native elements, as is encouraged by Conservation District rules.

The precautions for preventing effects to water quality during construction listed in Sections 3.1.1 and 3.1.6 will reduce adverse impact on aquatic biological resources in coastal waters to negligible levels.

The following measures will be implemented to help avoid impacts to endangered or rate native birds and the Hawaiian hoary bat:

- To minimize impacts to the endangered Hawaiian hoary bat, trees taller than 15 feet will not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15).
- To minimize impacts to Hawaiian hawks, earthmoving within 100 meters of tall trees or any tree cutting during the breeding season for Hawaiian hawks (March through the end of September) will be avoided. If this time period cannot be avoided, the applicant will arrange for a hawk nest search to be conducted by a qualified biologist. If hawk nests are present on or near the property, all land clearing activity will cease until the expiration of the breeding season.
- To avoid potential seabird downing through interaction with outdoor lighting, no construction or unshielded equipment lighting will be used after dark between the months of April and October.

> Minimal exterior lighting will be included, and it will be shielded in strict conformance with the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 9, Article 14). Lighting will be constrained to utilize only low light emitting fixtures using blue-deficient filtered LED lights with a Correlated Color Temperature (CCT) of 2700 Kelvin or less, and shielded to protect both transiting seabirds and dark skies.

Although it is unlikely that nēnē will be present on the property, if they are, the applicant will ensure that no nēnē will be harassed during construction or occupation of the residence. If nēnē nests are found, DLNR-DOFAW will be contacted.

3.1.5 Air Quality and Noise

Environmental Setting

Air quality in the area is generally excellent, due to its rural nature and minimal degree of human activity, although vog from Kilauea volcano is occasionally blown into this part of the island when this volcano is erupting, as it currently is. Noise on the site is very low and is derived from natural sources (such as surf, birds and wind) due to the isolated nature of the area, sheltered from the highway by a roadcut.

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 no sensitive noise receptors in the vicinity – with no houses or other structures within 1,000 feet of the proposed home site. Given the small scale and short duration of any noise impacts, coupled with the lack of sensitive receptors, noise mitigation would not be necessary.

3.1.5 Scenic Resources

A visual impact assessment was prepared for the project by Geometrician Associates. It is attached as Appendix 6 and summarized below.

Environmental Setting

Several locations in Rural South Hilo offer drivers on Highway 19 fairly long, sweeping, horizon views of the sea. Because of the ever-present sea-cliffs, actual shoreline views are rare and found mainly at lookouts in Wainaku and Laupahoehoe and on some of the bridges. The Holcomb property is at about Mile Marker (MM) 12.7. On the highway approaching the property between MM 12.5 and MM.14 there are no sweeping views, as the combination of topography, distance and vegetation allow drivers only fleeting views of the sea. The shoreline itself is not visible between Honoli‘i Gulch and Kolekole Gulch, at MM 14.2.

Although the Holcomb property borders State Highway 19, the useable portion is located behind a tall road-cut through which the highway passes. As shown in the photos in Appendix 6, on the highway fronting the Holcomb property itself there are no ocean views on the approaches from the south or north. From the highway and the sea, views of the interior – where all construction would occur – are almost completely blocked by trees and/or topography.

Impacts and Mitigation Measures

Several regulations and policies are of prime importance for evaluating scenic impacts. The Hawai‘i County General Plan states:

> The natural beauty of the South Hilo district is dominated by Mauna Kea and Mauna Loa. From various locations in the area, there are magnificent views of the mountains. Hilo Bay provides a picturesque front yard for Hilo. From the bay the land gently slopes upward towards Mauna Kea and Mauna Loa. Throughout the district there are waterfalls, including the famous Akaka Falls and nearby Kahuna Falls, Rainbow Falls, and others (p. 7-5).

The General Plan identifies several areas of natural beauty and important viewplanes for various places in Hawai‘i County. None of these sites are visible from the property or located within a mile of it. The Hāmākua Community Development Plan (CDP) implements the General Plan for the region including the districts of Hāmākua, North Hilo and the Rural South Hilo portion of the South Hilo District, which is north of the Wailuku River, and protection of scenic views is an integral part of the CDP.

Construction of the home requires a Special Management Area Use Permit from the County of Hawai‘i. Granting of the permit is subject to Rule 9 of Hawai‘i County Planning Commission Rules, and the guidelines contained in Rule 9 seek to minimize development that would **substantially interfere with or detract from the line of sight toward the sea from the State Highway nearest the coast or from other scenic areas identified in the General Plan**.

In order to assess the potential for interference by the home (the only planned structure) with views from State Highway 19 and the nearby shoreline, a series of roughly *mauka-makai* profiles were developed to show current topography and the proposed structures. These profiles are contained in Appendix 6. The profiles demonstrate the following:

- <u>Views from the shoreline to the home</u>. As illustrated in three profiles to various shoreline points, owing to the steep cliff that fronts the entire coastline, and secondarily because of the fringe of trees, the home will not be visible at all from any shoreline areas within miles of property. Even if invasive trees are cleared from a planned area in the north and northeast of the property, no shoreline views would be possible.

- <u>Views from Highway 19 to the home.</u> As illustrated in three profiles to various points on the highway, the home location lies in a topographic “dip” situated below a steep slope, which would

conceal it from view from the *mauka* side, even without vegetation. No visual impact for the viewplanes from the highway to towards the shoreline and over the home is expected.
In summary, construction of the residence would not lead to any visual impacts for the general public. Views to and from the shoreline and Highway 19 would not be affected.

Together, the profiles illustrate that construction of the residence would not lead to any visual impacts for the general public. Views to and from the shoreline and Highway 19 would not be affected.

The project is being designed to conform with the Conservation District rules (Hawai‘i Administrative Rules 13-5), which require subtle and sensitive colors and architectural styles, minimal height, and landscaping utilizing primarily native and Polynesian species. Although the home will not be visible to the general public except from the air or out to sea, its sensitive design will not cause any scenic impacts. Removal of ironwoods and other invasive trees to establish a sight line towards the sea on the north/northeast – coupled with planting native hala trees – would be undertaken, but this will not adversely affect any views of the property from the shoreline or highway. To the degree there are any visual effects from this tree removal, the replacement of ironwood with hala will be positive.

Minimal exterior lighting will be included. It will be constrained to utilize only low light emitting fixtures using blue-deficient filtered LED lights with a Correlated Color Temperature (CCT) of 2700 Kelvin or less, and shielded to protect dark skies and transiting seabirds. The overall effect would be a landscape in harmony with the rural landscape of Rural South Hilo.

3.1.7 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:

- Unused materials and excess fill (if any) will be 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 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 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;

- 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; and
- All spills will be cleaned up and properly disposed of immediately after discovery.

3.2 Socioeconomic and Cultural

3.2.1 Land Use, Socioeconomic Characteristics and Recreation

Existing Environment

The property is located about one road-mile from the center of the nearest village, Honomū. The 2010 U.S. Census of population counted 509 residents in Honomū, with about 24% White, 5% Native Hawaiian or Pacific Islander, 30% Asian, and almost 40% identifying as two or more races.
This region of traditional Hawaiian settlement was transformed by commercial sugarcane cultivation into a collection of plantation camps and individual homes, some within old government grants and homestead lots. Unlike many villages along the Hāmākua coast, it has retained a large fraction of its retail, service, religious and government buildings, although their function and level of business is nothing like the glory days of the plantations. The picturesque town attracts many tourists drawn to Akaka Falls State Park. Since the demise of sugarcane, the area at first lost population but then began to gain it, mostly from new residents to Hawai‘i. Many are attracted by large lots in the uplands which one could use as a farm or ranch, a vacation rental, a peaceful hideaway, or a home from which to commute to Hilo. With the Covid-19 pandemic, more and more residents are freelancing via the internet or telecommuting to jobs around the globe. Many new residents to the Honomū fit this category.

Impacts and Mitigation Measures

No adverse socioeconomic impacts are expected to result from the project. The project will have a very small but positive economic impact for the County of Hawai‘i. The residence and associated improvements will not adversely affect population or demand for services.

3.2.2 Cultural and Historic Resources

An archaeological inventory survey and a cultural impact assessment were prepared for the property and are attached as Appendices 2 and 3, 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 these appendices. Separately, the Office of Hawaiian Affairs, the Hāmākua Coast Councilperson, the Sierra Club, three neighbors and a local resident of Honomū with much knowledge of the history of use of the property were also consulted as part of the EA 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 are believed to be East Polynesian settlers who undertook difficult voyages across the open ocean. For many years, researchers have proposed that early 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 2011).

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 (Pogue 1978). Societal order was maintained by their traditional philosophies and by the conical clan principle of genealogical seniority 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 beliefs, and the concepts of *mana* and the *‘aumakua* (Fornander 1919-1919).

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.

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.

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 Holcomb property is located within the *ahupua‘a* of Mālamalamaiki, which is translated in Pukui et al. (1974:143) as “little light.” Mālamalamaiki is located in the traditional moku (district) of Hilo, which is one of six moku on Hawai‘i Island. As Mālamalamaiki encompasses *mauka* agricultural and forest resources and *makai* fisheries, residents were able to procure nearly all that they needed to sustain their families and contribute to the larger community from within the land division. *Native Planters in Old Hawaii* (Handy et al 1972:538-9) discussed traditional planting areas and methods in the North Hilo area. While Honomū Stream and

Mālamalamaiki were not mentioned as significant areas of taro *lo'i*, it was noted that unirrigated taro was planted in the lower forest and along streams in the general area.

Traditionally, the *moku* of Hilo was divided into three *'okana* (land divisions) with place names that have their origins in legendary times. The three divisions are (from north to south): Hilo Palikū, Hilo One, and Hilo Hanakahi. The location of the property is within Hilo Palikū or "Hilo of the upright cliff" (Pukui et al. 1974:46), which extends north from the Wailuku River to Ka'ula Gulch (Maly and Maly 2006).

While no *mo'olelo* (legendary accounts), *mele* (songs), *inoa 'āina* (place names) and *'ōlelo no'eau* (proverbs and poetical expressions) specific to Mālamalamaiki Ahupua'a were identified as part of the cultural impact assessment, a number of them that concern Hilo Palikū in general and some for Honomū and neighboring *ahupua'a* are excerpted and discussed in Appendix 3. A small sample is provided below.

In *Pele and Hi'iaka*, Emerson recounted the following *mele* that Hi'iaka sang while journeying between Hilo and Puna through the forest territory of the *mo'o* Pana'ewa, which mentions the area (1993:32-33):

Pau ke aho i ke kahawai lau o Hilo	One's strength is exhausted, climbing, climbing
He lau ka pu'u, he mano ka iho'ina	The countless valleys and ridges of Hilo,
He mano na kahawai o Kula'i-po	The streams without number of Ku-la'i-po,
He wai Honoli'i, he pali o Kama-e'e,	The mighty water of Hono-li'i, the precipice walls of Kama-e'e
He pali no Koolau ka Hilo-pali-ku	And the pali of Ko'olau: Such a land is Hilo-pali-ku.
He pali Wailuku, he one ke hele ia;	The banks of Wailuku are walls; the road to its crossing but sand;
He one e ke'ehia la i Wai-olama.	Sandy the way at Wai-o-lama.

Kepā and Onaona Maly elucidated the close connection between legendary beings and numerous places in Hilo Palikū in their translation of story entitled *Ka'ao Ho'oniua Pu'uwai no Ka-Miki* (The Heart Stirring Story of Ka-Miki). This legend was originally published in Hilo's Hawaiian Language newspaper *Ka Hōku o Hawai'i*:

> Of Hilo Paliku it is said, one becomes short of breath traveling through Hilo, for there are many (400) hills, many (4,000) areas to descend, and many (40,000) streams, indeed while swimming through the waters of Hilo one becomes out of breath, but one is never out of water at Hilo! (Maly and Maly 2006:13)

Maly and Maly (2006:13) explain that *The Heart Stirring Story of Ka-Miki*:

> …is about two supernatural brothers, Ka-Miki ("The quick, or adept, one") and Maka-'iole ("Rat [squinting] eyes"), who traveled around the island of Hawai'i along the ancient *ala loa* and *ala hele* (trails and paths) that encircled the island. During their journey, the brothers competed in contests alongside the trails they traveled, and in famed *kahua* (contest arenas) and royal courts, against *'ōlohe* (experts skilled in fighting or in other competitions, such as running, fishing,

> debating, or solving riddles, that were practiced by the ancient Hawaiians). They also challenged priests whose dishonorable conduct offended the gods of ancient Hawai‘i. Ka-Miki and Maka-‘iole were empowered by their ancestress, Ka-uluhe-nui-hihi-kolo-i-uka (The great entangled growth of uluhe fern which spreads across the uplands), a body-form of the goddess Haumea (the creative force of nature—also called Papa and Hina—who was a goddess of priests and competitors).

Another *mo‘olelo* describes a grueling battle that took place in the lands of Hilo Palikū between Poli‘ahu, the goddess of the snow-covered mountain and her fiery rival, Pele. A tale that began with a sporting competition in the hills of Hāmākua ended with fire fountains on Mauna Kea, earthquakes, great snowfalls and lava flows, which sculpted the landscape of the region from the ragged mass of Laupāhoehoe to the great ledge of the arch of Onomea.

Pukui (1983:107) provided a poetic description of Hilo Palikū a part of an ‘*ōlelo no‘eau* or poetical saying:

> *Hilo iki, pali ‘ele‘ele*.
> Translation: Little Hilo of the dark cliffs.
> Interpretation: Hilo-pali-ku, or Hilo-of-the-standing-cliffs, is always green because of the rain and mists.

King David Kalākaua (1888:284) described the lands of the northern portion of Hilo as he recounted the tale of ‘Umi-a-Līloa presented in his book, *Legends and Myths of Hawai‘i*. Writing at a time when the region had recently been transformed by sugarcane cultivation, the King recalled the former landscape:

> The northeastern coast of the island of Hawaii presents an almost continuous succession of valleys, with intervening uplands rising gently for a few miles, and then more abruptly toward the snows of Mauna Kea and the clouds. The rains are abundant on that side of the island, and the fertile plateau, boldly fronting the sea with a line of cliffs from fifty to a hundred feet in height, is scored at intervals of one or two miles with deep almost impassable gulches, whose waters reach the ocean either through rocky channels worn to the level of the waves, or in cascades leaping from the cliffs and streaking the coast from Hilo to Waipio with lines which seem to be molten silver from the great crucible of Kilauea.
>
> In the time of Liloa, and later, this plateau was thickly populated, and requiring no irrigation, was cultivated from the sea upward to the line of frost. A few *kalo* patches are still seen, and bananas grow, as of old, in secluded spots and along the banks of the ravines; but the broad acres are green with cane, and the whistle of the sugar-mill is heard above the roar of the surf that beats against the rock-bound front of Hāmākua.

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 Kealakekua Bay the following January and then attempted to leave Hawai‘i in February. However, his ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealakekua, 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 subsidence 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, including Hilo Palikū:

> The country, by which we sailed, was fertile, beautiful, and apparently populous. The numerous plantations on the eminences and sides of the deep ravines or valleys, by which it was intersected, with the streams meandering through them into the sea, presented altogether a most agreeable prospect. The coast was bold, and the rocks evidently volcanic. We frequently saw water gushing out of hollows in the face of the rocks, or running in cascades from the top to the bottom (Ellis 1826:316).

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.

In 1840, Lieutenant Charles Wilkes, head of the U.S. Exploring Expedition, traveled to North Hilo and described the landscape:

> The coast to the north of Hilo is slightly peculiar: it is a steep bluff, rising about two hundred feet; this is cut into small breaks here called "gulches," within which the villages are generally situated, and the natives grow banana and taro. In some places they cultivate small patches of sugarcane, which succeed well (Wilkes 1845).

Overland travel across the central and northern Hilo District remained difficult throughout the first part of the nineteenth century due to the rugged coastline and many deep gulches. Transportation difficulties probably delayed large-scale commercial exploitation of the *kula* lands in the region. Initial commercial exploitation of these lands was limited to small scale agriculture in areas with coastal access for shipping and receiving goods. The Reverend Titus Coan (1882:31-32), who settled at the Hilo Mission Station in 1835, wrote that:

> For many years after our arrival there were no roads, no bridges, and no horses in Hilo, and all my tours were made on foot…The path was a simple trail, winding in a serpentine line, going down and up precipices, some of which could only be descended by grasping the shrubs and grasses, and with no little weariness and difficulty and some danger.

By the mid-1800s, the first roads had been established along the coast of South Hilo, likely following the route of the older path described by Coan. These first roads, designed for travel on horses and in carts, were developed by landholders, primarily sugar growers, looking to connect their plantation lands.

The *Mahele ʻAina* took place in 1848, placing all land in Hawaiʻi 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. The land claims of native tenants became known as *kuleana*.

On February 3, 1848, the *aliʻi* Kekuapanio (also spelled Kuapanio) laid claim to three lands, one of which included Mālamalamaiki Ahupuaʻa. This *ahupuaʻa* was subsequently awarded to him as *ʻāpana* (parcel) 2 of LCAw. 130. Prior testimony was given on October 27, 1848, by John Young, one of Kamehameha I's foreign military advisors, specified that before the *Māhele ʻĀina,* Mālamalamaiki was held by John Young, but at the request Poki (Boki, Governor of Oʻahu), Mālamalamaiki was returned to King Kauikeaouli. At the time of the *Māhele*, King Kauikeaouli gave Mālamalamaiki to Kekuapanio, who was considered a *hulumanu,* a class of young nobles who were favorites of the chief. According to records obtained at the Edward Olson Trust Archives, after Kekuapanio died, the land was retained by his heir, Huakini of Honolulu, Oʻahu. Historical records indicate that Huakini was a defendant in a lawsuit against James W. Marsh, Marshall of the Hawaiian Islands, who through a court ruling levied Huakini's personal and real property, including Mālamalamaiki, and sold it at a public auction to Charles C. Harris for the sum of $226 on May 6, 1859 (Edward Olson Trust Archives HSC2-24; HSC2-35). It appears that no *kuleana* claims were made for lands in Mālamalamaiki.

In conjunction with the Māhele ʻĀina of 1848, the King authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was clarified by the "Enabling Act," which was ratified on August 6, 1850. The

Act resolved that portions of the Government Lands established during the Māhele should be set aside and sold as grants. The stated goal of this program was to enable native tenants, many of whom were not awarded *kuleana* parcels during the Māhele, to purchase lands of their own. Despite this goal, many of the Government Lands were eventually sold or leased to foreigners. South of the project area in Mālamalamaiki 1st , a 52.6-acre grant parcel (Royal Patent No. 1358) was purchased in 1854 by William Farwell for $51.50.

Various accounts of foreign travelers making the difficult journey overland across Hilo Palikū discussed in Appendix 3 provide insight into the slow pace of social and economic change occurring in this almost inaccessible area. Population rapidly dropped in the mid-19th century as a result of both epidemics and migration of rural inhabitants to towns and cities. However, by 1870, sugarcane cultivation had begun to dominate the economy and transform the landscape of many districts of the Hawaiian Islands, including the project area. Following the signing of the 1875 Treaty of Reciprocity, a free-trade agreement between the United States and the Kingdom of Hawai‘i that guaranteed a duty-free market for Hawaiian sugar in exchange for special economic privileges for the United States, a number of new sugar plantations incorporated in the Islands.

In 1880, M. Kirchoff & Company, along with C. Brewer & Company, Ltd. as agent, established Honomū Sugar Company on 2,400 acres, including the land that is now the property. The expansion of the Honomū Sugar Company into Mālamalamaiki began in May of 1886 when Edward Witschy leased four acres to the Honomū Sugar Company. Witschy had purchased Mālamalamaiki 2 from Charles C. Harris in May of 1875 after Harris had purchased the *ahupua‘a* in an 1859 public auction. In 1877, Witschy sold Mālamalamaiki to William and Caroline Kinney. In 1886, Witcshy along with his attorney, D. H. Hitchcock, appeared before the Commissioners of Boundaries to settle the boundaries of Mālamalamaiki 2. After Mālamalamaiki was deeded to Kinney, the acting manager for the Honomū Sugar Company, he sold a portion of the *ahupua‘a* in 1886 to the Honomū Sugar Company and retained a portion for his heirs. The Honomū Sugar Company mill was located less than a mile northwest up the coast from the property. In 1890 the plantation was producing 2,000 tons of sugar yearly. Initially, no Hilo coast plantation had a railroad, so fluming was extensively utilized. The Honomū Sugar Company shipped its product from Honomū Landing to Honolulu via inter-island vessels that anchored offshore, an expensive, laborious and weather-dependent method of shipping sugar.

The rise of the sugar industry was closely intertwined with the development of rail transportation, which was the focus of both governmental and private sector planning following the Treaty of Reciprocity. On the Island of Hawai‘i, the first major line to be constructed was in the North Kohala District, which operated as the Hawaiian Railroad Company. The North Kohala line was envisioned as only the first step toward a much larger system connecting the cane fields of Kohala, Hāmākua, and Hilo with Hilo Harbor, the only protected deep-water port on the island. Beginning in 1899, railroad lines began transporting sugar to the harbor for marine transport, and Hilo became an important shipping and railroad hub.

Lorrin A. Thurston, who according to Thrum had “been connected with the enterprise from its initiation” (Thurston 1913:142), wrote an article upon the completion of the railroad from Hilo to Pa‘auilo in May of 1913 entitled “Railroading in Hilo,” which was published in *Thrum’s Hawaiian Annual and Almanac for*

1914. Thurston reported that the Hilo Railroad Company (HRC) began by laying tracks in 1899 from Waiākea south to ʻŌlaʻa and onwards to Kapoho. The initial distance of 25 miles was completed by April 1901. Later that same year, the track was extended along the waterfront of Hilo to the Wailuku River, at the foot of Waianuenue Street (ibid.:143). In 1903, HRC constructed a wharf at Waiākea and completed a branch line connecting it to the waterfront line. The commercial sugar industry provided most of the cargo transported by HRC but suffered a sharp decline between the years of 1904 and 1907, which in turn halted development in Hilo (Thurston 1913).

In response, HRC worked with ʻŌlaʻa Sugar Company to send a representative to Washington D.C. in 1907 to secure funding for the construction of a breakwater that would allow Hilo Bay to accommodate larger ocean-going vessels. Many in Congress opposed the appropriation because of the limited commerce then being transacted through Hilo harbor. The HRC made assurances that if the breakwater were constructed, a railroad would be built into the country north of Hilo and suitable wharf facilities provided near the breakwater. These assurances had a material effect in securing the appropriation. Construction of the breakwater began in 1908 and was finally completed in 1929. The HRC made good on its pledge, building a new wharf, a one-mile rail extension from Waiākea, and a 50-mile rail extension north to Honokaʻa Mill.

The extension to Honokaʻa would finally connect the sugar mills of South Hilo, North Hilo, and Hāmākua with Hilo's protected harbor. Between June 1909 and December 24, 1911, HRC built 12.7 miles of rail extending from Hilo to Hakalau Mill (including within the Holcomb property), crossing many deep gulches and valleys along its route. This was followed by the construction of 21 more miles of rail that connected Hakalau with Paʻauilo to the north. The 34-mile segment was known as the "Hamakua Division" and was considered not only useful for the sugar industry but also an extremely scenic and a tourist attraction in itself for the occasional tourist to Hilo.

Ultimately, the high cost of the Hāmākua Division ruined HRC, and in 1916 it was forced to sell out and reorganize under the name Hawaii Consolidated Railway (HCR). In 1920, HCR attempted to capture a larger piece of the growing tourist business with its adventurous tour dubbed the "Scenic Express." HCR had long offered service to Glenwood for tourists visiting Kīlauea, but motorbuses now dominated this route. The Hāmākua Coast, by contrast, was not easily accessible by automobile. HCR was therefore able to run passenger coaches profitably along the Hāmākua Division with stops at scenic points.

By 1919, the Honomū Sugar Company encompassed roughly 2,300 acres of land, 1,300 owned outright by the company and 1,000 of which were leasehold. The company's sugarcane lands extended from 50 to 1,500 feet above sea level, between the neighboring mills of Pepeʻekeo and Hakalau. Water was supplied to the fields from diversions in perennial streams including Pāheʻeheʻe, Honomū (the mouth of which bounds the property to the north), and Kolekole, through a 9-mile long network of flumes.

With the complete development of railroad infrastructure in the vicinity, sugar production increased. A 1932 field map of the Honomū Sugar Company shows the property and the surrounding land to be within "Field 3", which included a land area of 44.80 acres, 37.45 acres of which were owned and operated by the plantation. Field 3 extended from the coast of both Mālamalamaiki 1st and 2nd to the Government Road (Appendix 3, Figure 26). The 1932 field map shows the railroad extending along the *mauka* edge of

the property and a flume meandering along the sea cliffs in the *makai* portions. Additionally, the 1932 map shows the more level land within the property cultivated in cane, whereas 1.25 acres of the cliff line was cultivated in "Pali Planters cane." This included 0.7 acres of the parcel's rocky coastline (labeled "#84" in Figure 26) and 0.55 acres of the steep, Mālamalamaiki Gulch bank (labeled "#82" in Appendix 3, Figure 26) The steep gulch banks and rocky coastal cliff edges in the South Hilo district made it difficult for the plantation companies' machinery to cultivate and harvest cane, therefore, independent contractors were hired to manually clear and cultivate cane in these marginal zones. The "Pali Planters" were one such group contracted by the Honomū Sugar Company to clear and cultivate cane in these areas.

The rise of the automobile spelled doom for the railroad. The rail passenger business declined precipitously in the early decades of the twentieth century. In 1920, 607,220 passengers were carried; by 1930, the number had dropped to 77,894 and continued falling as the years progressed, to as low as 16,681 in 1936 (Best 1978:145–146). As a result, the remaining passenger cars were converted for freight and the meager passenger traffic that persisted was hauled on custom-built railbuses.

By 1941, Honomū Sugar Company held 3,027 acres of cane land, and production had reached 10,407 tons, but in years following World War II the company fell under duress due to wage increases and labor scarcity. A pattern of cane field acquisition emerged in the following years in an effort to boost cultivatable acreage and thereby ensure sustainable profitability for the big players in the industry, and in 1946, C. Brewer & Co. acquired a controlling interest in Honomū Sugar Company and merged it into the Pepeʻekeo Sugar Company (Dorrance and Morgan 2000).

The year 1946 was truly momentous for the Island of Hawaiʻi. On April 1, a tsunami triggered by an earthquake in the Aleutian Islands slammed into Hawaiʻi's north coast, killing 165 people from Hilo to Waipio Valley. It severely harmed infrastructure around the island and dealt a fatal blow to the already struggling Hawaii Consolidated Railway. Tracks around the Hilo waterfront were entirely washed out and the Hilo Station was wrecked. An entire span of the Wailuku Bridge was torn out and the railroad bridge at the mouth of nearby Kolekole Stream lost its center span. Water reached heights of 37 feet in Kolekole and neighboring Hakalau Gulch. The destruction was so severe that the Hawaii Railroad Company filed for abandonment soon thereafter. Despite its destruction, the bridge-laden Hāmākua Division was later appropriated by the Territorial Government, who utilized the abandoned railroad alignment to construct much of the Hawaiʻi Belt Road in the 1950s.

Plantation sugar continued, and even thrived, substituting cane trucks for railroad cars. In 1962, the Pepeʻekeo Sugar Company fused with Hakalau Plantation, and in 1973 Hakalau was consolidated into Mauna Kea Sugar Company, a non-profit corporation that now held Hakalau in addition to the Honomū, Pepeʻekeo, Onomea, and Hilo Sugar companies (Dorrance and Morgan 2000). A 1966 USGS map (Appendix 3, Figure 28) shows the route of Hawaiʻi Belt Road outside the western boundary of the property – illustrating the realignment of the highway to the west, off the railroad right-of-way. The only remaining plantation infrastructure in the property was the looping cane road in the southern portion. Aerial imagery taken in 1965 (Appendix 3, Figure 29) shows the majority of the parcel, with the exception of the eastern point, cultivated in cane, with a looping cane haul road along the southern portion of the property. Another aerial taken in 1977 (Appendix 3, Figure 30) shows ongoing cane cultivation in the property; however, the looping cane haul road appears to have fallen out of use by this time. Mauna

Kea Sugar Company, which eventually became Mauna Kea Agribusiness, became the third-largest in acreage (13,000 acres) on Hawai‘i Island. It continued to operate until 1994 when it phased out sugar production and closed its doors forever, marking the end of commercial sugarcane production in the Hilo area (Dorrance and Morgan 2000).

Despite changes in the era since the demise of sugarcane plantations, there is a feeling of continuity and heritage in this community. In the words of the Hāmākua Community Development Plan (Hawai‘i County Planning Department 2018: 20):

> The region referred to as Hamakua stretches along north of Hilo along the upright cliffs (Hilo Paliku) to the majestic, historic valley of Waipi‘o and up the slopes to the sacred summit of Mauna Kea. It is against this sweeping, lush green landscape that the people of the Hamakua region have flourished for generations. The region was historically renowned as a powerful religious, economic, and demographic center of Hawai‘i Island and from early times, the region was known for its agriculture. One cannot truly understand Hamakua's people without appreciating the legacy that agriculture has stamped on this land and its people.
>
> For some, Hamakua is a place where their ancestors flourished for centuries and for others, agricultural employment drew their ancestors to emigrate from foreign lands. Here they raised their children and learned to love the land and sea as their own. Still others have come in search of a simpler way of life, drawn by the beauty of the land and a host of personal stories that testify to the magical attraction that draws people to places where they feel at home. Together, these groups form the modern communities of Hamakua.
>
> Regardless of their background, the people of Hamakua share a deep appreciation for the historical heritage of their small towns and highly value preserving an ‘ohana-centered community that emphasizes quality of life, neighborhood cooperation, and the aloha spirit. The people of Hamakua recognize that their future is tied to the preservation of their way of life and the natural and cultural resources that have sustained them for generations.

A constant through all these eras of history is that the well-developed Hawaiian traditions of fishing and collecting food from the ocean continued to be practiced. This orientation to the shoreline and the traditional practices developed in Hawai‘i are still passed down from generation to generation. Many residents fish for *‘ulua* on isolated points along the cliffs of the Hāmākua Coast in areas that often require both skill and courage to access. They use knowledge and techniques of past fishermen to select fishing locations, proper bait, and technique. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by State law. The specific situation related to the Holcomb property is discussed below in the consultation section.

Archaeological Investigations and Resources

Previous archaeological studies conducted in the general project area, historical documentary research, and settlement patterns for the coastal South Hilo District provided a working model for the types and density of features that the archaeologists could expect on the property. These studies are reviewed in Appendix 2. Historical data indicate that the general area was part of the heavily exploited traditional Hawaiian *kula* lands. For the last 100 years, however, the area has been utilized for sugarcane cultivation and associated transportation. It is likely that these Historic era modifications have largely destroyed any traditional Hawaiian features that may have been present at the property. The extreme coastal fringe along the eastern boundary of the property, as well as the edges of the Mālamalamaiki Gulch/Honomū Stream Gulch beyond the northern boundary, may have been less affected by these disturbances. The northern gulch edge, however, is very steep-sided and descends directly to a rocky streambed and a small rocky beach. The terrain in this area is not well-suited for traditional Hawaiian cultivation or habitation. The small rocky beach located at the base of the gulch (outside of the property), however, would have been an opportunistic area for fishing and gathering of marine resources. Based on historic maps, it was expected that remnants of the Hawai‘i Consolidated Railroad bed (Site 24212) would be found along the property's western boundary. These maps also depict a flume crossing the property, leading into the gulch. Remnants of this flume were also expected to be found along the gulch edge and possibly within the central portion of the property. Other remnants of Historic sugarcane infrastructure might also be found. These remains may be concentrated in the central portions or near the former flume route and railroad bed. Traditional Hawaiian agricultural and habitation features are unlikely to have survived historic disturbance from sugarcane cultivation. If present, they could include stone-constructed mounds, terraces, agriculture related features, or walls. These would likely be found in the vicinity of the lesser-impacted southern and eastern boundaries of the property.

Fieldwork for the current study was conducted on August 13th and 24th, 2020, by Jonny Dudoit, B.A., Genevieve Glennon, B.A., Gabriela Edwards, B.A., and Tim Scheffler Ph.D., under the direct supervision of Matthew R. Clark, M.A. (Principal Investigator). Fieldwork consisted of an intensive (100% coverage) pedestrian survey of the entire project area. The survey crew walked systematic northwest-southeast (cross-slope) transects across the entire project area with fieldworkers spaced no more than 10 meters apart. The rocky coastal cliff as well as the steep edge of the Mālamalamaiki Gulch were subject to a particularly thorough investigation, as these areas were less likely to have been impacted by activities associated with sugarcane cultivation. While vegetation was thick throughout most of the property, for the most part ground visibility was suitable for identifying any cultural features that may have been present.

Upon completion of the pedestrian survey, the survey crew returned to each potential feature to clear vegetation and examine them more thoroughly. Those features determined to be historic properties were then photographed, described, mapped and sketched. No subsurface testing was conducted during the survey fieldwork, as the only identified sites clearly date from the mid- to late nineteenth century.

The survey definitively located and documented a portion of one previously recorded site (Site 50-10-26-24212) and one newly recorded site (Site 50-10-26-31238). Site 24212 consists of the Hilo Railroad-Hawai‘i Consolidated Railway bed, a portion of which extends near to the western boundary of the

property. Site 31238 is the former route of a Historic-era permanent flume associated with the Honomū Sugar Company, which extends east to west near the northern boundary of the property. The sites are discussed and illustrated in detail in Appendix 2. It should be noted that aside from the routes for these sites, no physical remains such as railroad ties, spikes, or rails, or flume bed sections or supports was discovered. Much of the route of both features has begun to fill in through natural soil movement. Therefore, the sites retain their integrity of location only as the former routes of a railroad bed and flume, and not of design, setting, materials, or workmanship.

Despite the sites' general lack of integrity, the archaeologists determined that both were significant under the criteria established and promoted by the DLNR-SHPD and contained in the Hawai‘i Administrative Rules 13§13-284-6. They were found significant for Criterion a (associated with events that have made an important contribution to the broad patterns of our history); and Criterion d (for having yielded, or be likely to yield, information important for research on prehistory or history). This is because of their association with the development of commercial agriculture (sugarcane) in Hawai‘i during the early twentieth century and for the information they have yielded with respect to early twentieth century sugarcane infrastructure. The archaeologists recommended treatment for these sites is "no further work," as they were adequately documented in the survey, thus no mitigation would be necessary to address potential impacts to these sites.

By DLNR, State Historic Preservation Division (SHPD) policy, archaeological surveys cannot be submitted to SHPD or reviewed by this agency prior to the processing of a permit that requires consideration of archaeological resources. DLNR-OCCL requires that the EA be submitted as part of the permit application. As such, it has not been legally possible for the applicant to submit the survey to SHPD as of the date of preparation of the EA. The survey report will be provided to SHPD for their review and comment on site identification, significance and treatment recommendations as part of the EA and CDUA review process. The Final EA will report on the progress of review. As an additional mitigation measure, in the unlikely event that any unanticipated archaeological resources are unearthed within the property during the proposed development activities, work in the immediate vicinity of those resources should be halted and SHPD should be contacted in compliance with Hawai‘i Administrative Rules 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 project 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. As discussed above, EA consultation efforts involved letters to various agencies and individuals, and the cultural impact assessment identified seven community members who were long-time residents of the area and believed to have knowledge of past land-use, history, or cultural information. Five agreed to be interviewed, and their interview summaries are contained in Appendix 3. No specific resources were identified on the actual property, which was cultivated for almost a century in sugarcane and contains very few native plants or other natural features.

All interviewees focused on the shoreline resources that could be accessed at the foot of the cliffs below the property. Most mentioned in detail the 20th century tradition of descending the cliffs with ladders (no doubt an adaptation of more ancient means of accessing isolated fishing spots) to fish. Not only native Hawaiians but members of the entire multi-ethnic community participated in this type of fishing. Some recollections of several local residents who kindly shared their thoughts, which are fully recounted in Appendix 3, are repeated below:

> [Lito] Arkangel shared that the area between the old Honomū landing and the former Honomū mill site are known fishing grounds. He related that he used to access the property to fish but no longer does because descending the cliffs via the ladders has become more treacherous. He pointed out that the leaf litter from hala trees that grow along the cliff edge makes the area *pakika* (slippery, smooth) and that coastal erosion has made descending the cliff even more dangerous. He related that although the ladders are there, people also have to insert their feet into small holes in the cliff face to climb down. He described the coastal area between Mālamalamaiki and Honomū as "good fishing grounds" and recalled fishing this area on the full-moons. He explained that due to the topography, coastal access in this part of Hilo is limited and shared that he was aware of three coastal access points, one on the current property, another further south near the old Honomū landing, and another further north near the former Honomū mill site. Mr. Arkangel expressed that today, if he wishes to access the coastline to fish whether by himself or with his children, he will usually go through the former Honomū mill site and walk along the coast. When asked if he was aware of others who have or continue to access the area known as "Ladders," Mr. Arkangel shared that yes, people still descend the cliffs from the property and added that fishermen may not be there every day, but they do frequent the area.
>
> [Roger] Uchima shared that along the easternmost point of the property is a fishing spot that is known by the locals as "Ladders." He related that the name is in reference to the ladders that people used to descend the cliff. He added that while he remembers the ladders and still fishes along this coastline, he does not access the coast from this property because of safety concerns. When asked if he knew of others who have or continue to access the coast from this property, he shared that he was not aware of any such persons. He went on to state that the only persons who he could recall that used to access the coast from "Ladders" was the older generation. He added that the coastal access from "Ladders" appears to have lessened with the younger generation. Mr. Uchima explained that when the property was cultivated in cane, coastal access was easier because the vegetation on the path and along the cliff was significantly less. He shared that now the vegetation is dense and makes access difficult.

The system of ladders descending more than 100 feet down the edge of the steep cliff is no longer functional, with several missing rotten or burnt ladders. It is no longer possible to descend without ropes. Some ever-enterprising local fishermen have become proficient at rappelling, and some reportedly descend the cliffs in front of the property. Although seldom used – perhaps because of perceptions about access, dense vegetation, or more convenient spots elsewhere, preservation of access to this area is vital for preserving cultural practices and the use of a traditionally important place.

Impacts and Mitigation Measures for Cultural Resources

Consultation as part of the cultural impact assessment solicited community suggestions on a workable access plan, considering not only the need for community members to access the site but also the inappropriateness of having the general public, especially tourists, attempting to use the hazardous ladders or rappel down the unstable cliff. When asked if he had any mitigative solutions, longtime resident Sam Halsted said he hopes that the landowner and the local fishermen can work together to develop a mutually beneficial relationship. While he respects private property rights, he hopes a walking path can be established somewhere along the property boundary so that local fishers can continue their practice of accessing the coast and fishing from the point. He is open to meeting and developing a relationship with the landowner and believes that if this can be achieved then this is the true meaning of community. Radford DeMotta, who was raised in nearby Pepeʻekeo, said that in the Honomū area there are just a few coastal access points, including one known as 23 Flats at Koholā Point, on Kamehameha Schools land, another area just north of Honomū Gulch, and one just *makai* of the Holcomb property ("Ladders"). Mr. DeMotta would like to see coastal access maintained so that local fishers can access their traditional fishing spots. He believes that a managed public access easement should be established. He explained that the Pepeʻekeo Shoreline Fishing Committee of the Pepeʻekeo Community Association currently manages coastal access near the Pepeʻekeo Mill. He specified that they have installed a combination lock and that fishermen wishing to access the area must contact the point person, Jaerick Medeiros-Garcia, and provide specific information before receiving the combination code. He maintained that the management system currently used by the Pepeʻekeo Shoreline Fishing Committee is a good model and perhaps the committee could aid with management. Mr. DeMotta noted that managing access is important and that uncontrolled access can have unfortunate consequences.

Mr. Holcomb has assiduously educated himself concerning the property he has been fortunate enough to buy and the traditions that come with the land, through discussions with neighbors, meeting with local historical experts and reading reports on the natural and cultural resources of the property and region. He has stated his understanding and support for the right to access the fishing area. After hearing of the suggestions provided in consultation, which he had also heard from several of his friends in the community, he formulated a plan that would accommodate these fishing practices. As discussed in detail in Section 1.1., above, he has proposed coastal access corridors and provision of a license to the Makahanaloa Fishing Association to provide access to "Ladders", assist in management, and mitigate the potential liability to the property owner from claims for injury that could occur when attempting to access the shoreline. A parking area will also be provided for daytime fishing and access at night for those actively engaged in night fishing activities through a registration system managed by the Association. Informational and warning signage will also be provided.

It is reasonable to conclude, based upon the limited range and concentration on the *pali* and shoreline of cultural resources and practices, along with 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. The Draft EA was distributed to agencies and groups who might have knowledge in order to confirm this finding.

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 property is via an existing wide highway access shared by several properties, which limits driveway construction on Highway 19, in conformance with State Department of Transportation (HDOT) policy. Sight distance northwest and southeast is adequate for safe left or right turns in or out of the driveway. HDOT records show a 2019 traffic volume on Highway 19 of 10,556 vehicles per day at Milepost 8, near Pāpa'ikou, approximately 4.7 miles to the southeast, which falls off to lesser levels near Honomū (https://hidot.hawaii.gov/highways/covid-19-traffic-volume-comparison/). Pedestrian use on this section of Highway 19 is extremely uncommon; bicycles – mainly associated with touring – occasionally utilize the shoulder. No bus stops are present in the general area of the driveway. The access connects to a 600-foot long easement across another property into the Holcomb property. The applicant will not request a driveway directly on to Highway 19 from his property, which is not necessary and in any case is impractical because of topography. The Holcomb property does not contain or utilize any agricultural crossing points.

The existing unpaved access road extending from the driveway will be cleared of vegetation and any obstacles but otherwise left undisturbed. A roughly 300-foot driveway extension and turnaround area will be constructed on the property. Construction of the home will occasionally involve very minor levels of traffic as vehicles associated with workers, equipment and supplies arrive and depart the site. Once constructed, the home will generate extremely minor traffic that would not affect highway operations.

In a letter in response to early consultation of November 17, 2020, HDOT provided information and asked that the EA address certain issues (see Appendix 1a), which are mostly covered in the discussion above. HDOT noted that it did not anticipate that the number of trips generated by the proposed single-family residential use of the property would adversely impact the traffic conditions on Highway 19. It noted that use of an existing driveway on the highway needs to be approved by HDOT for continued use and shall meet current design standards, and that the applicant should consult directly with the Hawai‘i District Engineer regarding driveway improvements. The applicant will do so at the appropriate time.

3.3.2 Public Utilities and Services

Environmental Setting, Impacts and Mitigation Measures

Electrical power to the home would be provided by rooftop solar photovoltaic panels and telecommunications would be connected via an above-ground telephone wire from a utility pole along Highway 19, which will extend into the property approximately 140 feet to a 12-foot high utility pole. The telephone line will be routed from this utility pole through an underground conduit extending 242 feet to the dwelling.

Domestic water would be supplied from an onsite water well (see Figure 3 for location). It would have a 1.5-HP pump capable of delivering up to 50 gallons per minute at maximum use. A 500-gallon storage tank will be located within the garage. The proposed pump rate and storage is expected to be more than adequate to meet the expected demand, based on the applicant‘s expected use of less than 300 gallons per day, with almost no need for irrigation.

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. Full police, fire and emergency medical service are available in Hilo, about 13 miles away. A volunteer fire station is present about 3 miles away in Pepeekeo. Fire protection would be provided by fire-sprinklers throughout the home, connected to the water tank.

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. Mr. Holcomb acknowledges and understand that this lot, along with many residences along the Hāmākua Coast, 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. The adverse effects of building a single-family residence are limited to very minor and temporary disturbance to traffic, air quality, noise, and visual quality during construction. This area is fairly isolated from sensitive receptors. There are no traffic issues associated with the highway access point, which provides for only a handful of lightly visited properties that generate only negligible traffic. There are no known substantial government or private projects in construction or planning in the 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 3.1.7, 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
- Plan Approval and Grubbing, Grading, and Building Permits

State of Hawai‘i:

- Conservation District Use Permit
- Wastewater System Approval
- Water Well Permit
- Driveway Access Permit

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 property 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 would be 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 farming, grazing and recreational uses in the general project area. Pertinent environmental regulations would be followed, including those for mitigation of water quality impacts.

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 inventory survey properly documented and gathered the information for the remnants of a railroad bed route and a flume route, which have no physical remains and do not require preservation. The one cultural practice that occurs adjacent to the property, shoreline fishing after descending the steep *pali* by ladders or ropes, will not be adversely affected by the action. This practice will continue through access managed by community members.

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).
(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 proposed home site 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 longstanding uses of the land and will not cause scenic impacts or impede access. No areas of natural beauty or important viewplanes identified in the County General Plan are visible from the property or located within a mile of it. An analysis of the potential visual impacts from the planned project found that no existing views of the shoreline or to the ocean would be impacted in any way as a result of the construction of the home, as planned.

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.
(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 located about 149 feet above sea level, a minimum of 130 feet back from the edge of the *pali*, in an area that is clearly out of the flood zone, and it would not affect shoreline resources or be damaged by waves or tides.

HAMAKUA COMMUNITY DEVELOPMENT PLAN

The Hāmākua Community Development Plan (CDP) planning area encompasses not only the judicial district of Hāmākua, but also that of North Hilo, and a portion of the South Hilo district commonly referred to as Rural South Hilo (Wainaku to Hakalau. It was developed under the framework of the February 2005 County of Hawai‘i General Plan and was adopted in 2018 per Ordinance 2018-078. (http://records.hawaiicounty.gov/weblink/DocView.aspx?dbid=1&id=99067&page=1&cr=1).

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 Hāmākua CDP does not specify land use per se on the property (which was proposed to be retained in the Open General Plan designation, as it had been prior to the CDP), but has policies relevant to construction of a single-family home in certain aspirational priorities for natural and cultural resources and community infrastructure:

- Protects coastal areas, agricultural land, and *mauka* forests from development
- Protects open space, areas with natural beauty, and scenic view planes
- Guides the development of programs to strengthen protections for coastal and agricultural lands as well as open space and view planes
- Preserves historic resources
- Ensures appropriate public access to the shoreline and *mauka* forests
- Guides the development of a regional network of trails
- Guides collaborative stewardship and enhancement of coastal and forest ecosystems, cultural resources, agricultural lands, public access, and trails
- Concentrates future development in the existing towns, villages, and subdivisions
- Supports the preservation of village and town character and guides the enhancement of communities' unique sense of place

Discussion: The proposed single-family home would not represent development of coastal areas, as a home is a small-scale, permitted use within the Conservation District and does not affect shoreline resources. The property was used for over a century for sugarcane agriculture, and no native vegetation is present in the area of use. No rare species or forest resources would be affected. A home on this secluded site would have no adverse effect on natural beauty and scenic view planes. No historic properties are affected, and there would be impact to the access to the shoreline or cultural practices. Construction and occupation of the home would promote additional patronage of local businesses in Honomū, helping to preserve the quality of life and economy. The construction of a single-family home here would be consistent with the CDP.

3.6.2 Hawai'i County Zoning and Special Management Area

The entire property is zoned by the County of Hawai'i as within the Agricultural District, minimum lot size of 20 acres (A-20a), although County zoning per se does not apply in the Conservation District. No aspect of the project appears to be inconsistent with County zoning.

The entire property is within the Special Management Area (SMA). The project requires a County of Hawai'i SMA Minor Permit, which is being applied for via an SMA Assessment that will be filed concurrently with acknowledgment of receipt of the Conservation District Use Application. The Planning Department will determine whether the proposed use complies with provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled *Coastal Zone Management.* The application will contain detailed information on the project and will summarize the applicant's position on the

consistency of the project. The following is a brief summary of the project‘s effects on the resources of the SMA that are relevant to an EA.

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, and would not result in any substantial adverse impact on the surrounding environment. The house site is set far back from the *pali* and will not restrict any shoreline uses such as hiking, fishing or water sports. Access to the shoreline is difficult and hazardous because of steep cliffs, but the project accommodates users who have traditionally set ropes and ladders to access the area for fishing. Viewplanes towards the property will not be adversely impacted, as the home site is not visible from the highway, accessible shorelines or other public vantage points. The property contains mostly non-native and several common native plants. Standard clearing, lighting and seasonal survey mitigation will be employed to ensure no adverse impacts to threatened or endangered animals. There will be no adverse effect on the economy. The property is not situated over any natural drainage system or water feature that would flow into the nearby coastal ecosystem. No floodplains are present in the affected 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. With implementation of Best Management Practices associated with grading permits, there should be no impacts on marine resources. No historic sites would be adversely affected. No effects to cultural resources and practices will occur, and the cultural use of the shoreline area for fishing and gathering uses will be accommodated.

3.6.3 Conservation District

The State Land Use District for the Holcomb 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 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;

The development of the single-family residence is in conformance with the purpose of the Conservation District. It is an identified use within the Conservation District, requiring a Board Permit for such use. The proposed use will not impact the public’s ability to access any coastal resources. An area called “Ladders” at the foot of steep coastal sea cliffs about 120 feet tall was formerly accessed by fishermen who used wooden ladders for access. The ladders have deteriorated but fishermen wish to preserve access. Currently it can only be accessed by rappelling. The applicant proposes coastal access corridors and provision of a license to the Makahanaloa Fishing Association to provide access. Parking and signage will be installed, and the Association will assist in management of the access. 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."* Single-family residences are an identified use in the Resource subzone under HAR 13-5-24, R-8. This identified use, which conforms to the design standards in 13-5-41 as applicable, will ensure the sustained use of the natural resources in the project area by mitigating potential impacts as outlined in this document.

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 in detail 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, no native ecosystems or valuable flora or fauna would be committed or lost. Several common native plants are present, especially near the cliffs where there will be no disturbance other than removal of invasive trees; none would be adversely affected. Impacts to the island wide-ranging endangered Hawaiian hoary bat and formerly endangered Hawaiian hawk will be avoided through seasonal timing of vegetation removal and seasonal hawk surveys as needed. No effect on any coastal ecosystem will occur, because of the wide setback to the shoreline along with planned precautions for preventing soil runoff during construction. The proposed action will also have no impact on the public's current or traditional 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 other single-family residential and farming uses in the area. As presented in detail in Section 1, the proposed 3-bedroom, 3 ½-bath, one-story residence will include a kitchen, dining and living area, lanai and garage, with a total living space of approximately 3,018 square feet (sf) (Figure 3). With accessory features including a lanai, swimming pool, and various utility features, the Total Development Area (TDA) for the residence, per the Conservation District Rules (Title 13-5, HAR, Exhibit 4), is 4,877 sf. The maximum height above existing grade will be 21 feet. The proposed home site is not located in a flood zone nor would it affect one. In general, geologic conditions do not impose undue constraints on the proposed action, as volcanic hazard is low and the home will meet or exceed all seismic hazard standards. The house would be set back a minimum of 130 feet from the edge of the *pali*, and will not be affected directly by sea level rise or the slow retreat of shoreline cliffs. No protected scenic views are located nearby or would be affected in any way. The proposed use is consistent

with other single-family residential and farming uses in the area. It will be in area not readily visible from the shoreline and barely visible from the sea, and not at all visible from the nearest State highway or any other public road. Only very minor exterior lighting is planned, and it will be shielded and will consist of blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin. This will protect dark skies and reduce the risk that the threatened or endangered seabirds may be attracted to and then disoriented by the lighting. 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 or nearby properties nor how these properties are utilized, which are for farms and single-family residences. This land use will be attractive and compatible with the area.

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 use of the property for a single-family residence – particularly given the removal of invasive ironwood, albizia and fiddlewood trees – 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 proposed single-family residence will not be detrimental to the public health, safety, and welfare.

PART 4: DETERMINATION, FINDINGS AND REASONS

4.1 Determination

The applicant expects that the State of Hawai‘i, Department of Land and Natural Resources, will determine that the proposed action will not significantly affect the environment, as impacts will be minimal, and that this agency will accordingly issue a Finding of No Significant Impact (FONSI). This determination will be reviewed based on comments to the Draft EA, and the Final EA will present the final determination.

4.2 Findings and Supporting Reasons

Chapter 11-200.1-13, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

> (a) In considering the significance of potential environmental effects, agencies shall consider and evaluate the sum of effects of the proposed action on the quality of the environment.
>
> (b) In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected impacts, and the proposed mitigation measures. In most instances, an action shall be determined to have a significant effect on the environment if it may:

1. *Irrevocably commit a natural, cultural, or historic resource.* No valuable natural or cultural resource would be committed or lost. Several common native plants are present, especially near the cliffs where there will be no disturbance other than removal of invasive trees. No native ecosystems or valuable flora or fauna would be adversely affected. An archaeological inventory survey determined that two sites that lack physical integrity but are associated with former sugarcane cultivation were found. No adverse effects to historic sites would occur. A path to the top of a shoreline point accessed only by a series of now-defunct ladders but formerly used for shoreline fishing will be maintained. No valuable cultural resources and practices such as shoreline access, fishing, gathering, hunting, or access to ceremonial sites would be adversely affected in any way.

2. *Curtail the range of beneficial uses of the environment.* No restriction of beneficial uses would occur by residential use on this lot.

3. *Conflict with the State's environmental policies or long-term environmental goals established by law*. The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is environmentally benign and minor, and it is thus consistent with all elements of the State's long-term environmental policies.

4. *Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and 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. *Have a substantial adverse effect on public health.* 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. *Involve adverse 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. *Involve a substantial degradation of environmental quality*. The project is minor and environmentally benign, and thus it would not contribute to environmental degradation.

8. *Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions.* The adverse effects of building a single-family residence are limited to very minor and temporary disturbance to traffic, air quality, noise, and visual quality during construction. This area is fairly isolated from sensitive receptors. There are no traffic issues associated with the highway access point, which provides for only a handful of lightly visited properties that generate only negligible traffic. There are no substantial government or private projects in construction or planning in the area, 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.

9. *Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.* The site has been surveyed for threatened and endangered plants, and none are present. Other than Hawaiian hoary bats and Hawaiian hawks, island wide-ranging species that will experience no adverse impacts due to mitigation through seasonal timing of vegetation removal and seasonal hawk surveys as needed, no rare, threatened or endangered species of fauna are known to exist on or near the property, and none would be affected by any project activities. Only very minor exterior lighting is planned, and it will be shielded and will consist of blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin. This will reduce the risk that transiting threatened or endangered seabirds may be attracted to and then disoriented by the lighting.

10. *Have a substantial adverse effect on 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. The context of the property's location, with no residences, parks, or other sensitive uses nearby, will help avoid noise impacts. Erosion and sedimentation impacts will be avoided by implementation of Best Management Practices during grading, which will occur in a very limited area.

11. *Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.* The proposed home site is not located in a flood zone nor would it affect one. In general, geologic conditions do not impose undue constraints on the proposed action, as volcanic hazard is low and the home will meet or exceed all seismic hazard standards. The house would be set back a minimum of 130 feet from the edge of the *pali*, and will not be affected directly by sea level rise or the slow retreat of shoreline cliffs. The project has adapted to climate change by accounting for the potential for larger storms, through minimizing hard surfaces that generate runoff and removing nearby tall invasive trees. 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.

12. *Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.* No protected scenic views are located nearby or would be affected in any way. The proposed use is consistent with other single-family residential and farming uses in the area. It will be in area barely not visible from the shoreline and barely visible from the sea, and not at all visible from the nearest State highway or any other public road. Only very minor exterior lighting is planned, and it will be shielded and will consist of blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin. This will protect dark skies reduce the risk that the threatened or endangered seabirds that may be attracted to and then disoriented by the lighting.

13. *Require substantial energy consumption or emit substantial greenhouse gases*. Negligible amounts of energy input and greenhouse gas emission would be required for construction and occupation of the residence. The residence is designed as a single structure supporting efficient use of energy and materials and facilitating natural ventilation and lighting. The home will also have roof-mounted photovoltaic and solar water heating panels, reducing energy use and greenhouse gas emissions. Energy-efficient appliances will be used throughout the house. A design that accommodates natural ventilation and an insulated roof structure will reduce potential solar gain to the home and reduce the need for air conditioning.

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Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 1a
Comments in Response to Early Consultation

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geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 10 Hina Street Hilo Hawai'i 96720 rterry@hawaii.rr.com

October 28, 2020

Dear Neighbor or Agency/Organization Official:

Subject: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District, South Hilo District, Island of Hawai'i, TMK (3rd.) 2-8-012:028

I have been contracted by property owner Kelly Holcomb to prepare an Environmental Assessment (EA) in compliance with Chapter 343, Hawai'i Revised Statutes. Mr. Holcomb plans to build a home on his 6.485-acre property located makai of Highway 19 just southeast of Honomū (see map below).

The current conceptual plan for the home consists of an approximately 4,500 square foot (sf), 3-bedroom, 3.5-bath, single-story structure. The property was cultivated for a century in sugar cane. No archaeological sites, streams or sensitive native species are present. The proposed home site is in an area almost completely hidden from outside view by topography and groves of tall non-native trees, and will be set back more than 100 feet from the top of pali above the coastline. The plan includes removal of various non-native trees to open a view corridor to the north/northeast and planting of primarily native and Polynesian species, along with some ornamentals and fruit trees. The home will be totally off grid, powered by a photovoltaic system with a backup generator, and potable water provided by an on-site water well, together with an individual wastewater system meeting or exceeding all regulatory requirements. The EA will include detailed descriptions and illustrations of the final design.

An EA is necessary because the property is within the State Land Use Conservation District, and the EA will accompany a Conservation District Use Application. The areas of investigation in the EA will include but not be limited to the following: water quality assurance; wastewater treatment; flora, fauna, and ecosystems; roads and access; geology, soils, and hazards; flooding and drainage impacts; social, cultural and community impacts; and historic sites. This letter is to share project information and request your input on site conditions, issues that you wish to be addressed in the EA, and any other concerns you may have.

Please contact me at (808) 969-7090 or by email at rterry@hawaii.rr.com if you have any questions or require clarification. Kindly indicate whether you wish to receive notice of the availability of the Draft EA when it is completed.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Property Location Map

From: Vares, Kyle <Kyle.Vares@hawaiicounty.gov>
Sent: Friday, October 30, 2020 11:43 AM
To: rterry@hawaii.rr.com
Subject: Honomu Holcomb EA

Ron,
Fire Department access and water supply will be the Fire Departments concern for this project. The access and water supply shall meet the requirements of NFPA 1.
Mahalo,
Kyle Vares
Fire Captain
Prevention Bureau

From: Springer Kaye <skaye@hawaii.edu>
Sent: Friday, October 30, 2020 10:21 AM
To: Ron Terry <rterry@hawaii.rr.com>
Subject: Early consultation for EA for single family residence in Conservation District

Aloha Ron,

Val Poindexter forwarded me the notice re the new construction in Honomu. I'm going to go ahead and comment as the past president of Honomu Village Association and BIISC Manager.

The HVA would have no issue with the construction of a single family dwelling on the property provided there are no evident plans to convert it to an STVR in a Conservation District and all applicable state and county rules, statutes are followed. If there are traditional trails and coastal access points, the community would have an interest in maintaining their traditional access to the coast and the point.

Both BIISC and HVA would note the efforts made to control potentially hazardous albizia along Hwy 19. Every landowner on Hwy 19--with a single glaring exception just North of the Honomu turn-off-- has cooperated with HELCO, HDOT, and BIISC to allow access to remove albizia growing within 100 m (300 ft) of the highway edge. Millions of dollars of tax and rate payer funds have been spent to accomplish this work, and follow up work will need to be done from time to time as funding allows.

We'd ask that the landowner acknowledge that any invasive albizia trees fronting the highway are not the best option for privavcy, and that they consider removing albizia throughout the property. This should help maintain the value and useability of the property, prevent unnecessary nutrient loading (Nitrogen) to surface and nearshore waters, and remove future hazards to the property and property owners. Including a commitment to provide reasonable access to BIISC and/or the relevant agency when removal efforts along the highway are underway would be greatly appreciated.

Similarly, BIISC would point out that Fiddlewood is becoming a significant land management problem in the area as intensive agriculture has waned. While it does provide an effective privacy screen, fiddlewood spreads rapidly, is difficult to manage, and suppresses all undergrowth, leading to erosion of topsoil. It would be helpful for the landowner to make efforts to control these plants.

In considering these issues, as you are probably aware, we do have active, nesting pairs of `io in this area. They are often seen flying above the highway in the vicinity of this property. The Hawaiian Hoary Bat is commonly seen in the evening along streams and road cuts in this area as well. The best management practice is to avoid cutting large trees in the summer months when `io may be nesting and the bats may be roosting with young.

I have attached a printable copy of our East Hawaii Pono Planting Guide you might provide to your client for reference. More non-invasive plant choices can be found at www.PlantPono.org.

Thank you for your consideration of these issues in your planning.

With aloha,

Springer Kaye

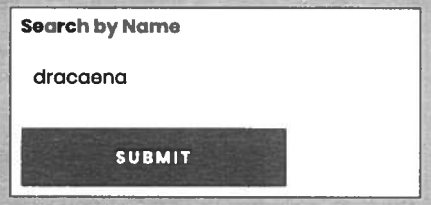
PONO

/'pono/ nvs.

The Hawaiian word pono carries a lot of depth and meaning. The Hawaiian dictionary lists over 80 English translations, with the most common being "righteousness." Planting pono means choosing to grow things in your yard that are beneficial and proper for the landscape.

WANT TO CHECK IF A PLANT IS INVASIVE?

1. Visit plantpono.org
2. Type plant name into search box



3. Select desired plant to learn more about it

Visit plantpono.org for personalized plant recommendations and a list of our endorsed nurseries!

PLANT PONO plantpono.org

For more information:
Contact us at biisc@hawaii.edu or call (808) 933-3340

RIGHT PLANT, RIGHT PLACE.

Your go-to guide for non-invasive plant choices in East Hawaii

Brought to you by:

PLANT PONO plantpono.org

BIISC
BIG ISLAND INVASIVE SPECIES COMMITTEE

WHAT IS AN INVASIVE SPECIES?

Any plant/animal introduced to Hawai'i by humans (intentionally or accidentally) that causes significant harm to:

1) the environment
2) the economy
3) human health and way of life



Photos (from left to right): Fountain grass, a major fire threat; Night-blooming jasmine, forms impenetrable thickets and smothers native plants; Barbados gooseberry, extremely thorny.

MAKE THE PONO CHOICE

1. VISIT PLANTPONO.ORG

Visit **www.plantpono.org** to learn how plants are designated as invasive. Use the database of over 2,000 plants to look up a plant's evaluated risk and find carefully selected non-invasive replacement plants for your yard.

2. BUY NATIVE/NON-INVASIVE PLANTS

No matter where you choose to get your plants from make sure to buy either native or non-invasive plants. There are so many beautiful options to choose from!

3. SPREAD THE WORD

Share this information with your family, friends, and neighbors so they too can make wise planting choices that benefit our 'āina.

FRAGRANT FLOWERS

Puakenikeni
(Fagraea berteriana)
Water: water until established
Sunlight: full to partial sun
Growth form: tree
Height: up to 50 ft.

Shampoo Ginger
(Zingiber zerumbet)
Water: needs lots of water
Sunlight: full shade to partial sun
Growth form: herbaceous
Height: 4 ft. tall or less

Gardenia
(Gardenia augusta)
Water: water until established, water in drought
Sunlight: full to partial sun
Growth form: hedge/small tree
Height: up to 12 ft.

Hō'awa
(Pittosporum sp.)
Water: Little to moderate watering
Sunlight: full sun to partial shade
Growth form: small tree
Height: up to 25 ft.

*All photos taken by Forest and Kim Starr

FRUIT TREES

Apple banana
(Musa sp.)
Water: water regularly
Sunlight: full to partial sun
Growth form: herbaceous tree
Height: up to 20 ft.

Star fruit
(Averrhoa carambola)
Water: water until established
Sunlight: full sun
Growth form: large tree
Height: up to 30 ft.

Avocado
(Persea americana)
Water: water until established
Sunlight: full sun
Growth form: large tree
Height: up to 40 ft.

Mountain apple
(Syzygium malaccense)
Water: water until established
Sunlight: full to partial sun
Growth form: large tree
Height: up to 60 ft.

*All photos taken by Forest and Kim Starr

NATIVES

'Ōhi'a
(Metrosideros polymorpha)
Water: water regularly, requires good drainage
Sunlight: full to partial sun
Growth form: shrub/tree
Height: up to 15-30 ft.

Māmaki
(Pipturus albidus)
Water: water regularly
Sunlight: full sun to partial sun
Growth form: shrub/tree
Height: up to 30 ft.

'A'ali'i
(Dodonea viscosa)
Water: minimal watering
Sunlight: full sun
Growth form: dense shrub
Height: up to 4-8 ft.

Kupukupu fern
(Nephrolepis cordifolia)
Water: water regularly
Sunlight: full sun to full shade
Growth form: fern, non woody
Height: up to 2 ft.

*All photos taken by Forest and Kim Starr

ORNAMENTALS

Ti leaf (any kind)
(Cordyline fruticosa)
Water: water until established, drought tolerant
Sunlight: full to partial sun
Growth form: hedge/small tree
Height: up to 20 ft.

Dracaena (any kind)
(Dracaena marginata)
Water: water until established, drought tolerant
Sunlight: full to partial sun
Growth form: hedge/small tree
Height: up to 20 ft.

Croton
(Codiaeum sp.)
Water: water regularly
Sunlight: full sun
Growth form: ornamental shrub/small tree
Height: up to 10 ft. tall

Heliconia
(Heliconia rostrata)
Water: water regularly
Sunlight: partial shade to full sun
Growth form: hedge/cut flowers
Height: 1.5 to 35 ft. tall

*All photos taken by Forest and Kim Starr

HEDGES

Bird of Paradise
(Strelitzia reginae)
Water: water until established, drought tolerant
Sunlight: full to partial sun
Growth form: hedge/cut flowers
Height: 5 ft.

Hawaiian White Hibiscus
(Hibiscus waimeae)
Water: water until established, water in drought
Sunlight: full to partial sun
Growth form: hedge
Height: up to 15 ft.

Cape Plumbago
(Plumbago auriculata)
Water: water until established, drought tolerant
Sunlight: full to partial sun
Growth form: hedge
Height: under 10 ft.

Natal Plum
(Carissa macrocarpa)
Water: water until established, drought tolerant
Sunlight: full to partial sun
Growth form: hedge
Height: 2-20 ft

*All photos taken by Forest and Kim Starr

Harry Kim
Mayor

Paul K. Ferreira
Police Chief

Kenneth Bugado Jr.
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai`i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

November 5, 2020

Mr. Ron Terry, Principal
Geometrician Associates, LLC
10 Hina Street
Hilo, HI 96720

Dear Mr. Terry:

SUBJECT: EARLY CONSULTATION AND ENVIRONMENTAL ASSESSMENT FOR PROPOSED SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT, SOUTH HILO DISTRICT, ISLAND OF HAWAII; TMK: (3RD) 2-8-012:028

Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

Should you have any questions, please contact Captain Reed Mahuna, Commander of the South Hilo Patrol Division, at 961-2214 or via email at reed.mahuna@hawaiicounty.gov.

Sincerely,

KENNETH QUIOCHO
ACTING ASSISTANT CHIEF
AREA I OPERATIONS

RM:lli/20HQ0934

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Director
LYNN A.S. ARAKI-REGAN
DEREK J. CHOW
ROSS M. HIGASHI
EDWIN H. SNIFFEN

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

IN REPLY REFER TO:
HWY-2769
HWY-PS 2.4462

November 17, 2020

Mr. Ron Terry
Geometrician Associates, LLC
10 Hina Street
Hilo, Hawaii 96720

Dear Mr. Terry:

Subject: Early Consultation for an Environmental Assessment
Private Residence Proposed in the State Conservation District
South Hilo District, Island of Hawaii
Tax Map Key No.: (3) 2-8-012:007 and 028

Thank you for your letter dated October 28, 2020 requesting comments on the early consultation materials.

The property owner, Kelly Holcomb, proposes to build a 4,500-square foot single-family residence on their 6,485-acre property, located adjacent to Mamalahoa Highway (State Route 19), a principal arterial roadway. The development would operate independent of public utility services. The site was historically used for sugar cane cultivation. The project is within the State Land Use Conservation District, requiring discretionary approval from the State Department of Land and Natural Resources and preparation of a Chapter 343, Hawaii Revised Statutes document.

The Hawaii Department of Transportation (HDOT) reviewed the materials provided and has the following comments, relevant to State highways:

1. Based on the materials provided, there does not appear to be a direct access to the State highway from the project site. The aerial photograph does show an unimproved road between the property and the highway through an adjacent parcel.

2. We do not anticipate the number of trips generated by the proposed single-family residential use of the project site would adversely impact the traffic conditions on State Route 19.

3. Agricultural crossing points that may be present are not considered legal access to HDOT highways.

4. Use of an existing driveway on Mamalahoa Highway needs to be approved by HDOT for continued use and shall meet current design standards. Consult directly with the Hawaii District Engineer regarding driveway improvements.

5. Every driveway represents potential conflict points between motor vehicles, pedestrians, and bicyclists. An increased number of these conflict points and reduced distance between them compromise the safety performance of the roadway. The HDOT generally discourages an increase in the number of access driveways. If a new access to the State highway is proposed, consider other alternatives in the draft Environmental Assessment (EA).

6. We recommend the draft EA traffic impact discussion include, but not be limited to the following:

    a. Jurisdiction of roadways and driveways in the vicinity.

    b. Location of existing and proposed site access driveways on the State highway and parcel boundaries of all affected parcels.

    c. Observations regarding traffic conditions and public safety in the vicinity of the site, include bicycle and pedestrian routes and the location of transit stops.

    d. Potential project impacts on traffic conditions and public safety, and mitigation, as warranted.

If you have any questions, please contact Jeyan Thirugnanam, Systems Planning Engineer, Highways Division, Planning Branch at (808) 587-6336 or by email at jeyan.thirugnanam@hawaii.gov. Please reference file review number PS 2020-168.

