

ENVIRONMENTAL ASSESSMENT

YAMADA AND SONS ROCK QUARRY

APPENDIX 3

Cultural Impact Assessment

Note: The CIA was prepared on the basis of a quarry size of 51.92 acres, which was subsequently reduced to 37.882 acres, all within the 51.92-acre footprint. The action was undertaken in part because of recommendations of the CIA to avoid the area of partially intact native forest. It was not necessary to adjust most of the text of the CIA, but the conclusions section on Page 64-65 was adjusted to reflect the reduced area and impact of the project.

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A Cultural Impact Assessment for a Proposed 50.192-acre Yamada Quarry Site

TMK: (3) 2-1-013:002 por.

Waiākea Ahupua‘a
South Hilo District
Island of Hawai‘i



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1. INTRODUCTION

At the request of Ron Terry of Geometrician Associates, LLC on behalf of Yamada & Sons, Inc. (the applicant), ASM Affiliates (ASM) has prepared this Cultural Impact Assessment (CIA) to inform a Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment (EA) for a proposed 50.192-acre quarry and stockpiling site located within a portion of State owned lands (Tax Map Key: (3) 2-1-013:002 por.) in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i (Figures 1 and 2). The proposed quarry site comprises a portion of a 2,407.756-acre agriculturally-zoned parcel currently owned by the State of Hawai'i (leased to the United States Department of Transportation) and is located within a 113.382-acre portion of the subject parcel that was designated as a "Borrow Pit Site" during the early 1960s. The proposed project area is situated directly east of a 14.99-acre parcel (Parcel D) that is currently used by Yamada & Sons, Inc. for quarrying and stockpiling purposes (Figures 3 and 4).

This CIA study is intended to inform an HRS Chapter 343 Environmental Assessment (EA) conducted in compliance with HRS Chapter 343; pursuant to Act 50 and in accordance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impact*, adopted by the Environmental Council, State of Hawai'i, on November 19, 1997. Act 50, which was proposed and passed as Hawai'i State House of Representatives Bill No. 2895 and signed into law by the Governor on April 26, 2000, specifically acknowledges the State's responsibility to protect native Hawaiian cultural practices. Act 50 further states that environmental assessments . . . should "assess the effects of a proposed action on the cultural practices of the community and State" and that . . . "native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the 'aloha spirit' in Hawai'i." Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on governmental agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups. Article IX, section 9 of the state constitution gives the State the power to "preserve and develop the cultural, creative and traditional arts of the various ethnic groups." While Article XII, section 7 of the state constitution requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights."

This report is divided into five main sections, beginning with an introduction and a general description of the project area location, followed by a detailed culture-historical background for Waiākea Ahupua'a and a presentation of prior studies that have been conducted within the vicinity of the proposed project area; all of which combine to provide a physical and cultural context for the proposed quarry site. The results of the consultation process are then presented, along with a discussion of potential impacts as well as appropriate actions and strategies to mitigate any such impacts. Lastly, section five contains a post-study update that details the actions taken by the applicant following the submission of the draft CIA, which resulted in a reduction of the size of the proposed quarry site from 51.192 acres to 37.882 acres. The applicant's decision to reduce the size of the proposed quarry site is a mitigative action to avoid adversely impacting a seemingly healthy portion of intact 'ōhi'a forest as well as the Drag Strip road; the former of which was found to be a valued cultural resource. This section also includes a revised discussion of findings and conclusions.



Figure 1. A portion of 2017 U.S.G.S. 7.5 minute Hilo quadrangle showing project area location.

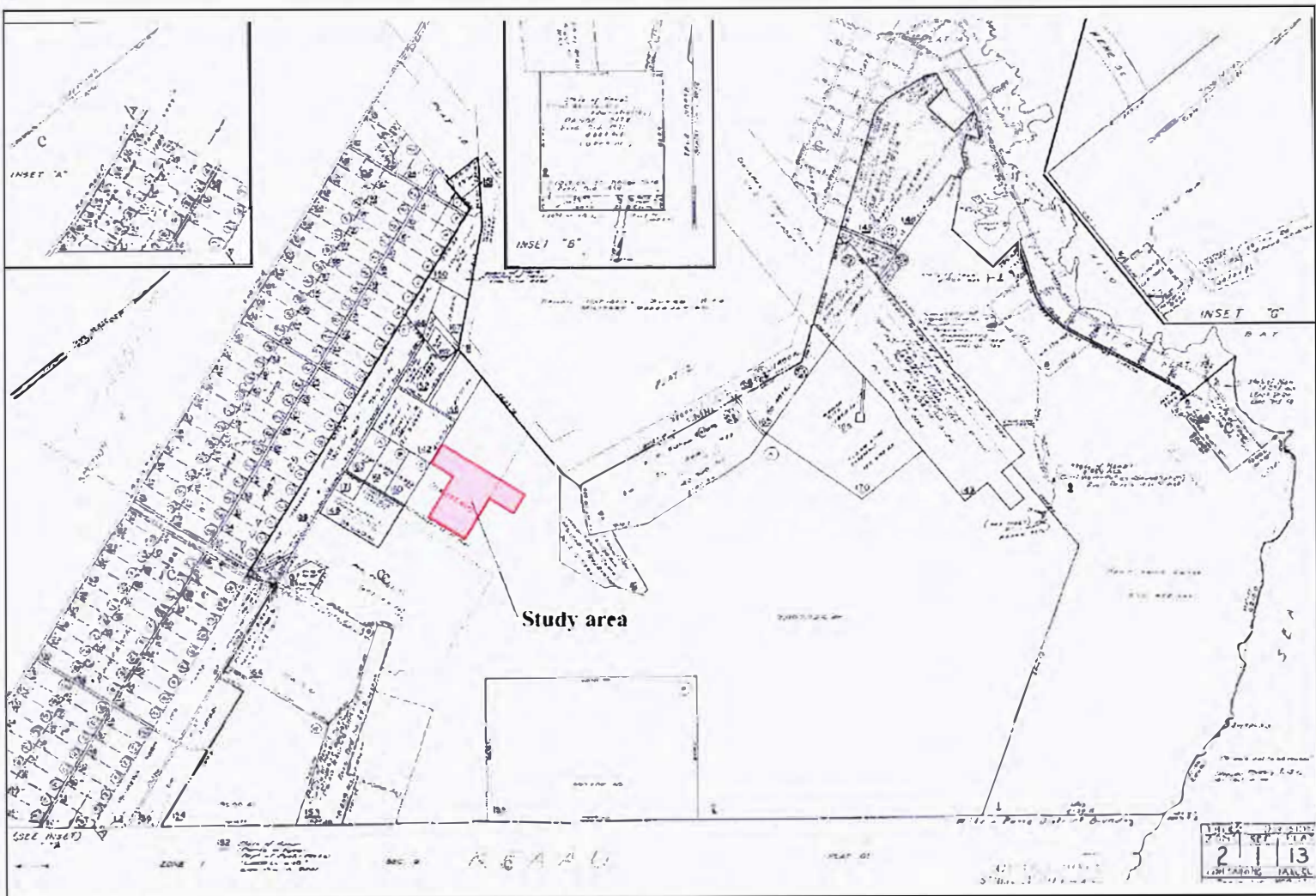


Figure 2. Tax Map Key (3) 2-1-013 showing the location of the current study parcel (002).

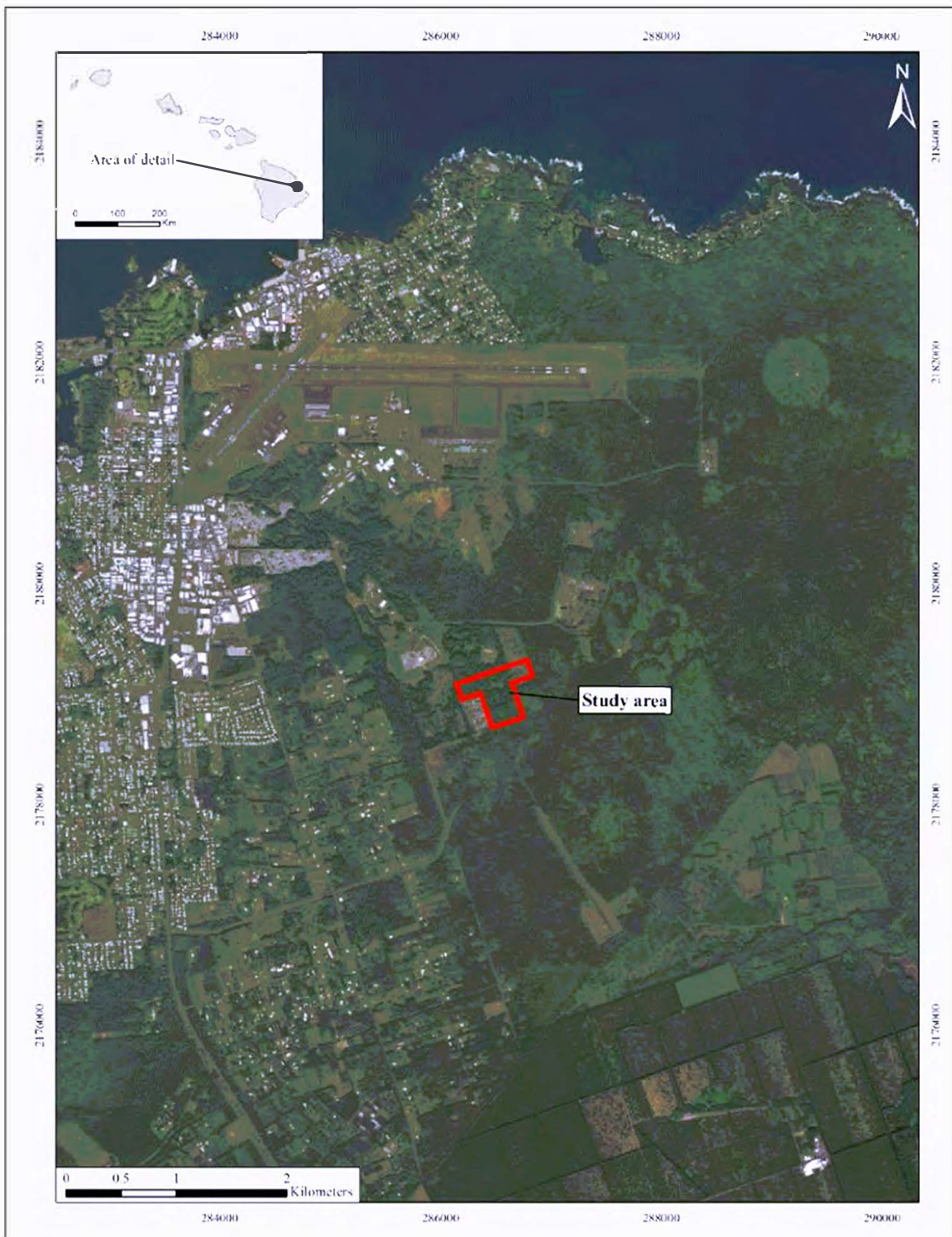


Figure 3. Google Earth™ satellite image showing the study area location (outlined in red).

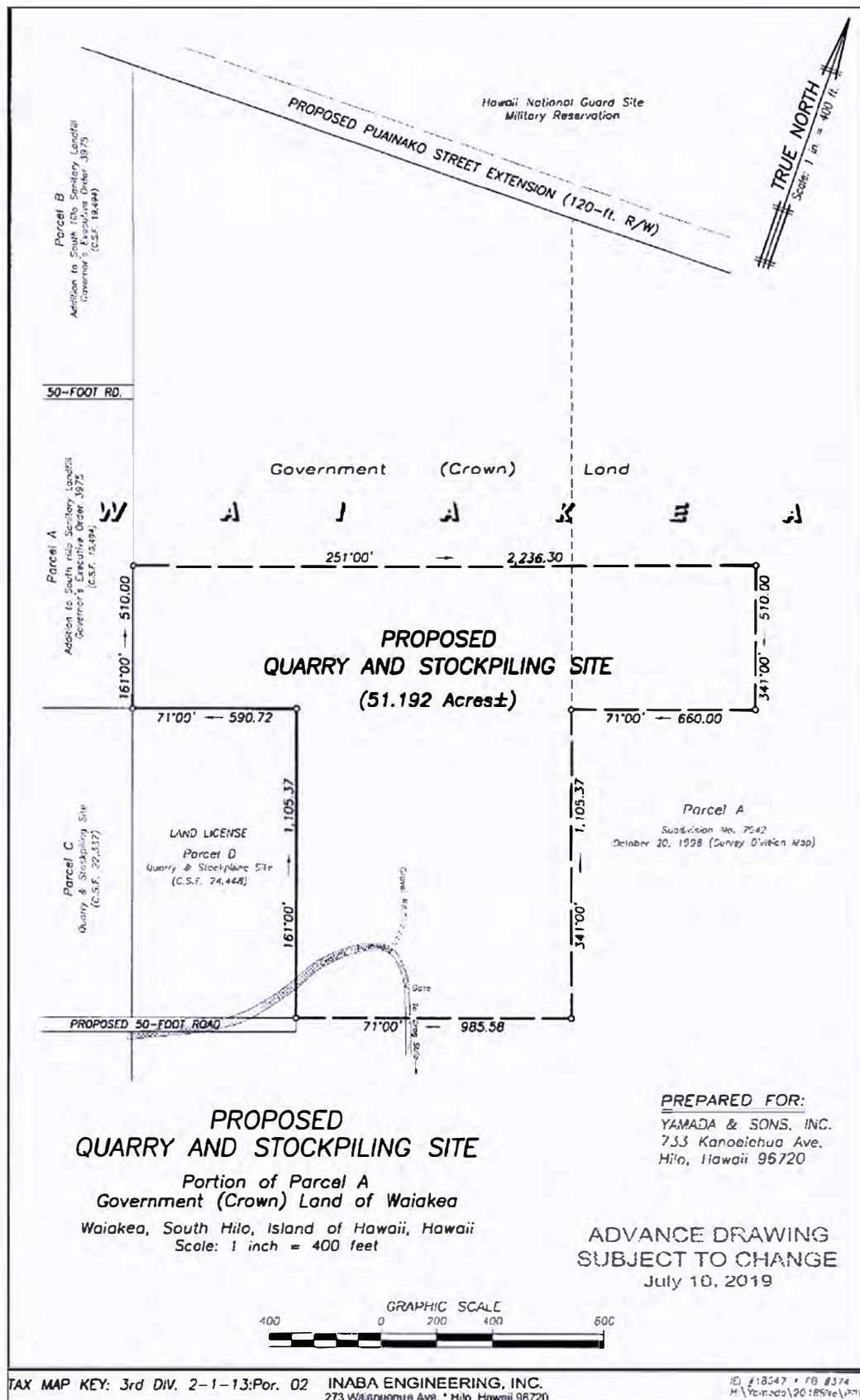


Figure 4. Proposed site plan for quarry and stockpiling site.

