ITEM G-1 PLO EXHIBIT A

DHHL NORTH KONA WELLS PROJECT – KEAUHOU WELL SITE & KAHALU'U WATER STORAGE TANKS

TMKs: portions of [3] 7-8-004:013, 014, and 015; & portions of [3] 7-8-009:014, 032, 054 and 077.
Moku of Kona, Island of Hawai'i

DRAFT ENVIRONMENTAL ASSESSMENT

November 2025

Proposing Agency/Determining Agency:
State of Hawai'i
Department of Hawaiian Home Lands
91-5420 Kapolei Parkway
Kapolei, Hawai'i 96707

Prepared by:
Bowers + Kubota Consulting, Inc.
2153 North King Street, Suite 200
Honolulu, Hawai'i 96819

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PROJECT SUMMARY TABLE

This Draft Environmental Assessment (EA) has been prepared in accordance with the requirements of Chapter 343, Hawai'i Revised Statutes (HRS) and Hawai'i Administrative Rules (HAR) Title 11-200.1 Environmental Impact Statement Rules.

Project Name:	DHHL North Kona Wells Project – Keauhou Well Site & Kahalu'u Water Storage Tanks
Proposing Agency:	State of Hawai'i Department of Hawaiian Home Lands 91-5420 Kapolei Parkway Kapolei, Hawai'i 96707 Contact: Lilliane Makaila, Planner
Determining Agency:	Hawaiian Homes Commission 91-5420 Kapolei Parkway Kapolei, Hawai'i 96707 Contact: Kali Watson, Chairperson
Authorized Agent (EA Preparer):	Bowers & Kubota Consulting, Inc. 2153 N King Street, Suite 200 Honolulu, HI 96819 Contact: Malachi Krishok Phone: (808) 521-5361
HRS §343 Trigger:	HRS §343-5(a)(1), use of State funds.
Project Location:	Ahupua'a of Kahalu'u and Keauhou, moku of Kona, island of Hawai'i, Hawai'i
Tax Map Key(s):	Portions of [3] 7-8-004:013, 014, and 015; & portions of [3] 7-8-009:014, 032, 054 and 077.
Landowners:	B.P Bishop Trust Estate and County of Hawaii Department of Water Supply
Existing Use on Project site:	The Tank Site consists primarily of cleared open space to accommodate the existing DWS water infrastructure, bordered by non-native forest and private agriculture. Multiple single-family residences are present around the site. The Well Site is adjacent to an active coffee farm, other agricultural activities and single-family residences.
State Land Use District:	Agriculture
County of Hawai'i Zoning:	Agricultural District A-5a
Special Management Area (SMA):	Outside of SMA
Flood Zone:	Zone X (Area outside the 500-year floodplain)

Proposed Action:	The Department of Hawaiian Home Lands (DHHL) is proposing to develop a new potable water well source, three concrete water storage tanks, associated water transmission piping, pumps, control building, fence, chlorination building, generator, transformer, electrical improvements, access road, and other appurtenant improvements necessary for the proper operation and maintenance of these facilities. The proposed action consists of the Keauhou Well 2 site (Well Site) and the Kahaluʻu Tanks site (Tank Site). The well, tank and transmission line features will be developed on portions of the privately owned parcels identified above. The new features will convey water to residents of the Villages of Laʻi ʻŌpua, a DHHL master planned community, and support the community's continued development as outlined in the DHHL Kealakehe – Laʻi ʻŌpua Regional Plan (Final 2020). The proposed action supports DHHL's mission and vision of creating vibrant and self-sufficient homestead communities by developing and delivering lands and homes to more native Hawaiian families. The Well Site improvements would consist of: • A 2-million-gallon reinforced concrete storage tank • A second well source • Well pumps • A pump control building • Chlorination system • Electrical improvements and site lighting • Access road upgrades • Chain-link fencing • Water transmission line to connect to the existing Keauhou tank The Tank Site improves would consist of: • Demolition of the existing 100,000-gallon, 50,000-gallon steel tanks, and 0.3 mg tank • Construction of two new concrete tanks • Pump improvements • A pump control building • Piping improvements, including valves and other appurtenances. • Electrical lines • Access road upgrades • Chain-link fencing • Site grading, retaining walls.

Permits and Approvals Needed for the Project:	HRS §343 Review; HRS §6E Review; Community Noise Permit and Noise Variance Permit; National Pollutant Discharge Elimination System Permit (NPDES); Well Construction Permit; Pump Installation Permit; and Grading, Grubbing and Stockpiling Permits
Determination:	Anticipated Finding of No Significant Impact (AFONSI)

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LIST OF ACRONYMS

AIS	Archaeological Inventory Survey
ALFRI	Archeological Literature Review and Field Inspection
amsl	above mean sea level
APE	Area of Potential Effect
BMP	Best Management Practice
CIA	Cultural Impact Assessment
CWRM	Commission on Water Resources Management
CZM	Coastal Zone Management
DHHL	Department of Hawaiian Homelands
DOH	State of Hawai'i, Department of Health
DWS	County of Hawai'i, Department of Water Supply
EA	Environmental Assessment
EPA	Environmental Protection Agency
FCL	Formally Classified Lands
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HAR	Hawai'i Administrative Rules
HELCO	Hawaiian Electric Light Company
HRS	Hawai'i Revised Statutes
IAL	Important Agricultural Lands
IBA	Important Bird Area
KASA	Keauhou Aquifer System Area
KFS	Kona Field System
mg	Million gallons
mgd	Millions of gallons per day
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
RD RUS	Rural Development Rural Utilities Service
SFHA	Special Flood Hazard Area
SHPD	State Historic Preservation Division
State	State of Hawai'i
USDA	United States Department of Agriculture
USGS	United States Geological Survey

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1.0 PROJECT DESCRIPTION

1.1 BACKGROUND

The Department of Hawaiian Homelands (DHHL) is proposing to develop a new potable water source with the installation of a new well, three storage tanks and associated water transmission pipeline near the Kealakehe – Laʻi ʻŌpua Planning Area in the North Kona District, island and County of Hawaiʻi. The well, tank and transmission line features will be developed on portions of privately owned parcels identified as TMKs [3] 7-8-004:013, 014 & 015 and [3] 7-8-009:014, 032, 054 & 077 (the "Project Site"). See Figure 1.1. The new features will convey water to residents of the Villages of Laʻi ʻŌpua, a DHHL master planned community, and support the community's continued development as outlined in the 2020 DHHL Kealakehe – Laʻi ʻŌpua Regional Plan. The proposed action supports DHHL's mission and vision of creating vibrant and self-sufficient homestead communities by developing and delivering lands and homes to more native Hawaiian families.

The well will be installed in two phases. During Phase I, an exploratory well will be drilled and tested to determine its sustainable capacity and water quality. If the quantity and quality of sampled water is satisfactory, the project will proceed to Phase II. During Phase II, the exploratory well will be converted to a production well, a second existing well will receive a pump and be brought online, the concrete water storage tanks will be installed, and ancillary structures necessary for well operations will be constructed at the Project Site.

1.2 PURPOSE FOR ENVIRONMENTAL ASSESSMENT

Chapter 343 (Environmental Impact Statements), Hawaiʻi Revised Statutes (HRS), establishes a system of environmental review at the State and County levels to ensure that environmental concerns are given appropriate consideration in decision-making along with economic and technical considerations. The State of Hawaiʻi, Office of Planning and Sustainable Development's (OPSD) Environmental Review Program facilitates the environmental review process in Hawaiʻi.

This project triggers the State's environmental review process under HRS Chapter 343, as amended, and Title 11, Chapter 200.1 (Environmental Impact Statement Rules) of the State Department of Health's Hawaiʻi Administrative Rules (HAR), as amended (State of Hawaiʻi, 2019) because the action involves:

1. *Use of State Funds*. State funds would be used for the construction of the new well, tanks, and transmission lines.

As such, this Draft Environmental Assessment (Draft EA) document is being prepared pursuant to Hawaiʻi Revised Statutes (HRS) Chapter 343 (HRS §343). Pre-assessment consultation comments received as part of the preparation of this Draft EA document are included in **Appendix A.**

Figure 1.1: Project Location - Well Site

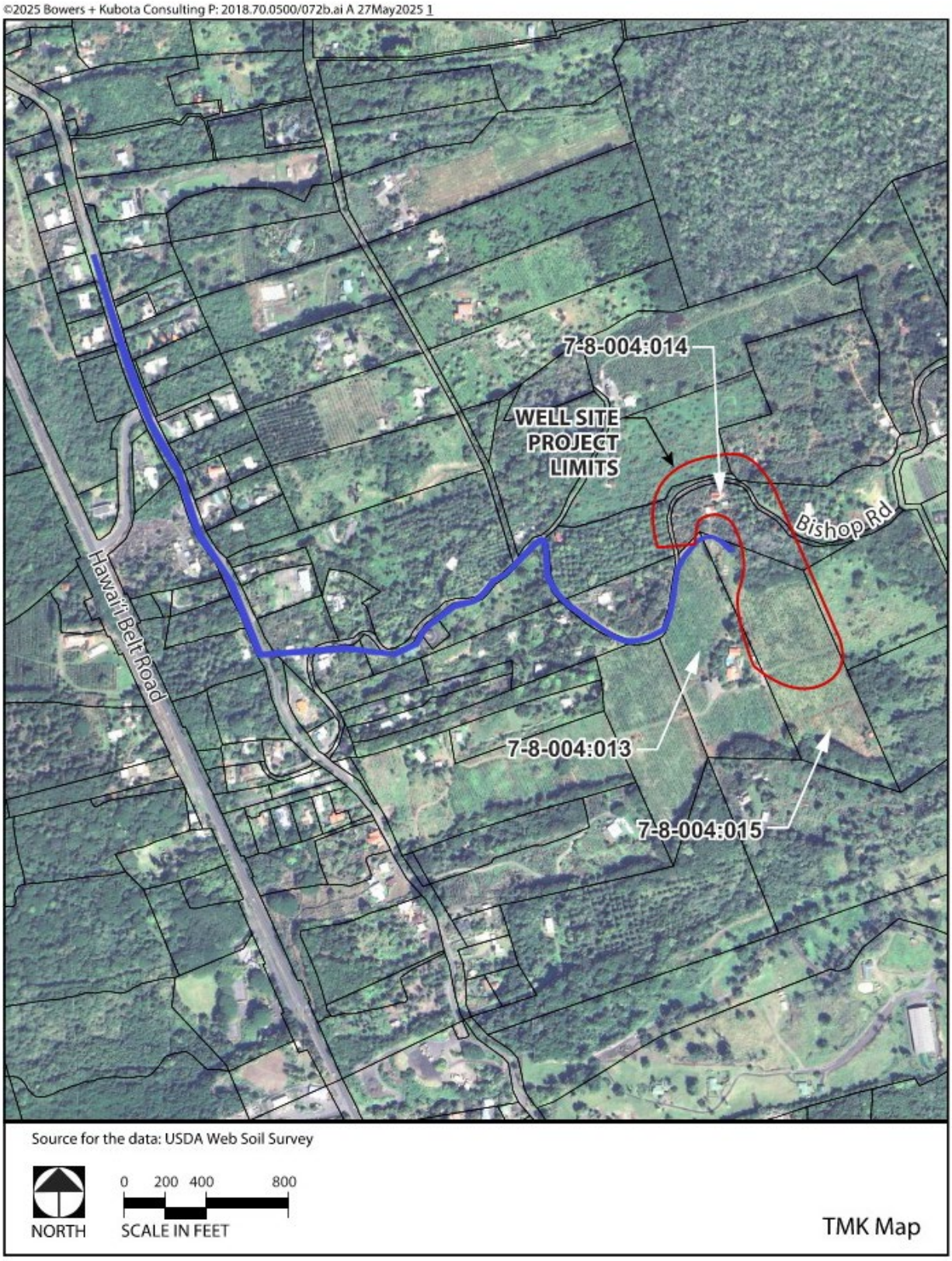
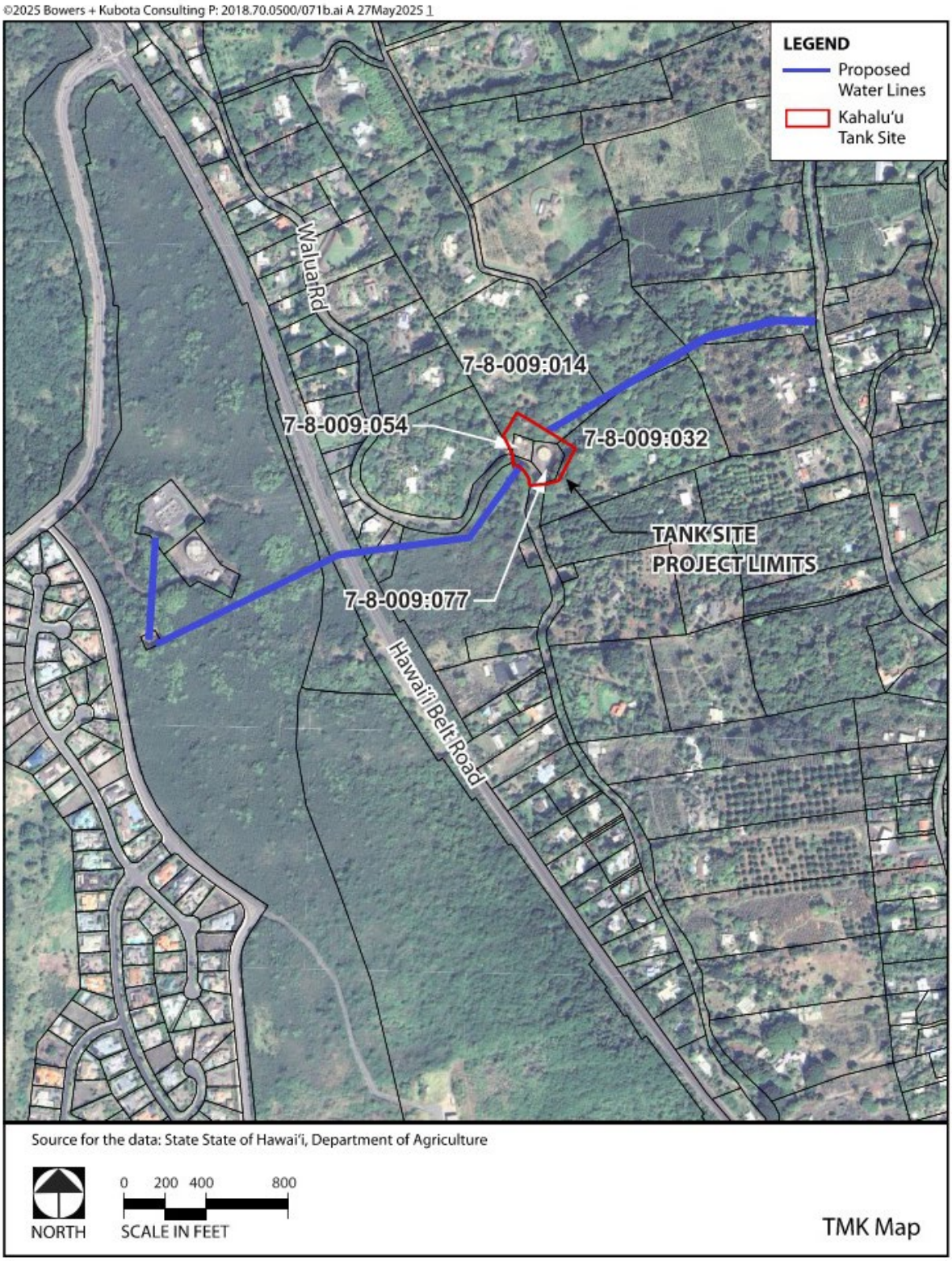


Figure 1.2: Project Location - Tank Site



Applicant Background

The Department of Hawaiian Home Lands is governed by the Hawaiian Homes Commission Act of 1920 (HHCA), enacted by the U.S. Congress to protect and improve the lives of native Hawaiians (defined as individuals having at least 50 percent Hawaiian blood). The HHCA created a Hawaiian Homes Commission to administer certain public lands, called Hawaiian home lands, for homesteads. The Act was incorporated as a provision in the State Constitution in 1959 when Hawai'i was granted statehood and responsibility for the Commission and the Hawaiian home lands was transferred to the State. In 1960, the State Legislature created the Department of Hawaiian Home Lands (DHHL) to manage Hawaiian home lands and administer the provisions of the HHCA. The primary responsibilities of DHHL are to implement the HHCA and the programs, policies, and direction established by the HHC on behalf of the native Hawaiian beneficiaries of the Trust.

The significance of water to the success of the HHCA has been recognized since the passage of the Act. Under HHCA §221 and Hawai'i Revised Statutes §174C-49, the State Commission on Water Resource Management (CWRM) shall "reserve" water for future DHHL needs when issuing water licenses, based on DHHL projections. DHHL last provided its current and future water needs projections to CWRM for approval in 2017, which includes project water demand for the Villages of La'i 'Ōpua and is included in the Department of Land and Natural Resources (DLNR) 2020 State Water Project Plan Update. Furthermore, in 1991 the state Legislature passed what became Act 325, which recognized that, "[s]ince the passage of the Hawaiian Homes Commission Act in 1921, the shortage of available water has been one of the primary reasons for the failure of Administrators to settle native Hawaiians on Hawaiian homesteads…" As a result, Act 325 modified other state laws regarding water further increasing the rights of water to the Hawaiian Home Lands Trust.

In 2014, the HHC approved the first DHHL Water Policy Plan, which is the first policy on managing the water kuleana of DHHL since the passage of the HHCA. The Water Policy Plan's mission is "to ensure the availability of adequate, quality water to fully support self-sufficiency and self-determination in the administration of the HHCA, and the preservation of Hawaiian values, traditions, and culture."

The DHHL has also implemented its own planning system consisting of a General Plan, Island Plans, Regional Plans, Program Plans, and Special Area Plans, which are discussed in relation to the Proposed Action in Section 4.3.

Determining Agency

The project is an "Agency Action" under the State's environmental review regulations because the project involves the use of State land and funds. The Hawaiian Homes Commission will serve as the "Approving Agency" for the processing of this environmental assessment document and currently anticipates a Finding of No Significant Impact (FONSI) determination.

Bowers + Kubota Consulting, Inc. (B+K) is serving as the "Authorized Agent" on behalf of DHHL (Applicant) in the preparation of this Draft EA. This Draft EA was prepared pursuant to Chapter 343, Environmental Impact Statements, HRS, as amended and the State

Department of Health's Title 11, Chapter 200.1, HAR (Environmental Impact Statement Rules) (State of Hawai'i, 2019).

1.3 PROJECT PURPOSE AND NEED

The purpose of the Proposed Action is to develop additional potable water supply sources from within the North Kona region to allow for the continued development of La'i 'Ōpua. By securing additional supply sources, DHHL can then secure the water credits needed for future residential, community and commercial uses. These uses would provide not only more homes for DHHL beneficiaries, but also parks, recreation spaces and economic opportunities towards fulfilling La'i 'Ōpua's vision of what the community sees for their homestead's future in the decades to come.

The need for the Proposed Action is based on limited water resources in and around the La'i 'Ōpua area. Limited water resources stem from the region's arid climate, limiting potable water supply available from the DWS. This limited supply has led DWS to require water entitlements through developer agreements, where the developer can install a well and/or other necessary infrastructure to be dedicated to DWS in exchange for a set allocation of water for the future development (the "water credits"). One water credit is equivalent to 600 gallons per day or one housing unit.

The result of these limitations is that following the completion of La'i 'Ōpua Village 4 Phase I 'Ākau and Phase II Hema, DHHL will not have enough water credits available from DWS for future homestead or commercial development at La'i 'Ōpua from now into the foreseeable future. Therefore, DHHL needs to establish an additional water source to receive water credits from DWS for future development.

Developing additional water sources for the continued development of La'i 'Ōpua has been identified as a priority project for DHHL and stakeholders in both the 2009 and 2019 Kealakehe – La'i 'Ōpua Regional Plans as the North Kona Water Source Development Project. In November 2014, DHHL submitted a water reservation request to the Commission on Water Resources Management (CWRM). In August 2015, CWRM approved the water reservation for 3.398 mgd in the Keauhou Aquifer System Area (ASYA) that services the North Kona region. The water request amount should meet the water demands needed for the full build-out of La'i 'Ōpua.

While a water reservation credit safeguards DHHL's access to potable water, it neither identifies a location of the water source nor includes how the water will be transmitted. DHHL owned lands in North Kona are not suitable for potable water wells. Therefore, they must partner with other landowners to develop water sources in more suitable locations.

In establishing a suitable location to install the wells, DHHL had to locate areas at high enough elevations a minimum of 0.25 miles away from existing DWS well sites to reduce pressure on groundwater resources and interference between wells. Further, the DWS prefers areas containing "high-level" groundwater that meets federal and state drinking water standards and is not subject to saltwater intrusion. The areas must then have sufficient capacity to support a production well. Upon finding a suitable location, DHHL then needs to secure a water source development agreement with the landowner.

The Project Site is one of four potential well sites where DHHL could establish a water credit agreement with a landowner and DWS, while meeting the location and groundwater quality needs. A water credit agreement and source development partnership between the Landowners, DHHL and DWS will need to be finalized prior to well site development. As part of the agreement, DHHL will receive two-thirds of the potable water developed by the proposed action while the remaining one-third will be integrated into the DWS water system for municipal use.

1.4 REGIONAL SETTING AND PROJECT SITE

The Project Sites are located within the Kona moku, on the leeward (western) slope of the Hualālai Volcano, and span the adjoining ahupuaʻa of Kahaluʻu and Keauhou in the North Kona District. The project is divided into two distinct locations: the Well Site and the Tank Site, as illustrated in Figure 1.1 and Figure 1.2.

The proposed development footprint spans portions of multiple land parcels. The respective landowners (the "Landowners") for each parcel are identified in Table 1.1.

Table 1.1: Land ownership of Project Site

Project TMK	Owner	Total Parcel Acreage
[3] 7-8-009:014	Kamehameha Schools	9.15
[3] 7-8-009:032	Kamehameha Schools	8.89
[3] 7-8-009:054	County of Hawaiʻi	0.21
[3] 7-8-009:077	State of Hawaiʻi	0.52
[3] 7-8-004:013	Kamehameha Schools	8.80
[3] 7-8-004:014	Kamehameha Schools	3.2
[3] 7-8-004:015	Kamehameha Schools	10.50

1.4.1 The Well Site

The Well Site is located on portions of TMKs [3] 7-8-004:013, 014 & 015. It is approximately 2 miles inland from the coast and within the upland Kahalauʻu ahupuaʻa. The Well Site site is located around 1,650 feet amsl and is situated along an unimproved access road off of Bishop Road on the edge of an active coffee farm. An existing potable water well, Keauhou-Kam #2 (KS Well 2), is present onsite. The area around the Well Site consists of active coffee farms, other agricultural uses, and single-family residences.

The Well Site is located near the town of Honalo outside the Kona Community Plan designated urban boundary on the mauka, or upland, side of Māmalahoa Highway. The Well Site abuts the mauka edge of the Heavenly Hawaiian Kona Coffee Farm and is approximately ten miles south of the Villages of Laʻi ʻŌpua, nine miles southeast of Kailua-Kona, and six miles north of Kealakekua Bay.

1.4.2 The Tank Site

The Tank Site is located on portions of TMKs [3] 7-8-009:014, 032, 054 & 077. The Tank Site is around 5500 feet above mean sea level (amsl) and is approximately one mile inland within the upland Keauhou ahupuaʻa. The Tank Site encompasses the existing County of Hawaiʻi, Department of Water Supply (DWS) Kahaluʻu Reservoir and Well Site property on Wailua Road. As such, DHHL is actively coordinating with DWS on the proposed action.

The DWS property currently contains three existing water storage tanks ranging from 0.1 to 0.3 million gallons capacity, a pump house, a chlorination building, an electric transformer box, Kahaluʻu Well A and Kahaluʻu Well C production wells, and four booster pumps. Around the site are mostly coffee and macadamia orchards, disturbed forested areas and residential properties with scattered single-family residences.

The Tank Site is located near the unincorporated community of Keauhou within the Kona Community Plan designated urban boundary on the mauka side of Hawaiian Belt Road (Route 11) and makai, or seaward, of Māmalahoa Highway (Route 180). The site is approximately seven miles south of the Villages of Laʻi ʻŌpua, six miles southeast of Kailua-Kona, and seven miles north of Kealakekua Bay.

1.4.3 Villages of Laʻi ʻŌpua

The Villages of Laʻi ʻŌpua (Laʻi ʻŌpua) is a 980-acre master planned community that consists of fourteen villages that will include single and multifamily residential units, recreational and community facilities, parks and preserves, and neighborhood- commercial complexes. Laʻi ʻŌpua was initially planned by the Housing and Community Development Corporation of Hawaiʻi in the early 1990's as an affordable housing project using State land. In 1997, a total of 572 acres was transferred from the State to DHHL and the remaining 408 acres are currently owned by various other landowners. Along with the acreage, a total of 241 units in water commitments were transferred to DHHL for future development (Kealakehe-Laʻi ʻŌpua Regional Plan Update, 2020).

As part of the regional planning process, a vision statement was crafted based on DHHL beneficiary feedback during the 2020 Kealakehe-Laʻi ʻŌpua Regional Plan update. This vision is reflective of what the community sees for the future of their homestead in the decades to come:

> *"Kealakehe – Laʻi ʻŌpua is a community with a strong sense of aloha, pride in their homestead and appreciation for the place. The community and DHHL support its people by promoting education, self-sufficiency, and providing additional homesteading opportunities for more native Hawaiian families in the Kealakehe – Laʻi ʻŌpua region."*

La‘i ‘Ōpua includes lands designated for residential, community, commercial and conservation uses. There are over 260-acres of residential, 33-acres of community, 50- acres of commercial and 950-acres of conservation lands within the villages. The majority of the lands designated for residential use occur within Villages 1 through 6 and Village 10, and include development of single and multi-family homes. La‘i ‘Ōpua is one of two communities within the planning area that have lands designated for community uses, which include spaces for parks and recreation, cultural activities, community-based economic development and other public amenities. The full build out is included in Figure 1.3.

To date, Village 3 and the Community Hale have been completed. A total buildout of the remaining villages would potentially provide over 1,000 single family homes, 300 multi-family units, multiple park spaces, a hospital, and commercial centers. Villages 4 and 5 are in construction, and Villages 1 and 2 and have initiated environmental compliance and engineering designs.

1.5 DESCRIPTION OF THE PROPOSED ACTION

The Department of Hawaiian Home Lands (DHHL) is proposing to develop a new potable water well source, three concrete water storage tanks, associated water transmission piping, pumps, control building, fence, chlorination building, generator, transformer, electrical improvements, access road, and other appurtenant improvements necessary for the proper operation and maintenance of these facilities (the “Proposed Action”).

The proposed action consists of the Keauhou Well 2 site and the Kahaluu Tanks site. The specific activities planned at each site are detailed in Sections 1.5.1 and 1.5.2.2.

1.5.1 Well Site

DHHL is proposing to convert the existing KS Well 2 into a 1-million gallon per day (mgd) production well and install a new production well with a capacity of 1 mgd. The Proposed Action also includes appurtenant site improvements necessary for the operation and maintenance of the wells, including installation of a 1 mgd pump at the existing Keauhou Well 2 and a new concrete water tank at the existing site. DHHL is currently negotiating an agreement with the Landowners to acquire the area required to develop the well site. The overall improvements would generally consist of:

- A 2-million-gallon reinforced concrete storage tank
- A second well source
- Well pumps
- A pump control building
- Chlorination system
- Electrical improvements and site lighting
- Access road upgrades
- Chain-link fencing
- Water transmission line to connect to the existing Keauhou tank

The installation of the second well will occur in two phases. Phase I involves drilling an exploratory well with a casing diameter of approximately 20 to 24 inches. The well will

undergo testing to verify that its water quality complies with the standards outlined in HAR §11-20-29, Rules Relating to Public Water Systems. The results will be submitted to the State of Hawai‘i Department of Health (DOH), Clean Water Branch. In addition, the well’s production capacity will be evaluated to confirm it can yield up to 1 MGD. Nearby existing wells will be monitored to ensure the aquifer can sustain the additional withdrawal without adverse impacts. If both water quality and quantity meet the required standards, the Proposed Action will advance to Phase II.

Phase II will involve outfitting the exploratory well into a permanent production well, installing a well pump, and constructing the remaining site improvements necessary for the second well operation. Both wells will be equipped with 700-gallon-per-minute submersible pumps and motors, each capable of delivering up to 1 mgd New electrical infrastructure will also be installed to support pump operation. The wells will comply with the CWRM Hawai‘i Well Construction & Pump Installation Standards (rev. 2004) and DWS standards. Under the original proportional share agreement, DHHL would retain two-thirds of the water produced, while DWS would retain the remaining one-third for municipal use.

As depicted in Figure 1.4 in addition to the wells, a 2 million-gallon storage tank will be constructed to receive and store the extracted groundwater. The tank will be designed to comply with International Building Code Seismic Zone 4 and is anticipated to be approximately 103 feet in diameter and 36 feet high. A new dry well will be installed near the storage tank to capture any potential overflow from the tanks through a discharge line. A single-story control building will be constructed to house the well’s electrical and chlorination systems.

During the installation of these features, excavation work will be conducted in compliance with Hawai‘i County Code, Chapter 10—Erosion and Sedimentation Control. Grading, grubbing and stockpiling permits will be obtained as applicable, depending on the conditions of the well’s final siting.

Upon completing the construction of the storage tank and control building, the tank will be connected to the DWS main line located along Māmalahoa Highway via a new 16-inch transmission line. Approximately 1.25 miles of water transmission line will be installed within existing utility easements along Bishop Road before connecting with the DWS main line on Malalahoa Highway, approximately 0.6 miles north of Bishop Road.. Effort will be made to install the new water lines within exiting easements within Māmalahoa Highway.

The transmission line will comply with DWS Rule 4 – Rules Regulating Water and Water System Requirements of Developments. These upgrades will ensure sufficient capacity to transmit potable water from the Project Site to DWS North Kona Water System for use throughout the region and La‘i ‘Ōpua.

Access to the Keauhou Well 2 site is available via an existing, unimproved private roadway from Bishop Road. Improvements to the existing private roadway or the construction of new private access roads within the Project Site will be included Any roadway improvements or construction within the Project Site will comply with County development standards for private roadways.

1.5.2 Tank Site

DHHL proposes to provide water system improvements at the Kahaluʻu Tank Site. The improvements would include replacement of the existing 100,000-gallon and 500,000-gallon steel tanks with a concrete storage tank and replacement of the existing 0.3 MG water tank with a larger concrete tank. Other improvements appurtenant site improvements would include:

- Pump improvements
- A pump control building
- Piping improvements, including valves and other appurtences
- Electrical lines
- Access road upgrades
- Chain-link fencing
- Site grading, retaining walls

As part of Phase II of the Proposed Action, the existing steel water storage tanks on-site will be decommissioned and removed. The DWS tank property will be expanded to accommodate two new, larger water storage tanks designed to enhance the reliability of the North Kona water system. The Kahaluʻu Tank Site improvements include the following activities:

- Demolition of the existing 100,000-gallon and 50,000-gallon steel tanks.
- Construction of a new concrete tank, approximate size 1.3 million gallons.
- Demolition of the existing 0.3-million-gallon tank.
- Installation of a new concrete tank at the site of the 0.3 million gallon tank, approximate size 2.0 million gallons.

Similar to the tank at the Keauhou Well Site, the tanks will be designed in accordance with International Building Code Seismic Zone 4 standards. The tanks will measure up to approximately 80-100 feet in diameter and 36 feet in height. The exact dimensions of the tanks will be finalized in coordination with DWS. A new dry well will be installed near the tanks to capture potential overflow via a discharge line. The control building will house the tanks' electrical and chlorination systems.

Upon completion, a new 16-inch transmission line, approximately 0.7 miles of pipeline will be installed, within existing utility easements, before connecting to the existing DWS water line located at Mamalahoa Highway approximately 0.4 miles northeast of the site.

Figure 1.3: Villages of La'i 'Ōpua Full Build Out

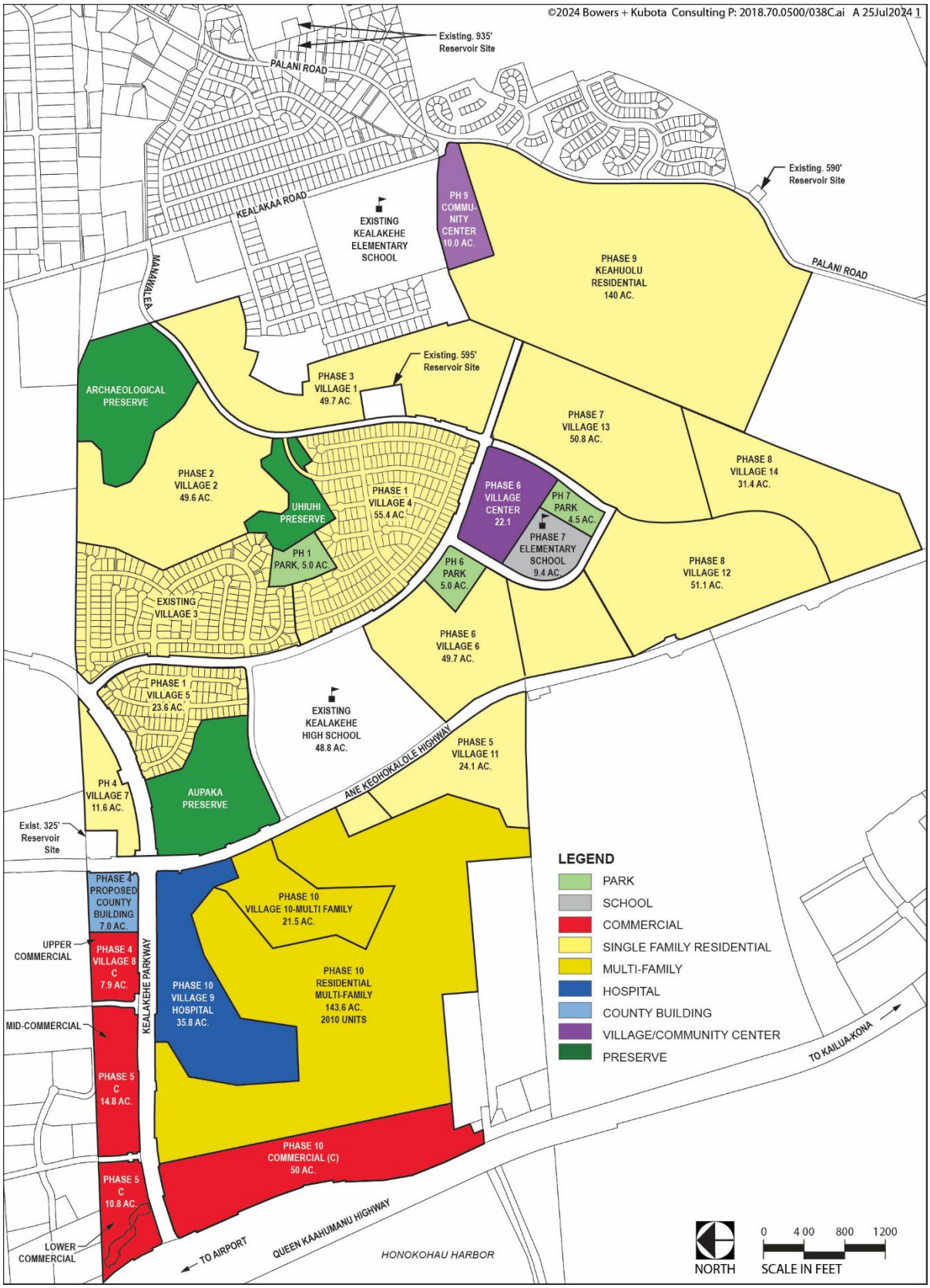


Figure 1.4: Well Site Preliminary Site Plan

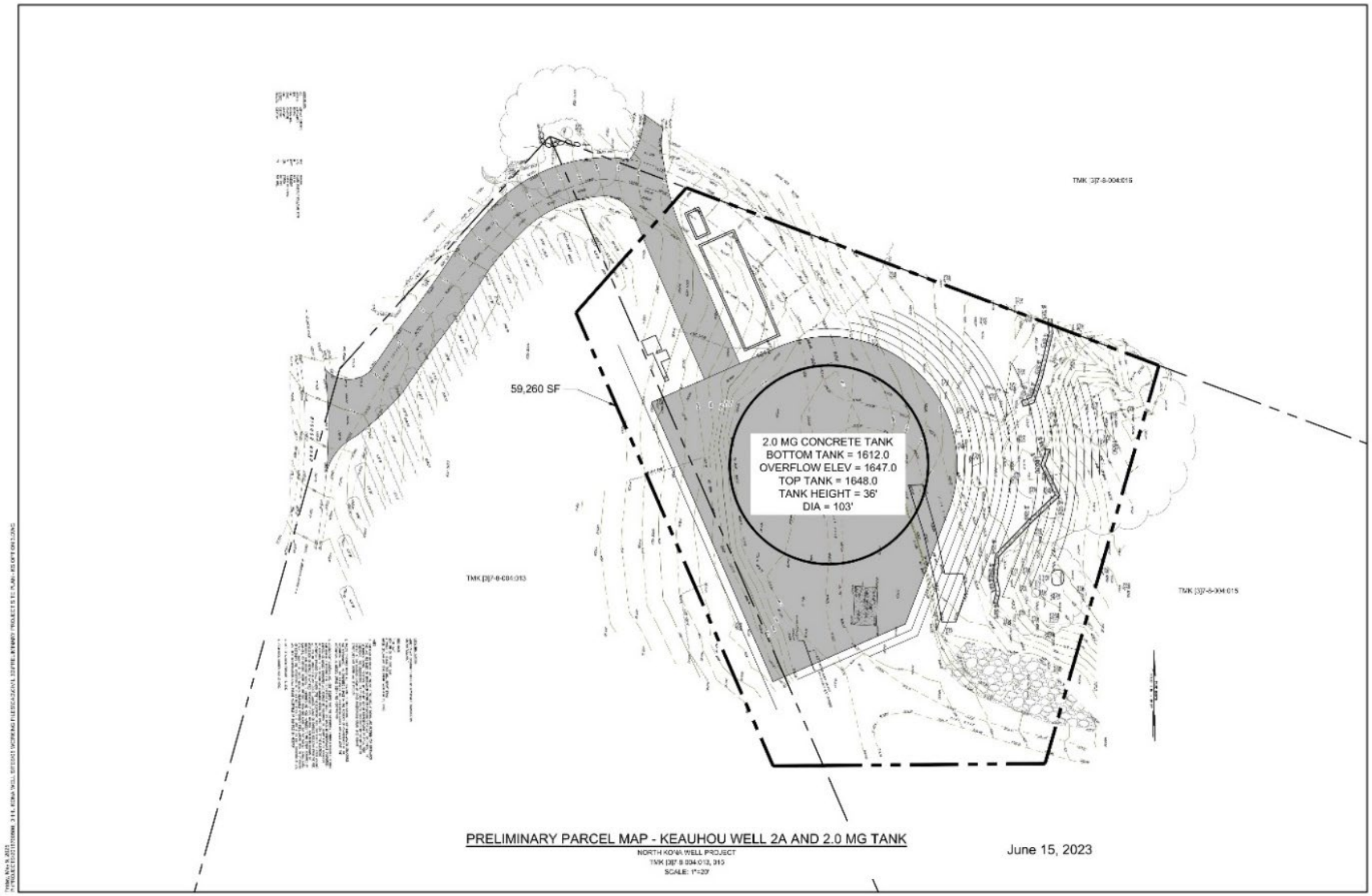
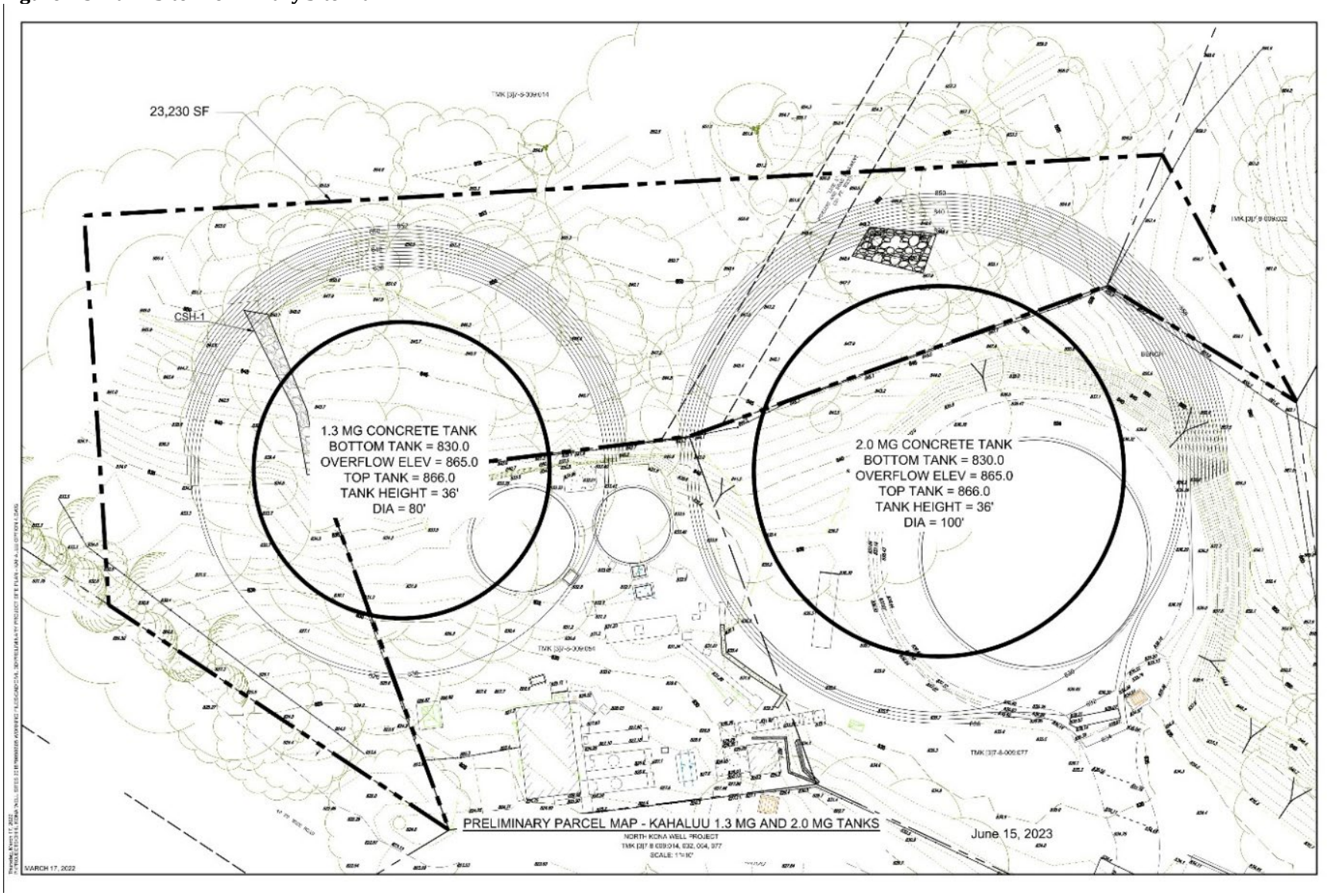


Figure 1.5: Tank Site Preliminary Site Plan



1.6 PRELIMINARY PROJECT COST AND TIMELINE

Phase 1 of the project will take approximately 18 months to complete. Phase 2 will require approximately 30 months to complete, beginning upon completion of Phase I well testing and approval.

Phase 1 is estimated to cost $9 Million and Phase 2 is estimated to cost $15 million.

1.7 APPROVALS AND PERMITS

The Proposed Action will be subject to the following list of permits and approvals to be completed prior to the start of construction.

Table 1.2: Approvals and Permits

Permits/Approvals	Approving Agency
State of Hawai'i	
HRS, §343 Review	DHHL; Hawaiian Homes Commission
HRS, §6E Review	DLNR, State Historic Preservation Division
Community Noise Permit and Noise Variance	DOH, Indoor and Radiological Health Branch
Well Construction Permit	CWRM
Pump Installation Permit	CWRM
County of Hawai'i	
Grading, Grubbing and Stockpiling permits	Department of Public Works

2.0 ALTERNATIVES CONSIDERED

As a requirement of HAR §11-200.1-18 (2019), this chapter identifies and considers alternatives to achieve the Purpose and Need of the Proposed Action. These alternatives are described in this section and include a No-Action Alternative.

2.1 ALTERNATIVE 1: NO-ACTION

Under the No Action Alternative, the Project Site's existing conditions would remain. No new water wells would be built, thereby leaving DHHL and DWS without a new water source. DHHL would run out of water credits upon completing Laʻi ʻŌpua Village 4 Phases I and II and would be unable to complete the build out the remainder of Laʻi ʻŌpua. With the No Action Alternative, the Project Site would continue to operate as a coffee plantation with no short-or long-term impacts on the existing resources found on the Project Site. Additionally, the Kahaluʻu tank site would not be improved with increased storage capacity.

However, this alternative fails to meet the purpose and need of the Proposed Action, which is to develop additional potable water supply sources within the North Kona region to support the continued development of Laʻi ʻŌpua. Further, it fails to meet DHHL's mission and vision of creating vibrant and self-sufficient homestead communities by developing and delivering lands and homes to more native Hawaiian families. Because of its failure to meet the purpose and need and DHHL's vision and mission, it is not a feasible alternative and was dismissed.

2.2 ALTERNATIVE 2: DELAYED ACTION

Developing additional water sources for the continued development of Laʻi ʻŌpua has been identified as a priority project for DHHL and stakeholders in both the 2009 and 2019 Kalakehe—Laʻi ʻŌpua Regional Plans. Additional water sources are needed to achieve DHHL's vision of creating a vibrant and self-sufficient community in the area and continuing to delay action would not meet DHHL's vision. Additionally, there are no existing activities or conditions in the Project Site or its vicinity that make delaying the Proposed Action more beneficial or reduce potential impacts. Because continuing to delay the Proposed Action would not meet DHHL's vision or the purpose and need, this alternative is not feasible and was dismissed.

2.3 ALTERNATIVE 3: ALTERNATIVE LOCATION

The lack of a suitable well site within existing DHHL land holdings and the need to partner with other landowners for the Proposed Action has been a constraint since 2009. DHHL has been working for over a decade to locate suitable sites for the Proposed Action and secure a water source development partnership. The Project Site is one of to two locations where DHHL has committed resources to develop partnerships and is suitable for the Proposed Action. As such, it is uncertain DHHL would be able to identify another location and secure a development agreement without continuing to delay or prevent the Proposed Action. Therefore, an alternative location would not meet the purpose and need and was dismissed.

3.0 AFFECTED ENVIRONMENT, LIKELY IMPACTS, AND MINIMIZATION MEASURES

As a requirement of HAR §11-200.1, an EA must include a description of the affected environment, identify and analyze potential impacts, and propose mitigation measures to minimize potential impacts. This chapter describes the Project Site's geographical and environmental setting, identifies potential impacts produced by the Proposed Action, and discusses mitigation measures for each affected resource to minimize or eliminate any adverse effects.

3.1 SUMMARY OF IMPACTS

Table 3-1 provides a summary of the affected environment, potential impacts, and proposed mitigation measures. Short-term impacts are those anticipated during construction, and long-term impacts are those anticipated during operation of the Proposed Action. Cumulative impacts are those resulting from the development of La'i 'Ōpua, which is a secondary action of the Proposed Action, combined with other housing development projects proposed or under development within the Keauhou Aquifer System Area and North Kona District.

Table 3.1: Summary of Potential Impacts

Affected Resource	Short-term Impacts		Long-term Impacts		Cumulative Impacts	Mitigation Measures
	Tank Site	*Well Site*	*Tank Site*	*Well Site*		
Land Use	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Anticipated, all future growth resulting from the Proposed Action and other developments are within designated growth areas	None Required
Geology, Topography, and Soils	Clearing, grading and grubbing	Clearing, grading and grubbing	None Anticipated	None Anticipated	None Anticipated	Grading, Grubbing and Stockpiling permits per Hawai'i County Code, Chapter 10—Erosion and Sediment Control; soil loss and erosion Best Management Practices (BMPs)
Hydrologic Resources	None Anticipated	None Anticipated	None Anticipated	Greater groundwater withdrawal from the Keauhou Aquifer System Area within the aquifer's sustainable yield	Greater groundwater withdrawal from the Keauhou Aquifer System Area within the aquifer's sustainable yield	Soil loss and erosion BMPs; Well Construction and Pump Installation Permits; Engineering Report compliant with HAR §11-20-29; NPDES permit
Biological Resources	Potential spread of invasive	Potential spread of invasive	None Anticipated	None Anticipated	None Anticipated	Invasive species control measures; fauna avoidance and impact reduction BMPs;

Affected Resource	Short-term Impacts		Long-term Impacts		Cumulative Impacts	Mitigation Measures
	Tank Site	*Well Site*	*Tank Site*	*Well Site*		
	species; temporary displacement of fauna species during construction phase	species; temporary displacement of fauna species during construction phase				biological resource training for crews; fauna resource buffers
Archaeological Resources and Historic Properties	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Anticipated	Cultural resource training for construction crews; archaeological monitoring during construction; notify SHPD if cultural or historic resources are identified during construction; cease work immediately and contact SHPD, coroner and police if iwi kūpuna are identified during construction activities and develop reinternment plan as appropriate.
Cultural Resources and Practices	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Anticipated	See Section 3.7.1 for a full list of feasible actions DHHL may take to reasonably protect cultural, historical, or natural resources, and exercise of traditional and customary native Hawaiian rights in the affected area.

Affected Resource	Short-term Impacts		Long-term Impacts		Cumulative Impacts	Mitigation Measures
	Tank Site	*Well Site*	*Tank Site*	*Well Site*		
Scenic and Aesthetics	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Required
Air Quality	Fugitive dust and construction related air pollutants	Fugitive dust and construction related air pollutants	None Anticipated	None Anticipated	None Anticipated	Air pollution control BMPs
Socioeconomics and Environmental Justice	None Anticipated	None Anticipated	None Anticipated	None Anticipated	Positively benefiting Native Hawaiian and low-income families by creating increased access to housing and economic opportunities	None Required
Acoustic Environment	Noise generated during construction	Noise generated during construction	None Anticipated	None Anticipated	None Anticipated	Community Noise permit; noise reduction BMPs; public informational meeting if applicable
Transportation and Traffic	Minor increase in traffic during construction phase	Minor increase in traffic during construction phase	None Anticipated	None Anticipated	Secondary impacts combined with reasonably foreseeable developments could result in increased traffic around La'i 'Opua	None Required
Natural Hazards	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Anticipated	None Required
Public Facilities and Infrastructure	None Anticipated	None Anticipated	None Anticipated	None Anticipated	Secondary impacts combined with reasonably foreseeable	None Required

Affected Resource	Short-term Impacts		Long-term Impacts		Cumulative Impacts	Mitigation Measures
	Tank Site	*Well Site*	*Tank Site*	*Well Site*		
					developments could increase demand on Keauhou Aquifer System Area, public facilities and infrastructure	

3.2 LAND USE

3.2.1 Existing Land Use

Well Site

The existing land uses within the Well Site primarily consist of non-native forests, private agriculture, and landscaping. Linear rows of mature coffee trees interspersed with grass, some landscaped trees and shrubs cover most of the surrounding area. Two single-family homes are present within the site.

Tank Site

The Tank Site currently functions as the County of Hawai'i, Department of Water Supply Kahalu'u Reservoir and Well Site. Existing water infrastructure features onsite include three water storage tanks ranging from 0.1 to 0.3 million gallons capacity, Kahalu'u Well A and Kahalu'u Well C production wells and associated pumps, four booster pumps[1], and two small, single-story buildings used as the chlorination and control buildings. Existing land uses within the Tank Site consist primarily of cleared open space to accommodate the existing water infrastructure, bordered by non-native forest and private agriculture. Multiple single-family residences are present around the site.

Site photos are included as Figure 3.1.

3.2.2 General Land Use Classifications

Figure 3.2 identifies both the Well and Tank Sites as within the State Land Use Commission Agricultural District.

As shown in Figure 3.3, the Well Site is located within Hawai'i County Code Agriculture District A-5a (minimum building site of five acres) Zone.

As shown in Figure 3.4, the Tank Site is identified as Hawai'i County Code Agriculture District A-5a (minimum building site of five acres) Zone. The makai edge of the site is bordered by State Land Use Commission Urban District zoned as RS-15 Single-Family Residential District (minimum building site are of 15,000 sq ft).

[1] Booster pumps are used to re-pressurize and move water from water storage tanks into a utility water system.

Figure 3.1: Site Photos



Mixed non-native forest near the Keauhou Well Site and water line.



Cultivated coffee fields near the Keauhou Well Site.



Existing steel water tanks at the Kahaluʻu Tank Site.



Existing 0.3 MG water tank at the Kahaluʻu Tank Site.



Portion of Bishop Road along the proposed pipeline route near the Keauhou Well Site.



Overview of the proposed water tank location at the Keauhou Well Site.

Figure 3.2: State Land Use

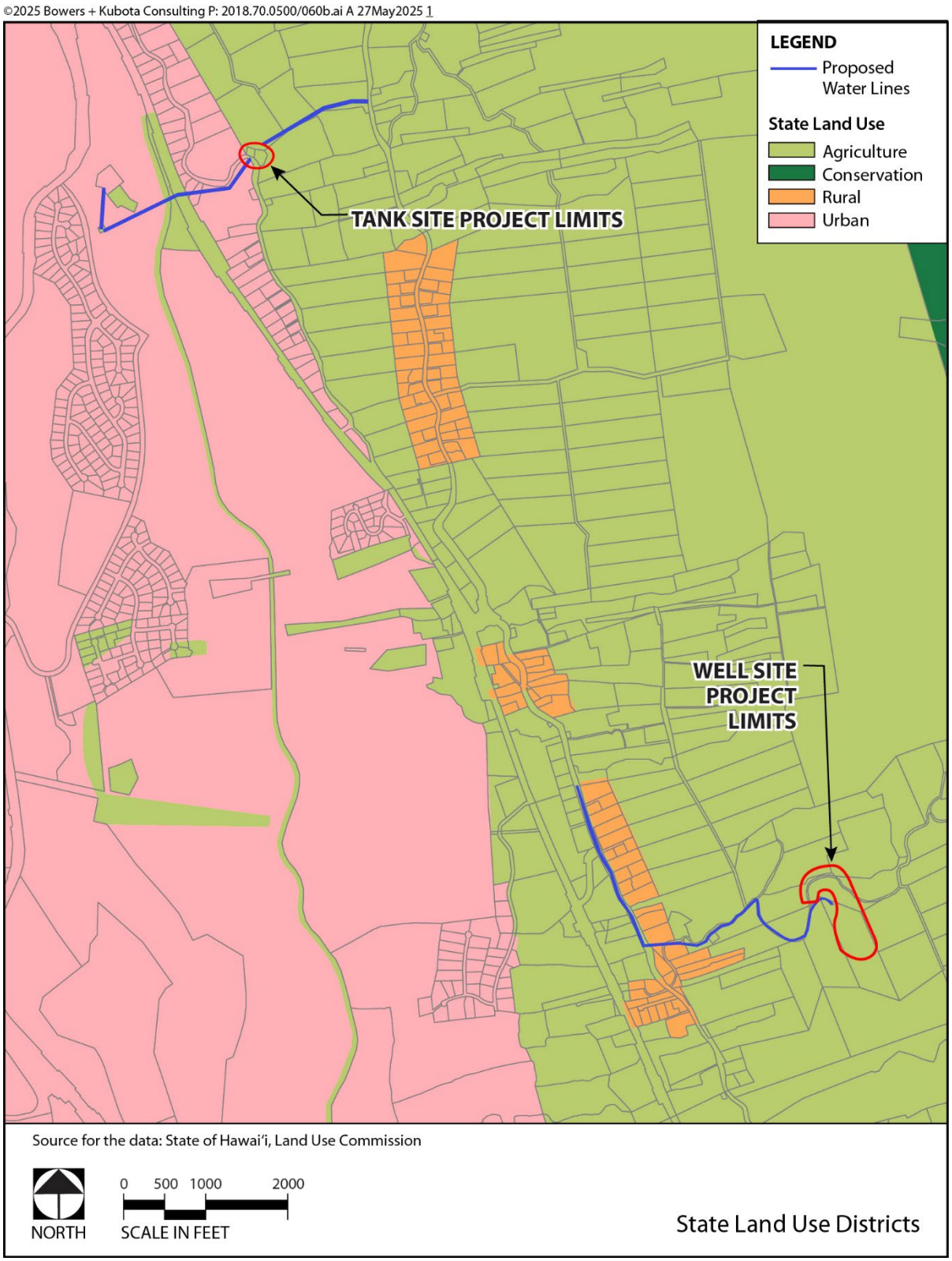


Figure 3.3: County Zoning Map – Well Site

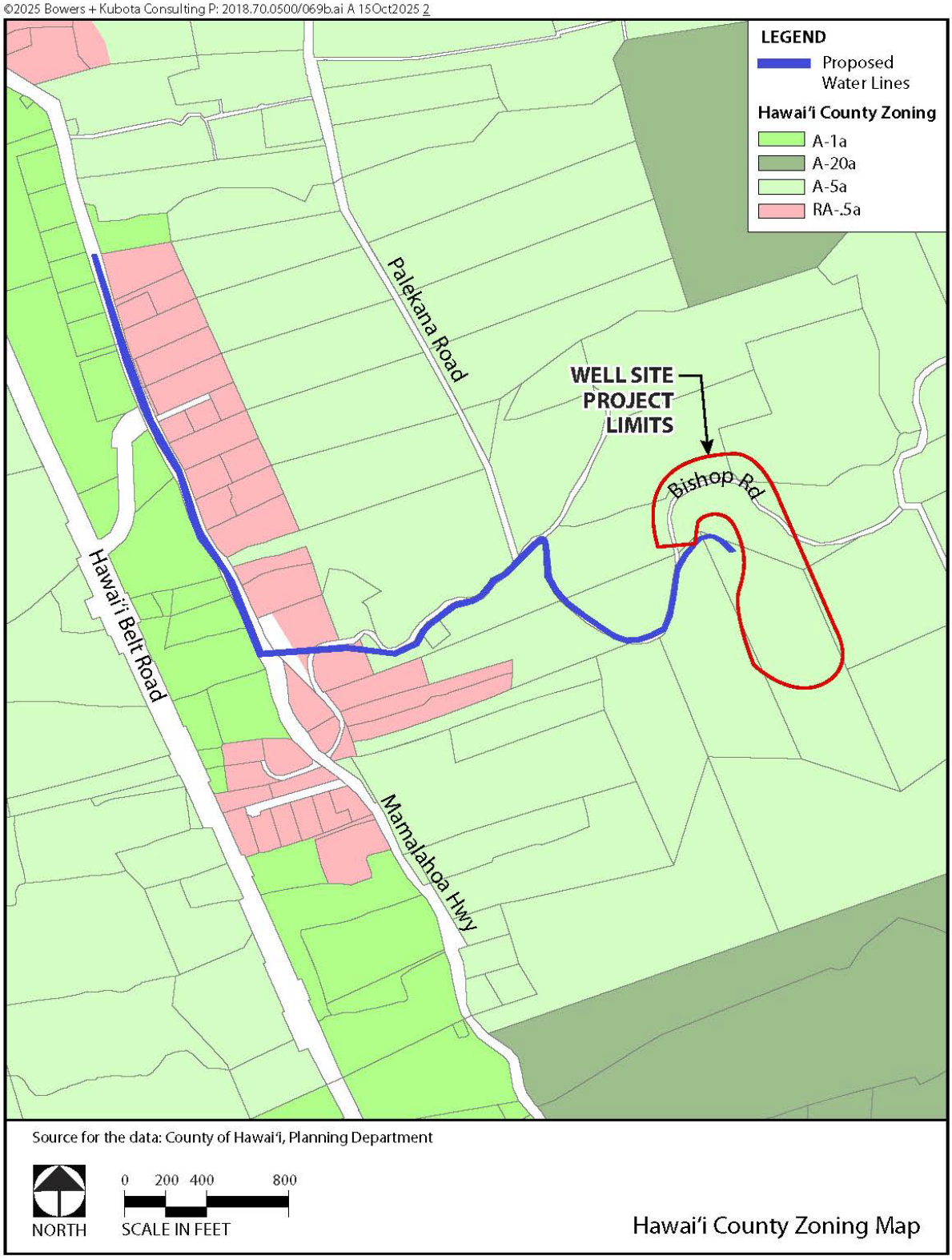
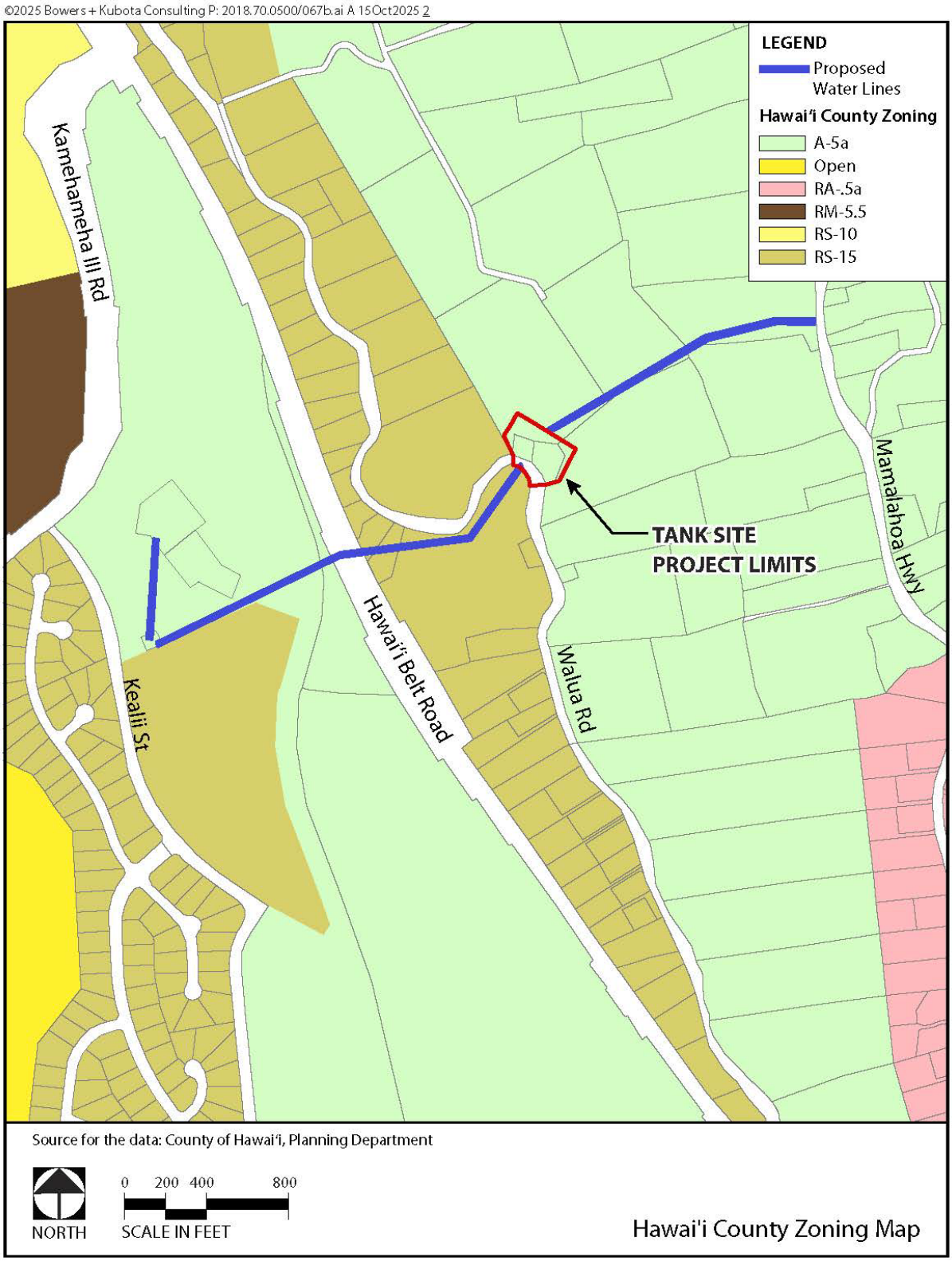


Figure 3.4: County Zoning Map – Tank Site



3.2.3 Agriculture Lands and Farm Lands

AGRICULTURAL LANDS OF IMPORTANCE TO THE STATE OF HAWAI'I

The Hawai'i State Department of Agriculture, Soil Conservation Service (SCS), USDA, and University of Hawai'i have created a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH). The system has three ratings for agricultural lands that correspond to the SCS's national equivalents3:

- *"Prime Agricultural Land"* which is best suited for the production of food, feed, forage, and fiber crops. The land has the soil quality, growing season, and moisture supply needed to sustain high yields of crops economically when treated and managed according to modern farming methods.
- *"Unique Agricultural Land"* which indicates agricultural land other than Prime that is valued for its unique high-value crops. In Hawai'i, some examples of high-value crops are coffee, taro, rice, watercress, and non-irrigated pineapple;
- *"Other Important Agricultural Land"* is any land other than "Prime or Unique Agriculture Land" that is of state-wide or local importance for the production of food, feed, fiber and forage crops.

Well Site

As shown in Figure 3.5, approximately 0.13 acres of Other Important Agricultural Land are present on the northern corner of the Well Site. This area currently contains single-family homes and residential landscaping. A small portion of the Well Site water transmission line passes through Other Important Agricultural Land. However, the water line will be placed within an existing utility easement.

Tank Site

The Tank Site does not overlap with any Agricultural Lands of Importance to the State of Hawai'i but, as shown in Figure 3.6 the Tank Site water transmission line passes through Other Important Agricultural Land on both the mauka and makai sides of the site. However, the water line will be placed within existing utility easements.

IMPORTANT AGRICULTURAL LANDS

Important Agricultural Lands (IAL) is a voluntary program where landowners can apply to the State Land Use Commission to designate their lands as IALs. IALs are intended to promote, conserve and protect agricultural lands, and assure the future availability of suitable agricultural lands. No IALs are present within or around the Tank or Well Sites, as the only IALs present on Hawai'i Island are located in South Kohala.

3.2.4 Formally Classified Lands

Federal, State, or local agencies, or have been given special protection through formal legislative designation." Examples of FCL include the National Park System, National Monuments, Coastal Zones, National Wildlife Refuges, and areas of state or local interest. No FCLs are present within or around the Tank or Well Sites. While not directly adjacent to the

Project Site, the Kaloko-Honokōhau National Historic Park is approximately 11 miles northwest of the Well Site and 9 miles northwest of the Tank Site.

Impacts and Mitigation Measures

Water storage tanks and associated accessory structures are permitted within the State Agricultural District and by the Hawai'i County Code Chapter 25—Zoning, so long as they do not pose a hazard or danger to the surrounding area and are approved by the Director of the Hawai'i County Planning Department. The Proposed Action will be installed in compliance with all relevant building codes to prevent any hazards to the surrounding area and construction would not begin prior to plan approval.

There will be no direct impacts to IAL or FCL, as neither land use occurs at or within proximity to the Well or Tank Sites. The Proposed Action is located between 9 and 11 miles away from Kaloko-Honokōhau National Historic Park and would therefore have no impact on the Park. However, the National Park Service previously had concerns regarding other groundwater resource uses near the Kaloko-Honokōhau National Historic Park. These concerns are discussed in Section 3.4.5.

The Proposed Action could affect approximately 0.13 acres of ALISH Other Important Agricultural Lands within the Well Site location. However, this area is currently utilized for residential purposes, and as such no agricultural uses would be lost. Since the associated water lines would be installed within existing utility easements at both the Well and Tank Site, no impacts to agricultural lands would occur from these features. Therefore, no short- or long-term adverse impacts to agricultural lands, IAL or FCLs are anticipated during construction or operation of the Proposed Action and no additional mitigation measures are required.

Figure 3.5: ALISH Lands Map – Well Site

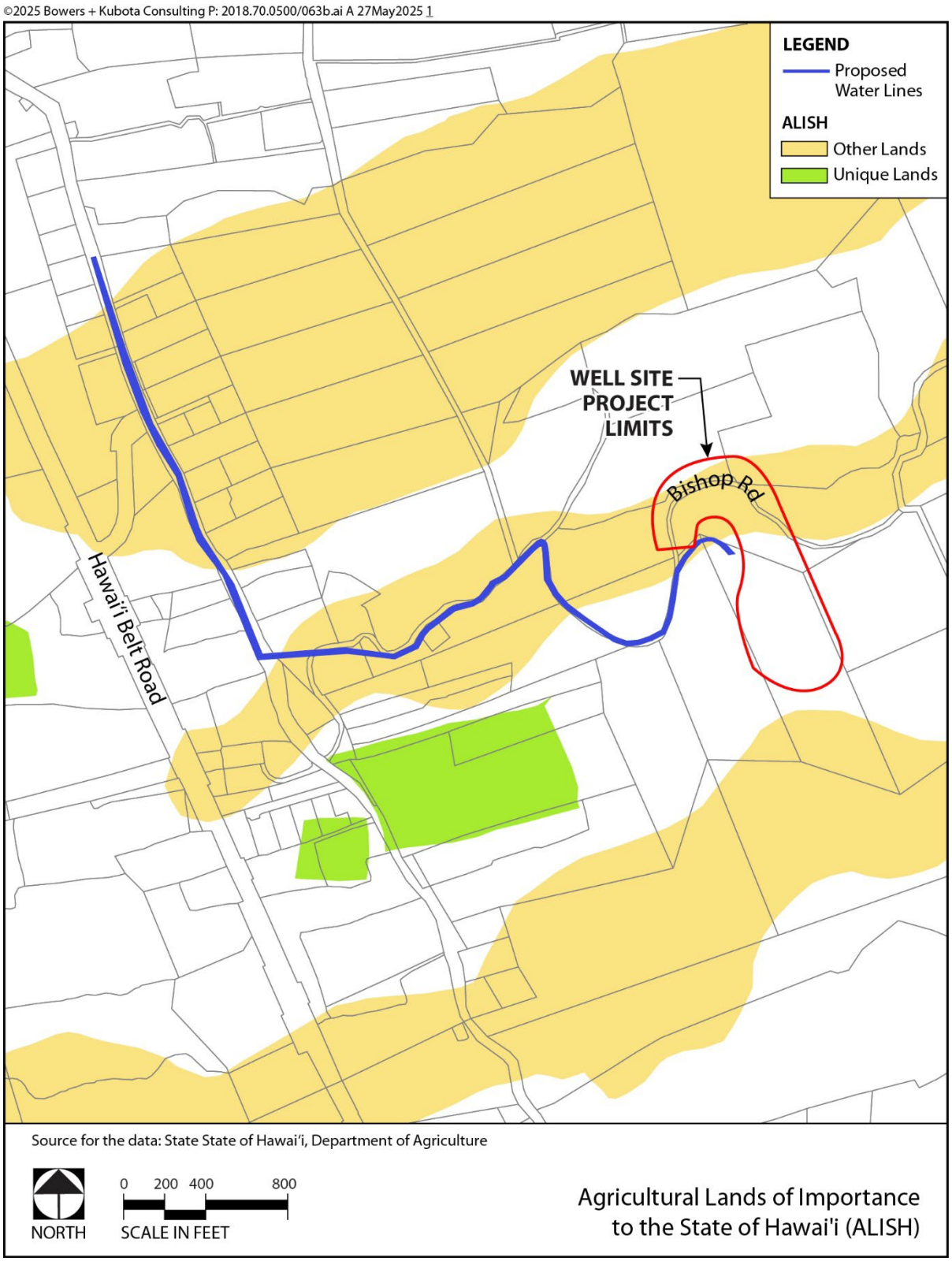
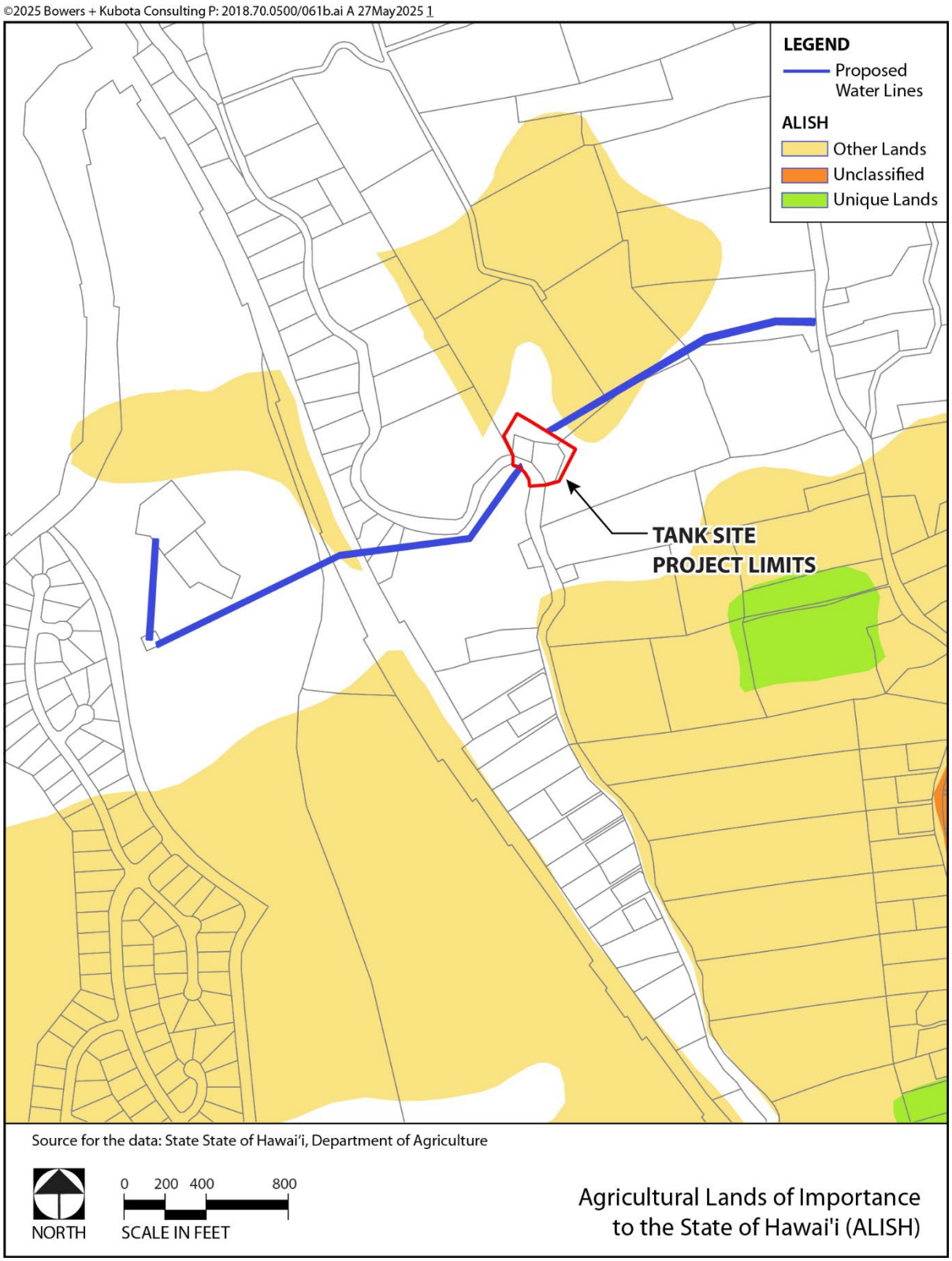


Figure 3.6: ALISH Lands Map – Tank Site



3.3 GEOLOGY, TOPOGRAPHY AND SOILS

3.3.1 Geology

Hawai'i Island is home to five volcanoes and is associated with volcanic eruptions and earthquakes. The Project Site is located on the western slope of the Hualālai Volcano, which last erupted between 1800-1801 and is now considered dormant. Flows from this last eruption originated on the northwestern ridge of the volcano at around 6,000 feet (the Ka'ūpūlehu flow) and at 1,500 feet (the Hu'ehu'e flow). These historic Hualālai flows extended from west of Kīholo Bay to Kaumo'o Point and much of the lava in this area has been since colonized by hardy vegetation and used for agriculture lands (Macdonald, GA., Abbot, A.T., and Peterson, F.L., 1983).

The U.S. Geological Survey (USGS) has developed a Lava-Flow Hazard Zones map and divided the island into zones based on the probability of coverage from future lava flows, with Zone 1 having the greatest risk and Zone 9 the least. The Project Site is located within Zone 4. While Hualālai Volcano is now considered dormant, its historic flows have typically covered large areas including the Project site.

3.3.2 Topography

The Project Site is located between 550-800 feet amsl (the Tank Site) and 1,650 feet amsl (the Well Site). Both sites slope moderately west towards the ocean. The Tank Site was previously cleared to accommodate the existing DWS water utility infrastructure and decades of coffee production has altered the existing landscape and topography of the Well Site.

3.3.3 Soils

The Land Study Bureau at the University of Hawai'i has developed a soils agricultural productivity rating system with the USDA. The system ranks soils within the State from A to E in terms of their over-all quality for agricultural productivity, with A being "very good" and E being "not suitable." As shown in Figures 3.7 and 3.8 , all the soils within the Tank and Well Sites are rated as "C", which is considered moderately good for agricultural productivity.

The National Earthquake Hazard Reduction Program has developed a soil classification system defining five soil types that help identify areas that will be most significantly affected by an earthquake. Earthquakes associated with tectonic or volcanic activity occur frequently in Hawai'i County, although many are too small to cause noticeable effects. "A" ranked soils represent hard rock that are able to reduce ground motions or shaking from earthquakes and "E" represent soft soils that amplify and magnify ground shaking and increase building damages and loss. According to the State of Hawai'i Hazard Mitigation Plan (2018), the National Earthquake Hazard Reduction Program has identified the Project Site as having "C" soils, which are very dense soils and soft rock that experience a moderate amount of ground shaking.

Figure 3-9 displays the USDA National Resources Conservation Services, Web Soil Survey results of the Tank and Well Sites. The Tank Site is primarily comprised of Punalu'u-Lava flows complex (10-20% slopes) and a small portion of the southern edge of the site contains

Waiaha-Punaluʻu-Lava flows complex (10-20% slopes). There are areas of Kaimu extremely stony peat (7-25% slopes) along the pipeline routes. Punaluu series soils are well-drained, thin organic soils developed over pāhoehoe lava and primarily used for pasture. Kaimu series soils are also well-drained, thin organic soils and generally used for agricultural purposes.

The Well Site is primarily comprised of Nāpōʻopoʻo-Honaulu complex (10-20% slopes) except for the northern corner, which has Puna and Haplic Udarent soils (10-20% slopes). Nāpōʻopoʻo series soils consist of shallow, well drained soils formed over volcanic ash or lava used primarily for grazing and orchard crops.

Potential Impacts and Mitigation Measures

The Proposed Action would not change the Project Site's potential exposure to geological hazards or prevent the use of any significant geological resources in the area. It will be constructed in accordance with County requirements and building codes relating to the onsite seismic conditions, and the appropriate American Water Works Association and American Concrete Institute standards. The entire island of Hawaiʻi, including the Project Site, are located within the International Building Code (IBC) Seismic Zone 4 which have the highest potential for seismic induced ground movement. The Proposed Action will comply with IBC Seismic Zone 4 building standards to reduce potential impacts created by earthquakes or seismic induced ground disturbances.

The Proposed Action would preclude between one to three acres of the Well Site from its current agricultural use for coffee production. However, it would not impact any A "very good" or B "good" ranked soils or prime agricultural soils or other agricultural uses in the area. While the land surrounding the Tank Site is classified as moderately good for agricultural uses, the area consists of non-native mixed forest and landscaping as discussed in Section 3.5.1. Therefore, no agricultural uses would be impacted or lost.

Ground disturbance resulting from the Proposed Action will require clearing, grubbing, and grading and the necessary permits will be obtained per Hawaiʻi County Code, Chapter 10—Erosion and Sediment Control. Implementing construction of the Proposed Action in two phases will reduce surface disturbance and all excavation and grading activities will be regulated by the applicable provisions of the County's grading ordinances and any SHPD requirements for archaeological monitoring. Excavation and grading activities will incorporate best management practices (BMPs) to minimize soil loss and erosion, such as:

- Silt fences;
- Dust fences;
- Slope stabilization;
- Temporary sediment basins;
- Temporary diversion berms and swales to intercept runoff;
- Use of compost filter socks;
- Truck wash down areas; and
- Slope protection.

If applicable, permanent sediment control measures will be implemented once construction is complete. Therefore, no long-term adverse impacts to soils are anticipated during construction or operation of the Proposed Action and no additional mitigation measures are required.

Figure 3.7: USDA Soils Map – Well Site

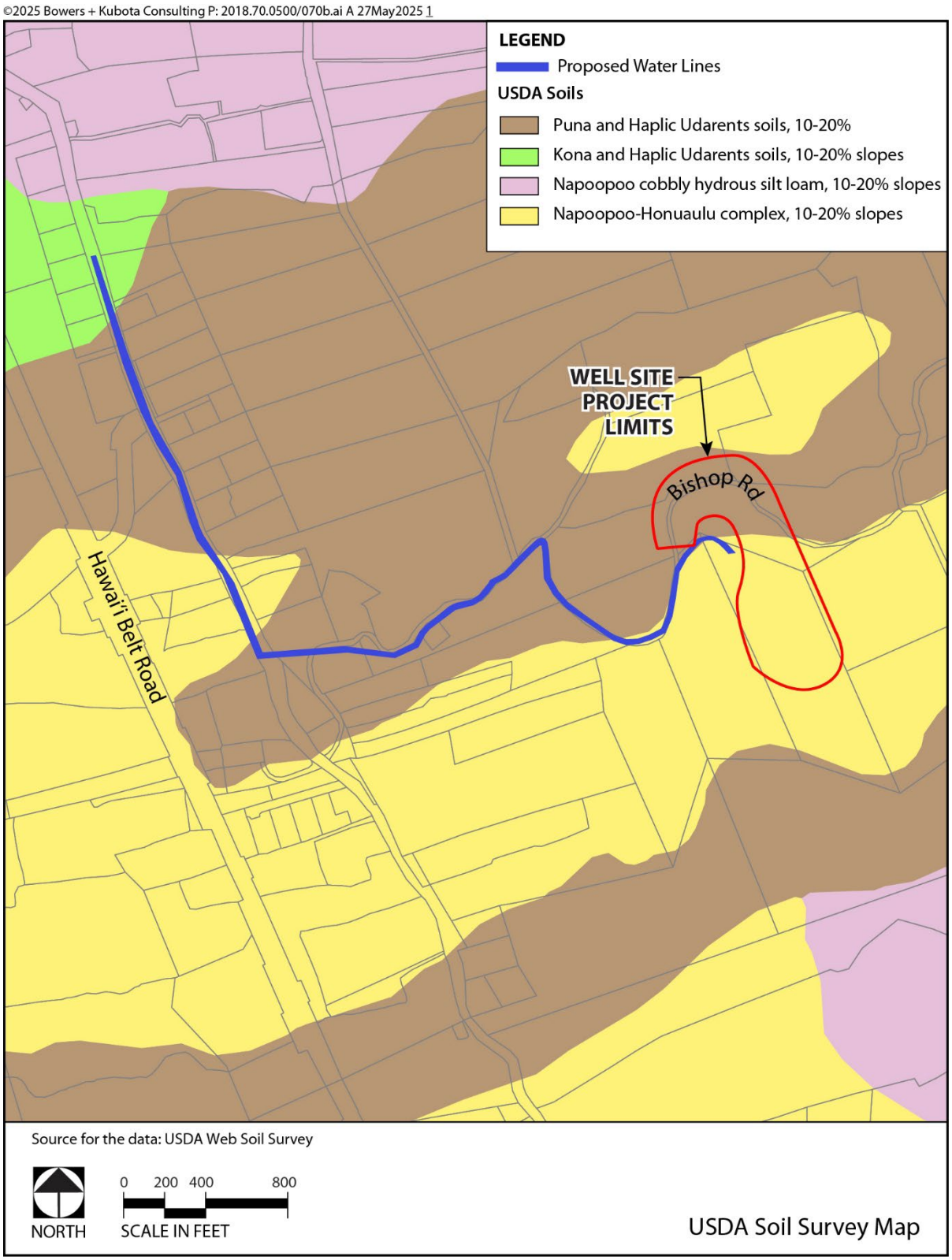


Figure 3.8: USDA Soils Map – Tank Site

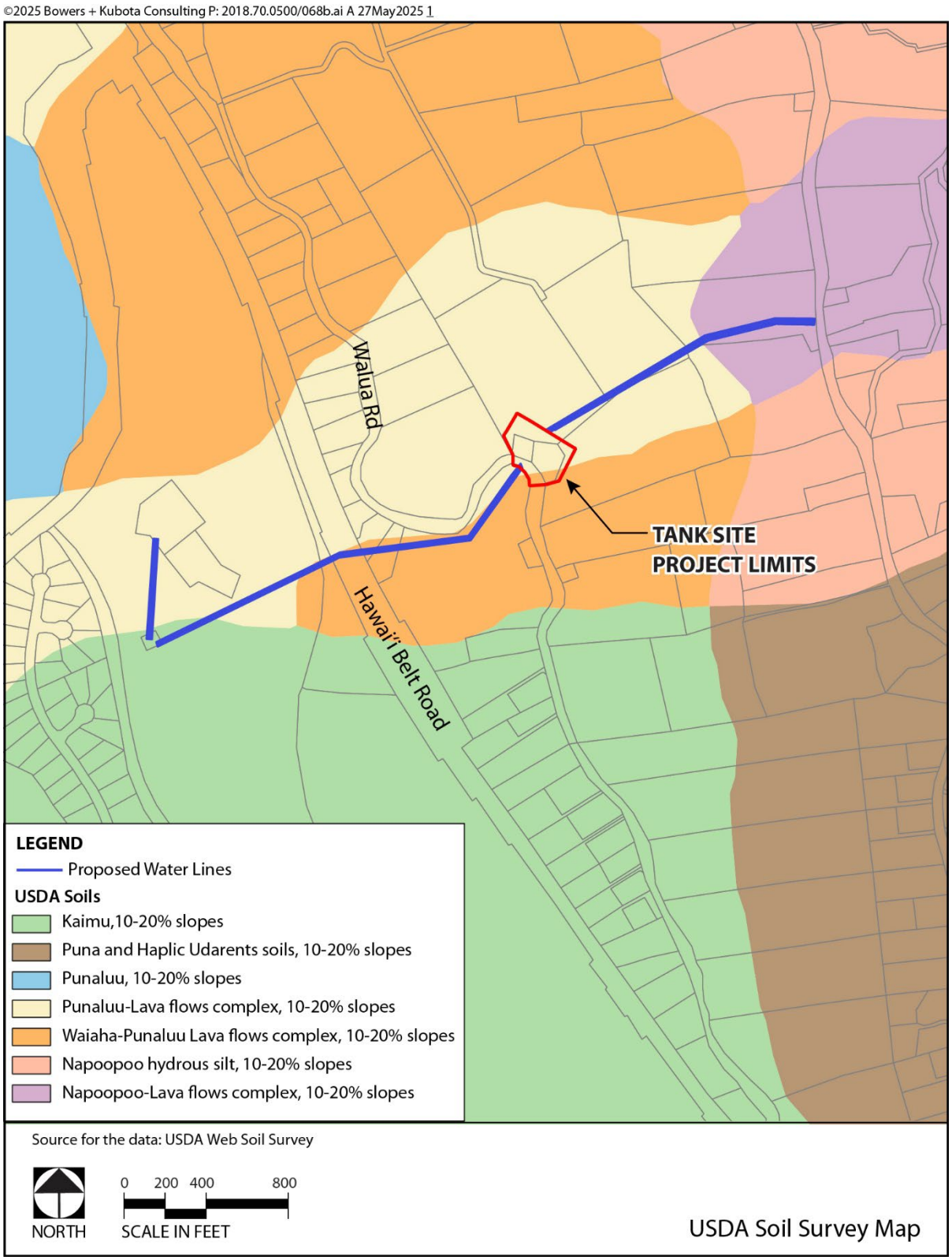
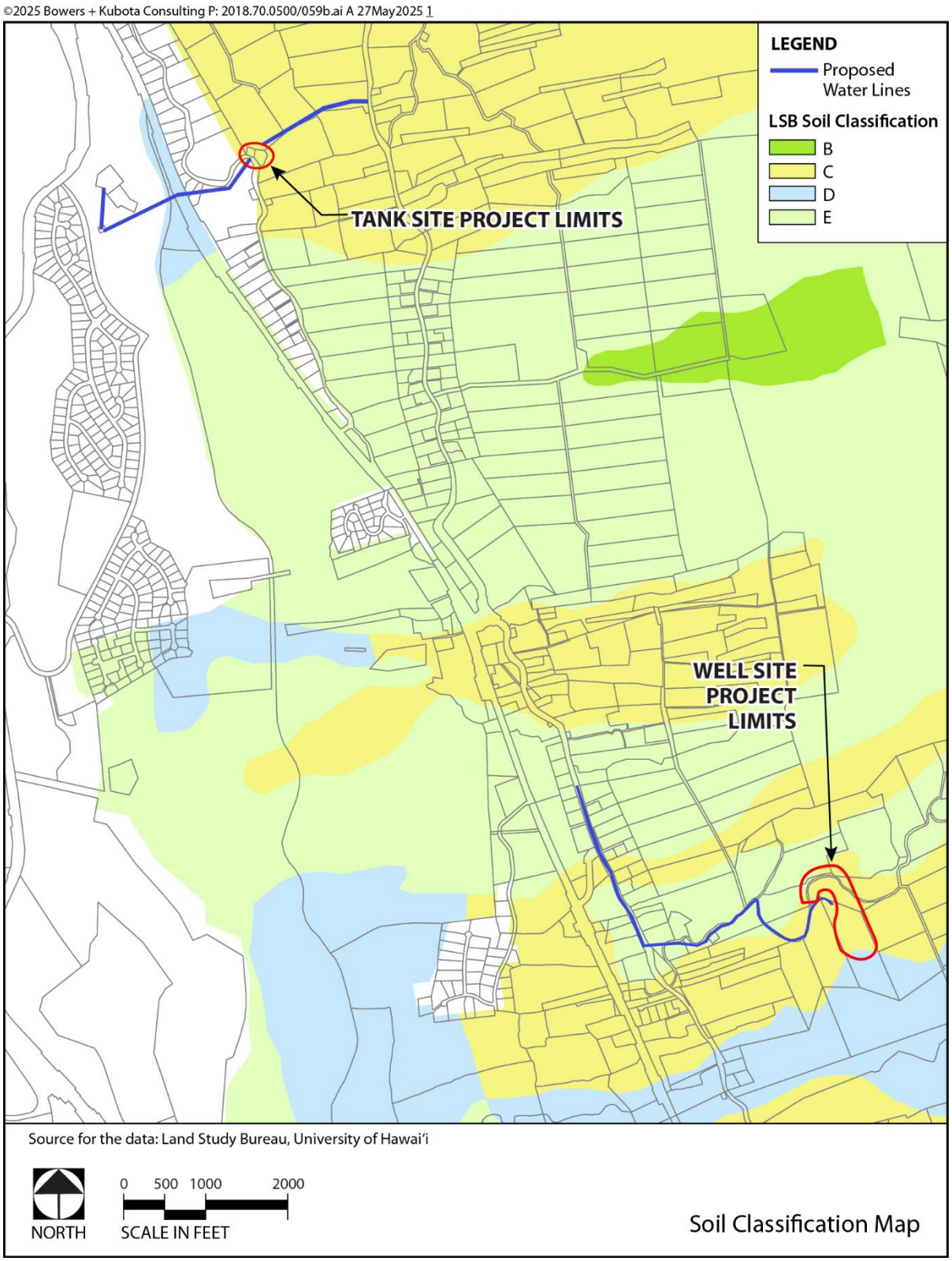


Figure 3.9: LSB Soils Map – Both Sites



3.4 HYDROLOGIC RESOURCES

3.4.1 Rainfall

On the North Kona coast, rainfall is generally between 20 inches at lower elevations and over 80 inches per year at higher elevations as shown in Figure 3.10. Mean annual rainfall near the Project Site is approximately 49 inches with rainfall typically highest in July and September and lowest in February (SWCA Environmental Consultants, 2019).

3.4.2 Watershed, Surface Waters and Floodplain

The Tanks Site is located within the Keauhou watershed, and the Well Site is within the Kahalauʻu watershed as shown in Figure 3-11. Neither watershed contains perennial or non-perennial surface waters and are therefore not included within the Department of Land and Natural Resources, Division of Aquatic Resource's *Atlas of Hawaiian Watersheds and their Aquatic Resources.*

Surface water in the North Kona region is extremely limited. According to the Hawaii Statewide GIS Program, no perennial or non-perennial surface waters are present at either the Tank or Well Sites. Thus, no floodplains are present.

3.4.3 Wetlands

According to the U.S. Fish and Wildlife Service, National Wetlands Inventory Online Wetland Mapper, no wetland features occur within or adjacent to the Project Site. The closest wetland-like features are between approximately 0.8 to 0.9 miles from the Well and Tank Sites, respectively as shown in Figure 3-12.

3.4.4 Coastal Waters

The Project Site is located between approximately 1 to 2 miles inland from the nearest coastline at an elevation of approximately 550 feet to 1,650 feet amsl. As no surface waters are present, the Proposed Action has no direct connection to coastal waters.

Figure 3.10: Rainfall on Hawai'i Island

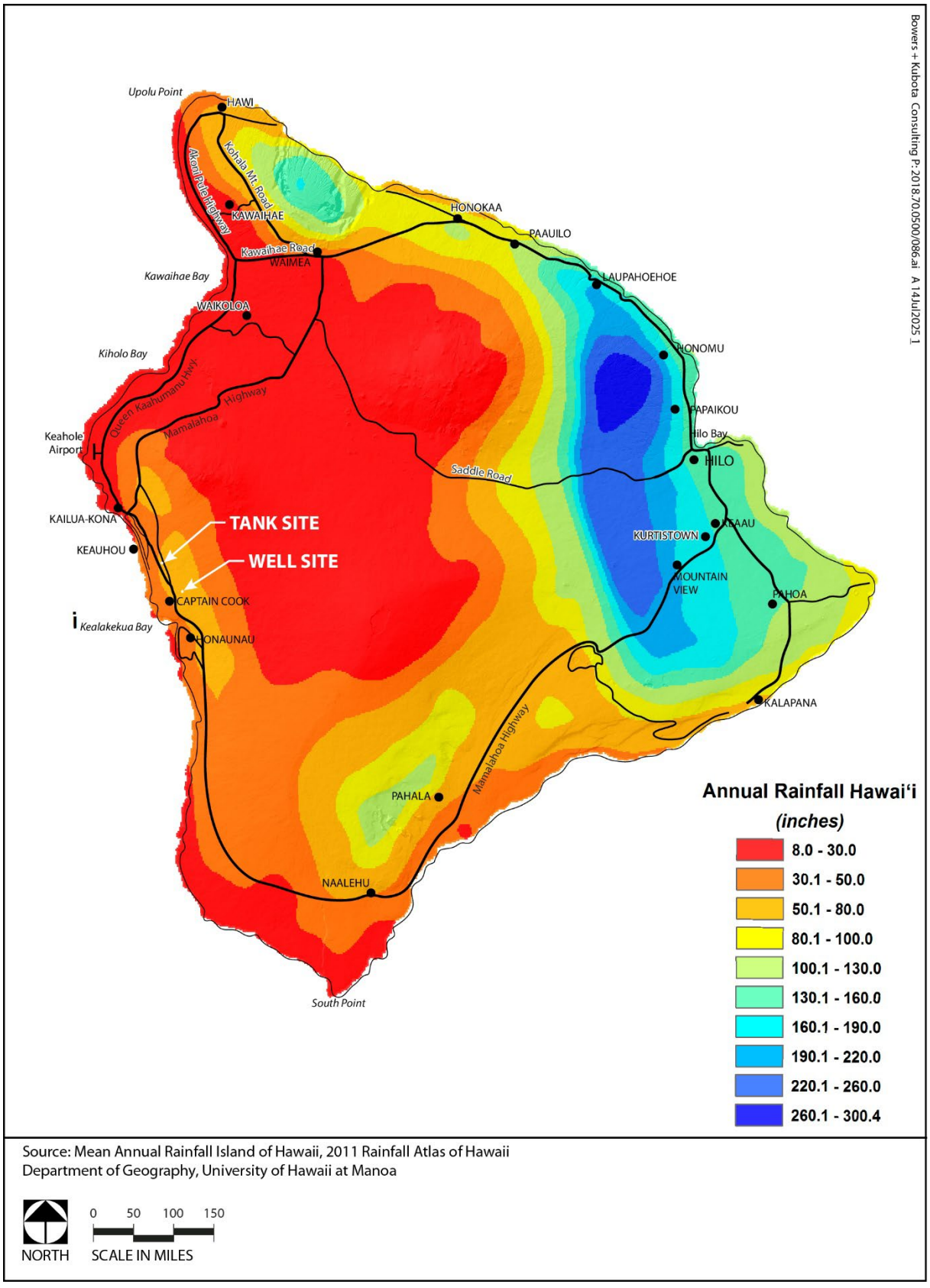


Figure 3.11: Watershed and Project Location Map

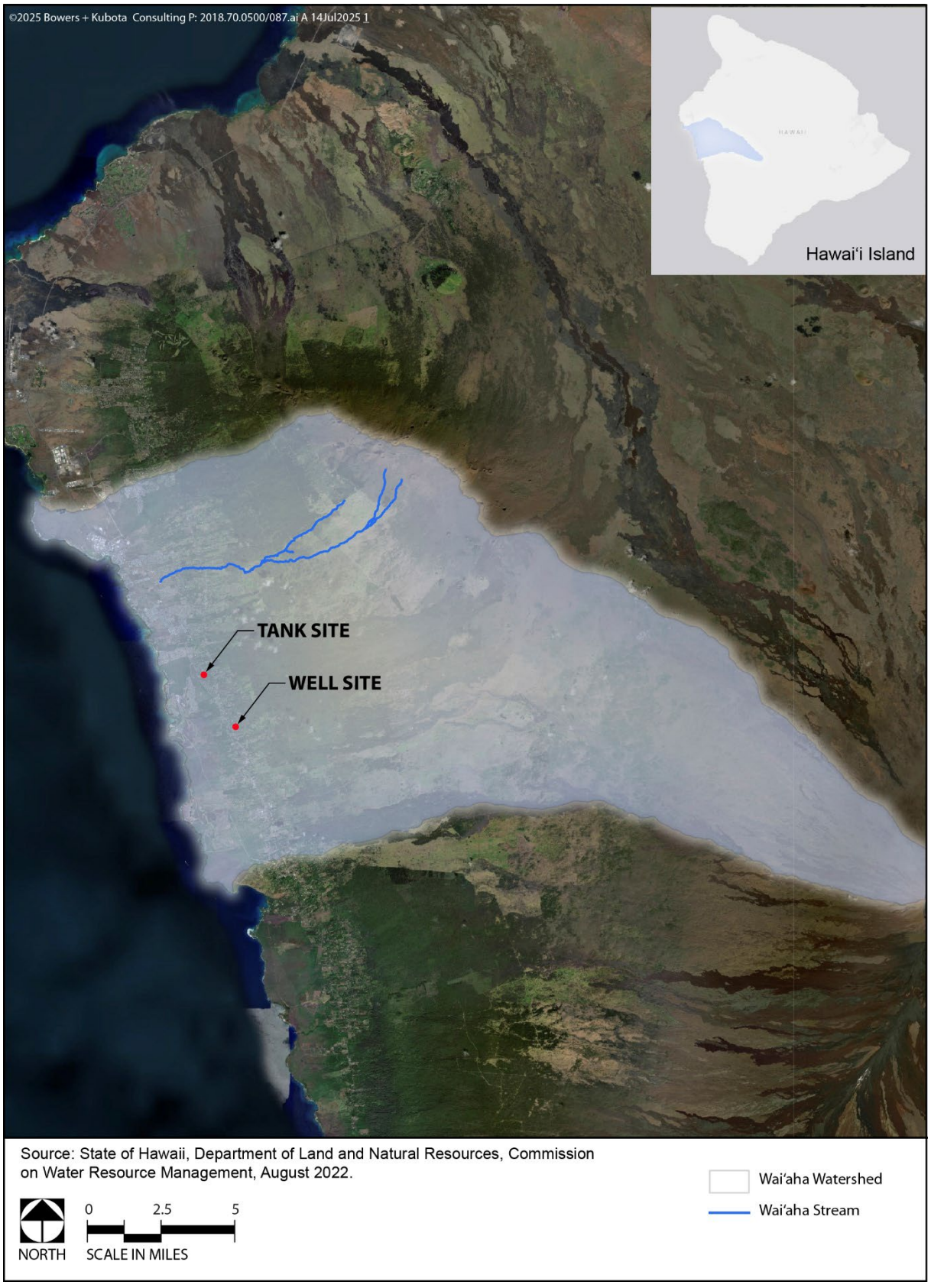


Figure 3.12: Wetlands Map

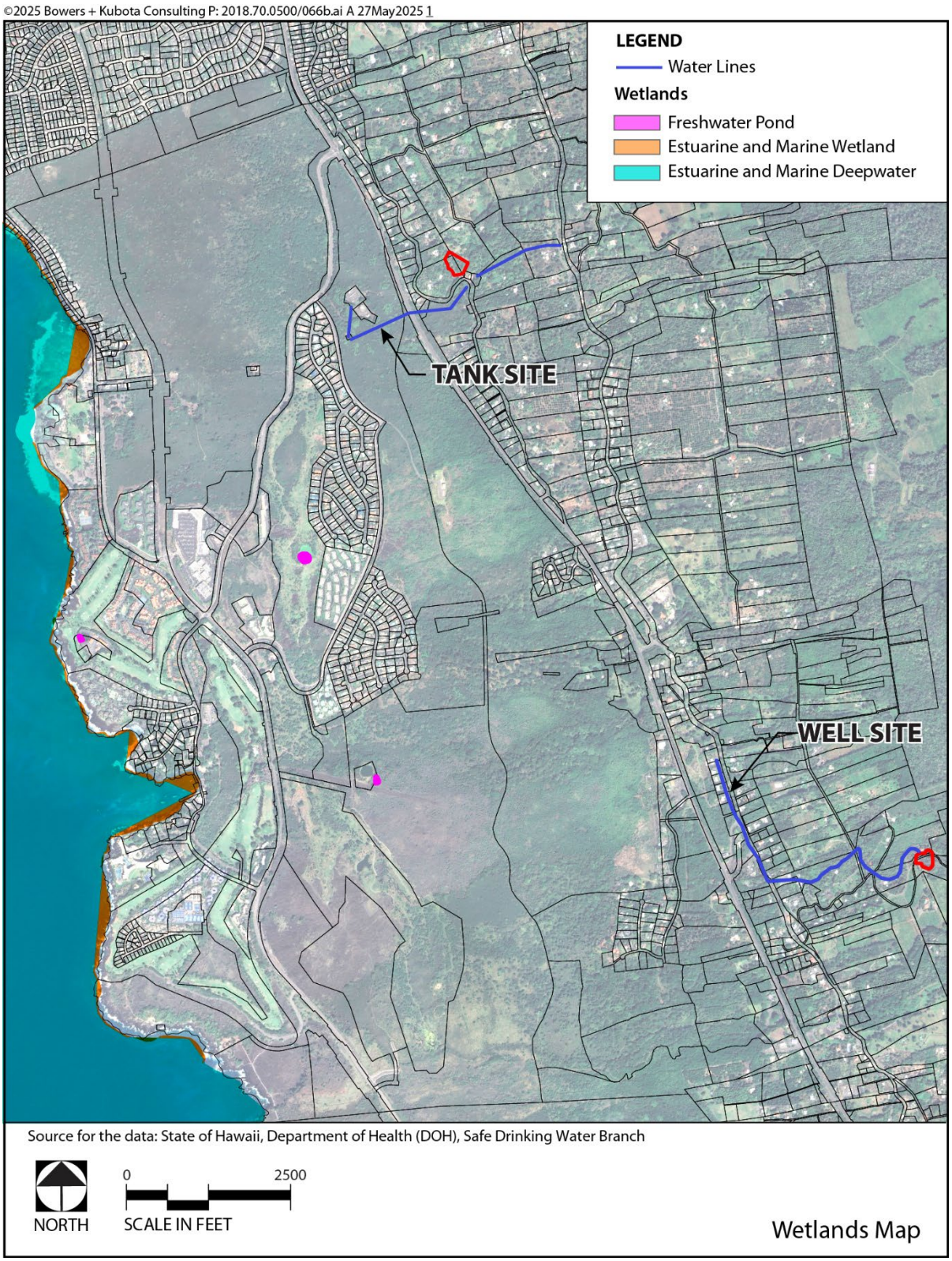
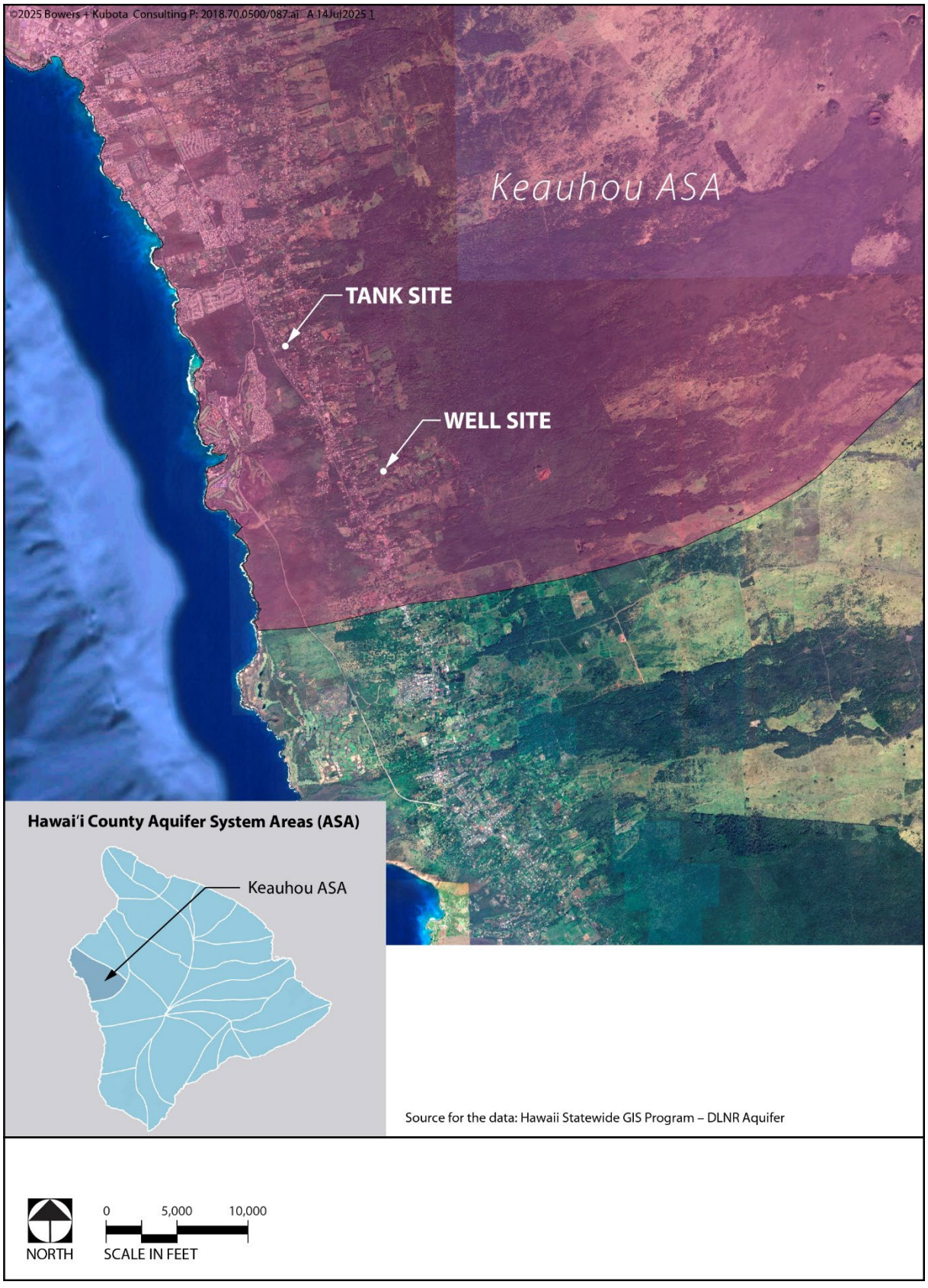


Figure 3.13: Hawai'i County Aquifer System Areas



3.4.5 Aquifer System

The Project Site is located within the Haulālai Aquifer Sector - Keauhou Aquifer System Area (KASA) as shown in Figure 3-14 The KASA extends over the western and southwestern flank of Hualālai Volcano and along the entire coastline from Mahaiʻula to Keikiwaha point.

According to *The Rainfall Atlas of Hawaiʻi*, rainfall on the western slopes of Hualālai Volcano is the principal source of groundwater recharge in the area and in Hawaiʻi County groundwater is the primary source of drinking water. Within the KASA, two types of groundwater are present: basal and high-level groundwater. Basal groundwater is freshwater that "floats" on top of deeper seawater. High-level groundwater is a freshwater source that is contained in the island's volcanic rock layers by relatively impermeable geologic structures, like clay soils or less permeable volcanic rock (Giambelluca et. al., 2016). Basal groundwater extends 1.5 to 4.5 miles inland from the coast, while high-level groundwater is restricted to mauka of Māmalahoa Highway from Lalaoa to Keʻei (Natural Energy Laboratory of Hawaiʻi Authority, 2018). High-level groundwater is considered pristine in quality, largely from the lack of saltwater intrusion like basal sources, with a chloride content ranging between 3 and 10 milligrams per liter. Chloride content is a measurement of freshness of Hawaiʻi's groundwater and this range is similar the chloride content of high elevation rainfall.

Following the discovery of high-level groundwater during the 1990's, DWS has shifted their priority to developing wells that use this groundwater type. Placement of wells utilizing high-level groundwater in the region range from 730 to 1,760 feet amsl with depths from approximately 1,000 to 1,780 feet, suggesting compartmentalization of this water source throughout the KASA area (Natural Energy Laboratory of Hawaiʻi Authority, 2018). DWS encourages development of future high-level wells in areas generally between 1,500 and 1,800 feet mauka of Māmalahoa Highway with a minimum of 0.25 miles between well sites. This reduces drawdown and interference between wells, creating greater water sustainability within the KASA region.

During the development of the *Hawaiʻi County Water Use and Development Plan* update, the National Park Service noted concerns regarding lower groundwater levels and increased pond salinity resulting from wells in the area intercepting groundwater and reducing flow through Kaloko-Honokōhau National Historic Park (County of Hawaiʻi, Department of Water Supply, 2017). The Kaloko-Honokōhau National Historic Park is an important natural and cultural resource located approximately six miles northwest of the Project Site.

According to the Commission on Water Resource Management's (CWRM) *Water Resource Protection Plan 2019 Update*, the KASA has a sustainable yield of 38 mgd (State of Hawaiʻi, Commission on Water Resource Management, 2019). Sustainable yield is the limit established by the CWRM for groundwater withdrawal from an aquifer without negatively impacting its long-term sustainability from the source. The CWRM adopted reservations of 3.398 mgd of water from the KASA for DHHL per its authority under HRS 174C-101. The water reservations may be used for various purposes in the planned development of DHHL's 1.51 acres of land occurring in the KASA, including the development of homesteads like La'i 'Opua under Section 221 of the Hawaiian Homes Commission Act. DHHL will receive two thirds of the water developed by the Proposed Action. Thus, even if the wells are pumped at

the daily maximum rate of 2 mgd DHHL would receive approximately 1.3 mgd which is within their reservation amount.

EXISTING WELLS

The Proposed Action occurs within the DWS North Kona Water System, which depends heavily on groundwater wells as a water source. According *to Hawai'i Water Use and Development Plan*, *Keauhou Aquifer System*, the KASA has 47 production wells in the system area including 16 for municipal purposes, 12 for irrigation, one industrial, five agricultural and 13 drilled but unused (County of Hawai'i, Department of Water Supply, 2017). The wells use both groundwater types and current pumping rates are approximately 15 mgd. The Proposed Action is anticipated to have a maximum daily demand of 1.1 mgd with the capacity to pump up to 2.0 mgd (Department of Hawaiian Homelands, 2006).

Table 3-2 lists the municipal production wells supplying potable water within five miles of the Project Site. Figure 3-14 shows the locations of the existing wells within the KASA. The Kahalu'u Wells A-D cluster, which are present at the Tank Site, are the closest operating wells located within 2 miles of the Well Site. Kahalu'u Well A and Kahalu'u Well C are the two production wells onsite, each capable of pumping approximately 1 mgd.

Table 3.2: Existing Groundwater Wells*

Well No.	Well Name	Approx. Distance to the Project Site (miles)
3557-01 to 05	Kahalu'u Wells A-D+	2
3557-05	DWS Kahaluu Shaft	2.5
3657-01	DWS Holualoa	5

*Source: County of Hawai'i, Department of Water Supply. *Hawai'i County Water Use and Development Plan Update, Hawai'i Water Plan, Keauhou Aquifer System*. March 2017.

FUTURE WELLS

There are three future production wells planned within the KASA, including the Proposed Action. The KASA has a sustainable yield of 38 mgd and projected future water demands for the KASA indicate that by 2035 pumping rates will reach approximately 23 mgd, or around 60 percent of the aquifer's sustainable yield. With the addition of the Proposed Action and other future wells, this value could increase up to 27 mgd. Table 3-3 lists the future planned municipal wells within the vicinity of the Proposed Action. The closest of these wells, Wai'aha Well B, is over 6 miles from the Project Site.

Table 3.3: Proposed Potable Wells

Well Name	Estimated Pump Capacity (mgd)	Distance to Project (miles)
Proposed Action	2	N/A
Wai'aha Well B	1	1.35
Ota Well	1	2.31

3.4.6 Groundwater Contamination

Potential sources for groundwater contamination include untreated stormwater runoff and wastewater. Stormwater runoff can occur anywhere within the watershed and is a source of water pollution. Wastewater is often generated as a byproduct of agricultural or industrial activities or from Individual Wastewater Systems and Underground Injection Control sites.

Impacts from ground water contamination are not anticipated at the Tank Site as this location currently has two safely operating production wells. The Proposed Action will not affect these wells and is intended to modify the water storage tanks at this location. The tanks and associated water transmission pipelines will be constructed according to HAR §11-20-29 Rules Relating to Public Water Systems, as applicable, to avoid potential contamination.

Potential for groundwater contamination affecting the Proposed Action at the Well Site is low. Groundwater recharge of the KASA occurs primarily on the slopes of Hualālai Volcano, mauka of the Well Site, and the area consists predominately of undeveloped land covered with shrub and forest vegetation.

Directly mauka of the Well Site are four small-scale coffee farms and mostly rural residential homes, small-scale agriculture and vacant land surround the site. Within the Well Site footprint, land uses include coffee cultivation and undeveloped mixed non-native forest. None of these land uses produce measurable amounts of potential contaminants that would be picked up by stormwater runoff. No large-scale commercial agricultural or livestock operations, which may use substantial quantities of pesticides and herbicides that can be picked up in stormwater runoff, occur mauka of the Well Site.

The County of Hawai‘i does not have a sanitary wastewater collection system in the uplands of North Kona or along Māmalahoa Highway. As a result, wastewater disposal near the Well Site is primarily within Individual Wastewater Systems which have historically been cesspools. There is one cesspool present within the Well Site boundaries and approximately 20 in the vicinity mauka of the site. In 2017, Act 125 was passed by the Hawai‘i State Legislature requiring all cesspools to be upgraded, converted, or connected to a sewer system by 2050.

The Project Site is located approximately 1.25 miles mauka of the Underground Injection Control line established by the DOH. The Injection Control line marks areas of the island where there are limits on the types of injection wells that can be installed, and the Project Site’s location mauka of the line indicates no new injection wells can be installed nearby. Injection wells are typically used by individual wastewater treatment facilities to dispose of treated wastewater effluent into ground pits.

Figure 3.14: Groundwater Wells Map

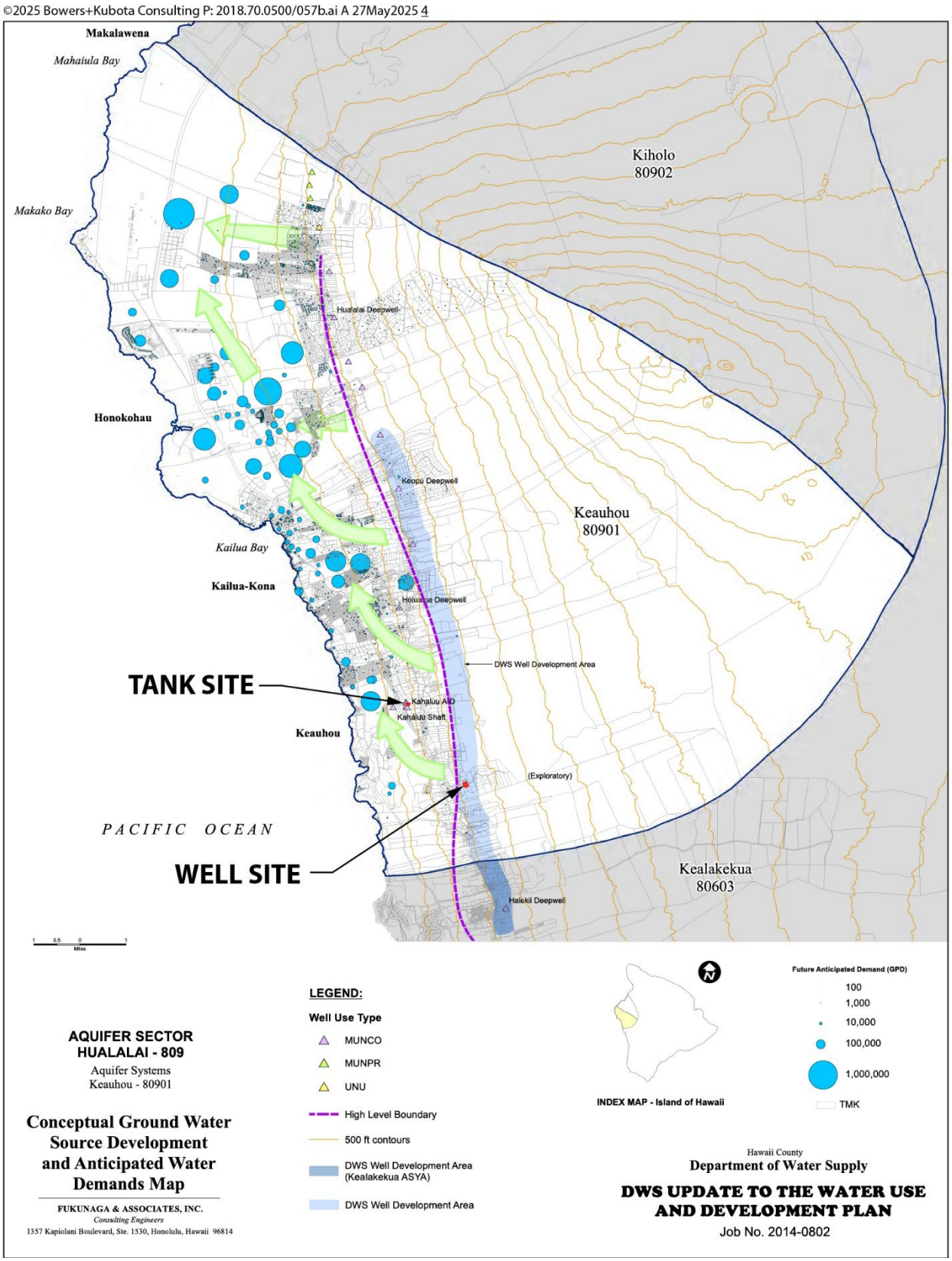


Figure 3.15: NPDES Contamination Injection Map



Impacts and Mitigation Measures

The Proposed Action would not change the Project Site's potential exposure to rainfall or impact rainfall levels in the area. The Proposed Action would have no impacts on wetland features, as none occur in the Project Site. Those in the vicinity are nearly 1 mile away from each location of the Project Site and would not be affected by the Proposed Action.

No surface waters are present in or near the Project Site. However, to ensure no downstream impacts on coastal waters BMPs like those described in Section 3.3.3 would be used during excavation and grading activities to minimize soil loss and erosion preserving existing coastal water conditions. Permanent sediment control measures will be used once construction is complete if applicable. Since the total area disturbed will exceed one acre, and a National Pollutant Discharge Elimination System (NPDES) permit will be obtained for the Proposed Action.

Prior to Phase I, Well Construction and Pump Installation Permits will be obtained for the Proposed Action. During Phase I testing, if the water quality or quantity is insufficient or there is interference with nearby production wells the Proposed Action would not continue to Phase II.

Upon installation and operation of Phase II, pumping by the Proposed Action will result in lowering groundwater levels in the project area. The Proposed Action is anticipated to withdrawal a maximum of 2 mgd. This is within CWRM's approximately 3.4 mgd DHHL groundwater reservation amount and is approximately 5 percent of the KASA's 38 mgd sustainable yield. If the Proposed Action and other additional proposed wells are developed, the future and existing wells would require an approximate total of 27 mgd. This is about 71 percent of the KASA's sustainable yield as determined by the CWRM, which is within the 90 percent sustainable yield limit. Thus, the Proposed Action would have minimal impact on the KASA or its long-term sustainability.

The DOH has strict requirements for new public drinking water sources. As such, the Proposed Action will comply with HAR §11-20-29 Rules Relating to Public Water Systems. An engineering report will be submitted to the DOH and approved before placing the Proposed Action online within the DWS's North Kona Water System. The report will identify all potential sources of contamination, evaluate alternative controls which could be implemented to reduce or eliminate contamination potential, and include a water quality analysis for all regulated contaminants.

With the passing of Act 125, it is anticipated the single cesspool onsite and nearby cesspools will be converted, upgraded or connected to a sewer system by 2050. To avoid any impacts from possible contamination, the Proposed Action will be developed in compliance with HAR §11-20-29.

Therefore, no short- or long-term adverse impacts to wetlands, surface waters, coastal waters, groundwater use, or groundwater contamination are anticipated during construction or operation of the Proposed Action and no additional mitigation measures are required.

3.5 BIOLOGICAL RESOURCES

A flora and fauna survey was conducted for the Proposed Action on December 1, 2021, by SWCA Environmental Consultants and is attached as **Appendix B**. The following is a summary of the findings.

3.5.1 Flora

The Project Site is an altered landscape composed primarily of three vegetation types: mixed non-native forest, landscaped vegetation, and cultivated fields. A total of 84 plant species were identified. None of the species are native to the Hawaiian Islands nor were the vegetation types and species identified considered unique. No federally and/or state-listed threatened, endangered, or candidate plant species or rare Native Hawaiian plants were observed during the survey effort.

Mixed non-native forest consists of a variety of tree species like opiuma (*Pithecellobium dulce*), Christmas berry (*Schinus terebinthifolius*) and koa haole (*Leucaena leucocephala*) with occasional monkeypod (*Samanea saman*) and breadfruit (*Artocarpus altilis*). This vegetation type contains an understory of non-native grasses like elephant grass (*Cenchrus purpureus*) and woody species like coral berry (*Rivina humilis*). This vegetation type was most common along the water transmission pipelines mauka and makai of the Tank Site but was present within the other vegetation types throughout the entire Project Site.

Landscaped vegetation includes common cultivated species like mango (*Mangifera indica*) and avocado (*Persea americana*) mixed with ornamental species like firecracker plant (*Russelia equisetiformis*) and agave (*Agave attenuate*). This vegetation type was most common near the Well Site and associated water transmission pipelines.

Cultivated fields cover most of the Well Site and consist of cultivated Arabian coffee (*Coffee arabica*) with an understory of low-growing herbaceous species. Portions of the site are also used for growing other fruit trees like papaya (*Carica papaya*), lychee (*Litchi chinensis*) and rambutan (*Nephelium lappaceum*).

3.5.2 Fauna

Fauna observed during the survey consisted entirely of non-native, introduced species that tend to be generalists and occupy a range of habitat types. In total, 11 avian species were observed in the Project Site. Three of these species, the cattle egret (*Bubulcus ibis*), house finch (*Haemorhous mexicanus*) and northern cardinal (*Cardinalis cardinalis*) are protected by the Migratory Bird Treaty Act. While not detected during the survey effort, there is suitable foraging and nesting habitat for the federally threatened and state-listed endangered nēnē, or Hawaiian goose (*Branta sandvicensis*) within the Project Site.

The Asian mongoose (*Herpestes javanicus*) was the only mammal detected however, the feral pig (*Sus scrofa*), rat (*Rattus spp.)* and mouse (*Mus musculus*) are expected to occur. While not detected during the survey effort, there is suitable foraging and roosting habitat for the federally and state-listed endangered ʻopeʻapeʻa, or Hawaiian hoary bat (*Lasiurus cinereus semotus*). Suitable habitat indicates the potential presence of this species onsite. No native invertebrates were observed.

The Project Site does not contain any designated or proposed critical habitat for any threatened or endangered fauna species and is not expected to support any other listed species beyond those previously discussed.

Impacts and Mitigation Measures

The Proposed Action will adhere to BMPs during construction and operation to minimize impacts to flora and fauna resources found at the Project Site. Construction will be implemented in phases to control erosion.

Due to the prevalence of weedy, non-native plant species within the Project Site the following mitigation measures would be implemented as applicable to prevent the unintentional spread or introduction of new invasive species to the site:

- All construction equipment and vehicles would be washed and inspected before first entering the Project Site;
- Regularly washing and inspection of all construction equipment, vehicles and materials at a designated location for the presence of invasive or harmful non-native species by a qualified botanist or entomologist prior to entering the Project Site;
- Regularly clearing equipment, materials and personnel of excess soils and debris;
- Purchasing raw construction materials (e.g. fill) from on-island suppliers to avoid introducing non-native species;
- Maximizing use of native plant species or non-invasive species for landscaping and erosion control; and
- Sterilizing gear such as work boots, cutting tools, and vehicle tires to prevent the spread of fungal pathogens.

Potential impacts to fauna species are anticipated to be short-term and limited to the construction phases of the Proposed Action, which could temporarily displace individuals from the Project Site. However, suitable foraging, nesting and roosting habitat is directly adjacent to the Project and could be used by displaced individuals until construction is completed. To reduce any potential impacts to biological resources, the following avoidance and mitigation measures would be used during the construction and operation of the Proposed Action:

- Conduct biological resource training for regular on-site project personnel to identify special-status species and measures to be taken by crews if found during construction or operation;
- Appropriate speed limits would be posted and implemented within the Project Site where nēnē are known to occur;
- Any nēnē found onsite during construction or operation would be avoided;
- Nesting bird surveys of the Project Site and areas directly adjacent would be conducted by a qualified biologist within 72 hours prior to initiating construction, tree trimming or tree removal activities or after three (3) or more consecutive days of inactivity. If nēnē are observed foraging or loafing onsite during their breeding

season (September through April) a qualified biologist would survey the Project Site for nests;

- If a nēnē nest is found within a 150-foot radius of the Proposed Action, or a previously undiscovered nest is located within said radius after construction has started, all work would cease immediately, and the U.S. Fish and Wildlife Service would be contacted for further guidance;
- While not anticipated to occur in or near the Project Site, no vegetation clearing or construction activities would occur within 1,600 feet of any active ʻIo nests until the nest is determined inactive by a qualified biologist;
- Trees containing confirmed active or inactive ʻIo nests would not be trimmed or removed, as nests may be re-used for consecutive breeding seasons;
- Active nesting sites of other species protected by the Migratory Bird Treaty Act would be avoided until the nest is determined inactive by a qualified biologist;
- While not anticipated to occur near the Project Site, no temporary or permanent standing water will be left onsite to prevent attracting Hawaiian waterbirds;
- Trimming and removal of vegetation greater than 15 feet tall would be avoided during ʻopeʻapeʻa birthing and pupping season (June 1 and September 15); and
- Barbless materials would be used for any construction or operation fencing to avoid entanglement of ʻopeʻapeʻa.

No additional short- or long-term impacts are anticipated. Therefore, no additional mitigation measures are required..

3.6 ARCHAEOLOGICAL RESOURCES AND HISTORIC PROPERTIES

An Archaeological Literature Review and Field Inspection (LRFI) report was completed to identify and evaluate the potential of any historic, cultural, or archaeological resources being found onsite. The LRFI consisted of historical, cultural, and archaeological background research and a field inspection was conducted by Cultural Surveys Hawaiʻi (CSH) on December 17, 2020, to determine the likelihood of archaeological historic properties being affected by the Proposed Action. The LRFI's field investigations were started prior to finalizing the Project Site footprint and water transmission pipeline locations. Once finalized, additional fieldwork was conducted by CSH on April 19, 2022, in the expanded site area. The following is a summary of the LRFI's findings (see **Appendix C**).

The region of Kahaluʻu and Keauhou is one of the most studied areas in Polynesia because of land uses during the pre-European Contact, Historic and post-European Contact periods. Multiple archaeological studies have been conducted near the Project Site documenting the presence of archaeological historic properties consistent with the region's agricultural and politically prominent past.

The traditional importance of the Kahaluʻu—Keauhou region is illustrated by containing several sites listed on the National and State Registers of Historic Places, including the Kahaluʻu Historic District (NRHP #74000713; SIHP #50-10-37-04150). Extensive agricultural complexes located in the inland portions of Kahaluʻu—Keauhou, including the

Project Site, are part of the Kona Field System (SIHP #50-10-37-06601). The proximity of these resources, past studies and their evidence of historic agricultural and settlement use indicate there is potential for subsurface archaeological deposits to be present within the Project Site.

Well Site

A total of four previous archaeological studies have been conducted in the vicinity of the Well Site, as listed in Table 3.4. Of these previous studies, none overlap the project boundaries as shown in Figure 3.16.

Table 3.4: Summary of Previous Archaeological Studies

Reference	Type of Study	Location	Results (SIHP # 50-10-37**** unless otherwise noted)
Hammat 1980	Archaeological reconnaissance	2.8 acres in Keauhou 2, TMK: [3] 7-8- 050:042	No archaeological features encountered; noted some areas of prior bulldozer disturbance
McGerty et al. 1996	AIS	1.5 acres in Keauhou 1, TMK: [3] 7-8- 007:053	No historic properties documented
Moore et al. 2005	AIS	Keauhou 1, TMK: [3] 7-8- 050:047	Documented three historic properties: a short, low wall (SIHP # -24332), and two agricultural complexes (SIHP #s -24333 and -24334); subsurface testing conducted at three features, which yielded kukui nut in one unit and no other cultural materials
Corbin 2008	AIS	8.5 acres in Keauhou 2, TMK: [3] 7-8- 007:005 por. 052	Documented a site complex consisting of three historic ranching/boundary walls, and 60+ terraces; personal communication with Mr. James Sugai confirmed he constructed numerous terraces prior 1958, effectively making these features historic properties; Mr. Sugai built numerous additional features after 1958 such as mounds, modified outcrops, low walls, etc. and as such were not considered historic properties at time of study

Background research indicated no previously recorded historic properties are present, although the Project Site is located within the known limits of the Kona Field System (SIHP # 50-10-32-06601). The field inspection confirmed the Well Site footprint has been completely altered by the development of the existing coffee plantation and associated

driveway. Bulldozer push mixed with scrap metal and other trash, agricultural uses and cleared land were observed.

Most of the actions proposed at the Well Site are along existing roadways, including approximately 0.52 miles of the proposed alignment along Old Māmalahoa Highway (SIHP # -30187) and portions of Bishop Road. The right-of-way of the original Hawai'i Belt Road (i.e. Old Māmalahoa Highway) sometimes contains historic rock walls, culverts, and other historic features associated with the road. While the Well Site and surrounding area has been heavily impacted, two potential historic properties were identified within the site footprint as shown in Figure 3-17.

- Potential feature CSH-4 is a linear, dry stacked stone wall measuring approximately 64 meters long running north to south with an approximate 6-meter-wide break near the midpoint. It is 1.5 meters high and 60-90 centimeters wide. It is located northeast of the proposed Well Site. The wall is constructed of five to eight courses of neatly stacked and faced basalt cobbles and small boulders with core fill of smaller basalt stones. The southern end appears to have been impacted by previous bulldozing activity. No artifacts or other resources were observed on or around the wall.

- Potential feature CSH-5 is a linear, low wall measuring approximately 7 meters long running north to south, 40-75 centimeters high and 50-70 centimeters wide. It is located approximately 13 meters east of CSH-4 within dense vegetation. The wall is constructed of two to five courses of stacked basalt cobbles and small boulders, and appears to be intact and undisturbed. No artifacts or other resources were observed on or around the wall.