Sincerely,

JADE T. BUTAY
Director of Transportation

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 01, 2020

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

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District located at South Hilo District, Island of Hawaii; TMK: (3) 2-8-012:028 on behalf of **Kelly Holcomb**

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

At this time, enclosed are comments from the (a) Engineering Division, (b) Office of Conservation & Coastal Lands, and (c) Land Division-Hawaii District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 12, 2020

MEMORANDUM

FROM: ~~TO:~~

TO: **DLNR Agencies:**
___Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
___Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
_X_Engineering Division (DLNR.ENGR@hawaii.gov)
_X_Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks (curt.a.cottrell@hawaii.gov)
_X_Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
_X_Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District
LOCATION: South Hilo District, Island of Hawaii; TMK: (3) 2-8-012:028
APPLICANT: Geometrician Associates, LLC on behalf of **Kelly Holcomb**

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **November 30, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: CSC
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Nov 19, 2020

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Early Consultation for Environmental Assessment for Proposed Single-Family Residences in the Conservation District
Location: South Hilo District, Island of Hawaii
TMK(s): (3) 2-8-012:028
Applicant: Geometrician Associates, LLC on behalf of Kelly Holocomb

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: Nov 19, 2020

HA-21-62

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

2020 NOV 12 P 2:33

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 12, 2020

MEMORANDUM

2020 NOV 27 PM 1:56
RECEIVED
LAND DIVISION

TO: **DLNR Agencies:**
___Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
___Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks (curt.a.cottrell@hawaii.gov)
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
X Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
X Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District
LOCATION: South Hilo District, Island of Hawaii; TMK: (3) 2-8-012:028
APPLICANT: Geometrician Associates, LLC on behalf of **Kelly Holcomb**

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **November 30, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: R B
Print Name: RACHEL BEASLEY
Division: OCCL
Date: 11/25/20

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

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

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

REF:OCCL:RB

Correspondence: HA 21-62

NOV 25 2020

Ron Terry, Principal
Geometrician
10 Hina Street
Hilo, Hawaii 96720

SUBJECT: Early Consultation for the Preparation of a Draft Environmental Assessment (EA) for the Proposed Construction of a Single-Family Residence Located at Kaakepa-Malamalama Iki, South Hilo, Hawai'i, TMK: (3) 2-8-012:028

Dear Mr. Terry:

Thank you for your early consultation correspondence regarding the preparation of the draft EA for a single-family residence. Environmental Impact Statement rules and regulations can be found in the Hawai'i Administrative Rules (HAR) §11-200.1; Conservation District rules can be found in the HAR §13-5.

The subject property is a 6.485-acre coastal lot located in the Resource subzone of the Conservation District. A single-family residence is an identified land use in the Resource subzone that could be applied for pursuant to the 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.* Exhibit 4 of the HAR §13-5 outlines single-family residential standards such as minimum setbacks, shoreline setbacks, maximum developable area, maximum allowable building envelope, and compatibility provisions. This proposed land use requires the filing of a Conservation District Use Application (CDUA) and all required attachments such as an EA and the filing of an HRS, 6E Intake Form for historic preservation compliance.

The proposed land use will require a Board permit; therefore, to allow, modify or deny the proposed land use would be at the discretion of the Board of Land and Natural Resources. The draft EA should site and describe all improvements for the proposal. This would include the proposed residence, access, utilities, landscaping and any other proposed work including trenching and grading.

Alternatives that may include other possible sites for the residence or other alternatives should be included with the draft. Proposed mitigation and best management practices before, during and after the proposed construction should be described. For all proposed landscaping preference

shall be given to native, indigenous, and endemic species. The introduction of invasive plant species is prohibited in the Conservation District.

Should you have any questions regarding this correspondence, contact Rachel Beasley at work cell (808) 798-6481.

Sincerely,

Sam Lemmo

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

C: County of Hawai'i
-Planning

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 12, 2020

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
___Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks (curt.a.cottrell@hawaii.gov)
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
X Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
X Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District
LOCATION: South Hilo District, Island of Hawaii; TMK: (3) 2-8-012:028
APPLICANT: Geometrician Associates, LLC on behalf of **Kelly Holcomb**

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **November 30, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: [signature]
Print Name: GORDON C. HEIT
Division: Land Division
Date: 11/19/20

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 02, 2020

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

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District located at South Hilo District, Island of Hawaii; TMK: (3) 2-8-012:028 on behalf of **Kelly Holcomb**

Thank you for the opportunity to review and comment on the subject matter. In addition to our previous comments dated December 01, 2020, enclosed are comments from the Division of Forestry & Wildlife on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 12, 2020

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
___Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
_X_Engineering Division (DLNR.ENGR@hawaii.gov)
_X_Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks (curt.a.cottrell@hawaii.gov)
_X_Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
_X_Historic Preservation (DLNR.Intake.SHPD@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District
LOCATION: South Hilo District, Island of Hawaii; TMK: (3) 2-8-012:028
APPLICANT: Geometrician Associates, LLC on behalf of **Kelly Holcomb**

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **November 30, 2020.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: [signature]
Print Name: DAVID G. SMITH, Administrator
Division: Division of Forestry and Wildlife
Date: Dec 2, 2020

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

November 30, 2020

MEMORANDUM *Log no. 2883*

TO: RUSSELL Y. TSUJI, Administrator
Land Division

FROM: DAVID G. SMITH, Administrator

SUBJECT: **Division of Forestry and Wildlife Comments on the Early Consultation for the Environmental Assessment for a Proposed Single-Family Residences in the Conservation District in South Hilo District, Hawai'i**

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your inquiry regarding review of the early consultation for the Environmental Assessment for a proposed single family residence in the conservation district in South Hilo on the Island of Hawai'i, TMK: (3) 2-8-012:028. The proposed project includes constructing an approximately 4,500 square foot, 3-bedroom, 3.5-bath, single-story structure on previously undeveloped land.

The State listed Hawaiian Hawk or 'Io (*Buteo solitarius*) is known to occur in the project vicinity. DOFAW recommends surveying the area to ensure no Hawaiian Hawk nests are present if trees are to be cut. 'Io nests might be present during the breeding season from March to September.

The State listed Hawaiian Hoary Bat or 'Ōpe'ape'a (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. If any site clearing is required this should be timed to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15). If this cannot be avoided, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed without consulting DOFAW.

To prevent the spread of Rapid 'Ōhi'a Death (ROD), if 'ōhi'a trees are present and will be removed, trimmed, or potentially injured DOFAW requests that the information and guidance at the following website be reviewed and followed: https://cms.ctahr.hawaii.edu/rod.

DOFAW recommends minimizing the movement of plant or soil material between worksites, such as in fill. Soil and plant material may contain invasive fungal pathogens (e.g. Rapid 'Ōhi'a Death), vertebrate and invertebrate pests (e.g. Little Fire Ants), or invasive plant parts that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee at (808) 933-3340 in planning, design, and construction of the project to learn of any high-risk invasive species in the area and ways to mitigate spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive

species. Gear that may contain soil, such as work boots and vehicles, should be thoroughly cleaned with water and sprayed with 70% alcohol solution to prevent the spread of Rapid ʻŌhiʻa Death and other harmful fungal pathogens.

DOFAW recommends using native plant species for landscaping that are appropriate for the area (i.e. climate conditions are suitable for the plants to thrive, historically occurred there, etc.). Please do not plant invasive species. DOFAW recommends consulting the Hawaiʻi-Pacific Weed Risk Assessment website to determine the potential invasiveness of plants proposed for use in the project (https://sites.google.com/site/weedriskassessment/home). We recommend that you refer to www.plantpono.org for guidance on selection and evaluation for landscaping plants.

We note that artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. This disorientation can result in collision with manmade artifacts or grounding of birds. For nighttime lighting that might be required, DOFAW recommends that all lights be fully shielded to minimize impacts. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea. For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawaiʻi please visit: https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf.

We appreciate your efforts to work with our office for the conservation of our native species. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Koa Matsuoka, Protected Species Habitat Conservation Planning Associate at (808) 587-4149 or koa.matsuoka@hawaii.gov.

Harry Kim
Mayor

Roy Takemoto
Managing Director

David Yamamoto, P.E.
Director

Allan G. Simeon, P.E.
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiicounty.gov

December 4, 2020

Geometrician Associates, LLC
Attn: Roy Terry
10 Hina Street
Hilo, HI 96720
(via. email: rterry@hawaii.rr.com)

SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR PROPOSED SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT SOUTH HILO, ISLAND OF HAWAII, HAWAII
TMK: (3) 2-8-012:028

We have reviewed the request for early consultation for a draft Environmental Assessment dated October 28, 2020, and have the following comments:

1. All development generated runoff shall be disposed of on-site and shall not be directed toward adjacent properties. A drainage plan may be required by the Plan Approval process in accordance with Section 25-2-72(3) of the Hawaii County Code.

2. All earthwork activity, including grading, grubbing and stockpiling, shall conform to Chapter 10, Erosion and Sedimentary Control, of the Hawaii County Code.

3. The subject parcel is in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA). Zone X is an area determined to be outside the 500-year floodplain.

Should there be any questions concerning this matter, please contact Bryce Harada of our Engineering Division at (808) 961-8042.

For: BEN ISHII, Division Chief
Engineering Division

BH

Mitchell D. Roth
Mayor

Lee E. Lord
Managing Director

West Hawai'i Office
74-5044 Ane Keohokālole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

Zendo Kern
Director

Jeffrey W. Darrow
Deputy Director

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

January 19, 2021

Mr. Ron Terry
Geometrician Associates
10 Hina Street
Hilo, HI 96720

Dear Mr. Terry:

SUBJECT: Early Consultation for Draft Environmental Assessment
Project: Proposed Single-Family Residence in State Land Use Conservation District
TMK: (3) 2-8-012:028; South Hilo, Hawai'i

Thank you for your letter dated October 28, 2020 requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA). The property owner, Kelly Holcomb, is proposing to construct a 4,500 square foot single-family residence.

The subject parcel is zoned Agricultural (A-20a) and is located within the State Land Use conservation and agricultural districts. In addition according to the County of Hawai'i General Plan 2005 (amended December 2006), the subject parcels are designated as Open by the Land Use Pattern Allocation Guide. The Draft Environmental Assessment should describe how the proposed project is consistent with the policies, standards and courses of action set forth in the County of Hawai'i General Plan. The subject parcel is located within the Hāmākua Community Development Plan District. The Draft Environmental assessment should also outline how the proposed project is consistent with the goals, objectives, and policies of the Hāmākua Community Development Plan.

The subject parcel is within the Special Management Area (SMA). Due to State Land Use designation of Conservation, we recommend consultation with the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) to obtain the necessary Conservation District Use Permit (CDUP).

Because the subject property is located within the Shoreline Special Management Area (SMA), it will need to be determined if it will require a Minor SMA Permit or a Major SMA Permit. Project valuation up to $500,000 will require a Minor SMA permit, and a project valuation over $500,000 will require a Major SMA Permit. You will also need to acquire a certified shoreline survey for the subject property. If you require further information or details, please contact an SMA Planner at the County of Hawai'i Planning Department for further details.

The project description indicates that potable water for the subject property will be provided via an on-site water well. If this will be a newly constructed water well, we suggest consultation with the Department of Land and Natural Resources (DLNR) Commission on Water Resource Management (CWRM) to obtain the proper permits.

We have no further comments to offer at this time. However, please keep us informed and provide our department with a copy of the Draft Environmental Assessment for our records.

If you have any questions or if you need further assistance, please feel free to contact Eric Cook of this office at 961-8169.

Sincerely,

ZENDO KERN
Planning Director

EC:kvs
\\coh33\planning\public\wpwin60\Eric\Comments on Permits\Pre EA Consult for Single family residence in SLU Conserv. TMK 2-8-012-028.doc

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Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 2
Archaeological Inventory Survey

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Archaeological Inventory Survey of the 6.5-Acre Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupuaʻa
South Hilo District
Island of Hawaiʻi

DRAFT VERSION

Prepared By:
Genevieve Glennon, B.A.,
and
Lokelani Brandt, M.A.

Prepared For:
Holcomb Family Trust
20411 S.W. Cypress Street
Newport Beach, CA 92660

September 2020

ASM affiliates
Archaeology • History • Anthropology • Architectural History
Hilo Office: (808) 969-6066 Fax: (808) 443-0065
507-A E. Lanikaula Street, Hilo, HI 96720
Honolulu Office: (808) 439-8089 Fax: (808) 439-8087
820 Mililani Street, Suite 700, Honolulu, HI 96813

ASM Project Number 35400.00

An Archaeological Inventory Survey of the 6.5-Acre Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupuaʻa
South Hilo District
Island of Hawaiʻi

ASM affiliates

EXECUTIVE SUMMARY

At the request of the Holcomb Family Trust (landowner), ASM Affiliates (ASM) conducted an Archaeological Inventory Survey (AIS) of Tax Map Key (TMK): (3) 2-8-012:028, located in Mālamalamaiki 1st and 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (Figures 1,2, and 3). The current AIS is being conducted in support of an Environmental Assessment (EA) triggered by a Conservation Use Application (CDUA) for the development of a single-family dwelling (Figure 4), and in anticipation of a County of Hawaiʻi grubbing permit application for the project area.

The current study was undertaken in accordance with Hawaiʻi Administrative Rules 13§13-284 and was conducted in compliance with the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in Hawaiʻi Administrative Rules 13§13-276. Compliance with the above standards is sufficient for meeting the initial historic preservation review process requirements of both the Department of Land and Natural Resources and the County of Hawaiʻi Planning Department.

Fieldwork for the current study was conducted on August 13th and 18th, 2020, by Genevieve Glennon, B.A., Johnny Dudoit, B.A., Gabriela Edwards, B.A., and Tim Scheffler, Ph.D., under the supervision of Matthew R. Clark, M.A. (Principal Investigator). A total of 28 labor hours were expended to complete the inventory survey fieldwork. Fieldwork consisted of an intensive (100% coverage) pedestrian transect survey of the entire project area with crew members spaced at 10-meter intervals in moderately thick vegetation. The easement that provides access to the project area from the neighboring parcel to the south, Mālamalamaiki Gulch, and the rocky coastal cliffs were also thoroughly investigated. Because the project area was known to have been intensively plowed for sugarcane cultivation from the 1870s to the 1990s, no prospective subsurface testing was conducted. None of the identified features required subsurface testing to resolve questions of age or function. No cultural material was collected during the inventory survey.

As a result of the fieldwork for the current study, a portion of one previously recorded site (Site 50-10-26- 24212) and one newly recorded site (Site 50-10-26-31238) were identified and documented. Site 24212 is a portion of the Hilo Railroad-Hawaiʻi Consolidated Railway bed, a portion of which extends near the western boundary of the parcel. Site 31238 is a section of a cut earthen ditch situated along the southeastern edge of Mālamalamaiki Gulch near the northern boundary of the project area. This ditch is the former location of a permanent flume built by the Honomū Sugar Company. Site 24212 is considered historically significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawaiʻi during the early twentieth century and under Criterion d for the information it has yielded regarding early twentieth century sugarcane transportation infrastructure. Similarly, Site 31238 is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawaiʻi during the early twentieth century and under Criterion d for the information yielded relative to the history of the development of commercial agriculture in South Hilo District. No additional historic preservation work is recommended for either Site 24212 or Site 31238 within the project area. Thus, our recommended determination of effect for the project is “no historic properties affected.”

CHAPTERS

FIGURES

FIGURES

Page

TABLES

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1. INTRODUCTION

At the request of the Holcomb Family Trust, ASM Affiliates (ASM) has prepared this Archaeological Inventory Survey (AIS) for the development of a proposed single-family residence on a roughly 6.5-acre parcel and access easement within Mālamalamaiki 1st and 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (see Figures1, 2, and 3,). A Conservation District Use Application (CDUA) is being prepared for the proposed development in accordance in Hawaiʻi Revised Statues (HRS) Chapter 343, and this AIS document is intended to inform that application process and has been undertaken in accordance with Hawaiʻi Administrative Rules (HAR) 13§13–284, and complies with the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in HAR 13§13–276. Compliance with the above standards is sufficient for meeting the historic preservation review process requirements of both the Department of Land and Natural Resources–State Historic Preservation Division (DLNR–SHPD) and the County of Hawaiʻi Planning Department. This report contains background information describing the location and environment of the project area; a culture-historical context for the project area; a summary of the previous archaeological work conducted in the vicinity of the subject parcel; an explanation of the study methods; detailed descriptions of all of the archaeological sites and features encountered; interpretation and evaluation of those resources; treatment recommendations for all of the documented sites; and an HRS Chapter 6E statement of effect with regard to the proposed development of the parcel.

Figure 1. Project area location.

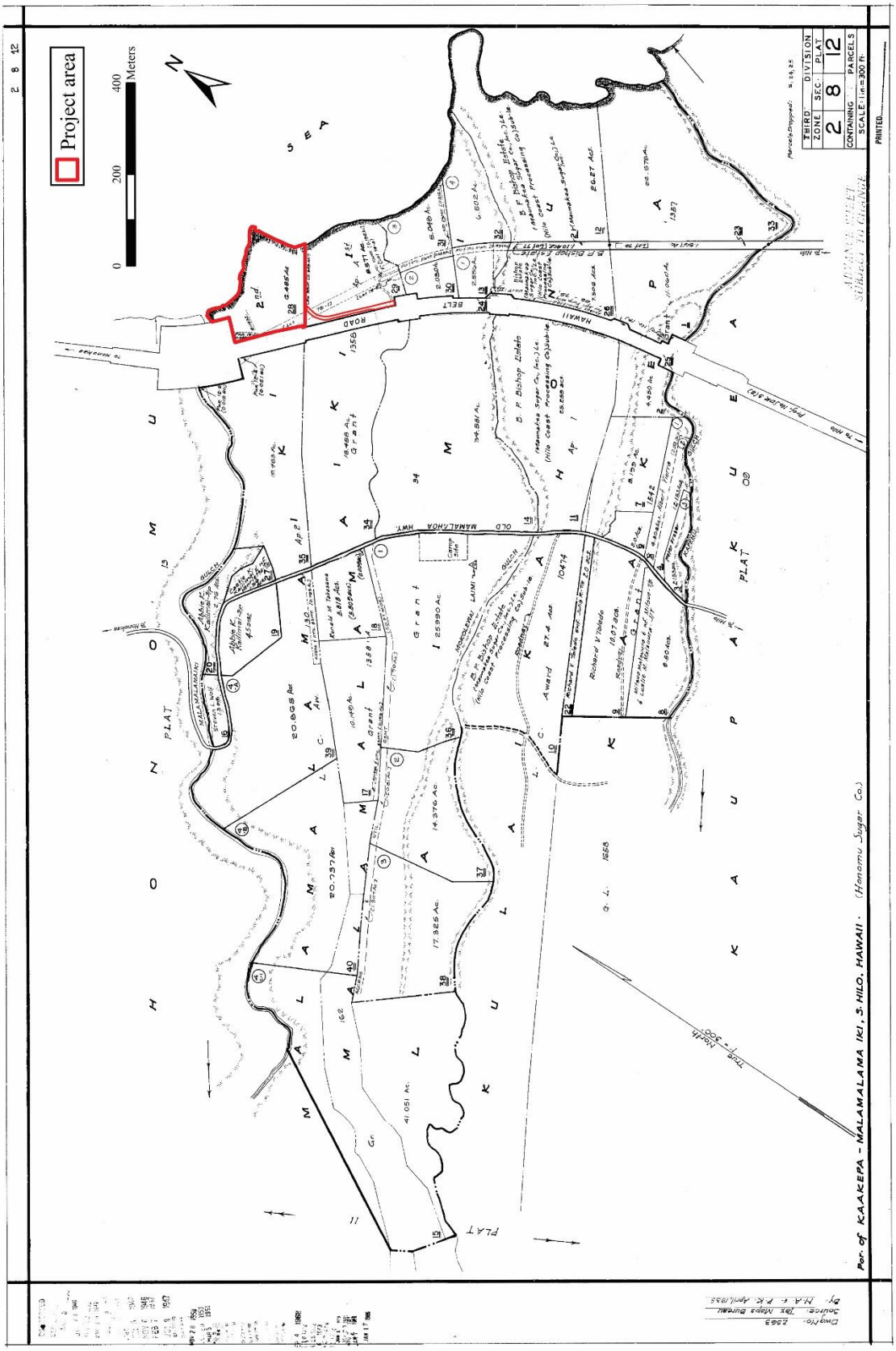

Figure 2. Tax Map Key (3) 2-8-012 showing location of current study parcel (028).

Figure 3. Google Earth™ satellite image showing the current project area.

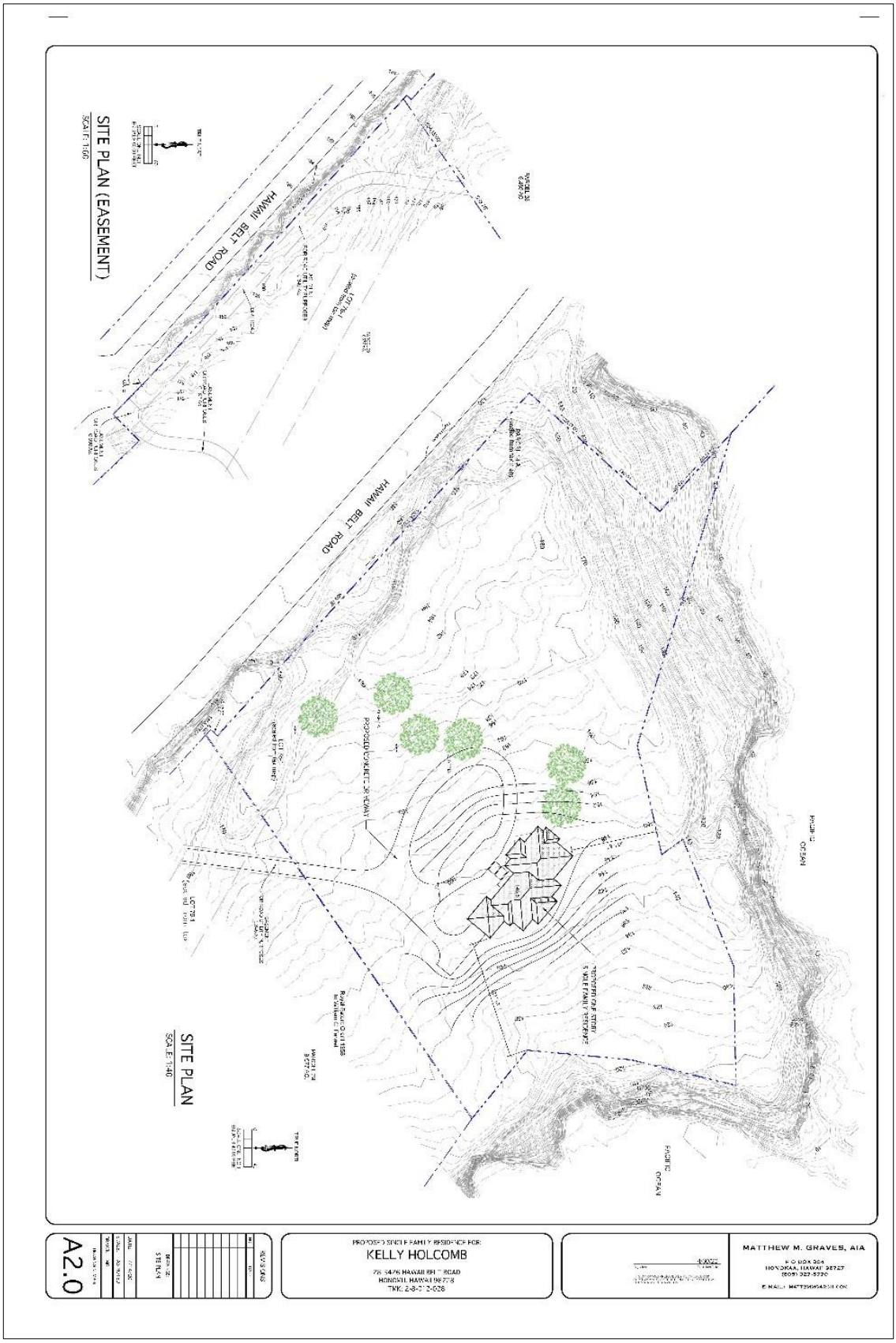

Figure 4. Proposed development plans.

PROJECT AREA DESCRIPTION

The current project area consists of approximately 6.5 acres of Conservation District land, located along the South Hilo coastal sea bluffs, approximately 0.9 kilometers *makai* of the town of Honomū, and just *makai* of the Māmalahoa Highway, within Mālamalamaiki 1st and 2nd Ahupuaʻa, Island of Hawaiʻi (Figure 5). Access to the property is through a gated, overgrown easement located along the *makai* edge of the Highway. The gated easement begins at the southwestern corner of the neighboring parcel to the south (TMK: (3) 2-8-012:029), and extends northwest for approximately 200 meters before entering into the subject parcel (Figure 6). The roughly square-shaped subject parcel is comprised of relatively level tableland, with elevations ranging from 45 to 150 feet (14-46 meters) above sea level, and is bounded to the east by the rocky coastal cliffs and the Pacific Ocean, to the north by the steep sided Mālamalamaiki Gulch, to the west by the Māmalahoa Highway right of way, and to the south by an undeveloped parcel. A hog wire fence line defines the boundary of the two parcels along this southern edge. The Honomū Stream flows through the Mālamalamaiki Gulch where it empties into the sea along the northern edge of the subject parcel (Figure 7). The former route of the Hawaiʻi Consolidated Railroad (Site 50-10-26-24212), evidenced by a deep cut in the terrain, extends northwest to southeast along a portion of the parcel's western boundary.

As a result of nearly a century of sugarcane cultivation, the terrain within the majority of the project area consists of level soil covered primarily in invasive plants species. The ground surface in the level central portion of the property is covered by a thick, tall growth of Guinea grass (*Megathyrsus maximus*) and molasses grass (*Melinis minutiflora*) (Figure 8). The outer edges of the parcel along the project area boundaries are more thickly vegetated, and covered in a dense growth of mostly invasive trees, shrubs and vines (Figure 9 and 10). Dominant species observed in these areas include gunpowder trees (*Trema orientalis*), guava (*Psidium sp*.), night blooming jasmine (*Cestrum nocturnum*), lantana sp., Bing-a-Bing (*Macaranga mappa*), African Tulip (*Spahodea campanulate*), ginger sp. and various other grasses and vines. Along the coastal edges of the property are groves of *hala* (*Pandanus tectorius*) intermixed with ironwood trees (*Casuarinaceae equisetifolia*) and ti plants (*kī*; *Cordyline fruticose*) (Figure 11). A grove of Alexander palm trees (*Ptychosterma elegans*) extends along the western edge of the parcel within the former route of the Hawaiʻi Consolidated Railroad (Site 50-10-28-24212) (Figure 12).

Located just outside of the eastern property boundary and along the coastline, is a wooden ladder that descends down from the cliff to the rocky shoreline below (Figure 13 and 14). Although this ladder is outside the project area boundaries, it is worth noting that in more recent times, it appears the coastal cliffs that bound the subject parcel have been utilized to access the marine resources along this portion of the coast. In addition, located near to the edge of the Mālamalamaiki Gulch and the parcel's northern boundary, is a modern rubbish pile which appears to be the remnants of a small camp site.

Soils within the study area (Figure 15) are classified Hilo hydrous silty clay loam on 10-20 percent slope (Soil Survey Staff 2017). These strongly acidic soils dehydrate irreversibly into fine gravel size aggregates, and have formed over basalt that originated from Mauna Kea Volcano 64,000 to 300,000 years ago (Figure 16) (Sherrod et al. 2007). These soils have historically been used for the cultivation of sugarcane. The study area receives a mean annual rainfall of approximately 3,500 millimeters, with the majority of the rain occurring during the spring months, with the most rainfall typically occurring in March, and the least occurring in June (Giambelluca et al. 2013). The climate is generally cool, with a mean annual temperature ranging from 72 to 77 degrees Fahrenheit throughout the year.

Figure 5. Aerial image of project area, view to the west.

Figure 6. Gated entrance and dirt road which leads to the subject parcel, view to the north.

Figure 7. Honomū Stream and Mālamalamaiki Gulch along the northern boundary of the project area.

Figure 8. Open grassy area within the central portion of the subject parcel, view to the southeast.

Figure 9. Aerial photograph of the project area, showing open grassy areas with dense vegetative growth along the parcel boundaries.

Figure 10. Dense vegetation along the western edge of the subject parcel, view to the northwest.

Figure 11. *Hala* groove intermixed with ironwood trees along the eastern coastal boundary of the parcel, view to the northeast.

Figure 12. Alexander Palm groove within the former route of the Hawai‘i Consolidated Railroad along the western edge of the parcel, view to the south.

Figure 13. Wooden ladder descending the coastal cliff to the rocky shoreline below.

Figure 14. Aerial of coastline (outside of the project area boundaries) showing a wooden ladder descending down the cliff face the rocky shoreline below, view to the northwest.

Figure 15. Soils in the vicinity of the current project area (outlined in red).

Figure 16. Geologic units in the vicinity of the current project area (outlined in red).

2. BACKGROUND

To generate a set of expectations regarding the nature of archaeological resources that might be encountered within the current study area, and to establish an environment within which to assess the significance of any such resources, a general culture-historical context for the South Hilo region that includes specific information regarding the known history of Mālamalamaiki 1st and 2nd Ahupuaʻa and the study area is presented. This is followed by a discussion of relevant prior archaeological studies conducted in the vicinity of the study area.

CULTURE-HISTORICAL CONTEXT

The study area is situated in the Ahupuaʻa of Mālamalamaiki 1st and 2nd on the windward coast of Hawaiʻi Island, within the present-day district of South Hilo, and the traditional *moku* (district) of Hilo, one of six *moku* of Hawaiʻi Island (Figure 17). The chronological summary presented below begins with a discussion of the general settlement patterns for South Hilo. The discussion of Prehistory is followed by a summary of Historical events in the district that begins with the arrival of foreigners in the islands and then continues with the history of land use in South Hilo after contact. The summary includes a discussion of the changing lifeways and population decline of the early Historic Period, a review of land tenure in the study *ahupuaʻa* during the *Māhele ʻĀina* of 1848, and documentation of the transition to the commercial sugar industry from the last quarter of the nineteenth century into the twentieth century. A synthesis of the Precontact settlement patterns and the Historically documented land use, combined with a review of the findings of previously conducted archeological studies, provides a means for predicting the types of archaeological features that may be encountered within the study area, and forms a basis for assessing the function, age, and significance of any encountered archaeological sites.

Mālamalamaiki 1st and 2nd ahupuaʻa and the Greater South Hilo District

The current project area is in the *ahupuaʻa* of Mālamalamaiki 1st and 2nd, and is bounded by Laimi Ahupuaʻa to the south, and the Honomū Stream to the north. "Mālamalamaiki" is translated in Pukui et al. (1974:143) as "little light." This narrow *ahupuaʻa* is located in the traditional district of Hilo, which is one of six districts on Hawaiʻi Island (Figure 17). Traditionally, the district of Hilo was divided into three *ʻokana* (sub-districts). Mālamalamaiki 2nd is located in the *ʻokana* of Hilo Palikū, which extends north of the Wailuku River to Kaʻula Gulch, oftentimes characterized by its upright and densely vegetated cliffs and broad *kula* (plains) lands.

The abundance of streams, valleys, and gulches in this region made for a difficult and treacherous pass. In "Ka Huakaihele ike i na Makaainana o Hilo" (A Sightseeing Tour to Visit the Common Folk of Hilo), an account by G.K. Mahoe (1876), of his travels throughout Hilo that was serialized in the Hawaiian language newspaper *Ka Lahui Hawaii*. The account has been translated from Hawaiian to English. He describes Hilo Palikū as such:

> ...I am protected from the long path ahead, I did not think twice of the dark cliffs of Hilo Palikū, the inclines, the descents, the ravines, the streams, the mountaintops, and the cleared fields, I moved alone, without thinking much of the strain and discomfort of traveling, although, when I recalled the length between Hilo One and Laupāhoehoe, those thirthy miles came and went. The reader should not be mistaken, the lands that are passed along the way are not clear and smooth, rather, there are many hills, gulches, and twisting roads. (Mahoe G.K. 1876:1)

King David Kalākaua also provided a concise description of this region's rough geography, but also includes a description regarding the density of the population there in his book *The Legends and Myths of Hawaii* (Kalākaua 1888):

> The northeastern coast of the island of Hawaii presents an almost continuous succession of valleys, with intervening uplands rising gently for a few miles, and then more abruptly toward the snows of Mauna Kea and the clouds. The rains are abundant on that side of the island, and the fertile plateau, boldly fronting the sea with a line of cliffs from fifty to a hundred feet in height, is scored at intervals of one or two miles with deep almost impassable gulches, whose waters reach the ocean either through rocky channels worn to the level of the waves, or in cascades leaping from the cliffs and streaking the coast from Hilo to Waipio with lines that seem to be molten silver from the great crucible of Kilauea.
>
> In the time of Liloa, and later, this plateau was thickly populated, and requiring no irrigation, was cultivated from the sea upward to the line of frost. A few kalo patches are still seen, and bananas grow, as of old, in secluded spots and along the banks of the ravines; but the broad acres are green

with cane, and the whistle of the sugar-mill is heard above the roar of the surf that beats against the rock-bound front of Hamakua. (Kalākaua 1888:284)

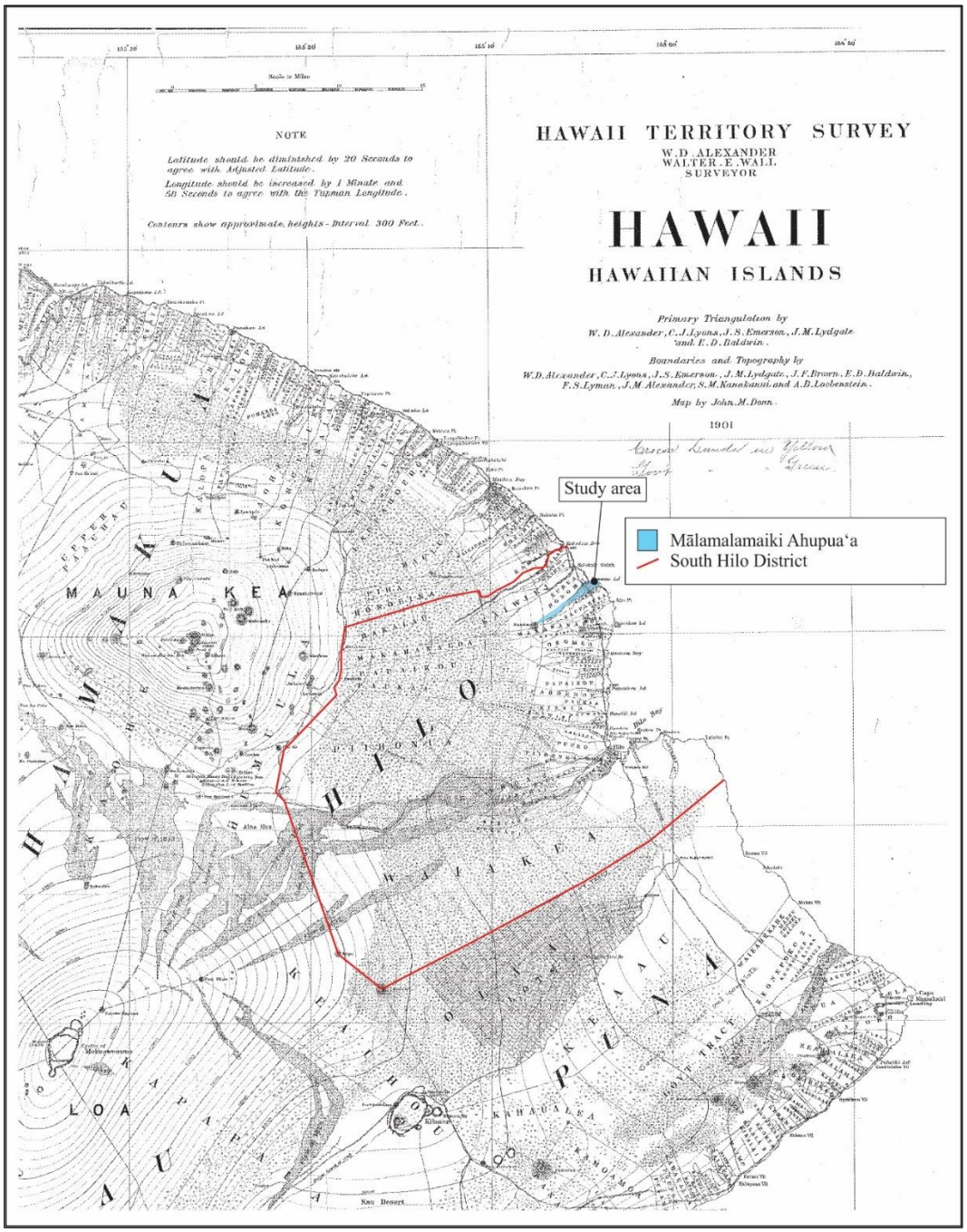

Figure 17. A 1901 Hawaii Territory Survey map showing the location of the study area within Mālamalamaiki and Lāʻimi *ahupuaʻa* and South Hilo District.

The low-lying coastal areas of South Hilo thrived with traditional Hawaiian habitation and cultivation. Within the larger gulches and broad plateaus (*kula*) regions, were lush, fertile lands well suited for agriculture. The staple traditional crop, *kalo* (taro), was cultivated in irrigated terraces along the stream edges while *ʻuala* (sweet potato), *maiʻa* (banana) and *kō* (sugarcane) were grown in the wet *kula* lands of the lower forest zone (Handy et al. 1991). The region had an abundance of *kukui* (candlenut), *ʻulu* (breadfruit), and *niu* (coconut) groves and was also rich in marine resources. Although settlements were prominent in these areas, with the increase of population and agricultural

production settlements spread into the upland *kula* regions. Handy and Handy (1972), in drawing from a description given by early missionary William Ellis, provide yet another description of the fertile landscapes of South Hilo:

> The light and fertile soil is formed by decomposing lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes and melons, come to the greatest perfection. Groves of cocoa-nut and bread-fruit trees are seen in every direction, loaded with fruit, or clothed with luxuriant foliage. (Ellis in Handy and Handy 1972:539)

Place Names for Mālamalamaiki

The names (*Inoa*) of places *(wahi)*, rains (*ua*), and winds (*makani*) within a particular *ahupuaʻa* or broader region evidences the long-term relationship of various communities to their immediate environment. Reacquainting ourselves with these place, rain and wind names allow us to appreciate the environment as it was once observed by ancestral Hawaiian populations. In Mālamalamaiki, a few place names are listed by Soehren (2005) as markers for the boundaries of these *ahupuaʻa* (Table 1).

Table 1. Place names in Mālamalamaiki

Place Names	*Notes*
Kaloaʻawapuhi	Translated as "the many wild gingers." A place that served as a boundary marker between Mālamalamaiki and Lāʻimi in the upper regions of the *ahupuaʻa*.
Kapoʻalua	Translated as "the second night." A marshy are good for growing taro that was located at the boundary of Honomū, Lāʻimi, and Mālamalamaiki.
Manaʻonui	Translated as "important matter." A rock that marked the boundary between Mālamalamaiki and Honomū located on the northern bank of Honomū stream.
Moʻomoʻohualoa	Translated as "long-haired moʻo." A stream marking the boundary of Mālamalamaiki and Honomū.
Waihaka	Translated as "watery perch." A stream that served as a boundary marker between Honomū and Mālamalamaiki.

Mele (songs) are valuable sources of information for the place names of particular areas that were published frequently in Hawaiian language newspapers and in other primary sources. A honorific song in honor of a person (*mele inoa*) was published in the Oʻahu-based Hawaiian language newspaper *Ka Nupepa Kuokoa* on February 17, 1872. The *mele inoa* was penned on February 5 and was written for a woman named Kaiewe, the eldest child of B. Kuhea, by multiple relatives and family friends living in Kuhua (the *ahupuaʻa* immediately north of Honomū). A verse written by a woman named Lila honors Kaiewe and lists adjacent *ahupuaʻa* such as Laʻimi and Kaʻakepa in the *mele inoa.* Although the original text does not include diacritics, *kahakō* (macrons to elongate vowels) and *ʻokina* (glottal stops) are included to conform to modern Hawaiian orthography and to aid in translating the text. Wind, rain, and place names are bolded for emphasis*:*

A uka au o ***ʻAkaka***	I am in the uplands of **ʻAkaka**
Haʻa na ka lehua i ka wai	The lehua blossoms droop from the abundance of water
ʻO ka neʻe a ka ua ***lokuloku***	The **lokuloku** rains inch along
Walaʻau i ka lau lāʻau	There is chattering in the forest
Hone ana ka leo o ka manu	The sweet sound of birds
Kaʻiʻi ʻana i ka nāhele	Shrilling in the forest
ʻO ka hele ala ka maʻeu	Traveling afar are these sounds
Kaʻulua ʻole iho ka manaʻo	My thoughts are not remiss
Pilipili ʻāina ʻole mai	They do not come near the land
Iluna au o Hale Rose	I am above Hale Rose
Hoʻolohe i ke kani o ka pio	Listening to the sound of chirps
Akahi no a olu pono mai	Never before have I been pleasantly comforted
Ka manao lauili i ka hoa	By these circuitous thoughts of a companion
Me oe ke aloha pau ole	With you is my endless love
O Kaiewe no he inoa	Indeed, Kaiewe is your name

*A luna au o **Lāʻimi***	I am in the uplands of **Lāʻimi**
*ʻO ka waiho aʻe a **Kaʻakepa***	Left in **Kaʻakepa**
ʻIke i ka lau o ke kō	I see the leaves of the sugarcane
ʻO ka welo a ka Hae Hawaiʻi	The waving fluttering of the Hawaiian flag
Ua pulu i ka ua liilii	Moistened by scattered showers
*Ia hona i ka **mālualua***	Fortunate to feel the **mālualua** wind
I ka pā kolonahe ma kai	Gently blowing by the ocean
*A kai au o ke **Awaiki***	I head seaward to **Awaiki**
Hāliu au nānā iā uka	I turn my attentions towards the uplands
ʻO ka holu a ka lau ʻĪnia,	The Pride-of-India (Chinaberry) leaves sway
ʻIʻini aku ana ka manaʻo	My thoughts desire
E ʻike i ka hoa i ka ʻili	To see my close friend
Me ʻoe ke aloha pau ʻole	With you is my endless love
ʻO Kaiewe no he inoa	Indeed, Kaiewe is your name (Lila 1872:3)

Early Historical Accounts 1820-1848: A Land in Transition

In October of 1819, seventeen Protestant missionaries set sail from Boston to Hawaiʻi. They arrived in Kailua-Kona on March 30, 1820 to a society with a religious void to fill. Many of the *aliʻi*, who were already exposed to western material culture, welcomed the opportunity to become educated in a western style and adopted their dress and religion. Soon they were rewarding their teachers with land and positions in the Hawaiian government. During this period, the sandalwood trade wrought havoc on the lives of the commoners, as they weakened from the heavy production, exposure, and famine just to fill the coffers of the *aliʻi*, who were no longer under any traditional constraints (Kuykendall and Day 1976; Oliver 1961). The lack of control of the sandalwood trade was to soon lead to the first Hawaiian national debt as promissory notes and levies were initiated by American traders and enforced by American warships (Oliver 1961). The Hawaiian culture was well on its way towards Western assimilation as industry in Hawaiʻi went from the sandalwood trade, to a short-lived whaling industry, to the more lucrative, but environmentally destructive sugar industry.

Some of the earliest written descriptions of the South Hilo district come from the accounts of the first Protestant Missionaries to visit the island. Early Historic visitors to the region noted the beauty, fertility, and ruggedness of this part of the island. In 1823, the Reverend William Ellis one of the first Christian missionaries to arrive in Hawaiʻi, passed along the South Hilo coast during his tour of Hawaiʻi Island. Having been warned against walking due to the ruggedness of the terrain, he sailed from Hilo to Laupāhoehoe in a canoe. Ellis (Ellis 2004:344) described the South Hilo coastline as follows:

> The country, by which we sailed, was fertile, beautiful, and apparently populous. The numerous plantations on the eminences and sides of the deep ravines or valleys, by which it was intersected, by streams meandering through them into the sea, presented altogether a most agreeable prospect.

After departing Hilo Bay, Ellis and his party did not land again until Laupahoehoe, where he and his traveling companions continued on foot, passing along the coastal cliffs of the Hilo and Hāmākua districts. It was on this leg of his journey that Ellis described the cultivated *kula* lands of the region that extended between the various valleys and gulches:

> The houses stood mostly singly, and were scattered over the face of the country. A rich field of potatoes or taro, five or six acres in extent, or large plantations of sugar-cane and bananas, occasionally bordered our path. But though the soil was excellent, it was only partially cultivated. (Ellis 2004:249-250).

Planting techniques within the *kula* lands of the Hāmākua region are further described by Handy and Handy (1972). Although the current project area is located to the south of Hāmakua, the *kula* lands of the Hāmakua and Hilo districts are very similar, and Handy and Handy's description of dryland cultivation within the region provides some insight to how the land was used prior to the advent of the sugarcane industry, which drastically changed the landscape. Handy and Handy (1972:537) state:

> Mulched taro was planted on the open kula lands up to the border of the old forest zone and is said to have flourished under a mulch of grass, *ti* leaves, and other rubbish heaped around it in the red soil. Small patches so growing today seem to flourish. We are told that taro was planted in kukui

> forests which used to cover the slopes of much of the land…Another method consisting of digging sizable holes in the ground, filling them with *kukui* leaves, and allowing these to decay completely, after which taros that had been started from cuttings planted in plain soil were introduced and grew to great size.

Overland travel across the central and northern Hilo District remained difficult throughout the first part of the nineteenth century due to its rugged coastline and many deep gulches. Transportation difficulties may have even temporarily delayed large-scale commercial exploitation of the *kula* lands in the vicinity of the study area (Desilets and Rechtman 2004). Initial commercial exploitation of these lands was limited to small scale agriculture in areas with coastal access for shipping and receiving goods. The Reverend Titus Coan (Coan 1882:31-32), who settled at the Hilo Mission Station in 1835, wrote that:

> For many years after our arrival there were no roads, no bridges, and no horses in Hilo, and all my tours were made on foot…The path was a simple trail, winding in a serpentine line, going down and up precipices, some of which could only be descended by grasping the shrubs and grasses, and with no little weariness and difficulty and some danger.

By the mid-1800s, the first roads had been established along the coast of South Hilo, perhaps following the route of the older path described by Coan (PHRI 1991). These first roads, designed for travel on horses and in carts, were likely developed by land holders, primarily sugar growers, looking to connect their plantation lands. Chester S. Lyman, travelling from Kawaihae to Hilo with the Reverend Titus Coan on June 19th, 1846, stayed in the vicinity one of the early sugar plantations located to the south of the study area. In his journal he described travel along a cart road and discussed the holdings of Mr. Castle. the progenitor of the first sugar plantation in the area. Lyman (1925:81) writes:

> After resting we started on at 41/2 & soon arrived at Mr Castle's, 3/4 of a mile beyond. When half way there we fell in with two carts each drawn by 4 yokes of oxen, one set of them just broken in; the two teams were connected by a long rope & went on by *fits & starts*, now stopping & now going on the run. The carts were large & heavy with thick solid wheels made of planks pinned together. They were well filled with a crowd of noisy girls & boys & by invitation of the Driver, an American, I took a ride in one of these Hawaiian Coaches as far as Mr Castle's house, glad thus to relieve a little my feet which were becoming sore from walking in water and climbing precipices.
>
> Stopped a few minutes at Mr C[astle]'s; were entertained with a refreshing bowl of milk, & then going on a mile & a half or 2 miles put up for the night at a native house, nearby. The place is called *Puumoi*. Mr. Castle is an American, has been in the country many yrs, has an extensive plantation & a native wife & family. Near his house we passed large fields of sugar cane on his lands, but cultivated by Chinamen who have pretty much monopolized the sugar business in this region. Mr C[astle] has also considerable herds of cattle.

The arduous journey along the South Hilo coastline is again referenced in an article written by Henry L. Sheldon which was published on December 9, 1882 in the English-language newspaper *Saturday Press* and can be found in the 44th installment of *Reminiscences of Honolulu Thirty-five Years*, a serial account that was published by Henry L. Sheldon between 1881 to 1883. This historical account references Mālamalamaiki as well as the renowned Dr. John Pelham who resided within the study ahupuaʻa at the time. In the article, Sheldon notes the death of Dr. John Pelham on March 16th 1857, an Englishman who served as a medical adviser to the *aliʻi* Kālaimoku, Kuakini, and Kaʻahumanu. Following this note about Pelham's demise, Sheldon reminisces about a visit with Pelham years prior:

> [Pelham] had resided in the Islands since the year 1826, and was the medical adviser of the high chiefs Kalaimoku, Kuakini and Kaahumanu. He was well educated and well read in his profession, but quite eccentric in his manner. Some six years previous to his death he was living at a place called **Malamalamaiki**, about fifteen miles north of Hilo, where I had occasion to call upon him while on a tour around the Island of Hawaii. Arriving at his very neat and comfortably arranged and furnished thatched cottage about 8 o'clock in the evening, in the midst of one of those soaking rains for which Hilo was then proverbial (The climate is said to have changed since), I received from the Doctor a bluff but hearty welcome, and the intimation that supper would be ready as soon as I had exchanged my drenched garments for dry ones. I was desperately hungry after my long ride from the bay, and visions of roast pig and taro, or mullet baked in ti-leaves, flitted through my mind. At length I was ceremoniously ushered into the dining-room, and, with the remark from my host that I must excuse him for that he had already supped, was hospitably urged to "eat hearty"--of a *raw squid* and poi! That was the entire bill of fare. I was, however, equal to the occasion, and managed to bolt--it was impossible to thoroughly masticate--enough of octopus and paste to stay my stomach. I had been

> previously informed of Pelham's eccentricities, and noted the twinkle of his eye while I wrestled with "the supper." At the conclusion of the necessarily brief repast the Doctor invited me to join him in "a glass of something hot." Directly a native woman brought in a japanned tray, on which were two steaming tumblers crowned with closed lemon. After such a barbarous supper this seemed the opposite extreme of civilized luxury. I sipped contentedly at the soothing mixture; but was only restrained from remarking upon its peculiar aroma by my regard for the proprieties. The evening was spent in pleasant converse, in the course of which the Doctor related many interesting recollections of the native chiefs with whom he had been familiar, especially of Governor Adams, as Kuakini was called. I was comfortably lodged (even luxuriously, for those days), and in the morning sat down to a nice breakfast of pork chops, *lawalu'd* fish, baked potatoes, biscuit and coffee. Noticing the satisfaction with which I regarded the board, my host dryly remarked that he had been pleased to see that I knew how to "rough it" in Hawaii, by the way in which I had attacked raw squid the previous evening, whereupon I was emboldened to inquire as to the particular brand of spirits that had entered into the composition of the hot punch with which I had washed the supper down. For reply he produced from the cupboard two small empty bottles, marked in plain letters, "Lavender Water," with the simple remark, "There."
>
> Lest my readers should suppose that our punch on the occasion mentioned was made of the article generally known as lavender water, I will here explain: Previous to the ratification of the treaty with France in 1858 the duty on imported spirits in this kingdom was $5 per gallon. One of the results of the high duty was the important of large quantities of alcohol, disguised under the names of cologne, lavender, bitters, etc., which paid a duty of only 5 per cent, *ad valorem*, and which was freely sold all over the islands and used as a beverage instead of the high-priced brandy. Brandied peaches, cherries and other fruits came under the same category, and were at one time largely imported and consumed here. (Sheldon 1882:1).

In 1872, Isabella Bird traveled by horseback along the North and South Hilo and Hāmākua Coast from Onomea to Waipiʻo Valley and described the general terrain and the difficult passage through the various gulches she crossed. Although Honomū is not specifically mentioned in her account, she would have inevitably passed through the Honomū area on her journey towards Waipiʻo. Of the region she writes:

> All the gulches for the first twenty-four miles contain water. The great Hakalau gulch we crossed early yesterday, has a river with a smooth bed as wide as the Thames at Eton. Some have only quiet streams, which pass gently through ferny grottoes. Others have fierce strong torrents dashing between abrupt walls of rock, among immense boulders into deep abysses, and cast themselves over precipice into the ocean. Probably, many of these are the courses of fire torrents, whose jagged masses of a-a have since been worn smooth, and channeled into holes by the action of water. A few are crossed on narrow bridges, but the majority are forded, if that quiet conventional term can be applied to the violent flounderings by which the horses bring one through. (Bird 1974:88).

Bird's detailed and colorful accounts provide a vivid glimpse into the early nineteenth century environs and native lifeways of the South Hilo District.

The lowland portion of South Hilo was clearly a region thriving with traditional Hawaiian habitation and cultivation. Like most other parts of Hawaiʻi, introduced diseases and global economic forces would have a devastating impact on traditional life-ways in the early to mid-1800s. Due to its rugged coastline and many deep gulches, however, transportation difficulties were severe in South Hilo, North Hilo, and Hāmākua. This served to delay large-scale commercial exploitation of the *kula* lands. In the second half of the nineteenth century these problems were overcome and sugar cane plantations replaced subsistence agriculture and grazing as the dominant land use.

The Legacy of the *Māhele ʻĀina* of 1848

By the mid-nineteenth century, the ever-growing population of Westerners in the Hawaiian Islands forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership. By 1840 the first Hawaiian constitution had been drafted and the Hawaiian Kingdom shifted from an absolute monarchy into a constitutional government. Convinced that the feudal system of land tenure previously practiced was not compatible with a constitutional government, the King (Kamehameha III) and his high-ranking chiefs decided to separate and define the ownership of all lands in the Kingdom (King n.d.). This change was further promoted by missionaries and Western businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be taken from them at any time. After much consideration, it was decided that three

classes of people each had one-third vested rights to the lands of Hawai‘i: the King, the chiefs and *konohiki*, and their tenants (the *maka‘āinana* or common people). In 1845 the legislature created the “Board of Commissioners to Quiet Land Titles” (more commonly known as the Land Commission. All land claims, whether by chiefs for entire *ahupua‘a* or by tenants for their house lots and gardens, had to be filed with the Land Commission within two years of the February 14, 1846, but the deadline was extended several times for chiefs and *konohiki* (Soehren 2005).

The King and some 245 chiefs (Kuykendall 1938) spent nearly two years trying unsuccessfully to divide all the lands of Hawai‘i amongst themselves before the whole matter was referred to the Privy Council on December 18, 1847 (King n.d.). Once the King and his chiefs accepted the principles of the Privy Council, the *Māhele ‘Āina* (Land Division) was completed in just forty days (on March 7, 1848), and the names of all of the *ahupua‘a* and *‘ili kūpono* (nearly independent *‘ili* land division within an *ahupua‘a*, that paid tribute to the ruling chief and not to the chief of the *ahupua‘a*) of the Hawaiian Islands and the chiefs who claimed them, were recorded in the *Māhele* Book (Soehren 2005). As this process unfolded King Kamehameha III, who received roughly one-third of the lands of Hawai‘i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased by his subjects to live on. Accordingly, the day after the division with the last chief was recorded in the *Buke Māhele* (*Māhele* Book), King Kamehameha III commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike the King, the chiefs and *konohiki* were required to present their claims to the Land Commission to receive their awards (LCAw.). The chiefs who participated in the *Māhele* were also required to provide to the government commutations of a portion of their lands in order to receive a Royal Patent giving them title to their remaining lands. The lands surrendered to the government by the King and chiefs became known as “Government Land,” while the lands retained by Kamehameha III became known as “Crown Land,” and the lands received by the chiefs became known as “*Konohiki* Land” (Chinen 1958:vii; 1961:13). All lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission.

During the *Māhele*, native tenants of the lands that were divided up among the Crown, *Konohiki*, and Government could claim, and acquire title to, *kuleana* parcels that they actively lived on or farmed. The Board of Commissioners oversaw the program and administered the *kuleana* as Land Commission Awards (LCAw.). Claims for *kuleana* had to be submitted during a two-year period that expired on February 14, 1848 to be considered. All of the land claimants were required to provide proof of land use and occupation, which took the form of volumes of native registry and testimony. The claims and awards were numbered, and the LCAw. numbers, in conjunction with the volumes of documentation, remain in use today to identify the original owners and their use of the *kuleana* lands. The work of hearing, adjudicating, and surveying the claims required more than the two-year term, and the deadline was extended several times for the Land Commission to finish its work (Maly 2002). In the meantime, as the new owners of the lands on which the *kuleana* were located began selling parcels to foreigners, questions arose concerning the rights of the native tenants and their ability to access and collect the resources necessary for sustaining life. The “Enabling” or “*Kuleana* Act,” passed by the King and Privy Council on December 21, 1849, clarified the native tenants’ rights to the land and resources, and the process by which they could apply for fee-simple interest in their *kuleana*. The work of the Land Commission was completed on March 31, 1855. A total of 13,514 *kuleana* were claimed by native tenants throughout the islands, of which 9,337 were awarded (Maly 2002).

According to the *kuleana* land claim documents, on February 3, 1848, the *ali‘i* Kekuapanio (also spelled Kuapanio) laid claim to three lands one of which included Mālamalamaiki Ahupua‘a. This *ahupua‘a* was subsequently awarded to him as *‘āpana* (parcel) 2 of LCAw. 130. Testimony given prior on October 27, 1848 by John Young, one of Kamehameha I’s foreign military advisors, specified that prior to the *Māhele ‘Āina,* he had held Mālamalamaiki but at the request Poki (Boki, Governor of O‘ahu), Mālamalamaiki was returned to King Kauikeaouli. At the time of the *Māhele*, King Kauikeaouli give Mālamalamaiki to Kekuapanio, who was considered a *hulumanu*, a class of young nobles who were favorites of the chief. According to records obtained at the Olson Trust Archives, after Kekuapanio died, the land was retained by his heir, Huakini and later put up for public sale.

Kuleana Awards

As the King and his *ali‘i* and *konohiki* made claims to large tracts of land via the *Māhele*, questions arose regarding the protection of rights for the native tenants. To resolve this matter, on August 6, 1850, the *Kuleana* Act (also known as the Enabling Act) was passed, clarifying the process by which native tenants could claim fee simple title to any portion of lands that they physically occupied, actively cultivated, or had improved (Garavoy 2005). The *Kuleana* Act also clarified access to *kuleana* parcels, which were typically landlocked, and addressed gathering rights within an *ahupua‘a*. Lands awarded through the *Kuleana* Act were and still are, referred to as *kuleana* awards or *kuleana* lands.

The Land Commission oversaw the program and administered the *kuleana* as Land Commission Awards (LCAws.) (Chinen 1958). Native tenants wishing to make a claim to their lands were required to register in writing those lands with the Land Commission, who assigned a number to each claim, and that number (the Native Register) was used to track the claimant through the entire land claims process. The native tenants registering their *kuleana* were then required to have at least two individuals (typically neighbors) provide testimony to confirm their claim to the land. Those testimonies given in Hawaiian became known as the Native Testimony, and those given in English became known as Foreign Testimony. Upon provision of the required information, the Land Commission rendered a decision, and if successful, the tenant was issued the LCAw. Finally, to relinquish any government interest in the property, the holder of a LCAw. obtained a Royal Patent Grant from the Minister of the Interior upon payment of the commutation fee. No *kuleana* claims were made for lands in Mālamalamaiki.

Government Land Grants

In conjunction with the *Māhele*, the King also authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was clarified by the "Enabling Act," which was ratified on August 6, 1850. The Act resolved that portions of the Government Lands established during the *Māhele* of 1848 should be set aside and sold as grants ranging in size from one to fifty acres at a cost of fifty cents per acre. The stated goal of this program was to enable native tenants, many of whom were not awarded *kuleana* parcels during the *Māhele*, to purchase lands of their own. Despite the stated goal of the land grant program, this provided the mechanism that allowed many foreigners to acquire large tracts of the Government Lands. Unlike in the *kuleana* claims, where claimants stated their use of the land, the grant records are silent regarding the grantees' intended use. The Royal Patent deeds and survey notes do contain some limited information about geographical features, vegetation, and survey markers, but they generally do not say anything about improvements to the land or land use.

South of the project area in Mālamalamaiki 1, a single grant parcel (Royal Patent No. 1358) was purchased in 1854 by William Farwell for $51.50. While the location of this 52.6-acre grant is shown in Hawai‘i Registered Map No. 1092 by W. A. Wall (Figure 18), Farwell's grant boundaries appear to be incorrectly depicted as it is shown extending well into Mālamalamaiki 2. Another Hawai‘i Registered Map No. 570 (Figure 18) dated 1879 does not show the location of Farwell's grant but it does shows other grants in nearby Honomū as well as what appears to be structures (depicted as square-like symbols) *mauka* and to the south of the the project area. The 1879 map (see Figure 18) also shows the route of the Government Road *mauka* of the project area. The surveyor notes for Farwell's grant described *hala* trees along the coast, as well as natural features such as the cliff and ravines as well as a road.

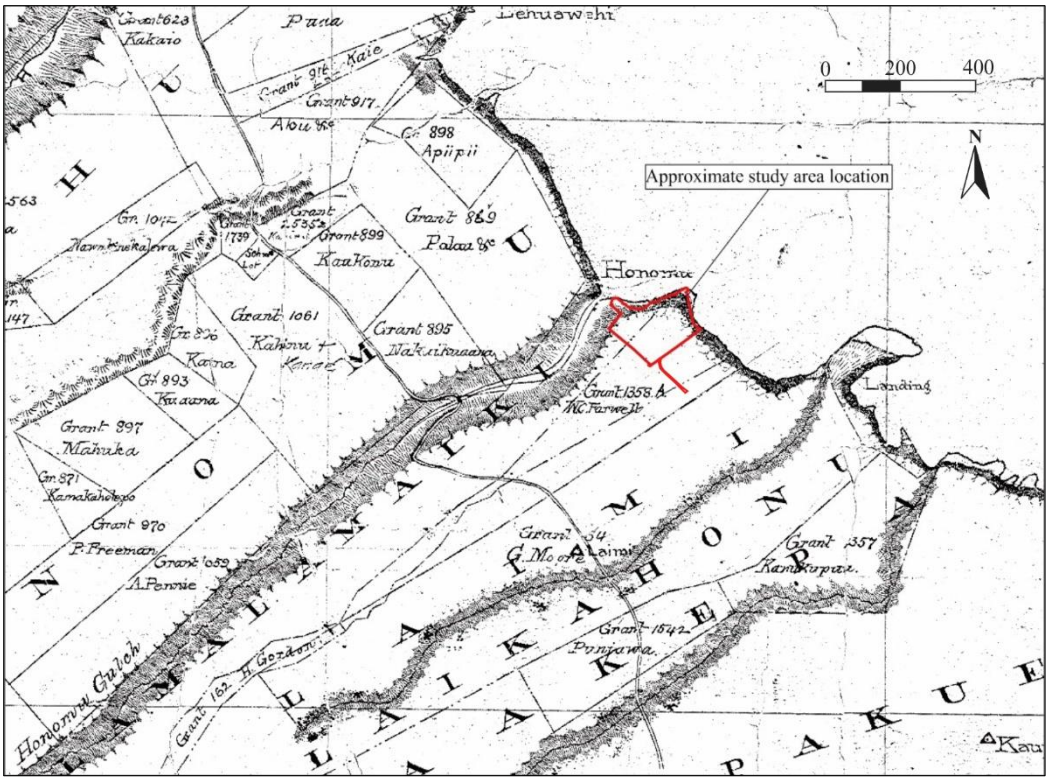

Figure 18. A portion of Hawai‘ Registered Map No. 1092 showing the location of the project area and grant parcels in the vicinity.

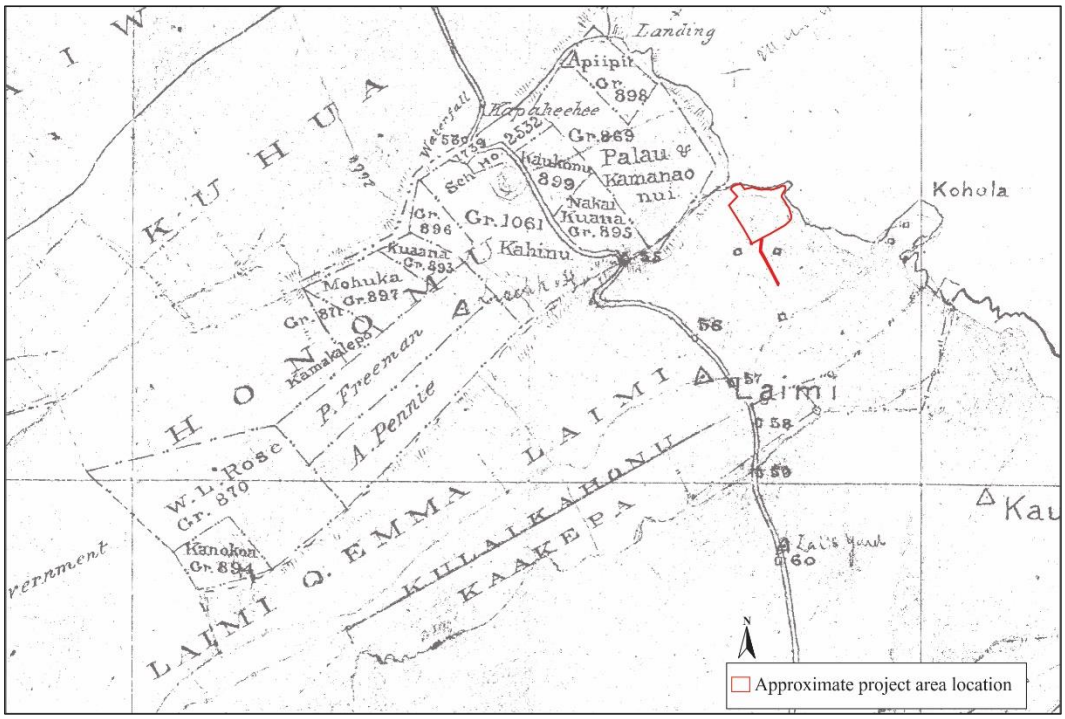

Figure 19. A portion of Hawai‘i Registered Map No. 570 by C. J. Lyons showing land grants in nearby Honomū as well as structures in the project area vicinity.

Honomū Sugar Company and Railroad Development (ca. 1880-1946)

Following the *Māhele* and the signing of the 1875 Treaty of Reciprocity, a free-trade agreement between the United States and the Kingdom of Hawai‘i which guaranteed a duty-free market for Hawaiian sugar in exchange for special economic privileges for the United States, commercial sugarcane cultivation and sugar production became the central economic focus for the Hilo area. By 1874, Hilo already ranked as the second largest population center in the islands and within a few years the fertile uplands, plentiful water supply, and port combined to make Hilo a major center for sugarcane production and export. The plantation lands commonly extended some two to three miles inland from the coast (Best 1978:123). Elevations typically ranged from 250 feet above sea level along the shoreline bluffs to 2,000 feet above sea level at their western (*mauka*) limits. Ocean frontage could range from two to six miles. Railroads operating on steam and animal power were built on some plantations by 1887, however some plantations utilized flumes or cable railways to transport cane from the fields to the coastal mills.

With the annexation of Hawai‘i to the United States in 1898 and the granting of Territory status in 1900, Hilo was designated the center of county government in 1905 and remained the second most populated city in the newly formed Territory of Hawai‘i. Sugar cultivation continued to be the island’s most lucrative industry until the ca. 1970s The sugar industry brought widespread changes to the Hilo area and the drastically altered the traditional landscape of the district. As part of the late nineteenth century development of the sugar plantations and related infrastructure, some of Hilo’s largest fishponds (Hanalei, Kalepolepo, Mohouli, Waiāhole, and Hoakumau) were filled in, and many old residences, burial sites, trails, *heiau*, formerly located in the cane fields were destroyed as a result.

In prospecting Hilo for land suitable for development, a report was made by the Royal Commissioners on Development of Resources. Formed by King David Kalākaua in 1877, commissioners conducted examinations of lands along the Hāmākua/Hilo coastline and consulted with residents in an effort to learn about needs and natural resources. In 1877, Honomū was investigated for its potential as a landing and sugar mill location:

> At Honomu, in ordinary weather, a good landing can be made in a surf boat, and would only need a buoy; parties are projecting a small plantation on this land with a mill in the gulch. There are some 1500 acres of Government land in the vicinity, and 1250 sold to private parties, some of which is cane land. The establishment of a good mill at Honomu would greatly add to the value of these lands. (Maly and Maly 2006:48)

Three years later in 1880, M. Kirchoff & Company, along with C. Brewer & Company, Ltd. as agent, established Honomū Sugar Company on 2,400 acres of land within the South Hilo District, which would eventually include the current study area (Dorrance and Morgan 2000).

Boundary Commission Testimony *(1886 and 1874)*

As the Honomū Sugar Company continues to expand its operations, they began the process of acquiring adjacent tracts of land which eventually included the current project area. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded solely by name as a part of the *Māhele ‘Āina*. Subsequently, in 1874, the Boundary Commission was authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents who typically learned of the boundaries from an elder relative or neighbor. The boundary information was usually given in Hawaiian and simultaneously transcribed by the courts into English. The information described by the informants tell of natural and built features as well as traditional place names and its uses specific to Mālamalamaiki.