PROJECT AREA DESCRIPTION

The project area encompasses 50.192-acres situated in the Pana'ewa portion of Waiākea Ahupua'a, South Hilo District, Island of Hawai'i (see Figure 1). It is situated on the eastern flank of Mauna Loa Volcano at elevations ranging from 80 to 100 feet (24 to 30 meters) above sea level and is roughly four kilometers inland from the coast (see Figure 1). The project area is accessed by a gated, paved road that extends northwest from the Pana'ewa Drag Strip road (see Figure 3). The access road extends northwest from the drag strip road (Figure 5), bisecting the southern portion of the project area into two equal halves (Figure 6), before turning to the northeast. Mechanically-created, earthen berms containing piles of gravel and scattered modern trash (e.g. rubber tires, glass/plastic bottles, car parts, and other assorted rubbish) are present along both of edges of the roadway (Figure 7). To the west, the project area is bounded by an existing 14.99-acre parcel (Parcel D) that is currently used by Yamada & Sons, Inc. for quarrying and stockpiling purposes (Figure 8), and by a section of Parcel A designated as part of the South Hilo Sanitary Landfill property. Large earthen berms, from prior mechanical disturbance, are present along the boundaries with these two properties. The northeastern corner of the existing quarry site (Parcel D) is marked by a metal pipe protected by concrete barriers (Figure 9). The project area is surrounded on the remaining sides by previously disturbed, but currently undeveloped, lands within TMK: (3) 2-1-013:002. The County of Hawai'i-Department of Parks and Recreation's Trap and Skeet Range is situated just to the north of the proposed quarry site (see Figure 3), and a large area in the northeastern portion of project area has been previously graded flat and covered with gravel (Figure 10). This graded area, which contains two corrugated aluminum storage sheds that are currently used for the storage purposes (Figure 41), are accessed by an offshoot of the primary paved access road that extends northeast (Figure 41). Other indications of previous disturbance within the study area include bulldozer cuts (Figure 41), berms (Figure 41), push piles, and modern rubbish (Figures 15 and 16), all of which are prevalent, especially within the western and northern portions of the proposed quarry site.



Figure 5. Pana'ewa Drag Strip road with entrance to study area pictured on left, view to the northeast.



Figure 6. Paved roadway leading into study area from the Pana'ewa Drag Strip road, view to the southeast.



Figure 7. Berm extending along the eastern edge of a paved roadway that bisects the southern half of project area, view to the southwest.



Figure 8. Existing quarry site on Parcel D, view to the north with the project study area visible in the background (at the tree line).



Figure 9. Boundary marker at the northeastern corner of the existing quarry site (Parcel D), view to the southeast.



Figure 10. Graded area in the northeastern portion of project area, view to the east.



Figure 11. Modern corrugated aluminum storage sheds and equipment in northeastern corner of project area, view to the northeast.



Figure 12. Road accessing the northeastern portion of the project area, view to the east.



Figure 13. Bulldozer cut in eastern portion of project area, view to the northwest.



Figure 14. Typical bulldozer berm within the project area, view to the northeast.



Figure 15. Modern rubbish pile of glass bottles, overview.



Figure 16. Accumulation of modern rubbish in the northeast corner of project area, view to the southwest.

Vegetation

Due to the prior mechanical disturbance, vegetation within the project area is comprised of numerous alien species mixed with a few indigenous and endemic species within a secondary forest setting (Figure 17). The overstory canopy is formed by plant species such as melochia (*Melochia umbellata*), bingabing (*Macaranga mappia*), autograph trees (*Clusia rosea*), strawberry guava (*Psidium cattleianum*), umbrella trees (*Schefflera actinophylla*), gunpowder trees (*Trema orientalis*), Albizia (*Falcataria Moluccana*) and hala (*Pandanus tectouris*). The understory consists of various vines, ferns, and weeds such as Koster's curse (*Clidemia hirta*), philodendron (*Philodendron cordatum*), arthrostema (*Arthrostemma ciliatum*), honohono grass (*Commelina diffusa*), and various other grasses. The southwestern corner of the project area (generally corresponding to the location of the Opihikao soils; see Figure 21), where the least amount of mechanized clearing appears to have occurred in the past, contains the most intact section of native forest where species such as 'ōhi'a lehua (*Metrosideros polymorpha*), uluhe (*Dicranopteris linearis*), and hala dominate (Figures 18 and 19). This vegetation pattern is indicative of what the landscape in the vicinity of the study area would have looked like prior to the widespread mechanical disturbances that occurred in the 20th century.

Soils and Geology

Geologically, the project area is situated on mixed 'a'ā and pāhoehoe lavas flows originating from Mauna Loa Volcano approximately 1,000 to 2,000 years B.P. (Figure 20). Collectively these lava flows have been designated by Trusdell and Lockwood (2017) as the Pana'ewa picrate flow. Soils that have developed on (and from) these lava flows are classified as Papai extremely cobbly highly decomposed plant material on 2 to 10 percent slopes (428), and Opihikao highly decomposed plant material on 2 to 20 percent slopes (664). The Papai soils are present across the majority of the project area, but a small area of the Opihikao soils, corresponding to the edge of a raised 'a'ā flow, are present in the southwest corner (Figure 21). Both are well-drained, thin, and extremely stony organic soils overlying cobbly substrates (Soil Survey Staff 2019), but the Papai soils are slightly thicker in profile (0-10 inches) than the Opihikao soils (0-3 inches). The terrain is characterized by mostly level to gentle to moderately undulating topography punctuated with the occasional small culturally-sterile lava blister, particularly within more forested sections in the eastern half of the study area. Mean annual rainfall in the area averages approximately 3346 millimeters (132 inches), with the majority of rainfall occurring in November and the least occurring in the summer months of May and June (Giambelluca et al. 2013). The project area vicinity is characterized by a cool climate with a mean annual temperature ranging from 70 to 73 degrees Fahrenheit throughout the year (Soil Survey Staff 2019).



Figure 17. Typical vegetation in previously disturbed area consisting of non-native species, view to the east.



Figure 18. Typical native-dominant vegetation pattern in minimally disturbed areas, view to the northwest.



Figure 19. Typical undergrowth of *uluhe* in a minimally disturbed area, view to the northeast.

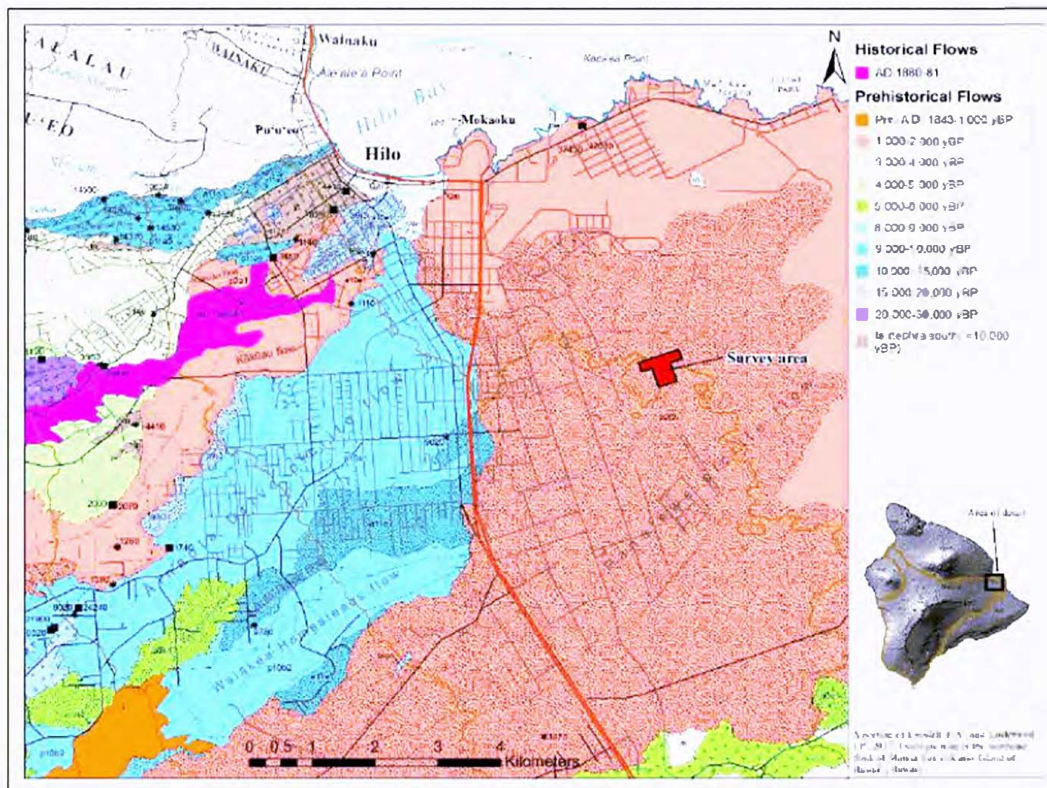


Figure 20. Geology of current project area with parcel outlined in red.



Figure 21. Soils in the vicinity of the current project area.

2. BACKGROUND

This section of the report includes a discussion of the culture-historical background for the project area and a synthesis of relevant prior research. This information is presented to provide a comprehensive understanding of the cultural significance of the study area and general vicinity and to establish an analytical basis for the assessment of any potential cultural impacts. The ability to assess the cultural significance of the current study area parcel is contingent upon developing (at a minimum), a comprehensive understanding of the *ahupuaʻa* in which the study area is located. As will be demonstrated in the ensuing section and particularly with the traditional Hawaiian legendary accounts, a consideration of the broader region and island landscape is also required at times. The culture-historical context presented below for Waiākea Ahupuaʻa is based on original research conducted by ASM at various online repositories as well as physical repositories including the University of Hawaiʻi at Hilo Moʻokini Library, State Historic Preservation Division library, and the Hawaiʻi State Archives.

CULTURAL-HISTORICAL CONTEXT

The chronological summary presented below begins with the peopling of the Hawaiian Islands and a generalized model of Hawaiian Prehistory followed by a summary of Historic events in the Hawaiian Islands after the arrival of foreigners. The discussion continues with a presentation of legendary and historical references to Waiākea Ahupuaʻa. This summary includes oral traditions and first-hand Historic accounts recorded by visitors and missionaries related to Waiākea and at times the culturally significant Panaʻewa forest. Land use practices and significant historical events in the study area vicinity are also presented, including commercial sugar cultivation, the development of the railroad, and the establishment of the nearby Hawaiian Homestead community of Keaukaha and Panaʻewa, as well as the construction of the Hilo Airport and the quarry site. A synthesis of previous relevant archaeological and cultural studies are also discussed.

A Generalized Model of Hawaiian Prehistory

While the question of the timing of the first settlement of Hawaiʻi by Polynesians remains unanswered, several theories have been offered that derive from various sources of information (i.e., genealogical, oral-historical, mythological, radiometric). However, none of these theories is today universally accepted (c.f., Kirch 2011). What is more widely accepted is the answer to the question of where Hawaiian populations came from and the transformations they went through on their way to establish a uniquely Hawaiian culture. The initial settlement in Hawaiʻi is believed to have

originated from the southern Marquesas Islands (Emory in Tatar 1982). During these early times, Hawai'i's inhabitants were primarily engaged in subsistence-level agriculture and fishing (Handy and Handy 1991). This was a period of great exploitation and environmental modification when early Hawaiian farmers developed new subsistence strategies by adapting their familiar patterns and traditional tools to their new environment (Kirch 1985; Pogue 1978). Their ancient and ingrained philosophy of life tied them to their environment and kept order; which was further assured by the conical clan principle of genealogical seniority (Kirch 1984). According to Fornander (1880), the Hawaiians brought from their homeland certain universal Polynesian customs and belief: the major gods Kāne, Kū, and Lono; the *kapu* system of law and order; cities of refuge; the *'aumakua* concept; and the concept of *mana*. The initial permanent settlements were established at sheltered bays with access to freshwater and marine resources. These communities shared extended familial relations and there was an occupational focus on the collection of marine resources. Over a period of a few centuries, the areas with the richest natural resources became populated and perhaps even crowded, and there was increasing separation of the chiefly class from the common people. As populations increased so did societal conflict, which resulted in war between neighboring groups (Kirch 1985). Soon, large areas of Hawai'i were controlled by a few powerful chiefs.