Figure 3.16: Potential Historic Features near the Well Site



Left: Photo showing a portion of CSH-4, rock wall; Right: Photo showing CSH-5, rock wall

Figure 3.17: Locations of Previous Archaeological Studies Map – Well Site

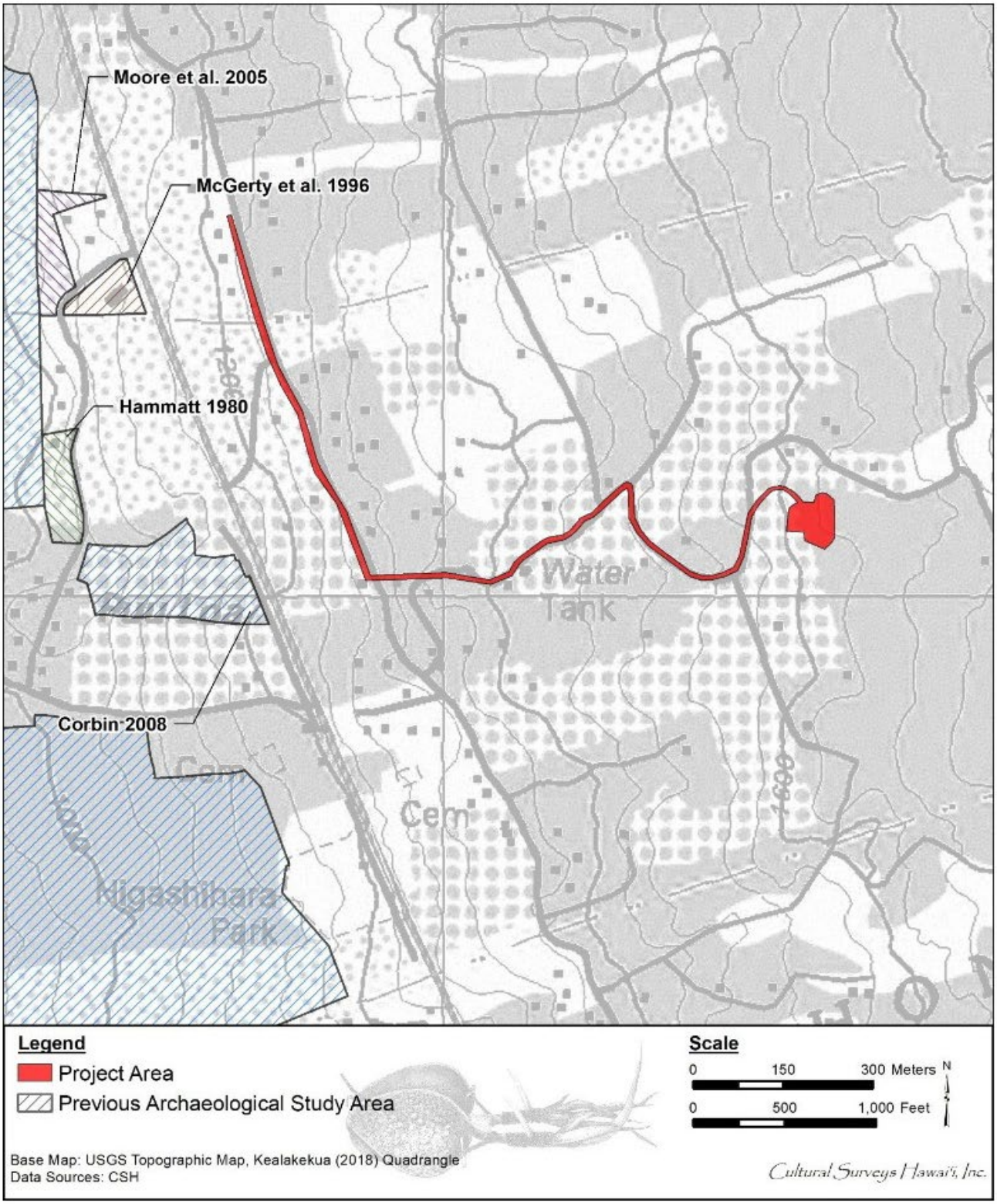
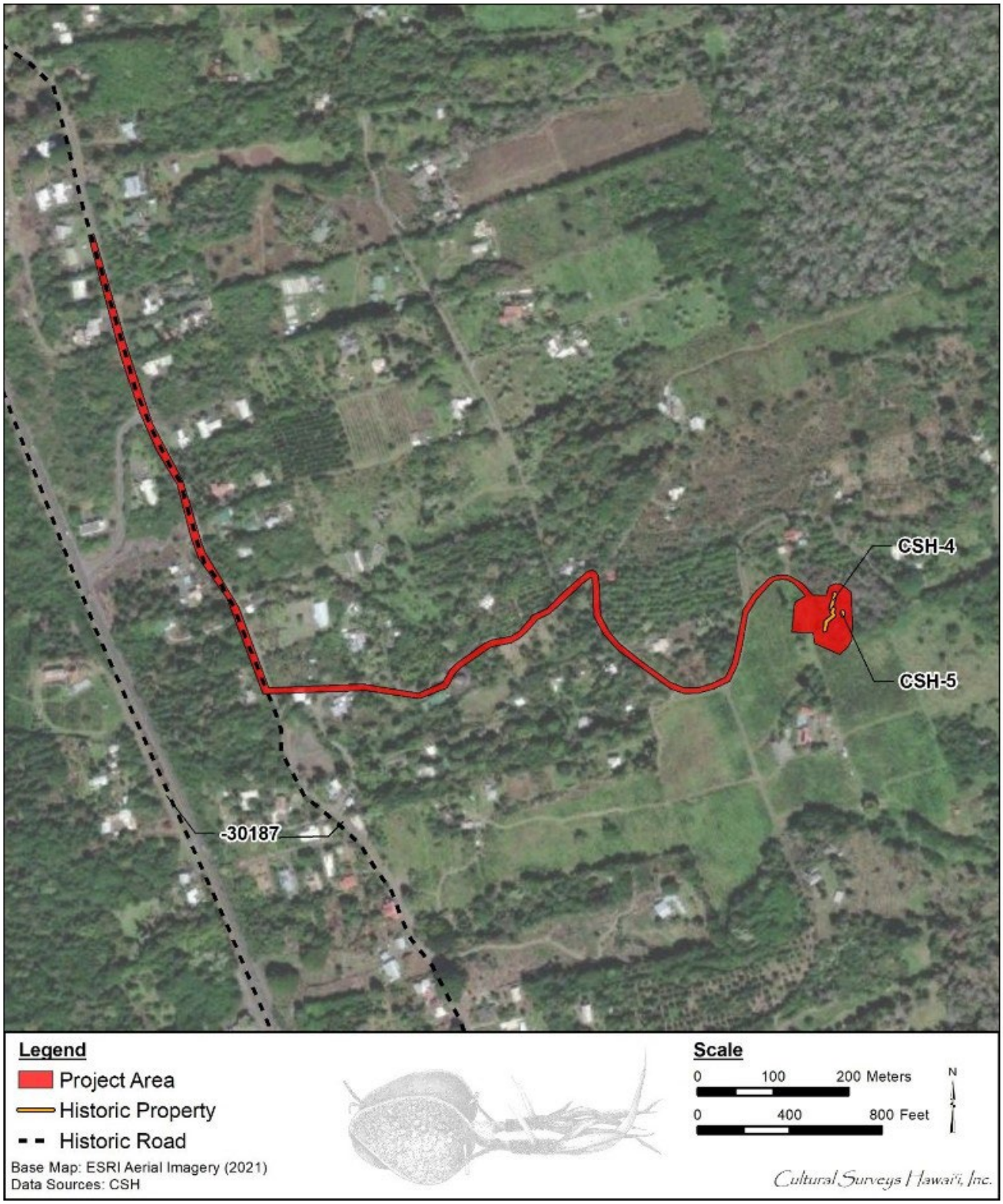


Figure 3.18: Archaeological Sites Encountered in Well Site Area



Tank Site

A total of 15 previous archaeological studies have been conducted in the vicinity of the Tank Site, as listed in Table 3.5. Of these previous studies, six overlap the project boundaries as shown in Figure 3.17.

Table 3.5: Summary of Previous Archaeological Studies

Reference	Type of Study	Location	Results (SIHP # 50-10-37**** unless otherwise noted)
Crozier 1971	Archaeological survey	Kamehameha III Rd, Kahaluʻu and Keauhou 1	Documented six historic properties comprising 366 features; sites not assigned SIHP numbers at the time; documented sites include ʻŌhiʻa cave (later assigned SIHP # -07962); one excavated unit contained late 19th century ceramics
Hammatt and Folk 1980*	Archaeological Inventory Survey (AIS)	751 acres in Kahaluʻu and Keauhou	Documented 320 historic properties comprising thousands of individual features; documented sites include five heiau (SIHP #s -03823, -04621, -04673, -07865, -07807), habitation complexes including possible former village sites (SIHP #s -07829, -07835, -07838), high status residences (SIHP #s -07864 and -07901), lava tubes, burial sites, trails, cart roads, animal enclosures and agricultural feaures.
Bath and Rosendahl 1984*	AIS	HELCO substation, Kahaluʻu TMK [3] 7-8-010: por. 027	Documented six habitation/agricultural sites, including a C-shape, terraces, mounds and walls; testing yielded two C14 dates (AD 885-1790; 1400-1515) and one volcanic rind date (AD 1742-1778).
Rosendahl and Rosendahl 1984	Archaeological Reconnaissance Survey	HELCO substation cooridor, Kahaluʻu TMK [3] 7-8-010: por. 027	Documented seven habitation/agricultural sites, not assigned SIHP numbers; noted presense of historic railroad bed (SIHP # -07214) but did not document it

Reference	Type of Study	Location	Results (SIHP # 50-10-37**** unless otherwise noted)
Hammatt and Brothwick 1985	Archaeological Reconnaissance Survey	28.6 acres in Kahaluʻu, TMK [3] 7-8-010:050	Documented 10 sites including a complex of walls, agricultural terraces, modified outcrops, mounds, and enclosure, and a walled platform; sites not assigned SIHP numbers; noted presence of historic railroad bed (SIHP # -07214) but did not document it
Rosendahl 1986	Archaeological Reconnaissance Survey	14.9 acres in Kahaluʻu, TMK [3] 7-8-010: por. 050	Documented 14 previously recorded sites and five newly recorded sites, not assigned SIHP numbers; sites consisted of agriculture and habitation complexes
Athens 1990a*	Archeological Reconnaissance Survey	22 acres in Kahaluʻu	Documented four newly recorded archaeological site complexes not assigned SIHP numbers, and previously recorded SIHP # -07412 (railroad berm)
Athens 1990b	Archeological Reconnaissance Survey	20 acres in Kahaluʻu	Documented eight previously unrecorded site complexes, not assigned SIHP numbers, and previously recorded SIHP #-07214 (railroad berm); newly recorded sites included agricultural complexes and walls
Lufty and Athens 1991a*	Archeological Reconnaissance Survey	22 acres in Kahaluʻu	Documented one previously recorded historic property (SIHP # -07214, railroad berm) and four newly recorded sites comprising 39 features (SIHP #s -15151, unmodified lava tub; -15152, ranching complex; and -5153 and -15154, agricultural complexes)
Lufty and Athens 1991b*	Archeological Reconnaissance Survey	20 acres in Kahaluʻu	Documented two previously recorded historic properties (SIHP #s -07214, railroad berm, and -15154, agricultural complex), and four newly recorded historic properties (SIHP #s -15155, -15156, -15157, and -15158; agricultural and ranching sites)

Reference	Type of Study	Location	Results (SIHP # 50-10-37**** unless otherwise noted)
Burchard 1992*	Archaeological mapping	Kahaluʻu	Documented lava tube burial cave SIHP # -16045
Burchard et al. 1994*	Archaeological survey and data recovery	24.4 acres Kahaluʻu	Included data recovery at previously recorded SIHP # -15154 (agricultural and limited habitation complex), and AIS-level documentation of new features at previously recorded SIHP # -16045 (agricultural and burial complex) and newly recorded SIHP # -16046 (agricultural complex)
Walker and Rosendahl 1994	AIS	275 acres in Kahaluʻu, TMK [3] 7-8-010:002, por. 004	Documented 251 sites comprising 532 individual features, of which 121 were previously recorded; 29 formal feature types present representing 14 general functional categories
Walker and Rosendahl 2002	AIS	275 acres in Kahaluʻu, TMK [3] 7-8-010:002, por. 004	Update of Walker and Rosendahl (1994) study; notes presence of 254 sites comprising 532 component features
Garrett et al. 2011	AIS	31 acres in Kahaluʻu, TMK [3] 7-8-010:0050 por.	Documented 23 historic properties comprising 204 individual features; one site previously recorded (SIHP #s -07214, -24920 through -24941); 15 historic properties previously recorded (SIHP # -0214 railroad berm and 14 sites with newly assigned SIHP numbers); remaining eight historic properties newly recorded; a wide variety of formal feature types documented, associated with Pre-Contact and historic land use for habitation, agriculture, transportation and ceremony

* indicates the study area overlaps the Tank Site

Background research indicated no previously recorded historic properties are present within the Tank Site footprint. The field inspection confirmed the Tank Site has been completely altered by the development of the existing DWS Kahaluʻu Reservoir and Well Site. The area immediately surrounding the facility is also disturbed. Large deposits of bulldozer push and cleared areas were observed.

Portions of the associated water transmission pipeline makai of the Project Site are within the Kahaluʻu Historic District boundary. No features of this district would be impacted by the Proposed Action as shown in Figure 3.21. However, the associated water transmission pipeline crosses a section of the previously documented railroad causeway/berm (SIHP # 50-10-37-07214) and Hawaiʻi Belt Road (Route 11)/ Old Māmalahoa Highway (SIHP # 50-10-46-30187) makai of the Tank Site.

While the Tank Site and surrounding area has been heavily impacted, three potential historic properties were identified within the Tank Site footprint as shown in Figure 3.22.

- Potential feature CSH-1 is a linear, dry stacked stone wall measuring approximately 15 meters long running north to south, 1 meter high and 60-70 centimeters wide. It is located approximately 1.5 meters upslope of the northwestern corner of the DWS facility fence. The wall is constructed of five to six courses of neatly stacked and faced basalt cobbles and small boulders with core fill of smaller basalt stones. The makai portion of the wall is undisturbed, whereas the mauka portion appears to have been impacted by previous bulldozing activity. No artifacts or other resources were observed on or around the wall.

- Potential feature CSH-2 is a site complex comprised of three individual dry stacked walls intersected by cross-slope walls, which are typical features of the Kona Field System. The complex is in the easternmost half of the associated transmission alignment in an area planted with coffee and shows evidence of other previous disturbances. Some PVC pipes were found on and around the features. It is common for pre-Contact agricultural walls to have been repurposed by post-European Contact coffee plantations, and additional features may be present along the water transmission line route closer to the DWS facility. Additional surveys were recommended to determine the exact boundaries of the feature.

- Potential feature CSH-3 is a linear, dry stacked stone wall measuring approximately 10 meters long running north to south, 1.25 meter high and 60-70 centimeters wide. It is located approximately 5 meters east of the DWS facility fence. The wall is constructed of four to seven courses of neatly stacked and faced basalt cobbles and small boulders with core fill of smaller basalt stones. The wall is mostly intact and undisturbed but obscured by the dense vegetation in the area. No artifacts or other resources were observed on or around the wall.

Photos of these features are included in Figure 3.19.

Figure 3.19: Potential Historic Features near the Tank Site



Top Left: Photo of CSH-1, rock wall, view to northeast
Top Right: Photo of CSH-1, rock wall; note DWS facility in background left
Middle Left: Photo showing a portion of a dry-stacked *mauka-makai* wall at CSH-2, view to west
Middle Right: Photo showing a portion of a dry-stacked *mauka-makai* wall at CSH-2; view to Southwest
Bottom left: Photo

Figure 3.20: Locations of Previous Archaeological Studies Map – Tank Site

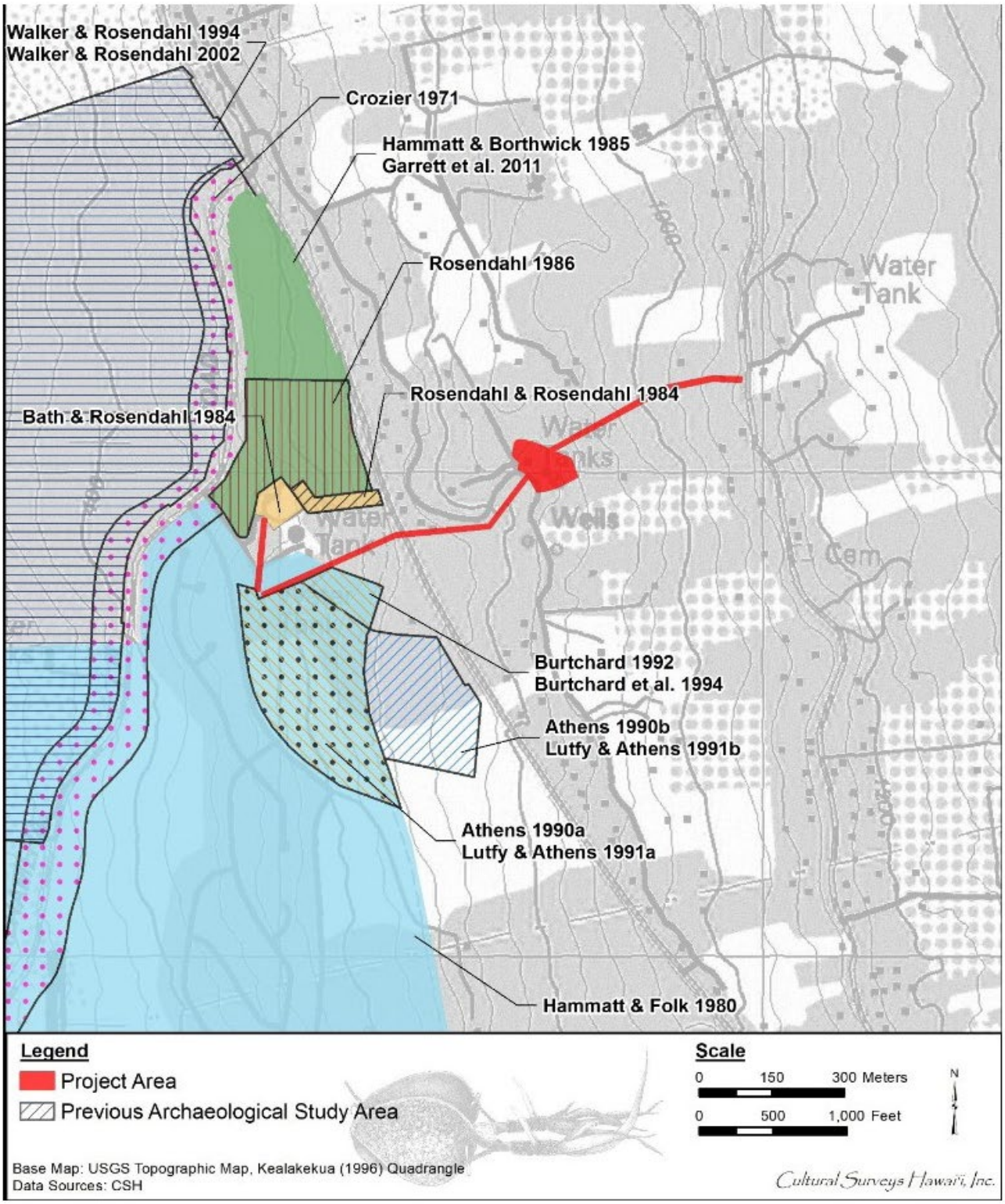


Figure 3.21: Kahalu'u Historic District in Relation to the Project Area

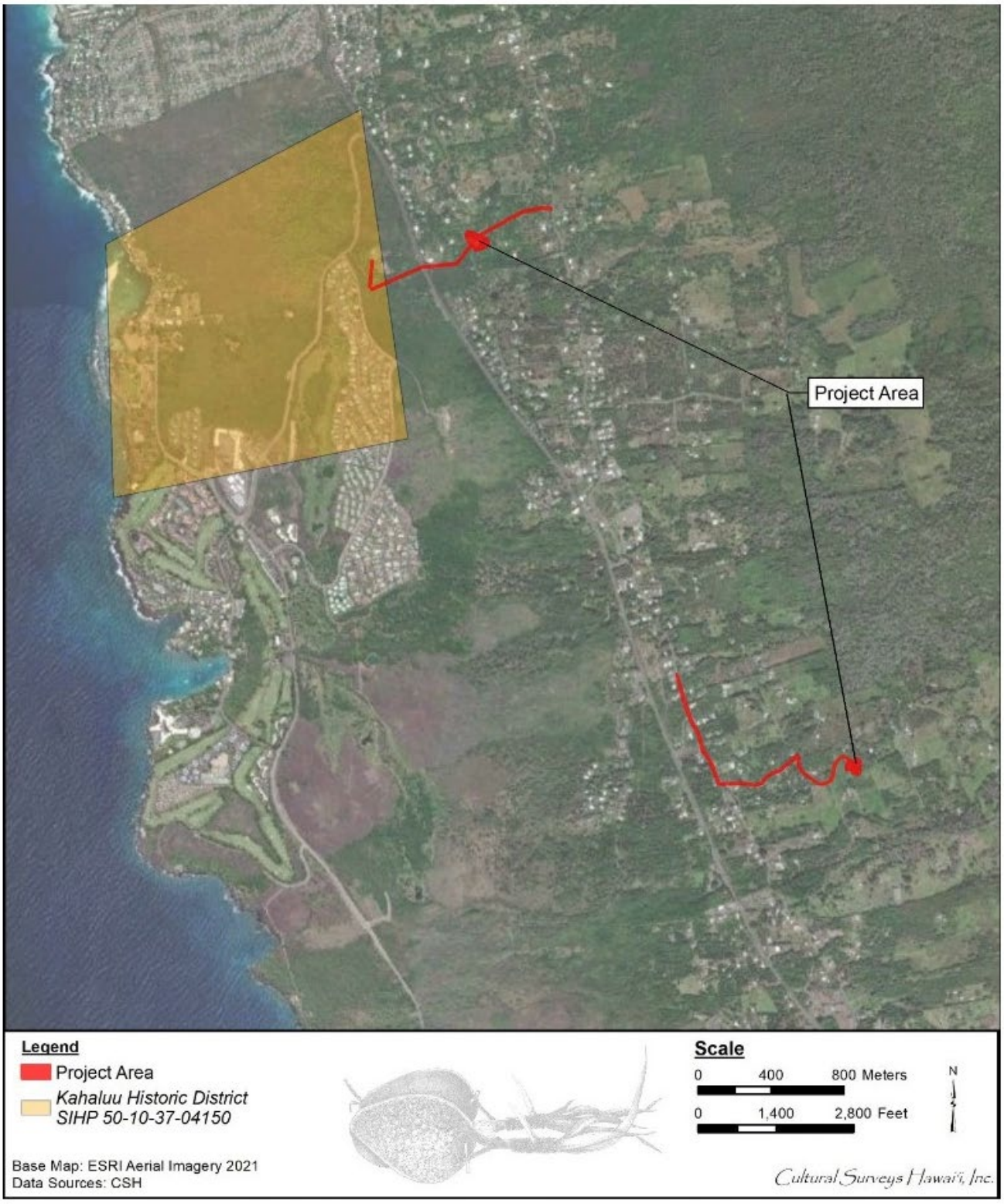


Figure 3.22: Archaeological Sites Encountered in Tank Site Area



Impacts and Mitigation Measures

Five potential historic properties were identified within the Project Site during the LRFI – three within the Tank Site and two within the Well Site. DHHL has initiated consultation with the Department of Land and Natural Resources, State Historic Preservation Division (SHPD) regarding historic preservation and mitigation requirements. Based on the outcome of this consultation, appropriate preservation and mitigation measures will be implemented to avoid or minimize impacts on the identified historic properties.

The Proposed Action will adhere to BMPs during construction and operation to minimize impacts to the historic property resources found at the Project Site. The following mitigation measures would be implemented to prevent or minimize potential impacts on historic, cultural or archaeological resources:

- Conduct cultural resource training as a component of safety training for project personnel before working onsite. Training should include informing crews of the potential for inadvertent cultural finds including archaeological deposits and iwi kūpuna, or human remains.
- Conduct archaeological monitoring during ground disturbance activities during construction phase.
- If any cultural or historic resources are identified during construction activities, all work will cease in that area and the SHPD will be notified pursuant to HAR §13-280-3. A cultural preservation plan for proper cultural protocol, curation and long-term maintenance should be developed as appropriate.
- If iwi kūpuna are identified during construction activities, all work will cease immediately in that area and be cordoned off while the SHPD, coroner and the police department are notified pursuant to HAR §13-300-40. A reinternment plan should be developed as appropriate. As DHHL lands are recognized as tribal lands under the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, any discovery iwi kūpuna must also follow NAGPRA protocols and statutory requirements.

Any additional mitigation measures established during the Ka Pa‘akai Analysis consultation process discussed in Section 3.7, or other consultations would be implemented to further avoid or minimize potential impacts on any historic, cultural or archaeological resources that occur or may potentially be found within the Project Site. No additional short- or long-term impacts are anticipated. Therefore, no additional mitigation measures are required.

3.7 CULTURAL RESOURCES AND PRACTICES

An investigation into cultural resources and practices was conducted in order to comply with HRS §343 and HAR §11-200.1 as well as Article VII, Section 7 of Hawai'i's State Constitution which "places an affirmative duty on the State and its agencies to preserve and protect traditional and customary native Hawaiian rights and confers upon the State and its agencies the power to protect these rights and to prevent any interference with the exercise of these rights" (Ka Pa'akai O Ka 'Āina v. Land Use Commission, 2000). As such, a Ka Pa'akai Framework Analysis was conducted to fulfill the statutory and constitutional obligations of DHHL in considering the Proposed Action.

HISTORIC OVERVIEW

The Project Site is located within the moku (district) of North Kona. The ahupua'a of Keauhou and Kahalu'u have typically been thought of as a unit, both in traditional Hawaiian times and by subsequent researchers. During the pre-European Contact and early post-European Contact periods, Kona was known to support a relatively large population, was the residence of chiefs, and the center of political consolidations. The traditional Hawaiian political authority was centered in the Kailua-Keauhou area from at least the 15th century until the reign of Kamehameha I. This is consistent with many traditional mo'olelo, mele and ka'ao associating great Hawaiian chiefs with the region.

Archaeological evidence suggests settlement in Kona began around AD 900, initially focused on marine resources near Keauhou and Kahalu'u Bay. By AD 1300, agriculture expanded inland, giving rise to the Kona Field System. This development was driven by population growth and political shifts that emphasized Kona's importance.

In the early 1500s, Chief 'Umi-a-Līloa established his court in Kona, building the Pā-o-'Umi heiau above Kahalu'u. His grandson, Lono-i-ka-makahiki, resided in a fortified coastal complex in Kahalu'u. During this time, lava tubes like 'Ōhi'a Cave were adapted for refuge, and high-status habitation clustered near Kahalu'u Bay's reefs and ponds.

By the late 1700s, Chief Kalani'ōpu'u and later Kamehameha I resided in the area, engaging in cultural practices like hula and surfing. The region's many heiau were rededicated to secure divine favor. Kamehameha's court remained in Kahalu'u for about a year after returning to Kona in 1813.

Following Western contact, Keauhou's population declined due to disease and migration to Kailua and Ka'awaloa. The kapu system's abolition in 1819 further reduced activity at local heiau. That same year, Kekuaokalani opposed Liholiho's reforms and was defeated in the Battle of Kuamo'o at Lekeleke.

In 1823, missionary William Ellis recorded 19 heiau and 610 houses between Kailua and Keauhou, and 443 houses between Keauhou and Ka'awaloa. Keauhou had 135 houses and hosted 150 people for a sermon. Ellis noted a steppingstone trail across lava fields and described hillside plantations. Missionaries regularly visited the area, drawing large crowds.

During the 1848 Māhele, Victoria Kamāmalu received Kahalu'u and Keauhou 1, while Lot Kapuāiwa (later Kamehameha V) received Keauhou 2. Numerous kuleana claims were made, especially near the bays and along the upper ala loa. Some awards overlapped the project

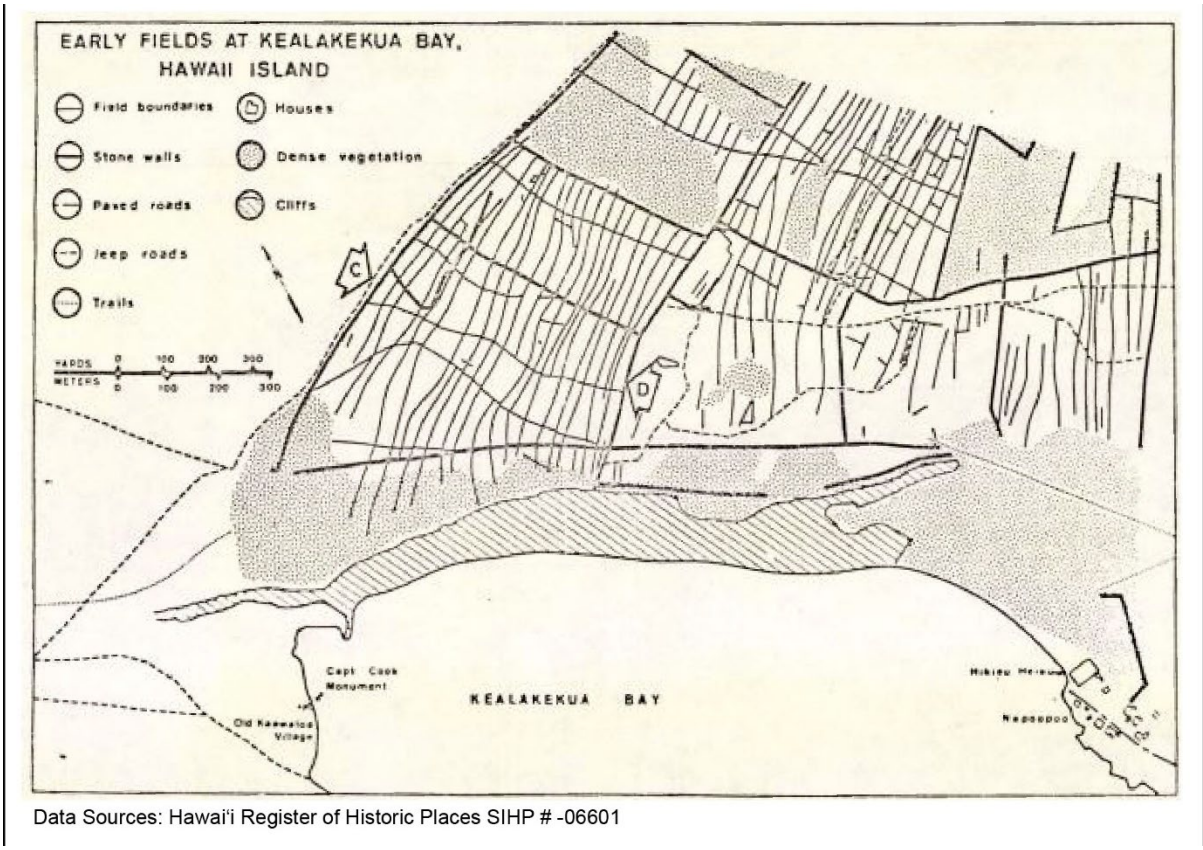
area and were used for agriculture and habitation, including citrus cultivation and native tree growth.

In the late 1800s, coffee cultivation expanded in upland areas, often replacing kuleana plots. Chinese and Japanese immigrants became key growers. Keauhou's population dropped from 72 in 1857 to 24 in 1881. Despite this, Keauhou's relative importance grew as Kealakekua Bay declined. The Bishop Estate inherited the lands in 1889.

By the early 1900s, Keauhou was considered remote, with limited infrastructure. Sugar cultivation was briefly attempted in Kahaluʻu and Keauhou. During this time, 11 miles of narrow-gauge railroad were installed, extending south from the mill in Kailua-Kona and through the project area environs, however plans to extend the railway throughout the region fell through. The early 20th century saw a boom in the coffee industry in the Kona uploads, with small towns springing up along Māmalahoa Highway. Coffee and cattle continued to dominate the economy in Kahaluʻu and Keauhou until the late 1960's when tourism began to flourish.

Today, coffee farming and commercial agriculture continues in upland areas, while Keauhou Bay and the surrounding resort properties remain a significant tourist draw, an effort is being made by Kamehameha Schools to return Bishop Estate lands to culturally appropriate educational venues.

Figure 3.23: Kona Field Diagram



Data Sources: Hawai'i Register of Historic Places SIHP # -06601

TRADITIONAL OR CUSTOMARY PRACTICES AND TRADITIONAL CULTURAL PROPERTIES

Hawaiian oral traditions are passed down through word of mouth from one generation next and record details of Hawaiian history such as the people's connection to the land, their lifestyle, and traditional land tenure. These traditions can come in the form of songs, proverbs, sayings, stories, genealogies, or historic newspaper articles. The following moʻolelo, or stories, reference the area's water features and cultural practices.

The Ka Paʻakai Analysis Framework highlights the traditional and customary practices noted to occur within the project area ahupuaʻa and the larger landscape of Kona Akau that have originated from the select moʻolelo and kaʻao detailed in the report. The summary is framed by the last stanza of the ancient Hawaiian mele (chant), He Mele no Kāne, which is about the Hawaiian God Kāne, who shape shifts into water as one of his forms – "he wai e ola! Water is life. From this framing, the traditional and customary practices and traditional cultural properties are discussed and organized by the many manifestations of water sources that surfaced when analyzing the select moʻolelo and kaʻao presented in the report (See **Appendix D** for the full stories and context). A brief summary is included below:

- Cloud Formations – From the moʻolelo and ʻōlelo noʻeau reviewed, several practices are revealed to occur in the study area: of nānā ao (observing clouds) or kilokilo (to observe and forecast), ʻuala cultivation, and specifically, makawela method of cultivation.
- Forest and Streams – From the moʻolelo and ʻōlelo noʻeau reviewed, water in the form of streams, as well as drinking water derived from the niu grove of Helani come to surface. Practices associated with these accounts convey that the practice of gathering freshwater, agricultural practices, maiʻa cultivation, and kalo cultivation occurred in the study areas.
- Rains - The recollection of inoa ua (rain names) detail that the Palahī Puaʻa, Kēhau, Nāulu, ʻAwa, ʻAwaʻawa, Kualau, Nahunahu, and Noe rains sources of wai ua that belong to the study areas and broader Kona Moku, each with various characteristics and qualities. In the account detailed by Malo, the Nāulu rain is associated with agricultural practices of ʻuala cultivation (Malo in Akana and Gonzales 2015:206; Kamakau 1869:1 from Nohopapa, 2024).
- Springs – From the moʻolelo reviewed, it is recorded that freshwater springs are significant features associated with the study area–the pūnāwai found in the uplands of Kahului, the spring associated with Helani in Kahaluʻu, the Waikuʻi spring at Kahaluʻu, and the Waiakekea spring near Waiʻaha and Kahului.
- Additional Practices: Agriculture and Fishing – Moʻolelo and historical accounts demonstrate that agricultural practices and religious ceremonies associated with agriculture were significant traditions that occurred in Kona. Regarding fishing practices, ʻEka is a named wind of Kona whose presence is an environmental indicator telling of signs optimal for fishing.
- Additional Practices: Recreation - Ka-Miki's moʻolelo tells a story of a game known by the name Hinakahua, and is said to be located in the Kahelo plains of Puapuaʻa Ahupuaʻa. The games associated with Hinakahua and therefore the broader ahupuaʻa

of Puapuaʻa are maika (bowling), mokomoko (wrestling and boxing), leʻaleʻa (pleasurable pastimes), and hoʻopāpā (contest of wit and strength), (Maly 1999:11 from Nohopapa, 2024).

- Additional Resources – Moʻolelo reveals that several were available in the area, which is telling of the potential of associated practices that may have occurred in the study area. The resources mentioned include: ʻalā stones, loulu palms, and kauila trees.

The Ka Paʻakai Framework Analysis incorporates testimony from the State Boundary Commission representing all ahupuaʻa that intersect the project area, along with references to Land Commission Awards (LCAs) granted within those ahupuaʻa. While no LCAs were issued directly within or adjacent to the Project Site, traditional and customary practices suggest that the area's resources may have been accessed and utilized historically. To support this, the analysis includes selected excerpts from the Māhele Award Books, featuring Native Testimony, entries from the Native Register, and relevant Land Commission Awards, offering insight into historical land use and cultural connections.

COMMUNITY CONSULTATION

On April 18, 2024, a kick-off meeting was held at the Kamehameha Schools Kahaluʻu Manowai (Ma Kai) site to share information about the Ka Paʻakai Framework Analysis for the proposed DHHL water source development project. Twenty-five individuals attended the public meeting and shared their contact information for future project updates. Between July and October 2024, individual consultation efforts were conducted to gather and summarize community manaʻo and data regarding local resources and customary practices. For this individual consultation effort, thirty-four individuals were contacted with thirteen committing to an interview. Interview format options included in-person, phone calls, or online interviews. Eleven individuals were unable to participate in the consultation process. Findings from the community consultation process have been anonymized and it is important to note that intellectual property shared through the process cannot and should not be reproduced, applied to other projects or studies, or utilized without free, prior, and informed consent are included in **Appendix D** and summarized in the Ka Paʻakai Framework Analysis section below.

Interview participants were prompted with three questions to fit the Ka Paʻakai Framework. The questions are as follows:

1) What are the valued cultural, historical, or natural resources in the project area and the extent to which traditional and customary native Hawaiian rights are exercised in the area?
2) What is the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action?
3) What feasible action(s), if any, to be taken to reasonably protect any identified cultural, historical, or natural resources, and exercise of traditional and customary native Hawaiian rights in the affected area?

The framing of community consultation in alignment with the Ka Paʻakai Framework allowed for the manaʻo documented, including potential impacts and mitigation recommendations, to be integrated into the analysis below.

3.7.1 Ka Paʻakai Framework Analysis

The court case *Ka Paʻakai o Ka ʻĀina v. State of Hawaiʻi Land Use Commission (2000)* established the fiduciary responsibility of state agencies to preserve and protect traditional and customary native Hawaiian rights pursuant to Article VII, Section 7 of the State of Hawaiʻi Constitution. The case upheld that the state and its agencies are obligated to protect the reasonable exercise of customary and traditional native Hawaiian rights to the extent feasible and are obligated to make an assessment of the impacts of these practices. The assessment must be independent of the developer or applicant and must include the following three factors, known as the 'Ka Paʻakai' framework:

1) What are the valued cultural, historical, or natural resources in the project area and the extent to which traditional and customary native Hawaiian rights are exercised in the area?
2) What is the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action?
3) What feasible action(s), if any, to be taken to reasonably protect any identified cultural, historical, or natural resources, and exercise of traditional and customary native Hawaiian rights in the affected area?

In 2024, a Ka Paʻakai Framework Analysis was conducted by Nohopapa Hawaiʻi, LLC for the Proposed Action. This analysis is summarized below and the full report is included as **Appendix D**.

1) WHAT ARE THE VALUED CULTURAL, HISTORICAL, OR NATURAL RESOURCES IN THE PROJECT AREA AND THE EXTENT TO WHICH TRADITIONAL AND CUSTOMARY NATIVE HAWAIIAN RIGHTS ARE EXERCISED IN THE AREA?

The Ka Paʻakai Analysis acknowledges that it is unreasonable to assume it is possible to inventory all traditional and customary native Hawaiian rights being exercised in a single area. To address the challenges of assembling an inventory of customs and valued resources in an area, and to relieve the burden from the community to come forward in a tight timeframe and under the assumption of un-requited knowledge sharing, the analysis, approaches the inventory through: (1) early and meaningful consultation; (2) primary source research; (3) the understanding that if a resource exists or can be restored then the right or practice exists; (4) consultation is an ongoing process that agencies compiling with Ka Paʻakai will continue to engage in.

The inventory findings with respect to the practices and associated resources in and around the Gianulias study area are organized under the following themes:

- Bird Catching
- Forestry and Hana Waʻa
- Mahi ʻai ʻana – Cultivation

- Trails and Connectivity
- Lawaiʻa & Waʻa (Paddling, Sailing, Voyaging)
- Kilo and Weather – Environmental Indicators
- Mea Wai - Water Resources and Collection
- Other Practices, including Hana Noʻeau, Beliefs, and Spirituality (not already included above)

The full inventory is included in **Appendix D.**

2) WHAT IS THE EXTENT TO WHICH THOSE RESOURCES – INCLUDING TRADITIONAL AND CUSTOMARY NATIVE HAWAIIAN RIGHTS – WILL BE AFFECTED OR IMPAIRED BY THE PROPOSED ACTION?

Hawaiian culture and traditional practices are rooted in an understanding that ʻohana (family) encompasses the natural world and there is no separation between the people and the land (Nohopapa, 2024). Because the land is part of the ohana, traditional Hawaiian customs and practices emphasize respect and care the ʻāina (land) and surrounding resources (Forman and Serrano, 2012 from Nohopapa, 2024). As such, traditional and customary practices often rely on resources – whether cultural, historical or natural – and it is important to understand that impacts these resources may also result in cultural impacts. Overall, interview participants feel that the current methods for water development do not allow for the continued care of resources, the traditional and customary Native Hawaiian practice of caring for wai (water) and Mālama ʻĀina.

Bird catching was extensively referenced in and above the study areas, caves, trails, springs and even specific forests, woods, and aʻa areas were discussed. Bird catching was for food and for hulu used in many hana noʻeau. Although bird catching is not viable now as a practice because of the scarcity of native bird species, the practice of Mālama ʻĀina so that resources are there when needed could be impacted.

Many springs, waterholes, and caves were referenced in consultation, and many were named in archival research through land testimonies and some moʻolelo. It is likely that some of these resources are located in the study areas and water source development may impact the downslope water features near the coast or offshore. Ma uka to ma kai connectivity of water was also a common theme in the analysis. Impacts could also include access for kanaka to gather wai from the study area or the uplands above for hoʻokupu and other traditional uses.

Historic records from the Boundary Commission also identified a burial cave in the uplands. Because one was named, there is a potential that more burials exist in the vicinity. It is a traditional practice not to speak of one's ancestors with strangers and many burial locations have been forgotten in ʻohana or intentionally un-shared. No burials were identified through the LRFI for this project, however access to caves above the study area may be impacted.

General concerns were shared over the sustainability of Kona's freshwater aquifer, which is under pressure from new water wells supporting expanding neighborhoods, resorts, golf courses, and cesspools. Consultation emphasized that new water distribution infrastructure must be done with extreme care to avoid disturbing significant cultural resources in the area. Drilling without a full understanding of the cultural and environmental context could negatively impact the ahupuaʻa system, the ocean, and the aquifer itself. Some noted that changes in water levels are already visible, particularly in Kaloko-Honokōhau, where water

is leaking into Honokōhau Harbor. This environmental stress is also reflected in the declining presence of native plants, animals, and fish.

3) ***WHAT FEASIBLE ACTION(S), IF ANY, TO BE TAKEN TO REASONABLY PROTECT ANY IDENTIFIED CULTURAL, HISTORICAL, OR NATURAL RESOURCES, AND EXERCISE OF TRADITIONAL AND CUSTOMARY NATIVE HAWAIIAN RIGHTS IN THE AFFECTED AREA?***

Feasible actions by DHHL to protect Native Hawaiian rights include the following:

- DHHL will uphold its mandates as prescribed by law.
- DHHL will site water source development within the same ahupua‘a as it will be consumed whenever possible.
- DHHL and its beneficiaries want to support other Kona communities in their water independence. Efficiency and conservation measures in areas that are importing water are critical in appropriately valuing the resource and respecting the communities that are exporting water.
    - Conservation & efficiency measures for transportation, storage and consumption.
    - Water recycling.
    - Water conservation collaboration/partnership in public awareness campaign.
- Research, studies and monitoring should be planned for and funded that will be used to inform mitigation. Research and studies should be culturally informed. Appropriate thresholds should be identified and upheld.
    - Regional monitoring program with benchmarks and actions tied to those benchmarks.
    - The design of monitoring plans and the identification of benchmarks and actions should be culturally and community informed.
    - Propose management options if the trend is towards detrimental effects.
- Frequent, meaningful, and accessible updates regarding research, studies and monitoring practices should be available to stakeholders. DHHL will consider the formation of a hui open to stakeholders to advise water-related decision-making and aid in outreach to stakeholders at large.
- DHHL will make efforts to encourage more beneficiaries and members of the native Hawaiian community to be involved in the Boards of Water Supply meetings and to be members on the Boards of Water Supply so these important stakeholders are able to have more authority over water use.
- DHHL should commit financially and administratively to supporting community-managed water resource management.

- DHHL will advocate for and participate in the update of the Water Use and Development Plan for Hawai‘i County.
- DHHL will support and advocate for Commission on Water Resource Management (CWRM) analysis of water availability and revised sustainable yields, including a process that has substantial opportunity for public input.
- DHHL will advocate for CWRM to share more rigorous summaries of existing state of knowledge as published.
- DHHL will advocate for and participate in the update of the Statewide Framework for Updating the Hawaii Water Plan (Framework). The Framework was developed to provide guidance in the integration of the various components of the Hawaii Water Plan and to give additional direction to the various agencies responsible for the preparation of its constituent parts. This Framework was created in 2000 and is in need of update and revision.
- DHHL will aid in funding mālama ‘āina/watershed management efforts in affected ahupua‘a to increase water recharge and to allow for mālama of places and areas critical for the continuation of native practices.
- DHHL will create a clear pathway for long-term access for native rights and customary practices on DHHL’s lands and will look into its current ROE/land disposition process for activities such as mālama ‘āina and stewardship.
- DHHL will collaborate with stakeholders in the creation of a preservation plan for Kealakowaa, the protection of cultural, historical and natural resources associated with the Kona field system, and stewardship of the Kona upland forests. These efforts include contributions or resources in other areas or in the project parcel itself, towards the restoration of these valued resources in collaboration with cultural practitioners, lineal descendants, native tenants, beneficiaries, etc.

With consideration of the Ka Pa‘akai Framework Analysis and by implementing mitigation measures to ensure the protection of traditional and cultural rights and practices, the Proposed Action is not anticipated to have a significant impact on cultural resources and practices.

3.8 SCENIC AND AESTHETIC RESOURCES

3.8.1 Existing Conditions

The Project Site is not in or near visually sensitive areas or areas of high scenic values.

Well Site

When standing along Bishop Road and looking mauka, the predominate view consists of rows of cultivated coffee trees forming the backdrop. The makai view consists of scattered landscaping and cultivated agriculture.

Tank Site

When standing along Walua Road and looking mauka, the predominate view consists of rows of mixed non-native forest and the existing DWS water storage tanks and associated infrastructure. Looking makai, the views continue to be of mixed non-native forest.

Impacts and Mitigation Measures

The Proposed Action would not have substantial adverse impacts on visual resources. The proposed water storage tanks are the tallest proposed structures at each location, with maximum heights of less than 40 feet. The storage tanks will require cutting into the site's slope and some grading, which will limit their visibility from viewing positions makai of their location. The Well Site tank would be surrounded by remaining rows of coffee trees consistent with the existing conditions to further minimize any potential visual impacts. The Tank Site currently contains three existing water storage tanks, so the Proposed Action would be consistent with the site's existing views. Therefore, no short- or long-term impacts are anticipated, and no additional mitigation measures are required.

3.9 AIR QUALITY

3.9.1 Existing Conditions

During volcanic eruptions, volcanic fog or "vog" may appear over the Kona coast. Vog produces emissions that include carbon dioxide, particulate matter and sulfur dioxide which can cause health related problems. The last volcanic eruption ended in 2018. Generally, the effects of vog are noticeable but do not generally exceed state and federal air quality standards near the Project Site. The nearest air quality monitoring station to the Project Site is in Kailua-Kona and air quality in the region is generally good (State of Hawai'i, Department of Health, n.d.).

Well Site

The current land use at the Well Site is a coffee farm and small-scale agriculture surrounds the area. The use of vehicles and agricultural equipment emit dust and other air pollutants. There are generally not more than a few vehicles operating at any given time, therefore air pollution generated by the current conditions is minor.

Tank Site

The current land use at the Tank Site is the DWS Kahalu'u Reservoir and Well Site and residential surrounds the area. There are generally not more than a few vehicles or other water system equipment operating at any given time, therefore air pollution generated by the current conditions is minor.

Impacts and Mitigation Measures

The Proposed Action is not expected to have adverse effects on air quality or impact potential for volcanic eruptions. During the construction phase, vehicles, machinery, and earthwork may emit fugitive dust and air pollutants. Emissions generated during construction would be short-term, temporary, and confined to the Project Site as applicable. To minimize any

potential impacts, construction activities will implement BMPs to contain fugitive dust to the Project Site per HAR §11-60.1 *Air Pollution Control*. BMPs may include:

- Watering of exposed soils or stockpiles;
- Rapid covering or landscaping of bare areas, including slopes; and
- Using dust mats or constructing dust barriers or fencing.

No noxious odors are anticipated during the construction of the Proposed Action. If any were inadvertently produced, they would be consistent with the operation of construction vehicles and machinery.

At the end of construction, air quality would revert to baseline conditions as the operation of wells and pumps will be powered by electricity which does not directly produce air pollutants. In the event of a power outage, an on-site diesel-powered generator will supply electricity. The use of backup generators would lead to limited and short-term air pollution, confined to the Project Site. Use of diesel-powered generators in this capacity is anticipated to be infrequent and for a short duration of time only. Following the completion of the Proposed Action, no adverse effects are anticipated. Therefore, no additional mitigation measures are required.

3.10 SOCIOECONOMIC CHARACTERISTICS

As described in Sections 3.2 and 3.6, the Project Site and surrounding lands have historically been used for residential purposes and small-scale agriculture. Table 3-6 presents detailed demographic and socioeconomic data for the Kealakehe and Hualālai Census Tracts—encompassing Laʻi ʻŌpua and the Project Site, respectively—as well as for Hawaiʻi County overall, as illustrated in Figure 3-21.

Kealakehe Census Tract 215.04, which includes Laʻi ʻŌpua and other Department of Hawaiian Home Lands (DHHL) properties, is characterized by a significantly higher proportion of Native Hawaiian and Pacific Islander residents compared to both the Hualālai Tract and the County. This tract also has a notably younger population, with a larger share of residents under the age of 18. These demographic patterns may help explain the lower percentage of residents with a bachelor's degree or higher. Additionally, Kealakehe reports lower median household incomes and higher unemployment rates than the other two areas.

In contrast, Hualālai Census Tract 215.02 has a higher proportion of white residents, an older median age, and a higher median household income. It also exhibits lower unemployment and poverty rates compared to Kealakehe and the County. Both census tracts, however, report lower poverty rates than the County average.

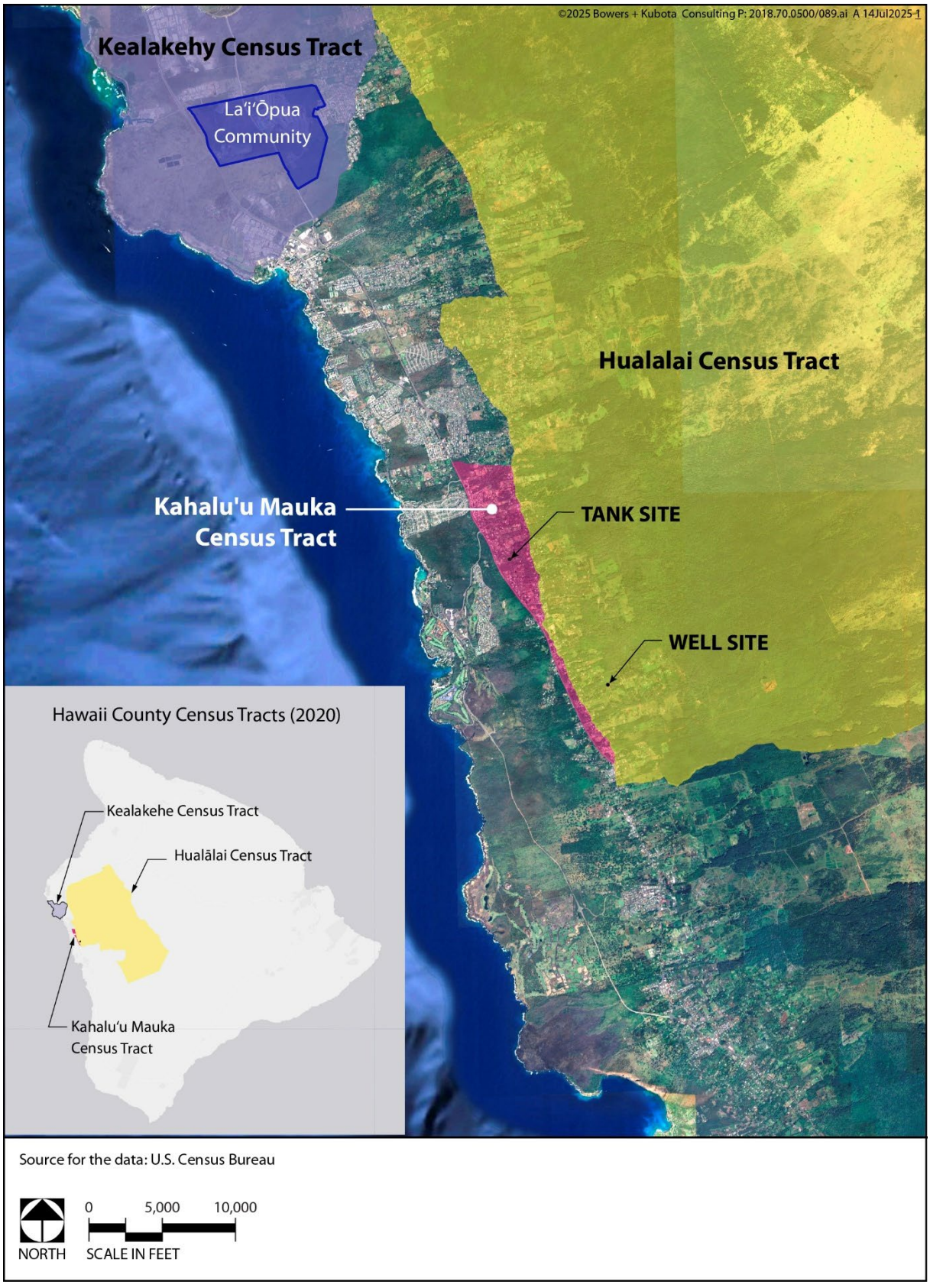
Currently, the Project Site is operated as a coffee farm. The nearest concentration of retail businesses is located approximately half a mile south along Māmalahoa Highway. Economic activity within Laʻi ʻŌpua remains limited, with only the Community Center and one residential phase completed; the remainder of the community is still under development. A few small farms and vacation rentals are located about two miles north of the community. The primary commercial hub for the region is Kailua-Kona Town, situated roughly four miles west of the Project Site and Laʻi ʻŌpua.

Table 3.6: Socio-Economic Profiles at Kealakehe and Hualālai Census Tracts

	Census Designation			
	Kealakehe Census Tract (215.04) La'i 'Ōpua	Hualālai Census Tract (215.02) Well Site	Kahalu'u Mauka Census Tract (215.11) Tank Site	Hawai'i County
Resident Population	6,013	4,815	2,266	201,350
Median age (years)	32.5	46.9	42.6	42.8
Population under 18	30.90%	19.60%	19.50%	21.40%
Population over 65	10.10%	20.40%	25.10%	20.90%
White+	29.50%	71.40%	54.90%	55.60%
Native Hawaiians and Pacific Islanders+	59.80%	38.60%	7.32%	33.50%
Asian+	35.60%	35.50%	46.80%	43.80%
Civilian unemployment rate	10.90%	3.50%	4.70%	6.30%
People below the poverty level	15.60%	10.30%	4.50%	10.30%
Language other than English	36.00%	19.00%	20.30%	26.90%
Speaks English less than very well	9.80%	4.80%	8.30%	8.80%
Median household income	$68,125	$74,714	$76,159	$65,401
Housing units	1767	1938	730	88624
Owner occupied	51.70%	61.40%	72.30%	69.30%
Average household size (persons)	3.4	2.9	3.25	2.76
Median value of owner-occupied unit	$405,100	$748,300	$545,800	$364,100
Bachelor's degree or higher	15.30%	27.60%	32.60%	29.50%

Source: US Census Bureau (2023). Hawai'i Demographic Profiles and DHC Data, 2020 Decennial Census; Hawai'i 2019-2023 ACS 5-Year Estimates by Census Tracts (US Census); US Census Bureau Hawai'i Population Characteristics 2019; + alone or in combination

Figure 3.24: Census Tracts and Project Site/ La‘i ‘Ōpua Map



Impacts and Mitigation Measures

The Proposed Action will not have a direct impact on population change at the Project Site, however, the water credits produced may impact population change in the Kealakehe Census Tract. North Kona has been designated within the County of Hawai'i's General Plan as an area that can accommodate additional population growth and La'i 'Ōpua's proposed residential, community and commercial lots are consistent with the General Plan's Urban Expansion and Low-Density Urban designations.

The Proposed Action is an allowable land use (see Section 3.2) and is unlikely to alter the socioeconomic profiles in or around the Project Site, aside from temporary and relatively minor construction employment and expenditures. Up to three (3) acres of the Well Site will be converted for the Proposed Action; the remainder of the Well Site will continue to operate as a coffee farm during construction and operation and the Tank Site will continue to operate as a water storage and production location for the North Kona Water System.

3.11 ACOUSTIC ENVIRONMENT

3.11.1 Existing Conditions

The DOH requires contractors engaged in construction activities to comply with HAR §11-46 Community Noise Control, which defines the maximum permissible sound levels that can be produced during construction depending on the surrounding land use as shown in Table 3-7. The Project Site falls within Class C and acceptable stationary noise levels are 70 dBA. This is comparable to the sound levels produced by a residential vacuum cleaner.

Table 3.7: Hawai'i Administration Rules §11-46 Noise Limits

Zoning District	*Noise Limit (in dBA)**	
	Daytime (07:00-22:00)	***Nighttime (22:00-07:00)***
Class A: Areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.	55	45
Class B: All areas equivalent to lands zoned for multifamily dwellings, apartment, business, commercial, hotel, resort, or similar type.	60	50
Class C: All areas equivalent to lands zoned agriculture, country, industrial, or similar type.	70	70

* dBA stands for A-weighted sound levels. This measures the frequencies of sound a human ear can hear, not the level of volume from a sound.

Impacts and Mitigation Measures

The Proposed Action would have short-term impacts on the acoustic environment of the Project Site. Noise created would vary according to the action type (e.g. well drilling, accessory structure construction, grading and grubbing, excavation for water transmission lines, well operations, etc.) and project phase and is expected to exceed the property line noise limits. Impacts from noise at the Tank Site would be less than those of the Well Site, as there is no drilling proposed at this location.

To minimize impacts from noise, a Community Noise Permit would be obtained for the Proposed Action prior to initiating construction activities. The contractor would work with the DOH Indoor and Radiological Health Branch in accordance with the provisions of HAR §11-46 to develop and implement mitigation measures to reduce noise generated during the Proposed Action as part of the permit process. Possible mitigation measures may include:

- Noise-attenuating equipment, such as mufflers or silencing equipment;
- Insulating or enclosing motors during use;
- Installing portable noise barriers;
- Restricting hours of operation;
- Activity restrictions during night work; and/or
- Using the smallest size power equipment practicable during construction.

Well drilling may require at times a 24-hour operation schedule, and this may exceed nighttime sound levels set by HAR §11-46. A public informational meeting would be held for the affected residents and property owners near the Well Site, and a noise variance will be sought from the DOH following consultation with neighboring residents if necessary.

Periodic inspections and maintenance work are expected to occur during operation of the Proposed Action, however any noise generated from this would be consistent with the existing conditions on-site at both locations. Noise generated by the pumps is expected to be minimal as they are electrically operated and located at the bottom of the encased production wells and the water storage tanks do no generate noise above ambient levels. The other accessory structures are expected to emit little to no additional noise. Therefore, no long-term impacts to the acoustic environment are anticipated after completion of the Proposed Action and no additional mitigation measures are required.

3.12 TRANSPORTATION AND TRAFFIC

3.12.1 Existing Conditions

Well Site

Access to the Well Site would be from an existing dirt roadway off Bishop Road. Bishop Road is a narrow two-way roadway connecting the farms and residences in the area to Māmalahoa Highway that terminates at a farm approximately 1 mile mauka of the site. Traffic volumes on Bishop Road are low with no pedestrian lanes or crossings are present. No fixed bus routes are present. Access within the Well Site will be via an existing dirt road that may be further developed for the Proposed Action.

Tank Site

Access to the Tank Site would be from the existing access road off of Walua Road used to access the Kahaluʻu Reservoir and Well Site. Walua Road is a narrow two-way roadway that parallels Hawaiʻi Belt Road (Route 11). The maximum traveling speed on Walua Road is 20 miles per hour (mph) and traffic volumes on the road near the Tank Site consists predominately of residential traffic and is considered low. There are no pedestrian lanes or

crossings and no fixed bus routes along Walua Road. Access within the Project Site will be via the existing access road that may be expanded for the Proposed Action.

Impacts and Mitigation Measures

During construction activities, there would be a short-term increase in traffic on Wailua and Bishop Roads created by 1) construction workers commuting to/from the project site, 2) delivery of materials and equipment, and 3) removal of construction equipment, waste or debris. During construction, the number of vehicle trips associated with the Proposed Action are anticipated to be low and likely spread throughout the day to avoid crews entering or exiting the site during peak traffic hours. During operation of the Proposed Action, traffic would return to the existing conditions as only a monitoring technician may make daily inspections to the Project Site and a maintenance crew would visit periodically to make repairs or manage landscaping at each location.

During construction, intermittent delivery or removal of large equipment and materials may result in traffic delays along Wailua and Bishop Roads. These kinds of deliveries and removals would be infrequent, and delays are anticipated to be brief. Adequate space exists within the Well and Tank Sites so vehicle parking associated with the Proposed Action would not impact traffic on Wailua or Bishop Roads during construction or operation activities. Therefore, neither construction or operation of the Proposed Action would result in adverse effects on traffic and no additional mitigation measures are required.

3.13 NATURAL HAZARDS

3.13.1 Flooding

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) as shown in Figure 3.25, the Tank and Well Sites are designated as Flood Zone X, which is defined as having a minimal risk of flooding. The Tank Site is located approximately 1.1 miles inland and the Well Site is 2 miles inland, and there are no surface waters present near either location. Both locations are outside the 3.2-foot and 6-foot sea level rise exposure areas.

3.13.2 Earthquakes and Volcanoes

Hawai‘i Island is home to five volcanoes and is associated with volcanic eruptions and earthquakes. The Project Site is located on the western slope of the Hualālai Volcano, which last erupted between 1800-1801 and is now considered dormant (UHM SOEST, 2013). The U.S. Geological Survey has developed a Lava-Flow Hazard Zones map and divided the island into zones based on the probability of coverage from future lava flows, with Zone 1 having the greatest risk and Zone 9 the least. The Project Site is located within Zone 4. While Hualālai Volcano is now considered dormant, its historic flows have typically covered large areas including the Project site. Section 3.3 provides additional information relating to risk from earthquakes and volcanoes and applicable mitigation measures.

3.13.3 Tsunami

Both locations of the Project Site are located between 1 and 2 miles inland, outside the Tsunami Evacuation Zone.

3.13.4 Hurricanes and Tropical Storms

Records of hurricanes affecting the Hawaiian Islands show that these events are relatively rare. Since the 1950s, only one hurricane has affected Hawai'i County while storms with strong winds that are not classified as a hurricane or tropical storm are more common (Businger, S., 1998). Due to prevailing weather patterns in the region, most impacts from these storms have been on the leeward, or eastern, side of Hawai'i island and the Project Site is located on the windward, or western side.

3.13.5 Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), climate change impacts are affecting every region on earth in a variety of ways. This includes rising temperatures, intensification of the water cycle and changing rainfall patterns (IPCC, 2021). These changes are already being seen in Hawai'i. Statewide temperatures have been rising and 2019 was the hottest summer in recorded history. Additionally, rainfall has decreased over the past 35 years and may decrease an additional 10 percent by the end of the century (Frazier, A.G., et al., 2016). The IPCC have confirmed that climate change impacts are the result of human produced greenhouse gas (GHG) emissions, which include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and sulfur oxides (Frazier, A.G., et al., 2016).

Modern water infrastructure systems are interdependent with energy systems, forming a water-energy nexus. Energy is required to extract, convey, and deliver water for agricultural, residential, commercial and wastewater use. According to the U.S. Environmental Protection Agency (EPA), drinking water and wastewater systems collectively account for approximately 2 percent of energy use across the country, contributing up to over 45 million tons of greenhouse gasses annually (EPA, 2025). However, there is significant regional variability in water and energy systems and their interactions.

Well Site

Current land uses at the Well Site include a single-family home and small-scale coffee farming operation; neither land use generates substantial amounts of GHG emissions. According to the EPA, the amount of energy used by single-family home in the U.S. generates on average 7.5 metric tons of CO2 annually. A study on coffee production at the farm level found coffee farming produces less than one pound of CO2 equivalents per acre with lower levels of production producing higher levels of GHG emissions due to carbon sequestration of the coffee and soils. Thus, coffee farming at the Well Site could potentially generate between 0 to 0.07 pounds of CO2 annually.

Tank Site

The Tank Site currently operates as the DWS Kahaluʻu Reservoir and Well Site. Existing water infrastructure features include three water storage tanks ranging from 0.1 to 0.3 million gallons capacity, Kahaluʻu Well A and Kahaluʻu Well C production wells and associated pumps, four booster pumps , and two small, single-story buildings used as the chlorination and control buildings. Kahaluʻu Well A and Kahaluʻu Well C production wells each pump approximately 1 mgd.

Depending on the depth and pumping efficiency, an average groundwater production well may require between 537 and 2,270 kilowatt hours (kWh) per million gallons pumped but this number may vary depending on a variety of factors. Therefore, Kahaluʻu Well A and Kahaluʻu Well C could potentially require between 1,074 and 4,540 kWh of energy per day. An average 100 horsepower (hp) booster pump requires approximately 83kW of energy for each hour used, which at the Tank Site averages around 16 hours per day. This means the four booster pumps could collectively require approximately 5,305 kWh of energy per day of operation. Thus, all operations at the Tank Site could potentially require between 6,379 and 9,845 kWh per day which is roughly the same daily energy requirements of between 350 to 550 single family homes. This amount of energy could produce between 1.5 to 4.1 metric tons of C02 daily depending on the energy source type.

Impacts and Mitigation Measures

Impacts and mitigation measures relating to natural hazards like earthquakes and volcanoes are discussed in Sections 3.3. The Project Site's inland location is outside the tsunami evacuation and impact zones, and the associated control building and storage tanks will be constructed in compliance with Hawaiʻi County Chapter 5A—Building Code to withstand wind speeds associated with hurricanes or tropical storms. Both locations of the Project Site are outside the FEMA special flood hazard zones.

Climate change may result in water supplies becoming less reliable or resilient in the future. One of the guiding principles of Laʻi ʻŌpua is to create a self-sustainable homestead community, including renewable energy and water conservation initiatives. If the Proposed Action and other additional proposed wells are developed, the future and existing wells would require an approximate total of 28 mgd or about 71 percent of the KASA's sustainable yield. If rainfall is reduced by 10 percent, the future total need would be approximately 81 percent of the KASA's sustainable yield. Thus, the Proposed Action would have minimal impact on the KASA or its long-term sustainability even with rainfall reductions created by climate change.

The Proposed Action will not directly release any GHG emissions, however, its construction and operation will generate GHG emissions. GHG emissions generated during construction of the Proposed Action are anticipated to be relatively minor. Emission sources from construction would primarily be from equipment during the site clearing, transmission pipeline installation, and well drilling actions.

During the operation of the Proposed Action, electricity will be required to pump water from the wells and storage tanks into the North Kona Water System. The amount of GHG emissions generated by electricity varies by the energy source type. In Hawaiʻi County, oil and renewables (e.g. geothermal, solar, wind, hydroelectric, and biomass) are the primary energy

sources. According to Hawaiian Electric, within Hawai'i County 58.7% percent of electricity is currently generated from renewable sources which produce zero or very small amounts of GHG emissions (HECO, 2025). The remaining 42 percent is generated from oil, which produces an average of 2.13 pounds of $C0_2$ per kilowatt hour (lbs $C0_2$/kWh).

Presently, the Tank Site requires between 6,379 and 9,845 kWh per day. This amount of energy could produce between 1.5 to 4 metric tons of $C0_2$ daily depending on the energy source type. The Proposed Action includes the addition of a water storage tank at the Well Site uphill from the DWS North Kona Water System mainline along Māmalahoa Highway. Adding a storage tank uphill that directly feeds via gravity transmission lines into the North Kona Water System may potentially reduce the volume of water stored at the Tank Site. This would decrease the volume of water pumped by the booster pumps thus reducing the amount of energy required to operate them and lowering the amount of $C0_2$ generated daily.

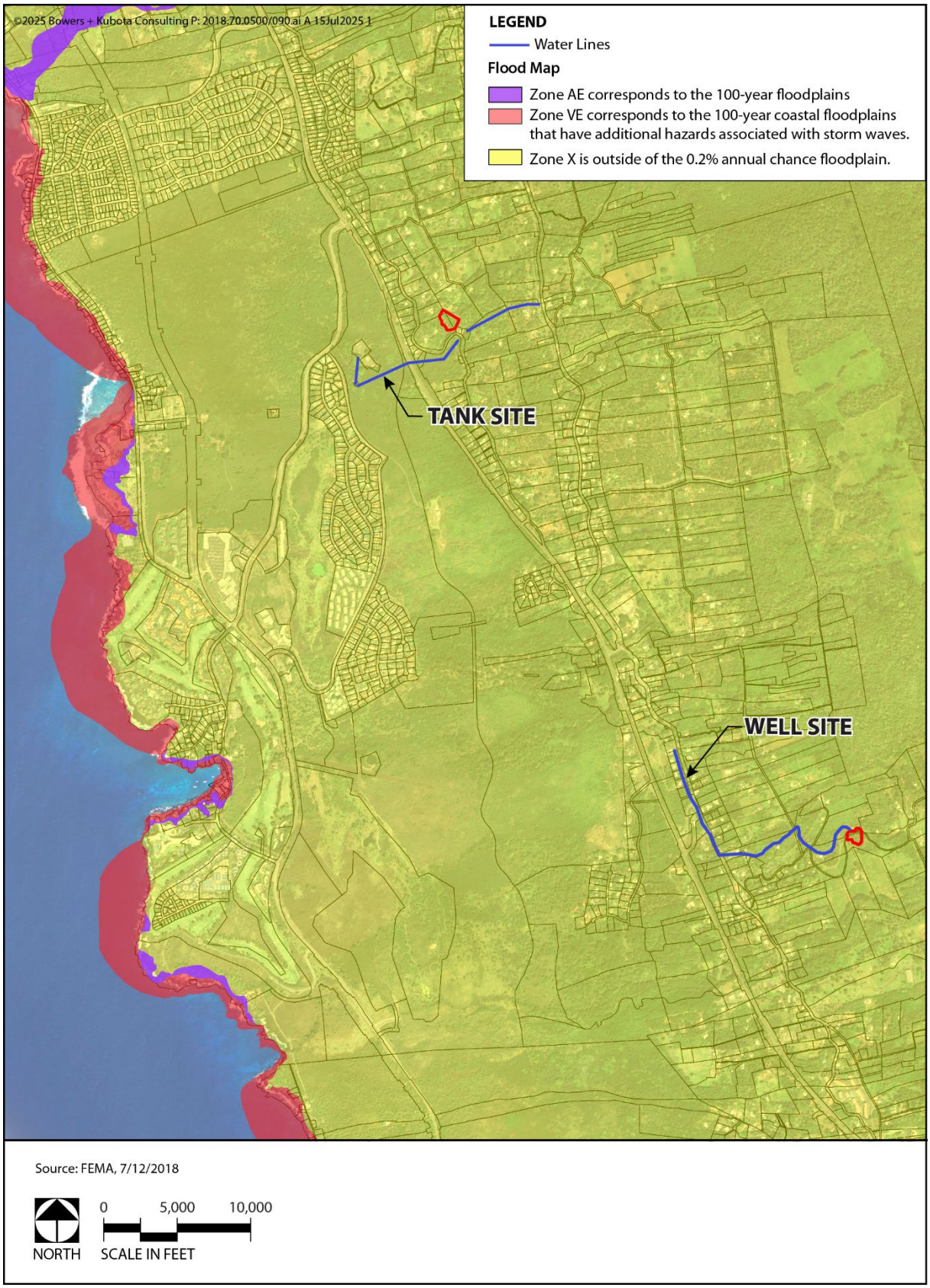
The Proposed Action is expected to pump 1.1 mgd with a maximum capacity of 2.0 mgd per day. It could therefore potentially require between 537 and 4,540 kWh per day of operation. Assuming 43 percent of this energy requirement is provided by renewable sources, the Proposed Action could potentially generate between 107 and 908 metric tons of $C0_2$ per year. This is roughly the same amount of $C0_2$ generated by powering between 14 and 121 single-family homes for one year.

GHG emissions generated by the Proposed Action's operation will be reduced over time as the county continues transitioning to a renewable energy resource portfolio standard. The State of Hawai'i Act 15 (2018) set the goal of making the state carbon "net-negative" by 2045, and HRS §269-91 requires electric utilities to meet 100 percent of net sales through renewable sources also by 2045. There are currently seven renewable energy projects under development for Hawai'i County that will assist in reaching this goal, and therefore operation of the Proposed Action may generate little to no $C0_2$ within the project's lifespan.

The Proposed Action will use gravity fed transmission lines at the Well Site that do not require additional energy to pump the water to La'i 'Ōpua. Because high-level groundwater is considered pristine in quality, little to no water treatment is anticipated further reducing the amount of indirect GHG emissions produced by the Proposed Action.

Therefore, neither construction nor operation of the Proposed Action would result in adverse effects contributing to climate change impacts or impacts from other natural hazards and no additional mitigation measures are required.

Figure 3.25: FEMA FIRM Map



3.14 PUBLIC FACILITIES AND INFRASTRUCTURE

3.14.1 Water Transmission

The Project Site is located within the North Kona Water System that consists of high, mid, and shaft-level groundwater wells; storage tanks; and an integrated transmission system that services DWS customers from Keāhole to Keauhou. As part of the Proposed Action, approximately 0.7 miles of new 16-inch transmission line will be installed to connect the Tank Site to the DWS North Kona Water System and 1.25 miles will be installed to connect the Well Site.

3.14.2 Sanitary Wastewater

The County of Hawai'i does not have a wastewater collection system in the uplands of North Kona or along Māmalahoa Highway. As a result, wastewater disposal near the Project Site is primarily within Individual Wastewater Systems which have historically been cesspools. There is one cesspool present within the Project Site.

3.14.3 Police, Fire Protection, Medical and Educational Facilities

The Project Site is located within the Hawai'i County Police Department's Kona District. The Kona Police Station is the nearest substation and is located approximately 10 miles northwest from the Well Site and 7.5 miles northwest of the Tank Site.

Hawai'i County Fire Department provides fire protection services throughout the county. Keauhou Fire Station (Engine 12) is the closest station located less than 2 miles from either the Tank or Well Sites. The station provides fire, emergency medical services (EMS), and rescue capabilities. Additionally, there are full-time fire stations with EMS services located in Makalei, Captain Cook and Kona and on-call volunteer services operated out of Kalaoa.

Kona Community Hospital is the closest hospital, located within approximately five miles of the Tank and Well Sites. The hospital is full-service, with 24-hour emergency services and an intensive care unit.

The Project Site is located in the Hawai'i State Department of Education's Honoka'a-Kealakehe-Kohala-Konawaena Complex. The project vicinity includes the Konawaena, Kahakai, and Hōlualoa school districts. The Konawaena area includes Konawaena Elementary, Konawaena Middle, Konawaena High Schol. The Kahakai area includes Kahakai Elementary School and the Hōlualoa area includes Holualoa Elementary School. There are also three Public Charter Schools in the project region: Kona Pacific Public Charter School, West Hawai'i Explorations and Innovations Public Charter School. Additionally, there are two private schools in the vicinity of the Project Site, Makau Lani Christian Academy and Kuleana Education Academy. Makau Lani Christian Academy provides educational services for elementary through high school students and Kuleana Education Academy serves elementary through middle school students.

3.14.4 Solid Waste

Solid waste services are provided by Hawai'i County Department of Environmental Management in some urban areas of the county. The closest facility to accept residential, commercial, government, and construction and demolition generated solid waste is the Pu'uanahulu (West Hawai'i) Landfill, which is located between approximately 29 and 31 miles from the Project Site. Where collection services are not provided by the County, waste may be self-hauled or collected by private companies and taken to Pu'uanahulu Landfill. Self-hauled waste is generally residential and can be taken to County operated transfer stations in Kailua, Keauhou, Ke'ei, Wailea and Miloli'i.

3.14.5 Electricity

Hawai'i Electric (HELCO) Keahuolu Substation provides electricity through 12.5 volt overhead lines along Bishop Road and distribution lines to portions of the Well Site. Overhead Walua Road, distribution lines and two electric transformers service the Tank Site.

Impacts and Mitigation Measures

The Proposed Action is not anticipated to substantially impact the demand for public facilities or infrastructure. The Proposed Action is intended to develop additional potable water supply sources from within the North Kona region to allow for the continued development of La'i 'Ōpua. Water from the Proposed Action will connect to the North Kona Water System via the proposed 16-inch transmission lines associated with each location, which are sufficient to accommodate the potential daily maximum withdrawal of 2.0 mgd. This amount combined with the other DHHL production well discussed in Section 3.4.5 would be sufficient for future proposed residential, commercial and community uses within La'i 'Ōpua. Completion of the Proposed Action will positively impact the resiliency of the North Kona Water System by creating a redundant source of water in the case of pump failures at other nearby wells.

During construction of the Proposed Action, a portable sanitary toilet will be located onsite at each location with secondary containment measures and serviced per provider recommendations. During operation, the control building and pumps at both the Tank and Well Sites will be unmanned and not require a permanent or temporary sanitary waste disposal system. Mitigation measures discussed in Section 3.4.7 would also be used to prevent impacts from the single cesspool onsite at the Well Site.

Use of BMPs and Occupational Safety and Health Administration (OSHA) worksite safety requirements will be used during construction of the Proposed Action to minimize any potential impacts on local fire, police and medical facilities.

Solid waste generated by the Proposed Action is anticipated to be minimal. The Well Site has no buildings that would need to be demolished, and any excess soil produced from excavation activities will remain onsite. The primary source of waste would be the demolition and removal of the three existing water storage tanks located at the Tank Site. Any solid waste generated during construction of the Proposed Action would be taken to Pu'uanahulu Landfill. As the control building and pumps will be unmanned during operation, no solid waste services or trash receptacles are required to operate the Proposed Action.

During Phase I of the Proposed Action, electric needs will be provided by generators onsite at the Well Site location. During Phase II, permanent electrical features to supply power to the pumps, control buildings and other accessory structures would be provided by tying into the existing distribution lines onsite or via new distribution lines connected to the existing overheads along Bishop and/or Walua Road depending on site specific power needs. Power demands created by the Proposed Action would exceed the existing conditions at both locations, however they are anticipated to be within HELCO's capacity without adversely affecting service to other customers.

Therefore, the Proposed Action would have no short or long-term adverse impacts on public infrastructure or utilities and no additional mitigation measures are required.

3.15 SECONDARY AND CUMULATIVE IMPACTS

HAR §11-200 defines secondary or indirect impacts as "Effects which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable," while it defines cumulative impacts as "The impact on the environment which results from incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The context for analyzing these impact types is defined by actions within the "reasonably foreseeable future"; in this case developments seeking entitlements within the previous five years that would be constructed in the same timeframe as Laʻi ʻŌpua. The following section is a discussion of the potential secondary and cumulative impacts resulting from the Proposed Action and other planned development in the area.

3.15.1 Secondary Impacts

SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The Proposed Action would facilitate the development of Laʻi ʻŌpua and approximately 1,000 single family homes and 300 multi-family units for DHHL beneficiaries, supporting the agency's vision of creating vibrant and self-sufficient homestead communities by developing and delivering lands and homes to more native Hawaiian families. Kealakehe Census Tract, which contains Laʻi ʻŌpua, has a nearly 20 percent higher rate of Native Hawaiian and Pacific Islander residents compared to the entire County who could positively benefit from its development through access to more housing options and economic opportunities.

The Proposed Action could positively alter the socio-economic profile of Kealakehe Census Tract. Laʻi ʻŌpua is one of two communities within DHHL's landholdings with lands designated for community and commercial uses, which include community-based economic development and other public amenities. Laʻi ʻŌpua has a combined total of 83 acres designated for community and commercial purposes. Creating economic development opportunities alongside residential uses would support the community's vision for self-sufficiency and provide them a chance to work close to home as Hawaiʻi County's average commute time is longer than the national average (County of Hawaiʻi Draft General Plan, 2023).

Therefore, the Proposed Action is anticipated to have positive impacts on the socioeconomics of the region and environmental justice by assisting DHHL beneficiaries in achieving home ownership and providing them economic opportunities. While this amount of land would assist the community in establishing economic self-sufficiency, it is not substantial enough to have a direct effect on the level of commerce in Kailua-Kona, the primary commerce center for the region.

HYDROLOGIC RESOURCES

The Proposed Action is anticipated to withdrawal a maximum of 2.0 mgd of high-level groundwater, which is approximately five percent of the KASA's 38 mgd sustainable yield. If the Proposed Action and other additional proposed wells are developed, the future and existing wells would require an approximate total of 28 mgd (County of Hawai'i, Department of Water Supply, 2017). This is about 73 percent of the KASA's sustainable yield as determined by the CWRM, which is within the 90 percent sustainable yield limit. If the sustainable yield is greater based on the USGS recharge rates, future and existing well use would be even less of the KASA's sustainable yield. Thus, the Proposed Action would have minimal impact on the KASA or its long-term sustainability.

TRANSPORTATION AND TRAFFIC

Traffic generation resulting from La'i 'Ōpua would be gradual and increase in response to each phase of development. During the environmental review process for each of the subsequent phases of development, traffic patterns and generation would be analyzed and mitigated at that time as necessary.

PUBLIC FACILITIES AND INFRASTRUCTURE

Hawai'i County's sewer system is currently in place within La'i 'Ōpua, with County operated gravity main lines present under existing roadways in the community as shown in Figure 3-23. Lateral lines from future development would be connected to the gravity main lines at that time and sanitary wastewater would be pumped to Kealakehe Wastewater Treatment Plant (the "Plant") for treatment. As of February 2021, the Plant has the capacity to treat up to 5.3 million gallons of wastewater per day and receives an average of 1.8 million gallons per day with approximately 1,700 active connections (County of Hawai'i, Department of Water Supply, 2017).

Upon full buildout of La'i 'Ōpua, approximately 1,000 single family homes and 300 multi-family units for DHHL beneficiaries would be connected to the sewer system. These new connections could potentially generate a maximum of 0.68 million gallons of residential wastewater per day (County of Hawai'i Planning Department, Final Environmental Assessment, Makalapua Project District, 2019). This would bring the daily total of wastewater produced throughout the region to around 2.5 million gallons per day, which is within the operational capacity of the Kealakehe Wastewater Treatment Plant.

Development of La'i 'Ōpua will result in additional individuals and families living in the community, which could potentially increase the number of school-aged children within the Kealakehe public school system complex and impact local fire, police and medical facilities.

Most of the land designated for residential use occurs within Villages 1 through 6 and Village 10. To date, only Village 3 has been completed and Villages 4 and 5 are scheduled for the next phase of development. Thus, continued development of Laʻi ʻŌpua will occur in phases over time and a substantial increase in the number school-aged children in the short-term because of the Proposed Action is not anticipated.

An increase in the number of school-aged children in the future is possible, however the County's population is expected to increase by 50 percent by 2040 with or without the development of Laʻi ʻŌpua (County of Hawaiʻi Planning Department, Final Environmental Assessment, Makalapua Project District, 2019). It is likely that the public school system would expand during that timeframe and could accommodate an increase in school-aged children associated with Laʻi ʻŌpua as the community is developed. This expansion could be achieved through school impact fees which the State of Hawaiʻi, Department of Education (DOE) has the authority to collect via Act 245. In 2010, a West Hawaiʻi School Impact Fee District was adopted and while efforts to implement fee collection were suspended that same year, the DOE may resume efforts to collect these fees in the future. It is assumed services provided by other the public utilities would also be expanded by 2040 in response to the expected future population growth. Phasing development of Laʻi ʻŌpua over time would reduce the potential impacts on these other facilities.

Development of Laʻi ʻŌpua will result in additional individuals and families living in the community, but these may include residents already residing within other areas of Hawaiʻi County. With the closure of Hilo Landfill in 2019, all solid waste generated within the County is now taken to Puʻuanahulu Landfill. As of January 2020, Puʻuanahulu Landfill is anticipated to have 50 to 100 more years of operational capacity based on existing solid waste generation of roughly 600 tons per day and onsite conditions (Hawaiʻi Public Radio, 2020). Thus, development of Laʻi ʻŌpua would have minimal impact on the Landfill.

The full development of Laʻi ʻŌpua will likely require around 23 Megawatts (MW) per day to power all the new residential development.[2] Currently, HELCO produces around 370 MW of energy per day using a variety of traditional and renewable energy sources and is working towards fully renewable energy production as discussed in Section 3.12.6 (Hawaiian Electric Company, 2021). Full buildout of the community would require approximately six percent of the existing power produced daily by HELCO, and approximately seven percent using only renewable energy sources currently operating and those approved for development to meet the 2045 renewable energy mandate (Hawaiian Electric Company, 2021). This would not adversely affect HELCO's ability to serve other customers.

These requirement percentages are assuming no renewable energy initiatives are implemented within the community or additional renewable projects are pursued by HELCO over the course of the community's full development. As part of their vision and values, Laʻi

[2] Based on HELCO evaluation that their average residential utility consumer used 518kWh per month, times the number of units and converted from kWh to MW. Accessed September 20201. https://view.hawaiianelectric.com/2019-2020-sustainability-report/page/4-5

ʻŌpua outlined their desire to incorporate renewable energy sources to ensure their self-sufficiency. HRS §196-7 permits the installation of residential photovoltaic systems. Thus, the energy requirements from Laʻi ʻŌpua would likely be lower as the community would not be fully reliant on HELCO for power.

3.15.2 Cumulative Impacts

There are two housing projects proposed for development in the reasonably foreseeable future and one under construction within the North Kona District in vicinity of the Project Site: Makalapua Project District, Kaloko Heights and Kamakana Villages at Keahuolū.

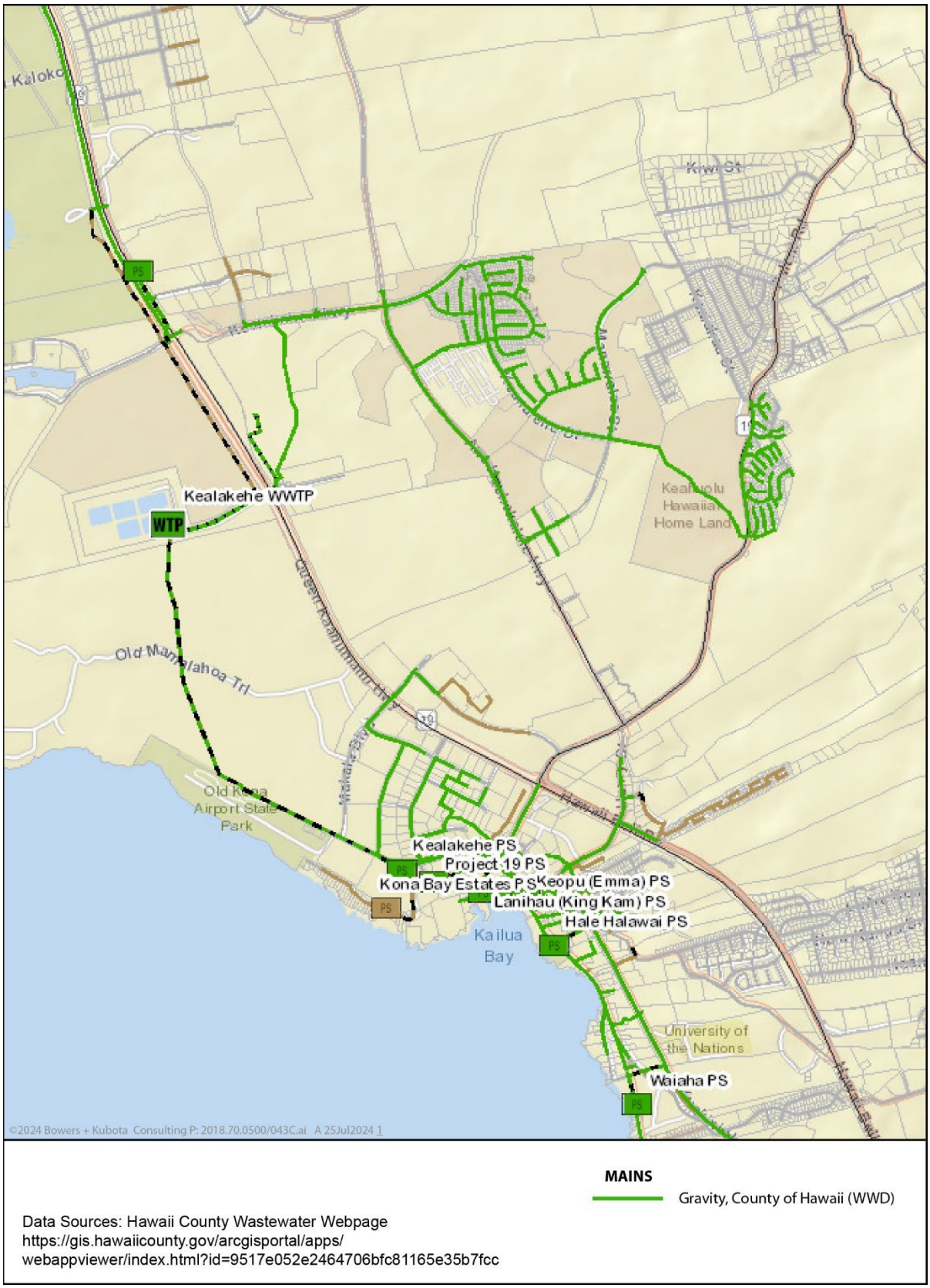
The proposed Makalapua Project District is a an approximately 67-acre site located in Kailua-Kona approximately three miles south of the Laʻi ʻŌpua. The project is intended to be a mixed-use development including residential, hotel, commercial, and civic/community uses, creating approximately 300 residential units and 220 hotel rooms developed over the next 15 years. Kaloko Heights is a proposed affordable housing project intended to develop up to 111 residential units and a community center located approximately three miles north of the Laʻi ʻŌpua. Phase I of the project, which includes construction of roughly 80 units, is anticipated to be completed within the next two years.

Kamakana Villages at Keahuolū is a mixed-use, master planned community across 272-acres that includes development of up to 2,330 homes, school facilities and a neighborhood center. Kamakana Villages is located within one mile of Laʻi ʻŌpua and its development is planned to occur over the next 20 years. The first homes were made available to the public in 2018, and presently 170 apartments have been completed with approximately 250 residents occupying the site. The housing and surrounding infrastructure are all Silver LEED certified.

Cumulative impacts from developing Laʻi ʻŌpua, facilitated by the Proposed Action, and the other housing projects are potential increases in the demand on the KASA aquifer and public facilities and infrastructure through increased population. The Proposed Action and additional housing developments and their water use demands have been accounted for in the Hawaiʻi County Water Use and Development Plan Update, Hawaiʻi Water Plan, Keauhou Aquifer System and are within the estimated 28 mgd future demand total . See Figure 3-25. This future demand total is about 73 percent of the KASA's sustainable yield as determined by the CWRM, which is within the 90 percent sustainable yield limit. Therefore, they would not adversely affect the KASA aquifer if all were fully developed.

Existing infrastructure, improvements and mitigations associated with the proposed projects would support the potential increase in population and the corresponding increase in demand on public facilities and infrastructure like roads, schools, medical facilities, and fire and police departments. Further, tax revenues generated from the housing developments would support improving and potentially expanding these County resources to better serve an increased population. Therefore, full development of the Laʻi ʻŌpua and the other projects would not adversely affect these resources.

Figure 3.26: County Sewer Line Map



4.0 RELATIONSHIP TO STATE AND COUNTY PLANS AND POLICIES

As a requirement of HAR §11-200.1-24 (2019), this chapter provides a description of the relationship and compatibility of the Proposed Action to other land use plans and policies. This chapter discusses the proposed project's conformance with pertinent State and County land use plans and policies, which include the State Land Use District regulations, State Environmental Policy (Chapter 344, HRS), and the regulations, policies, and goals set forth by the County's General Plan, and Special Management Area (Chapter 205A, HRS).
State of Hawai'i Plans and Policies

4.1 THE STATE LAND USE LAW (HRS §205)

The Hawai'i State Legislature adopted the State Land Use Law in 1961 to protect Hawai'i's valuable lands from development that resulted in short-term gains for a few and long-term losses to the income and growth potential of the State's economy. Accordingly, the Legislature established an overall framework of land use management. HRS §205 placed all lands within the State in one of four land use districts: Urban, Agricultural, Conservation, or Rural (the Rural District was added in 1963) and established the State Land Use Commission to administer the designated land use districts.

Discussion:

The Project Site is located within the Agriculture District. As discussed in Section 3.2, the Proposed Action is permitted within the State Agricultural District and by the Hawai'i County Code Chapter 25—Zoning, so long as it does not pose a hazard or danger to the surrounding area and is approved by the Director of the Hawai'i County Planning Department. The Proposed Action will be installed in compliance with all relevant building codes to prevent any hazards to the surrounding area and construction would not begin prior to plan approval. Thus, the Proposed Action is compliant with HRS §205.

4.2 HAWAI'I STATE PLAN (HRS §226)

The Hawai'i State Plan, HRS Chapter 226, as amended, is a broad policy document that guides all activities, programs and decisions made by State and local agencies by establishing a set of themes, goals, objectives, and policies meant to guide the State's long-term growth and development. The purpose of the plan is to: (1) improve the planning process; (2) increase the effectiveness of government and private actions; (3) improve coordination among agencies and levels of government; (4) provide for the use of Hawai'i's resources; and (5) guide the future development of the state.

Part I of the Plan references Overall Theme, Goals, Objectives and Policies and Part III references the Priority Guidelines; because Part II pertains primarily to internal government affairs it is not applicable to the Proposed Action and was not addressed. Of the 107 sections that comprise the HRS §226, six are directly applicable to the Proposed Action and discussed in the table below.

Table 4.1 Hawai'i State Plan Objectives and Policies			
HAWAI'I STATE PLAN, CHAPTER 226, HRS (Key: C = Consistent, I = Inconsistent, N/A = Not Applicable)	**C**	**I**	**N/A**
PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES			
HRS § 226-1: Findings and Purpose			
HRS § 226-2: Definitions			
HRS § 226-3: Overall Theme.			
HRS § 226-4: State Goals.			
In order to ensure, for present and future generations, those elements of choice and mobility that ensure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:			
(1) A strong, viable economy, characterized by stability, diversity and growth that enables fulfillment of the needs and expectations of Hawai'i's present and future generations.	**X**		
(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.	**X**		
(3) Physical, social and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring and of participation in community life.	**X**		
Discussion: The Proposed Action provides the potable water resources required to enable the development of DHHL's Villages of La'i 'Ōpua. The Proposed Action will provide necessary resources to help create a community that provides native Hawaiian beneficiaries housing and homestead leases that may be passed on to future generations. The Proposed Action will also provide the water resource necessary to develop a master planned community that will create opportunities for individuals and groups to improve their economic, social and physical well-being.			
HRS § 226-5: Objectives and policies for population.			
§226-6 Objectives and policies for the economy--in general.			
§226-7 Objectives and policies for the economy--agriculture.			
§226-8 Objective and policies for the economy--visitor industry.			
§226-9 Objective and policies for the economy--federal expenditures.			
§226-10 Objective and policies for the economy--potential growth and innovative activities.			
§226-10.5 Objectives and policies for the economy--information industry.			
§226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources.			
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources.			
§226-13 Objectives and policies for the physical environment--land, air, and water quality.			
(a) Objectives: Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:			
(1) Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.	**X**		
(2) Greater public awareness and appreciation of Hawai'i's environmental resources.	**X**		
(b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:			
(1) Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.			**X**
(2) Promote the proper management of Hawai'i's land and water resources.	**X**		
(3) Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.	**X**		

Table 4.1 Hawai'i State Plan Objectives and Policies			
HAWAI'I STATE PLAN, CHAPTER 226, HRS (Key: C = Consistent, I = Inconsistent, N/A = Not Applicable)	**C**	**I**	**N/A**
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.			**X**
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.			**X**
(6) Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.	**X**		
(7) Encourage urban developments in close proximity to existing services and facilities.	**X**		
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.	**X**		
Discussion: The Proposed Action is intended to develop a new potable water source for the development of La'i 'Ōpua. The Proposed Action has been included in the Hawai'i County Water Use and Development Plan update and would be within the sustainable yield of the area's underlying aquifer system, supporting proper management of Hawai'i's land and water resources. During construction, any potential impacts to air and water quality will be minimized using BMPs and project phasing.			
§226-14 Objective and policies for facility systems--in general.			
(a) Objective: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, sustainable development, climate change adaptation, sea level rise adaptation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.			
(b) To achieve the general facility systems objective, it shall be the policy of this State to:			
(1) Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	**X**		
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.	**X**		
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	**X**		
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.	**X**		
(5) Identify existing and planned state facilities that are vulnerable to sea level rise, flooding impacts, and natural hazards.			**X**
(6) Assess a range of options to mitigate the impacts of sea level rise to existing and planned state facilities.			**X**
Discussion: The Proposed Action fully supports the objectives and policies of HRS §226-14. The Proposed Action is intended to develop a new potable water source for the development of La'i 'Ōpua, which will allow DHHL to accommodate the needs of their beneficiaries. It is designed to promote prudent use of groundwater resources and its operation is within the region's aquifer's long-term sustainable capacity.			
§226-15 Objectives and policies for facility systems--solid and liquid wastes.			
§226-16 Objective and policies for facility systems--water.			
(a) Objective: Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.			
(b) To achieve the facility systems water objective, it shall be the policy of this State to:			

Table 4.1 Hawai'i State Plan Objectives and Policies			
HAWAI'I STATE PLAN, CHAPTER 226, HRS (Key: C = Consistent, I = Inconsistent, N/A = Not Applicable)	**C**	**I**	**N/A**
(1) Coordinate development of land use activities with existing and potential water supply.	**X**		
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.	**X**		
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.			**X**
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	**X**		
(5) Support water supply services to areas experiencing critical water problems.	**X**		
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.			**X**
Discussion: The Proposed Action is intended to develop a new potable water source for the development of La'i 'Ōpua. The Proposed Action has been included in the Hawai'i County Water Use and Development Plan update and would be within the sustainable yield of the area's underlying aquifer system. In August 2015, CWRM approved the water reservation for 3.398 MGD in the Keauhou Aquifer System Area (ASYA) that services the North Kona region. The water request amount should meet the water demands needed for the full build-out of La'i 'Ōpua.			
§226-17 Objectives and policies for facility systems--transportation.			
§226-18 Objectives and policies for facility systems--energy.			
§226-18.5 Objectives and policies for facility systems--telecommunications.			
§226-19 Objectives and policies for socio-cultural advancement--housing.			
(a) Objective: Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
(1) Greater opportunities for Hawai'i's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more rental and for sale affordable housing is made available to extremely low-, very low-, lower-, moderate-, and above moderate-income segments of Hawai'i's population.	**X**		
(2) The orderly development of residential areas sensitive to community needs and other land uses.	**X**		
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawai'i's people.	**X**		
(b) o achieve the housing objectives, it shall be the policy of this State to:			
(1) Effectively accommodate the housing needs of Hawai'i's people.	**X**		
(2) Stimulate and promote feasible approaches that increase affordable rental and for sale housing choices for extremely low-, very low-, lower-, moderate-, and above moderate-income households.	**X**		
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.	**X**		
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing rental and for sale housing units and residential areas.			**X**
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.	**X**		
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			**X**

Table 4.1 Hawai'i State Plan Objectives and Policies			
HAWAI'I STATE PLAN, CHAPTER 226, HRS (Key: C = Consistent, I = Inconsistent, N/A = Not Applicable)	**C**	**I**	**N/A**
(7) Foster a variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods that reflect the culture and values of the community.	**X**		
(8) Promote research and development of methods to reduce the cost of housing construction in Hawai'i.			**X**
Discussion: Without the Proposed Action, DHHL will not have enough water credits available from DWS for future homestead or commercial development at La'i 'Ōpua from now into the foreseeable future. Therefore, DHHL needs to establish an additional water source to receive water credits from DWS. This would allow DHHL to provide over 1,000 single family homes, 300 multi-family units, multiple park spaces, a hospital, and commercial centers at La'i 'Ōpua. La'i 'Ōpua will provide housing for native Hawaiian residents ranging from low-, very low-, lower-, moderate- and above moderate-income segments and the community is planned to reflect the culture and values traditional to Hawai'i.			
§226-20 Objectives and policies for socio-cultural advancement--health.			
§226-21 Objective and policies for socio-cultural advancement--education.			
§226-22 Objective and policies for socio-cultural advancement--social services.			
§226-23 Objective and policies for socio-cultural advancement--leisure.			
§226-24 Objective and policies for socio-cultural advancement--individual rights and personal well-being.			
§226-25 Objective and policies for socio-cultural advancement--culture.			
§226-26 Objectives and policies for socio-cultural advancement--public safety.			
§226-27 Objectives and policies for socio-cultural advancement--government.			
§226-101 Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.			
§226-102 Overall direction. The State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.			
§226-103 Economic priority guidelines.			
§226-104 Population growth and land resources priority guidelines.			
§226-105 Crime and criminal justice.			
§226-106 Affordable housing.			
§226-107 Quality education.			
§226-108 Sustainability.			
Priority guidelines and principles to promote sustainability shall include:			
(1) Encouraging balanced economic, social, community, and environmental priorities;	**X**		
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;	**X**		
(3) Promoting a diversified and dynamic economy;	**X**		
(4) Encouraging respect for the host culture;	**X**		
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;	**X**		
(6) Considering the principles of the ahupua'a system; and	**X**		

Table 4.1 Hawai'i State Plan Objectives and Policies			
HAWAI'I STATE PLAN, CHAPTER 226, HRS (Key: C = Consistent, I = Inconsistent, N/A = Not Applicable)	**C**	**I**	**N/A**
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawai'i	**X**		
Discussion: The Proposed Action is intended to develop a new potable water source for the development of La'i 'Ōpua. La'i 'Ōpua values the natural resources of the area and one of the community's visions includes self-sufficiency and increasing and conserving water resources is considered pivotal for the community's continued success. Further, the Proposed Action is a long-planned initiative intended to sustainably balance the needs of La'i 'Ōpua and the greater Kona District within the limits of the region's water resources. Thus, the Proposed Action is consistent with the provisions of the Hawai'i State Plan.			

4.2.1 The State Environmental Policy (HRS §344)

HRS §344 establishes an environmental policy that (1) encourages productive and enjoyable harmony between people and their environment, (2) promotes efforts that will prevent or eliminate damage to the environment and biosphere, (3) stimulates the health and welfare of humanity, and (4) enriches the understanding of the ecological systems and natural resources important to the people of Hawai'i.

HRS §344-3(1) states it shall be the policy of the State, through its programs, authorities, and resources to:

> *Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai'i.*

Discussion:

The Proposed Action would require a maximum daily limit of 2 mgd of groundwater, which is within the long-term sustainable yield for the region's aquifer system. Thus, it would not detrimentally effect water resources in the North Kona District. Further, the Proposed Action is intended to develop a new potable water source for the development of La'i 'Ōpua, which would allow DHHL to develop and deliver more lands and homes to native Hawaiian families fulfilling the social, economic and other requirements of the people of Hawai'i. Mitigation measures discussed throughout Chapter 3 would be implemented to avoid or eliminate impacts to the resources affected. Therefore, the Proposed Action is consistent with the purpose and objectives established by HRS §344.

4.2.2 The Hawai‘i State Water Code (HRS §174C)

The State Water Code, HRS §174C, was enacted to protect Hawai‘i’s water resources. It is intended to address problems of water supply and conservation and establishes the Hawai‘i Water Plan as the guide for implementing this policy. The Hawai‘i Water Plan consists of five constituent parts:

1. Water Resource Protection Plan: The plan is prepared by the CWRM and serves to protect and sustain statewide ground-and surface-water resources, watersheds, and natural stream environments.
2. State Water Projects Plan: The plan is prepared by the DLNR Engineering Division and provides a framework for planning and implementing water development programs to meet projected water demands for state projects.
3. Water Quality Plan: The plan is prepared by the DOH and serves to protect public health and sensitive ecological systems by preserving, protecting, restoring and enhancing the quality of ground and surface waters throughout the state.
4. Agricultural Water Use and Development Plan: The plan is prepared by the State Department of Agriculture and develops a long-range management plan that assesses state and private agricultural water use, supply and irrigation systems.
5. County Water Use and Development Plans: These plans are prepared separately by each county. They set forth the allocation of water based on proposed land uses to meet projected county-specific demands.

Discussion:

The most relevant of the Hawai‘i Water Plan’s five constituent plans to the Proposed Action are the Water Resource Protection Plan Update (2019), State Water Projects Plan Update (2020), and the Hawai‘i Water Use and Development Plan Update—Keauhou Aquifer System (2017).

The Water Resource Protection Plan Update (2019) inventoried water resources of the State to determine their sustainable yields based on available data and recommend means of conserving and augmenting these resources. The Proposed Action is anticipated to require a maximum daily limit of 2 mgd. This is within the long-term sustainable yield for the Keauhou Aquifer System, which is not classified as a Groundwater Management Area. Further, mitigation measures discussed in Section 3.4.7 would be implemented to ensure the Proposed Action does not create any adverse impacts on water resources.

The Proposed Action is intended to develop a new potable water source for the development of La‘i ‘Ōpua and the projected requirements are accounted for within the State Water Projects Plan Update (2020). The Proposed Action does not directly or indirectly impact other proposed State projects, but it would positively impact the resiliency of the North Kona Water System by creating a redundant source of water in case of pump failures at other nearby wells.

The County of Hawai‘i, Water Use and Development Plan Update (2010) implemented a broad, uniform island-wide approach to evaluate conservatively the County’s land use policies set forth in the County General Plan and Zoning Code. The plan provides scenarios

for low, medium and high growth rates and estimated public water needs for the island for years in the future. The update identified two aquifer sectors to be considered for further evaluation and detailed assessment. One of the sectors identified was the Hualālai Aquifer Sector, Keauhou Aquifer System which would be directly impacted by the Proposed Action.

Per CWRM, the update consisted of two phases. Phase I refined the plan's water demand scenarios and projections. Phase II created source development strategies and scenarios; addressed how proposed source strategies may impact cultural uses and rights or other public trust purposes; and identified appropriate mitigation measures for potential impacts or alternative strategies. The Hawai'i Water Use and Development Plan Update—Keauhou Aquifer System (2017) combines the findings of the two phases into a single plan.

As discussed in Section 3.4, the Proposed Action is consistent with the Hawai'i Water Use and Development Plan Update—Keauhou Aquifer System (2017) plan. The maximum daily amount is accounted for in the plan's refined water demand scenarios and projections and would not adversely impact groundwater resources within the Keauhou Aquifer System. Nor would it adversely affect in any way cultural uses and rights or other public trust purposes. Instead, it would help facilitate the development of La'i 'Ōpua, which is designed to promote cultural education, self-sufficiency, and provide additional homesteading opportunities for more native Hawaiian families. Thus, the Proposed Action is consistent with the Hawai'i Water Plan and HRS §174C.

4.3 DEPARTMENT OF HAWAIIAN HOME LANDS (DHHL) PLANS

DHHL's planning system includes three tiers. The first tier (Tier 1) is the General Plan, which identifies statewide goals and policies to guide land management and programs. Tier 2 includes Strategic Program Plans, which focus on statewide programs and policies, as well as Island Plans with longer-term, island-specific land use goals based on the General Plan. Tier 3 includes Regional Plans and Area Development Plans, which identify and address issues and opportunities relative to existing homestead communities and future development in that region.

4.3.1 DHHL General Plan

The DHHL General Plan Update was adopted in 2022 as an update of the DHHL General Plan, which was initially adopted in 2002. The DHHL General Plan sets the vision and establishes goals and policies to guide the discussions and decision-making of the Hawaiian Homes Commission and the DHHL plans, programs, and policies for the next 20 years, taking the Trust to the planning horizon of 2040. The DHHL General Plan Update includes seven (7) priority topic areas under which goals, policies and monitoring and evaluation metrics are identified. The priority topic areas include:

- Land Use and Water Resources
- Infrastructure
- Housing
- Food Production
- Healthy Communities
- Natural and Cultural Resource Management

- Revenue Generation and Economic Development

The following section includes discussion of the Proposed Action's consistency with applicable goals and policies in the DHHL General Plan Update:

Goal WR-1: *Implement water planning and management strategies that meet current needs and protect water resources for the future.*

Policy:

- ***WR-1A:*** *Implement the goals and policies from the DHHL Water Policy Plan.*
- ***WR-1B:*** *Incorporate watershed protection, water conservation, and recharge considerations in the use of groundwater and other water resources.*

Goal IN-1: *Provide and maintain infrastructure for homestead communities within resource limitations.*

Policy:

- ***IN-1A:*** *Design infrastructure to County standards and transfer systems to the Counties whenever possible for development within Residential, Commercial, and Industrial areas.*
- ***IN-1B:*** *Establish agreements with the Counties around infrastructure standards and licensing processes on Trust lands.*

Discussion:

As discussed in Section 1.3 the Proposed Action is based on the need for additional water sources to service DHHL's planned future homestead development at La'i 'Ōpua. The Proposed Action would develop the additional water sources needed, while falling within the approved water reservations in the Keauhou Aquifer System Area in alignment with the goals and policies of the DHHL General Plan and HHC Water Policy Plan. DHHL will also be developing the wells and transmission lines up to County standards in order to dedicate the infrastructure to the County and obtain additional water credits from the County of Hawai'i.

4.3.2 Hawaiian Homes Commission Water Policy Plan

Program Plans fall under the second tier of DHHL's planning system and are statewide plans that inform or carry out general plan policies and priorities for specific functional areas, including water resource management. In 2014, the Hawaiian Homes Commission adopted the first policy on managing the water kuleana of DHHL since the passage of the Hawaiian Homes Commission Act. The Water Policy Plan's includes the following vision:

Our vision is that there will be adequate amounts of water and supporting infrastructure so that homestead lands will always be usable and accessible, to enable us to return to our lands to fully support our self-sufficiency and self-determination in the administration of the Hawaiian Homes Commission Act (HHCA), and the preservation of our values, traditions, and culture.

To achieve this, the Water Policy Plan establishes four priority goals:

1. *Affirmatively communicate with beneficiaries regarding water decisions, performance, and water rights on a regional and annual basis.*
2. *Aggressively, proactively, consistently, and comprehensively advocate for the kuleana of the beneficiaries, DHHL, and HHC to water before all relevant agencies and entities.*
3. *Develop and manage a Water Assets Inventory (WAI).*
4. *Support watershed protection and restoration on DHHL lands and source areas for DHHL water.*

Discussion:

The Proposed Action aligns with the vision and priority goals of the HHC Water Policy Plan. Primarily, the Proposed Action supports the vision of providing adequate water and supporting infrastructure to enable native Hawaiian beneficiaries to return to Hawaiian home lands in Laʻi ʻŌpua. Furthermore, by securing additional water supply sources and water credits needed for future residential, community and commercial uses, the Proposed Action is demonstrating DHHL's commitment to advocating for beneficiaries, DHHL and HHC water rights in coordination with CWRM and the County of Hawaiʻi Department of Water. The Proposed Action is included in the Hawaiʻi County Water Use and Development Plan update (2017) and within the sustainable yield of the area's underlying the Keauhou Aquifer System Area as approved by CWRM. Without the Proposed Action, DHHL will not have any water credits available from the County DWS to develop additional homesteading in the North Kona region.

4.3.3 Hawaiʻi Island Plan

Island Plans also are included under the second tier of DHHL's planning system. The Hawaiʻi Island Plan was last updated in 2002 and provides DHHL with a comprehensive assessment of its lands on Hawaiʻi Island and aims to assess and recommend future uses for Hawaiian home lands on Hawaiʻi Island. The plan is organized by regions and identifies DHHL land tracts within those regions for priority development. The Proposed Action is located in the West Hawaiʻi Region and would provide water service to the high priority residential development of Kealakehe.

DISCUSSION

The DHHL Hawaiʻi Island Plan designated development of the residential land holdings within the Villages of Laʻi ʻŌpua as a priority and the Proposed Action will support this by developing the water resources and connect to infrastructure necessary to develop homesteads and other DHHL lands in the region.

4.3.4 Kealakehe- Laʻi ʻŌpua Regional Plan

The third tier of the DHHL planning system includes Regional Plans, which assess land use development factors, identify issues and opportunities, and identify the region's top priority projects slated for implementation within the next five years. The Kealakehe-Laʻi ʻŌpua Regional Plan update was approved by HHC in 2020, which updates the previous 2009

Regional Plan. The *North Kona Water Source Development and Storage* priority project is included in the 2020 Regional Plan Update and includes four objectives:

- Develop additional water supply from sources within the region. In order to meet the various needs of the community, additional water credits must be secured for the desired expansion of the region. DHHL currently has enough water credits to complete its on-going development projects in the area (Village 4 ʻĀkau and Hema). In order to achieve the community's vision for the region, DHHL will need to secure additional water credits to support these development projects.
- Support Community Economic Development Projects. DHHL has identified lands that would be suitable for commercial uses in order to increase the economic self-sufficiency of the homesteads within the region. In order for these lands to be utilized for economic development projects, there must be appropriate allocation of water credits for these projects. As DHHL currently does not have any additional water credits available for development projects within this region, it is important that DHHL pursue actions to secure additional water credits to support these potential development projects.
- Build more homes for beneficiaries. DHHL has enough water credits to complete the Village 4 ʻĀkau and Hema developments. The remaining Villages illustrated in the Villages of Laʻi ʻŌpua Master Plan do not currently have water credits available for development. The community identifies providing additional homesteading opportunities for more native Hawaiian families in the Kealakehe-La´i ´Ōpua region as a priority in the vision for the region. In order for DHHL and the community to reach this vision, DHHL must secure additional water credits to support these developments.
- Develop Community Facilities to support the homesteads. Recent community input has identified a concern that a vibrant and thriving community requires more than just homes and infrastructure. The community wants to ensure that areas for parks and recreation are included in the desired expansion of the region. In order to provide appropriate recreational spaces for the community, DHHL must secure additional water credits to support these needs. The Implementation Action Steps identified below concentrate on actions needed to develop wells on the property of the two private landowners.

Discussion:

The Proposed Action is consistent with the Kealakehe-Laʻi ʻŌpua Regional Plan. The Proposed Action is included as a priority project and as such implementation of the project directly aligns with the vision and objectives of the Regional Plan.

4.4 COUNTY OF HAWAIʻI PLANS AND POLICIES

4.4.1 County of Hawaiʻi General Plan

The County of Hawaiʻi General Plan (General Plan) is the County's long-range comprehensive plan that guides the pattern of future developments for the island. It provides a sound growth

strategy that directs future opportunities related to land use, zoning amendments and capital expenditures. The General Plan was last updated and adopted by ordinance in 2005, and is organized into 13 elements, with policies, objectives, standards and principles for each element. The County of Hawai'i is in the process of updating the General Plan through 2045, and the revised version the Draft General Plan 2045 was released for public comment in September 2023. The Final Revised General Plan Update is still pending final approval from the County Council. As such, the Proposed Action must address its consistency with the current 2005 amended version of the County of Hawai'i General Plan. Table 4-2 assesses the Proposed Action's consistency with relevant goals and policies of the presently adopted General Plan.

Table 4.2: Proposed Action's Conformance to the General Plan

Policy Description	
Economic	
Goal (b)	Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawai'i.
Goal (c)	Strive for diversity and stability in the economic system.
Environmental Quality	
Goal (b)	Maintain and, if feasible, improve the existing environmental quality of the island.
Goal (c)	Control pollution.
Policy (a)	Take positive action to further maintain the quality of the environment.
Policy (c)	Advise the public of environmental conditions and research undertaken on the island's environment.
Flooding and Other Natural Hazards	
Goal (e)	Reduce surface water and sediment runoff.
Policy (q)	Consider natural hazards in all land use planning and permitting.
Historic Sites	
Policy (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.
Policy (g)	Collect and distribute historic sites information of public interest and keep an inventory of sites.
Policy (h)	Aid in the development of a program of public education concerning historic sites.
Public Utilities – Water	

Policy Description	
Policy (a)	Water system improvements shall correlate with the County's desired land use development pattern.
Policy (b)	All water systems shall be designed and built to Department of Water Supply standards.
Policy (c)	Improve and replace inadequate systems.
Policy (d)	Water sources shall be adequately protected to prevent depletion and contamination from natural and man-made occurrences or events.
Policy (e)	Water system improvements should be first installed in areas that have established needs and characteristics, such as occupied dwellings, agricultural operations and other uses, or in areas adjacent to them if there is need for urban expansion.
Policy (f)	A coordinated effort by County, State and private interests shall be developed to identify sources of additional water supply and be implemented to ensure the development of sufficient quantities of water for existing and future needs of high growth areas and agricultural production.
Policy (k)	Promote the use of ground water sources to meet State Department of Health water quality standards.
	Land Use – Agriculture
Policy (i)	Designate, protect and maintain important agricultural lands from urban encroachment.
Policy (j)	Ensure that development of important agricultural land be primarily for agricultural use.

The General Plan identifies actions to implement these policies in the North Kona District and specifically directs DWS to:

- Continue to pursue groundwater source investigation, exploration, and development in areas that would provide for anticipated growth and that would provide for an efficient and economic system operation.

Discussion:

As discussed in Section 1.5, the Proposed Action will construct two new potable water wells and ancillary improvements that will provide the DWS North Kona Water System with a new source of drinking water. The construction of the wells will have little direct impact on the General Plan's goals and policies, however, the secondary impacts from creating a new water source may provide new opportunities for economic development for the County, specifically in the La'i 'Ōpua development, where the native Hawaiian population may stand to benefit.

Prior to the construction of the Proposed Action, BMPs will be implemented to protect the environment from drainage, runoff, and noise, which includes applying for NPDES, noise, and grading, grubbing and stockpiling permits. An LRFI, Ka Pa'akai Framework Analysis, flora

and fauna surveys were conducted in addition to the Division of Forestry and Wildlife (DOFAW) and SHPD being consulted with in preparation of this EA. Thus, the Proposed Action is consistent with the General Plan.

4.4.2 The Kona Community Development Plan – Amended 2019

The Kona Community Development Plan (CDP) was adopted by the County in September 2008 and amended in 2019. It expands on the broad development patterns set out in the General Plan and provides goals and actions for public facilities, infrastructure, and community services. The vision of the CDP is "a more sustainable Kona characterized by a deep respect for the culture and the environment and residents that responsively and responsibly accommodate change through an active and collaborative community."

Discussion:

The Proposed Action will be incorporated into the North Kona Water System and as a utility will support the planned growth of Kona as provided in the County's General Plan Land Use Allocation Pattern Guide and the Kona CDP's Official Kona Land Use Map. The Proposed Action is intended to develop a water source for the future development of Laʻi ʻŌpua, which is located within the Kona Urban Area where the CDP directs Kona's future development. Therefore, the Proposed Action is consistent and actively supports the CDP.

5.0 FINDINGS AND DETERMINATION

As a requirement of HAR §11-200.1-18 (2019), this chapter provides a description of the proposing agency's anticipated determination for the Project, including findings and reasons supporting the determination.

5.1 ANTICIPATED DETERMINATION

The proposing agency's analysis of the Proposed Action's primary, secondary, cumulative, and short and long-term effects on the environment would result in a determination of either: 1.) the action would have a significant impact on the environment and an Environmental Impact Statement Preparation Notice should be issued, or 2.) the action would not have a significant impact on the environment warranting a Finding of No Significant Impact (FONSI).

To support this anticipated determination, the project's effects on the environment are discussed in relation to the 13 Significance Criteria prescribed under the State Department of Health's Administrative Rules Title 11, Chapter 200.1. The results of the assessments conducted in the following Section 5.2 determine that the proposed project should not have a substantial adverse effect on the surrounding environment.

As a result, the Proposing Agency's anticipated determination is that the Proposed Action would not have a significant impact on the environment based on the criteria set forth in HAR §11-200.1-13, and therefore, through its review and evaluation of the overall impacts discussed in the DEA finds an anticipated FONSI determination is proposed for this Project.

5.2 SIGNIFICANCE CRITERIA FINDINGS

Potential impacts of the Proposed Action have been evaluated in accordance with the 13 significance criteria, pursuant to HAR §11-200.1-13. The following findings and reasons indicate that the Proposed Action will have no significant adverse impacts on the environment, and as a result, supports a Finding of No Significant Impact (FONSI) determination.

(1) Irrevocably commits a natural, cultural, or historic resource.

The Proposed Action would not irrevocably commit a natural, cultural, or historic resource. It is consistent with existing conditions and the surrounding environment and would not adversely affect the Keauhou Aquifer System Area (KASA) that services the North Kona region as discussed in Section 3.4.7. Contractors will adhere to mitigation measures described in Section 3.5.3 to avoid any potential impacts to federal- or state-listed species should they occur at the Project Site.

HRS §6E consultation with SHPD will be completed prior to the start of construction. Mitigation measures discussed in Section 3.6.4 and any proposed by SHPD would be implemented to avoid or minimize impacts to any cultural resources or historic properties identified in the Project Site.

(2) Curtail the range of beneficial uses of the environment.

The Proposed Action would not curtail the range of beneficial uses of the environment. The wells will be sited in an area within the Project Site that produces the least amount of impacts on the site's environment. While it will result in reducing the amount of groundwater available within the KASA, the extraction rate would not cause the aquifer to exceed its sustainable yield as discussed in Sections 3.4.7. Nor would the Proposed Action contribute cumulatively to long-term adverse impacts on the KASA, as discussed in Section 3.14.2.

(3) Conflict with the State's environmental policies or long-term environmental goals established by law.

The Proposed Action would not conflict with the State's environmental policies or long-term environmental goals established by law as discussed in Chapter 5. BMPs and other mitigation measures discussed throughout Chapter 3 would be implemented to avoid or minimize potential impacts associated with the Proposed Action during its construction and operation.

(4) Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.

The Proposed Action would not have direct substantial adverse effects on the economic welfare, social welfare or cultural practices of the community and State. It would create secondary positive impacts on the State's social and economic welfare by establishing a new potable water source for the development of La'i 'Ōpua. This would allow DHHL to provide over 1,000 single family homes, 300 multi-family units, multiple park spaces, a hospital, and commercial centers for native Hawaiian families. Thus, creating a long-term positive effect on the economic and social welfare of the community and State. However, these positive impacts would not be substantial enough to have a direct effect on the level of commerce in Kailua-Kona, the primary commerce center for the region.

The Proposed Action would not substantially impact traditional cultural practices. As discussed in Section 3.7, there are no traditional cultural properties onsite but there are cultural practices and associated resources in the vicinity of the Project Site. Mitigation measures discussed in Section 3.7.1 would be implemented to avoid or reduce any potential impacts to cultural or historic resources that may occur and protect the exercise of traditional and customary native Hawaiian rights in the Project Site.

(5) Have a substantial adverse effect on public health.

The Proposed Action would not have a substantial adverse effect on public health. A Well Construction and Pump Implementation Permit will be obtained for the Proposed Action prior to construction. An engineering report will be submitted to and approved by the DOH CWB before placing the Proposed Action online within the DWS's North Kona Water System. The report will identify all potential sources of contamination, evaluate alternative controls which could be implemented to reduce or eliminate contamination potential, and include a water quality analysis for all regulated contaminants.

Short-term impacts on noise levels and air quality would be minimized by phasing construction of the wells and implementing BMPs to maintain compliance with applicable County and State policies and regulations as discussed in Sections 3.9 and 3.11.

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities.

The Proposed Action would not result in adverse secondary impacts to the social environment or on public facilities. The Proposed Action would facilitate the development of La‘i ‘Ōpua with approximately 1,000 single family homes and 300 multi-family units for DHHL beneficiaries. This would result in secondary impacts such as potentially increasing the population within the Kealakehe Census Tract, which contains La‘i ‘Ōpua.

As discussed within the *DHHL Kealakehe-La‘i ‘Ōpua Regional Plan*, the areas proposed for La‘i ‘Ōpua are consistent with the State Land Use Districts, County General Plan designations, and County Zoning Code. Where there may be land use inconsistencies, DHHL may preempt these pursuant to Hawaiian Homes Commission Act Section 204. Further, the areas are located within the North Kona CDP’s Urban Area, where the CDP directs Kona’s future growth. Therefore, secondary population change associated with the Proposed Action would be the result of planned and orderly development consistent with land use planning policies and ordinances.

The Proposed Action would positively affect the North Kona Water System by creating a redundant water source in case of pump failures at other nearby wells and would not impact other public facilities. As discussed in Section 3.14, the future development of La‘i ‘Ōpua would not adversely affect public facilities and infrastructure.

(7) Involve a substantial degradation of environmental quality.

The Proposed Action would not degrade environmental quality at the Project Site or surrounding area. The wells will be sited within the Project Site in an area that produces the least amount of impacts. Mitigation measures proposed throughout Chapter 3 would be implemented to avoid or minimize impacts on the site’s environment.

While the Proposed Action will result in reducing the amount of groundwater available within the KASA, the extraction rate would not cause the aquifer to exceed its sustainable yield as discussed in Section 3.4 Nor would it contribute cumulatively to long-term adverse impacts on the KASA as discussed in Section 3.14.

(8) Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions.

The Proposed Action will not contribute cumulatively to substantial adverse effects upon the environment, as discussed in Section 3.14. While the Proposed Action is intended to develop a new water source that would result in the future development of La‘i ‘Ōpua, one third of the resulting groundwater would be used by the DWS for municipal uses in the North Kona Water System. Additionally, water use within La‘i ‘Ōpua has been accounted for in the Hawai‘i Water Plan as discussed in Section 3.4. Thus, the Proposed Action would facilitate but does not involve a commitment for larger actions.

(9) Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.

The Proposed Action would not have a substantial adverse effect on rare, threatened, or endangered species or their habitats. No critical habitat occurs within the Project Site, and

mitigation measures and BMPs discussed in Section 3.5 would be implemented during construction and operation of the Proposed Action to minimize impacts to species observed or with the potential to occur at the Project Site.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels.

The Proposed Action would not have a substantial adverse effect on air or water quality or ambient noise levels. The Proposed Action will be constructed over two phases and a Well Construction and Pump Installation Permit will be obtained prior to construction. During Phase I, a single exploratory well will be drilled and then tested to ensure its water quality meets HAR §11-20-29 Rules Relating to Public Water Systems standards. If the quality and quantity of sampled water are satisfactory, then the Proposed Action will proceed to Phase II. Additional mitigation measures discussed in Section 3.4would be implemented to avoid impacts on water quality during construction and operation of the Proposed Action.

Short-term impacts to noise levels and air quality would be minimized by phasing construction of the wells, implementing BMPs and obtaining a Community Noise Permit and Noise Variant Permit, if applicable, to maintain compliance with relevant County and State policies and regulations as discussed in Sections 3.9 and 3.11.

(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.

As discussed in Sections 3.3, 3.4 and 3.12, the Proposed Action will not have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive or naturally hazardous area. The Project Site is located between approximately 1 to 2 miles inland, outside the coastal zone, sea level rise exposure area, tsunami zone and erosion-prone areas. No surface water features are present within the Project Site, thus there is no risk for flooding under normal conditions.

The entire island of Hawai‘i, including the Project Site, is located within the International Building Code (IBC) Seismic Zone 4 which have the highest potential for seismic induced ground movement. Therefore, the Proposed Action will comply with IBC Seismic Zone 4 building standards to reduce potential impacts created by earthquakes or seismic induced ground disturbances.

(12) Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in County or State plans or studies.

The Proposed Action would not have a substantial adverse effect on scenic vistas or viewplanes surrounding the Project Site. As discussed in Section 3.7, the Project Site is not in or near visually sensitive areas or areas of high scenic value. The tallest feature of the Proposed Action is less than 40 feet in height and would be surrounded by rows of coffee trees limiting its visibility mauka of the Project Site

(13) Require substantial energy consumption or emit substantial greenhouse gases.

The Proposed Action will not require substantial amounts of energy during construction or operation, nor will it emit substantial amounts of greenhouse gases. As discussed in Section

3.13.5 the Proposed Action may require between 537 and 4,540 kWh per day of operation which is anticipated to be within HELCO's capacity without adversely affecting service to other customers. Assuming 43 percent of this energy requirement is provided by renewable sources, the Proposed Action could potentially generate between 107 and 908 metric tons of C02 per year. This is close to the same amount as powering between 14 and 121 single-family homes during that same timeframe. However, this amount of C02 per year will likely be reduced over time as the county continues transitioning to a renewable energy resource portfolio standard to reach "net-negative" by 2045. Thus, the Proposed Action may generate little to no C02 within the project's lifespan.

6.0 AGENCIES AND ORGANIZATIONS CONSULTED

As a requirement of HAR §11-200.1-18 (2019), this chapter identifies agencies, citizen groups, and individuals solicited in the preparation of the Draft EA. Consultation with various government agencies, officials, and community members were undertaken to obtain information on agency requirements and comments about potential community issues so that they could be addressed in this Draft EA. Consultation involved distributing a pre-assessment consultation letter with supporting documentation to various parties requesting their written comments. A listing of those parties consulted is below and those providing written responses have been identified with an "✓" symbol. Copies of written comments received and responses to these comments are included in **Appendix A**.

Federal Agencies

U.S. Fish and Wildlife Service
National Parks Service
✓ United States Department of Agriculture – Rural Development

State Legislature

State Senate District 3, Senator Dru Mamo
State House District 6, Representative Nicole E. Lowen

State Agencies

Office of the Governor – West Hawai'i Representative
Department of Agriculture
Department of Business, Economic Development & Tourism
Office of the Hawaiian Affairs
Department of Health:
Director Dr. Bruce Anderson
Department of Land & Natural Resources
Board of Land and Natural Resources
Commission on Water Resource Management
✓ Engineering
Historic Preservation Division - Administrator
Historic Preservation Division - Hawai'i Island Burial Council
✓ Land Division
Po'o o Moku Keawe
Division of Forestry and Wildlife
Department of Transportation

County Agencies

County of Hawai'i Council
Planning Department
Department of Public Works
✓ Department of Water Supply
✓ Hawai'i Police Department

Hawai'i Fire Department

Other Interested Parties

La'i 'Opua Community Association
Hawaiian Electric Company
Hawai'i Gas
Hawaiian Telecom
✓ Spectrum / Charter Communications

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8.0 LIST OF PREPARERS

The following is a list of BCH Design, a Bowers + Kubota Consulting staff who contributed in the development of this EA.

Name	Role	Years of Experience	Still With Company
Jared Chang	Planning Group Manager	19	Yes
Malachi Krishok	Planning Project Manager	10	Yes
Allen Kam	Planning Department Senior Manager	24	No
Matthew Kodama	Assistant Project Manager—Secondary Author	11	No
Sarah Harris	Senior Planner –Primary Author	9	No
Umeyo Momotaro	Planner—Support Staff	4	No
Veronica Leon	Assistant Planner—Support Staff	2	No
Ryan Andersen	Assistant Planner—Support Staff	1	No

APPENDIX A

Pre-Assessment Consultation

APPENDIX B

Flora and Fauna Survey Report

Kailua-Kona Well Flora and Fauna Survey Report

FEBRUARY 2022

PREPARED FOR

Bowers and Kubota Consulting

PREPARED BY

SWCA Environmental Consultants

KAILUA-KONA WELL
FLORA AND FAUNA SURVEY REPORT

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SWCA Project No. 049756.00

February 2022

EXECUTIVE SUMMARY

Bowers and Kubota Consulting requested that SWCA Environmental Consultants (SWCA) conduct a terrestrial flora and fauna biological resources survey for the proposed Kailua-Kona property well site which includes two proposed sites and three water lines on the island of Hawai‘i in North Kona.

This report summarizes the findings of the biological resources survey conducted for the project by SWCA Biologist Danielle Frohlich on December 1, 2021.The vegetation types and plant species identified during the survey are not considered unique. In total, 84 plant species were recorded in the survey area, none of which are native to the Hawaiian Islands. Four of the species found—kukui (*Aleurites moluccana*), breadfruit (*Artocarpus altilis*), ti (*Cordyline fruticosa*), and coconut (*Cocos nucifera*) — were introduced by Polynesians prior to European contact (Wagner et al. 1999). (Wagner et al. 1999). These species are not considered rare and are not federally listed or state-listed as threatened or endangered species, species proposed for listing, or candidate species. No federally listed or state-listed endangered plant species were observed in or near the survey area. Therefore, the proposed project is not expected to have a significant, adverse effect on terrestrial vegetation.

No federally listed or state-listed endangered birds were observed in the survey area. In total, 11 bird species were observed in the survey area, all of which are common, non-native introduced species. Three of the species—cattle egret (*Bubulcus ibis*), house finch (*Haemorhous mexicanus*), and northern cardinal (*Cardinalis cardinalis*)—are protected under the Migratory Bird Treaty Act. No federally listed or state-listed endangered wildlife species were observed in or near the survey area; however, forage and nest habitat for the Hawaiian goose, or nēnē, (*Branta sandvicensis*) and potential roosting trees for the Hawaiian hoary bat (*Lasiurus cinereus semotus*), a federally listed and state-listed endangered mammal, exist in the survey area. The federally listed and state-listed species are discussed in more detail in Section 5.2. Mitigation recommendations to address potential roosting habitat are outlined in the report. The survey area does not overlap critical habitat of any listed terrestrial faunal species. For these reasons, the proposed project is not expected to have a significant, adverse effect on terrestrial wildlife.

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1 INTRODUCTION

Bowers and Kubota Consulting requested that SWCA Environmental Consultants (SWCA) conduct a terrestrial flora and fauna biological resources survey for two proposed sites and three water lines in North Kona on the island of Hawai‘i.

This report summarizes the findings of the flora and fauna survey conducted for the project by SWCA Biologist Danielle Frohlich on December 1, 2021.

2 DESCRIPTION OF THE SURVEY AREA

The survey area is on the west side of the island of Hawaii, above the town of Keauhou off the Kuakini and Mamalahoa Highways (Figures 1 and 2). The flora and fauna survey followed three water lines to two proposed well sites. The water lines crossed several TMK boundaries, some of which were private property. These areas were surveyed using binoculars in an effort to avoid disturbing the landowners. All the sites were located on land currently or previously used for agriculture and residential use. Total area covered during the surveys was 6.43 acres.

Mean annual rainfall for the survey area is approximately 49 inches (1,257 millimeters [mm]). Rainfall is typically highest in July and September and lowest in February (Giambelluca et al. 2013).

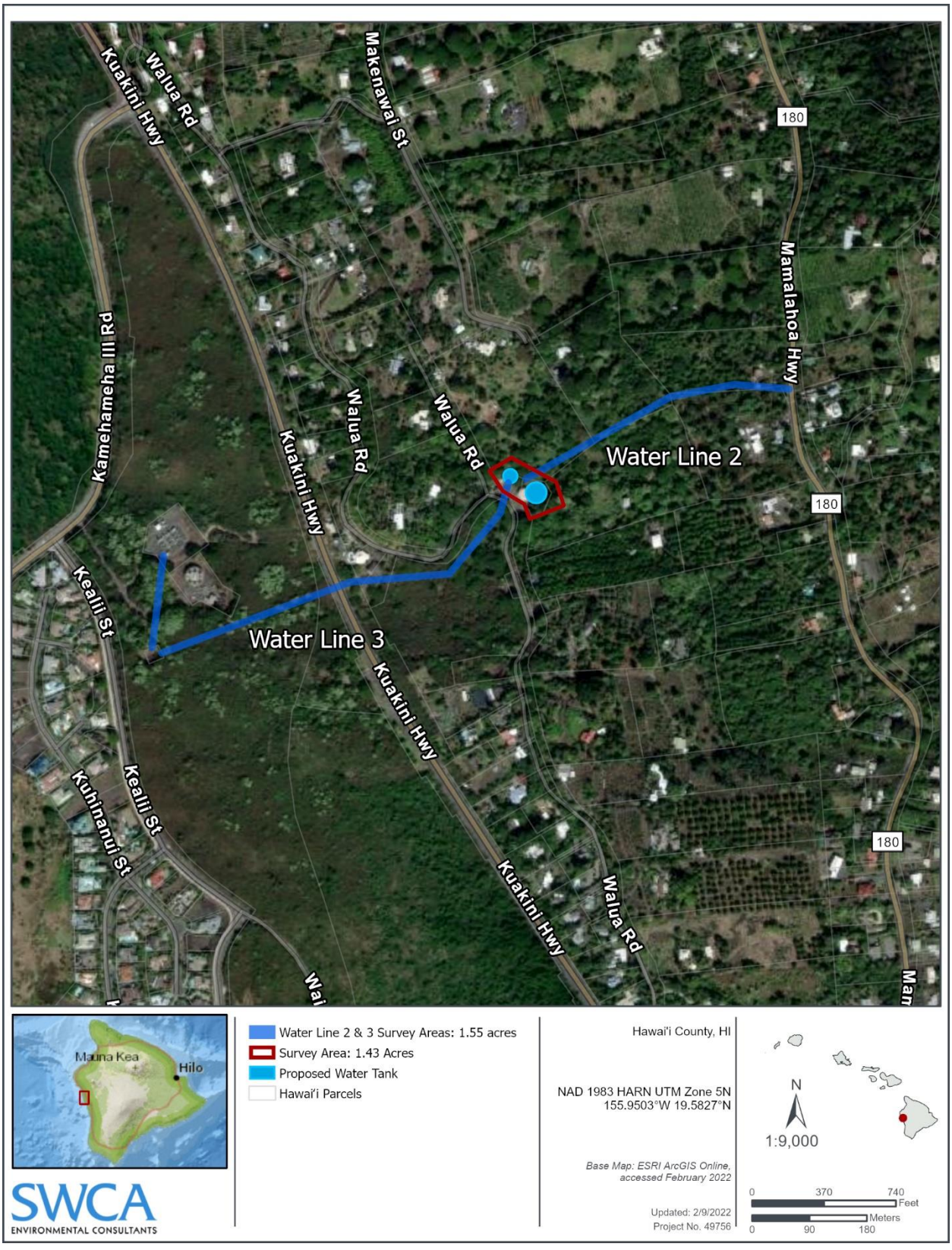


Figure 1. Survey area, northern portion.