Testimony concerning the boundaries of Mālamalamaiki was collected on two separate occasions. The first hearing for the boundaries of Mālamalamaiki 1 occurred in June of 1874 and the second for Mālamalamalaiki 2 was in August 1886. On June 30th, 1874 the Commissioners met at the Hilo Court House on the application of L. McCully, the attoryney for Noa Kaikinui, to settle the boundaries of Mālamalamaiki 1. Prior to the hearing of testimony, P. Ama, a land surveyor provided the following statement concerning his survey of Mālamalamaiki 1:

> Notes of survey filed by P. Ama; on May 1st 1874 presented by applicant. Ama took oath May 1st as to said Notes of survey. He said, I am a land surveyor and surveyed this land as Kauena pointed out boundaries to me, and copied Notes of survey from Patents of adjoining lands from the Kaupakuea hawai I surveyed up the road to Ohiakiikii and not on the boundary, but surveyed across to boundary at flume

The first native primary informant was Kauena who was a multi-generational resident of Mālamalamaiki. According to notes from the testimony, Kauena was about 70 years old at the time of the hearing, thus placing his date

of birth sometime around 1804. Kauena‘s testimony as well as those provided by two other native informants, Kaiakoili and Nawai are provided below:

> Kaunena k. Sworn
>
> I was born at Malamalamaiki during the reign of Kamehameha I and have always lived there, and my forefathers before me. I was large enough to go about at the time of the battle of Kuamoo. Know the boundary of the land as it is a small one, and a trail is the boundary between the two Malamalamaiki. Know Ama and pointed out the boundaries between the two lands to him. He surveyed the one adjoining Honomu gulch, and he surveyed it as I pointed it our. He commenced at the mauka corner at Ohiakiikii a resting place on the road in the woods he then surveyed down the road to hawai of Kaupakuea, not on the boundary. Thence towards Hamakua to where I pointed out the boundary between the two lands. Thence to Naomi‘s land on Malamalamaiki 1. (He surveyed as I told him without disputing the boundaries) From the mauka corner of Naomi‘s land to the shore the adjoining land has been sold. We went to shore and surveyed across from corner of land sold to Honomu gulch.
>
> The Honomu gulch is on the Hamakua side of this land and is the boundary from shore to opposite Ohiakiikii where Malamalamaiki is cut off by Honomu: Bounded makai by the sea.
>
> Kaiakoili k. Sowrn
>
> I went and carried the chain with Nawai when Ama surveyed the land Kauena was the kamaaina. Commenced at Ohiakiikii and surveyed across the land to Honomu gulch. Marked a tree at Ohiakiikii, and from thence surveyed down the road to flume. We then went down to where we came to the gulch and surveyed from there across to Homonu gulch. Then we to Palau‘s houses and surveyed to shore, and then across to the Honomu gulch. We went where Kauena pointed out.
>
> Nawai k. Sworn
>
> I went with Kauena and Kaiakoili when Ama surveyed the land. My knowledge is the same as the last witness has testified to. (Boundary Commission 1874a:283-284)

Following the testimony, the Commission heard the following statement from McCully, “...stated he finds that this land was sold to His Ex. C.C. Harris, paid cost, and declined to go any further in matter” (Boundary Commission 1874a:284)

On August 6th, 1886, the Commissioners of Boundaries convened again at the courthouse in Hilo on the application of D. H. Hitchcock, the attorney for Edward Witschy, to settle the boundaries of Mālamalamaiki 2. Sworn testimony for Mālamalamaiki 2 was provided by Kauhane, Bila Kamakana, and D. H Hitchcock. Although no information concerning land use is noted in the testimony, information about traditional place names are mentioned. Their testimony is transcribed in its entirety below:

> Kauhane sworn
>
> Malamalamaiki first adjoins the land from the sea to “Kaloaawapuhi”; then Laimi joins, a road being the boundary; to “Kapoalua”, where Honomu and Laimi meet, and Malamalamaiki 2nd ends. From Kapoalua down, the boundary of Malamalamiki 2nd and Honomu is an awawa [gulch] to the big gulch, which branches, the south branch being the boundary down to the sea; between Honomu and Malamalamaiki 2nd the north branch is large where it enters the woods, but it soon ends. “Kaihi” is really the principal branch of the Honomu gulch, which runs a long way up into the woods—the stream of water in the gulch is the boundary between Honomu and Malamalamaiki 2nd to the sea; bounded makai by the sea.
>
> Bila Kamakana sworn
>
> Kauhane has told the boundaries correctly.
>
> D. H. Hitchcock sworn
>
> I surveyed the land of Malamalamaiki 2nd along the adjoining Royal Patents, as far as they go, and on along the boundaries as they were pointed out by Bila Kamakana; the land is very narrow above to the place called “Poalua.” The survey of Malamalamaiki 2nd runs along the main branch of the Honomu gulch, which branches in the woods. (Boundary Commission 1874b:41-42)

A review of records obtained at the Olson Trust Archives indicate that C.C. Harris had purchased Mālamalamaiki 2, and that the land was later deeded to Edward Witschy. The land was then deeded to William Kinney, who according

to the 1890 *Directory and Handbook of the Kingdom of Hawaii* (Lane 1890), was the manager for the Honomū Sugar Company.

The Honomū Sugar Company mill itself was located on the coast, to the north of the current subject parcel and the upper region of Honomū was interspersed with small-farm homesteaders (Figure 20). By 1890 the plantation was producing 2,000 tons of sugar yearly. Initially, no Hilo coast plantation had a railroad, so fluming was extensively utilized by the Honomū Sugar Company who shipped its product from Honomū Landing to Honolulu via inter-island vessels that anchored offshore. A 1915 U.S.G.S. Honomū quadrangle of the subject parcel (Figure 21) depicts a portion of a flume traversing through the *makai* section of the subject parcel and descending into the Mālamalamaiki Gulch before continuing north along the coastline. Numerous flume routes can also be seen crossing the South Hilo landscape in Figure 21.

By 1919, the Honomū Sugar Company encompassed roughly 2,300 acres of land: 1,271 of which were owned outright by the company, and 1,000 of which were leasehold. The company's cultivated sugarcane lands extended from 50 to 1,500 feet above sea level, and were situated between the neighboring mills of Pepeʻekeo and Hakalau. A 1920 Hilo Forest reserve Plat Map No. 0799 (Figure 22) depicts the approximate extent of the Honomū sugar lands in relationship with the neighboring plantations. Water was diverted from several perennial streams including Pahaehae, Kolekole and Honomū (which bounds the subject parcel to the north) through a 9-mile long network of flumes to the fields which grew several varieties of cane including ". . . Yellow Caledonia with a little Rose Bamboo and a small amount of different varieties sent from the Planters' Experiment Station" and crop yields were further supplemented by nearby homestead growers who dedicated approximately 400 additional acres of land to cane cultivation for the company (Evening Bulletin Industrial Edition 1909). Figure 23, a 1932 Honomū Sugar Company Title Map, also shows the extent of the plantation's landholdings, which included fee simple (outlined in red) as well as leasehold lands (outlined in green). Uncontrolled lands (outlined yellow) are also indicated on the map. As depicted in Figure 23, the majority of the current project area was owned and operated as fee simple land by the Honomū Sugar Company, however a small portion of the project areas northwestern corner falls within uncontrolled lands. This section is likely associated with the Hawaiʻi Consolidated Railway company, and incorporates the Honomū/Malamalamaiki Gulch banks.

Figure 20. A 1929 aerial photograph of the Honomū Sugar Company Mill and surrounding area.

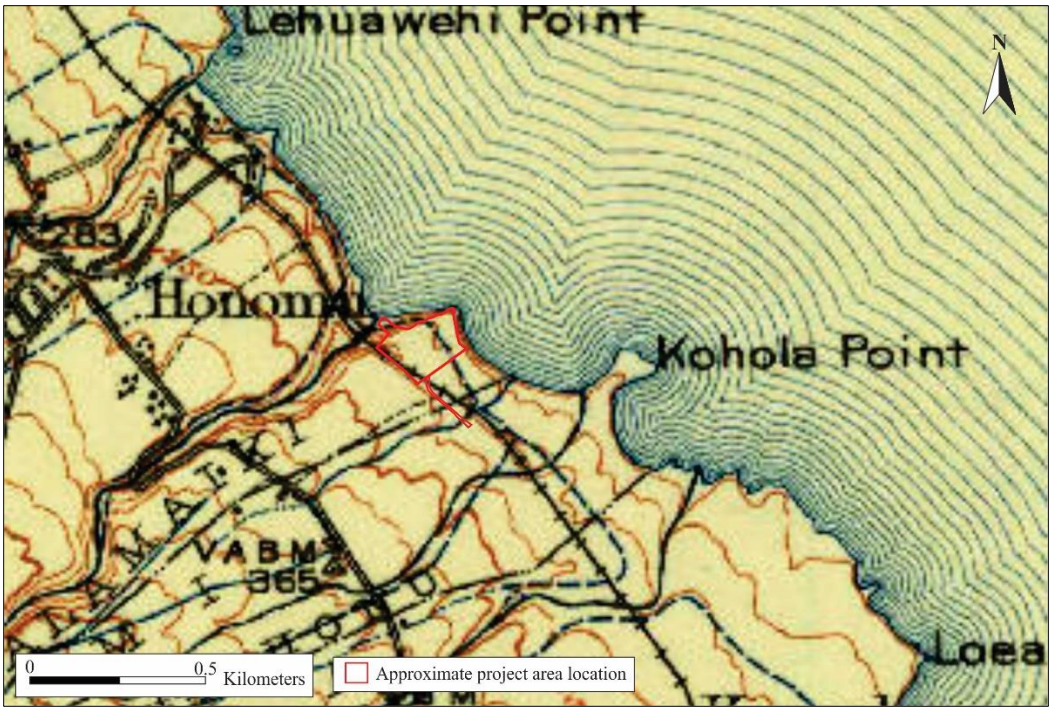

Figure 21. A portion of a 1915 U.S.G.S. Honomū Quadrangle showing the current subject parcel.

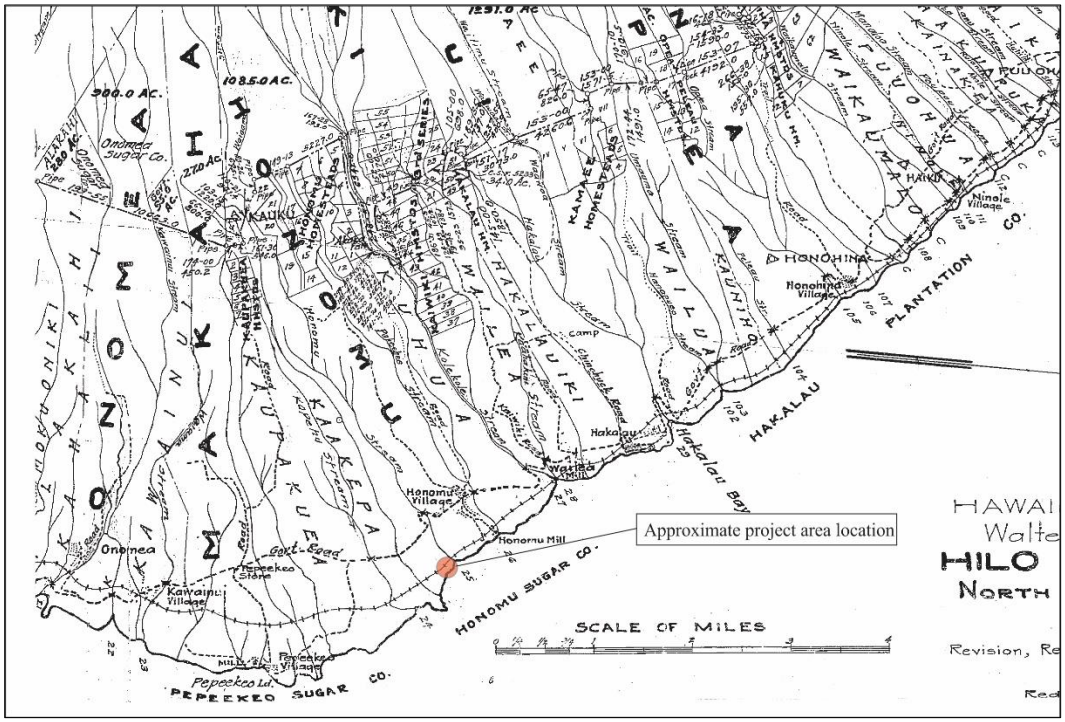

Figure 22. HTS/HSS Plat Map No. 0799 dated 1922 showing the extent of the Honomū Sugar Co. lands

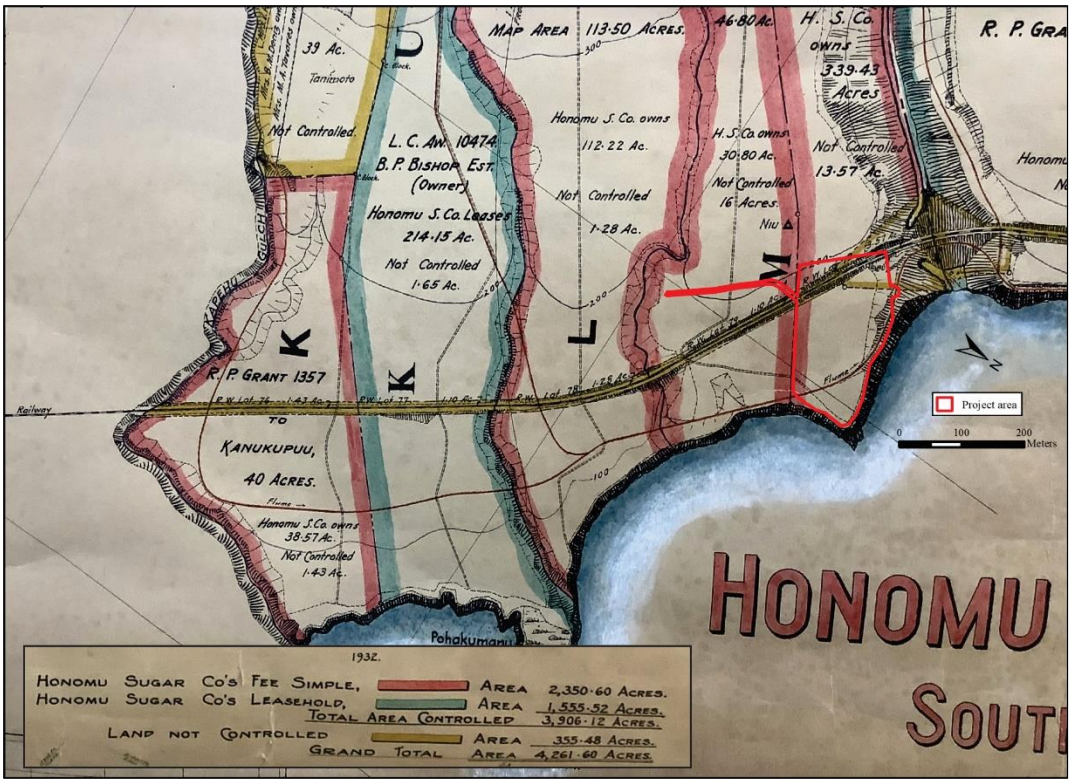

Figure 23. A portion of a 1932 Honomū Sugar Company Title Map with the approximate location of the current study area outlined in red.

An accompanying 1932 Field Map of the Honomū Sugar Company (Figure 24) indicates that the current subject parcel and the lands immediately surrounding it were incorporated as part of "Field 3" of the plantation. Field 3 extended *mauka* from the coastline to the old Māmalahoa Highway, totaled 44.8 acres, of which 37.45 acres were owned and operated by the plantation. As depicted in Figure 24, the level tableland within the project area was cultivated in "plantation cane" by the Honomū Sugar Company, whereas 1.25 acres of the project area was cultivated in "Pali Planters cane" (shaded orange). This included 0.70 acres of the parcel's rocky coastline (labeled #84), and 0.55 acres of the steep, Mālamalamaiki Gulch bank (labeled# 82). The steep gulch banks and rocky coastal cliff edges in the South Hilo district made it difficult for the plantation companies' machinery to operate, therefore, independent contractors were hired to manually clear and cultivate cane in these marginal zones. The "Pali Planters" (gulch-side planters) were once such group contracted by the Honomū Sugar Company to clear and cultivate cane in these areas. By 1935, Pali Planters as well as other independent contracts, became "adherent planters" to the sugar cane companies under the Agricultural Adjustment Act (Lands 1948). Also depicted in Figure 23 is the Hawai'i Consolidated Railway route, as well as a permanent flume (labeled "flume") extending through the *makai* portion of the subject parcel before crossing the Mālamalamaiki Gulch.

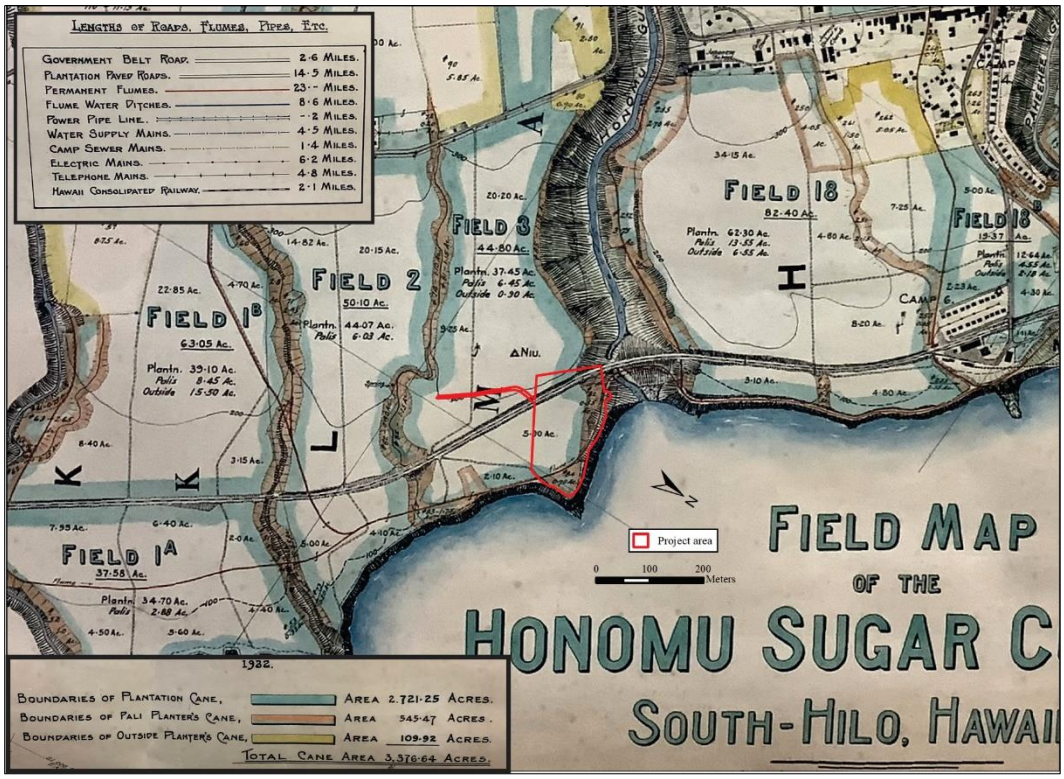

Figure 24. A portion of a 1932 Honomu Sugar Company Field Map with the approximate location of the current study area outlined in red.

By 1941, Honomū Sugar Company held 3,027 acres of cane land, and production had reached 10,407 tons (Hitch 1992), but in years following World War II left an indelible mark on the company as it fell under duress due to wage increases and labor scarcity. A pattern of cane field acquisition emerged in the following years in an effort to boost cultivatable acreage and thereby ensure sustainable profitability for the big players in the industry, and in 1946, C. Brewer & Co. acquired controlling interest in Honomū Sugar Company and merged it into the Pepeʻekeo Sugar Company (Dorrance and Morgan 2000). Nearly two decades later in 1962, Pepeʻekeo Sugar Company fused with Hakalau Plantation, and in 1973 Hakalau consolidated into Mauna Kea Sugar Company, a non-profit corporation that now held Hakalau in addition to the Honomū, Pepeʻekeo, Onomea, and Hilo Sugar companies (ibid.). Mauna Kea Sugar Company, which eventually became Mauna Kea Agribusiness, became the third largest in acreage (13,000 acres) on Hawaiʻi Island. It continued to operate until 1994 when it phased out sugar production and closed its doors forever, marking the end of commercial sugarcane production in the Hilo area (ibid.). The rise and fall of the sugar industry were closely intertwined with the development of rail transportation in the district.

Hawaiʻi Consolidated Railroad Company 1901-1946

Railroad construction was one of the most important elements of governmental and private sector planning following the Treaty of Reciprocity, as crops and product were still being transported by beast and cart (Dorrance and Morgan 2000). On the Island of Hawaiʻi, the first major line to be constructed was in North Kohala District, which operated as the Hawaiian Railroad Company. The North Kohala line, however, was envisioned as only the first step toward a much larger system connecting the cane fields of Kohala, Hāmākua, and Hilo with Hilo Harbor, the only protected deep-water port on the island. Beginning in 1899, railroad lines began transporting sugar to the harbor for marine transport, thus Hilo became an important shipping and railroad hub.

Lorrin A. Thurston, who according to Thrum had "been connected with the enterprise from its initiation" (Thurston 1913), wrote an article upon the completion of the railroad from Hilo to Paʻauilo, Hāmākua in May of 1913 entitled "Railroading in Hilo" which was published in *Thrum's Hawaiian Annual and Almanac for 1914*. Thurston reported that the Hilo Railroad Company (HRC) initiated the railroad endeavor in 1899 from Waiākea south to ʻŌlaʻa and onwards to Kapoho. The initial distance of twenty-five miles of track was completed by April 1901. Later that same year, the track was extended along the waterfront of Hilo to the Wailuku River, at the foot of Waianuenue Street"

(ibid.:143). In 1903, HRC constructed a wharf at Waiākea and completed a branch line connecting it to the waterfront line.

The commercial sugar industry provided most of the cargo transported by HRC, but suffered a sharp decline between the years of 1904-1907, which caused a halt of development in Hilo (Thurston 1913). In response, HRC worked with ʻŌlaʻa Sugar Company to send a representative to Washington D.C. in 1907 to secure funding for the construction of a breakwater that would allow Hilo Bay to accommodate larger ocean-going vessels. Construction on the breakwater began in 1908 and was still ongoing at the time of Thurston's writing (ca. 1914); the breakwater was finally completed in 1929. In exchange for construction of a breakwater in Hilo Bay, the Hilo Railroad was required to build a new wharf, a one-mile rail extension from Waiākea, and a 50-mile rail extension north to Honokaʻa Mill (the Hāmākua Division). The funding of the breakwater by HRC resulted in the extension of the railroad through the populated section north of Hilo all the way to Hakalau and Hāmākua (Figure 25):

> When the breakwater project was pending before Congress, opposition was made to the appropriation on account of the limited commerce then being transacted through Hilo harbor.
>
> Assurances were thereupon made by the Hilo Railroad Company, that if the breakwater were constructed, a railroad would be built into the country north of Hilo and suitable wharf facilities provided under the lee of the breakwater. Such assurances had a material effect in securing the appropriation. (ibid.:145)

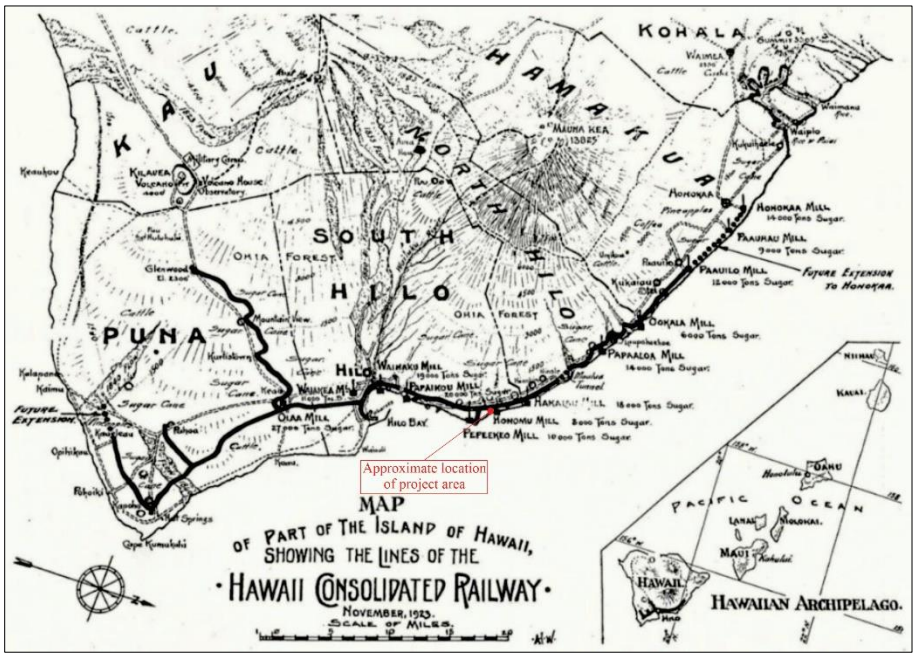

Figure 25. Hawaii Consolidated Railway Map of rail system as of November 1923 (Annual Report 1926).

The extension to Honokaʻa would finally connect the sugar mills of South Hilo, North Hilo, and Hāmākua with Hilo's protected harbor. Between June 1909 and December 24, 1911, HRC built 12.7 miles of rail extending from Hilo to Hakalau Mill, crossing many deep gulches and valleys, including the current study area, along its route. This was followed by the construction of an additional 21 miles of rail that connected Hakalau with Paʻauilo to the north, which covered a total distance from Hilo of roughly 34 miles and was known as the "Hamakua Division" (ibid.:146). The railroad can be seen crossing through western portion of the subject parcel as early as 1915 (see Figure 21). Thurston defined the objective of the Hāmākua Division thusly:

> The principal object of the extension is to give adequate transportation facilities between Hilo and the fertile and well-settled territory extending for 50 miles north of the town of Hilo, and averaging three to four miles in width. This district produces nearly one-fourth of the entire output of sugar of the Territory and is, including the town, the home of over 30,000 people. The only means of access to this section has heretofore been by wagon road, almost impassable in rainy weather, and by derrick and cable landings over bluffs rising from 50 to 300 feet sheer from blue ocean. There are no harbors. (ibid.:147)

Thurston described the scenery afforded to passengers who traveled on the Hāmākua Division as follows:

> Incidentally, the road has opened up one of the most remarkable, unique and spectacular scenic routes to be found in any part of the world. It may appear impossible for a railroad to run through a thickly-settled, highly-cultivated country and yet be noted for spectacular scenery. The paradox is explained by the fact that the district lies along the base and on the steep slope of Mauna Kea, the highest mountain in the Pacific. . .
>
> The combination of steep grade and heavy rainfall has resulted in excessive erosion, the mountain side being seamed at frequent intervals with deep gulches, in which the streams form innumerable cataracts and waterfalls. . .
>
> Some conception of the rugged character of the country can be gained from the fact that in less than 34 miles, there are 211 water openings under the railroad track, ranging from a concrete culvert to steel bridges up to 1006 feet in length and 230 feet high. . . (ibid.147-149)

The environs of the current study area were described by John W. Bains in an article entitled "Around About Hilo" that was published in a January 1913 edition of the *Mid-Pacific Magazine*:

> Mile upon mile of sugarcane fields stretch away on both sides of the line, insistent evidence of the magnitude of Hawaii's most valued product. The quaint and unique method of conveying the cane from the uttermost borders of the fields to the very jaws of the mill rollers by the means of water flumes is to be seen at various points along the line. (Bains 1913:356-357)

Ultimately, the cost of the Hāmākua Division ruined HRC and as a result, they were forced to sell out and reorganize under the name Hawaii Consolidated Railway (HCR) in 1916. In 1920, HCR attempted to capture a larger piece of the growing tourist business with its adventurous scenic route tour dubbed the "Scenic Express." HCR had long offered service to Glenwood for tourists visiting Kīlauea, but motorbuses now dominated this route. The Hāmākua Coast, by contrast, was not easily accessible by automobile. HCR was therefore able to run passenger coaches profitably along the Hāmākua Division with stops at scenic points. Passenger business declined precipitously in the early decades of the twentieth century, and the rise of the automobile was a harbinger for the railroad. In 1920, 607,220 passengers were carried. In 1930, the number dropped to just 77,894 and continued as the years progressed, with passenger counts dropping as low as 16,681 in 1936 (Best 1978:145–146). As a result, the remaining passenger cars were converted for other uses, and the little passenger traffic which persisted was hauled on custom-built railbuses.

In the years following railway passenger-ship progressively dropped, but with the onset of World War II usage spiked significantly due to war-time gas rationing and the dramatic influx of servicemen. By 1943 passenger totals had rebounded profoundly to 103,635 but inevitably, the popularity of automobiles began to take a toll on the railroad's industrial customers. As roadways were improved and gasoline prices dropped, simple economics favored trucking over trains. Ironically, just as rail transportation was in the throes of decline, HCR was by 1945 almost out of debt for the first time since its inception. The great *tsunami* of 1946, however, would soon seal its fate.

The *Tsunami* of April 1, 1946

On April 1, 1946, a *tsunami* triggered by an earthquake in the Aleutian Islands slammed into the north facing shores of Hawai'i Island, dealing a fatal blow to the already struggling HCR. Tracks around the waterfront were entirely washed out and the Hilo Station was wrecked. An entire span of the Wailuku Bridge was torn out and washed out river and "twelve miles north of Hilo, the railroad bridge at the mouth of the Kolekole Stream lost its center span" from a massive inundation of water that reached heights of 37 feet in Kolekole and neighboring Hakalau Gulch (Klein et al. 1985; MKE and Fung 2013:E8).

With the Hamakua Division officially defunct, Hawaii Consolidated Railway offered its right-of-way, bridges, and tunnels to the territorial division of highways and Hawai'i County supervisors. In a bold act of short-sightedness, both agencies refused. Un-phased, Hawaii Consolidated liquidated its assets on December 26, 1946. The entire railroad was sold to Gilmore Steel & Supply Co. of San Francisco for a mere $81,000. Most of the bridges were dismantled and the rails were pulled up along the length of the Hāmākua Division. Together with the remaining rolling stock, they were shipped to California as scrap metal. In the midst of the disassembly, the Division of Highways belatedly decided that Route 19 needed to be relocated and improved. It purchased the remaining bridges, plus some that were awaiting shipment in Hilo, for $302,723.53. Steel from the dismantled railroad bridges was used to widen the standing bridges for their new roles as highways. In Hilo, the damaged docks and track were repaired and rail service was continued to Olaa Sugar under lease from Gilmore Steel & Supply Co. Product was transported by train from Olaa

Sugar until December of 1948, at which time the line was permanently closed. All remaining assets were sold to The Independent Ironworks of Oakland for scrap.

Following the April 1, 1946 *tsunami*, the sugar industry persisted in the South Hilo District until 1994. The railroad bridges from Hilo to Hākalau that were destroyed by the 1946 *tsunami*, were rebuilt and reopened for vehicular travel along the Hawai‘i Belt Road in 1950 (which replaced the old Mamālahoa Highway), and remains in use to this day. A 1954 U.S.G.S. aerial image of the project area (Figure 26) which depicts the majority of the parcel cultivated in sugar cane, shows both the newly created Hawai‘i Belt Road (the Māmalahoa Highway) as well as the former route of the Hawai‘i Consolidated Railroad (Site 24212) along the western boundary of the subject parcel. A portion of a former flume route (seen as a large cut in the terrain) is also shown crossing through the *makai* portion of the parcel, before descending down into the gulch. This cut is no longer visible in a 1977 U.S.G.S. aerial image of the property (Figure 27), however the parcel is still shown to be cultivated in sugar cane at this time. Also depicted in Figure 25 is a loop road, a portion of which extends into the project area.

The dismantling of the railroad in 1946-1947 led to the development of additional plantation roads. The loop road that can be seen in the 1977 aerial image of the parcel is a portion of one such road. This road, which is also visible on a 1966 U.S.G.S. Papaikou quadrangle (Figure 28), was likely originally constructed as a cane haul road to provide vehicular access the Honomū plantations surrounding cane fields. The current easement that provides access to the project area as well as the neighboring parcel to the south follows this roads trajectory.

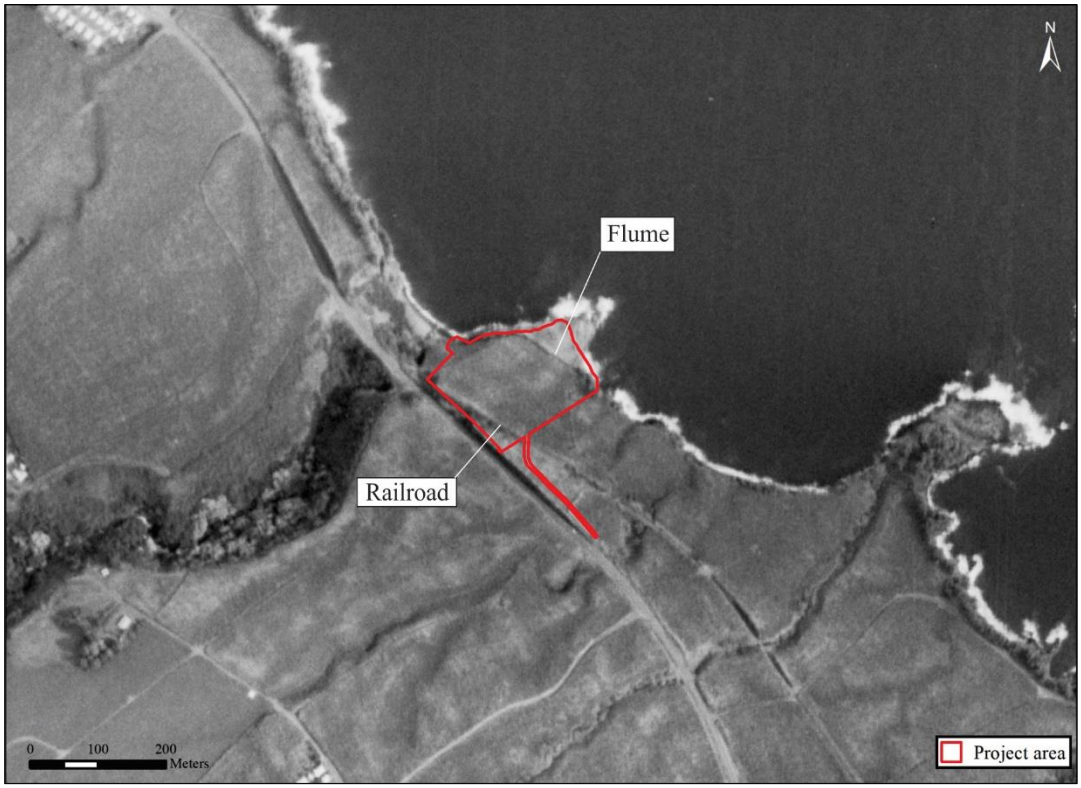

Figure 26. A 1954 U.S.G.S. aerial image with the approximate location of the current study area outined in red.

Figure 27. A 1977 U.S.G.S. aerial image with the approximate location of the current study area outlined in red.

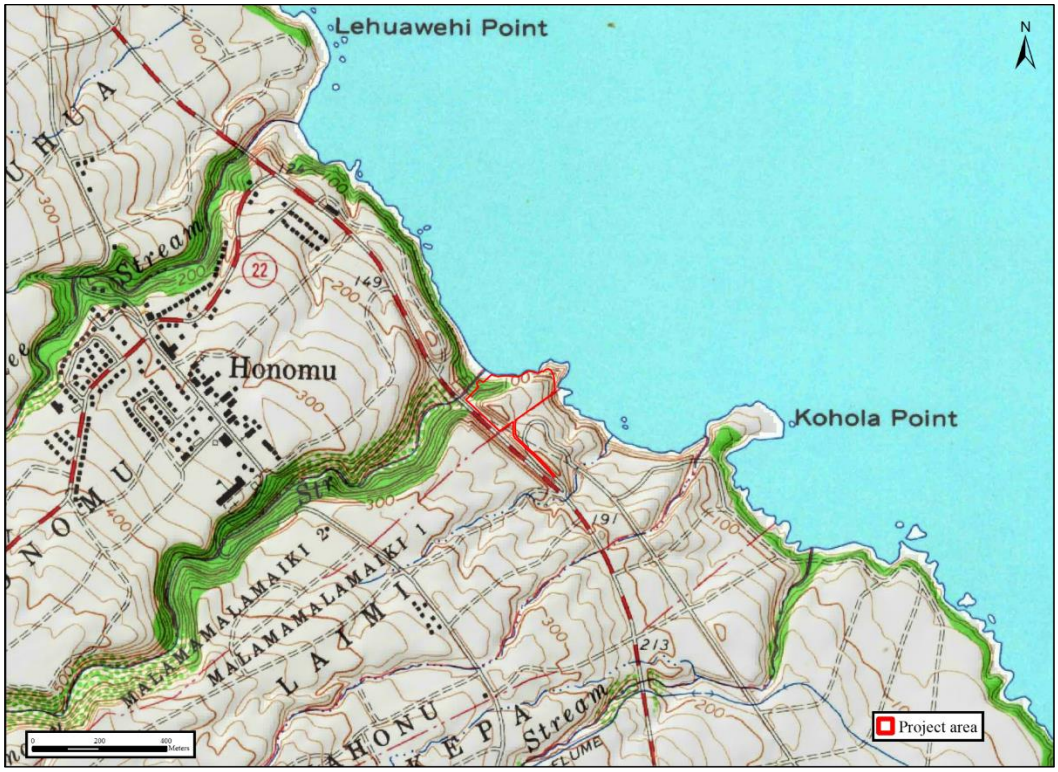

Figure 28. A portion of a 1966 U.S.G.S. Papaikou Quadrangle with the approximate location of the current study area outlined in red.

PREVIOUS ARCHAEOLOGICAL STUDIES

A search of archaeological reports on file at the DLNR-SHPD revealed that there have been no previous archaeological studies conducted specifically within the subject parcel. However, several previous studies have been conducted in the vicinity of the study area at similar elevations in the neighboring *ahupua'a* within the South Hilo district. These studies have included the lands of Hakalau Nui, Hakalau Iki, Wailea, Kaiwiki 3, and Kuhua. The most relevant of these studies are discussed below and presented in Table 2 and Figure 29.

Among the earliest archaeological work to be done in East Hawai'i was that of the early twentieth century *heiau* researchers Thrum and Stokes (Stokes and Dye 1991; Thrum 1908). No *heiau* were identified in the current study area or within the larger region spanning between Honomū and Hakalau. During the early 1930s, A.E. Hudson (Hudson 1932), working under the aegis of the Bernice Pauahi Bishop Museum, also conducted archaeological investigations in East Hawai'i. He found little in the region surrounding the current area of study, although he did note the presence of a roughly .25-mile square area of *kalo* terraces north of the study area in the upper part of Hakalau Gulch (Hudson in Maly 1994).

Walker and Rosendahl (Walker and Rosendahl 1994a, 1994b) conducted an AIS of approximately 595 acres of land within TMKs: (3) 2-9-002 and 004 located north of the current study area within Hakalau Nui Ahupua'a (see Figure 29). The study area was situated between the Hawai'i Belt Road and the 1,500-foot elevation mark on the northern side of Hakalau Gulch. An initial, low-level aerial (helicopter) survey was conducted over some of the uncultivated portions of the study area. Other uncultivated areas were investigated using "variable-coverage (partial to 100%) variable-intensity ground survey" (Walker and Rosendahl 1994b:2). As a result of the survey, it was evident that the study area had been extensively modified during Historic times for commercial sugar cultivation. As a result of this, no archaeological sites were identified.

In 1998, an archaeological survey was undertaken in support of an Environmental Assessment (EA) for the seismic retrofitting of Kolekole Bridge by Cultural Surveys Hawai'i, Inc. (Hammatt and Colin 1998) (see Figure 29). The survey area included "the slopes of Kolekole Gulch under and surrounding the Kolekole Bridge and approximately 100.0 feet of the slopes *mauka* and *makai* of the bridge" as well as "any access route to the gulch or other areas which would be used during construction of the bridge improvements" (Hammatt and Colin 1998:i and 1). As a result of that study, square footings from the pre-1946 Kolekole Bridge were noted outside the study area and a cylindrical cement footing was observed in the middle of Kolekole Stream. No other cultural remains were observed.

In 2001, (PHRI) (Rosendahl 2001a, 2001b) conducted a study of two former Historic cemeteries located within TMKs: (3) 2-9-002:001 (por.) and :083 (por.) (identified as Lots 5 and 10 of the Hakalau Estates Subdivision, respectively), both of which are located to the northwest of the current study area along the coastal bluffs (see Figure 29). With respect to Lot 5, Rosendahl (2001a) sought to determine the status of the cemetery and identify potential impacts that would be caused by the sale of the property. As a result of the study, the cemetery was identified as an informal, plantation-era cemetery associated with the Hakalau Jodo Mission (locally referred to as the "Japanese Cemetery"). The cemetery was primarily utilized during the first third of the twentieth century and may have held approximately 200 individuals. All of the graves were disinterred with a backhoe in the early 1970s by Homelani Memorial Park staff and were reinterred in that cemetery. Most of the individual internments consisted of deteriorated wooden coffins and skeletal remains. The grave monuments were generally reburied in the excavated pits after the remains were removed.

The study for Lot 10 was conducted in two stages; preliminary research and subsequent field inspection. The purpose of the study conducted by Rosendahl (2001b) was to confirm the boundaries of what is referred to as the "Catholic Cemetery." The initial research conducted for the study included oral history consultation with local informants familiar with the area. As a result of the study, Rosendahl (2001b) concluded that the cemetery was an informal plantation-era cemetery with an overall total area estimated between 1 to 2 acres and held possibly 200 to as much as 250 internments of individuals of several ethnicities (Filipino, Portuguese, Puerto Rican), all of whom were likely mainly plantation employees and/or family members of the Catholic faith. They found that the cemetery was primarily utilized during the first half of the twentieth century, and, while a few of the graves were disinterred in the late 1970s by individual families; most of the graves remain in their original place. Some of the graves within the cemetery probably date to the end of the nineteenth century or early twentieth century.

Rechtman Consulting, LLC (Desilets et al. 2004) conducted an AIS and limited cultural assessment of three land parcels comprising 4.5 acres (TMK: (3) 2-9-003, 013, 029, and 060) to the north of the current study area in Wailea Ahupua'a (see Figure 29). A systematic survey of the study area (TMKs: (3) 2-9-003:013, 029, 060) produced no evidence of traditional Hawaiian remains or evidence that the area was currently being accessed for the exercise of traditional and/or customary practices. A single Historic era site (Site 24212) with two associated features (Features

1 and 2) was recorded as a result of the study. This site consisted of two features situated in the northwestern portion of the study area that were interpreted as being associated with the Hāmākua Division of Hilo Railroad-Hawaii Consolidated Railway. Feature 1 consisted of a possible 10 to 15-meter long and 4-meter wide section of the former Hawaiʻi Consolidated Railway railroad grade section of railroad grade. Feature 2 consisted of a railroad trestle abutment that formerly crossed Kaahakini Gulch. Site 24212 was actively utilized by the railroad between 1911 to 1946, and primarily served to facilitate the transport of raw sugar from the many mills along the Hilo and Hāmākua Coasts to the harbor at Hilo Bay. In later years, they also served the secondary function of facilitating tourism.

PHRI (Rosendahl 2009) conducted an AIS and Cultural Impact Assessment (CIA) for an 8.7-acre property in Hakalau (TMKs: (3) 2-9-002:079 and 081) situated along the coastal bluffs to the north of the current study area (see Figure 29). The purpose of the study was to determine the general nature, extent, and potential significance of any archaeological-historical remains present, the historic preservation implications of any such remains for the feasibility of proposed residential development, and the general scope of work and level of effort for any subsequent archaeological-historic preservation work that might be needed. As a result of the fieldwork, two archaeological sites were identified: Site 26591, which consists of two warehouses (Features A and B) and associated foundation remnants (Features C thru I); and Site 26592, the site of the former Japanese/Korean cemetery (previously documented by PHRI (2001) but never assigned an SIHP number). Site 26591 was assessed as significant under Criteria a, c, and d, and Site 26592 was assessed for significance under Criteria d and e. With respect to Site 26591 Features A and B, Rosendahl (2009) recommended preservation with interpretive development and suggested renovation, and data recovery was the recommended treatment for Site 26592.

In 2011, Scientific Consultant Services, Inc. (Escott 2011) conducted an archaeological assessment (AA) of a 3.5-acre parcel in the *ahupuaʻa* of Kaiwiki 3, north of the current study area along the northern bank of Kolekole Stream (see Figure 29). No archaeological resources were identified as a result of the study.

Haun and Henry (2014) conducted an AIS of a 2.332-acre parcel (TMK: (3) 2-9-002:083) within the *ahupuaʻa* of Hakalau Nui to the north of the current study area (see Figure 29). A portion of this parcel was also investigated by Rosendahl (2001). As a result of the study, Haun and Henry (2014) identified the remnants of a plantation hospital (Site 30085), a concrete culvert that extended over a ditch (Site 30086) and the former location of the Japanese cemetery (Site 30087) previously documented during the Rosendahl (2001) study that existed within the project area prior to reinternment. Preservation was the recommended treatment for the cemetery location (Site 30087) and no further work was recommended for Sites 30085 and 30086.

In 2019, ASM Affiliates conducted an Archaeological Assessement of a 5.497-acre parcel (TMK: (3) 2-8-015:015) for improvements to the County of Hawaiʻi's Kolekole Gulch Park in Kuhua Ahupuaʻa, north of the current project area (Glennon et al. 2019). No archaeological resources were identified within Kolekole Park as a result of the study. Glennon et al (2019) determined that although the park was established in 1938, and has been an important recreation area for this portion of the South Hilo coastline, the existing structures bear no known direct association to ongoing cultural practices, traditional beliefs, events, or oral history of native Hawaiians or other ethnic groups. As such, the existing pavilions were not considered significant under any of the Hawaiʻi Register of Historic Places (HRHP) significance criteria, and therefore no SIHP Site numbers were assigned to them. subsurface archaeological resources are unlikely to be encountered in the areas proposed for park rehabilitation

Table 2. Previous archaeological studies conducted in the vicinity of the current study area.

Year	*Author(s)*	*Type of Study*	*Ahupuaʻa*
1994a	Walker and Rosendahl	AIS	Hakalau Nui
1994b	Walker and Rosendahl	AIS	Hakalau Nui
1998	Hammatt and Colin	Archaeological Survey	Kahua
2001	Rosendahl	AIS	
2004	Desilets	AIS	Wailea
2009	Rosendahl	AIS and CIA	Hakalau
2011	Escott	AA	Kaiwiki 3
2014	Haun and Henry	AIS	Hakalau Nui
2019	Glennon et. al.	AA	Kahua

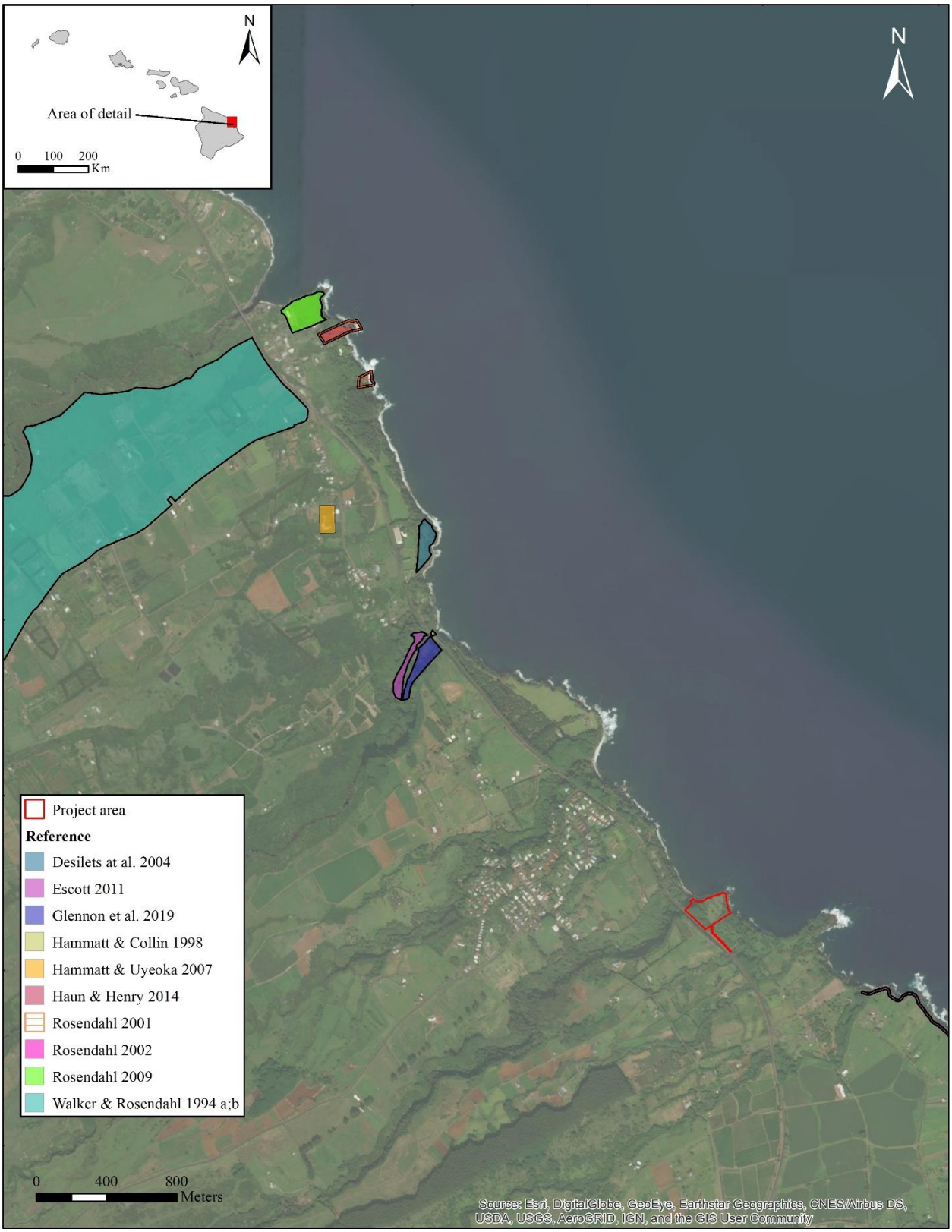

Figure 29. Previous archaeological studies in the vicinity of the current study area.

3. STUDY AREA EXPECTATIONS

Based on a review of the previous archaeological research, historical documentary research, and settlement patterns for the coastal South Hilo District, a set of archaeological expectations for the current project area are presented. Historical data indicate that the general area was part of the heavily exploited traditional Hawaiian *kula* lands. For the last 100 years, however, the area has been utilized for sugarcane cultivation and associated transportation. It is likely that these Historic era modifications have largely destroyed any traditional Hawaiian features that may have been present in the project area. The extreme coastal fringe along the eastern boundary of the parcel, as well as the edges of the Mālamalamiki Gulch/ Honomū Stream Gulch along the northern boundary of the property may have been less affected by these disturbances. The northern gulch edge, however, is very steep-sided and descends directly to a rocky streambed and a small rocky beach. The terrain in this area is not a well-suited place for traditional Hawaiian cultivation or habitation. The small rocky beach located at the base of the gulch (outside of the project area), however, would have been an opportunistic area for fishing and gathering of marine resources.

Based on historic maps depicting the current study parcel, it is expected that remnants of the Hawai‘i Consolidated Railroad bed (Site 24212) will be found along the project area’s western boundary. These maps also depict a flume crossing the parcel, leading into the gulch. Remnants of this flume are also expected to be found along the gulch edge and possibly within the central portion of the project area. Other remnants of Historic sugarcane infrastructure may also be found within the property. These remains may be concentrated in the central portions of the project area, or near the former flume route and railroad bed. Traditional Hawaiian agricultural and habitation features are unlikely to have survived historic disturbance from sugarcane cultivation. If present, they may include stone-constructed mounds, terraces, agriculture related features, or walls. These would likely be found in the vicinity of the lesser-impacted southern and eastern boundaries of the project area.

4. FIELDWORK

Fieldwork for the current study was conducted on August 13th and 24th, 2020, by Jonny Dudoit, B.A., Genevieve Glennon, B.A., Gabriela Edwards, B.A., and Tim Scheffler Ph.D., under the direct supervision of Matthew R. Clark, M.A. (Principal Investigator). A total of 28 labor hours were expended to complete the inventory survey fieldwork.

FIELD METHODS

Fieldwork consisted of an intensive (100% coverage) pedestrian survey of the entire project area. The survey crew walked systematic northwest-southeast (cross-slope) transects across the entire project area with fieldworkers spaced no more than 10 meters apart. The rocky coastal cliff as well as the steep edge of the Mālamalamaiki Gulch were subject to a particularly thorough investigation, as these areas were less likely to have been impacted by activities associated with sugarcane cultivation. While the vegetation cover was thick throughout most of the project area, for the most part ground visibility was suitable for identifying any cultural features that may have been present.

Upon completion of the pedestrian survey, the survey crew returned to each potential feature to clear vegetation and examine them more thoroughly. Those features determined to be historic properties were then photographed (both with and without a meter stick for scale), and described using standardized feature record forms. Each feature was assigned a temporary site number sequentially as it was recorded (T-1, T-2, T-3, etc.), and a more precise location for each of the recorded features was collected using a handheld tablet computer running ESRI's Collector application connected to an EOS Arrow 100 GNSS receiver with sub-meter accuracy (set to the UTM NAD 83 datum, Zone 5 North). Site boundaries were defined based upon the spatial arrangement the recorded features and the inferred associations between them. No subsurface testing was conducted during the inventory survey fieldwork as the only identified sites clearly date from the middle to late nineteenth century.

FINDINGS

As a result of the fieldwork for the current study, a portion of one previously recorded site (Site 50-10-26- 24212) and one newly recorded site (Site 50-10-26-31238) were identified and documented. (Table 3). Site 24212 consists of the Hilo Railroad-Hawai'i Consolidated Railway bed, a portion of which extends near to the western boundary of the parcel. Site 31238 is the former route of a Historic permanent flume associated with the Honomū Sugar Company, which extends east to west near the northern boundary of the project area. The locations of these sites relative to the parcel boundary are presented in Figure 30. The sites are described in further detail below.

Table 3. Archaeological sites recorded during the current study.

SIHP Site Number	*Type*	*Function*	*Age*
50-10-26-24212	Railroad bed	Transportation	1901-1946
50-10-26-31238	Flume	Agricultural	1890's

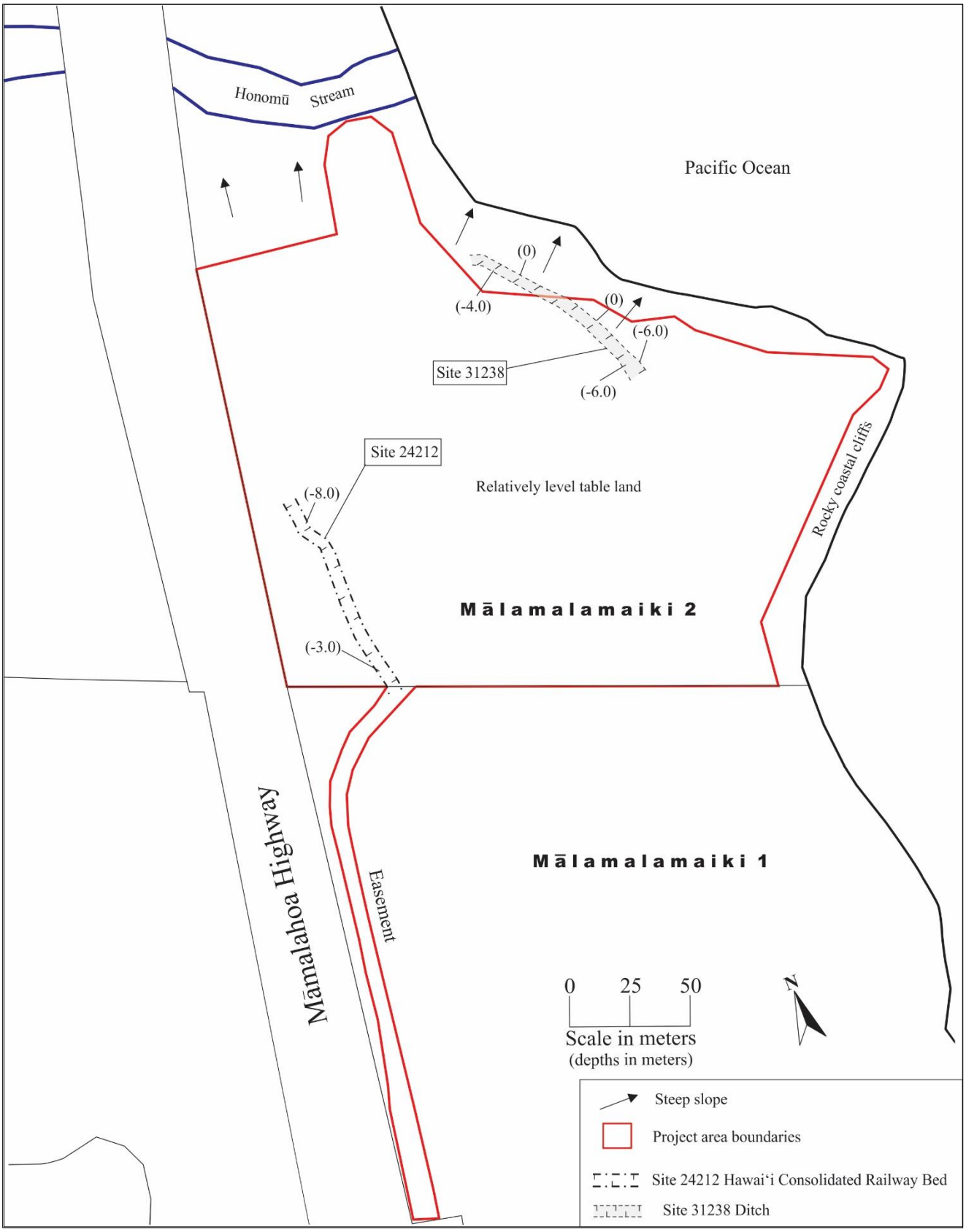

Figure 30. Site location map.

Site 50-10-26-24212

Site 24212 consists of an approximately 82-meter-long section of the Hāmākua Division of the Hilo Railroad-Hawai‘i Consolidated Railway bed, which extends northwest to southeast through the current project area, near to the parcels western boundary, and roughly paralleling the Māmalahoa Highway. (see Figure 30). The railway was previously recorded to the north of the study area by (Desilets et al. 2004). The portion of Site 24212 within the project area is defined by a relatively deep, mechanically made cut excavated below the natural ground surface (Figure 31). The steep cut slopes, consisting of soil and rock, vary in depth from 3-8 meters, increasing in depth as the railbed approaches the Highway at its northwestern end. The average width of the cut (the bed of the railroad) measures 5 meters (Figure 32). The surface of the railbed is fairly level and consists of soil and some loose cobbles. No rails, ties or other railroad infrastructure were observed within the cut railroad corridor.

The Hawai‘i Consolidated Railway’s Hakalau Extension that linked Hilo with the Hakalau Mill began construction in 1908 and was finished in 1911. Historic maps as well as aerial images of the parcel depicts the railroad right-of-way crossing the western portion of the project area (see Figures 21, 22, 23, 24, 26, 27, and 28). Given the historical information known about the Hāmakua Division, the portion of the Site 24212 that crosses the project area was likely built sometime during the early nineteenth century, and the materials that were once used as part of the railroads infrastructure (e.g. railroad ties and rails) were disassembled and sold following the 1946 *tsunami*, and the creation of the Māmalahoa Highway in 1950. The southern end of railroad bed within the project area is filled in by soil and rock. This likely occurred during the construction of a cane haul road (the current easement for the subject parcel) sometime during the early 1960s. Overall, the railroad bed is heavily eroded and in poor condition, and the portion of the railroad bed that crosses the current study area essentially retains its integrity of location but little else. Soil from the cut slopes has deposited onto its surface altering its shape (Figure 33), and heavy vegetative growth including a grove of Alexander palms within the cut, has also impacted the site. This site is assessed as significant under Criteria a and d (see discussion below).

Figure 31. Site 24212 Hawai‘i Consolidated Railway bed cut, view to the southeast.

Figure 32. Site 24212, railway bed, view to the northwest.

Figure 33. Site 24212, eroded western slope of railway bed, view to the west.

Site 50-10-26-31238

Site 31238 consists of a section of a cut earthen ditch situated along the southeastern edge of Mālamalamaiki Gulch near the northern boundary of the project area (see Figure 30). This site is the former location of a permanent flume built by the Honomū Sugar Company. A roughly 41-meter long portion of the ditch is located within the project area. This section of Site 31238 consists of a V-shaped cut that extends west from the edge of a former sugarcane field down the steeply sloped edge of Mālamalamaiki Gulch. The cut ranges from 3 meters wide at the base to 6 meters wide at the top, and is between 4 and 6 meters deep. The walls of the cut are formed of soil and bedrock. The ditch maintains a moderate grade along the steep contours of Mālamalamaiki Gulch as it slopes downward to the west before exiting the northern boundary of the project area and continuing downslope into the gulch (Figure 34). The western end of Site 31238, beyond the boundary of the project area, has eroded from the edge of the cliff face and is no longer present (Figure 35). No evidence of the former flume route, which was likely formed of metal, concrete, and wood sections laid on the ground surface, was observed to the east of the Site 31238 cut within the project area. The cut was required to maintain the grade and flow of water through the flume as it carried sugarcane from the fields, within and to the east of the project area, west across Mālamalamaiki Gulch to Honomū Mill.

Based on historical information, Site 31238 was likely constructed sometime during the late 1890s, before the advent of the railroad, as part of an extensive network of flumes the Honomū Sugar Company employed for diverting water and transporting cane. The alignment of the Site 31238 flume appears on maps as early as early as 1915. It is shown on the 1915 U.S.G.S. Honomū quadrangle extending northwest across the *makai* portion of the project area before turning west (at the location of the cut), crossing Mālamalamaiki Gulch, and continuing to the Honomū Sugar Mill (Figure 21). Later Honomū Sugar Company title and field maps prepared in 1932 (Figures 23 and 24) indicate that the flume originated at Kapehu Gulch (southeast of the project area) and passed through various cane fields, including Field # 3 within the current project area, for a distance of roughly two miles before reaching Honomū Mill. The alignment of Site 31238 is clearly visible on a U.S.G.S. aerial photograph taken in 1954 (Figure 26), but can no longer be seen in a 1977 aerial image (see Figure 27), indicating that is was removed sometime after 1954. Currently, the ditch cut is overgrown with *hala*, ironwood, and gunpowder trees, and is in poor condition. With the exception of modern debris consisting of a refrigerator and an aluminum beer can, no cultural material potentially associated with the site was observed. This section of Site 31238 is highly eroded, and the infrastructural elements that were formally associated with the flume are no longer present. Therefore, the site retains its integrity of location as the former route of a flume, but little else. This site is assessed as significant under Criteria a and d (see discussion below).

Figure 34. Site 31238 ditch, V-shaped cut located at the ditch's eastern end, view to the northwest.

Figure 35. Site 31238, eroded and overgrown section along the gulch bank, view to the west.

5. SIGNIFICANCE EVALUATIONS AND TREATMENT RECOMMENDATIONS

The recorded archaeological site is assessed for its significance based on criteria established and promoted by the DLNR-SHPD and contained in the Hawai‘i Administrative Rules 13§13-284-6. For a resource to be considered significant it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

a Be associated with events that have made an important contribution to the broad patterns of our history;

b Be associated with the lives of persons important in our past;

c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

d Have yielded, or is likely to yield, information important for research on prehistory or history;

e Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

The significance and recommended treatment for the two recorded sites is presented in Table 4 and discussed below.

Table 4. Site significance and treatment recommendation.

Site #	*Site Type*	*Temporal Affiliation*	*Significance*	*Recommended Treatment*
50-10-26-24212	Hilo Railroad-Hawai‘i Consolidated Railway bed	1908-1946	a, d	No further work
50-10-26-31238	Flume	1890-mid 1900s	a, d	No further work

SITE 50-10-26-24212

Site 24212, the railroad bed, is considered historically significant under Criteria a for its association with the development of commercial agriculture (sugarcane) during the early twentieth century, which dominated Hawai‘i’s economy until the late twentieth century. The railbed cut is highly eroded, and no other infrastructural elements associated with the railroad were observed. Additionally, the site is also considered significant under Criterion d, as it has also yielded locational information concerning the evolution of the infrastructural components of the plantation, especially as it relates to changes in transportation networks and technology. The current study has adequately documented the portion of Site 24212 within the project area, and no further historic preservation work is recommended.

SITE 50-10-26-31238

Site 31238, the former route of a permanent flume, is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawai‘i during the early twentieth century and under Criterion d for information it yielded relative to the history of the development of commercial agriculture in South Hilo District, and with the evolution and implementation of infrastructural components associated with the Honomū plantation. The majority of the flume route that formally traversed the current study area has been destroyed, and only a small section of the former flume route is located within the project area. This section is highly eroded, and the structural elements that were formally associated with the flume are no longer present. No further historic preservation work is recommended.

6. STATEMENT OF EFFECT

Given the above recommendations of no further historic preservation work for the two Historic Period sites documented within the current study area, the recommended determination of effect for the current project is “no historic properties affected.”

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Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 3
Cultural Impact Assessment

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A Cultural Impact Assessment for the Proposed Single-Family Development of the Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupuaʻa
South Hilo District
Island of Hawaiʻi

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A Cultural Impact Assessment for the Proposed Single-Family Development of the Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupuaʻa
South Hilo District
Island of Hawaiʻi

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CHAPTERS

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1. INTRODUCTION

At the request of the Holcomb Family Trust (landowner), ASM Affiliates (ASM) has prepared this Cultural Impact Assessment (CIA) for the proposed development of a single-family dwelling located on a roughly 6.5-acre parcel and access easement located in Mālamalamaiki 1st and 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (Figures 1, 2 and 3). This CIA will serve as a supplemental document for an Environmental Assessment triggered by a Conservation District Use Application (CDUA). The landowner is proposing to construct a one-story single family-residence, a paved drive way, and landscaping (Figure 4).

This CIA is intended to inform an Environmental Assessment (EA) being prepared to support a Conservation District Use Application (CDUA). This CIA is conducted in compliance with HRS Chapter 343, pursuant to Act 50 and in accordance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impacts*, adopted by the Environmental Council, State of Hawaiʻi, on November 19, 1997 (OEQC 1997). As stated in Act 50, which was proposed and passed as Hawaiʻi State House of Representatives Bill No. 2895 and signed into law by the Governor on April 26, 2000, specifically acknowledges the State's responsibility to protect native Hawaiian cultural practices. Act 50 further states that "environmental assessments . . . should identify and address effects on Hawaii's culture, and traditional and customary rights" and that "native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the 'aloha spirit' in Hawaiʻi. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on governmental agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups."

The report is divided into four main sections, beginning with an introduction and a general description of the proposed project area. To provide a physical and cultural context, section two of this report includes a detailed cultural and historical background for the general study area, which includes background information for both Mālamalamaiki 1st and 2nd and the greater district of South Hilo. This section also includes a presentation of prior studies conducted within the vicinity of the proposed development activity. The results of the consultation process are presented in section three of this report and section four concludes with a discussion of potential cultural impacts as well as appropriate actions and strategies that may help to mitigate any such impacts.

Figure 1. Study area location.

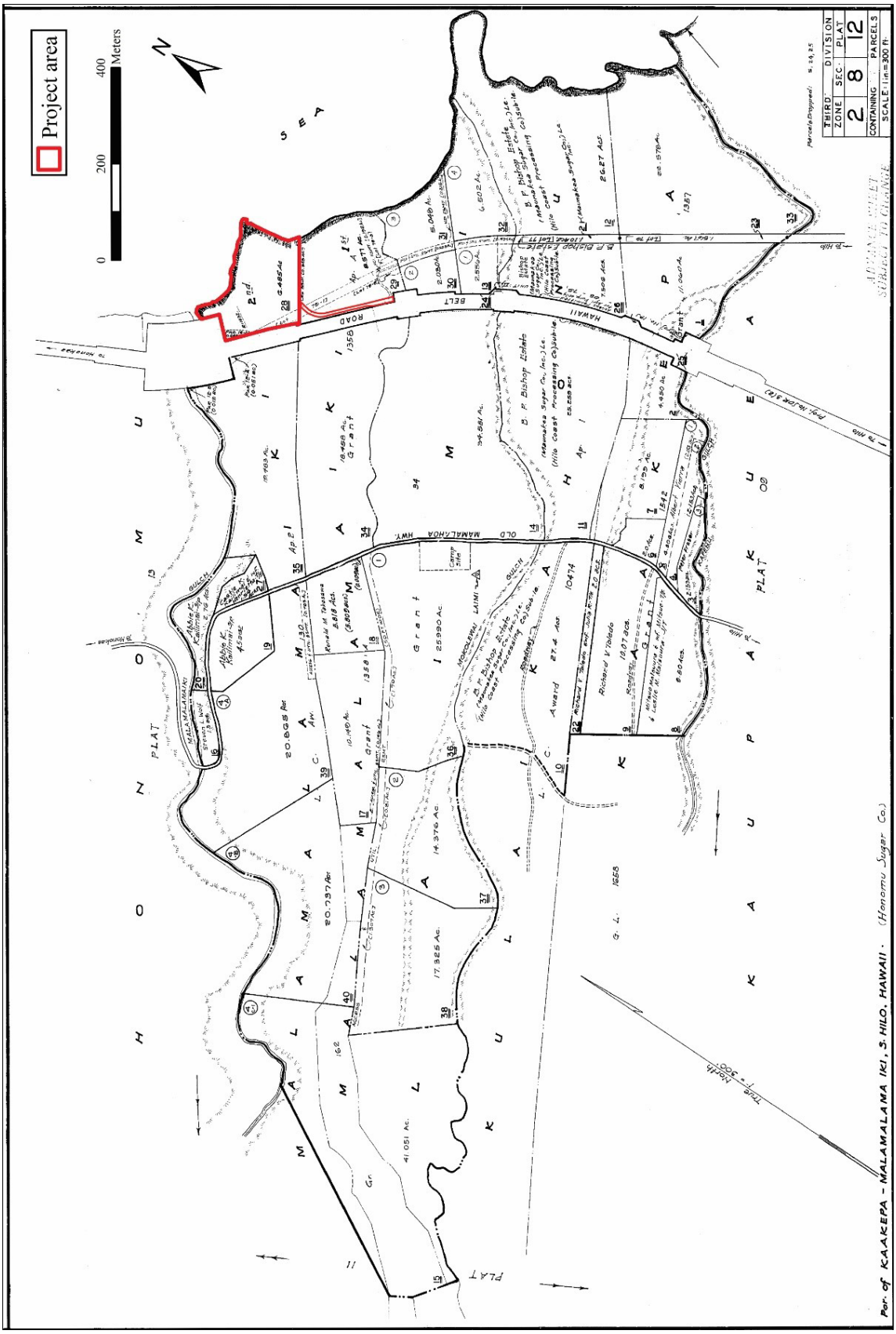


Figure 2. Tax Map Key (3) 2-8012 showing the location of the current project area parcel (028).

Figure 3. Google Earth™ satellite image showing project area location.

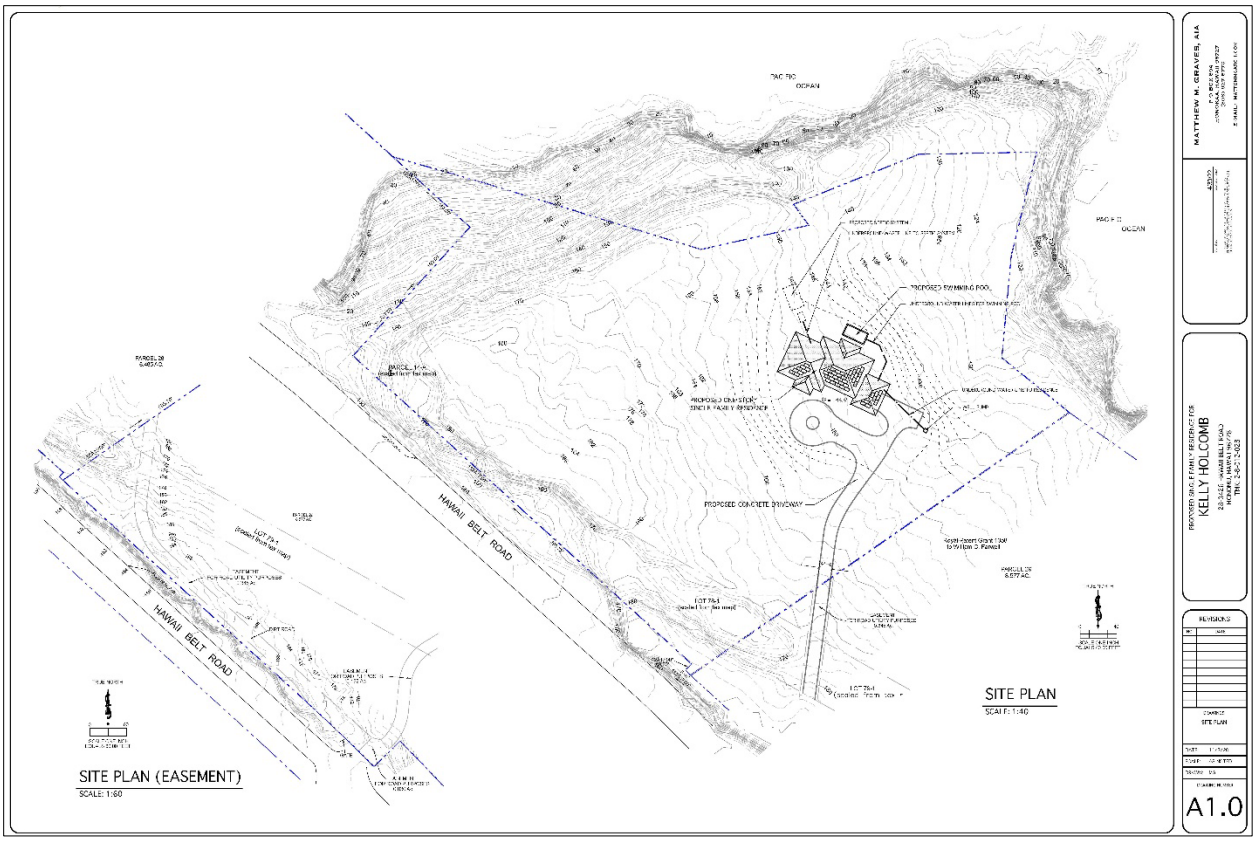


Figure 4. Proposed development plans.