As time passed, a uniquely Hawaiian culture developed. The portable artifacts found in archaeological sites of this next period reflect an evolution of the traditional tools and distinctly Hawaiian inventions. The adze (*ko'i*) evolved from the typical Polynesian variations of plano-convex, trapezoidal, and reverse-triangular cross-section to a very standard Hawaiian rectangular quadrangular tanged adze. The two-piece fishhook and the octopus-lure breadloaf sinker are Hawaiian inventions of this period, as are *'ulu maika* stones and *lei niho palaoa* (ivory pendant). The latter was a status item worn by those of high rank, indicating a trend toward greater status differentiation (Kirch 1985). As the population continued to expand so did social stratification, which was accompanied by major socioeconomic changes and intensive land modification. Most of the ecologically favorable zones of the windward and coastal regions of all major islands were settled and the more marginal leeward areas were being developed. During this expansion period, additional migrations to Hawai'i occurred from Tahiti in the Society Islands. Rosendahl (1972) has proposed that settlement at this time was related to seasonal, recurrent occupation in which coastal sites were occupied in the summer to exploit marine resources, and upland sites were occupied during the winter months, with a focus on agriculture. An increasing reliance on agricultural products may have caused a shift in social networks as well; as Hommon (1976) argues, kinship links between coastal settlements disintegrated as those links within the *mauka-makai* settlements expanded to accommodate the exchange of agricultural products for marine resources. This shift is believed to have resulted in the establishment of the *ahupua'a* system sometime during the A.D. 1400s (Kirch 1985), which added another component to an already well-stratified society. The implications of this model include a shift in residential patterns from seasonal, temporary occupation, to the permanent dispersed occupation of both coastal and upland areas.

Adding to an already well-stratified society was the development of the *ahupua'a*—the principle land division that functioned for both taxation purposes and furnished its residents with nearly all of the fundamental necessities from which they sustained themselves. The *ahupua'a* became the equivalent of a local community, with its own social, economic, and political significance and served as the taxable land unit during the annual *Makahiki* procession (Kelly 1956). During this annual procession, the highest chief of the land sent select members of his retinue to collect tribute in the form of goods from each *ahupua'a*. The *maka'āinana* (commoners) who resided in the *ahupua'a* brought their share of tribute and offerings to an *ahu* (altar) that was symbolically marked with the image of a *pua'a* (pig). *Ahupua'a* were ruled by *ali'i 'ai ahupua'a* or chiefs who controlled the *ahupua'a* resources; who, for the most part, had complete autonomy over this generally economically self-supporting piece of land (Malo 1951). *Ahupua'a* lands were in turn, managed by an appointed *konohiki* or lesser chief-landlord (ibid.). The *ali'i 'ai-ahupua'a*, in turn, answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire district) (ibid.). Thus, *ahupua'a* resources supported not only the *maka'āinana* and *'ohana* (families) who lived on the land but also contributed to the support of the royal community of regional and/or island kingdoms. *Ahupua'a* are land divisions that typically incorporated all of the eco-zones from the mountains to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base (Hommon 1986). Although the *ahupua'a* land division typically incorporated all of the eco-zones, their size and shape varied greatly (Cannelora 1974). This form of district subdividing was integral to Hawaiian life and was the product of resource management planning that was strictly adhered to. In this system, the land provided fruits and vegetables and some meat for the diet, and the ocean provided a wealth of protein resources (Rechtman and Maly 2003). In communities with long-term royal residents, divisions of labor (with specialists in various occupations on land and in the procurement of marine resources) were also strictly enforced.

By the 17th century, large areas of Hawai'i Island were controlled by a few powerful *ali'i 'ai moku*. There is island-wide evidence to suggest that growing conflicts between independent chiefdoms were resolved through

warfare, culminating in a unified political structure at the district level. It has been suggested that the unification of the island resulted in a partial abandonment of portions of leeward Hawai'i, with people moving to more favorable agricultural areas (Barrera 1971; Schilt and Sinoto 1980). 'Umi a Līloa, a renowned *ali'i* of the Pili line, is often credited with uniting the Island of Hawai'i under one rule during the Precontact Period (Cordy 1994). 'Umi-a-Līloa is also credited with formalizing the land division system on Hawai'i Island and separating the various classes of chiefs, priests, and laborers (Beamer 2014; Cordy 2000; Kamakau 1992). Upon the death of 'Umi-a-Līloa, Hawai'i Island came under the control of his eldest son Keli'iokāloa-A-'Umi (Cordy 2000), whose reign is marked by his mistreatment of the lesser chiefs and commoners. His reign was short-lived and by the early-18th century, Hawai'i Island fell under the control of Alapa'inui, who assembled a robust army and assigned his closest potential usurpers (his nephews Keawema'uhili, Kalani'ōpu'u, and Keōua) as generals in his militia. The prodigious 'Ī clan, spread across the districts of Ka'ū, Puna, Hilo, and portion of Hāmākua was also a powerful force and threat to Alapa'i campaign (Cordy 2000). As Alapa'i gathered his forces to strike back at Kekaulike, the *ali'i mui* of Maui, the high ranking *ali'i wahine* (chiefess) Keku'iapo'iwa made her way to Kokoiki. Kohala and give birth to Pai'ea, the birth name of Kamehameha (ibid.). Kamehameha was reared in the traditions and customs of the ancient chiefs and trained under some of the most skilled warriors of that time including Kekuhaupio. Upon Alapa'i's death, his eldest son Keawe'ōpala was named heir to his father's kingdom.

By the mid-18th century, the young and determined Kamehameha directed his efforts toward consolidating Hawai'i Island under his rule. To accomplish this monumental task, Kamehameha continued his training under his more experienced kin namely Kalani'ōpu'u, who was the *ali'i mui* of Hawai'i Island ('Ī 1959). During Kalani'ōpu'u's reign, the first foreign vessels arrived in Hawaiian waters captained by the British explorer, James Cook. Cook first landed at Waimea, Kaua'i in 1778 and in 1779, he anchored just off the shore of Kealahou Bay, Kona, Hawai'i. Aboard these ships were innovative technologies and diseases unknown to the inhabitants of these islands. Items such as metal, nails, guns, canons, and the large foreign vessels themselves stirred the interest of the *ali'i* and *maka'āinana* alike. Acquisition of these technological advancements came through barter. This resulted in the *ali'i* gaining possession of such items that ultimately set traditional Hawaiian warfare in new trajectory; one that would be forged by none other than Kamehameha. Wars occurred regularly between intra-island and inter-island politics during this period. It was during this time of warfare that Kamehameha, who would eventually rise to power and unite all the Hawaiian Islands under one rule (Kamakau 1992).

A Brief History of Hawai'i After Western Contact

Hawaiians first significant encounter with Europeans marked the end of the Precontact Period and the beginning of the Historic Period. With the arrival of foreigners, Hawai'i's culture and economy were drastically altered. Demographic trends during this period indicate population reduction in some areas, due to war and disease, yet increases in others, with relatively little modification of material culture. There was a continued trend toward craft and status specialization, intensification of agriculture, *ali'i* controlled aquaculture, upland residential sites, and the enhancement of traditional oral history. The traditions associated with Kū including *luakini heiau*, and the *kapu* system were at their peaks, although Western influence was already altering the cultural fabric of the Islands (Kent 1983; Kirch 1985). Foreigners very quickly introduced the concept of trade for profit, and by the time Kamehameha I had conquered O'ahu, Maui, and Moloka'i, in 1795, Hawai'i saw the beginnings of a market system economy (Kent 1983). This marked the end of an era of uniquely Hawaiian culture. Some of the work of the commoners shifted from subsistence agriculture to the production of foods and goods that they could trade with early visitors. Introduced foods often grown for trade with Westerners included yams, coffee, melons, potatoes, corn, beans, figs, oranges, guava, and grapes (Wilkes 1845).

On May 8th, 1819, Kamehameha, who had seen the impacts brought about by foreign introductions, died at his royal residence at Kamakahonu in Kailua-Kona and named his son 'Iolani Liholiho heir to his kingdom (Kamakau 1992). By May 21st 'Iolani Liholiho (Kamehameha II) at the age of twenty-one began his rule. As traditional custom dictated and to allow for all people to rightfully mourn the loss of their chief, all *kapu* were relaxed following the death of a chief (ibid.). It was the responsibility of the new ruler to conduct the proper rituals and ceremonies to reinstate all *kapu*. However, Liholiho's attempts to reinstate the long-standing *kapu* system was futile and the future of the *kapu* system stood in a state of uncertainty. *Kuhina Nui* (Premier), Ka'ahumanu (the wife of Kamehameha and the *hānai* (adopted) mother of Liholiho) and his biological mother Keōpūolani lured the young chief back to Kona and the *kapu* system was symbolically abolished when Liholiho ate in the presence of his mothers. While Liholiho, his mothers and other chiefs favored the complete abolishment of the *kapu* system, others including Kekuakalani and his followers prepared to wage war, determined to have the ancient laws reinstated. After several failed attempts at negotiation, Liholiho's army led by Kalaimoku went head-to-head against the forces of Kekuakalani in the Battle of

Kuamoʻo (Fornander 1918–1919). Western weaponry had already permeated traditional Hawaiian warfare and Kekuaokalani, who stood behind the ancient laws of the land was killed by gunfire on the battlefield alongside his wife Manono, thereby extinguishing the last public display of resistance. The abolishment of the *kapu* system in 1819, began to undermine the very foundations upon which traditional Hawaiian culture was formed. Adding to an already socially and politically fractured society was the arrival of Protestant missionaries who saw it to be their destiny to fill the spiritual void of the Hawaiian people.

In October of 1819, just five months after the death of Kamehameha, the first American Protestant missionaries aboard the Brig. *Thaddeus* left Boston, Massachusetts and by March 30th, 1820, they sailed to Kawaihā on the northwest coast of Hawaiʻi Island (Hawaiian Mission Children’s Society 1901). Having heard of the overturning of the ancient *kapu* system, these early missionaries formed close alliances with some of Hawaiʻi’s royalty, including Kaʻahumanu who held a tremendous amount of political power. Starting in 1823, these early missionaries, one of which included William Ellis (1917) set out into the remote parts of the islands in search of suitable locations for future mission stations and within a few short years, mission stations were being constructed outside of the main town centers. Christian beliefs quickly spread and soon established a firm foothold in the islands. The missionaries quickly discovered that many Hawaiians were selective about what aspects of Christianity they were willing to adopt. In striving for complete conversion, the missionaries with the help of the *aliʻi* implemented laws that enforced Euro-American beliefs on the Hawaiian people. To an extent, this furthered the efforts of the missionaries. Despite these massive cultural changes, many Hawaiians continued to hold to their ancient beliefs, especially those associated with their relationship to the land. Throughout the remainder of the 19th century, introduced diseases and global economic forces continued to degrade the traditional life-ways of the Hawaiian people.

WAIĀKEA AHUPUAʻA, PANAʻEWA, AND THE GREATER HILO DISTRICT

The current project area is within the traditional *ahupuaʻa* of Waiākea, whose name has been literally translated by Pukui et al. (1974:220) as “broad waters.” Noted Hawaiian Historian and Ethnographer Kepā Maly (1996a:A-5) adds to this translation, noting that the name can also be translated to mean “expansive—much water.” Maly (ibid.:A-5) goes on to explain that “in Hawaiian culture, water was the source of wealth”...and that reference to *wai* (fresh water) figuratively expresses the traditional value of these lands. The *ahupuaʻa* of Waiākea extends from the coast and is bounded on the north by Kūkūau 1st Ahupuaʻa. Waiākea shares its southern boundary with two *ahupuaʻa* of the Puna District. Keaʻau at its southeast end and ʻŌlaʻa at its southwest end. Waiākea is bound as its westernmost end by Humuʻula Ahupuaʻa (located in the Hilo District) and Keauhou Ahupuaʻa (located in the Kaʻū District).