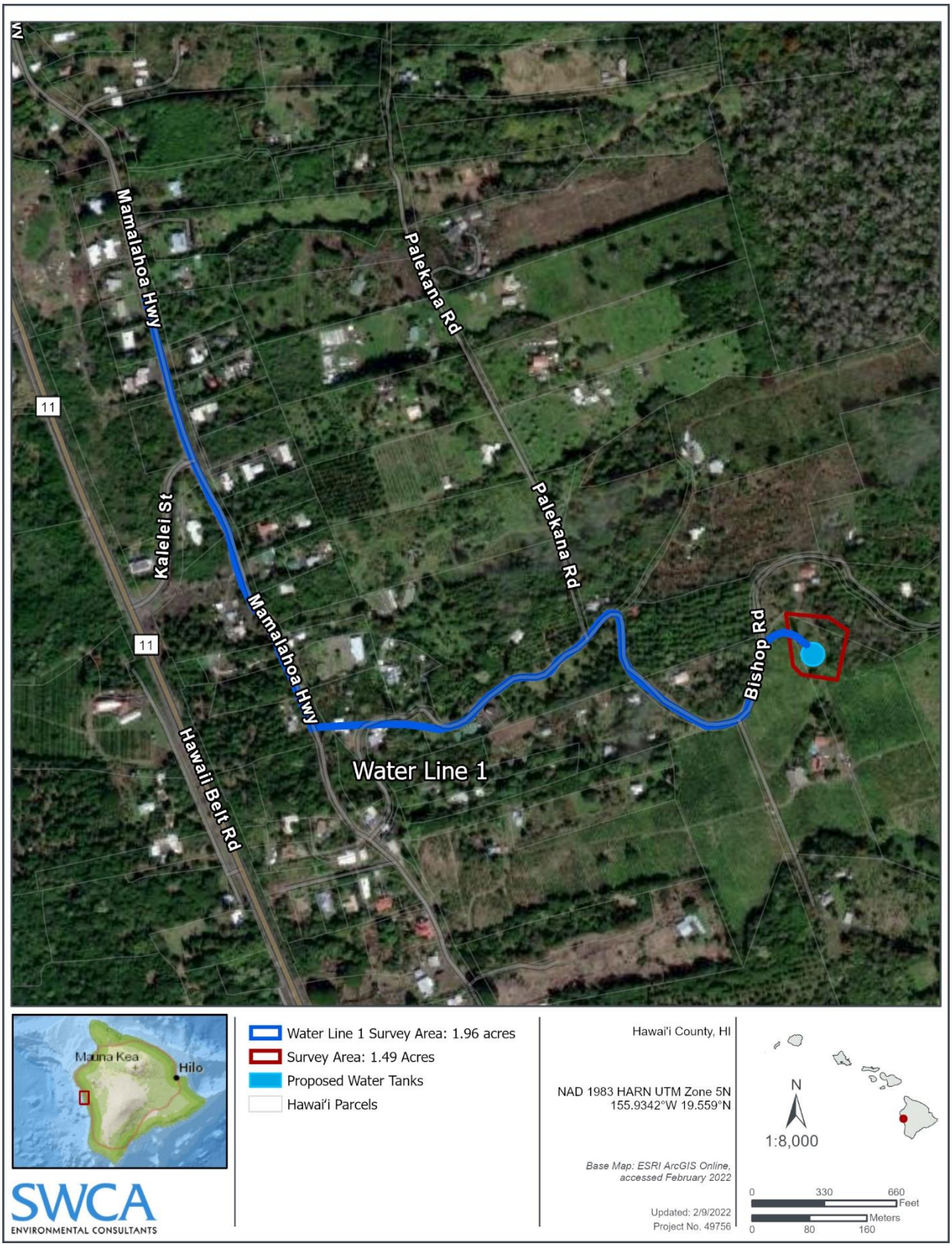


Figure 2. Survey area, southern portion.

3 REGULATORY ENVIRONMENT

This section describes laws and regulations applicable to terrestrial flora and fauna in the context of the project.

3.1 Endangered Species Act

The federal Endangered Species Act (ESA) of 1973, as amended, is regulated by the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration National Marine Fisheries Service and protects wildlife and plant species that have been listed as threatened or endangered. It is designed to conserve the ecosystem on which species depend. Candidate species, which may be listed in the near future, are not afforded protection under the ESA until they are formally listed as endangered or threatened. Section 9 of the ESA and rules promulgated under Section 4(d) of the ESA prohibit the unauthorized take of any endangered or threatened species of wildlife listed under the ESA. Under the ESA, the term *take* means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect species listed as endangered or threatened, or to attempt to engage in any such conduct." As defined in regulations, the term *harm* means "an act that actually kills or injures wildlife; it may include significant habitat modification or degradation, which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (50 Code of Federal Regulations [CFR] 17.3). The rules define *harass* to mean "an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent, as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering" (50 CFR 17.3).

The ESA affords maximum legal protections to species listed as threatened or endangered under the law and also provides authorization for incidental take permits for take that occurs incidental to otherwise legal operations. To comply with federal laws, additional measures must be taken to ensure that take of ESA-listed species does not occur. Any fatality of a listed species should be reported to the USFWS and the Hawai‘i Division of Forestry and Wildlife as soon as possible, and an incident report should be filed within 24 hours of detection of the fatality.

3.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, is regulated by the USFWS and prohibits the take of migratory birds. A list of birds protected under MBTA-implementing regulations is published under 50 CFR 10.13. Unless permitted by regulations, under the MBTA, "it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product" (16 United States Code 703–712). The MBTA provides no process for authorizing incidental take of MBTA-protected birds. As a result, birds that are not covered under the ESA that may be adversely affected by the proposed project cannot be covered by take authorizations. However, the direction of Executive Order 13112 allows for the take of cattle egret (*Bubulcus ibis*) and barn owl (*Tyto alba*) by agencies that have functional and/or jurisdictional responsibility for controlling invasive species and protecting native species in Hawai‘i Furthermore, a recent memorandum from the U.S. Department of the Interior concluded that the MBTA does not prohibit the incidental taking of migratory birds. Regardless, incidental take of individual MBTA-protected species is unlikely to adversely affect the species as a whole; however, any take of MBTA-protected species should be documented and reported in a similar manner to that of any endangered or threatened species of wildlife listed under the ESA.

3.3 Hawai‘i Revised Statutes Chapter 195D

The purpose of Hawai‘i Revised Statutes (HRS) Chapter 195D is “to insure the continued perpetuation of indigenous aquatic life, wildlife, and land plants, and their habitats for human enjoyment, for scientific purposes, and as members of ecosystems.” Section 195D-4 states that any endangered or threatened species of fish or wildlife recognized by the ESA shall be so deemed by the state statute. Like the ESA, under the State of Hawai‘i Division of Forestry and Wildlife the unauthorized take of such endangered or threatened species is prohibited (HRS 195-D-4[e]), but incidental take licenses can be obtained (HRS Section 195D-21). In addition to species protected under the ESA, rules adopted under HRS Section 195D-4 allow for the listing of indigenous species as threatened or endangered due to the following reasons:

- Habitat destruction or alteration (current or predicted)
- Overexploitation
- Disease or predation
- Lack of regulatory mechanisms
- Other factors threatening the species’ continued existence

Determinations are made based on any and all available sources of data (scientific, commercial, and other) and consultation with appropriate agencies (federal, state, and county) and interested organizations and parties.

4 METHODS

SWCA reviewed available scientific and technical literature regarding natural resources in and near the survey area. This literature review encompassed a thorough search of referenced scientific journals, technical journals and reports, environmental assessments, environmental impact statements, relevant government documents, USFWS online data, and unpublished data that provide insight into the area’s natural history and ecology. SWCA also reviewed available geospatial data, aerial photographs, and topographic maps of the survey area. Field surveys were conducted by SWCA biologist Danielle Frohlich on December 1, 2021.

4.1 Flora

SWCA conducted ground (automotive and pedestrian) surveys to document all vascular plant species and vegetation types present in the survey area. Areas more likely to support native plants (e.g., rocky outcrops, gulches, and shady areas) were more intensively examined.

Plants recorded during the survey are indicative of the season (rainy versus dry) and the environmental conditions at the time of the survey. It is likely that additional surveys conducted at a different time of the year would result in minor variations in the species and abundances of plants observed.

The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012).

4.2 Fauna

Fauna surveys consisted of a combination of ground (automotive and pedestrian) surveys of the survey areas. Ground surveys consisted of visual observations (aided by 10 × 42–mm binoculars) and auditory vocalization identifications. All birds, mammals, reptiles, amphibians, and invertebrate macrofauna species that were seen or heard were noted. Any signs, such as scat or tracks, were also noted. Field surveys for special-status fauna were conducted by noting areas of suitable foraging and roosting habitat as indicators of its potential presence; acoustic surveys were not conducted for the federally listed and state-listed Hawaiian hoary bat, or ʻopeʻapeʻa, (*Lasiurus cinereus semotus*).

5 RESULTS

5.1 Flora

No federally listed or and state-listed threatened, endangered, or candidate plant species or rare native Hawaiian plant species were observed in the survey area. In all, 84 plant species were recorded in the survey area, none of which are native to the Hawaiian Islands. Four of the species found—kukui *(Aleurites moluccana),* breadfruit *(Artocarpus altilis),* ti (*Cordyline fruticosa*), and coconut (*Cocos nucifera*) — were introduced by Polynesians prior to European contact (Wagner et al. 1999). Appendix A provides a list of all plant species observed by the SWCA biologist during the December 1, 2021, survey.

The vegetation in the survey area consisted of three main vegetation types: mixed non-native forest, landscaped vegetation, and cultivated fields.

5.1.1 Mixed Non-native Forest

This vegetation type typically consisted of a heterogeneous mix of non-native trees forming the canopy level, from about 3 to 10 meters (m) tall. Canopy species varied depending on location and included opiuma *(Pithecellobium dulce),* kukui, Christmas berry *(Schinus terebinthifolius),* koa haole *(Leucaena leucocephala),* and occasional monkeypod *(Samanea saman),* African tulip tree *(Spathodea campanulata),* and breadfruit. The understory was typically made up of a mix of non-native grasses such as Guinea grass *(Urochloa maxima)* and elephant grass *(Cenchrus purpureus).* Woody non-native understory species included Arabian coffee *(Coffea arabica),* coral berry *(Rivina humilis),* and lantana *(Lantana camara)* (Figure 3). This vegetation type is common along Water Lines 2 and 3 and mixed in among other vegetation types in almost all portions of the survey area.

5.1.2 Landscaped Vegetation

Landscaped areas were primarily located in yards along Bishop Road and Mamalahoa Highway and consisted of a wide variety of cultivated species. Mango *(Mangifera indica)* and avocado *(Persea americana)* were commonly featured, in addition to ornamental species such as agave *(Agave attenuata),* firecracker plant *(Russelia equisetiformis),* and snowbush *(Breynia disticha)* (Figure 4).



Figure 3. Mixed non-native Forest along Water Line 2 on December 1, 2021.



Figure 4. Landscaped vegetation along Mamalahoa Highway (Water Line 1) on December 1, 2021.

5.1.3 Cultivated Fields

Cultivated Arabian coffee (*Coffea arabica*) was found in the Proposed Well 2A footprint at the eastern end of Bishop Road. Most of the coffee plants were between 5 and 12 feet tall and were maintained in rows. Portions of the site are also used for growing fruit trees such as papaya (*Carica papaya*), lychee *(Litchi chinensis),* and rambutan *(Nephelium lappaceum).* The canopy in these areas consists almost entirely of Arabian coffee with a low-growing understory of diverse herbaceous weeds (Figure 5).



Figure 5. Cultivated coffee fields near the proposed Well 2A site.

5.2 Fauna

The fauna observed in the survey area consisted entirely of non-native introductions that tend to be generalist and often occupy a broad range of habitats.

5.2.1 Avifauna

The birds observed in the survey area are species commonly found in disturbed areas on the island of Hawai‘i. In all, 11 bird species were documented, three of which are protected by the MBTA (Table 1). MBTA prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service. These protections apply to the species indicated below even though they have been introduced to the Hawaiian Islands. None of these species are native to the Hawaiian Islands (see Table 1). Forage and nest habitat for the Hawaiian goose, or nēnē, (*Branta sandvicensis*) is present in the survey area. The federally listed and state-listed species are discussed in more detail in Section 5.2.5.

Table 1. Birds Observed by SWCA in and near the Survey Area

Common Name	Scientific Name	Status*	MBTA-Protected
Cattle egret	*Bubulcus ibis*	NN	X
Common myna	*Acridotheres tristis*	NN	
Feral chicken	*Gallus gallus*	NN	
House finch	*Haemorhous mexicanus*	NN	X
Japanese white-eye	*Zosterops japonicus*	NN	
Kalij pheasant	*Lophura leucomelanos*	NN	
Northern cardinal	*Cardinalis cardinalis*	NN	X
Saffron finch	*Sicalis flaveola*	NN	
Spotted dove	*Spilopelia chinensis*	NN	
Yellow-fronted canary	*Crithagra mozambica*	NN	
Zebra dove	*Geopelia striata*	NN	
Total species		**11**	**3**

* Status: NN = non-native permanent resident.

5.2.2 Mammals

Asian mongoose (*Herpestes javanicus*) was the only mammal detected during the surveys. No other mammals were observed during the ground surveys, although feral pig (*Sus scrofa*), small rat (*Rattus* spp.), and mouse (*Mus musculus*) are expected to occur.

The potential for the presence of Hawaiian hoary bat was assessed based on the presence of suitable habitat and vegetation types; an acoustic survey was not conducted. Hawaiian hoary bats forage and roost in pastures, croplands, orchards, forests, and developed lands such as golf courses, urban areas, and suburban yards. Hawaiian hoary bats are solitary and roost in exotic and native woody vegetation. They could forage throughout the survey area and roost in the trees in the survey area. The birthing and pup-rearing season typically occurs between June 1 and September 15. It is common for adult females to leave flightless young unattended in "nursery" trees and shrubs while foraging.

5.2.3 Terrestrial Reptiles and Amphibians

No terrestrial reptiles or amphibians are native to Hawai'i; one brown anole *(Anolis sagrei)* was detected during the ground surveys.

5.2.4 Insects and Other Invertebrates

Ten invertebrate individuals were observed during the survey, eight of which were identified to the genus or species level. All invertebrates observed are non-native introductions. The species observed include yellow crazy ant (*Anoplolepis gracilipes*), an unidentified grasshopper, a leaf katydid (Tettigoniidae), honeybee (*Apis mellifera),* passion butterfly (*Agraulis vanillae*), monarch butterfly (*Danaus plexippus*), aedes mosquito (*Aedes* sp.), rosy wolfsnail (*Euglandina rosea*), an unidentified fly (*Musca* sp.), and Hawaiian garden spider (*Argiope appensa*). All are common on the island of Hawai'i.

5.2.5 Special-Status Fauna

Special-status fauna are wildlife species listed by the USFWS and the State of Hawai‘i as threatened, endangered, or candidate. The survey area does not encompass any designated or proposed critical habitat for threatened or endangered fauna species. This section discusses the special-status species observed in the survey area and the special-status species that have the potential to occur in the survey area based on historical records and available habitat.

5.2.5.1 HAWAIIAN HAWK

The Hawaiian hawk is the only broad-winged hawk that breeds on the Big Island of Hawai‘i (USFWS 2012). They can be found from sea level to above 8,990 feet (2,740 m) (Pyle and Pyle 2009). Surveys in 2007 indicated that approximately 3,085 Hawaiian hawks inhabited the Big Island (Gorressen et al. 2008). These hawks construct their nests approximately 2 months before laying eggs, and the nests may be used for several years as the hawks add new material. Nest trees are typically 32.81 to 78.74 feet (10.0–24.0 m) in height, and the nests are typically located 11.48 to 59.06 feet (3.5–18.0 m) above the ground. Nest trees have a diameter at breast height averaging 19.68 inches (50 centimeters [cm]), although some trees with a diameter at breast height of 4.02 inches (10.2 cm) are used. Nests are constructed on stable platforms such as on top of birds-nest ferns (*Asplenium nidus*), in the crotches of tree trunks, on branches 7.87 to 19.67 inches (20–50 cm) in diameter, and at the intersections of the trunks and branches smaller than 7.87 inches (20 cm) in diameter (Griffin et al. 1998).

5.2.5.2 HAWAIIAN GOOSE

The Hawaiian goose is known to occupy various habitat types ranging from beach strand, shrubland, and grassland to lava rock at elevations ranging from coastal lowlands to alpine areas (Banko 1988; Banko et al. 1999). The Hawaiian goose has an extended breeding season, with eggs reported from all months except May, June, and July, although most of the birds in the wild nest during the rainy (winter) season between October and March (Banko et al. 1999; Kear and Berger 1980). Hawaiian geese nest on the ground in a shallow scrape in the dense shade of a shrub or other vegetation. During molt, adults are flightless for a period of 4 to 6 weeks. Molt occurs after hatching of eggs, such that the adults generally attain their flight feathers at about the same time as their offspring. When flightless, goslings and adults are extremely vulnerable to predators such as dogs, cats, and mongoose. From June to September, family groups join others in post-breeding aggregations (flocks), often far from nesting areas.

5.2.5.3 HAWAIIAN HOARY BAT

Hawaiian hoary bats are known to occur in native, non-native, agricultural, and developed landscapes (U.S. Department of Agriculture 2009; USFWS 1998). Hawaiian hoary bats forage in open, wooded, and linear habitats with a wide range of vegetation types. These animals are insectivores and are regularly observed foraging over streams, reservoirs, and wetlands up to 300 feet (100 m) offshore (U.S. Department of Agriculture 2009). Hawaiian hoary bats typically roost in trees greater than 16 feet (5 m) with dense canopy foliage or in subcanopy when canopy is sparse, with open access for launching into flight (Gorressen et al. 2013; U.S. Department of Agriculture 2009). Hawaiian hoary bats have been documented roosting in avocado (*Persea americana*) and Chinese banyan (*Ficus microcarpa*) trees. These and trees similar in structure provide suitable Hawaiian hoary bat roost habitat in the landscaped vegetation and cultivated fields vegetation types within the survey area. Suitable Hawaiian hoary bat forage habitat is present, and foraging may occur over the landscaped vegetation and cultivated field vegetation types within the survey area.

5.2.5.4 HAWAIIAN WATERBIRDS

Listed Hawaiian waterbirds, which include Hawaiian stilt, ae'o *(Himantopus mexicanus knudseni),* Hawaiian coot, 'alea kea *(Fulica alai),* and Hawaiian duck, or koloa, *(Anas wyvilliana)* are found in freshwater and brackish-water marshes and natural or man-made ponds. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur.

6 POTENTIAL IMPACTS

6.1 Hawaiian Hawk

Because no Hawaiian hawk nests were seen and their presence is unlikely in the survey area, impacts to nesting individuals, chicks, and eggs are unlikely. Foraging hawks may be temporarily displaced from the survey area during construction because of the presence of human noise and activity. However, because the area is largely residential, it is likely that local hawks are habituated to human noise and may not be greatly affected. The surrounding area provides a relatively large area of homogeneous habitat suitable for Hawaiian hawk foraging. Because of this, it is likely that sufficient prey would be available nearby until construction is completed. After construction, birds are expected to return to the survey area to forage.

6.2 Hawaiian Goose

Direct impacts to the Hawaiian goose could occur during vegetation removal if a nest is damaged or goslings are separated from adults. However, direct impacts are unlikely to occur because conservation measures would be implemented as described in Section 7.2.2.

In the short term, the human noise and disturbance associated with construction activities could temporarily displace the Hawaiian goose from nesting and/or foraging habitats. Displacement from available nesting and/or foraging habitat could impact the health of these individuals; however, because a small amount of foraging habitat would be removed, it would not likely affect nest success or population growth. Furthermore, foraging and nesting habitat is available adjacent to the survey area, into which the Hawaiian goose could move.

6.3 Hawaiian Hoary Bat

Direct effects to bats would occur only if a juvenile bat that is too small to fly but too large to be carried by a parent is present in a tree that is cut down. However, direct impacts are unlikely to occur if conservation measures would be implemented as described in Section 7.2.3.

6.4 Hawaiian Waterbirds

If the project will create, either purposefully or inadvertently, any kind of temporary or permanent standing water, including excavation or grading for construction or roadwork, it may attract Hawaiian waterbirds to the site. In particular, the Hawaiian stilt is known to nest in sub-optimal locations if water is present. Hawaiian waterbirds attracted to sub-optimal habitat may suffer adverse impacts, such as predation and reduced reproductive success, and thus the project may create an attractive nuisance. However, direct impacts are unlikely to occur because conservation measures would be implemented as described in Section 7.2.4

7 AVOIDANCE AND MINIMIZATION MEASURES

7.1 Flora

Overall, the vegetation in the survey area has been disturbed from previous and current land use activities. The vegetation types and species identified are not considered unique. No plants listed as threatened or endangered were found during the survey, and no designated plant critical habitat occurs in the area. Therefore, the proposed project is not expected to have a significant adverse effect on flora (botanical) resources.

Weedy, non-native plant species are common in the survey area. Most of these weedy species are widespread in Hawai‘i, and their control is not expected to result in a significant decrease in their number or distribution. However, construction activities are known to spread invasive species to new areas through the movement of vehicles and materials. For this reason, SWCA recommends the following invasive species minimization measures to avoid the unintentional introduction or transport of new invasive plant species to Hawai‘i Island and/or the survey area:

- All construction equipment and vehicles should be washed and inspected before entering the survey area.
- Construction materials should also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles, and insects).
- Inspection and cleaning activities should be conducted at a designated location. The inspector should be a qualified botanist and/or entomologist who is able to identify invasive species that are of concern relevant to the point of origin of the equipment, vehicle, or material.
- When possible, raw materials (e.g., fill and construction materials) should be purchased from a local supplier to avoid introducing non-native species not yet present on the island.

If landscaping occurs as part of the project, native Hawaiian plants or non-invasive plants should be used to the maximum extent possible. If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive could be substituted. Additional information on selecting appropriate plants for landscaping can be obtained from the following online sources:

- Plant Pono: http://www.plantpono.org/
- Native Plants Hawai‘i: http://nativeplants.hawaii.edu/

7.2 Fauna

Regular on-site staff should be trained to identify special-status species that have the potential to occur on-site and should know the appropriate measures to be taken if they are present. To minimize potential impacts to fauna, measures should be followed, as detailed in the following sections. The measures can also be found at https://www.fws.gov/pacificislands//articles.cfm?id=1494897.

7.2.1 Hawaiian Hawk

- If work must be conducted during the March 1 through September 30 Hawaiian hawk breeding season, have a qualified biologist conduct a nest search of the survey area and surrounding areas immediately prior to the start of construction activities.

- Pre-construction surveys for Hawaiian hawk are valid for 14 days. If disturbance for the survey area does not occur within 14 days of the survey, an additional survey is required.
- No vegetation clearing or construction activities should occur within 1,600 feet of any active Hawaiian hawk nest until the chicks have fledged.
- No trimming or cutting trees containing an active or inactive Hawaiian hawk nest is allowed, as nests may be re-used for consecutive breeding seasons.

7.2.2 Hawaiian Goose

- Hawaiian geese should not be approached, fed, and/or disturbed.
- If Hawaiian geese are observed loafing or foraging within the survey area during the Hawaiian geese breeding season (September through April), a qualified biologist should survey for nests in and around the survey area prior to the resumption of any work. Surveys should be repeated after any subsequent delay of work of 3 or more days.
- If a nest is found within a 150-foot (46-m) radius of proposed work, or if a previously undiscovered nest is found within said radius after work begins, all work should cease immediately and the USFWS should be contacted for further guidance.
- In areas where Hawaiian geese are known to occur, speed limits should be posted and implemented, and project personnel should be notified of their presence.

7.2.3 Hawaiian Hoary Bat

- If felling of standing trees occurs during the bat breeding season, direct impacts could occur to juvenile bats that are too small to fly but too large to be carried by a parent. To minimize this impact, no trees taller than 15 feet (4.6 m) should be trimmed or removed between June 1 and September 15.
- The use of barbless wire is recommended for all fence construction to avoid entanglement of Hawaiian hoary bats.

7.2.4 Hawaiian Waterbirds

- In areas where waterbirds are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site or nearby.
- If water resources are located within or adjacent to the project site, incorporate the applicable best management practices regarding work in aquatic environments into the project design.
- Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the proposed project site prior to project initiation. Repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest).

If a nest or active brood is found:

- Contact the Service within 24 hours for further guidance.
- Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.

- Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth-moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.

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APPENDIX A

Survey Plant List

Table A-1 provides an inventory checklist of plant species observed by SWCA on December 1, 2021, in the survey area for the Kailua-Kona Well flora and fauna survey. The plant names are arranged alphabetically by family and then by species into four groups: dicots, monocots, gymnosperms, and pteridophytes. The taxonomy and nomenclature are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012).

Table A-1. Checklist of Native Plants Observed in the Survey Area of the Kailua-Kona Property Proposed Well and Water Line Sites on December 1, 2021.

Family	Scientific Name and Authorship	Hawaiian and/or Common Name	Status
DICOTS			
Acanthaceae	*Barleria repens* Nees	small bush violet	X
Acanthaceae	*Justicia betonica* L.	white shrimp plant, squirrel's-tail	X
Acanthaceae	*Odontonema cuspidatum* (Nees) Kuntze	firespike	X
Anacardiaceae	*Mangifera indica* L.	mango, manakō	X
Anacardiaceae	*Schinus terebinthifolius* Raddi	Christmas berry, wilelaiki	X
Araliaceae	*Schefflera actinophylla* (Endl.) Harms	octopus tree, umbrella tree	X
Araliaceae	*Schefflera arboricola* (Hayata) Merr.	dwarf umbrella tree	X
Asteraceae	*Ageratum conyzoides* L.	maile hohono, maile honohono, maile kula	X
Asteraceae	*Bidens pilosa* L.	Spanish needle, beggartick	X
Asteraceae	*Elephantopus mollis* Kunth	elephant's-foot	X
Asteraceae	*Montanoa hibiscifolia* (Benth.) Standl.	tree daisy	X
Bignoniaceae	*Jacaranda mimosifolia* D.Don	jacaranda	X
Bignoniaceae	*Spathodea campanulata* P.Beauv.	African tulip tree, fountain tree	X
Cactaceae	*Hylocereus undatus* (Haw.) Britton & Rose	night-blooming cereus	X
Caricaceae	*Carica papaya* L.	papaya, mīkana, hē'ī, milikana, papaia, pawpaw	X
Clusiaceae	*Clusia rosea* Jacq.	autograph tree, copey, Scotch attorney	X
Convolvulaceae	*Ipomoea obscura* (L.) Ker Gawl.	morning glory	X
Cucurbitaceae	*Momordica charantia* L.	balsam pear, bitter melon	X
Cucurbitaceae	*Sechium edule* (Jacq.) Sw.	pipinella, chayote, choko	X
Euphorbiaceae	*Aleurites moluccana* (L.) Willd.	kukui, kuikui, candlenut	P
Euphorbiaceae	*Breynia disticha cv.* 'Roseo-picta'	snowbush, laukalakoa	X
Euphorbiaceae	*Codiaeum variegatum* (L.) Blume	croton	X*
Euphorbiaceae	*Euphorbia heterophylla* L.	kaliko, spurge	X
Euphorbiaceae	*Jatropha curcas* L.	physic nut	X
Euphorbiaceae	*Macaranga mappa* (L.) Müll.Arg.	bingabing	X
Euphorbiaceae	*Macaranga tanarius* (L.) Müll.Arg.		X
Fabaceae	*Canavalia cathartica* Thouars	maunaloa	X
Fabaceae	*Desmodium tortuosum* (Sw.) DC.	Florida beggarweed	X
Fabaceae	*Desmodium triflorum* (L.) DC.	tick trefoil, tick clover	X
Fabaceae	*Leucaena leucocephala* (Lam.) de Wit	koa haole	X

Family	Scientific Name and Authorship	Hawaiian and/or Common Name	Status
Fabaceae	*Neonotonia wightii* (Wight & Arn.) Lackey	perennial soybean	X
Fabaceae	*Pithecellobium dulce* (Roxb.) Benth.	ʻopiuma	X
Fabaceae	*Samanea saman* (Jacq.) Merr.	monkeypod, rain tree	X
Fabaceae	*Senna surattensis* (Burm.f.) H.S.Irwin & Barneby	kolomona, kalamona	X
Lamiaceae	*Hyptis pectinata* (L.) Poit.	comb hyptis	X
Lauraceae	*Persea americana* Mill.	avocado, alligator pear	X
Malvaceae	*Hibiscus rosa-sinensis* L.	hibiscus	X*
Malvaceae	*Malvaviscus penduliflorus* DC.	Turk's cap, aloalo pahūpahū	X
Malvaceae	*Pachira aquatica* Aubl.	Malabar chestnut	X*
Malvaceae	*Sida spinosa* L.	prickly sida	X
Melastomataceae	*Arthrostemma ciliatum* Pav. ex D.Don	pinkfringe	X
Moraceae	*Artocarpus altilis* (Parkinson ex Z) Fosberg	breadfruit	P
Moraceae	*Ficus microcarpa* L.f.	Chinese banyan, Malayan banyan	X
Myrtaceae	*Eugenia uniflora* L.	Surinam cherry, pitanga	X
Myrtaceae	*Psidium guajava* L.	common guava, kuawa	X
Nyctaginaceae	*Bougainvillea spectabilis* Willd.	bougainvillea	X*
Oleaceae	*Noronhia emarginata* (Lam.) Poir.	Madagascar olive	X
Oleaceae	*Olea europaea* subsp. *cuspidata* (Wall. ex G.Don) Cif.	olive, ʻoliwa, ʻoliwa haole	X
Passifloraceae	*Passiflora edulis* Sims	passion fruit, purple granadilla, purple water lemon, liliko‘i	X
Passifloraceae	*Passiflora suberosa* L.	huehue haole	X
Phytolaccaceae	*Rivina humilis* L.	coral berry, rouge plant	X
Plantaginaceae	*Russelia equisetiformis* Schltdl. & Cham.	firecracker plant	X*
Plumbaginaceae	*Plumbago auriculata* Lam.		X
Proteaceae	*Macadamia integrifolia* Maiden & Betche	macadamia	X
Rosaceae	*Rubus rosifolius* Sm.	thimbleberry, Mauritius raspberry, ōlaʻa, ʻākala, ʻākalakala	X
Rubiaceae	*Coffea arabica* L.	Arabian coffee	X
Rutaceae	*Murraya paniculata* (L.) Jack	mock orange	X
Sapindaceae	*Litchi chinensis* Sonn.	lychee	X*
Sapindaceae	*Nephelium lappaceum* L.	rambutan	X*
Tiliaceae	*Triumfetta semitriloba* Jacq.	Sacramento bur	X
Verbenaceae	*Lantana camara* L.	lākana, lantana	X
MONOCOTS			
Agavaceae	*Agave attenuata* Salm-Dyke	agave	X*
Agavaceae	*Cordyline fruticosa* (L.) A.Chev.	kï, ti	P
Agavaceae	*Dracaena marginata* Lamarck	dragon tree	X*
Agavaceae	*Dracaena reflexa* Lamarck	song of India	X*
Agavaceae	*Sansevieria trifasciata* Prain	snake plant	X

Family	Scientific Name and Authorship	Hawaiian and/or Common Name	Status
Araceae	*Epipremnum pinnatum* (L.) Engl.	pothos, golden pothos	X
Araceae	*Monstera deliciosa* Liebm.	monstera	X*
Arecaceae	*Cocos nucifera* L.	niu, ololani, coconut	P
Arecaceae	*Dypsis lutescens* (H.Wendl.) Beentje & J.Dransf.	areca palm	X*
Arecaceae	*Roystonea regia* (Kunth) O.F.Cook	royal palm	X
Commelinaceae	*Commelina diffusa* Burm.f.	honohono, honohono wai, mākolokolo, dayflower	X
Costaceae	*Cheilocostus speciosus* (J.Kōnig) C.Specht	crepe ginger, Malay ginger, spiral flag	X
Liliaceae	*Asparagus plumosus* Baker	asparagus fern	X
Musaceae	*Musa* hybrid	banana, apple banana	X*
Poaceae	*Cenchrus purpureus* (Schumach.) Morrone	elephant grass, Napier grass	X
Poaceae	*Echinochloa crus-galli* (L.) P. Beauv.	barnyard grass	X
Poaceae	*Melinis minutiflora* P.Beauv.	molasses grass	X
Poaceae	*Urochloa maxima* (Jacq.) R.D.Webster	Guinea grass	X
GYMNOSPERMS			
Araucariaceae	*Araucaria columnaris* (G.Forst.) Hook.	Cook pine	X
PTERIDOPHYTES			
Nephrolepidaceae	*Nephrolepis brownii* (Desv.) Hovenkamp & Miyam.	Asian sword fern	X
Polypodiaceae	*Phlebodium aureum* (L.) J.Sm.	laua'e haole, rabbit's-foot fern, golden polypody	X
Pteridaceae	*Pityrogramma calomelanos* (L.) Link	silverfern, silverback fern	X
Pteridaceae	*Pteris vittata* L.	ladder brake, cliff brake, Chinese brake	X
Thelypteridaceae	*Cyclosorus parasiticus* (L.) Farw.	parasitic maiden fern	X

Notes: P = Polynesian introduced; P? = probably Polynesian introduced but possibly introduced in historic times; I = indigenous; I? = probably indigenous but possibly naturalized; E= endemic; E? = probably endemic but possibly naturalized (Wagner et al. 1999:126-127); X = non-native; X* = non-native cultivated.

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APPENDIX C

Archaeological Literature Review and Field Inspection Report

Draft
Archaeological Literature Review and Field Inspection for the DHHL 2.0 MG Water Storage Tank and Transmission Lines Construction Project, Kahaluʻu and Keauhou 1-2 Ahupuaʻa, North Kona District, Hawaiʻi Island, TMKs: [3] 7-8-004:010, 013, 014, 015, 019, 039, 072, 999; 7-8-009:014, 029, 032, 054, 068, 069, 070, 077, 078, 999; 7-8-010:020, 050, 999

Prepared for
Bowers + Kubota Consulting
on behalf of
Department of Hawaiian Home Lands

Prepared by
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Cultural Surveys Hawaiʻi, Inc.
Kailua, Hawaiʻi
(Job Code: KEAUHOU 22)

May 2022

Reference	Archaeological Literature Review and Field Inspection for the DHHL 2.0 MG Water Storage Tank and Transmission Lines Construction Project, Kahaluʻu and Keauhou 1-2 Ahupuaʻa, North Kona District, Hawaiʻi Island, TMKs: [3] 7-8-004:010, 013, 014, 015, 019, 039, 072, 999; 7-8-009:014, 029, 032, 054, 068, 069, 070, 077, 078, 999; 7-8-010:020, 050, 999 (Bautista et al. 2022)
Date	May 2022
Project Number(s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: KEAUHOU 22
Investigation Permit Number	CSH completed the field inspection under archaeological fieldwork permit numbers 20-17 and 22-02, issued by the Hawaiʻi State Historic Preservation Division (SHPD) per Hawaiʻi Administrative Rules (HAR) §13-13-282.
Agencies	Department of Hawaiian Home Lands (DHHL); Hawaiʻi County Water Department; United States Department of Agriculture (USDA), SHPD
Land Jurisdiction	State of Hawaiʻi, County of Hawaiʻi, private; see Appendix A for a breakdown of land jurisdiction by parcel.
Project Proponent	DHHL Andrew H. Choy Acting Planning Program Manager Department of Hawaiian Home Lands 91-5420 Kapolei Parkway, Kapolei, HI 96707 P.O. Box 1879, Honolulu, HI 96805 Phone: (808) 620-9279 Fax: (808) 620-9559 Email: Andrew.H.Choy@hawaii.gov
DHHL Planning and Engineering Consultant for the Project	Matthew Kodama Bowers + Kubota Consulting Bowers + Kubota Management 94-408 Akoki Street, Suite 201-A Waipahu, Hawaiʻi 96797 Phone: (808) 521-5361 Fax: (808) 538-7819 Email: mkodama@bowersandkubota.com
Project Location	The project area is located within the adjoining *ahupuaʻa* (traditional land division) of Kahaluʻu and Keauhou in the North Kona district of Hawaiʻi Island. It comprises two discrete portions, one situated fully within upland Kahaluʻu Ahupuaʻa to the north, and the other fully within upland Keauhou to the south. The project area is depicted on portions of the Kailua (1996) and Kealakekua (1996) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles on Hawaiʻi Island (Figure 1), tax map plats (Figure 2 through Figure 4), and a

	2018 aerial photograph (Figure 5 through Figure 7).
Project Description and Related Disturbance	The project involves drilling a potentially 24-inch diameter hole for a new well and construction of a 2-million-gallon water storage tank and associated control building. Surface laid pipelines will transport water between the tank and existing infrastructure via existing and/or proposed pipeline routes (Figure 8 through Figure 11). Ground disturbance would involve drilling for the new well, grading of the tank facility site and an associated access road, and excavation for installation of underground utilities.
Project Area Geographic Extent	The project area comprises approximately 4.3672 acres in Kahaluʻu and 3.4546 acres in Keauhou, with an overall total of 7.8218 acres (3.1654 hectares). The project area includes portions of numerous land parcels; a breakdown of project acreage by parcel is provided in Appendix A
Historic Preservation Regulatory Context	As a state (DHHL) project located on public and private lands, this project is subject to Hawaiʻi State historic preservation review legislation (Hawaiʻi Revised Statutes [HRS] §6E-8 and HAR §13-275).
Document Purpose	This investigation was conducted—through historical, cultural, and archaeological background research and a field inspection of the project area—to determine the likelihood that archaeological historic properties may be affected by the project. This document is intended to facilitate the project's planning and support the project's historic preservation review compliance. This investigation does not fulfill the requirements of an archaeological inventory survey (AIS) investigation, per HAR §13-276. This information also supports DHHL's consultation with the SHPD regarding the project's necessary historic preservation review steps pursuant to HAR §13-275.
Built Environment	The project area is situated on the outskirts of Kailua-Kona, amongst residential and agricultural plots above the community of Keauhou. It is within the limits of the traditional Kona Field System, a large agricultural belt spanning the western slopes of Mauna Loa and Hualālai. The Kona Field System is characterized by a pattern of low earthen and/or rock walls bounding open planting fields. The lands of the project area are accessed primarily via the Hawaiʻi Belt Road (Route 11) and the Old Māmalahoa Highway (Route 180), and portions of the project area are along other secondary roadways. The northern portion of the project area in Kahaluʻu extends *makai* (seaward) from the Old Māmalahoa Highway through agricultural lots and disturbed forested areas, connecting to an existing fenced County Department of Water Supply (DWS) tank facility on Wailua

	Road. The proposed pipeline route in this area is within an existing, 20-ft-wide pipeline easement. From the BWS tank the project route continues *makai*, crossing Hawai‘i Belt Road into a largely undeveloped area containing an old railroad berm. The project area terminates at an existing graded water tank site and electrical substation accessed from Kamehameha III Road. The southern portion of the project area in Keauhou extends *makai* from a proposed tank site situated along the edge of a coffee farm. The proposed pipeline route extends from the tank site along Bishop Road, cutting across a private property near the bottom to intersect Old Māmalahoa Highway. The proposed pipeline runs north along Old Māmalahoa Highway approximately 0.6 miles.
Natural Environment	The project area is situated along the western slope of Hualālai Volcano on the leeward side of Hawai‘i Island. The westernmost extremities of the project area are between approximately 0.75 miles (in Kahalu‘u) and 1.0 mile (in Keauhou) back from the coast. The natural topography in the vicinity is moderately sloping to the west. Elevations within the project area extend from approximately 550–1,650 feet (ft) above mean sea level (amsl). This area receives mean annual rainfall of approximately 50 inches (Giambelluca et al. 2013). The vegetation encountered within the project area consists of primarily introduced species including Christmas berry (*Schinus terebinthifolius*), *haole koa* (*Leucaena leucocephala*), cecropia (*Cecropia obtusifolia*), autograph tree (*Clusia rosea*), strawberry guava (*Psidium cattleianum*), various vines and grasses, and cultivars such as macadamia nut (*Macadamia* spp.), coffee (*Coffea* spp.), breadfruit (*Artocarpus altilis*), banana (*Musa* spp.), avocado (*Persea americana*), papaya (*Carica papaya*), and mango (*Mangifera indica*). Occasional *kukui* (*Aleurites moluccana*) and *tī* (*Cordyline fruticosa*) were also observed. Soil survey data indicates the project area is underlain by five distinct soil types (Figure 12). The Kahalu‘u portion of the project area is predominately underlain by Punaluu extremely rocky peat, 6-20% slopes (rPYD), with some areas of Kaimu extremely stony peat, 7-25% slopes (rKED) along the pipeline corridors (see Figure 12). The Punaluu series soils consist of well-drained, thin organic soils that developed over *pāhoehoe* lava, used primarily for pasture (Sato et al. 1973:48). The Kaimu series soils consist of well-drained, thin organic soils that developed over *‘a‘ā* lava; mostly in native woodland, small areas are also used for pasture, macadamia nuts, papaya, and citrus fruits (Sato et al. 1973:21–22). The Keauhou portion of the project area overlies an area of Punaluu extremely

	rocky peat, 6-20% slopes (rPYD) at it northern extremity; it also crosses through areas of Puna extremely stony muck, 3-25% slopes (rPXE); Kona extremely rocky muck, 6-20% slopes (rKYD); and Honaunau extremely rocky silty clay loam, 6-20% slopes (HRD) (see Figure 12). The Puna series consists of well-drained, thin, extremely stony organic soils over fragmented *ʻaʻā* lava, used for woodland, pasture, and orchards (Sato et al. 1973:48). The Kona series consists of well drained, thin organic soil over *pāhoehoe* lava bedrock, used mostly for pasture and watershed with small areas of coffee and macadamia nuts (Sato et al. 1973:32). The Honaunau series soils consist of moderately well drained silt loams that formed in volcanic ash, used for pasture, woodland, and wildlife habitat (Sato et al. 1973:18).
Background Research Methods	Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai‘i, the Hawai‘i State Archives, the Hawaiian Mission Children’s Society Library and Archives, the Hawai‘i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai‘i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona ʻAina database (Waihona ʻAina 2021). This research provided the environmental, cultural, historic, and archaeological background for the project area.
Background Research Summary	**<u>Traditional Background</u>** The *ahupuaʻa* of Keauhou and Kahaluʻu have typically been thought of as a unit, both in traditional Hawaiian times and by subsequent researchers. Based on radiocarbon data, Burtchard et al. (1996:54) suggest the earliest settlement in Kona began around AD 900. Early settlement is suggested to be marine resource oriented, with habitation probably focused around Keauhou and Kahaluʻu Bay. Kin-based social and economic ties linked coastal areas in the vicinities of the bay. By AD 1300, upland areas at least 4,000 ft inland were cultivated; Burtchard (1996:83) cites a calibrated date of AD 1350 from a midden next to a habitation platform in Keauhou *mauka* (inland, toward the mountain). This pattern is suggested to be the origin of the Kona Field System (State Inventory of Historic Places [SIHP] # 50-10-37-06601), which developed from lower elevations farther inland after this time (Tuggle 1989:18). Expansion and intensification of agriculture into higher elevations and more formalized planting fields took place in response to population

growth and a shift of political power to the Kona Region (Tomonari-Tuggle 1985:15–19).

During the early sixteenth century the ruling chief ʻUmi-a-Līloa moved his court to Kona, stopping for a time at the Ahu-A-ʻUmi in the uplands of Keauhou 2 (Baker 1917:63; see also Fornander 1917:4[2]:232). While ʻUmi's place of residence in Kona is usually tied to the Kailua area, the *heiau* (pre-Contact place of worship) Pā-o-ʻUmi (SIHP # 50-10-37-03823), reportedly a *heiau hoʻouluulu ʻai* (a temple dedicated to the abundance of agricultural crops), was built by ʻUmi-a-Līloa above Kahaluʻu Village (Maly and Maly 2004:8; Stokes and Dye 1991:80–81). Furthermore, the ruling chief, Lono-i-ka-makahiki, a grandson of ʻUmi-a-Līloa, is said to have resided in coastal Kahaluʻu Ahupuaʻa at an impressive high-walled complex (the Lono-i-ka-makahiki Residence; Fornander 1917:4[2]:356).

Tomonari-Tuggle (1985) suggests the creation of refuge-type openings at major lava tubes like ʻŌhiʻa Cave in Kahaluʻu was undertaken for purposes of concealment during the wars and political instability of this period. Habitation, particularly high-status habitation, appears to have focused on the lands along the back of Kahaluʻu Bay, proximate to extensive inshore reefs and brackish and freshwater ponds. Other habitation areas extended to the south, to Heʻeia and Keauhou bays, and were scattered among the agricultural fields.

When Captain Cook died in 1779, it is said that the ruling chief Kalaniʻōpuʻu resided for some time around Kahaluʻu and Keauhou, occupying his time with hula (dance) and surfing (Kamakau 1992:105). Kalaniʻōpuʻu moved to Keauhou "where he could surf in the waves of Kahaluʻu and Hōlualoa" (Kamakau 1992:105). Both Kalaniʻōpuʻu and Kamehameha attempted to gain the support of the deities by constructing or rededicating the many *heiau* of Kahaluʻu. Kamehameha and his court are said to have resided at Kahaluʻu for about a year following his return to Kona in 1813 (ʻIʻī 1959:113).

Early Historic Period

By 1794, there was a foreigner in residence at Keauhou engaged in the manufacture of charcoal to supply visiting western ships (Menzies 1920:149). While this operation played a part in keeping the port there viable, it seems probable that the population of Keauhou overall declined rapidly in the early historic period. This would have been due not only to introduced diseases but also to demographic shifts to Kailua and Kaʻawaloa (at Kealakekua Bay). The abolition of the *kapu* system in 1819 would have also exacerbated this population loss in Keauhou, as people suddenly

	stopped visiting the many *heiau* there with their hogs and other offerings (Mann et al. 2003:9). Kamehameha 1 died in May 1819 and was succeeded by his son Liholiho. At the urging of his father's widows Keōpūolani and Kaʻahumanu, Liholiho abolished the traditional *kapu* system that had governed life throughout Hawaiʻi for centuries (Tomonari-Tuggle 1985:24). Some did not agree with this change, including Kamehameha's second heir Kekuaokalani, who chose to fight against Liholiho's Royal Army along the southern coast of Keauhou in December 1819, in an area also known as Lekeleke. This event is known as the battle of Kuamoʻo, in which 300 warriors were slain and the opposition army defeated. The Kuamoʻo battlefield has come to be known as the Lekeleke Burial Ground. In 1823 the missionary William Ellis reported 19 *heiau* and 610 houses between Kailua and Keauhou, and eight *heiau* and 443 houses between Keauhou and Kaʻawaloa. At Keauhou, Ellis noted 135 houses, and about 150 people assembled to hear him and his companions preach. Ellis remarked on the steppingstone trail across a mile-wide stretch of *ʻaʻā* between the Kahaluʻu and Keauhou villages. Ellis (1969:121) noted the houses of "those who live among the plantations on the sides of the hills." Keauhou was an outlier for the Kailua Mission Station. Missionaries from the American Board of Commissioners for Foreign Missions (ABCFM) would periodically take sermonizing trips down the coast, often on their way to the Kaʻawaloa Mission. Artemis Bishop (1892:18) noted (ca. 1825) that the Hawaiian communities at Hōlualoa, Kahaluʻu, Keauhou, and Kainaliu routinely marshaled 500 or more people to meet him. **Māhele** In the division of lands, or Māhele ʻĀina, of 1848, Victoria Kamāmalu received the *ahupuaʻa* of Kahaluʻu and the northern portion of Keauhou known as Keauhou 1 under Land Commission Award (LCA) 7713. Her brother, Lot Kapuāiwa (later Kamehameha V) received the southern portion of coastal Keauhou and a vast interior area known as Keauhou 2, as LCA 7715. The fact that these lands were retained by the Kamehameha dynasty reflects their perceived value. Tomonari-Tuggle (1985:27) suggests the division of Keauhou into these two parts dates from this time (ca. 1848). She notes that the Keauhou 1-2 division cuts through many *kuleana* (commoner) awards, which suggests the division post-dates the occupation of those areas. Numerous *kuleana* (commoner) claims were made in Kahaluʻu and Keauhou 1-2. While claims were awarded predominately in the areas

	around Kahaluʻu and Keauhou bays, some awards were also clustered along the upper *ala loa* (in the vicinity of the present Old Māmalahoa Highway). Figure 13 depicts LCA awarded within 250 m of the project area; these awards are listed in Table 1. In Kahaluʻu, *ʻāpana* or lots associated with three awarded claims (LCAs 5690:1, 5966:2, and 6032:2) are in the vicinity of the project area but do not overlap it (see Figure 13). Of the dozens of awards in Keauhou 1-2, 16 fall within 250 m of the project area (see Figure 13). One award (LCA 11047:3) is near the small portion of the project area in Keauhou 1, and the remaining 15 are in Keauhou 2. The awards in the vicinity of the project area are 6 acres or less in total, consisting of one to three geographically discrete *ʻāpana* generally situated at variable elevations within the *ahupuaʻa* (see Table 1). Two awards, both in Keauhou 2, overlap the project area along the Māmalahoa Highway corridor: 7319:1 and 10734[5903]:1 (see Figure 13 and Table 2). Land use information for these overlapping awards is somewhat limited but does indicate enclosed lots used for agricultural activity including citrus cultivation, presence of native *hala* (*Pandanus tectorius*) and *loulu* (*Pritchardia* spp.) trees, and habitation in a house at LCA 10734 (see Table 2). **Late Nineteenth Century** Concurrent with the Māhele ʻĀina, business interests in the region were expanding, necessitating improved road systems to facilitate the use of horses and wagons (Maly and Maly 2004:67). Two lateral, cross-*ahupuaʻa* trails or *ala loa* were utilized and connected by various *mauka-makai* trails; the upper *ala loa* known as "Kealaehu" was in the vicinity of the old Māmalahoa Highway (Maly and Maly 2004:67). Lacking sufficient water and easily convertible land, the Kona Coast was largely spared the changes associated with plantation agriculture that affected so much of Hawaiʻi. Economic opportunities created by this commercial agriculture elsewhere was another pull for relocation away from Kahaluʻu and Keauhou. Tomonari-Tuggle (1985:31) notes that according to Kingdom of Hawaiʻi tax ledgers, the population of Keauhou dropped from 72 in 1857 to 24 in 1881. While the overall importance of the Kona Coast diminished, the *relative* importance of Keauhou on that coast may have increased, as Kealakekua Bay (Kaʻawaloa and Nāpōʻopoʻo) became less important as an entry point. The importance of Keauhou Bay is borne out in the LCA data for Keauhou and Kahaluʻu and the presence of homes, churches, a few stores, and schoolhouses (Tomonori-Tuggle 1985:31), some of which are depicted on an 1891 map of North Kona

(Figure 14).

The uplands of Kahaluʻu and Keauhou became more important as the century drew to a close with the growth of coffee cultivation. Coffee was grown as an early commercial enterprise in small individual plots formerly occupied by the *kuleana* agricultural plots. Chinese and Japanese immigrants who had fulfilled their labor contracts to sugar plantations eventually became the dominant coffee growers, typically living at the farms. The coffee industry went through a number of booms and depressions through the late 1800s, due to introduced diseases and price fluctuations.

The trustees of Victoria Kamāmalu leased large portions of her award in Kahaluʻu coffee cultivation and for grazing land (Maly and Maly 2004:98–100). Commercial livestock within Keauhou 2 commenced with goat and sheep ranching in the Saddle region, under the control of Charles Wall. Though both goats and sheep were on his ranch, sheep eventually became the dominant livestock. Charles Wall eventually sold the lease to H.N. Greenwell who continued to run sheep until the late 1800s.

In 1889, the *ahupuaʻa* of Kahaluʻu and Keauhou 1-2 became part of the Bernice Pauahi Bishop Estate as inherited lands from Ruth Keʻelikōlani, who had inherited them after the deaths of Victoria Kamāmalu (Kahaluʻu and Keauhou 1) and Lot Kapuāiwa (Keauhou 2).

Twentieth Century

The early 1900s continued the pattern of population movement from the coastal areas to the uplands. During this period, Keauhou was known as the "end of the road" in the Kona region (Walker and Rosendahl 1989:11). A 1906 map (Figure 15) indicates the project area within grazing lands and depicts little aside from a post office at Keauhou Bay and a school along the upper road in Keauhou 1.

Sugar cultivation was briefly attempted in Kahaluʻu and Keauhou, with little success. In 1908 holdings of the short-lived Kona Sugar Company (1898–1904) were incorporated as the Kona Development Company by James B. Castle (Dorrance and Morgan 2000:112). During this time 11 miles of narrow-gauge railroad were installed, extending south from the mill in Kailua-Kona and through the project area environs. Plans to expand the railway throughout North and South Kona fell through. Burtchard et al. (1996) described the construction of the railroad:

> The rail route was built as a cut and fill feature across Hualālai's western slope. Rock outcrops and ridges were

	removed to create a level rail bed. At least some of this rock was reused to span ravines and other depressions in the irregular lava flow surface. Additional rock was quarried from nearby flows. [Burtchard et. al. 1996:294] The early twentieth century saw a boom in the coffee industry in the Kona uplands, with a continued shift in settlement to small towns that were springing up along the upland Māmalahoa Highway, which had been constructed as an improvement to the earlier Kealaehu *ala loa*. The 1924 USGS topographic map (Figure 16) and a 1930 Treasury Department map (see Figure 13) depict the railroad (SIHP # 50-10-37-07214) extending through the Kahaluʻu portion of the project area, schools, numerous trails throughout the area, and structures clustered along the highway. Also shown on the 1924 map is a route extending northwest from the Māmalahoa Highway in Kahaluʻu to Kailua-Kona; this route would some years later become a portion of the Hawaiʻi Belt Road (Route 11), also known as the "Belt Highway." Coffee and cattle dominated the economy in Kahaluʻu and Keauhou until the late 1960s and early 1970s, when tourism began to flourish. The 1960 USGS topographic map illustrates a significant population along the Māmalahoa Highway (Figure 17), served by the development of additional roadways, wells and water tanks, an electric substation, and commercial rock quarries. Less occupation is indicated along the lower Belt Highway in Kahaluʻu. Later in the 1960s, a golf course, hotels, condos and single-family residences were constructed along the coastal portion of these *ahupuaʻa*. A 1977 aerial photograph (Figure 18) illustrates the extent of development in the 1960s and 1970s as a response to the growing tourism industry. Most notable is the extensive coastal resort development located *makai* of the project area. **<u>Twentieth-First Century</u>** Presently some of the prime agricultural lands of Kahaluʻu and Keauhou remain under coffee cultivation or other commercial crops. The Hawaiʻi Belt Road and Old Māmalahoa Highway continue to be a focal point of the local community development. At the coast in Kahaluʻu, an effort is being made by Kamehameha Schools to return Bishop Estate lands to culturally appropriate educational venues. Keauhou Bay and surrounding resort properties remain a significant tourist draw. While the Kona Country Club Mountain Course closed in 2013, the Kona Country Club Ocean Course has recently undergone renovations and resumed operation.
Prior Archaeological	The region of Kahaluʻu and Keauhou is one of the most studied areas

Studies Summary	in Polynesia. A large majority of past studies, especially archaeological surveys of the large habitation and *heiau* complexes, are near the coast and/or within development parcels belonging to Kamehameha Investment Corporation (KIC). The traditional importance of the Kahaluʻu-Keauhou area is underscored by the listing of several sites in the vicinity on the National Register of Historic Places (NRHP). Eighteen sites in coastal Kahaluʻu comprise the Kahaluʻu Historic District (SIHP # 50-10-37-04150), which was listed on the NRHP in 1974. The *mauka* boundary for this historic district very minimally overlaps the western extremity of the project area in Kahaluʻu (Figure 19); while no known sites belonging to the historic district are within the current project area, the *mauka* known extent of ʻŌhiʻa cave (SIHP # 50-10-37-07962) is located within the district bounds approximately 550 m to the southwest (Figure 20). Other nearby sites on the NRHP (not within the current project area) include the Keauhou Hōlua Slide (SIHP # 50-10-37-01669), listed on 29 December 1962 and designated as a National Historic Landmark that same year; the Kuamoʻo Complex (SIHP # 50-10-37-01745), recognized primarily a burial ground from the 1819 battle of the same name, was listed in the NRHP on 13 August 1974; and Kamehameha III's birthplace (Kauikeaouli Stone; SIHP # 50-10-37-04383) was listed in the NRHP on 24 July 1978. Furthermore, the extensive agricultural complexes in the inland portions of Kahaluʻu and Keauhou, encompassing the lands of the current project area, are part of the Kona Field System (SIHP # 50-10-37-06601). An Archaeological Cover Sheet for the Hawaiʻi Register of Historic Places was completed (Appendix B) but does not indicate any submission to the Review Board nor any action. The Feature Description Form associated with the Cover Sheet is signed by T. Stell Newman and dated 15 May 1974. Background research indicates 15 previous archaeological studies in the vicinity of the northern/Kahaluʻu portion of the current project area, and four previous studies in the vicinity of the southern/ Keauhou portion of the current project area. These previous studies are presented in Figure 21 and Figure 22 and summarized in Table 3 and Table 4. Of the previous studies in the vicinity, six overlap or bound the current project area, all within Kahaluʻu: Hammatt and Folk (1980), Bath and Rosendahl (1984), Athens (1990a), Lufty and Athens (1991a), Burchard (1992), and Burchard et al. (1994). Historic properties documented in proximity to the current project area during these previous studies (n=11) are depicted on Figure 20 and summarized in Table 5; of note, no previously documented sites are indicated in proximity to the southern/Keauhou portion of the

	project area. In 1980 Archaeological Research Center Hawai‘i, Inc. (ARCH) conducted an archaeological inventory survey (AIS) of 751 acres within Kahalu‘u and Keauhou, minimally overlapping the western portion of the current project area in Kahalu‘u (Hammatt and Folk 1980; see Figure 21). Despite areas of prior disturbance, 320 historic properties comprising “thousands” of individual features were documented, with highest site concentrations in the coastal Kahalu‘u area. Sites included five *heiau*, temporary and permanent habitation complexes (some of which likely represented villages and high chief residences), burials, agricultural complexes, steppingstone trails, cart roads, and caves containing evidence of human habitation. The railroad berm (SIHP # 50-10-37-07214) was noted along the *mauka* study area boundary, but not documented or assigned an SIHP number. The fieldwork was completed at what is now considered a reconnaissance level; not all the historic properties identified were fully documented. Hammatt and Folk (1980:12–17) recommended salvage excavation, preservation, and burial site relocation for sites that would be potentially affected by proposed development activities, as well as oral history research. Sites documented in proximity to but well outside the current project area include SIHP #s 50-10-37-04643 (agricultural complex), -07954 (possible burial platform), and -07962 (‘Ōhi‘a Cave) (see Figure 20 and Table 5). In 1983-84 Paul H. Rosendahl, Inc. (PHRI) undertook intensive survey and testing for a HELCO substation bounding the western terminus of the current project area in Kahalu‘u (Bath and Rosendahl 1984; see Figure 21). The study documented six sites, not assigned SIHP numbers, comprising 27 individual agricultural features; none of these features are in direct proximity to the current project area. Feature types included terraces, mounds, walls, and a C-shape enclosure. Samples collected during testing yielded dates indicated occupation in the area between AD 1400 and 1800. No further work was recommended for any of the documented sites. In 1990 International Archaeological Research Institute, Inc. (IARII) conducted an archaeological reconnaissance of 22 acres in Kahalu‘u, minimally overlapping the western portion of the current project area (Athens 1990a; see Figure 21). The survey identified four previously unrecorded site complexes, which were not assigned SIHP numbers, and a portion of previously recorded SIHP # 50-10-37-07214 (railroad berm; we have been unable to ascertain when the SIHP designation was assigned). The newly documented sites were extensive agricultural complexes; further documentation was

	recommended. The following year, IARII returned to conduct an intensive survey of the Athens (1990a) project area, minimally overlapping the current project area in Kahaluʻu (Lufty and Athens 1991a; see Figure 21). The AIS identified and documented one previously recorded historic property (SIHP # 50-10-37-07214, railroad berm) and four newly recorded historic properties comprising 39 individual features: SIHP #s 50-10-37-15151, unmodified lava tube; -15152, ranching complex; and -15153 and -15154, agricultural complexes (see Figure 20 and Table 5). In 1992 IARII was contracted to map and provide a summary description of lava tube burial cave site SIHP # 50-10-37-16045 in Kahaluʻu (Burtchard 1992); while the study area is shown to slightly overlap the current project area, the lava tube itself is well to the south (see Figure 20 and Figure 21). Two incomplete sets of human remains were documented within the tube. A mound located near the entrance to the cave was tested and found to contain an abundance of nonhuman mammal bone, but no human remains. In 1994 IARI undertook an archaeological survey and data recovery within and expanding on the Burtchard (1992) study area in Kahaluʻu (Burtchard et al. 1994; see Figure 21 and Figure 23). Data recovery was undertaken at SIHP # 50-10-37-15154 (agricultural and limited habitation complex, located south of the current project area; see Figure 20). Traditional and historic cultural materials were identified during data recovery excavations, consistent with radiocarbon results. During the data recovery work new features at previously recorded SIHP # -16045 (burial lava tube with surface agricultural features) were encountered and documented (see Table 5 and Figure 23). Within the expanded part of the study area another agricultural complex comprising 22 features was documented (SIHP # -16046); the northern extent of this site is situated approximately 50 south of the current proposed pipeline corridor (see Figure 20, Figure 23 and Figure 24). Feature 21 at SIHP # -16046 may have served as a support for the adjacent railroad berm (Burtchard et al. 1994:49). Bulldozer disturbance was noted along the northern study area boundary, between SIHP # -16046 and the current proposed pipeline corridor (see Figure 24).
Fieldwork Effort and Findings	The field inspection for the DHHL 2.0 MG Water Storage Tank and Transmission Lines Construction project was conducted initially on 17 December 2020 by CSH Project Director Olivier M. Bautista and Archaeologist Samantha Purdy. This initial field inspection included the proposed tank sites and pipeline routes, as well as some alternate

	tank site and pipeline routes. Subsequently changes to the project were made and the alternate tanks sites and pipeline routes were removed from the project; this report has been updated to reflect these changes. Furthermore, topographic surveys conducted for the proposed tank sites in both Kahaluʻu and Keauhou identified some potential archaeological features not observed during the December 2020 fieldwork. Therefore, the project area was expanded around these tank sites and CSH was asked to conduct additional fieldwork to examine the features documented in the topographic survey. The additional fieldwork was conducted on 19 April 2022 by CSH Project Director Olivier M. Bautista and Archaeologist Samantha Purdy. Sites documented within the updated project area during the December 2020 and April 2022 field inspections are illustrated on Figure 25 and Figure 26. <u>Kahaluʻu Section</u> The western terminus of the Kahaluʻu portion of the project area is at a chain link fence surrounding a small water tank (Figure 27). Vegetation in this portion of the project area consists of dense *haole koa* and guinea grass (Figure 28). Moving *mauka* (upslope) from the small water tank, a section of the previously documented SIHP # 50-10-37-07214 railroad causeway crosses through the proposed pipeline route (see Figure 25 and Figure 29). The pipeline route continues upslope to the Hawaiʻi Belt Road/Route 11 (Figure 30); under previous studies elsewhere on Hawaiʻi Island the former and present alignments of this roadway have been assigned as SIHP # 50-10-46-30187 (see Figure 25). The existing Department of Water Supply (DWS) facility located *mauka* of the highway comprises an open graded area containing large tank, two smaller tanks, and a control building situated within a chain link fence (Figure 31 and Figure 32). The area immediately surrounding the facility exhibits evidence of some prior disturbance, as indicated by the presence of cleared areas, non-native vegetation, and deposits of mechanically deposited/pushed rock material (Figure 33). One substantial rock deposit was documented approximately 6 m (20 ft) north of the facility fence line in the topographic survey, appearing as a roughly platform-shaped feature. This feature was investigated by CSH and determined to be a loose, mechanically deposited pile of basalt rock associated with clearing and planting of an adjacent breadfruit tree (see Figure 33 and Figure 34). Soil, chipped basalt rock, and chunks of concrete were observed within the rock deposit. The topographic survey identified two rock wall features in the

vegetated area above the fenced DWS facility; following inspection by CSH these features were determined to be potential historic properties (CSH-1 and CSH-3). CSH-1 is located near the northwest corner of the DWS facility and CSH-3 is located to the east (see Figure 25). These features are described as follows:

- CSH-1 is a linear, dry stacked stone wall situated approximately 1.5 m upslope of the northwestern corner of the DWS facility fence. CSH-1 is constructed of 5 to 6 courses of neatly stacked and faced basalt cobbles and small boulders with a core fill of smaller basalt stones (Figure 35 and Figure 36). The wall measures approximately 15 m long (north-south), 1 m high, and 60–70 cm wide. The *makai* portion of the wall closest to the fence is intact and undisturbed; the *mauka* portion appears to have been impacted by bulldozing at some point in time. CSH-1 is historic in age as evidenced by the core filled construction technique. No artifacts were observed on or around the feature.
- CSH-3 is also a dry stacked stone wall. The wall is located approximately 5 m east of the DWS facility fence. is constructed of 4 to 7 courses of neatly stacked and faced basalt cobbles and small boulders with a core fill of smaller basalt stones (Figure 37). The wall measures approximately 10 m long (north-south), 1.25 m high, and 60–70 cm wide. The wall is mostly intact and undisturbed though it is obscured in the dense vegetation present in this area. CSH-3 is historic in age as evidenced by the core filled construction technique. No artifacts were observed on or around the feature.

Another potential historic property comprising three individual features (CSH-2) was identified along the proposed pipeline route between the DWS facility and the Old Māmalahoa Highway, which is also considered a portion of the SIHP #50-10-46-30187 Belt Road site (see Figure 25). CSH-2 is described as follows:

- CSH-2 is a site complex situated in the easternmost half of the proposed alignment in Kahaluʻu, in an area planted with coffee (see Figure 25). The site was accessed off the Old Māmalahoa Highway (SIHP # 50-10-46-30187) near a water meter box with numerous PVC pipes leading down slope (Figure 38). These PVC pipes traversed downslope along portions of *mauka-makai* dry-stacked stone walls intersected by cross-slope walls (Features A, B, and C; see Figure 25 and

Figure 39 through Figure 41). These walls are typical features of the Kona Field System. It is common in this area of Kona for pre-Contact agricultural walls to have been repurposed by historic coffee plantations rather than destroyed. Some PVC pipes were found on and around these features, possibly used for irrigation of the surrounding coffee. Additional features may be present along the portion of the proposed pipeline route closer to the DWS facility. This area shows some signs of previous disturbance but is not currently planted in coffee. The grasses and invasive trees in this area made for poorer ground visibility than within the coffee orchard above. A more intensive survey is needed to determine the boundary of CSH-2.

Keauhou Section

In Keauhou the majority of the project area is along existing roadways, including but not limited to Old Māmalahoa Highway (SIHP # 50-10-46-30187) and Bishop Road (see Figure 26 and Figure 42 through Figure 46). Approximately 835 m (0.52 miles) of the proposed pipeline route is along SIHP # 50-10-46-30187. The proposed pipeline route extends along Bishop Road through coffee orchards (Figure 47) to the proposed tank site, which comprises a clearing located between an orchard and an area of dense non-native vegetation (Figure 48). During the topographic survey some rock features were identified within the vegetated area east and southeast of the proposed tank location. Within the vegetation to the southeast of the proposed tank site a large area of basalt rock deposit was identified. This deposit was inspected by CSH and found to comprise scattered bulldozer rubble mixed with scrap metal and other trash (Figure 49). The topographic survey also identified two rock wall segments north of this disturbed area, which were assigned collectively as CSH-4 during the CSH inspection. Another shorter wall was documented by CSH just *mauka* of CSH-4 and assigned as CSH-5 (see Figure 26). CSH-4 and CSH-5 are described as follows:

- CSH-4 is a somewhat linear dry stacked stone wall situated within the dense vegetation east of the proposed tank site. The wall is constructed of 5 to 8 courses of neatly stacked and faced basalt cobbles and small boulders with a core fill of smaller basalt stones (Figure 50 and Figure 51). The wall measures approximately 64 m long overall (north-south), with an approximately 6-m-wide break near its midpoint. The southern end of the wall appears to have been impacted by the prior bulldozing activity to the south (Figure 52). The wall is 1.5 m high and 60–90cm wide. CSH-4 is historic in age as

	evidenced by the core filled construction technique. No artifacts were observed on or around the feature. • CSH-5 is a low rock wall located approximately 13 m east of CSH-4 within dense vegetation. CSH-5 is constructed of 2 to 5 courses of stacked basalt cobbles and small boulders (Figure 53 and Figure 54). The wall measures approximately 7 m long (north-south), 40–75cm high, and 50–70 cm wide, exhibiting greater heights along its downslope side. The wall appears intact and undisturbed. CSH-5 may represent a remnant of the Kona field system, perhaps functioning as an agricultural terrace. No artifacts were observed on or around the feature. <u>SIHP # 50-10-47-30187 (Hawai‘i Belt Road / Old Māmalahoa Highway)</u> As noted above both the Kahalu‘u and Keauhou portions of the project area come into contact with former and present alignments of the Hawai‘i Belt Road and Old Māmalahoa Highway (variably State Routes 11, 19, 180, and 190), which have been assigned in prior studies as SIHP # 50-10-46-30187. The portion of the Belt Road in Kahalu‘u is clearly a newer road than the more *mauka* alignment. The right-of-way of the original Belt Road alignment (i.e., the Old Māmalahoa Highway) can sometimes contain historic rock walls, culverts, or other historic features associated with the road. The field inspection did observe some rock wall sections near or along the project area alignments in both Kahalu‘u and Keauhou (see Figure 44), but these features would need closer inspection to determine their location in relation to the right-of-way and likely age and association.
Potential for Project Effect on Historic Properties	Three previously documented historic properties and five newly recorded archaeological sites representing potential historic properties are identified within the project area. The project may impact some or all of these sites to some degree, depending on the final tank and pipeline design. <u>Previously Recorded Historic Properties:</u> • The project area is located within the known limits of the Kona Field System (SIHP # 50-10-32-06601). Many of the pre-Contact portions of the Kona Field System in this area of Kona were repurposed for historic coffee cultivation. Some features originally associated with the Kona Field System may be present within the project area but require further investigation (see CSH-2). • A portion of the SIHP # 50-10-37-07214 railroad causeway

	crosses through the proposed pipeline route in Kahaluʻu. • Portions of the project area in both Kahaluʻu and Keauhou cross or overlap SIHP # 50-10-47-30187, representing the former and present alignments of the Hawaiʻi Belt Road and Old Māmalahoa Highway. <u>Newly Recorded Archaeological Sites:</u> • CSH-1 is a historic-era rock wall located upslope of the DWS facility in Kahaluʻu. • CSH-2 is a complex of three cross-slope wall features located within the proposed alignment in a coffee farm Kahaluʻu; these features may be associated with the Kona Field System. • CSH-3 is a historic-era rock wall located upslope of the DWS facility in Kahaluʻu. • CSH-4 is a historic-era rock wall located upslope of the proposed tank site in Keauhou. • CSH-5 is a low rock wall/possible terrace that may be associated with the Kona Field System.
Recommendations	Consultation with SHPD is recommended regarding project historic preservation requirements. This consultation effort would confirm whether an AIS is needed and aid in development of an SHPD-informed AIS fieldwork strategy.

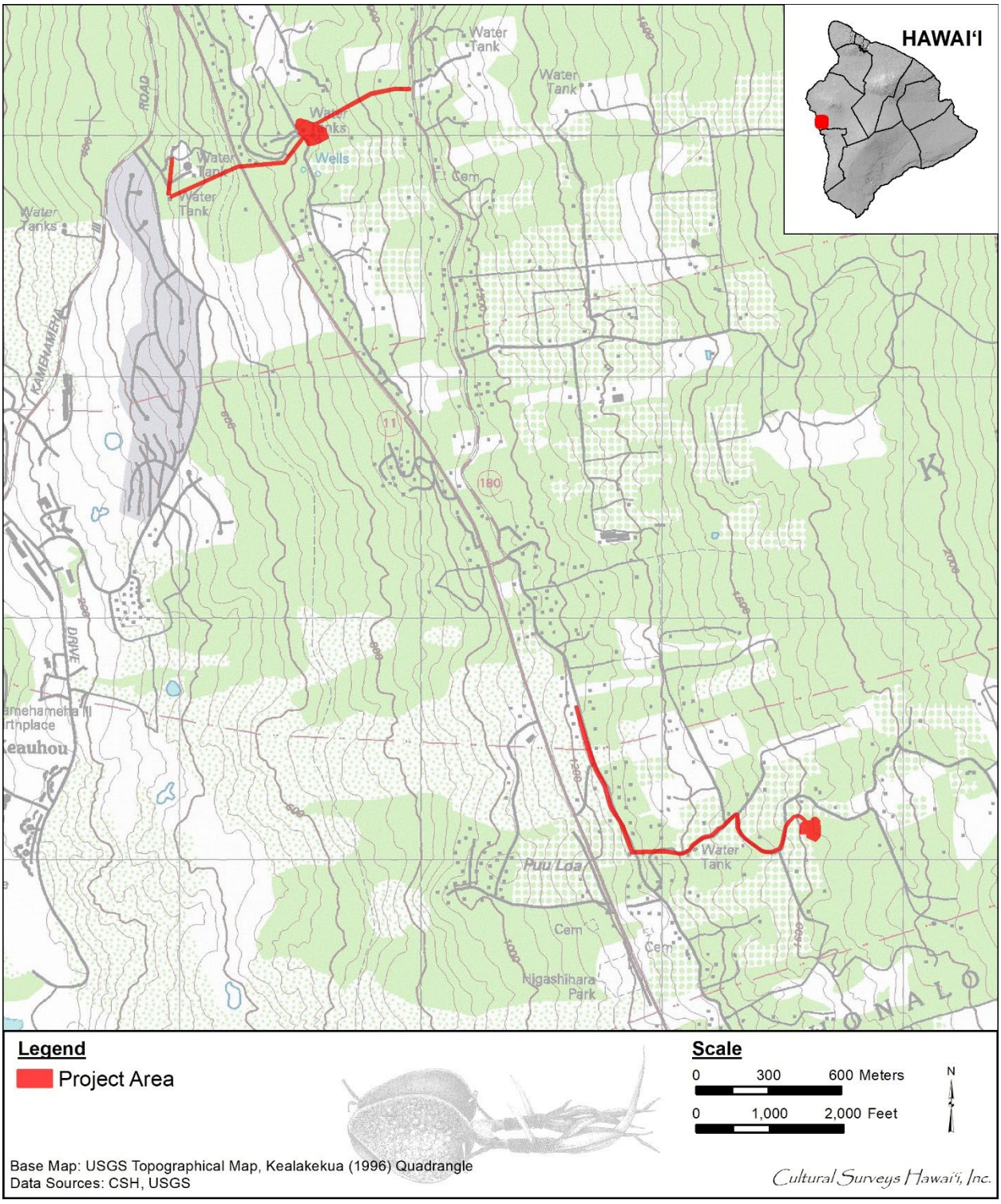


Figure 1. Portion of the 1996 Kealakekua USGS 7.5-minute topographic quadrangle, showing the location of the project area

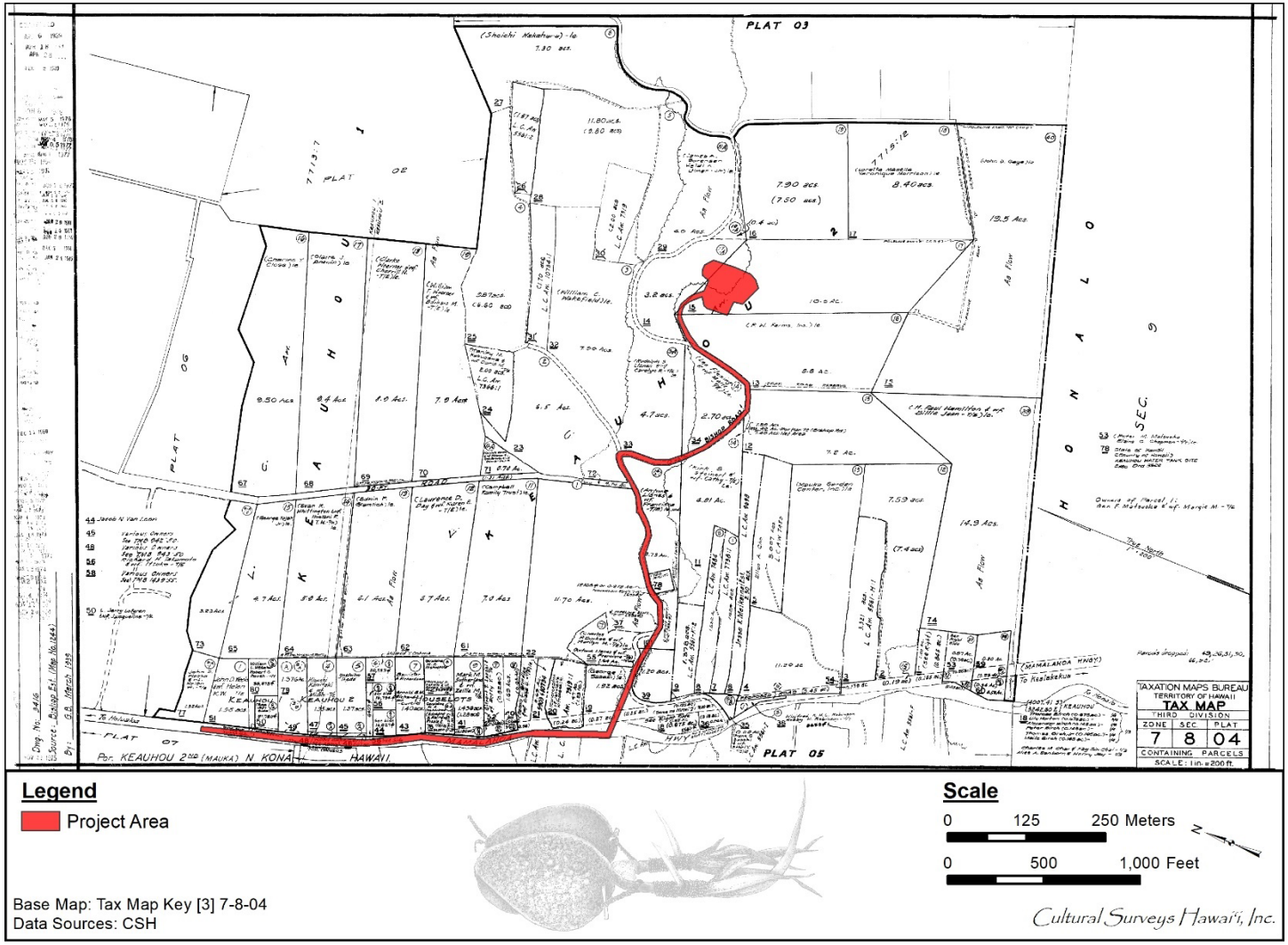


Figure 2. Tax Map Key (TMK) [3] 7-8-04 showing the southern portion of the project area in Keauhou 1-2 (Hawai'i TMK Service 2010)

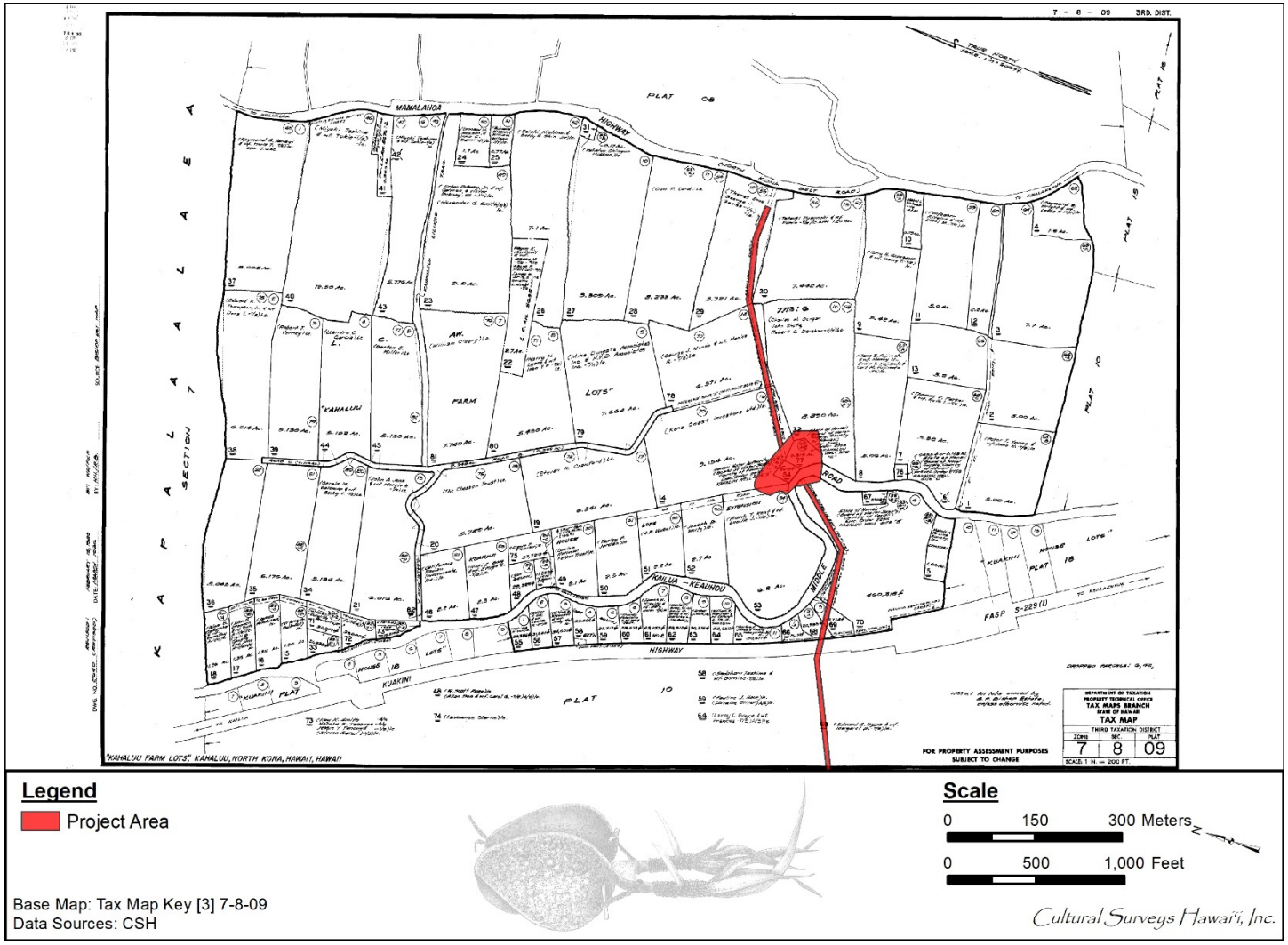


Figure 3. TMK: [3] 7-8-09 showing a part of the northern portion of the project area in Kahaluʻu (Hawaiʻi TMK Service 2010)

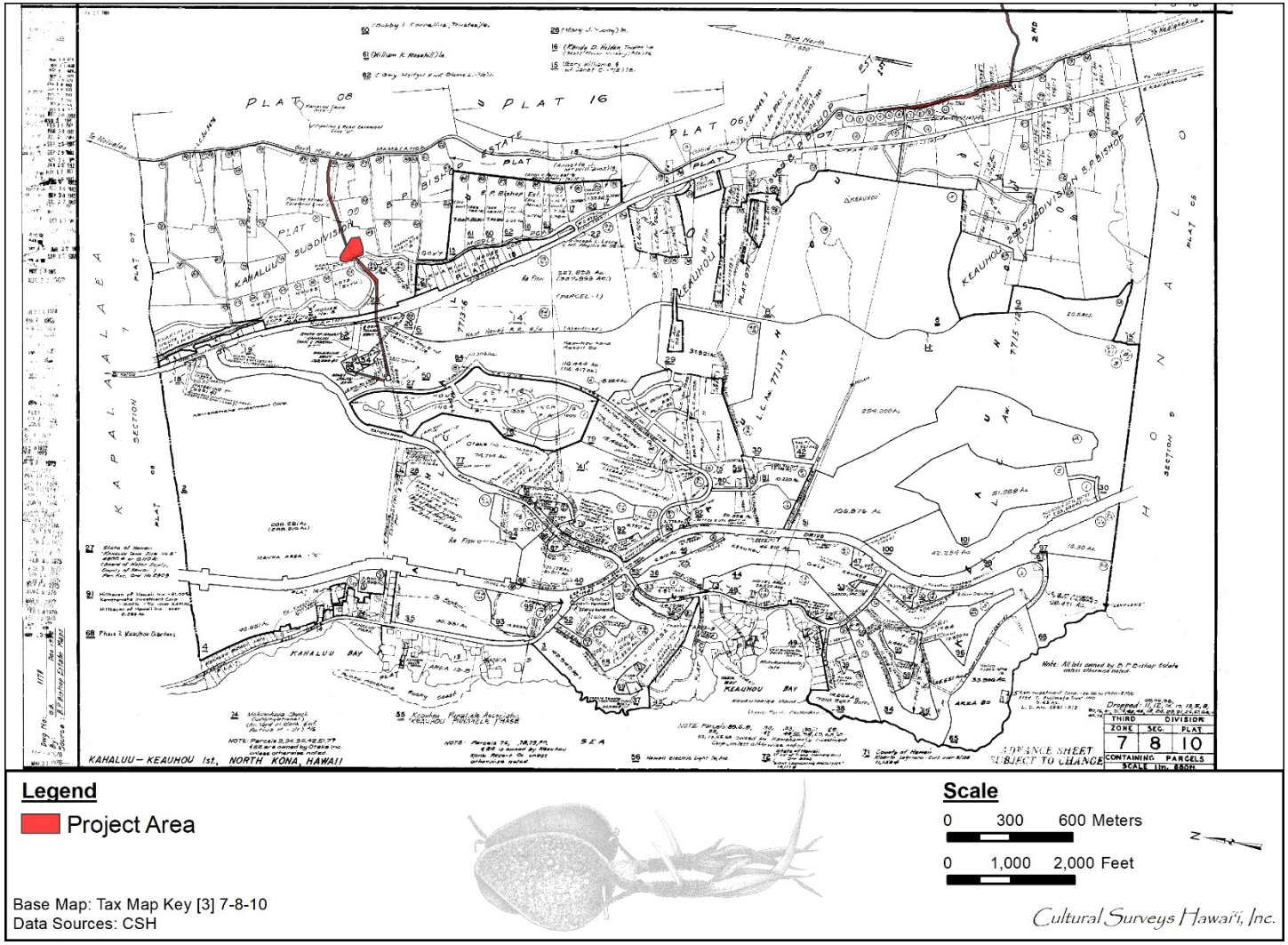


Figure 4. TMK: [3] 7-8-10 showing the northern portion of the project area in Kahaluʻu (Hawaiʻi TMK Service 2010)

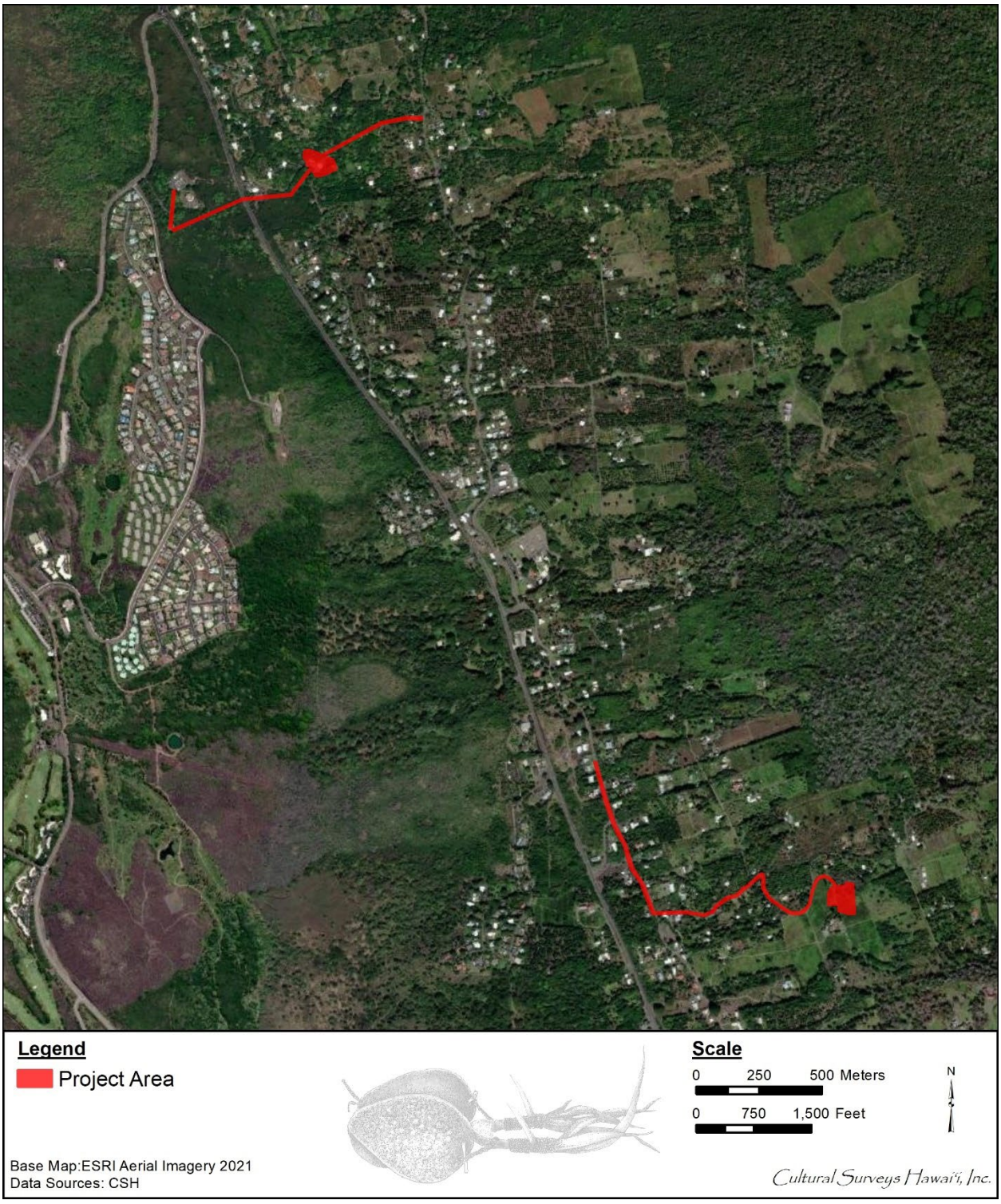


Figure 5. Aerial photograph showing the overall project area (ESRI 2018)



Figure 6. Aerial photograph of the northern portion of the project area in Kahalu‘u (ESRI 2018)

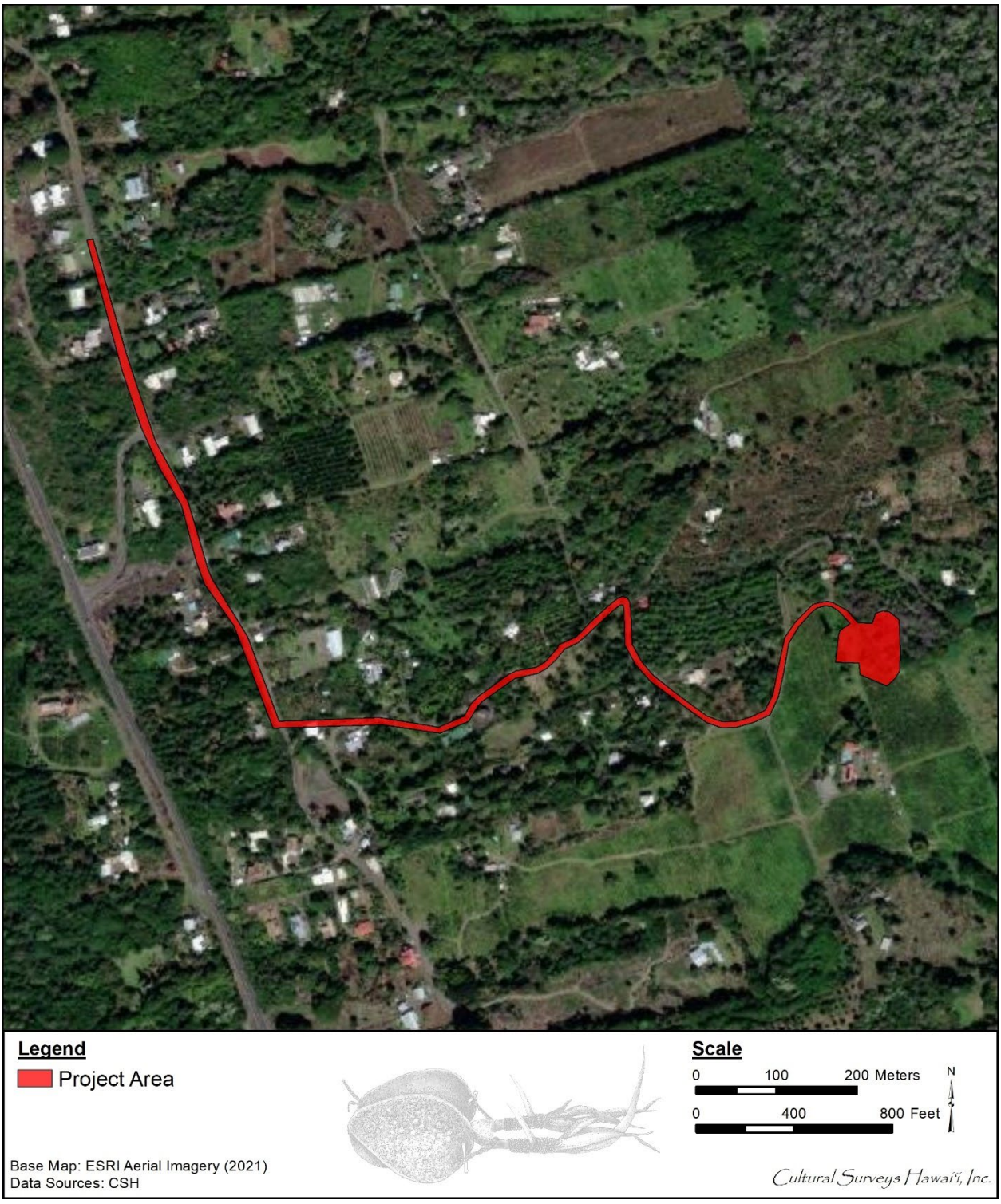


Figure 7. Aerial photograph of the southern portion of the project area in Keauhou 1-2 (ESRI 2018)

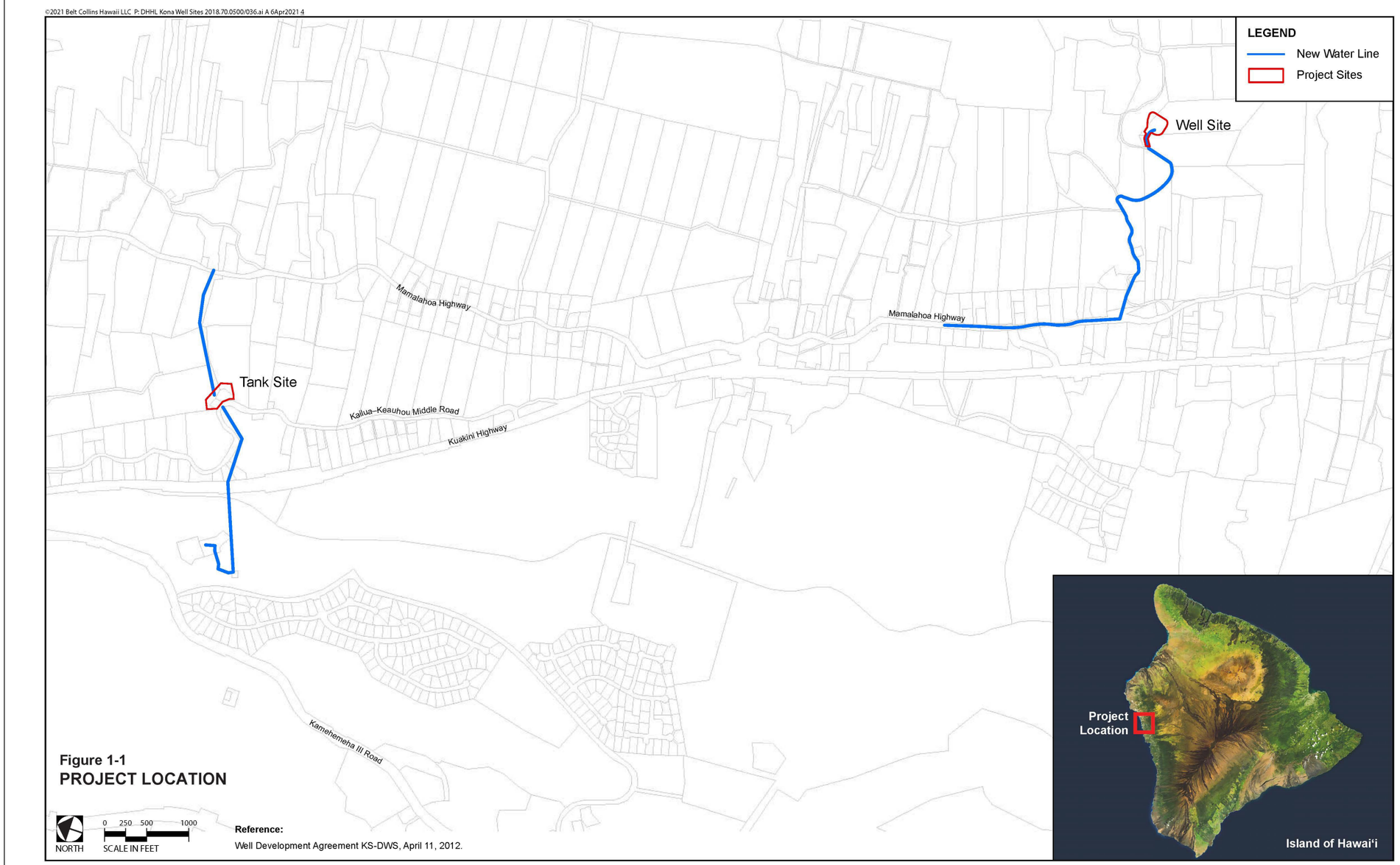


Figure 8. Project location map (courtesy of client) showing the configuration of water lines and tank sites

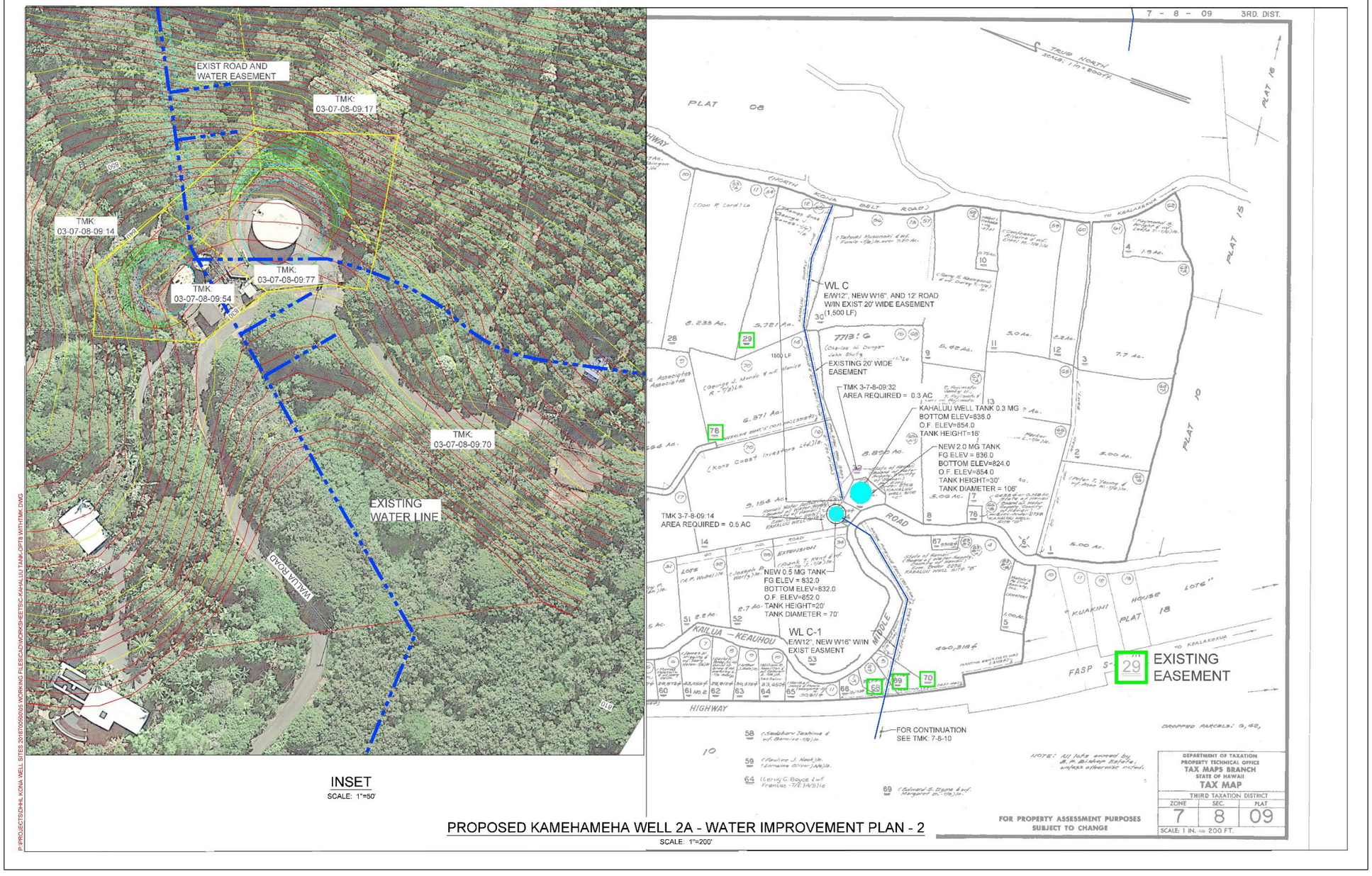
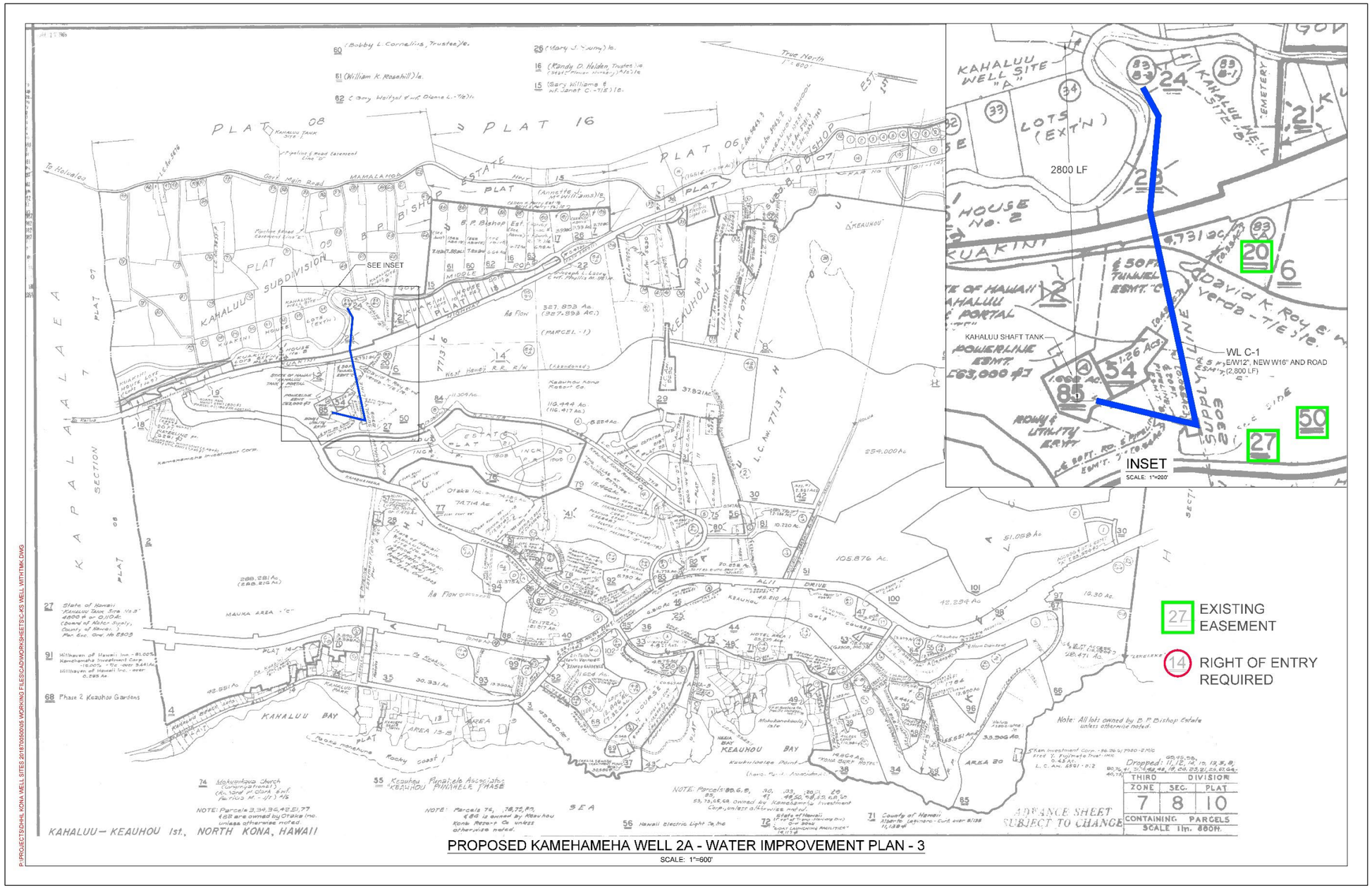


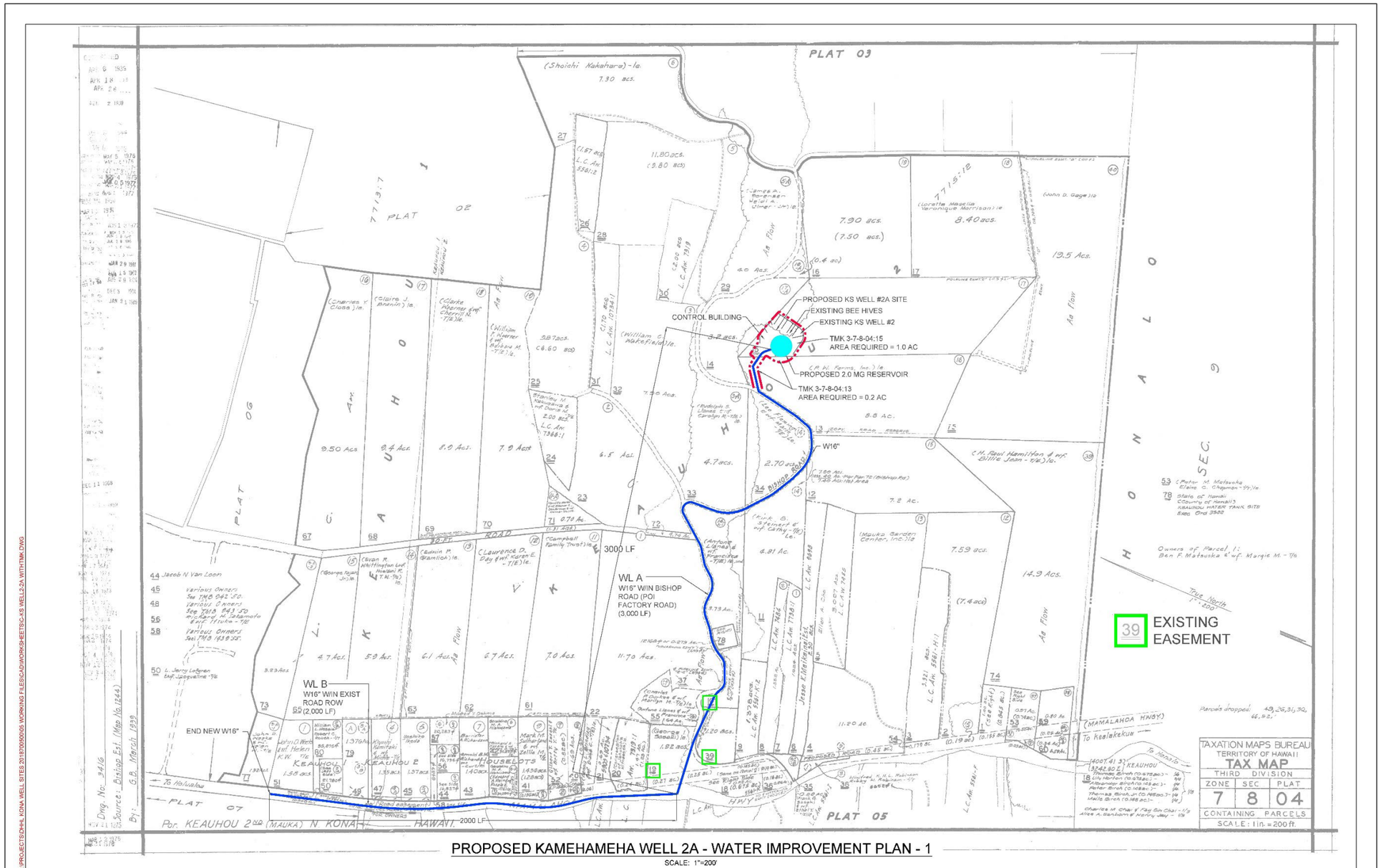
Figure 9. Proposed water improvement plan (courtesy of client) showing improvements at the tank site in Kahaluʻu



PROPOSED KAMEHAMEHA WELL 2A - WATER IMPROVEMENT PLAN - 3

SCALE: 1"=600'

Figure 10. Proposed water improvement plan (courtesy of client) showing the *makai* portion of the water line in Kahaluʻu



PROPOSED KAMEHAMEHA WELL 2A - WATER IMPROVEMENT PLAN - 1

SCALE: 1"=200'

Figure 11. Proposed water improvement plan (courtesy of client) showing improvements in Keauhou

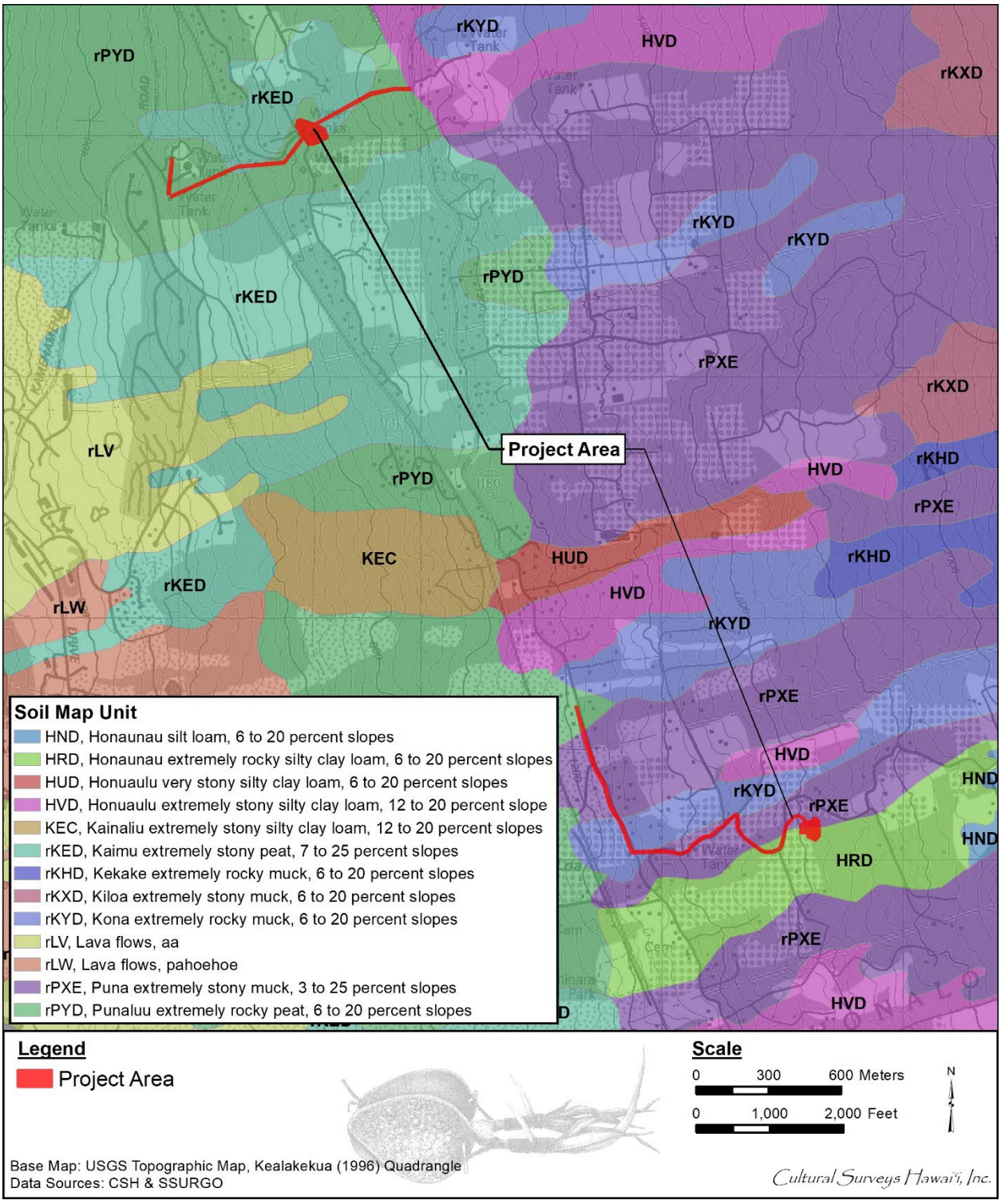


Figure 12. Overlay of *Soil Survey of the State of Hawaii* (Sato et al. 1972), indicating soil types within and surrounding the project area (USDA SSURGO 2001)

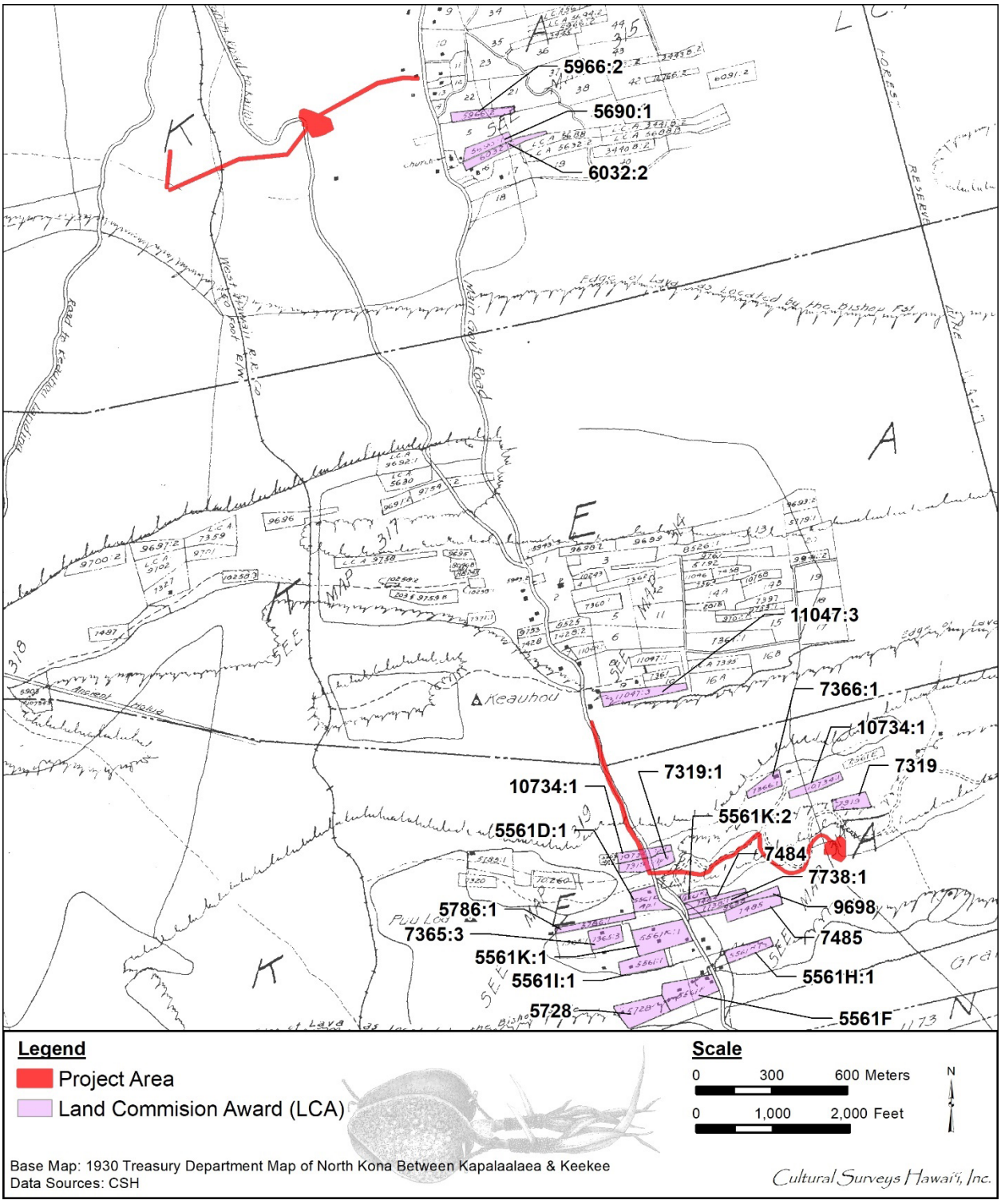


Figure 13. Portion of the 1930 Treasury Department map, showing the location of the project area in relation to nearby and overlapping LCA parcels

Table 1. LCAs in the immediate vicinity of the project area; entries in **bold** font overlap the project area

LCA/Āpana #	Awardee	Royal Patent #	Total # *ʻĀpana* Awarded in LCA	Total LCA Acreage
Kahaluʻu Awards				
5690:1	Kanakaole	4456	2	1.97
5966:2	Maheu	4359	2	2.05
6032:2	Napio	6807	2	2.54
Keauhou 1 Awards				
11047:3	Poopoopuu	6391	3	5.8
Keauhou 2 Awards				
5561D:1	Kanihana/Kauihana	3680	2	2.88
5561F	Kewalo, MC	3681	1	4.7
5561H:1	Kahilo	7757	2	3.07
5561I:1	Ki	–	2	5.0
5561K:1 and 2	Kalalakoa	3741	2	4.86
5728	Kaukanehola	8097	1	4.45
5786:1	Kapela	7032	2	2.11
7319:1	**Naholowaa**	**–**	**3**	**4.9**
7365:3	Keohoaeae	7019	3	6.28
7366:1	Kukahi	7044	3	2.51
7484	Keao	–	1	1.5
7485	Kapahu	5466	1	3.0
7738:1	Aoao	7387	2	3.0
9698	Kapela 1	6816	1	2.3
10734[5903]:1	**Paiki**	**6842**	**3**	**5.53**

Table 2. Land use within *kuleana* awards overlapping the project area

LCA #	Awardee	Land Use
7319:1	Naholowaa	Enclosed lot (no house), orange tree
10734[5903]:1	Paiki	One enclosed house lot, one *hala* tree, 12 *loulu* (*Pritchardia* spp.) palm trees

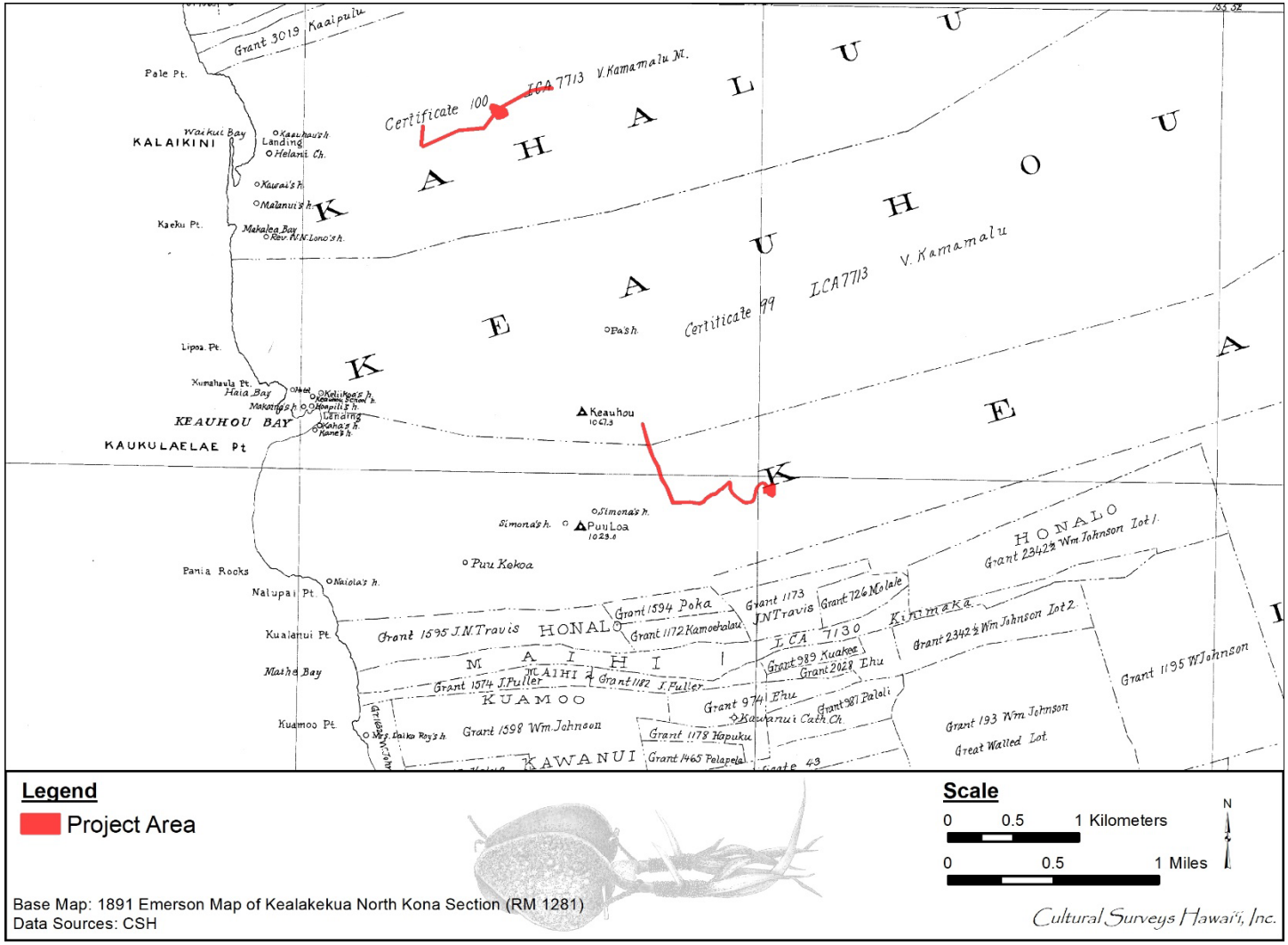


Figure 14. Portion of 1891 Emerson map of North Kona showing the project area; the map depicts the project area in LCA 7713 awarded to V. Kamamalu (Victoria Kamāmalu Ka‘ahumanu IV was Kuhina Nui of Hawaii); map shows there are no signs of any development within the project area (RM 1281)

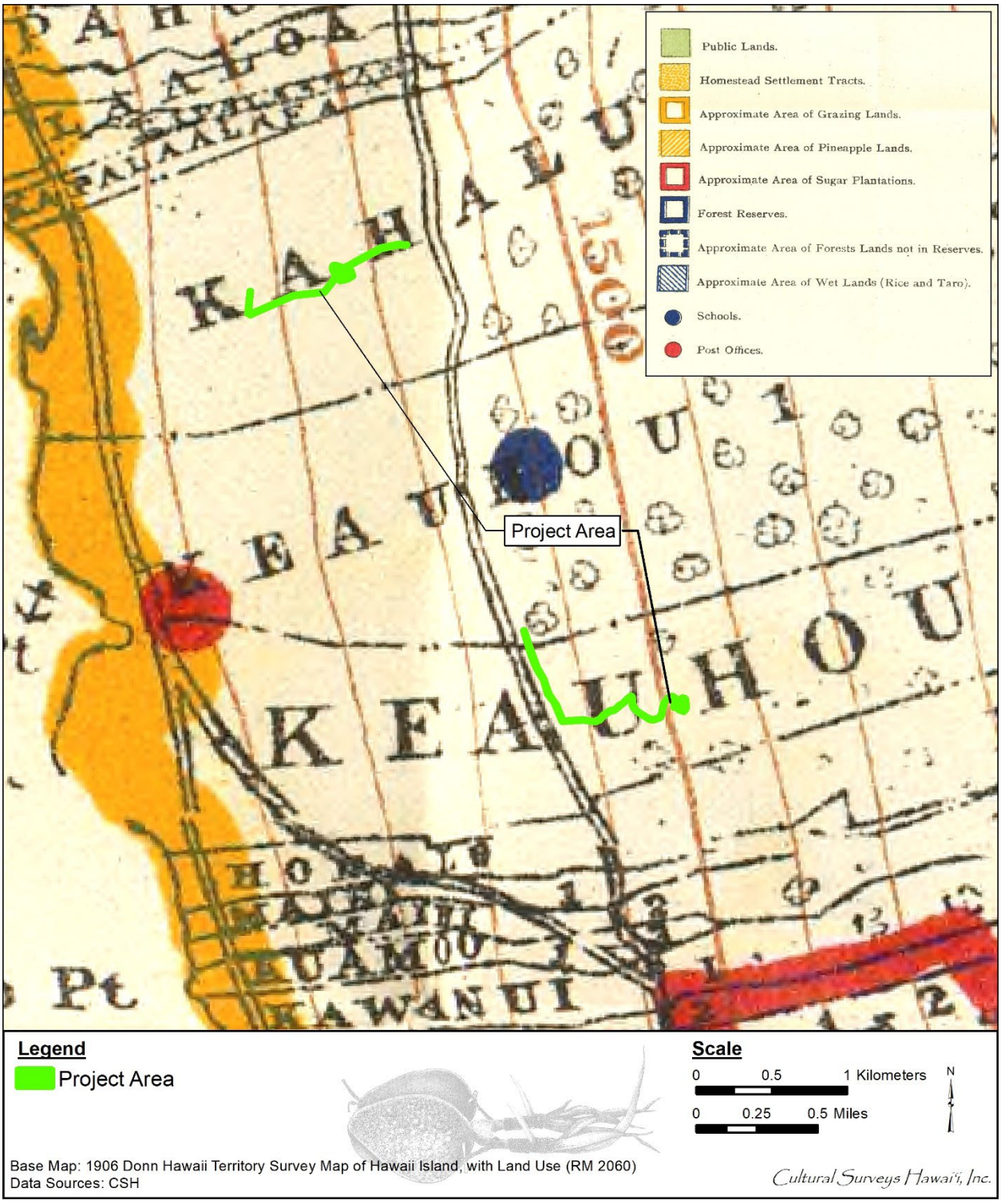


Figure 15. Portion of 1906 Donn Hawaii Territory Survey map of Hawaii Island showing location of project area in relation to the Old Māmalahoa Highway, schools, post offices, Homestead Settlement Tracts, and the bounds of sugar plantation lands to the south

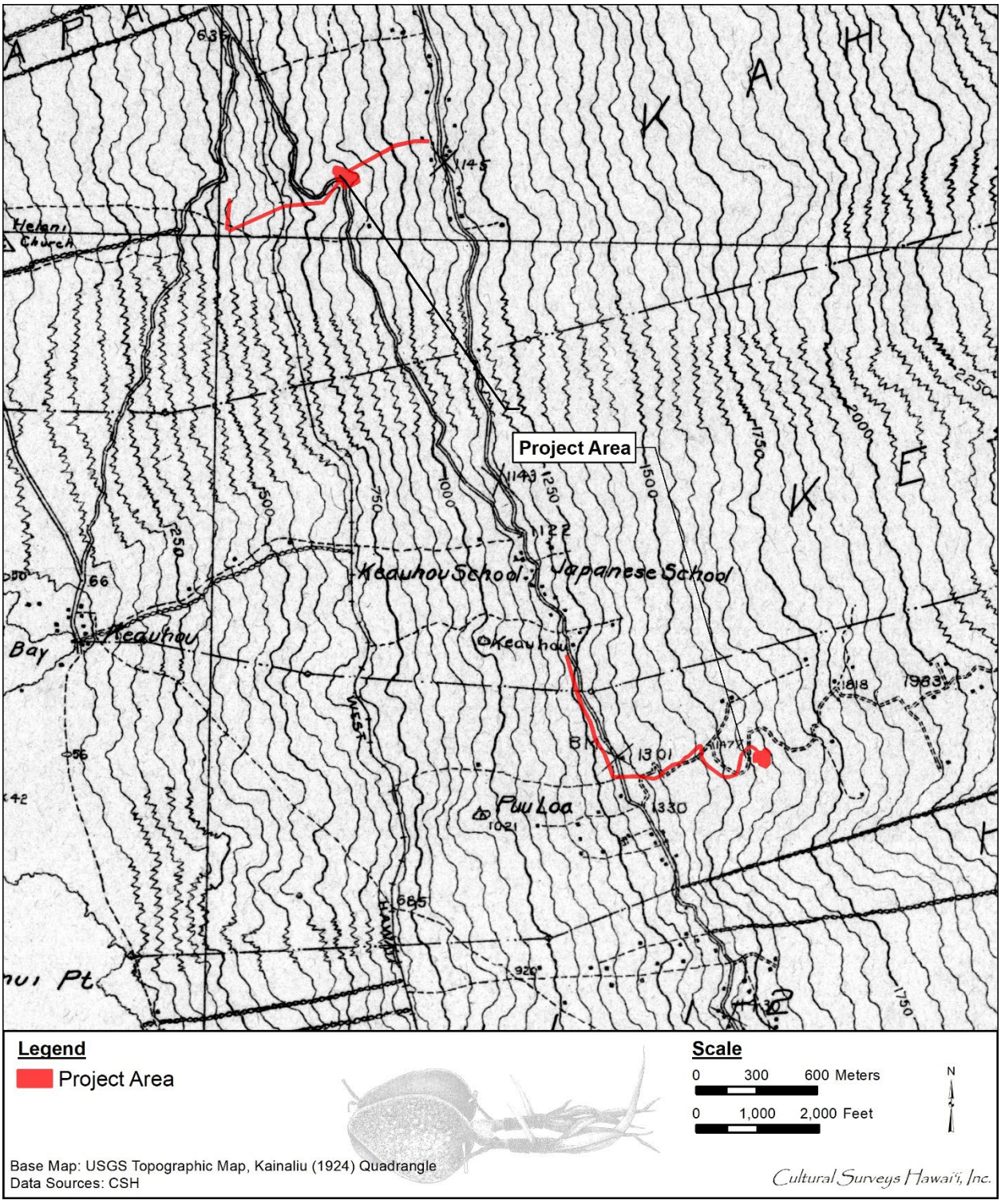


Figure 16. Portion of the 1924 Kainaliu USGS 7.5-minute topographic quadrangle showing the location of project area in proximity to developments including schools, trails, the Hawaii Railroad, and numerous structures (possibly residences) clustered along the Old Māmalahoa Highway