PROJECT AREA DESCRIPTION

The project area (TMK: (3) 2-8-012:028) is located along coastal sea bluffs (Figure 5), approximately 0.9 kilometers south of Honomū town, *makai* of Māmalahoa Highway within Mālamalamaiki 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (see Figures 1, 2, and 3). The project area is roughly 6.5 acres of gently sloping tableland, with elevations ranging from 45 to 150 feet (14-46 meters) above sea level. The project area is accessed through a gated, overgrown easement along the *makai* edge of Māmālahoa Highway (Figure 6). The gated easement begins at the southwest corner of the neighboring parcel (TMK: (3) 2-8-012:029) and extends northwest for approximately 200 meters before entering into the project area. The north boundary of the parcel is bounded by the steep-sided Mālamalamaiki Gulch. To the east, it is bounded by rocky coastline cliffs and the Pacific Ocean, to the west by the Māmalahoa Highway, and to the south by an undeveloped parcel (TMK: (3) 2-8-012:029) (see Figure 5). A hog wire fence line defines the boundary of the two parcels along this southern edge. The Honomū Stream flows through Mālamalamaiki Gulch where it empties into the Pacific Ocean just north of the project area's northern boundary (Figure 7). The former route of the Hawaiʻi Consolidated Railroad (State Inventory of Historic Places (SIHP) Site 50-10-26-24212), evidenced by a deep cut in the terrain, extends northwest to southeast along a portion of the parcelʻs western boundary (Figure 8).

As a result of nearly a century of sugarcane cultivation, the terrain within the majority of the project area consists of level soil areas covered primarily in invasive plant species. The level, central portion of the property consists of open areas of soil covered by a thick, tall growth of Guinea grass (*Megathyrsus maximus*) and molasses grass (*Melinis minutiflora*) (Figure 9). The vegetation along the parcel's outer edges consists of a dense growth of mostly invasive trees, shrubs, and vines. Dominant species observed within the parcel consist of gun powder trees (*Trema orientalis*), guava (*Psidium sp*.), night-blooming jasmine (*Cestrum nocturnum*), lantana sp., Bing-a-Bing (*Macaranga mappa*), African Tulip (*Spahodea campanulate*), ginger sp. and various other grasses and vines. Along the coastal edges of the property are grooves of *hala* (*Pandanus tectorius*) intermixed with ironwood trees (*Casuarinaceae equisetifolia*) and *tī* plants (*Cordyline fruticose*) (Figures 10, and 11). A groove of Alexander palms (*Ptychosterma elegans*) extends along the western edge of the parcel within the former route of The Hawaiʻi Consolidated Railroad (see Figure 7).

Located just outside of the eastern property boundary along the coastline is a wooden ladder that descends from the cliff to the rocky shoreline below (Figures 12 and 13). Although this ladder is located outside of the project area boundaries, it is worth noting that, in more recent times, the coastal cliffs that bound the subject parcel have been utilized to access the marine resources along this portion of the coast. Additionally, located near the edge of the Mālamalamaiki Gulch and the parcel's northern boundary is a modern rubbish pile, which appears to have been part of a small campsite.

Soils within the project area (Figure 14) are classified as Hilo hydrous silty clay loam on a 10-20 percent slope (Soil Survey Staff 2017). These strongly acidic soils dehydrate irreversibly into fine gravel size aggregates and have formed overlying basalt that originated from Mauna Kea Volcano 64,000 to 300,000 years ago (Figure 15) (Sherrod et al. 2007). These soils historically were used for the cultivation of sugarcane. The study area receives a mean annual rainfall of approximately 3,500 millimeters, with the majority of the rain occurring during the spring months, with the most typically occurring in March, and the least occurring in June (Giambelluca et al. 2013). The climate is generally cool, with a mean annual temperature ranging from 72 to 77 degrees Fahrenheit throughout the year.

Figure 5. Aerial of the project area.

Figure 6. Gated entryway into the project area adjacent to Māmalahoa Highway, view to the north.

Figure 7. Honomū Stream and Mālamalamaiki Gulch, view to the south.

Figure 8. Alexander Palm grove within the former route of the Hawai‘i Consolidated Railroad along the western edge of the parcel, view to the south.

Figure 9. Open grassy are in the central part of the project area surrounded by mixed vegetation, view to the southeast.

Figure 10. Mixed vegetation along the western edge of the project area, view to the northwest.

Figure 11. Coastal vegetation consisting of *hala*, ironwood, and *kī,* view to the northwest.

Figure 12. Aerial of the shoreline with ladder on the cliff face, view to the view to the west.

Figure 13. Wooden ladders located just outside of the project areas eastern boundary descending the coastal cliff to the rocky shoreline below.

Figure 14. Soils within the project area.

Figure 15. Geology within the project area.

2. BACKGROUND

As specified in the OEQC *Guidelines for Assessing Cultural Impacts* (1997:1), "…the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment." For this cultural impact assessment, the *ahupuaʻa* of Mālamalamaiki (inclusive of both Mālamalamaiki 1st and 2nd) is considered the study area, while the entirety of TMK: (3) 2-8-012:028 is referred to as the project area. To generate a set of expectations regarding the nature of cultural resources that might be encountered within the current project area and to establish a context within which to assess the significance of such resources, the background section begins with a general culture-historical context. This is followed by culture-historical background information concerning the history of Mālamalamaiki. A background of Hilo Palikū, the broader regional designation in which Mālamalamaiki is situated, also falls within the parameters of the OEQC guidelines and ensures that a broader set of cultural practices and histories are considered. Following this background section is a discussion of relevant prior archaeological studies that have been conducted in the vicinity of the project area.

RESEARCH METHODS

The culture-historical context and summary of previously conducted archaeological and cultural research presented below are based on research conducted by ASM Affiliates at various physical and digital repositories. Primary English language and Hawaiian language resources were found at various state agencies, including the State Historic Preservation Division, Hawaiʻi State Archives, the Department of Accounting and General Services Land Survey Division as well as the Edmund Olson Trust Archives in Pāpaʻikou, Hilo. Digital collections provided through the Office of Hawaiian Affairs Papakilo and Kīpuka databases, Waihona ʻĀina, the Ulukau Hawaiian Electronic Library Ulukau, the Hawaiʻi Genealogical Indexes, and Newspapers.com provide further historical context and information. Lastly, secondary resources stored at ASM Affiliates' Hilo office offer general information regarding the history of land use, politics, and culture change in Hawaiʻi, enhances the broad sampling of primary source materials that are cited throughout this cultural impact assessment.

CULTURE-HISTORICAL CONTEXT

The following subsections are intended to provide a general overview of Hawaiian origins, settlement, expansion, and describes some of the broad sociopolitical and cultural transformations that developed over time. The discussion continues with a summary of traditional ideologies associated with the land and the evolution of uniquely Hawaiian land stewardship practices. It is within this context that the history specific to the lands of Mālamalamaiki developed.

Generalized Model of Hawaiian Origins and Settlement

While the question of when Hawaiʻi was first settled by Polynesians remains contested, scholars working in the fields of archaeology, folklore, Hawaiian studies, and linguistics have offered several theories. With advances in palynology and radiocarbon dating techniques, Kirch (2011), Athens et al. (2014), and Wilmshurst et al. (2011) have argued that Polynesians arrived in the Hawaiian Islands sometime between A.D. 1000 and A.D. 1200. This initial migration on intricately crafted *waʻa kaulua* (double-hulled canoes) to Hawaiʻi from Kahiki, the ancestral homelands of Hawaiian deities and peoples from southern Pacific islands, occurred at least from initial settlement to the 13th century. According to Fornander (1969), Hawaiians brought from their homeland certain Polynesian customs and beliefs: the major gods Kāne, Kū, Lono, and Kanaloa (who have cognates in other Pacific cultures); the *kapu* system of political and religious governance; and the concepts of *puʻuhonua* (places of refuge), *ʻaumakua* (ancestral deity), and *mana* (divine power). Archaeologist Kenneth Emory who worked in the early to mid-20th century reported that the sources of early Hawaiian populations originated from the southern Marquesas Islands (Emory in Tatar 1982). However, Emory's theory is not universally accepted, as Hawaiian scholars in the past and present have argued for a pluralistic outlook on ancestral Hawaiian origins from Kahiki (Case 2015; Fornander 1916-1917; Kamakau 1866; Kikiloi 2010; Nakaa 1893; Poepoe 1906).

While stories of episodic migrations were widely published in the Hawaiian language by knowledgeable and skilled *kūʻauhau* (individuals trained in the discipline of remembering genealogies and associated ancestral stories), the cultural belief that living organisms were *hānau ʻia* (born) out of a time of eternal darkness (*pō*) and chaos (*kahuli*) were brought and adapted by ancestral Hawaiian populations to reflect their deep connection to their environment. As an example, the *Kumulipo*, Hawaiʻi's most famed *koʻihonua* (a cosmogonic genealogical chant), establishes a birth-rank genealogical order for all living beings (Beckwith 1951; Liliuokalani 1978). One such genealogical relationship that remains widely accepted in Hawaiʻi is the belief that *kalo* (taro) plants (in addition to all other plants, land animals,

and sea creatures), are elder siblings to humans (Beckwith 1951). This concept of hierarchical creation enforces the belief that all life forms are intimately connected, evidencing the cultural transformations that occurred in the islands through intensive interaction with their local environment to form a uniquely Hawaiian culture.

In Hawaiʻi's ancient past, inhabitants were primarily engaged in subsistence-level agriculture and fishing (Handy et al. 1991). Following the initial settlement period, communities clustered in the *koʻolau* (windward) shores of the Hawaiian Islands where fresh water was abundant. Sheltered bays allowed for nearshore fisheries (enriched by numerous estuaries) and deep-sea fisheries to be easily accessed (McEldowney 1979). Widespread environmental modification on land also occurred as early Hawaiian *kanaka mahiʻai* (farmers) developed new subsistence strategies, adapting their familiar patterns and traditional tools to work efficiently in their new home (Kirch 1985; Pogue 1978). Areas with the richest natural resources became heavily populated overtime, resulting in the population's expansion to the *kona* (leeward) side of the islands and to more remote areas (Cordy 2000).

As populations expanded, major socioeconomic changes occurred, such as the development of complex social stratification systems and intensive land modification. During this expansion period, additional migrations to Hawaiʻi occurred from the islands of Tahiti. Rosendahl (1972) proposed that settlement at this time was seasonally recurrent, in which coastal sites were occupied in the summer to exploit marine resources and upland agricultural sites were maintained during the winter months. An increasing reliance on agricultural products may have caused a shift in social networks as noted by Hommon (1976), who argued that kinship links between coastal settlements disintegrated as those links within the *mauka-makai* (upland-coastal) settlements expanded to accommodate the exchange of agricultural products for marine resources. This shift is believed to have resulted in the establishment of the *ahupuaʻa* system sometime during the 15th century (Kirch 1985). The implications of this model include a shift in residential patterns from seasonal, temporary habitation, to the permanent dispersed habitation of both coastal and upland areas.

Overview of Traditional Hawaiian Land Management Strategies

Adding to an already complex society was the development of traditional land stewardship systems, including the *ahupuaʻa.* The *ahupuaʻa* was the principal land division that functioned for both taxation purposes and furnished its residents with nearly all subsistence and household necessities. *Ahupuaʻa* are land divisions that typically include multiple ecozones from *ma uka* (upland mountainous regions) to *ma kai* (shore and near shore regions), assuring a diverse subsistence resource base (Hommon 1986). Although the *ahupuaʻa* land division typically incorporated all of the eco-zones, their size and shape varied greatly (Cannelora 1974). Noted Hawaiian historian and scholar Samuel Kamakau summarized the ecozones that could be found in a given *ahupuaʻa*:

> Here are some names for [the zones of] the mountains—the *mauna* or *kuahiwi*. A mountain is called a *kuahiwi*, but *mauna* is the overall term for the whole mountain, and there are many names applied to one, according to its delineations (*ʻano*). The part directly in back and in front of the summit proper is called the *kuamauna*, mountaintop; below the *kuamauna* is the *kuahea*, and makai of the *kuahea* is the *kuahiwi* proper. This is where small trees begin to grow; it is the *wao nahele*. Makai of this region the trees are tall, and this is the *wao lipo*. Makai of the *wao lipo* is the *wao ʻeiwa*, and makai of that the *wao maʻukele*. Makai of the *wao maʻukele* is the *wao akua*, and makai of there is the *wao kanaka*, the area that people cultivate. Makai of the *wao kanaka* is the *ʻamaʻu*, fern belt, and makai of the *ʻamaʻu* the *ʻapaʻa*, grasslands.
>
> A solitary group of trees is a *moku laʻau* (a "stand" of trees) or an *ulu laʻau*, grove. Thickets that extend to the *kuahiwi* are *ulunahele*, wild growth. An area where *koa* trees suitable for canoes (*koa waʻa*) grow is a *wao koa* and mauka of there is a *wao laʻau*, timber land. These are dry forest growths from the *ʻapaʻa* up to the *kuahiwi*. The places that are "spongy" (*naele*) are found in the *wao maʻukele*, the wet forest.
>
> Makai of the *ʻapaʻa* are the *paheʻe* [*pili* grass] and *ʻilima* growths and makai of them the *kula*, open country, and the *ʻapoho* hollows near to the habitations of men. Then comes the *kahakai*, coast, the *kahaone*, sandy beach, and the *kalawa*, the curve of the seashore—right down to the *ʻae kai*, the water's edge.
>
> That is the way *ka poʻe kahiko* [the ancient people] named the land from mountain peak to sea. (Kamakau 1976:8-9)

The *makaʻāinana* (commoners, literally the "people that attend the land") who lived on the land had rights to gather resources for subsistence and tribute within their *ahupuaʻa* (Jokiel et al. 2011). As part of these rights, residents were required to supply resources and labor to *aliʻi* (chiefs) of local, regional, and island chiefdoms. The *ahupuaʻa* became the equivalent of a local community with its own social, economic, and political significance and served as

the taxable land division during the annual *Makahiki* procession (Kelly 1956). During the time of *Makahiki*, the paramount *ali'i* sent select members of his/her retinue to collect *ho'okupu* (tribute and offerings) in the form of goods from each *ahupua'a*. The *maka'āinana* brought their share of *ho'okupu* to an *ahu* (altar) that was marked with the image of a *pua'a* (pig), serving as a physical visual marker of *ahupua'a* boundaries. In most instances, these boundaries followed mountain ridges, hill, rivers, or ravines (Alexander 1890). However, Chinen (1958:1) reports that "oftentimes only a line of growth of a certain type of tree or grass marked a boundary; and sometimes only a stone determined the corner of a division." These ephemeral markers, as well as their more permanent counterparts, were oftentimes named as evidenced in the thousands of boundary markers names that are listed in Soehren (2005).

Ahupua'a were ruled by *ali'i 'ai ahupua'a* or chiefs who controlled the *ahupua'a* resources. Generally speaking, *ali'i 'ai ahupua'a* had complete autonomy over the *ahupua'a* they oversaw (Malo 1951). *Ahupua'a* residents were not bound to the land nor were they considered property of the *ali'i*. If the living conditions under a particular *ahupua'a* chief were deemed unsuitable, the residents could move freely in pursuit of more favorable conditions (Lam 1985). This structure safeguarded the well-being of the people and the overall productivity of the land, lest the chief loses the principal support and loyalty of his or her supporters. In turn, *ahupua'a* lands were managed by an appointed *konohiki*, oftentimes a chief of lower rank, who oversaw and coordinated stewardship of an area's natural resources (Lam 1985). In some places, the *po'o lawai'a* (head fisherman) held the same responsibilities as the *konohiki* (Jokiel et al. 2011). When necessary, the *konohiki* took the liberty of implementing *kapu* (restrictions and prohibitions) to protect the *mana* of an area's resources from environmental and spiritual depletion.

Many *ahupua'a* were divided into smaller land units termed *'ili* and *'ili kūpono* (often shortened to *'ili kū*). *'Ili* were created for the convenience of the *ahupua'a* chief and served as the basic land unit which *hoa'āina* (caretakers of particular lands) often retained for multiple generations (Jokiel et al. 2011; MacKenzie 2015). As *'ili* were typically passed down in families, so too were the *kuleana* (responsibilities, privileges) that were associated with it. The right to use and cultivate *'ili* was maintained within the *'ohana*, regardless of the succession of *ali'i 'ai ahupua'a* (Handy et al. 1991). Malo (1951) recorded several types of *'ili*, including the *'ili pa'a* (a single intact parcel) and *'ili lele* (a discontinuous parcel dispersed across an area). Whether dispersed or wholly intact, *'ili* required a cross-section of available resources, and for the *hoa'āina*, this generally included access to agriculturally fertile lands and coastal fisheries. *'Ili kūpono* differed from other *'ili* lands because they did not fall under the jurisdiction of the *ahupua'a* chief. Rather, they were specific areas containing resources that were highly valued by the ruling paramount chiefs, such as fishponds (Handy et al. 1991).

Ali'i 'ai ahupua'a, in turn, answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire *moku or* district) (Malo 1951). Hawai'i Island is comprised of six *moku* (districts) that include Kona, Ka'ū, Puna, Hilo, Hāmākua, and Kohala. Although a *moku* comprises multiple *ahupua'a*, *moku* were considered geographical subdivisions with no explicit reference to rights in the land (Cannelora 1974). While the *ahupua'a* was the most common and fundamental land division unit within the traditional Hawaiian land management structure, variances occurred, such as the existence of the *kalana*. By definition, a *kalana* is a division of land that is smaller than a *moku. Kalana* was sometimes used interchangeably with the term *'okana* (Lucas 1995; Pukui and Elbert 1986), but Kamakau (Kamakau 1976) equates a *kalana* to a *moku* and states that *'okana* is merely a subdistrict. Despite these contending and sometimes conflicting definitions, what is clear is that *kalana* consisted of several *ahupua'a* and *'ili 'āina*.

This form of district subdividing was integral to Hawaiian life and the product of advanced natural resource management systems. As populations resided in an area over centuries, direct-teaching and extensive observations of an area's natural cycles and resources were retained, well-understood, and passed down orally over the generations. This knowledge informed management decisions that aimed to sustainably adapt subsistence practices to meet the needs of growing populations. The *ahupua'a* system and the highly complex land management system that developed in the islands are but one example of the unique Hawaiian culture that developed in these islands.

Intensification and Development of Hawaiian Land Stewardship Practices

Hawaiian philosophies of life in relation to the environment helped to maintain both natural, spiritual, and social order. In describing the intimate relationship that exists between Hawaiians and *'āina* (land), Kepā Maly writes:

> In the Hawaiian context, these values—the "sense of place"—have developed over hundreds of generations of evolving "cultural attachment" to the natural, physical, and spiritual environments. In any culturally sensitive discussion on land use in Hawai'i, one must understand that Hawaiian culture evolved in close partnership with its' natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture and and nature begins.

> In a traditional Hawaiian context, nature and culture are one in the same, there is no division between the two. The wealth and limitations of the land and ocean resources gave birth to, and shaped the Hawaiian world view. The *ʻāina* (land), *wai* (water), *kai* (ocean), and *lewa* (sky) were the foundation of life and the source of the spiritual relationship between people and their environs. (Maly 2001)

The *ʻōlelo noʻeau* (proverbial saying) "*hānau ka ʻāina, hānau ke aliʻi, hānau ke kanaka*" (born was the land, born were the chiefs, born were the commoners), conveys the belief that all things of the land, including *kanaka* (humans), are connected through kinship links that extend beyond the immediate family (Pukui 1983:57). *ʻĀina* or land, was perhaps most revered, as noted in the *ʻōlelo noʻeau* "*he aliʻi ka ʻāina; he kauwā ke kanaka,*" which Pukui (Pukui 1983:62) translated as "[t]he land is a chief; man is its servant." The lifeways of early Hawaiians, which were dependent entirely from the finite natural resources of these islands, necessitated the development of sustainable resource management practices. Over time, what developed was an ecologically responsive management system that integrated the care of watersheds, natural freshwater systems, and nearshore fisheries (Jokiel et al. 2011).

Disciplined and astute observation of the natural world became one of the most fundamental stewardship tools used by Hawaiians of the ancient past. The vast knowledge acquired through direct observation enabled them to detect and record the subtlest of changes, distinctions, and correlations in the natural world. Examples of their keen observations are evident in the development of Hawaiian nomenclature to describe various rains, clouds, winds, stones, environments, flora, and fauna. Many of these names are geographically unique or island-specific, and have been recorded in *oli* (chants), *mele* (songs), *pule* (prayers), *inoa ʻāina* (place names), and *ʻōlelo noʻeau* (proverbial sayings). Other Hawaiian arts and practices such as *hula* (traditional dance), *lapaʻau* (traditional healing), *lawaiʻa* (fishing), *mahiʻai* (farming) further aided in the practice of knowing the rhythms and cycles of the natural world.

Comprehensive systems of observing and stewarding the land were coupled by the strict adherence to practices that maintained and enhanced the *kapu* and *mana* of all things in the Hawaiian world. In Hawaiian belief, all things natural, places, and even people, especially those of high rank, possessed *mana* or "divine power" (Pukui and Elbert 1986:235; Pukui et al. 1972). *Mana* was believed to be derived from the plethora of Hawaiian gods (*kini akua*) who were embodied in elemental forces, land, natural resources, and certain material objects and persons (Crabbe et al. 2017). Buck (1993) expanded on this concept noting that *mana* was associated with "the well-being of a community, in human knowledge and skills (canoe building, harvesting) and in nature (crop fertility, weather etc.)" (c.f. Else 2004:244).

To ensure the *mana* of certain resources, places, and people, *kapu* of various kinds were implemented and strictly enforced to limit over-exploitation and defilement. Elbert and Pukui (1986:132) defined *kapu* as "taboo, prohibitions; special privilege or exemption." Kepelino noted that *kapu* associated with *akua* (deities) applied to all social classes, while *kapu* associated with *aliʻi* were applied to the people (in Beckwith 1932). As *kapu* dictated social relationships, they also provided "environmental rules and controls that were essential for a subsistence economy" (Else 2004:246). The companion to *kapu* was *noa*, translated as "freed of taboo, released from restrictions, profane, freedom" (Pukui and Elbert 1986:268). Some *kapu*, particularly those associated with maintaining social hierarchy and gender differentiation were unremitting, while those *kapu* placed on natural resources were applied and enforced according to seasonal changes. The application of *kapu* to natural resources ensured that such resources remained available for future use. When the *aliʻi* or the lesser chiefs (including *konohiki* and *poʻo lawaiʻa*) determined that a particular resource was to be made available to the people, a decree was proclaimed indicating that *kapu* had been lifted, thereby making it *noa*. Although transitioning a resource from a state of *kapu* to *noa* allowed for its use, people were expected to practice sustainable harvesting methods and pay tribute to the paramount chief and the *akua* associated with that resource. *Kapu* were strictly enforced and violators faced serious consequences including death (Jokiel et al. 2011). Violators who escaped execution sought refuge at a *puʻuhonua*, a designated place of refuge or an individual who could pardon the accused (Kamakau 1992). After completing the proper rituals, the violator was absolved of his or her crime and allowed to reintegrate back into society.

In summary, the layering and interweaving of beliefs, land stewardship practices, and the socio-political system forms the basis of the relationship shared between the Hawaiian people and the land. It is through the analysis of these dynamic elements that we develop an understanding of the complexity of place.

MĀLAMALAMAIKI AHUPUAʻA AND THE GREATER SOUTH HILO DISTRICT

The current project area is in the *ahupuaʻa* of Mālamalamaiki. "Mālamalamaiki" is translated in Pukui et al. (1974:143) as "little light." Mālamalamaiki is located in the traditional *moku* (district) of Hilo, which is one of six *moku* on Hawaiʻi Island. The Hawaiian proverb "*Hilo, mai Māwae a ka pali o Maulua*" (Pukui 1983:108) details the extent of the district spanning from Māwae, a fissure separating Hilo from the Puna District to Maulua, a land area

which serves as a boundary marker between Hilo and the Hāmākua District. Handy and Handy provides a general description of the district:

> Hilo as a major division of Hawai‘i included the southeastern part of the windward coast most of which was in Hamakua, to the north of Hilo Bay. This, the northern portion, had many scattered settlements above streams running between high, forested kula lands, now planted with sugar cane. From Hilo Bay southeastward to Puna the shore and inland are rather barren and there were few settlements. The population of Hilo was anciently as now concentrated mostly around and out from Hilo Bay, which is still the island’s principal port. The Hilo Bay region is one of lush tropical verdure and beauty, owing to the prevalence of nightly showers and moist warmth which prevail under the northeasterly trade winds into which it faces. Owing to the latter it is also subject to violent oceanic storms and has many times in its history suffered semidevastation from tidal waves unleashed by earthquake action in the Aleutian area of the Pacific. (Handy et al. 1991:538)

The low-lying coastal areas of South Hilo thrived with traditional Hawaiian habitation and cultivation. Within the larger gulches and *kula* (broad plateaus) regions, were lush, fertile lands well suited for agriculture. The staple traditional crop, *kalo* (taro), was cultivated in irrigated terraces along the stream edges while *‘uala* (sweet potato), *mai‘a* (banana) and *kō* (sugarcane) were grown in the wet *kula* lands of the lower forest zone (Handy et al. 1991). The region had an abundance of *kukui* (candlenut), *‘ulu* (breadfruit), and *niu* (coconut) groves and was also rich in marine resources. Although settlements were prominent in these areas with the increase of population and agricultural production settlements spread into the upland *kula* regions. Handy and Handy (1972), in drawing from a description given by early missionary William Ellis, provide yet another description of the fertile landscapes of South Hilo:

> The light and fertile soil is formed by decomposing lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes and melons, come to the greatest perfection. Groves of cocoa-nut and bread-fruit trees are seen in every direction, loaded with fruit, or clothed with luxuriant foliage. (Ellis in Handy and Handy 1972:539)

Traditionally, the *moku* of Hilo was divided into three *‘okana* (sub-districts). Beginning in the north is Hilo Palikū, an area that extends north of the Wailuku River to Ka‘ula Gulch, oftentimes characterized by its upright and densely vegetated cliffs and broad *kula* (plains) lands (Figure 16). The second *‘okana* is Hilo One, or “sandy Hilo,” famed for its black sand beach that extends along Hilo Bay between the Wailoa and Wailuku Rivers. The final *‘okana* is Hilo Hanakahi, which extends south of Wailoa River to include Keaukaha (Edith Kanaka‘ole Foundation 2012).

Figure 16. Aerial showing the landscape of Hilo Palikū with upright cliffs and expansive *kula* lands, view to the southeast.

Mālamalamaiki is located in the *ʻokana* of Hilo Palikū. The abundance of streams, valleys, and gulches in this region made for a difficult and treacherous pass. In "Ka Huakaihele ike i na Makaainana o Hilo" (A Sightseeing Tour to Visit the Common Folk of Hilo), an account by G.K. Mahoe (1876) of his travels throughout Hilo that was serialized in the Hawaiian language newspaper *Ka Lahui Hawaii*, he describes Hilo Palikū as such:

> *...ua pale ae au i ka loa o ke alahele, ua manao ole ae hoi i na pali hauliuli o Hilo paliku, na piina, na ihona, na alu, na kahawai, na kualono, a me na pupu, ua hele hookahi ia no e a'u, me ka manao ole i ka luhi a me ka inea o ka hele ana, oiai, ma ka hoomaopopo ana i ka loa mai Hilo one a hiki i Laupahoehoe, me he mea la, ua aneane no i ke kanakolu mile. A mai kuhihewa hoi ka poe heluhelu, he papu a he laumania hoi ke ano o ka waiho ana o ka aina, aole, aka, he puu kinikini, he alu, he kapekepeke ke alanui.*
>
> ...I am protected from the long path ahead, I did not think twice of the dark cliffs of Hilo Palikū, the inclines, the descents, the ravines, the streams, the mountaintops, and the cleared fields, I moved alone, without thinking much of the strain and discomfort of traveling, although, when I recalled the length between Hilo One and Laupāhoehoe, those thirty miles came and went. The reader should not be mistaken, the lands that are passed along the way are not clear and smooth, rather, there are many hills, gulches, and twisting roads. (Mahoe 1876:1)

King David Kalākaua also provided a concise description of this region's rough geography, but also includes a description regarding the density of the population there in his book *The Legends and Myths of Hawaii* (Kalākaua 1888):

> The northeastern coast of the island of Hawaii presents an almost continuous succession of valleys, with intervening uplands rising gently for a few miles, and then more abruptly toward the snows of Mauna Kea and the clouds. The rains are abundant on that side of the island, and the fertile plateau, boldly fronting the sea with a line of cliffs from fifty to a hundred feet in height, is scored at intervals of one or two miles with deep almost impassable gulches, whose waters reach the ocean either through rocky channels worn to the level of the waves, or in cascades leaping from the cliffs and streaking the coast from Hilo to Waipio with lines that seem to be molten silver from the great crucible of Kilauea.
>
> In the time of Liloa, and later, this plateau was thickly populated, and requiring no irrigation, was cultivated from the sea upward to the line of frost. A few kalo patches are still seen, and bananas grow, as of old, in secluded spots and along the banks of the ravines; but the broad acres are green with cane, and the whistle of the sugar-mill is heard above the roar of the surf that beats against the rock-bound front of Hamakua. (Kalākaua 1888:284)

Rain, Wind, and Place Names for Mālamalamaiki and the Greater Hilo Palikū

The *inoa* (names) of *wahi* (places), *ua* (rains), and *makani* (winds) within a particular *ahupuaʻa* or broader region evidences the long-term relationship of various communities to their immediate environment. Geographer Katrina-Ann R. Kapāʻanaokalāokeola Nākoa Oliveira offers a concise description regarding the natural environment as it was understood by Native Hawaiians of the past:

> Ancestral Kānaka recognized the connection between the heavens, lands, and oceans and how all three were interconnected and interdependent upon one another. In spite of the interwoven nature of the sky, land, and sea, however, Kānaka of ancestral times did not have a term that directly translates to what we have come to know today as "environment." Rather, the *Hawaiian Dictionary* offers two phrases that approximate the notion of environment: (1) "ʻano o ka nohona" and (2) "nā mea e hoʻopuni ana." ʻAno o ka nohona refers to the nature of one's relationship to one's surroundings or places. Nā mea e hoʻopuni ana relates to everything that surrounds or encircles a person. (Oliveira 2014:64)

Reacquainting ourselves with these *inoa ʻāina* (place names)*, inoa ua* (rain names)*, and inoa makani* (wind names) allow us to appreciate the environment as it was once observed by ancestral Hawaiian populations. In Mālamalamaiki and Lāʻimi, a few *inoa ʻāina* are listed by Soehren (2005) as markers for the boundaries of these *ahupuaʻa*. The *inoa ʻāina* for Mālamalamaiki are listed in Table 1 below:

Table 1. *Inoa ʻĀina* in Mālamalamaiki

Inoa ʻĀina	*Notes*
Kaloaʻawapuhi	Translated as "the many wild gingers." A place that served as a boundary marker between Mālamalamaiki and Lāʻimi in the upper regions of the *ahupuaʻa*.
Kapoʻalua	Translated as "the second night." A marshy are good for growing taro that was located at the boundary of Honomū, Lāʻimi, and Mālamalamaiki.
Manaʻonui	Translated as "important matter." A rock that marked the boundary between Mālamalamaiki and Honomū located on the northern bank of Honomū stream.
Moʻomoʻohualoa	Translated as "long-haired moʻo." A stream marking the boundary of Mālamalamaiki and Honomū.
Waihaka	Translated as "watery perch." A stream that served as a boundary marker between Honomū and Mālamalamaiki.

In terms of *inoa ua*, Hilo Palikū and the larger *moku* of Hilo is renowned in oral expressions such as *mele* (song), *oli* (chants), and *ʻōlelo noʻeau* (proverbs and poetical expressions) for its abundance of rain and fresh water. Numerous *ʻōlelo noʻeau* found in Pukui (1983) describe the characteristics of Hilo's many rains (Table 2).

Table 2. *ʻŌlelo Noʻeau* associated with the famed rains of Hilo

ʻŌlelo Noʻeau	*Literal/Figurative Translation*
ʻEleʻele Hilo, panopano i ka ua.	Dark is Hilo, clouded with the rain (Pukui 1983:40)
Halulu me he kapuaʻi kanaka la ka ua o Hilo.	The rain of Hilo makes a rumbling sound like the treading of feet. (ibid.:53)
Hana Hilo i ka poʻi a ka ua.	Hilo works on the lid of the rain. Refers to the constant showers typical of Hilo district on Hawaiʻi. (ibid.:54)
Hilo ʻāina ua lokuloku.	Hilo of the pouring rain. (ibid.:107)
Hilo i ka ua kinakinai, ka ua mao ʻole.	Hilo of the constant rain, where it never clears up. (ibid.)
ʻAu umauma o Hilo i ka wai.	Hilo has breasted the water. To weather the storm. The district of Hilo had many gulches and streams and was difficult to cross. (ibid. 28)
Pau ke aho i ke kahawai lau o Hilo.	One's strength is exhausted in crossing the many streams of Hilo. Said of or by one who is weary with effort. First uttered by Hiʻiaka in a chant when she found herself weary after a battle with the lizard god Panaʻewa. (ibid.:287)

Akana and Gonzalez (2015) in *Hānau Ka Ua*, a collection of Hawaiian rain names, describe the cultural significance of rain:

> Our kūpuna [ancestors] had an intimate relationship with the elements. They were keen observers of their environment, with all of its life-giving and life-taking forces. They had a nuanced understanding of the rains of their home. They knew that one place could have several different rains, and that each rain was distinguishable from another. They knew when a particular rain would fall, its color, duration, intensity, the path it would take, the sound it made on the trees, the scent it carried, and the effect it had on people. (Akana and Gonzalez 2015:xv)

Listed in Table 3 are a few of the rain names associated with Hilo Palikū and the northern portion of Hilo that can be found in Akana and Gonzalez (2015):

Table 3. Rain Names Associated with Hilo Palikū

Rain Name	*Literal/Figurative Translation*
ʻAwaʻawa	Translates as "bitter." Refers to a cold and dark rain or mist.
Heʻenehu	Translates as "sliding anchovy." Refers to a misty rain in the early morning off the coastline at a time when nehu fish are in abundance.
Hoʻolua	Translates as "to do twice." Refers to heavy rains that fall during strong northerly winds (which are also known as hoʻolua).
Kinai	Translates as "to quench or extinguish." Refers to a constant rain that continues for long hours.
Kualua	Translates as "repeating twice." Refers to rain over the sea that is accompanied by wind.
Lanipili	Translates as "clinging sky." Refers to cloudbursts or heavy rain that lasts for days.
Lanipōlua	Translates as "very dark sky." Refers to misty rain that falls when forests are obscured by low-lying clouds.
Lauhīnano	Translates as "bracts of the hīnano flower." Refers to a rain associated with the area of Honomū.
Lokuloku	Translates as "pouring rain." A generic term referring to heavy showers accompanied by wind. (Lila 1872:3)
Nāulu	Translated as "vexed." Refers to sudden heavy showers.
Ulumano	Translated as "growing exponentially." A rain that travels inland from the sea that is an indicator of the abundance of ʻōhua (juvenile fish).

Of the rains that are listed, the Nāulu is explicitly associated with Hilo Palikū, as expressed in a *mele kūʻauhau,* or genealogical chant, written for Queen Emma Kaleleonālani:

Hāneʻe mai Liloa me he Uluaunui lā	Liloa sags like an Uluaunui lā
Me he kuāua Nāulu nui i pano Hilo Pali Kū	Like a heavy Nāulu shower that obscured Hilo Pali Kū.
	(Nogelmeier in Akana and Gonzalez 2015:187)

Whereas *Hānau Ka Ua* provides us with a comprehensive listing of *inoa ua* across the Hawaiian Islands, there is no comparable publication for *inoa makani* to date. Listed in Table 4 are wind names that can be found in an array of Hawaiian and English language primary sources:

Table 4. Wind Names Associated with Hilo Palikū

Wind Name	*Notes*
ʻAʻalahonua	Translates as "fragrant earth." A wind that carries the fragrance of soil and foliage after the rain. (Alvarado 2005)
Kēpia	Translates as "dandruff." A wind associated with Hilo Palikū. (Nawaa 1904)
Kolonahe	Translates as "crawling slowly." A generic term for a gentle breeze (Lila 1872).
Uluaunui	Translates as "to grow increasingly." a strong northerly wind that makes landing by boat difficult.
Uluau	Translates as "to grow increasingly." Associated with Hilo Palikū in the *moʻolelo* of Kuapakaʻa. (Kuapuu 1861:24)
Hoʻolua	Translates as "to do twice." Refers to strong northerly winds that may include rain. (Malo 1903:35)
Hau	Translates as "ice." A wind that blows downward from the mountains (Malo 1903:35)
Māluakiʻiwai	"Translate as "water-collecting seabreeze." A sea breeze accompanied by showers. (Alvarado 2005:5).

Mele (songs) are valuable sources of information for the *inoa ʻāina, inoa ua,* and *inoa makani* of particular areas that were published frequently in Hawaiian language newspapers and in other primary sources. A *mele inoa* (honorific song in honor of a person) was published in the Oʻahu-based Hawaiian language newspaper *Ka Nupepa Kuokoa* on February 17, 1872. The *mele inoa* was penned on February 5 and was written for a woman named Kaiewe, the eldest child of B. Kuhea, by multiple relatives and family friends living in Kuhua (the *ahupuaʻa* immediately north of Honomū). A verse written by a woman named Lila honors Kaiewe and lists adjacent *ahupuaʻa* such as Laʻimi and Kaʻakepa in the *mele inoa.* Although the original text does not include diacritics, *kahakō* (macrons to elongate vowels) and *ʻokina* (glottal stops) are included to conform to modern Hawaiian orthography and to aid in translating the text. Wind, rain, and place names are bolded for emphasis*:*

A uka au o ***ʻAkaka***	I am in the uplands of **ʻAkaka**
Haʻa na ka lehua i ka wai	The lehua blossoms droop from the abundance of water
ʻO ka neʻe a ka ua ***lokuloku***	The **lokuloku** rains inch along
Walaʻau i ka lau lāʻau	There is chattering in the forest
Hone ana ka leo o ka manu	The sweet sound of birds
Kaʻiʻi ʻana i ka nāhele	Shrilling in the forest
ʻO ka hele ala ka maʻeu	Traveling afar are these sounds
Kaʻulua ʻole iho ka manaʻo	My thoughts are not remiss
Pilipili ʻāina ʻole mai	They do not come near the land
Iluna au o Hale Rose	I am above Hale Rose
Hoʻolohe i ke kani o ka pio	Listening to the sound of chirps
Akahi no a olu pono mai	Never before have I been pleasantly comforted
Ka manao lauili i ka hoa	By these circuitous thoughts of a companion
Me oe ke aloha pau ole	With you is my endless love
O Kaiewe no he inoa	Indeed, Kaiewe is your name
A luna au o ***Lāʻimi***	I am in the uplands of **Lāʻimi**
ʻO ka waiho aʻe a ***Kaʻakepa***	Left in **Kaʻakepa**
ʻIke i ka lau o ke kō	I see the leaves of the sugarcane
ʻO ka welo a ka Hae Hawaiʻi	The waving fluttering of the Hawaiian flag
Ua pulu i ka ua liilii	Moistened by scattered showers
Ia hona i ka ***mālualua***	Fortunate to feel the **mālualua** wind
I ka pā kolonahe ma kai	Gently blowing by the ocean
A kai au o ke ***Awaiki***	I head seaward to **Awaiki**
Hāliu au nānā iā uka	I turn my attentions towards the uplands
ʻO ka holu a ka lau ʻĪnia,	The Pride-of-India (Chinaberry) leaves sway
ʻIʻini aku ana ka manaʻo	My thoughts desire
E ʻike i ka hoa i ka ʻili	To see my close friend
Me ʻoe ke aloha pau ʻole	With you is my endless love
ʻO Kaiewe no he inoa	Indeed, Kaiewe is your name (Lila 1872:3)

Traditional Accounts of Mālamalamaiki Ahupuaʻa and the Greater Hilo Palikū

Moʻolelo (accounts) and *mele* (songs) offer rich resources for understanding the cultural landscape, land use, and practices of an area. In addition to *inoa ʻāina* (place names), *inoa ua* (rain names), and *inoa makani* (wind names), they are another source of history that informs our understanding of how peoples of the past expressed their relationships to their lands and environment. An exhaustive search through published resources and historical Hawaiian language newspapers resulted in no *moʻolelo* or *mele* that directly named the *ahupuaʻa* of Mālamalamaiki. However, there is an array of *moʻolelo* that speak of events that take place in the *ʻokana* of Hilo Palikū and in the general Honomū area.

The Story of Kuahailo and Hinaaukekele

He Moolelo Kaao no Kuahailo a me Hinaaukekele, Kana Kaikamahine Hanauna (An account for Kuahailo and Hiaaukekele, his female relative) is a story that recounts the establishment of the highest-ranking genealogical lines of Hawaiʻi. Published as a weekly serial in the Hilo-based Hawaiian language newspaper *Ka Hoku o Hawaiʻi* from July 18, 1918, to March 13, 1919, the *moʻolelo* follows Kuahailo and Hinaaukekele along their journey from their ancestral home of Kuaihelani to the various islands of Hawaiʻi.

The segment of the *moʻolelo* in Hilo Palikū takes place midway through the narrative and were published in installments between January 30, 1919, and February 27, 1919. At this point in the *moʻolelo,* Hinaaukekele and her husband, Kahikikuaokalani, resided in the valley of Waipiʻo. Their journey to Hilo Palikū began with a dialogue between Hinaaukekele and Kahikikuaokalani, where she expressed her desire to visit her grandmother, Hailikulamanu, and other relatives who lived in the *ʻokana* of Hilo Hanakahi. Kahikikuaokalani agreed with Hinaaukekele to visit their relatives. They made their way to Hilo Hanakahi atop a traveling *ʻōhiʻa* tree filled with *lehua* blossoms. According to the *moʻolelo,* the tree grew out of Hinaaukekele's *ʻiewe* (placenta, afterbirth) that her mother, Hinauluohia, planted near their home in Paliuli.

As the couple traveled to Hilo Hanakahi, Kahikikuaokalani heard the yelling and cheering of many people coming from the valley of Laupāhoehoe. He asked Hinaaukekele to instruct her traveling *ʻōhiʻa* tree to stop where all the commotion was coming from. In his curiosity, Kahikikuaokalani searched out the source of the cheering. He discovered that the noise was of bystanders who were cheering on two exceptionally skilled surfers, one from Hilo One and one from Hilo Palikū, who were competing against each other. The waves at Laupāhoehoe were well known across Hawaiʻi Island and were the same waves that were favored by the famed *aliʻi,* ʻUmi, generations later.

When Hinaaukekele and Kahikikuaokalani arrived, the people of Laupāhoehoe shifted their attention away from the surfers and rushed towards the beautiful travelers atop the moving *ʻōhiʻa* tree. What made these travelers even more extraordinary was the fact that they were accompanied by numerous forest-dwelling birds and four low-lying rainbows. When Hinaaukekele inquired about the commotion, some spectators responded that they were celebrating the fact that their surfer, a Hilo Palikū man by the name of Kekuaiwa, beat Kenao, the surfer from Hilo One, and won forty *kapa* cloths and a long canoe in the process. When Hinaaukekele asked how Kekuaiwa won, the people responded that it was because he was more skilled at surfing in the rough waters of Laupāhoehoe as opposed to the calmer waters of Hilo One. Furthermore, Hinaaukekele inquired about the ruling chief of the area, in which the people of Laupāhoehoe responded that there was no ruling chief who lived in the valley but that they were subjects of Kanakea, a chiefess who resided in Hilo. Kanakea knew of Hinaaukekele, as she was the one who was sent to retrieve Kahikikuaokalani from Oʻahu.

Hinaaukekele then proceeded to tell the people of Laupāhoehoe to have the two surfers compete once more. The spectators enthusiastically followed these instructions and told the local *konohiki* (head man of an *ahupuaʻa*) what they heard from these distinguished travelers. In turn, the *konohiki* told the surfers to take to the waves again, and the surfers agreed without complaint.

When Kekuaiwa and Kenao reached the wave break, both were intent on outdoing their competitor to become the champion of the waves. Kekuaiwa did not think twice about Kenao, for he surfed in the waters of Laupāhoehoe since he was a child. As a wave neared, Kenao paddled to a spot where the waves were easier to ride. Kekuaiwa knew what Kenao was doing and prepared himself for the competition ahead. Onshore, the majority of spectators believed that Kekuaiwa would win once more since he won the first time.

Enthused by the energy of the crowd and surfers, Kahikikuaokalani proposed to Hinaaukekele that they pick who they believed would win the surf competition. When Kahikikuaokalani told Hinaaukekele that she could pick first, she laughed, teasing him by saying that he only wanted her to choose Kekuaiwa, the obvious choice since he won the first competition, because he could rebuke her for choosing the former winner. Kahikikuaokalani laughed at Hinaaukekele's remarks and told his beloved that he was letting her choose first as a gesture of honor and respect and that either of the surfers could win.

When the couple looked down at the surfers who were poised to catch the next wave, Hinaaukele used her thoughts to secretly call her magical grandmother to let the surfer from Hilo One win the competition. When an excellent surfing wave neared, the two surfers caught it. They both rode splendidly. As they neared the shore, it was clear that the surfer from Hilo Palikū, Kekuaiwa, would win the competition. But as they neared the shore, Kekuaiwa saw a human hand emerge from the sea and snatched his board down into the depths. Kenao was thus the winner of the second round.

The spectators ashore were shocked to the point of speechlessness due to the outcome of the surfing competition. They could not explain how Kekuaiwa lost to Kenao. So too was Kahikikuaokalani puzzled by this turn of events, as he had no way of knowing that it was Hailikulamanu, Hinaaukekele's grandmother, who intervened. When the surfers came back to land, Hinaaukekele instructed someone to tell the surfers to come to her and Kahikikuaokalani. Kenao happily obliged to this request, but Kekuaiwa was furious about his loss and did not want to see these visitors out of embarrassment.

Kahikikuaokalani was still pondering the outcome of the competition. He realized in time that Hinaaukekele must have had something to do with Kenao's win, so he asked Hinaaukekele if he could leave and find Kekuaiwa, which

she allowed him to do so. When he found Kekuaiwa, Kahikikuaokalani explained that it was because of Hinaaukekele's magical abilities that resulted in his loss during the surfing competition. Kekuaiwa then described how a human hand grabbed his board and pulled him down. In response, Kahikikuaokalani explained to Kekuaiwa that he had nothing to be ashamed of because it was his decision to bet against Hinaaukekele that resulted in his (Kekuaiwa's) loss. Kahikikuaokalani continued by describing how Hinaaukekele used her thoughts to call out to her grandmother to assist Kenao in winning the competition.

When Kahikikuaokalani returned to Hinaaukekele, she laughed because she knew that her secret was exposed. She turned to Kenao and asked him if he wanted to accompany them to Hilo One, in which he humbly declined due to their superior rank. From there Hinaaukekele and Kahikikuaokalani continued on their journey through Hilo Palikū until they reached Hilo One.

Ke Kaʻao Hoʻoniua Puʻuwai no Ka-miki- The Heart Stirring Story of Ka-Miki

Although no *moʻolelo* were found that explicitly name Mālamalaiki or Lāʻimi, the adjacent *ahupuaʻa* of Kuhua and Honomū are named frequently. One such account of these lands concerns an *ʻōlohe* (skilled fighter/competitor) named Kuhua-i-Hālala in *Ke Kaʻao Hoʻoniua Puʻuwai no Ka-miki* (The Heart Stirring Story of Ka-Miki), another serialized *moʻolelo* published in *Ka Hoku o Hawaii* between 1914 and 1917. *Ka-Miki* was likely authored during the late 1800s through the early 1900s by noted Hawaiian scholars John Wise and J.W.H.I. Kihe. Although the account is not one that is considered to be from time immemorial, Maly (1997), who translated the *moʻolelo* from Hawaiian into English, states that following regarding the value of the information contained therein:

> ...the authors used a mixture of local legends, tales, and family traditions in association with place names to tie together fragments of site specific stories that had been handed down over the generations. Thus, while in many cases, the personification of individuals and their associated place names may not be "ancient," the site documentation within the "story of Ka-miki" is of both cultural and historical value. (Maly 1997:5)

The *moʻolelo* of Ka-Miki tells of two supernatural brothers, Ka-Miki and Maka-ʻiole, who were skilled *ʻōlohe.* They traveled around Hawaiʻi Island by way of the ancient trails and paths (*ala loa* and *ala hele*) and sought to compete with other *ʻōlohe.* Ka-Miki and Maka-ʻiole were born to Pōhaku-o-Kāne (male) and Kapaʻihilani (female), who were the *aliʻi* of the lands of Kohana-iki and Kaloko in North Kona. Upon the mysterious and premature birth of Ka-miki, he was placed in the cave of Pōnahanaha and given up for dead. He was eventually saved and raised by his ancestress, Ka-uluhe-nui-hihi-kolo-i-uka, a manifestation of the goddess Haumea, at Kalamaʻula, an area located on Hualālai. Ka-miki was later joined by his elder brother Makaʻiole where their ancestress Ka-uluhe-nui trained her grandsons into *ʻōlohe*, or experts skilled in fighting, wrestling, debating, riddle solving, and running, and how to use their supernatural power.

The portion of the *moʻolelo* set in the Kuhua-Kolekole area was published in *Ka Hoku o Hawaii* between May 24, 1916, to July 27, 1916. Through this account, we learn that Kuhua was so named in honor of an *ʻōlohe* chiefess, Kuhua-i-Hālala, daughter of Honomū and sister of ʻŌpeʻa-i-Honohina. Similarly, Kolekole was also named after the chief Kolekole and was an area famed as a *lua* (Hawaiian martial arts) contest grounds.

The *moʻolelo* begins along the *ala loa* in the *kula* regions, overlooking the infamous cliffs of Hilo Palikū. While there, Ka-Miki and Maka-ʻiole along with their companions, the chiefs named Hilo Hanakahi and Keahialaka, were attacked by Kapāheʻeheʻe and Honomū. Ka-Miki and Maka-ʻiole successfully warded off their attackers and restrained them, leaving them stranded along the trailside. A short distance away, they met Kuhua-i-Hālala, guardian of Kapāheʻeheʻe and daughter of Honomū.

Kuhua-i-Hālala was an *ʻōlohe* skilled in the art of *haʻihaʻi* (bone-breaking) and *lua* (hand-to-hand combat). Like Honomū and Kapāheʻeheʻe, she oftentimes challenged travelers along the *ala loa* when they neared her residence. If the travelers were successful in protecting themselves, she would lure them into her home, purportedly overlooking the cliff ledge of Kūpoupoʻo, and strangled her victims to death using her *ʻaha puluniu* (sennit crab snare).

When Kuhua-i-Hālala encountered Ka-Miki and Maka-ʻiole, she posed to him a riddle: "Can one move swiftly through Hilo?" To which they replied, "Yes indeed one may travel swiftly through Hilo, for there is no water in the streams!" Ka-Miki's rebuttal was an insult, implying that there were no *ʻōlohe* on the trail that could stop them from continuing on their journey (Maly 1994:6). Kuhua-i-Hālala, intrigued by their response, replied thusly:

> How is it that Hilo is without water (ʻolohe)? There are many (400) hills, many (4,000) descents, and many (40,000) rivers in Hilo, one becomes breathless (is overcome) swimming in the waters of Hilo, but one is never out of water in Hilo…Hilo is the land of rain, rain that goes on and on, rain that darkens the sun. Indeed the sun is darkened by the rains, and it is the Māluakiʻiwai that pushed

> down the river debris (travelers) from the uplands. So is the stormy nature of Hilo known, and blocked are the trails that one would travel. (Maly 1994:6)

Ka-Miki replied to Kuhua-i-Hālala in a poetic-riddle form:

> Hilo has no water. The water has returned and sits in the springs, along the dripping cliff faces, to the quiet pools. The rivers have receded, the rain trough of Hilo is placed in the heavens…we have come to see Hilo bound in the meshes of heavenly rains, Hilo in the long twined lines of the Mālualua, which fetches the multitudinous waters (*ʻōlohe*), those of skill, [wind] upon the mountain tops [adorned] with budding ʻōhiʻa, and the māmane that droops in the cold, on the mountains that move overhead like birds soaring in the heights of the heavens. Hilo is consumed by the great wind of the gourd; now it is like a small gourd to be set aside, the children call out; for it is ended, Hilo is [no longer] black, darkened by the rains, [emptied] are the rain troughs in the heavens… (Maly 1994:7)

In this passage, Ka-Miki cleverly referenced the many waters, streams, rains, and storms of Hilo that described the *ʻōlohe* who tormented the people within the region. The winds Ka-Miki spoke of, referred to how he and his men cleared the heavens, thereby giving way for the people of Hilo to celebrate and feel safe in their homeland once again. Ka-Miki with an ingenious retort told Kuhua-i-Hālala:

> It is I, the descendent of *Ka-uluhe-nui-hihi-kolo-i-uka*, who have cleansed and dried the rivers. Hereafter the debris (*ʻōlohe*) that has blocked the pathways will never again rise. *Nana-i-ke-kihi-o-Kamalama*, the descendent of *Lani-nui-kuʻi-a-mamao-loa* has ended the practices of Upeloa, Kaūmana, Kalanakamaʻa-o-uli, Pūkihae, Mokuhonua, Waiaea, Kaiwiki, Honoliʻi, Kīkoʻoakapuna, Pau and Kekaʻa [Paukaʻa], Pueopākū, Pāpaʻi-nui-a-kou [Pāpaʻikou], Waiāhole Kaʻieʻie-lulu-ka-iʻa [Kaʻieʻie], Kalaoa, Hanawī, Kulaʻimano, Kukuilauania, Kapāheʻeheʻe, and Honomū—for all have been bound by Ka-Miki. Thus Ka-Miki has waded through half of the streams of Hilo, and here is Ka-Miki seeking out and judging the skilled *ʻōlohe* who remain, seeking the *koa* trees that darken [i.e. disreputable warriors] all the forests. (Seeking) the great *koa* and little *koa*, those who are called the *Koa pāʻele-kū o Hilo—Koa* trees that darken Hilo [high canopy trees that shade all that is below; descriptive of powerful warriors]. (Maly 1994:7)

After hearing these taunts, Kuhua-i-Hālala realized that Ka-Miki and his group deliberately sought after her. Incensed by their confidence, Kuhua-i-Hālala lunged forward and attacked them. However, she failed and was ensnared in the net of Lani-nui-kuʻi-a-mamao-loa. She then surrendered and agreed to no longer ambush any more travelers. Upon her release, she took the two travelers to meet Hūʻia, a master carver, and skilled orator, from Kolekole who questioned their visit to their village. Kuhua-i-Hālala told Hūʻia and the people of Kolekole about Ka-Miki and his victory over her and that no one was capable of beating him, not even Hakalau-nui, a priest of the area.

Ka-Miki quickly noticed the many magnificent carved images in the village of Kolekole. In his admiration for the carvings, Ka-Miki complimented Hūʻia for his work, to which Ka-Miki was met with much arrogance. Hūʻia challenged Ka-Miki by stating that Kūlanikapele and Kolekole finest champions could defeat him. Ka-Miki quickly learned that Kolekole was the grounds where many contests were held and therefore, requested to meet with the area champions on the contest field.

In preparation for the contest, Ka-Miki uttered a chant, calling to his ancestors. From the mountains, a mysterious voice replied to him. Hūʻia heard this voice and became terrified and hurried to the home of Kūlanikapele, a chief, *ʻōlohe,* and advisor to Kolekole. He told Kūlanikepele of Ka-Miki and the unusual occurrences he witnessed. In response, Kūlanikapele sent the messenger ʻŌhiʻaokalani to confirm the what Honomū, Kuhua-i-Hālala, and Kapāheʻeheʻe had experienced at the hands of Ka-Miki and Maka-ʻIole, which to his dismay, was true. Kūlanikapele sent ʻŌhiʻaokalani out again, but this time, to retrieve his grandson, Akaka, another skilled competitor in the contest games. After much discussion, Kūlanikapele and Akaka agreed that they were outmatched by Ka-Miki and instead arranged for him a feast and *ʻawa* ceremony. Meanwhile, at the *kahua* (contest field) in Kolekole, the people of the area gathered and Akaka escorted Ka-Miki to the field to spectate and observe the contest.

Kuhua-i-Hālala was the first contestant arranged to compete against Waileʻaleʻa, a famous *ʻōlohe* from Maui. But since Kuhua-i-Hālala had surrendered to Ka-Miki, she claimed that he must fight him instead. Ka-Miki, never one to back down from a challenge, met Waileʻaleʻa on the *kahua* and with great skill and speed, flung Waileʻaleʻa off the platform. Following his victory, Ka-Miki called out for his next opponent but to his surprise, Waileʻaleʻa requested a rematch. Ka-Miki teased Waileʻaleʻa of his prior defeat and the great humiliation he would be subjected to if he challenged him a second time. This enraged Waileʻaleʻa and without hesitation, he stomped onto the *kahua* to try his

hand again at defeating Ka-Miki. To his displeasure, he was thrown from the *kahua* in the same manner as before to which he accepted his defeat and realized he was no match for Ka-Miki.

Following Ka-Miki's victory over Waileʻaleʻa, another contender named Hakalau-nui entered the *kahua* to compete. Ka-Miki exchanged banter with him, boasting of their abilities and skills to each other. When the contest began, Hakalau-nui attempted to seize Ka-Miki, but instead, found himself trapped by Ka-Miki's *malo* (loincloth). Unable to free himself, Hakalau-nui was defeated by Ka-Miki, who then proceeded to call for a new opponent. Kamaʻēʻē-a-kau answered and stepped on to the *kahua* ready to challenge Ka-Miki, and like those before him, he would not be victorious. In an attempt to avenge these defeats, eleven *ʻōlohe* rallied together to defeat Ka-Miki. However, they were unsuccessful and were left bound by Ka-Miki until the next day. Hūʻia, humbled by the outcome, asked for forgiveness from Ka-Miki and was then made the *konohiki* of Kolekole. He cared for the *loʻi* (taro) terraces, *ʻuala* (sweet potato) gardens and sugar cane, banana and *ʻawa* plantings that grew along the cliffs of ʻAkaka.

Kolekole, having been impressed by Ka-Miki and defeating all the *ʻōlohe* of Hilo Palikū, prepared a grand feast and *ʻawa* ceremony for Ka-Miki and his friends. Following the ceremony, they continued their journey to meet with Maulua-a-piʻo, a friend of Hilo Hanakahi who shared with Maulua-a-piʻo all the feats that Ka-Miki had accomplished and asked for his friend to not challenge Ka-Miki (Maly 1994).

Ka hele malihini ana i Hilo Palikū a me ʻAkaka -Sightseeing tours of Hilo Palikū and ʻAkaka

In the past (and still today), the legendary waterfall of ʻAkaka was an attraction that *malihini* (visitors) always visited as they traversed through the plains and valleys of Hilo Palikū. ʻAkaka is located in Kuhua, an *ahupuaʻa* north of Honomū and Mālamalamaiki. Such a famed site would have been known by native residents of Mālamalamaiki and is part of the cultural heritage of this area within Hilo Palikū. Below are two native accounts of visits to ʻAkaka that speak of the splendors of their hike to the waterfalls. The names of places and famed trees that once grew there are mentioned. Descriptions of the natural environment surrounding ʻAkaka reveal an abundant landscape of native birds and trees.

The earlier of the two accounts was written by Z. Poli, a Hawaiian reverend who wrote of his travels across Hawaiʻi Island to visit congregation members in a serialized story titled "*Ka Hele Malihini ana ia Hawaii a me na Mea Hoi i ike ia*" (Traveling to Hawaii and the many new things that were seen). Poli's account was published in 1867 in the newspaper *Ka Nupepa Kuokoa.* In the October 5th edition of "*Ka Hele Malihini ana*," Poli described his travels from Hilo to Waimea. On August 26, 1867, he acquired two horses, one for him and one for his child, from J. L. Kuahau and began his journey through Hilo Palikū. Kuahau and another man named Keo accompanied Poli to Hakalau where he met Reverend T. Pohano. At the beginning of his account, he described the numerous cliffs of the region:

> *...aia a ike mai i na iho ana kawahawaha, a me na piina piiku, e hualalahu ana i o a ia nei, a i iho la au iaʻu iho, pau io kuhihewa i na pali o Hilo, aohe io no o ka pali a pali, makena, weliweli ka nui o ua mea he pali o nei aina, he i hoi kaʻu o Kauai ka aina pali, eia ka aole, o Hilopaliku nei ka ka oi o ka pali.* (Poli 1867:4)
>
> ...as I saw the many uneven descending paths, as well as the many steep ascending paths, going up and down here and there, and once I descended, I was never mistaken again about the cliffs of Hilo, there are no cliffs like these cliffs, (there are) many, most of the cliffs of these lands are treacherous, I thought completely that Kauaʻi was the land of cliffs, but no, Hilopaliku indeed has incredible cliffs.

Along their path, Kuahau and Keo generously shared many stories about the famed places of Hilo Palikū, in which Poli was most appreciative. He listed some of the *moʻolelo* and *wahi pana* (storied placed) that he heard from them:

> *A ua oluolu lia laua i ka hoikeike a me ke kuhikuhi pono ana mai iaʻu i na wahi pana o ua Hilopaliku nei, a ike iho la au ia mau kanaka kaulana ma ke Kaao o Keanianiulaokalani, i ka hoe waa, o Kumunuiaiake, a me Moanonuikalehua, e ku ana i kahawai, he mau pohaku ala no elua e waiho nemonemo ana ma ka lihi makai pono o ke alanui iwaennakonu o ke kahawai, a o ke alanui no ia e au aku ai ma kela kapa. A pela mai no he wahi ana i kapaia o Kanikuekue, no ke kani kuekue ana o ka la Kuku Paupau a kekahi wahi luahine o na kau i hala, ke kumu i kapaiaʻi "Kanikuekue" a ua ikepono au i keia wahi pana inoino o ua Hilopaliku nei.* (Poli 1867:4)
>
> They both generously showed me where that many storied places of Hilo Palikū were, and I saw the famed characters of the account of **Keanianiulaokalani**, of the canoe, **Kumunuiaiake**, and **Moanonuikalehua**, standing in the stream, which are two smooth rocks in the middle of the stream along the seaward side of the road, a road that requires you to swim to the other side. It is also there that a cave named **Kanikuekue** is located,

> due to the sound of tapping tapa beaters of an old woman in days gone by, and the reason why that place bears the name "Kanikuekue," and I indeed saw that tempestuous place of Hilo Palikū.

In the late afternoon, Poli, his child, Kuahau, and Keo, arrived in Kuhua Ahupuaʻa and began their ascent to ʻAkaka. He described their path as one that went through *uluhe* (*Dicranopteris linearis*) bushes and verdant forests. Once they arrived at the waterfall, the upper forests were quickly covered in mist and they were caught in heavy rains and winds. As they endured the rains, Poli was reminded of something that he heard while he was in Hilo. The excerpt remains in quotes as Poli is quoting another person:

> *"He pilikia pinepine ka na malihini hele makaikai i ka Wailele o Akaka, i ka make i ka opili a ka ua, ke ako ake uhai paha i na Lehua a Pane i ka nuku o ka Wailele, a uhau iho iluna o ka pohaku a Pele, o ka manawa ia poele mai la ka lani i ka ua, a uhi paapu mai la ka ohu, a me ka noe i ke kuahiwi, a ike ole iaʻku kahi a me kahi, e La malie wale no ka la, e hele ana a ka lae ka lani, ike wahi ao ole ia'ku, a kolohe no e kolohe ka malihini i ua mau lehua nei, o ka manawa iho la no ia e hana ʻi ka ua i kana hana, a make i ka opili, wahi mai a kuu loke [sic.] i kai o Hilo-one, a ua papaia mai au me ia malihini hele makaikai i ka wailele o Akaka, aohe make kolohe, aohe make ako i na Lehua a Pane, mai uhau oe i ka lehua a Pane iluna o ka pohaku a Pele, o pulu io auanei oukou i ka ua, a pela iho la kuu noke ia ana mai i ka papa i ka o Hilo, a o ka hele maluhia wale no ka pono a hiki i ka ikemaka ana ia Akaka."* (Poli 1867:4)
>
> Visitors who hike to ʻAkaka Falls frequently experience problems, dying from the numbing cold rains. When they pluck and break the Lehua of Pane at the edge of the waterfall, and stack them atop the stone of Pele, that is the when the skies darken with rain, the fog envelops everything, and the mists shroud the mountaintops, to the point where you can't see the person next to you. It could be a pleasant day, the weather perfect on your travels, but if you are unaware, and do mischievous things with those *lehua* like most mischievous travelers do, that is when the rain will do what it does, and [you] die from the cold, according to my lover in Hilo-one, and I was forbidden from visiting ʻAkaka Falls, [I] would not die a dishonest death, [I] would not die from picking the lehua of Pane, do not leave the lehua of Pane atop the stone of Pele, lest you be drenched in the rain, and that is why I am persistently told by those of Hilo to not go, and that you should only travel safely to see ʻAkaka."

When Poli heard this account, he was skeptical and was determined to pick the *lehua* of Pane and to place it upon the rock of Pele to demonstrate that these beliefs were not real (*lapuwale*). After they reached the falls, Poli described the sense of awe that they felt because of its height and the beauty that surrounded it. Poli described the flow of the waters off the edge of the cliffside and down into the pools below where they made their way to Kolekole Stream. He then detailed his actions at the edge of the waterfall, which included an account behind the name of ʻAkaka:

> *A penei kaʻu hana:--O na Lehua a Pane, he mau lehua kapu ia, aia lakou e kakau nui ana i ka nuku pono o Akaka. (A o Akaka hoi, he wahi kanaka ui no ia ma kona moolelo, a mamuli o ke kena ana a kona Kupunawahine e hiahia ahi, a o kona hana no ia, a ia ia e noke ana i ka hia ahi, holo aku la ka hohono a i ka ihu o kana mau ipo e pii mai ana e moe me ua o Akaka, mai kai mai, a ike kekahi makamaka ona i ka honi ana mai o kana mau ipo, o kona hele no ia a hai aku la ia Akaka me ka i aku ia ia, --"E, pii mai nei au mau ipo a honi mai nei i ka hohono o ke ahi, a hoowahawaha ia oe."--a ia ia i lohe ai i keia, o kona lele no ia iloko o ka wai, a make loa, a kapaia iho la ua wahi nei, o Akaka, mamuli o Akaka.)*
>
> *A lawe mai la au hookahi kumulehua, a hahau iho la elua hahau ana i ka pohaku pono o ka ihu o ua o Akaka, a mahope iho, eha a'u hahau ana iluna o ka pohaku a Pele, me ke kanalua ole, a makau ole mai, no ke kolohe ana i keia mau mea i papa ia mai ai no keia wahi, a hookahi mea i koe mahope iho, o ke kali ana'ku i ka hana mai a ka ua nui i kana hana, o ka hoopulu mai ia makou, no kuu kolohe ana i na mea kapu i papaia, a ke hai aku nei au, me ke akaka loa, aohe makou i pulu iki i ka ua a hiki i kauhale. O ka pulu wale no i loaa i ka pii ana mai; oia wale iho la no, a nolaila hoi, ke hoike aku nei ai i na malihini hele makaikai a pau ia Akaka, mai hilinai i na mea i hookapu ia…* (Poli 1867:4)
>
> And this is what I did: Regarding the lehua of Pane, they are sacred *lehua*, growing near the edge of ʻAkaka. (As for ʻAkaka, [the name] derives from a story about a beautiful man, who was instructed by his grandmother to start a fire, which he indeed tried to do, and as he was making his fire, his lovers would smell the scent [of the smoke] and travel from the coast to where he was to have sex

> with ‘Akaka. One of ‘Akaka’s acquaintances saw his lovers smelling [the smoke]. He (the acquaintance) went to ‘Akaka and told him “eh, your lovers are coming up here when they smell the smoke from the fire, and some folks are fed up with you.” Once he heard this, ‘Akaka jumped off the waterfall and died, and that is why that place is called ‘Akaka, because of the man ‘Akaka.)
>
> Then, I brought one a *lehua* (*Metrosideros polymorpha*) branch, and struck it twice against the rock at the tip of ‘Akaka, and afterwards, I struck the rock of Pele four times, without hesitation, and with no fear because of my skepticism behind this forbidden act at this place, and another thing, I waited for the pouring rain to do its work, to make us soaked for doing what I was not supposed to, and I am telling you in all honesty, we did not get soaked all the way home. We only got wet when we hiked to ‘Akaka. That is the only time, and thus, I am showing all visitors to ‘Akaka that they should not believe in this superstition.