Waiākea Ahupuaʻa is one of the many *ahupuaʻa* that together comprise the traditional *moku* (district) of Hilo, which is one of six *moku* on Hawaiʻi Island. The Hawaiian *ʻōlelo noʻeau* (proverbial saying), “*Hilo, mai Mawae a ka pali o Maulua*” (Pukui 1983:108) details the extent of the Hilo District spanning from Māwae, a large fissure and boundary marker separating Hilo from the Puna District at the south end and Maulua, a gulch separating Hilo from the Hāmākua District at its north end. Handy and Handy (1991:538) provides a general description of the district and describes the principle settlement areas of the district:

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

Traditionally, the *moku* of Hilo was divided into three *ʻokana* (sub-districts) with place names that have their origins in legendary times. The three *ʻokana* are (from north to south): Hilo Palikū—characterized by its upright cliffs, this area of Hilo extends north of the Wailuku River to Kaʻula Gulch. The *ʻōlelo noʻeau*, “*Hilo iki, pali ʻeleʻele*” describes this sub-district noted for its greenery, rain, and mists (Pukui 1983:107). The second *ʻokana* is Hilo One—or sandy Hilo, which extends along the shoreline of Hilo Bay between the Wailoa and Wailuku rivers; and finally, Hilo Hanakahi—the land region extending south of Wailoa River to include Keaukaha and Panaʻewa (Edith Kanakaʻole Foundation 2012; Pukui 1983). The current study area is within the *ʻokana* of Hilo Hanakahi, a subdistrict often celebrated in many *mele* (song) composed for Hilo, with the infamous line “*Hilo Hanakahi, i ka ua Kani-lehua*” translated as “Hilo [land of] chief Hanakahi and of the rain that gives drink to *lehua* flowers” (Pukui and Elbert

1986:129). Another *‘ōlelo no ‘eae* describing Hanakahi and the rains of Hilo reads, “*Lu‘ulu ‘u Hanakahi i ka ua nui*” translated as “[w]eighted down is Hanakahi by the heavy rain” (Pukui 1983:219). Pukui (ibid.) expands on this saying, noting that “Hanakahi, Hilo was named for a chief of ancient times. This expression was much used in dirges too express heaviness of the heart, as tears pour like rain.” The source of these *‘okana* are found in the legendary account titled “*Ka ‘ao Ilo ‘oniua Pu ‘uwai no Ka-Miki*” (“The Heart Stirring Story of Ka-Miki”) published in Hilo’s Hawaiian language newspaper *Ka Hōkū O Hawai‘i* between January 8th, 1914, through December 6th, 1917. Maly, who compiled and translated this lengthy account explains that:

The narratives were written by John Wise and J.W.H.I Kihe, noted Hawaiian scholars of the late 1800s and early 1900s, historians who also collaborated on the translations of Abraham Fornander’s collection. The authors used place names as the line with which to tie together fragments of site-specific stories that had been handed down over the generations. Thus, while in many cases, the personification of individuals and their associated place names may not be “ancient,” the site documentation within the story is of great value. (Maly 1996a:A-4)

In that portion of the legend that references the Hilo area, Ka-Miki and his companions, Maka-‘iole and Keahialaka, continue their journey circumnavigating Hawai‘i Island coming out of the Puna District into Hilo. In drawing from this legendary account, Maly (1996a:A-2) notes that Waiākea Ahupua‘a was named in honor of the high chief Waiākea-kumu-honua, a brother of Pana‘ewa-nui-moku-lehua (female) and Pi‘ihonua-a-ka-lani (male). While the aforementioned accounts provide a possible origin of the naming of Waiākea, Maly (1996a:A-2), in relating a personal account from Clarence Moku‘ōhai Medeiros, mentions that *waiākea* “is also a native variety of taro, similar to the better known *lehua*, but with black streaks along the edges of the stalks.” Maly also provides the following translation of ethnographic notes taken by Theodore Kelsey during an interview with Mrs. Kamakakuikalani in 1921 that explains how the *ahupua‘a* of Waiākea was established:

Kapapala and Waiakea were sub-chiefs who were told by their superior to run around the tracts of land bearing their names (from Tom Cook, surveyor) (BPBM SC Kelsey Box 1.5, July 2, 1921:2 in Maly 1996a:A-11)

Kelsey also related that “Waiākea was so named ‘because you could dig any where [sic] and find water’” (Maly 1996a:A-11). The names of the legendary people of this area are commemorated in the place names for several land units (both the *ahupua‘a* and their components including *‘ili*) that comprise portions of the Hilo District. The lands of Hilo were further divided into *ahupua‘a* that today retain their original names (Kelly et al. 1981). These lands included but are not limited to the subject *ahupua‘a* of Waiākea—which forms the southernmost boundary of the Hilo District in addition to Punahoa, Ponahawai, Kūkūau, and Pi‘ihonua, all of which are found between Waiākea and the massive Wailuku River (Figure 22).

Waiākea Ahupua‘a: A Center of Chiefly Occupation

According to legendary and historical accounts, the rich and fertile lands of Waiākea were deeply cherished by the chiefs. Several traditional accounts make passing reference to Waiākea as the birthplace and residence of chiefs. In Fornander’s (1916–1917) *Legend of Kapuaokaoheloai*, Kū and Hina, who are recognized as paramount gods, had two children, their son Hookeakaikapakaakaua and their daughter Kapuaokaoheloai. Fornander (ibid.:540-541) writes, “*O Waiakea, i Hilo ka aina, o ka mua ke kaikunane, o ka muli ke kaikuahine, he mau alii lakou no Hilo*” to which he translated as “The brother was the first born and the sister the last. These people were of high chief rank of Hilo.” Various historical accounts also expound on this with multiple references to select places within Waiākea as royal residences. Sometime after the rule of the late 16th century chief, ‘Umi-a-Līloa, select portions of Waiākea, where bodies of freshwater are ever-present, were set aside as semi-autonomous land units known as *‘ili kūpono* or *‘ili kū* (Brandt 2017; Cordy 2000:200). These *‘ili kūpono* (independent land divisions) paid tribute directly to an *ali‘i nui* (high chief) rather than to the *ali‘i-‘ai-ahupua‘a* (chief who controlled the *ahupua‘a* resources) and required its inhabitants to pay a labor tax (Beamer 2014). Curtis J. Lyons, who worked as surveyor for the Hawaiian Kingdom government during the late 19th century and early 20th century further expounds on the political implication of this unique type of land division, writing:

The *ili kupono*, on the contrary, was nearly independent. The transfer of the *ahupua‘a* to a new chief did not carry with it transfer of the *ili kupono* contained within its limits. The chiefs previously holding the *ili kupono* continued to hold them, whatever the change in the *ahupua‘a* chief, having their own *koeles* (chiefs’ patches,) worked by their retainers. There was however, a slight tribute of work due to the *ahupua‘a* chief; sometimes one or two days in the month; sometimes even less, or only certain days in the year. (Lyons 1875:119)

Within Waiākea are three *‘ili kūpono*, namely Pi‘opi‘o, Makaokū, both of which are adjacent to Hilo Bay and located further east is Honohononui (see Figure 41) (Brandt 2017; Edith Kanaka‘ole Foundation 2012). The proposed quarry site is located approximately 0.4 miles (0.7 kilometers) southwest of the *‘ili kūpono* of Honohononui, which in itself has a rich history and is associated with the powerful *‘Ī* chiefs that ruled over Hilo and its adjacent districts during the 15th century (Cordy 2000; Edith Kanaka‘ole Foundation 2012). Similarly, Pi‘opi‘o has a long history of being a royal residence as Stephen Desha (2000:76), who was a prolific writer, senator, and pastor during the early 19th century refers to Pi‘opi‘o as “a place of residence of chiefs from ancient times”, and mentioned that Keawemauhili’s wife, Ululani had her residence there. During Alapa‘inui’s reign, Keōua (Kamehameha I’s father) died at Pi‘opio in 1752, and later Keōua’s brother, Kalani‘ōpu‘u also lived and died at Pi‘opi‘o (Kamakau 1992). Kamakau (1992), Thrum, and Fornander also makes reference to Pi‘opi‘o in the account of *‘Umi-a-līloa* where they describes a gathering at Kanukuokamanu, the northeastern point of Pi‘opi‘o. It was at Kanukuokamanu that the chiefs and people gathered for a celebration where “there was hula dancing, games of hiding stones (*papuhene*), tossing a half-coconut at a mark (*kīlu*), and *loku*... (Kamakau 1992:15) It was at Kanukuokamanu that *‘Umi-a-līloa* had his encounter with his wife, *‘Iiwalani*, the fine daughter of *Kulukulua*, the chief of Hilo (Thrum 1923). After the night’s festivities had come to an end, *‘Umi-a-līloa* approached his wife and inquired about her royal pendant necklace that was made of *wiliwili* (*Erythrina sandwicensis*) wood. In an act to demonstrate his disapproval of the material from which her necklace was made, *‘Umi-a-līloa* broke *‘Iiwalani*’s necklace and with deep sadness and regret, the woman told her father about her husband’s insulting actions. This incident eventually led to a war between the two chiefs and *‘Umi-a-līloa* of *Hāmākua* became acknowledged as the chief of Hilo. a

According Kamakau (1961) *‘Umi*’s conquest began with his defeat of the Hilo chiefs and that his reign lasted until around ca. A.D. 1620, and was followed by the rule of his son, Keawenui a *‘Umi*, who ruled *Hāmākua*, *Puna*, and *Hilo* from his royal residence in *Hilo*. *‘Umi*’s descendants continued to rule until *Alapa‘inui*, a descendant of the *Mahi* family of *Kohala*, conquered the island in the early 1700s (Cordy 2000). During the reign of *Alapai*, *Johna Papa ‘Ī‘Ī*, a Hawaiian historian who served in the royal court of *Kamehameha* recounts:

Alapai, ruler of Hawaii [from c. 1730-1754] and great uncle of *Kamehameha*, and his wife *Keaka* took charge of him [*Kamehameha*]. Some years later, *Alapai* and his chiefs went to *Waiolama* [a river separating *Waiākea* from *Kukuau Ahupua‘a*] in *Hilo*, where *Keoua Kupuapaikalani*, the father of *Kamehameha*, was taken sick and died. Before *Keoua* died he sent for *Kalaniopuu*, his older half brother and the chief of *Kau*, to come and see him. *Keoua* told *Kalaniopuu* that he would prosper through *Kamehameha*’s great strength and asked him to take care of the youth, who would have no father to care for him. *Keoua* warned *Kalaniopuu*, saying, “Take heed, for *Alapai* has no regard for you or me, whom he has reared.” After this conversation, *Keoua* allowed his brother to go, and *Kalaniopuu* left that night for *Puaaloa* [situated in the *Pana‘ewa* portion of *Waiākea*].

As *Kalaniopuu* neared *Kalanakamaa* [in *Waiākea*], he heard the death wails for *Keoua* and hastened on toward *Kalepolepo* [near Pi‘opi‘o] where he had left his warriors. There they were attacked by *Alapai*’s men, who had followed *Kalaniopuu* from *Hilo*. First the warriors from the lowland gained, then those from the upland . . . *Kalaniopuu* continued his journey and at midnight reached *Puaaloa*, where he arranged for the coming battle. The next day all went as he had planned. His forward armies led the enemy into the forest of *Paieie*, where there was only a narrow trail, branchy on either side and full of undergrowth. There his men in ambush rose up against the enemy warriors, and his rear armies closed in behind them.

When news reached *Alapai* that his warriors had been destroyed, he sent another company of warriors to meet *Kalaniopuu* at *Mokaulele* on the outer road, which was an ancient road, known from the time of remote antiquity. (‘Ī‘Ī 1959b:3–4)

Kamakau also relates the following account which makes reference to *Waiākea* being the choice lands for the late 18th century *Hawai‘i* Island chiefs. Kamakau (1992:152) writes that after the battle of *Koapapa* between *Kamehameha* and *Keoua*, in which neither side was victorious:

Keoua retired to *Hilo*; *Kamehameha* went back to *Waipi‘o* and *Kohala*. At *Hilo* *Keoua* divided the land among his chiefs and warriors; the fat mullet of *Waiākea* and Pi‘opi‘o became theirs.

The following year, *Keoua* was killed and *Kamehameha* retained the fertile lands of *Waiākea* in addition to Pi‘ihonua, and *Punahoa*. *Kamehameha* later passed *Waiākea* to his son and heir, *Liholiho* (*Kamehameha II*), which he retained until his death in 1824 at which point the lands were passed to *Kaunuuhoa*, the granddaughter of the *Hilo* chief, *Keawemauhili* (Maly 1996a). *Kaunuuhoa* held these lands until the 1848 *Māhele ‘Āina*, which is discussed in a later section of this report.

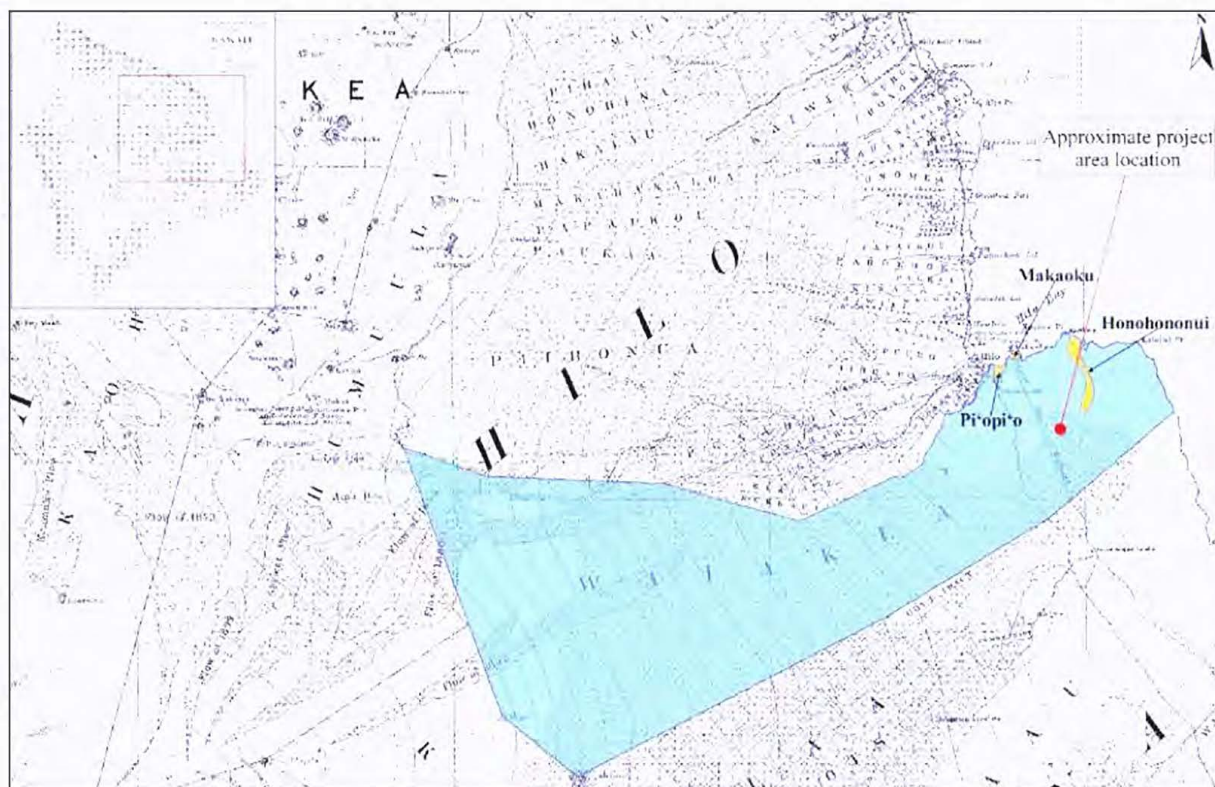


Figure 22. A portion of Hawai'i Registered Map No. 2060 by J. M. Donn in 1901, showing Waiākea Ahupua'a (shaded blue) within the moku of Hilo with the approximate location of the study area and 'ili kūpono lands.