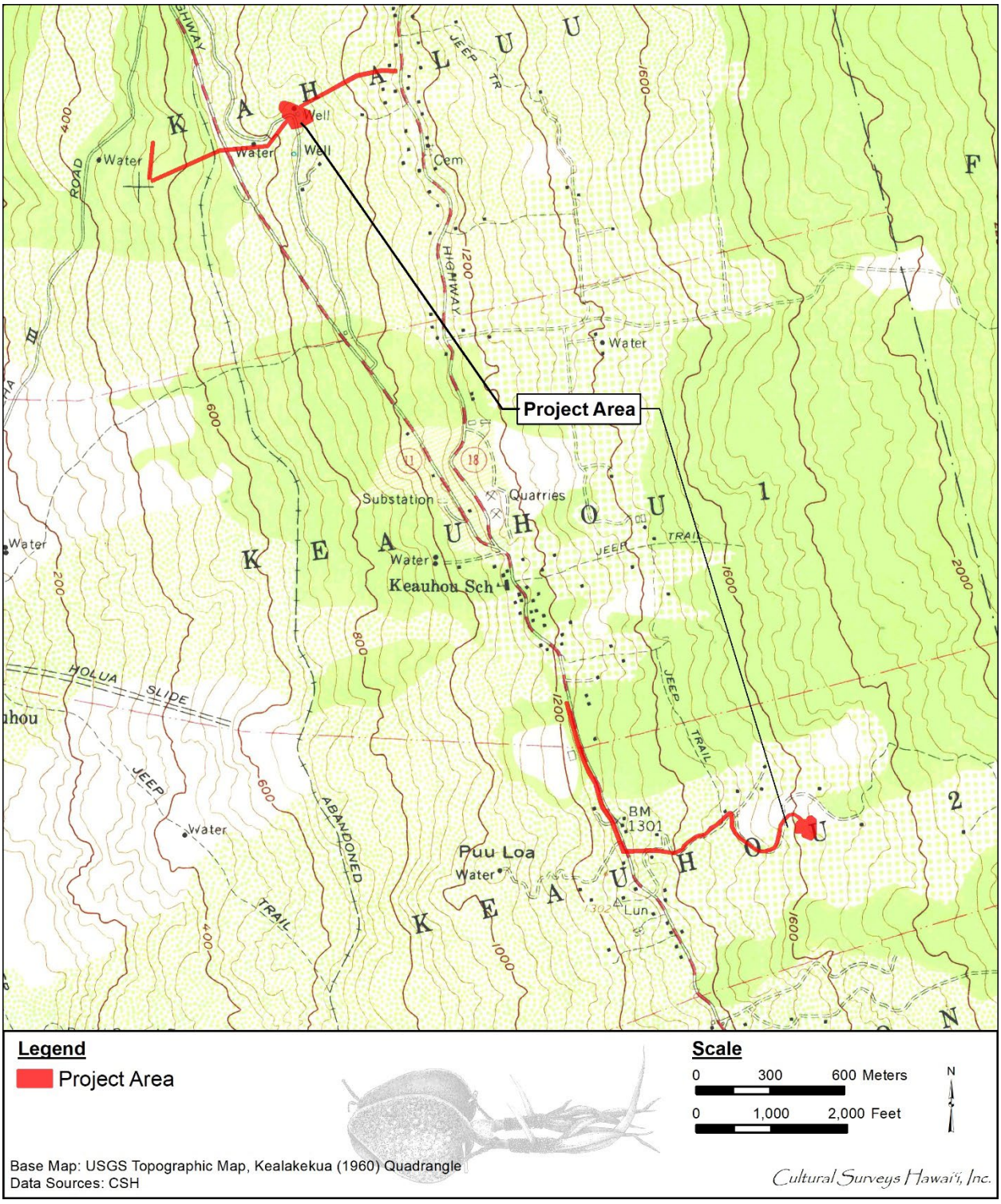


Figure 17. Portions of the 1960 Kealakekua USGS 7.5-minute topographic quadrangle showing the location of project area in relation to area development; note the "abandoned" Hawaii Railroad alignment

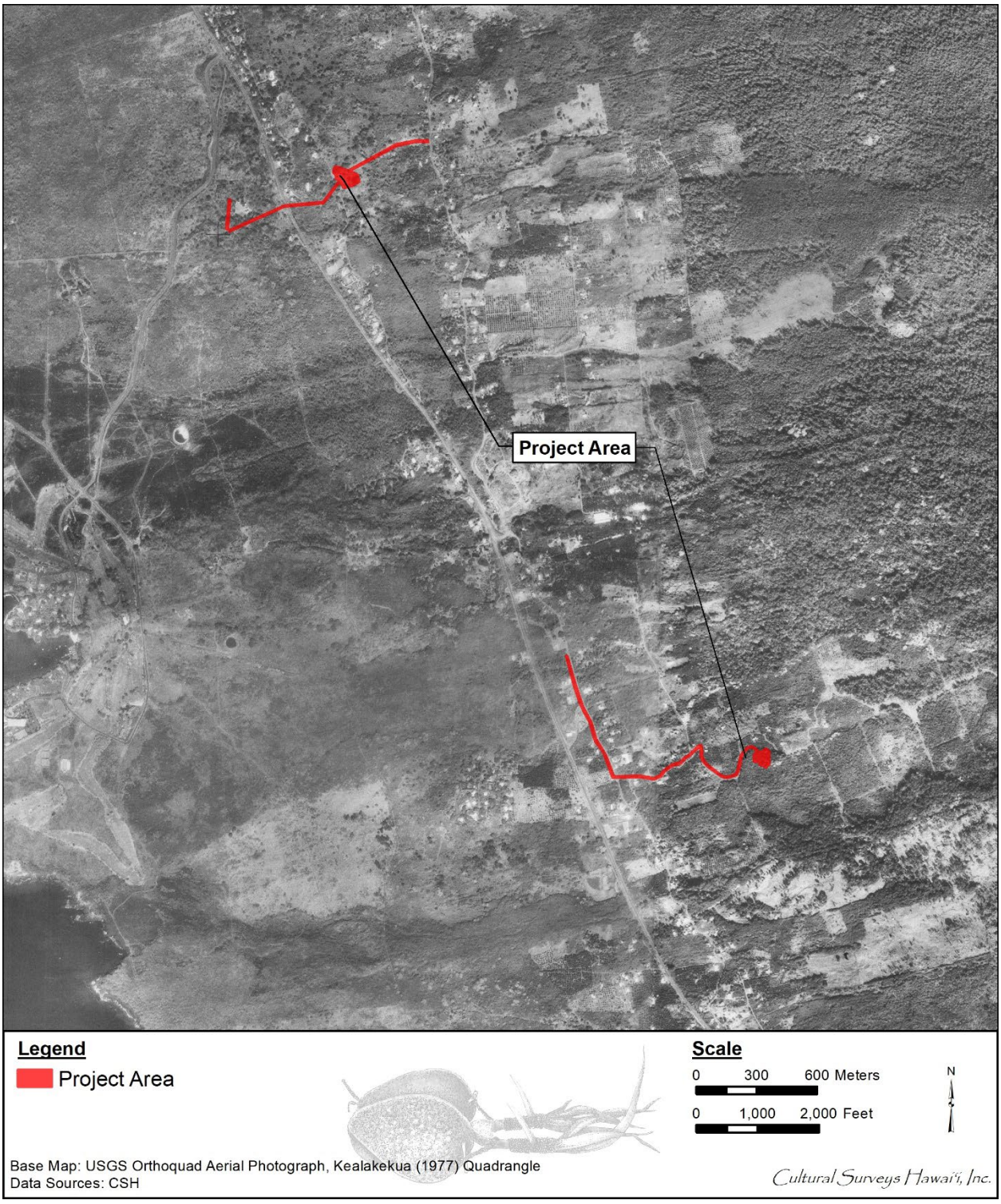


Figure 18. 1977 USGS Orthophoto, showing the continued use of the surrounding area for agriculture and ranching

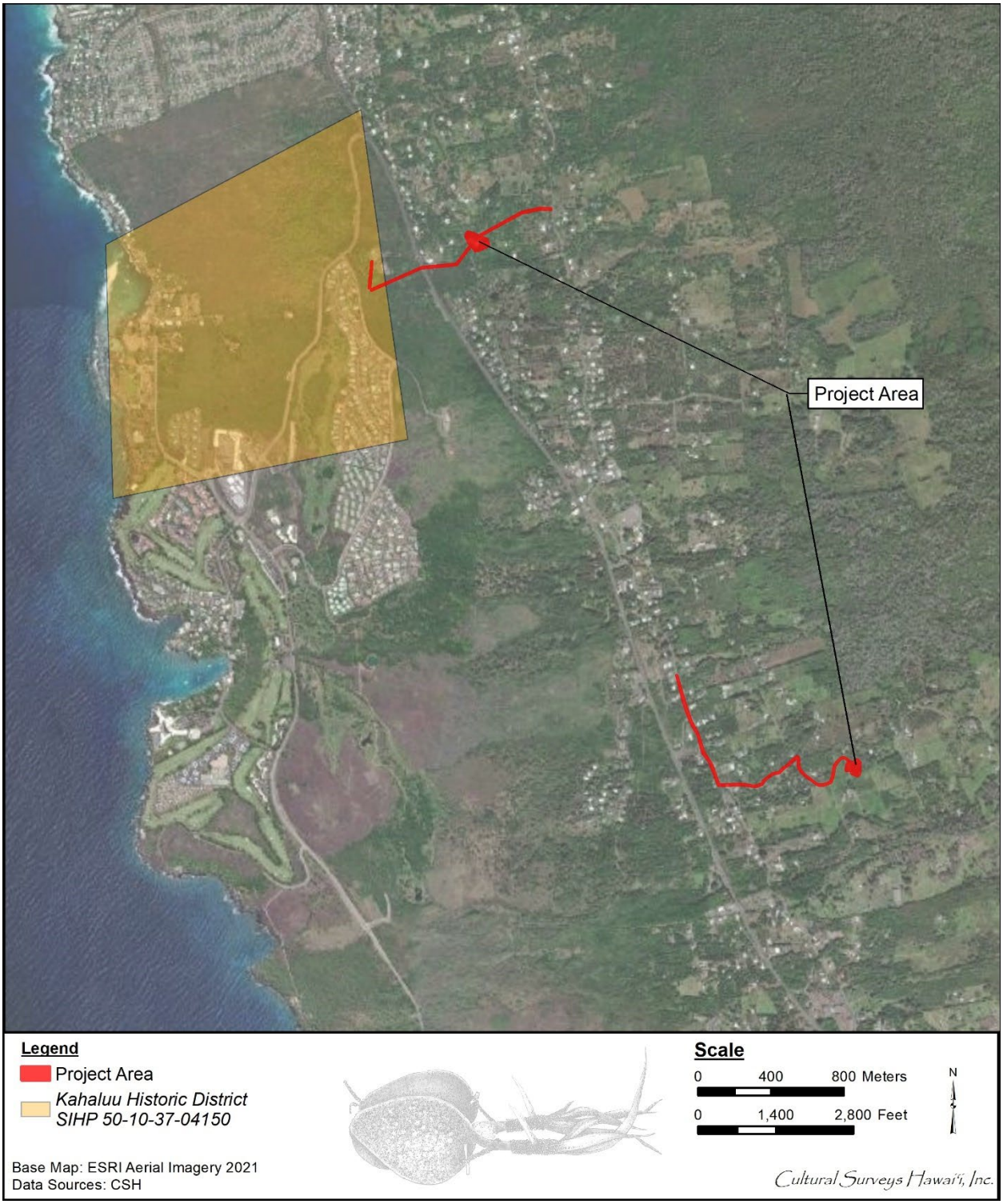


Figure 19. Aerial photograph (ESRI 2018) showing the Kahalu‘u Historic District (SIHP # 50-10-37-04150) in relation to the project area

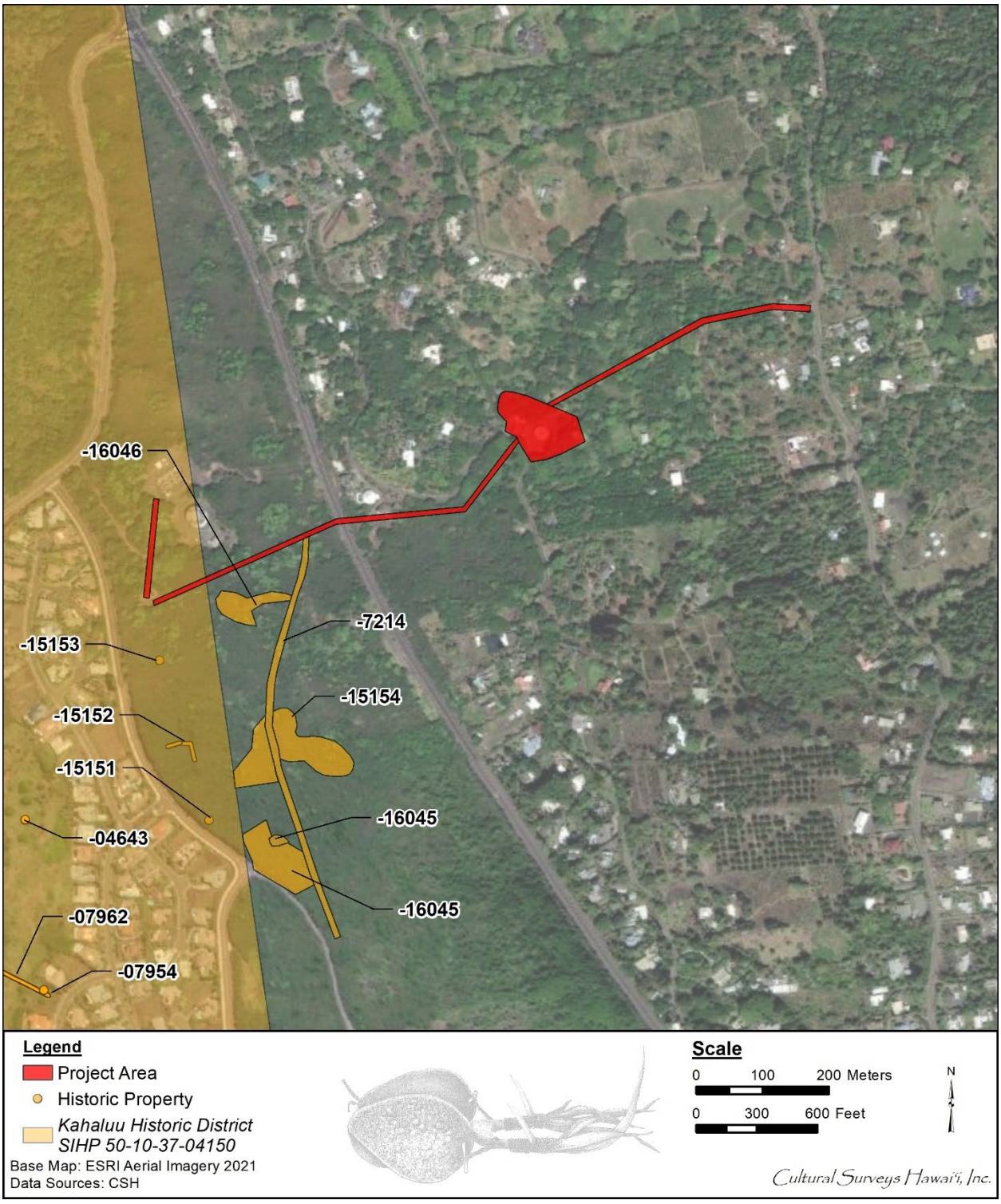


Figure 20. Aerial photograph (ESRI 2018) showing the locations of previously identified historic properties in the vicinity of the northern portion of the project area in Kahalu‘u

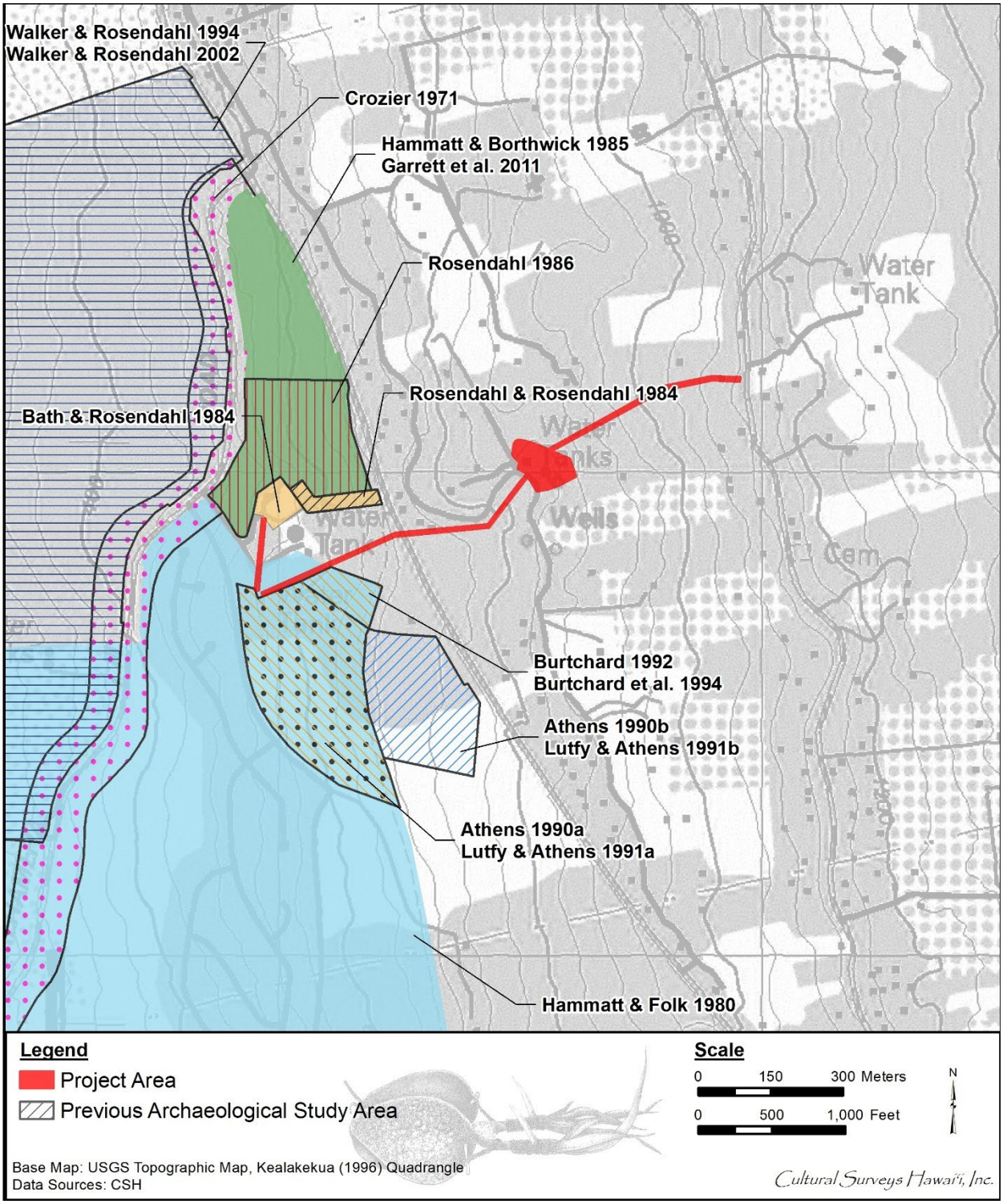


Figure 21. Portion of the 1996 Kealakekua USGS 7.5-minute topographic quadrangle, showing the location of previous archaeological studies in the vicinity of the northern portion of the project area in Kahalu‘u

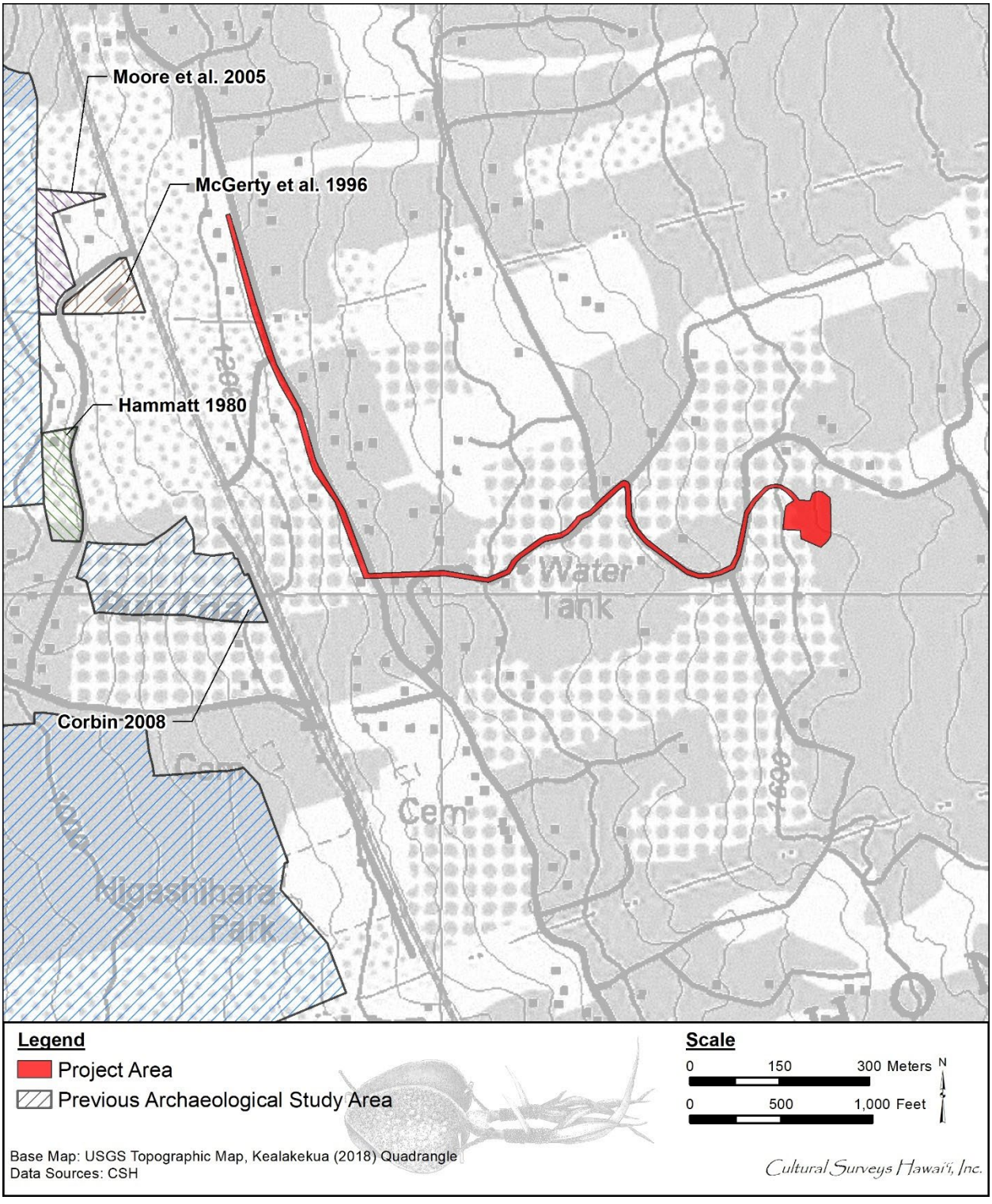


Figure 22. Portion of the 1996 Kealakekua USGS 7.5-minute topographic quadrangle, showing the location of previous archaeological studies in the vicinity of the southern portion of the project area in Keauhou 1-2

Table 3. Previous archaeological studies in the northern portion of the project area in Kahaluʻu (studies overlapping or bounding the current project area indicated in bold font)

Reference	Type of Study	Location	Findings (all SIHP site numbers prefixed 50-10-37 unless otherwise noted)
Crozier 1971	Archaeological survey	Kamehameha III Rd, Kahaluʻu and Keauhou 1	Documented six historic properties comprising 366 features; sites not assigned SIHP numbers; documented sites include ʻŌhiʻa cave (later assigned SIHP # -07962); one excavated unit contained late nineteenth century ceramics
Hammatt and Folk 1980	**Archaeological inventory survey**	**751 acres in Keauhou and Kahaluʻu**	**Documented 320 historic properties comprising thousands of individual features; documented sites included five *heiau* (SIHP #s -03823, -04621, -04673, -07865, -07807), habitation complexes (including possible former villages sites at SIHP #s -07829, -07835, and -07838; and high-status residences at SIHP #s -07864 and -07901), lava tubes, burial sites, trails, cart roads, animal enclosures, and agricultural features**
Bath and Rosendahl 1984	**Archaeological inventory survey**	**HELCO substation, Kahaluʻu, TMK: [3] 7-8-010:por. 027**	**Documented six habitation/agricultural sites, including a C-shape, terraces, mounds, and walls; testing yielded two C14 dates (AD 1400-1515; 885-1790) and one volcanic rind date (AD 1742-1778)**
Rosendahl and Rosendahl 1984	Archaeological reconnaissance survey	HELCO substation corridor, Kahaluʻu, TMK: [3] 7-8-010: por. 027	Documented seven habitation/agricultural sites, not assigned SIHP numbers; noted presence of historic railroad bed (SIHP # -07214), but did not document it
Hammatt and Borthwick 1985	Archaeological reconnaissance survey	28.6 acres in Kahaluʻu, TMK: [3] 7-8-010:050	Documented ten sites including a complex of walls, agricultural terraces, modified outcrops, mounds, an enclosure, and a walled platform; sites not assigned SIHP numbers; noted presence of historic railroad bed (SIHP # -07214), but did not document it
Rosendahl 1986	Archaeological reconnaissance survey	14.9 acres in Kahaluʻu, TMK: [3] 7-8-010: por. 050	Documented 14 previously recorded sites and five newly recorded sites, not assigned SIHP numbers; sites consisted of agriculture and habitation complexes

Reference	Type of Study	Location	Findings (all SIHP site numbers prefixed 50-10-37 unless otherwise noted)
Athens 1990a	**Archaeological reconnaissance**	**22 acres in Kahaluʻu**	**Documented four newly recorded archaeological site complexes not assigned SIHP numbers, and previously recorded SIHP # -07412 (railroad berm)**
Athens 1990b	Archaeological reconnaissance survey	20 acres in Kahaluʻu	Documented eight previously unrecorded site complexes, not assigned SIHP numbers, and previously recorded SIHP # -07214 (railroad berm); newly recorded sies included agricultural complexes and walls
Lufty and Athens 1991a	**Archaeological inventory survey**	**22 acres in Kahaluʻu**	**Documented one previously recorded historic property (SIHP # -07214, railroad berm) and four newly recorded sites comprising 39 features (SIHP #s -15151, unmodified lava tube; -15152, ranching complex; and -15153 and -15154, agricultural complexes)**
Lufty and Athens 1991b	Archaeological inventory survey	20 acres in Kahaluʻu	Documented two previously recorded historic properties (SIHP #s -07214, railroad berm, and -15154, agricultural complex), and four newly recorded historic properties (SIHP #s -15155, -15156, -15157, and -15158; agricultural and ranching sites)
Burchard 1992	**Archaeological mapping**	**Kahaluʻu**	**Documented lava tube burial cave SIHP # -16045**
Burchard et al. 1994	**Archaeological survey and data recovery**	**24.4 acres in Kahaluʻu**	**Included data recovery at previously recorded SIHP # -15154 (agricultural and limited habitation complex), and AIS-level documentation of new features at previously recorded SIHP # -16045 (agricultural and burial complex) and newly recorded SIHP # -16046 (agricultural complex)**
Walker and Rosendahl 1994	Archaeological inventory survey	275 acres in Kahaluʻu, TMKs: [3] 7-8-010:002, 004 por.	Documented 251 sites comprising 532 individual features, of which 121 previously recorded; 29 formal feature types present, representing 14 general functional categories

Reference	Type of Study	Location	Findings (all SIHP site numbers prefixed 50-10-37 unless otherwise noted)
Walker and Rosendahl 2002	Archaeological inventory survey	275 acres in Kahaluʻu, TMKs: [3] 7-8-010:002, 004 por.	Update of Walker and Rosendahl (1994) study; notes presence of 254 sites comprising 532 component features
Garrett et al. 2011	Archaeological inventory survey	31 acres in Kahaluʻu Ahupuaʻa, TMK: [3] 7-8-010:050 por.	Documented 23 historic properties comprising 204 individual features; one site previously recorded (SIHP #s 50-10-37-07214 and -24920 through -24941); 15 historic properties previously recorded (SIHP # -07214 railroad berm and 14 sites with newly assigned SIHP numbers); remaining eight historic properties newly recorded; a wide variety of formal feature types documented, associated with pre-Contact and historic land use for habitation, agriculture, transportation, and ceremony

Table 4. Previous archaeological studies in the southern portion of the project area in Keauhou 1-2 (no studies overlap or bound current project area)

Reference	Type of Study	Location	Results
Hammatt 1980	Archaeological reconnaissance	2.8 acres in Keauhou 2, TMK: [3] 7-8-050:042	No archaeological features encountered; noted some areas of prior bulldozer disturbance
McGerty et al. 1996	Archaeological inventory survey	1.5 acres in Keauhou 1, TMK: [3] 7-8-007:053	No historic properties documented
Moore et al. 2005	Archaeological inventory survey	Keauhou 1 Ahupua‘a, North Kona District, Island of Hawai‘i, TMK: [3] 7-8-007:047	Documented three historic properties: a short, low wall (SIHP # 50-10-37-24332), and two agricultural complexes (SIHP #s 50-10-37-24333 and -24334); subsurface testing conducted at three features, which yielded *kukui* nut in one unit, and no other cultural materials
Corbin 2008	Archaeological inventory survey	8.5 acres in Keauhou 2, TMK: [3] 7-8-005:por. 052	Documented a site complex consisting of three historic ranching/boundary walls, and 60+ terraces; personal communication with Mr. James Sugai confirmed he constructed numerous terraces prior to 1958, effectively making these features historic properties; Mr. Sugai built numerous additional features after 1958; such as mounds, modified outcrops, low walls, etc. (Corbin 2008:ii), meaning these features were not considered historic properties at time of study

Table 5. Historic properties previously documented in the vicinity of the current project area, with field inspection results

SIHP # 50-10-37	Project Ahupua‘a	Previous Study Reference(s)	Site Type	# of Fea.	Site Function	Site Age	Results of Field Inspection
-04643	Kahalu‘u	Hammatt and Folk (1980)	Planting area/complex	Not given	Agriculture	Not given	Well outside project area
-07214	Kahalu‘u	Athens (1990a and b), Lufty and Athens (1991a and b), Garrett et al. (2011)	Railroad berm		Transportation	Historic (early 1900s)	Located crossing through proposed alignment in western portion of project area/*makai* of Hawai‘i Belt Rd
-07954	Kahalu‘u	Hammatt and Folk (1980)	Platform	1	Possible burial	Not given	Well outside project area
-07962	Kahalu‘u	Hammatt and Folk (1980)	Cave complex (‘Ōhi‘a cave)	Not given	Habitation, burial	Pre-contact	Well outside project area
-15151	Kahalu‘u	Lufthy and Athens (1991a)	Lava tube	–	Unmodified/ likely natural	N/A	Well outside project area
-15152	Kahalu‘u	Lufthy and Athens (1991a)	Cattle wall complex	3	Ranching	Historic	Well outside project area
-15153	Kahalu‘u	Lufthy and Athens (1991a)	Complex	2	Agriculture	Pre-Contact	Well outside project area
-15154	Kahalu‘u	Lufthy and Athens (1991a and b), Burtchard et al. (1994)	Complex	60	Agriculture, limited habitation	Late pre-Contact to early historic	Well outside project area
-16045	Kahalu‘u	Butchard (1992), Burtchard et al. (1994)	Complex with lava tube and surface features	Lava tube + 29 surface features	Burial (within lava tube) and agriculture (surface features)	Late pre-contact to early historic	Well outside project area
-16046	Kahalu‘u	Burtchard et al. (1994)	Complex	22	Agriculture	Likely pre-Contact	Approximately 50 m south of project area; no component features observed during field inspection

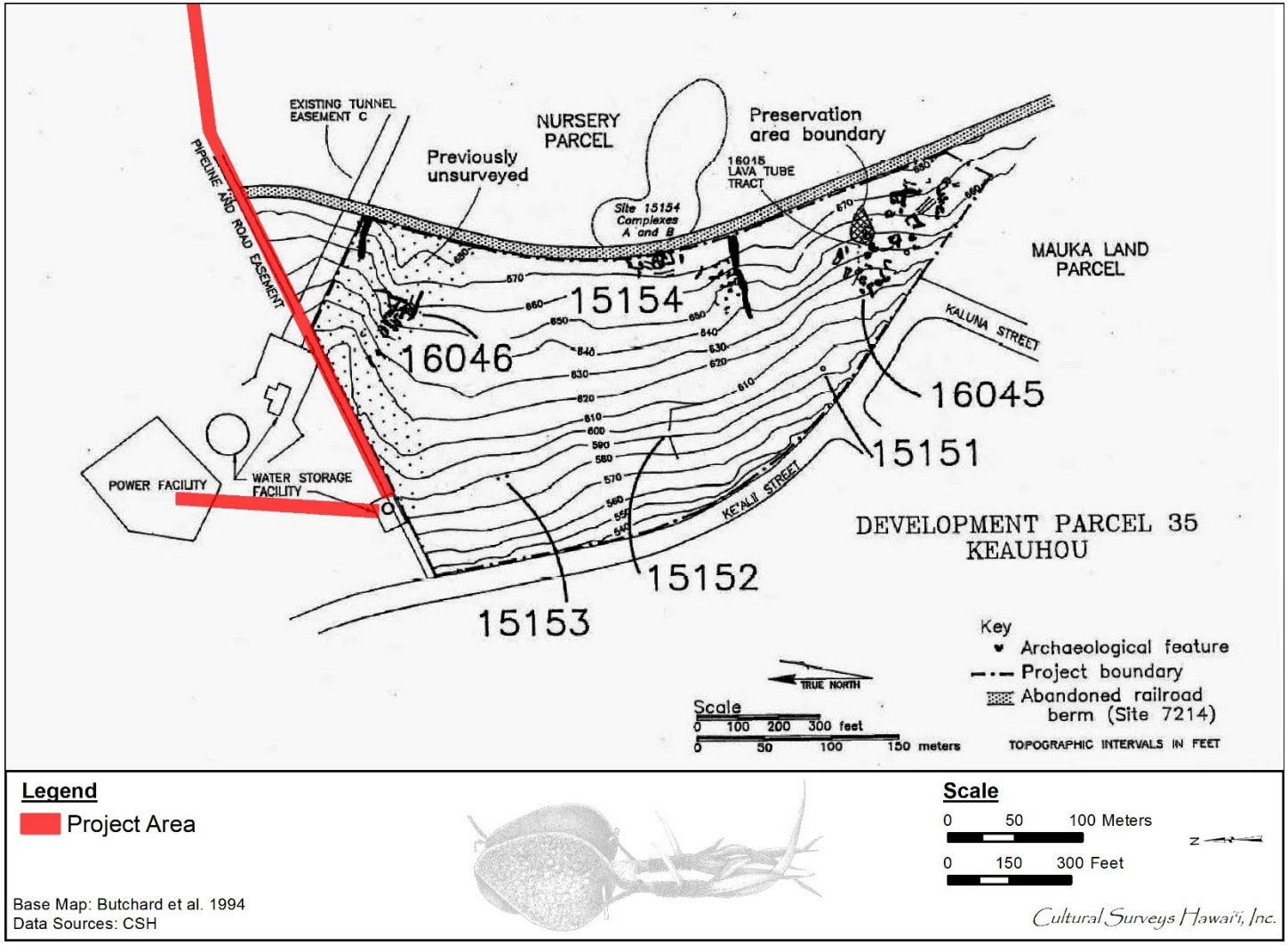


Figure 23. Map of KIC Development Parcel 35 adapted from Burchard et al. (1994:4) showing the location of previously documented sites in relation to transmission line corridors in the northern portion of the project area

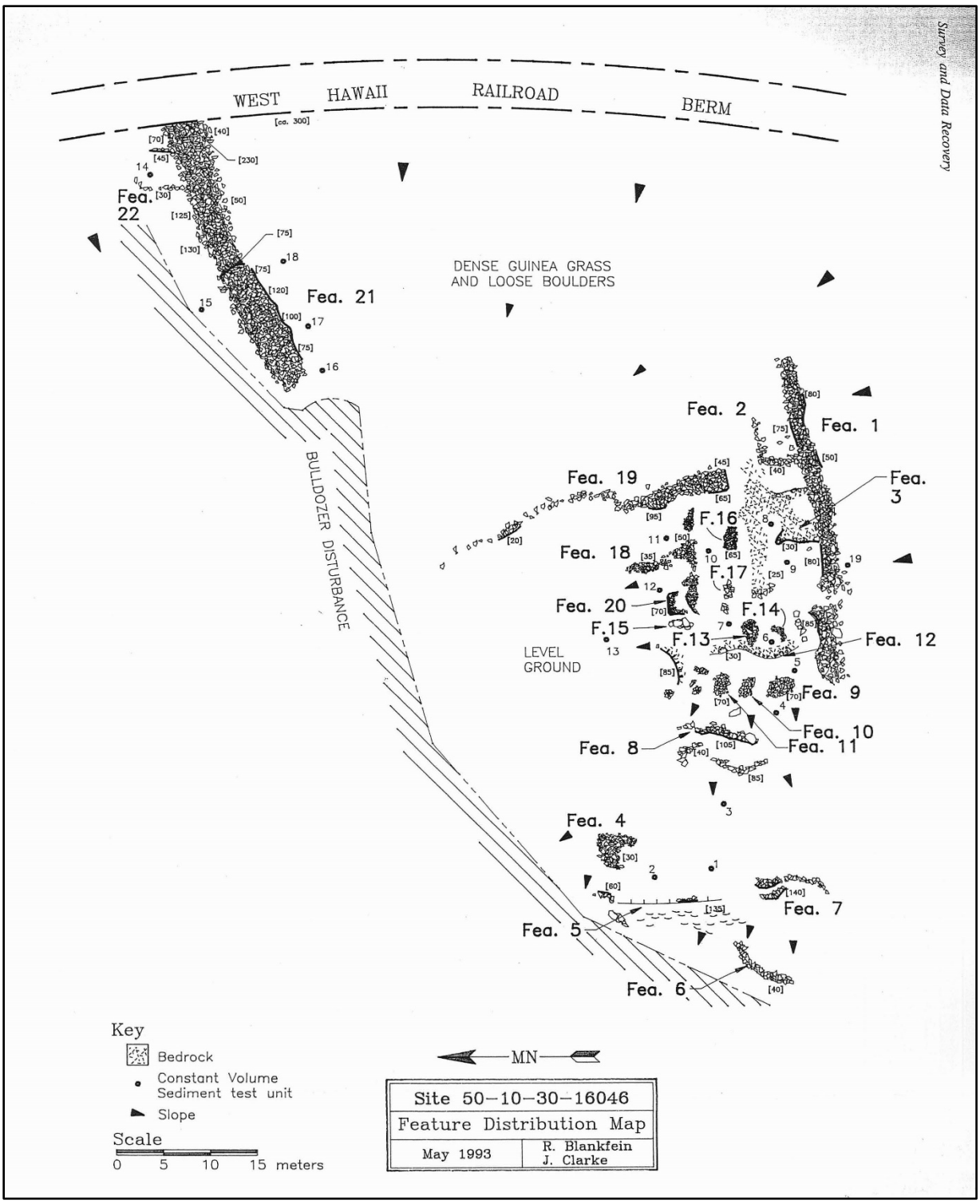


Figure 24. Plan map of SIHP # 50-10-37-16046 (Burtchard et al. 1994:47) showing feature distribution and bulldozer disturbance in the vicinity



Figure 25. Aerial photo (ESRI 2018) showing archaeological sites encountered in the northern portion of the project area in Kahalu‘u

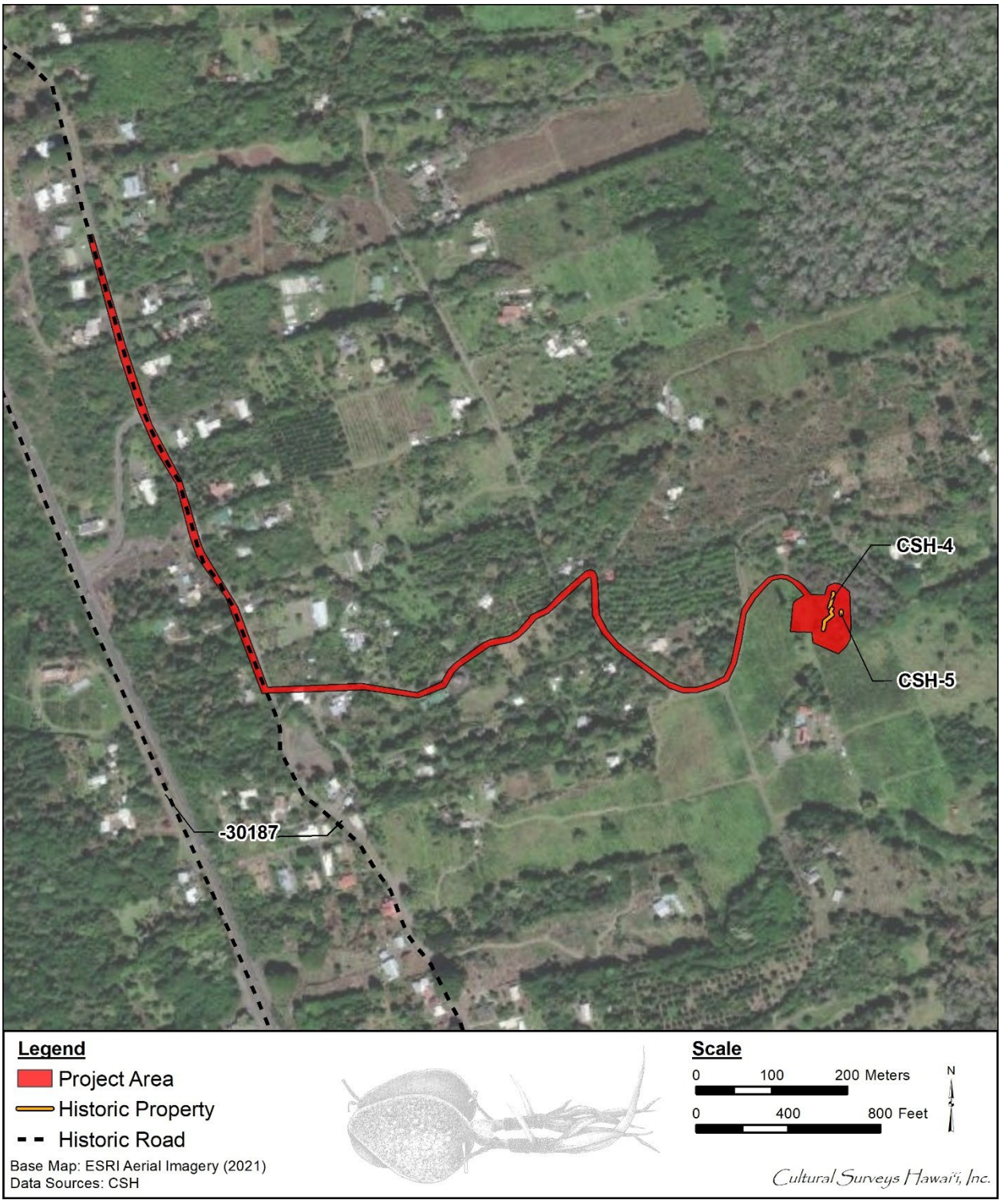


Figure 26. Aerial photo (ESRI 2018) showing archaeological sites encountered in the eastern portion of the project area in Keauhou 1-2



Figure 27. Photo of existing water tank at the western end of the proposed and alternative routes in the Kahaluʻu portion of the project area; view to north



Figure 28. Photo of the dense vegetation in the Kahaluʻu portion of the project area between the existing small tank and the Belt Road (Route 11); view to southeast



Figure 29. Photo showing the *makai* side of a section of the SIHP # 50-10-37-07214 railroad berm; view to northeast



Figure 30. Google Earth (2021) Street View image showing the portion of the Belt Road (Route 11) crossed by the proposed and alternate alignments in Kahaluʻu; view to south



Figure 31. Photo overlooking the Department of Water Supply (DWS) facility in the Kahaluʻu portion of the project area; view to northwest



Figure 32. Photo overlooking the eastern side of the DWS facility in the Kahaluʻu portion of the project area; note dense vegetation outside the fence; view to northeast



Figure 33. Photo showing typical terrain and vegetation in the area north of the DWS facility fence line; archaeologist is standing at the location of a bulldozer push pile adjacent to a breadfruit tree; view to southwest



Figure 34. Photo showing close-up of bulldozer push pile near breadfruit tree north of the DWS facility fence line; note bulldozer scarring visible on some of the rocks; view to north



Figure 35. Photo of CSH-1, rock wall; view to northeast



Figure 36. Photo of CSH-1, rock wall; note DWS facility in background left; view to south



Figure 37. Photo of CSH-2, rock wall; view to east



Figure 38. Photo of the eastern terminus of the proposed alignment at Old Māmalahoa Highway (SIHP # 50-80-47-31087) in Kahaluʻu (note water utility box in front left of photo); view to west



Figure 39. Photo of a portion of a dry-stacked cross-slope wall at CSH-2; view to west



Figure 40. Photo showing a portion of a dry-stacked *mauka-makai* wall at CSH-2; view to west



Figure 41. Photo showing a portion of a dry-stacked *mauka-makai* wall at CSH-2; view to southwest



Figure 42. Photo showing the Keauhou Store along a section of SIHP # -30187 along project area in Keauhou; view to south



Figure 43. Photo showing an entry gate along a section of SIHP # -30187 along project area in Keauhou; view to northwest



Figure 44. Photo showing a typical section of SIHP # 50-80-47-30187 along project area in Keauhou; note rock wall along shoulder by telephone pole in foreground; view to northwest



Figure 45. Photo of a portion of Bishop Road along the proposed pipeline route in Keauhou; view to northeast



Figure 46. Photo of a portion of Bishop Road along the proposed pipeline route in Keauhou; view to west



Figure 47. Photo overlooking a coffee orchard along the proposed pipeline route/Bishop Road in Keauhou; view to northeast



Figure 48. Photo overlooking the proposed tank site area at the *mauka* end of the proposed pipeline route in Keauhou; view to north



Figure 49. Photo showing evidence of bulldozer disturbance and trash in the southeastern portion of the Keauhou tank site project area; view to north



Figure 50. Photo showing a portion of CSH-4, rock wall; view to east



Figure 51. Photo showing typical construction along a portion of CSH-4, rock wall; view to northeast



Figure 52. Photo showing bulldozer disturbance along the southern portion of CSH-4, rock wall; view to west



Figure 53. Photo of CSH-5, rock wall; view to west



Figure 54. Photo of CSH-5, rock wall, showing how wall may have served as a terrace; view to south

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Appendix A Project Area Land Jurisdiction

Project TMK:	Owner	Parcel Acreage*	Acreage Portion in Project Area*
7-8-004:010	KAMEHAMEHA SCHOOLS	3.73	0.137961
7-8-004:013	KAMEHAMEHA SCHOOLS	8.8	0.1222
7-8-004:014	KAMEHAMEHA SCHOOLS	9.154	0.205
7-8-004:015	KAMEHAMEHA SCHOOLS	10.5	0.96
7-8-004:019	KAMEHAMEHA SCHOOLS	1.92	0.0696
7-8-004:039	KAMEHAMEHA SCHOOLS	1.2	0.0827
7-8-004:072	KAMEHAMEHA SCHOOLS	4.7	0.835
7-8-004:999	ROAD	-	0.51
7-8-009:014	KAMEHAMEHA SCHOOLS	9.154	0.7276
7-8-009:029	KAMEHAMEHA SCHOOLS	5.721	0.6292
7-8-009:032	KAMEHAMEHA SCHOOLS	8.89	0.3528
7-8-009:054	COUNTY OF HAWAII	0.208	0.2320
7-8-009:068	HAWAII COMMUNITY FEDERAL CREDIT UNION	0.481	0.0385
7-8-009:069	DURAN,MARGARET D	0.6377	0.0716
7-8-009:070	KAMEHAMEHA SCHOOLS	10.5674	0.5261
7-8-009:077	STATE OF HAWAII	0.519	0.5171
7-8-009:078	KAMEHAMEHA SCHOOLS	6.371	0.3002
7-8-009:999	ROAD	-	0.52
7-8-010:020	KAMEHAMEHA INVESTMENT CORP.	4.731	0.0324
7-8-010:050	KAMEHAMEHA INVESTMENT CORP.	115.444	0.8549
7-8-010:999	ROAD	-	0.097
		Total Project Acreage	7.8218 acres (3.1654 hectares)

*County Tax Acreages are listed in the Parcel Acreage column, while GIS was used to calculate the totals listed in the Acreage Portion in Project Area column; these differing data sources account for occasional discrepancies in the listed totals

Appendix B Kona Field System (SIHP # 50-10-37-06601) Archaeological Cover Sheet

ARCHAEOLOGICAL COVER SHEET 7-7-04:20 Dellinghouse

HAWAII REGISTER OF HISTORIC PLACES

50 - 10 - 37 - 6601 (1 2 3 4 5 6 7 8 9)
SITE IDENTIFICATION NUMBER

SITE NAME/TYPE: KONA Field System
DISTRICT: North and South KONA
AREA: 1,392 square Kilometers
CATEGORY: ___Single Feature X Complex ___Places
OWNERSHIP: X Public X Private
PHOTOGRAPHS: X Yes ___No (Temp/Tech)
KNOWN PRESSURES ON SITE: URBANIZATION

2 (10) 1 (11) PRE-1778 (12 13 14 15 16 17 18 19 20)
CARD No. DATE/PERIOD

PRESENT LAND USES: MULTIPLE

DESTRUCTION: ___No Known Future Danger X Possible Future Danger ___Future Danger Certain ___Present Danger ___Presently Being Destroyed

STATUS: ✓Occupied ✓Unoccupied CONDITION: ___Excellent ✓Good ___Fair ___Deteriorated

INTEGRITY: ✓Unaltered, Orig Loc ___Unaltered, Moved ___Altered, Orig Loc ___Altered, Moved

ACCESSIBILITY: ___Unrestricted ✓Restricted ___Inaccessible

LEGENDARY MATERIALS KNOWN: ___Yes ✓No WRITTEN HISTORICAL MATERIALS: ✓Yes ___No

IMPORTANCE AS EXAMPLE OF TYPE SITE: ✓Good ___Moderate ___Poor

SUSCEPTABILITY TO INTERPRETATION: ✓Good ___Moderate ___Poor

RESEARCH POTENTIAL: ✓Good ___Moderate ___Poor

LOCAL ATTITUDES ABOUT SITE: ___Valuable ___Moderate Value ___Low Value ___Ambivalent ✓Unknown

BRIEF DESCRIPTION (Columns 21-80): MASSIVE ANCIENT HAWAIIAN FIELD System MEASURING 3 by 18 miles

STAFF EVALUATION: X High Value ___Valuable ___Reserve ___Marginal

SUGGESTED THEMES: Polynesian Hawaii, AGRICULTURE, SETTLEMENT PATTERNS, Habitation

DATE SUBMITTED TO REVIEW BOARD: _____

REVIEWER'S RECORD AND EVALUATION

NAME: _____ DATE REVIEWED _____

CATEGORY: ___High Value ___Valuable ___Reserve ___Marginal

SIGNIFICANCE: ___National ___State ___Local

RECOMMENDED DISPOSITION: ___Nominate National Register ___State Register ___Staff Files

RECOMMENDED THEMES: _____

REVIEWER'S COMMENTS: _____

REVIEW BOARD EVALUATION RECORD

DATE REVIEWED: _____ RECORDER: _____

OFFICIAL CATEGORY: ___High Value ___Valuable ___Reserve ___Marginal

OFFICIAL SIGNIFICANCE: ___National ___State ___Local

OFFICIAL THEMES: _____

OFFICIAL DISPOSITION: ___National Register Nomination ___State Register ___Staff Files

REVIEW BOARD COMMENTS: _____

VOTING RECORD: Daws_____ Hormann_____ Jackson_____ Kikuchi_____
Lind_____ Mark_____ Nagata_____ Paglinawan_____
Roche_____ Tuggle_____

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE PARKS DIVISION

HAWAII REGISTER OF HISTORIC PLACES

ARCHAEOLOGICAL FORMS

FORM 01: FIELD SURVEY

4 CORNER: 1

SINGLE POINT COORDINATE LOCATION: 2 ____ ____ ____ . ____ ____ N. / ____ ____ ____ . ____ ____ E.

DISTRICT	LOC	FACTOR	AREA SQUARE	CATEGORY	SIG 1	SIG 2
17	1	1	999.	3	10	41

DESTR	LAND CLASS	PHOTOS	INITIALS	INSTITUTION	MONTH	YEAR
2	___	1	TSN	01	04	74

HISTORICAL OR COMMON NAME: KONA FIELD SYSTEM

FEATURE CLASSIFICATION CODE: 5114 ____ ____ ____ 20

COND	INTG	PERIOD
2	3	1

CLASS: Nominated / Accepted — NRHP

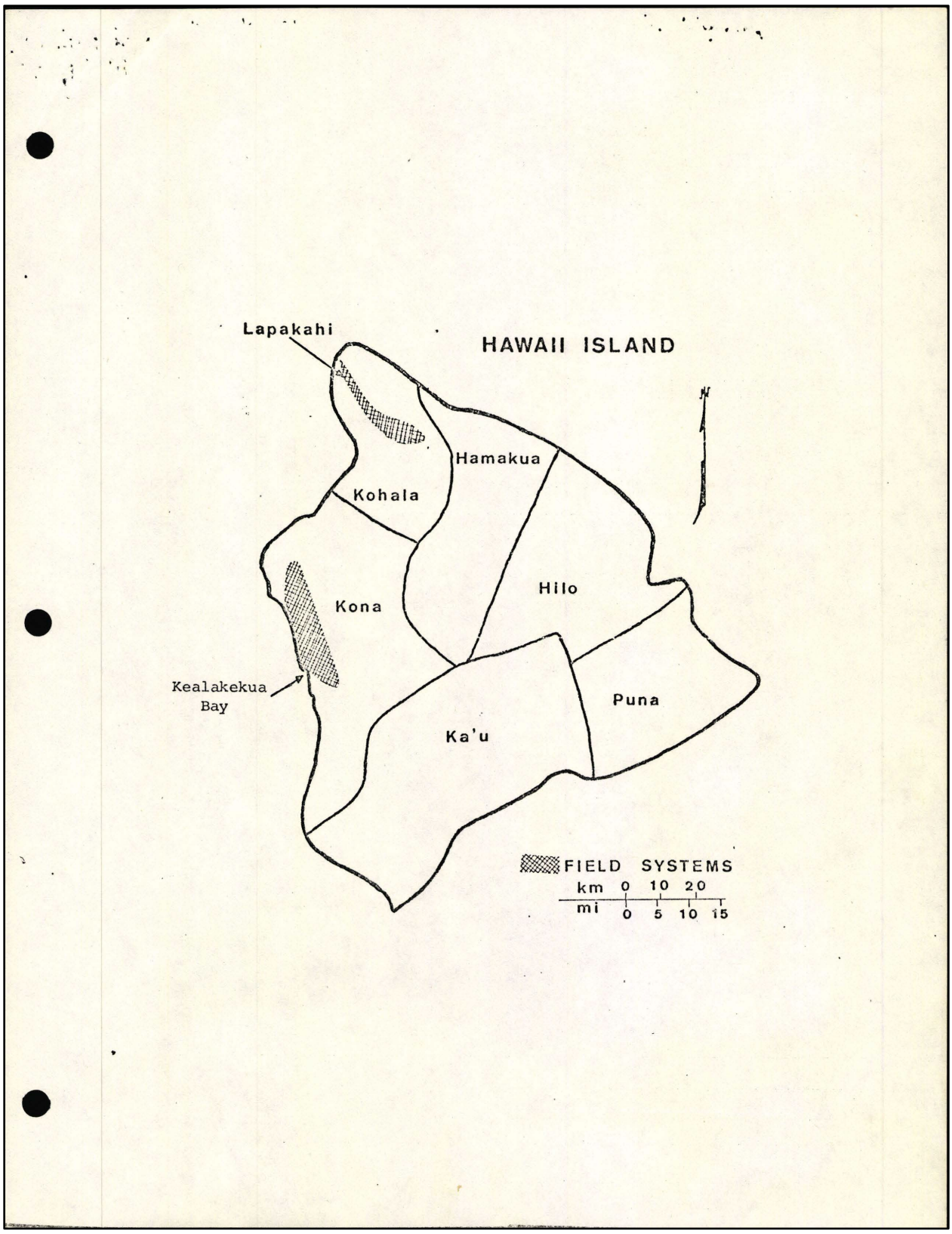
Category A / B / C — HRHP

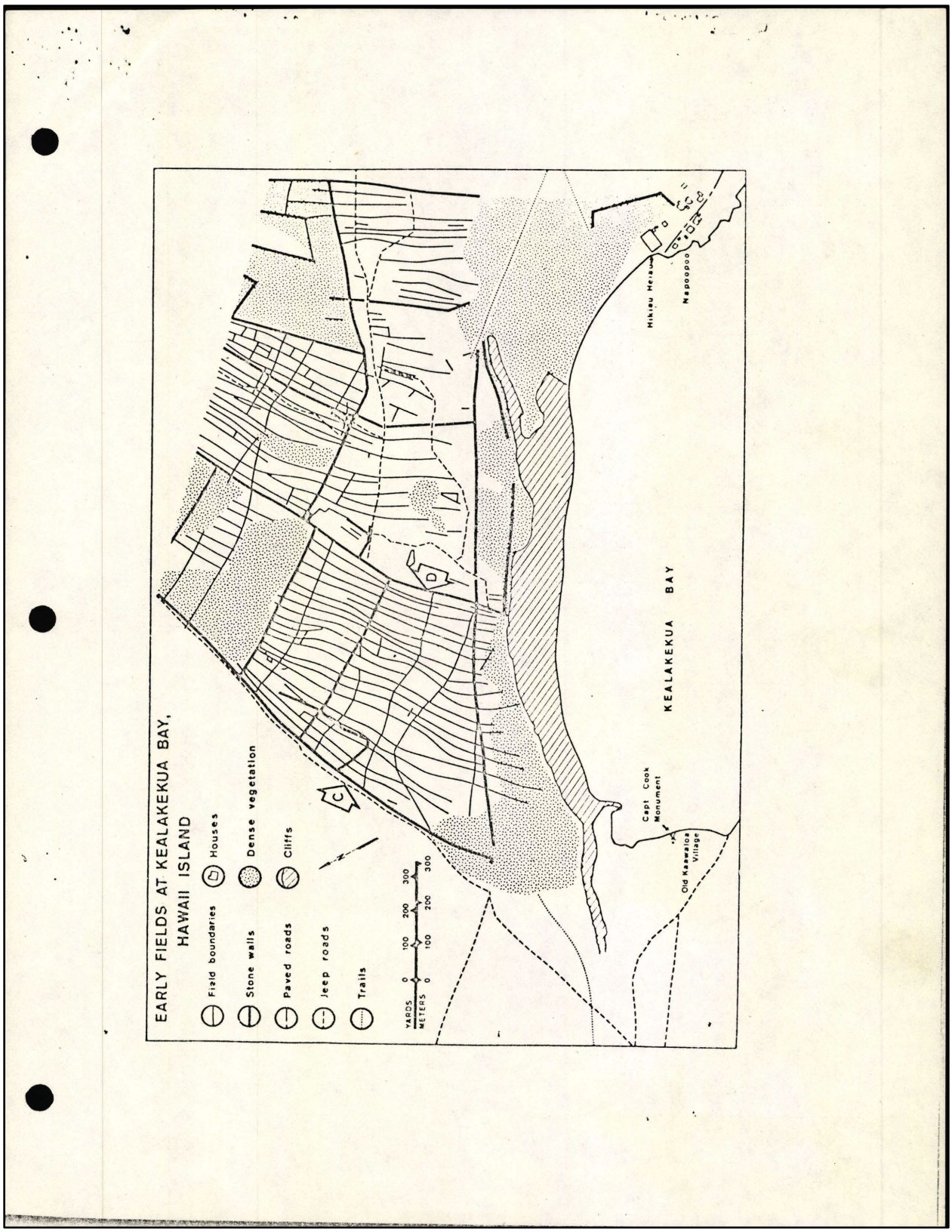
Keypunched

FORM 11: FOUR CORNER LOCATION

	QUAD	NORTH GRID COORDINATE	EAST GRID COORDINATE
NW CORNER:	27	21818 . 55 N.	183 . 71 E.
NE CORNER:	28	21818 . 41 N.	191 . 67 E.
SE CORNER:	57	21444 . 50 N.	202 . 07 E.
SW CORNER:	56	21433 . 00 N.	194 . 81 E.

ISLAND: 50 — QUAD: 10-37-6601 — IDENTIFICATION NO.


Lapakahi
HAWAII ISLAND
Hamakua
Kohala
Kona
Hilo
Kealakekua Bay
Puna
Ka'u
FIELD SYSTEMS
km 0 10 20
mi 0 5 10 15


EARLY FIELDS AT KEALAKEKUA BAY,
HAWAII ISLAND
Field boundaries
Houses
Stone walls
Dense vegetation
Paved roads
Cliffs
Jeep roads
Trails
YARDS 0 100 200 300
METERS 0 100 200 300
KEALAKEKUA BAY
Capt Cook Monument
Old Kaawaloa Village
Napoopoo

FEATURE DESCRIPTION FORM

50 - 10 - 37 - 6601
ISLAND QUAD IDENTIFICATION NO.

VERBAL DESCRIPTION MUST INCLUDE: bearings and sources used to locate feature; size; shape; construction technique; materials used; terrain features; condition; surface artifacts; midden. SIGNIFICANCE STATEMENT MUST INCLUDE: research potential; interpretive potential; unusual or important characteristics; probable function; importance as representative of its class; recommendation of Register status.

DESCRIPTION:
The most extensive and monumental work of ancient Hawaii is the Kona Field System, lying along the western side of Hawaii Island. This field system is so extensive that it can only be appreciated from an airplane or by air photos, for it is an integrated complex of remains three by eighteen miles in size. The fields form a patterned network of elongated rectangles lying as a band parallel to the sea.

Ground inspections in the Kealakekua Bay area have shown that the patterning is caused by earthen and rock ridges which enclose rectangular field areas, generally oriented with their long axis perpendicular to the sea. This places the long sides of each rectangular field perpendicular to the topographic contours and parallel to the terrain slope. Individual fields vary in size from 9 meters (30 feet) wide by 15 meters (50 feet) long to fields measuring 50 by 300 meters (150 by 1,000 feet). The field dimensions appear related to local topography. A field may widen to take in a feature, such as an outcropping, or it may narrow to go around one, for example.

Some field boundaries are well constructed of stacked stone while others are merely piles of rock lining the field borders. These walls vary in height from about 0.5 to 1.0 meters (1.5 to 3 feet). The earthen mounds vary from about 0.5 to 1 meters (1.5 to 3 feet) in height and are quite rounded. The width of these field boundaries ranges from about 1 meter (3 feet) for well constructed stone walls to about 3 meters (9 feet) for the rounded earthen mounds.

There was no evidence of irrigation as shown by traces of water diversion or by terracing; the mounds and walls apparently were for rainfall retention, boundary markers and depositories for field rocks. In addition, the upslope orientation of the fields rules against their use for holding surface water, indicating that water was limited to rainfall.

The general symmetry of the Kealakekua fields, and of the whole Kona System, is well designed to take advantage of the western Hawaii Island environment. The orientation maximizes the available sunlight and exposure to periodic rain showers. The alignment would have made the crops susceptible to high velocity trade winds were it not for the protection of Mauna Loa. On-shore winds are generally light so physical damage or excessive plant evapo-transpiration would not have been a crucial factor in field alignment, contrary to the situation in Kohala.

FEATURE DESCRIPTION FORM

50 - 1 0 - 3 7 - 6 6 0 1
ISLAND QUAD IDENTIFICATION NO.

VERBAL DESCRIPTION MUST INCLUDE PERTINENT DATA ON: bearings and sources used to locate feature; terrain and vegetation; size; shape; construction technique; materials used; condition; surface artifacts or midden visible. SIGNIFICANCE STATEMENT MUST INCLUDE: unusual or important characteristics; accessibility; interpretive and research potential; evaluation of the site's importance as a representative of its class; recommendations for register category.

(Page Two)

Excellent historical documentation exists for the Kona Field System, primarily through the journal of Archibald Menzies, the surgeon and naturalist with Captain George Vancouver, who visited periodically between A.D. 1792 and 1794. He made two trips inland through portions of the Kona Field System, from the coast to its upper elevations. In his walk through the northern portion of the Kona Field System, Menzies left Kailua to ascend Hualalai, noting:

> "We commenced our march with a slow pace, exposed to the scorching heat of the meridian sun, over a dreary barren track of a gradual ascent, consisting of little else than rugged porous lava and volcanic dregs, for about three miles, when we entered the breadfruit plantations whose spreading trees with beautiful foliage were scattered about that distance from the shore along the side of the mountain as far as we could see on both sides. Here the country began to assume a pleasant and fertile appearance, through which we continued our ascent for about two miles further, surrounded by plantations of the esculent roots and vegetables of the country, industriously cultivated, till we came to the uppermost village consisting of a few scattered huts ... (p. 154).

After reaching the summit of Hualalai, Menzies and his group angled south directly toward Kaawaloa at Kealakekua Bay instead of returning to Kailua. Descending out of the forest, he noted:

> "... we found the lower edge of it (the forest) as in other places, adorned with rich plantations of plantains and bananas (p. 167)."

The most extensive description of the Kona Field System comes from a similar trip by Menzies at Kealakekua Bay, near the southern end of the field system. After leaving Kaawaloa, Menzies observed:

> The forenoon was far spent in arranging and equipping the party before we left the village (Kaawaloa), and as our route lay directly back from it, over a dry barren rocky country, up a steep ascent, in the scorching heat of the day, the first part of our journey was rather fatiguing, before we gained the summit of the eminence over the bay, where we met a refreshing breeze, and had

SIGNED: DATE:

FEATURE DESCRIPTION FORM

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VERBAL DESCRIPTION MUST INCLUDE PERTINENT DATA ON: bearings and sources used to locate feature; terrain and vegetation; size; shape; construction technique; materials used; condition; surface artifacts or midden visible. SIGNIFICANCE STATEMENT MUST INCLUDE: unusual or important characteristics; accessibility; interpretive and research potential; evaluation of the site's importance as a representative of its class; recommendations for register category.

(Page Three)

an extensive prospect of the country and villages to the southward of us. The tract which extended along shore, if we might judge from its appearance and our knowledge of that which we had already traveled over, we were ready to pronounce a dreary naked barren waste, if we except a few groves of cocoa palms here and there near the villages. But that which stretched higher up along the verge of the woods from the manner it was industriously laid out in little fields exhibited a more pleasing and fertile appearance.

On leaving this station, we soon lost sight of the vessels, and entered their bread-fruit plantations, the trees of which were a good distance apart, so as to give room to their boughs to spread out vigorously on all sides, which was not the case in the crowded groves of Tahiti, where we found them always planted on the low plains along the sea side. But here the size of the trees, the luxuriancy of their crop and foliage, sufficiently show that they thrive equally well on an elevated situation. The space between these trees did not lay idle. It was chiefly planted with sweet potatoes and rows of cloth plant /wauke/. As we advanced beyond the bread-fruit plantations, the country became more and more fertile, being in a high state of cultivation. For several miles round us there was not a spot that would admit of it but what was with great labor and industry cleared of the loose stones and planted with esculent roots or some useful vegetables or other. In clearing the ground, the stones are heaped up in ridges between the little fields and planted on each side, either with a row of sugar cane or the sweet root of these islands (Dracena ferrea, Linn) /ti/ where they afterwards continue to grow in a wild state, so that even these stony, uncultivated banks are by this means made useful to the proprietors, as well as ornamental to the fields they intersect.

The produce of these plantations, besides the above mentioned, are the cloth plant (Morus papyriferus, Linn.) /wauke/, taro, and sweet potatoes. The latter are here planted three or four feet apart and earthed up around their stems much in the same manner as the common

SIGNED: DATE:

FEATURE DESCRIPTION FORM

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(Page Four)

potatoes are treated in England. When they dig up any, we remarked that, after stripping off the potatoes, they carefully put the old plant back again in the ground for the ensuing crop. But the taro, being naturally an aquatic plant, required in this dry soil a very different treatment. There were generally two or three of them planted together in a hole about nine inches below the surface of the ground. These holes were about four feet apart, and as the plants grew up, the earth is gathered round their stems in the form of a basin to retain the water, either from rain or otherwise, about their roots. The whole field is generally covered with a thick layer of hay, made from long, coarse grass or the tops of sugar cane, which continually preserves a certain degree of moisture in the soil that would otherwise be parched up by the scorching heat of the solar rays. In this way they rear up these roots to very great perfection even on a dry elevated situation.

The land here is divided into plantations, called ili, which take their rise at the sea side and proceed up the country, preserving a certain breadth without any limitations, or as far as the owner chooses to cultivate them, and without the protection either of high walls or gates. (p. 77)

After breakfast, we pursued our course onward with a fair prospect of a fine day and soon after entered the wood by a well trodden path, on both sides of which were luxuriant groves of plantains and bananas reared up with great industry in the neatest order of cultivation. These being tender vegetables, required a sheltered situation and good soil to bring them to perfection. (p. 80)

Menzies continued inland above the field sytem and returned to the coast at Honaunau, just south of Kealakekua Bay.

SIGNED: DATE:

FEATURE DESCRIPTION FORM

50 - ____ - ____ - ____ ____ ____ ____ ____
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(Page Five)

The routes of Menzies and other early observers were plotted, observations matched to specific land areas, and the observations and the areas were analyzed according to modern environmental data to determine the characteristics controlling the agriculture. The following subzones for the Kona Field System were developed:

Sweet Potato/Wauke Zone

Elevation: Sea level to about 500 feet (0 to 150 meters)

Annual Rainfall: Seasonal; 30 to 50 inches (.8 to 1.2 meters)

Crops: Sweet potatoes and wauke grown in very rocky areas.

Breadfruit/Sweet Potato/Wauke Zone

Elevation: 500 to 1,000 feet (150 to 300 meters)

Annual Rainfall: 30 to 60 inches (.8 to 1.5 meters)

Crops: breadfruit trees, with sweet potatoes and wauke planted between them.

Sweet Potato/Dry Land Taro Zone

Elevation: 1,000 to 2,500 feet (300 to 750 meters)

Annual Rainfall: 60 to 80 inches (1.5 to 2.0 meters)

Crops: no breadfruit trees; sweet potatoes in the lower part, dry land taro in the upper part. Field boundaries planted with ti and sugar cane.

DATE:

FEATURE DESCRIPTION FORM

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(Page Six)

Plantains and Banana Zone

Elevation: 2,000 to 3,000 feet (600 to 900 meters)

Annual Rainfall: 80 to 100 inches (2.0 to 2.5 meters)

Crops: bananas and plantains planted just below and within the forest.

All environmental variables are relatively constant for the sub-zones except those of elevation and rainfall, demonstrating the regulating effect of these two variables on agriculture in the Kona Field System. These divisions are not to be construed as clear-cut but rather show a gradual change from one sub-zone to the next, correlated with steady increases in elevation and rainfall.

SIGNIFICANCE

The Kona Field System is without equal in Hawaii, and probably in the nation in terms of the extensiveness of a prehistoric modification of the land. It is quite comparable in terms of complexity and size with the well known field systems of Central and South America, although differing in specific characteristics. It is a physical demonstration of the highly developed farming economy of ancient Hawaii and illustrates the complexity and advanced state of aboriginal Hawaiian culture. The system is so extensive that it cannot be seen in its entirety except from extremely high altitudes, but the physical remains are sufficiently well preserved and in such generally good condition that they may still be detected on the ground, although it is difficult to realize what is viewed is part of such a massive system. In all, it is a magnificent monument to the exhaustive labors and industry of the ancient Hawaiians.

The study of environmental and crop factors shows the ancient Hawaiians were knowledgeable and adept in molding their needs in consonance with environmental restraints. Historical records show a strong appreciation of good conservation measures, such as fallowing, and mulching. This illustrates the close partnership with nature which was so much a characteristic of ancient Hawaii.

SIGNED: DATE:

FEATURE DESCRIPTION FORM

50 - 1 0 - 3 7 - 6 6 0 1
ISLAND QUAD IDENTIFICATION NO.

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(Page Seven)

The vastness and complexity of the system show the excellent practical engineering and environmental knowledge of the ancient Hawaiians, as well as the highly evolved social organization which could coordinate the labors of a multitude of people to create and maintain such a system. Yet, within the overall system, it is possible to see the role of the 'ohana, the basic Hawaiian kinship and land-controlling grouping, for the boundaries of the traditional 'ili and ahupua'a land divisions are clear. This gives an unparallel opportunity for research into the organization and interrelationships of ancient Hawaiian society.

The innumerable habitation remains, as well as the remains of complete assemblages of other physical remains, such as burial areas, religious structures (heiau), cave shelters, refuge caves, animal enclosures, and work platforms all contribute to the research importance of this system.

Finally, the Kona Field System is a dramatic illustration of the dependence of ancient Hawaii upon the production of land foods, their primary subsistence source. Truly, this is worthy of entry into the Hawaii and National Registers of Historic Places as a district of high value.

Urban development and modern agriculture has caused moderate damage to the system, but ample remains are still in existence to delimit the system and to warrant a high value evaluation.

N.B. Quotations are from:
Menzies, Archibald
1920 Hawaii Nei 128 Years Ago.... Honolulu.

N.B. The Quad number in the site identification was arbitrarily chosen since the district extends through multiple quads.

	LAT.	LONG.
NW	19°42'15"N	156°00'27"W
NE	19°42'16"N	155°56'27"W
SE	19°22'20"N	155°50'10"W
SW	19°21'32"N	155°54°18"W

SIGNED: J. Stell Mason DATE: May 15, 1974

FORM 3 1: PROPERTY OWNERSHIP

50 - 1 0 - 3 7 - 6 6 0 1
(3 4 - 5 6 - 7 8 9 10 11)
ISLAND QUAD IDENTIFICATION NO.

12 13	14 15	16	17	18	19	20	21	22 23 24	25 26 27
2 1	1 1	1	3	2	2				
USE 1	USE 2	STAT	OWNR	ATTD	ACCS	zone	sect	plat (TAX MAP)	parcel (KEY)

PROPERTY OWNER: M U L T I P L E (28 29 30 31 32 33 34 35)

STREET ADDRESS: (46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63)

TOWN OR CITY: (64 65 66 67 68 69 70 71 72 73) STATE (74 75) ZIP CODE (76 77 78 79 80)

FORM 4 1: BACKGROUND DATA

50 - 1 0 - 3 7 - 6 6 0 1
(3 4 - 5 6 - 7 8 9 10 11)
ISLAND QUAD IDENTIFICATION NO.

AHUPUA'A: M U L T I P L E (12 13 14 15 16 17 18 19 20 21 22 23 24 25 26)

PREVIOUS SURVEYS: N O N E (27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44)

PREVIOUS SITE DESIGNATION(S): N O N E (45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62)

LAST NAME OF SURVEYOR: (63 64 65 66 67 68 69 70 71 72 73 74)

(75 76) INSTITUTION (77 78) YEAR (79 80) FILED AT

APPENDIX D

Ka Paʻakai Framework Analysis

ITEM G-1 PLO EXHIBIT A

February 2025 Draft

Excerpts from Nohopapa Hawai‘i’s DRAFT Ka Pa‘akai Analysis for DHHL Water Development Project in Waiaha, Kahului and Puapua‘a Ahupua‘a at the Gianulias Property (TMK: [3] 7-5-014:001) and Keauhou Ahupua‘a at the Kamehameha Schools Well Site (TMK: [3] 7-8-004:013 and -015)



*Included in Final Environmental Assessment (FEA) at DHHLs request in acknowledgment of the concurrent Kona Ka Pa‘akai Analysis consultation being completed alongside the EA.

**For inclusion in the FEA, consultation sections are redacted per Nohopapa's informed consent obligation to honor and respect consultees’ Intellectual Property Rights.

Prepared by

NOHO PAPA HAWAI‘I

Prepared for

DEPARTMENT OF HAWAIIAN HOME LANDS

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This report was prepared by Nohopapa Hawaiʻi, LLC, for the Department of Hawaiian Homelands

CITATION
Nohopapa Hawaiʻi, LLC with contributions from Kumupono Associates, LLC
2024 Excerpts from Nohopapa Hawaiʻi's DRAFT Ka Paʻakai Analysis for DHHL Water Development Project in Waiaha, Kahului and Puapuaʻa Ahupuaʻa at the Gianulias Property (TMK: [3] 7-5-014:001) and Keauhou Ahupuaʻa at the Kamehameha Schools Well Site (TMK: [3] 7-8-004:013 and -015)

NOHOPAPA HAWAIʻI CONTACT
nohopapa.hawaii@gmail.com

FOR MORE INFORMATION VISIT
www.nohopapa.com

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Kahaluʻu Manowai muliwai with the heiau Keʻekū and Hāpaialiʻi in background

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Introduction

He Leo Mahalo

Nohopapa would like to mahalo the individuals who shared their precious time, memories, and manaʻo for this study. This important project would not have been possible without their willingness to share personal recollections and stories. The manaʻo that was shared will help us all better understand, appreciate, and protect the precious resources of Kona Akau. We also mahalo Kaleo Manuel for providing invaluable manaʻo to help our hui better understand wai in its cultural, environmental, and political dimensions, specifically for Kona. Kaleo also challenged Nohopapa to shape and present the cultural, historical, and contemporary community manaʻo regarding wai within the framework of He Mele No Kāne. We accepted this challenge to ground our approach in ʻike kupuna. Lastly, mahalo to the Department of Hawaiian Homelands (Andrew Choy, Lilliane Makaila, Kuʻupua Mossman, and Cherie Kaʻanana) as well as their consultant, Jonathan Scheuer for being true partners in this effort to complete a Ka Paʻakai Analysis that meets its true purpose and intent.

He Mele No Kane

He ui, he nīnau:	*A query, a question,*
E ui aku ana au iā ʻoe,	*I put to you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i ka hikina a ka Lā,	*At the Eastern Gate*
Puka i Haʻehaʻe,	*Where the Sun comes in at Haʻehaʻe,*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*
E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i Kaulana a ka lā,	*Out there with the floating Sun,*
I ka pae ʻōpua i ke kai,	*Where the cloud-forms rest on Ocean's breast,*
Ea mai ana ma Nihoa,	*Uplifting their forms of Nihoa,*
Ma ka mole mai o Lehua;	*This side the base of Lehua;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*
E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i ke kuahiwi, i ke kualono,	*Yonder on mountain peak, on the ridges steep,*
I ke awāwa, i ke kahawai;	*In the valleys deep, where the rivers sweep;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*
E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i kai, i ka moana,	*Yonder at the sea, on the ocean,*
I ke kualau, i ke ānuenue,	*In the driving rain, in the heavenly bow,*
I ka pūnohu, i ka uakoko,	*In the piled-up mist wraith, in the blood-red rainfall,*
I ka ʻālewalewa;	*In the ghost-place cloud from;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*
E ui aku ana au iā ʻoe,	*A question I ask of you*

Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i luna ka Wai a Kāne,	*Up on high is the water of Kāne,*
I ke ao uli, i ke ao ʻeleʻele,	*In the heavenly blue, in the black piled cloud,*
I ke ao panopano,	*In the black black cloud,*
I ke ao pōpolo hua mea a Kāne lā, ē!	*In the black mottled sacred cloud of the gods;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*
E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i lalo, i ka honua, i ka wai hū,	*Deep in the ground, in the gushing spring,*
I ka wai kau a Kāne me Kanaloa	*In the ducts of Kāne and Kanaloa,*
He wai puna, he wai e inu,	*A well spring of water, to quaff,*
He wai e mana, he wai e ola.	*A water of magic power - the water of life!*
E ola nō ʻeā!	*Life! O give us this life!*

Found in Emerson's *Unwritten Literature of Hawaii: The Sacred Songs of the Hula* (1909:257-259). Collected from Kauaʻi, Author Unknown.

As the most isolated island chain in the world, Hawaiʻi is surrounded by ocean. It is understood that wai, or fresh water, is precious for modern use as well as for the traditional customary practices, identity, and spiritual beliefs of Native Hawaiians. In 2014 the DHHL finalized the *Hawaiian Homes Commission Water Policy Plan*. This plan defines water as including:

> ...mists, fog, rain, and other precipitation; water as it flows above or below ground, and into the ocean; water used for homesteading; alternative sources including waste, brackish, and saltwater; water used in the exercise of traditional and customary practices; infrastructure used to produce, store and transmit water; and water we use as well as water to which we have rights.

Nohopapa Hawaiʻi LLC (Nohopapa) approached this project through the lens of *He Mele No Kāne: The Waters of Kāne*[1]. With the project research and outreach framed around the components of the use of wai as described throughout the mele and summarized in its last few lines,

He wai puna, he wai e inu, he wai e mana, he wai e ola
wellspring of water, water to quaff, water of magic power, the water of life.

Approaching the research and consultation for the Ka Paʻakai Framework Analysis within the context of *The Waters of Kāne* allowed Nohopapa to explore what is unique about the Native Hawaiian worldview around wai.

[1] Mahalo nui to Kaleo Manuel for gifting the idea to ground this Ka Paʻakai Analysis of wai through Kāne and this foundational mele.

Project Description

On behalf of the DHHL, Nohopapa completed a Ka Paʻakai Framework Analysis for a proposed DHHL water development project at:

1. Waiʻaha, Kahului and Puapuaʻa Ahupuaʻa at the Gianulias property (TMK: [3] 7-5-014:001) (see Figure 1-Figure 7)
2. Keauhou Ahupuaʻa at a Kamehameha Schools well site (TMK: [3] 7-8-004:013 and -015) (see Figure 1-Figure 10).

Once construction on Laʻi ʻŌpua Village 4 Hema is completed, DHHL will have exhausted all of its water credits for homestead and community development in Kona. DHHL will need to seek additional water credits from the County in order to continue with the planned development of its homestead and community lands in Kealakehe. The County of Hawaiʻi Department of Water Supply (DWS) has asked that in order for DHHL to gain additional water credits, DHHL must add new water sources to the County system in Kona. This means the development of well sites and transmission lines to connect each well site to the nearest existing water lines in the DWS system. No long-distance transmission pipelines from the proposed groundwater well sites to DHHL lands in Kealakehe are being proposed by this project, just the water transmission lines from the well sites to the nearest DWS interconnection point in their existing system.

Nohopapa's specific scope of work entails analysis within the "Ka Paʻakai" legal framework, a seminal case that operationalizes the State of Hawaiʻi's constitutional mandate to "affirmatively protect" Native Hawaiian rights and practices.[2] Hawaiʻi's constitution requires government agencies to "conserve and protect Hawaiʻi's natural beauty" as a public trust on behalf of and "[f]or the benefit of present and future generations ..."[3] Co-extensive with State public trust protections are also federal requirements to protect the public trust with respect to lands that were ceded from the Hawaiian Kingdom from both the Main Hawaiian Islands ("MHI") and the Northwest Hawaiian Islands ("NWHI")/Papahānaumokuākea during the transition of Hawaiʻi as a U.S. territory to America's 50th State per the Admissions Act in 1959.[4]" (Akutagawa 2023:14-15)

Purpose

The purpose of the Ka Paʻakai Framework Analysis is to ensure the DHHL is in compliance with Article VII, Section 7 of Hawaiʻi's Constitution, which "places an affirmative duty on the State and its agencies to preserve and protect traditional and customary native Hawaiian rights and confers upon the State and its agencies the power to protect these rights and to prevent any interference with the exercise of these rights."[5] In order to fulfill its constitutional obligations agencies, like the DHHL, must consider the following three considerations regarding possible impacts of their proposed actions

---

[2] Ka Paʻakai O Ka ʻAina v. Land Use Comm'n, 94 Haw. 31, 7 P.3d 1068, 1083-84 (2000).
[3] HAW. CONST. art. XI, § 1 (1978)
[4] Hawaii Admission Act, Pub.L. No. 8603, 73 Stat. 5 (1959).
[5] Ka Paʻakai o Ka ʻĀina v. State of Hawaiʻi Land Use Com'n [*Ka Paʻakai*], 94 Haw. 31, 47, 7 P.3d 1068, 1084 (2000).

(1) the identity and scope of 'valued cultural, historical, or natural resources' in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;

(2) the extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and

(3) the feasible action, if any, to be taken … by the [State and/or its political subdivisions] to reasonably protect native Hawaiian rights if they are found to exist.[6]

[6] Ibid

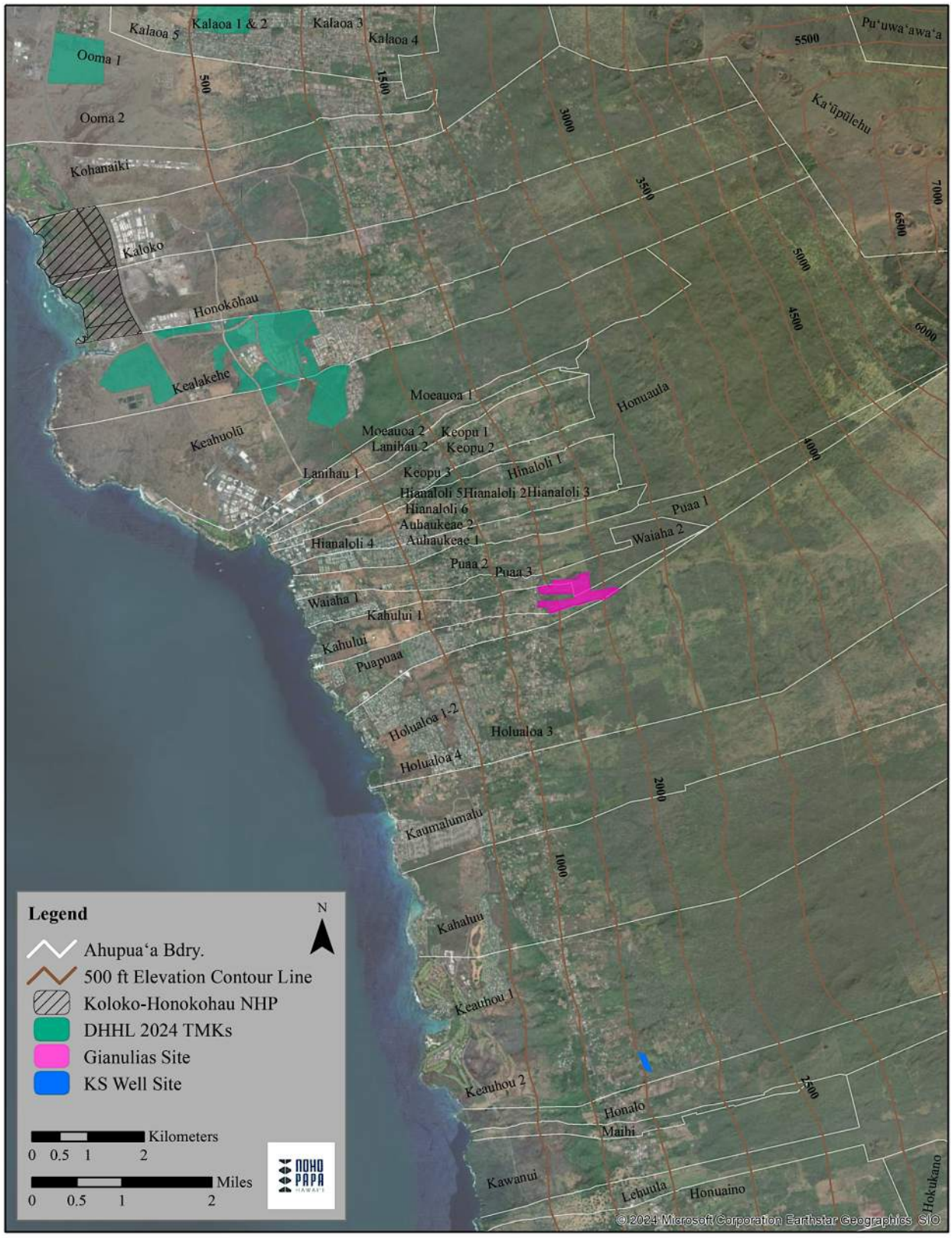


Figure 1. Aerial image illustrating the two proposed water development locations (pink and blue) as well as the existing DHHL parcels in Kona (green).

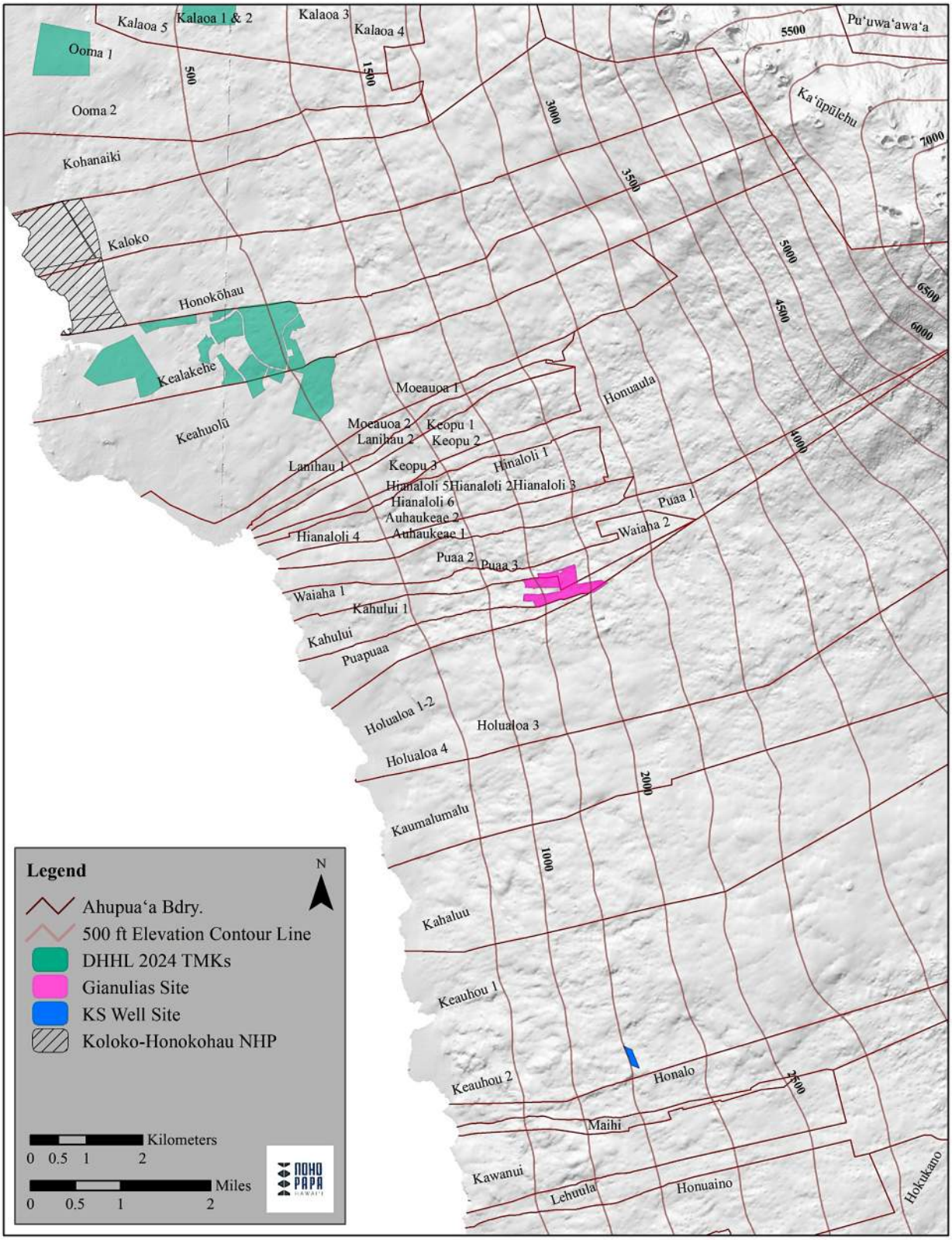


Figure 2. Contour and DEM map illustrating the two proposed water development locations (pink and blue) as well as the existing DHHL parcels in Kona (green).

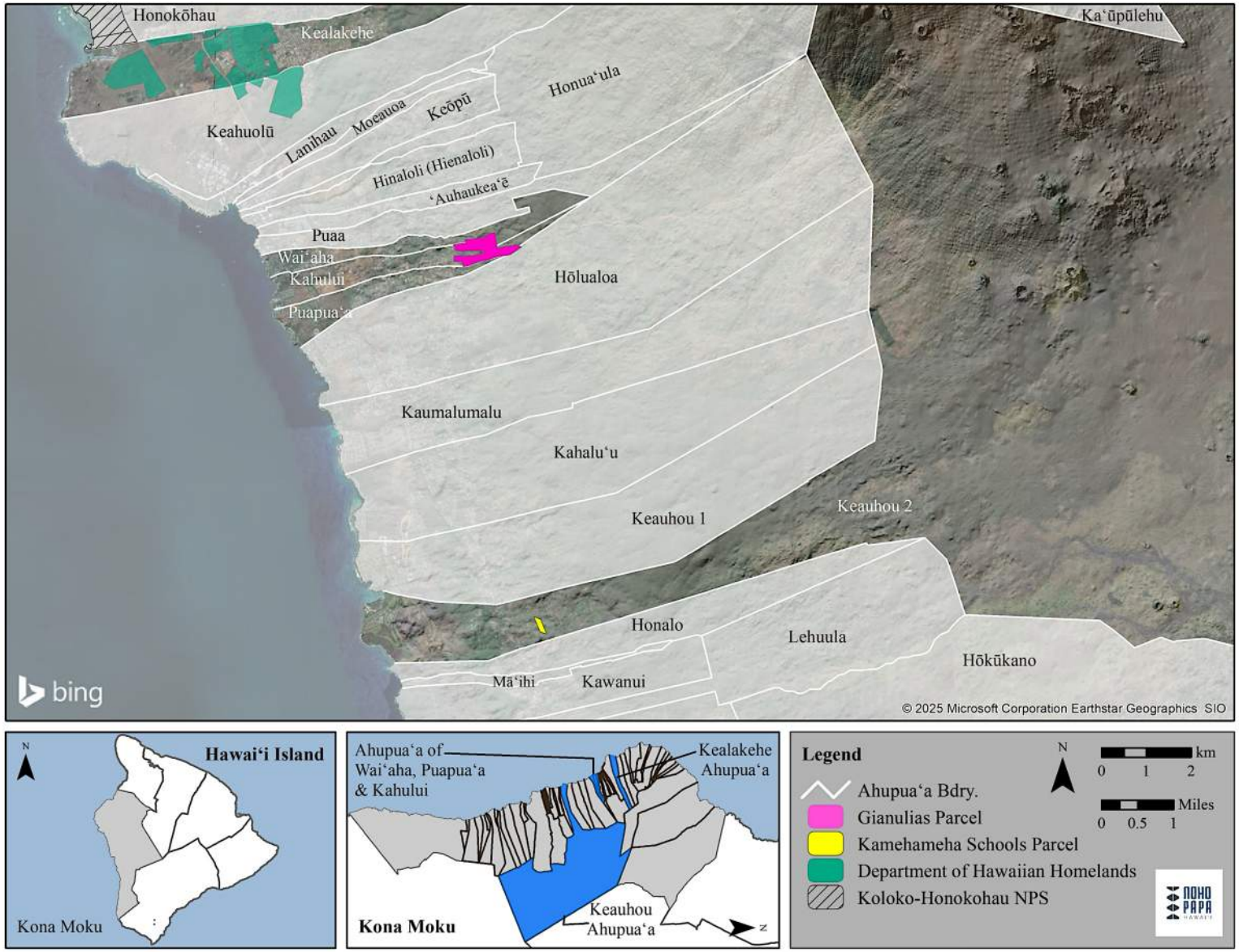


Figure 3. Aerial image illustrating the study are ahupua'a from north to south: Kealakehe, Keahuolū, Pua'a, Wai'aha, Kahului, Puapua'a, Keauhou 1, and Keauhou 2

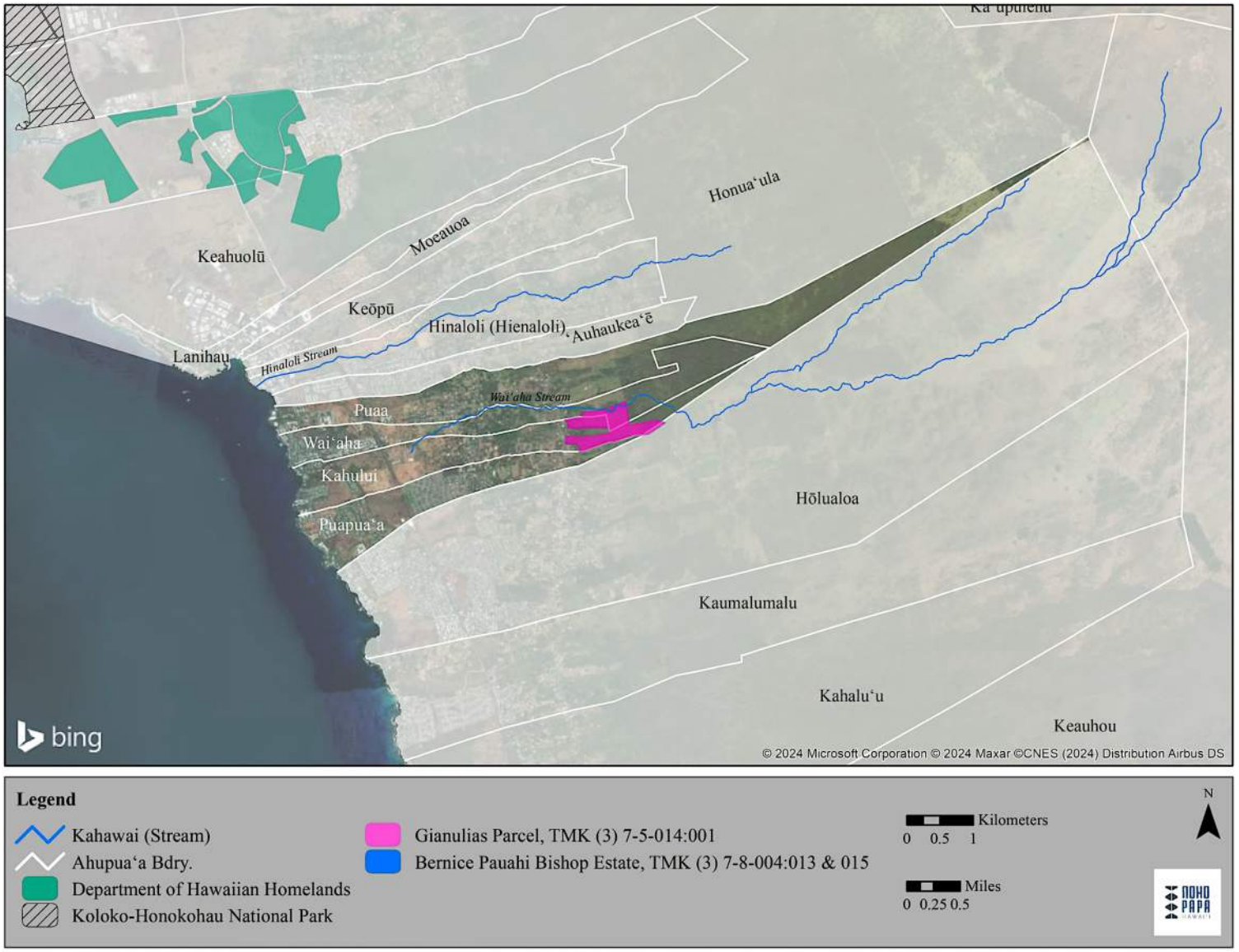


Figure 4. Close up aerial image of Pua'a, Wai'aha, Kahului, and Puapua'a Ahupua'a in relation to DHHL parcels

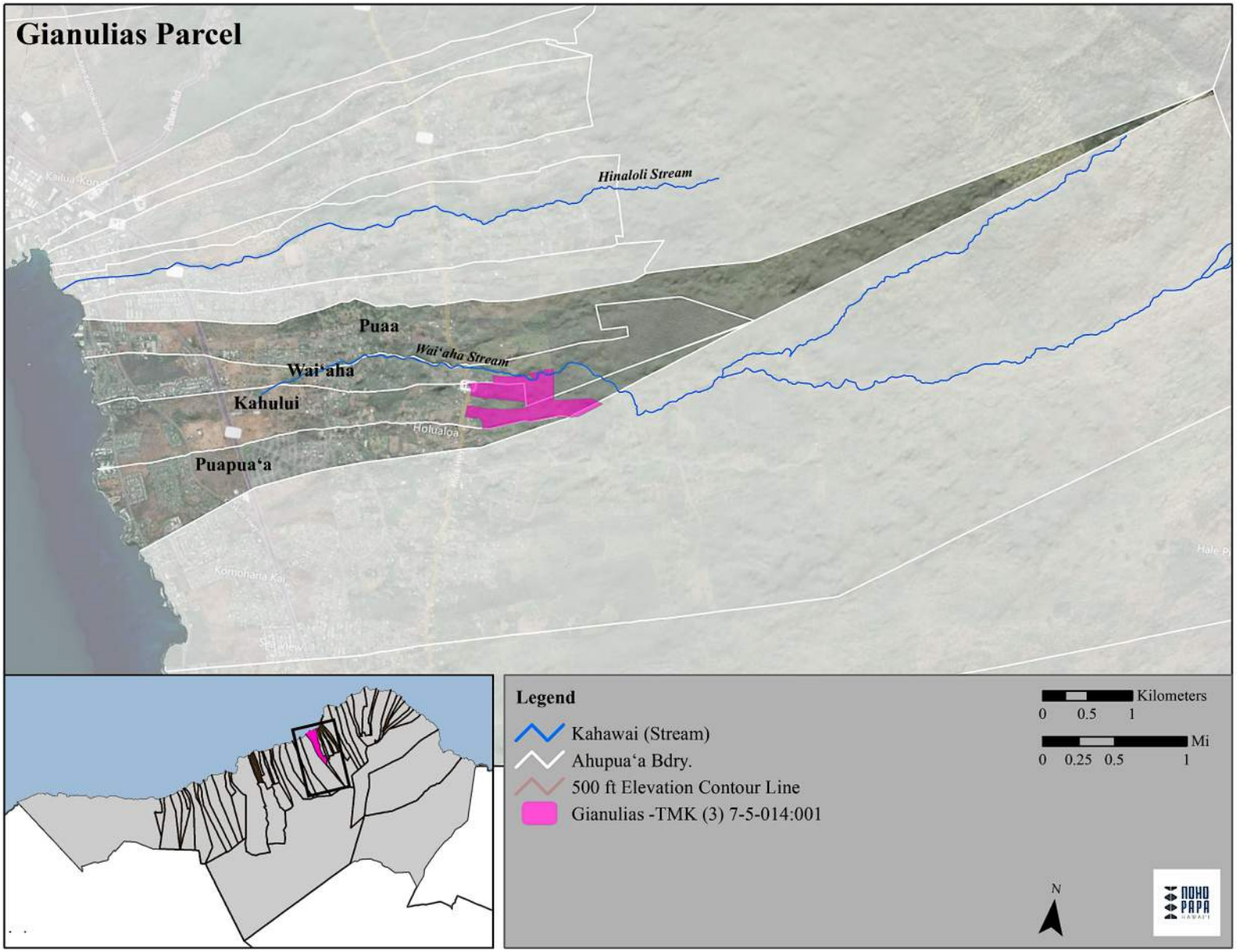


Figure 5. Further zoom in of the ahupua'a that the Gianulias parcels is located in

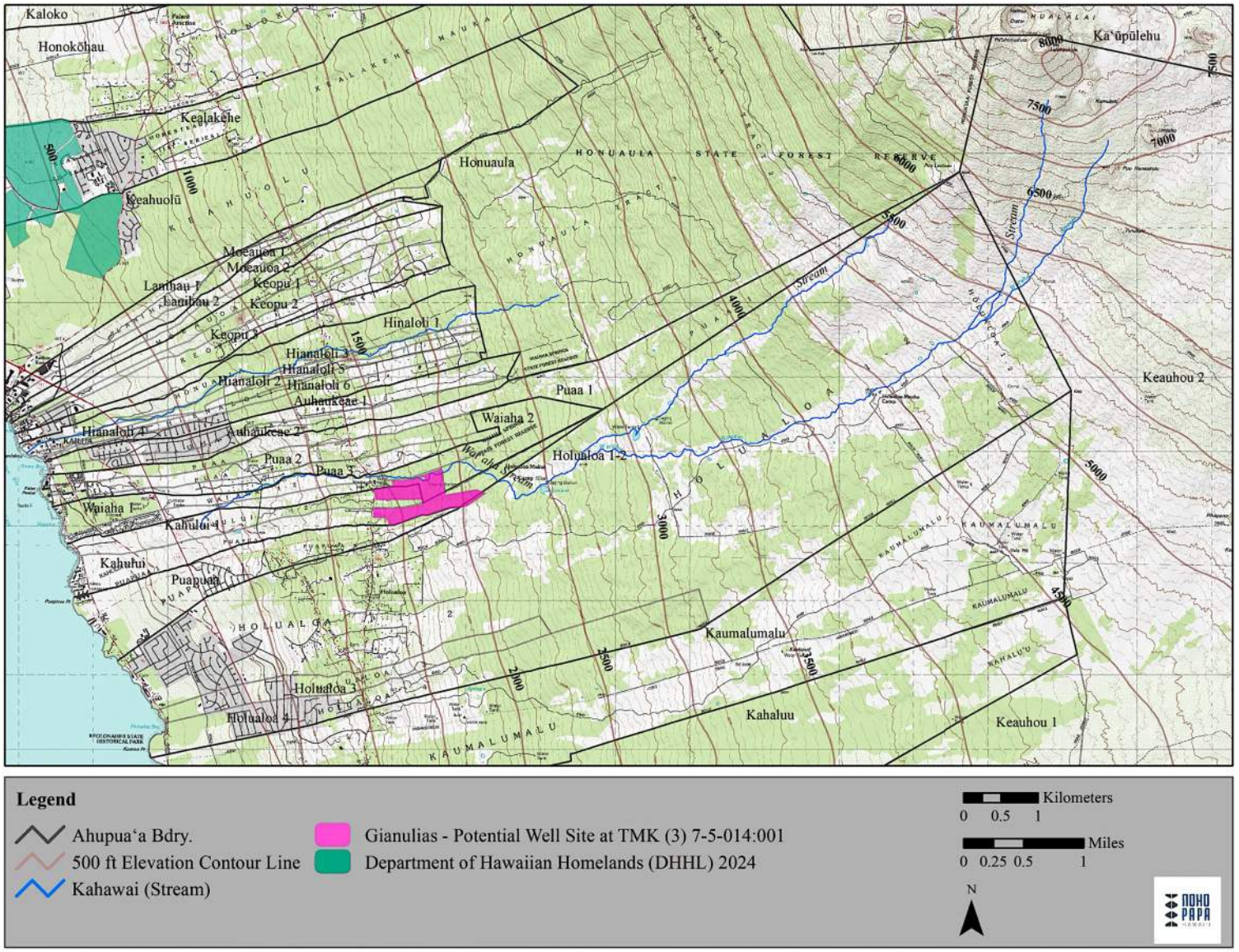


Figure 6. USGS map showing the DHHL TMK parcels (green) and the Gianulias potential well site TMK (pink)

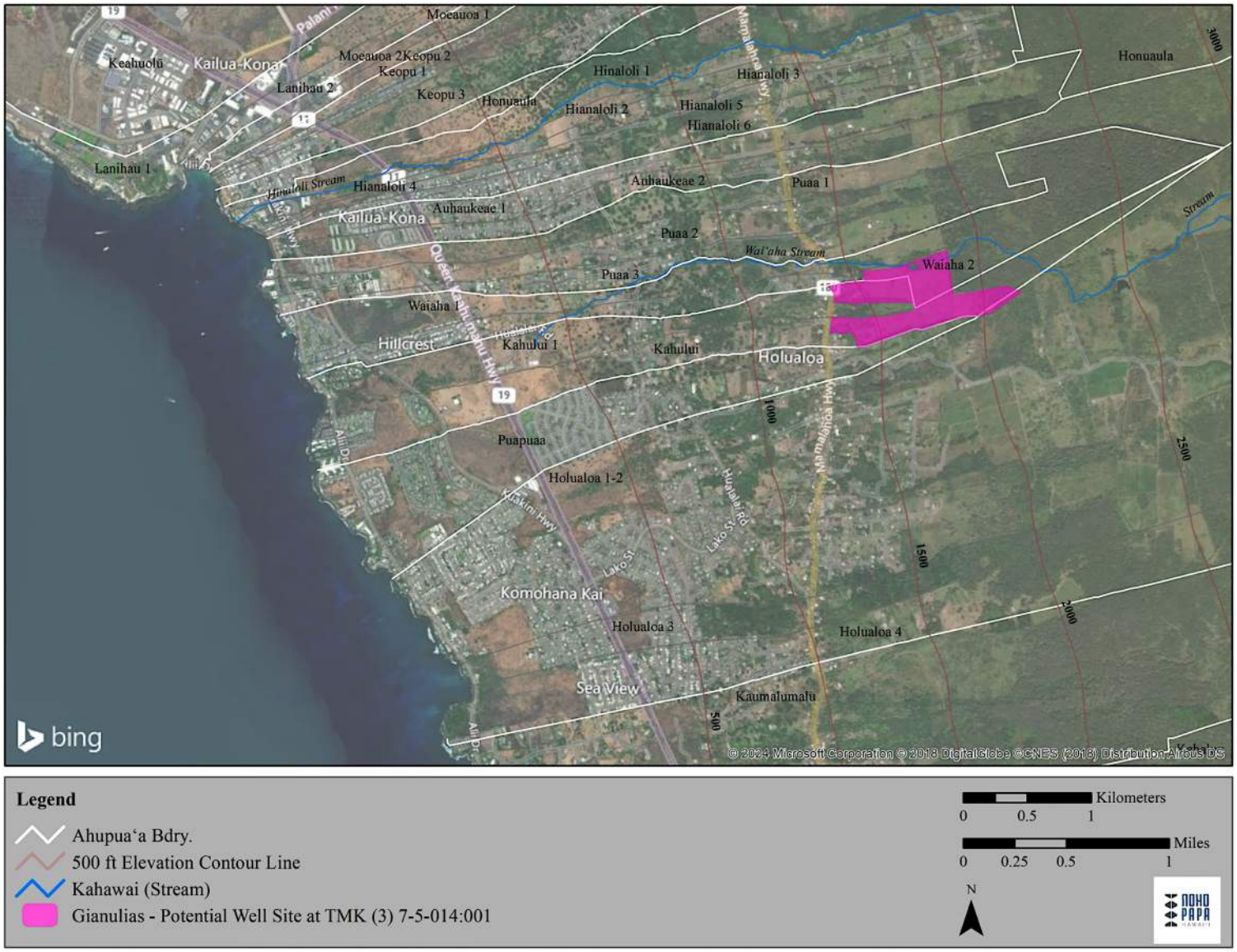


Figure 7. Aerial image showing the Gianulias TMK located within Wai'aha, Kahului, and Puapua'a Ahupua'a, which also includes a portion of Wai'aha Stream

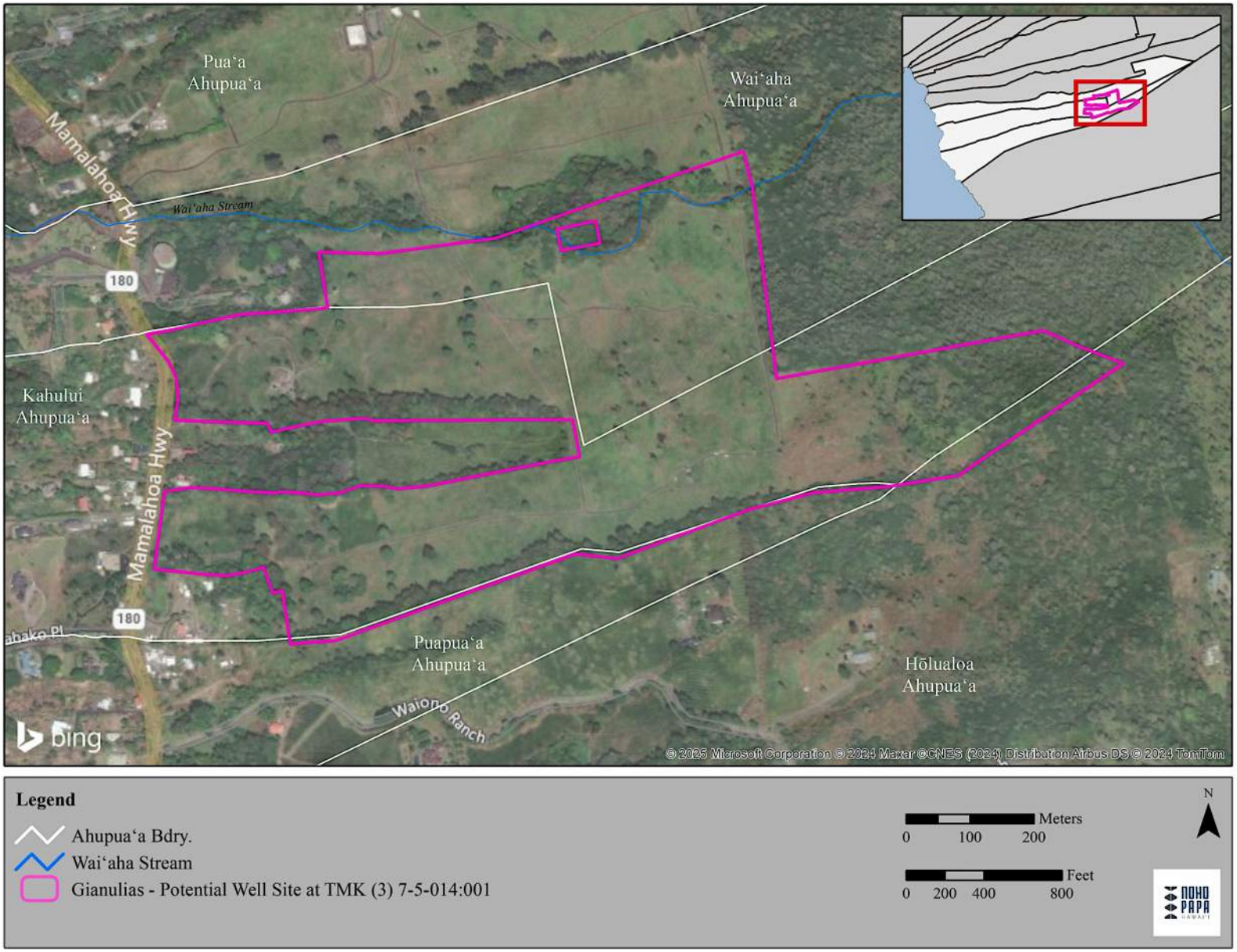


Figure 8. Zoom in aerial image of the Gianulias parcel boundaries.



Figure 9. USGS map of the BPBE Kamehameha Schools existing well site in blue.



Figure 10. Aerial image showing the location of the Kamehameha Schools well site in Keauhou 2 Ahupua'a and the surrounding ahupua'a

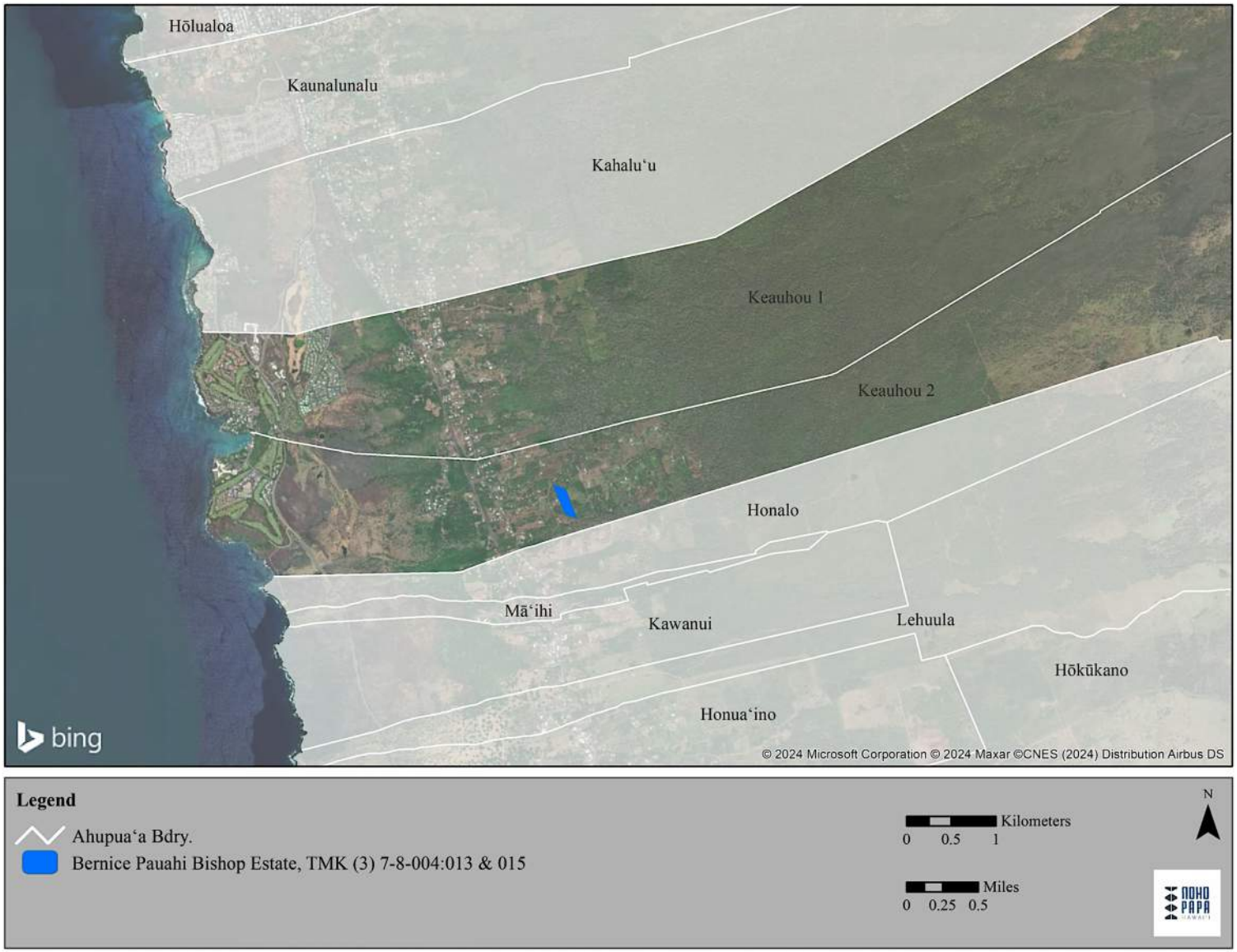


Figure 11. Aerial image of the KS BPBE parcel in Keauhou 2 Ahupuaʻa

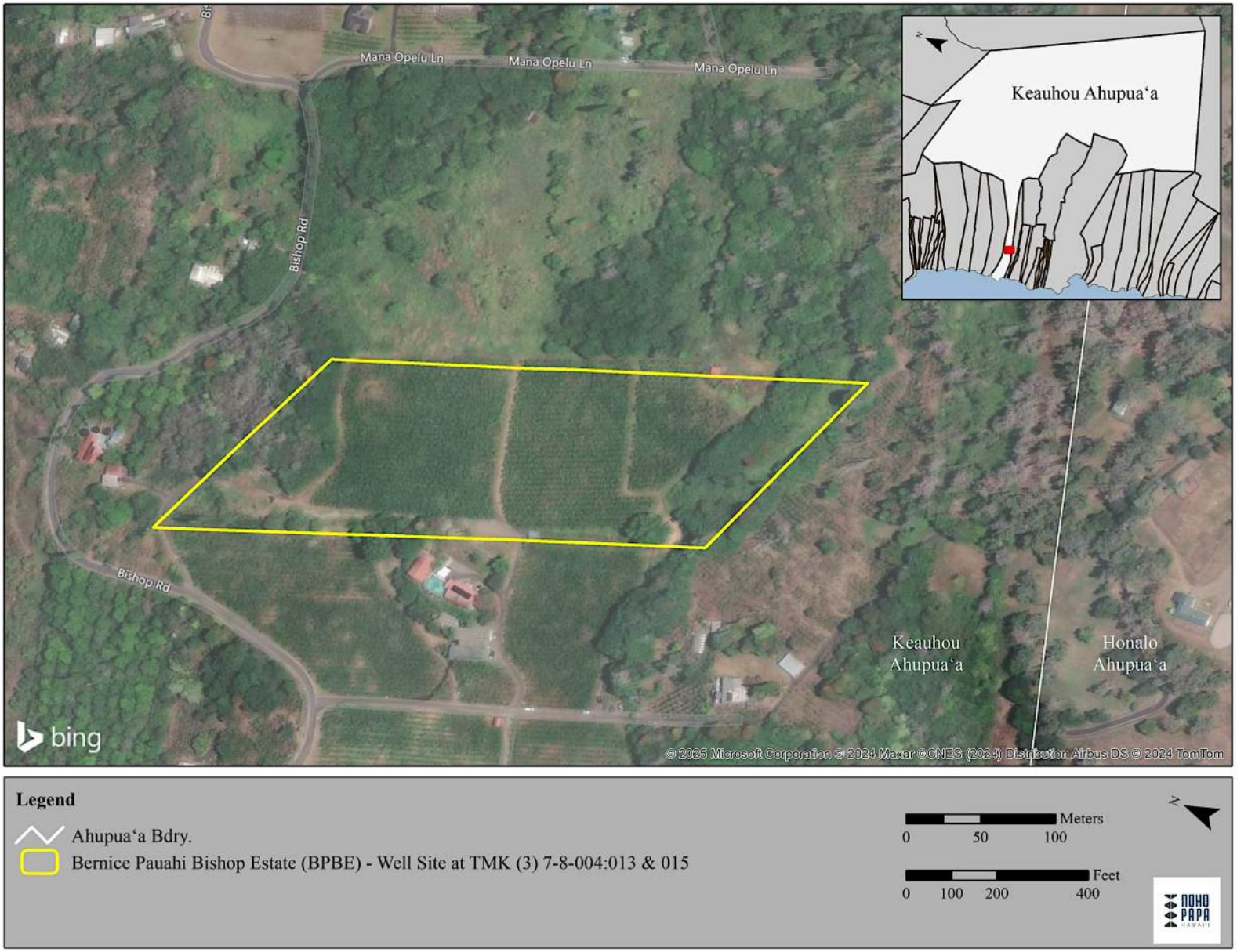


Figure 12. Zoom in aerial image of the KS BPBE well site in Keauhou 1 Ahupua'a

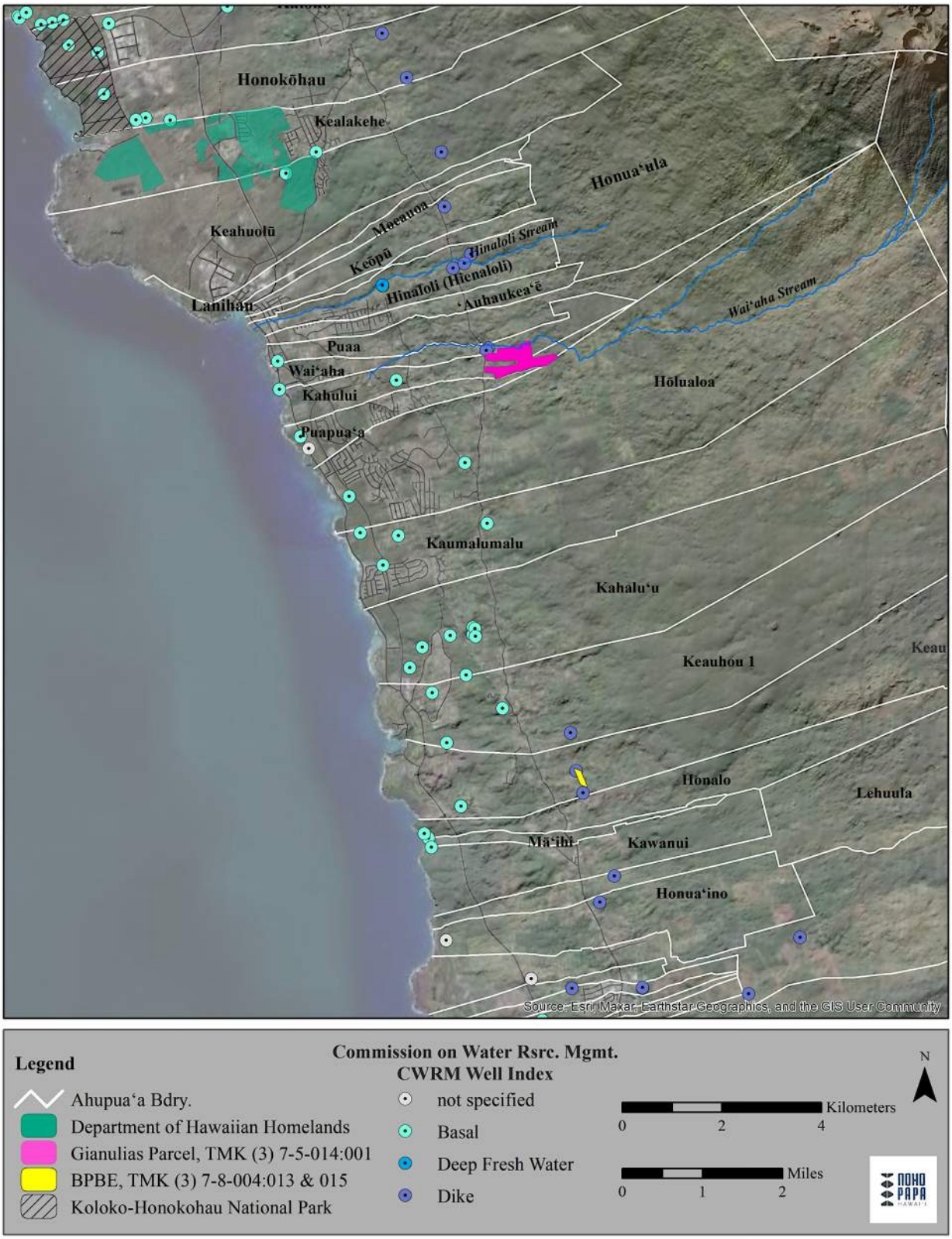


Figure 13. Water well locations from the Commission on Water Resource Management Well Index

Ka Paʻakai Legal Overview

What is the agency's obligation under Ka Paʻakai?

An understanding of the DHHL's responsibilities and obligations under the *Ka Paʻakai* Analysis framework must be rooted in the legal history of the sovereign Hawaiian Kingdom, and an overview of the unique jurisprudence contained in Hawaiʻi's Constitution and a constellation of state laws. Concurrently, it must be contextualized in an ecosystem and broader dialogue of federal and global policies and declarations concerning the rights of Indigenous peoples and the responsibilities of entities and agencies asserting agency and authority in Indigenous spaces.

Accordingly, the review and discussion below begins with an exposition on foundational understandings. It then explains why the Hawaiʻi State constitution and Hawaiʻi State laws require the protection of Hawaiian traditional and customary practices and related cultural resources - primary amongst them rights to freshwater, gathering, access to places and spaces, and the continued right to exercise an array of traditional and customary practices. These topics are followed by an overview of the DHHL's unique fiduciary obligations this *Ka Paʻakai* Framework Analysis is designed to satisfy. The section concludes with a discussion of how the purposes and goals of the Ka Paʻakai Framework Analysis are reflected and upheld by federal and global jurisprudence regarding the rights of indigenous peoples.

Foundational Truths About Hawaiian Culture and Traditional and Customary Practices

It is important to acknowledge a series of foundational, intertwined truths and realities that are frequently ignored and sidelined:

- **Hawaiian culture is living and dynamic**;
- **Traditional and customary practices, as aspects of a living, dynamic human cultural system, are an expansive spectrum**. They have the potential to be revealed and layered with ancestral knowledge and additional information through pathways that include but are not limited to: intentional revelation or sharing by knowledge carriers, cultural practitioners, and ʻohana, research, discovery, and new translations. **Therefore, the changing and emergent nature of *some* traditional and customary practices does not invalidate them**;
- **Hawaiian oral traditions and testimony are valid lines of empirical evidence that require no external validation[7];**

[7]*See* Ashford, 50 Haw. 314, 316, 440 P.2d 76, 77 (1968); Malia Akutagawa & Amanda Lerma, *Legal & Ka Paʻakai Analysis for the Nomination of the Papahānaumokuākea National Monument as a National Marine Sanctuary*, 49-50, 2023; Advisory Council on Historic Preservation, *Traditional Knowledge and the Section 106 Process: Information for Federal Agencies and Other Participants* (2021), https://www.achp.gov/sites/default/files/2021-05/TraditionalKnowledgePaper5-3-21.pdf; Council on Environmental Quality, Offices of Science and Technology Policy, the White House, *Guidance for Federal Departments and Agencies on Indigenous Knowledge*, (Nov. 30, 2022), https://www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IK-Guidance.pdf; Advisory Council on Historic Preservation,

- ***Ka Paʻakai* mandates the respect and protection of traditional and customary practices by State agencies; it does not require their understanding by outsiders, nor their defense or justification by cultural practitioners[8]**. Failure to grasp their essence is a lack of knowledge and understanding as well as an inability (or unwillingness) of agencies and their representatives to uphold and fulfill their fiduciary obligations.

Ka Paʻakai as an Outgrowth of Ancient Hawaiian Cultural Practices and Customs

In their recent *Ka Paʻakai* Analysis for the National Marine Sanctuary designation for Papahānaumokuākea, Professor of Hawaiian Studies and Hawaiian Legal Expert Malia Akutagawa, Esq., and co-author Amanda Lerma, J.D., write that the "The Kumulipo[9] and Hawaiian cosmogenic origins determined cultural practices and native customary norms," (Akutagawa and Lerma 2023: 18). The authors write:

> Much of the law around Native Hawaiian rights are grounded in the understanding of the ʻohana. The late kumu hula John Kaʻimikaua stated that "the whole culture of our ancestors was based upon the ʻohana" in the manner that the land was cared for.[10] He adds that this truth can be found "from the beginning of time in our moʻolelo that tells of the creation of our islands … with the union of earth and sky."[11]

The remainder of their discussion is featured below, inclusive of their footnotes for informational sources:

> Kumu John Kaʻimikaua describes lōkahi as "balance between the land, the people that lived upon the land, and the akua," which results in "pono, the spiritual balance in all things."[12] From these relationships stem kuleana, the responsibility to advance spiritually with the akua, to engage meaningfully with our fellow kānaka, and to foster right relationship with ʻāina, the land and sea which the "kūpuna [knew to be] living beings."[13]

Notice of Approval of Exemption for Indigenous-Knowledge Informed Activities by Native Hawaiian Organizations, Federal Register (Nov. 08, 2024), https://www.federalregister.gov/documents/2024/11/08/2024-25984/notice-of-approval-of-exemption-for-indigenous-knowledge-informed-activities-by-native-hawaiian.

[8] *See* Ka Paʻakai o Ka ʻĀina v. State of Hawaiʻi Land Use Comʼn (*Ka Paʻakai*), 94 Haw. 31, 47, 7 P.3d 1068, 1084 (2000); See also discussion below of the court case below.

[9] Described by Queen Liliʻuokalani as "an Hawaiian creation myth," and "[a]n ancient prayer for the dedication of the high chief Lonoikamakahiki to the gods soon after his birth,..." (see Queen Liliʻuokalani 1897/2021: cover and introduction).

[10] *A Mau A Mau (To Continue Forever): Cultural and Spiritual Traditions of Molokaʻi,* (Nālani Minton and Nā Maka O Ka ʻĀina 2000).

[11] *Id.*

[12] *Id.*

[13] Video interview of Dean Wilhelm, Hoʻokuaʻāina, see website: https://hookuaaina.org/find-a-program/resources/hawaiian-values-based-lessons/

Inherent in this understanding is the ʻōlelo noʻeau, "He Aliʻi Ka ʻĀina, He Kauwā Ke Kanaka" – the land is chief, the people are its servants.[14] The moʻokūʻauhau of Kānaka ʻŌiwi teaches that ʻohana encompasses the natural world, that there is no separation between the people and the land. From this comes kuleana, of which the highest responsibility fell to the aliʻi, who served as intermediaries facilitating the "destructive-reproductive forces of the unseen divinities of the cosmos."[15] When aliʻi failed to follow proper religious protocols and mistreated the people, the makaʻāinana were justified in abandoning their aliʻi as poor leaders and unfit conduits of the gods' favor.[16] The makaʻāinana were free to move and make another ʻāina momona if they were unhappy with their aliʻi. This provided an incentive for aliʻi to treat the people fairly and generously.[17] More importantly, as Danielle Espiritu, former Program Specialist with the cultural program Hoʻokuaʻāina, expressed:

> Embedded within [the ʻōlelo noʻeau, he aliʻi ka ʻāina, he kauwā ke kanaka is] the idea that [the aliʻi] were not going to be oppressive to [the] people, [nor] domineering. [They] were going to steward that authority, that kuleana in a way that protected [the] people and provided for their needs. So really, that's what it meant to be an aliʻi that was pono, an aliʻi that was good and righteous. We see this in our ʻāina. If ʻāina is honored and stewarded well, it can provide abundantly for Kānaka, and it can allow the rest of the world to thrive. When we see that second part of the ʻōlelo noʻeau, *he kauwā ke kanaka*, that people are the servants, it is important for us to pause and ask ourselves, how is the health and well-being of our ʻāina directly tied to how well we as kānaka steward it? And so, what is our kuleana, what is our responsibility, what is our privilege as Kānaka to really steward ʻāina? What is our relationship to ʻāina? We can all ask ourselves this … And if we notice that our relationship [with ʻāina] is not healthy, then we can think about, "Okay what can we do to improve that? What can we do to make our relationship with ʻāina healthier? [What can we do] to really care for and to really mālama ʻāina in the way that it deserves, so that ʻāina can return to being ʻāina?" Embedded in the word ʻāina is ai which means to feed and to eat. How can we care for our relationship with ʻāina so that ʻāina can be thriving and can be a land of abundance?[18]

All of Hawaiian society was responsible to take on this kuleana of mālama ʻāina. The makaʻāinana, however, by cultivating the land, enjoyed the greatest intimacy

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[14] Mary Kawena Pukui, ʻŌlelo Noʻeau: Hawaiian Proverbs & Poetical Sayings 531 (1983).
[15] Lilikalā Kameʻeleihiwa, Native Lands & Foreign Desires: Pehea Lā e Pono Ai?, 36 - 37 (1992).
[16] *Id.* at 39 .
[17] *Id.* at 26; Marion Kelly, Changes in Land Tenure in Hawaii, 1778-1850 (June 1956) (unpublished thesis, University of Hawaiʻi at Mānoa) (on file with author).
[18] Danielle Espiritu video interview, Program Specialist with Hoʻokuaʻāina. See website: https://hookuaaina.org/he-alii-ka-aina-he-kauwa-ke-kanaka/.

> with ʻāina. Mary Kawena Pukui emphasized that "the fundamental unit in the social organization [of Hawaiian society is the] ʻohana … tied by ancestry, birth and sentiment to a particular locality which was termed ʻāina."[19] These practices stem from the pre-contact era when ka poʻe kahiko lived under a communal land tenure system. The makaʻāinana tended to raise generations upon generations within the same ahupuaʻa, with extended ʻohana sharing provisions from the land and sea with each other.[20]
>
> The long-standing presence of the makaʻāinana on their ʻāina hānau and their rights of occupation, access, and gathering survived as a hallmark within Hawaiʻi's laws from the Kingdom period into the present day, despite a shifting at the Māhele from a communal land system to a private property regime. This is evidenced by the fact that all the crown, government, and chiefs' lands remained subject to the rights of native tenants, with the clause "koe nae na kuleana o na kanaka" affixed to all royal patents and land commission awards.[21] To this day, all property in Hawaiʻi (both public and private) are encumbered with this reservation.[22] [Akutagawa and Lerma 2023: 20, 21]

In the Office of Hawaiian Affairs-sponsored *Hoʻohana Aku, a Hoʻōla Aku: A Legal Primer for Traditional and Customary Rights in Hawaiʻi*, legal scholars David M. Forman and Susan K. Serrano synthesize the ancient cultural basis for the respect and protection of Hawaiian customs and practices. The authors specifically emphasize gathering, access, and their holistic connections to Hawaiian resource stewardship, health, and abundance:

> The cultural and spiritual identity of the Hawaiian people derives from their relationship with the ʻāina; because the land is part of their ʻohana, traditional Hawaiian customs and practices emphasize respect and care for the ʻāina and surrounding resources. Accordingly, the traditional and customary practices of the Hawaiian people include gathering, hunting, and fishing in a manner that allows natural resources to reproduce and replenish themselves. [Forman and Serrano 2012:3]

They describe "[a] system of trails and access" that veined every island in the archipelago and was open for access and utilization by everyone from commoners to chiefs (Forman and Serrano 2012:4). The authors also note:

> Access along the shore, between adjacent ahupuaʻa (loosely defined as watersheds), to the mountains and the sea, and to small areas of land cultivated or harvested by native tenants, were all necessary parts of early Hawaiian life. Gathering activities supplemented everyday food and medicinal supplies, while

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[19] E.S. Craighill Handy & Mary Kawena Pukuʻi, The Polynesian Family System In Kaʻu, Hawaiʻi (1998).
[20] *Id.*
[21] Lorenz Gonschor & Kamanamaikalani Beamer, *Toward an Inventory of Ahupuaʻa in the Hawaiian Kingdom: A Survey of Nineteenth- and Early Twentieth-Century Cartographic and Archival Records of the Island of Hawaiʻi.* 48 Haw'n J. Hist. 62 (2014).
[22] David M. Forman & Susan K. Serrano, Hoʻohana Aku, a Hoʻola Aku: A Legal Primer for Traditional and Customary Rights in Hawaiʻi 9 (2012).