Following his visit to ‘Akaka, Poli continued on his journey to Waimea. His account is of interest because he shares the names of storied places across Hilo Palikū even though he is skeptical of Hawaiian beliefs. Although Poli is dismissive of these beliefs, we are fortunate that he wrote about them during his journey for readers in the past and the present. Poli’s account is enriched by another trip made by J.M. Keliiwaiwaiole of the Honomū Sugar Company in 1885. In an article he authored titled “*Ike I na Pali Hookui o Akaka Fall*” (Seeing the Twin Cliffs of ‘Akaka Falls), published in *Ko Hawaii Pae Aina* on September 5, Keliiwaiwaiole describes his pleasant trip to Akaka, noting the things in the natural environment that caught his attention. He described the thick vegetation (*hihipe‘a*) of the forest and the sounds of forest birds like *‘apapane* and *‘i‘iwi*, and noted how these sights brought joy to their trip. At around 10 in the morning Keliiwaiwaiole reached the falls. He peered over the edge of ‘Akaka and saw the numerous ferns and gingers growing in the misty environment. Like Poli, Keliiwaiwaiole spoke of the famed Lehua of Pane in his account. However, Keliiwaiwaiole named more famed trees and rocks that can be found atop ‘Akaka falls:

> *A ma ka hoike mai a ke kamaaina i na mea kaulana o ua wahi nei, oia iho keia. He mau kumu lehua nenee i ka pahoehoe ma ka akau a ma ka hema o na wai lele nei, o ko laua mau inoa, o na lehua a Pane a me na lehua a Ehu, a o keia ka na wehi o na keiki nei. A he pohaku nui hoi ma uka aku, o pohaku o Kaloa ia, oia ka makuakane, a he wai poepoe hoi mauka aku, o Kulanikapele ia oia ka makuahine, a he kumu ohia nui e pili ana i ka pali ma ka aoao akau, o Ohiaokalani ia oia ke kupunakane, a he heiau no hoi ia wahi no na ‘lii o ka wa kahiko, he ohuku pali hoi e haawe mai ana ma ka aoao komohana, o Laeolono ia oia ke kupunawahine o ua keiki nei, a he mau wahi wai liilii e lele mai ana ma ka aoao a me ka hema, o ko lakou mau inoa oia o Ukuula, Hualei a me Ahaa, he mau wahine lawelawe ka ia no ua keiki nei. He nui aku na moolelo hoonanea no keia wahi.* (Keliiwaiwaiole 1885:4)
>
> These are the famed things that I was shown by a native of these lands. There are two *lehua* trees that move from right to left on the *pāhoehoe* above these waterfalls. Their names are the *lehua* of Pane and the *lehua* of Ehu, and they are adornments to the child (‘Akaka) found here. There is a large boulder found more upland named Kaloha, who is the father, and there is a round pool there too, whose name is Kulanikapele and who is the mother, and there is a *‘ōhi‘a* tree growing along the cliff’s northern face named Ohiaokalani, which is the grandfather, and there is a *heiau* there that was used by chiefs of the past. On the western bluff of the cliff is a protuberance that juts out named Laeolono, which is the grandmother of that child. Lastly, there are smaller falls to the southern side whose names are Ukuula, Hualei, and Ahaa, who were female retainers of this child. There are numerous time-passing stories of this place.

When it was time for lunch, Keliiwaiwaiole and his entourage picnicked at ‘Akaka. They laid out their spread of food, which consisted of things like *hō‘io*, *‘ōpae*, *‘o‘opu*, and *poi*, and decorated their eating area with ferns, *‘ie‘ie*, ginger, and *maile* that they gathered in the forest. Because of their visit, Kawaiwaiole was moved to recall lines from a prayer lovingly composed in honor of ‘Akaka:

A ka luna nae wau i Akaka	I am indeed at ‘Akaka
Luhe ana ka lehua noho i ka wai	The lehua droop into the waters
Nawai e ole ka mahui koni	Who would deny themselves the pleasure of
I ka nani o na lehua Apane	The beauty of the lehua of Pane
Pane mai ko leo me ka nanahe	Your voice responds with sweetness
Loku e ka halia i ka puuwai.	Drenched by memories of the heart (Keliiwaiwaiole 1885:4)

The accounts written by Poli and Keliiwaiwaiole are two of many accounts published by Hawaiians who made their way to the famed waters of ʻAkaka. Their writings evidence a history of travel and sightseeing throughout Hilo Palikū.

Pau Kuhihewa Iā Hili Palikū-Completely Mistakened by Hilo Palikū

One of the sayings for the Hilo Palikū region of Hilo is "pau kuhihewa iā Hilo Palikū," which translates to "Hilo Palikū is completely mistaken." In historical sources, authors used this saying as an expression of disdain for someone who lies or does keep promises. In August of 1900, an author under the penname "Hawaii Oiaio" published an article that explains the origins and usage of "pau kuhihewa iā Hilo Palikū. In his article titled "Pau Ole Kuhihewa Ia Hilo Palikū," Hawaii Oiaio addresses it to members of the Aloha ʻĀina political party, including Joseph Nawahī, William White, John Richardson, Thomas Clark, Reverend John Kalana Hihio, J. Nazareka, David Kalauokalani, James Kaulia, Robert Wilcox, and William Auld, which he chastises for their pro-Kingdom politics.. Although the excerpt that is included below focuses on the story of the Hilo Palikū saying, the overall message of the article encourages readers to pursue leadership positions within the newly formed government of the Territory of Hawaiʻi:

> *O ka huaolelo a hopunaolelo maluna ae e kau ae la, "Pau kuhihewa ia Hilo Paliku," he huaolelo kaulana loa keia mai ka wa kahiko loa mai o ko kakou aina, mawaena o na ho loh [sic] elua, e lilo i mau halekipa, a i mau aikane "Punakeonaona, ina no Maui, Oahu, Kauai ke kanaka i hoaikane me ko Hilo, a ina paha ma Maui kahi i launa ai, alaila, ua mopopo [sic] no i ke kanaka o Hilo ka makemake o ka hoaloha o Maui he waa alaila, pane aku la ke kanaka o Hilo, he wahi waa no koʻu makemake no ia, e lawe koke mai hoi ha oe, ae, ua pono.*
>
> *Oi kali aku ke kanaka o Maui a, a hala ae ana he anahulu, a hala aku ana ua anahulu, pau ka palena o ka pono, o kau nae kai puhi aku la ia iala, a hoka iho la ke kanaka o Maui. Pane iho la ke kanaka o Maui, he lohe akahi no a ike maka, nolaila, ua ailolo na kanaka o Maui, Oahu, Molokai, Lanai, Kuai i ko Hilo Poe i ka hoopunipuni, pili nae keia i ka poe kalaiwaa.*
>
> The saying and sentence located above, "Hilo Palikū is mistakened completely," it is a legendary saying from the ancient times of our land, that arouse between two friends, who became best friends, and later became companions. "Punakeonaona, indeed if the person from Maui, Oahu, and Kauai befriended Hilo's [person], and if on Maui is where they enjoy each others company, and then, the person in Hilo would know that their Maui friend is in need of a canoe, and then, the Hilo people responds, I definitely have a canoe that was painted black, I will leave and then return, and then, the person from Maui responded, that is what I desire, please bring it quickly, indeed, it is needed.
>
> Whilst the person from Maui waited, a month passed, and another month passed, he reached his limit and became furious and disappointed. The person from Maui told the person from Hilo, I heard you but I have yet to see it with my own eye, therefore, the people of Maui, Oahu, and Lanai were scorned. Hilo's people, in particular the canoe carvers, trade in lies. (Oiaio 1900:6)

Although the saying is one that does not see people from Hilo Palikū as favorable or honest, it is one that speaks of the region's long history of interisland exchange and communication.

Historical Accounts of Hilo Palikū

Some of the earliest written descriptions of the South Hilo district come from the accounts of the first Protestant Missionaries to visit the island. Early Historic visitors to the region noted the beauty, fertility, and ruggedness of this part of the island. In 1823, the Reverend William Ellis one of the first Christian missionaries to arrive in Hawaiʻi passed along the South Hilo coast during his tour of Hawaiʻi Island. Having been warned against walking due to the ruggedness of the terrain, he sailed from Hilo to Laupāhoehoe in a canoe. Ellis (2004:344) described the South Hilo coastline as follows:

> The country, by which we sailed, was fertile, beautiful, and apparently populous. The numerous plantations on the eminences and sides of the deep ravines or valleys, by which it was intersected, by streams meandering through them into the sea, presented altogether a most agreeable prospect.

After departing Hilo Bay, Ellis and his party did not land again until Laupāhoehoe, where he and his traveling companions continued on foot, passing along the coastal cliffs of the Hilo and Hāmākua districts. It was on this leg of his journey that Ellis described the cultivated *kula* lands of the region that extended between the various valleys and gulches:

> The houses stood mostly singly, and were scattered over the face of the country. A rich field of potatoes or taro, five or six acres in extent, or large plantations of sugar-cane and bananas, occasionally bordered our path. But though the soil was excellent, it was only partially cultivated. (Ellis 1963:249-250)

Overland travel across the central and northern Hilo District remained difficult throughout the first part of the nineteenth century due to its rugged coastline and many deep gulches. Transportation difficulties may have even temporarily delayed large-scale commercial exploitation of the *kula* lands in the vicinity of the study area (Desilets et al. 2004). Initial commercial exploitation of these lands was limited to small scale agriculture in areas with coastal access for shipping and receiving goods. The Reverend Titus Coan (1882:31-32), who settled at the Hilo Mission Station in 1835, wrote that:

> For many years after our arrival there were no roads, no bridges, and no horses in Hilo, and all my tours were made on foot…The path was a simple trail, winding in a serpentine line, going down and up precipices, some of which could only be descended by grasping the shrubs and grasses, and with no little weariness and difficulty and some danger.

By the mid-1800s, the first roads had been established along the coast of South Hilo, perhaps following the route of the older path described by Coan (PHRI 1991). These first roads, designed for travel on horses and in carts, were likely developed by landholders, primarily sugar growers, looking to connect their plantation lands. Chester S. Lyman, traveling from Kawaihae to Hilo with the Reverend Titus Coan on June 19th, 1846, stayed in the vicinity of one of the early sugar plantations located to the south of the study area. In his journal, he described travel along a cart road and discussed the holdings of Mr. Castle. the progenitor of the first sugar plantation in the area. Lyman (1925:81) writes:

> After resting we started on at 41/2 & soon arrived at Mr Castle's, 3/4 of a mile beyond. When half way there we fell in with two carts each drawn by 4 yokes of oxen, one set of them just broken in; the two teams were connected by a long rope & went on by *fits & starts*, now stopping & now going on the run. The carts were large & heavy with thick solid wheels made of planks pinned together. They were well filled with a crowd of noisy girls & boys & by invitation of the Driver, an American, I took a ride in one of these Hawaiian Coaches as far as Mr Castle's house, glad thus to relieve a little my feet which were becoming sore from walking in water and climbing precipices.
>
> Stopped a few minutes at Mr C[astle]'s; were entertained with a refreshing bowl of milk, & then going on a mile & a half or 2 miles put up for the night at a native house, nearby. The place is called *Puumoi*. Mr. Castle is an American, has been in the country many yrs, has an extensive plantation & a native wife & family. Near his house we passed large fields of sugar cane on his lands, but cultivated by Chinamen who have pretty much monopolized the sugar business in this region. Mr C[astle] has also considerable herds of cattle.

A historical reference to a renowned person who lived in Mālamalamaiki can be found in the 44th installment of *Reminiscences of Honolulu Thirty-five Years,* a serial account that was published by Henry L. Sheldon between 1881 to 1883 in the English-language newspaper *Saturday Press.* Published on December 9, 1882, Sheldon notes the death of Dr. John Pelham on March 16th 1857, an Englishman who served as a medical adviser to the *ali'i* Kālaimoku, Kuakini, and Ka'ahumanu. Following this note about Pelham's demise, Sheldon reminisces about a visit with Pelham years prior:

> [Pelham] had resided in the Islands since the year 1826, and was the medical adviser of the high chiefs Kalaimoku, Kuakini and Kaahumanu. He was well educated and well read in his profession, but quite eccentric in his manner. Some six years previous to his death he was living at a place called **Malamalamaiki**, about fifteen miles north of Hilo, where I had occasion to call upon him while on a tour around the Island of Hawaii. Arriving at his very neat and comfortably arranged and furnished thatched cottage about 8 o'clock in the evening, in the midst of one of those soaking rains for which Hilo was then proverbial (The climate is said to have changed since), I received from the Doctor a bluff but hearty welcome, and the intimation that supper would be ready as soon as I had exchanged my drenched garments for dry ones. I was desperately hungry after my long ride from the bay, and visions of roast pig and taro, or mullet baked in ti-leaves, flitted through my mind. At length I was ceremoniously ushered into the dining-room, and, with the remark from my host that I must excuse him for that he had already supped, was hospitably urged to "eat hearty"--of a *raw squid* and poi! That was the entire bill of fare. I was, however, equal to the occasion, and managed to bolt--it was impossible to thoroughly masticate--enough of octopus and paste to stay my stomach. I had been previously informed of Pelham's eccentricities, and noted the twinkle of his eye while I wrestled

> with "the supper." At the conclusion of the necessarily brief repast the Doctor invited me to join him in "a glass of something hot." Directly a native woman brought in a japanned tray, on which were two steaming tumblers crowned with closed lemon. After such a barbarous supper this seemed the opposite extreme of civilized luxury. I sipped contentedly at the soothing mixture; but was only restrained from remarking upon its peculiar aroma by my regard for the proprieties. The evening was spent in pleasant converse, in the course of which the Doctor related many interesting recollections of the native chiefs with whom he had been familiar, especially of Governor Adams, as Kuakini was called. I was comfortably lodged (even luxuriously, for those days), and in the morning sat down to a nice breakfast of pork chops, *lawalu'd* fish, baked potatoes, biscuit and coffee. Noticing the satisfaction with which I regarded the board, my host dryly remarked that he had been pleased to see that I knew how to "rough it" in Hawaii, by the way in which I had attacked raw squid the previous evening, whereupon I was emboldened to inquire as to the particular brand of spirits that had entered into the composition of the hot punch with which I had washed the supper down. For reply he produced from the cupboard two small empty bottles, marked in plain letters, "Lavender Water," with the simple remark, "There."
>
> Lest my readers should suppose that our punch on the occasion mentioned was made of the article generally known as lavender water, I will here explain: Previous to the ratification of the treaty with France in 1858 the duty on imported spirits in this kingdom was $5 per gallon. One of the results of the high duty was the important of large quantities of alcohol, disguised under the names of cologne, lavender, bitters, etc., which paid a duty of only 5 per cent, *ad valorem*, and which was freely sold all over the islands and used as a beverage instead of the high-priced brandy. Brandied peaches, cherries and other fruits came under the same category, and were at one time largely imported and consumed here. (Sheldon 1882:1)

In 1872, Isabella Bird traveled by horseback along the Hāmākua Coast from Onomea to Waipiʻo Valley and described the general terrain and the difficult passage through the various gulches she crossed. Although Honomu is not specifically mentioned in her account, she would have inevitably passed through the Honomu area on her journey towards Waipiʻo. Of the region she writes:

> All the gulches for the first twenty-four miles contain water. The great Hakalau gulch we crossed early yesterday, has a river with a smooth bed as wide as the Thames at Eton. Some have only quiet streams, which pass gently through ferny grottoes. Others have fierce strong torrents dashing between abrupt walls of rock, among immense boulders into deep abysses, and cast themselves over precipice into the ocean. Probably, many of these are the courses of fire torrents, whose jagged masses of a-a have since been worn smooth, and channeled into holes by the action of water. A few are crossed on narrow bridges, but the majority are forded, if that quiet conventional term can be applied to the violent flounderings by which the horses bring one through. (Bird 1974:88).

The *Māhele ʻĀina* of 1848

By the mid-19th-century, the Hawaiian Kingdom was an established center of commerce and trade in the Pacific, recognized internationally by the United States and other nations in the Pacific and Europe (Sai 2011). As Hawaiian political elite sought ways to modernize the burgeoning Kingdom, and as more Westerners settled in the Hawaiian Islands, major socioeconomic and political changes took place, including the formal adoption of a Hawaiian constitution by 1840, the change in governance from an absolute monarchy to a constitutional monarchy, and the shift towards a Euro-American model of private land ownership. This change in land governance was partially informed by ex-missionaries and Euro-American businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be revoked from them at any time. *Mōʻī* (Ruler) Kauikeaouli (Kamehameha III), through intense deliberations with his high-ranking chiefs and political advisors, separated and defined the ownership of all lands in the Kingdom (King n.d.). They decided that three classes of people each had one-third vested rights to the lands of Hawaiʻi: the *Mōʻī*, the *aliʻi* and *konohiki*, and the native tenants (*hoaʻāina*). In 1846, King Kauikeaouli formed the Board of Commissioners to Quiet Land Titles (more commonly known as the Land Commission) to adopt guiding principles and procedures for dividing the lands, grant land titles, and act as a court of record to investigate and ultimately award or reject all claims brought before them (Bailey in Commissioner of Public Lands 1929). All land claims, whether by chiefs for an entire *ahupuaʻa* or *ʻili kūpono* (nearly independent *ʻili* land division within an *ahupuaʻa*, that paid tribute to the ruling chief and not to the chief of the *ahupuaʻa*), or by *hoaʻāina* for their house lots and gardens, had to be filed with the Land Commission within two years of the effective date of the Act (February 14,

1846) to be considered. This deadline was extended several times for chiefs and *konohiki*, but not for native tenants (Soehren 2005).

The King and some 245 chiefs spent nearly two years trying unsuccessfully to divide all the lands of Hawai‘i amongst themselves before the whole matter was referred to the Privy Council on December 18, 1847 (King n.d.; Kuykendall 1938). Once Kauikeaouli and his chiefs accepted the principles of the Privy Council, the *Māhele ‘Āina* (Land Division) was completed in just forty days (on March 7, 1848). The names of all of the *ahupua‘a* and *‘ili kūpono* of the Hawaiian Islands, as well as the names of the chiefs who claimed them, were recorded in the *Buke Māhele* (*Māhele* Book) (Buke Māhele 1848; Soehren 2005). As this process unfolded, King Kauikeaouli, who received roughly one-third of the lands of Hawai‘i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased for fee simple title by his subjects. Accordingly, the day after the division when the name of the last chief was recorded in the *Buke Māhele*, the King commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike Kauikeaouli, the chiefs and *konohiki* were required to present their claims to the Land Commission to receive their Land Commission Awards (LCAw.). The chiefs who participated in the *Māhele* were also required to provide to the government commutations of a portion of their lands in order to receive a Royal Patent giving them title to their remaining lands. The lands surrendered to the government by the King and chiefs became known as “Government Land.” The lands personally retained by the King became known as “Crown Land.” Lastly, the lands received by the chiefs became known as “Konohiki Land” (Chinen 1958:vii; 1961:13). To expedite the work of the Land Commission, all lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the lands could be formally surveyed.

Disposition of Mālamalamaiki

On February 3, 1848, the *ali‘i* Kekuapanio (also spelled Kuapanio) laid claim to three lands, one of which included Mālamalamaiki Ahupua‘a. This *ahupua‘a* was subsequently awarded to him as *‘āpana* (parcel) 2 of LCAw. 130. Prior testimony was given on October 27, 1848, by John Young, one of Kamehameha I’s foreign military advisors, specified that before the *Māhele ‘Āina,* Mālamalamaiki was held by John Young, but at the request Poki (Boki, Governor of O‘ahu), Mālamalamaiki was returned to King Kauikeaouli. At the time of the *Māhele*, King Kauikeaouli gave Mālamalamaiki to Kekuapanio, who was considered a *hulumanu,* a class of young nobles who were favorites of the chief. According to records obtained at the Edward Olson Trust Archives, after Kekuapanio died, the land was retained by his heir, Huakini of Honolulu, O‘ahu. Historical records indicate that Huakini was a defendant in a lawsuit against James W. Marsh, Marshall of the Hawaiian Islands, who through a court ruling levied Huakini‘s personal and real property, including Mālamalamaiki, and sold it at a public auction to Charles C. Harris for the sum of $226 on May 6, 1859 (Edward Olson Trust Archives HSC2-24; HSC2-35).

Kuleana Awards

As the King and his *ali‘i* and *konohiki* made claims to large tracts of land via the *Māhele*, questions arose regarding the protection of rights for the native tenants. To resolve this matter, on August 6, 1850, the *Kuleana* Act (also known as the Enabling Act) was passed, clarifying the process by which native tenants could claim fee simple title to any portion of lands that they physically occupied, actively cultivated, or had improved (Garavoy 2005). The *Kuleana* Act also clarified access to *kuleana* parcels, which were typically landlocked, and addressed gathering rights within an *ahupua‘a*. Lands awarded through the *Kuleana* Act were and still are, referred to as *kuleana* awards or *kuleana* lands. The Land Commission oversaw the program and administered the *kuleana* as Land Commission Awards (LCAws.) (Chinen 1958). Native tenants wishing to make a claim to their lands were required to register in writing those lands with the Land Commission, who assigned a number to each claim, and that number (the Native Register) was used to track the claimant through the entire land claims process. The native tenants registering their *kuleana* were then required to have at least two individuals (typically neighbors) provide testimony to confirm their claim to the land. Those testimonies given in Hawaiian became known as the Native Testimony, and those given in English became known as Foreign Testimony. Upon provision of the required information, the Land Commission rendered a decision, and if successful, the tenant was issued the LCAw. Finally, to relinquished any government interest in the property, the holder of a LCAw. obtained a Royal Patent Grant from the Minister of the Interior upon payment of the commutation fee. With respect to the study area, it appears that no *kuleana* claims were made for lands in Mālamalamaiki.

Government Land Grants

In conjunction with the *Māhele*, the King also authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was clarified by the "Enabling Act," which was ratified on August 6, 1850. The Act resolved that portions of the Government Lands established during the *Māhele* of 1848 should be set aside and sold as grants ranging in size from one to fifty acres at a cost of fifty cents per acre. The stated goal of this program was to enable native tenants, many of whom were not awarded *kuleana* parcels during the *Māhele*, to purchase lands of their own. Despite the stated goal of the land grant program, this provided the mechanism that allowed many foreigners to acquire large tracts of the Government Lands. Unlike in the *kuleana* claims, where claimants stated their use of the land, the grant records are silent regarding the grantees' intended use. The Royal Patent deeds and survey notes do contain some limited information about geographical features, vegetation, and survey markers, but they generally do not say anything about improvements to the land or land use.

South of the project area in Mālamalamaiki 1st, a single grant parcel (Royal Patent No. 1358) was purchased in 1854 by William Farwell for $51.50. While the location of this 52.6-acre grant is shown in Hawai'i Registered Map No. 1092 by W. A. Wall (Figure 17), Farwell's grant boundaries appear to be incorrectly depicted as it is shown extending well into Mālamalamaiki 2. Another Hawai'i Registered Map No. 570 (Figure 18) dated 1879 does not show the location of Farwell's grant but it does shows other grants in nearby Honomū as well as what appears to be built structures (depicted as square-like symbols) *mauka* the project area. The 1879 map (see Figure18) also shows the route of the Government Road *mauka* of the project area. The surveyor notes for Farwell's grant (Figures 19 and 20) described *hala* trees along the coast, as well as natural features such as the cliff and ravines as well as a road.

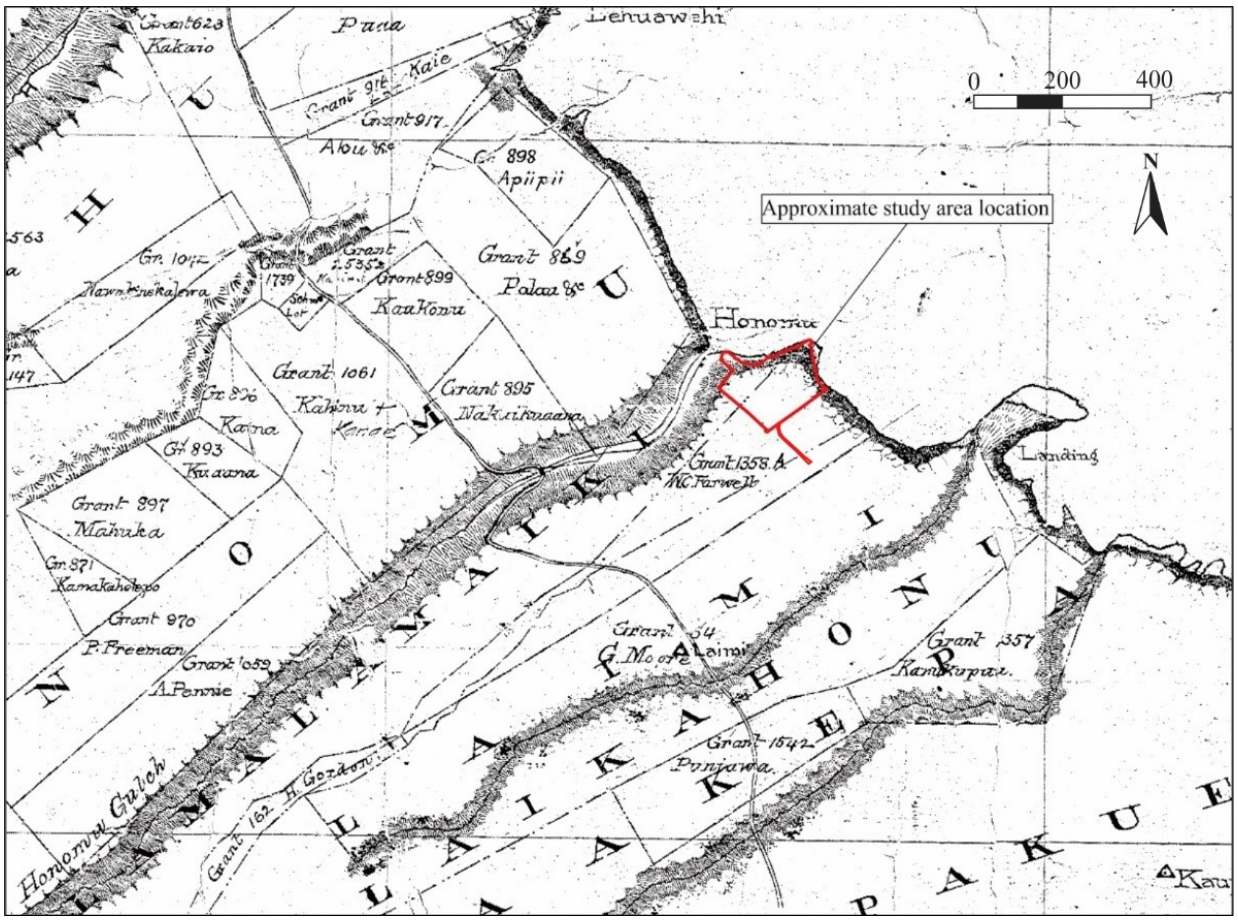


Figure 17. A portion of Hawai'i Registered Map No. 1092 by W.A. Wall showing Royal Patent Grant No. 1358 to W. Farwell and the approximate project area location.

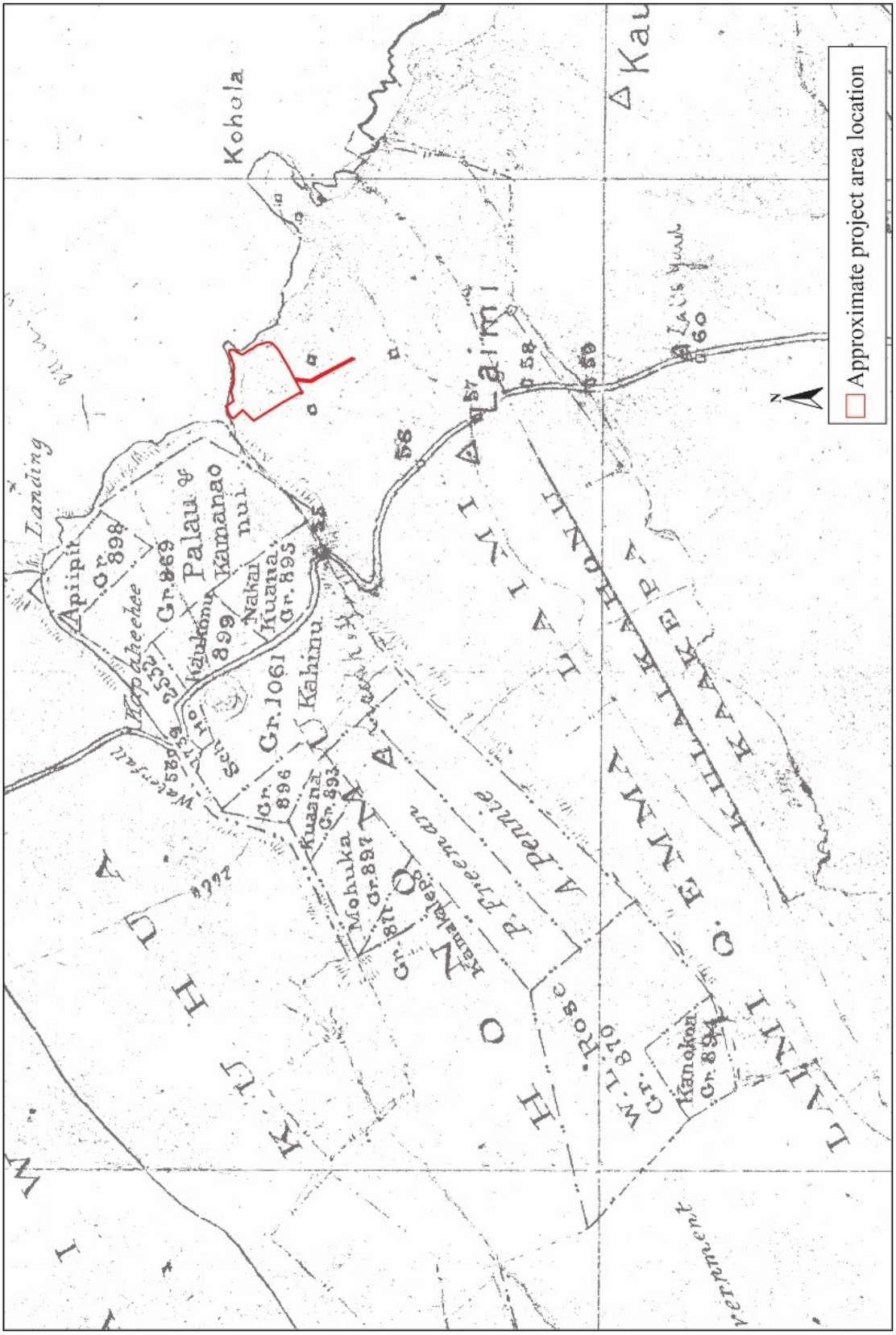
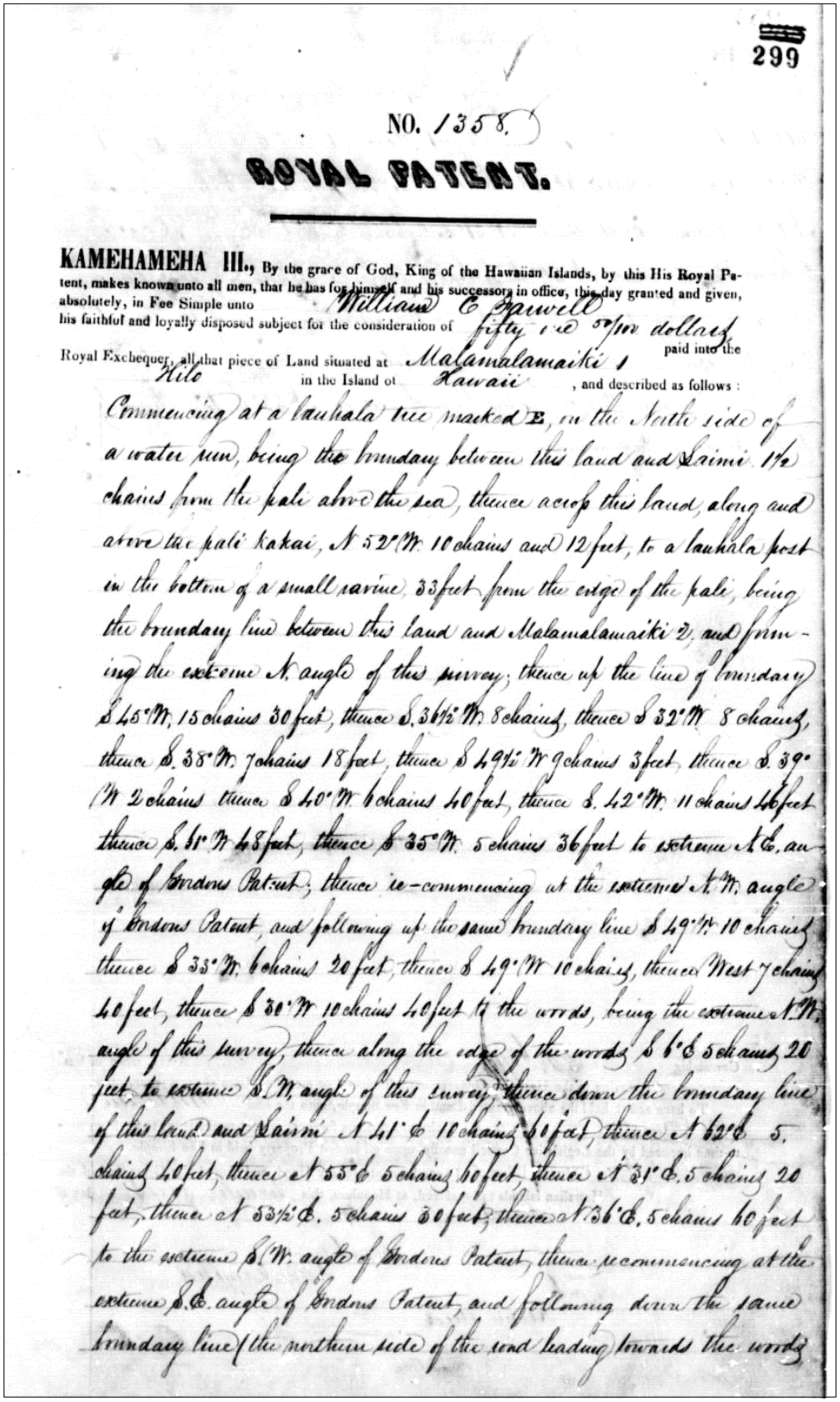


Figure 18. A portion of Hawai‘i Registered Map No. 570 from 1879 by C. J. Lyons showing land grants in nearby Honomū as well as structures *mauka* of the project area.



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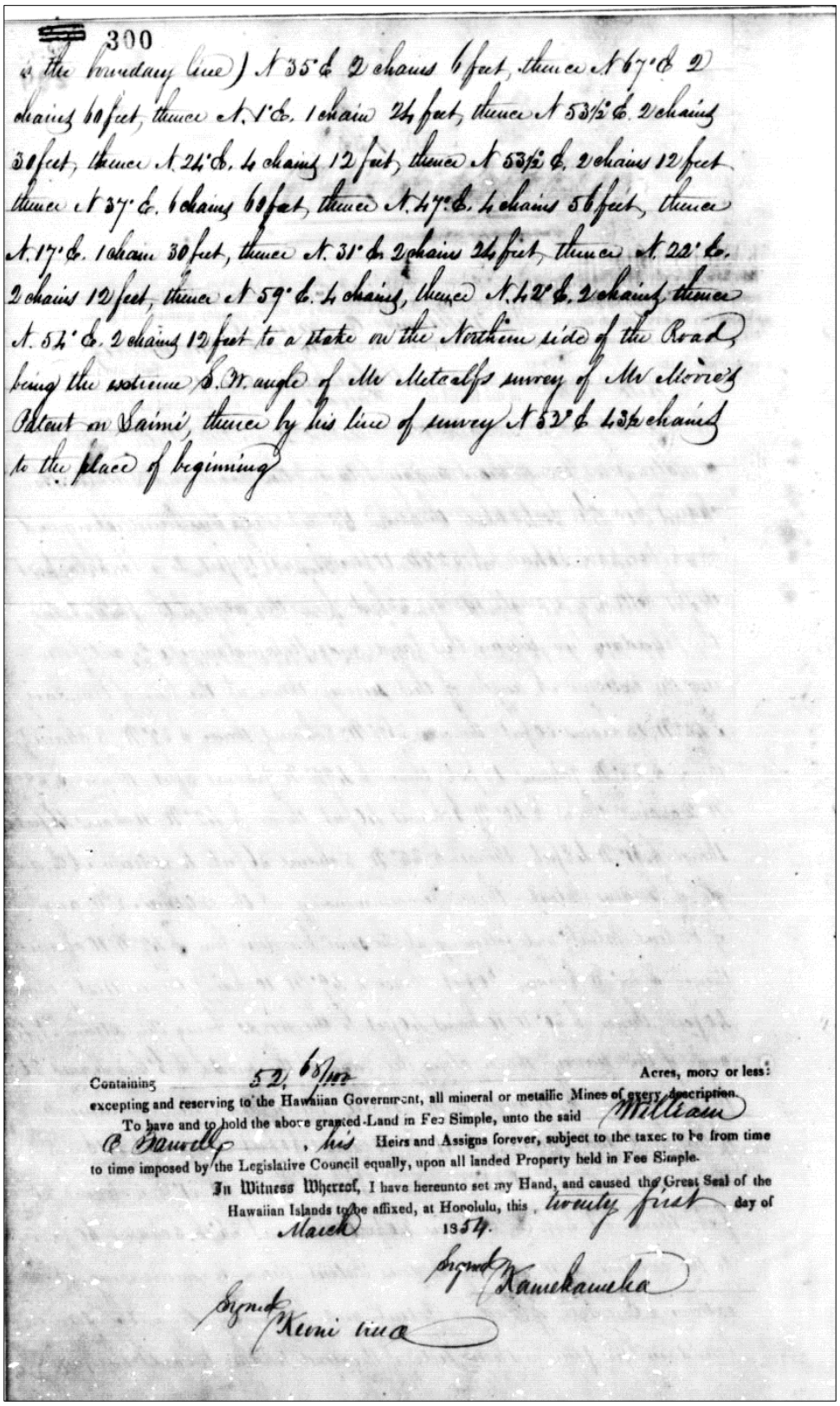
NO. 1358.

ROYAL PATENT.

KAMEHAMEHA III., By the grace of God, King of the Hawaiian Islands, by this His Royal Patent, makes known unto all men, that he has for himself and his successors in office, this day granted and given, absolutely, in Fee Simple unto William C Farwell his faithful and loyally disposed subject for the consideration of fifty 1/2 50/100 dollars paid into the Royal Exchequer, all that piece of Land situated at Malamalamaiki 1 in the Island of Hilo Hawaii, and described as follows:

Commencing at a lauhala tree marked E, in the North side of a water run, being the boundary between this land and Laimi 1½ chains from the pali above the sea, thence across this land, along and above the pali kakai, N 52° W 10 chains and 12 feet, to a lauhala post in the bottom of a small ravine 33 feet from the edge of the pali, being the boundary line between this land and Malamalamaiki 2, and forming the extreme N. angle of this survey; thence up the line of boundary S 45° W, 15 chains 30 feet, thence S. 36½° W. 8 chains, thence S 32° W 8 chains, thence S. 38° W. 7 chains 18 feet, thence S 49½° W 9 chains 3 feet, thence S. 39° W 2 chains thence S 40° W 6 chains 40 feet, thence S. 42° W. 11 chains 46 feet thence S. 41° W 48 feet, thence S 35° W. 5 chains 36 feet to extreme N.E. angle of Bridens Patent; thence re-commencing at the extreme N.W. angle of Bridens Patent, and following up the same boundary line S 49° W. 10 chains thence S 33° W. 6 chains 20 feet, thence S 49° W 10 chains, thence West 7 chains 40 feet, thence S 30° W 10 chains 40 feet to the woods, being the extreme N.W. angle of this survey, thence along the edge of the woods S 6° E 5 chains 20 feet, to extreme S.W. angle of this survey, thence down the boundary line of this land and Laimi N 41° E 10 chains 40 feet, thence N 62° E 5 chains 40 feet, thence N 55° E 5 chains 60 feet, thence N 31° E. 5 chains 20 feet, thence N 33½° E. 5 chains 30 feet, thence N 36° E. 5 chains 60 feet to the extreme S.W. angle of Bridens Patent, thence recommencing at the extreme S.E. angle of Bridens Patent, and following down the same boundary line (the northern side of the road leading towards the woods

Figure 19. Scanned copy of Royal Patent Grant No. 1358 to Farwell, page 1 of 2 (OHA 2018).



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is the boundary line) N 35° E 2 chains 6 feet, thence N 67° E 2 chains 60 feet, thence N. 1° E. 1 chain 24 feet, thence N 53½° E. 2 chains 30 feet, thence N. 24° E. 4 chains 12 feet, thence N 53½° E. 2 chains 12 feet thence N 37° E. 6 chains 60 feet, thence N. 47° E. 4 chains 56 feet, thence N. 17° E. 1 chain 30 feet, thence N. 31° E. 2 chains 24 feet, thence N. 22° E. 2 chains 12 feet, thence N 59° E. 4 chains, thence N. 42° E. 2 chains, thence N. 54° E. 2 chains 12 feet to a stake on the Northern side of the Road, being the extreme S.W. angle of Mr Metcalfs survey of Mr Morris's Patent on Saimi, thence by his line of survey N 52° E 43½ chains to the place of beginning

Containing 52, 68/100 Acres, more or less:
excepting and reserving to the Hawaiian Government, all mineral or metallic Mines of every description.
To have and to hold the above granted Land in Fee Simple, unto the said William C. Farwell, his Heirs and Assigns forever, subject to the taxes to be from time to time imposed by the Legislative Council equally, upon all landed Property held in Fee Simple.
In Witness Whereof, I have hereunto set my Hand, and caused the Great Seal of the Hawaiian Islands to be affixed, at Honolulu, this twenty first day of March 1854.
Signed Kamehameha
Signed Keoni Ana

Figure 20. Scanned copy of Royal Patent Grant No. 1358 to Farwell, page 2 of 2 (OHA 2018).

Commercial Sugar, Boundary Commission Testimony, and Railroad (ca. 1880-1994)

Following the *Māhele* and the signing of the 1875 Treaty of Reciprocity, a free-trade agreement between the United States and the Kingdom of Hawai‘i which guaranteed a duty-free market for Hawaiian sugar in exchange for special economic privileges for the United States, commercial sugarcane cultivation and sugar production became the central economic focus for the Hilo area. By 1874, Hilo already ranked as the second-largest population center in the islands and within a few years the fertile uplands, plentiful water supply, and port combined to make Hilo a major center for sugarcane production and export. The plantation lands commonly extended some two to three miles inland from the coast (Best 1978). Elevations typically ranged from 250 feet above sea level along the shoreline bluffs to 2,000 feet above sea level at their western (*mauka*) limits. Ocean frontage could range from two to six miles. Railroads operating on steam and animal power were built on some plantations by 1887, however, some plantations utilized flumes or cable railways to transport cane from the fields to the coastal mills.

With the purported annexation of Hawai‘i to the United States in 1898 and subsequent granting of Territory status in 1900, Hilo was designated the center of county government in 1905 and remained the second most populated city in Hawai‘i (Dorrance and Morgan 2000; Sai 2011). Sugar cultivation continued to be the island’s most lucrative industry until the ca. the 1970s (Dorrance and Morgan 2000). The sugar industry brought widespread changes to the Hilo area and drastically altered the traditional natural and cultural landscape of the district. As part of the late 19th-century development of the sugar plantations and related infrastructure, some of Hilo’s largest fishponds (Hanalei, Kalepolepo, Mohouli, Waiāhole, and Hō‘akimau) were filled in, and many old residences, burial sites, trails, *heiau*, formerly located in the cane fields were destroyed as a result.

In prospecting Hilo for land suitable for development, a report was made by the Royal Commissioners on Development of Resources. Formed by King David Kalākaua in 1877, commissioners conducted examinations of lands along the Hāmākua/Hilo coastline and consulted with residents in an effort to learn about needs and natural resources. In 1877, Honomū was investigated for its potential as a landing and sugar mill location:

> At Honomu, in ordinary weather, a good landing can be made in a surf boat, and would only need a buoy; parties are projecting a small plantation on this land with a mill in the gulch. There are some 1500 acres of Government land in the vicinity, and 1250 sold to private parties, some of which is cane land. The establishment of a good mill at Honomu would greatly add to the value of these lands. (Maly and Maly 2006:48)

Three years later in 1880, M. Kirchoff & Company, along with C. Brewer & Company, Ltd. as agent, established Honomū Sugar Company on 2,400 acres of land within the South Hilo District (Dorrance and Morgan 2000). The Honomū Sugar Company mill was located on the coast, north of the project area, and the upper region of Honomū was interspersed with small-farm homesteaders (Figure 21). The expansion of the Honomū Sugar Company into Mālamalamaiki began in May of 1886 when Edward Witschy lease four acres of land to the Honomū Sugar Company (Edward Olson Trust Archives HSC2-18-19). Witschy had purchased Mālamalamaiki 2 from Charles C. Harris in May of 1875 after Harris had purchased the *ahupua‘a* in an 1859 public auction (Edward Olson Trust Archives HSC2-37, 35). In 1877, Witschy sold Mālamalamaiki to William and Caroline Kinney but in 1886, Witcshy along with his attorney, D. H. Hitchcock appeared before the Commissioners of Boundaries to settle the boundaries of Mālamalamaiki 2 (Edward Olson Trust Archives HSC2-46).

Boundary Commission Testimony (1886 and 1874)

As the Honomū Sugar Company continues to expand its operations, they began the process of acquiring adjacent tracts of land which eventually included the current project area. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded solely by name as a part of the *Māhele ‘Āina*. Subsequently, in 1874, the Boundary Commission was authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents who typically learned of the boundaries from an elder relative or neighbor. The boundary information was usually given in Hawaiian and simultaneously transcribed by the courts into English. The information described by the informants tell of natural and built features as well as traditional place names and its uses specific to Mālamalamaiki.

Figure 21. A 1929 aerial photograph of the Honomū Sugar Mill; project area now shown.

Testimony concerning the boundaries of Mālamalamaiki was collected on two separate occasions. The first hearing for the boundaries of Mālamalamaiki 1st occurred in June of 1874 and the second for Mālamalamalaiki 2 was in August 1886. On June 30th, 1874 the Commissioners met at the Hilo Court House on the application of L. McCully, the attorney for Noa Kaikinui, to settle the boundaries of Mālamalamaiki 1st. Prior to the hearing of testimony, P. Ama, a land surveyor provided the following statement concerning his survey of Mālamalamaiki 1st:

> Notes of survey filed by P. Ama; on May 1st 1874 presented by applicant. Ama took oath May 1st as to said Notes of survey. He said, I am a land surveyor and surveyed this land as Kauena pointed out boundaries to me, and copied Notes of survey from Patents of adjoining lands from the Kaupakuea hawai [*sic*] I surveyed up the road to Ohiakiikii and not on the boundary, but surveyed across to boundary at flume

The first native primary informant was Kauena who was a multi-generational resident of Mālamalamaiki. According to notes from the testimony, Kauena was about 70 years old at the time of the hearing, thus placing his date of birth sometime around 1804. Kauena‘s testimony as well as those provided by two other native informants, Kaiakoili and Nawai are provided below:

> <u>Kaunena k. Sworn</u>
>
> I was born at Malamalamaiki during the reign of Kamehameha I and have always lived there, and my forefathers before me. I was large enough to go about at the time of the battle of Kuamoo. Know the boundary of the land as it is a small one, and a trail is the boundary between the two Malamalamaiki. Know Ama and pointed out the boundaries between the two lands to him. He surveyed the one adjoining Honomu gulch, and he surveyed it as I pointed it our. He commenced at the mauka corner at Ohiakiikii a resting place on the road in the woods he then surveyed down the road to hawai of Kaupakuea, not on the boundary. Thence towards Hamakua to where I pointed out the boundary between the two lands. Thence to Naomi‘s land on Malamalamaiki 1. (He surveyed as I told him without disputing the boundaries) From the mauka corner of Naomi‘s land to the shore the adjoining land has been sold. We went to shore and surveyed across from corner of land sold to Honomu gulch.
>
> The Honomu gulch is on the Hamakua side of this land and is the boundary from shore to opposite Ohiakiikii where Malamalamaiki is cut off by Honomu: Bounded makai by the sea.
>
> <u>Kaiakoili k. Sowrn</u>

> I went and carried the chain with Nawai when Ama surveyed the land Kauena was the kamaaina. Commenced at Ohiakiikii and surveyed across the land to Honomu gulch. Marked a tree at Ohiakiikii, and from thence surveyed down the road to flume. We then went down to where we came to the gulch and surveyed from there across to Homonu gulch. Then we to Palau‘s houses and surveyed to shore, and then across to the Honomu gulch. We went where Kauena pointed out.
>
> Nawai k. Sworn
>
> I went with Kauena and Kaiakoili when Ama surveyed the land. My knowledge is the same as the last witness has testified to. (Boundary Commission 1874a:283-284)

Following the testimony, the Commission heard the following statement from McCully, "...stated he finds that this land was sold to His Ex. C.C. Harris, paid cost, and declined to go any further in matter" (Boundary Commission 1874a:284)

On August 6th, 1886, the Commissioners of Boundaries conveined again at the courthouse in Hilo on the application of D. H. Hitchcock, the attorney for Edward Witschy, to settle the boundaries of Mālamalamaiki 2. Sworn testimony for Mālamalamaiki 2 was provided by Kauhane, Bila Kamakana, and D. H Hitchcock. Although no information concerning land use is noted in the testimony, information about traditional place names are mentioned. Their testimony is transcribed in its entirety below:

> Kauhane sworn
>
> Malamalamaiki first adjoins the land from the sea to "Kaloaawapuhi"; then Laimi joins, a road being the boundary; to "Kapoalua", where Honomu and Laimi meet, and Malamalamaiki 2nd ends. From Kapoalua down, the boundary of Malamalamiki 2nd and Honomu is an awawa [gulch] to the big gulch, which branches, the south branch being the boundary down to the sea; between Honomu and Malamalamaiki 2nd the north branch is large where it enters the woods, but it soon ends. "Kaihi" is really the principal branch of the Honomu gulch, which runs a long way up into the woods—the stream of water in the gulch is the boundary between Honomu and Malamalamaiki 2nd to the sea; bounded makai by the sea.
>
> Bila Kamakana sworn
>
> Kauhane has told the boundaries correctly.
>
> D. H. Hitchcock sworn
>
> I surveyed the land of Malamalamaiki 2nd along the adjoining Royal Patents, as far as they go, and on along the boundaries as they were pointed out by Bila Kamakana; the land is very narrow above to the place called "Poalua." The survey of Malamalamaiki 2nd runs along the main branch of the Honomu gulch, which branches in the woods. (Boundary Commission 1874b:41-42)

After Mālamalamaiki was deeded to Kinney, the acting manager for the Honomū Sugar Company (Lane 1890), he sold a portion of the *ahupua‘a* in 1886 to the Honomū Sugar Company and retained a portion for his heirs (Edward Olson Trust Archives HSC2-83).

Development of Railroad Infrastructure (ca. 1901-1946)

In 1890 the plantation was producing 2,000 tons of sugar yearly. Initially, no Hilo coast plantation had a railroad, so fluming was extensively utilized by the Honomū Sugar Company who shipped its product from Honomū Landing to Honolulu via inter-island vessels that anchored offshore. By the turn of the century, plans to install a railroad between Hilo and Honoka‘a were being actualized. Railroad construction was one of the most important elements of governmental and private sector planning following the Treaty of Reciprocity, as crops and product were still being transported by beast and cart (Dorrance and Morgan 2000). On the Island of Hawai‘i, the first major line to be constructed was in North Kohala District, which operated as the Hawaiian Railroad Company. The North Kohala line, however, was envisioned as only the first step toward a much larger system connecting the cane fields of Kohala, Hāmākua, and Hilo with Hilo Harbor, the only protected deep-water port on the island. Beginning in 1899, railroad lines began transporting sugar to the harbor for marine transport, thus Hilo became an important shipping and railroad hub.

Lorrin A. Thurston, who according to Thrum had "been connected with the enterprise from its initiation" (Thurston 1913:142), wrote an article upon the completion of the railroad from Hilo to Pa‘auilo, Hāmākua in May of 1913 entitled "Railroading in Hilo" which was published in *Thrum's Hawaiian Annual and Almanac for 1914*. Thurston reported that the Hilo Railroad Company (HRC) initiated the railroad endeavor in 1899 from Waiākea south

to ʻŌlaʻa and onwards to Kapoho. The initial distance of twenty-five miles of track was completed by April 1901. Later that same year, the track was extended along the waterfront of Hilo to the Wailuku River, at the foot of Waianuenue Street" (ibid.:143). In 1903, HRC constructed a wharf at Waiākea and completed a branch line connecting it to the waterfront line.

The commercial sugar industry provided most of the cargo transported by HRC, but suffered a sharp decline between the years of 1904-1907, which caused a halt of development in Hilo (Thurston 1913). In response, HRC worked with ʻŌlaʻa Sugar Company to send a representative to Washington D.C. in 1907 to secure funding for the construction of a breakwater that would allow Hilo Bay to accommodate larger ocean-going vessels. Construction on the breakwater began in 1908 and was still ongoing at the time of Thurston's writing (ca. 1914); the breakwater was finally completed in 1929. In exchange for the construction of a breakwater in Hilo Bay, the Hilo Railroad was required to build a new wharf, a one-mile rail extension from Waiākea, and a 50-mile rail extension north to Honokaʻa Mill (the Hāmākua Division). The funding of the breakwater by HRC resulted in the extension of the railroad through the populated section north of Hilo all the way to Hakalau and eventually to Hāmākua (Figure 22). The proposed railroad alignment is shown as early as 1902, as a map titled "Map of the lands of the Honomu Sug. Co." shows the Honomū mill to the north of the project area and the proposed railroad route meandering along the coast and crossing through the project area (Figure 23). In describing plans for the proposed extension of the HCR in the area north of Hilo town, Thurston wrote:

> When the breakwater project was pending before Congress, opposition was made to the appropriation on account of the limited commerce then being transacted through Hilo harbor.
>
> Assurances were thereupon made by the Hilo Railroad Company, that if the breakwater were constructed, a railroad would be built into the country north of Hilo and suitable wharf facilities provided under the lee of the breakwater. Such assurances had a material effect in securing the appropriation. (Thurston 1913:145)

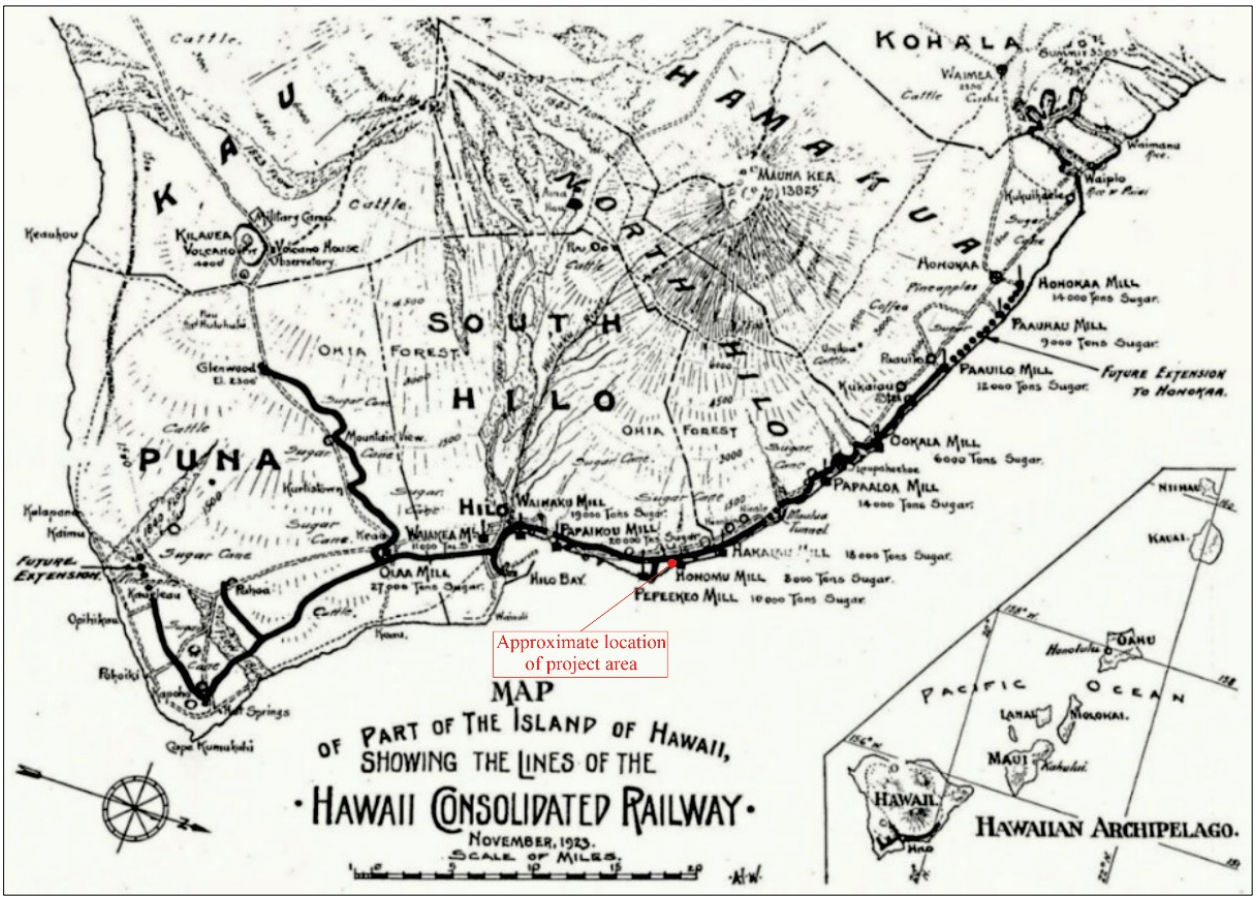

Figure 22. Hawaii Consolidated Railway Map of November 1923 (Annual Report 1926).

Figure 23. A portion of the 1902 "Map of the Lands of the Honomu Sug. Co., (Edmund Olson Trust Archives).

The extension to Honoka'a would finally connect the sugar mills of South Hilo, North Hilo, and Hāmākua with Hilo's protected harbor. Between June 1909 and December 24, 1911, HRC built 12.7 miles of rail extending from Hilo to Hakalau Mill, crossing many deep gulches and valleys, including the current study area, along its route. This was followed by the construction of an additional 21 miles of rail that connected Hakalau with Pa'auilo to the north, which covered a total distance from Hilo of roughly 34 miles and was known as the "Hamakua Division" (Thurston 1913:146). Thurston defined the objective of the Hāmākua Division thusly:

> The principal object of the extension is to give adequate transportation facilities between Hilo and the fertile and well-settled territory extending for 50 miles north of the town of Hilo, and averaging three to four miles in width. This district produces nearly one-fourth of the entire output of sugar of the Territory and is, including the town, the home of over 30,000 people. The only means of access to this section has heretofore been by wagon road, almost impassable in rainy weather, and by derrick and cable landings over bluffs rising from 50 to 300 feet sheer from blue ocean. There are no harbors. (Thurston 1913:147)

Thurston described the scenery afforded to passengers who traveled on the Hāmākua Division as follows:

> Incidentally, the road has opened up one of the most remarkable, unique and spectacular scenic routes to be found in any part of the world. It may appear impossible for a railroad to run through a thickly-settled, highly-cultivated country and yet be noted for spectacular scenery. The paradox is explained by the fact that the district lies along the base and on the steep slope of Mauna Kea, the highest mountain in the Pacific. . .
>
> The combination of steep grade and heavy rainfall has resulted in excessive erosion, the mountain side being seamed at frequent intervals with deep gulches, in which the streams form innumerable cataracts and waterfalls. . .
>
> Some conception of the rugged character of the country can be gained from the fact that in less than 34 miles, there are 211 water openings under the railroad track, ranging from a concrete culvert to steel bridges up to 1006 feet in length and 230 feet high. . . (Thurston 1913:147-149)

The railroad can be seen crossing through the western portion of the subject parcel in a 1915 U.S.G.S. Honomū quadrangle (Figure 24). Also depicted in 1915 U.S.G.S. map is a flume traversing through the eastern portion of the subject parcel and descending into Mālamalamaiki Gulch before continuing north along the coastline. The environs of the study area were described by John W. Bains in an article entitled "Around About Hilo" that was published in a January 1913 edition of the *Mid-Pacific Magazine*:

> Mile upon mile of sugarcane fields stretch away on both sides of the line, insistent evidence of the magnitude of Hawaii's most valued product. The quaint and unique method of conveying the cane from the uttermost borders of the fields to the very jaws of the mill rollers by the means of water flumes is to be seen at various points along the line. (Bains 1913:356–357)

Ultimately, the cost of the Hāmākua Division ruined HRC and the company was forced to sell and in 1916 they reorganize under the name Hawaii Consolidated Railway (HCR). By 1919, Honomū Sugar Company held roughly 2,300 acres of land; 1,271 of which were owned outright by the company, and 1,000 of which were leasehold. The company's cultivated sugarcane lands extended from 50 to 1,500 feet above sea level and were situated between the neighboring mills of Pepeʻekeo and Hakalau, including the majority of the current project area. A 1922 Hawaiʻi Registered Map No. 0799 (Figure 25) depicts the approximate extent of the Honomū sugar lands with respect to the neighboring plantations and shows the railroad track passing along the western boundary of the project area.

With the complete development of railroad infrastructure in the project area vicinity sugar production increased. A 1932 field map of the Honomū Sugar Company shows the current project area and the surrounding land to be within "Field 3", which included a land area of 44.80 acres, 37.45 acres of which were owned and operated by the plantation. Field 3 extended from the coast of both Mālamalamaiki 1st and 2nd to the Government Road (Figure 26). The 1932 field map shows the railroad extending along the *mauka* edge of the project area and a flume meandering along the sea cliffs in the *makai* portion of the project area. Additionally, the 1932 map (see Figure 26) shows the level tableland in the project area cultivated in cane whereas 1.25 acres of the cliff line (shaded orange) was cultivated in "Pali Planters cane." This included 0.7 acres of the parcel's rocky coastline (labeled "#84" in Figure 26) and 0.55 acres of the steep, Mālamalamaiki Gulch bank (labeled "#82" in Figure 26) The steep gulch banks and rocky coastal cliff edges in the South Hilo district made it difficult for the plantation companies' machinery to cultivate and harvest cane, therefore, independent contractors were hired to manually clear and cultivate cane in these marginal zones. The "Pali Planters" (cliff planters) were one such group contracted by the Honomū Sugar Company to clear and cultivate cane in these areas. By 1935, Pali Planters as well as other independent contracts became "adherent planters" to the sugar cane companies under the Agricultural Adjustment Act (Lands 1948).

While a similar scene is depicted in the 1932 Honomū Sugar Company title map (Figure 27), this map shows the extent of the Honomū Sugar Company infrastructure. Water was diverted from several perennial streams including Pāheʻeheʻe, Kolekole, and Honomū (which bounds the subject parcel to the north) through a 9-mile long network of flumes to the fields which grew several varieties of cane including ". . . Yellow Caledonia with a little Rose Bamboo and a small amount of different varieties sent from the Planters' Experiment Station" and crop yields were further supplemented by nearby homestead growers who dedicated approximately 400 additional acres of land to cane cultivation for the company (Evening Bulletin Industrial Edition 1909).

In 1920, HCR attempted to capture a larger piece of the growing tourist business with its adventurous scenic route tour dubbed the "Scenic Express." HCR had long offered service to Glenwood for tourists visiting Kīlauea, but motorbuses now dominated this route. The Hāmākua Coast, by contrast, was not easily accessible by automobile. HCR was therefore able to run passenger coaches profitably along the Hāmākua Division with stops at scenic points. Passenger business declined in the early decades of the twentieth century, and the rise of the automobile was a harbinger for the railroad. In 1920, 607,220 passengers were carried. In 1930, the number dropped to just 77,894 and continued as the years progressed, with passenger counts dropping as low as 16,681 in 1936 (Best 1978:145–146). As a result, the remaining passenger cars were converted for other uses, and the little passenger traffic which persisted was hauled on custom-built railbuses.

In the years following railway passenger-ship progressively dropped, but with the onset of World War II, usage spiked significantly due to war-time gas rationing and the dramatic influx of servicemen. By 1943 passenger totals had rebounded profoundly to 103,635 but inevitably, the popularity of automobiles began to take a toll on the railroad's industrial customers. As roadways were improved and gasoline prices dropped, simple economics favored trucking over trains. Ironically, just as rail transportation was in the throes of decline, HCR was by 1945 almost out of debt for the first time since its inception. The great *tsunami* of 1946, however, would soon seal its fate.

On April 1, 1946, a *tsunami* triggered by an earthquake in the Aleutian Islands slammed into the north-facing shores of Hawaiʻi Island, dealing a fatal blow to the already struggling HCR. Tracks around the waterfront were

entirely washed out and the Hilo Station was wrecked. An entire span of the Wailuku Bridge was torn out and washed out and "twelve miles north of Hilo, the railroad bridge at the mouth of the Kolekole Stream lost its center span" from a massive inundation of water that reached heights of 37 feet in Kolekole and neighboring Hakalau Gulch (Klein et al. 1985; MKE Associates LLC and Fung Associates, Inc. 2013:E8). The destruction from the *tsunami* was so severe that the HCR filed for abandonment soon thereafter, receiving permission to do so in December of 1946. Despite its destruction, the bridge-laden Hāmākua Division was later appropriated by the Territorial Government, who utilized the abandoned railroad alignment to construct the Hawai‘i Belt Road in the 1950s:

> . . . the railroad asked shippers to determine whether they would use the line if it were rebuilt or were intending to ship their raw sugar by truck. Only Theo H. Davies Ltd. voted to retain the railroad; the rest voted to use the existing highways, despite their poor condition. Hawai‘i Consolidated Railroad then offered its entire right-of-way, including all bridges and tunnels, to the Territorial Highway Department and to the Hawai‘i County supervisors. Both agencies declined the railroad's offer.
>
> The entire railroad was sold as scrap to Gilmore Steel & Company of San Francisco for $81,000. About the time the scrappers had finished pulling up the rails and begun dismantling the steel bridges, the Territorial Highway Department changed its mind. They decided to improve the Hawai‘i Belt Road, along the Hāmākua Coast by relocating it to the railroad right-of-way and to utilize the railroad trestles as highway bridge supports. They bought the bridges still in place, as well as the parts of bridges already trucked to Hilo, for $303,723.53 – nearly four times the amount Gilmore Steel & Supply Company had paid to Hawai‘i Consolidated for the entire railroad. These railroad bridge elements were used for the Hawaii Belt Road. . . (MKE Associates LLC and Fung Associates, Inc. 2013:E8)

By 1941, Honomū Sugar Company held 3,027 acres of cane land, and production had reached 10,407 tons (Hitch 1992), but in years following World War II left an indelible mark on the company as it fell under duress due to wage increases and labor scarcity. A pattern of cane field acquisition emerged in the following years in an effort to boost cultivatable acreage and thereby ensure sustainable profitability for the big players in the industry, and in 1946, C. Brewer & Co. acquired a controlling interest in Honomū Sugar Company and merged it into the Pepe‘ekeo Sugar Company (Dorrance and Morgan 2000). Nearly two decades later in 1962, Pepe‘ekeo Sugar Company fused with Hakalau Plantation, and in 1973 Hakalau consolidated into Mauna Kea Sugar Company, a non-profit corporation that now held Hakalau in addition to the Honomū, Pepe‘ekeo, ‘Onomea, and Hilo Sugar companies (Dorrance and Morgan 2000). A 1966 USGS map (Figure 28) shows the route of Hawai‘i Belt Road along the western boundary of the project area and the only remaining plantation infrastructure in the project area is the looping cane road along the southern portion of the project area. Aerial imagery taken in 1965 (Figure 29) shows the majority of the parcel, with the exception of the eastern point, cultivated in cane and a looping cane haul road along the southern portion of the property. Another aerial taken in 1977 (Figure 30) shows ongoing cane cultivation in the project area, however, the looping cane haul road appears to have fallen out of use by this time. Mauna Kea Sugar Company, which eventually became Mauna Kea Agribusiness, became the third-largest in acreage (13,000 acres) on Hawai‘i Island. It continued to operate until 1994 when it phased out sugar production and closed its doors forever, marking the end of commercial sugarcane production in the Hilo area (Dorrance and Morgan 2000).

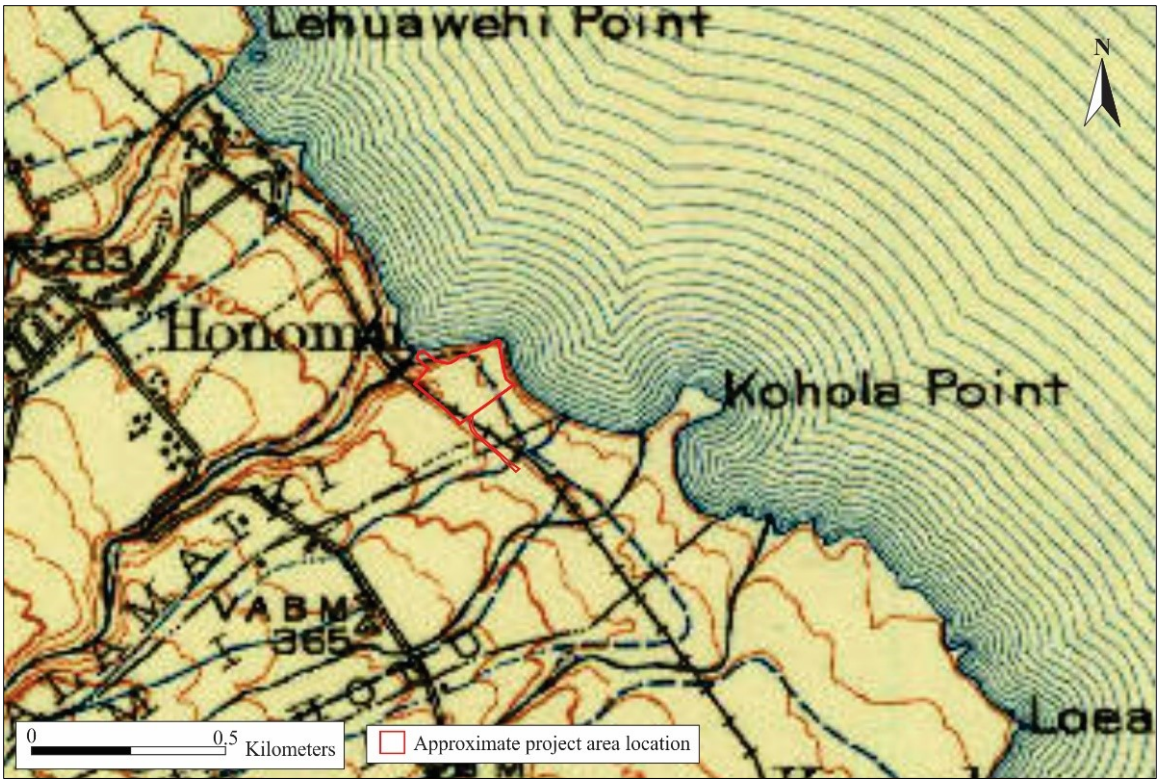

Figure 24. 1915 USGS Honomū Quadrangle map showing railroad and flume in the project area.