Captain George Vancouver, an early European explorer who met with Kamehameha I at Waiākea in 1794, recorded that Kamehameha was there preparing for his invasion of the neighbor islands and that Hilo was an important center because his *pelelu* fleet of 800 canoes were being built there (Moniz 1994; Tolleson and Godby 2001). The people of Hilo had long prepared for Kamehameha's arrival and collected a large number of hogs and a variety of plant foods, to feed the ruler and his retinue. Kelly et al. (1981) surmised that the people of Hilo had actually prepared for a year prior to Kamehameha's visit and expanded their fields into the open lands behind Hilo to accommodate the increased number of people that would be present. It was during this early Historic Period that Waiākea Ahupua'a became part of Kamehameha I's personal land holdings after which time the 'ili kūpono of Pi'opi'o appears to have been given to Ka'ahumanu (Moniz 1994). A residence for the Chiefess Ruth Ke'elikolani is shown at Pi'opi'o on an 1891 map (Figure 23).

As recounted above, the coastal portion Waiākea surrounding Hilo Bay served as a chiefly residence from at least the sixteenth century and well into the turn of the 19th century. The low-lying coastal areas of Waiākea where fishponds and near and offshore fisheries were easily accessible thrived as a traditional habitation area. Just inland of Hilo Bay, the marshy lands fed by fresh spring water was extensively cultivated while the forested areas situated further *mauka* provided the *ahupua'a*'s early inhabitants with access to hardwoods, and other important flora and fauna. The traditional staple crop, *kalo* (taro), was cultivated in irrigated terraces along the stream edges while 'uala (sweet potato), *mai'a* (banana) and *kō* (sugarcane) were grown in the wet *kula* lands of the lower forest zone (Handy and Handy 1991). These lands had an abundance of *kukui* (candlenut), 'ulu (breadfruit), and *niu* (coconut) groves and was also rich in marine resources, easily accessible from the sheltered bay. Although settlements were prominent in these areas the increase in population and agricultural production, settlements spread into the upland *kula* regions. Handy and Handy (1972), provide yet another description of the fertile landscapes of Hilo:

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

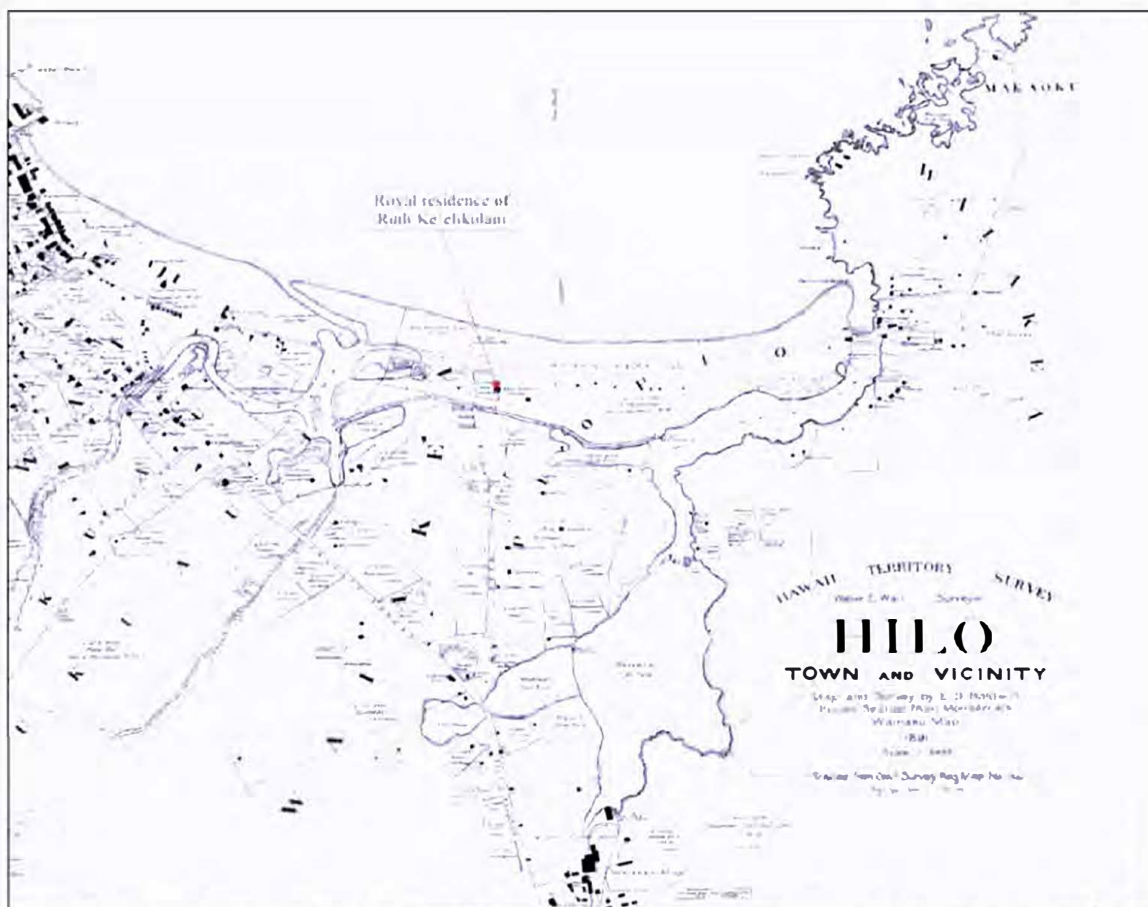


Figure 23. A portion of Hawai'i Registered Map No. 1561 from Baldwin in 1891 shows the extensively settled coastal lands of Waiākea with the royal residence of Ruth Ke'elikōlani in the 'ili kūpono of Pi'opio. Project area not depicted on map.

Marine Resources, Fishponds, and Agricultural Practices of Waiākea

Of the Hilo *ahupua'a* located south of Wailuku River, only Pi'ihonua and Waiākea provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea and Mauna Loa respectively. The abundant marine resources of Hilo Bay, extensive spring-fed fishponds and waterfowl, and wetland and dryland agricultural resources helped to sustain the population of the *moku* of Hilo. Marine-based subsistence was strongly linked to social organization. Strict *kapu* were enforced, which dictated when and where certain varieties of fish such as 'ōpelu and aku could be caught. A dedicated aku fishing ground or *ko'a* known as Maka-o-Kū was located on the shore of the Waiākea Peninsula, near present-day Mokuola, also known as Coconut Island (Maly 1996b).

As with other areas in Hawai'i, the fishponds in this *ahupua'a* were carefully managed and restricted for *ali'i* use only. Theoretically, access rights to fishing areas and ocean resources were defined by *ahupua'a* boundaries, with residents of a specific *ahupua'a* only taking fish within their own land division. However, in the case of Waiākea *Ahupua'a*, the Waiākea fishery extended straight across Hilo Bay, allowing residents of the adjacent *ahupua'a* only limited rights to the fishery (Kelly et al. 1981). Kelly et al. (ibid.) note that historically, the ocean resources of Hilo Bay were vital to everyday subsistence, and citing Kamakau (1976:59–60), describe various fishing techniques:

... with basket traps; with hook and line... by drugging. A man could also fish with his hands, or with crab or shrimp nets, or with a pole from a ledge or the seashore or catch fish in tide pools with a scoop net, or go along the seashore with a net, or set a fishline; or search for fish with a small basket trap or draw a net over sandy spots in the sea or up onto the shore; or drive fish into nets by splashing; or with a pole. But these were not expert ways of fishing; they were just for the taking of fish to make living more pleasurable...

The traditional fishing methods of Waiākea that were used to snare small fish, shrimps, and crabs are also noted in a poetical saying recorded by Pukui (1983:318):

Waiakea pepeiao pulu 'aha.

Waiakea of the cars that hold coconut-fiber snares.

Snares for small fish, shrimp, or crabs were made of coconut midrib and the fiber from the husk of the nut. When not in use the snare was sometimes placed behind the ear as one does a pencil. This saying is applied to one who will not heed—he uses his ears only to hold his snare.

Fornander (1918–1919) associates this poetical expression to Kulukulua, a chief that ruled over Hilo during the time of 'Umi-a-līloa as described in the *Legend of Kuapaka'a*. In this legend, the young Kuapaka'a of Moloka'i insultingly calls out to the various chief of Hawai'i Island. In one such chant, Kuapaka'a verbally degrades Kulukulua, by challenging his status as a chief and associating him with the task of commoners including the catching of shrimp with snares. Kuapaka'a called out to the Hilo chief in the following manner:

O ua 'lii o makou o Hilo, o Kulukulua,

aohe alii

He papehehele opae no Waiakea;

A pau ke papehehele ana,

Kau ae la i ka pulu niu i ka

pepeiao.

O ke kee no hoi ia o ia aina,

O ka ai ana ia Hilo,

Olele ia ai he 'lii.

(Fornander 1918–1919:85)

Our chief of Hilo, Kulukulua, is not a chief [by birth];

He is a snarer of the shrimps of Waiakea;

After the snaring,

He places the outside covering of the coconut on his ears.

This is the fault of the land;

But since he became possessed of Hilo.

He is called a chief.

(ibid.:84)

Extensive fishponds were cultivated in the vicinity of Hilo Bay, where spring-fed and walled-off inland ponds whose yields were reserved solely for the highest of *ali'i*. Kamehameha I was known to send runners from Kawaihae, Kohala and Kailua, Kona to fetch live mullet from Waiākea. Fornander elaborated on this relating that Kamehameha sent his fastest runners, Makoa and Kāneaka'chu to "Hilo to get mullet from the pond of Waiākea, on the boundary adjoining Puna" (Fornander 1918–1919:490). The largest of these ponds, Waiākea is located to the northwest of the current study and is fed by Waiākea and Wailoa River (see Figure 23). Religious rituals accompanied the creation and maintenance of these fishponds, which according to a historic account from 1823, were surrounded by small huts for their caretakers (Kelly et al. 1981). Caretakers had small huts alongside the fishponds, from where they guarded the fish against theft or being killed by pigs and dogs (Kamakau 1976). In 1846, early missionary, Chester Smith Lyman recorded the following scenes at the fishponds in Waiākea:

June 30. Just after leaving the village we passed the royal fish ponds on the left. These are connected with the bay and contain the finest mullet in large quantity... July 30. P.M. ... They are of brackish water, rise and fall with the tide... They are generally shallow, but in places of considerable depth. The fine mullet with which they are filled are tabu to all but Royal hooks or nets, and tho' they are innumerable and large, neither natives nor foreigners can often get a taste of them. (Lyman 1846 cited in Kelly et al. 1981:14)

The delicious fish of the Waiākea fishpond are referred to in various early accounts, such as a story concerning Kamehameha, who intended to make war on Keawemauhili. In response, Keawemauhili in an attempt to avoid war sent Kamehameha the "...sweet-tasting 'anae of Waiākea pond and the fat awa in the center of the fishpond..." (Desha 2000:161). In Westervelt's (1915:191) story of Keaunini, he tells of how "the people feasted on the mullet of Lolakea and the baked dogs of Hilo and the humpbacked mullet of Waiakea..." Waiākea's fishponds were also said to be favorites of Hi'iakaikapoliopole and her elder sister Pele. These two sisters are also figured in a story that describes why the goddess Hi'iakaikapoliopole caused the deadly ash fall that killed Keōua's army when they passed near the volcano. According to a seer at the time, "the goddess was angry at Keōua for not offering her some of the "fat mullet of Waiākea" (Desha 2000:279).

Agricultural resources were essential to the residents of Waiākea. The Hawaiian proverb "*Hilo 'ai lū'au*" makes reference to the significance of taro consumption and according to Pukui (Pukui 1983:107) when storms made it impossible to obtain fish, the people of Hilo depended on cooking the entire taro plant. Historical accounts analyzed by McEldowney (1979) indicate that much of Waiākea was in a zone of agricultural productivity. Pukui et al. (1974) relates the following account of a legendary man named 'Ulu, who lived in Waiākea when a bout of famine came over the land. He died of starvation and was laid to rest near a stream. The following morning, there was an '*ulu*' (breadfruit) tree filled with fruits growing where he was buried, thereby ending the famine (1974:219–220). Thrum

(1923) also related this same account, which was reported to him by early Hilo missionary, Henry M. Lyman, and provides additional details. Thrum reports that a large deluge known as Kahinalii swept over the land which left the earth bare of fruits with only *koa* and '*ōhi*'a remaining. Thrum adds:

But, during the reign of the second king after the flood, there lived at Waiākea a man by the name of Ulu, and he had a young son named Mokuola. This child was small and sickly; and his parents felt great sorrow for the pains which he suffered in consequence of eating the gross food which nature had so scantily furnished for their sustenance. Every morning his father would paddle out in his little canoe, and draw the fish-net through the still waters of the bay, if perchance he might catch a tender mullet or an opelu for his dear son; while at evening the kind mother would wrap her boy in a sheet of yellow kapa, and, when the sea-breeze gave way to the cool mountain wind, go down to the wet rocks on the sea-beach in search of limpets and mussels for her child's supper. In spite, however, of their fondest attention, little Mokuola grew thinner and weaker from day to day, so that his parents quite began to despair of his life. (Thrum 1923:235–236)

Unable to bear their son's condition, 'Ulu spoke with his wife and told her that he would seek the help of the gods Kāne and Kanaloa. The following morning, 'Ulu made his way before dawn to Pu'ueo to pray and offer sacrifices at a temple. During the ritual, 'Ulu learned from the gods how the child of Wākea (sky father) was buried outside of their home and from which sprouted a *kalo* plant. Inspired by this, 'Ulu returned home and informed his wife of his desire to be laid to rest near their home. 'Ulu then provided instructions to his wife:

When the breath is all gone from my body, and my spirit has departed to the realms of Milu, carefully bury my head near the spring of running water. Plant my heart and entrails before the door of the house. My feet, my arms and legs, hide away in the same manner. Then lie down upon the couch where we two have so often reposed, and listen during the watches of the night; but go not forth before the sun has reddened the morning sky. If, in the silence of the night, you shall hear sounds as of falling leaves and flowers, and afterward as of heavy fruit dropping to the ground, know then that my prayer has been granted, and that the life of our son shall be saved. (ibid.:238–239)

The woman lamented at her husband's request and after 'Ulu took his last breaths, she fulfilled his request and the following morning, she was woken by the sound of falling fruit, which she used to restore life back to their son, Mokuola.