> cultural and religious practices sustained the people in a variety of ways. [Forman and Serrano 2012:3]

Regarding cultural gathering practices, the authors state:

> Although early Hawaiians may have cultivated only small areas compared to the total acreage on each major island, they were able to utilize much greater land areas through gathering. Tenant farmers supplemented their subsistence lifestyle with plants and animals that either did not grow or could not be supported on or near the tenant's house lot or cultivated plot of land. They also gathered items for medicinal and religious purposes. During times of famine, gathering helped the people to survive. When crops or sea life had diminished significantly due to drought or other adverse climate conditions, gathering or foraging for food became the primary means of survival. When called upon by the resident chief, ahupuaʻa tenants would retrieve large products from the land for communal purposes, such as a tree for a canoe or rafters for a hālau (meeting house).
>
> Restrictions on gathering practices were also an extension of the kapu system, which not only held religious significance, but also served as an efficient means of conserving resources. For instance, with regard to makai gathering practices, there was a kapu placed during spawning season on deep-water fishes such as aku (ocean bonito) and ʻōpelu (mackerel). Because these fish bear their young in the open ocean, they were susceptible to overfishing—as compared with the manini (tang), uhu (parrotfish), palani (surgeonfish), and kala (unicornfish) in protected tidal pool areas. The resident chiefs could impose kapu regulating the size, type, and number of items gathered, as well as the manner in which they were gathered—subject to being overruled by a higher-ranking chief. [Forman and Serrano 2012:4]

Ka Paʻakai's Roots in the Legal History of the Sovereign Hawaiian Kingdom

Hawaiian Kingdom-era laws and jurisprudence recognized, privileged, and upheld Hawaiian cultural systems of resource management, especially those concerning water and traditional customary rights like gathering and access. King Kamehameha III (Kauikeaouli) was the first to enshrine protections for Hawaiian customs and practices into the legal system. Tenants' rights codified in 1839 retained elements of the kapu system described in the preceding section(Forman and Serrano 2012:4). The Constitution of 1840 and Kingdom judiciary of 1847 integrated elements of English common law and American civil law "...so far as they are deemed to be founded in justice, and not in conflict with the laws and usages of this kingdom," a legal structure that persisted for over a century through statehood (Akutagawa and Lerma 2023:23).

Akutagawa and Lerma (2023) write:

> In the post-contact era when the Hawaiian archipelago became united under one rule, the early monarchs began to codify these ancient understandings. The 1840 constitution of the Hawaiian Kingdom makes clear the stature of ʻāina as paramount over Kānaka ʻŌiwi, with a trusteeship held by the mōʻī to care for the chiefs and people through sound management of the land:
>
> > Kamehameha I, was the founder of the kingdom, and to him belonged all the land from one end of the Islands to the other,

> though it was not his own private property. It belonged to the chiefs and people in common, of whom Kamehameha I was the head, and had the management of the landed property.[23]

The constitution reflected the ancient understanding that the aliʻi possessed the kuleana to govern the people wisely and to observe religious and ceremonial protocols that ensured the protection of the land and people.[24] The makaʻāinana farmed the land and made it productive. While the aliʻi's tenure on the land was impermanent due to acts of conquest among them, the makaʻāinana, for the most part (especially when they were treated well), remained a permanent fixture upon the land and devoted their endeavors to making ʻāina momona (fat, abundant land).[25]

The constitution also laid the groundwork for the Māhele, the privatization and division of the lands among the king, chiefs, and makaʻāinana. The Māhele (1848) introduced a hybridized system of private property that adopted some western constructs while protecting the vested rights of makaʻāinana – rights inherent to them via Hawaiian cosmology and grounded in custom and practice through the ancient land tenure system.[26] The Māhele sought to divide the formerly undivided interests in land shared in common between the King, chiefs, and makaʻāinana. The first stages of the Māhele involved the King and 252 chiefs quit-claiming their interests between each other. The lands, now considered freehold, were converted into allodial titles. The chiefs were then awarded royal patents for konohiki lands once they paid a commutation fee.[27] The King dedicated the bulk of his landholdings to the government, while keeping the remainder as crown lands for himself and his heirs.[28]
As the Kingdom was evolving towards a private property regime, it did not wholly adopt a western framework.[29]

All of the Crown, government, and chiefs' lands remained subject to the rights of native tenants. The clause "koe nae na kuleana o na kanaka" is affixed to all LCAs, Royal Patents issued to konohiki, private citizens, Crown and government lands. This clause reaffirms that all lands throughout Hawaiʻi to the present-day are

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[23] *Nā Kumukānāwai O Ka Makahiki 1839 A Me Ka 1840*, 1.1 Ka Hoʻoilina: Journal of Hawaiian Language Sources, Luna Hoʻoponopono et al., eds., Jason Kāpena Achiu trans., Mar. 2002 [hereinafter L.1840], at 41, *available at* http://hooilina.org/collect/journal/index/assoc/HASH0166.dir/1.pdf (last visited Feb. 11, 2023).
[24] Lilikalā Kameʻeleihiwa, Native Lands & Foreign Desires: Pehea Lā e Pono Ai?, 36-39 (1992).
[25] Kamanamaikalani Beamer, No Mākou Ka Mana: Liberating The Nation, 45 (2014); E.S. Craighill Handy & Mary Kawena Pukuʻi, The Polynesian Family System In Kaʻu, HAWAIʻI 2 (1998).
[26] Kamanamaikalani Beamer, No Mākou Ka Mana: Liberating The Nation, 144 (2014).
[27] Lorenz Gonschor & Kamanamaikalani Beamer, *Toward an Inventory of Ahupuaʻa in the Hawaiian Kingdom: A Survey of Nineteenth- and Early Twentieth-Century Cartographic and Archival Records of the Island of Hawaiʻi*. 48 Haw'n J. Hist. 59 (2014).
[28] *Id.* at 58.
[29] *Pub. Access Shoreline Haw. v. Haw. Cnty. Planning Comm'n* (*PASH*), 79 Hawaiʻi 425, 447, 903 P.2d 1246, 1268 (1995) (concluding that the "western concept of exclusivity [in private property law] is not universally applicable in Hawaiʻi" and that "the issuance of [ ] Hawaiian land patent[s]" at the time of the Māhele conveyed "a limited property interest.").

encumbered by "reserved rights of native tenants."[30] The courts to this present day recognize a kuleana reservation attaches to private property holdings in Hawai'i.[31]

Hoa'āina were able to acquire small land-holdings, or kuleana, for themselves through the 1850 Kuleana Act as well as acquire government lands through purchase.[32] The Kuleana Act and the kuleana reservations attached to landholdings reflect traditional and customary understandings that pre-date Statehood and even the time of Kamehameha and his monarchy. These legal provisions represent hoa'āina relationships to their ahupua'a and recognize their rights to access lands from mauka to makai to gather materials for their basic needs (e.g., thatch and aho cordage for making rope and building hale, firewood for imu, ti leaf for wrapping food items, lei-making, and to serve spiritual and ceremonial purposes). Today, the Kuleana Act is memorialized in state law as Hawai'i Revised Statutes, Section 7-1

Hawai'i Revised Statutes, Section 1-1 is another source of law that was enacted in 1892 as part of the civil code[33] of the Hawaiian Kingdom and has survived into Statehood. H.R.S. § 1-1 instructs Hawai'i's courts to look to English and American common law decisions for guidance, except where they conflict with "Hawaiian judicial precedent, or … Hawaiian [custom and] usage" pre-dating 1892.[34] The origins of this law can be traced even further back to the early period of the Hawaiian Kingdom prior to 1838, when it was acknowledged that the islands were "governed … without other system than [Hawaiian custom and] usage, and with a few trifling exceptions, without legal enactments."[35] Under Kamehameha III, the constitutional monarchy took shape with the establishment of an Executive Department comprised of a Privy Council and Ministers to the King. This was followed by the creation of a Judiciary in 1847 authorized to "cite and adopt '[t]he reasonings and analysis of the common law, and of the civil law [of other countries] … so far as they are deemed to be founded in justice, and not in conflict with the laws and usages of this kingdom.'"[36] (emphasis added). This law also encompasses

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[30] Lorenz Gonschor & Kamanamaikalani Beamer, *Toward an Inventory of Ahupua'a in the Hawaiian Kingdom: A Survey of Nineteenth- and Early Twentieth-Century Cartographic and Archival Records of the Island of Hawai'i.* 48 Haw'n J. Hist. 61 (2014).

[31] David M. Forman & Susan K. Serrano, *Ho'ohana Aku, a Ho'ola Aku: A Legal Primer for Traditional and Customary Rights in Hawai'i,* 9 (2012).

[32] Lorenz Gonschor & Kamanamaikalani Beamer, *Toward an Inventory of Ahupua'a in the Hawaiian Kingdom: A Survey of Nineteenth- and Early Twentieth-Century Cartographic and Archival Records of the Island of Hawai'i,* 48 Haw'n J. Hist. 61 (2014).

[33] L.1892, c. 57, s 5, approved on November 25, 1892 which states, "Section 5. The common law of England, as ascertained by English and American decisions, is hereby declared to be the common law of the Hawaiian Islands in all cases, except as otherwise expressly provided by the Hawaiian Constitution or laws, or fixed by Hawaiian judicial precedent, or established by Hawaiian national usage, provided however, that no person shall be subject to criminal proceedings except as provided by the Hawaiian laws."

[34] State v. Zimring, 52 Haw. 472, 475 (1970) (citing De Freitas v. Trustees of Campbell Estate, 46 Haw. 425, 380 P.2d 762 (1963)).

[35] *PASH*, 79 Haw. at 437, 903 P.2d at 1246 (note 21, citing 1 *Statute Laws of His Majesty Kamehameha III, King of the Hawaiian Islands* 3 (1845-46)).

[36] *Id.* (note 21, citing Act of September 7, 1847, ch. I, § IV; 2 *Statute Laws of His Majesty Kamehameha III, King of the Hawaiian Islands* (1847) (emphasis added)).

> the entire spectrum of Hawaiian traditional and customary practices beyond the specific items listed in H.R.S. § 7-1. [Akutagawa and Lerma 2023:21—23]

Especially relevant in Kona, the 1859 Hawai'i Revised Statutes (HRS) § 7-1, as amended, entitled "Miscellaneous Rights of the People – Building materials, water, etc.; landlords' titles subject to tenants' use," protects the right to gather for personal, non-commercial use, and a right to "drinking water, and running water, and the right of way." It states:

> Where the landlords have obtained, or may hereafter obtain, allodial titles to their lands, the people on each of their lands shall not be deprived of the right to take firewood, house-timber, aho cord, thatch, or ki leaf, from the land on which they live, for their own private use, but they shall not have a right to take such articles to sell for profit. The people shall also have a right to drinking water, and running water, and the right of way. The springs of water, running water, and roads shall be free to all, on all lands granted in fee simple; provided that this shall not be applicable to wells and watercourses, which individuals have made for their own use. [HRS Hawaii Revised Statutes (HRS) § 7-1]

Hawaiian Rights Enshrined in Hawai'i Constitutional and State Law Underpinning Ka Pa'akai

Akutagawa and Lerma offer a discussion of the pivotal modern events and legal history underpinning *Ka Pa'akai*. They write:

> During the Hawaiian Renaissance period when Kānaka Maoli began to fight for native access and gathering rights, resist evictions from ancestral lands, and organize against the Navy's bombing of Kaho'olawe, a State constitutional convention was held. This rare opportunity prompted Kānaka and local environmentalists to strategically position themselves as delegates in these proceedings. It was at the 1978 constitutional convention that certain key amendments were adopted. With respect to native rights, the delegates adopted a new amendment, Article XII, Section 7, which reads as follows:
>
> > The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.[37]
>
> This provision solidifies and enhances H.R.S., §§ 1-1 and 7-1, by making it a constitutional mandate for the State and its political subdivisions to "protect the reasonable exercise of customar[y] and traditional[] rights of Hawaiians to the extent feasible."[38] Over the next forty years, a body of jurisprudence developed around these statutory and constitutional provisions which addressed issues of where Hawaiian rights are protected and to what extent.

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[37] HAW. CONST. art. XII, § 7 (1978).
[38] *PASH*, 79 Hawai'i 425 at437, 903 P.2d at 1246.

> The first landmark Native Hawaiian rights case emerged in 1982 with William "Billy" Kalipi, Sr. asserting his kuleana rights.[39] The Hawai'i Supreme Court strictly interpreted H.R.S., § 7-1 in *Kalipi v. Hawaiian Trust Co.* ("*Kalipi*") as protective only of access and gathering rights of native tenants actually residing within the ahupua'a and that these practices may occur only on undeveloped lands.[40] However, as more cases have been litigated since *Kalipi*, the Hawai'i Supreme Court has revisited the notion of whether traditional and customary practices are viable only on undeveloped lands. The court's decision in *Public Access Shoreline Hawaii v. Hawai'i County Planning Commission* ("*PASH*") acknowledged that these traditions exercised on "less than fully developed" lands may also warrant protection.[41]
>
> In *Pele Defense Fund v. Paty* ("*Pele I*"), the Hawai'i Supreme Court expanded its ruling in *Kalipi* and acknowledged that gathering rights may extend to other ahupua'a without benefit of tenancy if it can be demonstrated that this was the accepted custom and long-standing practice.[42] The court gave great weight to kama'āina evidence and acknowledged that "traditional and customary rights associated with tenancy in an ahupua'a [may] extend[ ] beyond the boundaries of the ahupua'a."[43]
>
> These cases tend to reflect the practices of hoa'āina[44] in the terrestrial realms, particularly the wao nahele (upper rainforests with permanent cloud cover), the wao lā'au (lower forests of characterized by traditional hardwoods utilized for building materials and permanent fruiting trees where human interactions and gathering practices were more pronounced), and the wao kanaka (where human settlements existed and the land was actively farmed). The wao kanaka also extended into the sea to include estuarine environments where loko i'a (fishponds) were constructed and where the nearshore reefs existed. [Akutagawa and Lerma 2023: 24, 25]

The authors go on to discuss water and other gathering rights, and the public trust:

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[39] Kalipi v. Hawaiian Trust Co., 66 Haw. 1, 656 P.2d 745 (1982).

[40] FORMAN & SUSAN K. SERRANO, HO'OHANA AKU, A HO'OLA AKU at 9 (citing Kalipi, 66 Haw. at 9, 656 P.2d at 750).

[41] *See PASH*, 79 Hawai'i at 451.

[42] Pele Def. Fund v. Paty (*Pele I*), 73 Haw. 578, 620, 837 P.2d 1247, 1272 (1992). *See* FORMAN & SUSAN K. SERRANO, HO'OHANA AKU, A HO'OLA AKU, at 13 (citing *Pele I*, 73 Haw. at 620, 837 P.2d at 1272). In *Pele I*, the plaintiffs, the Pele Defense Fund ("PDF") challenged the state's decision to exchange specific ceded lands for privately owned land on Hawai'i Island. PDF claimed that after the land swap, its Native Hawaiian members seeking to exercise traditional subsistence, cultural, and religious practices were denied access to the undeveloped and now privately owned land. PDF provided testimony and affidavits attesting to the actual practices of Native Hawaiians living in in the Puna region as traditionally gathering outside of their ahupua'a of residence onto the lands subject in this litigation. This evidence formed the basis for the court's decision to affirm these practices as rights protected by law.

[43] FORMAN & SUSAN K. SERRANO, HO'OHANA AKU, A HO'OLA AKU, at 13-14 (citing *Pele I*, 73 Haw. at 620-21, 837 P.2d at 1272; citing also Pele Def. Fund v. Estate of James Campbell, Civ. No. 89-089, 2002 WL 34205861 (Haw. 3d Cir. Aug. 26, 2002)).

[44] Hoa'āina can be translated as "tenant, caretaker" (Pukui and Elbert 1986)

In a post-Territory Hawai'i, the Hawai'i Supreme Court, in a series of groundbreaking cases, began a decolonize the law and reinvigorate the sources of law protecting native rights. Some of those cases have been described above in the section above. In 1973, the Court in *McBryde Sugar Co. v. Robinson* rejected the notion of prescriptive rights and private ownership of water, stating that from the time Hawai'i became a kingdom, the King maintained certain "sovereign prerogatives" which included "encourag[ing] and even ... enforc[ing] the usufruct of lands for the common good[,]" water being one of them.[45] Applied to the State of Hawai'i as the new "sovereign" this court decision had the effect of returning water as a public trust. The Court further reinforced this understanding in *Robinson v. Ariyoshi* (1982):

> [W]e believe that by [the sovereign reservation], a public trust was imposed upon all the waters of the kingdom. That is, we find the public interest in the waters of the kingdom was understood to necessitate a retention of authority and the imposition of a concomitant duty to maintain the purity and flow of our waters for future generations and to assure that the water of our land are put to reasonable and beneficial uses. This is not ownership in the corporeal sense where the State may do with the property as it pleases; rather, we comprehend the nature of the State's ownership as a retention of such authority to assure the continued existence and beneficial application of the resource for the common good.[46]

Reflecting on the implications of *McBryde* and *Robinson v. Ariyoshi* necessitates a deeper acknowledgement that the public trust as understood from the Kingdom's perspective encapsulates the understanding of the ali'i, through divine right and mo'okū'auhau tracing to origins in the Kumulipo, having kuleana to care for the 'āina and their people for the common good. Indeed, the Court has acknowledged of the kuleana the chiefs had to the maka'āinana where the "public trust [comprises] a dual concept of sovereign right and responsibility[,]" a hallmark of "the ancient Hawaiian system."[47]

Subsequent to the landmark decision in *McBryde*, the delegates to the 1978 constitutional convention solidified this case by adopting Article XI. Section 7 specifically refers to water and affirms the State's "obligation to protect, control and regulate the use of Hawaii's water resources for the benefit of its people."[48] Section 1 provides the State's and Counties' responsibilities under the Public Trust:

> For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawai'i's natural

[45] McBryde Sugar Co. v. Robinson, 54 Haw. 174, 186 (1973); McBryde Sugar Co. v. Robinson, 55 Haw. 260, 270 (1973).
[46] Robinson v. Ariyoshi, 65 Haw. 641,674, 658 P.2d 287, 310 (1982)
[47] *In re* Waiāhole Combined Contested Case Hearing, 94 Haw. 97, 135, 9 P.3d 409, 447 (2000) (citing Reppun v. Board of Water Supply, 65 Haw.531, 547-48 and n. 14, 656 P.2d 57, 68-69, and n. 14 (1982)).
[48] Haw. Const. art. XI, § 7 (1978).

> beauty and all natural resources, including land, water, air, minerals, and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State. All public natural resources are held in trust by the State for the benefit of the people.[49]

The Hawai'i Supreme Court recognizes both Article XI, section 1 and article XI, section 7 as the public trust doctrine and "a fundamental principle of constitutional law in Hawai'i."[50] These constitutional provisions have had profound effects on our jurisprudence, one that is unmatched in any other jurisdiction throughout the United States. A survey of the cases arising out of the public trust include strong language from the Hawai'i Supreme Court rejecting arguments from private commercial interests that they are protected under this doctrine and that to return water back to the stream would constitute "waste."[51] Rather, the Court has made clear that resource protection is an important underlying public trust responsibility. The public trust also extends to ocean and fisheries health.[52]

Native Hawaiian traditional and customary rights are also deemed a public trust purpose as Hawai'i's indigenous people are inextricably tied to the natural environment.[53] The Court traces this public trust responsibility to Native Hawaiians as derivative of protections afforded under the Kuleana Act/H.R.S., § 7-1 which recognized the rights of hoa'āina to traverse freely within their ahupua'a, to access traditional trails, and to gather specific items that were critical to their daily survival, including water.[54] Thus, native rights are not only protected by Article XII, § 7 of the constitution, but doubly so under the public trust.

More recently, the Court has further expanded its understanding of native rights and the public trust to include a "duty to mālama 'āina" or "to care for the land[,]"[55] and that the State must exercise its fiduciary obligations as a trustee for lands it holds and manages.[56] The Court in *Ching v. Case* (2019), which centered on the State's obligation to properly manage ceded lands it had leased to the federal government for military training exercises, made clear also that:

> [P]ublic lands ceded to the United States following the overthrow of the Hawaiian Monarchy and returned to Hawai'i upon its admission to the Union hold a special status under our law. These

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[49] Haw. Const. art. XI, §1 (1978).
[50] *In re* Waiāhole Combined Contested Case Hearing, 94 Haw. 97, 132, 9 P.3d 409, 444 (2000).
[51] *Id.* at 137-138, 9 P.3d 409, 449-450 (2000).
[52] *See generally,* Kelly v. 1250 Oceanside Partners, 111 Hawai'i 205, 140 P.3d 985 (2006).
[53] *In re* Waiāhole Combined Contested Case Hearing, 94 Haw. 97, 137, 9 P.3d 409, 449 (2000).
[54] HAW. REV. STAT. § 7-1 (1994) (ensuring hoa'āina "right[s] to take firewood, house-timber, aho cord, thatch, or ki leaf ... [and] a right to drinking water, and running water, and the right of way. ...").
[55] Ching v. Case, 145 Haw. 148, n. 26, 449 P.3d 1146, n. 26 (2019).
[56] *Id.* at 1168, 170, (citing In re Conservation Dist. Use Application HA-3568 (In re TMT), 143 Haw. 379, 400, 431 P.3d 752, 773 (2018); State ex rel. Kobayashi v. Zimring, 58 Haw. 106, 121, 566 P.2d 725, 735) (1977)).

> lands are held by the State in trust for the benefit of Native Hawaiians and the general public. Accordingly, our constitution places upon the State duties with respect to these trusts much lie those of a common law trustee, including an obligation to protect and preserve the resources however they are utilized."[57]

The ceded lands, and thus the trusts currently managed by the State of Hawaii for the betterment of the conditions of native Hawaiians, are comprised of land originally set aside in 1848 by the laws and customs of the Kingdom of Hawaii. In 1848, the lands set aside as crown lands and government lands were made subject to a trust inspired by Native Hawaiian tradition. In 1893, the Kingdom was overthrown, and the Crown and Government lands subsequently were stolen by the Republic of Hawaii. When these land groupings were ceded to the United States by the Republic in 1898, federal law made them subject to a special trust,[58] and at statehood they were placed in what is known as the ceded lands trust. In the 1959 Hawai'i Admission Act, provisions explicitly protected lands and resources for "native Hawaiian" beneficiaries as defined in the Hawaiian Homes Commission Act.[59] As a condition of statehood, section 5(f) of the Admission Act mandated that the State of Hawai'i manage certain ceded lands for any number of the five trust purposes, including the "betterment of the conditions of native Hawaiians.[60] Section 5(b) of the Admissions Act officially conveyed to the new State of Hawai'i title to 1,400,000 of the 1,800,000 of Kingdom crown and government lands.[61] The OHA was the State's vehicle for fulfilling its duty to Native Hawaiians under section 5(f). It was established at the 1978 constitutional convention for that purpose. [Akutagawa and Lerma 2023:46—49]

Ka Pa'akai o Ka 'Āina v. State of Hawai'i Land Use Commission

The court case *Ka Pa'akai o Ka 'Āina v. State of Hawai'i Land Use Commission (Ka Pa'akai)* established state agencies have an onus to fulfill their fiduciary duties to uphold Hawaiian rights enshrined in the State Constitution and state law. The Supreme Court of the State of Hawai'i determined Article VII, Section 7 of Hawai'i's Constitution "...places an affirmative duty on the State and its agencies to preserve and protect traditional and customary native Hawaiian rights and confers upon the State and its agencies the power to protect these rights and to prevent any interference with the exercise of these rights."[62] The court asserted:

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[57] *Id.* at 152, 449 P.3d at 1150.
[58] D. Kapua'ala Sproat & MJ Palau-McDonald, *The Duty to Aloha 'Āina: Indigenous Values as a Legal Foundation for Hawai'i's Public Trust*, 57 Harvard Civil Rights-Civil Liberties L. Rev. 525 (2022) (stating that, "Both the Joint Resolution of Annexation and Hawai'i's Organic Act, which established a U.S. territorial government, recognized the special trust status of the Crown and Government Lands and also stipulated that revenue from the lands must be used to benefit residents of the islands." Joint Resolution to Provide for Annexing the Hawaiian Islands to the United States, July 7, 1898, 30 Stat. 750; Hawaiian Organic Act, § 91, April 30, 1900, ch. 339, 31 Stat. 141 (1900).
[59] Hawaii Admission Act, Pub. L. No. 86-3, §§ 4-5, 73 State. 5, 5-6 (1959).
[60] *Id.* § 5(f).
[61] *Id.* § 5(b).
[62] *Ka Pa'akai*, 94 Haw. at 47, 7 P.3d at 1084.

> (1) The state and its agencies are obligated to protect the reasonable exercise of customarily and traditionally exercised rights of native Hawaiians to the extent feasible;
> (2) Agencies are obligated to make an assessment, independent of the developer or applicant, of the impacts on customary and traditional practices of Native Hawaiians; and
> (3) The independent assessment must include three factors known as the '*Ka Pa'akai*' framework.[63]

The case also "...established a three-pronged framework for assessing Native-Hawaiian constitutionally protected rights and further held that the state has an obligation to protect those rights and may not transfer its duties to a third party." [Palacat-Nelsen 2023]
The opinion resulting from *Ka Pa'akai* stated that in order to fulfill its legal obligations, state agencies, like the DHHL, must measure the potential impacts of proposed projects against the following considerations:

(1) The identity and scope of "valued cultural, historical, or natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;

(2) The extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and

(3) The feasible action, if any, to be taken ... by the [State and/or its political subdivisions] to reasonably protect native Hawaiian rights if they are found to exist.[64]

How are Hawaiian Customs Determined?

Akutagawa and Lerma (2023) also detail the legal precedent for determining Hawaiian customs:

> ...HRS §1-1 instructs Hawai'i's courts to look to English and American common law decisions for guidance, except where they conflict with "Hawaiian judicial precedent, or ... Hawaiian [custom and] usage."[65] One of the threshold issues in determining whether or not the law governing Native Hawaiian rights, then, is determining whether or not a purported practice is actually a Hawaiian custom.
>
> Courts look to kama'āina expert testimony as the foundation for authenticating Hawaiian custom and usage. This was first discussed in *Application of Ashford*[66] which relied on "reputation evidence" of a kama'āina over a shoreline boundary dispute rather than accept the conclusions of a certified land surveyor. The Court has recognized the definition of "kama'āina" to mean as stated in the Hawaiian

[63] *See id.*
[64] *Id.*
[65] State v. Zimring, 52 Haw. 472, 475 (1970) (citing De Freitas v. Trustees of Campbell Estate, 46 Haw. 425, 380 P.2d 762 (1963)).
[66] *In re* Ashford, 50 Haw. 314, 440 P.2d 76 (1968).

dictionary as one who is "[n]ative born, one born in a place, host[.][67] The *Ashford* court stated:

> Kamaʻāina witnesses may testify to the location of seashore boundaries dividing private land and public beaches according to reputation and ancient Hawaiian tradition, custom and usage. The method of locating the seaward boundaries was by reputation evidence from kamaʻāinas and by the custom and practice of the government's survey office. It is not solely a question for a modern-day surveyor to determine the boundaries in a manner completely oblivious to the knowledge and the intention of the king and old-time kamaʻāinas who knew the history and names of various lands and the monuments thereof.[68] [Akutagawa and Lerma 2023:49, 50]

The DHHL's Fiduciary Responsibilities Under Ka Paʻakai

Per the discussion above, the DHHL's fiduciary obligations under *Ka Paʻakai o Ka ʻĀina v. State of Hawaiʻi Land Use Commission* include obligations to: 1) "…to protect the reasonable exercise of customarily and traditionally exercised rights of native Hawaiians to the extent feasible;" 2) Assess the potential impacts of a proposed project on customary and traditional practices of Native Hawaiians; and 3) Ensure an independent assessment is performed that employs the '*Ka Paʻakai*' framework.[69]

From our place of expertise in Hawaiian culture and consultation, the authors offer additional cornerstones of best practices in the execution of a *Ka Paʻakai* Analysis framework. These include:

- project-specific consultation as well as the avoidance of repurposing and recycling consultation from one project for another;
- consultation processes that recognize and uphold the intellectual property rights of consultees, including but not limited to *continued* free, prior, and informed consent;
- ensuring consultation participants are provided a clear and accurate understanding of how consultation will be used;
- and, the good faith realization of desired mitigations and meaningful integration of perspectives shared during consultation into project planning and impact avoidance.

Ka Paʻakai in Global and Federal Legal Contexts and Dialogues

Global and federal policies, best practices, and guidelines for working in indigenous spaces, with indigenous communities and knowledge, align with the purpose and goals of *Ka Paʻakai* Framework analysis. Reviewed chronologically below, they offer a breadth and depth of critical considerations and pathways for state agencies to uphold their fiduciary responsibilities to Hawaiians, alongside, of course, the good faith realization of the mitigations and best practices identified by Hawaiian stakeholders for impacts to their rights and resources.

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[67] *Ka Paʻakai*, 94 Hawaiʻi at 31, 7 P.3d at 1068.
[68] *In re* Ashford, 50 Haw. 314, 316, 440 P.2d 76, 77 (1968).
[69] *Id.*

The 2007 *United Nations Declaration on the Rights of Indigenous People* (United Nations 2007) articulates the unique human rights belonging to indigenous people, and "...the minimum standards for the survival, dignity and well-being of the indigenous peoples of the world," (United Nations 2007:28). It acknowledges:

> ...that indigenous peoples have suffered from historic injustices as a result of, inter alia, their colonization and dispossession of their lands, territories and resources, thus preventing them from exercising, in particular, their right to development in accordance with their own needs and interests... [United Nations 2007:3]

The entire document upholds the purpose and goals of the Ka Paʻakai Framework analysis. It recognizes a holistic array of indigenous human rights, including around traditional and customary practices that include gathering, access to places and spaces, and the right to the health and continuity of cultural resources and practices. The following tenets are especially relevant and underscore how the state's fiduciary responsibility to protect Hawaiian rights is part of a broader global dialogue regarding the rights of indigenous peoples:

> ...[the] urgent need to respect and promote the inherent rights of indigenous peoples which derive from their political, economic and social structures and from their cultures, spiritual traditions, histories and philosophies, especially their rights to their lands, territories and resources,...[United Nations 2007:3]

> ...that control by indigenous peoples over developments affecting them and their lands, territories and resources will enable them to maintain and strengthen their institutions, cultures and traditions, and to promote their development in accordance with their aspirations and needs,...[United Nations 2007:4]

> ...respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment,...[United Nations 2007:4]

Elements of the United Nations' "standard of achievement to be pursued in a spirit of partnership and mutual respect," are important to emphasize. The underlined text below, specifically, articulates with and reflects the purpose and goals of the Ka Paʻakai Framework analysis:

> Article 2: Indigenous peoples and individuals are free and equal to all other peoples and individuals and have the right to be free from any kind of discrimination, in the exercise of their rights, in particular that based on their indigenous origin or identity.[United Nations 2007:2]

> Article 8.1. Indigenous peoples and individuals have the right not to be subjected to forced assimilation or destruction of their culture.[United Nations 2007:10]

> Article 11.1. Indigenous peoples have the right to practise and revitalize their cultural traditions and customs. This includes the right to maintain, protect and develop the past, present and future manifestations of their cultures, such as archaeological and historical sites, artefacts, designs, ceremonies, technologies and visual and performing arts and literature. [United Nations 2007:11]

> Article 11.2. States shall provide redress through effective mechanisms, which may include restitution, developed in conjunction with indigenous peoples, with

respect to their cultural, intellectual, religious and spiritual property taken without their free, prior and informed consent or in violation of their laws, traditions and customs. [United Nations 2007:12]

Article 12.1. Indigenous peoples have the right to manifest, practise, develop and teach their spiritual and religious traditions, customs and ceremonies; the right to maintain, protect, and have access in privacy to their religious and cultural sites; the right to the use and control of their ceremonial objects; and the right to the repatriation of their human remains. [United Nations 2007:12]

Article 15.1. Indigenous peoples have the right to the dignity and diversity of their cultures, traditions, histories and aspirations which shall be appropriately reflected in education and public information. [United Nations 2007:14]

Article 20.1. Indigenous peoples have the right to maintain and develop their political, economic and social systems or institutions, to be secure in the enjoyment of their own means of subsistence and development, and to engage freely in all their traditional and other economic activities. [United Nations 2007:16]

Article 20.2. Indigenous peoples deprived of their means of subsistence and development are entitled to just and fair redress. [United Nations 2007:16]

Article 24.1. Indigenous peoples have the right to their traditional medicines and to maintain their health practices, including the conservation of their vital medicinal plants, animals and minerals... [United Nations 2007:18]

Article 25. Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard. [United Nations 2007:18]

Article 26.1. Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired. [United Nations 2007:19]

Article 26.2. Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired. [United Nations 2007:19]

Article 26.3. States shall give legal recognition and protection to these lands, territories and resources. Such recognition shall be conducted with due respect to the customs, traditions and land tenure systems of the indigenous peoples concerned. [United Nations 2007:19]

Article 27. States shall establish and implement, in conjunction with indigenous peoples concerned, a fair, independent, impartial, open and transparent process, giving due recognition to indigenous peoples' laws, traditions, customs and land tenure systems, to recognize and adjudicate the rights of indigenous peoples pertaining to their lands, territories and resources, including those which were

traditionally owned or otherwise occupied or used. Indigenous peoples shall have the right to participate in this process. [United Nations 2007:20]

Article 29. Indigenous peoples have the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources. States shall establish and implement assistance programmes for indigenous peoples for such conservation and protection, without discrimination. [United Nations 2007:21]

Article 31.1. Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions. [United Nations 2007:22,23]

Article 31.2. In conjunction with indigenous peoples, States shall take effective measures to recognize and protect the exercise of these rights.[United Nations 2007:23]

Article 32.1. Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources. [United Nations 2007:23]

Article 32.2. States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources. [United Nations 2007:23]

Article 32.3. States shall provide effective mechanisms for just and fair redress for any such activities, and 24 appropriate measures shall be taken to mitigate adverse environmental, economic, social, cultural or spiritual impact. [United Nations 2007:23]

Article 34. Indigenous peoples have the right to promote, develop and maintain their institutional structures and their distinctive customs, spirituality, traditions, procedures, practices and, in the cases where they exist, juridical systems or customs, in accordance with international human rights standards.

A series of recent memorandums intended for Federal agencies and application in Federal regulatory contexts recognize the validity and importance of Indigenous Knowledge. In 2021, the White House Office of Science and Technology Policy (OSTP) and Council on Environmental Quality (CEQ) recognized "…Indigenous Knowledge as one of the many important bodies of knowledge that contributes to the scientific, technical, social, and economic advancements of the United States, and to our collective understanding of the natural world," (Prabhakar and Mallory 2022:3). They also called for "…the recognition and inclusion of Indigenous Knowledge," that is

"...founded on the understanding that multiple lines of evidence or ways of knowing can lead to better-informed decision making," (Prabhakar and Mallory 2022:3). The Advisory Council on Historic Preservation (ACHP) issued similar guidance mandating culturally-appropriate use of Indigenous Knowledge only with "free, prior, and informed consent," in Federal implementation of Section 106 of the National Historic Preservation Act (ACHP 2021:4). In 2024, the ACHP "...approved an exemption that would relieve Federal agencies from the historic preservation review requirements under Section 106 of the National Historic Preservation Act regarding the effects of various undertakings in Hawaii that are proposed or directed by a Native Hawaiian Organization (NHO), or substantially led, designed, or managed by an NHO, informed by Indigenous Knowledge of that NHO, and related to traditional cultural practices of Native Hawaiians," (ACHP 2024).

Methods

Conducting this Ka Paʻakai Framework Analysis consisted of three primary tasks: (1) ethnohistorical research, synthesis, and analysis; (2) community outreach and consultation, and (3) Ka Paʻakai analysis and report preparation.

Nohopapa conducted research and outreach to identify 'valued cultural, historical, or natural resources' to better understand if and how groundwater development may impact traditional customary Native Hawaiian practices and rights in the area of North Kona spanning from the ahupuaʻa of Kāloko to Keauhou. Additionally, the Ka Paʻakai Framework Analysis requires the identification of appropriate mitigation measures (feasible actions) that can be implemented to protect identified impacted resources and Native Hawaiian rights and practices associated with those resources.

While conducting this work, Nohopapa's research team incorporated a set of living values and beliefs to help guide our research, analysis, behavior, perspective, and overall frame of reference. These values represent the underlying foundation, spirit, and structure for this study:

- ***Aloha ʻĀina****- to have a deep and cherished love for the land which created and sustains us*
- ***Haʻahaʻa****- to be humble, modest, unassuming, unobtrusive, and maintain humility*
- ***Hoʻomau****- to recognize, appreciate, and encourage the preservation, perpetuation, and continuity of our wahi pana and kaiāulu*
- ***ʻImi Naʻauao****- to seek knowledge or education; be ambitious to learn*
- ***Kuleana****- to view our work as both a privilege and responsibility*

Ethnohistorical Research

Ethnohistorical information lays the foundation for understanding a place's natural, cultural, and historical background. To provide a more comprehensive understanding of the project areas, Nohopapa researched cultural and historical sources for Kona Akau, including historical maps, place and ua (rain) names, moʻolelo (stories), ʻōlelo noʻeau (proverbs), and historical land use documents. Inoa ʻāina, moʻolelo, and ʻōlelo noʻeau were compiled from Hawaiian language and English sources in books, newspapers, and online databases and archives. Historical land use accounts were derived from land documents, such as Boundary Commission Certificates and Testimonies, the Buke Mahele and Awards Books, Native & Foreign Testimonies and Registers, Government Land Grants, Crown lands, and Government Surveys.

To assist with the historical land use research for this project, Nohopapa was fortunate to contract and collaborate with Kumu Pono Associates, LLC. Kumu Pono provided an extensive compilation, Hawaiian language translations, and summaries of Boundary Commission testimony and Māhele claims (Native Testimony and Native Register) across North Kona. In addition, Kumu Pono associates shared their compiled works of the moʻolelo *Kaao Hooniua Puuwai no Ka-Miki*, by John Wise and J. W. H. I. Kihe, which ran in the nūpepa "Ka Hoku o Hawaii" in a series from Jan. 8, 1914 to Dec. 6, 1917. While the 1917 portion of the series can be found on online nūpepa collections, Kumu Pono associates painstakingly located, compiled and translated Ka-Miki, a labor over many years.

In this report, Kumu Pono also authored the following three sections:

- Boundary Commission Proceedings Of The Boundary Commission Lands Of: Keahuolū, Puaʻa, Waiʻaha, Kahului, Puapuaʻa and Keauhou
- The Māhele ʻĀina and Issuance of Kuleana to Hoa ʻĀina
- Excerpts from Kuleana Claims in the Ahupuaʻa of Keauhou 1 & 2, Kahaluʻu, Waiʻaha-Kahului, Keahuolū-Kealakehe

Their authorship of important sections and primary resource contributions greatly increased the waiwai of the inventory of resources and practices in, around and potentially impacted by proposed actions at the study area.

Community Consultation

Community Outreach

Prior to Nohopapa's individual consultation efforts, the Department of Hawaiian Home Lands (DHHL) with support from Nohopapa, held a kick-off meeting at the Kamehameha Schools Kahaluʻu Manowai (Ma Kai) site on April 18, 2024 to share information about the DHHL Kona Ka Paʻakai Framework Analysis project for water source development related to the proposed water improvement sites at Waiʻaha and Keauhou and larger project area (Kaloko to Keauhou) Kona, Hawaiʻi. Twenty-five individuals attended the public meeting and shared their contact information with DHHL and Nohopapa to follow-up with them about future project updates.

Individual Consultation

One-on-one community consultation efforts were conducted from July to October 2024. As a multi-phase study, the consultation process consisted of identifying appropriate and knowledgeable individuals, reaching out to them to participate, conducting in-person, phone, or online interviews, summarizing the community manaʻo, analyzing the data, and preparing a summary of findings for the Analysis. In particular, information was gathered relating to the many manifestations of Kāne and the resources, traditional customary practices, and rights that rely on them. Thirty-four individuals were contacted to participate in this study. Of the thirty-four individuals, twenty-four responded, and thirteen committed to an interview. Eleven individuals were unable to participate for various reasons.

Nohopapa engaged with individuals, ʻohana, and/or organizations with relationships to study area. In particular, we focused on gathering information relating to the many manifestations of Kāne and the resources, traditional customary practices, and rights that rely on them; as related to the proposed water improvement sites (at Waiʻaha and Keauhou) and larger project area (Kāloko to Keauhou):

- Biocultural forms of water in the study area, including, rainfall, fog, mist, seeps, catches, springs, flowing water, where water enters the sea, algae blooms, anchialine ponds, loko, clouds, storm patterns, etc.
- Observation of *changes* over time to the area's water resources, as well as to the birds, plants, and animals, marine or terrestrial, that rely on those waters.
- Moʻolelo, kaʻao, inoa ʻāina, mele, oli, ʻōlelo noʻeau, and hula and other stories related to the knowledge of wahi pana, wahi kapu, and wahi kūpuna and cultural practices and resources associated with these wahi
- Traditional and historical land use and specific use or larger area models relate to water
- Coastal to upland traditional and local relationships, especially regarding water
- Recommended traditional & local strategies for resource management and conservation in Kona
- Traditional practices you or those you know engage with or have engaged with in the past
- Potential short and long-term impacts of the proposed project on Hawaiian cultural resources, rights, and traditional customary practices
- Recommended mitigations for the proposed project
- Referrals of kūpuna and kamaʻāina who are knowledgeable of the project area and might be willing to participate in this study

Data Integration

After the interviews were conducted, the recorded interviews were transcribed then sent to the participants for review, an accuracy check, and to confirm they were comfortable with the thoughts, information, and comments being shared. Nohopapa worked hard to ensure that the voices of the community were honored, respected, correctly heard, and properly conveyed.

Ethics

Throughout the project, it was explained to all participants that their involvement was strictly voluntary. An informed consent process was initiated and completed, including providing ample project background information explaining the project focus and the purpose of the plan. Verbal or written informed consent was gathered from all contributors to this study (see Appendix C).

In alignment with professional best practices committed to doing no harm and protecting the best interests and intellectual property of participants, all contributions to this document have been anonymized. Additionally, per consultation professional standards, ethics, and all applicable laws and regulations, the intellectual property generously shared by consultation participants and featured in this study **cannot and should not** be reproduced, applied to other projects or studies, or utilized without free, prior, and informed consent.

Ka Paʻakai Analysis

The Analysis looked at the information compiled from both the ethnohistorical research and community consultation in order to:

(1) identify cultural resources, practices, beliefs, and features associated with the project area and vicinity
(2) identify impacts the proposed project will have on any identified cultural resources and practices, and
(3) identify appropriate mitigation commitments and recommendations for best practices.

Ka Nohona Hawai‘i – Cultural Resources, Practices, and Beliefs

This section of the report draws from a variety of oral and documented resources to present an overview of the cultural resources and practices associated with the current study areas focused primarily on **Kealakehe, Keahuolū, Pua‘a, Wai‘aha, Kahului, Puapua‘a, and Keauhou Ahupua‘a** of Kona. The goal of this broad overview is to contextualize the study areas, as well as the greater landscape of Kona, through the compilation of mo‘olelo and ka‘ao, ‘ōlelo no‘eau, mele, and historical accounts. As it is said in the ‘ōlelo no‘eau–*Kona, kai ‘ōpua i ka la‘i–Kona, where the horizon clouds rest in the calm,* (Pukui 1983:199, #1844)–a rich reservoir of stories and traditions also rests beneath the calm of these Kona clouds. Presented here is a selection of mo‘olelo that conveys some of the valued resources and significant practices associated with the study areas.

Mo‘olelo and Ka‘ao - Oral Traditions

Hawaiian oral traditions have been passed down by word of mouth from one generation to the next and recorded in more contemporary times. Hawaiian oral traditions are important; they convey a general sense of Kanaka ‘Ōiwi (Native Hawaiian) history, people’s connection to land, how they lived, and their traditional land tenure. Hawaiian oral traditions are relayed in the form of mele (songs), ‘ōlelo no‘eau (proverbs), pana no‘eau (sayings), mo‘olelo (stories), mo‘okūauhau (genealogies), and accounts in nūpepa (historic newspaper articles). These forms of oral traditions can be woven into each other. For instance, a mo‘olelo may present a mele about a mo‘okū‘auhau. Hawaiian oral traditions are vehicles for the intergenerational transmission of knowledge. They serve as a timeless bridge to cultural insights and beliefs that have guided Hawaiians across centuries and generations.

Today, through written form and English translations, these cultural traditions persist as sources of ancestral wisdom. Hawaiian oral traditions tell of the resources of the land, akua (gods), kupua (supernatural deities), ‘aumākua (familial guardians), ali‘i (chiefs), and ka po‘e kānaka (the Hawaiian people) whose stories weave a unique and treasured history of this ‘āina. Though many more mo‘olelo connected to the study areas may likely exist, the selected mo‘olelo presented in this section relay specific information regarding water features connected to the area and/or cultural practices associated with the place.

He Ka‘ao no ka Manu ‘Elepaio

“He Kaao no ka Manu Elepaio” appeared in the Hawaiian language newspaper, *Ka Hoku o ka Pakipika*, in 1862.[70] This mo‘olelo was written by an individual whose initials read; “S. W. K.” Little is known of the author aside from the individual's connection to Honolulu having had signed and dated his/her initials at the end of the publication with, “Kamakela, Honolulu, Mei 12, 1862.” Though the author appears to have written this mo‘olelo from the island of O‘ahu, the story itself takes place on the mokupuni of Hawai‘i, Kona Moku, Kahului Ahupua‘a. “He Kaao no ka Manu

[70] This mo‘olelo has been more recently adapted into a widely circulated bilingual children‘s book. *No Ka ‘Elepaio Kolohe: the Naughty ‘Elepaio* (Kruger, Furchgott, Andrews, & Akana-Gooch: 2008)

Elepaio" is a tale that describes the kolohe (mischievous) deeds of an ʻelepaio–a native flycatcher bird who dwells in the forests. Various subspecies of ʻelepaio exist that are particular to the island they are found. Hawaiʻi Mokupuni subspecies of ʻelepaio are identified as *Chasiempis sandwichensis sandwichensis* (Pukui and Elbert 1986:41). What is of significance to this study is the setting that this moʻolelo takes place and the water resource that is recounted in the story.

A kanaka named Piʻiwai set off on a journey into the mountains of Kahului, Kona in search of water. There in the uplands, he reached a freshwater spring and filled his huewai or water gourd with water from the pūnāwai (freshwater spring). With his huewai filled with the needed water, Piʻiwai readied himself for his return home. While descending the uplands, Piʻiwai set his huewai down in order to prepare a place for him to rest for a moment. While he was gone a manu ʻelepaio, referred to by the name, ʻElepaio, flew and settled on top of Piʻiwai's water gourd. ʻElepaio pecked at the gourd until all the water emptied from the hole that was made by his pecking. When Piʻiwai returned to the spot where he had left his huewai, he picked it up for a drink only to find it empty. Wondering how this could have happened, Piʻiwai looked up and saw ʻElepaio perched up on a tree branch. Realizing this bird was what caused his water to be wasted, Piʻiwai exclaimed that he would kill ʻElepaio. He picked up a stone and chucked it at ʻElepaio's head. Fortunately for ʻElepaio, he was not killed by the stone and instead was able to escape. Thus begins the start of where this story unfolds. "He Kaao no ka Manu ʻElepaio" begins:

> I kekahi la, pii aku la kekahi kanaka o Piiwai kona inoa, i ke kuahiwi i ka wai e inu, no ka mea, aia no ka wai oia wahi i ke kuahiwi, oia hoi o Kahului, i Kona, Hawaii. Mai o a o oia wahi o Kona, he wai no o kai, he wai kai nae, he awaawa ke inu, o ka wai huihui ono loa i ka inu ana, o ko uka o ke kuahiwi, oia mau mai no a hiki i keia manawa, ke kii o ka wai i ke kuahiwi.
>
> Ia pii ana aia nei, a hiki keia i ka punawai, ukuhi ilo la oia i kana huewai a piha ka huewai i ka wai, o ka hoi mai la no ia a ke ahua, hoomaha iho la ia. Kuu iho la, keia i kana huewai, a kukulu iho la, a hele aku la oia ma kahi e aku.
>
> Ia manawa, lele mai la kekahi manu, oia hoi ka Elepaio, a kau iho la ia i ka nuku o ka huewai a ua kanaka nui, ke kikokiko iho la no ia o ua wahi manu nei i ka huewai a na kanaka nei, a pau ka wai i ke kahe, hoi mai la ua kanaka nei a kahi o kana huewai i kukulu ai, lele aku la ua wahi manu nei a ma kahi e aku, kau iho la.
>
> Ike aku la no nae ua kanaka nei i ka lele ana aku a ua wahi manu nei, aole nae oia i manao ua kikokiko ia kana huewai e ua wahi manu nei. Ka lalau iho la no ia i ka huewai, i kaikai ae ka hana, mama ana, i nana iho ka hana o ua kanaka nei, ua puka ka huewai, o ka manao ae la no ia o ia nei, na ka manu no i kikokiko a puka, o ka pii mai a no ia o ka manao huhu o ua kanaka nei i ka manu; i iho la iloko ona, ka! He wahi manu kolohe maoli ka hoi oe, e maka ana oe ia'u.
>
> O ka lalau iho la no ia o ua kanaka nei i ka pohaku, o ka pehu aku la no ia i ua wahi manu nei a pa io no; aole nae i make. O ka lele aku la no ia o ua wahi manu nei; o ke kumu o keia lele ana o ua wahi manu nei, e lele ana e hookolo i ka hui manu o lakou, no keia pa ana ona i ka pohaku a ke kanaka.
> [S. W. K. 1862:1]

Provided below is the English translation of the moʻolelo interpreted by ethnographer Kepā Maly:

One day, a certain man named Piʻiwai, climbed up the mountainside to get water to drink, this was because there was a place on the mountainside that fresh water was found. It was at Kahului, in Kona, Hawaiʻi. Indeed, all around this place of Kona, the water in the lowlands was salty, it was brackish and bitter to drink. The cool sweet water for drinking came from the uplands on the mountain. It is still the same to this day, the fresh water is fetched from the mountain.

Now when he climbed up, he reached the spring and dipped his water gourd into it, filling the gourd with water. Now as he returned, he reached a hillock and stopped there to rest. He set his water gourd down, building an area to set it, and then went over to the side to rest.

At that time, a certain bird flew by, it was the ʻElepaio, and it perched itself on the spout of the man's water gourd. The bird then began pecking at the man's water gourd, and all the water was lost as it poured out. When the man returned to the place where he had left his water gourd, the bird flew a little ways off and set down.

Now the man saw this bird fly away, but he did not think that the bird had pecked at his water gourd. He bent down to pick up the water gourd, and as he lifted it, it was light. Looking for the reason, the man saw that there was a hole in the water gourd. It was then that he understood that the bird had pecked out the hole, and the man's anger at the bird welled up. He said within himself, "So that's it! You are a truly mischievous bird, and you are going to be killed by me."

The man then picked up a stone and threw it at the bird, striking it, but, it was not killed, and the bird flew away. Now the reason the bird flew off was because it was going to inquire of the other birds what they felt about his having been hit by the man's stone.
[Translated by Maly in Maly 1997:5-7]

Recounted in this excerpt of the moʻolelo, and of particular importance to this study, is the description of a **pūnāwai** located in the uplands of **Kahului, Kona**. What is gleaned from this account is both the presence of a freshwater spring in Kahului, as well as the **practice of kānaka gathering water** from its source. People were not always living where fresh water was available and the access to the uplands, connectivity and travel, was important for subsistence and traditions around gathering and caring for that distribution of resources.

The remainder of the moʻolelo continues with ʻElepaio's effort to seek empathy from the other manu of the forest for having been struck by Piʻiwai. After fleeing from Piʻiwai, ʻElepaio flies in search of other birds to tell them of what Piʻiwai has done. ʻElepaio seeks pity from the other manu he encounters and asks them their opinion as to who they believe is to blame in the hopes that they will fault Piʻiwai for the wrongdoing he felt has happened. However, each time ʻElepaio inquires with a new manu and retells the story of how he caused Piʻiwai's water gourd to empty which angered him, each time ʻElepaio is told that he, himself is in fact the one at fault. Tired and saddened by having had no empathy from the birds he spoke to, ʻElepaio was forced to self-reflect and realize that he was at fault and repented for it. The remainder of the story of ʻElepaio is recounted below:

Ia lele ana a ia nei, e nana hele ana i na manu, a liuliu ia lele ana a ia nei, ike mua aku la keia Pueo, lele aku la keia a kokoke io Pueo la, kaheea aku la keia penei;

“Pueo–e, Pueo–la.” A lohe o Pueo i keia kahea ana aku a Elepaio, ka haliu mai la no ia o Pueo a hoohai mai la me ke kolonahe, ninau mai la o Pueo, penei. “E! Elepaio, E! Elepaio, Heaha ka’u?” Hai aku la o Elepaio, i kana mea i hana ai i ka huewai a ke kanaka, hana aku la oia na ke ano olioli, penei, “Ua pa wau, i ka pohaku, a ke kanaka.”

Ninau mai la o Pueo ia Elepaio penei, “Nawai ka hala.” Olelo aku no o Elepaio, ma ke ano oli no penei, Na’u ka hala, I ka pao ana, I ka huewai, A ke kanaka. I mai la o Pueo ma ke ano oli no, penei. “Hookolo ia, i ka nui manu, o kakou.”

O ka huli aku la no ia o ua o Elepaio, o ka lele aku la no ia a liuliu, ike aku la keia ia Io, e kauaheahe ana iluna o na makani kolonahe, kahea aku la o Elepaio penei. “E Io–e, E Io–la.” Huli mai la o Ia a ninau mai la ia. “Heaha ka’u?” Hai aku la o Elepaio penei. “Ua pa wau, i ka pohaku a ke kanaka.” Ninau mai la o Io, “na wai ka hala?” I mai o Elepaio. “Na’u ka hala, i ka pao ana, i ka huewai a ke kaknaka.” I mai la o Io, ua like pu nae ka laua olelo me Pueo, penei. “Hookoloia, i ka nui manu, o kakou.”

I ka huli aku la no ia o Elepaio lele no, a ia lele ana a ia nei, ike aku la keia ia Amakihi alo, kahea aku la no o Elepaio. “Amakihi–e, Amakihe–la.” Huli mai la o Amakihi a ninau mai la, “Heaha ka’u?” Hai aku la o Elepaio penei. “Ua pa wai i ka pohaku a ke kanaka.” Ninau o Amakihi ma ano olioli penei. “Nawai ka hala?” I mai la o Elepaio. “Na’u ka hala, i ka pao ana, i ka huewai, a ke kanaka.” Ia manawa, lulilulu iho la ke poo o ua wahi Amakihi nei, a ea mai la ia iluna, a nana mai la ia Elepaio, a olelo aku ia ia ma ke olioli ana.

Elepaio–e, Elepaio–la,
Hewa ha oe,
I ka pao ana,
I ka huewai,
A ke kanaka.
A make no oe,
A e pono,
He kolohe oe.

Ia lohe ana o Elepaio i keia manao o Amakihi, o ka pii mai la no ia o kona huhu, a mele oli aku la oia, penei ia Amakihiki.

Kau pono ka ia,
Kela Amakihi,
Pupua awaawa,
He hohono pakui,
Ke pulehu aku,
He hauna e ke kai,
Io ole e ka mole,

O ka pau no ia o ko Elepaio kamailio pu ana me Amakihi, o ka lele aku la no ia, ia lele ana aku o Elepaio, nui kona kaumaha no kela ike ana a Amakihi i ko Elepaio hewa, a lele aku la ia me ke kaumaha o ka manao. Aka, aole i pau loa kona manao e hele e huli i ka nui manu e like me kona manao paa. Lele aku la no ia a ike aku la o Elepaio ia Iiwimakapolena, kahea aku la ia e like me kona hai ana i na manu mua.

I mai la o Iiwi e like me ka Amakihi olelo ana aku ua hewa ia. O ka pau no ia o kona hookolo ana i ka nui manu, a kaumaha ka manao o ua o Elepaio, a mihi io iho la oia, au hewa ia.
[S. W. K. 1862:1]

The excerpt is translated below:

While flying, he looked around to see other birds, and after flying a little while, the first bird he saw was Pueo (Owl). He flew close to Pueo and called out like this, "Oh Pueo, say Pueo." Pueo heard the call of ʻElepaio, and turned to Elepaio, encouraging him with a question, "Oh Elepaio, say Elepaio, what can I do for you?" Elepaio then told him what he had done to the water gourd of the man, and explained it in the form of a chant, "Ua pâ wau, i ka pôhaku, a ke kanaka" (I was struck with a stone by the man).

Pueo then asked ʻElepaio, "Whose fault is it." ʻElepaio answered in the form of a chant, "Naʻu ka hala, i ka pao ana, i ka hue wai, a ke kanaka" (The fault is mine for pecking at the water gourd of the man). Pueo then responded in the form of a chant, "Hoʻokolo ia, i ka nui manu, o kâkou" (Go inquire of other birds of our kind).

ʻElepaio then went in search of others. In a little while, he saw ʻIo soaring above in the gentle winds. ʻElepaio called out, "O ʻIo, hail ʻIo." ʻIo turned and asked, "What do you want of me?" ʻElepaio said, "I have been struck with a stone by the man." ʻIo asked "Whose fault was it?" Elepaio answered, "The fault is mine for pecking at the water gourd of the man.." ʻIo then answered with the same words as those of Pueo, "Go inquire of other birds of our kind."

ʻElepaio then turned, flying away, he flew and came in the presence of ʻAmakihi. ʻElepaio called, "O ʻAmakihi, hail ʻAmakihi." ʻAmakihi turned and asked, "What do you want of me?" ʻElepaio said, "I have been hit with a stone thrown by the man." ʻAmakihi then asked in a chant, "Who's fault is it?" ʻElepaio answered, "The fault is mine for pecking at the water gourd of the man.." This time, ʻAmakihi shook his head, and rising above, he looked at ʻElepaio, and spoke in a chant:

O ʻElepaio, ʻElepaio,
Indeed you have erred
By digging
Into the water gourd
Of the man.
It is right
That you should die,
You are so mischievous.

When ʻElepaio heard what ʻAmakihi thought, his anger rose and he chanted to Amakihi:

This is what is just
For that ʻAmakihi,
That he be made into a condiment to go with the ʻawa.
The scent is unpleasant,

And when it is broiled,
The gravy is foul,
There is no meat within.

This was the end of ʻElepaio's conversation with ʻAmakihi; he then flew away. As ʻElepaio was flying, he was greatly saddened because ʻAmakihi knew ʻElepaio's fault. So he flew with heavy thoughts. But he had not given up his thoughts of inquiring of the other birds about this. As he was flying, ʻElepaio saw ʻIʻiwimakapôlena and he called out as he had to the other birds. ʻIʻiwi spoke the same words as ʻAmakihi had, "The fault was with ʻElepaio." This was the end of his inquiring of the birds, and ʻElepaio's thoughts were truly sad. He repented within himself, saying "I was indeed at fault."
[Translated by Maly in Maly 1997:5-7]

Through this moʻolelo we learn about several resources and traditional cultural practices within and around the study area in Kahului Ahupuaʻa; a traditional value of aloha i kekahi, several manu are identified in the uplands of Kahului, and specifically that ʻāmakihi was broiled and a pūpū eaten while drinking ʻawa, and most importantly the importance of wai, and the work it took to collect it, and the fact that people traveled to the uplands regularly, possibly daily based on the moʻolelo, for potable water.

He Moʻolelo Kaʻao no Kepakaʻiliʻula

The moʻolelo of Kepakaʻiliʻula is a tale of a young boy who was born prematurely, traditionally referred to by the term "ʻeʻepa;" a birth of this nature is associated with being born possessing "miraculous powers," (Pukui and Elbert 1986:37). The version of the story that will be referenced in this section is attributed to David Malo and originates from the Hawaiian language newspaper, *Ka Hoku o Hawaii*. The articles appeared weekly in *Ka Hoku o Hawaii* and was published in the newspaper from March 19, 1919 through December 9, 1920, totaling 79 printed articles. Maly introduces "He Moʻolelo Kaʻao no Kepakaʻiliʻula" as follows:

Like Ka-Miki, the story of Kepakaʻiliʻula is about a youth who was born in an ʻeʻepa (premature - mysterious) form, who was given up for dead by his parents. Kepakaʻiliʻula's father was Maka-o-Kū, and his mother was Hina-ai-ka-malama, both of whom were descended from Kūahailo and Hina the akua - aliʻi (god-chiefs) who came from Kahiki and established the highest chiefly bloodlines of Hawaiʻi. At the time of Kepakaʻiliʻula's birth, Makaokū and Hina dwelt near Moku-ola (now called Coconut Island) and ruled the district of Hilo.

Kepakaʻiliʻula's birth was accompanied by numerous displays of natural phenomena including fragmented rainbows that rested upon the ocean, rains that poured upon the land, and rivers that overflowed upon the land. His maternal uncles, Kiʻinoho and Kiʻihele, took these signs as omens of Kepakaʻiliʻula's supernatural nature. Without the knowledge of Makaokū or Hina, Kiʻinoho and Kiʻihele rescued Kepakaʻiliʻula and raised him while instructing him in all manner of fighting techniques, and in the uses of his supernatural powers. When Kepakaʻiliʻula came of age, his uncles went in search of a suitably beautiful and highly ranked chiefess to whom Kepakaʻiliʻula could be married. The journey took them around Hawaiʻi, where they met with sacred chiefesses of the island's districts. In Kona, the uncles met with the chief Keolonāhihi and his wife Kahaluʻu, who were parents of the sacred chiefess Mākoleʻā. Mākoleʻā was found to be the

most suitable chiefess for Kepakaʻiliʻula, and a wedding was arranged. When the uncles departed, Keolonāhihi was approached by Kaikipaʻananea, a chief from Maui, and he broke the betrothal between Kepakaʻiliʻula and Mākoleʻā. This action set in motion the events of the legend's narratives. By association with other figures identified in the legend, the time period seems to be set in the 16th century, immediately before the time of Lono-i-ka-Makahiki.
[Malo 1919-1920 in Maly 1997:24-25]

The relevancy of this kaʻao in regards to a study whose focus is Kona, lies in the recollection of the numerous place names, natural features, and practices of Hawaiʻi that are revealed in the telling of this story. As detailed in the summary above, Kepakaʻiliʻula's uncle, Kiʻihele went in search for a suitable wahine for his nephew. Traveling through Hilo, Puna, and Kaʻū, he eventually arrived in Kona and was taken aback by the beauty of Mākoleʻā, the young aliʻi wahine (chiefess) of Kona. Thus, Kiʻihele returned to Hilo to retrieve Kiʻinoho and their nephew, Kepakaʻiliʻula so that he could take Mākoleʻā as his wahine. Maly provides a summary Kepakaʻiliʻula's journey and the moʻolelo that unfolds:

Once in Kona, Kepakaʻiliʻula waited in the uplands of Kahaluʻu at the great banana plantation of the chief Kahoʻoaliʻi, which extended from Kaumalumalu-Kāpalaʻalaea to Keʻei, while preparations were made for his meeting with Mākoleʻā. When all things were made ready, Kepakaʻiliʻula and his guardians descended to the shore of Kahaluʻu, where they stood not far from the royal house of Mākoleʻā.

Standing before them was the priest of Kahaluʻu who was named Hāliʻikolomea. Through the priest's divining skills he had seen the true dual nature of Kepakaʻiliʻula, and understood that he was descended from the aliʻi-akua of antiquity. Hāliʻikolomea presented offerings to Kepakaʻiliʻula, and when the observances were completed, Kepakaʻiliʻula responded with a mele kānaenae (chant offering) to Mākoleʻā and those gathered with her:

Kau iluna ka wai a ka Nāulu
ʻAlohi ʻula i ka pali o Koholālele e
Lehulehu i ka luna o Koaʻekea a
Paʻa pono mai Kona i ka ehu a ke kai a
Kīpū lua i ke one o Kaiakeakua
He akua ka hoa he ʻike ʻole mai e
ʻAuwe ka mea aloha oia la e hoʻi a!

The Nāulu showers which are placed above
Appear to glow red in the light on the cliff of Koholālele
Indeed, the multitudes are gathered at the heights of Koaʻekea
But Kona is firmly embraced by the sea mists
And there is two-fold calm upon the shore of Kaiakeakua
A god [-chief] is the companion which is not seen
But here is one that can indeed be cherished!

Hāliʻikolomea then called Kepakaʻiliʻula within the compound telling him that he was indeed welcome to know the famous waters of Kahaluʻu. Because Mākoleʻā desired to be near Kepakaʻiliʻula, she beckoned him to join her upon her sacred platform (nuʻu kapu) calling to him with her own chant of affection…

> All things having been fulfilled, the chiefess Kahaluʻu could not deny the value of this relationship, thus Kahaluʻu the chiefess—i ka ʻāina kaulana i ka wai puka iki o Helani (of the land famous for the small flowing spring of Helani) gave her blessings to Mākoleʻā and Kepakaʻiliʻula… (June 19-26, 1919).
>
> Unknown to Kahaluʻu, Mākoleʻā and the others, Keolonāhihi had broken his agreement allowing Mākoleʻā to marry Kepakaʻiliʻula, and had instead promised to take the young chiefess to Maui nui a Kama (Maui great island of the chief Kama) where she would wed the high chief Kaikipaʻananea (Kaiki). Having prepared the canoes, Keolonāhihi forced Kahaluʻu and Mākoleʻā to travel to Maui.
>
> This turn of events greatly angered Kepakaʻiliʻula and he challenged Keolonāhihi to a fight. Frightened, Keolonāhihi fled to Maui as well, thus Keolonāhihi left behind those he loved and his favorite places. Among the favorite places of the Kona chiefs was the spring of Wai-kuʻi at Kahaluʻu, where the aliʻi gathered to relax and play the game of kōnane (July 3-17, 1919).
> [Malo 1919-1920 in Maly 1997:25-26]

Revealed in this section of Kepakaʻiliʻiula's story are a number of water resources and agricultural features associated with Kona. Kepakaʻiliʻula is said to have waited in the **uplands of Kahaluʻu** where a great **plantation of bananas** is located. This cultivated area of banana is noted to belong to the aliʻi, Kahoʻoaliʻi and stretches from **Kaumalumalu-Kāpalaʻalaea to Keʻei** (Malo 1919-1920 in Maly 1997:25). When Kepakaʻiliʻula meets the beauty of Mākoleʻā, he offers a chant whose first lines recite: *Kau iluna ka wai a ka Nāulu*, (Malo 1919-1920). The opening of this chant translates to, *The Nāulu showers which are placed above*, poetically identifying the **Nāulu rain** as the rain of the area and the source of water placed above. Mākoleʻā's mother, Kahaluʻu gives the approval to Kepakaʻiliʻula to take her daughter as his wife. The author of this moʻolelo references Kahaluʻu as, "i ka ʻāina kaulana i ka wai puka iki o Helani," which Maly translates as, "of the land famous for the small flowing spring of Helani;" thus revealing a **spring associated with Helani and the ʻāina of Kahaluʻu** (Malo 1919-1920 in Maly 1997:26). When Mākoleʻā's father, Keolonāhihi, is challenged by Kepakaʻiliʻula for having broken his promise to wed his daughter to him, the author writes that Keolonāhihi flees Kona leaving behind a favored **spring named Waikuʻi located at Kahaluʻu**. This spring was favored by the chiefs of Kona and was also the area aliʻi took pleasure in relaxing and playing **kōnane** (ancient game resembling checkers), (Malo 1919-1920 in Maly 1997:26)

The valuable information that is gathered from this portion of Kepakaʻiliʻula's moʻolelo is the acknowledgement of two named springs associated with the Kahaluʻu ahupuaʻa–one of which is noted to be favored by the chiefs of Kona; the Nāulu rainfall of Kahaluʻu; great cultivated areas of bananas located in the uplands of Kahaluʻu which also holds chiefly associations having belonged to the aliʻi, Kahoʻoaliʻi; as well as the acknowledgement of aliʻi passing time by playing kōnane.

Though much has been revealed of Kona, and specifically of the Kahaluʻu Ahupuaʻa in but a small chapter of Kepakaʻiliʻula's tale, the moʻolelo continues. Maly summarizes the events that unfold after Keolonāhihi is challenged by Kepakaʻiliʻula:

> Because many of the aliʻi of Kona were related to Kahaluʻu, Keolonāhihi, and Mākoleʻā, they rallied to challenge Kepakaʻiliʻula in battle. These chiefs included Kahoʻoaliʻi (k) who controlled the upland plantation called Kaumalumalu which extended from Kaumalumalu-Kāpalaʻalaea to Kaʻawaloa and Kealakekua, Kuapehu (k), Kāināliu (k), Hōlualoa (k), Onouli-ākea (k), Hōkūkano (k), and

Kailua (k). When the chief Hōlualoa took up the challenge against Kepakaʻiliʻula on behalf of the Kona chiefs, Hōlualoa called upon his god **Kālaipāhoa** to assist him in his battle. Hōlualoa was the first chief to call upon the god Kālaipāhoa, and this was the beginning of this gods' use by the chiefs of Hawaiʻi. All of the chiefs were related, and all associated with the lands which now bear their names.

Calling upon his god **Kāʻili**, Kepakaʻiliʻula defeated each of the chiefs in battle, and came to control all of Kona from Kekaha wai ʻole in the north, to Keʻei in the south. At this time the land was greatly populated, and because Kepakaʻiliʻula was found to be a just chief, the people of the land were satisfied with his benevolence, and they accepted him as the aliʻi ʻai moku (chief who consumes - controls the district). Following the people's acceptance of Kepakaʻiliʻula as their chief, tribute from all Kona was presented to Kepakaʻiliʻula. All of the offerings of the wealth of the land were gathered at one site and presented to Kepakaʻiliʻula. The mound of offerings was so great that it looked as if a hill had been formed. To this day, the site where the offerings were gathered is called Puʻu which is above the place named for Keolonāhihi.

Kepakaʻiliʻula divided the wealth, offering the first portion to his god, he then provided a portion to the families of his trusted supporters, and returned the rest to the people of the land. To Kepakaʻiliʻula is attributed the saying:

> ʻO ke aliʻi mālama kānaka a hoʻomanaʻo mau i ka mōhai i nā akua, ʻoia ana no ke aliʻi e kū i ka moku — The chief who cares for his people and remembers to pay tribute to his gods, is the chief who will stand upon [be supported by] the island (July 24-November 13, 1919).

...Seeing that there was peace in Kona, Kepakaʻiliʻula then departed from the lands of the Kahaluʻu area... Kepakaʻiliʻula traveled to Kohala to test the Chief Kukuipahu, Mākoleʻā's uncle. Kukuipahu was a just chief, who saw that Keolonāhihi had acted inappropriately, and Kukuipahu joined Kepakaʻiliʻula in mounting an attack on Maui.

Kukuipahu went to the compound of Kaikipaʻananea at Olowalu, Maui and told Mākoleʻā about the events that had occurred on Hawaiʻi, and informed her of her father's treachery, and told her that Kepakaʻiliʻula still desired her as his wife (November 20, 1919).

Upon hearing these things from her uncle Kukuipahu, Mākoleʻā chanted to him asking that he would give her message to Kepakaʻiliʻula. In the chant she spoke of the beauty of Helani at Kahaluʻu and the pleasant time which she had spent with Kepakaʻiliʻula:

> Kuʻu hoa o ka malu niu o Helani
> E hea puaʻi nei iaʻu e hoʻi aku wau
> Kuʻu hoa i ka peʻa huli luna e Kona e
> He ʻEka ka makani o kāua e ʻolu ai...
>
> *My companion sheltered there by the coconut palms of Helani*
> *My call flows forth to you, I will return*

You are my companion of the upper reaches of Kona
Where the ʻEka breezes refresh us two…

While Kukuipahu was on Maui, Kiʻihele journeyed to Hilo and revealed Kepakaʻiliʻula's identity to his parents Makaokū and Hina, who joined him, along with over 30,000 warriors of Hawaiʻi, in the quest of reclaiming Mākoleʻā (November 27, 1919–February 26, 1920).

When the battle preparations were completed, the canoe fleet set sail, and it stretched from Kohala, Hawaiʻi to Kahikinui, Maui. Landing at Puʻunoa, final battle preparations were made, and the people of Lānaʻi and Molokaʻi joined together in supporting Kepakaʻiliʻula against Kaikipaʻananea, as well (March 4, 1920). The battle took place upon the kahua (battle field) of Waineʻe, a short distance above the Waineʻe Church. It was there that Kaikipaʻananea was killed by Kepakaʻiliʻula, and Keolonāhihi was killed by Makaokū. So it was in this way that Mākoleʻā the beautiful chiefess of Kahaluʻu came to marry Kepakaʻiliʻula (March 11-April 1, 1920).

As a result of the battle on Maui, Kahaluʻu was killed, and Kepakaʻiliʻula and Mākoleʻā were reunited. Kepakaʻiliʻula mā lived in Lāhaina for one year, and then Kepakaʻiliʻula desired to visit Oʻahu, Kauaʻi, Niʻihau, and journey on to Kahiki, the land of his ancestors. Following numerous events, Kepakaʻiliʻula returned to Hawaiʻi and with Mākoleʻā, he settled in his compound which was a short distance from the heiau of Pākaʻalana at Waipiʻo. Thus they lived out the rest of their lives in peace (April 8-December 9, 1920).
[Malo 1919-1920 in Maly 1997:#27]

The moʻolelo of Kepakaʻiliʻula ends happily with him and Mākoleʻā finally being able to live their lives out together. During the portion of the story where Mākoleʻā chants out to Kepakaʻiliʻula, she describes several significant resources specific to Kahaluʻu. The first line of her chant recites: *Kuʻu hoa o ka malu niu o Helani*, which Maly translates as, *My companion sheltered there by the coconut palms of Helani* (Malo 1919-1920 in Maly 1997:27). Mākoleʻā ends her chant with the line, *He ʻEka ka makani o kāua e ʻolu ai…*, translated by Maly as, *Where the ʻEka breezes refresh us two…* (Malo 1919-1920 in Maly 1997:27). What is conveyed in Mākoleʻā's chant to Kepakaʻiliʻula is the imagery of the natural resources and elements associated with Kahaluʻu, Kona. A **niu (coconut or *Cocos nucifera*) grove** associated with Helani is described, as well as the **ʻEka wind** known affectionately for belonging to Kona. It is significant to note that the Helani that is identified here with the niu grove was mentioned previously in the description of the spring in Kahaluʻu, "i ka ʻāina kaulana i ka wai puka iki o Helani," (Malo 1919-1920 in Maly 1997:26). Lastly, note the constant travel that is ongoing in this moʻolelo, which indicates there was voyaging between islands and across the sea to Kahiki at this time. In later sections we describe connections between the uplands of Kona, in the study area, and the koa trees prized for kaʻele (canoe hulls).

Puʻu o Kaloa

From 1923 through 1924 an article series entitled "Na Hoonanea o ka Manawa," meaning, "Pleasurable Pastimes," was published in the Hawaiian language newspaper, *Ka Hoku o Hawaii*. The series was written by Isaac W. H. Kihe, a kupa of Kona, who wrote to the newspaper under the pen name "Ka Ohu Haʻaheo i na Kuahiwi Ekolu" (The Proud Mist of the Three Mountains). "Na Hoonanea o ka Manawa" celebrates the many storied places and traditions of Kona. One of the moʻolelo included in this series concerns a certain puʻu or hill and the clouds patterns that the

people of Kona observed as an indicator of rain. This landmark known as Puʻu o Kaloa, is a significant feature of this region.

Kihe's segment regarding Puʻu o Kaloa was printed in the newspaper in September of 1923. The section below shares the moʻolelo as it was printed in its original Hawaiian text, followed by an English translation interpreted by Hawaiian language translators and scholars of the Institute of Hawaiian Language Research and Translation, Emmanuel Kilikia Bennett and Puakea Nogelmeier. Regarding Puʻu o Kaloa, Kihe writes:

> He wahi puu keia aia mawaena o Kealakehe a me Keahuolu, e kokoke ana i ke puhi a Kahikini i kahakai. O ka moolelo o keia wahi puu.
>
> I ka wa kahiko, oiai, ua maloo a papaala ka aina mai o a o aohe ua, ua neeia e ka La a pikaʻo aohe wai o na punawai.
>
> Maloo na huli kalo, kalina uala maloo, aohe mea kanu ulu. Aia i kekahi manawa, e ike ia aku ana he kilihune ua e koʻiaweawe iho ana iluna pono o ua wahi puu nei.
>
> Ae o ka poe mahiai i noho a kamaaina, a ike lakou i kela wahi hoailona ua lu iho ana iluna o ua wahi puu nei o Puu o Kaloa, oiai no ka la nee ana. Olelo ae la lakou, akahi a ola ka aina, ke hehi mai la na manamana o ka ua iluna o Puu o Kaloa. [Kihe 1923:2]
>
> *This is a small hill between Kealakehe and Keahuolū near the blowhole of Kahikini on the shore. The story of this little hill.*
>
> *In ancient times, there were times that the land was dry and parched everywhere, lacking rain, traversed by the sun, with no water in the springs.*
>
> *The taro cuttings dried, so did the slips of sweet potato, and no plant grew. Sometimes light drizzle could be seen moving directly above that hill.*
>
> *The resident farmers there, when they saw this sign of rain over this hill of Puʻuokaloa, even though the sun was still moving along, would say, "The land shall finally prosper, for the fingers of rain tread over Puʻuokaloa."* [Translated by Bennet and Nogelmeier 2017]

The account relays that though the lands of Kona were dry, when clouds could be seen carrying a light drizzle over Puʻuokaloa, the people knew that rain would come and the land would flourish. This puʻu rests between **Kealakehe** and **Keahuolū** and is an **indicator of rain** for those of Kona. Anticipating the coming of rain, kamaʻāina of the area readied their lands to take advantage of this precious resource. Kihe continues to write:

> Ke ike ia keia hoailona e na poe kahiko, o ka hoomaka no ia e puhi makawela, a pau waiho, a huli kahi e loaa ai ka lau uala.
>
> Nana aku o ka ike hou ia o ka hoailona ua, a ina e ike hou alaila, makakau e kanu meia nui no o ka la, aohe maopopo o ka ua.
>
> I ke kanu ana a paa ka makawela (mala i puhi la i ke ahi) i ka lau, alaila ike hou ia ka ua iluna o Puu o Kaloa, a oia ka wa e ike ia ai ka ua e kaʻi lalani ana ma ke kula,

a ike na poe e no i keia ka'i hele o ka ua ma ke kula, hoomaka e waele ke pulu a kali aku la o ka ua mai alaila kanu aku la ka lau uala.

O ka mea nana ka maka wela mua loa i kinohi, ua kapuapua kana lau, a ke olohio ala, a ke apoapo mai la a pau i ka pue.

Haule hou i ke kuaua o ka hu noia o ka lau a pau i ka wili a moku mai la ka naaupua, oia ka lala, (oia ka uala e kaka ana i ke ka o ka lau i moku mai i ka pue ana, a oi a uala ke kahukahu mua).
[Kihe 1923:2]

When this sign was seen by the people of old, they would immediately go and scorch the land, and once finished, leave it and search for a place to get sweet potato vines.

They would watch to see the sign of rain again, and if it was seen, then they would prepare to plant, even though the sun still beat down, with no visible sign of rain.

When the patch burned for cultivation was sowed with the sweet potato slips, the rain could be seen again atop Puʻuokaloa. It is at that time that the rain could be seen proceeding in a line along the plains, and when others saw the procession of clouds, they would begin to clear the mulch and wait for the rain, and whereupon they would plant the sweet potato slips.

For the one who first scorched the land at the outset, his sweet potato slips would have flourished, and he would be cultivating them, and hilling them all into mounds.

When the showers fell again, the slips would all rise to the surface, and the naʻaupua would become twisted and severed, that being the branch. (This is the sweet potato clustered on the vine of the slip severed in the hilling of the mound, and this sweet potato would be the first offering of the season).
[Translated by Bennet and Nogelmeier 2017]

The natives of Kona were attentive to the natural cycles and seasons of their environment. The cloud movement over Puʻu o Kaloa was an indicator of rain, so thus, began the preparations of the ʻuala patches. Specifically, the moʻolelo describes a **makawela style of ʻuala cultivation** which Pukui describes is a method of land cultivation that involves slashing and burning the cultivated area (Pukui and Elbert 1986:228).

Hala ae la elua a ekolu malama hoomaka mai la ka ua mai o a o o ka aina, a o ka mea mua loa hana ka makawela i kanu mua o ua puunui kana uala, a ke uhai aia ka uala a kalua i ka imu me ka puaa.

A ike aku la ka mea nohoaihalale a hele aku la malaila e noho ai e ake o ka loaa mai o ka uala, a manao ke ola o ka la pololi.

Oiai e huai ana ka inu uala, a ohi aku mahai o ka imu, a ike i ikeai ai halale e noho ana, a ninau mai la i keia nimau; "Ua ka na i Puu o Kaloa ihea oe?" A ina e pane aku, I Kona nei no au, alaila aole e loaa ka uala iaia. Ina hoi e pane aku, I Kohala au, ai ole i Kau paha, alaila e loaa ana ka uala iaia.

No keia wahi Puu kela olelo kaulana o ka paanaau o ka poina ole a hiki i keia la, “Ua ka ua i Puu o Kaloa–I hea oe?” I Kohala au-loaa ka uala. I Kona nei no au-aole loaa ka uala.

Ua hala keia poe kahiko, ko kakou mau kupuna i ka po, a eia no keia wahi puu ke ku nei no he kiahoomanao poina ole no na manao e ola ana i keia la.

He hoailona olalo loa no kela a ke ike ia nei no ia hoailona, a ke ike ia no i ka wa la keia wahi ua kamahao a kupanaha alaila, he hoike maopopo loa ia o ka ua e hoea mai ana.

Ina he wa papaala ia o ka aina a ike ia keia wahi hoailina ua ilina o keia wahi hoailoa ua iluna o keia wahi puu kuanea hoomaopopo ole ia aia he mea ano nui loa ke hoea mai ana. Aole i Pau.
[Kihe 1923:2]

After the passing of two or three months, that rain would begin to fall all over the land, so that first person who had the burned patch and who planted first, his sweet potato would have grown large and the sweet potato would be carried off to be cooked in the oven with pork.

Gluttons would see and go to stay there, wanting to get some sweet potato, hoping to satisfy their hunger.

As the underground oven was uncovered and collected near the underground oven, and the glutton was seen sitting, the question would be asked “The rain fell atop Puʻuokaloa, where were you?” And if the answer was [“]I was here in Kona[”] then he would not get any sweet potato. If he were to say [“]I was in Kohala” or perhaps “Kaʻū[”], then he would get sweet potato.

For that hill was this famous memorized saying unforgotten until this day, “The rain fell at Puʻuokaloa–Where were you?” [“]I was in Kohala[”]–one would receive sweet potato. [“]I was in Kona[”]–one would not get sweet potato.

Those people of old, our ancestors, have passed over into the night, and here the hill still stands as an unforgettable memorial for the descendants living today.

That is a very real sign, and is still being seen. When this strange and remarkable rain is seen during the day, it is a clear sign of coming rain.

If it is a parched period of the land and this symbol is seen atop this desolate hill, you never know, there may be something big coming your way. To be continued.
[Translated by Bennet and Nogelmeier 2017]

This account informs its readers that after two to three months of the initial rainfall, those who prepared and cultivated their lands first would have yielded ʻuala ready to be harvested and cooked in the imu (underground oven). Understanding the biocultural indicators such as the cloud patterns above Puʻu o Kaloa and dedicating the effort to make the necessary preparations in order to take advantage of the window of rain, paid off greatly with prosperous lands and large yields.

Ke Puhi a Kaleikini

Similar to the moʻolelo shared above, "Ke Puhi a Kaleikini," is a story that appeared in the article series "Na Hoonanea o ka Manawa" regarding Kona that was written by Kihe. This particular story was published in *Ka Hoku o Hawaii* in 1923 and describes a blowhole named Hiʻiaka-noho-lae. In Place Names of Hawaiʻi, Pukui, Elbert and Mookini describe the location of Hiʻiaka-noho-lae to be situated in the ahupuaʻa of Keahuolū "between Kona Inn and the end of the wall at Kailua Village, Kona, Hawaiʻi," (Pukui et al: 1974:45). They interpret the literal translation of this site as, "Hiʻiaka living [at] point," and also remarks that "One of Pele's Hiʻiaka sisters lived here. In one legend the stone is the shark form of a priest turned to stone in response to an enemy's prayer to Pele," (Pukui et al: 1974:45). Regarding the blowhole Hiʻiaka-noho-lae, Kihe shares a story which includes an individual named Kaleikini. The moʻolelo as found in Ka Hoku o Hawaii is as follows:

> Aia keia Puhi ma ma kahi i kapaia o Hiiaka-Noho-Lae. Ka moolelo o keia "Puhi."
>
> I ka wa kahiko ke puhi keia "Puhi," pu-ko ke kai a pii iluna o ka lewa a o ke ohu kai aoia puhi ana uhi aku la iluna o ka aina a maloo na mea kanu o uka o ke kula a hiki i kaluulu.
>
> I ka wa o Kaleikini i kaahele ai a ike i keia Puhi e pii ana ke kai iluna oia kona wa i kii ai e pani i ke kauila, a oia paa a hiki i keia la, aohe hiki hou i ke ehu kai ke hoomaloo hou ma mea kanu o uka.
>
> He aiwawao Kaleikini, na olelo ia he ikaika papalua ko keia kanaka a he ano kupua hoi, he nui na "Puhi" ana i pani ai, a ke waiho nei ia Puhi a hiki i keia la, he mau kia hoomanao poina ole no na hana aiwaiwa pookela a ku i ka hookala kupua a kela kupueu o na la i hala o Hawaii nei, a keia hanauna hou e nana aku nei me ka paha'oha'o no keia mau hana, me he kaao aia no kekahi kupua.
> [Kihe 1923:2]

Presented below is an English translation of the account interpreted by The Institute of Hawaiian Language Research Team of ʻIke Wai.

> *This blowhole is located at a place called Hiʻiakanoholae. This story of this blowhole.*
>
> *In ancient times, when this "blowhole" would blow, the sea would crash and the sea spray would rise up into the air, then that spray would cover the land until the plants on the field all the way up to the brush line dried out.*
>
> *When Kaleikini traveled, and saw this blowhole, with the sea spray rising up, that is when he fetched and laid a grid of kauila tree branches over the hole, completely shutting it. It remains shut until this day; the sea spray could no longer dry out the vegetation on shore.*
>
> *Kaleikini was mysterious, and it was said that he also had supernatural strength, and was a supernatural being. There are several blowholes that he shut and that remain until this day; unforgettable monuments of outstandingly wonderful and magical feats of this hero of Hawaiʻi's past; monuments for this new generation to look to with wonder because of these feats like a heroic tale.*

[translated by The Institute of Hawaiian Language Research Team,ʻIke Wai]

As the story recalls, Hiʻiakanoholae is the blowhole that is located in the ahupuaʻa of **Keahuolū**. The ʻehukai or sea spray that the blowhole would shoot was problematic for the fact that the salt of the spray that blew over the ʻāina caused the land to dry so that no vegetation could grow. In order to solve this problem, the author shares that Kaleikini covers the Hiʻiakanoholae with kauila tree branches. In regards to the type of resources known of this area, from this account we learn that the native **kauila (*Alphitonia ponderosa*)** tree was present at Keahuolū.

Kaʻao Hoʻoniua Puʻuwai no Ka-Miki

Another celebrated moʻolelo that has been preserved and documented in the Hawaiian language newspaper is the epic saga, "Kaʻao Hoʻoniua Puʻuwai no Ka-Miki," (The Heart Stirring Story of Ka-Miki). This moʻolelo was published serially in *Ka Hoku o Hawaii* beginning in 1914. The saga ran for four years ending its final publication in 1917. The primary authors noted to have contributed to the publication of this moʻolelo are Hawaiian historians John Wise and J.W.H.I. Kihe. The story of Ka-Miki takes place in the 1300s at the time when the aliʻi, Pili-a-Kaʻaiea, was the district chief of Kona (Maly 1997:10). Maly, who is credited for his synopsis of Ka-Miki summarizes the moʻolelo:

> This legend is an account of two supernatural brothers, Ka-Miki (The quick, or adept, one) and Maka-ʻiole (Rat [squinting] eyes], who traveled around the island of Hawaiʻi along the ancient ala loa and ala hele (trails and paths) that encircled the island. During their journey, the brothers Ka-Miki and Maka-ʻiole competed alongside the trails they traveled, and in famed kahua (contest arenas) and royal courts, against ʻōlohe (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 Hawaiʻi. Ka-Miki and Maka-ʻiole 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 reincarnate form of the goddess Haumea (the creative force of nature; also called Papa or Hina; who was also a goddess of priests and competitors).
> [Maly 1997:10]

Included in this section are Maly's translated summary of select excerpts of "Kaʻao Hoʻoniua Puʻuwai no Ka-Miki" in which he paraphrases the important events that occurred during Ka Miki's journey. The story begins with the birth of Ka-Miki:

> Born in ʻeʻepa (mysterious – premature) forms, Ka-Miki and Maka-ʻiole were the children of Pōhaku-o-Kāne (k) and Kapaʻihilani (w), the aliʻi of the lands of Kohana-iki and Kaloko. Maka-ʻiole was the first born child and Ka-Miki was the second. Following their birth, Ka-Miki was given up for dead and placed in the cave of Pōnahanaha. Ka-uluhe retrieved Ka-Miki from the cave and reared him at Kalamaʻula on the heights of Hualālai. It was there that Ka-uluhe began instructing Ka-Miki in the uses of his supernatural powers, and when Maka-ʻiole joined his young brother, together, they learned various techniques of contest skills, in preparation for their journey around Hawaiʻi Island.
> [Maly 1997:12]

> After a period of training and tests, the brothers joined their ancestress in an ʻawa ceremony. When Ka-uluhe-nui-hihi-kolo-i-uka (Ka-uluhe) fell asleep, the brothers ventured from their residence at Kalamaʻula to visit some of the places of Kona. Their journey took them as far as the cliffs of Kealakekua, and upon returning to Kalamaʻula, Ka-uluhe inquired about what the brothers had seen. As they described the places visited, Ka-uluhe explained to the brothers the nature of the lands, features and people which they had seen.
> [Maly 1997:12]

> Departing from Kalamaʻula, Ka-Miki and Maka-ʻiole set out on their quest. The journey took the brothers first through the lands of Kona — O Kona i ka pohu nāʻū ke keiki e kāohi ala i ke kukuna o ka lā, O Kona ia (Kona in the calm where children take in their breath and then chant, claiming the rays of the sun as their own, Indeed it is Kona). Their path took them first to the kahua (contest site) at Ahuʻena in Lanihau, where the brothers met with Kauakāhiahāola one of the contest champions of Puapuaʻa...
> [Maly 1997:14]

Recounted in this segment of the moʻoleo is a kahua, translated by Maly as a "contest site." Maly described that the kahua is located at Ahuʻena, Lanihau and is referred to as a **kahua mokomoko leʻaleʻa** or contest and game. This field was known by the name **Hinakahua** and is located in the **Kahelo plains of Puapuaʻa Ahupuaʻa** (Maly 1999:10). In the moʻolelo of Ka-Miki, Kauakahiakahaola is identified as the champion of Puapuaʻa and Keiki-puʻi-puʻi is noted as the champion of Kailua. Maly relays that the moʻoleo compares them to "*Ke kumu ʻulu-pū-loa o noe ʻokana ʻāina o Puapuaʻa*" (The well-formed, oval-fruited breadfruit of the lands of Puapuaʻa [said in praise of strength and handsome features]), (Maly 1999:12). These champions of Puapuaʻa and Kailua are memorialized in two heiau that bear their names. According to Maly, **Kauakahiakahaola heiau** is located in Puapuaʻa and Keiki-puʻi-puʻi rests in the boundary between Keōpū and Honuaʻula (Maly 1997:15). Ka-Miki challenged Kauakahiakahaola on the contest grounds in Puapuaʻa and quickly defeated him. From there, Ka-Miki and his brother journey onward to another kahua at Hōlualoa (Wise and Kihe 1914-1917 in Maly 1999:12).

In another chapter of this saga, Ka-Miki travels along the coast of Kona to a place called **Niumalu**. Regarding the location of this wahi, Maly notes that it is described as being situated in the ahupuaʻa of Puaʻa, (Maly 1997:22). It is also noted that there is a māla ʻuala, or a sweet potato garden that stretches between Niumalu and Puapuaʻa Ahupuaʻa (Wise and Kihe 1914-1917 in Maly 1999:12). This māla ʻuala is described as the place where the opponents of Ka-Miki go to recover and sleep after being defeated by the young boy (Wise and Kihe 1914-1917 in Maly 1999:12). Ka-Miki meets Pili-nui-kapu-kuʻi-a-ka-lani-kua-liholiho-i-ke-kapu ("Pili bound in great sacredness, the chief with the burning back *kapu*" — a restriction that forbade approaching the chief from behind, and which carried a penalty of death by fire), who was an aliʻi of this wahi. Referred to by the shortened name, Pili, this aliʻi enjoyed the games of competitions. The games played at this wahi were:

> The contests and events held at Hinakahua included *maika, mokomoko, leʻaleʻa, a me hoʻopāpā* (bowling or tripping stones, wrestling and boxing, pleasurable pastimes, and contests of wit and strength). It was while the chief and his *ʻōlohe* champions were at Hinakahua, that Ka-Miki presented himself to some of Pili's stewards, claiming the right to care for the chief's possessions and foods. Word of this claim was carried to Pili, who in-turn called his key counselors and champions to Niumalu discuss the claims made by Ka-Miki...

(April 5, 1917)
[Wise and Kihe 1914-1917 in Maly 1999:11]

Here in this account, specifics of the type of traditional games played at Hinakahua are described. The games associated with Hinakahua and therefore the broader **ahupuaʻa of Puapuaʻa** are **maika** (bowling), **mokomoko** (wrestling and boxing), **leʻaleʻa** (pleasurable pastimes), and **hoʻopāpā** (contest of wit and strength), (Maly 1999:11). When Ka-Miki arrived at Hinakahua and made the claim that he would come to care for the aliʻi's possessions, Pili, the aliʻi of the ʻāina questioned Ka-Miki as to why he thought himself able to boast such statements. Ka-Miki responded that it was the chief that said anyone who excelled in lua and possessed unmatched ʻōlohe skills would be able to gain the privileges to the favorite of the aliʻi. Being that Pili had no proof of Ka-Miki's skill, Pili instructed the Ka-Miki should compete and defeat all 150 of Pili's champions and secure the lū heʻe (octopus lure) from Lālāmilo. If Ka-Miki should succeed, Pili agreed to give Ka-Miki half of Kona and the privilege of being his favorite (Wise and Kihe 1914-1917 in Maly 1999:11-13). Accepting the challenge, Ka-Miki prepares for the contests by calling out to Ka-uluhe with a mele paha (spoken chant) to evoke her mana and be empowered by the gods (Wise and Kihe 1914-1917 in Maly 1999:13). The mele is offered:

E ala e Kaulu-i-ke-kihi-o-Kamalama	*Arise o Kaulu – [star] point of light [knowledge] of Kamalama*
E ala e kīkoʻokoʻo ka lani	*Arise expanse of the heavens*
E ala e kīkoʻokoʻo ka honua	*Arise expanse of the earth*
E ala e kīkoʻokoʻo ka mauna	*Arise expanse of the mountain*
E ala e kīkoʻokoʻo ka moana...	*Arise expanse of the ocean...*

[Wise and Kihei 1914-1917 in Maly 1999:13]

No competitor could match the skill of Ka-Miki. Every champion Ka-Miki faced was defeated. Following through with their arrangements, Ka-Miki was named the favorite of Pili and given the power of the kingdom of Kona (Wise and Kihe 1914-1917 in Maly 1999:13). Ka-Miki ordered Pili's **ʻeleʻele** or messengers to spread the word of his victories to Kalamaʻula (Wise and Kihe 1914-1917 in Maly 1999:13). Pili sent other messengers throughout all the districts of Kona to inform the people and chiefs that Ka-Miki possessed the rights of the aliʻi over these lands(Wise and Kihe 1914-1917 in Maly 1999:13).

Having won the competitions, Ka-Miki also won the lūheʻe of Lālāmilo which he presented to Pili. Regarding the lū heʻe, Maly summarizes this section of the moʻolelo:

> Now this leho (octopus lure) was a favorite of Pili's, and filled his eyes with pleasure. Pili's canoes were prepared to go octopus fishing – lawaiʻa lūheʻe as Pili wanted to see how the lure worked. The lure was made by securing the kākala (hook), and a sinker stone (ʻōahi) near the cowrie (on a wooden shaft) with three ply olonā (Touchardia latifolia) rope. When Pili mā arrived at the octopus fishing site, he removed the lure from a gourd container and set it in the water. The chief and all those with him were startled to see unlimited numbers of heʻe (octopus) rise up to the lure, and even lobsters were attached to some of the octopus (July 26, 1917)...
> [Wise and Kihe 1914-1917 in Maly 1997:22]
>
> As the lure was drawn up to the canoe, the heʻe followed it right into the canoe, and the moment the lure was covered, the heʻe stopped rising to the canoe. Pili returned to the shore of Niumalu at Oneō, and had the heʻe divided among all of the people.

> So the fame of the lure went about the island and many chiefs, fishermen, and people traveled to see the lure as well. It was in this way that Lālāmilo learned his lure was in Kona (August 2, 1917)...
> [Wise and Kihe 1914-1917 in Maly 1997:22]

Relayed in this excerpt is information regarding waʻa off shore **fishing practices** that occurred in Puaʻa, Kona. Specifically, it is recounted that the lūheʻe method for gathering octopus was used at the shore of Niumalu at a place called Oneō (Wise and Kihe 1914-1917 in Maly 1997:22), which was near a known heʻe spot, that was also rich in lobster.

Regarding the **Waiʻaha and Kahului Ahupuaʻa** of Kona, Maly shares an excerpt from the moʻolelo of Ka-Miki that describes **Waiʻaha stream**, one of only two perennially flowing surface streams in Kona, which connects the two ahupuaʻa which is said to feed **puʻepuʻe**, a mounded style of upland farming, indicating kalo cultivation to have occurred in this area. The excerpt also recounts that a paved spring named Wai-a-Kekea is located in the same area. The account as translated by Maly reads:

> ...the stream of Waiʻaha joins with the lands of Kahului. The waters filled the upland taro mounds of the sacred prostration chiefs Kaleiʻeha, Kapahu (or Kapahu-a-Loʻi), and Kaʻalaea, who possessed the kapu (restrictions) of Lono-Makahiki... There too, you see — ka luawai ua kīpapa ʻia i ka pōhaku ʻalā e ulu pōhai ʻia e nā lāʻau loulu, o ka punawai i ka oʻioʻina pali o Waiakekea — a spring paved with dense [ʻalā] stones and surrounded by loulu palms, this is the spring of Wai-a-Kekea, which was near the trail side resting place... (IN Ka Hōkū o Hawaiʻi, April 9, 1914; Maly translator)
> [Wise and Kihe 1914-1917 in Maly 1998:3]

Another one of the study areas that is highlighted in the moʻolelo of Ka-Miki concerns the ahupuaʻa of Keahuolū. The hill, Puʻu o Kaloa is a significant feature recorded as a puʻu of Keahuolū and Kealakehe. A summary of this segment of Ka-Miki regarding Keahuolū and Puʻu o Kaloa was translated by Maly as follows:

> Ka-noenoe (The mist, fogginess) The mound-hill called Puʻu-o-Kaloa sits upon the plain of Kanoenoe which is associated with both Keahuolu and Kealakehe. The settling of mists upon Puʻu-o-Kaloa was a sign of pending rains; thus the traditional farmers of this area would prepare their fields. This plain was referenced by Pili when he described to Ka-Miki the extent of the lands which Ka-Miki would oversee upon marrying the sacred chiefess Paehala of Honokōhau. The inheritance lands included everything from the uplands of Hikuhia above Nāpuʻu and the lands of the waterless Kekaha, which spanned from the rocky plain of Kanikū (Keahualono) to the plain of Kanoenoe at Puʻukaloa (Ka Hoku o Hawaiʻi 10/25/1917, as translated by Maly 1994:A-4).
> [Wise and Kihe 1914-1917 in Simonson 2010:8]

Echoing the previous account examined by Kihe in the article “Na Hoonanea o ka Manawa,” Puʻu o Kaloa is also described in the moʻolelo of Ka-Miki as being a landmark telling of signs of rain.

ʻŌlelo Noʻeau - Hawaiian Proverbs and Poetical Sayings

ʻŌlelo noʻeau or Hawaiian proverbs and poetical sayings are valuable in perpetuating Hawaiian cultural knowledge, presenting kaona (concealed reference), and illustrating creative expressions that incorporate observational knowledge with educational values, history, and humor. They can be reflected upon to inform an individual of the conditions or characteristics of a place, group of people, common sentiments of an era, or event in history. They can be looked towards to glean insight on the peculiarities of a given landscape or the behavior of people in general or specifically, and oftentimes provide guidance in understanding the wisdom and warnings left to us by those of the past. Today, ʻōlelo noʻeau serve as a traditional source to learn about people, places, and the environment of Hawaiʻi. As one of the many celebrated works penned by Pukui during her time, the 1983 publication of *ʻŌlelo Noʻeau: Hawaiian Proverbs and Poetical Sayings*, is one of which holds no end in its relevance and richness as it relates to an epistemological worldview that is Hawaiian.

Listed in this section are ʻōlelo noʻeau gathered from Pukui's collection of traditional sayings that reference the cultural practices, resources, and traditions related to the study areas located in the Kona Moku of Hawaiʻi. Particular emphasis is placed upon traditional sayings related to water resources associated with the study areas and vicinity. Additionally, the ʻōlelo noʻeau offered here serve to illuminate insight on various places, winds, rains, famed aliʻi, akua, and other moʻolelo and characteristics particular to the study areas and vicinity that have been preserved in the poetics of these traditional sayings.

Though the focus of this study is centralized to arrive at a deepened understanding of Kealakehe, Keahuolū, Puaʻa, Waiʻaha, Kahului, Puapuaʻa, and Keauhou Ahupuaʻa, this section of the report also offers a compilation of ʻōlelo noʻeau that pertains to the larger geographical region of Kona, Hawaiʻi. Though these set of ʻōlelo noʻeau may not always speak directly to the study area ahupuaʻa, they have been selected as relevant to the holistic understanding of the cultural and environmental landscape as a whole. Inclusion of the broader Kona Moku is paramount to fully and properly grasp the significance of the study areas as it relates to the practices, resources, and traditions unique to the district. To analyze the cultural context of the study areas isolated from the cultural significance of the region it is situated upon and has coexisted within, disconnects the wealth of history embedded within the landscape. For these reasons, this section highlights ʻōlelo noʻeau that illuminate the practices, resources, and traditions of the study areas Kealakehe, Keahuolū, Puaʻa, Waiʻaha, Kahului, Puapuaʻa, and Keauhou Ahupuaʻa, as well as the broader Kona Moku of Hawaiʻi.

The following ʻōlelo noʻeau offers insight regarding water resources associated with the moku of Kona. Recounted in several ʻōlelo noʻeau, the presence and formation of **ʻōpua**, or "cumulus clouds," and **ao ʻōpiopio** or "young clouds," are environmental indicators unique to Kona relaying that rain is expected to occur in the area (Pukui 1983:9,27,2134; ʻŌlelo Noʻeau #55, #232, #2134). Another water resource associated with Kona acknowledges a thriving **coconut grove in an area named Helani** where water is retained by gathering and drinking from coconuts (Pukui 1983:179, #1661). Though not a part of the immediate study area, the saying "Kekaha wai ʻole o na Kona," characterizes the Kekaha Ahupuaʻa of Kona as a waterless place beloved by the natives of Kehaha, despite the lack of water (Pukui 1983:185:1716). These set of ʻōlelo noʻeau which describe the natural resources of wai and the cultural traditions surrounding it are listed below:

55 **Aia ka wai i ka maka o ka ʻōpua.**
Water is in the face of the ʻōpua clouds.

In Kona, when the ʻōpua clouds appear in the morning, it's a sign that rain is to be expected.
[Pukui 1983:9, #55]

232 **Ao ʻōpiopio.**
Young cloud.
A cloud that rises from sea level or close to the cloud banks and is as white as steam. When seen in Kona, Hawaiʻi, this is a sign of rain.
[Pukui 1983:27, #232]

1661 **Ka wai puka iki o Helani.**
The water of Helani that comes from a small opening.
Refers to Helani, Kona, Hawaiʻi. Here a coconut grove thrived, and from a small opening in the shell of the nut one could get water to drink.
[Pukui 1983:179, #1661]

1716 **Kekaha wai ʻole o na Kona.**
Waterless Kekaha of the Kona district.
Kekaha in Kona, Hawaiʻi, is known for its scarcity of water but is dearly loved by its inhabitants.
[Pukui 1983:185, #1716]

2134 **Māmā Kona i ka wai kau mai i ka maka o ka ʻōpua.**
Kona is lightened in having water in the face of the clouds.
Kona is relieved, knowing that there will be no drought, when the clouds promise rain.
[Pukui 1983:232, #2134]

2154 **Me he makamaka la ka ua no Kona, ke hele la a kipa i Hanakahi.**
The rain is like a friend from Kona–it goes and calls on Hanakahi.
These are two lines from an old chant used to express a friendly visit with one who dwells in a distant place.
[Pukui 1983:234-235, #2154]

The ʻōlelo noʻeau listed below identify two named winds of Kona; **Hau**, a wind belonging to Maʻihi and is described as a breeze that does not exceed beyond the boundaries of Kainaliu and **Keauhou**, and **ʻEka**, a particular wind associated with the moku of Kona whose presence is telling of **signs optimal for fishing**. These ʻōlelo noʻeau regarding the winds of Kona are as follows:

1303 **Ka Hau o Maʻihi.**
The Hau [breeze] of Maʻihi.
Refers to Maʻihi, Kona, Hawaiʻi. Because of this locality was named for Maʻihi-ala-kapu-o-Lono, daughter of the god Lono-a-ipu, this wind was regarded as sacred and did not blow beyond Kainaliu and Keauhou.
[Pukui 1983:142, #1303]

1467 **Ka makani kūkulu peʻa nui, he ʻEka.**
The ʻEka, the wind that sets up the big sails.
When the ʻEka wind blew in Kona, Hawaiʻi, the fishermen sailed out to the fishing grounds.

[Pukui 1983:159, #1467]

1690 **Ke ʻEka, makani hoʻolale waʻa o na Kona.**
The ʻEka breeze of Kona that calls to the canoe men to sally forth to fish.
Refers to Kona, Hawaiʻi.
[Pukui 1983:182, #1690]

Several ʻōlelo noʻeau commemorate the chiefly lineage of Kona and also offer a glimpse into the political climate that took place in the region. In particular, the sayings "Kona, kai malino a Ehu"– *"Kona land of the calm sea of Ehu,"* and "Na laʻi a Ehu"– *"The calm regions of Ehu,"* honors Ehunuikaimalino and Ehunuikaumanamana as aliʻi (chief) of Kona. Ehunuikaimalino is noted as the aliʻi of Kona who reigned during the time of Liloa (Pukui 1983:199, #1843). Ehunuikaumanamana was another named chief whose domain was Kona (Pukui 1983:246, #2248). The ʻōlelo noʻeau, "E pale lauʻī i ko akua ke hiki aku i Kona," which translates to "*Place a shield of ti leaves before your god when you arrive in Kona,"* shines light upon the political climate that stirred throughout the pae ʻāina (archipelago) when the push to abolish the kapu system and traditions of old Hawaiʻi was enacted in order to facilitate a transition towards Western belief systems (Pukui 1983:45, #370). The ʻōlelo noʻeau, "Keauhou i ka ʻihi kapu," which translates to *"Keauhou, where strict kapu were observed,"* is a phrase descriptive of the area of particular interest for this study that highlights the level of prestige and sacredness associated with this wahi as it is acknowledged as the residence of many high ranking chiefs and the birth place of Kauikeaouli, Kamehameha III (Pukui 1983:181, #1682).

253 **E akahele i ka mamo a I, o kolo mai ka mole uaua.**
Beware the descendants of I, lest the tough roots crawl forth.
A warning uttered by Palena, a chief of Kohala, who saw Kuaʻana-a-I cruelly treated by the chiefs of Kona. Kuaʻana later went to see the people of his mother, Hoʻoleialiʻi, in Hāna, and to help the chiefs of Hilo in fighting those of Kona.
[Pukui 1983:31, #253]

370 **E pale lauʻī i ko akua ke hiki aku i Kona.**
Place a shield of ti leaves before your god when you arrive in Kona.
A message sent by Kaʻahumanu to Liholiho requesting him to free the *kapu* of his god Kūkāʻilimoku. Kaʻahumanu was at that time striving to abolish the *kapu* system.
[Pukui 1983:45, #370]

1682 **Keauhou i ka ʻihi kapu.**
Keauhou, where strict kapu were observed.
Keauhou, Kona. This was the place where many of the highest chiefs resided and where Kamehameha III was born.
[Pukui 1983:181, #1682]

1843 **Kona, kai malino a Ehu.**
Kona, land of the calm sea of Ehu.
Ehunuikaimalino was a chief of Kona, Hawaiʻi, under the ruler Liloa.
[Pukui 1983:199, #1843]

2248 **Na laʻi a Ehu.**
The calm regions of Ehu.

The districts of Kona, Hawai‘i, where Ehunuikaumanamana once ruled. Also, an epithet for Kalākaua, taken from a name chant.
[Pukui 1983:246, #2248]

The ‘ōlelo no‘eau listed below describe natural features and boundaries related to the Kona Moku of Hawai‘i:

1519 **Ka ‘ōwili makani ‘ino o Kāwili.**
The stormy wind of Kāwili.
Kāwili is the current that comes from Kona and goes out to sea at Kalae, Ka‘ū.
[Pukui 1983:164, #1519]

1731 **Ke kai malino o Kona.**
The calm sea of Kona.
Refers to Kona, Hawai‘i.
[Pukui 1983:186, #1731]

1839 **Kona ‘ākau, mai Keahualono a Pu‘uohau.**
North Kona, from Keahualono to Pu‘uohau.
The boundary of North Kona, Hawai‘i.
[Pukui 1983:198, #1839]

1840 **Kona hema, mai Pu‘uohau a Kaheawai.**
South Kona from Pu‘uohau to Kaheawai.
The boundaries of South Kona.
[Pukui 1983:199, #1840]

1842 **Kona i ke kai mā‘oki‘oki.**
Kona of the sea that is cut up.
From a distance one can see the smooth surface of the sea at Kona, Hawai‘i, cut by innumerable streaks of color.
[Pukui 1983:199, #1842]

1844 **Kona, kai ‘ōpua i ka la‘i.**
Kona, where the horizon clouds rest in the calm.
[Pukui 1983:199, #1844]

1846 **Kona, mauna uliuli;**
Kona mauna ulupō.
Kona, of the green mountains;
Kona of the dense forest.
North and South Kona, Hawai‘i.
[Pukui 1983:199, #1846]

Other ‘ōlelo no‘eau offer insight into some of the cultural practices occurring in Kona. “Kona, po‘o ku‘i” which translates to *“Kona of the added head,”* cleverly articulates the farming practices that occurred in Kona by describing the imagery of a farmer carrying his/her load upon their shoulders (Pukui 1983:199, #1847). The other two ‘ōlelo no‘eau regarding the named winds of Kona (‘Ōlelo No‘eau #1467 and #1690), were shared previously in an earlier discussion; however, they are revisited here as pertinent to noting the cultural practices associated with Kona. As relayed in the

ʻōlelo noʻeau that describes the winds of Kona, the arrival of the ʻEka wind meant the mobilization of fishermen in Kona who readied their canoes and headed out to their fishing grounds (Pukui 1983:159,182). Recounted in the ʻōlelo noʻeau presented below are descriptions of the **farming and fishing practices** that are associated with the Kona Moku:

1847 **Kona, poʻo kuʻi.**
Kona of the added head.
Said of farmers of Kona, Hawaiʻi, returning from the fields with a load on the shoulders and a child sitting atop the load.
[Pukui 1983:199, #1847]

1467 **Ka makani kūkulu peʻa nui, he ʻEka.**
The ʻEka, the wind that sets up the big sails.
When the ʻEka wind blew in Kona, Hawaiʻi, the fishermen sailed out to the fishing grounds.
[Pukui 1983:159, #1467]

1690 **Ke ʻEka, makani hoʻolale waʻa o na Kona.**
The ʻEka breeze of Kona that calls to the canoemen to sally forth to fish.
Refers to Kona, Hawaiʻi.
[Pukui 1983:182, #1690]

The following ʻōlelo noʻeau are traditional sayings whose origin is tied to the study area of Keauhou and are descriptive of the characteristics of this ahupuaʻa and its people. During background research, ʻōlelo noʻeau associated with the Kahului, Waiaha, and Puapuaʻa Ahupuaʻa were not found.

1411 **Ka ʻiole ʻaihue moa o Keauhou.**
The chicken-stealing rat of Keauhou.
One who steals another's sweetheart or mate. Any place name may be used, depending on where the "rat" is from.
[Pukui 1983:153, #1411]

1682 **Keauhou i ka ʻihi kapu.**
Keauhou, where strict kapu were observed.
Keauhou, Kona. This was the place where many of the highest chiefs resided and where Kamehameha III was born.
[Pukui 1983:181, #1682]

1683 **Keauhou, kai nehe i ka ʻiliʻili.**
Keauhou, where the sea murmurs to the pebbles.
Keauhou, Puna, Hawaiʻi.
[Pukui 1983:181, #1683]

The ʻōlelo noeʻau compiled below are other traditional sayings associated with and descriptive of the broader district of Kona:

48 **Aia i Kona i Honalo.**
It is in Kona, in Honalo.
A play on *nalo* (lost). You've lost it and it is gone.
[Pukui 1983:8, #48]

1072 **Hoʻokāhi no Hāwaʻe, lauhue Kona.**
Only one Hāwaʻe, and poisonous gourds grow all over Kona.
In Kona, Hawaiʻi, a priest named Hāwaʻe lived during the reign of Ehukaipo. In every important *heiau* in that district, an image named for this priest was kept. Many people were sacrificed to these evil namesakes of Hāwaʻe.
[Pukui 1983:114, #1072]

1755 **Ke kope hoʻohiaʻā maka o Kona.**
The coffee of Kona that keeps the eyes from sleeping.
This saying applies not only to coffee, but also to love. To be in love with a person of Kona is to lose much sleep.
[Pukui 1983:188, #1755]

2046 **"Mai hea mai ʻoe?"**
"Mai Kona mai."
"Pehea ka ua o Kona?"
"Palahī puaʻa ka ua o Kona."
"A pehea ke aku?"
"Hī ka pā, hī ka malau,"
"Where are you from?"
"From Kona."
"How is the rain of Kona?"
"The rain of Kona pours like the watery excreta of a hog."
"How are the aku fish?"
"They run loose from the hook and the bait carrier."
Said in fun of one suffering from loose bowels. Once, a chief was out relieving himself when his bowels were very loose. A runner came by the little-traveled path through the underbrush and seeing the chief there extended his greetings. The chief began to ask questions, which the runner answered. When the chief went home he told those of his household of the sundance of rain and the run of fish in Kona. His servant, whose curiosity was roused, asked, "What were you doing at the time?" "I was excreting, and my bowels were loose," answered the chief. "He wasn't talking about the rain and fish," said the servant, "he was talking about you." The chief was angry when he heard this, but it was too late to do anything about it.
[Pukui 1983:222, #2046]

2469 **O ko Kona mau no ia o ka laʻi.**
Calm is typical of Kona.
Said of a Kona person who is always poised and calm.
[Pukui 1983:269, #2469]

2471 **O Kona i ka paka ʻona–ke haʻu iho ʻoe kūnewanewa.**
Kona of the potent tobacco–a draw would make one stagger.
Kona is said to be a land of potent lovemaking.
[Pukui 1983:270, #2471]

2645 **Pili aloha o Kona, hoʻoipo i ka mālie.**
Love remains close to Kona, who woos the calm.

Kona is a land beloved for its calm and pleasant weather.
[Pukui 1983:290, #2645]

The remaining sayings listed below are a compilation of ʻōlelo noʻeau associated with other ahupuaʻa and wahi pana (storied places) located within the Kona Moku:

682 **He Keʻei ʻoe no lalo lilo.**
You are a person of Keʻei, from far below.
You are of no consequence. Two chiefesses peered into a pool together at Keʻei, in Kona, Hawaiʻi. The reflection of the one from Hanauma appeared above that of the one from Keʻei, so she made this remark.
[Pukui 1983:76, #682]

708 **He kukāhi au, he wauke no Kūloli.**
I stand alone, for I am a wauke plant of Kūloli.
A boast–"Like the lone *wauke* plant of Kūloli, I stand alone in my battles."
At Kūloli, in Kona, Hawaiʻi, grew a lone *wauke* plant around which none other grew.
[Pukui 1983:78-79, #708]

1636 **Kau pō Kāneiahuea.**
All night long rode Kāneiahuea.
Said of one who wastes time in useless effort. From the story of a man who started out from the inlet of Kāneiahuea, Kona, one night. Because he was unfamiliar with the place, he went back and forth all night without finding an outlet to the open sea. Similar to the saying *Naʻaupō wale o Kāneiahuea*.
[Pukui 1983:176, #1636]

1730 **Ke kai maka koholua o Keahole.**
The sea of Keahole that pierces like the point of a koholua stick.
Keahole in Kona, Hawaiʻi, is a cold place to swim.
[Pukui 1983:186, #1730]

1841 **Kona Honua-ʻino.**
Kona, [the] Bad Land.
Said in humor of Kona, Hawaiʻi, for within its boundaries is a place called Honuaʻino.
[Pukui 1983:199, #1841]

2188 **Moku ka ihu ia Hio la!**
Bitten off is the nose by Hio!
Used by adults to frighten children into staying at home. Hio was an *akua* (ghost) who wandered about peering into the doors of homes and biting off the noses of those who annoyed him. He escaped when his companions were caught in a fishnet set by the supernatural hero Kamiki at Kuʻunaakeakua (Net-let-down-for-*akua*), Makalawena, Kona.
[Pukui 1983:238, #2188]

2478 **Ola aku la ka ʻāina kaha, ua pua ka lehua i kai.**
Life has come to the kaha lands for the lehua blooms are seen at sea.

"*Kaha* lands" refers to Kekaha, Kona, Hawai'i. When the season for deep-sea fishing arrived, the canoes of the expert fishermen were seen going and coming.
[Pukui 1983:271, #2478]

2515 **O na hōkū o ka lani luna, o Pa'aiea ko lalo.**
The stars are above, Pa'aiea below.
Refers to Kamehameha's great fishpond, Pa'aiea, in Kona, Hawai'i. Its great size led to this saying–the small islets that dotted its interior were compared to the stars that dot the sky. The pond was destroyed during a volcanic eruption.
[Pukui 1983:275, #2515]

2753 **Pupuhi ka 'ulu o Ke'ei; ua koe ka 'a'aiole.**
The breadfruit of Ke'ei are gone; only those blown down by the wind are left.
Said when something mysteriously vanishes. A *konohiki* of Ke'ei in Kona, Hawai'i, was placed in charge of a fine breadfruit grove. In spite of his watchfulness, the fruit were stolen as soon as they matured. Secretly he asked all of his relatives to help him watch for the culprit. However, some were related to the thief as well, who learned about the watch and evaded capture. Long after, a slip of the tongue revealed the thief.
[Pukui 1983:301, #2753]

2939 **Wili i ke au wili o Kāwili.**
Swirled about by the swirling Kāwili.
Said of a confusing, bewildering situation. Kā-wili (Hit-and-twist) is a current at Kalae, Ka'ū, Hawai'i, that comes from the Kona side and flows out to the ocean. It is the router of the two currents that meet off Kalae.
[Pukui 1983:320, #2939]

No ka Ua - Regarding Rain

The intimacy developed by Kānaka 'Ōiwi (Native Hawaiians) in relation to the natural environment is evident in the practice of naming natural features, resources, and environmental elements. Hawaiians honored and celebrated the world around them by the careful, thoughtful, and intentionality of giving a name, and therefore, mana (authority or power) to a person, place or thing. Natural features of the landscape, oceanscape, and skyscape were observed intimately by those who were of, and frequented a place so deeply, that the particularities of the natural elements were understood and named affectionately to honor, describe, and celebrate its connection.

Hānau Ka Ua is a comprehensive publication that delves into the richness of rain names associated with various places throughout Hawai'i. The authors, Collette Leimomi Akana and Kiele Gonzalez, are Native Hawaiian scholars and teachers whose publication honors the unique rains of Hawai'i and the places they are associated with. Akana and Gonzalez further describe this intimacy specific to rain:

> Our kūpuna 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 trees, the scent it carried, and the effect it had on people. [Akana and Gonzalez 2015:xv]

The collection of rain names included in *Hānau ka Ua* is often paired with a mele, or song, that references the rain and its association to a featured place. This section of the report utilizes Akana and Gonzalez's work and the cited sources included in this publication in order to identify the rains associated with the study areas and the broader moku of Kona, Hawai'i. Rain names specific to **Kealakehe, Keahuolū, Pua'a, Wai'aha and Kahului Ahupua'a** of Kona were not identified during this background study; however, this is not to say that they do not exist. Named rains belonging to **Puapua'a Ahupua'a** and **Keauhou Ahupua'a** as well as the broader region of Kona study were found and in listed in Table 1. The discussion that follows offers a narrative that describes the characteristics of each of the rains identified in this section so as to better understand the unique qualities and cultural significance they possess.

Table 1. Table of rain names associated with the Kona Moku of Hawai'i.

Ka Ua *The Rain*	**Ka Wahi** *The Place*	**Nā Kūmole** *References*
Palahī Pua'a	Kona, Hawai'i	Described as an "intermittent rain," and translated to mean "pig diarrhea," (Akana and Gonzales 2015:218,219).
		"Mai hea mai 'oe?" "Mai Kona mai." "Pehea ka ua o Kona?" "Palahī pua'a ka ua o Kona." "A pehea ke aku?" "Hī ka pā, hī ka malau." *"Where are you from?"* *"From Kona."* *"How is the rain of Kona?"* *"The rain of Kona pours like the watery excreta of a hog [palahī pua'a]."* *"How are the aku fish?"* *"They run loose from the hook and the bait carrier."*[71] [Akana and Gonzales 2015:218]
		"Ka ua palahī pua'a–falls, stops, falls, stops, etc.," (Akana and Gonzales 2015:219).[72]

[71] Author notes: A traditional saying. Source: Pukui, *'Ōlelo 222. Note: Pukui says that this was "said in fun of one suffering from loose bowels,"* (Akana and Gonzales 2015:218).

[72] Author notes: "From a list of rain names and their descriptions. Source Kelsey, "Rains,"" (Akana and Gonzales 2015:219).

Ka Ua *The Rain*	**Ka Wahi** *The Place*	**Nā Kūmole** *References*
Kēhau	Kona, Hawai‘i	Described as a dew and mist and is noted as both the name of specific rain and wind (Akana and Gonzales 2015:73).
		Indexed as a rain associated with Kona, Hawai‘i (Akana and Gonzales 2015:316).
Nāulu	Kona, Hawai‘i	Described as a sudden shower and is noted as being also the name of a rain cloud and a wind (Akana and Gonzales 2015:187).
		‘O Kona ia o ke kai malino a ‘Ehu ē! Ke ala a ‘Ehu, ke ala a kāua i hele ai I ke ao, i ka pō, pōwehiwehi i ka ua Nāulu a weli He weliweli, he maluhia i ke aloha iā ‘oe Iā ‘oe, iā ‘oe, e Kalopelekei i ka lā ē! *Oh, Kona it is, of the tranquil sea of ‘Ehu, oh!* *The pathway of ‘Ehu, the path we two traversed* *By day, by night, made dim and threatening by the stormy Nāulu rains* *Frightful, but peaceful because of love for you* *For you, for you, O Kalopelekei of the day, oh!*[73] [Akana and Gonzales 2015:188,189]
	Puapua‘a Ahupua‘a	Indexed as a rain associated with Puapua‘a (Akana and Gonzales 2015:324).
‘Awa‘awa	Kona, Hawai‘i	Described as a “bitter, cold, dark rain, vog, or smoke of the mountains; acidic rain;” and is noted as being the same as the ‘Awa rain and also the name of a wind (Akana and Gonzales 2015:17).
		Indexed as a rain associated with Kona, Hawai‘i (Akana and Gonzales 2015:316).
	Keauhou Ahupua‘a	Indexed as a rain associated with Keauhou (Akana and Gonzales 2015:315).
‘Awa	Keauhou Ahupua‘a	Described as a “bitter, cold, dark rain, mist, fog, vog, or smoke of the mountains; acidic rain;” and is noted as being the same as the ‘Awa‘awa rain and also a name of a wind (Akana and Gonzales 2015:73).

[73] Author notes: “From a kanikau, or lament, for Kamehameha IV by his wife, ‘Emalani Kaleleonālani,” (Akana and Gonzales 2015:189).

Ka Ua *The Rain*	**Ka Wahi** *The Place*	**Nā Kūmole** *References*
		Indexed as a rain associated with Keauhou (Akana and Gonzales 2015:315).
Kualau	Keauhou Ahupuaʻa	Described as a rain that showers over the seas and is accompanied by wind (Akana and Gonzales 2015:121).
		Indexed as a rain associated with Keauhou (Akana and Gonzales 2015:315).
Nahunahu	Keauhou Ahupuaʻa	Described as a "pelting rain associated with Hawaiʻi," and translated to mean "to bite," (Akana and Gonzales 2015:184).
		Indexed as a rain associated with Keauhou (Akana and Gonzales 2015:315).
Noe	Keauhou Ahupuaʻa	Described as a fog and a mist that is "lighter than the uhiwai [heavy fog], but heavier than ʻohu [mist, fog, vapor], ʻehu [spray, foam, mist], and ʻehuʻehu [reduplication of ʻehu];" and is noted as both a rain and wind, (Akana 2015:208).
		Indexed as a rain associated with Keauhou (Akana and Gonzales 2015:315).

Nāulu is the rain associated specifically with **Puapuaʻa Ahupuaʻa**, as well as the general region of Kona (Akana and Gonzales 2015:324, 188-189). Nāulu is defined by Pukui and Elbert as a "sudden shower," (Pukui and Elbert 1986:263). Not only is it noted as the name of a particular rain, Nāulu is also identified as the name of a shower cloud, a sea breeze, as well as a type of wind (Pukui and Elbert 1986:263; Akana and Gonzales 2015:187).

As a cloud or as rain, records reference many different characteristics that describe the type of rainfall and patterns typical of a Nāulu rain. Kānaka ʻŌiwi and renowned historian, David Malo wrote that the Nāulu rain is strong in intensity but short in duration. He characterized the rain as: "He ua Nāulu he ua ʻuku ia, he ikaika naʻe." *"A Nāulu rain, a brief rain, though it is intense,"* (Malo in Akana and Gonzales 2015:206; translated by Akana and Gonzales). The short and sudden characteristic that Malo described the Nāulu rain to be is also mirrored by another one of Hawaiʻi's noted historians, Samuel Mānaiakalani Kamakau. Published in the Hawaiian language newspaper, *Ke Au Okoa* in 1869, Kamakau shared an account regarding traditional cultivation methods of ʻuala (*Ipomoea batatas* or sweet potato) in which he acknowledged the Nāulu rain:

> He ua Nāulu ka ua e loaʻa i ka Makaliʻi, he ua kūhewa ia, aia ma kona wahi e hāʻule ai, ua ulu ka laulele, ka pōpolo, a ua ola ia wahi i ka lau nāhelehele. [Kamakau 1869:1]
>
> *Sudden showers (ua Nāulu) fall during the Makaliʻi season. These are rains accompanied by wind gusts, and where they fall, laulele and pōpolo plants spring up, and that place comes to life with wild growth.*
> [Translated by Akana and Gonzales 2015:206]

According to Kamakau, Nāulu is again referred to here as a shower that arrives suddenly–he ua kūhewa, (Kamakau 1869:1). What is also detailed in this account is that this particular rain is often joined by wind; and with it, entices the ʻāina the rain falls upon to sprout with vegetation such as laulele (*Asclepias curassavica* or butterfly weed), pōpolo (*Solanum nigrum*), and other wild growing flora. Other accounts offer similar depictions of the life brought with the coming of the Nāulu rain as it falls upon the earth. A mele hoʻāeae or love chant poetically references the Nāulu rain as a rain that softens the forest:

> He ipo aloha naʻu ka nani o Kūkiʻi e waiho nei
> I lohia ʻia mai e nā lehua o Hōpoe, ʻau i ke kai
> Ke kaʻikaʻikū ʻia maila a Kalanamaihiki
> Hikiwawe ka hana a ka ua i ka nahele
> Ke hoʻowali ʻia maila e ka ua Nāulu
> Kū helahela ke kula o Kamāʻoa, nopu i ka lā
> [Pukui 1995:76 in Akana and Gonzales 2015:205]
>
> *Kukuni wela i ka ʻili o ka malihini*
> *The beauty of Kūkiʻi, my intimate lover, lies there*
> *Sparkling from the lehua of Hōpoe, reaching out into the sea*
> *Carried about until arriving at Kalanamaihiki*
> *The rain works hastily upon the forest*
> *Softened by the Nāulu rain*
> *The plain of Kamāʻoa is extensive, heated by the sun*
> *That scorches the skin of newcomers*
> [Translated by Akana and Gonzales 2015:205]

A chant entitled, "Haui Kalani," offers the imagery of the Nāulu rain as a rain that makes the land glisten: "He ʻā, he haʻihaʻi pua, he Nāulu kaupua liko moku." *"A booby bird, a flower breaker, a Nāulu rain cloud that gathers, making the land glisten,"* (Fornander 1916-1920:381 in Akana and Gonzales 2015:205; translated by Akana and Gonzales).

A mele inoa or name chant for the chief, Kūaliʻi, describes the Nāulu rain as the rain that carries the kēhau mist:

> ʻAʻole i like i ka Nāulu — *Unlike the Nāulu shower*
> Ia ua hoʻohali kēhau — *The rain that bears the kēhau mist*
> Me he ipu wai i ninia lā — *Like a water gourd that was poured*
> Nā hau o Kūmomoku — *Upon the hau trees of Kūmomoku*
> [Na Mele Aimoku 2001:94; translated by Akana and Gonzales 2015:204-205]

The accounts shared above each characterizes Nāulu as a rain that brings life to the ʻāina. As Kamakau recalled, ʻuala and other native wild flora began to sprout as a result of the Nāulu rain (Kamakau 1869:1). Pukui described it as a rain that softens the forest (Pukui 1995:76 in Akana and Gonzales 2015:205). Fornander wrote of a chant that described the Nāulu rain as a rain that makes the land glisten, while another chant described it as a rain that carries mist (Fornander 1916-1920:381 in Akana and Gonzales 2015:205; translated by Akana and Gonzales; Na Mele Aimoku 2001:94; translated by Akana and Gonzales 2015:204-205).

In the moʻolelo of Kamapuaʻa, compiled and translated by Lilikalā Kameʻeleihiwa, Nāulu is recounted as a body form of one of Hina's daughter, named Leialoha. When she is born, the body manifests into rain, which is identified as Kauanāulu, meaning, the Nāulu rain:

> Ua hāpai aʻela ʻo Hina… ʻO ka ʻehā o nā keiki i hānau mai ai, he kaikamahine, ʻo ia hoʻi ʻo Leialoha. A i ka manawa i nui ae ai ʻo ia kaikamahine, ua lele akula ʻo ia i ka lani, a lilo kona kino he kino ua, a ua kapa ʻia ʻo Kauanāulu.
> [Kameʻeleihiwa 1996 in Akana 202-203]

> *Hina was pregnant… The fourth child born was a daughter, Leialoha. And when this girl grew up, she flew into the sky, and her body took the form of rain, and it was called Kauanāulu.*
> [Translated by Akana and Gonzales 2015:202-203]

ʻAwa, ʻAwaʻawa, Kualau, Nahunahu, and Noe are rains associated with the **Keauhou Ahupuaʻa**. The rains, **ʻAwa** and **ʻAwaʻawa**, are the same type of rains that vary in its naming. Both rains are described to mean, "bitter, cold, dark rain, vog, or smoke of the mountains; acidic rain," (Akana and Gonzales 2015:17,73). Metaphorically, this type of rain is used to convey emotions of grief and tragedy and speak towards hardships of misfortune (Akana and Gonzales 2015:17; Pukui and Elbert 1986:33).