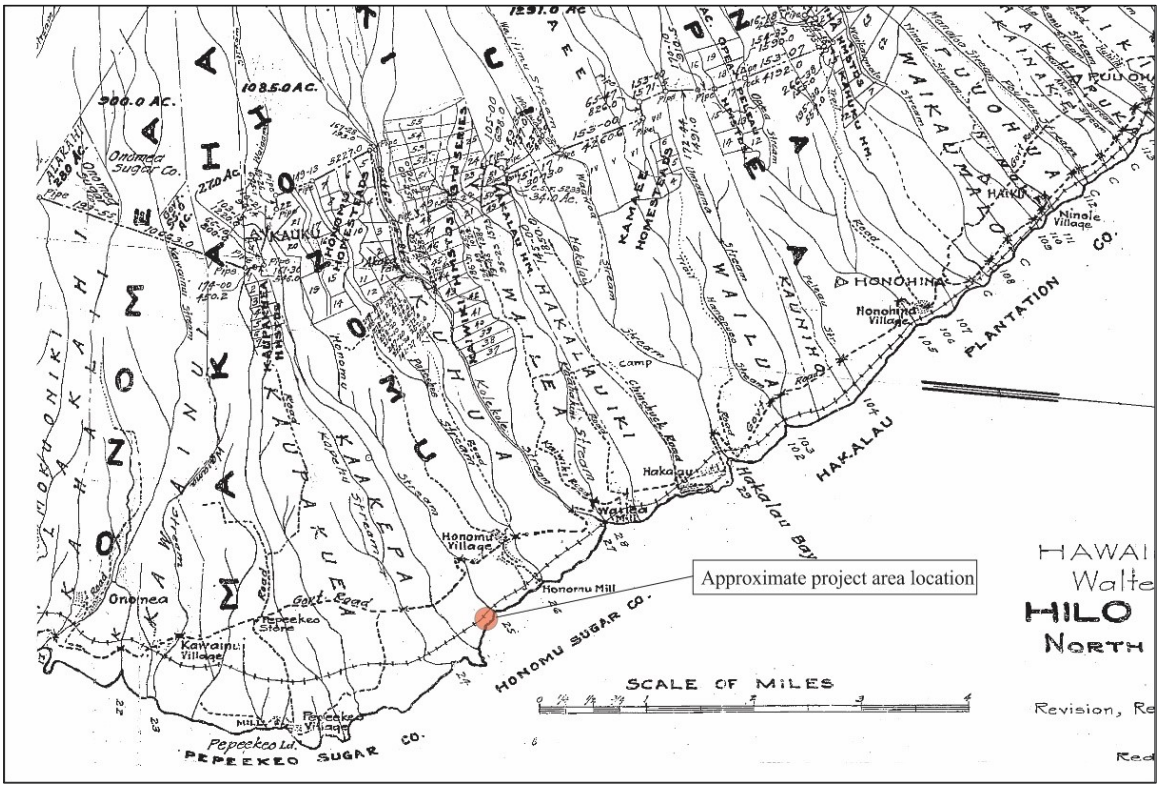

Figure 25. HTS/HSS Plat Map No. 0799 dated 1922 showing the extent of the Honomū Sugar Co. lands.

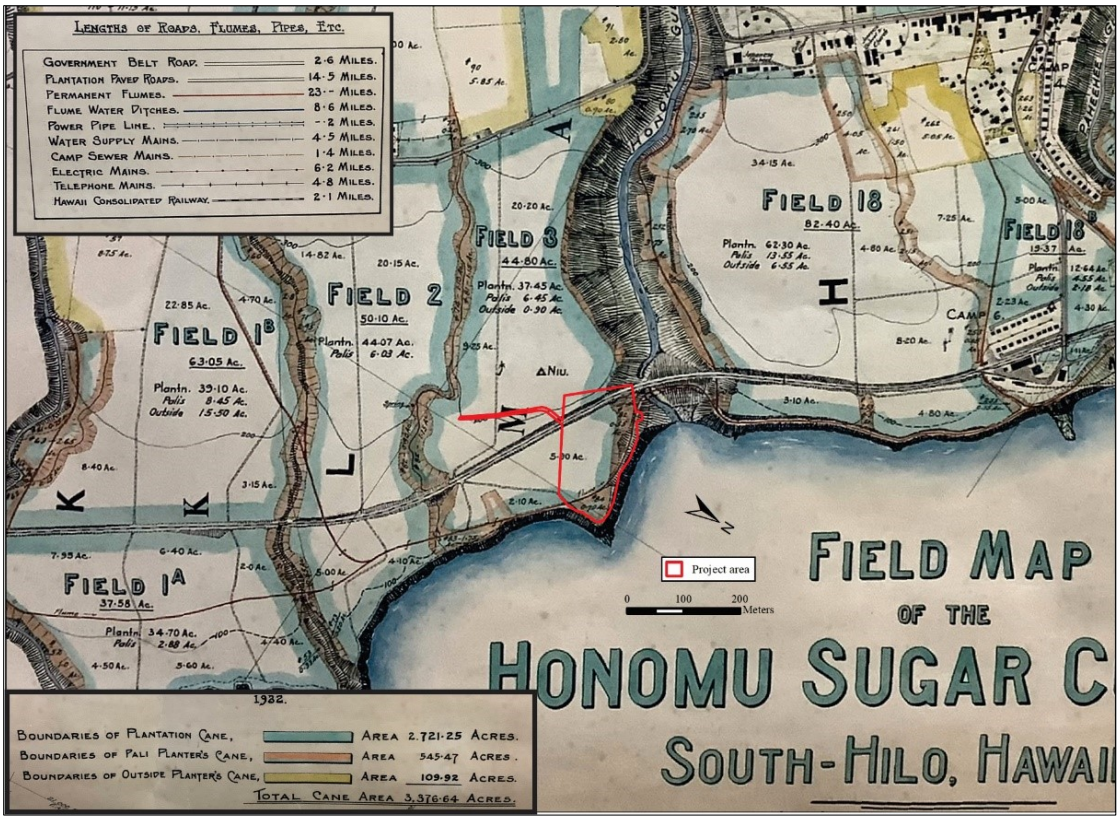

Figure 26. 1932 Field Map of the Honomu Sugar Company by A. J. Williamson. (Edmund Olson Trust Archives)

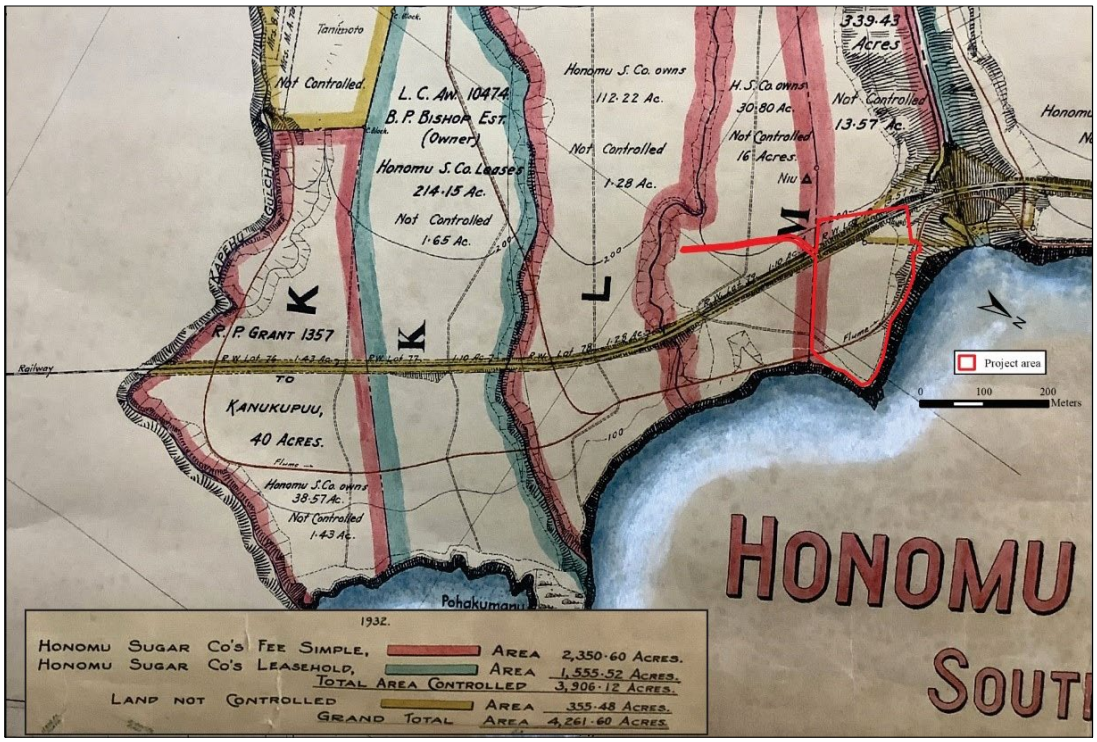

Figure 27. 1932 Title Map of the Honomu Sugar Company by A. J. Williamson. (Edmund Olson Trust Archives).

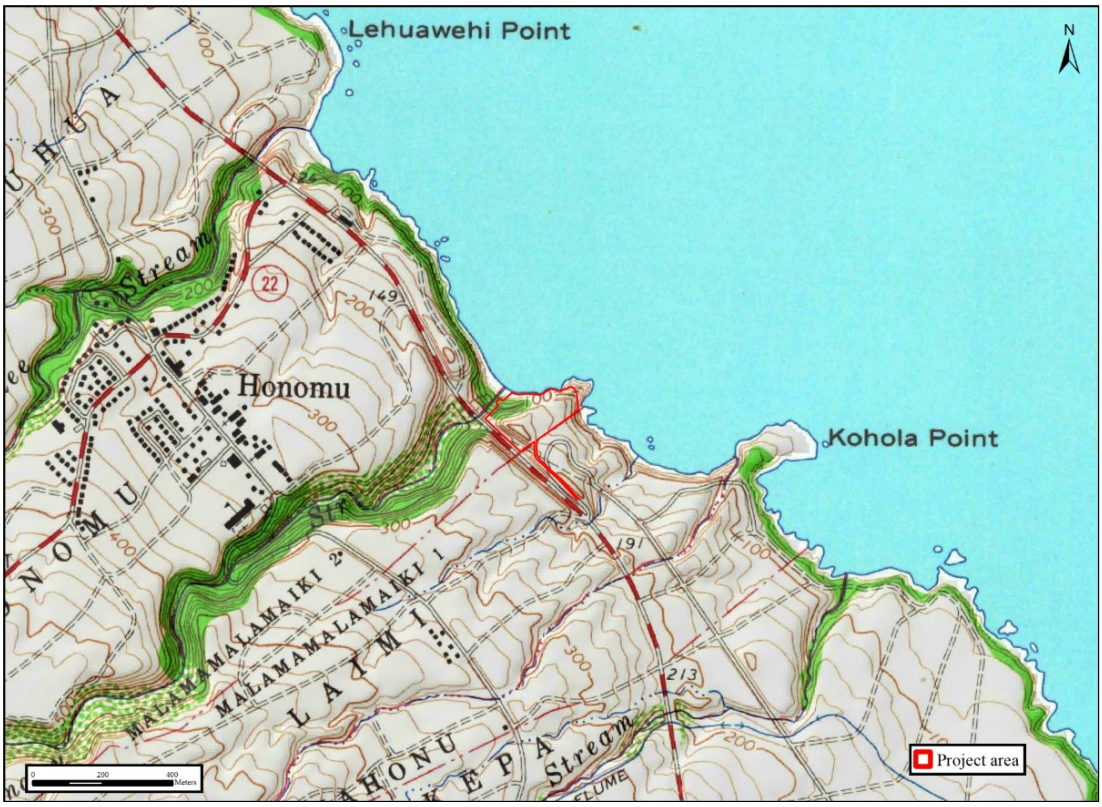

Figure 28. 1966 USGS Pāpa‘ikou Quadrangle map showing railroad and cane road in the project area.

Figure 29. 1965 aerial showing parcel cultivated in cane and a cane haul road.

Figure 30. 1977 aerial showing the project area parcel cultivated in cane.

SUMMARY OF PREVIOUS STUDIES

The earliest archaeological work done in East Hawai‘i was that of the early twentieth-century *heiau* researchers Thomas G. Thrum and John F. G. Stokes (Stokes and Dye 1991; Thrum 1908). They did not identify any *heiau* in the current study area or within the larger region spanning between Honomū and Hakalau. During the early 1930s, Alfred E. Hudson (Hudson 1932), working under the aegis of the Bernice Pauahi Bishop Museum, conducted archaeological investigations in East Hawai‘i. He found little in the region surrounding the current area of study, although he did note the presence of a roughly .25-mile square area of *kalo* terraces north of the project area in the upper part of Hakalau Gulch (Hudson in Maly 1994).

Prior to 2020, there have been no previous archaeological studies conducted specifically within the subject parcel or within the greater Mālamalamaiki 2nd Ahupua‘a. However, several previous studies have been conducted in the neighboring *ahupua‘a* located to the north including Hakalau (Walker 1994;Rosendahl 2001;Uyeoka 2007;Rosendahl 2009; Henry 2014), Wailea (Desilets et al. 2004; Hammatt and Colin 1998), Kaiwiki 3 (Escott 2011), and Kūhua-Honomū (Bautista et al. 2018b; Glennon et al. 2019). The archaeological finds from these studies have been limited to Historic era sites most of which were associated with commercial sugar plantation (i.e. concrete foundations, wooden structures, ditches), plantation cemeteries, bridges, and railroad infrastructure. None of these archaeological studies have reported on any Precontact era sites. The cultural impact assessments conducted in the study area vicinity are limited and have focused solely on the lands of Kūhua-Honomū located north of the project area (Bautista et al. 2018a; Santos et al. 2019). The cultural practices identified in these studies included subsistence gathering in the streams and on the coastline. The parties consulted as part of these studies also expressed concern over the disturbance of historical plantation features as land use activities change in the area.

In 2020, ASM Affiliates conducted an archaeological inventory survey of the project area (Glennon and Brandt 2020). One previously recorded site (State Inventory of Historic Places Site 50-10-26-24212) and one newly identified site (SIHP Site 50-10-26-31238) were documented. Site 24212 is a portion of the Hawai‘i Consolidated Railroad railway bed that extends near the western boundary of the parcel. Site 31238 is a section of cut earthen ditch location along the southeastern edge of Mālamalamaiki Gulch near the northern boundary of the project area. Site 31238 is the former location of a permanent flume built by the Honomū Sugar Company.

Site 24212 is considered signigicant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawai‘i during the early twentienth century and under Criterion d for the information it has yielded regarding early twentieth century sugarcane transportation infrastructure. Likewise, Site 31238 is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawai‘i during the early twentieth century and under Criterion d for information it yielded relative to the history of the development of commercial agriculture in South Hilo District. No additional historic preservation work was recommended for either Site 24212 or Site 31238. Thus, their recommended determination of effect for the project was “no historic properties affected.” (Glennon and Brandt 2020).

3. CONSULTATION

Gathering input from community members with genealogical ties and long-standing residency or relationships to the study area is vital to the process of assessing potential cultural impacts to resources, practices, and beliefs. It is precisely these individuals that ascribe meaning and value to traditional resources and practices. Community members often possess traditional knowledge and in-depth understanding that are unavailable elsewhere in the historical or cultural record of a place. As stated in the OEQC (1997) *Guidelines for Assessing Cultural Impacts*, the goal of the oral interview process is to identify potential cultural resources, practices, and beliefs associated with the affected project area. It is the present authors’ further contention that the oral interviews should also be used to augment the process of assessing the significance of any identified traditional cultural properties. Thus, it is the researcher’s responsibility to use the gathered information to identify and describe potential cultural impacts and propose appropriate mitigation as necessary. This section of the report begins with a description of level of effort undertaken to identify persons believed to have knowledge of the study area, followed by the interview methodology. This section of the report concludes with a presentation of the interview summaries that have been reviewed and approved by the consulted parties.

In an effort to identify individuals knowledgeable about traditional cultural practices and/or uses associated with the current study area, a public notice was submitted to the Office of Hawaiian Affairs (OHA) on August 10, 2020 for publication in their monthly newspaper, *Ka Wai Ola* (Brandt 2020). The public notice was published in the September edition of *Ka Wai Ola* and a copy of the public notice is included as Appendix A in this report. As of the date of the current report, no responses have been received from the public notice.

Additionally, ASM staff attempted to contact seven individuals via email and/or phone. These individuals were identified as persons who were long-time residents of the area and believed to have knowledge of past land-use, history, or cultural information. Of the seven people contacted, five agreed to participate in this study. The names of the individuals who agreed to be interviewed are Roger Uchima, Carmelito “Lito” Arkangel, Sam Halsted, Radford DeMotta, and Gail Pilialoha Kailima‘i Ka‘apuni.

INTERVIEW METHODOLOGY

While interviews for CIAs are typically held in persons and sometimes accompanied by a site visit, in light of the COVID-19 pandemic and state social distancing recommendations, all interviews were conducted via phone. Prior to the interview, ASM staff provided information about the nature and location of the proposed project and informed the potential interviewees about the current study. The potential interviewees were informed that the interviews were completely voluntary and that they would be given an opportunity to review their interview summary prior to inclusion in this report. With their consent, ASM staff then asked questions about their background, their knowledge of past land use, and history of the project area, as well as their knowledge of any past or ongoing cultural practices. The informants were also invited to share their thoughts on the proposed development and offer mitigative solutions. Below are the interview summaries that have been reviewed and approved by the consulted parties.

ROGER UCHIMA

On September 8, 2020, Mr. Roger Uchima contacted ASM staff, Ms. Lokelani Brandt via phone, in response to an August 28, 2020 phone call made by Ms. Brandt regarding the proposed project and the nature of the current study. As a long-time resident of the Honomū area, Mr. Uchima shared that growing up the property was cultivated in cane. He described a loop cane haul road that extended into the property which was built for the cane trucks. He explained that the loop road made it easier for the cane trucks to pick up the cane that was harvested from that area. He shared that once the cane was picked up, it was trucked to the nearby mill.

Mr. Uchima shared that along the easternmost point of the property is a fishing spot that is known by the locals as “Ladders.” He related that the name is in reference to the ladders that people used to descend the cliff. He added

that while he remembers the ladders and still fishes along this coastline, he does not access the coast from this property because of safety concerns. When asked if he knew of others who have or continue to access the coast from this property, he shared that he was not aware of any such persons. He went on to state that the only persons who he could recall that used to access the coast from "Ladders" was the older generation. He added that the coastal access from "Ladders" appears to have lessened with the younger generation. Mr. Uchima explained that when the property was cultivated in cane, coastal access was easier because the vegetation on the property and along the cliff was significantly less. He shared that now, the vegetation is dense and makes access difficult.

In describing a past visit to the property, Mr. Uchima shared that he has observed trash piles and noted that people have been illegally dumping rubbish on the property. He opined he was aware of people temporarily camping/squatting on the property. Mr. Uchima stated that with the increase in vegetation, he no longer sees people camping/squatting on the property.

When asked if he was aware of any other cultural practices, history, and past land use, Mr. Uchima stated that aside from prior sugarcane operations and fishing at "Ladders," he was not aware of any other information specific to that property.

CARMELITO ARKANGEL

ASM staff, Ms. Lokelani Brandt contacted Mr. Carmelito "Lito" Arkangel, a long-time Hilo Palikū resident, song writer, musician, and educator regarding the proposed project and current study. When asked if he was familiar with the proposed project area, Mr. Arkangel shared that the area between the old Honomū landing and the former Honomū mill site are known fishing grounds. He related that he used to access the property to fish but no longer does because descending the cliffs via the ladders has become more tretcherous. He pointed out that the leaf litter from *hala* trees that grow along the cliff edge makes the area *pakika* (slippery, smooth) and that coastal erosion has made descending the cliff even more dangerous. He related that although the ladders are there, people also have to insert their feet into small holes in the cliff face to climb down. He descibed the coastal area between Mālamalamaiki and Honomū as "good fishing grounds" and recalled fishing this area on the full-moons. He explained that due to the topography, coastal access in this part of Hilo is limited and shared that he was aware of three coastal access points, one on the current property, another further south near the old Honomū landing, and another further north near the former Honomū mill site. Mr. Arkangel expressed that today, if he wishes to access the coastline to fish whether by himself or with his children, he will usually go through the former Honomū mill site and walk along the coast. When asked if he was aware of others who have or continue to access the area known as "Ladders," Mr. Arkangel shared that yes, people still descend the cliffs from the subject property and added that fishermen may not be there everyday, but they do frequent the area.

Mr. Arkangel recalled the many changes to the Hilo Palikū coastline, most notably, the development of private homes and estates along the cliffs. He expressed that before these sorts of development, community members could access the coast without any issue and that over the years it is becoming more challenging for fishers to get to the coast. He commented that fishing in this part of Hilo is already challeging because of the unique topography and many of the old access points have been utilized over the generations. Mr. Arkangel hope the property owner will work collectively with the local fishermen and the County of Hawai‘i to ensure coastal access is preserved and that the generations to come can continue the practice of fishing along this coastline.

SAM HALSTED

On September 8, 2020, ASM staff, Ms. Lokelani Brandt conducted a phone interview with Mr. Sam Halsted, an educator, father, hunter, fisherman, and life-long Hilo resident. Born and raised in Waiākea Uka, Hilo, Mr. Halsted relocated to Honomū some twenty-years ago and currently lives there with his wife and family. Mr. Halsted humbly explained that he does not consider himself an expert in the history and practices of this area and pointed out that there are others in the Honomū community that has lived there for many generations and know more about the place. He hopes that what he shared in this interview is not taken as an expert or authoritative opinion rather a sharing of his personal understanding and experiences.

Concerning his background, Mr. Halsted shared that his father relocated to Hawai‘i Island in the 1970s and that he had first learned about the various fishing spots between Hilo Bay and Kukuihaele from his uncle, George Martin. He related that his uncle had worked as a mechanic for the Hāmākua Sugar Company and was an avid fisherman. He went on to explain that as he got older and met other fishermen from the area, they would take him to fishing spots previously unknown to him, thus growing his knowledge of the coastal access spots, fishing techniques, and culturally appropriate behavior and practices. For example, he stated that because coastal access is limited along the part of Hilo

and the Hāmākua coast, if they saw a truck parked at one of the access points, they would continue driving to find another unoccupied spot. He opined that it was considered disrespectful to show up and fish right next to another fisher that was already there.

With respect to the current project area vicinity, Mr. Halsted was familiar with the area and stated that the point is a well-known and long-standing fishing spot. He went on to add that in the past, before the installation of the gate, people would drive on the property and descend the cliffs using the ladder and ropes. He laughingly explained that when he was younger, he used to descend the cliffs using ropes and ladders but no longer does this because of safety concerns. He confirmed that people still use this property for coastal access but they now park along the main highway and walking in. He was, however, not sure if people still use the ladders since they are quite old. He related that although he has never gone down the ladders in the project area, he frequently dives in the ocean fronting the point and has observed men picking *ʻopihi* from the rocky shoreline. Mr. Halsted noted that he visits the coastline in the project area for specific types of fish but emphasized that everyone uses resources differently. He clarified that he was aware of only four coastal access routes between the area of Mālamalamaiki and Honomū, which include (from south to north), 23 Flats, the project area, another near the Church, and at the Honomū Mill. He added that each of these spots is quite a distance from one another that if coastal access in the project area is closed, then fishers wishing to get to the point in the project area would have to hike and swim along a very hazardous coastline.

He explained that access to the point in the project area has dwindled over the years but recalled it being a spot that was frequented during his uncleʻs time (i.e. sugar plantation era). When asked why he believed the use of the project area has decreased over the years, he pointed out that during the plantation era, people from the community were not restricted from accessing the coast. He added that after the plantations closed and the land was sold, landowners installed gates or implemented other measures that prevented people from using the area. Mr. Halsted expressed that he understands why such measures are taken and noted that in the project area, he has observed people illegally camping and littering. He also recalled hearing about a fire sometime in 2019 that occurred on the property, which he believes was started by people illegally camping there.

Mr. Halsted spoke at length about the unique geography of this part of Hilo and the coastal access techniques that developed as a result of the steep landscape. He emphasized that because of the geography, access down the cliff is only achievable at certain locations and that knowledge of these locations and the type of marine resources that can be found at each of these spots is passed down orally between family and friends. He theorized that the fishing spots utilized today, including the one in the project area, were likely used for many generations. He imagined that during the Precontact period, north Hilo was a well-populated area because the land there is suited for agriculture. While the terrain does not allow for more classic Hawaiian fishing practices, such as fishponds, Mr. Halsted contends that the only way to obtain a diversity of marine resources in this part of Hilo, which was integral to the traditional lifestyle, was to descend the cliffs. He emphasized that points and peninsulas have always been the preferred location for fishing because they often extend into deeper parts of the ocean where certain pelagic species frequent such as the prized *ulua*.

In reflecting on the changes in this part of Hilo, Mr. Halsted pointed out that over the years, the fishing practices of this region have continuously been threatened by restricted coastal access. He is disheartened by the fact that over the years, the fishing practices specific to this region have declined. He shared that during the plantation era people often remained in their respective communities for several generations but after the plantations' closed, families and more specifically the younger generation relocated to more affordable parts of the island, such as the Puna District. He believes that the relocation of long-time families contributed to the decline in the traditional fishing practices specific to this region. Mr. Halsted stated that the kids that live here today "are only getting half the picture of what the generations before got." He went on to add that the fishing practices of this region are one cultural element that makes this place unique. He highlighted the fact that people from the area do rely on the natural resources to supplement their households, whether it be for subsistence or monetary purposes. He openly shared that although he is a teacher, he and his family supplement their diet multiple times a week with fish and wild boar that they caught from the area. For these reasons, he believes that maintaining coastal access is critical to the survival of the region's fishing traditions.

When asked if he had any mitigative solutions, Mr. Halsted hopes that the landowner and the local fishermen can work together to develop a mutually beneficial relationship. While he respects private property rights, he hopes a walking path can be established somewhere along the property boundary so that local fishers can continue their practice of accessing the coast and fishing from the point. He is open to meeting and developing a relationship with the landowner and believes that if this can be achieved then this is the true meaning of community.

RADFORD DEMOTTA

At the recommendation of Mr. Sam Halstead, a phone interview was conducted by ASM staff, Ms. Lokelani Brandt on September 14, 2020, with Mr. Radford DeMotta. Raised in Pepeʻekeo, Mr. DeMotta currently resides in Honomū town and is a long-time fisherman. Mr. DeMotta shared that the point in the project area has always been a heavily used fishing spot and recalled people using the area since at least the plantation times. In addition to fishing, he commented that people also access the coast to gather *ʻopihi* and sometimes utilize the nearby stream to collect prawns. He added that fishermen from Hāmākua are the ones that frequent this area. When asked about the ladders in the project area, he stated that the ladders are used by the fishermen to descend the cliff. He pointed out that the ladders were frequently used, however, after the gates were installed fewer people accessed the project area. When asked how people today access the fishing spot, he explained that they park along the road and walk-in.

Mr. DeMotta spoke about the old cane road that extends into the project area and noted that the road was used to connect to the Pepeʻekeo Mill and provided access to the various fishing spots. He pointed out that after the sugar mills closed, the old cane road was no longer maintained and that a bridge along the ocean road had washed out, which cut off access to additional fishing spots. Additionally, he reflected that over the years, after the sugar plantations closed and as homes were built along the coast, access to the old fishing spots were blocked. He shared that this was the case in the area near Pepeʻekeo Mill and that only more recently has fishing access been reestablished. He explained that the Pepeʻekeo Shoreline Fishing Committee of the Pepeʻekeo Community Association currently manages coastal access near the Pepeʻekeo Mill. He specified that they have installed a combination lock and that fishermen wishing to access the area must contact the point person, Jaerick Medeiros-Garcia, and provide specific information before receiving the combination code. Mr. DeMotta noted that managing access is important and that uncontrolled access can have unfortunate consequences. He expressed that in the project area vicinity, there are just a few coastal access points including a place known as 23 Flats, another area just before the gulch, and one in the project area.

When asked if he had any thoughts about how to mitigate shoreline access, Mr. DeMotta believes that a managed public access easement should be established. He maintained that the management system currently used by the Pepeʻekeo Shoreline Fishing Committee is a good model and perhaps the committee could aid with management. Mr. DeMotta would also like to see coastal access maintained so that local fishers can access their traditional fishing spots.

GAIL PILIALOHA KAILIMAʻI KAʻAPUNI

On September 16 and 17, 2020, ASM staff, Ms. Lokelani Brandt conducted a phone interview with Ms. Gail Pilialoha Kailimaʻi Kaʻapuni, a multi-generational resident of Mālamalamaiki. Ms. Kaʻapuni's grandfather's sister, Emalia Pilialoha, was married to William Kinney who had purchased the *ahupuaʻa* of Mālamalamaiki 2nd in 1877. Ms. Kaʻapuni's family has maintained their 12-acre family property located on the south side of Honomū Gulch in Mālamalamaiki since her granduncle Kinney had acquired the land. Although Ms. Kaʻapuni currently lives in Hilo, she has spent her entire life growing up Mālamalamaiki, where she attended Honomū Elementary School and where her family hunted, fished, and maintained livestock. She is the third of five children. She explained that many people refer to the area as Honomū, however, she recalled her mother telling her that their property was in Mālamalamaiki. In articulating her connection to this area, Ms. Kaʻapuni stated that "this place is my breath and this land gives me life."

When asked if she knew any history about her granduncle Kinney, Ms. Kaʻapuni explained that he was from Nova Scotia and that he was brought to Hawaiʻi by King Kalākaua to assist with the king's agricultural endeavors. Ms. Kaʻapuni recalled a story of how her granduncle was sent by the king to the Northwestern Hawaiian Islands and saw that the island was filled with bird guano. Her granduncle then recommended to the king that he utilize the guano as fertilizer to advance agricultural productivity. She stated that her granduncle Kinney eventually worked for C. Brewer and Company. Ms. Kaʻapuni related that Kinney came to Hawaiʻi with his wife and children from Nova Scotia but his wife eventually returned home with their children. He, however, remained in Hawaiʻi and after his wife had died, he remarried Mr. Kaʻapuni's grandaunt, Emalia Pilialoha. She shared that Emalia and William had seven children. Although most of Mālamalamiki was later sold to the Honomū Plantation Company, with respect to the family property, she related that the land belonged to William's children and his sons later passed the property to her grandfather, William Hoapili Kailimaʻi. She shared that William's sons sold the land to their uncle for "love and a dollar" and explained that this practice continued in the next generation. In further detailing this family tradition, she added that when she recently transferred the property to her eldest son, she "sold it for love and thirty-five dollars" and laughingly explained that the fees to transfer property is much higher today. In reflecting on how her father had acquired the property in Honomū, Ms. Kaʻapuni related that they had the option to choose between property in Hilo

or Honomū and that her father insisted they take the Mālamalamaiki property because he would be able to fish and farm. Additionally, she believed that her father knew that the area is a special place to raise a family.

As the family settled into their home in Mālamalamaiki, the land became a vital source of sustenance, and Ms. Kaʻapuni shared an array of childhood stories. She commented that at one time, the family house had dirt floors and that when visitors came, they would harvest Guinea grass and use that as floor covering. With respect to the family's use of natural resources, she recalled how her grandparents used to collect *ʻōpae* (shrimp) and *ʻoʻopu* (stream goby) from Honomū Stream. She added that her mother told her that the gulch was called Honomū and that the stream was named Mālamalamaiki. Ms. Kaʻapuni described how her grandfather, William H. Kailimaʻi, had built a small collection/house box for the *ʻōpae* and that when the weather prevented them from gathering from the stream, he would harvest *ʻōpae* from the box. She explained that this way, they always had *ʻōpae* to eat. She reflected on going to *lūʻau* (traditional feast) as a child and looking forward to eating *ʻōpae*. She explained that there were always two pans of *ʻōpae* at the *lūʻau*, one prepared raw-style and one cooked and that "eating it was such a treat." Concerning the family practice of collecting *ʻoʻopu*, Ms. Kaʻapuni described how her grandfather would collect grass with the roots intact and construct a dam near a waterfall. She clarified that within the grassroots were worm which was a food source for the *ʻoʻopu*. She pointed out that the family relied on the river and ocean for various marine resources and noted that while growing up, that is when prawns started populating the rivers. She explained as the prawn population increased, they began eating the food of the *ʻōpae*, which cause the *ʻōpae* population to decrease. Furthermore, Ms. Kaʻapuni lamented that people today use methods like poison or electrocution to gather prawns which further impacts the streams.

In recalling the family fishing practices, Ms. Kaʻapuni remembered the eel fishing method called *puhi ʻinikiniki*. Ms. Kaʻapuni explained that different communities have their own way of collecting certain resources, but in their family traditions, they would place a piece of bait on a "granny pin," place their hand in a long sock, then hold the baited granny pin in their socked hand. They would then stick their hand with the baited pin into the hole and when the eel swam out into their hand, they would grasp the head and quickly peel the sock from their hand and cover the eel. Once the eel was in the sock, they would strike the tail to kill it. The eel was then prepared and placed into *ti* leaves and they would *lāwalu*, a traditional cooking method where the food is wrapped in *tī* and placed on hot coals. She added that when it was time to eat it, they would grasp the head of the eel and pull the head and central bone out in one sweeping motion. She recalled her brothers and father doing this type of fishing and food preparation but noted that *puhi* (eel) was not something she did not eat. Ms. Kaʻapuni added that growing up, these sorts of traditions were not openly shared and that one of the unfortunate results is that these family traditions are forgotten.

Ms. Kaʻapuni also shared stories of how her father and brothers would catch *honu* (turtles) between the area of Pepeʻekeo and Hakalau. She described how her father would drop her brothers off in the waters off Pepeʻekeo and they would swim and fish along the coast where they would eventually meet up with their father. She shared that this is how her father trained his sons to become skilled divers and fishermen. Concerning the preparation of *honu*, she stated that they would clean the turtle in the river, where the bridge had collapsed, and that her father and brothers never collected more than two turtles on anyone fishing trip. She remembered how her family would share their catch with *ʻohana* and neighbors and eating turtle stew, turtle steak, and other turtle dishes as a child. One fishing place that was frequented by her family was Pōhakumana, which is a point on the shore between Kahuā and Honomū. She went to share that today people call that place "23 Flats" but growing up they called it Pōhakumana. She shared stories of how her father would launch their small boat off the cliff by tethering a cable to a tree and boulder. Other resources that were collected by her family included lobsters and Ms. Kaʻapuni shared that they ate lobsters quite often and that this is something she no longer enjoys eating.

Ms. Kaʻapuni recalled that during the sugar plantation, the family relied on a freshwater spring that was from the Honomū Plantation. She added that towards the end of the plantation, the family was informed that they need to connect to the county water supply. She told of how the family had to maintain their water pipes and recalled the pipes running along the gulch, then across the bridge then up the gulch and to the house just below the cemetery. She described how they often dealt with broken water pipes because when the cane trucks came through it often cause the pipes to come loose. If there was no running water at the house, she shared how she and her siblings would go down to the stream just below the Honomū bridge to bathe. She reminisced about how she would float in the stream and the unique sound that she heard while underwater as cars drove overhead on the bridge. She shared stories of walking down Honomū gulch to the coast to a place they called "Takatoi." She described a small pool at the mouth of the stream where they often swam and played. When asked if this Takatoi was near the project area, she clarified that it is on the north side of the project area. She recalled how her son, who lives in Hilo, would take children to experience Mālamalamaiki and life in the gulch.

She recollected stories of walking the streams and stopping at the various waterfalls where they swam and played. In recalling one particular trip to ʻAkaka Falls, Ms. Kaʻapuni said that one night she and her father hiked up the narrow path along the river and as they walked, she and her father heard pebbles falling into the water in the gulch. She explained that when they got to the top and after hearing those pebbles, her father immediately told her that they had to turn back and return home. Although her father was adamant about returning home, it was not clear to her why they had to go back. After returning home, she asked her father why they needed to leave and the father told her that the pebbles falling was a sign that they were not alone on their hike and it was not the right time for them to be there. After sharing that account, Ms. Kaʻapuni said that recalling that story gave her "chicken skin." In relating another family story associated with ʻAkaka Falls, Ms. Kaʻapuni spoke about how during her grandparents' generation, they went above falls into the *koa* forest. She detailed how they hewed a *koa* tree down and *kālai waʻa* (carved a canoe) at Kolekole and that after the canoe was prepared the family gathered food and a live pig and paddled to Pohoiki in the Puna District to deliver it to the Issac Hale ʻOhana. She spoke about how her family was close to the Hale ʻOhana and that relationships were maintained between the people of Mālamalamaiki and Pohoiki. In describing other ancient customary practices of this area and those of Hāmākua, Ms. Kaʻapuni described how families in ʻOnomea cared for the sharks that lived in the bay and made sure they were cleaned and fed. In return, the sharks would offer protection to the families.

When asked about her thoughts on the proposed project, Ms. Kaʻapuni described how the land tax has continuously increased due to the type of houses that have been constructed and this has adversely impacted the local and old-time families. She explained that it is important that fishing access is maintained in the project area because people still fish there and stated that "if we donʻt allow the next generation to do and experience those things and pass it down, it will be lost." Furthermore, she shared that the lifestyle of this area is very much a reflection of past traditions, where some people grow food and others hunt, and that sharing is a lifeway. She spoke passionately about how important this place is to her and her family. She stated that the "love of the *ʻāina* and area is in our blood" and that "Mālamalamaiki to us is really who we are."

4. IDENTIFICATION AND MITIGATION OF POTENTIAL CULTURAL IMPACTS

The OEQC guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include "...subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs" (OEQC 1997:1). The guidelines also identify the types of cultural resources, associated with cultural practices and beliefs that are subject to assessment. These include other types of historic properties, both man made and natural, submerged cultural resources, and traditional cultural properties. The origin of the concept and the expanded definition of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service (Parker and King 1998). An abbreviated definition is provided below:

> "Traditional cultural property" means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community's history and contribute to maintaining the ethnic community's cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

"Traditional" as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. "Cultural" refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term "Property" defines this category of resource as an identifiable place. Traditional cultural properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them.

It is however with the definition of "Property" wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. However offensive the concept of boundaries may be, it is nonetheless the regulatory benchmark for defining and assessing traditional cultural properties.

As the OEQC guidelines do not contain criteria for assessing the significance for traditional cultural properties, this study will adopt the state criteria for evaluating the significance of historic properties, of which traditional cultural properties are a subset. To be significant the potential historic property or traditional cultural property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

a Be associated with events that have made an important contribution to the broad patterns of our history;

b Be associated with the lives of persons important in our past;

c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

d Have yielded, or is likely to yield, information important for research on prehistory or history;

e Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

While it is the practice of the DLNR-SHPD to consider most historic properties significant under Criterion d at a minimum, it is clear that traditional cultural properties by definition would also be significant under Criterion e. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa'akai O Ka 'Āina* v Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights

will be affected or impaired; and third, specify any mitigative actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

SUMMARY OF CULTURE-HISTORICAL BACKGROUND

A review of the culture-historical background material reveals, at a minimum, the Precontact history of Mālamalamaiki Ahupuaʻa is closely related to that of the greater Hilo Palikū region. The upright cliffs, *kula* regions, and numerous valleys and streams served as an ideal landscape for cultivating traditional crops such as *kalo* (taro), *ʻuala* (sweet potato), *maiʻa* (banana), and *kō* (sugarcane). Marine and freshwater resources were accessible from the sheltered bays and copious streams. The abundance of resources in this region was both valued and honored as evidenced by the numerous names for specific places, winds, and rains. Although historical sources about Mālamalamaiki are limited, there are numerous other sources that speak of Hilo Palikū and the adjacent *ahupuaʻa* of Kūhua, where Kolekole Stream and ʻAkaka Falls are located. Both ʻAkaka and the broader Hilo Palikū area are commemorated in several traditional *moʻolelo* and historical accounts. More specifically, numerous *moʻolelo*, such as the story of Kuahailo and Hinaʻaukekele and Ka-Miki, tell of legendary individuals traversing from place to place, meeting with *kamaʻāina* (long-time residence), and partaking in local events. Similar travel accounts of the Historic period can be found, including the narratives told by Z. Poli and Keliiwaiwaiole regarding their journey to ʻAkaka Falls. In these traditional and historical narratives, the treacherous passes and turbulent waterways of Hilo Palikū are consistently noted.

During the early part of the 19th-century, as Hawaiian political elites sought ways to modernize the Hawaiian Kingdom and as the population of Western settlers increased, major socioeconomic and political changes began to take place. By 1840, the Hawaiian Kingdom, through the formal adoption of a constitution, became a constitutional monarchy which was soon followed by a reformation of the traditional land tenure system. By 1848, King Kauikeaouli and his chiefs came together for the final land division and the *ahupuaʻa* of Mālamalamaiki 2nd was awarded to the *aliʻi* Kekuapanio, a *hulumanu* (favorite young noble) of the King. After Kekuapanio died, the land passed to his heir, Huakini. Huakani was, however, involved in a lawsuit against James W. Marsh, Marshall of the Hawaiian Islands, and through a court ruling, Marsh levied Huakini's personal and real property including his land at Mālamalamaiki 2nd. Marsh then sold Mālamalamaiki 2nd at a public auction to Charles C. Harris for $226 on May 6, 1859. By May of 1875, Harris sold Mālamalamaiki 2nd to Edward Witschy and two years later, Witschy had sold most of the *ahupuaʻa* to Nova Scotian natives, William and Caroline Kinney. In 1886, Kinney had retained a portion of Mālamalamaiki for his heirs and sold the remaining land to the Honomū Sugar Company, thus expanding commercial sugar cultivation into Mālamalamaiki 2nd.

Throughout the latter half of the 19th century as large tracts of *kula* land were cleared to make way for commercial sugar operations, the natural landscape of Mālamalamaiki was radically transformed, and most of the remnants of the Precontact and Early Historic cultural landscape was destroyed. In Mālamalamaiki 2nd and the greater Hilo Palikū region, sugar cultivation was restricted to the tablelands, thus the gulches and cliffs were spared from the intensive commercial clearing methods. As a result, these marginal areas have maintained some evidence of the pre-plantation natural and cultural landscape that included plants such as *hala*. Within the project area, the Honomū Sugar Company cultivated its cane and processing occurred at the nearby Honomū Mill. As the sugar industry's economic growth hinged upon increased production, thousands of contract laborers arrived in the Hawaiian Islands to work the fields and mills. To house the workforce, plantation owners built homes and small but thriving communities and invested in infrastructure such as flumes to transport cane to the mill. As evidenced in historic maps and the 2020 archaeological inventory survey of the project area, a portion of a former flume route (SIHP Site 50-10-26-31238) was identified in the northeastern section of the property. To further economic prosperity, during the early part of the 20th century, HCR constructed a railroad, a portion of which extended through the project area and documented as SIHP Site 50-10-26-24212. The unfortunate and destructive April 1, 1946 *tsunami*, wiped out many of the bridges and left HCR in economic hardship. Unable to recover, by the 1950s, the railroad tracks were removed and construction on the wider and straighter Māmalahoa Highway was completed providing a quicker route for the cane trucks and motorists. The new highway effectively replaced the old Māmalahoa Road but in that process rerouted motorists to bypass the once thriving plantation communities. Despite having fulfilled their contracts, many of the laborers opted to remain in Hawaiʻi, which consequently added to the cultural tapestry of the islands and gave rise to Hawaiʻiʻs mixed-ethnicity plantation culture. By 1994, commercial sugar operations in this area came to an end, but the hybrid mixed-culture communities that combined elements of Hawaiian and plantation traditions and heritage have persisted.

IDENTIFICATION OF TRADITIONAL AND CUSTOMARY PRACTICES AND PROPOSED MITIGATIVE MEASURES

Historical documentation describing traditional and customary practices are limited, however, the information gathered through the consultation process was crucial in identifying past and ongoing traditional and customary practices specific to the project area. Additionally, the results of the consultation process in addition to the archaeological inventory survey of the project area conducted by ASM Affiliates (Glennon and Brandt 2020, in prep) aided with the identification of Historic era sites.

Concerning past traditional and customary practices, the consulted parties identified the following: the gathering of near-shore marine resources including *ʻopihi*, eels, lobsters, turtle, fishing for near-shore and pelagic species, and gathering of freshwater resources from streams such as *ʻōpae*, *ʻoʻopu*, and prawns. Additionally, several of the consultees identified the tradition of accessing the coast from the cliffs using methods that include ladders, ropes, and knowledge of the natural environment. Regarding the identification of significant historic properties, several of the consulted parties identified the old cane road that looped into the project area. The old cane road easement was also noted in the archaeological inventory survey in addition to a former flume route (Site 31238) and HCR railway bed (Site 24212).

Of the identified traditional and customary practices, many of the consulted parties expressed explicit concern over the potential impact the proposed development could have on coastal access and gathering of near-shore and pelagic marine species. As expressed by the consulted parties, accessing the cliffs to gather marine resources from the eastern point in the project area has been taking place for at least the past five generations, and that this practice has always been a fundamental part of their lifestyle. Mr. DeMotta, Mr. Halsted, and Mr. Arkangel shared that because of the topography, coastal access in the Hilo Palikū area is limited to a few places and that over the years, the number of access points along the coast has decreased. The decrease in coastal access has been attributed to increased coastal residential development that has disregarded customary access rights. In more recent years, efforts to reestablish customary access rights have been achieved through joint partnerships with landowners and community organizations such as the Pepeʻekeo Shoreline Fishing Committee, a subcommittee of the Pepeʻekeo Community Association.

To mitigate any potential adverse impact to this above identified traditional and customary practices, it is recommended that a public access easement be created that extends from the old cane haul road (currently designated by the County of Hawaiʻi as an easement) to the eastern point in the project area. A public access easement will help ensure that the above-identified practices are maintained for current and future generations. As stated by several of the consulted parties, managed access was preferred. Thus to help with the management of shoreline access, it is recommended that consultation be initiated with Jaerick Medeiros-Garcia of the Pepeʻekeo Shoreline Fishing Committee and any of the parties consulted as part of this study. If the above-identified mitigative measures are considered and implemented then the proposed project may have minimal to no impact on the identified traditional and customary practices. Conversely, if efforts to reasonably protect these traditional customary practices are not considered or implemented, then the proposed project has the potential to disrupt these traditions and practices, thus resulting in an adverse cultural impact.

With respect to the above-identified historic properties, SIHP Site 50-10-26-24212, the HCR railroad bed, was determined significant under Criteria a and d; for its assiciation with the development of commercial agricuture (sugarcane) in Hawaiʻi during the early twentieth century and for the information it has yielded with respect to early twentieth century sugarcane transportation infrstructure. SIHP Site 50-10-26-31238, the former flume route, was determined significant under Criteria a and d; for its association with the development of commercial agriculture (sugarcane) in Hawaiʻi during the early twentieth century and for the information yielded relative to the history of the development of commercial agriculture in South Hilo District. The recommended treatment for these sites was "no further work," as they were adequately documented in the AIS (Glennon and Brandt 2020), thus no mitigation would be necessary to address potential impacts to these sites.

In summary, the recommendations provided above are intended to protect the traditional and customary practices that have been occurring on the subject property from being adversely impacted by the proposed residential development. Likewise, these recommendations are to convey to the planner, landowner, and associated government agencies, the concerns and thoughts shared by the parties interviewed as part of this study. If concerted efforts are made to consider and implement the recommended mitigative measures, then the proposed project will likely not result in a significant adverse impact to the above-identified traditional and customary practices.

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APPENDIX A.
KA WAI OLA PUBLIC NOTICE

CULTURAL IMPACT ASSESSMENT - MĀLAMALAMAIKI AHUPUA'A, SOUTH HILO DISTRICT, ISLAND OF HAWAI'I

ASM Affiliates is preparing a Cultural Impact Assessment (CIA) for a single-family residence being proposed for a roughly 6.48-acre parcel (TMK: (3) 2-5-012:028) situated in Mālamalamaiki Ahupua'a (located south of Honomū Ahupua'a), South Hilo District, Island of Hawai'i. Please contact ASM Affiliates if you would like to participate or contribute to this study by sharing your mana'o about any cultural or historical resources or other information you believe may be relevant. This includes, but not limited to, knowledge of past land use, history, traditional cultural uses of the proposed project area; or those who are involved in any ongoing cultural practices that may be occurring on or in the general vicinity of the subject property. If you have and can share any such information please contact Lokelani Brandt (lbrandt@asmaffiliates.com); phone (808) 969-6066, mailing address ASM Affiliates 507-A E. Lanikaula Street, Hilo, HI 96720. Mahalo.

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Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 4
Coastal Erosion Study

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FINAL

COASTAL EROSION AND SHORELINE HAZARDS STUDY FOR THE HOLCOMB PROPERTY.

Malamalama Iki Ahupua`a, Hāmākua District, Island of Hawai`i.

TMK: (3) 2-8-012:028.

Prepared by:

Timothy E. Scheffler, Ph.D.

and John P. Lockwood, Ph.D., CPG #9806

Prepared for:

Kelly Holcomb

c/o

Jason Knable

Carlsmith Ball, LLC

121 Waianuenue Avenue

Hilo, HI 96792

Tel: 808.935.6644

November 10, 2020

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Executive Summary

A geological survey of the Holcomb property was conducted in order to characterize geological structures and calculate a site-specific Average Annual Erosion Rate (AAER) for the shoreline. This report also identifies erosion prone areas and evaluates the risks posed by other potential hazards that could impact the property. This survey has been prepared in support of a Conservation District Use Permit Application (CDUA) and Environmental Assessment (EA) being prepared for the owner. John P. Lockwood, Ph.D., Certified Professional Geologist (#9806), served as Principal Investigator. The geological history of the subject property is explained. Historical photos of the coastline from 1954, 1965, 1977 and 2019 were evaluated for any measureable changes.

We conclude that the AAER cannot be measured with a high level of quantitative precision, but that the overall value is less than **0.2 feet/year** for the subject property. However, emphasis is placed on the episodic nature of cliff failures and the exacerbating influence of sea level rise on erosion processes.

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Introduction

Hawaii Administrative Rules concerning Conservation Districts (Title 13, Subtitle 1, Chapter 5, adopted August 12, 2011) state that applicants for Single Family Residential construction in coastal Conservation Districts must consider rates of coastal erosion affecting their properties in order to determine minimum shoreline setbacks for permitting. DLNR established a requirement that the Average Annual Coastal Erosion Rate must be determined, based on formal "Coastal Erosion Studies" which are to be carried out following the guidelines in the Hawaii Coastal Hazard Mitigation Guidebook (Hwang 2005). This report satisfies these requirements.

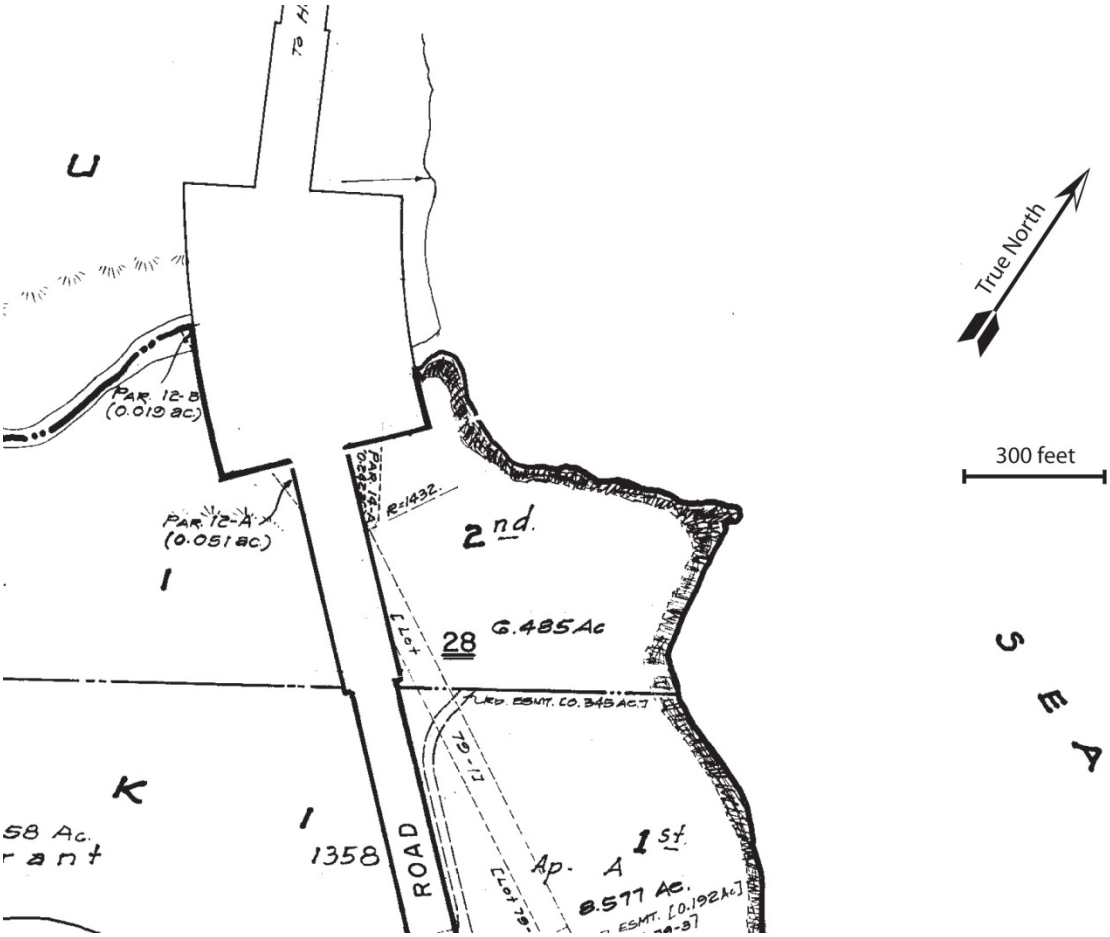


Figure 1 Tax Map Key and Subject Property.

Changes in the coastline over time are the product of the complex and long-term interplay between powerful geological forces, particularly so in Hawai`i. The combined effects of volcanism, erosion, sedimentation, sea-level change, island subsidence, and even bio-genic (ie. reef-building) production over millennia will influence the nature and durability of the coast and the position of the shoreline as we now see it. These processes of both construction and destruction must be accounted for in any evaluation of coastal dynamics (Ramalho, et al., 2013). Volcanic action, mostly new lava flows, build out the island, and then coastlines retreat as mass wasting, marine and fluvial erosion reshape the landscape. The Hawaiian Islands also are subsiding at variable rates across the archipelago; this can accelerate the processes influencing shoreline mobility or future migration.

The dynamics between volcano, ocean and air are difficult to quantify in some aspects, especially on the younger of the Hawaiian Islands which, in their youth, may not yet have reached a long-term, stable equilibrium.

Thorne Abbott (2013) reviews several problematic aspects in determining the AAER for planning purposes in Hawai`i. The difficulties he discusses in measuring erosion rates on lengths of coastline on Maui, apply directly to the Big Island. The problems enumerated include issues with irregular shaped properties and erosion in multiple directions and the problematic nature of erosion-resistant hard coasts as opposed to soft linear beaches. “Soft” shorelines are in a constant state of change affected by seasonal movements of sand (Abbott 2013:17). Hard coasts are more difficult to monitor, usually changing over only much longer periods of time.

Any estimates are best approached with longer term (decadal) studies of a scope that extends beyond the geography of a single parcel. Ideally, regional monitoring studies would include highly accurate means of terrain mapping such as is available today with LiDAR technology (Rosser 2005).

Despite these drawbacks, it is possible to derive an empirically based, and quantitative estimate of erosion rates on site. This report also seeks to delineate any erosion-prone or otherwise hazardous areas along this section of coastline. Per State definitions, the “shoreline” denotes the highest wash of waves and is usually defined by the line of permanent vegetation. However, for properties bounded by sea cliffs (as here), the “certified shoreline” as defined for construction setback purposes is the upper edge of the bounding sea cliff. The “coastline” is a more general term used in this report for the most seaward edge of land at high tide. We continue below with a description of the property and the ocean conditions for this section of the Hāmākua coast.

Property Location and Physical Setting

Honomū, literally translated, “silent bay” (Pukui and Elbert 1986) is located on the northeast facing, windward side of the island in the southern portion of the Hāmākua District.

The Holcomb property consists of a small promontory immediately south of the mouth of the Honomū Stream. It lies about midway between Lehuawehi Point (to the northwest) and Kohola Point (southeast) which define Honomū Bay (see Figures 2 and 7).

The entire coastline, for several miles southeast and northwest, consists of rocky headlands with small embayments at stream mouths. Heavy stream discharge along this windward slope provides ample volcanic detrital material to coast and small temporary pebble and cobble beaches form where wave energy and coastal slope permit. These same sediment laden streams, however, also prevent the formation of nearshore coral reefs.

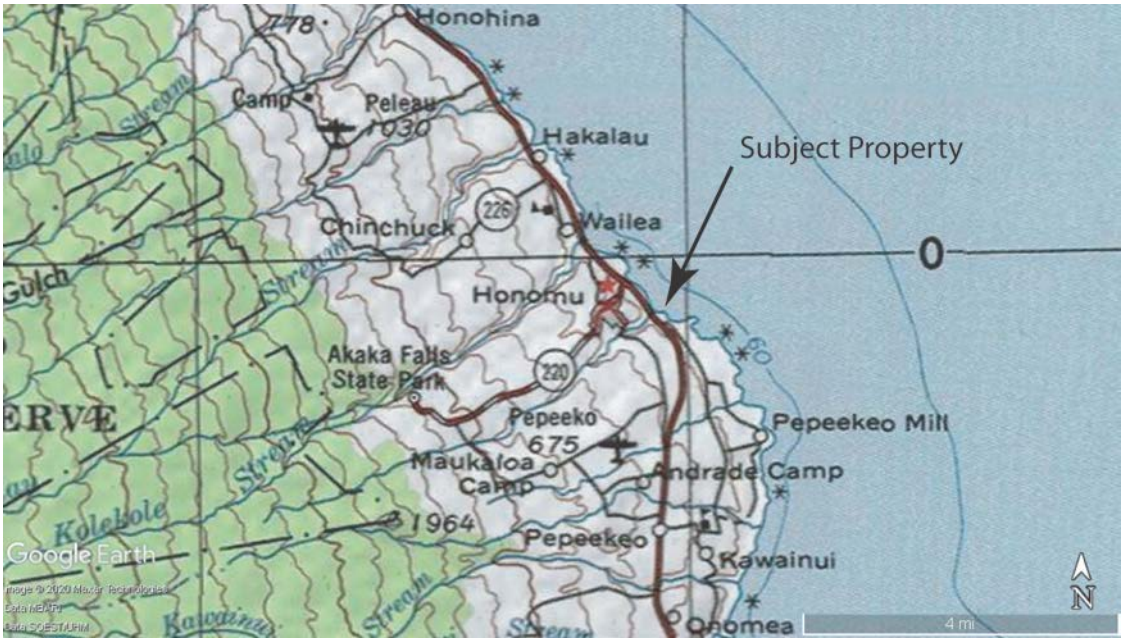


Figure 2 Subject Property, Portion of USGS 1:50,000 scale.

Figure 3 Subject Property, Google image (7.12.2019).

Photo 1 Overview of shoreline, north facing side.

Photo 2 Overview of shoreline, east facing side.

Geological Background

Understanding the sequence of geological events on site provides a fundamental framework on which inferences concerning erosion rates are based. The surficial geology consists of 2-3' of disturbed, mostly brown colored soil that was repeatedly churned by historic sugar operations. This loose material overlies deeply weathered, but stable, yellow-tan ash deposits. The thickness of these so called, "Homelani" ashes (see below), were not directly measureable because of extensive re-working and vegetation cover.

Buchanan-Banks (1983) indicates that where undisturbed, these ash deposits should be about 10 feet thick in this area. They consist of deeply weathered orange to ochre yellow volcanic ash is entirely of air fall origin, and was derived from multiple volcanic eruptions from Mauna Kea volcano. These ashes, which originally consisted of volcanic glass fragments, were carried to the Hilo-Hamakua area from high lava fountains associated with the formation of various prehistoric volcanic cones on Mauna Kea (see Figure 4, "hmc"). These ashes have been dated in part as having mainly been deposited between 10,000 and 40,000 years ago (Buchanan-Banks, 1983). Similar yellow-orange ash deposits form fertile soils once critical to Hawaii's sugar industry all over Hawaii Island, and have together been described as the "Pahala Ash" (Stearns and Macdonald, 1946), although the ashes along the Hāmākua Coast are of very different origin and age than the deposits underlying the cane lands in Ka'u. Buchanan-Banks (1993) later named these Hāmākua ash deposits the "Homelani Ash", as they are the preferred sites for graveyards all over East Hawaii.

Weathering that has taken place over many thousands of years in the moist, warm, tropical climate of this area has converted these ash deposits almost entirely to secondary minerals. Wieczorek and others (1982) studied the mineralogy of the Homelani Ash in the Hilo area, and found the deposits to consist almost entirely of the alumina mineral gibbsite, with lesser amounts of amorphous allophane and very minor quartz (derived from distant sources). Regional relations (Wentworth, 1938) suggest that these ash deposits were originally 12-15' thick in this area, and well indurated, but mechanical cultivation associated with cane harvesting and planting during the last several decades of cane production loosened the upper surface of the ash section and resulted in extensive erosion and soil loss. The thickness of the ash remaining on the land is variable, and was measured at 6-10' where exposed along cliff faces. (Note: the Homelani Ash is not shown on Figure 4).

These ash deposits overly deeply weathered Mauna Kea lava flows of the Hāmākua Volcanic Series (Stearns and Macdonald 1946). There are several poorly-defined subunits within the Hāmākua Volcanic Series lava flows, and the contacts between them are commonly marked by ash and soil deposits (Wolfe and others, 1997). The Hāmākua lava flows vary between 65-200,000 years in age (*ibid.*). These lavas are deeply weathered high on coastal cliffs, but are relatively un-weathered and resistant to wave erosion at cliff bases.

This ash is everywhere underlain by rocks consisting of deeply weathered Mauna Kea lava flows (see Figure 4). These lava flows have few residual volcanic minerals, are almost entirely altered to clays directly below the ash layer. Where undisturbed, they are well-indurated, and can form vertical faces along road cuts, for example. They are also orange to ochre yellow in color, and may easily be mistaken for ash deposits if residual volcanic features are not recognized. These highly altered lavas have been derived from basaltic pāhoehoe flows of the Hāmākua Volcanic Series, which were erupted more than 60,000 years ago from now buried Mauna Kea eruptive

vents (Wolfe and others, 1997). These rocks were collected and described at the flume trench (Locality 4, Figure 8).

Although these lavas are highly weathered in their upper parts, they transition gradationally to relatively fresh, dense pāhoehoe flows at the base of sea cliffs. The pāhoehoe lavas exposed at the shoreline consist of multiple lobes of relatively resistant layered basalt.

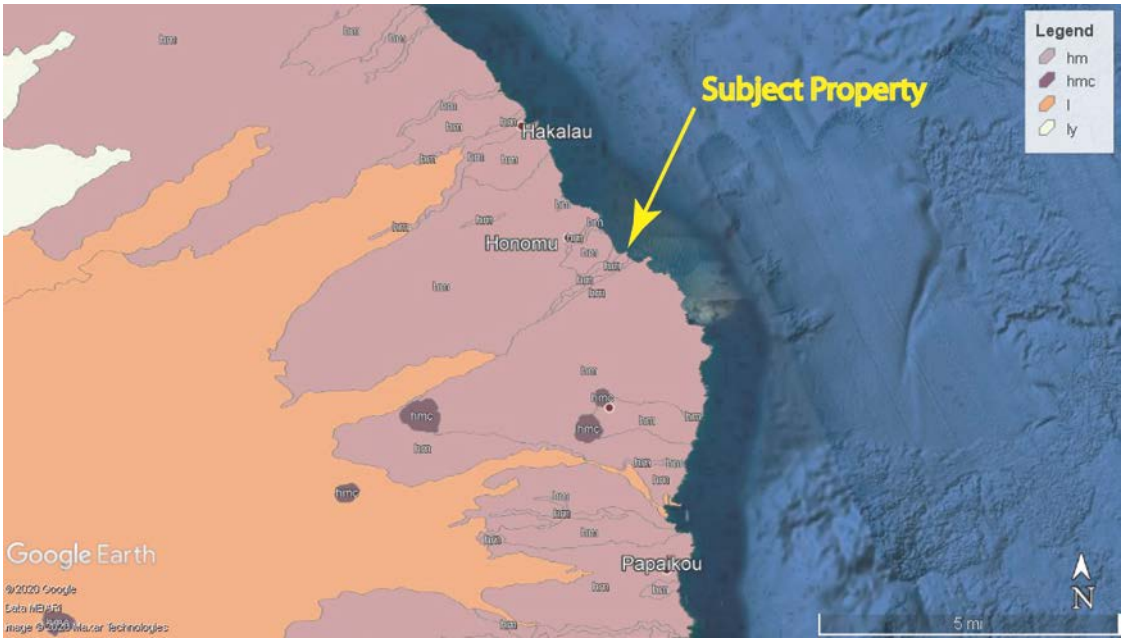


Figure 4 Portion of Geologic Map (Trusdell et al. 2006).

Unit	Description	Epoch	Age B.P.
hm	Hamakua Volcanics, lava flows	Pleistocene	200,000 - 65,000
hmc	Hamakua Volcanics Vent Deposits	Pleistocene	200,000 - 65,000
l	Laupahoehoe Volcanics, lava flows	Pleistocene	65,000 - 14,000
ly	Laupahoehoe Volcanics, lava flows, younger member	Pleistocene/Holocene	14,000 - 4,000

Table 1 Ages of the geological units discussed in the text (Trusdell et al. 2006).

Marine Conditions and Wave Climate

The extremely long fetch of wind crossing the Pacific Ocean creates big, long period swells, generating waves that can rise to significant heights before slamming into the island's flanks. Large waves reaching the coastline at this propoerty are predominantly related to trade wind conditions, though the coastline is also exposed directly to the largest North Pacific swells (Figure 5).

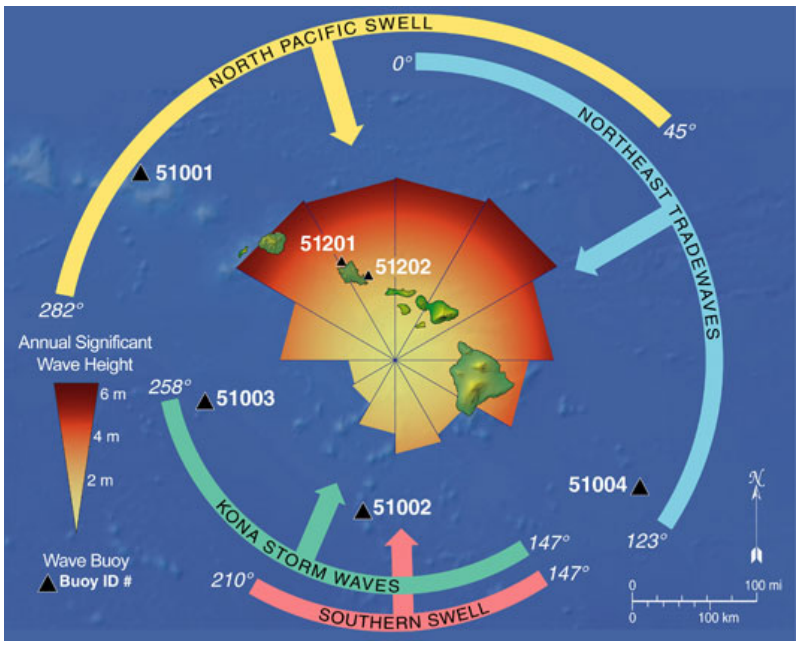


Figure 5 Frequency and magnitude of waves affecting Hawaii (www.soest.hawaii.edu).

The Hawai`i Island coastline faces roughly 45° east of north. However, the Holcomb property's north side faces essentially directly north. On the other hand the southern portion is well shadowed from the direct onslaught of the waves as it faces somewhat south of east.

This is significant relative to typical incoming waves. Note on Figure 5 that the largest waves of all come from the north-north-east, north or north-north-west direction. These North Pacific swells can reach significant heights of 20+ ft. and are a major contributor to coastal erosion and storm damage.

Future changes in storminess and frequency of significantly higher wave heights due to climate change are impossible to quantify. A precise forecast of these positively contributing variables isn't possible, but their potential effects on erosion are considered in our conclusions below.

Rising sea surface temperatures in Hawaiian waters could, for example, influence hurricane storm tracks impacting the islands (Businger, 1998). Any changes in the recurrence interval or intensity of wave energy focused on the coastline are critical factors in the evaluation of erosion along any coast. Merrifield and Maltrud (2011) noted that trade winds have intensified across the Pacific gradually since the early 1990s, e.g., which could also alter the wave climate. Additionally, trends in sea level rise are more pronounced in western Pacific waters, relative to other regions in the World Ocean, with some rates as much as three times

the global average – this will exacerbate the waves effects. The probability and magnitude of sea level rise associated with climate change at the property is discussed in a separate section.

Nevertheless, for tropical waters, the incidence of "one-in-ten year" extreme waves impacting shorelines may double or triple as a consequence of the wind intensification described above (Wang et al. 2014). Substantial wave height increases—by as much as 40%-- have also been observed along some Pacific shores, though to what extent this relates to climate change or pulsating phenomena such as the Pacific Decadal Oscillation is unclear (e.g.—Ruggiero and others, 2010). In fact, hypothetically, the incidence of hurricanes in the eastern Pacific may actually *decrease* with warming climate, but the strongest storms will likely become even more intense (e.g.--Grinsted, 2012; Holland and Bruyére, 2013).

Tidal conditions for this part of the island are summarized in Figure 7. These are based upon data collected in nearby Hilo Bay, the closest continuously monitored tidal station to the property. The magnitudes of these relative elevations are an important reference for assessing the importance of any measured changes or, in particular their impacts outside the normal range.

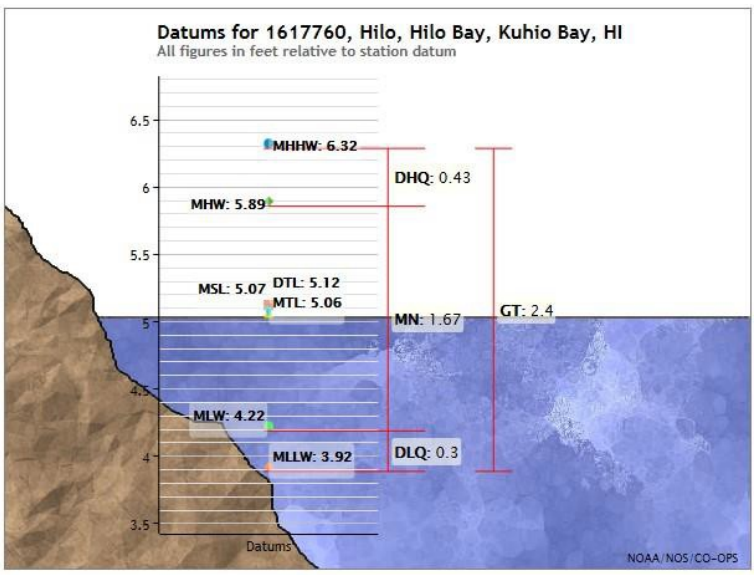


Figure 6 Tidal data for Hilo Bay (in ft.).