The productivity of the land is described by missionary William Ellis while visiting Waiākea in 1823. In describing the scene that lay before him, Ellis relates the following for Waiākea:

...the most beautiful we have yet seen....The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes, and melons, grow to the greatest perfection.

Groves of cocoa-nut and breadfruit trees are seen in every direction loaded with fruit, or clothed with umbrageous foliage. The houses are mostly larger and better built than those of many districts through which we had passed. We thought the people generally industrious; for in several of the less fertile parts of the district we saw small pieces of lava thrown up in heaps, and potato vines growing very well in the midst of them, though we could scarcely perceive a particle of soil.

There are plenty of ducks in the ponds and streams, at a short distance from the sea, and several large ponds or lakes literally swarm with fish, principally of the mullet kind. The fish in these ponds belong to the king and chiefs, and are tabued from the common people.

Along the stone walls which partly encircle these ponds, we saw a number of small huts, where the persons reside who have the care of the fish, and are obliged frequently to feed them with a small kind of mussel, which they procure in the sands round the bay.

...There are 400 houses in the bay, and probably not less than 2000 inhabitants... (Ellis 1963:337–338)

In addition to the cultivation of dry taro, wet taro was cultivated on mounds built into the existing marshlands along the Wailoa River behind the sand dunes of Hilo Bay using the *kipi* or *kipikipi* method, which resulted in a landscape of raised islands and ditches (Maly 1996b). The development of *kipi kalo* originates from Hilo in the swamps of Waiākea Handy and Handy (1972). Handy and Handy (1972) describe how the *kipi* method was implemented by:

...heaping up, above the surface of the water, long mounds (*kipi* or *kipikipi*) of soil upon the tops and sides of which the cuttings were planted. (1972:91)

Handy and Handy (1972:539) also describe the general region of Waiākea and the forested areas of Pana'ewa as an agricultural area:

On the lava strewn plain of Waiākea and on the slopes between Waiākea and Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Panaewa and in all the lower fern-forest zone above Hilo town along the course of the Wailuku River.

Maly (1996b:A-2) also makes reference to a 1922 article from the Hawaiian Language newspaper, *Ka Nūpepa Kū'oko'a*, where planting on *pāhoehoe* lava flats in the Pana'ewa forest is described:

There are *pāhoehoe* lava beds walled in by the ancestors in which sweet potatoes and sugar cane were planted and they are still growing today. Not only one or two but several times forty (*mau ka'au*) of them. The house sites are still there, not one or two but several times four hundred in the woods of the Panaewa. Our indigenous bananas are growing wild, these were planted by the hands of our ancestors.

The Forested Lands of Pana'ewa

The project area is situated in an inland zone of Waiākea known as Pana'ewa characterized by its dense forest that blankets the eastern part of the *ahupua'a* and extends towards the Puna District. The extent of this massive forest is depicted in several historical maps. These maps situate the project area at the northeast edge of the Pana'ewa forest. Figure 41, below is a map from 1851 drafted by W. M. Webster showing the route of the old volcano road (located to the west of the project area) in addition to a "Road to Puna" which passed along northeast corner of the study area into the Puna District, and includes notes about the "woods." A second map from 1891 prepared by C. J. Willis (Figure 25) shows the project area situated between the "Hala Woods" to the north and "Panaewa Forest" to the south. Figures 41 and 25 also shows the relative location of the three *'ili kūpono* (Pi'opi'o, Makaokū, and Honohononui) described above to the study area. A third map from 1893 prepared by E. D. Baldwin (Figure 26) shows the route of the old Volcano Road and makes reference to the "Panaewa Woods" and the upper Waiākea Forest.

Maly (1996a:A-6) translates the name Pana'ewa to mean "crooked or unjust place" and describes its location to be "a land section of Waiākea, on the Puna side of Kāwili." McEldowney (1979) notes that the Pana'ewa forest was one of the few forests on the island to reach the ocean. The following Hawaiian proverb recorded by Pukui (1983) poetically expresses how the *'ōhi'a lehua* (*Metrosideros polymorpha*) blossoms from the Pana'ewa forest would fall into the ocean in great numbers, indicating that this celebrated forest extended to the coast.

He kai lū lehua ko Pana'ewa.

Pana'ewa shakes down the lehua fringes into the sea.

Once, when the forest of Pana'ewa extended to the sea, fringes of *lehua* blossoms were seen floating about in the water. (ibid.:74)

Ke kai kua'au lehua o Pana'ewa.

The sea where lehua fringes float about in the shallows.

Long ago, when *lehua* tree grew down to the shore at Puna and Hilo, the fringes of the flower often fell into the sea, reddening the surface. (ibid.:186)

Formander (1918–1919) also notes that Waiākea was known for a specific type of *'ōhi'a* known as the *'ōhi'a puakea* (white-blossom *lehua*), which was named after a beautiful maiden, Puakea who lived in Waiākea. In describing the characteristics and traditional uses of this unique type of *'ōhi'a*, Formander (1918–1919:621–622) writes:

This tree has white flowers, and its fruit is also white when it is ripe; it is palatable when eaten. It has one round seed split in two parts; the birds are fond of the nectar of its flowers. The bird snarers used the branches on which the flowers were thick to put their gum on, and when a bird was caught the snarer would call out, "Snared, snared is my bird." The bird must be secured as quickly as possible. Its trunk, as also its branches, is used for firewood.

Although renowned for its extensive and tall stands of *'ōhi'a lehua*, Pana'ewa is also celebrated in many traditional poetic compositions for its *maile* (*Alyxia stellata*), *hala* (*Pandanus tectorius*), and *'awa* (*piper methysticum*) that grew in the trees, and an array of native birds. Pukui (1983) enumerates on the endemic taxa of this area that were utilized by the people, writing:

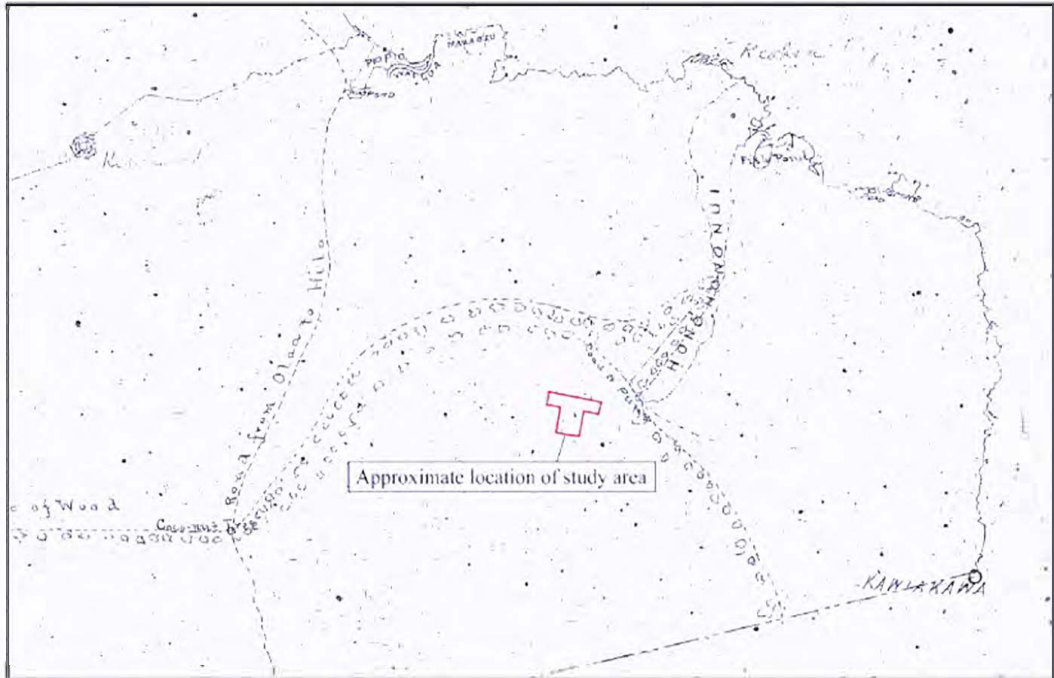


Figure 24. Portion of 1851 Hawai'i Registered Map No. 705 by W.M. Webster showing the eastern portion of Waiākea and the study area location (outlined in red) relative to the 'ili kūpono of Honohononui, Pi'opi'o and Makaokū within the bounds of the Pana'ewa forest.

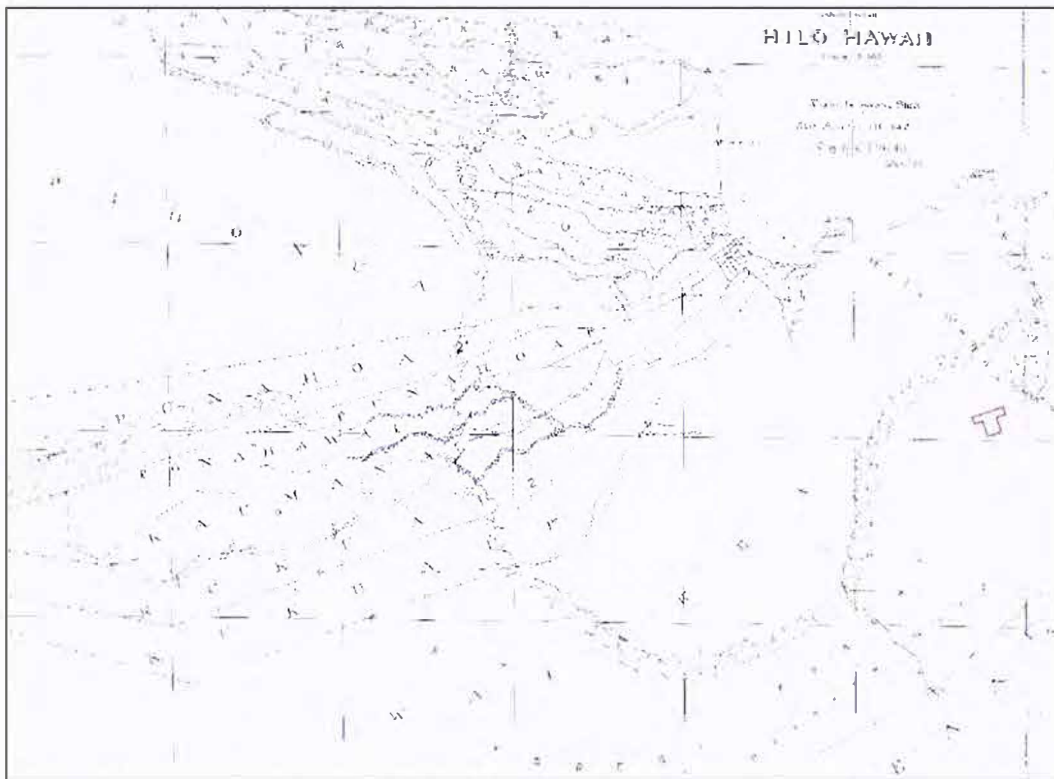


Figure 25. Hawai'i Registered Map No. 842 by C. J. Willis in 1891, showing the study area (outlined in red) and the extent of the Pana'ewa Forest with notes on the "hala woods" and "Panaewa Woods." The three 'ili kūpono are also depicted.



Figure 26. Hawai'i Registered Map No. 1713 by E. D. Baldwin in 1893 showing the extent of the Pana'ewa and upper Wai'akea forest.

Lei Hanakahi i ka 'ala me ka onaona o Pana'ewa.

Hanakahi is adorned with the fragrance and perfume of Pana'ewa.

The forest of Pana'ewa was famous for its *maile* vines and *hala* and *lehua* blossoms, well liked for making *lei*, so Hilo (Hanakahi) was said to be wreathed with fragrance. (ibid:212)

Na manu leo nui o Pana'ewa.

Loud-voiced birds of Pana'ewa.

Loud talkers. Pana'ewa, Hilo, was famous for its *lehua* forests that sheltered the honey-sucking birds. Here people went to gather *lehua* and *maile*. (ibid.:247)

Reference to the mystical and potent 'awa of Pana'ewa is described in the account of Keaunini (Westervelt 1915). After receiving orders from his brother, Ke-au-miki was sent to fetch small black and white pebbles from Hā'ena in Kea'au, Puna and 'awa from Pana'ewa. In describing the 'awa of Pana'ewa, Ke-au-miki's brother explained:

Get thirteen stones—seven white and six black. Make them fast in a bundle, so they cannot be lost, then come back by Pana'ewa and get awa...which man did not plant, but which was carried by the birds to the trees and planted there.