Pukui categorizes the **ʻAwa** rain as a "cold mountain rain." Similarly, Malo described the various rains of Hawaiʻi and of ʻAwa, he wrote: "He ua ʻawa, ma ka mauna ia ua." (*An ʻawa rain, this rain falls on the mountains),* (Malo 1951:14 in Akana and Gonzales 2015:15). The characterization of the ʻAwa rain as rain associated with the mountains is also seen in a 1866 newspaper article titled "Manao Wehewehe" that was written by an individual named L. Z. E. Kalaaukumuole:

> Ua ʻAwa–He ua kēia ma ka mauna, he ua ʻawa, he ua liʻiliʻi, ʻo ke ehu wale nō; ʻaʻole i loku ʻo ka ua, ʻo ke poʻo ke kuakea me he kanaka poʻo hina lā, he ua poʻo nui o ke kuahiwi, ʻo ke anu naʻe ka mea nui, no laila mai kēia inoa ua ʻAwa, he ua noe.
> [Kalaaukumuole 1866:3]

> *ʻAwa rain–This is a rain in the mountains, a bitter rain, a fine rain; it is only mist; it doesn't pour down; the head is white like a gray-haired man, a trouble-some "poʻo nui" rain in the mountains, though the cold is the main problem, and therefore this name, ua ʻAwa, a misty rain.*
> [Translated by Akana and Gonzales 2015:14]

The ʻAwa rain is also associated with possessing a station of high rank and divinity. The ʻōlelo noʻeau, "He lupe lele a pulu i ka ua ʻawa" is translated by Pukui as, *A kite that flies till it is dampened by icy cold [ʻawa] raindrops,* (Pukui 1983:85, #775). The phrase is interpreted by Pukui as being descriptive of someone "whose station has risen very high," (Pukui 1983:85). In the moʻolelo of Keaomelemele, recorded by Hawaiian historian Moses Manu, the birth of Hina's child is detailed. During the birth, many hōʻailona or signs telling of the childs' high rank and kapu (scaredness) were observed. Among them was the downpour of the ʻAwa rain:

> I ka manawa i ʻike maopopo loa ʻia aʻe ai ua hāpai ʻo Hina, ua noho aku lāua ma ia ʻano a kokoke i nā lā nahunahu hānau keiki, ua ʻike ʻia nā ʻōuli o ka lani a me nā ao polohiwa e haʻakokōhi ana i loko o ka lewa nuʻu, a ke hoʻokūkū maila nā ʻōpua i ka ʻili o ke kai, a ke ʻōkūkū maila nā ʻale kūpikipikiʻō o ka moana, a ke neʻe paʻa aʻela ka ʻohu e uhi i nā awāwa a me ka piko o nā mauna, a ke ʻaneʻane maila ʻo

> Kūlanihākoʻi e hoʻohanini iho i kona wai lani, a ʻike ʻia akula ka lalapa o ka uila i ka lewa, a ke lohe ʻia akula nā leo pohāpohā nunulu o ka hekili e nākolo ana i ka honua, aia hoʻi nā ānuenue ke haʻaheo maila i loko o nā kilihune ua ʻawa, ka ua koko hoʻi ke haʻaheo maila ma nā awāwa i luna o nā lau lāʻau, "me he ua ʻUlalena lā no Piʻiholo e kīheʻaheʻa ana i kukui o Lilikoʻi."
> [Manu 2002:8]
>
> *When it became clearly known that Hina was pregnant, the two of them waited together, and when the days of birth pangs approached, the omens were seen in the heavens: there were dark, heavy clods pressing on the skies above, and the billowing clouds were heaped upon the surface of the sea, while the wild swells of the ocean rose on high, the sea spray blanketed the valleys and the mountain tops, and Kulanihakoi was nearly read to overflow its heavenly waters when the flashes of the lighting were seen in the sky, and the rumbling roar of the thunder was shaking the earth, then the rainbows appeared proudly in the droplets of the Awa rain, and the red rainbow patches showed their glory over the tree tops of the valley, "like the Ulalena rain of Piiholo, streaking the kukui leaves of Lilikoi."*
> [Translated by Pukui in Manu 2002:100]

As noted previously, this particular rain is also noted as being a vog. Amongst the many sources compiled by Akana and Gonzales in their comprehensive inventory of rain names, the authors share a segment of an oral interview between two native speakers, Hilda Hoohila Kawelo and Clinton Kanahele in 1970 (Akana and Gonzales 2015;15-17). In their discussion, Kawelo describes ʻAwa as a fog and its association with Pele. She also shares with him an oli which references the ʻAwa fog. Their conversation is as follows:

> Kawelo: Hele mai ʻo Pele mai Kahiki. Kona manawai i hele mai ai, hele mai nō ka ua. Hele mai ka ua Noe me ka ua ʻAwa. He aha ia mea he ua ʻAwa? Maopopo anei iā ʻoe?
> *Pele came from Kahiki. When she arrived, so too came the rain. The Noe rain and the ʻAwa rain came. What is this thing known as an ʻAwa rain? Do you know?*
>
> Kanahele: ʻAʻole.
> *No.*
>
> Kawelo: ʻAe, ka ua ʻAwa, ʻo ia nō ka uahi.
> *The ʻAwa rain, it is smoke.*
>
> Kanahele: Oh.
>
> Kawelo: Ka uahi o kēlā ahi, o kēlā, no ka mea, he ahi hoʻi ʻo ia i hele maila. Kēlā uahi e pōhina nei ka ʻāina āna i hele mai nei, e ʻike ʻia aku nei i ka maka o nā keiki a kānaka, mea, inā ʻoe e honi i kēlā, ʻano, mea, pōniuniu nō ʻoe.
> *The smoke of that fire, of that, because she came as fire. That smoke that creates a haze over the land she came to, that is seen and felt by the eyes of the children of men, if you were to inhale that, you would get dizzy.*
>
> Kanahele: Ua ʻAwa kēlā?

That's the ʻAwa rain?

Kawelo: Ka ua ʻAwa hoʻi ia. Kēlā ua, ʻaʻole ʻoe pulu. ʻAʻole ʻoe pulu i kēlā ʻAwa.
The ʻAwa rain, indeed. That rain, you don't get wet. You don't get wet from that ʻAwa.

Kanahele: He hanu wale nō ʻoe i kēlā ua.
You just inhale that rain.

Kawelo: ʻAe, hanu wale nō. "Hele mai ʻo Pele mai Kahiki, hele mai ka ua ʻAwa me ka ua Noe. Uhi aʻela, paʻa nā pali paʻa o Kahiki, ʻakahi ka hikina ʻana mai o kō aloha iaʻu."
Yes, it is just inhaled. "Pele came from Kahiki; the ʻAwa rain and the Noe rain came; completely smothering the cliffs of Kahiki; your love has finally reached me."

Kanahele: He hīmeni kēlā?
Is that a song?

Kawelo: ʻAe, he olioli hoʻi paha.
Yes, an olioli chant.

Kanahele: He olioli?
An olioli?

Kawelo: ʻAe, he olioli kēlā.
Yes, it is an olioli.

Kawelo [e olioli ana]:
He mai ʻo Pele mai Kahiki
Hele mai ka ua ʻAwa me ka ua Noe
Uhi ʻia aʻela, paʻa nā pali paʻa o Kahiki
ʻAkahi ka hikina ʻana mai o kou aloha i oʻu nei
E Kalani mā ē
E iho koke mai i lalo nei
I maha aʻe au
E Kāne mā ē
ʻOki ʻia ka lili, ka inaina o lākou nei lā ē
ʻAe

Kawelo [chanting]:
Pele came from Kahiki
The ʻAwa rain and the Noe rain came
Completely smothering the cliffs of Kahiki
Your love has finally reached me
O Heavenly One and company
Come quickly down here
That I may be at ease
O Kāne and company
End their jealousy and rage
Yes

Kualau is another rain associated with the Keauhou ahupuaʻa (Akana and Gonzales 2015:121). When referring to the kualau rain, Malo wrote: "He ua kualau, ma ka moana ia ua." *A kualau rain, this rain occurs at sea.* (Malo 1951:14).

Nahunau means "to bite," and is characterized as a pleting rain associated with Keauhou (Akana and Gonzales 2015:184). **Noe**, is another rain of Keauhou that is also referred to as Noenoe (Akana and Gonzales 2015:208). Noe is the name of a specific type of rain as well as a general term for mist, fog, vapor, or rain (Pukui and Elbert 1986:268).

Palahī Puaʻa, Kēhau, Nāulu, and ʻAwaʻawa are rains associated with the general **Kona Moku** of Hawaiʻi. **Nāulu** was described previously as a rain and a cloud also associated with the Puapuaʻa Ahupuaʻa. Malo characterized it as a sudden rain of strong intensity and Kamakau provided a description of Nāulu rainfall that was associated with ʻuala cultivation and the sprouting of wild native flora (Malo in Akana and Gonzales 2015:206; Kamakau 1869:1). Several chants reviewed noted that Nāulu is a "rain that softens the forest," a "rain that makes the land glisten," and a "rain that carries the kēhau mist," (Pukui 1995:76 in Akana and Gonzales 2015:205; Fornander 1916-1920:381 in Akana and Gonzales 2015:205; Na Mele Aimoku 2001:94 in Akana and Gonzales 2015:204-205).

Similarly, the **ʻAwaʻawa** rain was previously identified and discussed as a rain associated with the Keauhou Ahupuaʻa. As noted, its overall characteristics is a dark rain or fog most commonly associated with the mountain regions. Metaphorically, it can be associated with hardships and misfortunes.

Palahī Puaʻa is a rain exclusively associated with the Kona Moku. Its name literally translates to mean "pig diarrhea" and is described as a rain that "falls and stops, falls and stops," (Akana and Gonzales 2015:218-219). **Kēhau** is another rain of Kona and is also recorded as a dew and misty and is described to be "a cold fine rain floating in the air, mostly in the mountainous regions," (Akana and Gonzales 2015:76).

Nā Hana a ke Kupa ʻĀina – Summary of Traditional and Customary Practices

This section highlights the traditional and customary practices noted to occur within the project area ahupuaʻa and the larger landscape of Kona Akau that have originated from the select moʻolelo and kaʻao presented in this report. These practices emphasize the generations of kupa ʻāina (native of the land) in Kona Akau who maintained a deep pilina with the vast natural and cultural resources of this ʻāina. The cultivation of the land and sea, and the gathering and utilization of freshwater resources that originate from the storied places of this ʻāina, have, and continue to feed Kona's community physically and spiritually. These practices are a testament to the enduring legacy of Kona Akau and reaffirm the right for Kānaka ʻŌiwi to actively maintain traditional and customary practices in these spaces today.

As is recorded in the last paukū or stanza of He Mele no Kāne–he wai e ola! Water is life. The source of all things is wai. The same is true for this report as the focal point of this study is centered around wai and the way in which the movement and presence of freshwater experienced in Kona Akau has influenced the culture, practices, and lifestyle of the community who cherish this ʻāina. Examining the influence of freshwater within Kona emphasizes the importance it imparts to the well-being of both the ʻāina it nourishes as well as the people who benefit from it. Thus, the protection of freshwater and the proper management of it is of utmost importance.

To frame this discussion, He Mele no Kāne is reflected upon to highlight the many manifestations of water sources that surface when analyzing the select moʻolelo and kaʻao presented in this report associated with Kona. The perseverance of moʻolelo captures valuable knowledge sets relaying traditional practices, resources, and cultural lessons. Each of the moʻolelo shared in this report impresses the underlying fact that Kona is not to be thought of as a place absent of water. Rather, as expressed and reiterated in He Mele no Kāne, the life-giving waters of Kāne are indeed present in all ways. *Aia i ka hikina a ka lā… A i lalo, i ka honua…* From the rising of the sun, to the aquifers that rest beneath the earth, wai is everywhere. The lessons learned in He Mele no Kāne transcends the barriers of time and resonates today as much as it did when first composed. The framing of this discussion presented in this way is intended to elevate a holistic understanding of water resources within the study areas, while also highlighting some of the traditions and practices revealed in the reflection of moʻolelo.

He ui, he nīnau:
E ui aku ana au iā ʻoe,
Aia i hea ka Wai a Kāne?

A query, a question,
I put to you
Where is the water of Kāne?

Cloud Formations

The first paukū of He Mele no Kāne establishes that freshwater can be found at the rising of the sun.

He ui, he nīnau:	*A query, a question,*
E ui aku ana au iā ʻoe,	*I put to you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*

Aia i ka hikina a ka Lā	*At the Eastern Gate*
Puka i Haʻehaʻe,	*Where the Sun comes in at Haʻehaʻe,*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*

"Aia i ka hikina a ka lā, puka i Haʻehaʻe." *At the Eastern Gate, where the sun comes in at Haʻehaʻe.* The poetic references that introduce the sun as a source of water is an example of the deep intellect Kānaka ʻŌiwi possessed having understood the sun's role in creating water vapor–an essential step in the water cycle. The heat that radiates from the sun is the mechanism that enables liquid water to turn into water vapor, which is recognized universally as the process called evaporation. The water vapor that is created by the heat of the sun rises to the atmosphere and as it cools, the vapor condenses to eventually create clouds. The clouds then produce rain that will fall and recharge the honua–continuing the cycle of water. As is documented in the first paukū of the chant, the role the sun plays in radiating heat and creating the appropriate fluctuating temperatures for these atmospheric changes to occur is critical in the movement of water.

The second paukū of the chant describes the transition of water that began from the sun, now evolved into clouds. Thus, freshwater is found in the clouds.

E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i Kaulana a ka lā,	*Out there with the floating Sun,*
I ka pae ʻōpua i ke kai,	*Where the cloud-forms rest on ocean's breast,*
Ea mai ana ma Nihoa,	*Uplifting their forms of Nihoa,*
Ma ka mole mai o Lehua;	*This side the base of Lehua;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*

Specifically the chant recalls that wai is found, "I ka pae ʻōpua i ke kai." *Where the cloud-form rests on ocean's breasts.* An ʻōpua cloud is a cumulus or billow cloud that Pukui describes as "puffy clouds, as banked up near the horizon, often interpreted as omens," (Pukui and Elbert 1986:293). This particular type of cloud is associated with interpreted omens as well as its ability to carry and release freshwater in the form of rain. Several ʻōlelo noʻeau encapsulate this cultural understanding of ao ʻōpua (cumulus clouds):

7 **Aia i ka ʻōpua ke ola: he ola nui, he ola laulā, he ola hohonu, he ola kiʻekiʻe**
Life is in the clouds: great life, broad life, deep life, elevated life.
The reader of omens knows by their shape and color whether clouds promise rain and prosperity, or warn of disaster.
[Pukui 1983:7, #42]

356 **E nānā ana i ka ʻōpua o ka ʻāina.**
Observing the horizon clouds of the land.
Seeking to discover future events by observing the cloud omens.
[Pukui 1983:43, #356]

1907 **Kūkulu ka ʻike i ka ʻōpua.**
Knowledge is set up in the clouds.
Clouds are observed for signs and omens.
[Pukui 1983:205, #1907]

2328 **Noho no ke kanaka a ka lā mālie, kau ka ipu hōkea o ka lawai‘a, nānā ana i ka ‘ōpua.**
A person waits for a clear day, sets up the gourd that holds the fisherman’s paraphernalia, and observes the clouds.
To a fisherman, a clear day, his tools, and the signs and omens seen in the clouds are important.
[Pukui 1983:253, #2328]

2482 **Ola i ka wai a ka ‘ōpua.**
There is life in the water from the clouds.
Rain gives life.
[Pukui 1983:271, #2482]

2487 **Ola na ‘ilima wai ‘ole i ke ao ‘ōpua.**
Healed are the ‘ilima of waterless places by the rain cloud.
[Pukui 1983:272, #2487]

The ‘ōlelo no‘eau presented below are traditional expressions regarding ao ‘ōpua that are distinct to the Kona Moku and the study areas.

55 **Aia ka wai i ka maka o ka ‘ōpua.**
Water is in the face of the ‘ōpua clouds.
In Kona, when the ‘ōpua clouds appear in the morning, it’s a sign that rain is to be expected.
[Pukui 1983:9, #55]

232 **Ao ‘ōpiopio.**
Young cloud.
A cloud that rises from sea level or close to the cloud banks and is as white as steam. When seen in Kona, Hawai‘i, this is a sign of rain.
[Pukui 1983:27, #232]

2134 **Māmā Kona i ka wai kau mai i ka maka o ka ‘ōpua.**
Kona is lightened in having water in the face of the clouds.
Kona is relieved, knowing that there will be no drought, when the clouds promise rain.
[Pukui 1983:232, #2134]

Revealed in these ‘ōlelo no‘eau is the knowledge that one of Kona’s distinct sources of freshwater rests in the ‘ōpua clouds. For this reason, knowing that the presence of ao ‘ōpua may bring rain, the practice of **nānā ao** (observing clouds) or **kilokilo** (to observe and forecast) are significant practices carried out by the natives of Kona in order to understand the nuances of their environmental seasons and inform their work.

The mo‘olelo concerning Pu‘uokaloa described this practice and its significance to informing when other practices for the people of Kona should occur. Kihe described Pu‘uokaloa as a hill situated between Kealakehe and Keahuolū (Kihe 1923:2). When the people of Kona saw clouds over Pu‘uokaloa, the kama‘āina of the area understood it as a sign of rain and readied their lands to take advantage of the bounty the rain would bring. In this perspective, the presence of clouds over Pu‘uokaloa is an environmental indicator of rain for those of Kona. Informed by the movement of clouds observed over Pu‘uokaloa, paired with being attentive to the natural cycles

and seasons of their environment, Kihe recounts that kamaʻāina understood this as a sign to make the necessary preparations to plant ʻuala patches (Kihe 1923:2). Specifically, Kihe writes that the people of this region utilized a makawela style of ʻuala planting. This style of planting involves slashing and burning the land before planting (Pukui and Elbert 1986:228). The notion of ʻuala cultivation practices that occurred in Kona is also revealed in the moʻolelo of Ka-Miki. At a place called Niumalu in the Puapuaʻa Ahupuaʻa, a māla ʻuala is said to stretch throughout Puapuaʻa. This ʻuala garden is described as the place where Ka-Miki's opponents go to recover and sleep after being defeated by the young boy (Wise and Kihe 1914-1917 in Maly 1999:12).

From the moʻolelo and ʻōlelo noʻeau reviewed, several practices are revealed to occur in the study area: **nānā ao or kilokilo of clouds**, **ʻuala cultivation**, and specifically, **makawela method of cultivation**.

Forests and Streams

The third paukū in He Mele no Kāne describes that wai can be found in the upland areas.

E ui aka ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i ke kuahiwi, i ke kualono,	*Yonder on mountain peak, on the ridges steep,*
I ke awāwa, i ke kahawai;	*In the valleys deep, where the rivers sweep;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*

"Aia i ke kuahiwi, i ke kualono. I ke awāwa, i ke kahawai…" *Yonder on the mountain peak, on the ridges steep, in the valleys deep, where the rivers sweep…* These lines of the chant speak to freshwater being found throughout the ʻāina and specifically in the upland forests, valleys, and streams.

In several moʻolelo shared in this report, the individuals of the stories ventured in the mountains and discovered wai. In "He Kaʻao no ka Manu ʻElepaio," which was published in *Ka Hoku o Hawaii* in 1862, the author tells the story of a man named Piʻiwai who traveled ma uka with his huewai (water calabash) in the forests of Kahului Ahupuaʻa to collect wai (S. W. K. 1862:1). The **practice of gathering freshwater** is revealed in this moʻolelo.

In the story of Kepakaʻiliʻula which appeared in *Ka Hoku o Hawaii* from 1919 through 1920, Kepakaʻiliʻula and his uncles journeyed in the uplands of Kahuluʻu and there they found water in the form of springs. During this chapter of the moʻolelo, the author noted that the great banana plantation of the aliʻi, Kahoʻoaliʻi was there as well (Malo 1919-1920 in Maly 1997:25-26). This cultivated area of maiʻa (banana) was said to stretch from Kaumalumalu-Kāpalaʻalaea to Keʻei (Malo 1919-1920 in Maly 1997:25). The mention of there being a large banana plantation dedicated to an aliʻi, indicates **agriculture practices** to occur in Kahaluʻu Ahupuaʻa, and specifically, **maiʻa cultivation**.

In the moʻolelo of Ka-Miki, while he and his brother are journeying through Kona, the author offers descriptions of the various places they travel through. Regarding the Waiʻaha and Kahului Ahupuaʻa of Kona, Ka-Miki is said to travel past a **stream** that connects the two ahupuaʻa. The translated excerpt reads:

> …the stream of Waiʻaha joins with the lands of Kahului. The waters filled the upland taro mounds of the sacred prostration chiefs Kaleiʻeha, Kapahu (or Kapahu-a-Loʻi), and Kaʻalaea, who possessed the kapu (restrictions) of Lono-

> Makahiki... There too, you see — ka luawai ua kīpapa ʻia i ka pōhaku ʻalā e ulu pōhai ʻia e nā lāʻau loulu, o ka punawai i ka oʻioʻina pali o Waiakekea — a spring paved with dense [ʻalā] stones and surrounded by loulu palms, this is the spring of Wai-a-Kekea, which was near the trail side resting place... (IN Ka Hōkū o Hawaiʻi, April 9, 1914; Maly translator)
> [Wise and Kihe 1914-1917 in Maly 1998:3]

This stream is said to feed puʻepuʻe or mounds of kalo, indicating that agriculture practices of **kalo cultivation** would have occurred in this area of Waiʻaha and Kahului.

Though not located in the upland forests, but still located on ʻāina, the moʻolelo of Kepakaʻiliʻula describes a **niu grove** of Kona associated with Helani (Malo 1919-1920). This grove is also mentioned in the ʻōlelo noʻeau, **"Ka wai puka iki o Helani."** *The water of Helani that comes from a small opening,* (Pukui 1983:179, #1661). Pukui states that this expression refers to "Helani, Kona, Hawaiʻi. Here a coconut grove thrived, and from a small opening in the shell of the nut one could get water to drink," (Pukui 1983:179). Culturally, coconuts are recognized as a source of freshwater as one could nourish their quench with water derived from the shells of coconuts. This understanding is conveyed in the ʻōlelo noʻeau, "Ka wai lewa i ka makani." *The water that sways in the breeze*, (Pukui 1983:179, #1656). Here, Pukui interprets this saying as "the coconut, which contains water and is found in clusters high up in the tree," (Pukui 1983:179). The moʻolelo of Kepakaʻiliʻula and the accompanying ʻōlelo noʻeau reveal that the **niu grove of Helani** is a resource that produces viable **drinking water**.

From the moʻolelo and ʻōlelo noʻeau reviewed, water in the form of streams, as well as drinking water derived from the niu grove of Helani come to surface. Practices associated with these accounts convey that the practice of gathering freshwater, agricultural practices, maiʻa cultivation, and kalo cultivation occurred in the study areas.

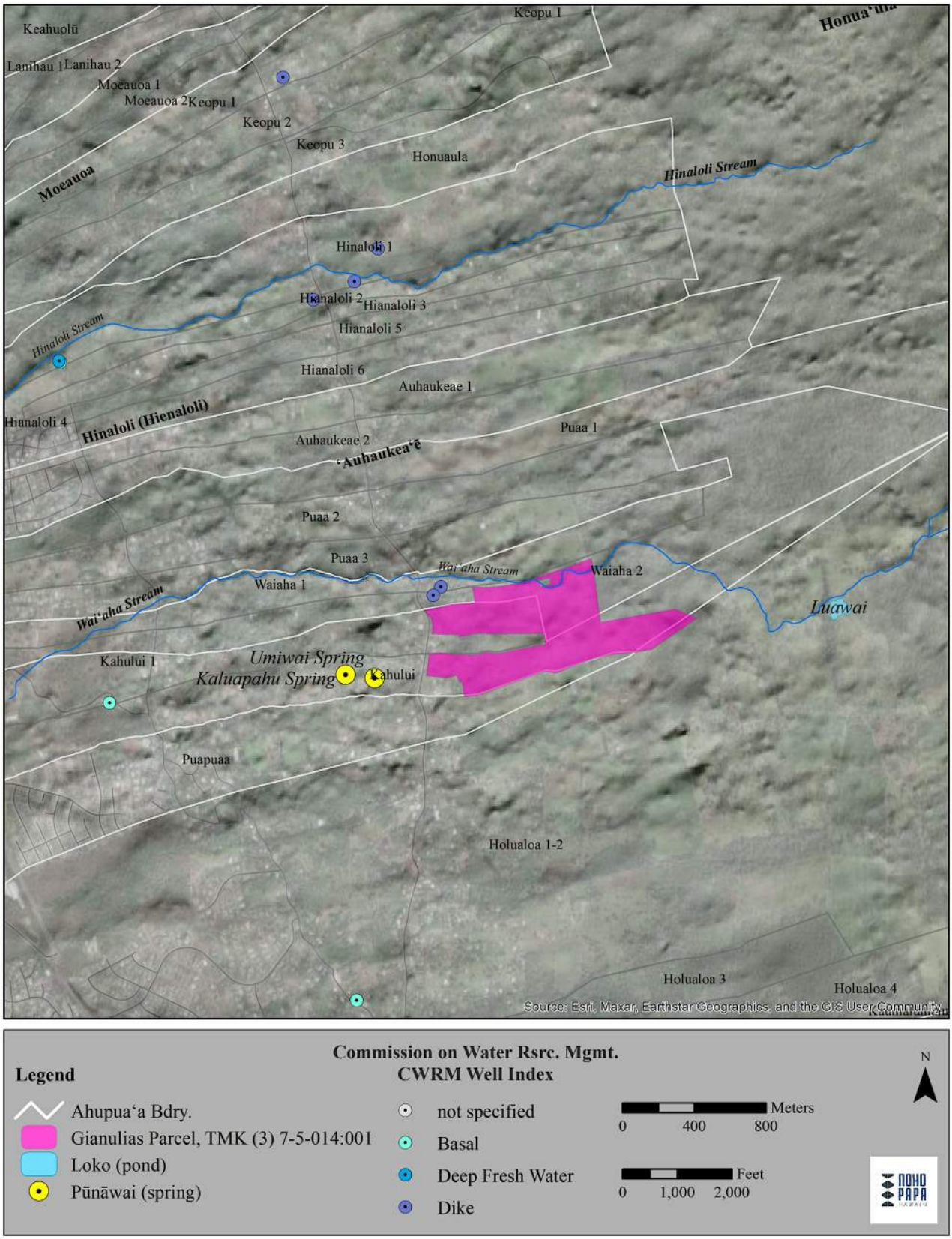


Figure 14. Wai (water) resources within and surrounding the Gianulias parcel

Rains

The fourth paukū of the chant expresses that water is found out at sea and in the rains, rainbows, and mists.

E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i kai, i ka moana,	*Yonder at the sea, on the ocean,*
I ke kualau, i ke ānuenue,	*In the driving rain, in the heavenly bow,*
I ka pūnohu,	*In the piled-up mist wraith,*
i ka uakoko,	*In the blood red rainfall*

A Kona expression conveys the pleasant feeling when rain visits the ʻāina of Kona–**"Me he makamaka la ka ua no Kona, ke hele la a kipa i Hanakahi."** *The rain is like a friend from Kona–it goes and calls on Hanakahi,* (Pukui 1983:234-235, #2154). Palahī Puaʻa, Kēhau, Nāulu, and ʻAwaʻawa are rains associated with the general Kona Moku of Hawaiʻi. ʻAwa, ʻAwaʻawa, Kualau, Nahunahu, and Noe are rains associated with the Keauhou Ahupuaʻa. Nāulu is the rain associated specifically with Puapuaʻa Ahupuaʻa.

- **Palahī Puaʻa** is a rain exclusively associated with the Kona Moku. Its name literally translates to mean "pig diarrhea" and is described as a rain that "falls and stops, falls and stops," (Akana and Gonzales 2015:218-219).
- **Kēhau** is another rain of Kona and is also recorded as a dew and misty and is described to be "a cold fine rain floating in the air, mostly in the mountainous regions," (Akana and Gonzales 2015:76).
- **Nāulu** is described as a rain and a cloud associated with the Puapuaʻa Ahupuaʻa and the general Kona Moku. Malo characterized it as a sudden rain of strong intensity and Kamakau provided a description of Nāulu rainfall that was associated with **ʻualа cultivation** and the sprouting of wild native flora (Malo in Akana and Gonzales 2015:206; Kamakau 1869:1). Several chants note that Nāulu is a "rain that softens the forest," a "rain that makes the land glisten," and a "rain that carries the kēhau mist," (Pukui 1995:76 in Akana and Gonzales 2015:205; Fornander 1916-1920:381 in Akana and Gonzales 2015:205; Na Mele Aimoku 2001:94 in Akana and Gonzales 2015:204-205). The Nāulu rain is also referred to in the moʻolelo of Kepakaʻiliʻula when he offers a mele kānaenae to Mākoleʻā:

  Kau iluna ka wai a ka Nāulu
  ʻAlohi ʻula i ka pali o Koholālele e
  Lehulehu i ka luna o Koaʻekea a
  Paʻa pono mai Kona i ka ehu a ke kai a
  Kīpū lua i ke one o Kaiakeakua
  He akua ka hoa he ʻike ʻole mai e
  ʻAuwe ka mea aloha oia la e hoʻi a!
  The Nāulu showers which are placed above
  Appear to glow red in the light on the cliff of Koholālele
  Indeed, the multitudes are gathered at the heights of Koaʻekea
  But Kona is firmly embraced by the sea mists
  And there is two-fold calm upon the shore of Kaiakeakua
  A god [-chief] is the companion which is not seen
  But here is one that can indeed be cherished!

- **Kualau** is a rain associated with the Keauhou ahupuaʻa (Akana and Gonzales 2015:121). When referring to the kualau rain, Malo wrote: "He ua kualau, ma ka moana ia ua." *A kualau rain, this rain occurs at sea.* (Malo 1951:14).
- **Nahunau** means "to bite," and is characterized as a pleting rain associated with Keauhou (Akana and Gonzales 2015:184).
- **Noe** is a rain of Keauhou that is also referred to as Noenoe (Akana and Gonzales 2015:208). Noe is the name of a specific type of rain as well as a general term for mist, fog, vapor, or rain (Pukui and Elbert 1986:268).
- **ʻAwa** is a rain of Keauhou and is described by Pukui as a cold mountain rain (Pukui and Elbert 1986:33) Malo wrote: "He ua ʻawa, ma ka mauna ia ua." (*An ʻawa rain, this rain falls on the mountains),* (Malo 1951:14 in Akana and Gonzales 2015:15). Metaphorically, this type of rain is used to convey emotions of grief and tragedy and speak towards hardships of misfortune (Akana and Gonzales 2015:17; Pukui and Elbert 1986:33). This rain is also associated with being of high rank and divinity. The ʻōlelo noʻeau, "He lupe lele a pulu i ka ua ʻawa" is translated by Pukui as, *A kite that flies till it is dampened by icy cold [ʻawa] raindrops,* (Pukui 1983:85, #775). The phrase is interpreted by Pukui as being descriptive of someone "whose station has risen very high," (Pukui 1983:85). In the moʻolelo of Keaomelemele, recorded by Hawaiian historian Moses Manu, the birth of Hina's child is detailed. During this birth, many hōʻailona telling of the childs' high rank and kapu (scaredness) were observed. Among them was the downpour of the ʻAwa rain.
- **ʻAwaʻawa** is a rain noted to be the same as the ʻAwaʻ rain. It is a rain associated with the Keauhou Ahupuaʻa. As noted, its overall characteristics is a dark rain or fog most commonly associated with the mountain regions. Metaphorically, it can be associated with hardships and misfortunes.

The recollection of inoa ua (rain names) detail that the Palahī Puaʻa, Kēhau, Nāulu, ʻAwa, ʻAwaʻawa, Kualau, Nahunahu, and Noe rains sources of wai ua that belong to the study areas and broader Kona Moku, each with various characteristics and qualities. In the account detailed by Malo, the Nāulu rain is associated with agricultural practices of ʻuala cultivation (Malo in Akana and Gonzales 2015:206; Kamakau 1869:1).

Springs

The fifth paukū of the chant details the movement of water from the ʻāina, cycling back into the atmosphere in the form of clouds. The sixth and final paukū of He Mele no Kāne speaks to the recharge of the honua when water seeps underground and is retained in aquifers, springs and estuaries. "Aia i lalo, i ka honua, i ka wai hū. I ka wai kau a Kāne me Kanaloa." *Deep in the ground, in the gushing spring. In the ducts of Kāne and Kanaloa.*

E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i luna ka Wai a Kāne,	*Up on high is the water of Kāne,*
I ke ao uli, i ke ao ʻeleʻele,	*In the heavenly blue, in the black piled cloud,*
I ke ao pōpolo hua mea a Kāne lā, ē!	*In the black mottled sacred cloud of the gods;*
Aia i laila ka Wai a Kāne.	*There is the water of Kāne.*
E ui aku ana au iā ʻoe,	*A question I ask of you*
Aia i hea ka Wai a Kāne?	*Where is the water of Kāne?*
Aia i lalo, i ka honua, i ka wai hū,	*Deep in the ground, in the gushing spring,*
I ka wai kau a Kāne me Kanaloa.	*In the ducts of Kāne and Kanaloa,*
He wai puna, he wai e inu,	*A well spring of water, to quaff,*

He wai e mana, he wai e ola.	*A water of magic power–the water of life!*
E ola nō ʻeā!	*Life! O give us this life!*

"He Kaao no ka Manu ʻElepaio" detailed a **pūnāwai located in the uplands of Kahului, Kona**. In this story, Piʻiwai journeys ma uka and is able to collect water in his huewai before the mischievous ʻElepaio had his way with the calabash, causing it to leak. From this account, both the presence of a freshwater spring in Kahului, as well as the **practice of kānaka gathering water** from its source is revealed.

"He Moolelo Kaao no Kepakaʻiliʻula" included two references of springs. When Kepakaʻiliʻula and his uncles journey through Kahaluʻu Ahupuaʻa in search of Mākoleʻā for whom he is to marry, the author refers to Kahaluʻu as, **"i ka ʻāina kaulana i ka wai puka iki o Helani,"** which Maly translates as, "of the land famous for the small flowing spring of Helani;" thus revealing a **spring associated with Helani and the ʻāina of Kahaluʻu** (Malo 1919-1920 in Maly 1997:26). In another chapter of this moʻolelo, Mākoleʻā's father is challenged by Kepakaʻiliʻula for breaking his promise to wed his daughter to him. As a result, her father flees Kahaluʻu, leaving behind a favored **spring named Waikuʻi located at Kahaluʻu**. This spring is said to have been a favorite of the chiefs of Kona (Malo 1919-1920 in Maly 1997:26).

"Kaao Hooniua Puuwai no Ka-Miki" briefly noted the **Waiakekea spring** located near the stream that joins Waiʻaha and Kahului. This pūnāwai is described as being paved with ʻalā stones (dense waterworn volcanic stones) and surrounded by loulu (fan palms or *Pritchardia*). The passage translated by Maly reads:

> There too, you see — ka luawai ua kīpapa ʻia i ka pōhaku ʻalā e ulu pōhai ʻia e nā lāʻau loulu, o ka punawai i ka oʻioʻina pali o Waiakekea — a spring paved with dense [ʻalā] stones and surrounded by loulu palms, this is the spring of Wai-a-Kekea, which was near the trail side resting place... (IN Ka Hōkū o Hawaiʻi, April 9, 1914; Maly translator)
> [Wise and Kihe 1914-1917 in Maly 1998:3]

From these moʻolelo, it is recorded that freshwater springs are significant features associated with the study area–the pūnāwai found in the uplands of Kahului, the spring associated with Helani in Kahaluʻu, the Waikuʻi spring at Kahaluʻu, and the Waiakekea spring near Waiʻaha and Kahului.

The water that surges from the pūnāwai and all the other manifestations of water discussed in this section are indeed the life-giving waters of Kāne. The moʻolelo and oral traditions examined in this discussion are a testament to the presence of water associated with the study areas and broader moku of Kona, as well as the practices and traditions that are a result of, and sustained by the gift of wai.

He wai puna, he wai e inu, He wai e mana, he wai e ola.
A water of magic power–the water of life! A well spring of water, to quaff.

E ola nō ʻeā!
Life! O give us this life!

Additional Practices

Woven into the telling of these moʻolelo are tidbits of information that describe certain resources and other practices to occur within and around the study areas.

Regarding Agricultural Practices

As discussed in the moʻolelo concerning Puʻuokaloa, Kepakaʻiliʻula, and Ka-Miki, agricultural practices of ʻuala, kalo, and maiʻa cultivation occurred in the ahupuaʻa study areas (Kihe 1923:2; Wise and Kihe 1914-1917 in Maly 1999:3,12; Malo 1919-1920 in Maly 1997:25-26). A Kona ʻōlelo noʻeau offers additional insight into understanding that agriculture practices occurred in Kona. The ʻōlelo noʻeau, **"Kona, poʻo kuʻi"** which translates to *"Kona of the added head,"* cleverly articulates the farming practices that occurred in Kona by describing the imagery of a farmer carrying his/her load upon their shoulders (Pukui 1983:199, #1847).

Supporting these moʻolelo and ʻōlelo noʻeau that describe agricultural practices, authors of *Native Planters in Old Hawaiʻi*, E.S. Craighill Handy, Elizabeth Green Handy, and Mary Kawena Pukui, describe the environment of Kona and briefly discuss the agricultural practices associated with this moku. According to Handy, Handy, and Pukui, Kona was one of the places where the **cultivation of ʻuala and ipu** (gourd) was frequent (Handy, Handy, and Pukui 1972:14). It is documented that:

> The sweet potato and gourd were suitable for cultivation in the drier areas of the islands. The cult of Lono was important in those areas, particularly in Kona on Hawaii and ʻUlupalakua on Maui. At both of these places there were temples dedicated to Lono. The sweet potato was particularly the food of the common people. The festival of Lono, preceding and during the rainy season, was essentially a festival for the whole people, in contrast to the war rite in honor of Ku which was a ritual identified with Ku as god of battle.
> [Handy, Handy, and Pukui 1972:14]

Because of the specific crops and agricultural practices associated with Kona, Handy, Handy, and Pukui share that the akua Lono is associated with Kona; and therefore the **religious practices and ceremonies** such as **makahiki** are tied to this place:

> …he is plainly identified with Kona, Hawaii and is said to have introduced the main food plants, taro, sweet potato, yams, sugar cane, and bananas to Hawaii, and also *ʻawa*. Hogs were likewise identified with Lono, but there is no mention of his having brought them to Hawaii. The fact that the *Makahiki* festival and the rituals for inducing rainfall and fertility centered in Kona comes out clearly in the description of the *Makahiki*.
> [Handy, Handy, and Pukui 1972:523]

These traditional moʻolelo and historical accounts demonstrate that **agricultural practices and religious ceremonies associated with agricultur**e were significant traditions that occurred in Kona.

Regarding Fishing Practices

In the chapter of "Kaao Hooniua Puuwai no Ka-Miki," after defeating all of his opponents, Ka-Miki is gifted the **lūheʻe of Lālāmilo** (Wise and Kihe 1914-1917 in Maly 1997:13). He presents the lūheʻe to the aliʻi, Pili-nui-kapu-kuʻi-a-ka-lani-kua-liholiho-i-ke-kapu, and the moʻolelo recounts that the chief and his entourage excitedly ready their canoes to **lawaiʻa lūheʻe**–the method of fishing for gathering heʻe (octopus) with a lure. The passage details the following regarding the favored lūheʻe and the fishing practice associated with it:

> Now this leho (octopus lure) was a favorite of Pili's, and filled his eyes with pleasure. Pili's canoes were prepared to go octopus fishing – lawaiʻa lūheʻe as Pili wanted to see how the lure worked. The lure was made by securing the kākala (hook), and a sinker stone (ʻōahi) near the cowrie (on a wooden shaft) with three ply olonā (Touchardia latifolia) rope. When Pili mā arrived at the octopus fishing site, he removed the lure from a gourd container and set it in the water. The chief and all those with him were startled to see unlimited numbers of heʻe (octopus) rise up to the lure, and even lobsters were attached to some of the octopus (July 26, 1917)...
> [Wise and Kihe 1914-1917 in Maly 1997:22]

> As the lure was drawn up to the canoe, the heʻe followed it right into the canoe, and the moment the lure was covered, the heʻe stopped rising to the canoe. Pili returned to the shore of Niumalu at Oneō, and had the heʻe divided among all of the people. So the fame of the lure went about the island and many chiefs, fishermen, and people traveled to see the lure as well. It was in this way that Lālāmilo learned his lure was in Kona (August 2, 1917)...
> [Wise and Kihe 1914-1917 in Maly 1997:22]

Relayed in this account is information regarding the **lawaiʻa lūheʻe** practice to have occurred in Puaʻa, Kona at the shore of Niumalu at a place called Oneō (Wise and Kihe 1914-1917 in Maly 1997:22). Additional ʻōlelo noʻeau provide information regarding fishing practices occurring in the Kona Moku. ʻEka is a named wind of Kona whose presence is an environmental indicator telling of **signs optimal for fishing**. These ʻōlelo noʻeau regarding the makani ʻEka of Kona and fishing are as follows:

1467 **Ka makani kūkulu peʻa nui, he ʻEka.**
The ʻEka, the wind that sets up the big sails.
When the ʻEka wind blew in Kona, Hawaiʻi, the fishermen sailed out to the fishing grounds.
[Pukui 1983:159, #1467]

1690 **Ke ʻEka, makani hoʻolale waʻa o na Kona.**
The ʻEka breeze of Kona that calls to the canoemen to sally forth to fish.
Refers to Kona, Hawaiʻi.
[Pukui 1983:182, #1690]

As relayed in the ʻōlelo noʻeau that describes the winds of Kona, the arrival of the ʻEka wind meant the mobilization of fishermen in Kona who readied their canoes and headed out to their fishing grounds (Pukui 1983:159,182).

Regarding Recreations

The premise of Ka-Miki's moʻolelo is his journey to become the most skillful champion and defeat any challenger he is met with. Throughout this saga, Ka-Miki battles on a **kahua mokomoko leʻaleʻa** or contest and game known by the name **Hinakahua**, and is said to be located in the Kahelo plains of Puapuaʻa Ahupuaʻa (Maly 1999:10). Ka-Miki challenged his opponent, Kauakahiakahaola on the contest grounds in Puapuaʻa and quickly defeated him. From there, Ka-Miki and his brother journeyed onward to another **kahua** at Hōlualoa (Wise and Kihe 1914-1917 in Maly 1999:12). The author of this account names the different types of traditional games played at Hinakahua. The games associated with Hinakahua and therefore the broader ahupuaʻa of

Puapuaʻa are **maika** (bowling), **mokomoko** (wrestling and boxing), **leʻaleʻa** (pleasurable pastimes), and **hoʻopāpā** (contest of wit and strength), (Maly 1999:11).

Another type of recreation past time is kōnane, which is often likened to Hawaiian checkers. In the moʻolelo of Kepakaʻiliʻula, Malo references Waikuʻi spring. This pūnāwai is described as a favored spring of the chiefs of Kona. Included in the description of this place, Malo writes that this was also the area where aliʻi took pleasure in relaxing and enjoying a game of **kōnane** (Malo 1919-1920 in Maly 1997:26).

Additional Resources

Mention of resources included in the details of the selected moʻolelo of this report are significant to note in this discussion as the presence of resources is telling of the potential of particular practices to have occurred in the study areas.

The moʻolelo of Kepakaʻiliʻula describes Waikuʻi spring in Kahaluʻu as the favored pūnāwai of the Kona chiefs. The description of where Waikuʻi is located highlighted that the spring was paved with **ʻalā stones** and that the native **loulu** palm grew surrounding the pūnāwai (Wise and Kihe 1914-1917 in Maly 1998:3). The details of these resources existing in this area provides information that other practices associated with these resources could have occurred.

A spring paved with ʻalā stones indicates that ʻalā was available in this area. Pukui describes that ʻalā is a type of stone that could be used for pōhaku kuʻi ʻai (poi pounders), adzes, and hula (Pukui and Elbert 1986:16).

Loulu is an endemic fan palm of Hawaiʻi. Botanist, teacher, and historian, Beatrice H. Krauss, author of *Plants in Hawaiian Cultural*, offers a description of loulu:

> Loulu is a name applied to several native Hawaiian fan palms. The leaves are borne in a cluster at the top of a ringed trunk, the rings being the scars of once-attached leaf stems. The leaves are very large, most are rigid, ordinarily broadly wedge-shaped and shallowly cut with numerous bifid segments (twice-divided clefts). The underside of the leaves, the strong spineless leaf stems, and the flower stems may have a waxy or feltlike covering. The numerous flowers occur in clusters; they are perfect, having a three-toothed calyx and a tubular corolla with three segments, the segments falling off upon the opening of the flower. There are six stamens, and a three-lobed and three-celled ovary, one cell only of color ranging from green to yellow to brown or black at maturity. It is externally smooth, with a fleshy or fibrous later covering a thin woody shell, which, in turn, covers a hard seed. [Krauss 1993:216]

The characteristics of this plant, and specifically its leaves, presents itself as being pliable. Krauss also notes that the loulu leaves were used in **weaving practices** (Krauss 1993:31). Kānaka ʻŌiwi scientist, mānaleo (fluent Hawaiian language speaker), and educator Dr. Isabella Abbott published *Lāʻau Hawaiʻi: Traditional Hawaiian Uses of Plants* in which she discusses the various uses and cultural significance of Hawaiʻi's plants. Regarding loulu, Abbott notes that "*Loulu* palm (*Pritchardia* species), used to construct *heiau loulu*, where gods of fishing were seasonally propriatied," (Abbott 1992:17). The insight that Abbott provides deepens an understanding of loulu with association to constructing a type of temple referred to as **heiau loulu**. According to Abbott, this heiau is associated with the fishing gods and therefore, **fishing practices**.

Ke Puhi a Kaleikini is one of the moʻolelo that appeared in the article series "Na Hoonanea o ka Manawa" regarding Kona that was written by Kihe. This particular story was published in *Ka Hoku o Hawaii* in 1923 and described a blowhole named Hiʻiaka-noho-lae. As the story recalls, Hiʻiakanoholae is the blowhole that is located in the ahupuaʻa of Keahuolū. The ʻehukai or sea spray that the blowhole would shoot was problematic for the fact that the salt of the spray that blew over the ʻāina caused the land to dry so that no vegetation could grow. In order to solve this problem, the author shares that a man named Kaleikini covered Hiʻiakanoholae with branches of kauila. In regards to the type of resources known of this area, from this account we learn that the native **kauila** (*Alphitonia ponderosa*) tree was present at Keahuolū.

Kauila, also seen spelt as "kauwila" is a plant endemic to Hawaiʻi. Krauss writes that:

> The name *kauila* or *kauwila* is given to two different native Hawaiian trees, both members of the buckthorn family: *Alphitonia ponderosa* and *Colubrina oppositifolia*. The former is found on all six of the main Hawaiian islands. It has alternate, thin, oblong to narrow leaves that are grayish or rusty-woolly on the underside; petioles are up to an inch long. The wood is hard and red-and-black streaked. The latter species has opposite, thin, pale green, ovate or oblong leaves that may be up to seven inches long; petioles are up to two inches long. A conspicuous gland is found at the base of each vein on the underside of the leaves. The wood is hard (even harder than the first-mentioned *kauila*), heavy and dark red. *Colubrina oppositifolia* is only found on Oʻahu and Hawaiʻi.
> [Krauss 1993:182]

The characteristic of kauila is that it is a hard wood. Abbott shares that ʻōʻō (digging sticks) used for farming and other **agricultural practices** were made of kauila (Abbott 1992;11-12). In a discussion regarding featherwork and **ceremonial regalia**, Abbott writes that the poles in which kāhili (feather standard) which were symbolic of royalty were suspended and carried were primarily made out of koa *(Acacia koa*) and kauila (Abbott 1992:107-108). Kauila was also used in creating **hula implements** and was the wood of choice for making kālaʻau (stick dancing), (Abbott 1992:120). Kauila was used in **religious ceremonies** and in **carving** sacred images (Abbott 1992:20,114). Particularly, the wood of kauila was used in ***makahiki ceremonies*** as the staff of the akua Lono was made of kauila (Abbott 1992:20-21). Abbott writes that it is likely that kauila was used in these types of religious ceremonies dedicated to Lono because the word kauila means lightning, which is one of the kinolau or manifestations of Lono (Abbott 1992:21). Another usage of kauila was seen in the making of **weaponry**. Kauila was the hardwood used in making pāhoa or daggers (Abbott 1992:111).

Boundary Commission Proceedings Of The Boundary Commission Lands Of: Keahuolū, Puaʻa, Waiʻaha, Kahului, Puapuaʻa and Keauhou – by Kumu Pono Associates

The Māhele and Land Grant program of the Kingdom of Hawaiʻi saw a rapid growth of business interests. In an address before the Annual Meeting of the Royal Hawaiian Agricultural Society (1857), J. F. B. Marshall spoke of the growing business ventures in the islands which included —the cultivation of sugar and coffee; harvesting pulu for mattresses and pillows, and kukui for oil; ranching and export of hides, tallow and wool; farming for trade and export, and salt manufacture (see *Pacific Commercial Advertiser*; November 5, 1857). As a part of growing business interests, large land owners pursued the establishment of formal boundaries on their land holding, in order to protect their private property "rights."

In 1862, a Commission of Boundaries (the Boundary Commission) was established in the Kingdom of Hawaiʻi to legally set the boundaries of all the ahupuaʻa that had been awarded as a part of the Māhele. Subsequently, in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them (cf. W. D. Alexander in Thrum 1891:117-118). Rufus A. Lyman served as the Commissioner of Boundaries for the Third Judicial Circuit (J. C.)—the island of Hawaiʻi. The primary informants for the boundary descriptions were old native residents of the area being discussed. Some of the native witnesses were born as early as the 1770s, and the youngest (for the early proceedings, born at least by ca, 1840.

Most of the witnesses were either born on in the ahupuaʻa under consideration, or they had lived there for extended periods of time. All of the witnesses had learned of the boundaries from their elders, and described the landscape by the nature of the terrain, presence of resources, land use, and features which were of significance to the residents of the land. Their testimonies demonstrate the relationship of lands, residency, practices and access to resources that span the biocultural landscape from the ocean to the mountain lands and top of ahupuaʻa being described. Some of the testimonies also describe the relationships shared between ahupuaʻa in management of the natural resources. These records describe many resources which are in traditional lifeways.

The native witnesses spoke in Hawaiian, and their testimony was usually translated into English and transcribed as the proceedings occurred. Readers here will note in the verbatim transcript prepared from the original handwritten documents that there are often inconsistencies in spelling of particular words such as place names, people names and natural or man-made features (see Appendix D). Furthermore, it will be noted that there are often multiple spellings of the same name or word. Examples of this include, but are not limited to Honokōhau, written as "Honokahau," and Hienaloli, written as "Hinaloli, Hianaloli, Hiananaloli, and Hianalole," and pūhala, written as "puuhala" etc.

Over several years of researching the Boundary Commission testimonies, we have also observed that often, when two of the same vowels were written by the original translator/transcriber, it indicated that he heard a lengthened pronunciation of a particular vowel. This emphasis of pronunciation is now indicated by a macron mark—for example, the place name "Kahiihiia" (where the two Honokōhau and Kealakehe meet one another) would now be written "Kahīhīa."

The narratives include the testimonies, surveys and proceedings for the ahupuaʻa cited at the top of this section—several of the ahupuaʻa were further identified by "nui" (big/large), "iki" (little or small), and by numbers such as "1, 2, 3," etc. The narratives also cover some details from the

adjoining lands which were not part of the Commission proceedings. We have used underlining and square brackets in selected narratives to emphasize references of importance—those which identify noted practices, resources and other interesting descriptions that identify valued cultural assets.

As a part of the certification of title and boundaries, surveyors produced a series of maps covering the ahupua‘a. Some of those maps have survived that passing of time, and help us place given locations and resources (natural and manmade). When available, reductions of the maps are cited as figures in their respective Boundary Commission proceedings.

Readers, please note that the date sequence of the applications, witness testimony and issuance of certificates are not always recorded in chronological sequence. Sometimes the testimony is cited (by date) previous to the title holder’s application of survey and certification.

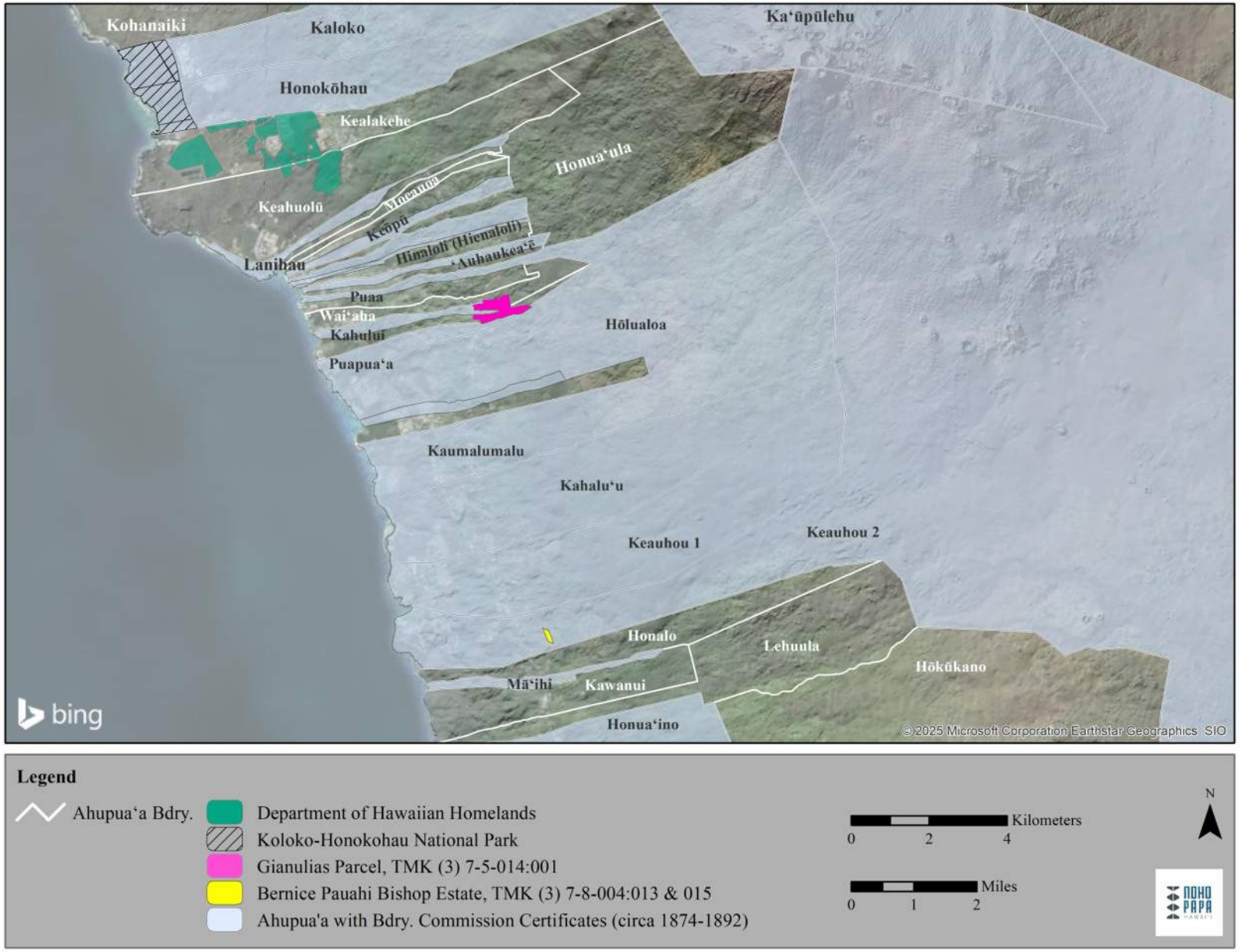


Figure 15. GIS map depicting ahupua'a with Boundary Commission Certificates

Excerpts from the Boundary Commission for ahupua‘a in and around study parcels – by Nohopapa Hawai‘i

Kamehameha Schools Parcel Boundary Commission Testimony Discussion

Kahului Ahupua‘a was the subject of a Boundary Certificate, it includes the Kamehameha Schools well site subject parcel (See Table 2). The following disussion details the kanaka who lived in these ahupua‘a and gave testimony, as well as excerpts from the testimony and certificate tied to places, practices and resources in the subject ahupua‘a. Also see full Keauhou testimonies in Appendix D.

Keauhou Ahupua‘a

Table 2. Select Ahupua‘a with named localities and kama‘āina cited in Boundary Commission proceedings in Keauhou Ahupua‘a, location of the Kamehameha Schools subject parcel.

Ahupua‘a	Place Names	Kama‘āina Residents
Keauhou 1st	Halelaau Kamauae (Kamauai Heiau) Kanakaliikapu Kewa Nanunuakalupe [?] Napueuala Ohiki Paaniau (Paniau) Pohakunahaha Puainako Waikui Waikulukulu	Kakio Keakaikawai Kuluahi Lono
Keauhou 2nd	Aahuwela (Ahuwela) Ahua Um Anakolekolea Haalulu (Ana Halulu) Haliilaukoa (storied place of Umi) Hapukaa (Hapuukaa) Honuaula Hill (Puu Honuaula) Hopea Huaikaumauma [74] Hualalai Judd road (Boundary also called Nahuina) Ka Hale o Umi Kaalapuali (Kealapuali) Kaawa Kaekuakapuaa Kahooplu	Aalona Hukikee Kahilo Kahueai Kahulialo (w.) Kakio Kamakainai Kanahuna Kaoiwi Kapohakaimokumahe [?] Kauluahi (Kuluahi) Keaka (w.) Keakaokawai (Keakaikawai) Kealoha Maui

74 Huaikaumauma – “junction of Kaumalumalu, Kahaluu and Keauhou. it is an ahua in the koa woods, where the canoe makers used to have a heiau.”

Ahupua'a	Place Names	Kama'āina Residents
	Kahulinanui Kaimuhapu (Kaimuhapuu) Kakai a lae Kalalakoukolo Kalalua Kaluamakani Kalulu Kamakaulaula Kamoike Kamomoku Kaneeneenui Kanekii Kanohoana o Umi Kanupa Kaonohi Waiau Kapapakauheana Kapukaiki Kauhi Kauhikahua Kaukahoku Kawahapele Keahialoa Keahou Keakui Kealaehu Keanaaipu Keanaakala (where canoe makers used to live) Keanakiha (Keana o Kiha) Keanaokalehuna Keanapaki Keikinanahu	Keeaumoku Kehepo Kekai Keliikanakaole Keohi Komaka Kupakoa Makaike Mauna Nauwe Niihoa (Nihoa) Palauolelo Palea Papa Puhi Uluhiwa

Keauhou is divided into two ahupua'a, Keauhou 1 and Keauhou 2. Listed below in this section are selections from Boundary Commission testimonies recorded for Keauhou 1 and Keauhou 2 Ahupua'a.

Kakio, kama'āina of Keauhou, mentions **Ohiki**, an old cultivating site, **Waikulukulu** and **Waikui**, which are both caves with water inside.

> Kakio, K., Sworn
> I have lived on Keauhou until I am an old man and know the boundaries of the land. Kahaluu bounds Keauhou on the North side. The boundary at seashore is a pali called Paaniau [Paniau] and a long wall from Kewa to road; thence mauka to Puuainako, an oioina on old trail; said trail being made for the ohia trees, which in the time of Governor Adams were drawn down to Kailua for a church [Mokuaikaua]. Said church was burnt some years ago.
>
> From Puainako to Kanihinihula [Kahinihiniula], at the mauka Government road where there are two ahua pohaku, on the boundary; thence to the North side of Awapuhi, in the woods; thence to Ohiki, an old cultivating ground on the boundary; thence mauka to Napueuala, an oioina; the boundary being on the

> North side of it and Keauhou in the middle of it; thence to Waikulukulu, a cave with water in it; thence to Halelaau; these places are all on the boundary of Keauhou, they're on Keauhou 1st; between [page 318] Napueuala and Nanunuakalupe [?]. I do not know the boundaries on the mountain of Mauka and of lands. Waikui is a large cave of water; the boundary half way between said cave and Ohiki.
>
> I cannot point out boundaries in the woods. Keakaiwai is a kamaaina, and used to go into the mountain with his father, Kuluahi.
> [Boundary Commission Testimony: Keauhou 2 Ahupua'a, Kakio 1873:v.A 1, p270]

Lono, kama'āina of Keauhou, mentions a fishing heiau named **Kamauai (Kamauae)** and expands upon Ohiki mentioning that it was a spring as well as an old mahi'ai place in the woods.

> Lono, K., Sworn
> I was born at Keauhou at the time of Kaoku [Mai Okuu, 1804-1805] and have lived here most of my life; Lived in Kau a few years; am a kamaaina of the boundaries of Keauhou as far mauka as the Government road. The boundary at the shore between Keauhou 1st and Keauhou 2nd is at Kamauae [Kamauai], a heiau for fishermen situated above the beach, on the hill where the houses stand; thence mauka to a breadfruit tree; thence to the head of Holua; thence mauka to Kanakaliikapu, an ahua pohaku at the Government road; this is as far as I know the boundaries. Have heard that the boundaries of the two Keauhous run through the woods to Palahinui, where koa trees grow on Keauhou 2nd. Keauhou is bounded by the sea and the land has ancient fishing rights extending out to sea.
>
> Kahaluu bounds Keauhou 1st on the North side, the boundary at seashore is Paaniau, a large stone wall reaching from shore a short distance mauka. There is a pali at seashore by the same name; thence mauka to the Government road; thence straight mauka on aa to two piles of stones at government road. Kahinihiniula is on the high ground, just before you decend [sic] into the hollow; going from Kealakekua to Ohiki, a spring and old mahiai place in the woods. I do not know boundaries above this place. Have not heard where the land ends.
> [Boundary Commission Testimony: Keauhou 1 Ahupua'a, Lono 1873:v.A1, p318-320]

Keakaokawai, a kama'āina of Kona, mentions a plethora of place names and mentions six different watering holes and also **Kalulu** and **Kilohana**, which were places that he and his father would catch birds.

> Keakaokawai[75] K., Sworn
> I was born at Kealakekua a few years before the death of Kamehameha 1st [in ca. 1810] (Note; this is the same witness that was on Kahuku boundaries). I moved at time of Kaua o Kekuaokalani (1820) to Lehuula (was grown at that time); I now live at Hookukano [Hokukano], North Kona and am a kamaaina of Kona.

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[75] "Keakaokawai" is usually written as "Keakaikawai." He was a notable kama'āina witness across a number Kona lands.

I used to go on the mountain with my Father collecting sandalwood and catching birds; his name was Kauluahi, and old bird catcher and kamaaina now dead; Honalo bounds Keauhou 2 at sea shore on South side; A pali aa called Lekeleke is the boundary at sea shore between these lands; thence the boundary runs mauka along lands on Honalo sold to different parties on Honalo, to a place called Nohomoanahoaiku, in the woods on the makai side of pali; Thence along the Government portion of Honalo to **Kapapakauheana, a round water hole** in the woods in the centre of Honalo. Thence the boundary runs mauka to **Kaimuhapu [Kaimuhapuu], a water hole**; thence to Kipukauki, most of this place is on Keauhou, and a small portion on Honalo [page 256]; said land being now overgrown in aa; thence to Komomoku, a pali which is the boundary between Keauhou and Honalo.

There Keauhou turns south and cuts Honalo off, nearly through the woods; thence to Kaukahoku, junction of Lehuula nui; said place is an Ahuapohaku, a small hill of pahoehoe covered with scrub ohia and mamani; thence along Lehuula nui to **Keanakiha, a small cave** where natives used to sleep; Thence to an ahu pohaku, mauka of the ana, built in olden times and now knocked down by the goats; this is an open spot with scrub ohia and mamani growing all around; thence along Lehuulanui to a place called Kepuhi at Governor Adams road through the woods, scrub koa and other trees growing there.

The land of Hookukano cuts of Lehuulanui at Governor Adams road; thence along the land of Hookukano. This land runs mauka. In olden times, Keaumokunui [Keeaumokunui], the Alii nui of Keauhou claimed all the **geese** on Hookukano, Kealakekua and other lands and used to divide the geese. The **uwao [uwau or ‘uao]** were left for konohiki of these lands. The land was not the property of the Keauhou chief when my Father and I divided the geese with the Keauhou konohiki; but the Uwau we had to divide with the Konohiki of Hookukano and not with the konohiki of Keauhou, unless we took the uwao on Keauhou; thence mauka from Kepulu to Kamoike along Hookukano, the aa on Keauhou, and from thence the boundary runs to Keanaakala, a small cave, thence to Kikikiaeae, a long hill (puu lepo) at mauka corner of Hookukano, trees of all kinds growing all around; thence South again to Kamakaulaula, pahoehoe along mauka end of Hookukano in woods; thence up aa called Kainapahoa; thence down on to pahoehoe to a **cave called Aahuwela**, corner of Kealakekua and Hookukano, said **cave used to have water** in it; thence along Kealakekua, running mauka about one half of a mile to Umi’s road. Kanohoana o Umi; aa with mamani trees growing both sides of the road. When I used to go up with my father, these were only a few mamani trees growing makai of the road, now there are a great many, both sides of the road.

[Thence] turn south again across aa to **Haliilaukoa [page 257] (where Umi sat and they spread Koa leaves for him; old tradition)**. Few koa and ohia trees grow there; they are mostly mamani; thence the boundary runs up an Ahua to Kanekii, a small water hole which dries up in dry weather. Keauhou mauka and Kealakekua makai; thence to Kalulu; Keauhou mauka and Kealakekua makai (pahoehoe); which is where we used to catch birds in olden times; the Uwao [uawau] belonging to both lands. At Kanekii, the boundary leaves Umi’s road and goes makai of it; From Kalulu to a place called Kakai a lae Koa (Koa grove on Pahoehoe, the South East corner[)]; thence turn makai along Kealakekua, to a large

mawae called Kawahapele; thence down along said mawae to Puuloa, a pali on the mauka corner of land of Honaunau. The woods extend there now; In olden times there were hardly any trees there. I have forgotten the names of the places beyond here on boundary of Keauhou and other lands along there. I have not been along there often. Kanupa is the place where Keauhou joins Kaulanamauna, a Kipapale ana, junction of Keauhou, Manuka and Kaulanamauna. All kinds of trees grow there, also small spots of pahoehoe in the aa. I have only been there once when I went with my father before I was fully grown. Do not know as I could find it now; thence mauka to Kilohana, on an aa flow where we used to catch birds and where Kahuku joins Keauhou.

Thence along Kahuku to Kulauala, on Umi's road; From Puuloa to Kanupa Keauhou used to take the pahoehoe above the woods and the Kona lands reached to the mauka edge of the woods from Kilohana along Kapapala to Pohakuhanalei, a hill on the top of the mountain [Mauna Loa]; thence the boundary runs down to Kolekole, a hill where Humuula joins Keauhou and cuts Kapapala off; thence down the side of the mountain to Kaaawa, along Humuula, there Puanahulu [Puu Anahulu] joins Keauhou and Humuula stops. Kaaawa is pahoehoe with small ohia trees, and also other kinds of trees growing there; thence the boundary runs to a hill called Kalalua, along the land of Puanahulu. A large hill can be seen from Ahua Umi, which is at Hualalai.

Thence the boundary runs down to pili land, to Palahinui, along Puanahulu; thence to Hapukaa, on Umi's road to Waimea [page 258] on the pahoehoe; thence Kanupa 2, a cave in pili land, now covered with the lava flow of 1859 to Kiholo; thence to Kanupa 3, a cave hear the base of Hualalai, where the land of Puuawaa [Puu Waawaa] joins Keauhou; thence the boundary runs up the mountain to a cave on the side of the mountain, above the woods called Waikulukulu, thence to Puuakawai, an old water hole now filed up by cattle tramping around it; this place is the junction of the land Kaopulehu [Kaupulehu] with Keauhou.

Thence the boundary runs to the mauka side of a hill called Haalulu in a hollow between the hill and an Ahua; Thence along to Kaluamakani, a large hole or crater; there Kapulehu [Kaupulehu] ends and Honuaula joins Keauhou; thence along this land to Puulalaau [Puu Laalaau], a hill where the land of Puuaa [Puaa 1st] is on the makai side, Honuaula is very narrow at the mauka end. The boundary of Keauhou runs along the mauka edge of woods above Puulalaau, and along to Mawae, there the land of Kaomalumalu [Kaumalumalu] joins Keauhou; thence along to Kamomoku to Judd road, on the mauka edge of the woods; thence along what used to be the edge of the woods (the trees are now all grown along Kaumalumalu) to aa where Kahaluu joins Keauhou.

I do not know the boundaries between the land of Kahaluu and Keauhou, or between the two Keauhous.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256]

Kahilo, is a kamaʻāina of Keauhou, mentions several important features including a crack in the rock that they would place the dead called Lekeleke, and a spring called Waio.

Kahilo K., Sworn

I was born at Keauhou at the time of the building of the first Kiholo [ca. 1810-1812], and have always lived there, in Kona, Hawaii.

Honalo bounds it on the South side, an awaawa and ilina kupapau (a crack in the rock where the natives used to put their dead) called Lekeleke is the boundary.

Thence the boundary between these lands runs mauka, the Kualapa on Honalo and Awaawa on Keauhou to Mawawae Nuuanu at the Government road mauka; thence follow up Kualapa an awaawa to Kamomoku, a pali surrounded by small trees, koa, ohia, mamani, naio, &c. The tall woods are makai of this place; there is an ancient pile of stones here at the mauka corner of Honalo. There the boundary turns towards Kau to lae aa, along Honalo, to another Ahu built in olden times, which is at the corner of Honalo and Lehuulanui, called Kukaiaina. The mamani mostly growing mauka of this place. Thence along Lehuulanui to Palihoomana on Honuainonui; thence along Honuaino (called Kamomona) (J. G. Hoapili says it is Makaike's land, Honuaino III); thence to a small pali, along Honuaino, in scraggy woods to Waio, Governor Adams road crossing the boundary at the Pali Hoomana [illegible] where Honuaino ends, and where Hookukano joins Keauhou. Thence along Hookukano to Waio, which place is on Hookukano and Kanauweuwe [Kanaueue]. I do not know which side of the spring the boundaries are; pili and trees are growing around there; the mamani trees extend makai of this point.

Thence along Kanauweuwe the boundary turning directly mauka to a hill called Kikikiaeae. I do not know the names of the lands that join Keauhou here. From Kikikiaeae, which place is on Keauhou, I do not know the boundaries beyond Waio.

I have heard that Kealakekua joins Keauhou and other Kona lands run up to the mamani and to the poha; Pahoehoe that breaks through when trod upon. My Parents and Grandparents used to go bird catching for feathers as far as Waiea, and they said that there were only pu-keawe [pukiawe] trees on Keauhou. I have heard that Kahuku of Kau joins Keauhou on Mauna Loa, but I have not heard where. Kamauae [Kamauai], a cave at the sea shore is the boundary between Keauhou 1st and Keauhou 2nd; thence the boundary between these two lands runs mauka to the Poo Hoohia, above Keauhou; thence into groves of ohia trees, below the Government road, to a cave called Kaekuakapuaa; thence to a place called Kanokaliikapu [?], which is on the Government road. An Ahu used to stand at this place, but was knocked down when the road was built. Thence the boundary runs to Laaunui, a large ohia tree; said tree is in the woods about the end of where people work.

Running from the Government road mauka, there is a kualapa, and Keauhou 2d is on the low ground, this side, and Keauhou 1st on high ground. From Laaunui the boundary runs to a pali called Paakai; Keauhou 2d at the foot and Keauhou 1st on top of the pali. Thence along the pali till you come into koa woods and aa, there the pali ends. Thence out of the woods to Piipaa, a cave on Keauhou 1st; the boundary being on the Kau side of the cave. Thence turning toward Kohala the boundary runs to Kawaha o Pele, a hill with a crater; here Keauhou 1st ends and Kahaluu; There are a great many hills with craters there, tall woods on lands makai and mamani on Keauhou; Thence to Kawaha; Pele 2d. I do not know what lands join Keauhou there; thence to the Government road; thence to Hoikekanaka.

(Kahua hoike kanaka o Umi); thence to Pohakuloa, a large rock by a water hole, on the Kau slope of Ahuaumi, above Hualalai. Thence along aa to Waiakapee, a small water hole on the aa; Keauhou does not extend to the top of Hualalai, but runs along the Kau slope of the mountain; Honualua [Honuaula] takes in the top of Hualalai, [page 262] and joins Keauhou at a hill called Kaumoku which is on Honuaula at Hoikekanaka. From Waiakapee, I have been told the boundary runs to Ka-amoku, but I have not been further than Waiakapee. Have heard that Waikoloa, Kaohe, and Humuula bound Keauhou on the further side.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261]

Palea, a kamaʻāina of Kalahiki, mentions some information regarding bird catching in Keauhou as well as a spring named Lumia.

Palea K., Sworn
I was born at Kalahiki, South kona, Hawaii and have always lived there; was born at the time of Kuewai o ka Lae [Kui wai o Kalae, ca. 1782]. Know the land of Keauhou. Lekeleke is the boundary at sea shore between Honalo and Keauhou. I know the boundaries between Kalahiki and Keauhou. My Father, Kanahuna (now dead) was appointed by Keauhou konohiki to watch the bird catchers on our land and other lands, to see if they did not take the geese and uwao [uwau], which belonged to Keauhou and he told me the boundaries between these lands and Keauhou. He said that Kalahiki ran through the woods; small ohia trees, kapiopio, and mamani to the pahoehoe; then you come to Keauhou. I do not know where the boundary of Kauhako and Kalahiki on Keauhou is. Thence the boundary runs along the head of Kalahiki to lae aa, in lae aa Waiea joins Keauhou cutting off Kalahiki. Thence along above the mamani to Lumia, junction of Honokua (a punawai) water hole on a hill. I do not know the boundaries beyond this point; Have seen Umi's road, when we were on the mountain gathering sandalwood. Have heard that Kahuku joins Keauhou.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Palea K. 1873:v.A1, p263]

Kahulialo, a kamaʻāina of Kona who shares the same father as Keakaokawai, mentions similar localities as Keakaokawai as well as **Makaulaula**, a place they lived whilst bird catching, and Ahuwela, which is a cave with water in it.

Kahulialo W., Sworn
I was born at Honalo, North Kona, Hawaii on a place called Kealaehu, and at the time of the first Kiholo [1810-1812]. Know the land of Keauhou and part of its boundaries, mauka, in the woods and above the woods. My Father, Kuluahi, who was the kamaaina of Kona, on the mountain, showed them to me. Kaana o Kiha, a cave with a large pile of stones mauka of it, is the boundary between Keauhou and Lehuulanui and the corner of Honalo. I have not been with my Father along the boundary of Honalo and Keauhou. At that time this place was above the woods and you could see from Kiha to Waio, now the trees are all grown up. Thence the boundary of Keauhou runs along Lehuula to lae aa and to Kepulu, a spot where there is soil and no rocks mauka of Palihoomana; there Lehuulanui ends, and the land of Hookukano joins Keauhou. The boundary between Hookukano and Lehuula is a small stream of aa on the South side of Kepulu; from thence the boundary runs along Hookukano to Kiikiaeae, an awaawa where by husband used

to live. A large kualapa on the left side, as you face mauka, is the boundary. Thence to Makaulaula, where we used to live when bird catching. Thence to Kaonohi, a cave; thence to Ahuwela, a cave with water in it; there Hookukano ends and Kealakekua joins and bounds Keauhou; thence to Haliilaukoa (I do not remember the names of all the points along Kealakekua[)]. Keakaokawai K. is the one who knows them all. I have not seen the place called Haliilaukoa (An old tradition says Umi used to sit there because he liked [page 264] the koa). Thence to Kalulu. I have been there; there is a water hole there and it used to be a place for catching birds. Kolekole is an Ahua with koa on it in the middle of Kealakekua, and the boundary of Keauhou is just mauka of it. The place called Kukai is the further boundary of Kealakekua. I have been there with my Father and he told me it was on Kealakekua. Have heard Keauhou turns makai at this place. Honaunau ends in the mauka edge of the woods. I do not know the boundaries (perhaps Kawahapele is the boundary between Kealakekua and Keauhou going towards the woods.[)]

I have been to Pupuawai. It is on Keauhou. Honaunau does not reach there. [illegible side note] My Father also told me that Kapapala, Humuula and Kaohe reached Keauhou on the top of Mauna Loa.

Na Elemakule where the lava flow went that destroyed Kiholo [1859], is where Kaohe joins Keauhou at Uauakahoa [?] cave. Have not heard where Kahuku joins Keauhou. Uauakahoa cave is where the Kaohe Elemakule came to at the time of the settlement of lands. These are all the boundaries that I know.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263]

Kakio, a kamaʻāina born in the time of Kamehameha I, mentions a few place names including Holua, which was an ancient sliding place.

Kakio K., Sworn
I was born at Keauhou at the time Kamehameha I came from Hilo to Kealakekua and from there to Honolulu, at the time of Oku [Mai Okuu, 1804-1805]. I have always lived here and know the land of Keauhou 2d and its boundaries. I used to go after sandalwood on the mountain, with Kapohakaimokumahe [?] (now dead). He was a kamaaina in the mountain and used to go across to Hilo. Lekeleke is the boundary between Honalo and Keauhou. at seashore is kualapa; Keauhou being at the [page 266] foot of the ridge on this side; thence the boundary runs mauka along Honalo to Kukuikomo on the makai side of the Government road; thence along the awaawa to the mauka side of the Government road; place called Leiohapu; thence along awaawa into the woods; I do not know the boundaries. Know a place called Palahinui, a cave where people used to live. Honalo ends makai of this cave at the mauka edge of the woods. The mamani and scrub koa being on Keauhou. Have heard that Kealakekua and other lands, only run through the tall koa; have never been there.

The boundary at shore between the two Keauhous is at a place called Kamauae [Kamauai] at the beach; Thence it runs mauka to the head of Holua (an old sliding place); thence to the South side of Keahialoa, the boundary running in a hollow; thence to Mauka of the Government road to a place called Kanaokeliikapu; thence mauka in the woods to Kualapa Kahoopulu; this is as far as I know the boundary

in the woods. On the mauka side of the tall koa trees at Nanunuakalupe [?], an oioina, Keauhou 1st ends; and the boundary runs towards Kohala.

Kahaluu ends at the mauka edge of the tall koa trees. They say in the days of Keauaumoku [Keeaumoku] the Akule used to belong to Keauhou 2d and the birds to Keauhou 1st, but the Chief of Keauhou 2 married a chief of Keauhou 1st and after that all the fish were given to Keauhou 1st and the birds and land mauka to Keauhou 2nd.

Mauna Loa is called the Kuaiwi of Kau. I have been told that Keauhou joins Hilo and Hamakua on Mauna Loa, at the edge of the aa flow from the summit of the mountain, the pili is on Keauhou and the aa on Kaohe. Have heard Kaupulehu joins Keauhou, but do not know where.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A1, p266]

Papa, mentions a few names that have also been mentioned by other testimony.

Papa K., Sworn (a very old man)
I was born at Kahaluu at the time of Holuanui, and have always lived there. Kaumalumalu ends at Mawae, mauka of a hill called Hiinau; thence along Kaumalumalu. Kaupulehu joins Keauhou and takes in Hualalai. Keauhou on this side. Kahulinanee [?] is on Napu. Kau joins Keauhou at Kalulu near the top of the mountain, at grove of mamani and pukiawe. Keauhou on this side and Kau above to top of mountain. (I used to go to the mountains after sandal woos, but never went after birds.[)]

Have always heard that Kahuku cut all off. South Kona Lands, and takes the mountain. Keauhou ends at Puulehua, above Kainaliu, above the wood at the foot of the mountain. I heard this when I used to go after sandal wood. Do not remember the names of the Kamaainas, who are now all dead. Kau is on the other side of the mountain.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Papa K. 1873:v.A1, p268]

Waiau, a kamaʻāina from North Kona, mentions Kanekiʻi and Puʻulepo, as well as provides some information surrounding bird catching customs and places in which they used to fight with Kaʻū people.

Waiau K., Sworn
I was born at Kanauwaue [Kanaueue], North Kona, Hawaii at the time Kamehameha 1st returned from Honolulu; at the time of Papakee. Lived at Kainaliau [Kainaliu] until about eleven years ago when I moved to Kealia, South Kona [page 268].

Know the land of Keauhou, used to go after birds with my father, Nauwe, an old bird catcher and he pointed out the boundaries to me, as it was kapu to go after birds and not divide them with the konohiki; used to go frequently not vary far above here. Honalo bounds Keauhou 2 on the South side, as you go into the lower edge of the woods. I do not know the boundaries.

A place in Okolea, in the woods called Kaimuhapu, a water hole, is on the boundary between Honalo and Keauhou; Thence mauka to Kipupuike [Kipukaiki], a small spot of soil with scrub ohia in the toll woods; the tall ohia being on the aa each side of this place; thence mauka to Kamomoku, a small pali, at the upper edge of the woods, thence to Keikinanahu, close to scrub trees of various kinds; There Honalo ends. Thence along the head of Honalo to Kaukahoku, a large rock at the corner of the land Lehuulanui; thence along Lehuula to Keanakiha, an ahu pohaku mauka of a cave; thence to Kepulu where there is soil. When I was young there were no trees there but now the trees have grown up.

Governor Adam's road is at the end of Lehuulanui; thence along Hookukano; thence mauka along the Government road, between two aa flows to Kamoomoo; thence to Keanaakala, a cave; thence to Kikikiaeae, where we used to live. The canoe makers of Hookukano also lived there. There is a hill called Puulepo, with a crater on it. There is a water hole makai of said hill. Thence the boundary turns directly towards Kau to a place called Kamakaulaula, a pahoehoe kipuka in laau, mamani growing all around; thence to Aahuwela, a cave with water (I do not know the place called Kanapahoa) there Kealakekua cuts off Hookukano; from thence the boundary runs along Kealakekua to Haliilaukoa, a place near Umi's road; Kuluahi said it reached to Umi's road, but this place is only near it. It is on the soil across aa, where bird catchers used to live; thence to Kukai, along a grove of koa trees, small pahoehoe. I do not know the points between. We did not go beyond there in olden times. We used to fight with Kau people here. Kuluahi and Kalalahu's father were chased by Kau people a little above Pupuawai. [page 269]

I do not know boundaries above this point. Have heard that Waiakea, Humuula and Kaohe run up the mountain. Kaalaala had a road extending to the top of Mauna Loa. I do not know where Kahuku and Keauhou end. Have not heard whether Honaunau reaches to Pupuawai or not. I have not heard that they reach far above the woods. Do not know the boundaries of Keauhou and North Kona Lands.
[Boundary Commission Testimony: Keauhou 2 Ahupua'a, Waiau K. 1873:v.A1, p268-269]

Keliikanakaole, a kama'āina who also gave testimony on Holualoa, mentions various place names including the name of a road made by bird catchers named, Keakui.

Keliikanakaole K., Sworn
Niihoa [Nihoa], Uncle to my mother, is the one who went to look out boundaries of Keauhou. I saw him when I was young and heard him tell what the boundaries were on the North side.

A place called Keakui, a road across the aa made by bird catchers, a puu pahoehoe and a Mawae in the centre, is the place where Keauhou 2 turns North and cuts off Keauhou 1st. Niihoa and Kekai, the men who made the road which is the boundary between the two, told me thus. I went with Kekai after sandalwood. [page 270]

The road runs t the North at Hopea, where you come off of the aa; there Keauhou cuts across the head of Kahaluu; thence along Kahaluu through pili and mamani to an ana called Naohuleelua, North corner of Kahaluu. (I can point this place out.) Thence Keauhou turns makai along Kahaluu to Kepulu, the mauka corner of Kaumalumalu, a pulu lepo, at the edge of the forest, thence along the head of

Kaumalumalu to Kapukaike [Kapukaiki], makai of Walls house on Judd road (Nahuina is one name of this place).

Thence to Huaikaumauna, a lae koa on kualapa; thence along Holualoa to Apiipi; thence along the head of Holualoa to Puualalaau [Puu Laalaau]; thence along Honuaula to Hualalai, a hill on the North side[76] with a deep crater in it; said hill is the junction of Kaupulehu with Keauhou, and the mauka corner of Honuaula. The brow of the precipice is Honuaula and the land back is Keauhou. Kaupulehu comes to the pahoehoe at the base of Hualalai hill; Thence along the head of Kaupulehu to the hills called Napuumahoe, on makai side, the aa being on Kaupulehu, and pukeawe on Keauhou. Thence to makai side of a hill mauka of lae koa, where my makuakane lived; Kaupulehu ends at the koa grove.

I do not know whether Puawaa joins Keauhou or not. I do not know what lands join along here; thence the boundary of Keauhou runs to Kanupa, a cave near the new lava flow where the trees are dried up.

Thence mauka along the boundary of Napuu on this side of the lava flow to Kahulinanui [?], an ahua pohaku built by Hamakua men and now covered by the lava flow on boundary of Kaohe.

Thence mauka towards Mauna Loa to a place called Keanaokalehuna, where a Hamakua man was killed for stealing food at Keauhou; thence to Kolekole, a hill; a waha pele on the East side of Kolekole is the boundary; thence up pahoehoe eleele, this is as far as I have been.

CX'd.

I have heard Kahuku and Kapapala and Kaalaala join at the top of the mountain. Have not heard where Keauhou cuts off South [page 271] Kona Lands, and joins Kahuku. I know the place called Kaaawa, it is a grove of Naio and Alii [aalii], towards Kealakekua from Kolekole. Kalalua is a cave which was covered up by lava in the flow of 1859.

Know a place called Palahinui; it is a large cave on Keauhou. Hapukaa is mauka of Umi's road. Know a cave called Waikulukulu, at the base of Hualalai, towards Ahuaumi, the place called Kaluamakani or Kalalakaukolo is on the top of the mountain.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270]

Kupakoa, a kamaʻāina from Holualoa, mentions that Keauhou ends where they used to cut koa for canoes, and also mentions Ohiapapaawai, a water hole among the ohiʻa trees, and that all the koa that they used to make canoes is all on makai lands and Keauhou is mauka.

Kupakoa K., Sworn

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76 This description identifies the crater near Hainoa at summit of Hualalai.

I was born at Holualoa, North Kona, Hawaii at the time of building Kiholo [1810-1812], lived at Kona until the year 1867, when I moved to Honolulu and I still reside here. Know the land of Keauhou and a part of its boundaries. Puhi, K., a cousin of Keakaokawai's now living at Kalihi, pointed out the boundaries to me. He was a kamaaina of the mountain having been born and brought up there. (S. K. Kaai says he is old and sick). I do not know the boundaries at shore, only on the mountain.

Keauhou 2d cuts off Keauhou 1st a little mauka of a place called Nakipapaakalehuna some koa trees in the woods. Keauhou 1st does not reach mauka of the koa, but ends where they used to cut canoes. Thence the boundary of Keauhou 2d runs across the head of Keauhou 1st to Keanaaipu (a cave) at the junction of Kahaluu.

Thence along Kahaluu (in the woods) to Kanoa, a point of koa and mamani trees, the place where the fire from Kau, on the mountain went out. Thence along the land of Kaumalumalu to Huaikaumauma, koa trees and mamani, on the Kohala side of Judd road. Keauhou taking the land mauka of the woods and Kaumalumalu the woods.

Thence the boundary runs towards the mountain along Holualoa 4th to Laenaia [Laenaio] (a grove of trees). Thence along Holualoa 2d (Laenaia being on that land) along the mauka edge of the woods to a gulch called Waiaha, an awaawa where water flows when it rains, thence along the land of Puaa to a hill called Puulalaau, to land of Honuaula; thence along this land to the top of Hualalai mountain to a hill called Honuaula. This hill is on the land of Honuaula, and the boundary [page 448] of Keauhou 2nd running along at the foot of the hill. Thence along this land to Kilohana, a resting place on the pali, where the mountain slopes towards Waimea; thence down to Keanapaki, a small cave where bird catchers used to live; the mauka corner of Honuaula and junction of Kaupulehu with Keauhou and with Puaawaa; thence the boundary runs along Puaawaa mauka to Kuhaalele, a cave; thence to Ohiapapaawai, a water hole in among ohia trees. Thence to Kahulinanui, a lae aa, where Puawaa ends and Kaohe and Kapapala corner on the boundary of Keauhou (this is a place where the bird catchers used to quarrel).

Thence along around land of Kaohe (the aa being on Keauhou 2nd) up Mauna Loa to the alohi pahoehoe; thence along the land of Kapapala (pahoehoe on Kapapala) to the Keanakalehuna Akako [?], a water hole in a cave on the side of the mountain; thence up the mountain to Puumau, a hill on Keauhou near the boundary; thence to where the snow covers the mountain, where Keauhou 2d ends, so my informant told me, as there was no waiwai there, and Keauhou 2d does not reach to Mokuweoweo; thence to Pohakuhanalei, a rock on the Southern slope of the mountain. Thence down to Puulonalona, a hill along Kahuku, where Kapua joins Keauhou. I have been there. Thence towards Kona along the mauka edge of the woods, cutting off South Kona lands, to Honaunau, to a place called Ohiakuapu, a grove of koa trees that runs mauka. Honaunau takes the koa; thence along mauka edge of woods, the grove of koa mauka being on Keauhou to Keahou, an old lava flow, junction of Kealakekua; thence along Kealakekua to a place I do not remember the name of; Thence along Onouli (it runs out on old aa flow); thence along Kanauaauwe [Kanaueue], along the mauka edge of the woods to Uwaukanipo, a kualapa mauka of Waio; thence to Kaneeneenui taking in Waio; thence to Anakolekolea, a cave mauka of the boundary of Honalo. I do not know where these lands join Keauhou. the koa from which we used to make canoes, is all

on makai lands and Keauhou is mauka. All that I know about [page 449] the boundaries, is what Puhi told me.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449]

Puhi, an old kamaʻāina born in Kona, mentions Mawae, a water hole and burial cave and that Huaikaumana was a place where the canoe makers used to have a heiau.

Puhi K. Sworn (quite an old man)
I was born in Kona time of the Peleleu [ca. 1793-95], at Hokukano, Keakaokawai knows a part of the boundaries. His brother knew them. I have forgotten the names of the places on the boundary. The ones Kupakoa testified to are the right boundaries; he told me the points he testified to yesterday. I cannot remember the places.

Keauhou 1st ends in the koa woods. It is cut off by Keauhou 2d at a place called Mawae where there is a water hole, and a cave where my relations are buried. The boundary is way makai of this place. Keauhou 2d takes the land where they used to catch uwau, on the mauka side of the woods, cutting off Kahaluu and Kaumalumalu. Do not remember the names of the points Kaumalumalu reaches to Huaikaumauna, junction of Kaumalumalu, Kahaluu and Keauhou. it is an ahua in the koa woods, where the canoe makers used to have a heiau. Keauhou cuts off Holualoa 2 (do not remember names of places); thence Honuaula bounds Keauhou and runs up the mountain. I do not remember the name of the point where Honuaula joins Keauhou.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Puhi K. 1874:v.A1, p450]

Chas. Hall, a kamaʻāina of Kona, mentions Puepuewai which is a spring in the pahoehoe and Ahuaumi.

Chas. Hall K., Sworn (same witness as on Kahuku)
I have lived in Kona thirty-seven years, and know the land of Keauhou 2d; am a kamaaina of Kona and know a part of the boundaries of Keauhou. Kahilo, Kuluahi; father of Keakaikawai and Kini pointed them out to me at different times. Kahilo is still living and I hear he gave his testimony on this land last year. The other two men are dead. I do not know the makai boundaries. Kahilo went with Captain Cummins and myself and pointed out the boundaries when Cummins leased this land. Kahilo and Kaluahi pointed out boundaries at the same place on the south side of Governor Adam's road, but Kini pointed them out as being further mauka but nearly the same place. Kini pointed out the boundary as being a short distance makai of Puulehua on Governor Adam's road and running straight to Waiio, Puulehu is a hill. There is a pali on Governor Adam's road, on the boundary of Keauhou, and near the pali there is a sandal wood tree; the only one I know of that grows so far down on the road, towards Kau. They did not show me boundaries as we went to Kau way above the woods on the pahoehoe. I cannot say anything about boundaries beyond Waiio. Kuluahi and Kahilo pointed out the boundaries as being about one mile [page 253] makai of Waiiu [Waiio]. Going to Kau with Kini we went from Waiiu to Hale o Umi, since destroyed by the lava flow. I cannot give the boundaries from Waiiu to Kukuiopae as I have not been along there in the woods.

Keauhou cuts Manukaa [Manuka] off to the westward of Halepohaha. I know the boundary as I used to drive goats there. I have always heard that Keauhou cuts all South Kona lands off at the mauka edge of the woods. On the North side Kahilo pointed out the boundary as running along the base of Hualalai, passing Kohala side of Huaumi (or Ahuaumi). He is the only one who pointed this out to me. I have always heard that Keauhou joins Kaohe of Hamakua; the boundary runs to the kipuka running past Keamoku, to a point among the hills mauka of these clinkers.

CX'd.

I cannot point out the boundaries from Puulehua to Waiio. I put more confidence in what Kuluahi showed me than in what Kini showed me, as he was a much older man and had been living longer in the mountain. I know a spring called Puepuewai. It is one the pahoehoe some distance mauka of the woods. I do not know that Kaupulehu reaches to Keauhou. I have never heard that Keauhou takes to the top of Hualalai.

Evidence taken on Kahuku March 13th 1873 for boundaries of Keauhou, adjoining Kahuku as Mr. Hall states that he will give his testimony just the same as at that time.
See Folio 143 and 144, Book A.

Know the land of Keauhou in Kona. I have often gone onto the plains above the woods and have come across from Kona to Kau twice; above the woods. It was a long time ago. Came up through the woods to Hale a Umi, and looked at it, it is about eight or ten miles above the woods, but was covered up by the lava flow of 1845 or thereabouts. From there I went to Ahuaumi up above there and slept there in a crack of the pahoehoe. [page 254]

The father of Keakaikawai was my kamaaina from there we went to the Bay. I think Hale o Umi is mauka of Kipahoehoe, the distance between this and Ahua Umi is about fifteen or eighteen miles. Hale o Umi is on Keauhou. Heard that Ahua Umi on the boundary of Kau and Kona, about nine or ten miles from here. Kini was my kamaaina the second time I came across. Keakaikawai's father piloted me all over Maunaloa and Maunakea. One Ahua Umi is near Hualalai (2d Ahu a Umi); he told me Kahuku and Keauhou ran straight up Maunaloa, following a ridge all the way.

I have heard Ahu a Umi, near Hualalai is on Keauhou. Keauhou runs over to Puanahululu and meets Kaohe and Humuula; thence runs up the mountain with Humuula, on the Hilo slope to Pohakuhanalei. Different kamaaina have pointed out these different places. Kuakini of Puako and others showed me these places. The father of Keiki and Kini showed me the boundaries on this side. Keakaikawai is the son of one of my kamaaina and he himself is a kamaaina on the mountain.

CX'd.

I could talk better native when I came across from Kona to Kau than at the present day. Came down here from Ahua Umi. I have been up from Kapua to Ahu a Umi and understood that Keauhou cuts off Kapua below Ahu a Umi. Also Kaulanamauna is cut off and from there the boundary of Kau and Kona runs direct to the top of the mountain. My opinion of the direction of the line of boundary

between the Districts is based on the direction at shore. There is no land in South Kohala running side by side with Kona lands, to the top of Mauna Loa, cut off by Hamakua. Kona and Kau run to the top of the mountain. Humuula runs up a long way but not to the top. There are two places on the mountain called Pohakuhanalei, one is a rock on the Northeast slope, the other is a crater on the South slope. The latter is not pointed out as a boundary. I have only crossed the boundary they pointed out to me; a ridge running up to the top of the mountain and to the other side. [page 255]; said ridge running between the craters of Mokuweoweo and Pohakuhanalei.

Pohakuhanalei is about south of Mokuweoweo and I think that is in Kau.

Have never heard what land Mokuweoweo is on. Have always heard that Kahuku joins Keauhou mauka and that Kahuku and Kapapala join at Pohakuhanalei, on the northeast slope of Mauna Loa, but I do not know how far this way they join. Have worked in the woods and above Kahuku mauka of Waiohinu, catching goats and heard that Waiohinu cuts off all the lands of Kapapala. I can show pretty nearly the place where Hale o Umi was. Hale o Umi was built of six stones and was so close to the mountain that I could not see far towards Kau or Kohala. At Ahu a Umi on the boundary of Kona there are four or five piles of stones in a mawae or crack; there are two red hills in an easterly direction from Ahu a Umi, and a water hole near one of them. From this point it is two or three miles directly towards the sea, before you come to the thick woods.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Chas. Hall K. 1874:v.B, p253]

Kahueai mentions Umiwai, a place with water in the woods.

Kahueai K., Sworn (same as on Kaupulehu)
I know the land of Keauhou and the boundaries on this side and mauka. I do not know the boundaries between Keauhou and Kahalu [Kahaluu]. I know the boundary Kaumalumalu and Keauhou. It is at Palinui at the lae mamani beyond Hall's premises (Kekuakua ma told me boundaries.[)] Thence to a place called Kapunalei, thence [page 256] to a cave called Pihapono; thence across the head of Holualoa to the kahawai and thence to Kapukaiki, a cave. Boundary running across the head of Puuaa [Puaa]; it runs to a place where a dog that came from Waipio staid, Pupuaalenalena. Thence to Puulaalaau; thence to Umiwai, the boundary follows along mauka of Puulaalaau to mauka of Umiwai, water in the koa woods. Thence to a gulch called Pohakuloa; thence mauka along this gulch to the hill called Honuaula; thence to Hualalai, junction of Kaupulehu and Keauhou; thence along Kaupulehu to the aa, makai of Pualala.

Commencing at Hualalai, the junction of Kaupulehu with Keauhou, thence to Napuumahoe thence to Ihuano [Ihuanu]; thence to Puualala; thence to lae aa, where you see Mailihahei beyond aa. Thence along Puawaa to Keanapakii, a cave; thence to Kuhalele, a cave covered by the lava flow; thence to Ohiapapawai, in the lava flow; thence to Naohuleelua junction of Kaohe, Kapapala and Keauhou; there used to be three ahus there; perhaps they are now covered by the flow. This is as far as I know the boundaries.

CX'd.

I have heard that Uwauliilii is on the boundary between Keauhou and Kaawa.

Have heard that Waiio is on the boundary of Keauhou. Have never been to Kau. I do not know where Kahuku is; have never heard of the land. I do not know whether Keauhou extends to Mokuweoweo or not.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahueai K. 1874:v.B, p256-257]

Komaka, is listed as giving testimony prior, mentions Ulimau, a pūnāwai, and a water hole that Komaka found called Komakawai.

Balance of the testimony of Komaka

From Folio 259 of this book

From Ka Hale o Umi, junction of Keauhou and Kahuku I have always heard that Keauhou cuts off the Kona lands at the mauka edge of the woods. Do not know what lands run through woods. Heard Kaapuna ends at Ahinui; Opihale [Opihihale] 2d at Ulimau, a punawai about as far as [page 319] from here to Capt. Gates' house, above woods.

Thence along edge of koa along Opihale 1st; thence along Olelomoana 2d, along koa grove, thence along edge of woods along land of Kolo; thence along Kukuiopae, along koa grove. I pointed out the place to Keanapaakai. Thence to Kukuiopae 1st along hollow Kapai, mauka end of Kukuiopae 1st. Runs up as far as hollow extends. The Kau boundary is the Kona side of goat pen above the water hole where we got water the first night. Thence along Kaohe 5, 4, 3, 2, 1 along edge of woods. Kaohe of Kaopua ends mauka of Polewai at Kapualei, a short distance from where we ate. The lands this side of there end at the koa. Have heard Pahoehoe ends at Kamakaili, the lae mamani in awaawa; thence along Alae to Puuoluamanu; thence along Honokua 2 to Kaopapa, a cave near the koa; thence along Honokua 1st.

Have heard it ends at the koa at Puuikaiole, the goat pen mauka of Lumia, a hill. From there I do not know where Waiea ends. Have (not) (heard) from my makua that it runs to the Alohi; thence to water hole I found, named Komakawai, because I found it where we slept. Do not know what land it is on. I have always heard that Kealia and Hookena do not reach above woods. Have heard that Hookena reached to a few scattering koa trees on Kau side of Kealia trail, but not to Laemamani out on Pahoehoe. This is as far as I know the boundaries between Keauhou & shore lands. I have been around there chasing goats on this side.
[Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Komaka. 1874:v.B, p319-320]

Table 3. Keauhou Ahupuaʻa Inventory of Inoa ʻĀina, Wai Resource, and Other Resources & Practices from Boundary Commission Testimonies.

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Aahuwela	Cave that used to have water in it (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).	-
Ahuwela	Cave with water in it (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263).	-
Anakolekolea	-	A cave mauka of the boundary of Honalo (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Haalulu		A hill (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Halelaau	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270).
Haliilaukoa	-	Place where ʻUmi sat and they spread koa leaves for him (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256). An old tradition says Umi used to sit there because he liked the koa (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263).
Hapukaa	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Hoikekanaka	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Holua	-	Name of old (hōlua) sliding place

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		(Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A1, p266).
Huaikaumauna	-	A lae koa on the kualapa (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270). A junction of Kaumalumalu, Kahaluu and Keauhou, and an ahua in the koa forest where canoe makers used to have a heiau (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Puhi K. 1874:v.A1, p450).
Kaaawa	-	Pahoehoe with ohiʻa and other kinds of trees growing (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256). Grove of naio and aʻaliʻi (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kahinihiniula	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270).
Kahulinanui	-	An ahua pohaku built by Hamakua men and now covered by lava (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270). A place where the bird catchers used to quarrel (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Kaimuhapuu (Kaimuhapu)	Water hole (Boundary Commission Testimony: Keauhou	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
	2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256). A water hole in Okolea that is on the boundary between Honalu and Keauhou (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Waiau K. 1873:v.A1, p268-269).	
Kakai a lae Koa	-	Koa grove (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kaluamakani / Kalalakaukolo	-	Name of place at the top of Hualalai (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270).
Kalulu	Water hole and place for catching birds (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263).	Place where they would catch birds (Uawau) in olden times (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kamauae [Kamauai]	-	Fishing heiau (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320).
Kamoike	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256)
Kamomoku	-	A small pali (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Waiau K. 1873:v.A1, p268-269)
Kanakaliikapu	-	An ʻāhua pōhaku (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320).
Kanauaauwe / Kanaueue	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1,

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		p448-449).
Kaneeneenui	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Kanekii	A small water hole that dries up in dry weather (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256). A water hole on Kealakekua near the boundary (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Waiau K. 1873:v.A1, p268-269).	-
Kanoa	-	A point of koa and mamani trees, where a fire from Kaʻū went out (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Kanohoana o Umi	-	ʻUmiʻs road (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kanupa	-	A cave (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270)
Kaonohi	-	A cave (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263).
Kapapakauheana	Round water hole (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).	-
Kapapala	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Kaukahoku	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kaumalumalu	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kaumoku	-	A hill (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Kawaha o Pele	-	A large māewa (fissure or crevice), (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256). A hill with a crater (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Keahou	-	An old lava flow (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449). “Ancient fishing rights extending out to sea,” (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320).
Keakui	-	A road made by bird catchers (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270).
Keanaakala	-	A cave (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Keanakiha	-	Small cave where natives used to sleep (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Keanaokalehuna	A water hole in a cave on the side of the mountain (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).	Place where a Hamakua man was killed for stealing food at Keauhou (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270).
Keanapaki	-	A place where bird catchers used to live (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Kepuhi	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kepulu	-	A place where there is soil and no rocks (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263). A “pulu lepo,” (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270).
Kikikiaeae	-	Place where canoe makers used to live (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Waiau K. 1873:v.A1, p268-269).
Kilohana	-	Place for bird-catching (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kipukauki	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Kolekole	-	An ʻāhua with koa in the middle (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263). Hill where Humuula joins Keauhou (Boundary Commission

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Komakawai	A water hole (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Komaka. 1874:v.B, p319-320).	-
Kulauala	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Laaunui	-	Name of large ohiʻa tree (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Laenaio /Laenaia	-	A grove of tree (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Lehuulanui	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Lekeleke	-	A crack in the rock where natives used to put their dead (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Lumia	Water hole and pūnāwai (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Palea K. 1873:v.A1, p263).	-
Makaulaula	-	Place to live while bird catching (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahulialo 1873:v.A1, p263).
Mawae	Water hole (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Puhi K. 1874:v.A1, p450).	A burial cave (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Puhi K. 1874:v.A1, p450).
Naohuleelua	-	A cave (Boundary Commission

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole K. 1873:v.A1, p269-270).
Napueuala	-	An "'oiʻoina" or point, cape, headland, (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270).
Nohomoanahoaiku	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Ohiakuapu	-	A grove of koa trees that runs mauka (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Ohiapapaawai	A water hole amongst the ohiʻa trees (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).	-
Ohiki	A spring (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320)	Old cultivating ground, old mahi ʻai place in the woods.
Onouli	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa K. 1874:v.A1, p448-449).
Paaniau [Paniau]	-	A pali, a long stone wall (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320).
Palahinui	-	A koa tree forest (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320). A large cave where people used to live (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A1, p266).
Piipaa	-	A cave (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa,

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		Kahilo K. 1873:v.A1, p261).
Pohakuhanalei	-	Hill on Mauna Loa (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).
Pohakuloa	-	Large rock near water hole (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Poo Hoohia	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Puainako	-	A place name (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270).
Puepuewai	Spring on the pāhoehoe (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Chas. Hall K. 1874:v.B, p253).	-
Pupuewai	Water hole (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).	-
Puuakawai	Old water hole now filled up (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai K. 1873:v.A1, p256).	-
Puulaalaau	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Puulepo	Hill with a water hole below (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Waiau K. 1873:v.A1, p268-269).	-
Waiaha	A gulch where water flows when it rains (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa,	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
	Kupakoa K. 1874:v.A1, p448-449).	
Waiea	-	Extent of which bird feathers were gathered (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).
Waikui	Large cave of water (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270).	-
Waikulukulu	Cave with water in it (Boundary Commission Testimony: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1, p318-320).	-
Waio	Spring (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahilo K. 1873:v.A1, p261).	-
Ulimau	Pūnāwai (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Komaka. 1874:v.B, p319-320).	-
Umiwai	Water in the koa woods (Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kahueai K. 1874:v.B, p256-257).	-

Gianulias Parcel Boundary Commission Testimony Discussion

All of the ahupuaʻa that the Gianulias subject parcel spans were also included in the Boundary Commission Certification Process. This includes the ahupuaʻa of Puaʻa, Waiʻaha, Kahului, and Puapuaʻa (See Table 4). The following discussion details the kanaka who lived in these ahupuaʻa and gave testimony, as well as excerpts from the testimony and certificate tied to places, practices, and resources in the subject ahupuaʻa.

Table 4. Select Ahupuaʻa with Named Localities and Kamaʻāina cited in Boundary Commission proceedings in the area of the Gianulias Subject Parcel

Ahupuaʻa	Place Names	Kamaʻāina Residents
Gianulias Parcel		
Puaa	AianiniHilia (punawai) Hilio Holoke (Punawai) Honu (an upland punawai) Honuaula Kaalaeia Kahawai o Holualoa Kahuku Kainakelekele (olona growth) Kanakehipahoa (?) Kanuawa Kanenehu Kanoweana Kaopapa Kapapai Kawi Keahupuaa Kekawa (Kekapa) Kiai Kipukaiki Kolioaio Kuinakihei Liuike (Luaiki) Namahana (Olona growth – canoe making site) Nakakai Nuanulapalapa (Nuuanulapalapa) Pahuaukii Pali Kookoolau Palule (water source) Pohakuloa Poholua Puakauahi Puepuelenalena Puulalalaau (Puulaalaau) Puuokaloa Puuomaio (Puu o Naio?) Umiwai Waialala Wainakelekele	Kahaunele Kahio Kahueai Kamahiai Kapana Kauwa James Kole Makahiehie Naihe Napuwailuna Pupule

Ahupua‘a	Place Names	Kama‘āina Residents
Gianulias Parcel		
Waiaha	Maiahuna (banana grove) Makaihuliwaa Papalanui Pupuula Puuokaloa Waialipi (water hole)	Kapukui Makahiehie Peahi
Kahului	Kaaipaka Kakapa Kalalii Kealaehu (also Alau a koele) Palule Papalanui Pohakuhano Popoulu Puukehoi Puukohia Puuokaloa Puuokoheo Waiakalaho spring Waiakekua spring Waiahuna (Waihuna) spring Waikee	Kapae Makuakane Niniha
Puapuaa	Kaaiau Kahananuialewa Kahiaholo Kaluaele (water hole) Kaopapa (punawai) Kauhiapapa (water hole) Kaumupoalua Keawapuapua (Keawapuapuaa) Puapae Pahoa Poomaka Puapai Puapualoa Puhanoi Puhiuhiu (awaawa) Pukahano Puukiihoe Puuopelu	Kahaunele D. Alawa Kalimapaa Kawaihoa Keawe Mahalo Piki Simeona Ukumea

Puaʻa Ahupuaʻa

Listed below in this section are the boundary commission testimonies recorded for the ahupuaʻa of Puaʻa.

Kauwa, a kamaʻāina of Puaʻa, mentions Holoke, Palule, and Honu which were all sources of water. Also mentions many place important place names.

> Kauwa W., Sworn
> I was born at Puaa, North Kona, Hawaii, at time of Keoua [ca. 1792], and have always lived there, and am acquainted with the boundaries of the land. Kahio, my father (now dead), who was a kamaaina, and bird catcher told me the boundaries.
>
> Puaa is bounded makai by the sea and the land has ancient fishing rights near the shore, but not extending out to sea. Thence commencing at a punawai by the seashore called Holoke, between the lands of Puaa and Auhaukeae and running mauka to Poholua, a huli pali near the shore and just above a house; thence along iwi aina, the boundary runs mauka to Kuinakihei, an oioina way above pa aina; or Governor Adam's wall; thence to Puukole, a breadfruit tree; thence to Nuanulapalapa [Nuuanulapalapa?], a kualapa; thence mauka to Keahupuaa, the [page 376] boundary follows the iwi aina, along all these places; thence to a kihapai by the mauka Government road; thence to an Ahupohaku; thence along the iwi aina to Kanoweana, an old kauhale, a [illegible] bushes and a Puuhala tree are at this place from thence to Kanakehipahoa [?], a banana grove at the edge of the woods, said grove is the mauka end of Ahuhaukeae. Thence the boundary runs towards Kohala; first cutting off the land of Hianaloli 1, 2, 3, 4, 5 & 6 and then Auhaukeae 1 & 2 to Luaike [Luaiki], junction with Honuaula. I have not seen this place. I have only heard about it being on the edge of the woods. Thence Puaa runs along the land of Honuaula to Mamahana wai olona [Mamahana a damp area of olona growth].
>
> (I have only heard of the boundaries in the woods, have never seen them[)].
>
> Thence mauka to Kainakelekele, wai olona, and where olona grows; thence the boundary runs mauka to the side of a gulch called Honuaula (said gulch comes out of woods on Hianaloli); thence mauka along the South side of the gulch to Kapapai, a place where two old roads used to meet on a pali above the woods, from thence the boundary turns toward Kau. Along Honuaula to Pulalalaau [Puu Laalaau], a hill; Keauhou 2d is mauka of the hill and Honualua [Honuaula] is on the North side, Puaa and Holualoa corner there.
>
> Thence makai along Holualoa to kahawai – o – Holualoa, the boundary line passing to the North side of it; thence makai along the gulch to Palule, a pahihi and Wai aoao [auau?]; thence makai leaving the gulch and running to a place called Puuokaloa; passing along Kahului 2nd, through a lae mana (sharp ferns like uluhi [uluhe]); thence cutting across Kahului 1st, Kahului 2nd, Waiaha 1st and Waiaha 2d and Puaa 3d and running mauka to a punawai at the mauka corner of Puaa 2d called Honu; at the makai edge of the forest. Thence makai to Kanenehu, an old kauhale; thence makai along the iwi aina and through the fern to Pahuaukii, a kihapai at the Government road; and in the middle of the land; This is a mistake; I should have said to Palikookoolau, a small pali on the road and thence to

> Pahuaukii; Thence to a huli pali on the North side of some houses, and thence to banana trees growing on the huli pali; thence makai to Kawi, and thence to Pailima; thence makai to Hiilia, a punawai; thence to Kekawa, at the seashore. Hiilia is mauka of [page 377] Governor Adam's wall, and Kekapa [?] is the awaawa kai, with points each side. The boundary is between the two.
>
> Puaa has ancient fishing rights extending to the squid grounds.
> [Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376]

Kahueai, a kamaʻāina of Kona that lives in Puaa, mentions Namahana, a place where they used to make canoes, Aianini, which is a water hole and few other place names within Puaʻa.

> Kahueai K., Sworn (same witness as on Keauhou 2d)
> I now live on Puaa 2d. The boundary at shore on the Kau side is Nakakai, owned by Pupule, the mauka corner of Pupule's land on Puaa 2d is at Kaopapa. There it leaves the gulch and runs toward Kau to a place called Puuokaloa cutting of[f] Puaa 2d and Puaa 3d. Waiaha 1st and Waiaha 2d and two Kahuluis to the gulch. Adjoining Holualoa, thence along the kahawai to Kipukamana, a kipuka in the woods; Thence to Palule where koa grows; thence mauka along the kahawai to Namahana, where we used to make canoes; thence along the gulch to Aianini [?], a water hole in the gulch; thence up to Kipukaiki a cave; thence along Keauhou to Puepuelenalena; to Puulaalaau; thence to mauka of Umiwai; thence to Pohakuloa, a gulch the junction of Puaa 1st with Honuaula; Thence down the gulch to Kolioaio, a kauhale kalaiwaa; thence makai to Wainakelekele, crater in gulch; thence to Waialaala, a kauhale, thence to [page 244] the lower edge of the woods, to Kahuku, a banana grove; thence the boundary leaves the gulch, and runs across the heads of the Hianalolii and Auhaukeae to Kaalaeia (the koa is on all Puaa); thence to Kunuawa, a large banana grove, thence makai along Hauiio's land and thence along Ukumea's land and then along Kole to the sea shore. Bounded makai by the sea. Ancient fishing rights extending out to sea.
>
> CX'd.
>
> Note: J.G. Hoapili states that he can find no more kamaaina of this land. Copy testimony on Keauhou 2d and Holualoa adjoining Puaa 1st, as evidence on Puaa 1st.
> [Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245]

Table 5. Puaʻa Ahupuaʻa Inventory of Inoa ʻĀina, Wai Resource, and Other Resources & Practices from Boundary Commission Testimonies.

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Ahuhaukeae	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Aianini	A water hole (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Auhaukeae	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Hianalolii	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Hiilia	Pūnāwai (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).	-
Holoke	Pūnāwai at the seashore (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).	-
Honu	Pūnāwai at the makai edge of the forest (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).	-
Kaalaeia	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Kahuku	-	A banana grove (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Kainakelekele	-	A place where olonā grows (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Kanakehiapahoa	-	A banana grove at the edge of the woods (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Kanenehu	-	An old kauhale (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Kanoweana	-	An old kauhale (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Kapapai	-	A place where two old roads used to meet (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Kipukamana	-	A kīpuka in the woods (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Kolioaio	-	A kauhale kālai waʻa (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Kole	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Kuinakihei	-	An ʻoiʻoina (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Kunuawa	-	A large banana grove (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Mamahana wai olona	“A damp area of olona growth,” (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).	-
Namahana	-	A place where they used to make canoes (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Nuanulapalapa	-	A kualapa (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Pahuaukii	-	A kīhāpai (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Pailima	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Palule	A pāhihi and wai ʻauʻau (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).	-
Poholua	-	A huli pali near the shore (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Puaʻa	-	The ahupuaʻa of Puaʻa has ancient fishing rights extending out to sea and to the squid grounds, (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Puepuelenalena	-	A place name (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Puukole	-	Name of a breadfruit tree (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kauwa K. 1873:v.A1, p376).
Waialaala	-	A kauhale (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).
Wainakelekele	-	A crater in the gulch (Boundary Commission Testimony: Puaʻa 1 Ahupuaʻa, Kahueai K. 1874:v.B, p244-245).

Waiʻaha Ahupuaʻa

Peahi, a resident of Waiʻaha for 16 years, recounts a watering hole called Waialipi and a banana grove named Maiahuna.

> Peahi K. Sworn
> I was born at Kohala at the time of Kiholo [XX 18 XX], when I was married I came here and have lived here ever since. Know the land of Waiaha. Lived there sixteen years. A water hole called Waialipi is on the boundary between the two Waiahas. Waiaha 2d is bounded by Waiaha 1st to a banana grove at the edge of the woods, called Maiahuna. Waiaha 2d is bounded on the South side by Kahului. The land is sold to Kapae K. from shore to the Government road. Thence along Kahului 2d to

Puuokaloa, where I had heard it is cut off by Holualoa. Waiaha 1st was surveyed from shore to Maiahuna and I do not think it extends far beyond there.

Waiaha 2d is bounded makai by the sea.

Ancient fishing rights extending out to sea.
[Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Peahi K. 1874:v.B, p269]

Makahiehie, mentions Pamakani and Makaihuliwaa, two resting places of ancient time.

Makahiehie K., Sworn
I was born at Puaa, Kona, at the time of Kumoalii [XX Kaumualii ?], so my parents told me. I know the boundaries of Waiaha; have always lived on these lands. My father told me the boundaries. Waiaha 2d is bounded on the North side by Waiaha 1st. Saw Fuller survey Waiaha 1st from the shore to Maiahuna; the mauka end of it. Kahului 1st bounds Waiaha 2d on the South side. A place called Pamakani is the mauka corner of Kapae's land. It is a resting place; thence to Papalanui, between Kahului, Aupuni, and Waiaha 2d; thence to Makaihuliwaa, an old resting place; thence to Popoula, the mauka corner of Kahului 1st from thence the boundary turns and Waiaha is cut off by Puaa to Maiahuna.
[Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Makahiehie K. 1874:v.B, p267]

Table 6. Waiʻaha Ahupuaʻa Inventory of Inoa ʻĀina, Wai Resource, and Other Resources & Practices from Boundary Commission Testimonies.

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Maiahuna	-	Banana grove (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Peahi K. 1874:v.B, p269).
Makaihuliwaa	-	An old resting place (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Makahiehie K. 1874:v.B, p267).
Pamakani	-	A resting place (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Makahiehie K. 1874:v.B, p267).
Papalanui	-	A place name (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Makahiehie K. 1874:v.B, p267).
Popoula	-	A place name (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa,

		Makahiehie K. 1874:v.B, p267).
Puuokaloa	-	A place name (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Peahi K. 1874:v.B, p269).
Waiʻaha	-	"Ancient fishing rights extending out to sea," (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Peahi K. 1874:v.B, p269).
Waialipi	A waterhole; described by Peahi as being on the boundary between the two Waiahas (Boundary Commission Testimony: Waiʻahu 2 Ahupuaʻa, Peahi K. 1874:v.B, p269).	-

Puapuaʻa Nui Ahupuaʻa

Ukumea, born in Puapuaʻa and kamaʻāina of Puapuaʻanui, mentions an iwi aina, Kaumupoalua which is a Neneleau grove, Kaluaele which is a watering hole, and Kaopapa, a pūnāwai.

> Ukumea K., Sworn
> I was born on Puapua [Puapuaa] at the time of Kauaokekuakalani [XX 18 XX]. I now live at Puapuanui [Puapuaanui]; have lived there most of my lifetime; am a kamaaina and know the boundaries. Kelinopa (now dead), my cousin, showed them to me. Bounded on the North side by Piki, the boundary at shore between these two lands is Keawapuapua [Ke-awa-Puapuaa] on the south side of the awa; thence to Puhano, aa above Governor Adams wall. There is an iwi aina from makai up. Kaumupoalua, a neneleau grove; thence along the iwi to the Government road, passing on the South side of Kaluaele, a water hole, thence mauka to Kaaiaua kihapai, the iwi is on the South side of the kihapai; thence to Kahananuialewa, a large rock at the mauka corner of the land, where Puapuanui is cut off by Holualoa. Thence turn towards the sea along Holualoa 1st to Kaopapa a punawai; thence along the iwi aina Uwaunui, an [page 260] old kauhale, the boundary runs through this place and to Puapualoa, a cave on the North side of the boundary; thence to Huloa, a resting place above Governor Adams wall; thence to seashore. I do not know the name of this makai point. Bounded makai by the sea.
>
> Ancient fishing rights extending out to sea.
> [Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261]

Mahalo, got control of land for five years, mentions a water hole named Kauhipapa.

> Mahalo K., Sworn

I was born at Holualoa. Do not know when. Have always lived there. I had charge of Puapuanui for five years, and looked at the boundaries. Keawe was the man who told them to me. Puapuaiki bounds it on the North side.

Commencing at the seashore on the Kau side of the Awaawa Puhiuhiu, the awaawa being on the Kau side of the canoe landing; thence to Pakuhano, aa mauka of the wall. The boundary runs along the iwi aina to Kaumupoalua; thence to the South side of Kaluaele following up the Government road; thence to Kaaiau, and through this place to a big stone, the name I have forgotten; there Holualoa cuts Puapuanui off.

Thence makai along his land to Puapualoa; thence to Kauhiapapa, a water hole; thence to the North side of Kauhiaholo; thence to Pahoa; thence makai to Ahuloa; thence to Puuopelu; thence to Kuapae at the seashore. Bounded makai by the sea.

Ancient fishing rights extending out to sea.

Testimony closed
[Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Mahalo K. 1874:v.B, p261-262]

Table 7. Puapuaʻa Ahupuaʻa Inventory of Inoa ʻĀina, Wai Resource, and Other Resources & Practices from Boundary Commission Testimonies.

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Huloa	-	Resting place (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Kaaiau	-	A kīhāpai (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Kahananuialewa	-	"A large rock at the mauka corner of the land," (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Kahiaholo	-	A place name (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Kaluaele	Water hole (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).	-
Kaopapa	Pūnāwai (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B,	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
	p260-261).	
Kauhiapapa	Water hole (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Mahalo K. 1874:v.B, p261-262).	-
Kaumupoalua	-	Neneleau grove (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261). Lennox mentions it as being used to make “calabash and lomilomi sticks” (Lennox, C. 1967. Auwahi Forest Report; Appendix 6. Unpublished report, 3pp.).
Keawapuapua / Keawapuapuaa	-	A place name (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Pakuhano	-	A place name (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Mahalo K. 1874:v.B, p261-262).
Puaʻa Nui	-	“Ancient fishing rights extending out to sea,” (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Puapai	-	A place name (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Puapualoa	-	A cave (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Puhano	-	A place name (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).
Puhiuhiu	-	An awaawa or valley (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Mahalo K. 1874:v.B, p261-262).
Puuopelu	-	A place name (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa,

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		Mahalo K. 1874:v.B, p261-262).
Uwaunui	-	Iwi ʻāina and old kauhale (Boundary Commission Testimony: Puapuaʻa Nui Ahupuaʻa, Ukumea K. 1874:v.B, p260-261).

Kahului Ahupuaʻa

Kahului is divided into two ahupuaʻa, Kahului 1 (north) and Kahului 2 (south). In an initial overview of the boundary commission, no testimonies submitted for Kahului 1 Ahupuaʻa documented water resources, inoa ʻāina, or practices. Listed below in this section are the boundary commission testimonies recorded for Kahului 2 Ahupuaʻa.

Niniha, a kupa ʻāina of Kahului, Kona recounts the boundaries of Kahului and mentions several water holes referred to by the names Waiakalaho, and Waiakekua. Niniha testified the following:

> Niniha, K., Sworn
> I was born at Kahului, North Kona, Hawaii at the time of Kaoku [Mai Okuu, 1804-1805] and have always lived there. My parents (now dead) pointed out the boundaries to me.
>
> Boundary at the seashore between Kahului 2 and Puapuaaiki is at the right hand side of Kakapa, a rocky point in the sea; thence mauka along an iwi aina to Governor Adam's wall; thence to Waiakalaho, a water hole; thence mauka to Waiakekua, a water hole near the iwi aina and a little above the Government road; thence to Kaaipaka, a kulana kauhale, ahua hulipali; thence mauka a short distance to where Puapuaaike ends; thence to Puuokoheo, a high hill outside of the woods; now overgrown with koa; there Holualoa corners at Pohakuhano; thence along Holualoa to Waikee, a [page 327] kahawai; thence across said gulch and follow the gulch up to Puuokaloa, a pali in the woods on the North side of the gulch; thence to Palule where Holualoa and Puaa cut off Kahului; said place is a puu pahoehoe and kahawai; thence makai along the boundary of Puaa to Popoulu, mauka corner of Kahului 1st near the lower edge of the woods; thence along Government portion of Kahului to Papalanui, a kihapai koele, below Puukohia; thence along iwi aina, makai to Alau in the fern above the Government road. There is a pile of stones set up there. I pointed out the boundaries of Kahului 1st when it was surveyed; thence along the land sold, to Kalalii, a pulu lepo a seashore.
>
> Ancient fishing rights extending out to sea.
> [Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328]

Makuakane was a kanaka from Hāmākua who came to reside in Kahului during his younger years. He mentions the two springs of the area being Waiakalaho and Waiakekua:

> Makuakane, Kane, Sworn (rather a young man)

I was born at Hamakua, Hawaii; came to Kahului when I was young and have resided here ever since; know the boundaries of said land; Kapee [Kapae?] (now dead) former konohiki of the land with whom I lived four years told me the boundaries, and also pointed them out to me.

Commencing at seashore between Kahului and Puapuaa at a rocky point called Kakapa; thence mauka along an iwi aina to Governor Adam's wall; thence mauka, the boundary still following the iwi aina to Waiakalaho, a water spring; said spring being about three kihapai to North of the boundary of Puapuaa; thence to Waiakekua, spring mauka of the road; said spring is on Kahului near the iwi aina; thence to Kaaipaka, an Ahuapuu, kauhale kahiko, boundary at the South side of it; thence to Waikee (I do not know where Puapuaaike ends; Holualoa joins Kahului at Waikee; thence to Popoula, a kahawai with koa growing in it; thence to Puuokaloa, a pali; thence to Palule where Puaa and Holualoa cut Kahului off; thence makai along Puaa to Puuokaloa; thence to Popoulu, the land is very narrow here; thence makai to Puukehoi [?], a hill in fern; thence makai along the iwi aina to Waihuna, a water hole on the boundary between Kahului 1st [page 328] and Kahului 2nd. Kahului 1st reaches to Puuokaloa at the foot of the pali; makai of the Government road you come to Waiahuna which is the boundary of Kapai's [Kapae's] land. The mauka corner of Kapai's land is at Kealaehu, sometimes called Alau a koele. Thence the boundary runs along land sold, to the sea, and the land has ancient fishing rights extending out to sea.
[Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329]

Table 8. Kahului Ahupuaʻa Inventory of Inoa ʻĀina, Wai Resource, and Other Resources & Practices from Boundary Commission Testimonies.

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Alau	-	A place name (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Kaaipaka	-	An ʻāhua puʻu, ʻāhua hulipali, kūlana kauhale, and kauhale kahiko, (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328; Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329).
Kahului	-	"Ancient fishing practices extending out to sea," (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Kakapa	-	A rocky point out at sea

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		(Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Kalalii	kahawai: “along Holualoa to Waikee”	A “pulu lepo” at the seashore (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Kealaehu (also Alau a koele)	-	A place name (Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329).
Palule	A kahawai (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).	A puʻu pāhoehoe (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Papalanui	-	A kīhāpae kōʻele (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Pohakuhano		A place name (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Popoula	A kahawai with koa growing in it (Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329).	
Popoulu	-	A place name (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Puukehoi	-	A hill (Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329).
Puukohia	-	A place name (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Puuokaloa	-	A pali (Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329).
Puuokoheo	-	a high hill outside of the woods now overgrown with koa (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).
Waiakalaho	A waterhole (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).	
Waoakekua	A waterhole (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).	
Waihuna	A waterhole name (Boundary Commission Testimony: Kahului Ahupuaʻa, Makuakane Kane 1873:v.A1, p328-329).	
Waikee	A kahawai (Boundary Commission Testimony: Kahului Ahupuaʻa, Niniha K. 1873:v.A1, p327-328).	-

DHHL Kona Parcels Boundary Commission Testimony Discussion

The Department of Hawaiian Homelands has parcels in the ahupuaʻa of Kealakehe and Keahuolū. Although not the subject parcel of the proposed undertaking these lands serve to benefit from water resource development in the subject parcels, and are included here as such.

Table 9. Ahupuaʻa of Keahuolū with named localities and kamaʻāina cited in Boundary Commission proceedings in Keauhou Ahupuaʻa, location of the Kamehameha Schools subject parcel.

Ahupuaʻa	Place Names	Kamaʻāina Residents
Keauholū	Halelaau Kamauae (Kamauai Heiau) Kanakaliikapu Kewa Nanunuakalupe [?] Napueuala Ohiki Paaniau (Paniau) Pohakunahaha Puainako Waikui Waikulukulu	Kakio Keakaikawai Kuluahi Lono

Keahuolū Ahupuaʻa

Below are excerpts from the Boundary Commission Testimony for Keahuolū Ahupuaʻa. The ahupuaʻa of Keahuolū describes the southern boundary of Kealakehe Ahupuaʻa

J.Z. Waiau, a kamaʻāina from Honuaula, mentions a few water holes including, Keanawai and Waiakamalama. Also mentions a heiau named, Kalualapauila and a place called Kawauhooni, where people would rest on the way to taking their dead to rest in the crater of Hualalai.

> J. Z. Waiau K., Sworn
> I was born at Honuaula, Kona, Hawaii at the time of the fight of Keakuaokalani [Kekuaokalani in 1819]. I now live at Lanihauiki. Know the land of Keahuolu and its boundaries, have seen a part, and have heard where a part of them are from my parents and kamaaina on the land. I leased the land in former times. Kealakehe bounds it on the North side and Lanihaunui on the South side. A round rock on the sea shore called Pohakuloa is on the boundary between Lanihaunui and Keahuolu; thence the boundary between these two lands run mauka about one hundred fathoms and then turns South, to the North side of an old village, on Lanihau, called Makaeo. Thence the boundary runs straight mauka to Hoenui, a pile of stones makai of the wall of Governor Adams. If you look maikai [makai] from mauka near the Government road, it looks like a wall or iwi aina on the pahoehoe, but you cannot see it from makai. From Hoenui to Maili along [page 354] the boundary runs along an iwi aina, a wall or iwi aina from some way above Adams wall. Maili is an old village at Puuokaliu, a pali, pali ahua, where houses used to stand; thence to the mauka Government road at Kahuoli; an old kihapai koele, there are two kuleanas there, on Lanihau, adjoining Keahuolu. Said kuleanas belong to Kaawa and Luhei.

Thence mauka along the iwi aina to Puukoai, a very small ahua, of dirt and stones; thence to Keanawai, a water hole where there used to be a great many houses. Thence to Kaopapa, a place in the woods in Akolea fern a punawai, where Lanihauiki cuts of Lanihaunui. This place is a grove of young koa trees about the distance of a mile from the edge of the woods. I have heard Sleeper surveyed the line from Piilani down, that is mauka of Keanawai, on the boundary between Lanihaunui and Lanihauiki; from Kaopapa to Puulepo, a kualapa; this is above the young koa trees, in the ohia. From Puulepo the boundary runs direct mauka to Waiakamalama, a water hole where the natives get water when it fails below the woods. You have to dig to get it; have been to this place once.

Thence to Kawauhooni, a kupapau, a place where the natives used to sleep when on their way with dead bodies to throw into the crater on Hualalai; the koa woods are on Lanihauiki, and ohia on Keohuolu [Keahuolu]; thence turn North to kahawai Opilopilo, the mauka corner of Kealakehe. I do not know the boundaries in the woods between Keahuolu and Kealakehe; know where the mauka corner of Kaahui's land is, it is at a pile of stones on Kealakehe, at the junction of Kaahui's land of Kealakehe and Keahuolu; thence to an ahu pohaku called Laeaniau, at the Government road; thence makai along an iwi aina to a few fathoms on the North side of a heiau called Kalualapauila; thence to Puunahaha, a large red hill on the mauka side of the makai Government road, thence to Puuokaloa, an oioina or small hill; thence to Kaiwi a lae pohaku on the middle of point. Ancient fishing rights extending out to sea.

CX'd.
I saw the haole survey the line down the road, between the lands of Lanihau nui and Lanihauike [page 355], said road runs down an iwi between these two lands. I do not know whether he surveyed to the boundaries of Keahuolu or not.
[Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354]

Kealakai, a kamaʻāina of Keahuolu, mentions a few inoa ʻāina including Piilani, a mahina ʻai and Kalioniau which is an ʻahu.

Kealakai K., Sworn
I was born at Keahuolu, North Kona, Hawaii at the time of [name illegible] & saw building Kiholo 2nd. Have always lived there, and know the makai boundaries. My parents; makuakane hanai Kaohimahi [name is Kauhimahi] (now dead) told them to me.

The boundary at sea shore between Lanihaunui and this land is at Pohakuloa; thence towards Kailua; the sand on Lanihau and the pahoehoe on Keahuolu; Thence mauka along raised lava (flat lava being on Lanihau) passing some distance on the North side of Puuopalena; thence mauka to Hoenui, a good ways makai of Governor Adams wall; thence mauka along an iwi aina to the mauka Government road; thence mauka to Puukoae, a puuolepo; thence mauka to Piilani, a mahina ai; the boundary passing to the North side of it; thence to Puulepo. I do not know where Lanihaunui ends; as I have never been there; have only heard of these boundaries. The mauka corner of Keahuolu is an ahua called Kaohiamoekanaka; thence makai along Kealakehe, but I do not know the points on the line.

> At Government road there is an ahu, called Kalaioniau, a puu makai of said road which can be seen from the road. Thence makai along an iwi aina to Kalualapauila, a heiau; thence makai to the North side of a hill called Puuouliuli; thence to Puunahaha; the boundary passing on the North side; from thence to Puuokaloa; thence makai to Kaiwi, the kula in middle of point and lae pohaku on the point at sea shore.
>
> Ancient fishing rights extending out to sea and claiming the opelu.
> [Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356]

Kahuanui, a kamaʻāina of Kealakehe, mentions Puulaula, Puunahaha, Kaenaena and Kaeeku, all hills within Keahuolū. He also mentions Pukalua which is a water hole above in the young koa.

> Kahuanui K., Sworn
> I live at Kealakehe, and have always lived there, know the boundaries between Keahuolu and Kealakehe. I have bought a piece of the latter land, but have not received the Patent. Have seen the boundaries of adjoining. Kaiwi is the boundary at the shore between Kealakehe and Keahuolu; thence mauka to Puukaloa, thence [page 356] to Puulaula, mauka side of the Government road, thence to Puunahaha; thence to Kaenaena, a hill; thence to Kaeeku, a hill; thence to Kalualapauwila; thence to Lainiau, the iwi or the South side; thence to Keahupuaa, an ahua pohaku at the mauka Government road; thence along the iwi aina (the land below the road was surveyed by Wiltse for me); thence mauka to Ohiakaukanaka;[77] a pali in the woods where you can look down to the sea shore. It is the long pali that runs across all the lands.
>
> This is the mauka end of Keahuolu and is here cut off by Lanihauiki (in koa) and by Kaloko; thence makai along Lanihauiki to Puulepo; thence makai to Piilani, in woods, at which place Lanihaunui ends and Lanihauiki leaves Lanihaunui and Keahuolu boundary. Lanihaunui ends at Pukalua, a water hole above the young koa. Piilani is way below the woods.
> [Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kahuanui K. 1873:v.A1, p356-357]

Kapea, a resident of Moeauoa, Kona, mentions Kaopapa which is a pūnāwai.

> Kapea K., Sworn
> I live on Moeauoa, Kona, Hawaii, have lived there several years, know the land of Keahuolu, and have been up the road to the woods, after water. The mauka corner is on a pali at Koohiahoomoekanaka. The koa is on Lanihau and Kaloko; thence makai along Lanihauiki, to Puulepo; thence to Nohonoa, the mauka corner of Lanihaunui, where there is an ahua; thence down the pali to Kaopapa, a punawai; thence to Piilani outside of the woods. There is young koa growing at Kaopapa. I

[77] Also cited as Kaohiahoomoekanaka.

have been there with the kamaaina after water. I do not know the boundaries on the other side.
[Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kapea K. 1873:v.A1, p357]

Mahu, a kamaʻāina of Keahuolū, mentions Ohiawela which is a spring, an Kauwau, a grove of large trees where they used to lay dead bodies.