The mean range of tidal change (MN) is 1.67 ft. with a Great Diurnal Range (GT) of 2.4 ft. Tidal heights are given as positive and negative values relative to the Mean Lowest Low Water (3.92 ft.) and Mean Highest High Water (6.32 ft.). Understanding the tidal variation throughout the year is important as any instantaneous "snapshot" of the coastline at a given tide can be misleading on the whole. The effects of tides are dependent on beach slope. For example, 2.4 ft. of tide will move the tideline 24 ft. horizontally on a 10% slope. This can have dramatic effects, changing the location and breadth of active weathering.

Field Observations

Although the shoreline is legally defined in Hawaii as “the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves, ...” (HAR §13-5-2).), for properties bounded by sea cliffs – the tops of cliffs are considered the “shoreline” for setback purposes.

Given the complexity of volcanic coastlines and their formation processes, in order to assess the historical and prehistorical movement of the shoreline and identify areas prone to erosion, an attempt was made to inspect the entire length from sea level. This was accomplished through a variety of means including pedestrian, boat and rope assisted access. The evolution of the geomorphology was re-constructed in a simple way. Chronologically constrained “facies” (bodies of rock with specified characteristics) were identified and related in the field. This is a recommended means of assessing complex geomorphic situations in Hawaii and the goal towards which our field methods were oriented. For example, Felton (2002) uses this method to distinguish different forms of emplaced debris, describe the potential mobility of any beach deposits and their nature, and account for isostatic changes in his research on the coastal flanks of Lana`i.

Efforts were made to evaluate the appearance and composition of rock clast sizes, their roundness/sphericity and condition of eroded materials. In addition, the matrix and macro-mineralogical composition of the lava flows present was assessed (see lithology, below). Sedimentary structures and other indications of erosion were mapped and evaluated within the project area (see Structure, below). Particular attention was paid to the nature of the material and slope at several key areas on the property, these profiles and their implications are presented below. Figure 8 is a key to the locations of rocks and situations described further below.

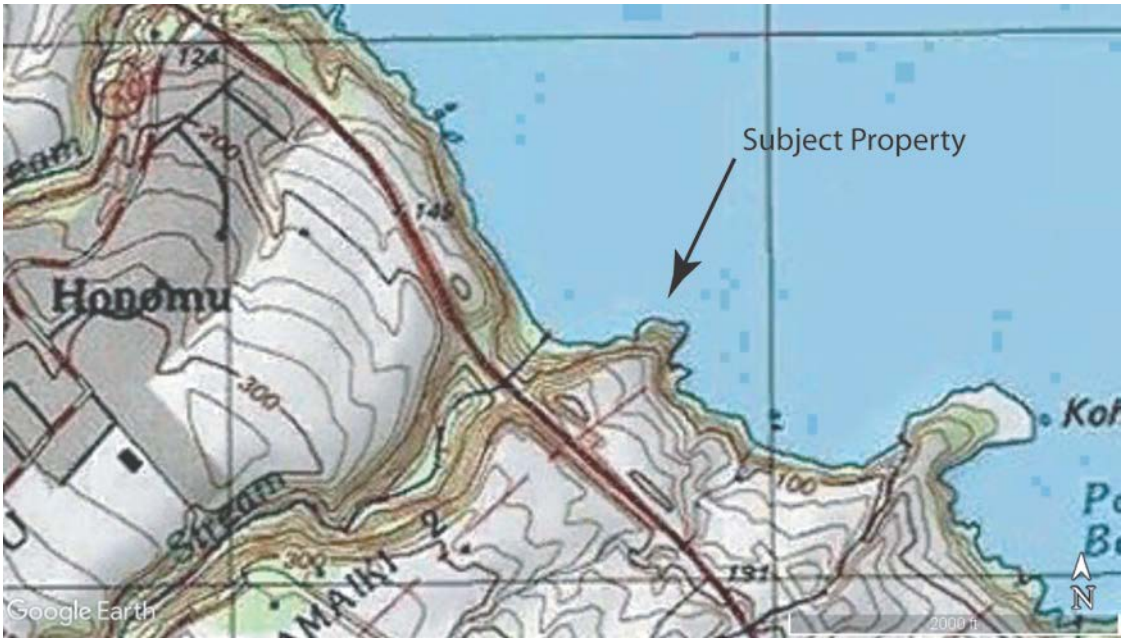


Figure 7 Subject Property, USGS 1:24,000 scale (1984).

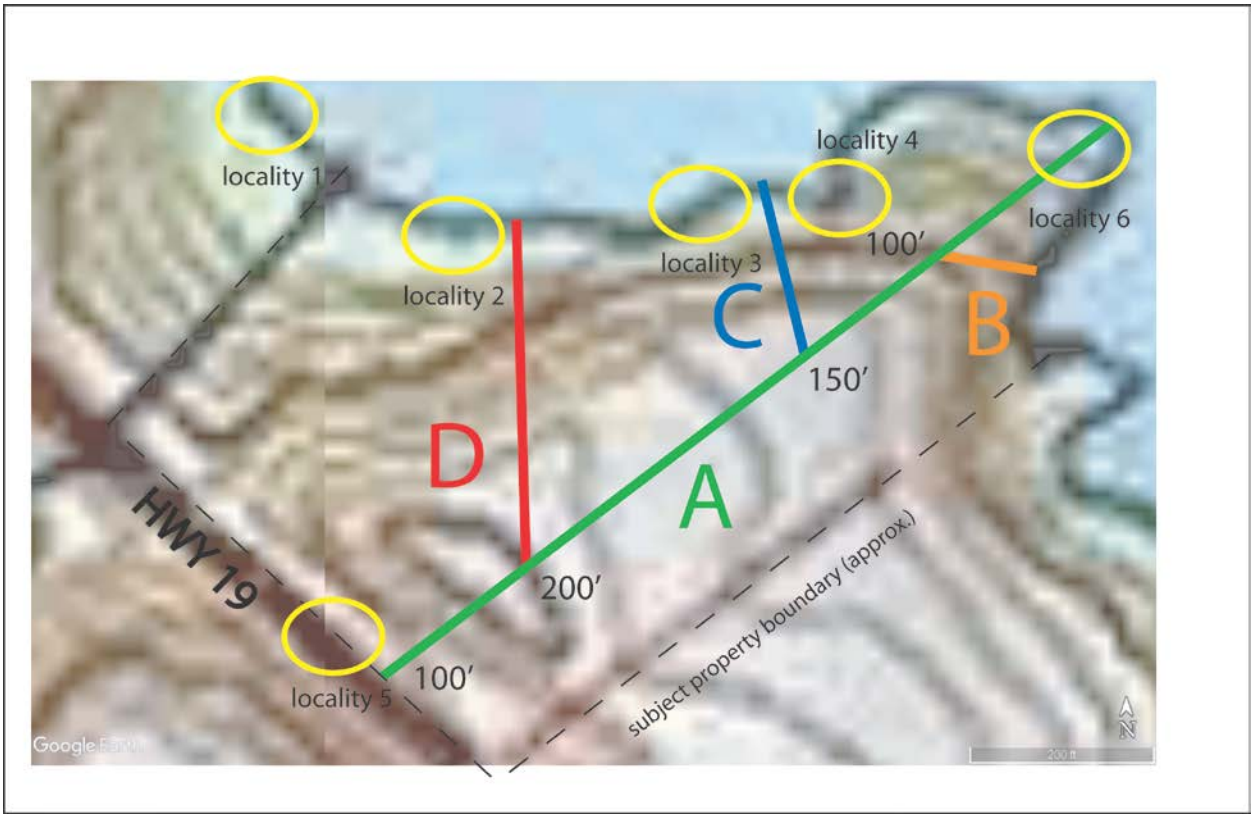


Figure 8 Subject Property Features, Profile Locations and Sample Localities.

Coastal Access

There are two ways in which the point may be accessed. These are by the walking around the coast, and by a ladder on the point itself.

The cobble beach at the mouth of the Honomū stream can be accessed by a narrow jungle track from Māmālahoa Highway. The track is slightly overgrown, but, apparently used somewhat regularly. Saw grass and bananas at the beginning of the track yield to arrowroot and vines lower down. The track is steep, although not exceeding 45°. There are short sections which are 80° to vertical. These steep sections, however, are modified with rough steps, or the descent is assisted by a fixed cable. The path is muddy and in wet conditions extremely slippery.

The point is not accessible from the beach. The waters' edge along the base of the cliff can be traversed only about half-way. The first section is over rough cobble and boulder beach, this gives way to a scoured and narrower shelf of stable bedrock. In 100 meters this bedrock forms a small headland beyond which is only sheer cliff meeting the sea and surf.

A ladder was installed down the nose of the point at some point in the past – probably by fisherman. This ladder is currently accessed by passing through dense saw grass to the edge of the cliff, which is forested with various light underbrush, ironwoods, and weeds. To get to the base, one has to descend around 175 feet. The descent begins with a gentle 45° section for 10 feet, before reaching an aluminum ladder, about 8 feet long. Then there is a steep section with

shallow footholds. This continues for approximately 10 feet. At that point a fiberglass boat ladder is lashed to the slope and the ladder descends another 8 feet or so, however, the top three rungs are broken. At the base of the fiberglass ladder there is a sizable ledge with a large ironwood tree growing (see Photo 3). Further descent is near vertical and was not attempted. There is a long ladder of milled wood, and round head nails, secured with rusted iron spikes. There is evidence of a fire at the top of this ladder. The wooden ladder continues down about 50 feet, where there is another small ledge and a slightly shorter ladder constructed in a similar fashion which ends at the base of the cliff, just above the high surf line.

Photo 3 Abandoned Ladder on Point.

Lithology

All of these Hāmākua Series volcanic rocks are well-indurated. This is apparently due to the extensive mineralization that has accompanied weathering. The rocks are capable of supporting relatively stable near-vertical faces along the old railroad excavations and Highway 11 road cuts at the southwestern margin of the Property.

The massive "basal" lava flow on which the Holcomb property's upper flows rest is the lynch-pin controlling erosion of those overlying rocks. There appears to be some considerable passage of time between emplacement of that basal unit and the overlying, more erosion-susceptible flows - complete with a rarely seen "erosional unconformity".

A red soil and ash layer was noted near the base of coastal sections along the entire perimeter of the Property shoreline (Photo 4). This red-weathered layer, which may define the boundary between “Upper” and “Lower” parts of the Hāmākua Series indicates an erosional unconformity and thus the passage of some considerable time interval (note in Photo 4 the glassy rind on the lower surface of the upper member, as well as the inclusions of clay in that upper rock member’s

matrix) . The ash layer is clay-rich, and is believed to play an important role in the erosion of the shoreline, as it separates more resistant, massive rocks below and the intensely weathered rocks above. It may be responsible for relatively recent rock fall collapse events (see discussion below of rock fall collapse mechanisms).

Reference has been made by both Jim Moore and Pete Lipman to the first HSDP borehole data and they have formed conclusions regarding a subsidence rate for Hāmākua. The rate is about 2.5 mm/year so, at 60 k years, you would expect about 150 m of subsidence.

Lava flows can be distinguished by their macro-mineralogy. Representative rock samples were collected from the localities indicated on Figure 8, and examined with low magnification hand-lens. The rocks are deeply weathered, however, and there are few indications of their original flow nature. Vesicle morphology suggests most of them were originally pāhoehoe flows. Because of extensive alteration, little indication of original mineral compositions remain, although sparse remnant phenocrysts (crystals) of dark honey-brown orthopyroxene observed in some samples indicate original compositions included hawaiite and ankaramite. Potassium – Argon (K-Ar) dating indicates these volcanic rocks include lava flows as young as 81,000 years old at the top of the sequence and basal flows as old as 237,000 years (Wolfe and others, 1997).

Photo 4 Photo of red clay layer separating the “upper” and “lower” Hāmākua seris flow.

Structure

These textural comparisons are a key to interpretation of the profile data and facies model presented below. The varied minerology, texture and type of rock from each geologic unit respond differently to erosive forces. These different capacities to withstand degradation create instructive morphologies. To assess the extent and impact of these forces on the rock landscape, several scaled stratigraphic profiles were drawn along transects indicated in Figure 8 (profiles A-D). Figure 9, giving an overall gross sense for the topography was drawn from USGS (1994) topographic data and modified with field data. Figure 10 was compiled based solely on measurements and estimates of slope and elevation and other observation taken in the field. The locations of these four profiles are shown on the reference Figure 8, above.

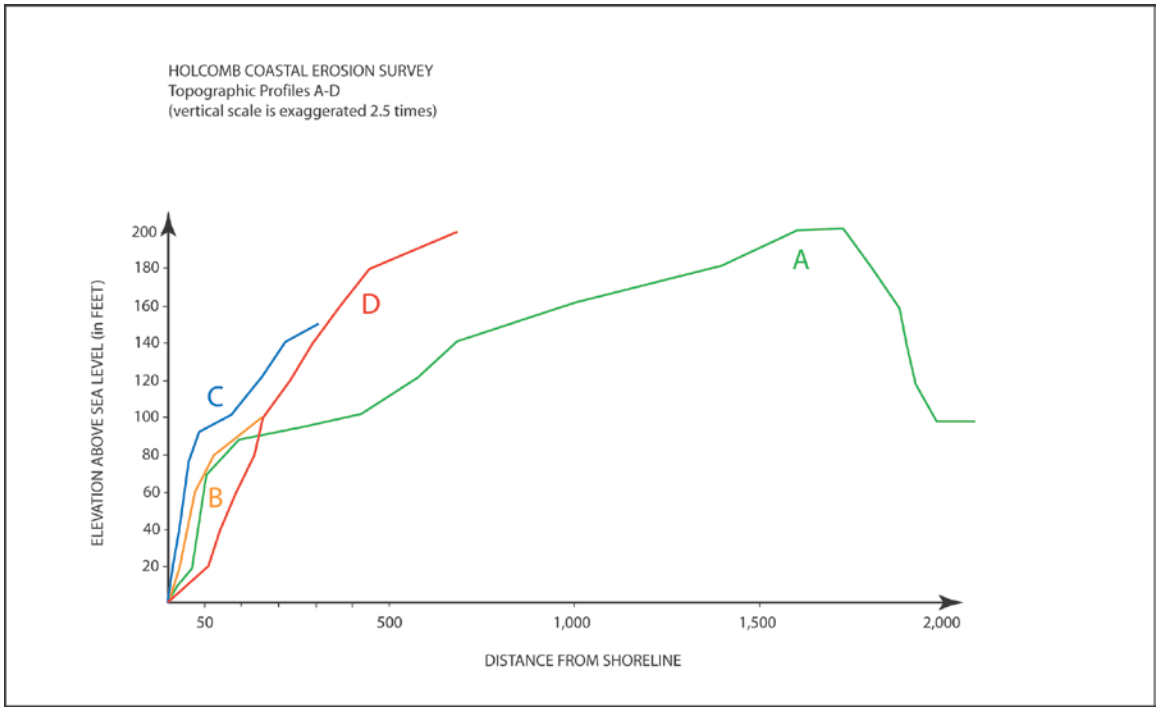


Figure 9 Subject Property Slopes at A-D.

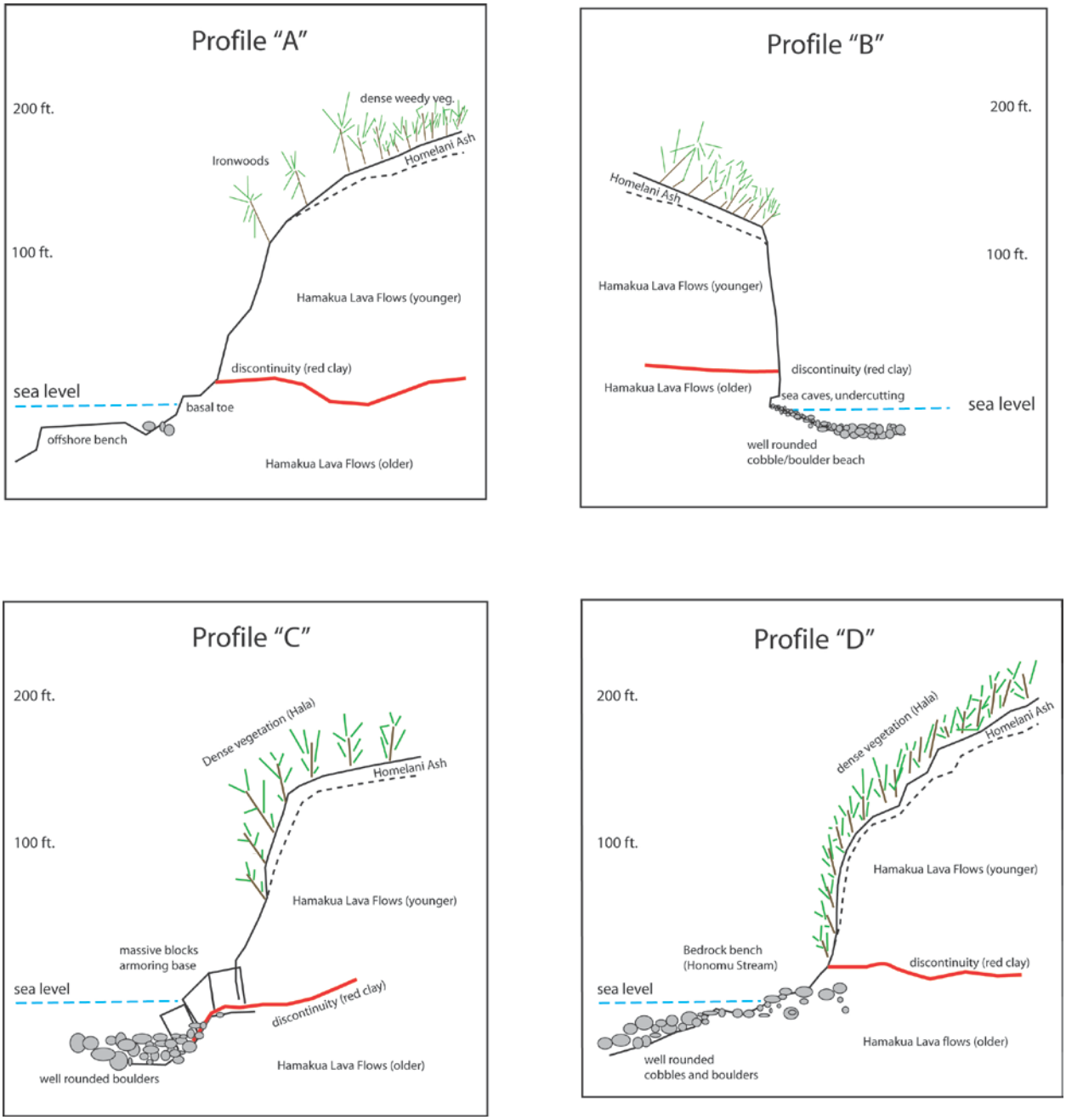


Figure 10 Geologic sections at A – D.

Erosion Processes

Coastlines can be classified, generally, into “soft” and “hard,” depending upon whether they consist of sands and related fine, easily transportable sediments or of solid less easily weathered substrate. Almost all shoreline change studies focus on soft coasts, including quite recently within the Hawaiian Islands (e.g., Anderson *et al.*, 2015). Available data for hard coastlines are otherwise scarce.

Several key processes are at work contributing to erosion of the subject property and all typical hard coasts. Wave energy impacting the bluff loosens masses of rock by compressing air within fractures (“hydraulic ramming”), while the drag of moving water, boulders and cobbles, and abrasively grind smaller fragments into sand at the shore. Wind and gravity can loosen free pieces rock and redeposit them as breccia, though none were found on the property. Storm seas coincident with extreme tides can be especially erosive. There is no way to definitely quantify the relative contributions of these processes, though it is reasonable to say that the energy released by wave action is probably the main cause of shoreline retreat at this locality.

The following photos illustrate several of these processes in operation at the subject property.

Photo 5 Sea Caves

Photo 6 Bedrock riverbed and well-rounded boulders at the entrance of Honomū Stream.

Photo 7 Sub-angular Rocks Armoring Shore at "C".

For example, Photo 5 shows the punctuated slopes on the east side of the property. While these cliffs are lower in height, the upper vegetated portions give way abruptly to nearly vertical cliffs plunging to the sea. 1954 aerial photography shows vegetation rock fall scars (Fig. 11).

Undercutting of the cliff is apparant and a small sea cave is visible at the base on the left side, just beyond the property boundary.

Photo 6 is taken at the mouth of Honomū Stream (Locality 2). Several items are of note in this image. First, note the bedrock over which the stream flows. This is solid bedrock, the same as is inferred to buttress the point. Here it is overlain by a cobble and boulder beach, which it continually supplies with more stones. Note, that the background of the photo a visible shoreline is present in a vegetation line and buildup of colluvial sediments against the base of the cliff. Wave energy impacts this bluff only rarely and retreat is unlikely in the near future.

Photo 7 is taken at Locality 3/Profile "C". The view back towards the beach affords a good look at the armoring at this minor promontory. Note, on the immediate left in the foreground, the dense "bluerock" outcrop, smoothed with ages of wave action, but practically immovable. In the center, fronting this massif we see angular and sub-rounded boulders of this very material, faulted off on large blocks, but still providing a great mass of buffer to the oncoming hydraulic assault.

Soil Loss and Slope Erosion

Little is known about pre-contact Hawaiian agricultural practices in this area, but clearing of native forests must have resulted in increased erosion. The low intensity of vegetable crop production by Hawaiians probably caused only minor additional erosion, but all this changed abruptly with the beginning of industrial-scale sugar production along the Hāmākua Coast in the late 19th century. Traditional cane harvesting by hand methods with no need for reseeding caused relatively modest erosion, but the introduction of machine harvesting after WWII directly led to major soil erosion, as the delicate Homelani Ash was deeply cultivated and churned during harvesting and planting. The offshore waters of the entire Hāmākua Coast were stained brown for miles offshore during times of heavy rainfall, and vast amounts of valuable topsoil were permanently lost through erosion. The closure of sugar operations along the Hāmākua Coast in 1993 began a period of healing to the soils beneath old cane lands, but considerable care is required to protect remaining soil, as the upper 1-2 feet of the Homelani Ash soil is highly susceptible to erosion during periods of heavy rainfall. The remaining Homelani Ash beneath the disturbed zone is very well indurated and resistant to erosion

Rock fall and Cliff Failure

Where covered by extensive vegetation little erosion is caused directly by rainfall, and retreat of the cliff edge is almost entirely caused by rock falls initiated from below. Several rock fall scars were investigated during our field inspection, and it appears these were mostly caused by failure of the deeply weathered lava flows of the Hāmākua Series (see Photo 8). These deeply weathered rocks are characterized by a system of joints (rock fractures) that mostly parallel the cliff face.

Photo 8 Major rock fall scar.

In most examples studied, the rock falls are derived from the deeply weathered lavas and do not involve the underlying solid lava flows exposed at the shoreline. Once the cliff faces are destabilized by either erosion from below or by the impact of tree roots (next section), the actual rock falls appear to be initiated by two primary factors: times of prolonged heavy rainfall, and regional earthquakes. Rainfall contributes to rock falls in two ways the increased weight of the water saturated rocks and soil on the cliff face, and, more importantly, the increased intergranular pore pressure exerted by rainwater as it infiltrates cracks within rocks. Flights along the Hāmākua coastline following periods of heavy, prolonged rainfall will always reveal fresh scars on the sides of cliffs that have been caused by rainfall-induced rock falls and landslides. The processes involved are the same as those that cause rock falls and landslides along Hāmākua roadways during periods of heavy rainfall.

Ironwood

Ironwood trees (*Cassuarina equisetifolia*) infest the slopes at the tip of the property and along the eastern facing side. The deep roots of ironwoods exploit cracks in the cliff face, and contribute to mechanical instability. Native plants such as naupaka (*Scaevola taccada*) and hala (*Pandanus tectorius*) have shallow roots and can aid in the stabilization of slopes. Hala, are commonly found in moist coastal location and on valley slopes (Wagner 1990).

Photo 9 Transitional slope and Ironwood litter.

Established groves of these native plants can be convincing indicators of relative stability, in fact. The presence of mature hala trees indicate that no rock falls have occurred for a very long time. This is the case for the northwest section of the property's coast, from the flume-cut to the cobble beach. The contrast between property slopes covered in native versus invasive species is particularly vivid in Photo 8 (notice the hala on the right and fresh scars below the ironwoods on the left).

The ironwood trees, also known as Australian Pine, are the most serious cause of accelerated erosion, as their root systems are very aggressive at exploiting cracks and joints in bedrock and forcing these joints open wider – which fragments and loosens otherwise cohesive rocks. In contrast to shallow-rooted native Hawaiian plants that once grew along and stabilized these cliffs, the ironwood trees have extensive roots that penetrate deeply into the cliff faces and directly set the stage for rock fall triggering by heavy rains or earthquakes

Dense concentrations of ironwood trees can crowd out native species, or poison them by chemical contamination (note how few other species there are in Photo 9). Regarding the ecological impact of ironwood along coastlines, Swearingen (1997) states that:

C. equisetifolia is fast-growing (1.5 to 3 meters per year), produces dense shade and a thick blanket of leaves and hard, pointed fruits that completely cover the ground beneath it. Dense thickets displace native dune and beach vegetation, including mangroves and many other resident, beach-adapted species. Once established, it radically alters the light, temperature, and soil chemistry regimes of beach habitats as it outcompetes and displaces native plant species and destroys habitat for native insects and other wildlife. Chemicals in its leaves may inhibit the growth of other plants underneath it.

Granulometry

One of the easiest ways to recognize the relative age of rock falls that have fallen from the cliff face fronting the Property is to note the shapes of boulders present along the shoreline. Since there is little lateral movement of rocks along shore, the areas beneath recent rock falls are marked by angular boulders that have not had time to be rounded by wave action, whereas in areas where there is no evidence of recent rock fall activity, shore boulders are well-rounded (as noted in the above Photos).

These features together serve to qualify the extent, type and likelihood of both stochastic and gradual geologic processes. Next we turn to the attempt to quantify these processes and the speed at which they are at work.

Quantification of Erosion Rate

Historic Aerial Photos and Maps Analyses

Aerial imagery was examined for evidence of major changes in coastal profile or shoreline movement during historic times. The oldest image found included one captured by the Navy in 1954. Hi-resolution (600dpi) stereoscopic pairs of images from 1954, 1965 and 1977 were examined systematically under a Farichild binocular magnifying stereoscope (model F-71).

DATE FLOWN	SOURCE	PROJECT NAME	FLIGHT LINE	PHOTO NO.	MAGIS NO.
1954-14 October	USN-USGS	HAI	8	003	016-1437
1954-14 October	USN-USGS	HAI	8	004	016--1438
1954-14 October	USN-USGS	HAI	8	Unnumbered-oblique	016-1095
1954-14 October	USN-USGS	HAI	8	Unnumbered-oblique	016-1096
1965-16 January	USDA	EKL	6CC	121	062-5510
1965-16 January	USDA	EKL	6CC	122	062-5511
1977-03 January	USGS	GS-VEEC	4	134	007-408
1977-03 January	USGS	GS-VEEC	4	135	007-409

Table 2 List of historical aerial photograph references.

The scale of the photos and the precision measurements presented some confounding factors. When enlarged to an appropriate scale for our analysis, the photos were “grainy” with pixels equivalent to 10 ft. or more.

In addition to the resolution of the photos, the time of day they were taken causes shading differences can easily obscure important smaller-scale details such as the shifting of a boulder here or modest collapse of a ledge there. Note in Figure 11, a reproduction of a portion of the original photo how poorly the north slope of the property is illuminated.

Unknown differences in tidal level and surf conditions at the times individual photography was obtained, also contribute to the lack of precision. The average diurnal range of tides is 1.67 ft.; on a beach with a slope of 30% (1:3) this translates to a change of approximately 5 ft. of horizontal distance, adding another confounding variable to our photogrammetric methods.

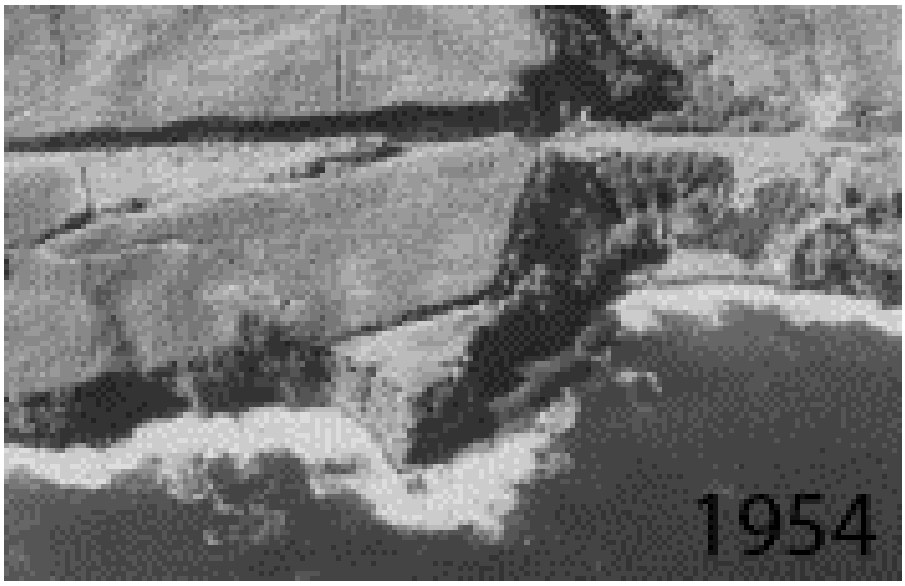


Figure 11 1954 Aerial Photo (oblique, view to the southwest).

Two additional historic maps added to our analysis. A field map of sugar cane operations from 1932 was valuable in confirming the presence of a major flume across the property, still visible in the 1950's, but gradually eroding and less obvious on modern photos. The Onomea Quadrangle, a USGS publication from the 1930's was also valuable for comparative purposes. In fact, one might be tempted to say that the 1930 map more accurately portrays the coastline than the 1994 USGS version.

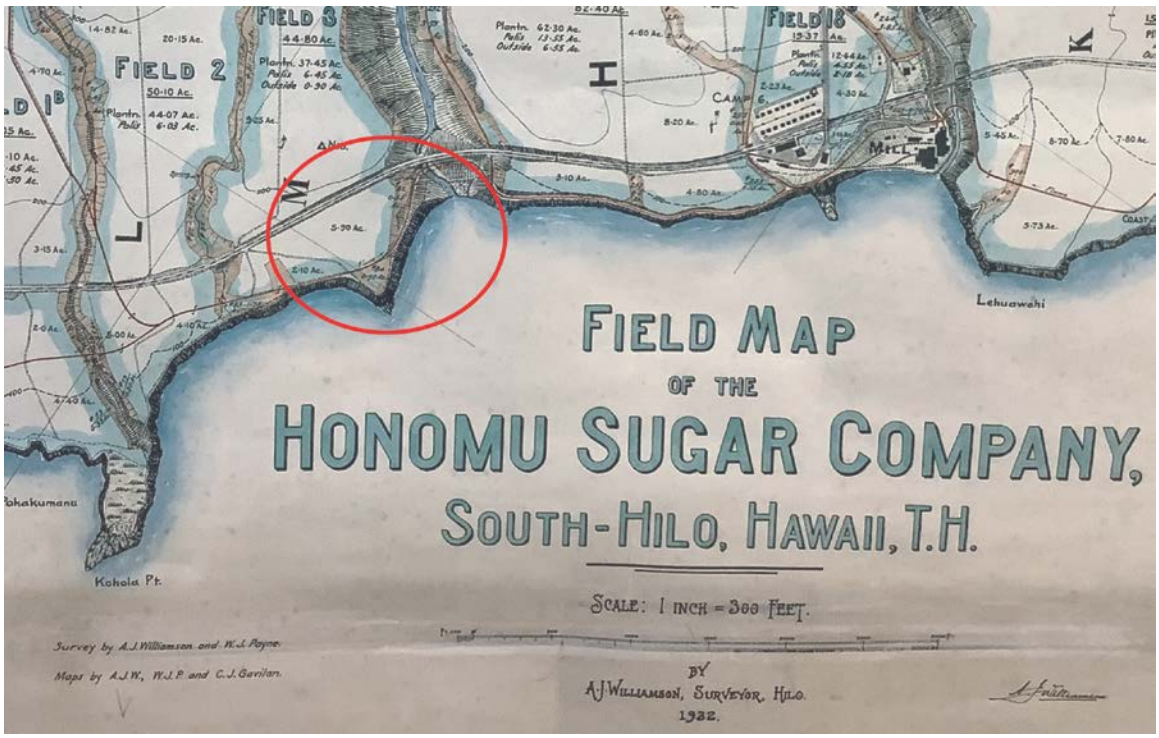


Figure 12 Portion of Honomū Sugar Company Field Map (1932).

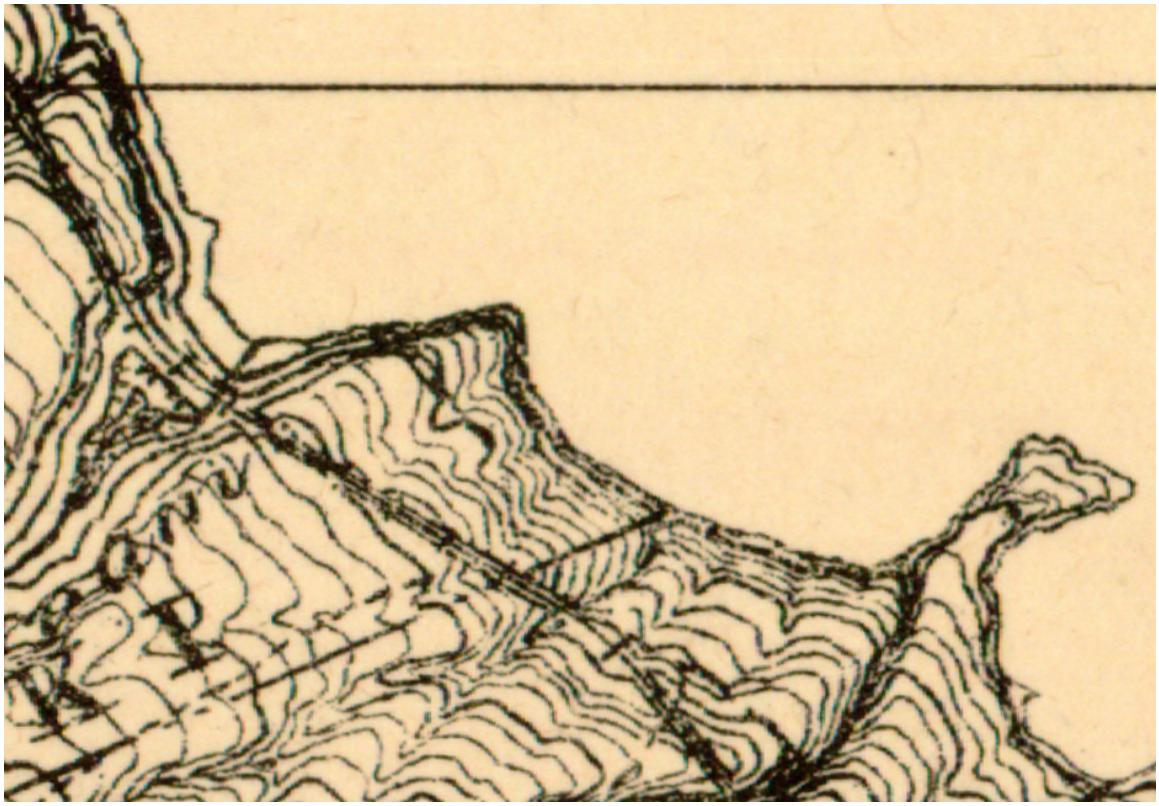


Figure 13 Portion of Onomea Quadrangle, USGS (1930).

Consideration of these maps spanning a period of 90 years yielded no apparent changes in configuration of the headland or of any major changes in coastal morphology. It does seem that the biggest changes occur on the headland seaward of the flume trench. In 1954 the cliff edges are distinct and crisp, seemingly approaching vertical. However, today and throughout the series of photos, it becomes apparent by 1970's that the vegetation is changing and soil loss may be occurring, the slopes become more gradual and rounded. However, this surficial erosion does not seem to have had any effect on the shoreline; in fact, this wasted material may have provided some buffer to any erosion at the base of the cliffs.

Given the lack of measureable changes on the photos the *minimum* Average Annual Erosion Rate for the subject property may be zero. However, photographic resolution precludes the identification of any changes smaller than a single pixel (estimated to resolve to ~10 ft. sq.) Conversely, then a *maximum* AAER of 0.15 ft. per year is possible.

Discussion of AAER

Calculating *the* erosion rate for the property is problematic because the actual rate is constantly changing with conditions. Over geologic time coastlines will go through periods of relative stability followed by rapid change. Sea levels rise will have dramatic consequences for future erosion rates.

Effects of Island Subsidence and Sea Level Rise (SLR) on the Migration of the Shoreline

Predicting Sea Level Rise (SLR) is a notoriously difficult task. Hwang *et al.* (2007) use a figure of 0.16 inches per year in their assessments of present-day SLR for Oahu, but an overall global rise in sea level of 40 inches by the end of the 21st century has been proposed by Fletcher (2010) and others, that translates in to almost one-half inch per year (0.44 in/yr over 90 years). SLR for any particular area depends heavily on local factors (water temperatures, ocean currents, salinity, etc. Anderson and others (2015) predict a doubling of current SLR rates for Hawaii within 30 years because of climatic factors (polar ice melting, increase in ocean temperatures).

Sea level rises' effect on the erosion of sandy beaches, found on older islands with more gradually sloping coastlines, has been predicted to be two orders of magnitude greater than the amount of the rise. This general prediction for soft coasts is borne out by mathematical models of the interaction between sea level and sedimentary equilibria (Bruun 1962). In a confirmation of these theoretical effects based on the evaluation of continental scale historical data sets, Zhang et al. (2004) conclude that there is a "multiplicative association" between climate change, resultant sea level rises, and coastal erosion. Their modeling leads them to conclude that the effect of coastal erosion, already severe in the 20th C., will be much worse in the 21st. While their discussion focuses on sandy beaches, the theory holds for hard coasts as well – though the magnitude and response times would differ, in particular given the vertical and durable coasts of the younger Big Island.

A "worst-case" eustatic sea-level rise estimate of 78 inches by the end of this century (.96 in/yr) is given by Pfeffer (2008). Solomon (2007) estimates the rise at 40 inches, a more conservative estimate and in-line with Fletcher's (2010) estimate above. The greatest rate of SLR will take place during the second half of this century according to recent modelling (e.g.--Cazenave and Le Cozannet, 2014).

Total sea level, of course, is a result of the combined changes in elevation of both water and land. Therefore, we must distinguish between eustatic and isostatic change. Eustatic changes are due to a greater or lesser volume of water in the oceans globally which is affected by global warming. Isostatic changes are locally affected by crustal movements and land subsidence or accretion.

The Big Island of Hawaii is sinking into the Earth's mantle because of the gravitational isostaic load of its growing volcanoes. A subsidence rate of (0.08 - 0.12 inches per year) related to isostatic sinking has been determined by submersible studies of drowned reefs off west Hawaii (Moore and Fornari 1984).

The potential changes in eustatic SLR must be added to predicted isostatic changes in crustal

subsidence rates for easternmost Puna. These changes are summarized in Table 2, below.

	MINIMUM (in/yr)	MAXIMUM (in/yr)
Land subsidence - positive isostatic change (Moore and Fornari 1984).	0.08	0.12
Global Sea-level rise - positive eustatic change (Fletcher 2010, Solomon 2007 and Pfeffer 2008).	0.44	0.96
Sea-level rise (sum)	**0.52**	**1.08**

Table 3 Summary of Potential Sea Level Rise.

Future combined sea level change and land subsidence is likely to cause an increase in block failures in this area over the long term (100 years-scale). These changes will slowly and episodically increase the erosive action of storm waves at higher and higher elevations over the next several decades.

Anderson and others (2015) studied this phenomenon in the context of low-lying "soft" coasts (beaches) throughout the Hawaiian Islands and concluded that average rates of shoreline recession would double by the year 2050, and increase to 2.5 times present and historically measured values by 2100, with shoreline retreats of as great as 190 ft. possible at some beaches. The relevancy of this study to "hard" substrates across the Big Island is unclear. This is something to consider in planning. Army Corps models of SLR for the islands come to similar conclusions with at least a foot and possibly as many as 5.5 feet of SLR by the end of the 21st Century (see Figure 14).

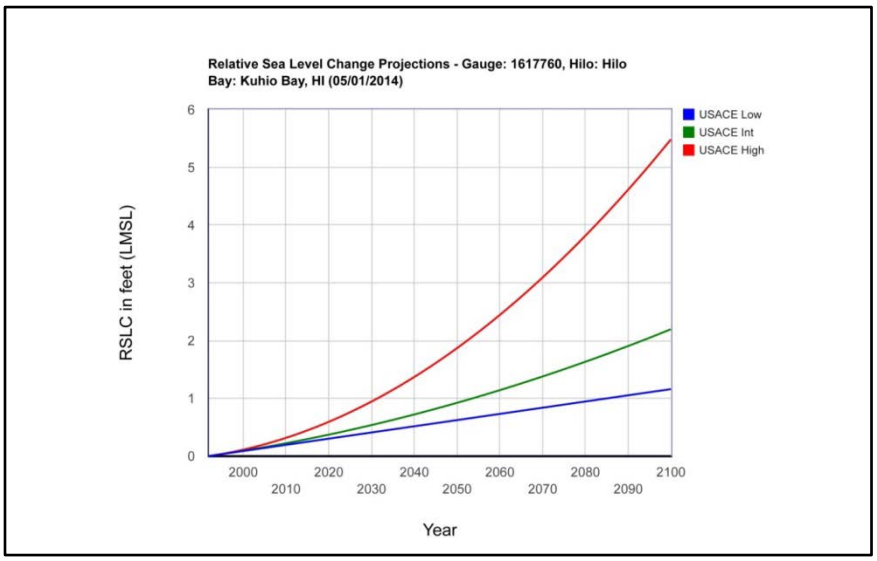


Figure 14 Projected Sea-level Rise for Hilo, HI (www.corpsclimate.us/ccaceslcurves.cfm).

General Coastal Zone Hazards

In a national assessment of coastal vulnerability conducted by Woods Hole for the United States Geological Survey, six variables were examined in the construction of an alternate, "Coastal Physical Vulnerability Index" or, CVI (Thieler Hammer-Klose 2000). These include mean tidal range, coastal slope, rate of relative sea-level rise, shoreline accretion and erosion rates, mean wave height and geomorphology. The geomorphology, calculated erosion rate, mean tidal range and coastal slope variables can be considered in this case as moderate, while two of the factors listed might cause some concern, sea-level rise and significant wave events. More to the point is the importance of a holistic treatment of coastal vulnerability.

Hwang (2005) recommends that all hazards facing coastal areas should be considered when planning for land-use zoning in Hawaii, and not just erosion. Fletcher *et al.* (2002:150) calculated island-wide hazards assessments for Hawaii's coastlines. These hazards are rated on an ascending scale from 1 (low) to 4 (high). The specific hazard risk levels for this area of Hāmākua are shown in the following Table (3):

Hazard Type	Risk Level
Tsunami (1-4)	3
Stream Flooding (1-4)	1
High Waves (1-4)	3
Storms (1-4)	3
Erosion (1-4)	2
Sea Level Change (1-4)	4
Volcanic/Seismic (1-4)	4
Overall Hazard Assessment (1-7)	4

Table 4 Summary of Coastal Hazards at the Holcomb Property.

Sea-Level rise ranks as one of two highest risk categories. Fletcher et al. (2002:21) estimate a decadal seal level rise for Hilo of 1.55 +/- .09 inches (almost 4 centimeters per 10 years). Sea Level Rise has been discussed above at length. Correspondingly, the risk level at the property for future higher water is 4.

The risk of any lava flows impacting the property is near none. Mauna Kea is a dormant volcano (Lockwood and Hazlett, 2010). The area lies in the USGS's Zone 8 (out of 9 zones of decreasing risk). This means that not only have there been no historic (since 1800) no lava flows, but none in the past 750 years and furthermore, in the last 10,000 years only a few percent of the area has been covered. Nevertheless, the volcanic nature of the island presents another hazard, that of earthquakes. The entire island of Hawaii is an active seismic area (Wyss and Koyanagi, 1992), and the southern Hāmākua area in particular is subject to future events.

Seismic events are common in Hawaii and can affect large areas. In 1973, Honomū was the epicenter of a large destructive earthquake occurring on April 26 and measuring 6.2 on the

Richter scale. Seven major rockslides blocked Hwy 19 for seven hours (no one counted how many sea-cliff failures occurred) and 355 homes in addition to 75 businesses were severely damaged (usgs.gov, Unger and Ward 1973). The entire island is subject to the effects of large earthquakes. Because of the potential for major earthquakes on the flanks of Mauna Kea, residential construction on the Property should be built to the highest standards as to earthquake resistance as specified by Hawaii County Building Codes.

Hawaii Island is also susceptible to the effects of seismic and volcanic activity generated around the Pacific Rim. There is a real possibility of tsunami (seismically generated "tidal"-waves) threatening this coastline. However the threat is mitigated by the high cliffs. The effects of a tsunami are highly variable, dependent on both local and extra-regional factors, the beach on the north end could be severely affected. Tsunami have impacted this coast in 1946, 1957 and again in 1960. These three events, two generated by Aleutian earthquakes and the third by activity in Chile, generated maximum wave run-up heights of between 25 feet in '46 and 12.25 feet '57 (Fletcher, et al. 2002:131).

High Waves and storms are also relatively hazardous. The property is exposed directly to the predominant trade winds. These winds approach from between 40° and 90° east of north, at 10 – 20 miles per hour, 70% of the time. This consistent wind produces consistent seas. These conditions combine with large winter storms from the north that regularly create waves between 20 and 30 feet in height.

Stream flooding ranks low. Stream flooding is actually rather common along this coastline with significant events occurring with decadal frequency. However the effects of these events are mitigated by the steep coastline; runoff is focused into deep ravines and channeled to the sea. There is some risk of sheet flow occurring between these channels under heavy rain conditions (Fletcher et al., 2002:132). Attention should be paid to vegetation maintenance and any alterations in surface hydrology.

Construction Considerations

The engineering properties of ash deposits in the Hilo area were investigated by field and laboratory testing of samples of volcanic ash in two shallow core holes above Hilo, about 6 miles south-southwest of the Project site (Wieczorek and others, 1982). As is evident from their sample descriptions and geologic logs, these sites adequately describe the ash units that underlie the Subject Properties.

Through in-situ vane shear, and laboratory vane shear, direct shear, and triaxial tests, Wieczorek and others determined that the "Homelani Ash" ash has relatively high strength in undisturbed state, with internal friction angles ranging from 40° - 43°. They observed that highway cuts as steep as 76° are stable, but that the "sensitivity" of the ash is relatively high. That means the Homelani Ash is relatively strong (and resistant to erosion) where undisturbed, but loses strength when reworked. They caution that, "The high friction angle of the ash permits very steep slopes under static conditions, which because of high sensitivity are particularly susceptible to seismically induced land sliding". Water contents determined for the ash samples studied were variable between different layers, ranging from 100 to nearly 400%, which causes reworked and disturbed deposits of the ash to be subject to plastic flow.

Erosion of the fragile ash soils underlying the Property is only a problem when the soils are

disturbed and exposed to rainfall runoff. These soils are for the most part presently covered by dense non-native grasses, which do a good job of soil stabilization. During new construction activities or future agricultural cultivation, however, care must be taken to not create any channel ways at angles to natural slopes that would develop into sites of rapid erosion during heavy rainfall.

Planned construction includes the roof of a single residence and a driveway with a turnaround area. The footprint of the development is relatively small. Considering the size of the lot, excess runoff from these roadways and rooftops should not produce significant problems. Some consideration should be given to channeling any concentrated rain runoff thoughtfully. Broad, low vegetated swales might serve to redirect flow and more importantly, diffuse and reduce its velocity. This is critical to avoiding any runoff to cliff faces, particularly if any intensive agricultural activities are planned. Where feasible, the creation of impermeable surfaces with excessive pavement or concrete should be minimized.

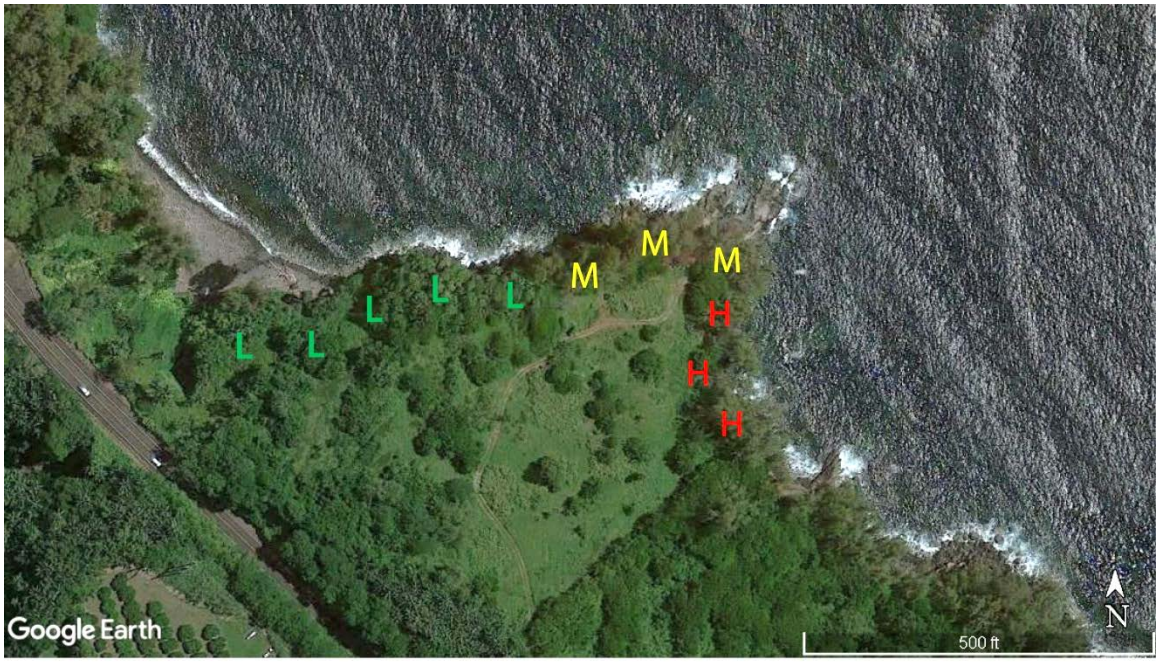
Much of the interior “flat land” of the Property slopes gently seaward. For slab construction, it will be important that any cuts made into upslope faces be protected with concrete “stem walls” or retaining walls that deflect any future flood waters that could flow from upslope during times of heavy rain.

Lastly, the ironwoods present a long term threat to the stability of the coastal edge. Landscaping plans might consider the incremental removal and replacement of the ironwoods with more appropriate species such as naupaka, hala, milo (*Thespesia populnea*) and hau (*Hibiscus tiliaceus*), for example.

Conclusion

As a hard rock coast, it is difficult to assess "erosion rates" in the same terms used for the many beaches and soft sand shorelines of the older islands of Hawaii. Hard coastlines are at one extreme of a "sensitivity scale" in this regard - they are slow responding systems (Hansom 2001). Coastlines such as these are susceptible to High Magnitude – Low Frequency (HMLF) events. For coasts on this end of the sensitivity scale "low frequency" needs to be better defined. Given the probability of significant seal level rise, the frequency can be expected to increase.

The edges of sea cliffs fronting much of the Hāmākua coastline are unstable in many places, have been impacted by numerous rock falls and small landslides over the past several decades. Cliff stability and erosion history of the Hāmākua Coast should be considered by planners as major factors that will impact the longevity and safety of proposed coastal structures. Although the shorelines of Hāmākua are undergoing little change, the edges of the cliffs above have been and are continuing to be modified by erosion – erosion that has been accelerated by poor land-use practices over the past century. Agricultural practices, modified drainage patterns, and the introduction of alien invasive trees along the coastline have all contributed to accelerated erosion of cliff faces along much of the Hāmākua coast, but the impact of these factors can be greatly reduced by wise land-use practices.



H = High Risk M = Moderate Risk L = Low Risk

Figure 15 Relative Risk of failure along the subject property sea cliffs.

No measurable erosion of the shoreline fronting the Subject Properties has occurred in the 60 years of available aerial photography. This reflects the stability of the lava flows forming the shoreline and the steepness of the coastal cliffs. The edge of the cliff face has, however, been subject to greatly accelerated retreat

It has proven difficult to calculate a rigorous erosion rate for the property and such rates would vary along its 1,300' shoreline. Photos over the past 70 years and maps from the last 90 indicate the shoreline has been stable ("highest wash of the waves…"). However, this is not the case for the cliffs above, whose edges suffer episodic slope failure. These failures generally, rarely alter the "toe" of the cliff. However, an estimate of the Average Annual Erosion Rate was calculated based on historical and geological sources and treated in as quantitative a manner as the data permitted. Given the dramatic increases in sea level and related impacts of climate change on the forces in question, it would be prudent to treat any rate conservatively. We therefore, recommend weighting this estimate by a factor of at least 20% and conclude that a maximum **final AAER for the property of 0.2 feet per year** is appropriate.

This represents an average annual rate based on estimated changes measured over large spans of time. The actual erosion rate for any given year may vary greatly based on extreme weather or geologic events that could impact the coastline at any given time. The present shoreline is not entirely stable (see Figure 15 above).

We suggest that 100' be considered a minimum setback – in view of the fact that large rock falls have apparently occurred to the northeastern and eastern cliff faces bounding the Property.

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Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 5
Biological Survey

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Biological Survey, TMK (3) 2-8-012:028
South Hilo District, Island of Hawai‘i

By Ron Terry, Ph.D.
Geometrician Associates, LLC
August 2020

Introduction

This biological survey concerns portions of a shoreline property formerly cultivated in sugar cane and now in a semi-forested condition. The 6.485-acre property identified by TMK 2-8-012:028 is located near the town of Honomū on the Island of Hawai‘i, as shown on Figure 1a (the “property”). Included for purposes of analysis is an access easement that extends about 600 feet through TMK 2-8-012:029 from the highway to the edge of the subject property.

Kelly Holcomb, the owner of the property, plans to build a single-family home and conduct related accessory uses on the property, including utilities, a driveway and turnaround, and cutting overgrown vegetation and conducting minor surface restoration for an easement along an old cane road access from Highway 19 to the property boundary The property is illustrated in Figure 1. Although the property was formerly in sugar cane, it is within the State Land Use Conservation District. In order to conduct these development activities on the property responsibly, it is important to locate any sensitive species or vegetation types, identify the potential for biological impacts, and develop mitigation measures to avoid or reduce impacts to minimal levels.

The property was surveyed by Ron Terry on portions of two days in August 2020. The objectives of the botanical survey component of the survey were to: 1) describe the vegetation; 2) list all species encountered; and 3) identify the locations of any individual plants of rare, threatened or endangered species. Plant species were identified in the field and, as necessary, collected and keyed out in the laboratory. Special attention was given to the possible presence of any federally listed (USFWS 2020) threatened or endangered plant species, although the habitat did not indicate a high potential for their presence. The faunal portion of the survey consisted of visual/auditory faunal surveys both during and apart from the botanical survey covering birds and introduced mammals, reptiles, or amphibians. Also considered during the survey was the general value of the habitat for native birds and the Hawaiian hoary bat. Not included in the survey were invertebrates or aquatic species, although it should be noted that no lakes, ponds or intermittent or permanent streams were observed or are known to be present (Honomū Stream passes just west of the property). As with all coastal locations, protection of marine water quality through strict adherence to sediment and erosion Best Management Practices is necessary and expected to be required.

Vegetation Type and Influences

Geologically, this part of the island is located on the lower flank of Mauna Kea volcano. The surface consists of weathered soils derived from regional ash deposits and alkalic

basalt lava flows dated at 65,000-200,000 years before the present (Wolfe and Morris 1996). Elevations on the useable part of this moderately sloping shoreline property drop from about 165 to 80 feet above sea level, seaward of which there are 50- to 80-foot tall sea cliffs. The property receives an average annual rainfall of about 132 inches (Giambelluca et al 2013). The project site soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Hilo hydrous silty clay loam, 10 to 20 percent slopes. This soil is formed from ash fields on lava flows and if irrigated can be considered prime farmland. This type of soil was formerly used mostly for sugarcane cultivation (U.S. Soil Conservation Service 1973) and now supports diversified agriculture, secondary forest, or pasture.

In the *Manual of the Flowering Plants of the Hawaiian Islands*, Gagne and Cuddihy (1990) classified the natural, pre-human vegetation in areas with similar geology, elevation and rainfall as Lowland Wet Forest. Dominant species were likely ʻōhiʻa trees (*Metrosideros polymorpha*), hala (*Pandanus tectorius*), uluhe (*Dicranopteris linearis*) and hapuʻu ferns (*Cibotium* spp.), and a large variety of trees, shrubs, ferns, sedges, grasses and herbs. Shoreline cliff fringes likely contained hala, naupaka (*Scaevola taccada*), ʻōhiʻa, and nanea (*Vigna marina*).

This original community in the general area was long ago eradicated or heavily degraded by sugar cane cultivation, cattle grazing, and clearing for small farms and residences. The vegetation outside towns in the area is now either managed (i.e., farms, pasture or landscaped grounds) or adventive "communities" of various alien weeds. Small remnants of native forest remain only in the far mauka areas, on sea cliffs, and on the sides of some gulches.

U.S. Department of Agriculture and Geological Survey airphotos from 1954, 1965 and 1977 indicate that virtually the entire property was formerly cultivated in sugar cane. After the cessation of sugar cane cultivation in the 1980s, the property was reportedly used for pasture and pigs. Tree cover has rapidly increased on the property since that time and now makes up over half the vegetation cover, although sections dominated by various grasses still persist (Figure 3).

Results: Vegetation and Flora

As shown in Figure 1a, a Google Earth© image of the property from 2019; in Figure 1b, an oblique digital drone aerial image; and in the ground photos in Figure 2, the property is semi-forested. Over most of the property away from the seacliffs, a wide variety of robust grasses dominate the grass layer, including guinea grass (*Megathyrsus maximus*), California grass (*Urochloa mutica*) and Lyon's grass and (*Themeda villosa*), as well as smaller grasses, especially crabgrasses (*Digitaria* spp.) (Figure 2a). The tree layer is dominated by fiddlewood (*Citharexylum caudatum*), common guava (*Psidium guajava*), African tulip (*Spathodea campanulata*), and Alexander palms (*Archontophoenix alexandrae*), although many other tree species are present, notably gunpowder tree (*Trema orientalis*), macaranga (*Macaranga mappa*), albizia (*Falcataria moluccana*) and Chinese banyan (*Ficus microcarpa*) (Figures 2b-c). In forested areas there is a variable understory consisting of tree saplings, shrubs, herbs, ferns and vines, almost all of them alien. Most represented are the shrubs Asian melastome (*Melastoma candidum*),

strawberry guava (*Psidium cattleianum*) and night-blooming jasmine (*Cestrum nocturnum*); the herbs rattlepod (*Crotalaria* spp.) and Koster's curse (*Clidemia hirta*); and the vines pilau maile (*Paederia foetida*) and white thunbergia (*Thunbergia fragrans*). One native shrub is found sparingly but prominently: neneleau (*Rhus sandwicensis*). This attractive native sumac is present in a few areas, especially surrounding the easement (Figure 2d). Ferns vary with the micro-environment and are all aliens (Figure 2e). The downy wood fern (*Christella dentata*) and sword fern (*Nephrolepis multiflora*) are present in and around pastures, while shadier margins and forests support warabi (*Diplazium esculentum*) and *Blechnum appendiculatum*. Trees have several epiphytic ferns including maile-scented fern (*Phymatosorus grossus*) and golden polypody (*Phlebodium aureum*). The shady cliff edges and several of the deep cuts formed by natural slumping or the railroad cut support maidenhair fern (*Adiantum raddianum*) and holly fern (*Cyrtomium falcatum*).

The cliffs exhibit a different vegetation than the rest of the property (Figure 2f). It still includes fiddlewood – the dominant tree of the rest of the property – as well as Chinese fan palm (*Livistona chinensis*), warabi ferns, and various other plants, but is dominated by ironwood (*Casuarina equisetifolia*) and the natives hala, naupaka and nanea (*Vigna marina*). The understory includes tree seedlings and herbs but is generally covered by a thick layer of ironwood needles. Ironwoods suppress native vegetation and contribute to slope instability. While natives act to stabilize the slopes, ironwood trunks and branches capture the wind like a sail and their roots act as levers, forcing out boulders. Ironwood needles tend to function as a blanket and suppress the growth of the natives.

All plant species found on the property during the survey are listed in Table 1. Of the 74 species detected, 6 were indigenous (native to the Hawaiian Islands and elsewhere), while only one – neneleau – was endemic (found only in the Hawaiian Islands). Each of the indigenous plants is very common throughout the Hawaiian Islands and elsewhere, and no rare or unusual native plant species were present. Two common Polynesian introductions were also present: ti (*Cordyline fruticosa*) and 'awapuhi (*Zingiber zerumbet*). It should be noted that we were not able to identify several species because they were sterile, juvenile and/or in poor condition. It is highly unlikely that any of these unidentified species would be rare.

Results: Threatened and Endangered Plant Species and Critical Habitat

No threatened or endangered plant species as listed by the U.S. Fish and Wildlife Service (2020) appear to be present on the property, nor are there uniquely valuable habitats. No existing or proposed federally designated terrestrial critical habitat for plants (or animals) is present on or near the property.

Botanical Impacts and Recommended Mitigation Measures

The history of continuous disturbance coupled with a location in the lowlands has resulted in a flora and vegetation on most of the property that has little value in terms of conserving native vegetation or threatened or endangered plant species. In general, no adverse botanical impacts are expected as a result of developing a single-family home and accessory uses, including the proposed driveway re-establishment on the old cane

road. It is recommended that native plants such as hala, naupaka and neneleau be preserved where practical and be included in a landscape plan focused on native elements, as is encouraged by Conservation District rules.

Results: Birds

A total of eight bird species were observed during the botanical surveys and the specific bird observation periods, all of them common non-natives of urban, suburban and rural areas (see Table 2).

Although not seen in the survey, only the Hawaiian hawk (*Buteo solitarius*) among all native forest birds is likely to have much of a presence on this low-elevation property. The Hawaiian hawk generally prefers ʻōhiʻa forest habitat but is known from both native and non-native forests. It occurs throughout the island of Hawaiʻi from sea level to 8,530 feet in elevation. Hawks often forage in forests near agricultural tracts and nest in tall trees of a variety of species. Most nesting occurs in native ʻōhiʻa trees, although hawks may also nest in non-native trees, including eucalyptus, ironwood, mango, coconut palm and macadamia. Nest construction is protracted, beginning up to two months before the first egg is laid and continuing into the nestling period. Egg-laying generally occurs from March to June, with fledging from July to September. Both sexes contribute to nest-building. Clutch size is nearly always one, although clutches of two and three have been reported. Both sexes incubate, although females perform most of the brooding of nestlings; males provide most of the food to chicks and female. Both adults feed fledglings, which are dependent on adults for up nine months.

Given the vegetation context, there is a small but not negligible possibility that hawks could nest on or near the property. If nests were near enough, any grading, tree removal or other construction activities might disturb nesting, although the context adjacent to several farms and a highway utilized by large trucks somewhat reduced the likelihood of both nests and disturbance potential.

A number of native forest birds occur in the uplands of Hilo-Hāmākua-Kohala above 3,000 feet in elevation. These include honeycreepers such as the ʻapapane (*Himatione sanguinea*) and ʻamakihi (*Chlorodrepanis virens*), the monarch flycatcher ʻelepaio (*Chasiempis sandwicensis*), and the thrush ʻōmaʻo (*Myadestes obscurus*). All of these species generally require ʻōhiʻa forest. Bird survey work on the eastern end of the Island of Hawaiʻi documented in Spiegel et al. (2006) indicate that in many lowland forests, ʻamakihi are the most common and widespread native birds and are significantly associated with ʻōhiʻa. These lowland ʻōhiʻa forests can also support endangered Hawaiian hawks, which forage in forests nearby agricultural tracts and nest in tall trees. At low elevations there has been widespread recovery of both these species and a changing composition of the forest bird community; nevertheless, lowlands dominated by non-native vegetation and bird species continue to have very few forest birds. Rarer native forest bird species are only found in the montane forests along the Hāmākua Coast outside the mosquito belt (generally above 4,000 feet in elevation), where native plant resources are still present and *Culex* mosquitos are absent or scarce. These birds include the threatened ʻiʻiwi (*Drepanis coccinea*), as well as the endangered ʻakiapōlāʻau (*Hemignathus munroi*), Hawaiʻi creeper (*Loxops mana*) and Hawaiʻi ʻakepa (*Loxops*

coccineus). Although it is possible that ‘amakihi, which have been seen in lowland ironwood groves in Puna, might occasionally be present, all of the other Hawaiian forest birds would be extremely unlikely to occur on this property.

The endangered Hawaiian goose or nēnē (*Branta sandwicensis*) has become very common on many Hawaiian islands and can be found at elevations ranging from sea level to sub-alpine areas above 7,000 feet. Historically, flocks moved between high-elevation feeding habitats and lowland nesting areas. Nests consist of a shallow scrape lined with plant material and down. Breeding pairs usually return to the previous year’s nest site, typically in dense vegetation. Nēnē have an extended breeding season, and nesting may occur in all months except May, June, and July, meaning that even if nēnē were present they would not be nesting. Because of the lack of water bodies, the property appeared to be unlikely habitat for nēnē and particularly for nesting. We did not observe any signs of nēnē, although they are perhaps occasionally present.

It is also likely that a number of migratory shorebirds and one seabird are present on the cliffs and rocky tidepools just makai of the property. These would include the migratory birds wandering tattler or ‘ulili (*Tringa incana*), the ruddy turnstone or ‘akekeke (*Arenaria interpres*), and the Pacific golden-plover or kolea (*Pluvialis fulva*), as well as the seabird black noddy (*Anous minutus melanogenys*), which may nest in the cliffs below the property. The proposed actions would not affect these birds.

As with all of the island of Hawai‘i, several listed seabirds may overfly the Honomū area between the months of May and November, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell’s shearwater (*Puffinus auricularis newelli*). These seabirds hunt over the ocean during the day and fly to higher elevations at night to nest. The Hawaiian petrel was formerly common on the Island of Hawai‘i. This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea, as well as at the mid-to-high elevations of Hualālai. It has within recent historic times been reduced to relict breeding colonies located at high elevations on Mauna Loa, Kohala and, possibly, Hualālai. The Hawaiian petrel (as well as the band-rumped storm petrel) generally nest on the Big Island well above 5,000 feet in elevation. Some Hawaiian petrel nests have recently been found at lower elevations on Kohala volcano. Both the Newell’s shearwater and Hawaiian petrel are known to burrow under ferns on forested mountain slopes. These burrows are used year after year, usually by the same pair of birds. Although capable of climbing shrubs and trees before taking flight, they need an open downhill flight path through which they can become airborne. Although once abundant on all the main Hawaiian islands, most Newell’s shearwater colonies today are found in the steep terrain between 500 to 2,300 feet on Kaua‘i. Band-rumped storm petrels have recently been discovered to be nesting on the Mauna Loa side of the saddle between this mountain and Mauna Kea. Although each of these seabirds may fly over on their way to and from mountain nesting areas and the open ocean, no suitable nesting habitat for any of them is present on the property.

The primary cause of mortality in these seabird species in Hawai‘i is thought to be predation by alien mammals at the nesting colonies. Collision with man-made structures is another significant cause. Nocturnally flying seabirds, especially fledglings on their

way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals including cats and mongooses.

Results: Mammals, Reptiles and Amphibians

It is highly likely that Hawaiian hoary bats (*Lasiurus cinereus semotus*), the only native Hawaiian land mammals, are sometimes present on the property. They have been found throughout the Hāmākua coast and in most areas on the island of Hawai‘i. Bats may forage for flying insects on the property on a seasonal basis and may also roost in trees and large shrubs. Bats are often visible while they are feeding on flying insects near dusk and dawn at various locations around the island of Hawai‘i. The presence of these bats can also be verified by ultrasound detectors or radar. If a bat is detected during a night's study, this merely indicates that they were present in the area. Determination of bat populations or usage patterns requires much more sophisticated, long term studies. Conversely, the absence of bat detections does not indicate an absence of bats, which may have been absent for only a night, a week, or a season, or may have simply gone undetected. No bats were observed in our survey, which took place in full daylight and did not use any detection equipment. For the purposes of this assessment, it is assumed that Hawaiian hoary bats are present at least some of the time, as they have been frequently seen and detected by ultrasound and radar in ironwood, African tulip and groves of other species. Hawaiian hoary bats are vulnerable to disturbance during the summer pupping season and require special mitigation measures.

Only one non-native mammal was observed on the property, what appeared to be semi-feral pigs (*Sus scrofa*). It is likely that small Indian mongooses (*Herpestes a. auropunctatus*), mice (*Mus* spp.), rats (*Rattus* spp.), cats (*Felis catus*) and domestic dogs (*Canis f. familiaris*) are also sometimes present. None of these alien mammals have conservation value and all are deleterious to native flora and fauna.

There are no native terrestrial reptiles or amphibians in Hawai‘i. No reptiles were seen but there are probably various species of skink (Family: Scincidae) and gecko (Gekkonidae) present. The highly invasive coqui frogs (*Eleutherodactylus coqui*) was heard chirping at several locations. It is possible that bufo toads (*Bufo marinus*) and perhaps other amphibians are also present.

No invertebrate survey was undertaken as part of the survey, but in general, rare native invertebrates tend to be associated with native vegetation and are very unlikely to be present. No rare invertebrates would be expected from this property.

Faunal Impacts and Mitigation Measures

The following recommendations will help avoid impacts to endangered native birds and the Hawaiian hoary bat:

- To minimize impacts to the endangered Hawaiian hoary bat, trees taller than 15 feet should not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15).