Ke-au-miki then with his supernatural powers, hastened over the lands of Hāmākua and arrived at Wailuku River where he defeated the *kupua* (demigod) that attempted to block his pathway over the river. Having arrived at Pa-ai-ie [Pā'ie'ie] in Waiākea, Ke-au-miki began his search for the objects that were requested by his brother.

Then Ke-au-miki rushed over the river and up the precipices, speeding along to Pa-ai-ei, where the long ohia point of Pana-ewa is found, then turned toward the sea and went to Haena, to the place where the little stones aala-manu are found. He picked up the stones and ran to Pana-ewa and got the awa hanging on the tree, tied up the awa and stones and hurried back.

A traditional legendary account titled “*He Kaa no Pikoikaalala, ke Keiki Akamai i ka Pana*” describes the traditional practice of bird catching which took place in the Pana'ewa forest. Published in a series of articles printed in the Hawaiian language newspaper, *Ka Nūpepa Kū'oko'a*, between December 16, 1865, through March 10, 1866, the author S. M. Kauī provides insight into this practice. Born to 'Alalā and Koukou on the island of Kaua'i, their son Pikoika'alalā becomes adept at *pana pua* (shooting with bow and arrow) and was able to shoot rats and birds from great distances. As a preamble to the telling of this story, Maly and Maly (2004:8) writes:

The tradition is set in the late 1500s when Keawe-nui-a-'Umi, the king of Hawai'i Island, was in need of an expert to shoot some supernatural 'elepaio birds that continually interrupted the work of his canoe makers in the uplands of 'Ōla'a and Hilo.

Keawe-nui-a-'Umi learned of Mainele, a champion in the sport of *pana pua*, who resided on O'ahu, and promised him that if he could rid the forest of the enemy 'elepaio, he could wed his daughter, the beautiful Keakalaulani.

Although Mainele boasted greatly of his skill, it was soon learned that could not kill the birds. As this story unfolded, Waiākea, a steward of Keawe-nui-a-'umi befriended the great shooter, Pikoika'alalā. The skilled Pikoika'alalā requested that Waiākea not tell anyone who he was and the two began their work ridding the upland forest of the mischievous birds. That portion of the story naming the birds that were caught by Pikoika'alalā in the lands of Pana'ewa and in the uplands of 'Ōla'a reads:

Eia na inoa pakahi o na manu a Pikoikaalala i pana ai i mea ai no ka wa maka pahu o Hilo. O ka Oo, ka Iiwi, ka Ou, ka Akakane, ka Amakihi, a me ka Mamo, o na manu ai-lehua no a pau o ka uka i Olaa a me ka nahele laau loloa o Panaewa; oia mau manu ka ke keiki Pikoikaalala i panai, a o ka Waiakea hoi ia e haawi aku ai i ke alii nui me na lii malalo iho, na kaukualii, na puali, me na koa a me na kanaha hoi o ke alii.

Here are the names of the birds which Pikoika'alalā shot during his time in Hilo; the 'Ō'ō, 'I'iwi, 'Ō'ū, 'Akakane, 'Amakihi, and the Mamo, the birds which eat of the lehua blossoms in the uplands of 'Ōla'a, and the long-treed forest of Pana'ewa. Those were the birds shot by Pikoika'alalā, and given to Waiākea to the king, the chiefs below him, the attendant chiefs, the warriors and the men of the chief. (Maly and Maly 2004:9)

The abundance and frequency of rain in Pana'ewa is another celebrated natural feature that is enumerated in several traditional expressions:

Ka ua kinai lehua o Pana'ewa.

The rain that bruises the lehua blossoms of Pana'ewa.

Both *lehua* and rain are commonly found in Pana'ewa. (Pukui 1983:169)

Ka ua lū lehua o Pana'ewa.

The *lehua*-shedding rain of Pana'ewa.

The heavy rain of the *lehua* forests of Pana'ewa in Hilo, Hawai'i. Famed in chants of old. (ibid.:172)

It is through these resources and natural wonders that Kānaka Maoli constructed their relationship to the lands of Pana'ewa. According to native scholars both of whom live in Pana'ewa, Pualani Kanaka'ole-Kanahele and the late Edward Kanahele in their report, *Pana'ewa: Cultural Description Of Indigenous Hawaiian Life*, all literary sources describe the healthy condition of the forest, which was comprised predominately of large 'ōhi'a *lehua* trees. Such an understanding is derived from the traditional terms used to refer to this forests. Mr. and Mrs. Kanahele enumerate on these descriptions noting:

Pana'ewa is synonymous with [the terms] *uliuli*, *moku lehua* and *ulu lehua o Pana'ewa*. *Uliuli* translates as dark, dense and very green that again translates as healthy. *Moku lehua* and *ulu lehua* reveals that Pana'ewa's dominate canopy is 'ōhi'a *lehua*. The poetic description of Pana'ewa as a *lehua* grove or a island is visually correct. (Kanahele and Kanahele n.d)

Furthermore, the many *mo'olelo* describing the 'ōhi'a *lehua* in Pana'ewa are closely associated with Pele, the deity of lava and creator of earthly matter and her younger sister, Hi'iakaikapoliopele, whose divine energy is associated with revegetating the barren lava flows created by her sister and other volcanic siblings (Kanahele 2011). According to Mr. and Mrs. Kanahele, the Pana'ewa forest lies within the domain of these two goddesses.

It ['ōhi'a *lehua*] is the first hardwood tree to grow on fresh lava and it acts as an agent to break down the lava, making it palatable for other forest plants to grow around or under it beginning the cycle of life for flora and fauna. It is considered at almost the same level of the creation cycle as Pele and Hi'iaka because it is an initiator. (Kanahele and Kanahele n.d)

In addition to this forest's close association with Pele and Hi'iaka, this forest is also said to the boundary between the domain of Pele and her rival lover, Kamapua'a. After engaged in a tumultuous relationship with Kamapua'a, the pig deity, he and Pele establish land boundaries as a means to end their feud. Kamapua'a was given domain over the lush northern part of the island, and Pele the southern, volcanically active section (Fornander 1918–1919). Westervelt (1916:53) relates that during his tumultuous relationship with Pele, "the islands were divided between the two demi-gods, and an oath of divine solemnity was taken by them." Westervelt goes on to explain that "they set apart a large portion of the island of Hawaii for Pele, and the eastern shore from Hilo to Kohala and all the island northwest of Hawaii as the kingdom over which Kamapuaa might establish rulers" (ibid.).

Other traditional accounts also relate the naming of this forest after the infamous *mo'o* deity, Pana'ewa, who resided in the thick forest grove. In explaining the nature of traditional *mo'o* deities and its association to fresh water, Mr. and Mrs. Kanahele writes::

The imagery of this *mo'o* or lizard is the equivalent of a large dragon-type character. The *mo'o* is considered a water creature who lives in or is part of a watery landscape. The relevance of the *mo'o* and forest adds another descriptive dimension to this forest and that is, this forest is wet and soggy. (ibid.)

Kanahele and Kanahele (n.d) provided the following chant that describes the Pana'ewa forest and tells of the origins of its name. That portion of the chant reads:

*I ka ulu lehua o Pana'ewa
Ile ulu lehua Kaulana kēia no Hilo
A, ua loa 'a mai kona inoa
Ma muli o kekahi kupua
Nona ka inoa o Pana'ewa
A, 'o ia ke kia 'i o ua wahi nei.*

In the *lehua* grove of Pana'ewa
This is indeed a famous *lehua* grove of Hilo
And its name was obtained
From a demigod
From him was the name, Pana'ewa
And, he is the guardian of this forest

While the accounts presented above details the many celebrated resources and features of this forest, its namesake is derived from a malevolent *mo'o* (lizard-like deity) Pana'ewa that inhabited and kept close guard over this forest (Ho'oulumāhie 2006a). The following section presents the various *mo'olelo* that makes reference to Pana'ewa as well as the greater Waiākea Ahupua'a.

Select Mo'olelo for Pana'ewa and the Waiākea Ahupua'a

Traditional *mo'olelo* (stories, tales, and myths) and *mele* (songs) aids in understanding the cultural landscape. Such accounts often tell of traditional land use and practices of an area and provides narratives to articulate the values and expressions of the people's relationships to their lands and environment. While an abundance of native and historical accounts exists for the greater Waiākea region, this section of the study will focus primarily on Pana'ewa as it is that land areas in which the proposed quarry site is located. Associated *mo'olelo* include, the battle between Hi'iaka and the *mo'o* Pana'ewa, *Ka'ao Ho'oniua Pu'uwai no Ka-Miki* (Heart Stirring Story of *Ka-Miki*), and *Ke Kānāwai Māmalahoe* (the Law of the Splintered Paddle).

The Battle Between Hi'iakaikapoliopole and the Mo'o, Pana'ewa

In legendary accounts, *mo'o* are often depicted as fearsome and meddlesome, while in other accounts they are portrayed as friendly and even helpful (Beckwith 1970). According to Kamakau, the *mo'o* most commonly referred to in Hawaiian folklore differ from the typical house or rock lizard. Kamakau notes that the bodies of mythical *mo'o* were "extremely long and terrifying" (Kamakau 1964:82). In *Pele and Hi'iaka A Myth From Hawaii*, Hi'iaka, the heroine of the journey slays numerous malevolent *mo'o* throughout the island chain while en route to Kaua'i to retrieve her sister's lover (Emerson 1997). Hi'iaka's connection to Pana'ewa is most explicit in *Ka Mo'olelo O Hi'iakaikapoliopole*, authored by Ho'oulumāhiehe. Ho'oulumāhiehe's version was initially published in the Hawaiian language newspaper *Ka Na'i Aupuni* between the years 1905-1906. Throughout the early 21st century, Hawaiian language scholar, Puakea Nogelmeier compiled the individual chapters written by Ho'oulumāhiehe, translated each page of text, and published it in a double volume (one in Hawaiian and the other in the English) (Ho'oulumāhiehe 2006b, 2006a). Nogelmeier notes that Ho'oulumāhiehe's version is one of twelve known published accounts of *Ka Mo'olelo O Hi'iakaikapoliopole*, of which select portions specific to Pana'ewa are summarized and presented below.

The story begins with Pele and her siblings who traveled from their home-land of Kahiki until reaching Hawai'i island where Pele had made her permanent home in Puna. After settling on Hawai'i Island, Pele and her siblings ventured down to Hā'ena in Kea'au to bathe in the sea. While there, Pele was overcome with the desire to sleep. She informed her youngest sister, Hi'iaka not to allow any of their siblings to awaken her. Hi'iaka consented to her sister's commands. In her dream state, Pele followed the sound of a *pahu* (drum), which carried her spirit to the island of Kaua'i, where she saw and met a striking man named Lohi'au. The two met and fell madly in love, however, given that Pele was in her spirit form, she made it clear to Lohi'au that she must return to her home but would send someone to fetch him. Pele's long sleep was cause for concern and although tempted to awaken her sister, Hi'iaka held true to her sister's commands.

Finally, Pele roused from sleep and called upon each of her sisters where she made a proposition, asking which one of them would fetch her dream lover Lohi'au from Kaua'i. Knowing Pele's tempestuous temper, each feared possible repercussions and refused to go. After being denied by all but one sister, her youngest sister, Hi'iaka appeared to her. The irascible Pele demanded that Hi'iaka travel to Kaua'i to fetch Lohi'au, and sent her on her way with strict instructions. Hi'iaka was not to take him as her husband, she was not to touch him, and she was to take no longer than forty days on her journey. While Hi'iaka agreed to her sister's demands, she realized that in her absence, Pele would become incensed with a burning and vehement fury and destroy whatever she desired. So Hi'iaka set forth two stipulations; her beloved 'ōhi'a *lehua* grove was to be spared from destruction, and Pele was to protect her dear friend Hōpoe in her absence. In this version of the story, Hōpoe is described as a young girl from Kea'au that was skilled at riding the surf of Hā'ena, and the one who taught Hi'iaka the art of *hula*. Pele agreed to Hi'iaka's requests, and Hi'iaka departed on her journey to retrieve Pele's lover. In a sympathetic act, Pele bestowed supernatural powers upon Hi'iaka so that she would be protected against the dangers she would undoubtedly meet along the way. In preparing for her journey, Hi'iaka left for the uplands of Puna to perform a ceremony at Kīlauea. While there, Hi'iaka met Wahine'ōma'o, who ended up joining Hi'iaka on her journey.

After departing Puna, Hi'iaka and her traveling companion Wahine'ōma'o reached Kuolo in Kea'au, Puna District—a place that bordered the Pana'ewa forest. Having learned her from her parents that Pana'ewa was a place of certain death for travelers, Wahine'ōma'o turned to Hi'iaka and expressed her concern and offered a second route of travel along the coast. Aware of the potential dangers that loomed ahead, Hi'iaka insisted that they pass through the "lehua groves of Pana'ewa" (Ho'oulumāhiehe 2006a:50). Upon reaching Kūkulu, a high place in the Pana'ewa forest, the two women were observed by Kūkulukukui and Kapuakoai'a, the guardian birds for the chiefly *mo'o* Pana'ewa. The two guards quickly went to Pana'ewa to report the presence of Hi'iaka, "the champion, the dynamic one of the

lightning skirt from Kīlauea" (ibid.:51). After hearing the news of Hi'iaka's presence in the forest, Pana'ewa retorted the following:

"What matter would be the doom she might bring, if it truly is she who had entered the lehua groves here in Pana'ewa.

She and her people should know that the chiefs of Hilo have no regard for them.