Mahu K., Sworn
I was born on the land of Keahuolu at the time of the birth of Kamehameha II [ca. 1797], and my parents who were kamaainas of the land told me its boundaries. Kealakehe bounds it on the North side, the boundary at shore between the two lands is at Kaiwi; thence it runs mauka to Puuokaloa; thence to Puunahaha; thence to Kaunauhila [?], a puu aa. Thence to Kalualapapauaia [Kalualapauwila]; thence mauka to Kalaeoniau; thence to Keahupuaa at the Government road; thence to Kahuaakaulei in the woods (I have not been there) then into Ohiawela (I have not been there, but have heard that there is a spring there). Thence to Kahihiia [Kahihia], the mauka corner of Keahuolu where Lanihauiki cuts it off. I do not know whether Kaupulehu or Kaloko cuts if off on the North side.

Thence makai along Lanihauiki, all the koa except what is just on the lower edge of the woods being above the boundary of Keahuolu. Thence makai to Kauwau, a grove of large trees where they used to lay dead bodies; from thence makai to Ohiapiipa; thence to Waiakamalama. (I have been up to the mauka corner of the land on the road between Keahuolu and Lanihauiki but I have not been on the North side.)

Thence makai to Kapulehu, an oioina; thence to Nohoana o maa, an oioina, at the mauka corner of Lanihaunui, near the lower edge of the woods. My father's name was Kamaha and my mother's name was Loma.
[Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358]

Table 10. Keahuolū Ahupuaʻa Inventory of Inoa ʻĀina, Wai Resource, and Other Resources & Practices from Boundary Commission Testimonies.

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Makaeo	-	Name of old village in Lanihau (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Hoenui	-	Pile of stones (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Kahihiia / Kahihia	-	A place name (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358).
Kahuoli	-	An old kīhāpai kōʻele with two kuleana

Inoa ʻĀina	Wai Resource	Other Resources & Practices
		belonging to Kaawa and Luhei (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Kaiwi	-	A lae pōhaku (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Kalaioniau	-	An ahu, a puʻu (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356).
Kalualapauila	-	A heiau (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Kaohiamoekanaka	-	An ʻāhua (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356).
Kaopapa	A pūnāwai in the woods amongst the Akolea fern (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).	-
Kapulehu	-	An ʻoiʻoina (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358).
Kauwau	-	A grove of large trees where they used to lay dead bodies (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358).
Kawauhooni	-	A kupapaʻu, a place where natives used to sleep when on their way with dead bodies to throw into the crater of Hualalai (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Keahuolū	-	“Ancient fishing rights extending out to sea and claiming the ʻōpelu,” (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356)
Keanawai	A water hole where there	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
	used to be a great many houses (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).	
Laeaniau	-	Ahu pōhaku (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Lanihauiki	-	A place of young koa grove (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Maili	-	An old village at Puuokaliu where houses used to stand (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Nohoana o Maa	-	An ʻoiʻoina at the ma uka corner of Lanihaunui (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358).
Ohiakaukanaka	-	A pali in the woods, (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kahuanui K. 1873:v.A1, p356-357). *Same as Kaohiamoekanaka* (Kahuanui, Boundary Commission Testimony, 1873, Keahuolū)
Ohiapiipa	-	A place name (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358).
Ohiawela	A place where a spring is said to exist (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Mahu K. 1873:v.A1, p358)	-
Opilopilo	A kahawai (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
Piilani	-	A mahina ʻai (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356).
Pohakuloa	-	A round rock on the seashore (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Pukalua	A water hole above the young koa (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kahuanui K. 1873:v.A1, p356-357).	-
Puukoai	-	a very small ʻāhua of dirt and stones (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Puulepo	-	A kualapa or ridge (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Puunahaha	-	Large red hill (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Puuokaliu	-	A pali, pali ʻāhua (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Puuokaloa	-	An ʻoiʻoina or small hill (Boundary Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).
Puuopalena	-	A place name (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356).
Puuouliuli	-	A hill (Boundary Commission Testimony: Keahuolū Ahupuaʻa, Kealakai K. 1873:v.A1, p356).
Waiakamalama	A water hole where natives get water when it fails below the woods (Boundary	-

Inoa ʻĀina	Wai Resource	Other Resources & Practices
	Commission Testimony: Keahuolū Ahupuaʻa, J.Z. Waiau K. 1873:v.A1, p354).	

The Māhele ʻĀina and Issuance Of Kuleana To Hoa ʻĀina - By Kumu Pono Associates

In pre-western contact Hawaiʻi, all land and natural resources were held in trust by the high chiefs (aliʻi ʻai ahupuaʻa or aliʻi ʻai moku). The use of lands and resources were given to the hoaʻāina (native tenants), at the prerogative of the aliʻi and their representatives or land agents (konohiki), who were generally chiefs of some standing as well. In 1848, the Hawaiian system of land tenure was radically altered by the Māhele ʻĀina. This change in land tenure was promoted by the missionaries, the growing Western population, and business interests in the island kingdom. Foreigners were hesitant to enter business deals on lease-hold lands.

The Māhele (division) defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the konohiki. As a result of the Māhele, all land in the Kingdom of Hawaiʻi came to be placed in one of three categories: (1) ʻĀina Lei Aliʻi (Crown Lands) for the occupant of the throne, (2) ʻĀina Aupuni (Government Lands); and (3) Konohiki Lands.

1848-1855: The Māhele ʻĀina (Land Division)

Disposition of the ʻāina between Keauhou 2nd to Kaloko was largely settled between the King, Kamehameha III, some 250 chiefs and a few foreigners in the 1848 "Buke Mahele" (*Land Division Book*). Most of the awardees were either closely related to the Kamehameha line and supported the rise and rule of the Kamehamehas, or had been given tracts of land in payment for services to the King. As part of the process of reaching agreements with each of the participants in the Māhele, the applicants released selected ahupuaʻa or land areas from their larger claims as a means of paying fees for processing their claims. These relinquished ʻāina were then retained by the King as ʻĀina Lei Aliʻi or given by the King to the ʻĀina Aupuni inventory. Title to the awarded lands was subsequently confirmed and assigned for ahupuaʻa under the provisions of the Kuleana Act. Table 11 identifies the original disposition the ʻāina—north to south—from Kaloko to Keauhou 2nd.

Table 11. Kaloko to Keauhou 2nd: Disposition of ʻĀina in the Māhele — ʻĀina Lei Aliʻi (Crown Lands), Konohiki Lands, and ʻĀina Aupuni (Government Lands)

Inoa ʻĀina North to South	Helu (Land Commission Award Number & Royal Patent)	Awardee and Acreage
Kaloko	7715:11 – R.P. 8214 Buke Mahele 1848:8	Kapuaiwa Lot Kamehameha V Son of Kinau and Mataio Kekuanaoa. (4230.00 Acs.)
Honokōhau Nui (1)	11216:36 – R.P. 7587 Buke Mahele 1848:28	Mikahela Kekuniahi Kekauonohi Daughter of Kinau kane and Wahinepio. (2653.00 Acs.)
Honokōhau Iki (2)	9971:9 – R.P. 6855	Wm. P. Leleiohoku Son of Kalanimoku (Paalua) and Kiliwehi. He was first married to Nahienaena, then to Ruta Keelikolani Following Nahienaena's death. (480.00 Acs.)
Kealakehe	—	Government Land Not cited in Buke Mahele. Transferred

		to Government Land Inventory by Kamehameha III.
Keahuolū	8452:12 – R.P. 6851 Buke Mahele 1848:10	Ane Keohokalole, daughter of Aikanaka and Kamaeokalani; mother of David Kalakaua and Lydia Liliuokalani mā (4071.00 Acs.)
Lanihau Nui (1)	8559 B:11 – R.P.7456	Wm. C. Lunalilo (302.00 Acs.)
Lanihau Iki (2)	— Buke Mahele 1848:157, 181	Government Land. Relinquished by Kaopua
Moeauoa	107474:3 – R.P. — Buke Mahele 1848:175	Nueku Namauu (— Acs.)
Moeauoa 2nd	9971:27 – R.P. 8126	Wm. P. Leleiohoku (130.00 Acs.)
Keōpū 1	11216:39 – R.P. 7874 Buke Mahele 1848:28	Mikahela Keahikuni Kekauonohi (7120.00 ac.)
Keōpū 2	—	Government Land
Keōpū 3	7713:5 – R.P. 4475 M. Kekuanaoa and Kinau. Sister of Moses Kekuaiwa, Lot Kapuaiwa and Alexander Liholiho. On of the grandchildren of Kamehameha I	Victoria Kamamalu, daughter of (Ahp. — Acs.)
Keōpū House Lots	9971:36 – R.P. 6690 9971:37 – R.P. 6694 9971:38 – R.P. 6690	Wm. P. Leleiohoku Wm. P. Leleiohoku Wm. P. Leleiohoku
Niumalu House Lot	9971:39 – R.P. 6690	Wm. P. Leleiohoku
Kailua House Lots	9971:41 – R.P. 6694 9971:42 – R.P. 6694 9971:45 – R.P. 6693 9971:46 – R.P. 6693 9971:47 – R.P. 6693 9971:68 – R.P. 6693	Wm. P. Leleiohoku Wm. P. Leleiohoku Wm. P. Leleiohoku Wm. P. Leleiohoku Wm. P. Leleiohoku Wm. P. Leleiohoku
Honua‘ula 1st	— Buke Mahele 1848:181	Government Land. Relinquished by Kamehameha III.
Honua‘ula		XX (Ahp. — Acs.)
Hienaloli 1	— Not cited in the Buke Mahele	Government Land
Hienaloli 2	7716:5 – R.P. —	Ruta (Ruth) Keelikolani, daughter of Pauahi-nui and M. Kekuanaoa. She was the half sister of Kamehameha IV and V, and Victoria Kamamalu. She was also married to Kuakini’s hanai, Leleiohoku. (Ahp. — Acs.)

Hienaloli 3	—	Government Land
Hienaloli 4th	387 Part 4, Section 2 No. 1	A.B.C.F.M. (Church lands)
Hienaloli 5th	8524 B:3 – R.P. — Buke Mahele 1848:167	Peke (Ahp. — Acs.)
Hienaloli 6th	—	Government Land
Auhaukeaʻe 1st	11216:37 – R.P. 7580 Buke Mahele 1848:28	Mikahela Keahikuni Kekauonohi (334.00 Acs.)
Auhaukeaʻe XX 2nd	Buke Mahele 1848:8, 179 —	Relinquished by Kapuaiwa Lot Kamehameha. Relinquished by Kamehameha III to Government Land Inventory.
Puaʻa 1st	7715:13 – R.P. 7845 Buke Mahele 1848:8	Kapuaiwa Lot Kamehameha (859.00 Acs.)
Puaʻa 2nd	—	Check Crown / Government Land
Puaʻa 3rd	Buke Mahele 1848:14, 179	Government Land. Relinquished by Moses Kekuaiwa.
Waiʻaha 1st	387 Part 4, Section 2, No. 3	A.B.C.F.M. (Mission Station land) (— Acs.)
Waiʻaha 2nd	Crown Land Crown Land	(1890, pursuant to "Act to Declare Certain lands to be a part of the Crown Lands and Royal Domain)
Kahului 1st Buke Mahele 1848:163	8516-B:3 – R.P. 1669 Kaoanaeha and John Young Sr., one of Kamehameha I's haole advisors. Sister of Kekelaokalani, Keoni Ana and Lahilahi. Kamaikui adopted her niece Emma (daughter of Kakelaokalani), who was born at Kahului 2nd, and later the wife of Alexander Liholiho, and known as Queen Emma.	Grace Kamaikui, the daughter of (Ahp. — Acs.)
Kahului 2nd	—	Government Land. (846 Acs.)
Puapuaʻa iki (1st)	4887:2 received land in return for services to	Thomas Sam, a foreigner who the Kamehameha line.
Puapuaʻa nui (2nd) Not cited in Buke Mahele	8559-B:8 – R.P. 7819 grandson of Kaleimamahu, half brother of Kamehameha I.	William C. Lunalilo, the son of Kekauluohi and Kanaina, and
Hōlualoa 1st & 2nd Buke Mahele 1848:4	7713:43 – R.P. 4475 (Ahp. 7330 Acs.)	Victoria Kamamalu
Hōlualoa 3rd	—	Government Land
Hōlualoa 4th	7228 – R.P. —	Loe, daughter of Kapiiwi and

Buke Mahele 1848:131	Kahikoloa of Holualoa and sister of Kinimaka. (638 Acs.)	
Kaumalumalu Not cited in Buke Mahele	9971:28 – R.P. — (Ahp. — Acs.)	William Pitt Leleiohoku.
Pāhoehoe 1st & 2nd Buke Mahele 1848:5	— Relinquished by Victoria Kamamalu.	Government Land.
Pāhoehoe 2nd Buke Mahele 1848:28	11216:35 (1190 ac.)	Mikahela Keahikuni Kekauonohi.
Pāhoehoe 3rd Buke Mahele 1848:163	8520-B:3 – R.P. 1668 Kaoanaeha, and John Young Sr. Mother of Queen Emma. (Ahp. — Acs.)	Gini Lahilahi. Daughter of
Pāhoehoe 4th	—	Government Land
Laʻaloa 1st Buke Mahele 1848:16	7716:4 – R.P. — (Ahp. — Acs.)	Ruth Keelikolani
Laʻaloa 2nd	Buke Mahele 1848:91, 183	Relinquished by Kaunuohua, Relinquished by Kamehameha III to Government Land Inventory.
Kāpalaʻalaea 1st Buke Mahele 1848:147	4452:2 – R.P. — Naihekukui and Kepooku. Wife of Kamehameha III. (— Acs.)	Hazaleleponi Kalama, daughter of
Kāpalaʻalaea 2nd	Buke Mahele 1848:181	Government Land
Kahaluʻu Buke Mahele 1848:6	7713:6 – R.P. 6856 (5443.00 Acs.)	Victoria Kamamalu
Keauhou 1st Buke Mahele 1848:6	7713:7 – R.P. 4475 (Ahp. 5146 Acs.)	Victoria Kamamalu
Keauhou 2nd (kahi i hanau ai o Kauikeaouli– birth place of Kamehameha III) Buke Mahele 1848:8	7715:12 – R.P. 7844	Kapuaiwa Lot Kamehameha. (109,600 Acs.)

ʻĀina of the Crown and Government

At the time of recording the "Buke Mahele," issues with the completeness of the records were already evident. On July 14, 1848, "*Ka Elele Hawaii*" the Kingdom newspaper published a list of lands which King Kamehameha III transferred to the ʻĀina Aupuni (Government Land) as a mean of providing hoaʻāina with access to lands more suited to their needs, and as a means of developing revenue for the government. The list also includes those ʻāina which the King retained for the benefit of the use and Crown. *Ka Elele Hawaii* identified the following ʻāina between Keauhou to Kaloko:

Puaa (Crown)
Kealakehe (Government)
Honuaula (Government)
Auhaukeae (Government)
Kahului (Government)
Elepaio Ili no Honokohau (Government)
Lanihau 2 (Government)
Hienaloli 1 & 2 (Government)
Puaa 2 & 3 (Government)
Laula Ili i Holualoa (Government)

Kooai Ili o Holualoa 3 (Government)
Kamakaolohe Ili i Pahoehoe (Government)
Laaloa (Government)
[*Ka Elele Hawaii*, Iulai 14, 1848:1]

Kaulehua Ili (Government)
Pahoehoe (Government)
Kapalaaea 2 (Government)...

Hoa'āina (Native Tenants) Allowed To Make Claims For 'Āina They Resided on and Actively Cultivated

As the Māhele between the King and his chiefs was underway, provisions were also being established for the hoa'āina. This was manifest in the "Enabling" or "Kuleana Act" (December 21,1849) laid out the framework by which native tenants could apply for, and be granted fee-simple interest in "Kuleana" or property rights, and also confirmed their rights of access to collection of resources necessary to their life upon the land in their given ahupua'a. The Act reads:

> August 6, 1850
> An Act confirming certain resolutions of the King and Privy Council passed on the 21st day of December 1849, granting to the common people allodial titles for their own lands and house lots, and certain other privileges.
>
> Be it enacted by the Nobles and Representatives of the People of the Hawaiian Islands in Legislative Council assembled;
>
> That the following parcels which were passed by the King in Privy Council on the 21st day of December A.D. 1849 when the Legislature was not in session, be, and are hereby confirmed, and that certain other provisions be inserted, as follows:
>
> **Section 1**. Resolved. That fee simple titles, free of commutation, be and are hereby granted to all native tenants, who occupy and improve any portion of any Government land, for the land they so occupy and improve, and whose claims to said lands shall be recognized as genuine by the Land Commission; Provided, however, that the Resolution shall not extend to Konohikis or other persons having the care of Government lands or to the house lots and other lands, in which the Government have an interest, in the Districts of Honolulu, Lahaina and Hilo.
>
> **Section 2**. By and with the consent of the King and Chiefs in Privy Council assembled, it is hereby resolved, that fee simple titles free of commutation, be and are hereby granted to all native tenants who occupy and improve any lands other than those mentioned in the preceding Resolution, held by the King or any chief or Konohiki for the land they so occupy and improve. Provided however, this Resolution shall not extend to house lots or other lands situated in the Districts of Honolulu, Lahaina and Hilo.
>
> **Section 3**. Resolved that the Board of Commissioners to quiet Land titles be, and is hereby empowered to award fee simple titles in accordance with the foregoing Resolutions; to define and separate the portions belonging to different individuals; and to provide for an equitable exchange of such different portions where it can be done, so that each man's land may be by itself.
>
> **Section 4**. Resolved that a certain portion of the Government lands in each Island shall be set apart, and placed in the hands of special agents to be disposed of in lots of from one to fifty acres in fee simple to such natives as may not be otherwise

furnished with sufficient lands at a minimum price of fifty cents per acre.

Section 5. In granting to the People, their House lots in fee simple, such as are separate and distinct from their cultivated lands, the amount of land in each of said House lots shall not exceed one quarter of an acre.

Section 6. In granting to the people their cultivated grounds, or *Kalo* lands, they shall only be entitled to what they have really cultivated, and which lie in the form of cultivated lands; and not such as the people may have cultivated in different spots, with the seeming intention of enlarging their lots; nor shall they be entitled to the waste lands.

Section 7. When the Landlords have taken allodial titles to their lands the people on each of their lands shall not be deprived of the right to take firewood, *aho* cord, thatch, or ti leaf from the land on which they live, for their own private use, should they need them, but they shall not have a right to take such articles to sell for profit. They shall also inform the Landlord or his agent, and proceed with his consent. The people shall also have a right to drinking water, and running water, and the right of way. The springs of water, and running water, and roads shall be free to all should they need them, on all lands granted in fee simple. Provided that this shall not be applicable to wells and water courses which individuals have made for their own use.

Done and passed at the Council House, Honolulu this 6th day of August 1850. [copied from original hand written "Enabling Act"[78] – DLNR 2-4]

The lands awarded to the hoa'āina (*native tenants*) became known as "*Kuleana* Lands." All of the claims and awards (the Land Commission Awards or LCA) were given a "Helu" or number, generally referred to as Land Commission Awards. These Helu (LCA) remain in use today to identify the original owners of lands in Hawai'i.[79]

The work of the Land Commission was brought to a close on March 31, 1855. The program, directed by principles adopted on August 20, 1846, met with mixed results. In its' statement to the King, the Commissioners to Quiet Land Titles (George M. Robertson, March 31, 1855) summarized events that had transpired during the life of the Commission:

> ...The first award made by the Commission was that of John Voss on the 31st March 1847... ...The time originally granted to the Board for the hearing and settlement of all the land claims in the kingdom was two years, ending the fourteenth day of February, 1848.
>
> Before the expiration of that term it became evident that a longer time would be required to perform a work... Accordingly, the Legislature on the 26th day of August

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78 See also Kanawai Hoopai Karaima no ko Hawaii Pae Aina (Penal Code) 1850.

79 While on the surface, this statement is correct, over the last 175-years, layers of transposition have been added to maps and records. Thus the Real Property Tax Maps (TMK), are often erroneous, with Helu and the names of original awardees are inacurrate.

1847, passed an Act to extend the duration of the Board to the 14th of February, 1849, adding one year to the term first prescribed, not however, for the purpose of admitting fresh claims, but for the purposes of hearing, adjudicating and surveying those claims that should be presented by the 14th February, 1848. It became apparent to the Legislature of 1848 that the labors of the Land Commission had never been fully understood, nor the magnitude of the work assigned to them properly appreciated, and that it was necessary again to extend the duration of the Board. An act was accordingly passed, wisely extending the powers of the Commissioners "for such a period of time from the 14th day of February 1849, as shall be necessary for the full and faithful examination, settlement and award upon all such claims as may have been presented to said Board." ...[T]he Board appointed a number of Sub-Commissioners in various parts of the kingdom, chiefly gentlemen connected with the American Mission, who from their intelligence, knowledge of the Hawaiian language, and well-known desire to forward any work which they believed to be for the good of the people, were better calculated than any other class of men on the islands to be useful auxiliaries to the Board at Honolulu...

...During the ten months that elapsed between the constitution of the Board and the end of the year 1846, only 371 claims were received at the office; during the year 1847 only 2,460, while 8,478 came in after the first day of January 1848. To these are to be added 2,100 claims, bearing supplementary numbers, chiefly consisting of claims which had been forwarded to the Board, but lost or destroyed on the way. In the year 1851, 105 new claims were admitted, for Kuleanas in the Fort Lands of Honolulu, by order of the Legislature. The total number of claims, therefore, amounts to 13,514, of which 209 belonged to foreigners and their descendants. The original papers, as they were received at the office, were numbered and copied into the Registers of the Commission, which highly necessary part of the work entailed no small amount of labor...

...The whole number of Awards perfected by the Board up to its dissolution is 9,337, leaving an apparent balance of claims not awarded of say 4,200. Of these, at least 1,500 may be ranked as duplicates, and of the remaining 2,700 perhaps 1,500 have been rejected as bad, while of the balance some have not been prosecuted by the parties interested; many have been relinquished and given up to the Konohikis, even after surveys were procured by the Board, and hundreds of claimants have died, leaving no legal representatives. It is probable also that on account of the dilatoriness of some claimants in prosecuting their rights before the Commission, there are even now, after the great length of time which has been afforded, some perfectly good claims on the Registers of the Board, the owners of which have never taken the trouble to prove them. If there are any such, they deserve no commiseration, for every pains has been taken by the Commissioners and their agents, by means of oft repeated public notices and renewed visits to the different districts of the Islands, to afford all and every of the claimants an opportunity of securing their rights... [Minister of Interior Report, 1856:10-17]

ʻĀina Kuleana: Summary of Claims For Kuleana Made by the Hoaʻāina

One of the requirements of the Māhele for hoaʻāina was that they produce proof of their use of the lands being claimed. A careful review of claims made by native residents of the lands between Keauhou 2nd to Kaloko reveals that in the time preceding, and during the time of registering

claims, Hawaiian use of the land was ongoing in a wider area than reflected on historic and TMK maps. Indeed, of particular importance to this current study is that the number of claims for land on the kula (open lands behind the shore in reaching to the forested zone) was greater than the number of claims for other agricultural zones of Kona.

A number of hoa'āina made verbal claims which were transcribed as spoken, and others forwarded written claims to the Land Commission in order to register their claims for land. This process created the volumes of the Native and Foreign Register of Claims. The next phase of documentation was the presentation of supporting "Testimony" by individuals who were family with the applicants and the lay of their kuleana. The record of the witnesses was recorded in the volumes of the Native or Foreign Testimony. This was followed by conducting of surveys, recorded in the "Mahele Award Books," and in many cases, further confirmed by issuance of a Palapala Sila Nui (Royal Patent on Kuleana Claims).

As a part of the present study, we reviewed thousands of records from the hoa'āina which include lands between Keauhou 2nd to Kaloko to identify residency, land use, agricultural zones and crops, and access to resources claimed by applicants. Table 12 is a summary of information recorded from the Keauhou-Kaloko region.

Table 12. Summary of Crops Identified in Māhele/Kuleana Claims

Food Plants	Number of Citations	Other Plants	Number of Citations
Kalo (taro)	54	Loulu (Pritchardia palms)	15
Uala/Uwala (sweet potatoes)	45	Kou (Cordia) trees	6
Niu (coconut trees)	15	Hala (pandanus)	5
Ipu (gourds)	3	Noni (Indian mulberry)	1
Maia (bananas or plantains)	3	Hau (hibiscus)	1
		Olonā (Touchardia latifolia)	2
Uhi (yams)	1		
Ulu (breadfruit)	3		

Introduced Crops	Number of Citations
Kope (coffee)	12
Alani (orange trees)	14
Hala kahiki (pineapple)	2
Momona (Cherimoya)	1
Pu (squash/pumpkin)	2

It should be remembered that the Māhele records are incomplete because native tenants who were living upon and working on the land were often hesitant to make personal claims for kuleana. The Hawaiian commoners had difficulty—spiritually and in practice—with the foreign notion of being able to "own" land. This naturally limited the number of tenants who came forward to apply for kuleana. Of those who did come forward, many reported that their mākua (parents) and kūpuna (grandparents or elders) had used the lands prior to their inheritance of the parcels.

Some Hoa'āina Were Reluctant to Register Claims for Kuleana

Reviewing the results of the Māhele and awarding of Kuleana, some readers might wonder, "why?" The cultural-social context in which private land title was a foreign concept was in itself a

predominant issue, but other concerns also contributed to the low response. In Kona, John Fuller was appointed land agent, and served as one of the primary surveyors of the kuleana claims. In 1853, Fuller wrote a number of letters to Land Commissioners describing difficulties he encountered in having applicants come forward. Among the problems was that some of the aliʻi, konohiki and their representatives used fear tactics to intimidate their hoaʻāina. This had implications across the region and all the Hawaiian Islands. Among the letters are the following:

The Kingdoms' policy of providing land grants to native tenants was further clarified in a communication from Interior Department Clerk, A. G. Thurston, on behalf of Keoni Ana (John Young), Minister of the Interior; to J. Fuller, Government Land Agent-Kona:

> ***February 23, 1852***
>
> …His Highness the Minister of the Interior instructs me to inform you that he has and does hereby appoint you to be Land Agent for the District of Kona, Hawaii.
>
> You will entertain no application for the purchase of any lands, without first receiving some part, say a fourth or fifth of the price; then the terms of sale being agreed upon between yourself and the applicant you will survey the land, and send the survey, with your report upon the same to this office, for the Approval of the Board of Finance, when your sales have been approved you will collect the balance due of the price; upon the receipt of which at this office, the Patent will be forwarded to you.
>
> Natives who have no claims before the Land Commission have no Legal rights in the soil. They are therefore to be allowed the first chance to purchase their homesteads. Those who neglect or refuse to do this, must remain dependent upon the mercy of whoever purchases the land: as those natives now are who having no kuleanas are living on lands already Patented, or belonging to Konohikis.
>
> Where lands have been granted, but not yet Patented, the natives living on the land are to have the option of buying their homesteads, and then the grant be located, provided this can be done so as not to interfere with them.
>
> No Fish Ponds are to be sold, neither any landing places.
>
> As a general thing you will charge the natives but 50 cents pr. acre, not exceeding 50 acres to any one individual.
>
> Whenever about to survey land adjoining that of private individuals, notice must be given them or their agents to be present and point out their boundaries… [Interior Department Letter Book 3:210-211]

On October 11, 1852, Fuller wrote to J. Smith (Secretary, Board of the Land Commission); Describing extent of survey work completed—including the consolidation of multiple ʻāpana into

a single parcel[80]— and also reported that Naheana or Kaheana, Konohiki of several lands in vicinity of Kailua has been "abusive." Fuller wrote:

> …He [Naheana] says his chiefs have given orders not to allow any Kuleana on their lands… …But I should like to know how to proceed with such a villain… …He has prevented quite a number from showing their Kuleanas and I leave them until Mr. Robertson or some other of the Commission come up…
>
> …Most of the claimants here have taken all their land in one piece, besides their pahale – and I must say their claims are very moderate, generally not more than from 1 to 3 acres, according to what they have planted… [DLNR s-1- Box 1]

J. Fuller, Kona Land Agent, Surveyor, to
J. H. Smith, Secretary to Board of Land Commissioners
August 5, 1853, Kona, Hawai'i

> … I am happy to inform you that I have completed the surveys of Kuleanas in this District so far as I have been able to find them. There are, however, quite a number scattered through the District which have not been pointed out to me, and a few in the neighborhood of Kailua which the Konohiki, Kaheana, prevented the people showing me. I am now making a tour through the whole district as Land Agent, and shall survey all the scattering claims which are pointed out to me… [HSA – Interior Department Land Files]

It should be noted here that several Native Hawaiians in the Kona District, also submitted letters regarding the character of Fuller, claiming that he was rude and impatient with them—even asking that he be replaced as the land agent.[81]

Native Terms Found in Cited Kuleana Claims

In the translated texts that follow, native terms are used. The glossary in Table 13, below, provides readers with translations of various words and terms used in the Māhele claims; and that describe plants cultivated, and garden features in the study area.

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80 This action resulted from the massive job of surveying claims for the Land Commission. Today, it provides us with some background in the difference between Register and Testimony claims with multiple 'āpana across several "wao" (environmental zones) which traditionally had been an important aspect of hoa'āina residency. The multiple 'āpana enabled residents to access lands and sustain themselves through the varying seasons of weather and the availability of wai (water) resources.

81 See Kahookaumaha to Keoni Ana, Augate 21, 1854 (HSA-Int. Dept. Misc. Box 146).

Table 13. Glossary of Selected Hawaiian Terms Cited in Kuleana Claims

Ahupuaa Ahupuaʻa

An important sub-division of land (usually extending from a fishery to an area on the mountains), generally containing varied environmental zones and resources necessary to sustain a community. Such zones and resources were managed in smaller land parcels—among which are ʻili, kīhāpai, kula, lele, māla, moʻo and paukū— which were delineated within given ahupuaa.

Aina (ʻĀina)

General term for land, earth – that which sustains.

Aina waiho wale (ʻĀina waiho wale)

Idle land (that which was being rested or untended; also an unclaimed parcel.

Alaloa Long trail.

The main ancient trail used to provide access through the district and around the island, generally the trail situated near the shoreline (near the present day Aliʻi Drive). Sometimes, the mauka trail Ke-ala-ehu was also referred to as the ala loa.

Alani Orange trees.

Alanui A trail; in the early system of trails, one that was larger than the ala hele (local paths and accesses), yet smaller than the alaloa Alanui Aupuni – Government Road.

Alanui Aupuni

Government Road System established by law in 1848 and protected in the "Highways Act of 1892." In the context of the claims below, use of :Alanui Aupuni" might refer to both the coastal and mauka roads around the island. In many places, overlaid on the Alaloa and Kealaehu.

Alanui pii Ascending trail (i.e., trail leading to the uplands, the mauka-makai trail system which occurred in all ahupuaʻa.).

Amau (ʻAmaʼu or ʻĀmaʻumaʻu)

The Sadleria fern forest zone, a region of upland agricultural fields.

Anana A unit of measurement extending from tip of longest finger to longest finger, with arms stretched out.

Apaa (ʻĀpaʻa)

An arid area of dry land cultivation.

Apana (ʻĀpana)

Parcels or lots within given kuleana (i.e. Apana 1, Apana 2…). In texts below, ʻāpana identified on historical maps as being within the primary study area are identified by "ʻĀp." followed by the number of the specific ʻāpana.

Eamaia (Eʻa maiʻa)

A variety of mountain banana tree.

Ili (ʻIli) Small units of land within an ahupuaʻa, often described as long narrow parcels of land that run mauka-makai, and cross several agricultural zones.

Ipu (Gourds)

Used as containers for storing valuable items, for the collection of water, for food, in ceremonial observance (particularly those associated with Lono), and as musical instruments.

Iwi aina (Iwi ʻāina)

A boundary wall, identifying any one of several features, as an ahupuaʻa boundary wall, a boundary wall of a planting area and/or the boundary between two separately held ʻāpana of land.

Iwilei A unit of measure with arm extended out from Collar bone to tip of mid-finger.

Kahakai Beach, shoreline.

Kahuahale House site.

Kalo (Taro)

Kalo served as one of the major starch foods of Hawaiians around the islands. Kalo is used in ceremonies, is a part of the Hawaiian stories of creation and birth of kānaka, and was developed into many varieties, some of which were particularly valued in the Kona district. While often thought of as being grown in loʻi Kalo (irrigated taro pond fields), the cultural record reveals that there was more kula (dryland) Kalo grown in the islands than that grown in loʻi Kalo..

Kaluulu (Kanu-ʻulu & Ka-ulu-ʻulu)

The region of ʻulu cultivation and growth. Providing an important starch food source, wood valued in making canoes and various tools; in some accounts young ʻulu branches were harvested and used in making kama (bark cloth). The canopy of ʻulu provided shade and helped retain moisture from important under-story cultigens.

Kealaehu (Ala Ehu)

The ancient upland trail that passed through the ʻāmaʻumaʻu (fern forest agricultural zone) in the vicinity of the present day Māmalahoa (Belt) Highway. It's development is associated with the reigns of Ehu and ʻUmi.

Kealakowaa (Kealakōwaʻa)

The trail on which canoes were dragged from the uplands to the shore; crosses several ahupuaʻa including Kahului to Hōlualoa.

Kihapai (Kīhāpai)

A dry land garden; cultivated areas, or patch; generally written in cited texts as "kihapai ua mahiia" (planted garden). "Kīhāpai Kalo" and "kīhāpai ʻuala (dry land taro and sweet potato fields). in the larger Kona Field System, the planting areas are often marked by walls, clearings, stone mounds, and planting pits, etc...

Ko (Kō) Sugar cane.

Koele (Kōʻele)

A parcel of land cultivated in support of the King. These parcels were held under title of the Crown or in the Kingdom Land Inventory

Konohiki Land overseer, chief or owner of the larger land division.

Kope Coffee trees.

Kou The Cordia subcordata tree.

Kula Plain or grassy flat land; generally, an area between the shoreline and lower forest zone. In the early usage, the term describes lowland agricultural fields. In the later 1800s, usage of "kula" in describing land areas was used to describe pasture land. This usage postdates claims of the Māhele, and if taken in the latter meaning changes actual forms of land use. This is particularly problematic when a Kuleana claim text reads something like "1 kula Kalo" and the later translations state, for example, "1 one taro pasture," which is leads to inaccurate or misleading descriptions of lands use.

Kuleana In the context of the Māhele, kuleana are property rights. In larger context there are several meanings, but "responsibility" is one of the important uses of the word.

Kumu In this context, Tree as in "kumu loulu."

Kupuna Ancestor, Elder. Kūpuna (Ancestors, Elders).

Lele (and ʻili lele)

A separate or detached section of an ʻili (e.g., pieces of a land parcel separated by environmental zones, but carrying the same name); may also even be a parcel of land associated with a different ahupuaʻa, and extends across various "wao" elevational zones.

Lihi A narrow strip of arable land.

Loulu Pritchardia palm.

Maia Bananas.

Makai Towards the sea (shoreward).

Makua Parent(s), elders.

Mala (Māla)

A dryland garden, planted field, or patch; e.g., "mala uala" (sweet potato field), "mala Kalo" (taro field).

Mau or Amau (Maʻu; cf. ʻAmaʻu above)

A damp fern region of the uplands in which cultivation occurred.

Mauka Towards the mountain (upland).

Mea ana aina (Mea ana ʻāina) Surveyor.

Niu Coconut trees.

Olona (Olonā)

An endemic Hawaiian shrub (*Touchardia latifolia*), which was used to produce extremely strong fiber for cordage and ceremonial kapa.

Pa (Pā) depending on context of documentation, use of "pa" indicates a fence, wall, enclosure, lot/parcel of land, or house lot (see "Pahale").

Paahao (Paʻahao)

Prison/Jail. Parcels of land work by convicts in public service. Paʻahao parcels were held under title of the Kingdom Land Inventory.

Pa aina (Pā ʻāina)

Land division wall (see discussion about the history of the Pā Kuakini or Great Wall in this study).

Paakai (Paʻakai)

Salt (literally, hard ocean water) sometimes identified in claims.

Pahale (Pāhale)

A house lot (also hale, kahuahale, kauhale).

Pahee (Paheʻe)

A moist (shaded) area of dry land agricultural fields.

Pahulu Land that is worn out, lying fallow to restore its productivity.

Pali A cliff.

Papipi (Pā pipi)

Cattle wall or enclosure, depending on context (see the section that discusses history of the Pā Kuakini or Great Wall). Depending on context, and written "pa pipi" it describes a cattle enclosure.

Pauku (Paukū)

A segment of land, generally a long narrow cultivated section of land, described "pauku ua mahiia" (a cultivated trip of land).

Poaha (Pōʻahā)

Thursday parcel of land worked in lieu of paying taxes. These parcels were held under title of the Kingdom Land Inventory.

Poalima (Pōʻalima)

Friday parcel of land worked in support of the chiefs. These parcels were held under title of the chiefs or in the Kingdom Land Inventory.

Pu (Pū) Squash or pumpkin.

Puhala (Pūhala)

Growth of hala (pandanus) trees.

Punawai (Pūnāwai)

A freshwater spring.

Uala (ʻUala or ʻUwala)

General name of Hawaiian sweet potatoes, one of the major crops of the Kona district and associated with the ritual of Lono. Later, "ʻuala kahiki" was the native name given to introduced Irish potatoes.

Uhi Yams.

Ulu (ʻUlu) Breadfruit trees.

Wahi waiho wale Unused or untended land.

Excerpts from Kuleana Claims in the Ahupua‘a of Keauhou 1 & 2, Kahalu‘u, Wai‘aha-Kahului, Keahuolū-Kealakehe – by Kumu Pono Associates

Background

The claim and award narratives below are generally cited in order from South (Keauhou) to North (Kealakehe and adjoining lands). Some of the claims cite kuleana (property rights) across more than one ahupua‘a—particularly those of Ali‘i and foreign claimants. The claims also span a wide cross section of “wao” (traditional environmental zones), ranging from kai and kahakai” (ocean and shore lands) to the “ulu lā‘au,” or “mauka loa” (forest or distant uplands). The extensive use of lands across several wao as cultivating fields, residences, water resources and collection of natural resources such stone, birds and plants/trees—was integral to the long-term wellbeing and sustainability of hoa‘āina. This practice allowed the native tenants, to adjust their cultivation and residency practices based on weather and environmental conditions. As noted earlier in this section on development of the Māhele/Kuleana rights limited claimants’ ability to claim ‘āina, as the act required that they were actively living on their house lots (approximately one quarter acre), and the agricultural land claims were limited the ‘āina that were actively under cultivation (“Enabling Act”[82] – DLNR 2-4, August 6, 1850).

Because of the scope of this project spans multiple ahupua‘a, we focused on land use claims identified on historic maps within a portion of most ahupua‘a within the study area, generally in the region from the shore to c. 2,000-foot elevation. Kepā Maly, then prepared verbatim translations—in some instances excerpts of larger claims—of the identified Native/Foreign Register claim documents. We then looked through the Native/Foreign Testimony documents, preparing excerpts of the documents.[83] Also included in the “Testimony” documents are cited the boundary references/adjoining parcels as those provided documentation of neighboring residents, features and adjoining land uses, which demonstrate the extent of land use across the region at the time.

It is important to remember that additional documentation of kuleana claims exists in the notes of survey documented in the “Mahele Award Books” and in “Royal Patents” issued upon confirmation of the claims.[84] Where the cited claims include parcels identified on maps as being within the primary study zone—shore to c. 2,000-foot elevation. The ‘āpana (parcels) identified as “‘Āp.” (followed by a number), indicate those ‘āpana which are in the upper region of the project area. Also, the writing is at times illegible, and because the spelling of place and people names is

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82 See also Kanawai Hoopai Karaima no ko Hawaii Pae Aina (Penal Code) 1850.

83 Typically, the Register and Testimony volumes recorded the application and initial description of the kuleana claims, followed by refined descriptions and witness support of the application. Between 1848 to 1855, many of the initial applications and supporting documentation were lost in transit. As a result, some of the Kuleana cited below include only one record prior to accepting or denying the claim.

84 While it was the original intention of the Commission to issue Palapala Sila Nui (Royal Patents) on awarded claims, the monumental task of recording the Māhele and Kuleana, proved to be too much, and also extended beyond the allotted time frame for completing the commission’s work. As a result, many awards were confirmed without issuance of the Royal Patent.

inconsistent, the correct spelling may be unclear. In such cases we have used the "[?]" following the word where it is uncertain.

Regardless, a review of the claim documentation provides us with a rich and varied collection of inoa ʻāina (place names) across the landscape. Table 14 is a list of names across various ahupuaʻa which we could identify through the cited documents. Some of the names occur in multiple ahupuaʻa

Table 14. Inoa ʻĀina (Place Names)

Ahupuaʻa, ʻIli, Paukū, Moʻo, Kīhāpai Found in Cited Kuleana Claims

Inoa ʻĀina	Ahupuaʻa
Ahualoa	Honokohau
Alanaio	Lanihau
Auliilii	Lanihau
Elepaio	Honokohau
Haleamahuka	Honokohau
Haleape	Keauhou
Haleokane	Keauhou
Haleokaupaku	Keauhou
Haleolai	Keauhou
Haleolono	Moeauoa, Honokohau
Halewaawaa	Kahului
Haliipalala	Keauhou, Kahaluu
Hanamauloa	Waiaha
Hanapouli	Honokohau
Hapaipapa	Kahului
Helekamahina	Kahaluu
Hokio	Kahaluu
Hopeloa	Lanihau
Hulihee	Keopu
Hulihuli	Kealakehe
Hulilau	Kahului
Ililoa	Kahaluu, Keauhou, Puapuaa
Inaimoa	Kahului
Kaaipuaa	Kahului
Kaaipuhi	Keopu
Kaaki	Kealakehe
Kaeamaia	Kealakehe
Kaeo	Honokohau
Kahea	Moeauoa
Kahuamoa	Kahaluu
Kahuki	Kahului
Kaiakeakua	Lanihau
Kaimuloa	Kahaluu
Kalamaunu	(Kailua Vicinity)
Kaloaulu	Kahaluu
Kaluaaina	Keauhou
Kaluaolena	Kahului
Kaluaoliloa	Keopu

Kaluapaa	Keopu
Kamakahonu	Lanihau
Kamuku	Kahaluu, Lanihau
Kamumu	Kahului
Kaniohale	Kealakehe
Kanuaawa	Moeauoa
Kaohia	Keauhou, Moeauoa
Kapio	Kahaluu
Kauailoa	Kahului, Waiaha
Kaulukauheana	Keauhou
Kealaehu (Alaehu)	An ancient trail attributed to Umi-a-Liloa that crosses all of the ahupuaa in the Kona District.
Kealakowaa (Alakowaa)	Kahului
Kealakupou (Kaalakupou)	Keauhou
Kealaloa (Alaloa)	A part of the ancient trail system that crosses through Kona, encircling the island.
Kihikihi	Kahaluu
Kikiaiole	Kahului
Kionalua	Keauhou
Koaie	Kahaluu
Kohekaua	Lanihau
Kohelemu	Keauhou
Koheloa	Lanihau
Kuekaa	Keauhou
Kukuihaa	Kahaluu
Kukuiokahinu	Kahaluu
Kukuimino (Kukuiomino)	Kealakehe
Kukuiominoiki	Kealakehe
Kukuiominonui	Kealakehe
Kukuipuloa	Kahului
Kumuhawane	Kahaluu, Keauhou
Kumuniu	Keauhou
Lapalua	Kahului
Lauekieleele	Keauhou
Lauhulu	Puapuaa
Laulaulahili	Keauhou
Lehuakona	Kahaluu
Luaoiliki	Kahaluu, Lanihau
Maalo	Keauhou
Maili	Keauhou, Keahuolu
Makaihuliwaa	Waiaha
Makakaualii	Keauhou
Makakiloia	Kahaluu, Kealakehe
Makolea	Kahaluu
Malaiula	Keauhou
Moelaepuni	Lanihau 2
Mokuaikaua	Keauhou
Naalapa	Kahului
Niukini	Kahului
Niukukahi	Lanihau
Niumalu	Keopu

Nuuhiwa	Honokohau
Ohiki	Kahului, Puaa
Ohuahale	Kahului
Opukaha or Opuokaha	Keauhou
Pahauopu	Kahaluu
Pahoa	Kahaluu
Pahukauila	Waiaha
Pakii (Paki)	Keauhou, Kahaluu
Pakohe	Keauhou
Pamaki	Kahaluu
Papaakoko	Honokohau
Papaawela	Lanihau
Papala	Keauhou
Papalanui	Keauhou
Papiha	Kahului
Papipi	Localities identified as the “Great Wall” in various ahupuaa, and as cattle enclosures.
Papuaa	Kahaluu, Kahului, Moeauoa, Lanihau
Papuaaiki	Kealakehe
Papuaanui	Kealakehe
Paulu	Kahaluu
Pawaalae (wahi pana)	Puaa
Pohakupalahalaha	Honokohau
Poolani	Keopu
Puakahi	Kahaluu
Punaio	Waiaha
Puuhinahina	Kahaluu
Puukehoe	Kahului
Puuki	(not named)
Puukou	Honokohau
Puukukaeke	Waiaha
Puuloa	Keauhou, Lanihau
Puunoni	Keauhou
Puohe	Kealakehe
Puuokaa	Keauhou
Puuokaliu	Lanihau, Keahuolu
Ukakoni	Honokohau
Ulumoe	Kahaluu
Umiwai (Punawai)	Kahului
Waiapuko	Kahului
Waiha	Honokohau
Waipio	Keauhou, Kahaluu

Māhele Discussion: Land Use Model in Kona

This section highlights select excerpts from the Māhele Awards Books, including Native Testimony, Native Register, and Land Commission Awards. Transcriptions and translations from original Awards Books were completed by Kumu Pono Associates; the discussions featured below were completed by Nohopapa Hawai‘i.

Kamehameha School Parcel - Keauhou Ahupua‘a

Keauhou 2 Ahupua‘a and Environs

Multiple ‘āpana under cultivation, predominantly with taro and ‘uala, although foreign-introduced oranges and even coffee were also cultivated, and one or more walled pāhale at the shoreline typify Keauhou 2 land claims. Many claims reference lands as ancestral places traditionally occupied by members of one ‘ohana across multiple generations. A cluster of helu within the land division sit north of the Kamehameha Schools well site, at a similar 1,500 amsl (above mean sea level) elevation, and are described below:

Kukahi, Helu 7366

Kukahi issued a Native Register claim for “…a land claim and a pahale claim on the shore,” and 20 kīhāpai in the ‘ili ‘āina of Puunoni (Kukahi was awarded 2 ‘āpana in Keauhou 2 (MA:v5, p578). Native testimony issued by Kapela on behalf of Kukahi (NT:v4, p653-654) describes mauka lands in the ‘ili ‘āina of Maili containing oranges and olonā[85] tended by Kukahi as well as “very old land” in the ‘ili ‘āina of Kohelemu inherited from his parents and planted by his wife. Kapela goes on to describe Kukahi’s residence in Keauhou 2: “1 Apana Pahale, Mauka and all surrounding boundaries idle land. It was enclosed with a wall by him. 1 hale is his, and he resides there,” (NT:v4, p653-654). Notably, Kapela also described the oranges and olonā as “with Kane” on February 21, 1849, evincing continuation of Hawaiian cultural beliefs and practices in Keauhou 2 during the mid-nineteenth century.

Native Register, Volume 8:430, Helu 7366 (‘Āp. 1), Kukahi.
January 23, 1848

> …Here is this, there are some planted trees, an orange tree and olona which is in another Ili aina.
>
> The Land Commissioners: Here am I, with a land claim and a pahale claim on the shore. I hereby tell you of the size of my land claim and the pahale claim. Here is the length of my land 810 long, 262 wide, from the kula to the distant uplands. Here is the length of by pahale claim, 40 long by 20 wide; Here is the name of the ili aina, Puunoni. Here is the number of my kihapai, 20.
>
> Done by Kukahi and Kinimaka 2.

[85] *Touchardia latifolia* – a bush with many uses cultivated primarily in wet mauka locations whose fibers were frequently crafted into cordage (Kraus 1993:27, 28).

Keauhou, Kona, Hawaii.

Native Testimony, Volume 4:653-654,
February 21, 1849

...In the ili aina of Puunoni, Keauhou 2 ahupuaa. 2 Apana aina. There in Kohelemu, 1 Apana. The boundaries are not known to me [Kapela. He [Kukahi] will make them known when the surveyor comes. They are cultivated.

Planted Apana in the ili aina of Maili. There Kukahi planted olona and oranges. He does not have them at this time, they are with Kane. I believe that he has submitted his petition for the claim, but I do not know who planted. I have seen that Kukahi is the one who cares for the oranges.

There in the ili aina of Kohelemu, 1 kumu alani, planted by his wife. This is very old land [right] from the parents in the time of Kamehameha I, and they are his at this time. No one has objected to him. There is one who opposes the planted things.

1 Apana Pahale, Mauka and all surrounding boundaries idle land. It was enclosed with a wall by him. 1 hale is his, and he resides there...[86]

Foreign Testimony, Volume 5:89-91, Kue Konohiki (In opposition to the Konohiki), 13, February. 1852, *[Note: This document is largely illegible.]*

Konohiki Petition of Kukahi to the Land Commissioners for the remainder, an orange tree outside of the claim. That orange tree was spoken of in his petition. (Kapela, Witness for Kukahi)

G.L. Kapeau: Do you swear publicly and before God concerning the truth of Kukahi's claim to the orange tree in the Ili named Maili in the Ahupuaa of Keauhou, Kona, Hawaii?

Kapela, yes; Kalona, yes; Naholowaa, yes. Kapela: Maheha[?] is the konohiki...

[86] Helu 7366; Keauhou 2 N. Kona. 1 ʻĀp. 0.14 Ac., Royal Patent 7044; Keauhou 2 Kona. 2 ʻĀp. 2.37 Acs.

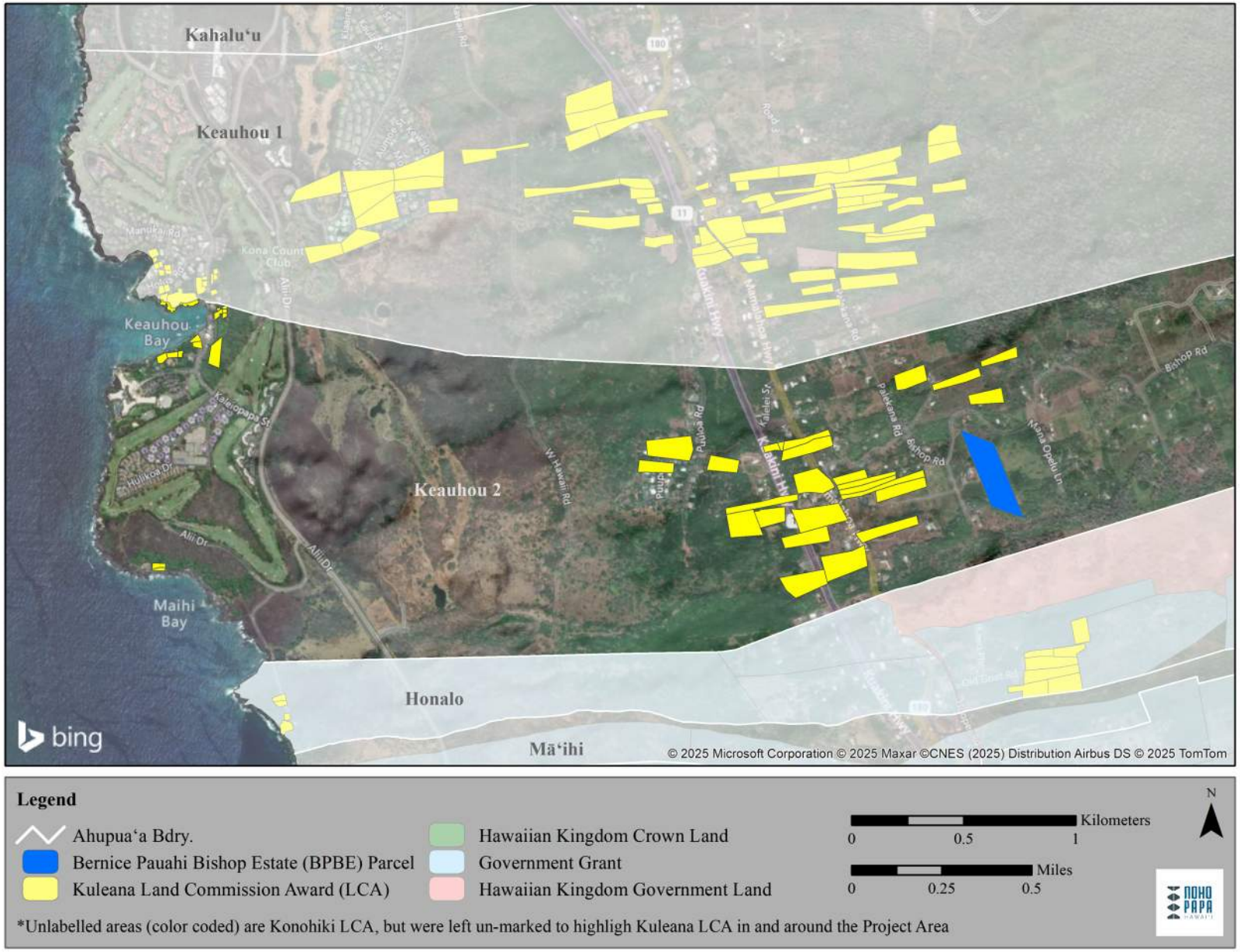


Figure 16. Keauhou 2 Land Commission Award GIS map showing the KS parcel in blue

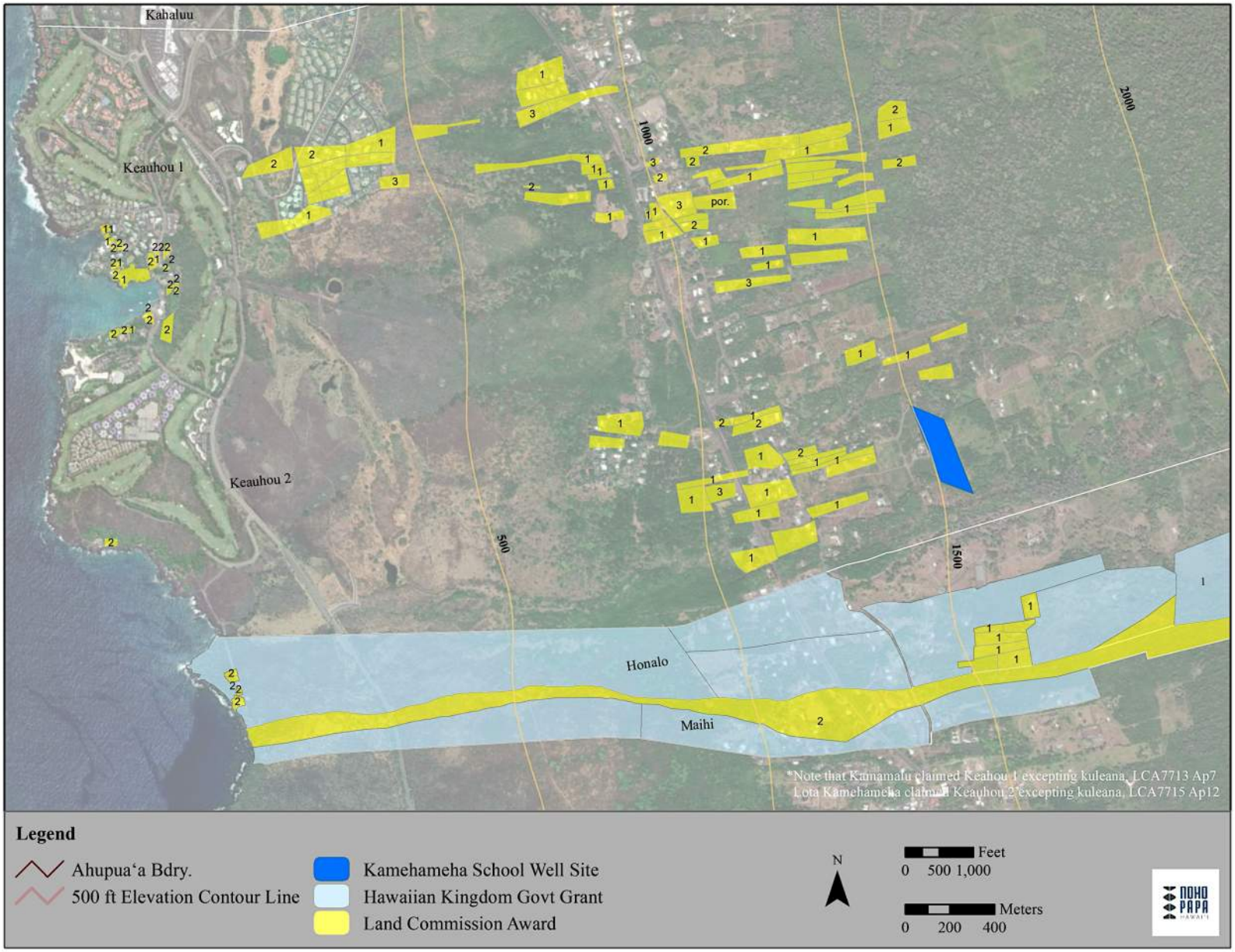


Figure 17. Keauhou 1 and 2 Land Commission Awards and Apana colored in yellow with the KS well site location in blue

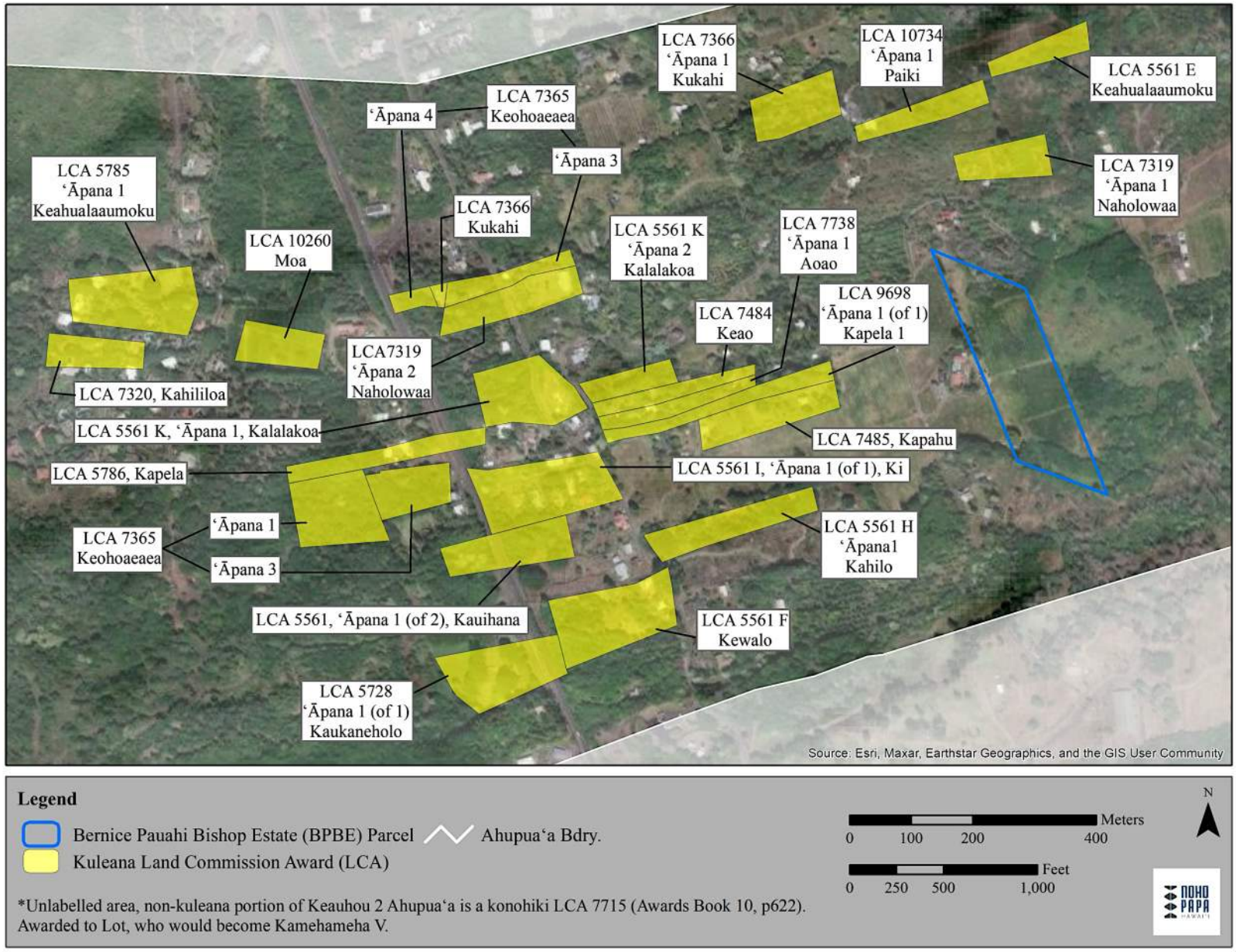


Figure 18. Close up GIS map showing the LCAs around the KS parcel in Keauhou 2 Ahupuaʻa

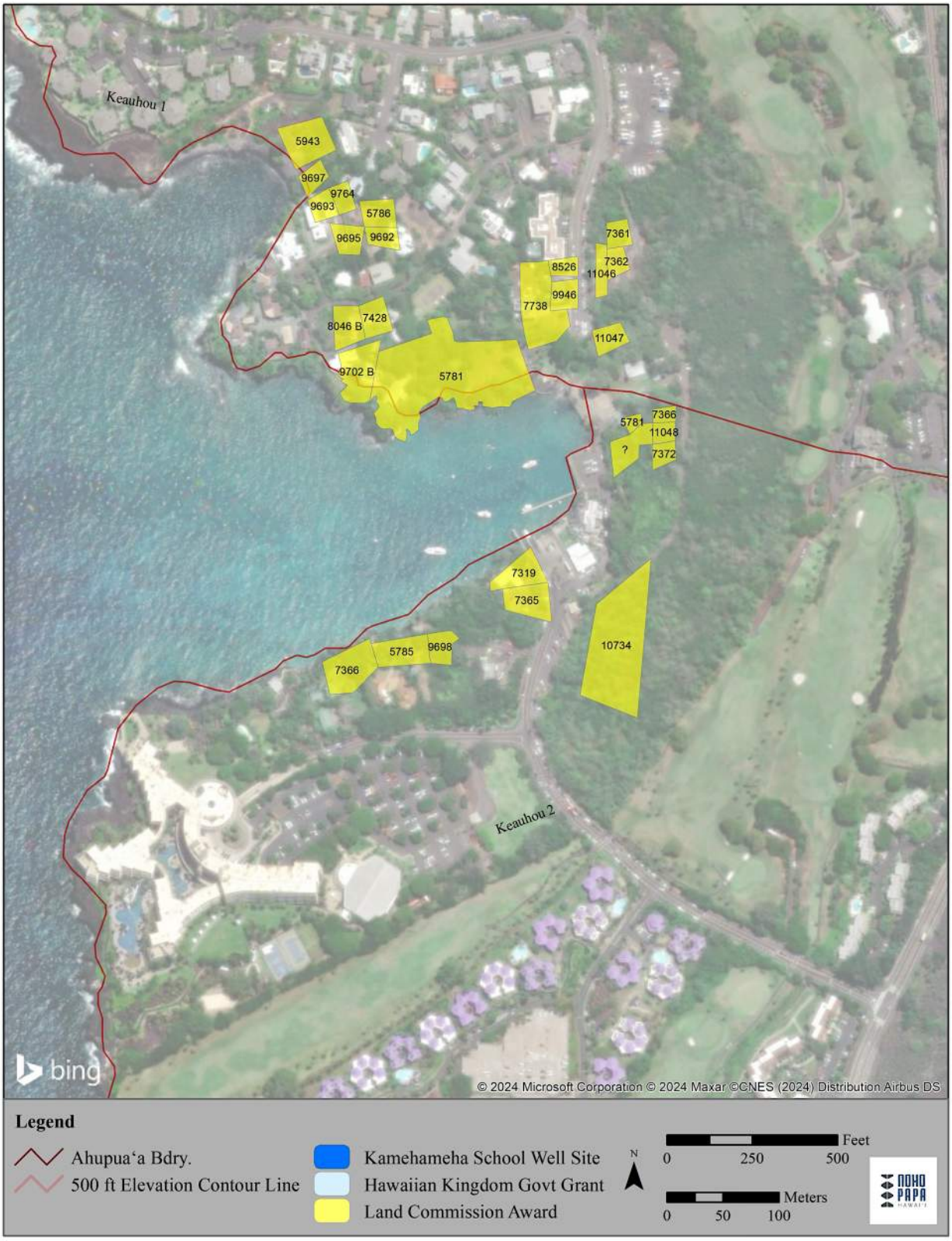


Figure 19. Land Commission Awards located in Keauhou 1 and 2 makai, downslope of the KS well site location.

KePaiki, Helu 10734

Māhele records indicate Paiki made five Native Register claims and two were awarded, including Helu 10734 in the ʻili ʻāina of Maili, Keauhou 2, in 1848. Native testimony issued by Kauhiahiwa W. (NT:v4, p653) described Paiki's land as being cultivated, and that Paiki's kuleana tract of land served as Paiki's residence.

Native Testimony, Volume 4:653, Helu 5903 & 10734,
February 21, 1849

> ...In the ili aina of Maili, Keauhou 2 Ahupuaa. 5 Apana aina; 1 Apana kahuahale; also 1 Apana pahale in the ili aina of Waipio 4, Keauhou 1 Ahupuaa. 3 Apana. The boundaries are not known to me [Kauhiahiwa W.], he will show them accurately to the surveyor when he comes. The land is cultivated.
>
> The pahale is enclosed with a wall made by him [Paiki], with 1 hale. The house is for Hoapili, and Paiki lives there. His kuleana is as a residence for him. He received the ili aina of Maili in the Yr. 1847. His interest in the ili aina of Waipio 4 was from Kanehoa in the Yr. 1848. No one has objected to him...[87]

Naholowaa, Helu 7319

In Native Register claims, Naholowaa described their ancestral land and house lot, occupied by their kūpuna and mākua (parents) before them during the time of Kamehameha I in the eighteenth century (NR:v8, p408). Naholowaa also claimed 11 kīhāpai (NR:v8, p421). In addition to their Native Register claims (NR:v8, p421), Māhele records show Naholowaa issued Native Testimony for other associates (NT:v4, p661-662).

Native Register, Volume 8:408, Helu 6029 (ʻĀp. 2), Nakea & 6030, Naholowaa,
Kahaluʻu, Hawaiʻi, January 10, 1848

> Aloha to you the Land Commissioners. We hereby tell of our house lots, and old lot from olden, in the time of Kamehameha I. Our kupuna and makua have occupied it until ourselves at present. Therefore we state the size of our lot. On two sides, the length is 360 feet; on the other two sides the width is 183 feet. The circumference of four sides is 443. That is it for you to hear.
>
> Nakea
> Naholowaa

Native Register, Volume 8:421, Helu 7319 (ʻĀp. 1), Naholowaa.
Keauhou, January 22, 1848

> Aloha to you Land Commissioners. See my kihapai which I am thinking of taking in Alodial title. Those which are mode know below. Showing the length and width

---

[87] Helu 5903; Royal Patent 6842; Keauhou 2 Kona. 3 ʻĀp. 5.53 Acs. (see also Helu 10734).

Kihapai 1. Anana, length 100, width 16

Kihapai 2. Anana, length 33, width 11

Kihapai 3. Anana, length 34, width 14

Kihapai 4. Anana, length 73, width 23

Kihapai 5. Anana, length 49, width 32

Kihapai 6. Anana, length 63, width 11

Kihapai 7. Anana, length 60, width 17

Kihapai 8. Anana, length 21, width 14

Kihapai 9. Anana, length 40, width 30

Kihapai 10. Anana, length 80, width 21

Kihapai 11. Anana, length 37, width 10
590 99

The combined length and width is 780. Here also is this, my house lot is 63 long by 40 wide, combined being 103.

Done by me, Naholowaa

Kahualaaumoku, Helu 5561E

In 1848, Kahualaaumoku filed Native Register claim for their house lot (NR:v8, p400). Native testimony supporting Kahualaaumoku's claim was issued by Kahilo in 1849 (NT:v4, p662). Kahilo described Kahualaaumoku's house lot in the 'ili 'āina of Pakohe as being cultivated lands consisting of "2 Apana aina, and 2 Apana Pahale," which hosed Kahualaaumoku's residence and was planted with "...1 Niu and 1 Kou..." (NT:v4, p662). Kahilo noted the presence of four additional trees in another lot.

Native Register, Volume 8:400, Helu 5785, Kahualaaumoku.
Keauhou 2, January 17, 1848

Aloha to you Z. Kaauwai and all the esteemed Land Commissioners. Here is my claim the lot and my hale. That is my claim.

By Kahualaaumoku

Native Testimony, Volume 4:662, Keahualaaumoku,
February 22, 1849

...In the ili aina of Pakohe, Keauhou 2 Ahupuaa. 2 Apana aina, and 2 Apana Pahale. The boundaries are not known to me [Kahilo]. He [Keahualaaumoku] will accurately make them known to the surveyor when he comes. They are cultivated.

> The pahale in enclosed with a wall. 1 hale is for him, also 4 kumu are in another lot. 1 Niu, also 1 Kou planted by him. It is and old land right from the time of Kamehameha I. No one has objected...[88]

> At least twenty additional helu cluster ma kai of the Kamehameha Schools well site, at an elevation of between 750 and 1400 amsl, and are discussed below:

Keao, Helu 7484

Keao issued a land claim for 15 kīhāpai in the Keauhou 2 Ahupuaʻa of Kona in 1848 (NR:v8, p443-444).

> Native Register, Volume 8:443-444, Helu 7484, Keao,
> Kona, Hawaiʻi, January 22, 1848

> Hear ye, o Land Commissioners: I hereby explain to you size of my Kihapai, there are 15, here is the length 1061, that I have a total of 15 kihapai. The length is 1061, the combined width is 168. Finished. Aloha to all you Commissioners.

> By Keao
> Keauhou 2

Kapahu, Helu 7485

Kapahau issued a land claim for an entire ʻili in Keauhou 2 and described the boundaries of the ʻili ʻāina to extend from Kaneaa as the headlands of the ʻāina and ʻUlalena as the ma kai extent of the claimed ʻāina (NR:v8, p444).

> Native Register, Volume 8:444, Helu 7485, Kapahu.
> Kona, Hawaiʻi, January 23, 1848

> Hear ye, o Land Commissioners. I hereby explain my land claim for an entire ili. The head (top) of the land is from Kaneaa to Ulalena, which is the tail (bottom) of the land. Finished. Aloha to all of you.

> Done by me, Kapahu
> Keauhou 2

Ki, Helu 5561 I

Native testimony issued in favor of Ki's claim (NT:v8, p641) described their ʻāpana parcel in the ʻili ʻāina of Puʻuloa, and also stated that the land was given to them the year prior by Kalalakoa. The ʻāpana claimed is described to be comprised of four kīhāpai cultivated with kalo and ʻuala (NT:v8, p641).

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[88] Helu 5785: Keauhou 2 N. Kona. 2 ʻĀp. 4.42 Acs.

Native Testimony, Volume 8:641, Helu 5561 I, Ki

> An Apana parcel with 4 kihapai Kalo and uala in the ili of Puuloa, Keauhou. Given to him by Kalalakoa in the Yr. 1846. No one objected to him.[89]

Kahilo, Helu 5561 H

Māhele records show that Kahilo's pāhale, located in the ʻili ʻāina of Pakohe, Keauhou 2, was given to them by their parents in 1819. They cultivated kalo and ʻuala on their ʻāpana parcels which are also located in Keauhou 2 Ahupuaʻa.

Native Testimony, Volume 8:641, Helu 5561H (ʻĀp. 1), Kahilo

> ...Apana 1., Ili of Haleolai, Keauhou 2 Ahup. Given by Kaikuahine in the Yr. 1846.
>
> Apana 2. 8 Kihapai Kalo & uala, at Ililoa, Keauhou 2. Gotten from Kaikuahine in Yr. 1846.
>
> Apana 3. Pahale in the ili of Pakohe, Keauhou 2. Gotten from his parents the Yr. 1819. No one has objected.[90]

Kauihana, Helu 5561 D

Kauihana claimed two ʻāpana in the Keauhou Ahupuaʻa. ʻĀpana 1 was claimed for the ʻili of Kaalakupou and ʻĀpana 2 was claimed for a pāhale located on the Kaalakupou ʻili ʻāina (NT:v8, p640). Kauihana testified that the ʻāpana were inherited to him from his parents in 1819.

Native Testimony, Volume 8:640, Helu 5561D (ʻĀp. 1), Kauihana – Heir, Kumau

> ...Apana 1 – Ili of Kaalakupou ili in Keauhou 2 Ahup.
>
> Apana 2 – Pahale at Kealakupou, also at Keauhou.
>
> These Pana were from his parents in the Yr. 1819. No one objected to him.[91]

Kalalakoa, Helu 5561 K

Kalalakoa claimed five kīhāpai which were cultivated with kalo and ʻuala located in the ʻili ʻāina of Haleokaupaku, Keauhou 2 Ahupuaʻa (NT:v8, p641). It is noted that Kalalakoa received the lands from Kaikuahine in 1839 with no objections.

Native Testimony, Volume 8:641, Helu 5561 K (ʻĀp. 1, 2), Kalalakoa

> ...5 Kihapai Kalo & uala in the ili of Haleokaupaku, Keauhou 2 Ahupuaa.

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89 Helu 5516I; Keauhou 2 N. Kona; 1 ʻĀp. 0.5 Ac.; Keauhou 2. 1 ʻĀp. 4.85 Acs.
90 Helu 5561H; Royal Patent 7757; Keauhou Kona. 2 ʻĀp. 3.07 Acs.
91 Helu No. 5561D; Royal Patent 3680; Keauhou 2 Kona. 2 ʻĀp. 2.88 Acs.

It was from Kaikuahine in the Yr. 1839. No one objected.[92]

Kapela, Helu 5786

Kapela issued a claim for their house lot in Keauhou 2. Testimony supporting their claim (NT:v4, p662) indicates that their pāhale and additional cultivated lands were located in the ʻili ʻāina of Puʻuloa in the Keauhou 2 Ahupuaʻa.

Native Register, Volume 8:400, Helu 5786 (ʻĀp. 1), Kapela. Keauhou

Hear year ye, Kaauwai and Keoni Ii. I hereby petition you two, the Ministers of the King, for my house lot.

By Kapela

Native Testimony, Volume 4:662, Helu 5786 & 7482,
February 22, 1849

...In the ili aina of Puuloa, Keauhou 2 Ahupuaa. 3 Apana. In the ili aina of Pakohe, 1 Apana is a lele. 1 Apana pahale. The boundaries are not known to me [Kahilo]. He [Kapela] will show the correct boundaries to the surveyor when he comes. The are cultivated.

Keohoaeae, Helu 7365

Keohoaeae's land claim described a land division extending "from the kula to the distant uplands," (NR:v8, p429-430) as well as a coastal pāhale and a land claim in a flat place called "Nuuanu" in Ililoa, Keauhou 2.

Native Register, Volume 8:429-430, Helu 7365 (ʻĀp. 1, 3), Keohoaeae,
September 23, 1847

Here is my land claim. The length is 910 from the kula to the distant uplands. Here is the width, one is 5 one is 7, one is 9 one is 10, and the width is 5 in part, 7 in another part, 9 in another part, 10, 6 different places. Some are less in width. Here also is this, my pahale claim on the shore. It is 35 long, by 23 wide There is also a land claim on this papa [flat area], named Nuuanu. The moo aina is Ililoa.

Done by me, Keohoaeae
Keauhou 2, Kona, Hawaii

Kapela, Helu 9698

Land claim records indicate Kapela claimed three kīhāpai and grew kalo and oranges on their lands in Keauhou 2 (NR:v8, p467). Testified in the Native Testimony given for this claim, Kapela

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[92] Helu 5561K; Royal Patent 3741; Keauhou N. Kona. 2 ʻĀp. 4.86 Acs.

is said to have three ʻāpana in the ʻili ʻāina of Paki, Keauhou Ahupuaʻa, as well as, one ʻāpana at Haliipalala 2 and a house lot. Kapela's land is noted to have been partially cultivated and was inherited from Kupaka during the era of Kamehameha I and (NT:v4, p652).

Native Register, Volume 8:467, Helu 9698 (ʻĀp. 2), Kapela,
Keauhou, January 18, 1848

> Greetings to the Esteemed Land Commissioners. 3 kihapai Kalo, 3 kumu alani.
>
> By Kapela

Native Testimony, Volume 4:652, February 20, 1849

> ...In the ili aina at Paki 2, Ahupuaa of Keauhou, 3 apana.
>
> 1 parcel at Haliipalala 2; and 1 house lot parcel.
>
> The land is partially cultivated. It was from Kupaka in the time of Kamehameha I, no one has objected to Kapela.[93]

Moa, Helu 10260

Moa issued land claims for their coastal pāhale, ma uka lands "from the kula to the distant uplands," (NR:v8, p476) as well as 22 kīhāpai in the ʻili ʻāina of Kumuniu.

Native Register, Volume 8:476, Helu 10260, Moa.
Keauhou 2, Kona, Hawaiʻi, January 24, 1848

> Here is my land claim and my pahale claims. I tell you the size of my land, a claimant of land and a house lot at the seashore, hereby state the size of my land. The length is 100.008 [?], 263 from the kula to the distant uplands. Here is the number of my kihapai, 22. Also, the pahale. Here is the size of the pahale, 30 long, 21 wide. Here is the name of the ili aina, Kumuniu.
>
> Done by Moa.

Keahualaaumoku, Helu 5785

Keahualaaumoku claimed two pāhale, which at least one of them was walled, and claimed an additional two ʻāpana in the ʻili ʻāina of Pakohe, Keauhou 2. It is noted that four trees grew on another ʻāpana which included one niu and one kou tree (NT v4: p662).

Native Register, Volume 8:400, Helu 5785, Kahualaaumoku.
Keauhou 2, January 17, 1848

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93 Helu 9698, Royal Patent 6816; Keauhou 2 Kona. 1 ʻĀp. 2.3 Acs.

Aloha to you Z. Kaauwai and all the esteemed Land Commissioners. Here is my claim the lot and my hale. That is my claim.

By Kahualaaumoku

Native Testimony, Volume 4:662, Keahualaaumoku,
February 22, 1849

...In the ili aina of Pakohe, Keauhou 2 Ahupuaa. 2 Apana aina, and 2 Apana Pahale. The boundaries are not known to me [Kahilo]. He [Keahualaaumoku] will accurately make them known to the surveyor when he comes. They are cultivated.

The pahale in enclosed with a wall. 1 hale is for him, also 4 kumu are in another lot. 1 Niu, also 1 Kou planted by him. It is and old land right from the time of Kamehameha I. No one has objected...[94]

Kahililoa, Helu 7320

Kahililoa claimed six kīhāpai, as well as, one pāhale in Keauhou 2 Ahupuaʻa (NR:v8, p421-422).

Native Register, Volume 8:421-422, Helu 7320, Kahililoa,
January 20, 1848

Hear ye, o Land Commissioners. That you may know about my kihapai, which I desire to have Alodial title to. They are known below, showing the length and the width

Kihapai 1. Anana length, 47, width 10

Kihapai 2. Anana length, 36, width 12

Kihapai 3. Anana length, 50, width 16

Kihapai 4. Anana length, 54, width 12

Kihapai 5. Anana length, 84, width 12

Kihapai 6. Anana length, 74, width 16

Here also is my pahale, 28 long by 8 wide, a total of 36 anana.

By Kahililoa

---

94 Helu 5785: Keauhou 2 N. Kona. 2 ʻĀp. 4.42 Acs.

Summary in Brief: Kamehameha School Parcel - Keauhou Ahupua‘a

Hawaiian primary source historical records contained in the Native Testimony, Native Register, and Buke Māhele mention, or are indicative of cultural resources and practices associated with the ahupua‘a of Keauhou 2, site of the Kamehameha Schools well acquisition, Keauhou 1, and Keauhou (Table 15 through Table 20). Keauhou 2 contained pāhale and kīhāpai used to cultivate unspecified crops as well as kalo and ‘uala. Alongside kalo and ‘uala, Hawaiians cultivated niu, olonā, loulu, kou, ‘alani, and kope in Keauhou 2. Significantly less cultural resources are mentioned in the neighboring land division of Keauhou 1, which seemed to predominantly host kīhāpai kalo and ‘uala. Of the land divisions surveyed, the richest array of cultural resources and practices is recorded for Keauhou. Kalo, ‘uala, and foreign-introduced kope were prevalent cultivars, alongside uhi and ipu. Flowers and forest resources are also referenced.

Table 15. Cultural Resources Recorded in Māhele Records for Keauhou 2 Ahupua‘a*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
Kalo (taro)	Food, medicine, spiritual	4
‘Uala/‘Uwala (sweet potatoes)	Food, medicine	5
Niu (coconut trees)	Food, medicine, utensils, cordage (see Krauss 1993:27)	1
Olonā (*Touchardia latifolia*)	Food, medicine, cordage (see Krauss 1993:27)	1
Other Plants (Indigenous and Endemic)		
Loulu (*Pritchardia spp.* palm trees)	Cordage (see Krauss 1993:27)	2
Kou (*Cordia subcordata*) trees	A dry land garden; cultivated areas, or patch	4
Foreign-introduced Crops		
Kope (coffee)	Food	1
‘Alani (orange trees)	Food	3

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 16. Cultural Practices Recorded in Māhele Records for Keauhou 2 Ahupua‘a*

Cultural Practice	Definition	Number of Citations**
Mala (Māla) kalo	A dryland garden, planted field, or patch of taro	1
Mala (Māla) ‘uala	A dryland garden, planted field, or patch of sweet potatoes	1
Pahale (Pāhale)	House lot	9
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	4
Kihapai (Kīhāpai) kalo	A dry land garden; cultivated areas, or patch of taro	5
Kihapai (Kīhāpai) ‘uala	A dry land garden; cultivated areas, or patch of sweet potatoes	6

ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	11

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 17. Cultural Resources Recorded in Māhele Records for Keauhou 1 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
Kalo (taro)	Food, medicine, spiritual	1
ʻUala/ʻUwala (sweet potatoes)	Food, medicine	1
Other Plants (Indigenous and Endemic) - none		
Foreign-introduced Crops - none		

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 18. Cultural Practices Recorded in Māhele Records for Keauhou 1 Ahupuaʻa

Cultural Practice	Definition	Number of Citations*
Mala (Māla) kalo	A dryland garden, planted field, or patch of taro	1
Mala (Māla) ʻuala	A dryland garden, planted field, or patch of sweet potatoes	1
Pahale (Pāhale)	House lot	13
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	8
Kihapai (Kīhāpai) kalo	A dry land garden; cultivated areas, or patch of taro	1
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	37

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 19. Cultural Resources Recorded in Māhele Records for Keauhou Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
Kalo (taro)	Food, medicine, spiritual	8
ʻUala/ʻUwala (sweet potatoes)	Food, medicine	8
Uhi (yams)	Food, medicine	1
Ipu (gourds)	Food, medicine, utensils	1
Niu (coconut trees)	Food, medicine, utensils, cordage (see Krauss 1993:27)	3
Noni (Indian mulberry)	Medicine	1
Lauhala	Arts and crafts; charcoal; sails	1
Other Plants (Indigenous and Endemic)		

Cultural Resource	Use	Number of Citations**
Loulu (*Pritchardia spp.* palm trees)	Cordage (see Krauss 1993:27)	2
Kou (*Cordia subcordata*) trees	A dry land garden; cultivated areas, or patch	4
Pū	Squash or pumpkin	2
Pūhala (hala)	Crafts, cordage (see Krauss 1993:27)	1
Flowers, generally	Arts and crafts, medicine	1
Forest zone	Array of associated cultural uses	1
Foreign-introduced Crops		
Kope (coffee)	Food	5
ʻAlani (orange trees)	Food	4
Hala kahiki (pineapple)	Food	2

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 20. Cultural Practices Recorded in Māhele Records for Keauhou Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Mala (Māla) ʻuala	A dryland garden, planted field, or patch of sweet potatoes	8
Mala (Māla) kope	A dryland garden, planted field, or patch of coffee	5
Mala (Māla) kalo	A dryland garden, planted field, or patch of taro	6
Ma uka kalo	Mountain kalo – mauka cultivation area	4
Mala (Māla) ipu	A dryland garden, planted field, or patch of gourds	1
Mala (Māla) uhi	A dryland garden, planted field, or patch of yams	1
Mala (Māla) pū	A dryland garden, planted field, or patch of squash or pumpkin	3
Pahale (Pāhale)	House lot	17
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	13
Kihapai (Kīhāpai) kalo	A dry land garden; cultivated areas, or patch of taro	1
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	23
Forest zone	Array of associated cultural practices, including gathering and access, affiliated with this place	1

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

The Gianulias Parcel – Ahupuaʻa of Puaa, Waiʻaha, Kahului, and Puapuaʻa

This section highlights select excerpts from the Māhele Awards Books, including Native Testimony, Native Register and Land Commission Awards. Transcriptions and translations from original Awards Books provided are by Kumu Pono Associates. The discussions are composed by Nohopapa Hawaiʻi. The awards presented in this section are discussed from north to south across the ahupuaʻa of Puaʻa, Waiʻaha 1 and 2, Kahului 1 and 2, and Puapuaʻa.

Puaa 3 Ahupuaʻa

Within the Puaa 3 Ahupuaʻa, at least six claimants were revealed to have made claims to kuleana ʻāina associated with the ahupuaʻa whose proximity borders near the Gianulias well parcel. The Native Registry, Native Testimonies, LCA's, and Royal Patents which were issued for the various land claims provide insight into the various resources and land uses associated with Puaa 3 Ahupuaʻa. For instance, many of the descriptions concerning the kuleana lands within the ahupuaʻa are remarked as being cultivated parcels of lands located in the uplands of Puaa 3, while others similarly described their landholdings as consisting of ma uka kīhāpai. The ʻāpana claimed and awarded throughout this ahupuaʻa are described also as having pāhale on them; which illuminates the perspective that properties associated with both residential and agricultural land use types were prevalent in Puaa 3 Ahupuaʻa. Presented below are the summarized descriptions, and in some cases, the transcriptions of the Māhele claims associated with the Puaa 3 Ahupuaʻa.

Kahuakailoa, Helu 7077

According to Māhele records, Kahuakailoa was awarded two ʻāpana in the Puaa 3 Ahupuaʻa of Kona; one of which included a pāhale (MA:v8, p641-642; NT:v4, p512-513; NR:v8, p417).

Kaiwikui, Helu 7081 (ʻĀp.1)

Kaiwikui was another claimant associated with the Puaa 3 Ahupuaʻa. Kaikikui was awarded an ʻāpana in the ahupuaʻa (MA:v4, p554). The Native Testimony submitted on behalf of this claim recounts that this kuleana ʻāina is located ma uka of a kīhāpai and that there is also a pāhale associated with the ʻāpana (NT:v4, p560).

Makai, Helu 10266 (ʻĀp. 1)

Makai issued several land claims for ʻāina in the Puaa 3 Ahupuaʻa; however, only one was awarded. According to the Native Testimony associated with Makai's claim, three ʻāpana located in the ʻili ʻāina of Opulehelehe said to have been cultivated, along with two ʻāpana in the ʻili ʻāina of Ilipahu, and a ʻāpana with a pāhale on it was claimed by Makai (NT:v4, p538-539). The one ʻāpana that was awarded to Makai was the ʻāpana described to have a pāhale on it located in the ma kai region of the Puaa 3 Ahupuaʻa in Kona (LCA 10266; NR:v8, p476).

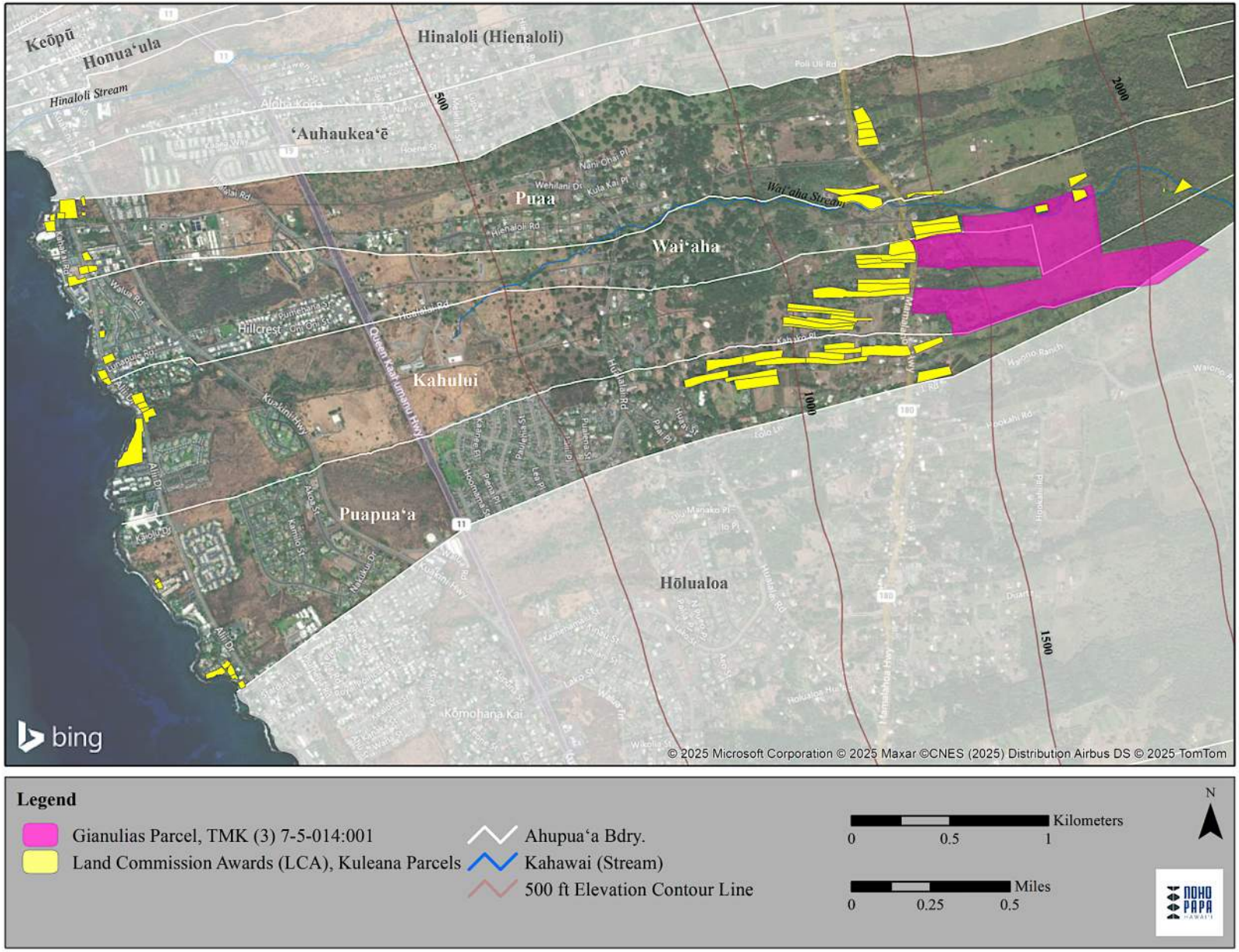


Figure 20. Land Commission Awards located around the Gianulias Parcel

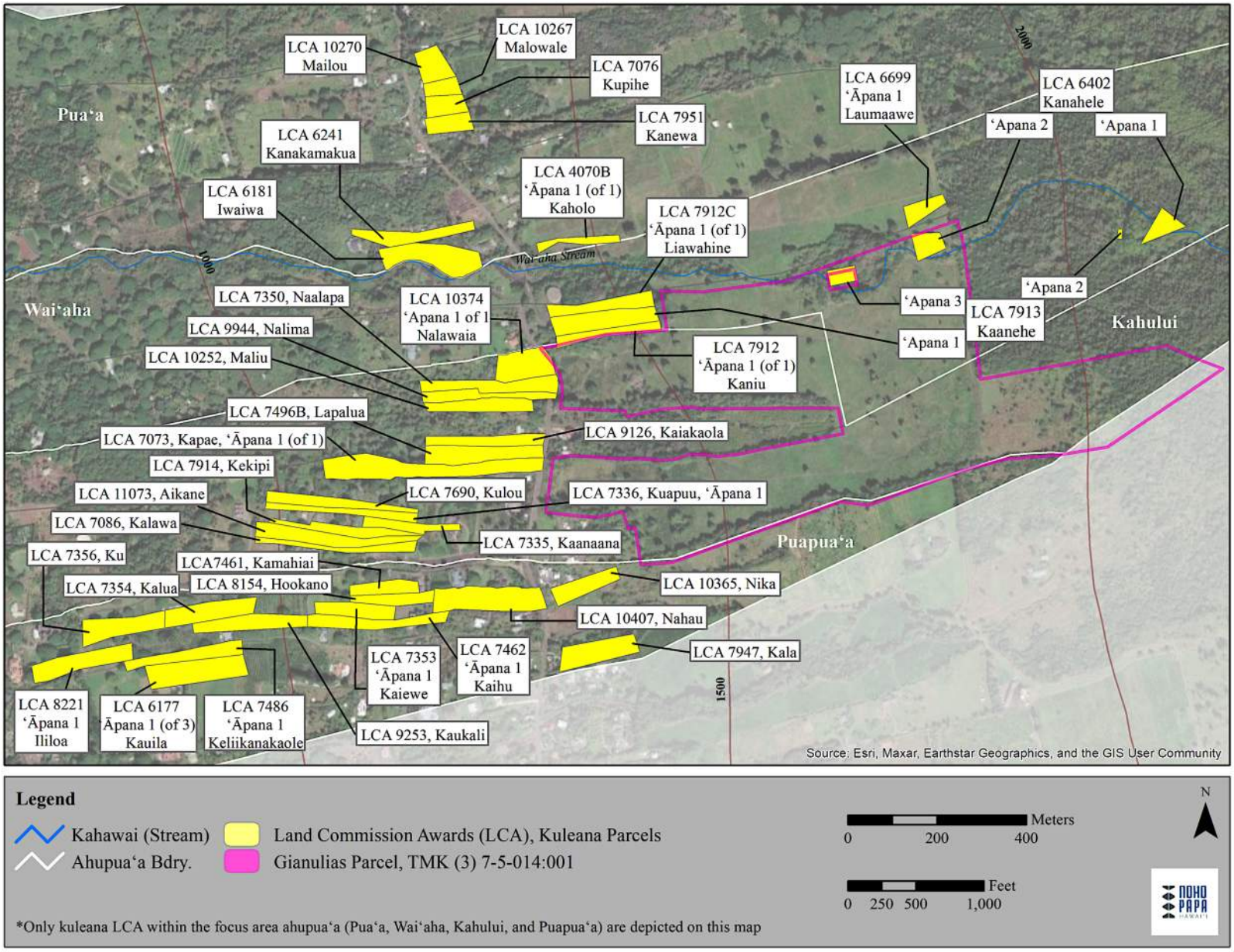


Figure 21. Close up of LCAs in and around the Gianulias Parcel

Kanakamakua, Helu 6241 (ʻĀp. 1)

Kanakamakua claimed two parcels; a pāhale that was taken by the konohiki at the coast, and an upland cultivated parcel. Kanakamakua was awarded the one ʻāpana whose location is described to be in the uplands, a paukū ʻāina. It is in the ʻili of Kamuku, an upland ʻili that spans some distance across many cultivated kuleana.

According to the Native Testimony (NT & FT:v8, p675) Kanakamakua did **not** live on his upland kuleana award. It is noted that the Konohiki Makai had taken Kanakamakua's land because of a fence built on the Labor Days. Labor days were also mentioned in Kapae's claim in Kahului 2 Ahupuaʻa (Helu 7073), where he managed labor days at the behest of the konohiki, who was most likely Makai.

Native Register, Volume 5:266,
January 25, 1848, Kailua

> Aloha to you the Land Commissioners. I have a little ili at Puaa, the land of Makai, adjoins on the North by the ili aina of Kanakaloa, and on the South it adjoins the ili aina of Nakipi.
>
> Here also is this, I have a Pahale, which taken by the konohiki and he has built his house there. That pahale is in Puaa. I lived on that lot from olden times, and my house destroyed by fire. Then the konohiki took my lot.
>
> By Kanakamakua

Native & Foreign Testimony, Volume 8:675

> ...It is an Ili called Kamuku in the Ahupuaa of Puaa 3, Kona. Clt does not live on it at present. His house lot was taken from him by Makai, a konohiki in 1849. Claimant has not cultivated any of this land since. The House Lot was taken away because the fence was built on the Labor Days.[95]

Iwaiwa, Helu 6181 (ʻĀp. 1)

Iwaiwa claimed a pāhale and cultivated lands in the uplands in the ʻili ʻāina of Kamuku (NR:v8, p188-189). Iwaiwa's claim is supported in testimony that the ʻāina was inherited through Iwaiwa's parents in 1819 (NT:v8, p649).

Native Register, Volume 8:188-189,
January 26, 1848, Kailua

> Aloha to you the Land Commissioners. I hereby state my claims, in accordance with your directions. They are in the Ahupuaa of Puaa, 3 ili aina, of Kamuku and Waiaha Ahupuaa, Kamuku I and Kamuku II. The length of the right of the Kamuku, and Waiaha is from A. Bishop, Preacher, and then it was left to Dr. Andrews and I was

95 Helu 6241; Royal Patent 8071; Puaa 3 N. Kona. 1 ʻĀp. 1.35 Acs.

the man who lived here. The length of this right at Kamuku Ili in Puaa Ahupuaa, it was from the time of Kahahana, mother of Kahonu.

There is also a pahale claim there, which is 13 anana long by 7 anana wide.

By Iwaiwa w.
Kauka k.

Native Testimony, Volume 8:649,
January 12, 1850

...His Apana is in the Ili of Kamuku in Puaa 3. It was from his parents in 1819, and long before then. No one has objected to him.[96]

Kaholo, Helu 4070 B (ʻĀp. 1)

Kaholo claimed and was awarded one ʻāpana in the ʻili of Kamuku, Puaa 3 Ahupuaʻa which is described as a cultivated upland ʻāpana (BM:v8, p644).

Native Testimony, Volume 8:651

Kaiwikuia, Sworn... His apana is in the Ili of Kamuku, Puaa 3 Ahupuaa. It was I who gave it to him in the Yr. 1840. No one objected to him.

Boundaries of the land are surrounded by the land of the Konohiki.[97]

Waiʻaha Ahupuaʻa

According to the Māhele ʻĀina documents examined during this study, two claims were submitted for the Waiʻaha 1 Ahupuaʻa associated with the study area, while five claims were submitted with association to the Waiʻaha 2 Ahupuaʻa of the study area. Throughout these claims, descriptions of various resources associated with Waiʻaha Ahupuaʻa were provided, such as the mention of the pūnāwai referred to as Waikiʻi, other unnamed springs, ʻili ʻāina, paukū ʻāina, pāhale, hale, pā pipi, and mountain bananas referred to as ʻeʻa maiʻa. Majority of the ʻāpana mentioned in claims and testimonies are described as being cultivated ʻāina, which evidences agricultural practices to have occurred in the Waiʻaha Ahupuaʻa and surrounding areas. However, several other ʻāpana claimed throughout this ahupuaʻa did not indicate the land use associated with the specified parcel. Provided below are the descriptions and select excerpts obtained from the Māhele Awards Books, including Native Testimony, Native Register, and Land Commission Awards for Waiʻaha 1 and 2 Ahupuaʻa of Kona whose location is associated with the study area.

Waiʻaha 1 Ahupuaʻa

Kalama, Helu 7241 B (ʻĀp. 1)

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96 Helu 6181; Royal Patent 8031 & 8034 Puaa 3 Kona. 1 ʻĀp. 1.56 Acs
97 Helu 4070B; Royal Patent 3742, XX Royal Patent 5503, Kamuku in Puaa 3 N. Kona. 1 ʻĀp. .75 Acs.

Kalama was a claimant who was only awarded a single ʻāpana, although Kalama claimed paukū ʻāina abutting the pā pipi in the uplands. Most claimants who only received one ʻāpana but claimed two, generally were granted their upland claim. Kalama's case is unusual in that he was only awarded his ma kai pāhale claim and not his cultivated upland claim. The name of the ʻili ʻāina is given in the Native Testimony (NT:v4, p514) but was illegible to make it out clearly.

Kalae, Helu 7481 (ʻĀp. 1)

Kalae was awarded two ʻāpana during the Māhele process associated with the Waiʻaha 1 Ahupuaʻa (LCA 7481). According to the Native Registry and Native Testimony associated with Kalae's claim, the ʻāpana are located in the ʻili ʻāina of Kamuku.

Waiʻaha 2 Ahupuaʻa

Kanahele, Helu 6402 (ʻĀp. 1, 2)

Kanahele claimed land that is in and ma uka of the current Gianulias subject parcel. Kanahele's pāhale, per the accompanying Native Testimony (NT:v4, p555), below, is ma uka; as are two paukū ʻāina described to have been cultivated. Kanahele claimed and was awarded these two ʻāpana. Based on Māhele claims, testimony, and awards, Kanahele did not have any ma kai parcels. This claimant lived and farmed ma uka of the ala nui and the pā pipi.

According to Kalama, Kanahele's ʻāpana was bounded to the west by Waikiʻi Spring, south by Kahului I, north by Waiahanui and east by mountain banana (ʻEʻa maiʻa). Kalama also testified for Kaulua and described one of his ma uka parcels as also being bounded ma kai by Waikiʻi Spring (Awards Books-NT:v4, p514).

Native Register, Volume 8:413

> Aloha to you the Land Commissioners. I have a pauku land far mauka, which is occupied at present, a firmly established right of residency. There is no kula, nor any middle parcel. My pauku land is only mauka. It is 400 long on the north, and the same on the south, to the east it is 40, and on the west, 40. On the north is Waiahanui, on the south is Kahului, This claim is for you to hear.
>
> Done by Kanahele
> Kona, Kailua, Waiaha.

Native Testimony, Volume 4:555,
January 9, 1849

> Kalama Sworn... There in the Ahupuaa of Waiaha, 1 pauku aina.
>
> Mauka by Maiahuna, Ea maia (mountain banana), Kau by Kahului I aina, Makai by Waikii punawai, Kohala by Waiaha nui. 1 cultivated pauku aina. 2 hale for him and he resides there.

Land from Kaanehe in the Yr. 1846. No objections to him.[98]

Liawahine, Helu 7912 C (ʻĀp. 1 of 1)

Liawahine only claimed one ʻāpana, ma uka of the uka ala nui and pā pipi that is located next to Kaanehe‘s ʻĀpana 1 and Kaniu’s ʻĀpana 1. Liawahine also did not specify what the land use for the parcel was for. However, in Kekipi’s testimony for Kaanehe’s ma kai pāhale claim (NT:v4, p533-534), Kekipi indicated that there were three houses on Kaanehe’s pāhale (LCA 7913 ʻĀp. 4), which one of them was identified as belonging to Kaliawahine. As detailed in this account, it is understood that Kaliawahine lived at the coast and the claimed parcel awarded as LCA 7912C was likely a cultivated paukū ʻāina, as was Kaanehe’s adjoining ma uka lot. It is notable to mention here that in this instance, the claimant is referred to as “Kaliawahine” as opposed to “Liawahine.”

In the Native Registry, two of Liawahine’s neighbors testified that their lands were given to them by Liawahine (also Kaliawahine); including one of the houses in Kaanehe’s pāhale claim at the coast and one of the paukū ʻāina whose location is described as being ma uka in the ʻili ʻāina of Kamuku 2 (NT:v4, p533-534). This paukū ʻāina is said to have been given to them during the time of Kuakini; while Kaniu’s only ʻāpana (LCA 7912) was said to be given to Kaniu in 1839 (Awards Book, NT:v8, p649).

Native Testimony, Volume 8:649

> Kaniu and Lumaawe, sworn... ...His Apana is in the Ili of Hanamauloa, Waiaha 2 Ahp.
>
> Kaaea gave it to him on the Yr. 1824. No one objected to him. The boundaries are surrounded by the land of the Konohiki.99

Kaanehe, Helu 7913

At Kaanehe’s ma kai parcel, three houses were identified. One hale was described as belonging to Kaanehe, one to Kaliawahine (Liawahine) who claimed a ma uka paukū ʻāina, and one house to belonging to Kaaweha. In the Native Register, Kaanehe claimed an entire ʻili ʻāina, which was explained as portions of ʻili ʻāina in the Native Testimony. Kaanehe has significant land holdings ma uka and ma kai in an area within Kona abundant with wai, including a pāhale at the coast that neighbors a pūnāwai. Kaanehe also gave ma uka lands in Waiʻaha to Kanahele (LCA 6402), in 1846 (Native Testimony by Kalama for Kanahele, NT:v4, p555). Evidenced in Kaanehe’s claims, awards, and gifting of lands to Kanahele, it is lilely that Kaanehe was an aliʻi, though not the named konohiki of the area.

Native Register, Volume 8:453,
Kailua, January 31, 1848

> Aloha to you the land commissioner. I hereby tell you about by pahale claim, it is there makai in Waiaha 2, Ahupuaa; the length and with is 91 anana. My lands claim is also in this ahupuaa mentioned above. Two ili aina, Pahukauila is one, and

98 Helu 6402; Royal Patent 5214; Waiaha 2 N. Kona. 2 ʻAp. 1.7 Acs.
99 Helu 7912C; Waiaha 2, N. Kona. 1 ʻĀp. 1.3 Acs.

Kamuku a is the other. The ili lands are not fully cultivated. The boundaries of this ili are Hanamauloa on the north, Kamuku 2 on the south, Paupuhi on the west and Makaihuliwaa on the east.

Kaanehe.

Native Testimony, Volume 4:533-534,
December 29. 1848

Kekipi Sworn... There in the ili aina of Pahukauila, Waiaha ahupuaa (There was an error by including the whole ili in claim), the place he cultivated is correct.

1. Mauka by Konohiki, Kau by ili aina of Kauailoa, Makai by the pa pipi, Kohala by the ili aina of Hanamauloa. 1 pauku aina.

2. Mauka by Konohiki, Kau by ili aina of Kamuku, Makai by Konohiki, Kohala by ili aina of Hanamauloa. 1 cultivated pauku aina

3. At Kaluulu. Mauka by konohiki, Kau by ili aina of Kamuku 1, Makai by Konohiki, Kohala by ili aina of Hanamauloa. 1 cultivated pauku aina.

4. Mauka by konohiki, Kau by Kamuku 2, Makai by konohiki, Kohala by ili aina of Hanamauloa. 1 cultivated pauku aina.

5. Mauka by konohiki, Kau by Kauailoa ili Makai by konohiki, Kohala by ili aina of Hanamauloa. 1 cultivated pauku aina.

6. In the ili aina of Kamuku 2. Mauka by konohiki, Kau by ili aina of Kauailoa, Makai by konohiki, Kohala by Kamuku 1. One cultivated pauku aina. His interest was from Kaliawahine in the time of Kuakini on Hawaii. NO one has objected to him.

7. Pahale. Mauka by the Alanui Aupuni, Kau by Kaulua's lot, Makai by kahakai, Kohala by a punawai (spring). He has enclosed it with a wall. There are 3 houses. 1 hale for Kaanehe. One house is from Kaliawahine. One hale is from Kaaweha. It is only a house claim for Kaaweha and Kaliawahine. It is a true claim for Kaanehe...[100]

Kaniu Helu 7912 (ʻĀp. 1 of 1)

Kaniu's claim and Land Commission Award do not give any clues to the land use associated with the ʻāina. Similar to Kaniu's ma uka neighbor, Kanahele, Kaniu only listed the ma uka lands in the claim submitted. Kaniu was given lands in 1839 by his neighbor to the north, Liawahine (LCA 7912C).

Native Register, Volume 8:514,

[100] Helu 7913; Royal Patent 5221; Waiaha 2 N. Kona. 1 ʻĀp. 2.1 Acs; Royal Patent 7815; Waiaha 2 N. Kona. 3 ʻĀp. 1.02 Acs; Waiaha 2 N. Kona.1 ʻĀp. 565 anana. (Note: this Kuleana includes a portion of the Waiaha, Kona Inn Water Tank parcels.)

January 31, 1848, Kailua

Aloha to you the Land Commissioners. I hereby state my land claim there in the ahupuaa of Waiaha 2. Kauwiloa is the name of the ili aina. The boundaries of this ili aina are, Pahukauila on the north; Halewaawaa on the south; Punaio on the west; and Makaihuliwaa on the east.

By Kaniu

Native Testimony, Volume 8:649

Liawahine & Lumaawe, Sworn... His Apana is in the Ili of Kauailoa in Waiaha 2 Ahupuaa.

It was given to him by Liawahine in the Yr. 1839.[101]

Laumaawe, Helu 6699 (ʻĀp. 1, 2)

Laumaawe claimed two parcels and was awarded both of the parcels; ʻĀpana 1 located in the uplands of Waiʻaha and ʻĀpana 2 on the coast described as a pāhale (NR:v8, p413-414).

Kahului Ahupuaʻa

Unlike Waiʻaha, most of the kuleana LCA awarded in Kahului are single ʻāpana that consist, per the Native Register claims, of cultivated lands, but not pāhale. It is likely that some mahiʻai lived in the uplands, and more likely, many of these makaʻāinana also had houses at the coast but were unclaimed. In several pāhale coastal claims, descriptions in the testimonies support the kuleana pāhale claim, while describing multiple houses on the claim and sometimes naming the people who lived in those hale. The same is true in the Waiʻaha Ahupuaʻa claims. It is clear that there is a strong connection ma uka to ma kai and across ahupuaʻa in the uplands. The discussion that follows are a summarized description of the Māhele claims associated with the Kahului 1 and 2 Ahupuaʻa of Kona.

Kahului 1 Ahupuaʻa

Kaulua, Helu 7083 (ʻĀp. 1 of 1)

Kaulua claimed in the Native Register (NR:v8, p418) a pāhale at the coast in the ahupuaʻa of Kahului 1 which is the sole ʻāpana Kaulua was awarded in LCA 7083 (MA:v7, p324). However, Kaulua also claimed at least seven kīhāpai in the uplands, like many claims in the neighboring Waiʻaha Ahupuaʻa, Kaulua described them as being bounded on the ma kai side by the pā pipi, which ran just north of the ala loa, or modern day Māmalahoa Hwy. Kalama testified on behalf of Kaulua's claim and elaborated on it. Kalama confirmed that in 1848 Kaulua received his pāhale, just ma kai of the coastal ala nui in Kahului (NT:v4, p513-514). Kalama went on to describe at least six kīhāpai in the uplands of Kahului that were cultivated by Kaulua (NT:v4, p514).

[101] Helu 7912; Royal Patent 7923; Waiaha 2 Kona. 1 ʻĀp. 1.2 Acs.

Kalama described the pūnāwai of Waikiʻi as being ma kai of Kaulua's ma uka claim (NT:v4, p514). Kalama also testified for an awarded claim for Kanahele (NT:v4, p555), which described Waikiʻi spring as being to the west. It was likely that at least one kīhāpai of Kaulua's was near the Waiʻaha Ahupuaʻa border beside LCA 6402, ʻĀpana 1; unawarded, it was subsumed by the konohiki LCA 8516 B to Kamaikui (MA:v3, p63-66, Part 2).

Nalawaia, Helu 10374 (ʻĀp. 1, 2)

Nalawaia was awarded both of the ʻāpana he claimed (NR:v8, p479-480). Nalawaia was awarded a pāhale at the coast, ma kai of the "Alanui Kohala" and a large paukū ʻāina cultivated ma uka of the "Kealakowaa," or Māmalahoa Hwy. today. However, Nalawaia had claimed more cultivated lands in the uplands, though at least two additional ʻāpana were not awarded.

Maliu, gave a sworn account for the Native Testimony of Nalawaia's claim. Maliu named the ʻili ʻāina of the ma kai parcel (ʻĀp.2) as Halewaawaa (NT:v4, p529-530). Maliu also named the ma uka ala loa "Kealakowaa" which speaks to waʻa, from tree to coast, as a practice impressed on the naming of the wahi of Kahului. Maliu supported Nalawaia's ma uka and ma kai claims in some detail. Maliu explained that, like other ma kai parcels, Nalawaia's pāhale had two houses on it; one for Nalawaia and one belonging to Kalou.

Native Register, Volume 8:479-480,
January 24, 1848, Kailua

> Aloha to you the Land Commissioners. I hereby tell you of pahale claim. It is makai in the ahupuaa of Kahului 1. It is 30 anana long by 28 anana wide, and it was given me in the entirety by the one who had the lot in 1848. My land claim is in the ahupuaa as above. The pauku lands are as follows: Mauka of the Papipi, 400 anana long, and the width is 20 anana. A Pauku of land above the Kaluulu,, the length being 220 anana, and the width 15 anana. A Pauku of land mauka of Kealaloa, the length is 280 anana and the width is 17 anana. The boundaries of these pauku lands are Kauailoa on the North Naalapa on the South, the Papipi on the west, and Kaalapahu on the east.
>
> By Nalawaia

Native Testimony, Volume 4:529-530,
December 29, 1848

> ...There in the ili aina of Halewaawaa, Kahului ahupuaa.
>
> 1. Mauka by Hapaipapa, Kau by Naalapa ili aina, Makai by the pa aina, Kohala by Kauailoa ili aina. 1 cultivated pauku.
>
> 2. Kaluulu [upland agricultural field]. Mauka by the Alanui of Kealakowaa, Kau by Naalapa ili aina, Makai by Ahuakahewa land, Kohala by Kauailoa land. 1 partially cultivated pauku aina. No hale.
>
> 3. Mauka by Kaalapahee [?] land, Kau by Naalapa ili aina, Makai by the alaloa, highway Kohala by Kauailoa. 1 cultivated pauku aina.

4. Pahale. Mauka by wahi waiho wale (idle land), Kau by Kalawa's lot, Makai by the Alanui, Kohala by wahi waiho wale. It is enclosed with a wall made by Maliu. 2 hale, 1 hale for Nalawaia, and 1 hale for Kalou, It is a true kuleana for Nalawaia, and he resided there.

It is and old land (right) received from Kamehameha by Nalawaia to this time. His hale was from Maliu in the Year 1848. No one has objected.

Maliu, Sworn, He has given his kulana lot interest by me in 1848. In the nature as a younger sibling [or male cousin]... I have no intentions to object...[102]

Kialoa, 7350 ('Āp. 1)

Kialoa claimed a contiguous parcel of cultivated kīhāpai that extended from below Māmalahoa Hwy. across the highway, ma uka and beyond the "Great Wall" which was likely the pā pipi. However, Kialoa was only awarded lands below the ala loa. The ma uka unawarded portion of Kialoa's lands are part of the study area. Ipunui gave a testimony that described 15 patches partly in cultivation" (NT:v8, p671).

Native Register, Volume 8:262,
January 24, 1848

For the Land Commissioners. Here is my claim for land at Kahului akahi (1st), a kihapai. On the East, 20 anana, on the West 20 anana, on the South 130 anana, on the North 130 anana.

A kihapai in Kaapaa [the apaa zone]. East 6 anana, West and 6, the Southern boundary 60 anana, the Northern boundary, 60 anana

A kihapai in Kauluulu. East, 12 anana, West, 12 anana, Southern boundary 60 anana, Northern boundary 60 anana.

Kihapai on Kula. East, 15 anana, West, 15 anana, Southern boundary 180 anana, Northern boundary 180 anana.

Those are my kihapai that are applied for.

By Kialoa
Niumalu, Kailua, Kona, Hawaii

Native & Foreign Testimony, Volume 8:671

Ipunui, sworn says, he knows the claim of Kialoa in Kahului, Kona. It consists of 15 patches partly in cultivation. They all lie together in one piece. Claimant derived the land from the Konohiki in 1844 and has held it ever since without dispute. This piece is intersected by the Road.

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[102] Helu 10374; Kahului 1 N. Kona. 2 'Āp. 2.97 Acs.

> Clt has also 14 patches in another piece makai of the first piece. It is bounded On Kohala side by Niniha's land. On Kau side by Nalima's land. Mauka by a road.
>
> He has also a piece of Kula land near the Great Wall. It is bounded makai by the Great Wall. Kohala side by Niniha's land On Kau side by Nalima's land.[103]

Nalima (Lima), 9944 (ʻĀp. 1)

Ipunui described two ʻāpana held by Nalima; one in the ʻili ʻāina of Niukini, which based on its name, appears to be a coastal parcel, as well as a paukū ʻāina in the ʻili ʻāina of Kukuipuloa (NT:v4, p517). According to the documents associated with this claim, it appears that Nalima was only awarded the ma uka parcel.

Native Register, Volume 8:472,
January 25, 1848,

> Aloha to all of your the Land Commissioners: A kihapai at ke alaloa, E. 8, W. 20, south side 300, north side 300. A kihapai in apaa. E. 8, W. 13, south side 130, north side 130.
> Done by Nalima

Native Testimony, Volume 4:517,
December 22, 1848

> Ipunui (Konohiki), Sworn... There in the ili aina of Niukini, Ahupuaa of Kahului I. 2 Apana and a Pauku aina at Kukuipuloa 1. The boundaries are not known to not well known to me, the length by anana or the width. When the surveyor comes he [Lima] will accurately describe the boundaries when he comes.
>
> He received these lands in the time of Kuakini, and in this time they are from me [Ipunui]. No one has objected to him (Nalima).[104]

Maliu, Helu 10252 (ʻĀp. 1)

Maliu is a claimant who only claimed his cultivated lands (NR:v8, p475). Maliu is unique to other claims in that this claimant described their land similar to a mahiʻai, describing the wao of their three land claims. Of the three ʻāina claimed; one is described as being in the maʻū (moist wet area, probably the upland most claim), one in the ʻāpaʻa (dry arid area, maybe one with soil, but it could be rocky) and one in the kula area (connotating openness or a plain, kula is often described as pasture, dryland, or a fallow field).

It should be noted that Maliu offered a Native Testimony for Nalawaia's claim for LCA 10374 (NT:v4, p529-530), in which Maliu testified that he constructed the wall enclosing Nalawaia's pāhale (ʻĀp.2).

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[103] Helu 7350; Royal Patent 7059; Kahului 1 N. Kona. 1 ʻĀp. 1.65 Acs.
[104] Helu 9944; Royal Patent 6278; Kahului 1 N. Kona. XX ʻĀp., XX Acs.

Native Register, Volume 8:475,
January 26, 1848

Aloha to you the Land Commissioners. I hereby explain to you about my land claim in Kahului 1. My claim is from Kekupuohi. Here is the length of my kihapai, 58 long by 18 wide. At the head of one, the width is 6 anana. Another is far mauka in the mau, it is 8 long by 20 wide. On the kula, one is 80 long by 14 wide, at its head it is 13. I also have 3 puhala.

I have three land claims far mauka. 1 is in the mau, 1 in the apaa, and 1 on the kula. There are three kuleana of mine. That is it, for you to hear, and to see if it is right or in error.

Done by Maliu

Native Testimony, Volume 4:538,
December 29, 1848

There in the ili aina of Kamuku Kahului I ahupuaa.

1. Kula. Mauka, Kaluapahu punawai (spring of Kaluapahu), Kau by ili aina of Ililoa, Makai by Makai, Ohuahale a kihapai, Kohala Niukini. 1 cultivated pauku aina.

2.: Mauka, Laie kihapai, Kau by ili aina of Ililoa, Makai by the Alakowaa, Kohala, Niukini ili aina.

3. Mauka is Umiwai punawai (Umiwai spring), Kau, Lapalua ili aina, Makai by Puukehoe a puu (hill), Kohala, Papalanui land. 1 cultivated kihapai.

4. In the ili of Halewaawaa. Mauka, the Alaloa, Kau, by Naalapa ili aina, Makai, Kealakowaa, Kohala by Ahupuaa of Waiaha. 1 cultivated parcel land.

5. At Kamuku 2. Mauka by Alapai's land, Kau by Kukuipuloa ili aina, Makai by Kealaloa, Kohala by ili aina of Ililoa. 1 cultivated kihapai.

6. Kahuahale. Mauka by the alanui, Kau by Ililoa ili land, Makai by konohiki, Kohala by ili aina of Ohiki. It is not enclosed, there is one house and 3 cultivated kihapai.

It is an old land (right) for him from the time of Kamehameha II, and the from Ipunui at the present time. No one has objected...[105]

Kaiakaola, Helu 9126 (ʻĀp. 1)

Kaiakaola claimed several moʻo ʻāina and stated that the land was held in possession from the time of Kekupuohu. Kalama, who offered a testimony stated that Kaiakaola's ʻohana had the

[105] Helu 10252; Royal Patent 6742, Kahului Kona. 1 ʻĀp. 1.4 Acs.

parcel since the time of Kīwalaʻō before 1782, which is an unusually deep genealogy to present for land. Kalama also described in detail the crops that Kaiakaola cultivated such as kalo, coffee, and ʻuala (FT:v8, p677).

It is unclear if Kaiakaola's house was in the same area as the cultivated lands; one is not inclined to think so because Kalama described Kaiakaola's house lot as being in a separate place. The parcel is also described as having three patches of kalo, which could be an indicator of the ʻāina being located in the uplands. It is possible that Kaiakaola was not awarded all the lands he claimed, or that he was awarded them in a long contiguous parcel; considering the inequity of the Māhele. It was unfortunately likely the former.

Native Register, Volume 8:541,
January 26, 1848

> Aloha to you, Z. Kaauwai and the Land Commissioners. I hereby petition for kuleana moo land there in Kahului 1. Kukuipuloa is the name of the moo aina. It has been my land from the time of Kekupuohi, from then to the present time. Naheana is the one over Kahului 1.
>
> Here I am on my little moo aina. Here are the places that I desire. At another place it is 103 long by 12 wide, Another place is 112 long, by 12 wide. At another place 74 long by 12 wide; at another place, 210 long by 44 wide; and at another place 430 long by 20 wide. These are the places I desire. The witnesses are Maliu and Nalawaia.
>
> By Kaiakaola

Foreign Testimony, Volume 8:677, Helu 9126 & 9255

> Kalama, sworn says, he knows the kuleana of Clt. in Kahului 1, Kona. It consists of several pieces of cultivated land scattered over the ahupuaa, viz. 3 Kalo patches, 3 patches of coffee, 2 patches of potatoes.
>
> He has a house lot also and 3 patches of Kalo in another place. The house site is not enclosed.
>
> Clt. derived the land from his ancestors, who got it in the days of Kiwalao [prior to 1782], and holds it without dispute.[106]

Keaweehu, Helu 7496 B (ʻĀp. 1)

No land ma uka of Māmalahoa Hwy., and the Kealakowaa, was awarded in Kahului 1 Ahupuaʻa, although many makaʻāinana claimed land in the kula area below the highway and above the pā pipi. Keaweehu, was one such individual who claimed land in this kula region above the Kealakowaa. Instead, Keaweehu was only awarded the ma uka lands claimed that lay just seaward of Kealakowaa.

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[106] Helu 9126; Royal Patent 8059; Kahului N. Kona. 1 ʻĀp. 1.5 Acs.

Native Register, Volume 8:444-445,
January 26, 1848

Aloha to all of you the Land Commissioners. Pertaining to some kihapai in the mau [zone]. On the east it is 8 long; west, 9 wide; south side 350 long; north side, 350 long. Kihapai in the Kaluulu, 8 wide; west 6 wide; south side 150 long; north side, 150 long. Kihapai on the kula, east 10 wide; west 9 wide; on the east, 9; west side 400 long; north side 400 long
Done by me, Keaweehu

Native Testimony, Volume 4:515-516,
December 22, 1848

There in the ili aina of Lapalua, Ahupuaa of Kahului 3 Apana Aina.

1. Kula [open dryland field]. Mauka by konohiki, Kau by Ililoa land, Makai a pa pipi, Kohala by Ohiki ili aina. 1 cultivated pauku aina. [unawarded]

2. Kaluulu [upland agricultural field]. Mauka by the Alanui, Kau by Kahului 2 land, Makai by Kuaulu (Kaulana [a resting place]), and Kohala by Kukuipuloa ili aina. 1 partially cultivated pauku aina.

3. Mauka by Papuaa, land of konohiki, Kau by Kahului 2 land, Makai by Kaluaolena land, Kohala by Kukuipuloa ili aina. 1 cultivated pauku aina.

His interest was from Ipunui (Konohiki) in the Yr. 1845. No one had objected to him...[107]

Kahului 2 Ahupua‘a

Neniha, Helu 10373 (‘Āp. 1)

Interestingly, Neniha is one of the only awardees not to claim a cultivated upland parcel. Neniha’s only claim is for a pāhale that is located on the coast which was awarded (NR:v8, p479). Kalama gave a sworn testimony for Neniha’s claim (NT:v4, p533) which was based on Neniha’s wife’s family, who received the lands from Kamehameha I.

Kapae, Helu 7073 (‘Āp. 8)

Kapae claimed a good amount of land. Of those relevant to the study area, Kapae claimed one ma kai parcel and four ma uka parcels. Kapae received one of each. Kapae’s ma kai parcel at Kahului 2 included a house and cultivated land that was received in 1846 when an individual by the name of Puna, who is mentioned to be the husband of Kaoanaeha, gave Kapae “administration of the konohiki labor days for the konohiki on this land” (NR: v8, p414-415).

107 Helu 7496B; Royal Patent 6277A; Kahului 1. 1 ‘Āp. 1.9 Acs.

If Kapae's ma kai lot was claimed because of his work, the ma uka claims for portions of the upland 'ili of Inaimoa and Kamuku were on behalf of his wife's connections, through her parents and kūpuna kāne. It is unclear how many of the four paukū claims are included in Kapae's extensive ma uka award. Kapae was awarded the parcel above the pā pipi, an extensive upland award just below Māmalahoa Hwy.

Kapae claimed residence at the coast where Kapae administered konohiki labor days. Kapae also testified that he farmed the upland parcels with his wife's family "from 1838 until today (1848, or ten years). Here, we see a clear connection between the uplands and the coast that can trace more than one generation, even for people that might have had a higher status.

Native Register, Volume 8:414-415
January 24, 1848, Kailua

Aloha to you the Land Commissioners. I hereby state my pahale, which is there makai in Auhaukeae 1, Ahupuaa, in Kona, Hawaii. It was given to me in its entirety by Unualoha and Kaikainalii. It was given me absolutely by Ulualoha and Kaikainalii at the time I became a teacher for the children, in the Year 1838.

There are some other places beside this lot which I worked again on the west and the northeast. I and some others purchased a mans house, selling his lot for $4.50 in 1846. [For which] I asked Kamanawa. On the east side is my place. it was given to me and was combined into one lot with a circumference of 196 3/6 anana; some of the border of the lot enters into Hianaloli 6.

Here is the, a pahale in the Ahupuaa of Kahului 2. It was received in this way. Puna, husband of Kaoanaeha, gave me the administration of the konohiki labor days for the konohiki on this land. The konohiki was living on that land, and the lot was from ancient times until the present. There is a pahale on the side of this lot, and cultivated place on the other side and the other in from former times. The length and width is 345 anana. This lot was gotten by me in 1846.

Here is the, the land claims as stated by Limaikaika, for us to apply to you the land Commissioners, describing the nature of our claims as explained below.

Pauku Aina 1, mauka of the papipi, the length is 187 3/6 anana, the width is 13 anana.

Pauku aina 2, in the mid kula [region], the length is 117 3/6 anana by 17 3/6 anana.

Pauku lands 3, within the Kaluulu, reaching maki to Inaimoa. The length is 362 anana by 44 3/6 anana, being the same in some places and more in other places.

Pauku 4, mauka of Kealaloa to makai of Hulilau. The length is 73 anana by 13 anana

The boundaries of these pauku aina described above are Lapalua on the north, Kahuku 1 on the south, the papipi on the West, and Hulilau on the east.

These land claims are in Kahului 2, that is the ahupuaa. There are three ili are in this claim, Inaimoa and 2 Kamuku. These land claims are from my wife's parents, and an ili from her kupunakane. This was their land which they cultivated, from

the time they occupied the land, until the present. But they gave the property to my wife and I. It is there that we have farmed t with them from 1838 until today. All the things I have planted are there now.

Here is a kihapai at Kahuku 1, acquired by me as follows. The annual tax of this ili had not been fully paid to the tax collector and I paid the remaining quarter, and I asked for some of kihapai from the one who had the ili and it was given (to me). The total of these kihapai is 61 3/6 anana long by 14 anana wide. The boundaries of the pauku aina are Kamumu 2 on the North, Kahuki 2 on the South, the Uluniu (Coconut grove) on the west, and Kaohia on the east.

I am with aloha,
Kapae.

Native Testimony, Volume 4:501-502,
December 20, 848 *[See also Helu 2415 B]*

There in the ahupuaa of Auhaukeae.

1. Pahale. Mauka by idle land, Kau by Kealoha folks lot, Makai kahakai (shore), Kohala by Kaiamakini's lot. Kapu enclosed with a wall in 1829. 1 house for Kapae, he is living there. It was given to him by Kealoha in 1838. He has lived there to the present day.

2. Pahale in Ahupuaa of Kahului. Mauka by Alanui Aupuni, Kau by idle kula land, Makai by kahakai, Kohala by idle land. It is enclosed with a wall. 1 house for Kapae. Kapae lives there. His interest was from Puna in the Yr. 1846.

3. Pauku aina. Above the pa pipi, the ili aina of Kahului. Mauka by idle land, Kau by Kahuki I, Makai by Papipi, Kohala by Lapalua ili aina. 1 pauku partially cultivated in various areas.

4. Pauku Aina on the Kula. Mauka by idle land, Kau by Kahuki ili aina, Makai by idle land, Kohala ili aina. It is cultivated.

5. At the Kaluulu. Mauka by Konohiki, Kau by Kahuki I ili aina, Makai by idle land, Kohala by Lapalua ili aina. 1 cultivated pauku aina., 1 hale for him.

6. Pauku aina. Above Kealaloa. Mauka, Hulilau a kihapai for the Konohiki, Kau by Kahuki 1 land, Makai by the Alanui, Kohala by Lapalua. Cultivated land.

7. Ili aina at Kahuki 1. Mauka by idle land, Kau by Kahuki 2, Makai by idle land, Kohala by Kamuku 2 land.

Kihapai gotten from Kalou[?] in the Yr. 1844. Apana 1 from Kealoha, Apana 2 from Puna, The Apana Aina are old lands [rights] from the kupuna of his wife. No one has objected...

Native Testimony, Volume 8:646, Helu 2415 B, Kapae
January 10, 1850

...Kalama and Kaili, Sworn. We know his apana, Ili of Lapalua in Kahului 2 Ahupuaa, from Kaoanaeha in the Yr. 1846. No one has objected to him. It is surrounded on all side by the land of the Konohiki, they have seen his parcel in Lapalua ili of Kahului 2 ahupuaa from Kaoanaeha in 1846. No one objected to him. Boundaries are surrounded by the land of the konohiki.[108]

Kulou, Helu 7690 (ʻĀp. 1)

Kulou, through the claim of his wife's ʻohana claimed six paukū of ma uka lands. He described them at the end of his claim (NR:v8, p445-446) as contiguous parcels. The pā pipi is a western boundary of the ʻāpana and must run between the ma kai and ma uka ala loa, rather than being above Māmalahoa Hwy. It is likely that Kulou's claim was awarded in a single parcel.

Native Register, Volume 8:445-446,
January 24, 1848, Kailua

Aloha to you the Land Commissioners. I hereby state to you my land claim which is in Kahului 2 Ahupuaa. Thus, it is for your understanding of my places of cultivation, pursuant to the words of Limaikaika (Armstrong), I petition to you for my land claims, the cultivated places.

A pauku of land, mauka of the papipi. 500 anana long by 5 anana wide.
A pauku of land in the mid kula region 500 anana long by 5 anana wide
A pauku of land mauka there is 300 anana long by 7 anana wide.
A pauku mauka of Kaluulu is 90 anana long by 5 anana wide.
A pauku o land above there that is 82 anana long by 5 anana wide.
A pauku of lands that is mauka of the alaloa, 240 anana long by 6 anana wide.

The boundary of this land is Kamuku 2 on the north, Kahuku 3[?] on the south, the papipi on the west and by , by Hulilau on the east.

This land claim was from my wife, and her keiki, Kapeleaumoku, in 1843 when I /began to/ cultivate this land, until the present.

By Kulou

Native Testimony, Volume 4:516,
December 22, 1848

Kekipi (konohiki), Sworn... There in the ili aina of Kahuki, Ahupuaa of Kahului 2.

It is just as it was described by him [Kulou] in his claim document, that is what I know. however, I [Kekipi] do not know the length of the boundaries. It is my thought that when the surveyor comes, he will establish the boundaries. 6 Pauku aina

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[108] Helu 7073; Royal Patent 8072; Kahului 2 N. Kona. 1 ʻĀp. 3.4 Acs. Kahului 2 N. Kona. 6 ʻĀp. 7.72 Acs. Royal Patent 8073; Kahului 2 N. Kona. 1 ʻĀp. 2.19 Acs.; Auhaukeae 2 Kona. 2 ʻĀp. 1.92 Acs.

His interest was from Kapae, to this time, but it is an old [right] for his wife, in the time of Kamehameha 1. No one has objected to him...[109]

Kuapuu, Helu 7336 (ʻĀp. 1, 2)

Kuapuu claimed six to seven ʻāpana and was awarded two of them; one ma kai pāhale at the coast and a partially cultivated kīhāpai in the uplands. It is likely that Kuapuu's ma uka award, ʻĀpana 1, included several of his claimed paukū that were contiguous.

Native Register, Volume 8:424,
January 26, 1848, Kailua

Aloha to you the Land Commissioners. I hereby state my pahale claim, there makai, Kahului 2, Ahupuaa. The length and width are 43 anana.

My land claim is in Kahului 2, and known as follows, 500 anana long by 5 anana wide.

A pauku of land mauka of this, reaching the Kaluulu, 300 anana long by 5 anana wide.

A Pauku of land from Kealakowaa to Manuwa, 400 anana long by 5 anana wide.

A pauku of land mauka of Kealaloa is 100 anana long by 5 anana wide.

These pauku are bounded by Kahuki 1 on the north, by Kikiaiole on the south, by the Papipi on the west, and by Kaaipuaa on the East.

A pauku of land at Kikiaiole 2, 500 anana long by 6 anana wide

Pauku of land that is above Pahanui to Kamakahalau, 300 anana long, by 5 anana wide. The boundaries of these lands are Kikiaiole 1 on the north, Ohia on the south, the Papipi on the west, and Kamakahalau on the east.

By Kuapuu

Native Testimony, Volume 4:500,
December 20, 1848

...There in the ili aina o Kahuki, Kahului 2 Ahupuaa. 7 Apana.

1. Pahale. Mauka by idle land, Kau by Niniha's lot, Makai by an Alanui Aupuni, Kohala by Kalawa's lot. Enclosed. 1 house for Kuapuu, he is living there.