- To minimize impacts to Hawaiian hawks, avoid earthmoving within 100 meters of tall trees or any tree cutting during the breeding season for Hawaiian hawks (March through the end of September). If this time period cannot be avoided, arrange for a hawk nest search to be conducted by a qualified biologist. If hawk nests are present on or near the project site, all land clearing activity should cease until the expiration of the breeding season.
- If development activities incorporate outdoor lighting, they may attract endangered seabirds, which may become disoriented by the lighting, resulting in birds being downed. To avoid potential seabird downing through interaction with outdoor lighting, no construction or unshielded equipment lighting should be used after dark between the months of April and October. All permanent lighting should be shielded in strict conformance with the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 9, Article 14), which requires shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting.

Report Limitations

No biological survey of a large area can claim to have detected every species present. Some plant species are cryptic in juvenile or even mature stages of their life cycle. Dry conditions can render almost undetectable plants that extended rainfall may later invigorate and make obvious. Thick brush can obscure even large, healthy specimens. Birds utilize different patches of habitat during different times of the day and seasons, and only long-term study can determine the exact species composition. The findings of this survey must therefore be interpreted with proper caution; in particular, there is no warranty as to the absence of any particular species.

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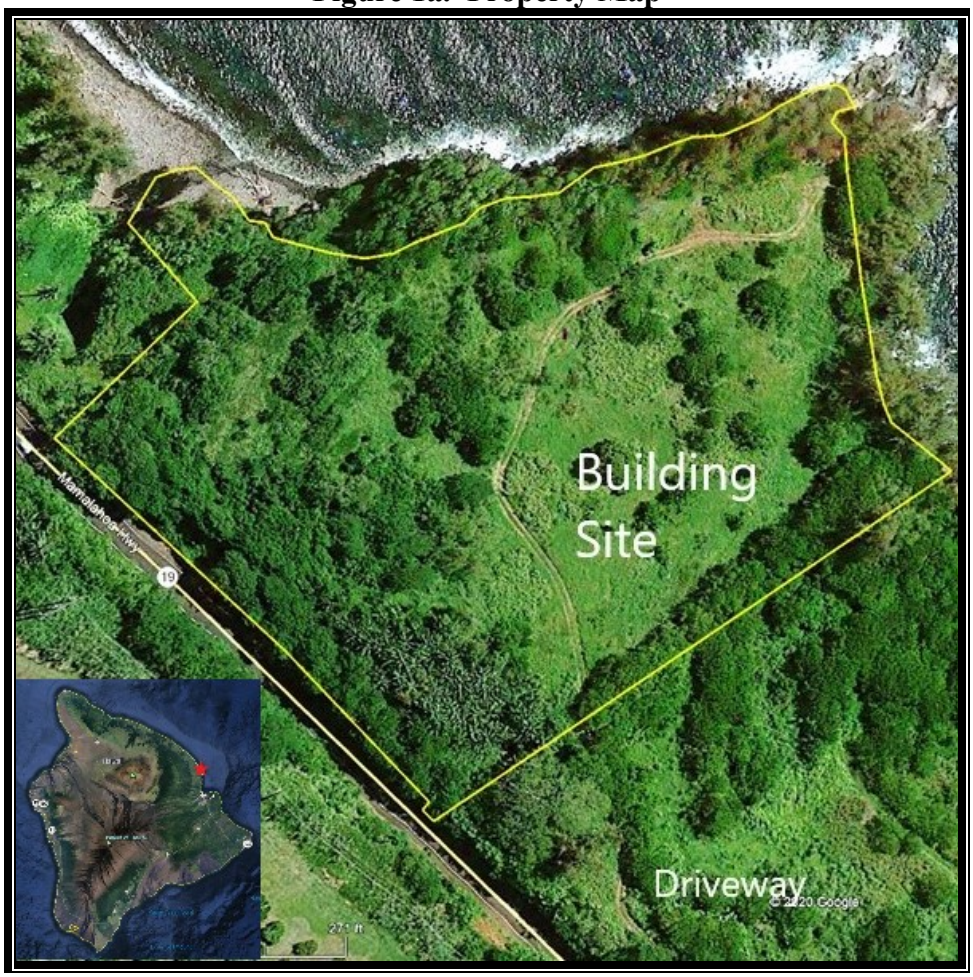
Figure 1a. Property Map



Aerial Image Base Map © Google Earth

Figure 1b. Drone Oblique Aerial Image

Figure 2. Property Vegetation Photos

2a. Grass dominates the center of the property ▲

▼ 2b. Forest of alien species, dominated by fiddlewood

Figure 2. Property Vegetation Photos

2c. A dense forest of ferns is present in old railroad cut ▲

▼ 2d. Native neneleau

Figure 2. Property Vegetation Photos

2e. Ferns on cliff banks ▲

▼ 2f. Looking down edge of cliff at ironwood, hala and naupaka

Table 1. Plants Observed on Property

Scientific Name	Family	Common Name	Life Form	Status*
Adiantum raddianum	Pteridaceae	Maidenhair Fern	Fern	A
Alpinia zerumbet	Zingiberaceae	Shell Ginger	Herb	A
Archontophoenix alexandrae	Arecaceae	Alexander Palm	Tree	A
Begonia sp.	Begoniaceae	Begonia	Herb	A
Blechnum appendiculatum	Blechnaceae	Blechnum	Fern	A
Casuarina equisetifolia	Casuarinanceae	Ironwood	Tree	A
Centella asiatica	Apiaceae	Asiatic Pennywort	Herb	A
Cestrum nocturnum	Solanaceae	Night Blooming Jasmine	Shrub	A
Chamaecrista nictitans	Fabaceae	Partridge Pea	Herb	A
Chloris barbata	Poaceae	Swollen Fingergrass	Grass	A
Christella dentatus	Thelypteridaceae	Downy Wood Fern	Fern	A
Citharexylum caudatum	Verbenaceae	Fiddlewood	Tree	A
Clidemia hirta	Melastomataceae	Clidemia	Herb	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Conyza bonariensis	Asteraceae	Conyza	Herb	A
Cordyline fruticosa	Agavaceae	Ti	Shrub	PI
Crotalaria incana	Fabaceae	Smooth Rattlepod	Herb	A
Crotalaria trichotoma	Fabaceae	Curara Pea	Herb	A
Cyperus halpan	Cyperaceae	Sharp Edge Sedge	Herb	A
Cyperus meyenianus	Cyperaceae	Meyen's Flatsedge	Sedge	A
Cyperus polystachyos	Cyperaceae	Manyspike Flatsedge	Herb	I
Cyrtomium falcatum	Dryopteridaceae	Holly Fern	Fern	A
Desmodium intortum	Fabaceae	Desmodium	Vine	A
Desmodium triflorum	Fabaceae	Desmodium	Herb	A
Dicranopteris linearis	Gleicheniaceae	'Uluhe	Fern	I
Digitaria ciliaris	Poaceae	Henry's Crab Grass	Herb	A
Diplazium esculentum	Athyriaceae	Paca	Fern	A
Dissotis rotundifolia	Melastomataceae	Dissotis	Herb	A
Emilia fosbergii	Asteraceae	Flora's Paintbrush	Herb	A
Eragrostis pectinacea	Poaceae	Carolina Lovegrass	Herb	A
Erechtites hieracifolia	Asteraceae	Erechtites	Herb	A
Falcataria moluccana	Fabaceae	Albizia	Tree	A
Ficus microcarpa	Moraceae	Chinese Banyan	Tree	A
Fimbristylis dichotoma	Cyperaceae	Fimbristylis	Herb	I
Hyptis pectinata	Lamiaceae	Comb Hyptis	Shrub	A
Ipomoea triloba	Convolvulaceae	Little Bell	Vine	A
Kyllinga brevifolia	Cyperaceae	Kyllinga	Herb	A
Lantana camara	Verbenaceae	Lantana	Shrub	A
Livistona chinensis	Arecaceae	Chinese Fan Palm	Tree	A
Macaranga mappa	Euphorbiaceae	Bingabing	Shrub	A
Megathyrus maximus	Poaceae	Guinea Grass	Herb	A
Melastoma sp.	Melastomataceae	Melastoma	Shrub	A
Melinus minutiflora	Poaceae	Molasses Grass	Herb	A
Miconia calvescens	Melastomataceae	Miconia	Shrub	A
Mimosa pudica	Fabaceae	Sleeping Grass	Herb	A

Momordica charantia	Cucurbitaceae	Bitter Melon	Vine	A
Nephrolepis multiflora	Nephrolepidaceae	Sword Fern	Fern	A
Paederia foetida	Rubiaceae	Maile Pilau	Vine	A
Pandanus tectorius	Pandanaceae	Hala	Tree	I
Paspalum conjugatum	Poaceae	Hilo Grass	Herb	A
Phlebodium aureum	Polypodiaceae	Golden Polypody	Fern	A
Phyllanthus debilis	Euphorbiaceae	Niruri	Herb	A
Phymatosorus grossus	Polypodiaceae	Maile Scented Fern	Fern	A
Pluchea carolinensis	Asteraceae	Sourbush	Shrub	A
Polygala paniculata	Polygalaceae	Milkwort	Herb	A
Psidium cattleianum	Myrtaceae	Strawberry Guava	Tree	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Rhus sandwicensis	Anacardiaceae	Neneleau	Tree	E
Ricinus communis	Euphorbiaceae	Castor Bean	Shrub	A
Rubus rosifolius	Rosaceae	Thimbleberry	Herb	A
Sacciolepis indica	Poaceae	Glenwood Grass	Herb	A
Scaevola taccada	Goodeniaceae	Naupaka Kahakai	Shrub	I
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A
Sporobolus indicus	Poaceae	Sporobolus	Herb	A
Stachytarpheta jamaicensis	Verbenaceae	Jamaican Vervain	Shrub	A
Syzygium cumini	Myrtaceae	Java Plum	Tree	A
Themeda villosa	Poaceae	Lyon's Grass	Herb	A
Thunbergia fragrans	Acanthaceae	White Thunbergia	Vine	A
Tibouchina herbacea	Melastomataceae	Cane Tibouchina	Herb	A
Trema orientalis	Ulmaceae	Gunpowder Tree	Tree	A
Urochloa mutica	Poaceae	California Grass	Herb	A
Vigna marina	Fabaceae	Nanea, Beach Pea	Vine	I
Wedelia trilobata	Asteraceae	Wedelia	Herb	A
Zingiber zerumbet	Zingiberaceae	'Awapuhi	Herb	PI

A=Alien PI= Polynesian Introduction E=Endemic I=Indigenous END=Federal and State Listed Endangered

Table 2. List of Bird Species Observed on Property

Scientific Name	Common Name	Status
Acridotheres tristis	Common Myna	Alien Resident
Geopelia striata	Zebra Dove	Alien Resident
Paroaria capitata	Yellow-Billed Cardinal	Alien Resident
Passer domesticus	House Sparrow	Alien Resident
Serinus mozambicus	Yellow-Fronted Canary	Alien Resident
Sicalis flaveola	Saffron Finch	Alien Resident
Streptopelia chinensis	Spotted Dove	Alien Resident
Zosterops japonicus	Japanese White-Eye	Alien Resident

Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 6
Visual Impact Assessment

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Visual Impact Assessment
Holcomb Residence in Special Management Area
TMK (3) 2-8-012:028, South Hilo District, Island of Hawai‘i

By Ron Terry, Ph.D.
Geometrician Associates, LLC
October 2020

Introduction

This assessment concerns a development of a single-family residence on a shoreline property. The 6.485-acre property identified by TMK 2-8-012:028 is located near the town of Honomū, directly adjacent to State Highway 19, on the Island of Hawai‘i, as shown on Figure 1. Almost the entire property was formerly cultivated in sugar cane but is now covered in tall non-native trees except for the center, which supports a few clumps of trees scattered in meadows of tall, robust grasses (Figure 2). Native hala trees, all of which are being preserved, fringe the top of the shoreline cliff where not crowded out by invasive ironwood trees.

Construction of the home requires a Special Management Area Use Permit from the County of Hawai‘i. Granting of the permit is subject to Rule 9 of Hawai‘i County Planning Commission Rules, which govern County-regulated development in the Special Management Area or SMA of the Coastal Zone in the County of Hawai‘i. Chapter 205A, Hawai‘i Revised Statutes, expresses the intent of the State’s Coastal Zone Management program to protect, preserve, and where desirable, restore or improve the quality of scenic and open space resources.

To implement this intent, the guidelines contained in Rule 9 seek to minimize development that would **substantially interfere with or detract from the line of sight toward the sea from the State Highway nearest the coast or from other scenic areas identified in the General Plan**. The discussion below identifies and evaluates scenic resources in the context of these regulations and guidelines.

Several locations in Rural South Hilo and North Hilo offer drivers on Highway 19 fairly long, sweeping, horizon views of the sea. Because of the ever-present sea-cliffs, actual shoreline views are rare and found mainly at lookouts in Wainaku and Laupahoehoe and on some of the bridges. The Holcomb property is at about Mile Marker (MM) 12.7. On the highway approaching the property between MM 12.5 and MM.14 there are no sweeping views, as the combination of topography, distance and vegetation allow drivers only fleeting views of the sea. The shoreline itself is not visible between Honoli‘i Gulch and Kolekole Gulch, at MM 14.2.

Although the Holcomb property borders State Highway 19, the useable portion of the property is set behind a tall road-cut through which the highway passes (Figures 2a and b). On the highway fronting the Holcomb property itself there are no ocean views on the

approaches from the south or north. The view of the property approaching on the highway from the north includes the trees situated at the top of cliff on the wide highway right-of-way in this area and a narrow view of similar trees on the far western cliff of the Holcomb property (Figure 2c). The view of the property approaching on the highway from the south is almost completely blocked by trees and topography (Figure 2d). The site chosen for the home is within a grassy part of the property in the interior (Figure 2e) and is not visible from any point on the highway. Tall trees present on all margins of the property block views of the interior from all directions, obscuring even views of the horizon (Figures 2a and 2f).

The Hawai‘i County General Plan states:

> The natural beauty of the South Hilo district is dominated by Mauna Kea and Mauna Loa. From various locations in the area, there are magnificent views of the mountains. Hilo Bay provides a picturesque front yard for Hilo. From the bay the land gently slopes upward towards Mauna Kea and Mauna Loa. Throughout the district there are waterfalls, including the famous Akaka Falls and nearby Kahuna Falls, Rainbow Falls, and others (p. 7-5).

The General Plan identifies areas of natural beauty and important viewplanes for various places in Hawai‘i County (Table 1). None of these sites are visible from the project site or located within a mile of it.

Table 1
County General Plan Sites of Natural Beauty in Rural South Hilo

Site	Tax Map Key Plats	Ahupua‘a or Region
Honolii Beach Area and Stream	2-6-24:1-4	Alae
Onomea Bay Area	2-7-09:1, 2, 26; 2-7-10:1	Kahalii-Onomea
Onomea Arch (fallen)	2-7-10:1	Onomea
Akaka and Kahuna Falls	2-8-10:34	Honomu
Kolekole Gulch	2-8-15, 2-9-03	Kuhua-Kaiwiki
Hakalau Bay/Gulch Area	2-9-02, 3-1-01	Hakalaunui-Kamae

The Hamakua Community Development Plan (CDP) implements the General Plan for the region including the districts of Hamakua, North Hilo and the Rural South Hilo portion of the South Hilo District, which is north of the Wailuku River. Protection of scenic views is an integral part of the CDP, which includes the following objectives and policies:

> Community Objective
> Objective 1: Protect, restore, and enhance watershed ecosystems, sweeping views, and open spaces from mauka forests to makai shorelines, while assuring responsible public access for recreational, spiritual, cultural, and sustenance practices.
> Objective 2: Protect and restore viable agricultural lands and resources. Protect and enhance viewscapes and open spaces that exemplify Hamakua’s rural character.

4. 5. 2 Existing Policy
Land Use Policy Intent: Do not allow incompatible construction in areas of natural beauty. (GP 7.3 (i))
Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources. (GP 7.2 a))
Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty. (GP 7.2 (c))
Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.GP 8.2 (e))
Provide and protect open space for the social, environmental, and economic well-being of the County of Hawaii and its residents. (GP 14.8.2 a))

In order to assess the potential for interference by the home (the only planned structure) with views from State Highway 19 and the nearby shoreline, a series of roughly mauka-makai profiles were developed. These are based on Google Earth © imagery and digital elevation models (DEMs). These DEMs are derived from Shuttle Radar Topography Mission (SRTM) collected in 2009 from the Space Shuttle Endeavour. The inherent accuracy ranges from 5 to 10 meters but is improved by applying interpolation algorithms to mix and mesh SRTM data with other DEM data such as U.S. Geological Survey models. The resulting DEM has a smoothed surface and provides a reasonably accurate first-order approximation of topography. The profiles also include the existing topography, the proposed 18-foot from finished grade home, and a small but representative and conservatively depicted sample of the trees. Figures 3a-f illustrate various angles for potential viewers and include *sight lines* between critical points, including the highway, the top of the roof, and points along the shoreline. The profiles demonstrate the following:

- Views from the shoreline to the home. As illustrated in three profiles to various shoreline points, owing to the steep cliff that fronts the entire coastline, and secondarily because of the fringe of trees, the home will not be visible at all from any shoreline areas within miles of property. Even if invasive trees are cleared from a planned area in the north and northeast of the property, no shoreline views would be possible.

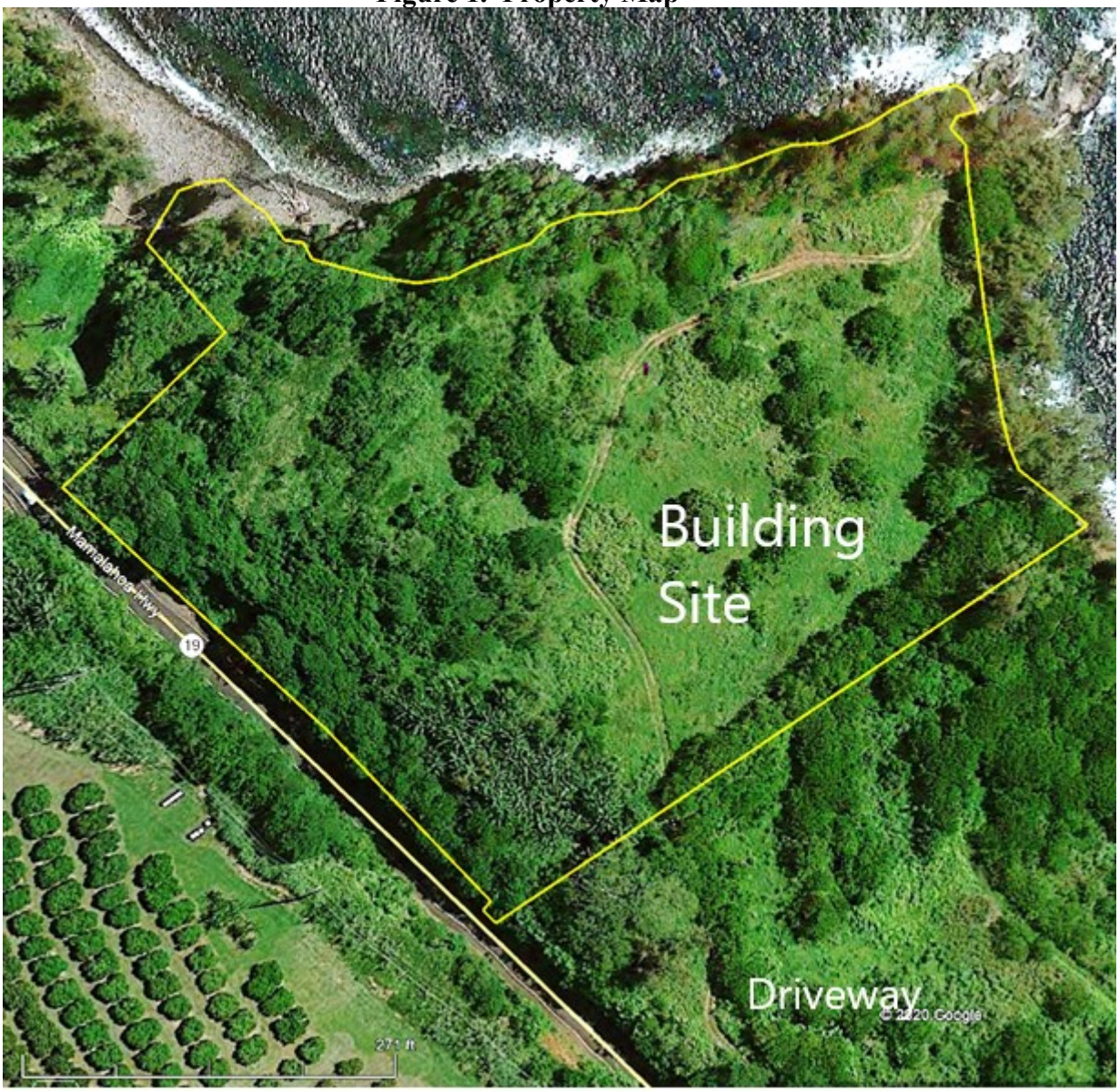
- Views from Highway 19 to the home. As illustrated in three profiles to various points on the highway, the home location lies in a topographic "dip" situated below a steep slope, which would conceal it from view from the *mauka* side, even without vegetation. No visual impact for the viewplanes from the highway to towards the shoreline and over the home is expected.

In summary, construction of the residence would not lead to any visual impacts for the general public. Views to and from the shoreline and Highway 19 would not be affected.

The project is being designed to conform with the Conservation District rules (Hawai'i Administrative Rules 13-5), which require subtle and sensitive colors and architectural styles, minimal height, and landscaping utilizing almost exclusively native and Polynesian species. Although the home will not be visible to the general public except from the air or out to sea, its sensitive design will not cause any scenic impacts. Invasive

ironwood tree removal to establish a sight line towards the sea on the north/northeast – coupled with planting native hala trees – would be undertaken, but this will not adversely affect any views of the property from the shoreline or highway. To the degree there are any visual effects from this tree removal, the replacement of ironwood with hala will be positive.

Figure 1. Property Map



Aerial Image Base Map © Google Earth

Figure 2. Property Photos

2a. Oblique aerial. Note highway on left and right, with roadcut in between. Home site is grassy area in middle of point. ▲

▼ 2b. Road cut that borders property on southwest side.

Figure 2. Photos

2c. View approaching property from north ▲

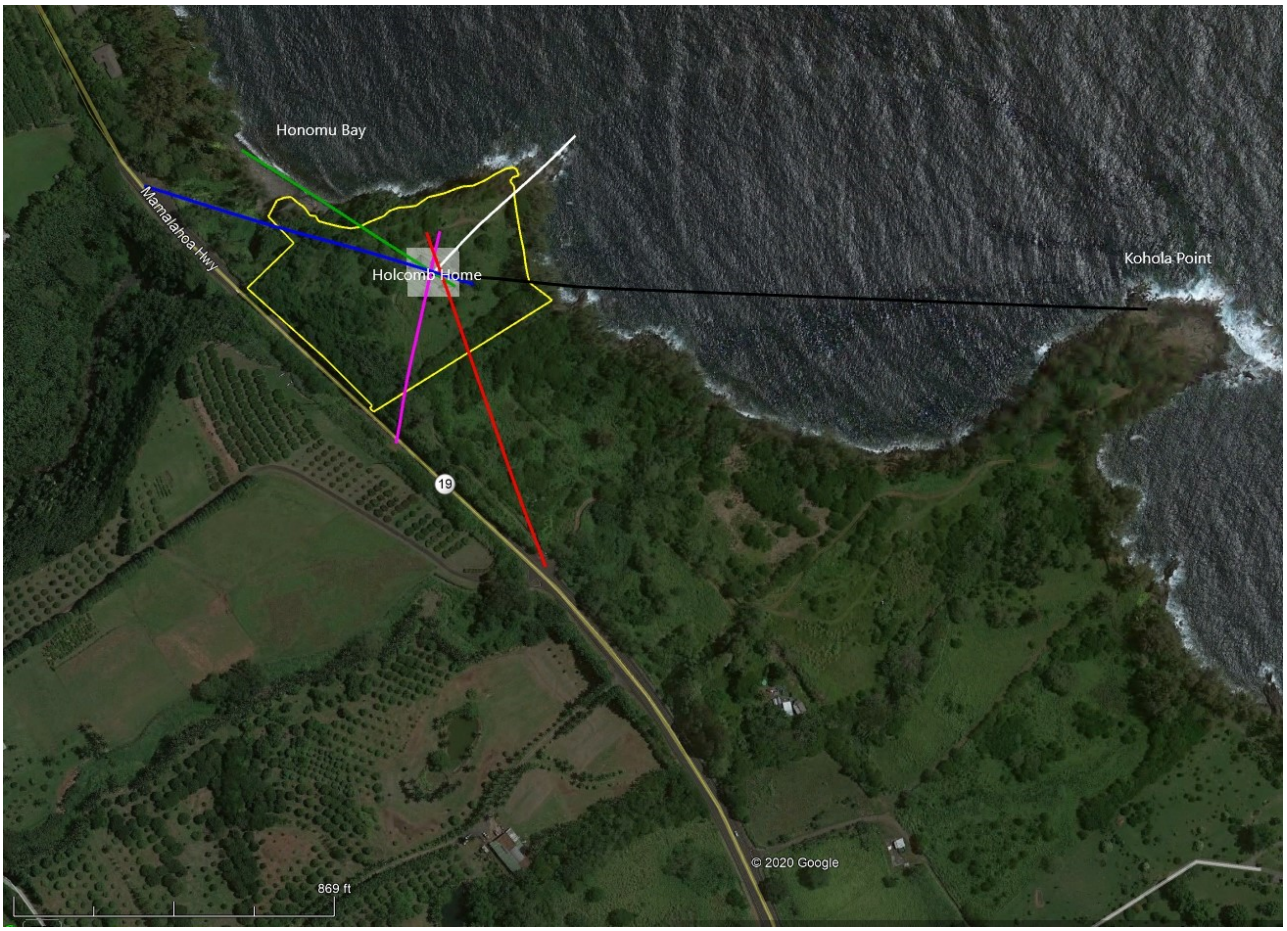
▼ 2d. View approaching property from south

Figure 2. Photos

2e. ▲ Building site

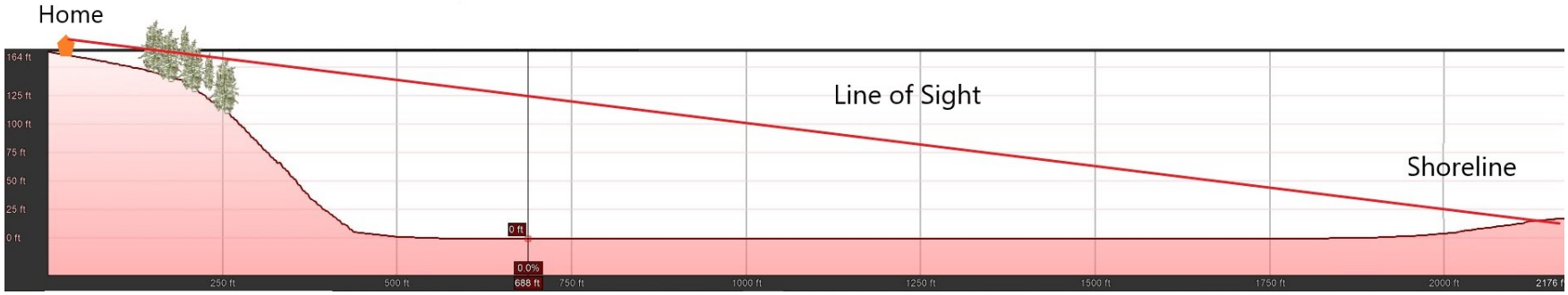
▼ 2f. View from building site north towards sea

Figure 3 Visual Impact Profiles

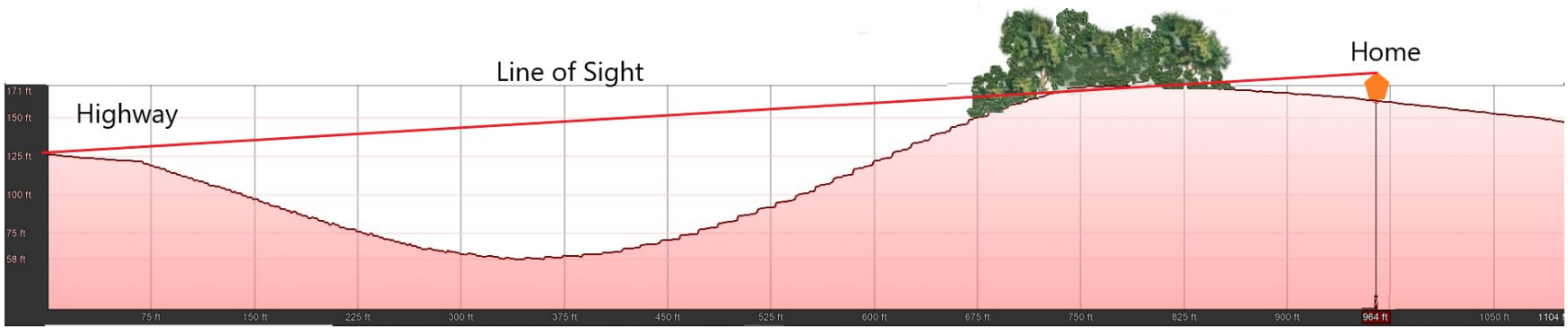


Key to Profiles

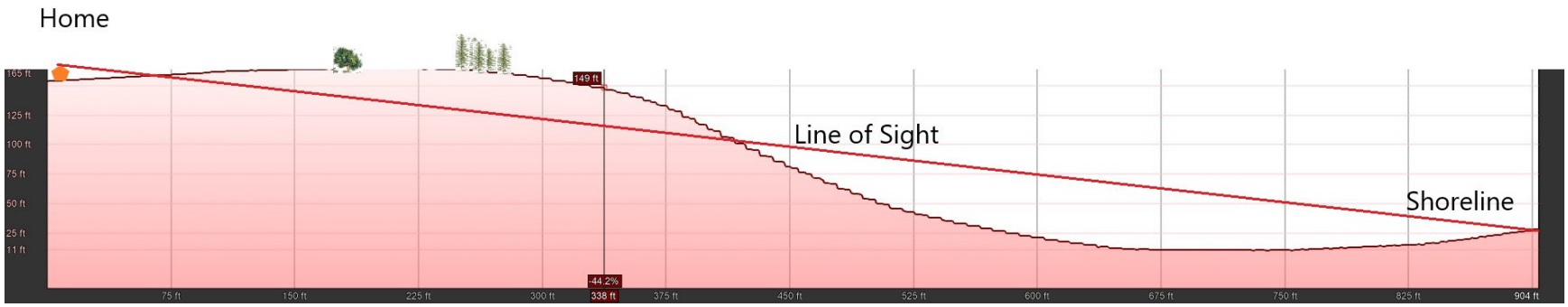
Figure 3 Visual Impact Profiles



Black Profile

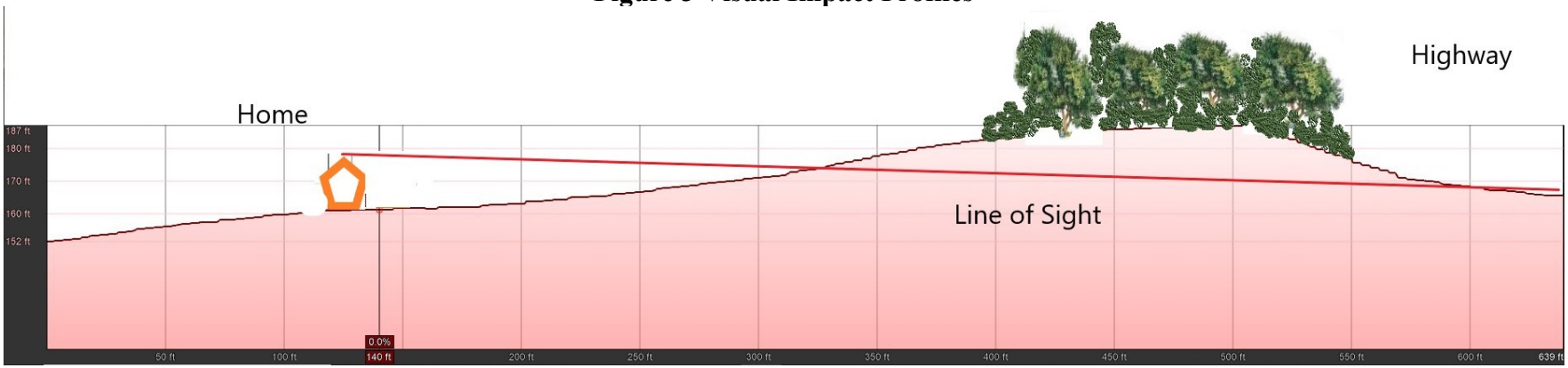


Blue Profile

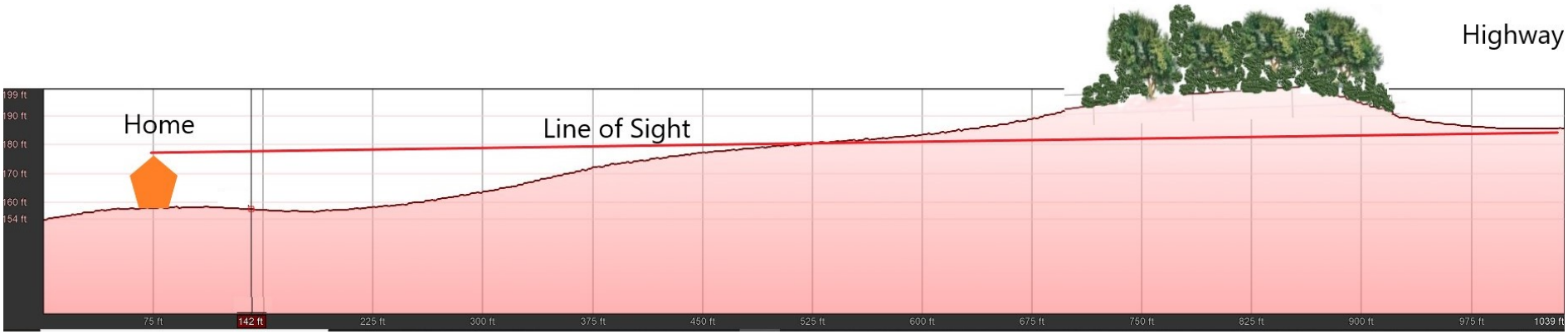


Green Profile

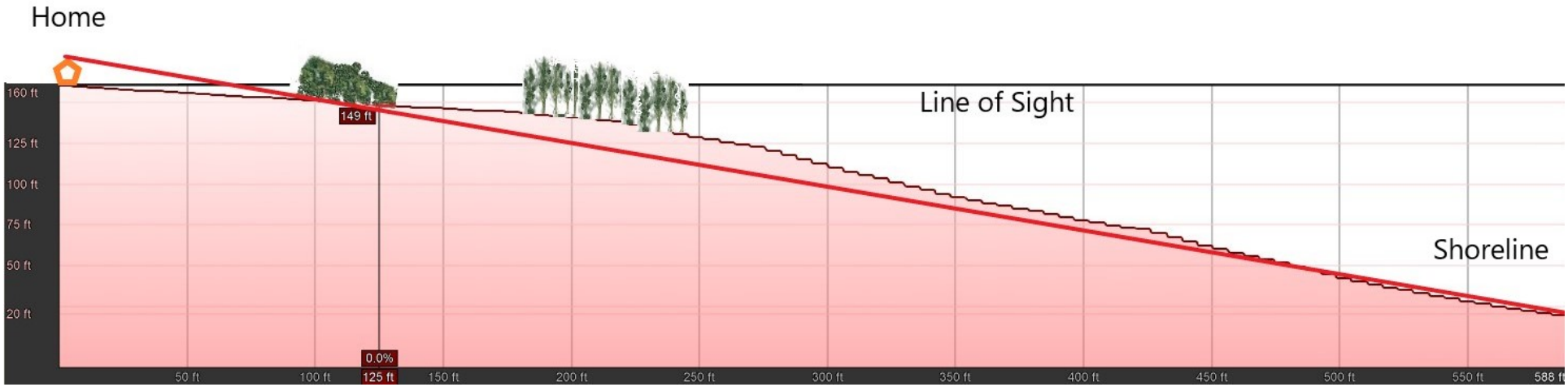
Figure 3 Visual Impact Profiles



Magenta Profile



Red Profile



White Profile

Environmental Assessment

Holcomb Single-Family Residence in the Conservation District in Honomū

APPENDIX 7
Site Plans: Civil Site Plan; Grading Plan; Landscape Plans; Tree Removal Aerial

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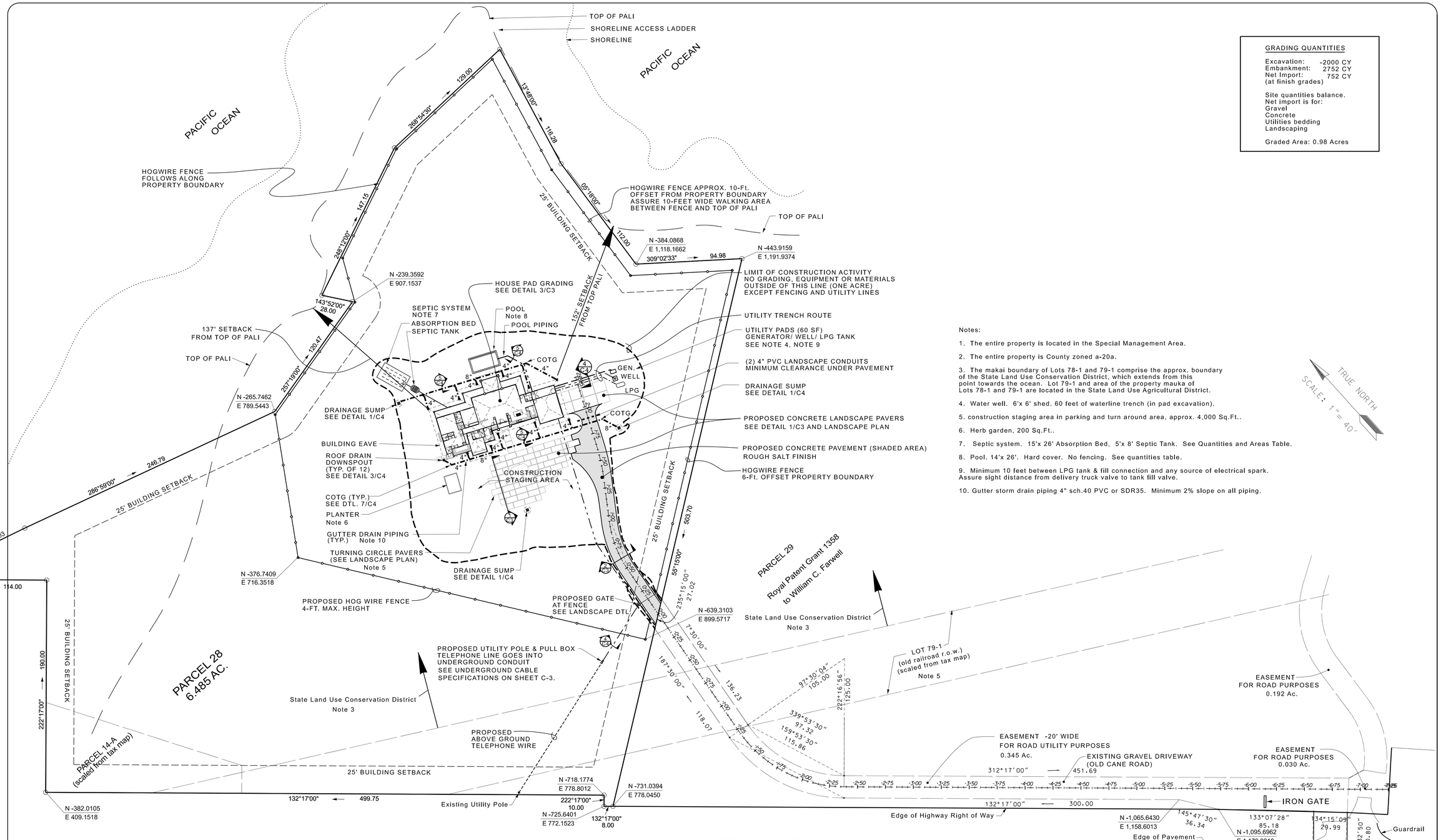


GRADING QUANTITIES

Excavation: -2000 CY
Embankment: 2752 CY
Net Import: 752 CY
(at finish grades)

Site quantities balance.
Net import is for:
Gravel
Concrete
Utilities bedding
Landscaping

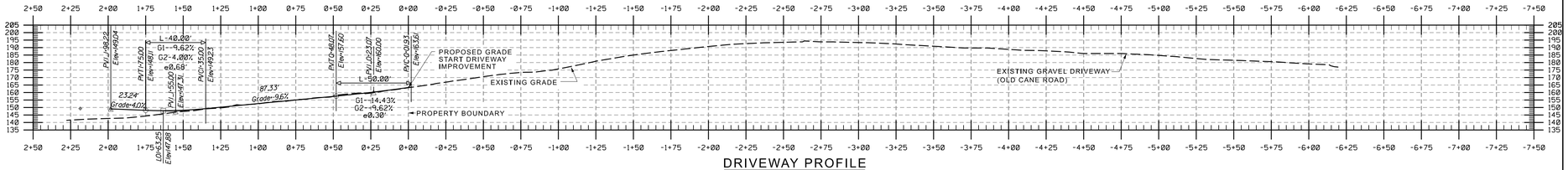
Graded Area: 0.98 Acres

Notes:

1. The entire property is located in the Special Management Area.
2. The entire property is County zoned a-20a.
3. The makai boundary of Lots 78-1 and 79-1 comprise the approx. boundary of the State Land Use Conservation District, which extends from this point towards the ocean. Lot 79-1 and area of the property mauka of Lots 78-1 and 79-1 are located in the State Land Use Agricultural District.
4. Water well. 6'x 6' shed. 60 feet of waterline trench (in pad excavation).
5. construction staging area in parking and turn around area, approx. 4,000 Sq.Ft..
6. Herb garden, 200 Sq.Ft..
7. Septic system. 15'x 26' Absorption Bed, 5'x 8' Septic Tank. See Quantities and Areas Table.
8. Pool. 14'x 26'. Hard cover. No fencing. See quantities table.
9. Minimum 10 feet between LPG tank & fill connection and any source of electrical spark. Assure sight distance from delivery truck valve to tank fill valve.
10. Gutter storm drain piping 4" sch.40 PVC or SDR35. Minimum 2% slope on all piping.

DRIVEWAY CENTERLINE

Point Type	Station	Northing (Y)	Easting (X)
POB	-7+25.843	-1184.6006	1304.3744
	487.8738 132°17'00"		
PC	-2+37.969	-856.3604	943.4323
LC= 110.8274	CD= 55°%d13'01"		
RC= 115.0000	DC= 49°%d49'21"		
PI	-1+77.827	-815.8970	898.9375
PT	-1+27.142	-756.2694	906.7879
	127.1417 187°%d30'01"		
PI	0+00.000	-630.2154	923.3837
	47.7483 187°%d30'00"		
PC	0+47.748	-582.8756	929.6161
LC= 47.1622	CD= 27°%d01'19"		
RC= 100.0000	DC= 57°%d17'45"		
PI	0+71.776	-559.0530	932.7524
PT	0+94.911	-539.2560	946.3697
	38.3489 214°%d31'19"		
PC	1+33.259	-507.6600	968.1028
LC= 30.2465	CD= 9°%d31'19"		
RC= -182.0000	DC= 31°%d28'52"		
PI	1+48.418	-495.1711	976.6933
PT	1+63.506	-481.4331	983.0994
	64.3418 205°%d00'00"		
POE	2+27.848	-423.1196	1010.2914



DRIVEWAY PROFILE
SCALE 1"=40'

This work was prepared by me or under my supervision and conforms with the standards of observation (as defined under sec. 16-115-2, of Hawaii Administrative Rules)

Engineer May, 2021
Date LICENSE EXPIRES: 30APR22

STEPHEN J. HERBERT LICENSED PROFESSIONAL ENGINEER No. 1978-C HAWAII, U.S.A.

KONA WAI ENGINEERING LLC
Civil Engineering & Wastewater Design
Stephen J. Herbert, P.E.
(808) 386-4497 Phone

PROPOSED SINGLE FAMILY RESIDENCE FOR:
KELLY HOLCOMB

28-3426 HAWAII BELT ROAD
HONOMU, HAWAII 96728
TMK: 2-8-012-028

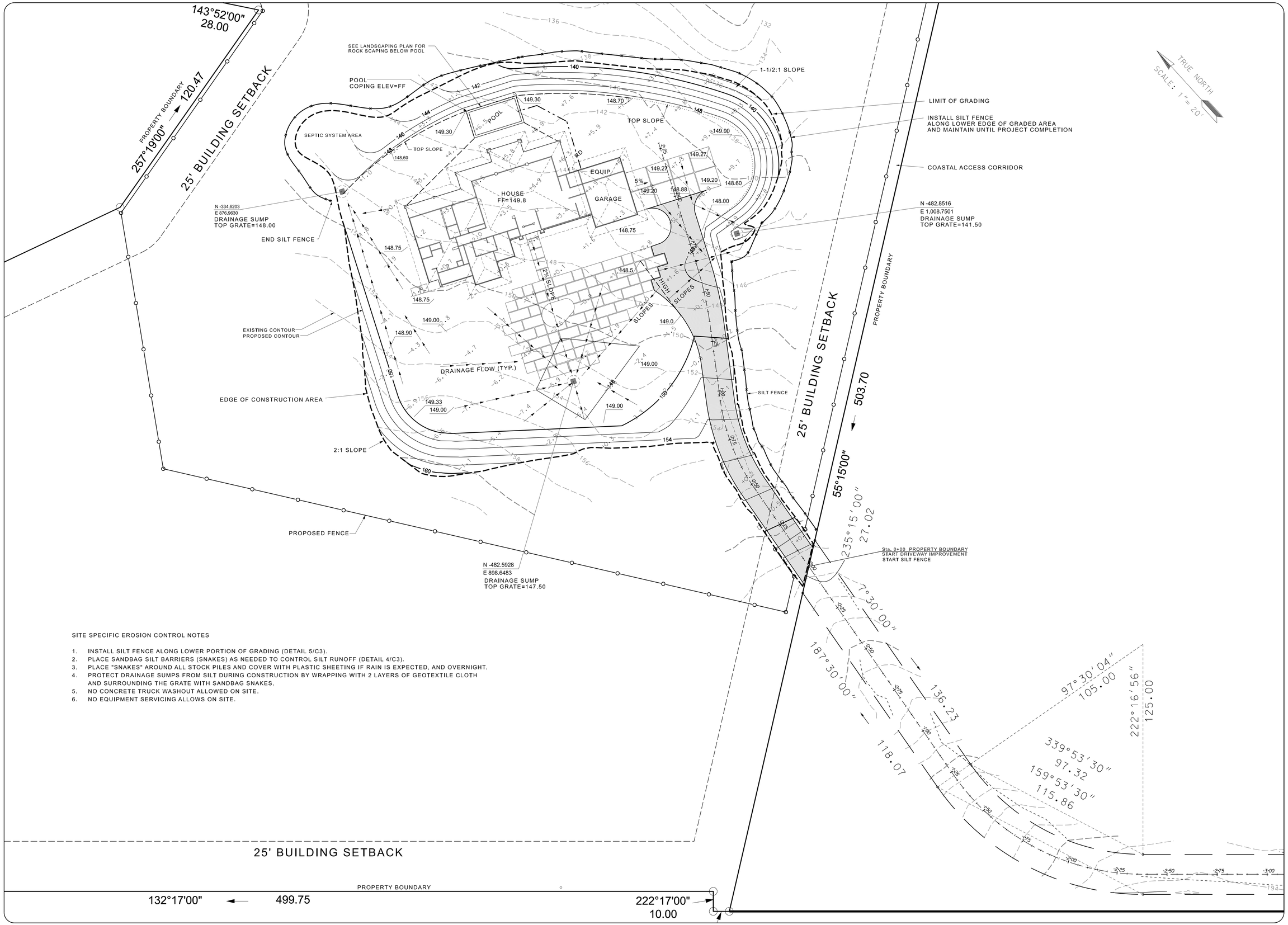
REVISIONS

NO	DATE

DRAWINGS:
CIVIL SITE PLAN

DATE: May 7, 2021
SCALE: AS NOTED
DRAWN:

DRAWING NUMBER
C-1



SITE SPECIFIC EROSION CONTROL NOTES

1. INSTALL SILT FENCE ALONG LOWER PORTION OF GRADING (DETAIL 5/C3).
2. PLACE SANDBAG SILT BARRIERS (SNAKES) AS NEEDED TO CONTROL SILT RUNOFF (DETAIL 4/C3).
3. PLACE "SNAKES" AROUND ALL STOCK PILES AND COVER WITH PLASTIC SHEETING IF RAIN IS EXPECTED, AND OVERNIGHT.
4. PROTECT DRAINAGE SUMPS FROM SILT DURING CONSTRUCTION BY WRAPPING WITH 2 LAYERS OF GEOTEXTILE CLOTH AND SURROUNDING THE GRATE WITH SANDBAG SNAKES.
5. NO CONCRETE TRUCK WASHOUT ALLOWED ON SITE.
6. NO EQUIPMENT SERVICING ALLOWS ON SITE.

This work was prepared by me or under my supervision and meets minimum standards for observation (as defined under sec. 16-115-2, of Hawaii Administrative Rules)

Engineer May, 2021

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HONOMU, HAWAII 96728
TMK: 2-8-012-028

REVISIONS

NO	DATE

DRAWINGS:

GRADING PLAN

DATE: May 7, 2021

SCALE: AS NOTED

DRAWN:

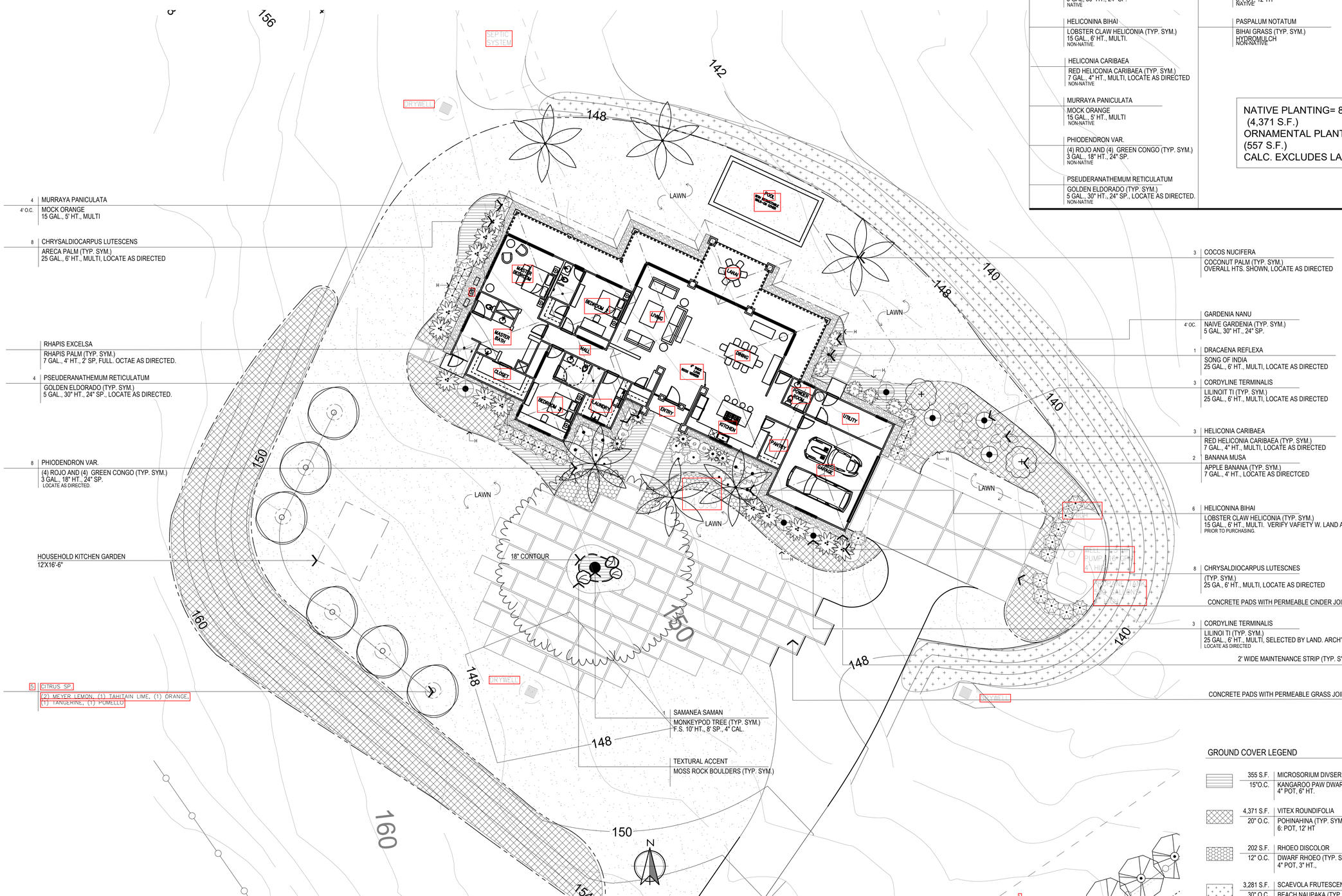
DRAWING NUMBER

C-2

PLANT LIST

TREES	PALMS	SHRUBS	GROUND COVERS
CITRUS SP. (2) MEYER LEMON, (1) TAHITAIN LIME, (1) ORANGE, (1) TANGERINE, (1) POMELLO NON-NATIVE	CHRYSALDIOCARPUS LUTESCENS ARECA PALM (TYP. SYM.) 25 GAL., 6' HT., MULTI, LOCATE AS DIRECTED NATIVE	BANANA MUSA APPLE BANANA (TYP. SYM.) 7 GAL., 4' HT., LOCATE AS DIRECTCED NON-NATIVE	MICROSORIUM DIVSERIFOLIA KANGAROO PAW DWARF LAUA'E FERN (TYP. SYM.) 4" POT, 6" HT. NON-NATIVE
SAMANEA SAMAN MONKEYPOD TREE (TYP. SYM.) F.S. 10' HT., 8' SP., 4" CAL. NON-NATIVE	COCOS NUCIFERA COCONUT PALM (TYP. SYM.) OVERALL HTS. SHOWN, LOCATE AS DIRECTED POLYNESIAN INTRODUCTION	CORDYLINE TERMINALIS LILINOIT TI (TYP. SYM.) 25 GAL., 6' HT., MULTI, LOCATE AS DIRECTED NON-NATIVE	SCAEVOLA FRUTESCENS BEACH NAUPAKA (TYP. SYM.) 1 GAL., 18" HT., 12" SP. NATIVE
THESPESIA POPULNEA MILO TREE 15 GAL., 6' HT., 1" CAL., 4' SP. NATIVE	RHAPIS EXCELSA RHAPIS PALM (TYP. SYM.) 7 GAL., 4' HT., 2' SP, FULL. LOCTAE AS DIRECTED. NON-NATIVE	DRACAENA REFLEXA SONG OF INDIA 25 GAL., 6' HT., MULTI, LOCATE AS DIRECTED NON-NATIVE	RHOEO DISCOLOR DWARF RHOEO (TYP. SYM.) 4" POT, 3" HT., NON-NATIVE
		GARDENIA NANU NATIVE GARDENIA (TYP. SYM.) 5 GAL, 30" HT., 24" SP. NATIVE	VITEX ROUNDIFOLIA POHINAHINA (TYP. SYM.) 6: POT, 12' HT NATIVE
		HELICONINA BIHAI LOBSTER CLAW HELICONIA (TYP. SYM.) 15 GAL., 6' HT., MULTI. NON-NATIVE.	PASPALUM NOTATUM BIHAI GRASS (TYP. SYM.) HYDROMULCH NON-NATIVE
		HELICONIA CARIBAEA RED HELICONIA CARIBAEA (TYP. SYM.) 7 GAL., 4" HT., MULTI, LOCATE AS DIRECTED NON-NATIVE	
		MURRAYA PANICULATA MOCK ORANGE 15 GAL., 5' HT., MULTI NON-NATIVE	
		PHIODENDRON VAR. (4) ROJO AND (4) GREEN CONGO (TYP. SYM.) 3 GAL., 18" HT., 24" SP. NON-NATIVE	
		PSEUDERANATHEMUM RETICULATUM GOLDEN ELDORADO (TYP. SYM.) 5 GAL., 30" HT., 24" SP., LOCATE AS DIRECTED. NON-NATIVE	

NATIVE PLANTING= 88%
(4,371 S.F.)
ORNAMENTAL PLANTING = 12%
(557 S.F.)
CALC. EXCLUDES LAWN



GROUND COVER LEGEND

355 S.F.	MICROSORIUM DIVSERIFOLIA	
15"O.C.	KANGAROO PAW DWARF LAUA'E FERN (TYP. SYM.) 4" POT, 6" HT.	
4,371 S.F.	VITEX ROUNDIFOLIA	
20" O.C.	POHINAHINA (TYP. SYM.) 6: POT, 12' HT	
202 S.F.	RHOEO DISCOLOR	
12" O.C.	DWARF RHOEO (TYP. SYM.) 4" POT, 3" HT.,	
3,281 S.F.	SCAEVOLA FRUTESCENS	
30" O.C.	BEACH NAUPAKA (TYP. SYM.) 1 GAL., 18" HT., 12" SP.	
13,256 S.F.	PASPALUM NOTATUM	
	BIHAI GRASS (TYP. SYM.) HYDROMULCH	

1 LANDSCAPE PLANTING PLAN (ENLARGEMENT)

SCALE: 1/10"=1'-0"

LORIANN GORDON
LANDSCAPE ARCHITECT, LLC

LANDSCAPE
ARCHITECTURE & PLANNING

P.O. Box 2028
Honka'a Hawaii 96727
Tel.: (808) 934-7363
Website: www.lglahawaii.com

PROJECT:

HOLCOMB RESIDENCE

ADDRESS:

28-3426 HAWAII BELT ROAD
HONOMU, HAWAII 96728
TMK: 2-8-012-028

LICENSED PROFESSIONAL LANDSCAPE ARCHITECT No. 6817

SIGNATURE:
License Expiration Date: 04/03/2022

This work was prepared by me or under my supervision, and construction of this project will be under my observation. (Par. 6-82-8. Department of Commerce and Consumer Affairs)

ISSUE:	REVISIONS:	DATE:
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△	S.F. CALCS. PROVIDED	5-24-21

PROJECT NO: 00-00
DRAWN BY: KD/LG
DATE: APRIL 21, 2021

SHEET TITLE:

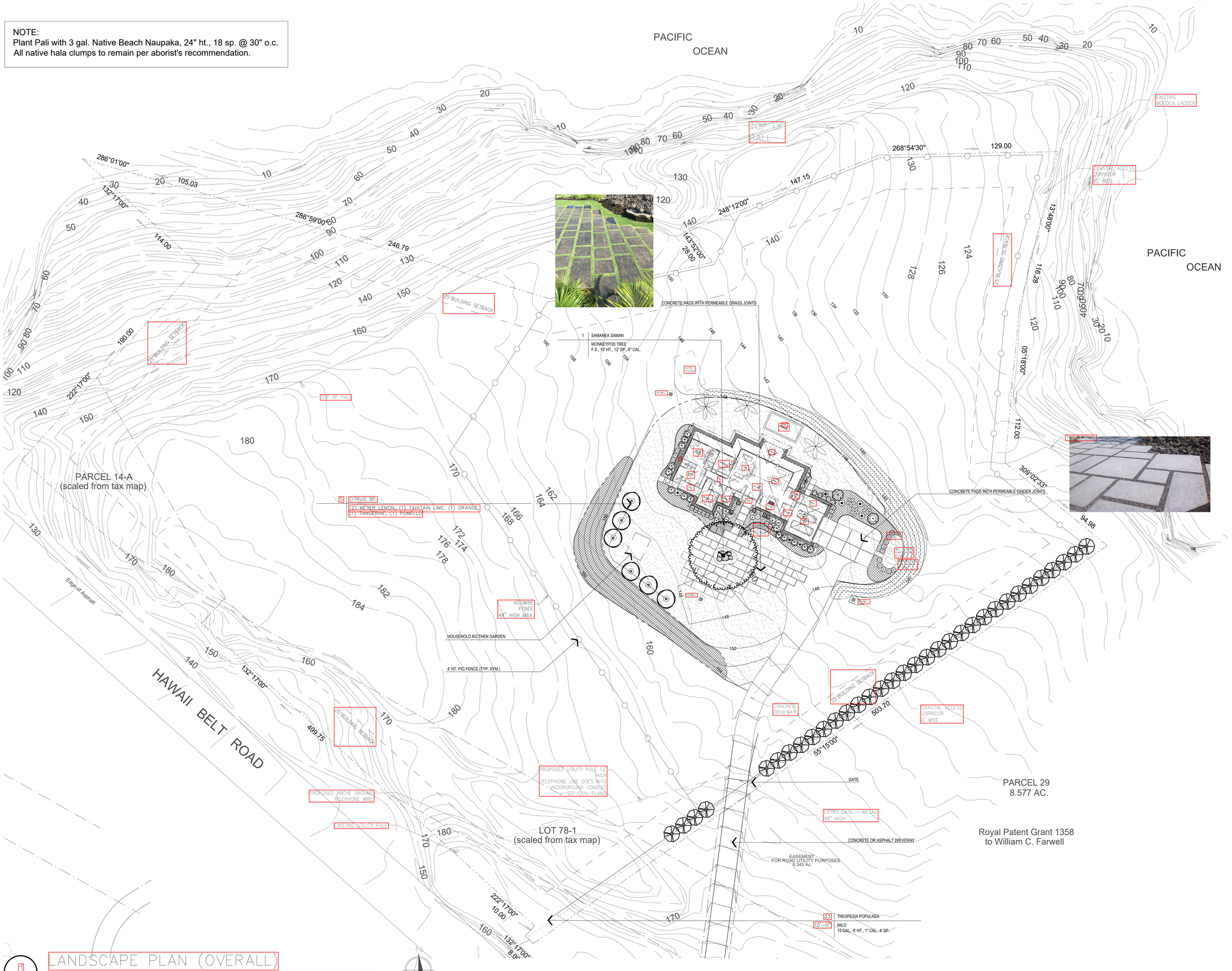
LANDSCAPE PLANTING PLAN (ENLARGEMENT)

SHEET NUMBER:

L-2

2 OF 2

NOTE:
Plant Pali with 3 gal. Native Beach Naupaka, 24" ht., 18 sp. @ 30" o.c.
All native hala clumps to remain per aborist's recommendation.



LANDSCAPE PLAN (OVERALL)

SCALE: 1/25"=1'-0"

LORIANN GORDON
LANDSCAPE ARCHITECT, LLC

LANDSCAPE
ARCHITECTURE & PLANNING

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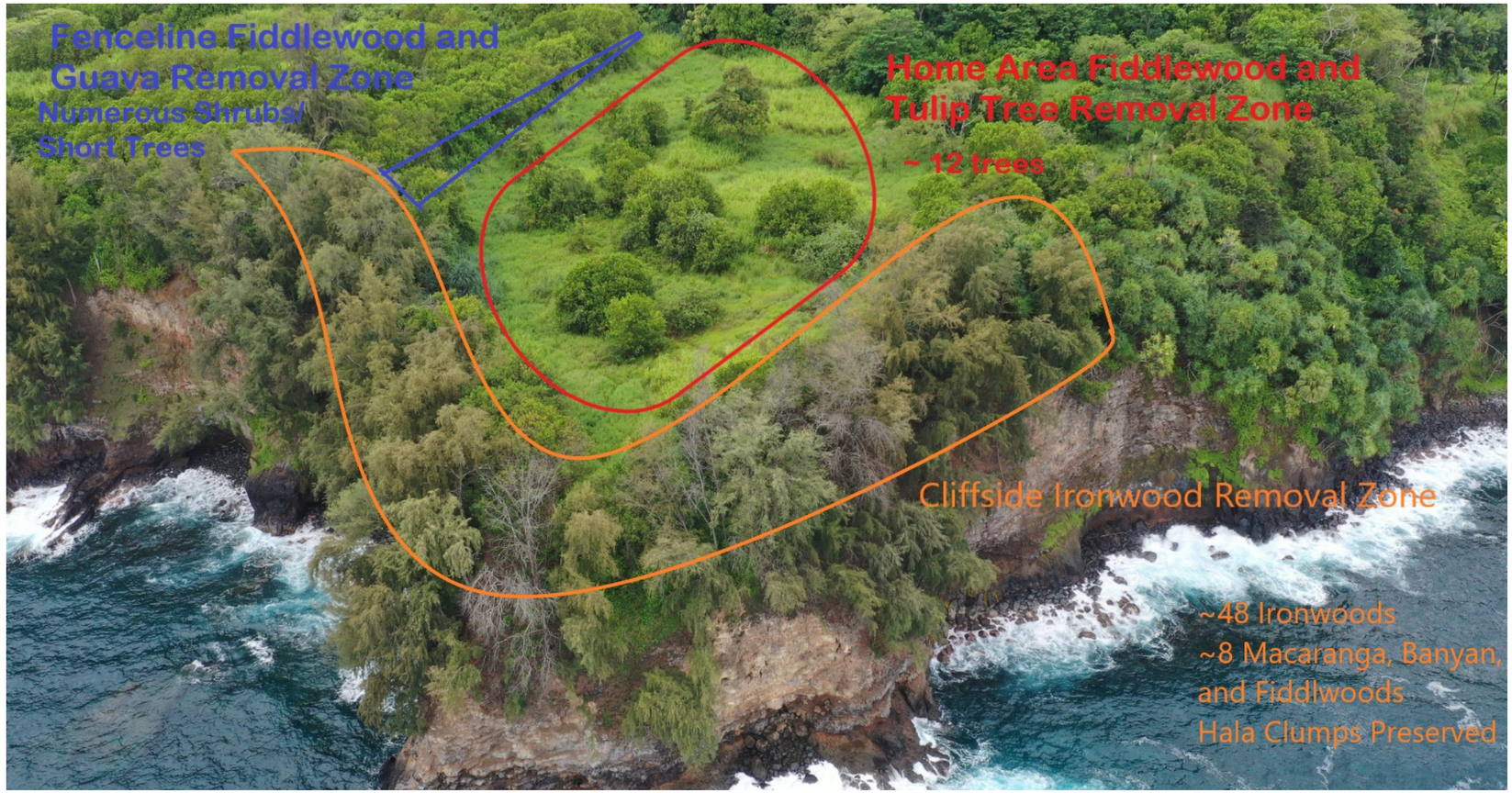
PROJECT NO: 00-00
DRAWN BY: KD/LG
DATE: APRIL 18, 2021

SHEET TITLE:

LANDSCAPE PLAN (OVERALL)

SHEET NUMBER:

1 OF 2

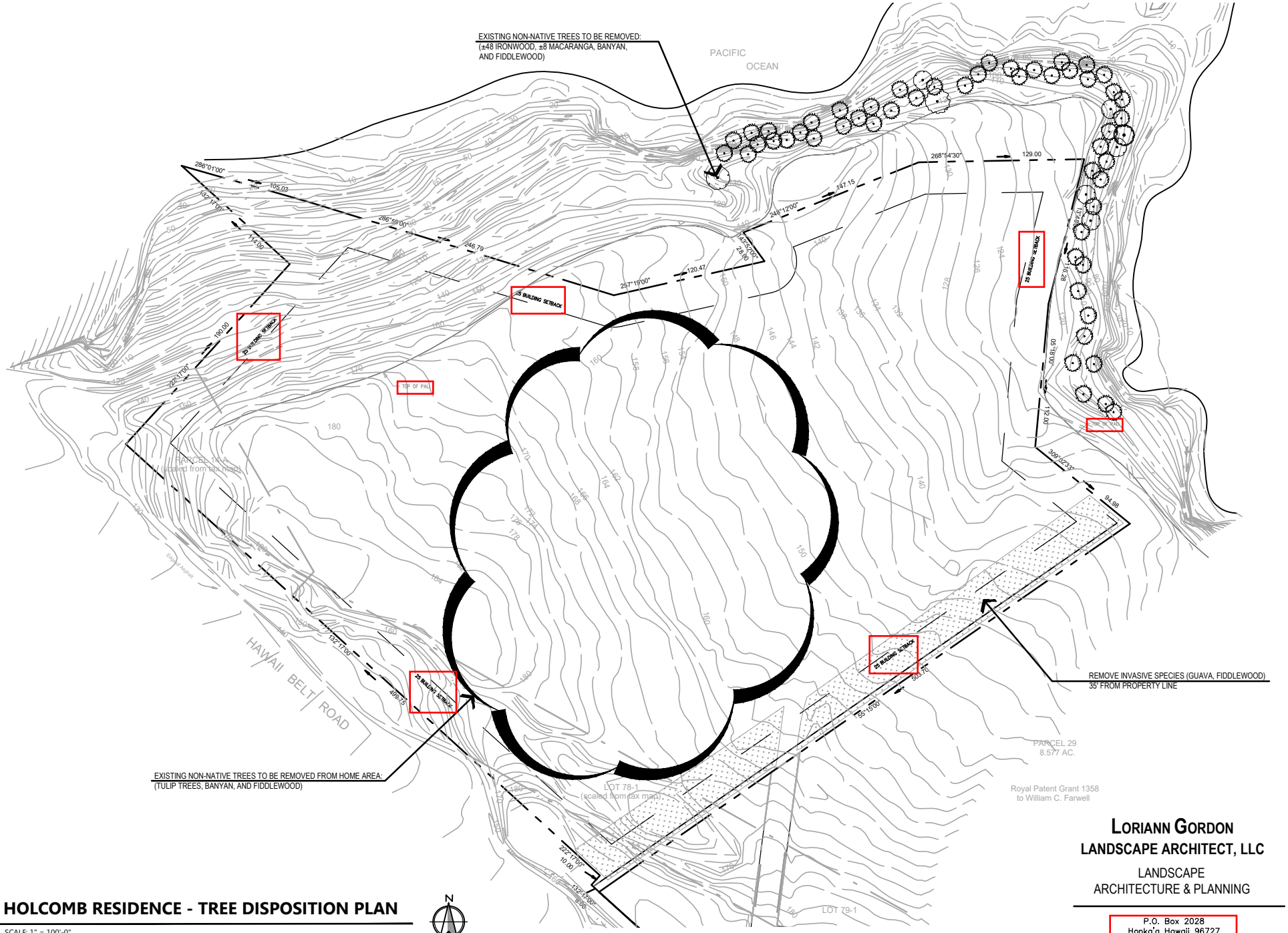



Ironwood outcompeting hala on cliff


Tulip trees and fiddlewood around home site


Vegetation of fenceline area


Ironwood-dominated cliff section with mass wasting versus hala-dominated, stabler cliff



1

HOLCOMB RESIDENCE - TREE DISPOSITION PLAN

SCALE: 1" = 100'-0"

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