2. Mauka of Papipi. Mauka by idle land. Kau by Kikiaiole land, Makai by a papipi,

[109] Helu 7690; Kahului 2 N. Kona. 1 ʻĀp. 1.75 Acs.

Kohala by Kahuki land. 1 cultivated kihapai.

3. Kaluulu [Inland agricultural zone]. Mauka by idle land. Kau by Kikiaiole, Makai by idle land, Kohala by Kahuki land.

4. At Kealakowaa. Mauka by konohiki, Kau by Kikiaiole, Makai by Konohiki, Kohala by Kahuki land.

5. The Alaloa. Mauka by idle land, Kau by Kikiaiole land, Makai by Konohiki, Kohala by Kahuki land.

6. There in Kikiaiole ili aina. Mauka by Konohiki, Kau by Ohia land, Makai by Konohiki, Kohala by Kikiaiole 2. 1 partially cultivated kihapai.

7. Mauka by Konohiki, Kau by Ohia land, Makai a papipi, Kohala by Kikiaiole 2 land. 1 partially cultivated kihapai.

It is and old land (right) belonging to Kuapuu's wife, given to her by her parents in the time of Kamehameha I. No one has objected...[110]

Kaanaana, Helu 7335 (ʻĀp. 1)

Kaanaana only claimed the cultivated lands which are described as being in the uplands and having had been cultivated since 1840 (NR:v8, p423). It is documented that Kaanaana received the ʻāina from his parents who had gotten the land themselves during the time of Kamehameha I. (NT:v4, p449). Kaanaana claimed no house lot. The lands claimed where paukū ʻāina and paukū kula (NR:v8, p 423).

Native Register, Volume 8:423,
January 24, 1848, Kailua

Aloha to you the Land Commissioners. I hereby tell you of my land claim in the ahupuaa of Kahului 2.

It is described as follows. My cultivated place, as I understand it having heard from Limaikaika, "You are to petition for your land claims to the Commissioners.

A pauku of land mauka of the pa pipi, 700 anana long by 9 anana wide.

A pauku mauka of the kula, 30 anana long by 10 anana wide.

A pauku of lands above there is 46 anana long, by 12 anana wide.

A pauku of lands mauka of the Kaluulu to makai of Manuwa is 290 anana long by 9 anana wide. This boundaries of the land above described, are Kahuki 2 on the north, the papipi on the west, and Manuwa on the east.

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[110] Helu 7336; Royal Patent 3740; Kahului N. Kona. 2 ʻĀp. 1.35 Acs.

These place have all been cultivated from the time I received these ili aina. That is in the year 1840, up to this time. It is for you to hear.
I am Kaanaana 2

Native Testimony, Volume 4:499,
December 20, 1848

...There in the ili aina of Kikiaiole, 1 Apana, Kahului 2 Ahupuaa. 3 Apana Aina.

1. Mauka idle land for the Konohiki, Kau by Kikiaiole 2, Makai a pa pipi, Kohala by Kahuku [Kahuki] Aina. 1 uncultivated kihapai.

2. Kula (land). Mauka by idle land, Kau by Kikiaiole land, Makai by Konohiki, Kohala by Kahuki aina. 1 cultivated kihapai.

3. Kaluulu [regions extending to) Manuwa. Mauka by Konohiki, Kau by Kikiaiole, Makai by Konohiki, Kohala by Kahuki aina. 1 cultivated pauku.

It is an old land (right) from Kaanaana's parents to him. His parents received it in the time of Kamehameha I. No objections...[111]

Kekipi, Helu 7914 (ʻĀp. 1)

Kekipi claimed one paukū ʻāina from Kealakowaa to a wahi called Waiapuka to the east. A kīhāpai is also mentioned associated with this ʻāina.

Aikane (Aekane), Helu 11073 (ʻĀp. 1)

Aikane claimed cultivated kula lands in Kahului and a pāhale in the ahupuaʻa of Hinaloli located to the north. Aikane was only awarded the paukū ʻāina in the uplands (NR:v8, p610). An individual by the name of Kekipi presented a testimony that Aikane's ʻāpana was located in the ʻili ʻāina of Ohia and Papahia in the Kahului Ahupuaʻa and that it was Aikane's ʻāina since 1839 (NT:v8, p651).

Native Register, Volume 8:610,
Feb. 7, 1848, Kailua

Aloha to you're the Land Commissioners. I hereby describe my claim for land, a house lot and kula. The land claim is in the Ahupuaa of Kahului in Kona, Kailua. The size of the land is 296 anana long, and 31 anana wide. That is the size of the pauku of land. And my kula is 100 anana long by 20 anana wide. There is a pahale claim also, in the Ahupuaa of Hianaloli at Kailua. It is 15 anana long by 7 anana wide. They were given me by Malo and Kaohao. Those are my claims which are stated to you.
By Aekane [Aikane]

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[111] Helu 7335; Royal Patent 7066; Kahului 2 N. Kona. 1 ʻĀp. 1.2 Acs.

Native Testimony, Volume 8:651,
January 12, 1850

> Kekipi, sworn... ...His Apana is in the Ili of Ohia & Papiha, Kahului Ahupuaa. From Iino in the Yr. 1839. No one objected to him.
> Boundaries of the land are surrounded by the land of the Konohiki.[112]

Kalawa (also Kalaua), Helu 7086 (ʻĀp. 1, 2)

According to the Native Testimony (NT:v4, p557) and Native Register (NR:v8, p419) submitted for this claim, Kuapuu claimed three ʻāpana, two paukū ʻāina in the uplands, and a pāhale at the coast. Kalawa was awarded two ʻāpana which included one house site located at the shore and one in the uplands. It is unclear if one of Kalawa's ma uka cultivated claims was unawarded, or they were awarded as one large ʻāpana.

A wahine by the name of Kaili offered a testimony on behalf of this claim (NT:v4, p557). In this testimony, Kaili described the ma kai pāhale parcel as having had two houses; one which belonged to Kalaua and another which belonged to herself (NT:v4, p557). Both house sites are said to have been enclosed by a wall (NT:v4, p557).

Native Register, Volume 8:419,
January 26, 1848, Kailua

> Aloha to you the Land Commissioners. I hereby tell you of my land claim as follows. A pauku land from the papipi to Kahului-loa, being 500 anana ling by 5 anana wide.
>
> A pauku of lands Ke Alakowaa [Kealakowaa] to Waiapuko, being 500 anana long by 5 anana wide.
>
> Pahale claim the makai of Kahului 1, Ahupuaa. The length and width are 42 anana.
>
> The Pauku of land explained above are in the Ahupuaa of Kahului 2. The boundaries of these lands are Kikiaiole on the north, Papiha on the south, the Papipi on the West, and Waiapuko on the east.
>
> By Kalawa

Native Testimony, Volume 4:557,
January 10, 1849

> ...There in the ili aina of Puki, Ahupuaa of Kahului 2. 3 Apana.
>
> 1. Mauka by konohiki, Kau by Papiha ili aina, Makai by pa pipi, Kohala by Ohia ili aina. 1 kihapai not cultivated.

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[112] Helu 11073; Royal Patent 7058, Kahului 2 N. Kona. 1 ʻĀp. 1.8 Acs.

2. Mauka by konohiki, Kau by Papiha ili aina, Makai by Ohia ili aina, Kohala by Kikiaiole. 1 cultivated kihapai.

3. Pahale. Mauka by idle land, Kau by Kuapuu's lot, Makai by the Alanui Aupuni, Kohala by Nalawaia's lot. It is enclosed with a wall. 2 hale. 1 hale for Kalawa, and 1 for me (Kaili W.). It is a kuleana hale Kalawa. They are residents since Kamehameha I, to this day. No one has objected.[113]

Puapuaa Ahupuaʻa

As opposed to the other ahupuaʻa examined in this study, Puapuaʻa 1 and 2 Ahupuaʻa appears to have had the most claimants submit a claim during the Māhele process. A total of 16 claimants associated with the Puapuaa region were analyzed. According to the Native Testimonies, Native Registry, Land Commission Awards, and supporting Māhele records, this region reported many kīhāpai, malā, and other cultivated lands; thus indicating agricultural practices to have occurred in the area. Similar to the other ahupuaʻa examined, many of the claims submitted for Puapuaʻa describe majority of the cultivated lands to have been located in the ma uka or kula zone of the ahupuaʻa, while the house sites claimed were situated ma kai of the ahupuaʻa. Presented below are a summarized description of each of the claims submitted for the Puapuaʻa 1 and 2 Ahupuaʻa.

Puapuaa 1 Ahupuaʻa

Nika, Helu 10365 (ʻĀp. 1)

In the Puapuaa 1 Ahupuaʻa, Nika was awarded a single ʻāpana (LCA 10365). This ʻāpana is described as a kīhāpai that is located in the ma uka region of the ahupuaʻa (NR:v8, p479). The types of crops and vegetation cultivated in this kīhāpai is not specified in any of the Māhele documents associated with Nika's claim.

Kaiewe, Helu 7353 (ʻĀp. 1, 2)

Kaiewe claimed nine parcels, a kīhāpai ʻai (kalo garden) in the kula region, an ʻāpana in the ʻāpaʻa zone which consisted of four kīhāpai and a pāhale, an ʻāpana in the ʻāmaʻumaʻu zone, as well as other ʻāpana noted to have at least ten other cultivated kīhāpai on them. These ʻāpana are said to be located in the ʻili of Ililoa, Haliiipalala and Lauhulu (NR:v8, p427-428). Kaiewe was ultimately awarded two ʻāpana; one long parcel in the uplands, that included the claim submitted for the ʻāina in the ʻāpaʻa region of Puapuaa, as well as one ʻāpana on the coast that is located beside Kawainui's LCA 7353 ʻĀpana 2.

Native Register, Volume 8:427-428,
January 20, 1848

Hear ye, o Land Commissioners. I, Kaiewe, hereby state my claims to you by length and width.

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[113] Helu 7086; Royal Patent 5225; Kahului 1 Kona. 1 ʻĀp. .270 Ac. Kahului 2 Kona. 1 ʻĀp. 1.3 Acs.

On the N. 10 anana; to the E., adjoining the lot of Kawainui, 11 anana, and on the So. 11 anana. To the W. adjoining the lot of Nahau, 12 anana. The length is on the E. and the W. The width is on the N. and the S. There is nothing planted. This lot is finished.

Here is the claim for a kihapai ai (Kalo garden) on the kula. The length of that place worked by my own hands is 107 anana long on the E., adjoining the kihapai of Ku; that is the length on the W.; adjoining the kihapai of Kawainui it is 42 anana wide; on the N. it adjoins the kihapai of Nahau. The N. and S. are the same.

Mauka of this, it is 120 long on the E, and the same on the W. The width of this to the N. is 15 anana, at the place adjoining the Kihapai of Kalua. The N. and S. are the same. This claim is finished. It is Kula land.

Here also is this claim in the Kaluulu. To the N., 6. To the E. adjoining the kihapai of Ainoa, it is 27 anana. To the S. it is 6. To the W. adjoining kihapai of Ikeole it is 27 anana, there to the S. it is 6. to the E. adjoining the kihapai of Ainoa it is 27 anana. The length is on the W. and the with is to the N. and S. This claims is finished. Kaluulu.

Here is another claim, mauka in the Apaa, there are growing various plants. The length on the E. is 18 anana, also on the W., and to the N. adjoining Kaukali, it is 6 anana wide, and the same on S.

There on the N. W. to N. of the Kihapai is 5 anana, and the same on the E. On the E. it adjoins the kihapai of Kamahiai, 25 anana, and the same on the W.

Another is to the S. N. and E. it is 14 anana long, at the place where it bounds Kaukali's kihapai. It is the on the W. where it bounds Kauila's kihapai. N. 15 anana, to the place where it bounds the Kihapai of Nahau. On the N. and the S. the width is the same as the above anana

Other kihapai are to the N. the length is 47 anana; also the length on the E., at the place bounding Kaihu's kihapai, and being 20 anana wide, That is also on the N. and the S.; the W. is it 47 anana. This claim on the Apaa is finished.

-Here is this claim in the Amaumau [zone]. This claim is in the distant uplands, being 34 anana long, to the E. and the same on the W. The width is 15, the same on the N. and S.

By me I. Kaiewe
Puapua [Puapuaa] 1, District a. Kona, Hawaii.

Native Testimony, Volume 4:565-566,
February 2, 1849

(Nahau, Konohiki, Sworn) ...There in the ili aina of Ililoa, Puapuaa 2 Ahupuaa; in the ili aina of Haliiipalala and Lauhulu. Puapuaa 2 Ahupuaa.

1. Pahale. Mauka by Idle land, Kau by Kawainui's land, Makai by shore; Kohala my [Nahau's] lot. It has been enclosed by a wall. 2 hale with for him, and he resides there.

2. Kihapai in ili aina of Haliipalala. Mauka by my land, Kau by Ku's land, Makai by the pa aina (land boundary wall), Kohala by Kahookano's land. 2 cultivated kihapai.

3: Mauka by Kalua's land, Kau by my land, Makai by Kawainui's land Kohala by my land. 2 cultivated kihapai.

4. At the Apaa [upland agricultural zone]. Mauka by Konohiki, Kau by Kaihu's land, Makai by my land, Kohala by Konohiki. 4 cultivated kihapai. 1 house for him.

3. Ili aina of Lauhulu. Mauka by Konohiki, Kau by Kamahiai's land, Makai Konohiki, and the same towards Kohala. 1 cultivated kihapai.

6 - At ili aina in Waipio. Mauka by my land, Kau by Ainoa's land, Makai by Konohiki, Kohala by Ainoa's land. 1 cultivated kihapai.

7. In the ili aina of Ililoa. Mauka by Keliikanakaole's land, Kau by Ainoa's land, Makai by Konohiki, Kohala by Ikeole's land. 2 cultivated kihapai.

8. Mauka by Kaihu's land, Kau by Ikeole's land, Makai by Kauhi's land, Kohala by Konohiki. 1 cultivated kihapai.

9. Mauka, Konohiki, the same towards Kau and Makai, Kohala by Ahupuaa of Kahului. 1 cultivated kihapai.

His interest was from me (Nahau) in the Yr. 1844. No one has objected.[114]

Kawainui, Helu 7355 (ʻĀp. 1)

Kawainui issued a claim for five ʻāpana; however, only one of the five parcels were awarded (LCA 7355). The one ʻāpana received by Kawainui during the Māhele was an ʻāpana comprised of a pāhale. The remaining four parcels that went unawarded were three ʻāpana that consisted of at least seven cultivated kīhāpai and a kahua hale or house site (NT:v4, p564-565).

Ikeole, Helu 8221 (ʻĀp. 1)

Ikeole only claimed one ʻāpana in the ʻili ʻāina of Ililoa. This ʻāpana was the location of Ikeole's pāhale, which consisted of one house enclosed by a wall, according to Nahau (NT:v4, p569), and where Ikeole cultivated at least six kīhāpai in the ʻāpaʻa (upland dryland agricultural zone). Nahau's pāhale and goat pen is described as being nearby.

Native Register, Volume 8:460,
January 29, 1848

> Aloha to you Excellencies. I hereby tell you of my kihapai which I made with my own hands and are cultivated by me. It is 110 long by 18 wide.
> Ikeole

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[114] Helu 7353; Royal Patent 4304; Puapuaa 1 Kona. 2 ʻĀp. 1.2 Acs.

Native Testimony, Volume 4:569,
February 2, 1849

There in the ili aina of Ililoa, Ahupuaa of Puapuaa 1. 5 Apana.

1. At the Apaa [upland dry ag. zone]. Mauka by Konohiki, Kau by Puapuaa 2. Makai by Konohiki, Kohala by Kaihu's land. 6 cultivated kihapai.

2. Mauka by Konohiki, Kau by Puapuaa 2, Makai by Konohiki, Kohala by Kaiewe's land. 13 cultivated kihapai.

3. Mauka by Konohiki, Kau by Puapuaa 2, Makai by Konohiki, Kohala by my [Nahau's] land. 3 cultivated kihapai.

4. Mauka by Konohiki, Kau by Puapuaa 2, Makai by Konohiki, Kohala by my [Nahau's] land. 2 cultivated kihapai.

5. Pahale. Mauka by my [Nahau's] pa kao goat enclosure, Kau by my [Nahau's] lot, Makai by kahakai, Kohala by wahi waiho wale (Idle land). It is enclosed with a wall. 1 hale for him.

The are old residents from the time of Kamehameha, No one has objected...[115]

Ku, Helu 7356 (ʻĀp. 1)

During the Māhele, claimant, Ku, claimed four ʻāpana. The Native Register associated with Ku described that the kula lands being claimed had kīhāpai on them (NR:v8, p428). According to the Native Testimony, there are a total of six cultivated kīhāpai mentioned; one in the ʻili ʻāina of Waipio, two in the ʻili ʻāina of Ililoa, two in the ʻili ʻāina of Haliipalala, and another one mentioned associated with the ʻili ʻāina of Lauhulu in the Puapuaʻa 1 Ahupuaʻa (NT:v4, p563).

Native Register, Volume 8:428, Helu 7356, Ku

He ye o Land Commissioners. Here I am, Ku, making known to you my land claims. There are some kihapai there on the Kula lands, 120 long on the East, and the same on the West 120 anana. It is at the place adjoining Kaiewe's kihapai, being 18 wide. There to northwest one is 40 anana long on the east at the place adjoining the kihapai of Nahau. The length that place made known is 40 anana long and the 4 wide. Towards the East is another, that is 30 anana long, 11 wide; on the north of the kihapai that is 40 anana long by 14, wide.

Done by me, Ku
Puapua [Puapuaa] 1, Kona, Hawaii. January 20, 1848.

Native Testimony, Volume 4:563,

[115] Helu 8221; Royal Patent 4263; Puapuaa 1 N. Kona. 2 ʻĀp. 1.762 Acs.

February 2, 1849

> ...There in the ili aina of Lauhulu, Ahupuaa of Puapuaa 1, Hawaii. 4 Apana
>
> 1. Mauka by Nahau's land, Kau by my [Kawainui's] and Kaiewe's land, Makai by Kaiewe's land Kohala by Hookano's land. 1 cultivated kihapai.
>
> 2. In the ili aina of Waipio. Mauka by Konohiki, the same towards Kau, Makai by pa aina, Kohala by Kaiewe's land. 1 cultivated kihapai.
>
> 3. In the ili aina of Ililoa. Mauka by konohiki, and the same towards Kaua and all around. 2 cultivated kihapai.
>
> 4. In the ili aina of Haliipalala. Mauka by Konohiki, the same towards Kau, Makai by Kalua's land, Kohala by Kamahiai's land 2 cultivated kihapai.
>
> His interest was from Nahau [Konohiki] in the year 1843. No one has objected to him..[116]

Kalua, Helu 7354 (ʻĀp. 1)

According to Kalua's Native Testimony, four ʻāpana were claimed during the Māhele, though only one was awarded a LCA. The parcel that was awarded to Kalua was a ma uka ʻāpana whose land use was not specified (LCA 7354). The three other ʻāpana that went unawarded were two parcels decribed as being ma uka ʻāpana, and one described as a kula ʻāpana. Collectively, a total of six kīhāpai were noted to have been cultivated in Kalua's three unawarded parcels (NT:v4, p561-562).

Kaukali, Helu 9253 (ʻĀp. 1)

As a result of the Māhele, Kaukali was awarded one parcel described to be in the ma uka region of the ahupuaʻa (LCA 9253). Kaukali testified a claim to for three ʻāpana; one described as a ma uka ʻāpana ʻāina, another ma uka ʻāpana that contained a total of six kīhāpai, and a final ʻāpana that had two kīhāpai (NT:v4, p584). The types of crops cultivated in the kīhāpai were not specified in the Māhele records.

Kamahiai, Helu 7461 (ʻĀp. 1)

Kamahiai received an award for a single ʻāpana in the ma uka region of the Puapuaʻa 1 Ahupuaʻa (LCA 7461). Originally, Kamahiai testified to having a total of nine ʻāpana, though only one was awarded. As described in Kamahiai's Native Testimony, this claimant had one ʻāpana in the kula region that contained one kīhāpai, a ma uka ʻāpana, another ma uka ʻāpna with one kīhāpai, four more ʻāpana—each containing two kīhāpai on each parcel, as well as two additional ʻāpana described as cultivated paukū ʻāina (NT:v4, p505-506). Māhele records indicate that Kamahiai had a total of 12 parcels in cultivation.

Kaihu, Helu 7462 (ʻĀp. 1)

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[116] Helu 7356; Royal Patent 4356; Puapuaa 1 Kona. 1 ʻĀp. 2 Acs.

Kaihu was awarded two ʻāpana in the Puapuaʻa 1 Ahupuaʻa; one listed as an ʻāpana ʻāina, and the other, a pāhale. Kaihu's Native Testimony recounts that though only two parcels were awarded as a result of the Māhele, Kaihu had claimed a total of four ʻāpana; one ʻāpana pāhale and three ʻāpana kīhāpai (NT:v4, p506). One parcel was noted to have one cultivated kīhāpai on the property, another parcel and three kīhāpai, and the third parcel was described as a cultivated paukū ʻāina. The descriptions provided in Kaihu's claims indicate cultivation practices to have occurred on these ʻāpana.

Hookano, Helu 8154 (ʻĀp. 1)

Māhele Records indicated that Hookano was award***ed*** a single ʻāpana ʻāina in Puapuaʻa 1 Ahupuaʻa (LCA 8154), though the claimant had testified to have at least seven ʻāpana (NT:v4, p566). ***Hookano attests to having a total of at least 21 cultivated kīhāpai and one cultivated paukū ʻāina across the seven ʻāpana in the ahupuaʻa.***

Nahau, Helu 10407 (ʻĀp.)

Nahau was awarded two ʻāpana in the Puapuaʻa 1 Ahupuaʻa which consisted of an ʻāpana ʻāina and a pāhale (LCA 10407). Though Nahau was awarded two ʻāpana, this individual had originally testified to have claimed a total of 11 ʻāpana. The nine ʻāpana that went unawarded were described to have had cultivated kīhāpai associated with the parcels. Nahau attested to having had a total of 20 kīhāpai (NT:v4, p562-563). The type of crops cultivated in these kīhāpai were not identified in any of the documents associated with Nahau's claim.

Puapuaʻa 2 Ahupuaʻa

Keliikanakaole, Helu 7486 (ʻĀp. 1)

During the Māhele process, Keliikanakaole described having had five ʻāpana associated within the Puapuaa 2 Ahupuaa; however, Keliikanakaole was only awarded two of the five land claims made. The two claims awarded to Keliikanakaole consisted of an ʻāpana of ʻāina and a pāhale (LCA 7486). The other three that Keliikanakaole were ma uka parcels of ʻāina (NT:v4, p570).

Kauila, Helu 6177 (ʻĀp. 1, 2, 3)

Kauila was awarded three ʻāpana in the Puapuaʻa 2 Ahupuaʻa of Kona during the Māhele. Two of the three ʻāpana awarded to Kauila are listed as house sites or pā on the ma kai region; while the other parcel is an ʻāpana ʻāina in the ma uka area (LCA 6177).

Kala, Helu 7947 (ʻĀp. 1, 2)

Kala was awarded two ʻāpana during the Māhele in the Puapuaʻa 2 Ahupuaʻa. One of the parcels awarded was an ʻāpana of ʻāina, while the second awarded was for a pāhale (LCA 7947). Though Kala was awarded two ʻāpana, this claimed had actually submitted a claim for a total of eight different parcels. The various ʻāpana described by Kala in the Native Testimony mention at least twelve kīhāpai of cultivated ʻāina to have belonged to Kala. The first ʻāpana is described as having one kīhāpai in the uplands of Puapuaʻa, the second ʻāpana is also said to have had a kīhāpai, the third ʻāpana is said to have had two, the fourth ʻāpana is said to have three kīhāpai, the fifth ʻāpana had two more kīhāpai, the sixth ʻāpana is a paukū ʻāina, the seventh ʻāpana had three kīhāpai, and the final ʻāpana is described as a being a ma uka parcels that was held since the time of Kamehameha I (NT:v4, p564).

Kalimapaa, Helu 7743 (ʻĀp. 2)

Kalimapaa had made claim to five parcels of ʻāina; however, during the Māhele process, was awarded only two of the five claims made; one of which was a pāhale (LCA 7743). The Native Registry regarding Kalimapaa's landholdings described Kalimapaa to have had many kīhāpai which grew an abundance of native crops and vegetation. The Native Registry associated with Kalimapaa recounts that there were three māla ʻuala in the kula region in the ʻili of Kapahu, two māla kalo on the ʻāpaʻa and ʻāmaʻu zones of the ahupuaʻa, ten other māla kalo in another parcel, two additional māla kalo in a kīhāpai along with another māla ʻuala, a māla in the kula lands which grew ipu, a māla of lauhala, and another māla of pahulu ʻuala or a garden of volunteer sweet potatoes (NR:v8, p446). As exemplified from the testimonies and registry associated with Kalimapaa's claim, a variety of native vegetation and crops were cultivated and cared for in the Puapuaʻa Ahupuaʻa.

Keawe, Helu 5849 (ʻĀp. 1)

Keawe claimed and was awarded an ʻāpana that included a pāhale in the Puapuaʻa 2 Ahupuaʻa. According to the Native Testimony submitted for this claim, this ʻāpana was in Keawe's possession before the time of Kamehameha I (NT:v4, p590). The Native Registry attests that there were several different plants which grew on the property. Among the plants described, there were two loulu trees, a noni grove, hala kahiki or pineapple, and coconuts trees which were said to have been planted by "ka poe kahiko," or the ancients (NR:v5, p158).

Summary in Brief: The Gianulias Parcel – Ahupuaʻa of Puaʻa, Waiʻaha, Kahului, and Puapuaʻa

Hawaiian primary source historical records contained in the Native Testimony, Native Register, and Buke Māhele mention, or are indicative of cultural resources and practices associated with the ahupuaʻa of Puaʻa 3, Waiʻaha 1 and 2, Kahului 1 and 2, and Puapuaʻa 1 and 2, site of the Gianulias Parcel well. Spanning across these focus area ahupuaʻa, the Māhele records indicate that agricultural practices were common practices that occurred in these regions when one takes into account the numerous cultivated kīhāpai, māla, and paukū ʻāina that were described. Puaa 3 Ahupuaʻa contained at least six claimants whose land use consisted of cultivated kīhāpai and residential house sites. Similarly, Waiʻaha Ahupuaʻa 1 and 2 evidenced agriculture practices and also mentioned the named pūnāwai, Waikiʻi and other resources existing in the region such as the native mountain banana patch, termed ʻeʻa maiʻa. Kahului 1 and 2 Ahupuaʻa continued the similar claims being made for ʻāina which consisted of paukū ʻāina, cultivated ma uka lands, and ma kai house lots. Puapuaʻa 1 and 2 Ahupuaʻa also reflected an abundance of kīhāpai and māla. Of the land divisions surveyed, Puapuaʻa and Kahului Ahupuaʻa appeared to host the richest array of cultural resources and practices associated with the study area scope. Collectively, cultural resources such as kalo, ʻuala, ʻuala pahulu, lauhala, loulu, niu, kope, hala kahiki, pūnāwai, wai, and the practices associated with these resources were noted to occur throughout the Puaa, Waiʻaha, Kahului and Puapuaʻa Ahupuaʻa. The tables below reflect the cultural resources and practices for each ahupuaʻa that were revealed in an analysis of the various Māhele records.

Table 21. Cultural Resources Recorded in Māhele Records for Puaa 3 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous) - none		
** no specific resources were noted or legible in the Māhele documents to note associated with the Puaa 3 Ahupuaʻa; however this is not to say that no cultural resources exist. Many of the ʻāpana claimed in the ahupuaʻa were cultivated tracts of parcels. Though the types of crops and plant species cultivated in these areas were not specified, it can likely be assumed that cultural resources of crops existed in these cultivated ʻāpana.*		
Other Plants (Indigenous and Endemic) - none		
Foreign-introduced Crops - none		

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 22. Cultural Practices Recorded in Māhele Records for Puaa 3 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Pahale (Pāhale)	House lot	5
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	5
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	14

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 23. Cultural Resources Recorded in Māhele Records for Waiʻaha 1 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous) - none		
** no specific resources were noted or legible in the Māhele documents to note associated with the Waiʻaha 1 Ahupuaʻa; however this is not to say that no cultural resources exist. One of the three ʻāpana claimed in the ahupuaʻa were described as being cultivated. This ʻāpana was ultimately not awarded and the types of crops and plant species cultivated in this parcel was not specified.*		
Other Plants (Indigenous and Endemic) - none		
Foreign-introduced Crops - none		

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 24. Cultural Practices Recorded in Māhele Records for Waiʻaha 1 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Pahale (Pāhale)	House lot	1
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	1
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	3
Paukū ʻĀina	A segment of land, generally a long narrow cultivated section of land	1

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 25. Cultural Resources Recorded in Māhele Records for Waiʻaha 2 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
ʻEʻa Maiʻa (a variety of mountain bana)	Food, medicine	1
Pūnāwai (freshwater spring)	Nourishment, medicine, spiritual	2
Wai (freshwater)	Nourishment, medicine, spiritual	1
Other Plants (Indigenous and Endemic) - none		
Foreign-introduced Crops - none		

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 26. Cultural Practices Recorded in Māhele Records for Waiʻaha 2 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Pahale (Pāhale)	House lot	6
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	13
Paukū ʻĀina	A segment of land, generally a long narrow cultivated section of land	2
ʻIli ʻĀina	Small units of land within an ahupuaʻa, often described as long narrow parcels of land that run mauka-makai, and cross several agricultural zones.	2

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 27. Cultural Resources Recorded in Māhele Records for Kahului 1 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
Kalo (taro)	Food, medicine, spiritual	4
ʻUala/ʻUwala (sweet potatoes)	Food, medicine	1
Pūnāwai (freshwater spring)	Nourishment, medicine, spiritual	1
Other Plants (Indigenous and Endemic)		
Forest zone	Array of associated cultural uses	3
Foreign-introduced Crops		
Kope (coffee)	Food	1

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 28. Cultural Practices Recorded in Māhele Records for Kahului 1 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Mala (Māla) ʻuala	A dryland garden, planted field, or patch of sweet potatoes	1
Mala (Māla) kope	A dryland garden, planted field, or patch of coffee	1
Mala (Māla) kalo	A dryland garden, planted field, or patch of taro	4
Pahale (Pāhale)	House lot	3
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	29
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	12
Paukū ʻĀina	A segment of land, generally a long narrow cultivated section of land	2
Moʻo ʻĀina	Narrow strips of land within an ʻili	1
Forest zone	Array of associated cultural practices, including gathering and access, affiliated with this place	3

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 29. Cultural Resources Recorded in Māhele Records for Kahului 2 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous) - none		
** no specific resources were noted or legible in the Māhele documents to note associated with the Kahului 2 Ahupuaʻa; however this is not to say that no cultural resoruces exist. At least four ʻāpana were described as being cultivated kīhāpai. Though the types of crops and plant species cultivated in these areas were not specified, it can likely be assumed that cultural resources of crops existed in these cultivated ʻāpana.*		
Other Plants (Indigenous and Endemic) - none		
Foreign-introduced Crops - none		

*Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 30. Cultural Practices Recorded in Māhele Records for Kahului 2 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Pahale (Pāhale)	House lot	6
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	4
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	18

Cultural Practice	Definition	Number of Citations**
Paukū ʻĀina	A segment of land, generally a long narrow cultivated section of land	15
ʻIli ʻĀina	Small units of land within an ahupuaʻa, often described as long narrow parcels of land that run mauka-makai, and cross several agricultural zones.	1
Forest zone	Array of associated cultural practices, including gathering and access, affiliated with this place	2

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 31. Cultural Resources Recorded in Māhele Records for Puapuaʻa 1 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
Kalo (taro)	Food, medicine, spiritual	1
Other Plants (Indigenous and Endemic)		
Forest zone	Array of associated cultural uses	6
Foreign-introduced Crops - none		

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 32. Cultural Practices Recorded in Māhele Records for Puapuaʻa 1 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Pahale (Pāhale)	House lot	3
Kahuahale	House site	1
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	93
Kīhāpai ʻAi (kalo)	Cultivated area for food	1
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	58
Paukū ʻĀina	A segment of land, generally a long narrow cultivated section of land	4
Forest zone	Array of associated cultural practices, including gathering and access, affiliated with this place	6

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 33. Cultural Resources Recorded in Māhele Records for Puapuaʻa 2 Ahupuaʻa*

Cultural Resource	Use	Number of Citations**
Canoe Plants (Indigenous)		
Kalo (taro)	Food, medicine, spiritual	14
ʻUala/ʻUwala (sweet potatoes)	Food, medicine	3
Ipu (gourds)	Food, medicine, utensils	1
Niu (coconut trees)	Food, medicine, utensils, cordage (see Krauss 1993:27)	1
Noni (Indian mulberry)	Medicine	1
Lauhala	Arts and crafts; charcoal; sails	1
Other Plants (Indigenous and Endemic)		
Loulu (*Pritchardia spp.* palm trees)	Cordage (see Krauss 1993:27)	1
Foreign-introduced Crops		
Hala kahiki (pineapple)	Food	1

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

Table 34. Cultural Practices Recorded in Māhele Records for Puapuaʻa 2 Ahupuaʻa*

Cultural Practice	Definition	Number of Citations**
Mala (Māla) ʻuala	A dryland garden, planted field, or patch of sweet potatoes	2
Māla pahulu ʻuala	A dryland garden, planted field, or patch of volunteer sweet potato shoots	1
Mala (Māla) ipu	A dryland garden, planted field, or patch of gourds	1
Mala (Māla) kalo	A dryland garden, planted field, or patch of taro	14
Māla Lauhala	A dryland garden, planted field, or patch of lauhala	1
Noni Grove	Grove of noni	1
Pahale (Pāhale)	House lot	6
Kihapai (Kīhāpai)	A dry land garden; cultivated areas, or patch; crop unspecified	13
ʻĀpana ʻĀina	Parcels or lots within given kuleana tract of land	22
Forest zone	Array of associated cultural practices, including gathering and access, affiliated with this place	3

* Includes Native Testimony, Native Register, and Buke Māhele
**Denotes the mention of a resource or practice *not* amounts recorded

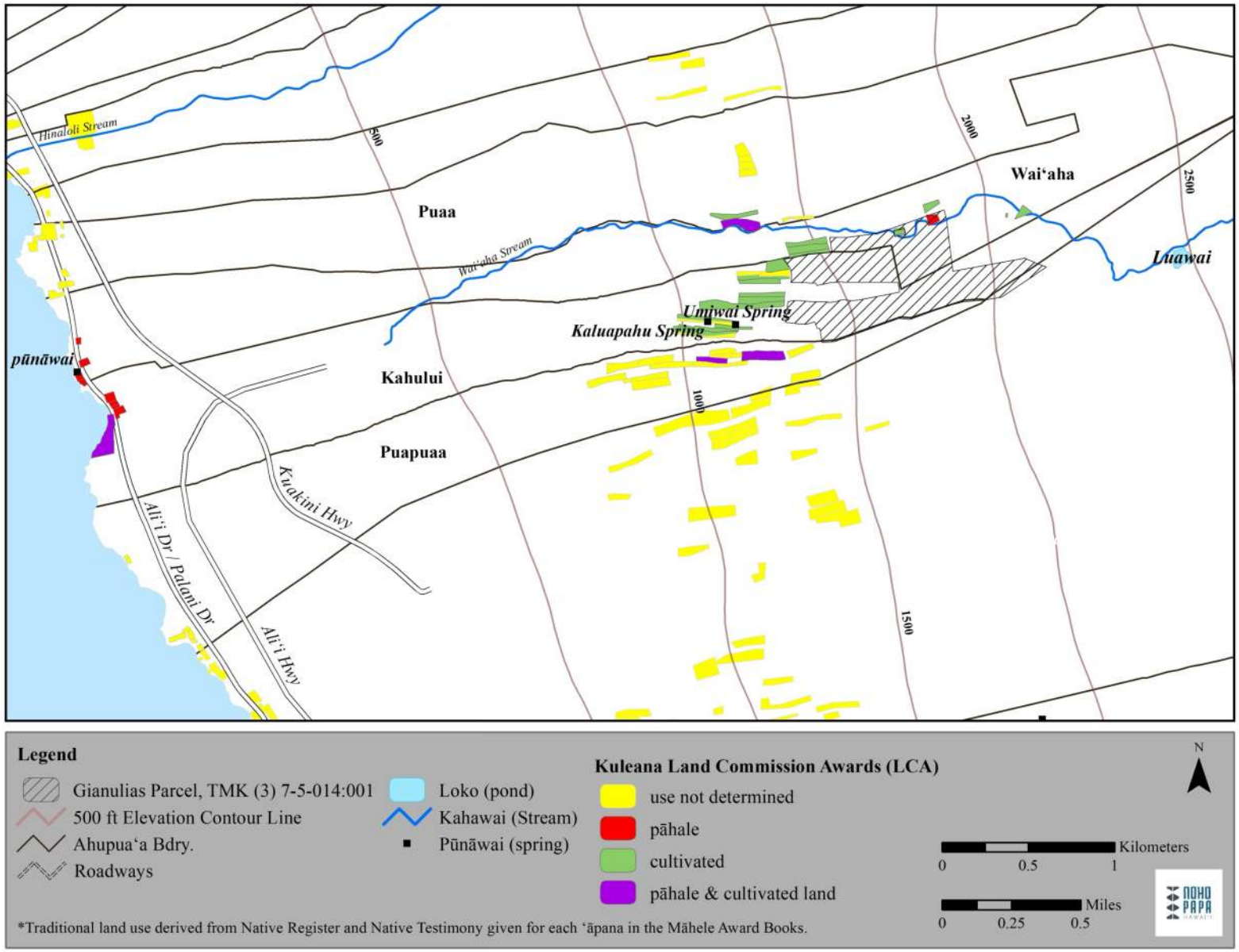


Figure 22. Traditional land use as noted in the Kuleana LCAs in and around the Gianulias Parcel.

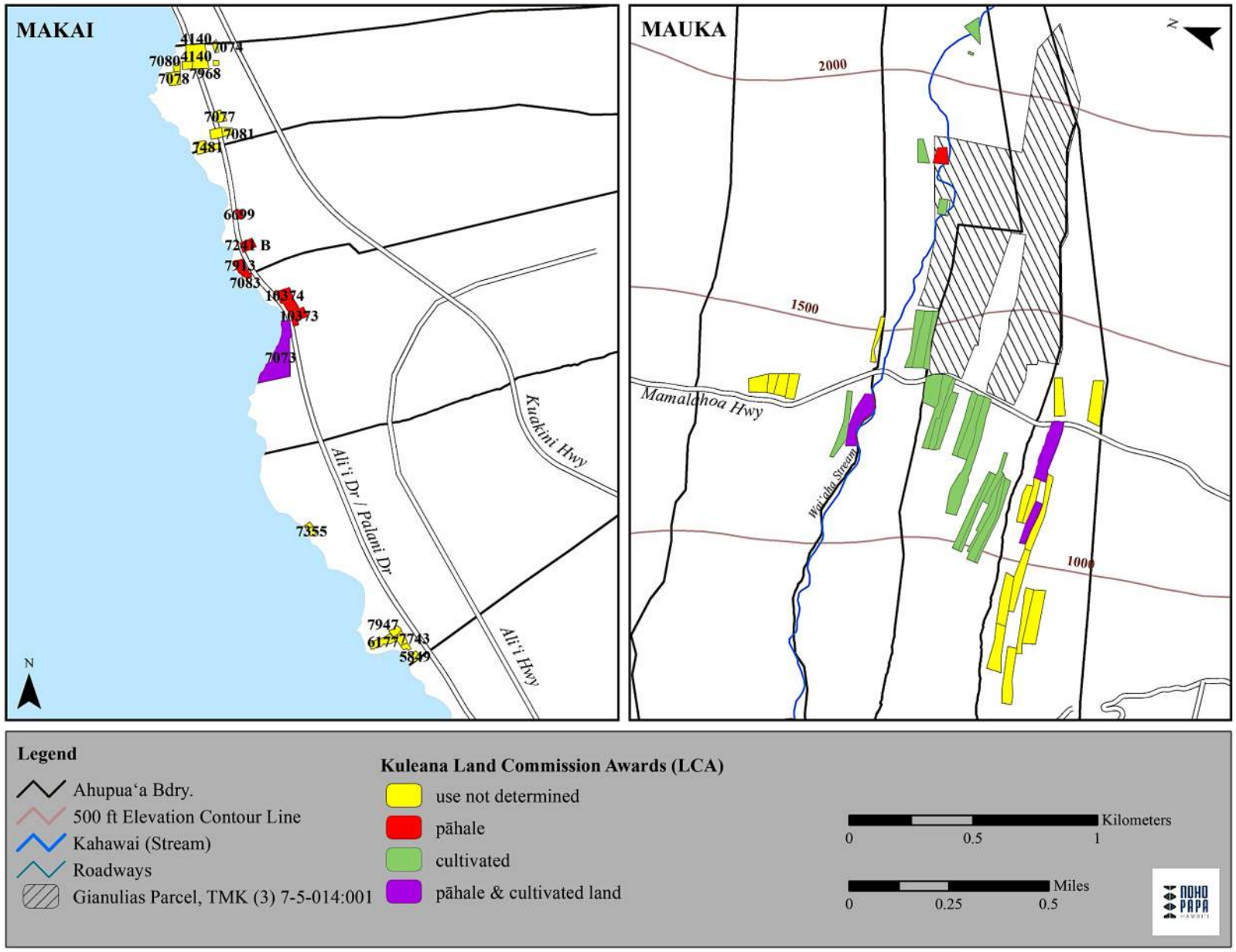


Figure 23. Close up of traditional land use as noted in the Kuleana LCAs in and around the Gianulias Parcel.

Māhele & Wahi Inoa

During the extensive analysis of the Māhele records associated with the study area ahupuaʻa; Keauhou, Puaa, Waiʻaha, Kahului, and Puapuaʻa, many wahi inoa or site names surfaced during this study. An inventory of the names, feature type, details about the wahi, as well as any cultural practices, resources, or moʻolelo connected to the area are listed in Table 35. The inclusion of a table of this nature is intended to provide a deeper understanding of the wealth of resources associated with the study area sites.

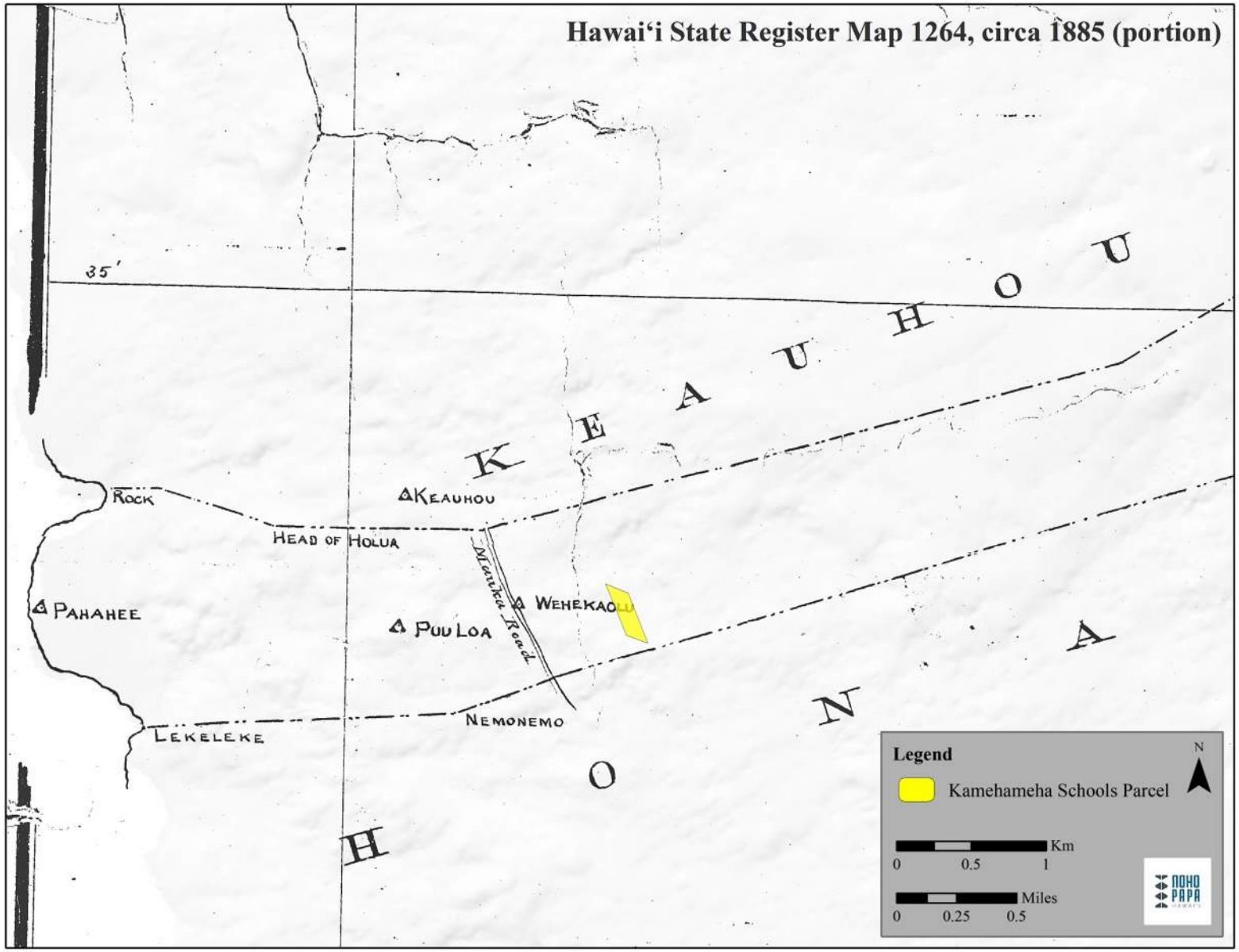


Figure 24. circa 1885 map of Keauhou 2nd, Kona Hawaii. Surveyed by J.M. Alexander and J.S. Emerson, map by J.M. Alexander, copy by W. A Wall, 1886. Hawaiian Government Survey. Hawai'i State Register Map No.1264

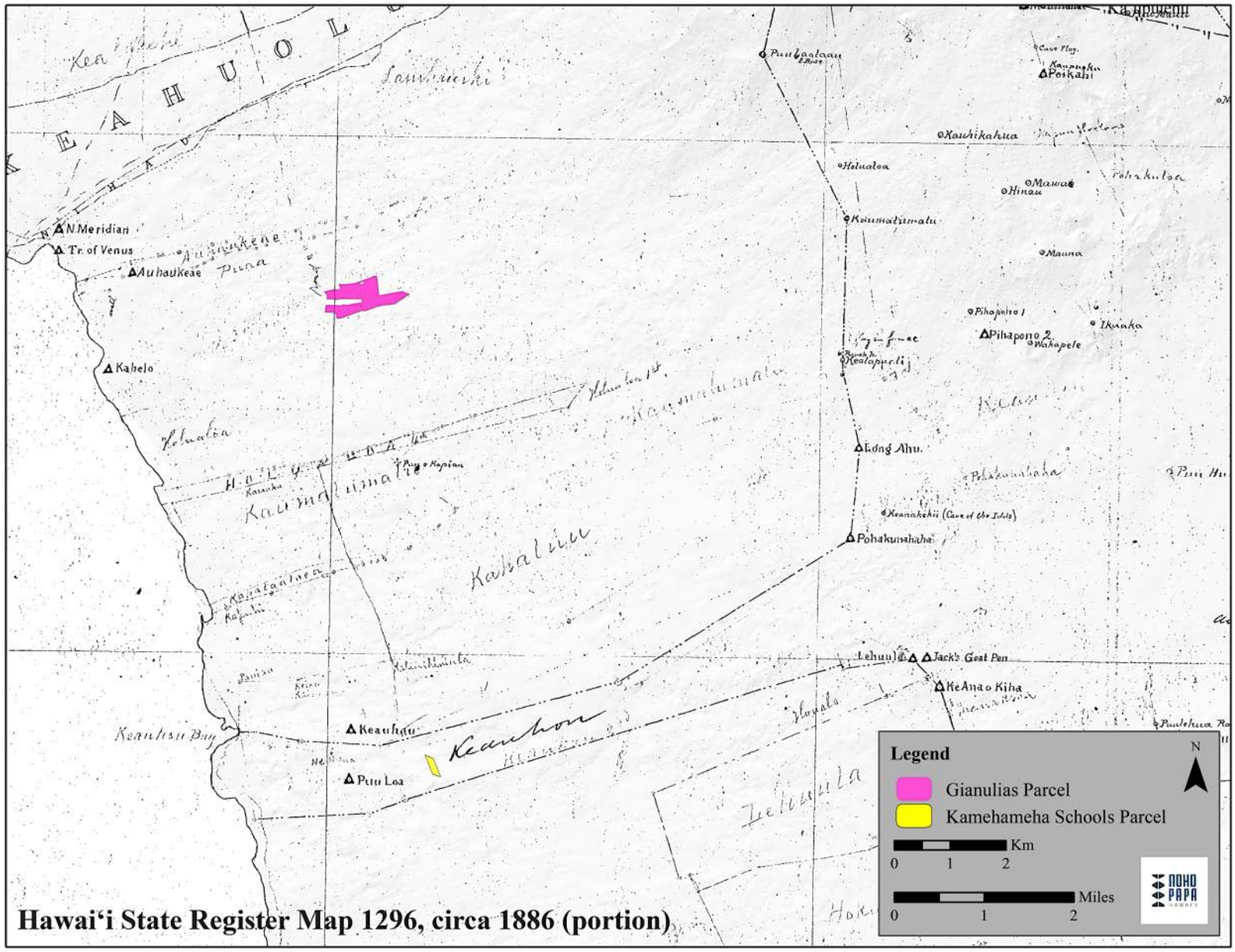


Figure 25. circa 1886 map of North Kona showing the locations of the Gianulias and KS parcels. Register Map 1296

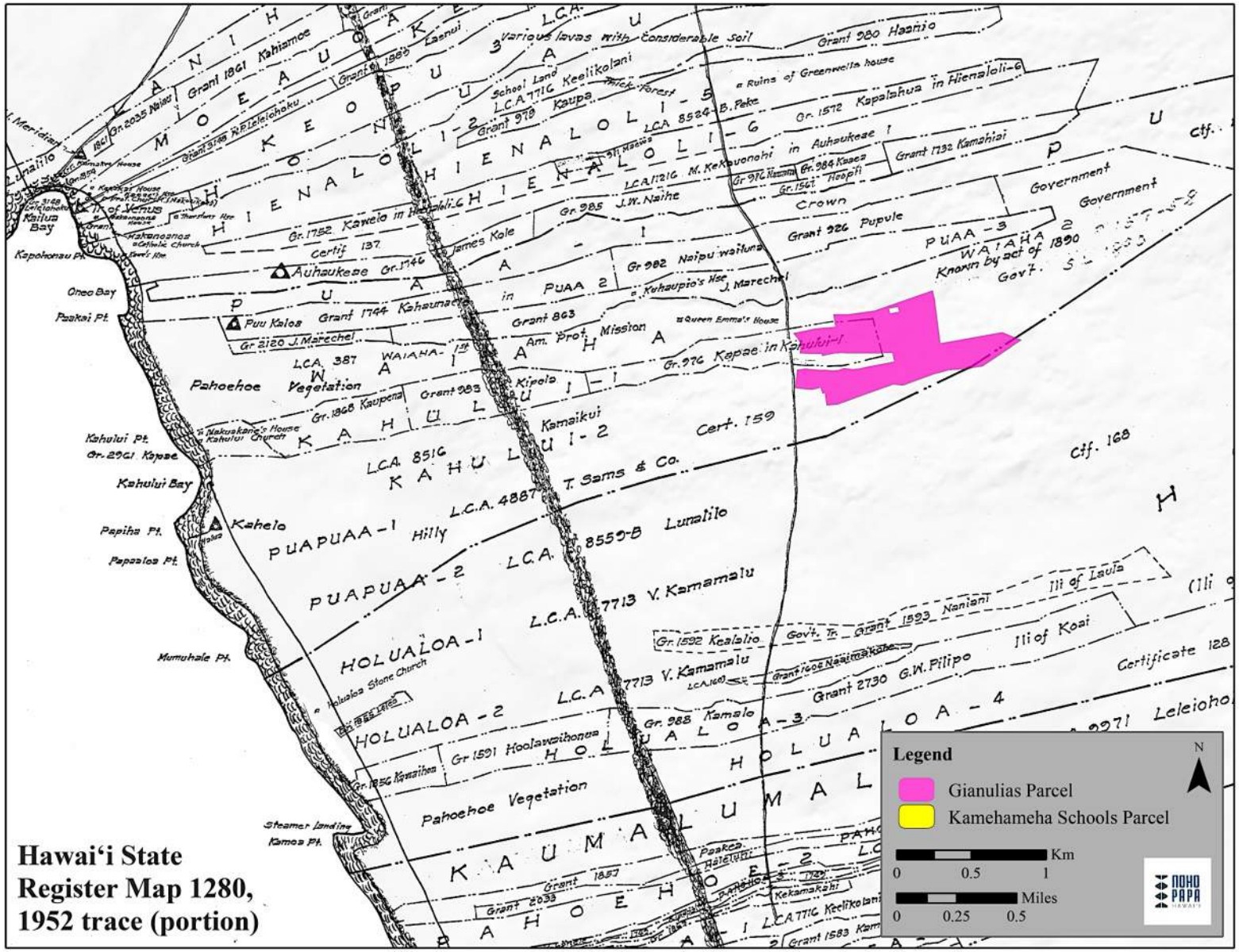


Figure 26. 1952 (trace) map of North Kona, surveyed by T. Y. Awana, Register Map No.1280

Table 35. Inventory of Wahi Inoa Documented in Māhele Records Associated with the Study Area Ahupuaʻa of Keauhou, Puaa, Waiʻahu, Kahului, and Puapuaʻa.

Inoa	Type	Ahupuaʻa	Information Description	Cultural Practice &/or Resource	Connections other Moʻolelo, Practices, ʻOhana, or Places	Source(s)
Kealakowaa (Alakowaa)	Heiau	Kahului	Listed as the name of a heiau said to have been built by ʻumi for the dedication of canoes. The canoes were felled and brought here for dedication and then launch by the shoreline at Puʻu spring and the surf of Puʻu. Was misnamed Hale-hau in recent times. (Kekahuna)	Ties to families of ʻumi as well as canoe carving and dedication practices. The path to drag the canoe *Kawika Translation		Henry E.P. Kekahuna Collection, MS Group 312, Map: 50-HA-D8.
Makolea	heiau	Kahaluu	"Built or restored by Lonoikamakahiki for prayers in general (Stokes). Once the dwelling place of Makole'a, a most beautiful chiefess, daughter of Kahaluu (k) and Keauhou (w) (Kekahuna), or of Kahaluu and Keolanahihi (w) (Reinecke). Also called Keekuapuaa." (Soehren)		Because of connection to Lono, could be related to water and rain.	Stokes, "Heiau of the Island of Hawaiʻi", 1991, p.80-81., Kekahuna & Kelsey, "Kamehameha in Kailua", p.20., Catalog of Hawaiian Place Names, Lloyd J. Soehren., John Reinecke, "Archaeology of West Hawaiʻi, 1929-1930, Kailua to

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
						Kalahuipuaa", (3) p. 4.
Helekamahina	‘ili ‘āina	Kahaluu	Listed in Native Register 5690:1 to Kanakaole in Kihikihi 2 ‘ili is bounded on the south by Helekamahina, 5964:6 by Hanakoekoe in Hokio 3 ‘ili (not awarded) is bounded makai by Helekamahina.			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5690:1 to Kanakaole, 5964:6 to Hanakoekoe.
Hokio	‘ili ‘āina	Kahaluu	Listed in Native Register 5673 to Kamalo is "i ka ilia aina i Hokio 2. 1 apana aina." Apana 1,2,3 and 4 are bounded on the south by Hokio 3, on the north by Hokio 1. Also written Hookio. Also, claim 5694 by Kanakoekoe is "i ka ili aina i Hokio ahupuaa Kahaluu, Hawaii, he 12 kihapai ua lelele nae." Apana 3,4,5,6 are bounded south by Hokio 4, north by Hokio 2.			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5673 to Kamalo, 5694 to Hanakoekoe.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
Kahuamoa	‘ili ‘āina	Kahaluu	Listed in Native Register 5831B by Kanalu is "i ka ili aina o Kahuamoa ahupuaa Kahaluu. 5 apana.", 3449B to Luukia was not awarded.			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5831B to Kanalu, 3449B to Luukia.
Kaimuloa	‘ili ‘āina	Kahaluu	Listed as one of the ‘ili in the claim 9971 to W. P. Leleiōhōkū. No other information found.			Native Register 9971 to W. P. Leleiōhōkū.
Kaloaulu	‘ili ‘āina	Kahaluu	Listed in Native Register 6091 to Malaihi is "i ka ili aina i Kaloaulu ahupuaa Kahaluu...5 nae apana." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 6091 to Malaihi.
Kapio	‘ili ‘āina	Kahaluu	Listed in Native Register 6029:1-5 to Nakoa in Paulu ‘ili are bounded on the south by "Kapio ili aina". (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 6029:1-5 to Nakoa.
Kihikihi	‘ili ‘āina	Kahaluu	Listed in Native Register 5690 to Kanakaole as "i ka ili aina o Kihikihi 2, ahupuaa Kahaluu. 5 apana." Apana 1,2 are bounded on the north by Kihikihi 1, 3445B to Kahananui is "i ka			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5690 to Kanakaole, 3445B to Kahananui.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			ili aina i Kihikihi [1] ahupuaa Kahaluu. Eha apana." Apana 2 is bounded on the south by Kihikihi 2. (Soehren)			
Koaie	‘ili ‘āina	Kahaluu	Claim no. 3443B by Kuia is "i Koaie 3 ahupuaa Kahaluu. 5 apana." Apana 1,2,3,4 are bounded on the north by Koaie 2. Claim no. 10766 by Pio is "i ka ili aina o Koaie 2 a me Kamuku, ahupuaa Kahaluu." Apana 3 is in Kamuku, 3444B to Kapihe is in Koaie 3. (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 3443B to Kuia, 10766 to Pio, 3444B to Kapihe
Kukuiokahinu	‘ili ‘āina	Kahaluu	Listed in Native Register 5966B to Imakakoloa is "i ka ili aina o Kukuiokahinu ahupuaa o Kahaluu. 2 apana." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5966B to Imakakoloa.
Pahauopu	‘ili ‘āina	Kahaluu	Listed in Native Register 5672 to Kahalelahaole is "i ka ili aina o Pahauopu ahupuaa Kahaluu. 4 apana." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5672 to Kahalelahaole.
Pahoa	‘ili ‘āina	Kahaluu	Listed in Native Register 6032:7 to			Catalog of Hawaiian Place

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			Napio is "i ka ili aina o Pahoa.", 5690:3 to Kanakaole, 6091:1,2,3,4 to Malaihi in Kaloaulu ‘ili are bounded on the south and north by the "aina o Pahoa", and 3442B to Kaniaa in Pahoa 1 and 2 was not awarded. (Soehren)			Names, Lloyd J. Soehren., Native Register 6032:7 to Napio, 5690:3 to Kanakaole, 6091:1,2,3,4, to Malaihi, 3442B to Kaniaa.
Pamaki	‘ili ‘āina	Kahaluu	Listed in Native Register 5678 to Kauwale is "i ka ili aina i Pamaki ahupuaa Kahaluu. 8 apana." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5678 to Kauwale.
Paulu	‘ili ‘āina	Kahaluu	Listed in Native Register 6029 to Nakea is "i ka ili aina i Paulu ahupuaa [not named]. 7 apana." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 6029 to Nakea.
Puakahi / Puekahi	‘ili ‘āina	Kahaluu	Listed in Native Register 5673C:1 to Naauhau is "i ka ili aina Puekahi ahupuaa Kahaluu. 3 apana." Written "Puakahi" in claim no. 6094. (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5673C:1 to Naauhau.
Puu Hinahina	‘ili ‘āina	Kahaluu	Listed in Native Register 5676 to			Catalog of Hawaiian Place

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			Keliiaihue is "i ka ili aina o Puuhinahina ahupuaa Kahaluu. 3 apana." (Soehren)			Names, Lloyd J. Soehren., Native Register 5676 to Keliiaihue.
Ulumoe	‘ili ‘āina	Kahaluu	Listed in Native Register 5688B:4 to Kameeui is "i ka ili aina o Ulumoe.", 5632:8 to Keikihookama, 6032:3 by Napio, 3440B:6 to Naaho, 5691:5,6 by Kamaui in Makolea ‘ili are bounded on the south by Ulumoe. (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5688B:4 to Kameeui, 5632:8 to Keikihookama, 6032:3 to Napio, 3440B:6 to Naaho, 5691:5,6 to Kamaui.
Lehuakona	‘ili ‘āina, inoa hōkū	Kahaluu	Listed in Native Register 5688 to Kaleola is "i ka ili aina i Lehuakona ahupuaa Kahaluu. 3 apana.", 5632:5 to Keikihookama, 3440B:3 to Kaluahinenui, 3440B:9 to Naaho, and 5691:1 to Kamaui in Pakii 1 is bounded on the south by Lehuakona. (Soehren) Also listed in the Hawaiian Dictionary			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 5688 to Kaleola, 5632:5 to Keikihookama, 3440B:3 to Kaluahinenui, 3440B:9 to Naaho, 5691:1 to Pakii, "Lehuakona", Hawaiian Dictionary,

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			as the name of a star in the Milky Way, perhaps Antares (Pukui & Elbert).			Puku‘i and Elbert, 1986.
Kukuihaa	‘ili ‘āina, inoa wahi kahiko	Kahaluu	Listed in Native Register 6128 to Napipi is "i ka ili aina o Kukuiohaa [sic] ahupuaa Kahaluu." Apana 2 is bounded on the south by Kukuihaa 3, on the north by Kukuihaa 1, 5831 to Kaeha is "i ka ili aina o Kukuihaa 4 ahupuaa Kahaluu. 3 apana." Apana 1,2 are bounded on the south by Kukuihaa 5, on the north by Kukuihaa 3. Also, 5689 to Nahoounauna, 3446B to Kahue "i ka ili aina o Kukuihaa 1" was not awarded. Also, 3455B to Maikeiki is "i ka ili aina o Kukuihaa 3. 2 apana aina." Apana 1,2 are bounded on the south by Kukuihaa 4, on the north by Kukuihaa 2, 3447B to Palaukai is "i ka ili aina i		Name is connected to Haumea and is the name of her homeland (*Ka Na‘i Aupuni 1906)*.	Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 6128 to Napipi, 5831 to Kaeha, 5689 to Nahoounauna, 3446B to Kahue, 3455B to Maikeiki, 3447B to Palaukai., "Moolelo Hawaii Kahiko", *Ka Na‘i Aupuni,* July 13, 1906, p. 1.

Inoa	Type	Ahupuaʻa	Information Description	Cultural Practice &/or Resource	Connections other Moʻolelo, Practices, ʻOhana, or Places	Source(s)
			Kukuihaa 5, ahupuaa Kahaluu. 4 apana." All 4 apana are bounded on the south by Kukuihaa 6, on the north by Kukuihaa 4. (Soehren) It is also listed in the article "Moolelo Hawaii Kahiko", where it mentions that in the Kumulipo, it mentions Kukuihaʻa as a place in Nuʻumea that Haumea comes from (*Ka Naʻi Aupuni 1906).*			
Halewaawaa	ʻili ʻāina	Kahului	Listed in Native Register 10374 by Nalawaia is "i ka ili aina o Halewaawaa, ahupuaa Kahului. (NT 10374)" Claim no. 7241B by Kalama is "i ka ili aina o Halewaawaa, ahupuaa Kahului 1. (NT 7241B)" Claim no. 10252:4 by Maliu is "i ka ili i Halewaawaa." (NT 10252:4)	House full of gulches *Kawika Translation		Native Register for LCA 10374 to Nalawaia, 7241B to Kalama, 10252:4 to Maliu.
Hapaipapa	ʻili ʻāina	Kahului	Listed in Native Register 10374:1 by Nalawaia in ʻili of			Native Register for LCA 10374:1 to Nalawaia.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			Halewaawaa is bounded on the mauka side by Hapaipapa.			
Kahuki	‘ili ‘āina	Kahului	Listed in Native Register 7336 to Kuapuu is "i ka ili aina o Kahuki ahupuaa o Kahului 2." Also claim no. 7690 by Kulou. Claim no. 7073:7 by Kapa in Kahuki 1 is bounded on the south by Kahuki 2. (Soehren)	The pull *Kawika Translation		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 7336 to Kuapuu, 7690 to Kulou, 7073:7 to Kapa.
Kamuku	‘ili ‘āina	Kahului	Listed in Native Register 7083:2 to Kaulua is for a "kihapai aia i Kamuku". Claim no. 10252 by Maliu is "i ka ili aina i Kamuku ahupuaa Kahului 1." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 7083:2 to Kaulua.
Kukuipuloa	‘ili ‘āina	Kahului	Listed in Native Register 9944 by Nalima included a "Pauku aina i Kukuipuloa 1", LCA 7496B:2 by Keaweehu in the kaluulu region of Lapalua (TMK 7516:19) is bounded "Ma Kohala o	The elongated candlenut tree *Kawika Translation		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 9944 to Nalima, 7496B:2 to Keaweehu, 10252:5 to Maliu.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			Kukuipuloa ili aina", and LCA 10252:5 by Maliu "i Kamuku 2" is bounded on the south by "Kukuipuloa ili aina." (Soehren)			
Lapalua	‘ili ‘āina	Kahului	Listed in Native Register 7496B to Keaweehu is "i ka ili aina Lapalua ahupuaa Kahului 1, 3 apana aina." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 7496B to Keaweehu.
Papiha	‘ili ‘āina	Kahului	Listed in Native Register 7086:1,2 by Kalawa in the ‘ili of Puki are bounded on the south by the ‘ili of Papiha. (Soehren)	Full enclosure (Parker 1992)		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 7086:1,2 to Kalawa., A Dictionary of the Hawaiian Language, Parker 1922.
Papuaa	‘ili ‘āina	Kahului	Listed in Native Register 7496B:3 by Keaweehu in Lapalua (TMK 7516:19) is bounded "Mauka Papuaa aina konohiki". (Soehren)	Pig-pen enclosure *Kawika Translation		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 7496B:3 to Keaweehu.
Waiapuko	‘ili ‘āina	Kahului	Listed in Native Register 7914 by Kekipi is "i ke			Catalog of Hawaiian Place Names, Lloyd J.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			ahupuaa o Kahului 2, he pauku aina. [Bounded] Mauka o Waiapuko he ili aina." (Soehren)			Soehren., Native Register for LCA 7914 to Kekipi.
Niukini	‘ili ‘āina	Kahului	Listed in Native Register 9974 to Nalima is "i ka ili aina o Niukini ahupuaa Kahului 1, 2 apana."(Soehren). Is also mentioned in the Kanikau of Kamehameha IV stating "... ma ka pae opua i Niukini..." (Nupepa Kuokoa 1864) "...at the cluster of clouds on the horizon at Niukini..." *Kawika Translation	Multitude of coconuts *Kawika Translation		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 9974 to Nalima., "Kanikau No Ka Moi.", Ka Nupepa Kuokoa, January 23, 1864.
Kaaipuaa	‘ili ‘āina, loko, māla	Kahului	Named in the story of Kamiki as a food patch for the chiefs, mentioned that there was a fishpond in which the mo‘o lived at the center of the pond at a place called Kapakolea (HEN 1911) Listed in Native Register 7557 to Kalapuna: "...Uka lilo kekahi, o Kaaipuaa	The eating of pig *Kawika Translation	Longer story in the mo‘olelo of Kamiki and the summary can be found in HEN Newspapers: May 3, 1911. The original mo‘olelo with full story can be found Ke Au Hou, Feb. 22, 1911 "Kamiki". This is a great resource to pull information	HEN Newspapers: May 3, 1911, "Kamiki"., Native Register 7557 to Kalapana., Ke Au Hou, Feb. 22, 1911 "Kamiki".

Inoa	Type	Ahupuaʻa	Information Description	Cultural Practice &/or Resource	Connections other Moʻolelo, Practices, ʻOhana, or Places	Source(s)
			kona inoa". "...one was lost, Kaʻaipuaʻa is itʻs name". *Kawika Translation		about wai within the region.	
Ohuahale	kīhāpai	Kahului	Listed in Native Register 10252:1 to Maliu "i ka ili aina i Kamuku ahupuaa Kahului 1" is bounded "Makai o Ohuahale he kihapai". (Soehren)	House for/of Retainers *Kawika Translation		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 10252:1 to Maliu.
Umiwai	pūnāwai	Kahului	Listed in Native Register 10252:3 by Maliu "i Kamuku ahupuaa Kahului 1....Mauka o Umiwai punawai." (Soehren)	To hold breath [in] water, or water [of] ʻUmi. (Soehren)	Mentioned in the story of Halemano as a place where they stopped at saying: "Holo aku la lakou a pae ma Umiwai, Kohala, i Hawaii. A ku lakou ma Umiwai ma Kohala, noho a olulo iho malaila..." (Ke Alakai o Hawaii 1928) "The sailed until they landed at Umiwai, Kohala, on Hawaiʻi. And they stopped at Umiwai in Kohala, where they lived as castaways..." *Kawika Translation	Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 10252:3 to Maliu., "He Moolelo Kaao Hawaii no Halemano", Ke Alakai o Hawaii, May 10, 1928.
Puukehoe	puʻu	Kahului	Listed in Native Register 10252:3 by Maliu "i Kamuku			Catalog of Hawaiian Place Names, Lloyd J.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			ahupuaa Kahului 1.... Makai o Puukehoe [sic] he puu." (Soehren)			Soehren., Native Register for LCA 10252:3 to Maliu.
Hulilau		Kahului	N/A	Would like to see source of name, as nothing found in research.		
Inaimoa		Kahului	N/A	Would like to see source of name, as nothing found in research.		
Kaluaolena		Kahului	No information found on region, only mentions place in Wai‘ehu, Maui.			
Kamumu		Kahului	No information found.			
Kikiaiole		Kahului	No information found.			
Papipi		Kahului	Localities identified as the “Great Wall” in various ahupua‘a, and as cattle enclosures.			
Ililoa	‘ili ‘āina	Keauhou, Puapuaa, Kealakehe	Listed in Native Register 7365:1 by Keohoaeae is "i ka ili aina i Ililoa ahupuaa Keauhou. 2 apana.", 7485 by Kapahu, 5561H:2 by Kahilo. (Soehren) [Keauhou] Also listed in Native Register for LCA	The long ‘ili [land division] *Kawika Translation		Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 7365:1 to Keohoaeae, 7485 to Kapahu, 5561H:2 to Kahilo, 8608:5

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			8608:5 to Kaahui is "i ka ili i Ililoa." Claim no. 10671 by Pepe is for 2 kihapai in the ili of Ililoa (Soehren). [Kealakehe]			to Kaahui, 10671 to Pepe.
Papalanui	palena ‘āina, point, ‘ili ‘āina	Keauhou, Waiaha	Listed in Native Register 7360:2 to Kaaiwana is for "1 apana i Papalanui 1, ahupuaa Keauhou.", 7372:1 by Kaikuaana, 10257 to Manohili, 10768 by Palapala is "i ka ili aina o Papalanui 2 ahupuaa Keauhou. 3 apana aina.", and 5781:1 to Kanekoa is "i ka ili aina i Papala [sic] 2...ahupuaa Keauhou." (Soehren) Also listed as "a kihapai koele, below Puu Koheo" [sic: Puu Kehoi is meant]. On north boundary Kahului 2, between Alau & Popoulu. LCA 7083:7 in Waiaha 1 to Kaulua is bounded mauka by Papalanui, and LCA 10252:3 by Maliu "i Kamuku			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register for LCA 7360:2 to Kaaiwana, 7372:1 to Kaikuaana, 10257 to Manohili, 10768 to Palapala, 5781:1 to Kanekoa, 7083:7, 10252:3 to Maliu.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			ahupuaa Kahului 1" is bounded on the north by "Papalanui aina". (Soehren)			
Ohiki	‘ili ‘āina	Puaa	Listed in Native Register 7076 to Kupihe is "i ka ili aina i Ohiki ahupuaa Puaa 2", 10267 to Malowale is "i ka ili aina o Ohiki 2, ahupuaa Puaa 2." (Soehren)			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 7076 to Kupihe, 10267 to Malowale.
Pawaalae	wahi pana	Puaa	Listed in Native Register 10267:3 to Malowale in Ohiki 2 ‘ili is bounded "Makai o Pawaalae he wahi pana."			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 10267:3 to Malowale.
Lauhulu	‘ili ‘āina	Puapuaa	Listed in Native Register 7461 to Kamahiai is "i ka ili aina i Lauhulu, ahupuaa o Puapua[a], Hawaii. 9 apana.", 8154 to Hookano, 7356 to Ku, 7355 to Kawainui is "i ka ili aina i Lauhulu 1, i ka ili aina i Lauhulu 2, i ka ili aina i Haliipalala a me Kamuku.", 7353 to Kaiewe is "i ka ili aina o Haliipalala a			Catalog of Hawaiian Place Names, Lloyd J. Soehren., Native Register 7461 to Kamahiai, 8154 to Hookano, 7356 to Ku, 7355 to Kawainui, 7353 to Kaiewe.

Inoa	Type	Ahupua‘a	Information Description	Cultural Practice &/or Resource	Connections other Mo‘olelo, Practices, ‘Ohana, or Places	Source(s)
			me Lauhulu ahupuaa Puapuaa 2...[apana] 5 i ka ili aina o Lauhulu..." Quad uncertain. (Soehren)			

Community Consultation

For inclusion in this FEA, consultation sections were redacted per Nohopapa's informed consent obligation to honor and respect consultees' Intellectual Property Rights

Ka Paʻakai Framework Analysis Application

Ka Paʻakai Framework Analysis Questions:

1) What are the valued cultural, historical, or natural resources in the project area and the extent to which traditional and customary native Hawaiian rights are exercised in the area?
2) What is the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action?
3) What feasible action(s), if any, to be taken to reasonably protect any identified cultural, historical, or natural resources, and exercise of traditional and customary native Hawaiian rights in the affected area?[117]

1) What are the valued cultural, historical, or natural resources in the project area and the extent to which traditional and customary native Hawaiian rights are exercised in the area?

It is unreasonable to assume it is possible to inventory all the traditional and customary native Hawaiian rights being exercised in a single area. Firstly, because it is a well-known truth, embodied in an ʻŌlelo Noeʻau, that "'Aʻohe pau ʻike i ka hālau hoʻokāhi. All knowledge is not taught in the same school" (Pukui 1989:24, #203). This can be taken to mean that one can, and should, learn from many sources and that one cannot at the same time hold all the sources of knowledge. Secondly, to place the burden on practitioners to come forward in a timeline subject to an undertaking such as this one is unreasonable and impossible for many reasons. The most important to acknowledge, is that many kumu, practitioners, and ʻohana have Native Hawaiian traditions and customs that are not for frivolous sharing. As in many hālau, knowledge must be earned and entrusted.

To address the challenges of assembling an inventory of customs and valued resources in an area, and to relieve the burden from the community to come forward in a tight timeframe and under the assumption of un-requited knowledge sharing, this study approaches the inventory through:

1) early and meaningful consultation
2) primary source research
3) the understanding that if a resource exists or can be restored then the right or practice exists
4) consultation is an ongoing process that agencies compiling with Ka Paʻakai will continue to engage in.

[117] Ka Paʻakai o Ka ʻĀina v. State of Hawaiʻi Land Use Comʼn [*Ka Paʻakai*], 94 Haw. 31, 47, 7 P.3d 1068, 1084 (2000).

Traditional and Customary Native Hawaiian rights are exercised through practice, whether one that is continued or restored. Practice relies on resources. If a resource exists, a practice exists. If a resource existed historically and has the potential to be restored, then the practice exists. These are the premises on which Nohopapa bases its inventory of valued cultural and historical or natural resources in the project area. To fulfill the requirements of Ka Paʻakai, this inventory includes what we are calling **resources**, or cultural resources, which refer to "valued cultural, historical, or natural resources…" that stand alone or are part of a practice. For the purposes of this inventory, we will refer to "traditional and customary Native Hawaiian rights" as **practices**. Practices often require resources to be exercised, and the two go hand in hand.

Inventory of Practices & Resources

This section presents an inventory of **practices** and **resources** tied to the project area that have been collected from consultation and primary source historical and archival materials that include moʻolelo, oli, mele, ʻōlelo noʻeau, Māhele records and testimonies, Boundary Commission Certificates and testimonies. These practices emphasize the generations of kupa ʻāina (native of the land) in Kona Akau who maintained a deep pilina with the vast natural and cultural resources of this ʻāina. The cultivation of the land and sea, and the gathering and utilization of freshwater resources that originate from the storied places of this ʻāina, have and continue to feed Kona's community physically and spiritually. These practices are a testament to the enduring legacy of Kona Akau and reaffirm the right for Kānaka ʻŌiwi to actively maintain traditional and customary practices in these spaces today.

Table 36. Table of Practices and associated resources in and around the study area tied to **Wai**

Practice	Resource(s)	Location	Information	Source
Water collection	Wai pūnāwai	Kahului Ahupuaʻa	In upland Kahului, a freshwater spring journeyed to to gather wai in huewai for daily use. "It was at Kahului, in Kona, Hawaiʻi. Indeed, all around this place of Kona, the water in the lowlands was salty, it was brackish and bitter to drink. **The cool sweet water for drinking came from the uplands on the mountain. It is still the same to this day, the fresh water is fetched from the mountain**."	Mentioned in *He Kaao no ka Manu Elepaio* (S.W.K.: 1862, in the nūpepa Ka Hoku o ka Pakipika)
Water collection	Pūnāwai offshore springs cave water collection rain anchialine ponds	Kona Study Area	Kona is an arid and dry place. There were only certain ways to get water for customary use. Four ways of acquiring water for sharing: 1) Collect water with ipu from the plumes of freshwater emissions in the ocean. 2) Collect water with ipu from drips/condensation in caves. 3) Freshwater springs bubbling up i.e. Kaloko. 4) Rain. 5) Brackish water collection from ponds/wells for consumption and everyday use.	Consultation
Water collection kilo	Pūnāwai Subsurface flowing water Brackish habitat	Kailua to Keauhou Kailua to Keauhou	Deep sea fresh water present from Keauhou to Keāhole. Smooth areas on the ocean are indicative of fresh water springs.	Consultation
			Keauhou to Kailua has springs in the sand that enter into the water at many beaches along the Kona coast. Smooth areas on the ocean are indicative of fresh water springs.	Consultation
		Kona makai	Water wells in caves or down by the ocean.	Consultation
Kiaʻi loko Water collection	**Puhi Spring** Anchialine ponds	Hulihe'e, at Niumalu	Puhi Spring flowed underground from Keōpū Forest Reserve down to ponds at Hulihe'e, Niumalu.	Consultation
	ʻIlinawai Anchialine ponds	Kona Study Area	ʻIlinawai; an underground river/stream. Brackish water.	Consultation
Kilo	**Waikū**	Kona Study Area	Water in Kahaluʻu is Waikū.	Consultation

Practice	Resource(s)	Location	Information	Source
Water collection	**Waikuʻi** a spring	Kahaluʻu	a favored Kahaluʻu, Kona spring where aliʻi relaxed and played kōnane, at the coast.	From the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)
Water collection	**Waikuʻi** a spring & a Cave **Waikulukulu** a spring	Keauhou 1 & 2 Ahupuaʻa	Kakio, kamaʻāina of Keauhou 2, mentions Ohiki, an old cultivating site, **Waikulukulu** and **Waikui**, which are both caves with water inside. "From Puainako to Kanihinihula [Kahinihiniula], at the mauka Government road where there are two ahua pohaku, on the boundary; thence to the North side of Awapuhi, in the woods; thence to Ohiki, an old cultivating ground on the boundary; thence mauka to Napueuala, an oioina; the boundary being on the North side of it and Keauhou in the middle of it; thence to **Waikulukulu**, a cave with water in it; thence to Halelaau; these places are all on the boundary of Keauhou ...I do not know the boundaries on the mountain of Mauka and of lands. Waikui is a large cave of water; the boundary half way between said cave and Ohiki." In Kakioʻs testimony for Keahou 1 he again mentions Waikui, "**Waikui is a large cave of water**; the boundary half way between said cave and Ohiki."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A1, p318-320
	Waikulukulu a cave		Keliikanakaole in his sworn testimony for Keauhou 2 describes Waikulukulu as large cave, but mentions no water. " Know a cave called Waikulukulu, at the base of Hualalai, towards Ahuaumi, the place called Kaluamakani or Kalalakaukolo is on the top of the mountain."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikanakaole 1873:v.A1, p268-272.
Water Collection	Ke ana (caves)	Kona Study Area	Water collection in caves	Consultation
Water collection	**Keanaakala** a cave	Keauhou 2 Ahupuaʻa	According to Kahulialoʻs Boundary Commission testimony "Keanaakala is on Hookukano, mauka of Waio."	Boundary Commission Testimony: Keauhou 2, Kahulialo W. 1873: v.A1 P261-265
Water collection	**Ohiki** a spring	Hianaloli Ahupuaʻa	Haleokoane, K. Says that Ohiki is "a punawai, at the corner of Kaupa's land"	Boundary Commission Testimony: Hienaloli 1 & 2 Ahupuaʻa, Haleokane 1873:v.B p281-282.

Practice	Resource(s)	Location	Information	Source
Water Collection	**Mawae** a spring	Keauhou 2 Ahupuaʻa	Described as "quite an old man", Puhi K. Gives his sworn testimony describing a water hole in the, "Keauhou 1st ends in the koa woods. It is cut off by Keauhou 2d at a place called Mawae where there is a water hole, and a cave where my relations are buried."	Boundary Commission Testimony: Keauhou2 Ahupuaʻa, Puhi K. 1874:v.A 1, p450-451.
Water collection mahiʻai ʻana	**Kaluapahu** a spring	Kahului 1 Ahupuaʻa kula zone	In Kahului 1, Maliu was awarded 1 upland ʻāpana, LCA 10252. In the testimony supporting his claim (NT: v4, p538) two springs were described as bordering his claim. Umiwai and Kaluapahu. "1. Kula. Mauka, **Kaluapahu punawai** (spring of Kaluapahu), Kau by ili aina of Ililoa, Makai by Makai, Ohuahale a kihapai, Kohala Niukini. 1 cultivated pauku aina." Kaluapahu spring bounds his kula claim on the mauka side.	LCA 10252 to Maliu, NT: v4, p538.
Water collection mahiʻai ʻana	**Umiwai** a spring	Kahului uplands	In Kahului 1, Maliu was awarded 1 upland ʻāpana, LCA 10252. In the testimony supporting his claim (NT: v4, p538) two springs were described as bordering his claim. Umiwai and Kaluapahu. "3. Mauka is Umiwai punawai (Umiwai spring), Kau, Lapalua ili aina, Makai by Puukehoe a puu (hill), Kohala, Papalanui land. 1 cultivated kihapai." Umiwai spring is located mauka of this cultivated kihapai.	LCA 10252 to Maliu, NT: v4, p538.
	Waikii a spring	Waiʻaha 2 Ahupuaʻa Kahului 1 ahupuaʻa	According to Kalama, Kanaheleʻs ʻāpana was bounded to the west by Waikii spring, south by Kahului I, north by Waiahanui and east by mountain banana (Ea maia). Kalama also testified for Kaulua and described one of his mauka parcels as also being bounded makai by Waikii Spring	LCA 6402 to Kanahele, NT: v4, p514, Waiaha 2.
		Waiaha 2	Kekipi, who gives native testimony (NT: v4,p533-534) for Kaanaheʻs pahale in Waiaha 2 (LCA 7913, ʻĀp. At the coast) describes the houselot as being bounded on the Kohala side by a punawai. "7. Pahale. Mauka by the Alanui Aupuni, Kau by Kaulua's lot, Makai by kahakai, Kohala by a punawai (spring). He has enclosed it with a wall. There are 3 houses. 1 hale for Kaanehe. One house is from Kaliawahine. One hale is from Kaaweha. It is only a house claim for Kaaweha and Kaliawahine. It is a true claim for Kaanehe... " The spring is named as Waikii in NT: v4, p514, for LCA 6402 to Kanahele, in Waiaha 2.	LCA 7913 to Kaanehe, NT: v4,p533-534.

Practice	Resource(s)	Location	Information	Source
Kilo	Ua	Kona Moku	ʻŌlelo Noʻeau #213, "Māmā Kona i ka wai kau mai i ka maka o ka ʻōpua. Kona is lightened in having water in the face of the clouds. Kona is relieved, knowing that there will be no drought, when the clouds promise rain."	Pukui 1983:232, #213
Kilo	Ua	Kona Moku	ʻŌlelo Noʻeau #2154, "Me he makamaka la ka ua no Kona, ke hele la a kipa i Hanakahi. The rain is like a friend from Kona–it goes and calls on Hanakahi. These are two lines from an old chant used to express a friendly visit with one who dwells in a distant place."	Pukui 1983: 234-235, #2154
Mālama ʻĀina	Wai balanced ecosystem	Kona Study Area	Understanding that water has a big impact on the ecosystem.	Consultation
Mālama ʻĀina Mauli ola	Wai balanced ecosystem	Kona Study Area	The physical/tangible form of wai weaves the fabric for subsistence well-being.	Consultation
Water Collection	**Pūnāwai** wai	Kahului Ahupuaʻa Uplands	A drinking water pūnāwai in upland Kahului identified in moʻolelo. It was an upland spring one would travel to daily from the coast or lowlands to collect drinking water for the ʻohana. Whether a real spring or a representative of many the moʻolelo carries a moral of the waiwai, the value, of wai and daily travel and long term care of the resource people exerted to get it..	Mentioned in *He Kaao no ka Manu Elepaio* (S.W.K.: 1862, in the nūpepa "Ka Hoku o ka Pakipika")
Mālama ʻĀina Ahupuaʻa Management	**Wai**	Kona Study Area	Conservation of water.	Consultation
Water collection	**Holoke** a spring	Puaʻa Ahupuaʻa at the coast	"Puaa is bounded makai by the sea and the land has ancient fishing rights near the shore, but not extending out to sea. Thence commencing at a punawai by the seashore called **Holoke**, between the lands of Puaa and Auhaukeae and running mauka to Poholua, a huli pali near the shore and just above a house..."	Boundary Commission Testimony: Puaa 1 Ahupuaʻa, Kauwa 1873: v.A1 p376-378

Practice	Resource(s)	Location	Information	Source
Water collection	**Waiakalaho** a spring	Kahului 2 Ahupuaʻa	"Thence to **Waiakalaho**, a water hole; thence mauka to **Waiakekua**, a water hole near the iwi aina and a little above the Government road; thence to Kaaipaka, a kulana kauhale, ahua hulipali..." "Commencing at seashore between Kahului and Puapuaa at a rocky point called Kakapa; thence mauka along an iwi aina to Governor Adam's wall; thence mauka, the boundary still following the iwi aina to **Waiakalaho**, a water spring; said spring being about three kihapai to North of the boundary of Puapuaa; thence to **Waiakekua**, spring mauka of the road; said spring is on Kahului near the iwi aina..."	Boundary Commission Testimony: Kahului 2 Ahupuaʻa, Niniha 1873: v.A1 P327-329 Boundary Commission Testimony: Kahului 2 Ahupuaʻa, Makuakane 1873: v.A1 P327-329
	Waiakekua a spring			
Mālama ʻĀina masonry water collection	**Pūnāwai ʻalā stones loulu**	Waiʻaha Ahupuaʻa Kahului Ahupuaʻa	"There too, you see — ka luawai ua kīpapa ʻia i ka pōhaku ʻalā e ulu pōhai ʻia e nā lāʻau loulu, o ka punawai i ka oʻioʻina pali o Waiakekea — a spring paved with dense [ʻalā] stones and surrounded by loulu palms, this is the spring of Wai-a-Kekea, which was near the trail side resting place..."	Wise & Kihe 1914-1917, in the nūpepa "Ka Hōkū o Hawaiʻi," translated by and in Maly 1998:3.
Water collection	**Waihuna (Waiahuna)** a spring	Kahului 2 Ahupuaʻa	"...thence makai along the iwi aina to **Waihuna**, a water hole on the boundary between Kahului 1st [page 328] and Kahului 2nd. Kahului 1st reaches to Puuokaloa at the foot of the pali; makai of the Government road you come to **Waiahuna** which is the boundary of Kapai's [Kapae's] land."	Boundary Commission Testimony: Kahului 2 Ahupuaʻa, Makuakane 1873: v.A1 P327-329
Water collection	**Helani** a niu grove	Kahaluu, at Helani	From a chant from Mākoleʻā as a message to Kepakaʻiliʻula, she asked her uncle Kukuipahu to convey; remembering her time w/ him at Kahaluʻu. "Kuʻu hoa o ka malu niu o Helani: My companion sheltered there by the coconut palms of Helani"	From the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)
			Another water resource associated with Kona acknowledges a thriving coconut grove in an area named Helani where water is retained by gathering and drinking from coconuts	Pukui 1983:179, ʻŌlelo Noʻeau #1661
	Niu coconuts wai niu	Kona Moku from Puaa to Keauhou	15 mentions of niu trees or groves are made in Māhele records for area spanning just north of Puaʻa to south of Keauhou.	Awards Books: Native Register and Native Testimony
	Ka wai puka iki o Helani a spring	Kahaluʻu Ahupuaʻa	Kahaluʻu, a chiefess from Kahaluʻu was referred to as "...Kahaluʻu the chiefess—i ka ʻāina kaulana i ka wai puka iki o Helani (of the land famous for the small flowing spring of Helani)" identifying a pūnāwai in Kahaluu.	From the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)

Lawaiʻa & Waʻa (Paddling, Sailing, Voyaging)

Table 37. Table of Practices and associated resources in and around the study area tied to **Lawaiʻa and Waʻa**

Practice	Resource(s)	Location	Information	Source
Lawaiʻa Mālama ʻĀina (stewardship) Community Managed Fisheries	ʻAnae, ʻawa, weke, ʻoama, manini, pākukui yellow tang White limu brackish water	Kona Study Area	Care and knowledge of white limu, that grows in brackish water as food for important fish species, Mullet, ʻawa, weke, ʻoama, manini, pākukui, yellow tang.	Consultation
	Fishery Squid (heʻe) grounds	Puaʻa Ahupuaʻa	"Puaa is bounded makai by the sea and the land has ancient fishing rights near the shore, but not extending out to sea." > "Puaa has ancient fishing rights extending to the squid grounds."	Boundary Commission Testimony: Puaa 1 Ahupuaʻa, Kauwa 1873: v.A1 p376-378
	Limu ʻeleʻele Nenue	Kona Study Area	Limu ʻeleʻele for bait for nenue.	Consultation
	Fishery ocean iʻa	Keahuolū Puaa Waiaha Kahului Puapuaa Kahaluʻu Keauhou Hōlualoa 1 and 4 Kaumalumalu	"Ancient fishing rights extending out to sea." Is a phrase seen again and again in the Boundary Commission by multiple Testifiers across Kona; only a select few in and around the study area are cited here.	Boundary Commission Testimony: Keahuolū Ahupuaʻa, J. Z. Waiau, 1873: v.A1 p354-357. Puaa 1 Ahupuaʻa, Kahueai 1873: v.B p244-245. Waiʻaha Ahupuaʻa, Peahi 1873: v.B p269-270 and Mahalo 1873: v.B p260-262. Puapuaa nui Ahupuaʻa, Ukumea 1873: v.B p260-262. Keauhou 2, Makuakane, 1873: v.A1 P327-329 and Niniha, 1873: v.A1 P327-329. Kahaluu, Papa, 1873: v.A1 p321-323. Keauhou, Lono, 1873: v.A1 p318-320 and Papa, 1873: v.A1 p321-323. Kaumalumalu Ahupuaʻa, Kamakahoohia, 1873: v.A1 p324-326
Lawaiʻa Waʻa ʻōpelu traditions	Ocean ʻōpelu	Kona Study Area	Waʻa, sailing and paddling for lawaiʻa, specifically ʻōpelu.	Consultation

Practice	Resource(s)	Location	Information	Source
Limu cultivation Koʻa traditions ʻŌpelu traditions	ʻŌpaeʻula ʻōpae lōlō ʻŌpelu Akule Koʻa	Kona Study Area	ʻŌpaeʻula, or ʻōpae lōlō, propagated to be used as bait for ʻōpelu fishing. Used to maintain the **fishing koʻa** to acquire ʻōpelu and akule.	Consultation
Lawaiʻa Stewardship	ʻŌpaeʻula Anchialine ponds Brackish water	Kealakehe Ahupuaʻa Lanihau Ahupuaʻa	ʻŌpaeʻula ponds present in Kealakehe, Keahuolū, and Lanihau. Part of anchialine system.	Consultation
		Kaloko to ʻAnaehoʻomalu	Anchialine system from Kaloko to ʻAnaehoʻomalu.	
ʻŌpelu traditions Community Managed Fisheries	Ahi ʻōpelu	Māʻihi Ahupuaʻa Keauhou Ahupuaʻa	"Ancient fishing rights extending out to sea, the Opelu belonged to Maihi and the Ahi to Keauhou; bounded makai by the sea."	Boundary Commission Testimony: Maihi Ahupuaʻa, Ehu 1873: v.A1 p311-312
	ʻŌpelu	Keahuolū Ahupuaʻa	"Ancient fishing rights extending out to sea and claiming the opelu."	Boundary Commission Testimony: Keahuolū Ahupuaʻa, J. Z. Waiau, 1873: v.A1 p354-357
Lawaiʻa lūheʻe Waʻa Community Managed Fisheries	Lobster heʻe grounds waʻa	Puaʻa Ahupuaʻa, at Ōneo	"Now this leho (octopus lure) was a favorite of Pili's, and filled his eyes with pleasure. Pili's canoes were prepared to go octopus fishing – lawaiʻa lūheʻe as Pili wanted to see how the lure worked. The lure was made by securing the kākala (hook), and a sinker stone (ʻōahi) near the cowrie (on a wooden shaft) with three ply olonā (Touchardia latifolia) rope. When Pili mā arrived at the octopus fishing site, he removed the lure from a gourd container and set it in the water. The chief and all those with him were startled to see unlimited numbers of heʻe (octopus) rise up to the lure, and even lobsters were attached to some of the octopus (July 26, 1917)..."	Wise and Kihe 1914-1917, the series *Kaʻao Hoʻoniua Puʻuwai no Ka-Miki*, in the nūpepa, "Ka Hoku o Hawaii." Translated by Kumu Pono Associates (Maly 1999: 22, and 11-13).
	Heʻe Leho (cowrie)		In the moʻolelo of Ka-Miki, there was a competition between ʻōlohe at Ōneo in Puaʻa Ahupuaʻa, and a renowned and favored lū heʻe was the prize.	
Lawaiʻa	Marine species springs Brackish water	Kona Study Area	Fishing by pole, throw net, diving for fish that relied on fresh/brackish water	Consultation
Lawaiʻa Beliefs & Ceremony	**Kamauai Heiau** (Kamauae) a heiau a sea cave	Keauhou 1 & 2	Lono, a kupaʻāina born at Keauhou talks about a fishing heiau near the coast at the border of Keauhou 1 and 2. "The boundary at the shore between Keauhou 1st and Keauhou 2nd is at Kamauae [Kamauai], a heiau for fishermen situated above the beach, on the hill where the houses stand..."	Boundary Commission: Keauhou 1 Ahupuaʻa, Lono 1873:v.A1 P318-320

Practice	Resource(s)	Location	Information	Source
			Kakio, Like Lono speaks of Kamauae (Kamauai) on the border of Keauhou 1 and 2, but unlike Lono, he doesnt mention a heiau, he speaks of a sea cave or shoreline cave. "The boundary at shore between the two Keauhous is at a place called Kamauae [Kamauai] at the beach; Thence it runs mauka to the head of Holua (an old sliding place)..."	Boundary Commission: Keauhou 2 Ahupuaʻa, Kakio K. 1873:v.A1 p265-268.
Voyaging Waʻa	Various (for canoe making)	Kahaluʻu Ahupuaʻa	Fleets of canoe were known to set sail from Kahaluʻu Ahupuaʻa as recorded in the moʻolelo of Kepakaʻiliʻula.	In *Kepakaʻiliʻula*, (Malo 1919-1920). Translated in Maly 1996:25)
Waʻa Canoe making	**Namahana**	Puaʻa 2 Ahupuaʻa In the uplands	Kahueai testifies for BC of a koa tree growing a waʻa place, mauka long Waiʻaha stream, this would be at the same elevation, possible within the Gianulias study area. We pick up his boundary description of the south (Kaʻū) side of Puaa, bounding Waiʻaha, heading upland. "Thence to Palule where koa grows; thence mauka along the kahawai to **Namahana**, where we used to make canoes; thence along the gulch to Aianini [?], a water hole in the gulch; thence up to Kipukaiki a cave..."	Boundary Commission Testimony: Puaa 2 Ahupuaʻa, Kahueai, 1873: v.B:244-245. *also gives testimony for Keahou 2. Olonā growth (Kumu Pono Associates BC notes)
Voyaging Waʻa kilo	Calm seas	Kona Moku	"Ke kai malino o Kona. The calm sea of Kona. Refers to Kona, Hawaiʻi." Including this one, there are four ʻŌlelo Noʻeau that talk about the calm seas of Kona Moku 1842, 1844, 1731	Pukui 1983:186, ʻŌlelo Noʻeau #1731, 1842, 1844, 1731
	Kona sailing winds **ʻEka** (a makani)		Three ʻŌlelo Noʻeau speak of winds and conditions that tell it is time to launch sailing canoes for fishing in Kona. One references ʻEka, a particular wind associated with the moku of Kona whose presence is telling of signs optimal for fishing. Another talks about filling big sails, and the last calls canoe men to sally forth.	Pukui 1983:159, ʻŌlelo Noʻeau #1467 and #182, #1690
Kilo Nānā Ao Lawaiʻa	Clouds Rain Calm seas	Kona Study Area	Clouds would carry water from mountains to the ocean, bringing rain from ma uka to ma kai. Understanding cloud patterns to know when it was safe to fish, etc.	Consultation

Forestry and Hana Waʻa

Table 38. Table of Practices and associated resources in and around the study area tied to **Forestry and Hana Waʻa.**

Practice	Resource	Location	Information	Source
Forestry Canoe Making	**Huaikaumauna** Lae Koa Koa Forest Koa and Mamani trees **Mawae**	Keauhou 2 Ahupuaʻa Hōlualoa Ahupuaʻa Kahaluʻu Ahupuaʻa Kaumalumalu Ahupuaʻa	Mentioned by Keliikanakaole K. In his sworn testimony, "Thence to Huaikaumauna, a lae koa on kualapa."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keliikankaole 1873:v.A 1, p270, Folio 448
			Mentioned by Kupakoa K. In his testimony, "Thence along the land of Kaumalumalu to **Huaikaumauma**, koa trees and mamani, on the Kohala side of Judd road. Keauhou taking the land mauka of the woods and Kaumalumalu the woods."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa 1874:v.A 1:448-450
			Described as a "quite an old man", Puhi gives his sworn testimony and describes Huaikaumauna as more than just a koa forest, but a sacred place, where a heiau not far from a water hole and a burial cave, "Keauhou 1st ends in the koa woods. It is cut off by Keauhou 2d at a place called Mawae where there is a water hole, and a cave where my relations are buried. The boundary is way makai of this place. Keauhou 2d takes the land where they used to catch uwau, on the mauka side of the woods, cutting off Kahaluu and Kaumalumalu. Do not remember the names of the points Kaumalumalu reaches to Huaikaumauna, junction of Kaumalumalu, Kahaluu and Keauhou. it is an ahua in the koa woods, where the canoe makers used to have a heiau."	Boundary Commission Testimony: Keauhou2 Ahupuaʻa, Puhi K. 1874:v.A 1, p450-451.
Forestry	**Kanoa** Koa Forest Koa and Mamani trees	Keauhou 2 Ahupuaʻa Kahaluʻu Ahupuaʻa	Mentioned by Kupakoa K. In his testimony, "Thence along Kahaluu (in the woods) to **Kanoa**, a point of koa and mamani trees, the place where the fire from Kau [Kaʻū], on the mountain went out."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kupakoa 1874:v.A 1:448-450
Canoe Making	**Keanaakala**	Keauhou 2 Ahupuaʻa	where canoe makers used to live	
Forestry Canoe Making	**Huaikaumauna**	Keauhou 2 Ahupuaʻa Hōlualoa Ahupuaʻa	Keliikanakaole in his sworn testimony for Hōlualoa 1 mentions Huaikaumauna in Keauhou 2, remembering the felling of a tree. "Thence mauka along old trail to Kalaenaio where Naio trees are growing, in Koa woods; thence to Huaikaumauna, a kualapa, from which a big tree was taken, where Kaumalumalu is cut off by Keauhou 2."	Boundary Commission Testimony: Hōlualoa Ahupuaʻa, Keliikanakaole K. 1874:v.A 1, p336-339.

Practice	Resource	Location	Information	Source
Forestry	**Waikulukulu** (a forest)	Keauhou 2 Ahupuaʻa	Waikulukulu is the name of a woods or forest near Puuakawai water hold, "thence the boundary runs up the mountain to a cave on the side of the mountain, above the woods called Waikulukulu, thence to Puuakawai, an old water hole now filed up by cattle tramping around it; this place is the junction of the land Kaopulehu [Kaupulehu] with Keauhou."	Boundary Commission Testimony: Keauhou 2, Keakaokawai, K. 1873:v.A1, p256-260
Forestry Historical	**Haliilaukoa**	Keauhou 2 Ahupuaʻa	A storied place of Umi, "Haliilaukoa (where Umi sat and they spread Koa leaves for him; old tradition)"	Boundary Commission Testimony: Keauhou 2, Keakaokawai K. 1873: v.A1 p257.
Canoe Making Trails	**Kealakōwaʻa** (Kealakowaa) (Alakowaa)	Kahului Ahupuaʻa	Listed as the name of a heiau said to have been built by ʻumi for the dedication of canoes. The canoes were felled and brought here for dedication and then launch by the shoreline at Puʻu spring and the surf of Puʻu. Was misnamed Hale-hau in recent times. (n.d. Kekahuna) Ties to families of ʻumi as well as canoe carving and dedication practices. *Lit*. The path to drag the canoe, (translation Kawika Aspili, Nohopapa Hawaiʻi)	Henry E.P. Kekahuna Collection, MS Group 312, Map: 50-HA-D8.
		Kahului Ahupuaʻa ʻIli ʻāina of Puki ʻIli ʻāina of Kahuki ʻIli ʻāina of Kamuku ʻIli ʻāina of Halewaawaa	A place where logs destined to become canoes, travelled to on their journey down from the uplands to the shore Several Māhele land claims reference Kealakōwaʻa as bounding their pauku ʻāina.	LCA 7086 (NR:v8p419) LCA 7336 (NR:v8p424, NT:v4p500) LCA 10252 (NT:v4p538) LCA 10374 (NT:v4p529-530)
		Kahului Ahupuaʻa to Hōlualoa Ahupuaʻa	The trail on which canoes were dragged from the uplands to the shore; crosses several ahupuaʻa including Kahului to Hōlualoa.	From Buke Māhele records, Kumu Pono Associates in Māhele Section, Glossary
Forestry Canoe Making	**Kikikiaeae** (canoe making place)	Keauhou 2 Ahupuaʻa	In Waiau's testimony for the Keauhou 2 Boundary Commission he described **Kikikiaeae** as a canoe maker place. "Governor Adam's road is at the end of Lehuulanui; thence along Hookukano; thence mauka along the Government road, between two aa flows to Kamoomoo; thence to Keanaakala, a cave; thence to Kikikiaeae, where we used to live. The canoe makers of Hookukano also lived there. There is a hill called Puulepo, with a crater on it. There is a water hole makai of said hill. "	Boundary Commission Testimony: Keauhou 2, Waiau K., 1873: v.A1 P268-272

Practice	Resource	Location	Information	Source
Forestry	Kaimuhapu (a forest)	Keauhou 2 Ahupuaʻa At Okolea	The KS study area is in Keahou 2 near its boundary with Hōnalo. Waiau testified of a forest and a waterhole at the border in a place called Okolea. "A place in Okolea, in the woods called Kaimuhapu, a water hole, is on the boundary between Honalo and Keauhou..."	Boundary Commission Testimony: Keauhou 2, Waiau K., 1873: v.A1 P268-272.

Bird Catching

Table 39. Table of Practices and associated resources in and around the study area tied to **Bird Catching**

Practice	Resource	Location	Information	Source
Bird catching	Manu	Kahului Ahupuaʻa	Several manu were referenced as living in upland Kahului, these species were important enough to mention and would have been resources tied to cultural, religious and subsistence practices. They are also biological indicators of a healthy forest system and watershed. Included area: ʻelepaio, pueo, ʻIo, and ʻamakihi	In He *Kaao no ka Manu Elepaio,* found in the nūpepa "Ka Hoku o ka Pakipika" (S.W.K.: 1862)
Bird catching	**Huaikaumauma** (Huaikamauna)	Keauhou 2 Ahupuaʻa Hōlualoa Ahupuaʻa	Ihihi testified for the Hōlualua Boundary Commission hearings, "Know the place in the woods called Kahiihiie; it is the junction of Kaumalumalu and Holualoa 1st; thence the boundary runs mauka along old trail to Kalokau; a grove of banana trees on a pali; thence to Kanoa, an old kauhale kawilimanu; thence to Kalaemaia, an ahua and kualapa; thence to Huaikaumauma, a kualapa; thence to Apiipii, where Keauhou 2 cuts these lands off, from there the boundary turns North to Puulalaau [Puulaalaau]." "Keauhou cuts Kaumalumalu off at Pukaiki and Huaikaumauma and boundary of this & Keauhou runs up in the middle to Hiinau. This is what the bird catchers say, as I hear now. Kaumalumalu runs to Pukaiki and Huaikaumauma."	Boundary Commission Testimony: Hōlualoa Ahupuaʻa, Ihihi K. 1874:v.A 1, p336-339.
Bird catching	**Keakui**	Keauhou 2 Ahupuaʻa	Mentioned by Keliikanakaole K. in his sworn testimony, "A place called Keakui, a road across the aa made by bird catchers, a puu pahoehoe and a Mawae in the center, is the place where Keauhou 2 turns North and cuts off Keauhou 1st. Niihoa and Kekai, the men who made the road which is the boundary between the two, told me thus. I went with Kekai after sandalwood."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270, Folio 448
Bird catching	**Kilohana**	Keauhou 2 Ahupuaʻa	In BC testimony for Keauhou 2, Keakaokawai (Keakaikawai), a noted kamaʻāina witness in Kona, he identifies a bird catching place, notably on an ʻaʻā flow. "...thence mauka to Kilohana, on an aa flow where we used to catch birds and where Kahuku joins Keauhou. Thence along Kahuku to Kulauala, on Umi's road; From Puuloa to Kanupa Keauhou used to take the pahoehoe above the woods and the Kona lands reached to the mauka edge of the woods from Kilohana along Kapapala to Pohakuhanalei, a hill on the top of the mountain [Mauna Loa]"	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai (Keakaikawai) 1874:v.A1, p256-260.

Practice	Resource	Location	Information	Source
Bird catching	**Makaulaula**	Keauhou 2 Ahupuaʻa	According to Kahulialo, a dwelling for bird catchers, "Thence to Makaulaula, where we used to live when bird catching. Thence to Kaonohi, a cave; thence to Ahuwela, a cave with water in it; there Hookukano ends and Kealakekua joins and bounds Keauhou..."	Boundary Commission Testimony: Keauhou 2, Kahulialo W. 1873: v.A1 p261-265
Bird catching	ʻAmakihi as a pūpū with ʻawa	Kahului Ahupuaʻa	Specifically identified as a practice occurring in the ahupuaʻa of Kahului; "broiled" ʻamakihi as "a condiment to go with ʻawa" in a chant from ʻElepaio to ʻAmakihi in *He Kaao no ka Manu Elepaio*	Mentioned in *He Kaao no ka Manu Elepaio* in the nūpepa Ka Hoku o ka Pakipika (S.W.K.: 1862).
Bird catching, konohiki	Manu	Keauhou 2 Ahupuaʻa Hōnalo Ahupuaʻa	Waiau testified for Bdry Commission of Keauhou 2, he was born at Kanaueue during Kamehameha I's reign and talked about bird catching and the konohiki take. "Know the land of Keauhou, used to go after birds with my father, Nauwe, an old bird catcher and he pointed out the boundaries to me, as it was kapu to go after birds and not divide them with the konohiki; used to go frequently not vary far above here. Honalo bounds Keauhou 2 on the South side, as you go into the lower edge of the woods. I do not know the boundaries."	Boundary Commission Testimony: Keauhou 2, Waiau K., 1873: v.A1 P268-272
Bird catching	Manu	Keauhou Ahupuaʻa Hōnalo Ahupuaʻa	"I used to go on the mountain with my Father collecting sandalwood and catching birds; his name was Kauluahi, and old bird catcher and kamaaina now dead..."	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Keakaokawai (Keakaikawai) 1874:v.A1, p256-260.

Mahi ʻai ʻana – Cultivation

Table 40. Table of Practices and associated resources in and around the study area tied to **Mahi ʻai ʻana - Cultivation.**

Practice	Resource	Location	Information	Source
Mahi ʻai ʻana (Cultivation)	Farmable soils, wai, upland fields	Kona Study Area	Kona field system including the water systems to support it.	Consultation
	Pūnāwai, springs, cultivated upland fields		ʻUala, kalo, ʻulu and other cultivated crops fed by the rain and water wells.	Consultation
	Alani (orange tree), Hala, Hala Kahiki (pineapple), Hau, Ipu (gourd), Kalo, Kope (coffee), Kou, Loulu, Maia, Momona (Cherimoya), Niu Nonu (Indian mulberry), Olonā, Pu (squash), ʻuala (sweet potato), Uhi (yam), ʻulu (breadfruit)	Just north of Puaʻa Ahupuaʻa down to the south of Keauhou Ahupuaʻa	Crops mentioned in Māhele records as being cultivated in and around the project area as resources for the people who lived and exercised their traditional rights in this region of Kona	Māhele Awards Books, Native Testimony and Native Register
Mahi ʻai **Makawela**, a ʻuala farming practice Nānā Ao (cloud observation)	**Kanoenoe** (a plain) (a misty rain)	Kealakehe Ahupuaʻa Keahuolū Ahupuaʻa	Indicator, when mist sat upon Puʻuokaloa (Puukaloa) it was a sign rain would come and to prep the ʻuala fields of Kanoenoe plain. A rain fed plain that was under ʻuala cultivation. Rains could be seen coming from afar. Practiced **Makawela style of ʻuala cultivation** here.	Ka Hoku o Hawaiʻi 10/25/1917, as translated by Maly 1994:A-4. In Wise and Kihe 1914-1917 in Simonson 2010:8
			Makawela cultivation. A slash and burn agricultural practice, but predicated on actual kilo of predicting the iminent onset of rain	Pukui & Elbert 1986: 228, Bennet & Nogelmeier 2017
Puʻupuʻe a kalo farming practice hale building thatching water collection	**Wai-a-Kekea** a spring loulu	Waiʻaha Ahupuaʻa Kahului Ahupuaʻa	"There too, you see — ka luawai ua kīpapa ʻia i ka pōhaku ʻalā e ulu pōhai ʻia e nā lāʻau loulu, o ka punawai i ka oʻioʻina pali o Waiakekea — a spring paved with dense [ʻalā] stones and surrounded by loulu palms, this is the spring of **Wai-a-Kekea**, which was near the trail side resting place..." Located near **puʻepuʻe kalo cultivation** in the uplands at the boundary of Waiʻaha and Kahului.	Wise and Kihe 1914-1917, in the series *Ka Hōkū o Hawaiʻi* (in Maly 1998:3).
Mahi ʻai ʻana (cultivation)	**Waiʻaha Stream** Upland taro mounds	Puaʻa Ahupuaʻa Waiʻaha Ahupuaʻa Kahului Ahupuaʻa Puapuaʻa Ahupuaʻa Hōlualoa Ahupuaʻa	"...the stream of Waiʻaha joins with the lands of Kahului. The waters filled the upland taro mounds of the sacred prostration chiefs Kaleiʻeha, Kapahu (or Kapahu-a-Loʻi), and Kaʻalaea, who possessed the kapu (restrictions) of Lono-Makahiki..."	Wise and Kihe 1914-1917, translation by Kumupono Associates, (in Maly 1998:3)

Practice	Resource	Location	Information	Source
Water collection Mahi ʻai ʻana (cultivation)	Pūnāwai offshore springs cave water collection rain anchialine ponds	Kona Study Area	Kona is an arid and dry place. There were only certain ways to get water for customary use. Four ways of acquiring water for sharing: 1) Collect water with ipu from the plumes of freshwater emissions in the ocean. 2) Collect water with ipu from drips/condensation in caves. 3) Freshwater springs bubbling up i.e. Kaloko. 4) Rain. 5) Brackish water collection from ponds/wells for consumption and everyday use.	Consultation
Mahi ʻai ʻana (cultivation)	Mala ʻuala	Puapuaʻa Ahupuaʻa At the coast at **Niumalu**	there is a māla ʻuala, or a sweet potato garden that stretches between Niumalu and Puapuaʻa Ahupuaʻa (Wise and Kihe 1914-1917 in Maly 1999:12). This māla ʻuala is described as the place where the opponents of Ka-Miki go to recover and sleep after being defeated by the young boy (Wise and Kihe 1914-1917 in Maly 1999:12).	Wise and Kihe 1914-1917, translation by Kumu Pono Associates, (in Maly 1998:3)
Mahi ʻai ʻana	Banana plantation	Kahaluʻu Ahupuaʻa	located in the uplands of Kahaluʻu "Once in Kona, Kepakaʻiliʻula waited in the uplands of Kahaluʻu at the great banana plantation of the chief Kahoʻoaliʻi, which extended from Kaumalumalu-Kāpalaʻalaea to Keʻei" -Malo 1919-1920.	Discussed by Maly (1996: 24-25) and mentioned in the moʻolelo of Kepakaʻiliʻula, by David Malo, appearing in series in the nūpepa *Ka Hoku o Hawaii* (1919-1920)
Mahi ʻai ʻana Palena	**Pā pipi** (pa pipi) (papipi)	Kona Moku At and below Mamalahoa Hwy	Cattle wall or enclosure, depending on context (see the section that discusses history of the Pā Kuakini or Great Wall). Depending on context, and written “pa pipi” it describes a cattle enclosure.	Māhele Awards Books Kumu Pono Associates, Mahele Section, Glossary
Mahi ʻai ʻana	ʻUlu	Puapuaʻa Ahupuaʻa	Famous bounty of the ʻulu from Puapuaʻa Ahupuaʻa. “*Ke kumu ʻulu-pū-loa o noe ʻokana ʻāina o Puapuaʻa.* (The well-formed, oval-fruited breadfruit of the lands of Puapuaʻa [said in praise of strength and handsome features])”	Maly 1999:12, from *Kaʻao Hoʻoniua Puʻuwai no Ka-Miki* (Wise and Kihe, 1914-1917)
Mahi ʻai ʻana	Upland fields	Kona	"Kona, poʻo kuʻi. Kona of the added head. Said of farmers of Kona, Hawaiʻi, returning from the fields with a load on the shoulders and a child sitting atop the load."	Pukui 1983:199, ʻŌlelo Noʻeau #1847

Practice	Resource	Location	Information	Source
Upland cultivation zone	Kula	Upland Kona	Plain or grassy flat land. Generally, an area between the shoreline and lower forest zone. In the early usage, the term describes lowland agricultural fields. In the later 1800s, usage of "kula" in describing land areas was used to describe pasture land. "This usage postdates claims of the Māhele, and if taken in the latter meaning changes actual forms of land use. This is particularly problematic when a Kuleana claim text reads something like "1 kula Kalo" and the later translations state, for example, "1 one taro pasture," which is leads to inaccurate or misleading descriptions of lands use."	From Buke Māhele records, Kumu Pono Associates in Māhele Section, Table 3. Glossary
Upland cultivation zone	**Kaluulu** (Kanu-ʻulu) (Ka-ulu-ʻulu)	Upland Kona	"The region of ʻulu cultivation and growth. Providing an important starch food source, wood valued in making canoes and various tools; in some accounts young ʻulu branches were harvested and used in making kama (bark cloth). The canopy of ʻulu provided shade and helped retain moisture from important under-story cultigens."	From Buke Māhele records, Kumu Pono Associates in Māhele Section, Glossary
Upland cultivation zone	**Amaumau** (Amau, ʻAmaʼu) ʻĀmaʻumaʻu)	Upland Kona Kona Kuahewa	The Sadleria fern forest zone, a region of upland agricultural fields.	From Buke Māhele records, Kumu Pono Associates in Māhele Section, Glossary
Coastal cultivation	**Hiʻiaka-noho-lae** blowhole	Keahuolū Ahupuaʻa, Kailua	Dwelling place of Hi'iaka and a blowhole at Kailua that would cover fields and dry them out (salt). Kaleikini grids a cover of kauila he uses to cap this blowhole, and others, so crops can grow close to the sea.	From Kihe 1923:2, translated by The Institute of Hawaiian Language Research Team, ʻIke Wai
Mālama ʻĀina cultivation Connectivity	Laʻau	Kona study area	Relationship of water to plants and plants to people and plants as trade items and economic development amongst and between families and across ahupuaʻa.	Consultation
Cultivation Hana Noʻeau Maʻawe	Hala hala groves	Coastal and upland Kona Moku	Growth of hala (pandanus) trees.	Kumu Pono Associates in Mahele Section, Glossary

Practice	Resource	Location	Information	Source
Mahi ʻai ʻana	**Ohiki** A spring A cultivation place	Uplands of Hienaloli Ahupuaʻa Keauhou Ahupuaʻa	Lono describes Ohiki, as an old cultivating site, that is also a spring, "Kahaluu bounds Keauhou 1st on the North side, the boundary at seashore is Paaniau, a large stone wall reaching from shore a short distance mauka. There is a pali at seashore by the same name; thence mauka to the Government road; thence straight mauka on aa to two piles of stones at government road. Kahinihiniula is on the high ground, just before you decend [sic] into the hollow; going from Kealakekua to Ohiki, a spring and old mahiai place in the woods. I do not know boundaries above this place. Have not heard where the land ends."	Boundary Commission Testimony: Hianaloli 1 & 2 Ahupuaʻa, Kakio 1873:v.A 1, p318, Folio 448 and Lono, K.
Mahi ʻai ʻana	Kalo wai kula lands	Kona Moku	Kalo served as one of the major starch foods of Hawaiians around the islands. Kalo is used in ceremonies, is a part of the Hawaiian stories of creation and birth of kānaka, and was developed into many varieties, some of which were particularly valued in the Kona district. While often thought of as being grown in loʻi Kalo (irrigated taro pond fields), the cultural record reveals that there was more kula (dryland) Kalo grown in the islands than that grown in loʻi kalo.	Kumu Pono Associates, Mahele Section, Glossary.

Trails and Connectivity

Table 41. Table of Practices and associated resources in and around the study area tied to **Trails and Connectivity**

Practice	Resource(s)	Location	Information	Source
Connectivity	Trails Trade Reciprocity	Kona Study Area	Trade and reciprocity ma uka and ma kai, allowing different family units to interface with each other ensuring quality of life.	Consultation
Connectivity Travel	**Ke Alaehu** (Kealaehu) (Alaehu)	Kona Moku	An ancient trail attributed to Umi-a-Liloa that crosses all of the ahupuaʻa in the Kona District. Mentioned in *Na Hunahuna no Ka Moolelo Hawaii* as, "...a hui pu me ke ala mauka, i kapaia ke Alaehu, mawaena konu o ke amaumau mai Kona Hema mai... A ua manaoia, ma keia ala no paha o Kauhiakama o ka holo kaapuni ana ia Hawaii, a puni ai i na la pokole."(Iʻi 1870) "...and connects with the upland trail, called Ke Alaehu, right between the ʻāmaʻumaʻu ferns from South Kona... and it is thought, that on this trail perhaps that Kauhiakama encircled the Hawaiʻi, and encircled in a short amount of days"	Iʻi 1870, Translated by Kawika Aspili (Nohopapa Hawaiʻi).
		Kahaluu Ahupuaʻa ʻIli ʻāina of Kamuku ʻIli ʻāina of Kukuihaa ʻIli ʻāina of Haliipalala ʻIli ʻāina of Kahuamoa ʻIli ʻāina of Paulu ʻIli ʻāina of Kukuiohaa	The ancient upland trail that passed through the ʻāmaʻumaʻu (fern forest agricultural zone) in the vicinity of the present day Māmalahoa (Belt) Highway. It's development is associated with the reigns of Ehu and ʻUmi (Kepa & Onaona Maly, Kumu Pono Associates).	LCA 3447 (NT: v4p640-641. LCA 5773 B (NT: v4p615-616 LCA 5673 B & 5673 (NT: v4p615-616). LCA 5677 (NT: v4p621) LCA 5689 (NT: v8p396) LCA 5695 (NT:v4p624-625) LCA5831B (NT: v4p637) LCA 6029 (NT:v4p627) LCA6128 (NR:v8p410-411, NT:v4p621)
		Puaʻa 2 Ahupuaʻa ʻIli ʻāina of Ohiki		LCA 7076 (NR: v8p416, NT: v4p512)
		Honokohau 1 ʻIli Haleamahuka		LCA10521 (NR:v8p596, NT:v8p602
Connectivity Trails Travel	Alanui Pii	Kona Moku	Ascending trail that connected the coast to the uplands (i.e., trail leading to the uplands, the mauka-makai trail system which occurred in all ahupuaʻa). Not always a public road.	Kepa Maly, Mahele Section, Glossary

Practice	Resource(s)	Location	Information	Source
	Ala	Keauhou 2	Mauka-makai trail used for transporting ʻōhiʻa down from the uplands, "...trail being made for ohia trees..." - Kakio.	Boundary Commission Testimony: Keauhou 2 Ahupuaʻa, Kakio 1873:v.A 1, p270, Folio 448
Connectivity Hana waʻa	**Kealakōwaʻa** (Kealakowaa)	Kahului Ahupuaʻa to Hōlualoa Ahupuaʻa	The trail on which canoes were dragged from the uplands to the shore; crosses several ahupuaʻa including Kahului to Hōlualoa.	Kumu Pono Associates in Mahele Section, Glossary
Connectivity Messengers Communication Trails	**ʻElele** (messengers)	Kona	Ka-Miki ordered Pili's ʻeleʻele or messengers to spread the word of his victories to Kalamaʻula (Wise and Kihe 1914-1917 in Maly 1999:13). Pili sent other messengers throughout all the districts of Kona to inform the people and chiefs that Ka-Miki possessed the rights of the aliʻi over these lands (Wise and Kihe 1914-1917 in Maly 1999:13).	Wise & Kihe (1914-1917), in *Kaʻao Hoʻoniua Puʻuwai no Ka-Miki*, translated by Kumu Pono Associates.
Connectivity Mālama ʻĀina	**Wai kaiāulu**	Kona Study Area	What keeps us [Hawaiians] together is our shared belief in cooperation, support, respect, and a continuous system of reciprocity when it comes to water resources.	Consultation

Kilo and Weather – Environmental Indicators

Table 42. Table of Practices and associated resources in and around the study area tied to environmental indicators through **Kilo – Keen Observation.**

Practice	Resource(s)	Location	Information	Source
Kilo	Ua	Kona Study Area	Learned to listen for the rain.	Consultation
Kilo Weather & Ocean Observation	**ʻEka** (a wind)	Kahaluʻu Ahupuaʻa at Helani	From a chant from Mākoleʻā as a message to Kepakaʻiliʻula, she asked her uncle Kukuipahu to convey; remembering her time with him at Kahaluʻu. "Kuʻu hoa i ka peʻa huli luna e Kona e He ʻEka ka makani o kāua e ʻolu ai...: You are my companion of the upper reaches of Kona Where the ʻEka breezes refresh us two..."	From the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)
	Hau (a wind)	Kainaliu to Keauhou Ahupuaʻa	"Ka Hau o Maʻihi. The Hau [breeze] of Maʻihi. Refers to Maʻihi, Kona, Hawaiʻi. Because of this locality was named for Maʻihi-ala-kapu-o-Lono, daughter of the god Lono-a-ipu, this wind was regarded as sacred and did not blow beyond Kainaliu and Keauhou." Hau, a wind belonging to Maʻihi, described as a breeze that does not reach beyond the boundaries of Kainaliu and Keauhou	Pukui 1983:142, ʻŌlelo Noʻeau #1303
	Kāwili (wind & current)	Kona Moku to Kaʻū Moku	"Ka ʻōwili makani ʻino o Kāwili. The stormy wind of Kāwili. (Kāwili is the current that comes from Kona and goes out to sea at Kalae, Kaʻū)."	Pukui 1983:164, ʻŌlelo Noʻeau #1519
Kilo Rain & Weather Observation	**ʻAwaʻawa ʻAwa** (a rain)	Keauhou Ahupuaʻa	A "bitter, cold, dark rain, vog, or smoke of the mountains; acidic rain;" and is noted as being the same as the ʻAwa rain and also the name of a wind . Per Pukui, a cold mountain rain	Malo 1951:14 in Akana and Gonzales 2015:15
	Kēhau (a rain)	Kona Moku	A dew and mist and is noted as both the name of specific rain and wind	Akana & Gonzales 2015:73
	Kualau (a rain)	Keauhou Ahupuaʻa	A rain that showers over the seas and is accompanied by wind	Akana & Gonzales 2015:121
	Nahunahu (a rain)	Keauhou Ahupuaʻa	A "pelting rain associated with Hawaiʻi," and translated to mean "to bite,"	Akana & Gonzales 2015:184
Kilo Rain & Weather Observation	**Noe** (a rain)	Keauhou Ahupuaʻa	Described as a fog and a mist that is "lighter than the uhiwai [heavy fog], but heavier than ʻohu [mist, fog, vapor], ʻehu [spray, foam, mist], and ʻehuʻehu [reduplication of ʻehu];" and is noted as both a rain and wind.	Akana & Gonzales 2015:208
	Palahī Puaʻa (a rain)	Kona Moku	"Ka ua palahī puaʻa–falls, stops, falls, stops, etc.," Intermittent rain. Exclusively associated w/ Kona	Akana & Gonzales 2015:219

Practice	Resource(s)	Location	Information	Source
Kilo Rain & Weather Observation	**Nāulu** a rain	Puapuaʻa Ahupuaʻa	A sudden shower and is noted as being also the name of a rain cloud and a wind	Akana & Gonzales 2015:187
			Published in the Hawaiian language newspaper, Ke Au Okoa in 1869, Kamakau shared an account regarding traditional cultivation methods of ʻuala (Ipomoea batatas or sweet potato) in which he acknowledged the Nāulu rain: He ua Nāulu ka ua e loaʻa i ka Makaliʻi, he ua kūhewa ia, aia ma kona wahi e hāʻule ai, ua ulu ka laulele, ka pōpolo, a ua ola ia wahi i ka lau nāhelehele. [Kamakau 1869:1] Sudden showers (ua Nāulu) fall during the Makaliʻi season. These are rains accompanied by wind gusts, and where they fall, laulele and pōpolo plants spring up, and that place comes to life with wild growth. According to Kamakau, Nāulu is again referred to here as a shower that arrives suddenly–he ua kūhewa, (Kamakau 1869:1). What is also detailed in this account is that this particular rain is often joined by wind; and with it, entices the ʻāina the rain falls upon to sprout with vegetation such as laulele (Asclepias curassavica or butterfly weed), pōpolo (Solanum nigrum), and other wild growing flora.	From Kamakau 1869:1 (Akana & Gonzales 2015:206)
		Kahaluʻu Ahupuaʻa	Mentioned in a chant for the uplands of Kahaluʻu	from the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)
Kilo Nānā Ao Weather observation	**ʻŌpua** (cumulus), **ao ʻōpiopio** (young clouds), ua	Kona Moku	Recounted in several ʻōlelo noʻeau, the presence and formation of ʻōpua, or "cumulus clouds," and ao ʻōpiopio or "young clouds," are indicators unique to Kona relaying that rain is expected to occur in the area	Pukui 1983:9,27,2134; ʻŌlelo Noʻeau #55, #232, #2134

Mālama ʻĀina – Care for Resources and Place-based Stewardship (Ahupuaʻa Management)

Table 43. Table of Practices and associated resources in and around the study area tied to **Mālama ʻĀina and the long-term care and stewardship of people, resources, and place.**

Practice	Resource(s)	Location	Information	Source
Mālama ʻĀina Connectivity Kilo Ahupuaʻa Management Mahiʻaiʻana (cultivation)	Wai healthy environment laʻau	Kona Study Area	Mālama ahupuaʻa specific resources. Relationship of water to plants and plants to people and plants as trade items and economic development amongst and between families and ahupuaʻa. Wai creates a community that facilitates skilled resource managers. Malama i ka wai	Consultation
			Mālama our resources, including ourselves. People within each ahupuaʻa have a kuleana to take care of their specific resources. When diligent and responsible, we survive.	
	Wai		Conservation of water.	
	Crops wai pūnāwai ua	Kona Study Area Uplands	ʻUala, kalo, ʻulu and other cultivated crops fed by the rain and water wells. (As mentioned in previous tables above, the importance of water wells for cultivation and their re-injection of water whether from the ground or the heavens)	
Mālama iwi kūpuna	**Burial caves** **Mawae**	Keauhou 2 Ahupuaʻa	Described as "quite an old man", Puhi K., a cousin of Keakaokawai who lived at Kalihi at the time (BC) gives his sworn testimony describing a family burial cave in the uplands, "Keauhou 1st ends in the koa woods. It is cut off by Keauhou 2d at a place called Mawae where there is a water hole, and a cave where my relations are buried. The boundary is way makai of this place."	Boundary Commission Testimony: Keauhou2 Ahupuaʻa, Puhi K. 1874:v.A 1, p450-451.
Connectivity Ahupuaʻa Management Mālama ʻĀina	**Puhi spring** subsurface waterflow	Niumalu, ponds at Hulihe‘e Keōpū Reserve	Puhi Spring flowed underground from Keōpū Forest Reserve down to ponds at Hulihe‘e Palace, Niumalu.	Consultation
	var.	Kona Study Area	Responsible and accountable place based resource stewardship/management	

Other Practices, including Hana Noʻeau, Beliefs, and Spirituality (not already included above)

Table 44. Table of Practices and associated resources in and around the study area tied to **Other Practices**

Practice	Resource(s)	Location	Information	Source
Hoʻokupu water collection Spirituality Beliefs	Wai halau wai (source waters) pūnāwai	Kona Study Area	Religious/ceremonial significance and uses of freshwater (wai as a hoʻokupu, given from the place you are from or a special source of water is always an appropriate and valued form of hoʻokupu, arguably the most noa).	Consultation
Beliefs Spirituality Mālamaʻāina	Balanced ecosystem traditional cultural practices exercised	Kona Study Area	Cultural familial and religious practices of respect and an interrelationship with nature.	Consultation
Mauliola	Beliefs var. resources (integral to practices)	Kona Study Area	Need to blend regular routines with spiritual/emotional tasks for pono/balance.	Consultation
Contest site for games Makahiki grounds Beliefs Spirituality Kaiaulu Hana Noʻeau Lawaiʻa	**Hinakahua**	Puapuaʻa Ahupuaʻa the Kahelo plains at Niumalu at the coast	A kahua mokomoko leʻaleʻa, game site for competitions, Visited by La-Miki and Maka-iʻole. Games played at Hinakahua: maika (bowling), mokomoko (wrestling and boxing), leʻaleʻa (pleasurable pastimes), and hoʻopāpā (contest of wit and strength), (Maly 1999:11). Pili-nui-kapu-kuʻi-a-ka-lani-kua-liholiho-i-ke-kapu is the aliʻi at the time of Ka-Miki and presided over these ʻōlohe grounds.	(Wise & Kihe 1914-1917) *Kaʻao Hoʻoniua Puʻuwai no Ka-Miki*, in the nūpepa, "*Ka Hoku o Hawaii*." Translated by Kumu Pono Associates (Maly 1999"10, 11, 12, 13)
	Kahua mokomoko leʻaleʻa	Lanihau Ahupuaʻa	A famous kahua site for competitions (ʻōlohe) was at Ahuʻena, in Lanihau Ahupuaʻa. Visited by La-Miki and Maka-iʻole	
	Kauakahiakahaola a heiau	Puapuaʻa Ahupuaʻa	Kauakahiakahaola is a famous ʻōlohe of Puapuaʻa and Keiki-puʻi-puʻi is noted as the champion of Kailua. Also, the name of a heiau in Puapuaʻa	
	Heʻe leho (cowrie)	Puaʻa Ahupuaʻa at Ōneo	A kaulana and favored lū heʻe was an ʻōlohe prize	
Beliefs Spirituality	**Kāʻili** an akua of Kona	Kahaluʻu Ahupuaʻa	Akua invoked by the Kahaluʻu aliʻi Kepakaʻiliʻula in battle before unifying Kona Moku	From the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)
	Kālaipāhoa an akua of Kona	Hōlualoa Ahupuaʻa	Akua invoked by the aliʻi Hōlualoa in battle	From the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)

Practice	Resource(s)	Location	Information	Source
Beliefs Spirituality Ahupuaʻa Management	Kapu laws	Keauhou Ahupuaʻa	"**Keauhou i ka ʻihi kapu.Keauhou**, where strict kapu were observed. Keauhou, Kona. This was the place where many of the highest chiefs resided and where Kamehameha III was born."	Pukui 1983:181, ʻŌlelo Noʻeau #1682
Beliefs Hana noʻeau Forestry	Kauila	Kona Moku Kailua	In a moʻolelo discussed, Keleikini uses a cap of lashed kauila wood to plug a blowhole at the coast that is salting out valuable and scarce coastal fields and causing them to "dry out". Kauila, a Hawaiian hardwood that is difficult to cut through because of its density must have been a somewhat common resource in the uplands if Keleikini was able to use it at the coast to plug a blowhole. It is rare now.	From Kihe 1923:2, translated by The Institute of Hawaiian Language Research Team, ʻIke Wai
Hoʻokupu Wahi pana Ahupuaʻa Management	Puʻu	Kahaluʻu Ahupuaʻa	"All of the offerings of the wealth of the land were gathered at one site and presented to Kepakaʻiliʻula. The mound of offerings was so great that it looked as if a hill had been formed. To this day, the site where the offerings were gathered is called Puʻu which is above the place named for Keolonāhihi."	from the moʻolelo of Kepakaʻiliʻula, (Malo 1919-1920, translated in Maly 1996:25)

2) What is the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action?

For inclusion in this FEA, consultation sections were redacted per Nohopapa's informed consent obligation to honor and respect consultees' Intellectual Property Rights

3) What feasible action(s), if any, should be taken to reasonably protect any identified cultural, historical, or natural resources, and exercise of traditional and customary native Hawaiian rights in the affected area

For inclusion in this FEA, consultation sections were redacted per Nohopapa's informed consent obligation to honor and respect consultees' Intellectual Property Rights

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