And my kapu, my sacred law, is firmly set, that no man or woman may arrogantly tread amid the lehua trees of Pana'ewa without my consent. But as to those stone-eating, land-eating, lehua-grove eating women, I would never allow them to enter here into Pana'ewa. If it turns out that is not Hi'iaka, but some local women from up by the shoreline of Hilo, then say nothing and you two can allow her to go along this road to get to Waiākea." (ibid.:52)

Just as Kapuakoai'a finished speaking to Pana'ewa, Hi'iaka's voice was heard echoing through the forest, where she recited the following chant requesting permission from Pana'ewa to pass through his forest:

| | |
|---|---|
| <i>'O Pana'ewa nui moku lehua</i> | Great Pana'ewa of the lehua groves |
| <i>'Ōhi'a kupu hāo'eo'e</i> | 'Ōhi'a that reach upwards in spikeso |
| <i>I ka ua lehua 'ula</i> | In the red lehua raino |
| <i>Hō mai ana ho'i ua alanui</i> | Grant us the pathwayo |
| <i>No'u nei, no Hi'iakaikapoliopelo</i> | For me, indeed, Hi'iakaikapoliopelo |
| <i>E aloha mai! E uē kāua.</i> | Offer us welcome! Let us share our tears of joy.o |
| (Ho'oulumāhiehie 2006b:54) | (Ho'oulumāhiehie 2006a:52)o |

Angered by Hi'iaka's request, Pana'ewa sharply responded:

"You have no pathway here in Pana'ewa. You are an arrogant woman, coming down from inland Puna, a marginal land used up by the gods, and you proudly assume this to be your road to travel. Certainly you know that Pana'ewa is a sacred forest, not to be wantonly traversed by the stone-eaters. There is no road here. As though your eyes didn't see that the road for travel is seaward of Hā'ena." (Ho'oulumāhiehie 2006a:52)

Having heard Pana'ewa's discourteous remarks, Wahine'ōma'o turned to Hi'iaka and again reminded her of the coastal trail which would be easy to travel but Hi'iaka remained firm and insisted they pass through the forest. Having hear the mighty growl and harsh retorts of Pana'ewa, Hi'iaka prepared herself and her companion for the impending danger that the merciless Pana'ewa would unleash on them. Here Pana'ewa:

Then devoured all of the cooked taro corms and the broiled taro leaves that the sentinels had brought. When sated, the mo'o commanded the two sentinels, Kūkukukui and Kapuakoai'a, to go and cut the heads of all of the flying ghost (spirits) in Pana'ewa and to flood the path that Hi'iaka and company were advancing upon with their blood. (ibid.:53)

Hi'iaka then prepared Wahine'ōma'o for the imminent danger stating:

"Listen, hold fast to my skirt. Hold on tight, and don't let your grip loosen, or you will be swept away by the tide of blood from Pana'ewa. Wherever I go, you must come along. We will know defeat in the dawn hours, but Pana'ewa will lose in the twilight of evening. As we go along, if you hear the roar of voices echoing through Pana'ewa forest, recognize that the red tide of the mo'o. Pana'ewa, had begun to flow. This will tempter my skirt, once it's been soaked in the red waters."

In a short time, the women found themselves caught in the red flood of Pana'ewa with nothing more than their chins bobbing above the red waters. Fearful of whether they would survive, Wahine'ōma'o cried out to her companion. Hi'iaka quickly replied, "hold your breath my friend... I shall call upon our elder sister, our brothers and our ancestors." Responding to their sister's cries, Pele and their brother Lonomakua began to stoke the fires of Kīlauea and in no time, thick smoke blanketed the slopes of Maunaloa, Maunakea, and Hualālai and darkness fell over the lehua filled forest of Pana'ewa. Clinging on to life, Hi'iaka again called out in chant:o

| | |
|---|---|
| <i>Pana'ewa nui moku lehua</i> | Pana'ewa, wildwood of lehua |
| <i>'Ōhi'a kupu hāo'eo'e i ka lani</i> | 'Ōhi'a that grows jaggedly toward the heaveno |
| <i>I ka ua, lehua 'ula i ka ua</i> | In the rain, scarlet lehua in the raino |
| <i>I ka wī a ka manu, ua pō ē</i> | At the twitter of the birds, night has comeo |
| <i>Pō wale Hilo i ka uahi o kū (ku'u) 'āina</i> | Hilo is darkened by the smoke ofony lando |
| <i>Ola ia kini, ke 'ā maile ke ahi.</i> | Those multitudes will survive, for the fires are ablaze.o |
| (Ho'oulumāhiehie 2006b:58) | (Ho'oulumāhiehie 2006a:56)o |

Pele sent billows of smoke to her sister and informed her to summon the help of their brothers. Knowing that to defeat Pana'ewa would require more than what Hi'iaka was capable of, she cried out her powerful brothers, Kauilanuimaka'ehaikalani, Kamohoali'i, Kahuiakalani, Ka'ekaokalani, and to Kāneikawaiola to send down their clouds and water. As Hi'iaka beckoned her siblings for help, they responded by sending torrential rain from the heavens, flashing their lightning across the sky, and violently shaking the earth. As the waters rushed into the domain of Pana'ewa, the trees were pushed over and the mighty waters swept over the pitiless *mo'o*. Unable to withstand the powerful torrents, Pana'ewa shapeshifted, transforming himself into a *lehua* tree and later into an '*ama'uma'u* fern to no avail. Pana'ewa could not fight back against the raging waters and his body and spirit grew weak. Recognizing that the only way out of this disaster was to reconcile with Hi'iaka, the fading Pana'ewa called out asking to be spared. Hi'iaka refused his pleas, stating:

"If that is it,"... then you shall not be spared, for you have been evil to me in response to the fair request that I made of you. You shall die, though the *lehua* grove of Pana'ewa shall live on, as a commemorative forest for the people here in Hilo. (Ho'oulumāhiehie 2006a:57)

Pana'ewa was seized by the water and his lifeless body carried out to the depth of the ocean where it was devoured "whole into the belly of a big-mouthed fish" (ibid.). With their path now cleared of the malevolent *mo'o*, Pana'ewa, Hi'iaka and her companion carried on with their journey. As they were exiting the forest, Hi'iaka then turned to Wahine'ōma'o and exclaimed:

"We have faced the red water and the white waters here in Pana'ewa. We have donned the lei of red *lehua* and the white *lehua* of this place, and now we shall leave here and go to the shore of Waiākea. We will encounter many baneful ones in these places prior to reaching Waiākea. There is Pā'ie'ie, a supernatural woman, and Pua'aloa, a supernatural male; Ka'iliahiali, a woman, and Pu'umoho, a male; Nā'ū is a woman, as is Haili, while Kū'ēho'opiokalā is a male; Ma'ū is the wife of Makali'i; Kapakapaka is a male, and Honokawailani is also male. However, if you pray diligently and heed me, then our descent through these places towards the sea should be safe, but if they pay no mind to my plea for compassion, then they shall be made victims of this magical skirt of mine." (Ho'oulumāhiehie 2006a:58–59)

From Ho'oulumāhiehie's narrative, we learn of the *lehua*-filled Pana'ewa forest which was closely guarded by the *mo'o*, Pana'ewa, and his bird guards, Kūkukukui and Kapuakoai'a, was a forest for those of Hilo. We also learn of two main trails that connected Waiākea to Puna, with the longer route passing along the coast and the shorter but more treacherous one cutting through the Pana'ewa forest. This narrative also describes the forest being demolished by red and white waters, perhaps a reference to a volcanic eruption, which was later extinguished by a great flood of water. Additionally, from the preceding quote, we learn of other *mo'o* that dwelled within Waiākea. Some of these names have been retained today as place names. Additional information for Pana'ewa and the epic battle with Hi'iaka have been compiled and described in the ensuing paragraphs.

In *Hawaiian Legends of Volcanos*, Pana'ewa was a very strong reptile-man who could change forms from animal to man as he desired and would guard the paths through the forest (Westervelt 1916). Pana'ewa allowed some to pass through his forest, but for the others, he brought fog, rain, and wind in attempts to capture travelers, to rob them of their possessions, and in some cases consume those who entered his forest (1916). Westervelt adds that "those who knew about Pana'ewa brought offerings of awa to drink, taro and red fish to eat, tapa for mats, and malos, or girdles" (1916:99). This encounter with Pana'ewa was Hi'iaka's first obstacle in her journey.

While Emerson's (1997) version of the story shares a similar premise, his account provides other details not described in Ho'oulumāhiehie's (2006b, 2006a) version—details that relate the tragic death of the fallen to geological formations found in Pana'ewa. Emerson reports that Pana'ewa did not want Hi'iaka to pass through, so he brought upon thick blinding fog, freezing cold rains, and winds strong enough to bend down the trees and smite Hi'iaka. Emerson continues:

The warriors of Pana-ewa, who—in imitation of their chief—had for the most part taken the guise of trees and other natural objects, found themselves from the first fettered and embarrassed by a tangle of parasitic vines, so that their thrusts against Hi'iaka were of little avail. Now comes the onset of the Pele gods in the tempest-forms of hurricane, lightning, hail, and watery cloud-bursts that opened heaven's flood-gates. Against these elemental forces the dryad-forms of Pana-ewa's host could not stand for a moment. Their tree-shapes were riven and torn limb from limb, engulfed in a swirling tide that swept them down to the ocean and far out to sea.

Two staunch fighters remained, Kiha, who had chosen to retain the honest dragon-form; and Pua'a-loa, a creature, like Kama-pua'a, in the demi-shape of a boar, whom Pana-ewa, at the scent of

disaster, had thrust into the confinement of a secret cave. This manner of retreat saved the twain from the immediate disaster by flood but not from the vengeance of Pele's army. Detected in their lairs, they were slain and their petrified bodies are pointed out to this day in verification of this story.

The fate of Pana-ewa himself was most tragical. He no sooner had taken the form of a kukui tree than he found himself over laid and entangled with meshes of parasitic growth; he could neither fight nor fly. The spot on which he stood sank and became a swamp, a lake, a sink; the foundations on which its bottom rested were broken up and fell away. Pana-ewa, swallowed up in the gulf, was swept out to sea and perished in the waves- Kane-lu-honua had broken up the underlying strata and made of the place a bottomless sink.

(A reef is pointed out in the ocean opposite Papa'i which is the remains of the body of the mo'o Pana-ewa.) (Emerson 1997:45)

The victory for Hiiaka was complete. Hawaii for once, and for all time, was rid of that pestilential, man-eating, mo'o band headed by Pana-ewa who, from the time of Pele's coming, had remained entrenched in the beautiful forest-land that still bears the name—Pana-ewa. (ibid.:46)

While account described above describes Pana'ewa as a male *mo'o*, the following account relates Pana'ewa to be a female guardian and chiefess of the forest. This account is described in more detail below as related in the account of Ka-Miki.

Pana'ewa Described in the Legend of Halemano

The forested lands of Pana'ewa is further described in Fornander's (1918–1919) *Legend of Halemano* as the place where he and his wife, Kamalālāwalu set up their home before she was taken by Hua'ā, a chief from Puna. Those portions of the story describing their time in Pana'ewa reads thusly:

They went from Kohala to Waimea where they spend the night; from this place they continued to Hamakua and spent the night at Kaumoali; from this place they proceeded on to Uluomalama in Waiakea, Hilo Hanakahi where they staid [*sic*]. After living in this place for twenty days, Huaa the king of Puna, heard that Kamalālāwalu was in Hilo, so he sent a messenger to Kamalālāwalu and she was taken to the king of Puna. When she was being taken by the messenger of Huaa, she instructed her brother Kumukahi to take good care of Halemano.

After Kamalālāwalu was enticed away from her husband and taken captive by Hua'ā, Halemano yearns for her. His sorrow and despair consumes his being and he dies, only to be brought back to life again by his supernatural sister, Laenihi. Deparate to bring his wife back, Kamalālāwalu and Halemano find themselves engaged in the game of *kili*. Halemano in an attempt to woo her by evoking memories of their time together at Uluomalama utters the following chant, which describes their home being in Pana'ewa:

*Noho i Hilo i o maua hale—e,
He hale noho i Panaewa e;
Maewaewa i ka hale kuleana ole,
Hookahi no kuleana o kuu kino e.
He kini, he lehu, kahawai o Hilo e,
Pali kui ka hale a ke aloha i alo ai.
Auwe kuu wahine o na lehua o
Mokupane!
O ia lehua pauku me ka hala e,
Hala ka ukana a ke aloha o ka leo,
Hele kunihi ka ua ma Lelewi,
Kokolo hele i na hala o Pomaikai,
Akahi la a ke aloha i pepehi ai.
Auwe! Kuu wahine— a!
Kuu wahine mai ke kawa lele o
Piikea;
Mai ka wai lumalumai kanaka o
Wailuku,
A kua i alo aku ai i na pali kinikini o
Hilo,
O ia mau pali anoano kanaka ole,*

We once lived in Hilo, in our own home,
Our home that was in Panaewa.
For we had suffered in the home that was not ours,
For I had but one friend, myself.
The streams of Hilo are innumerable,
The high cliffs was the home where we lived.
Alas, my love of the lehua blossoms of Mokupane!
The lehua blossoms were braided with the hala blossoms,
For our love for one another was all we had.
The rain only fell at Lelewi,
As it came creeping over the hala trees at Pomaikai,
At the place where I was punished through love.
Alas, O my love!
My love from the leaping cliffs of Piikea;
From the waters of Wailuku where the people are carried under,
Which we had to go through to get to the many cliffs of Hilo,
Those solemn cliffs that are bare of people,
Peopled by you and I alone, my love,

*Hoolaukanaka i ka wahine—e!
Kuu wahine hoi e!*

You, my own love!

Ka'ao Ho'oniua Pu'uwai no Ka-Miki (Heart Stirring Story of Ka-Miki)

References to Pana'ewa and other places in Waiākea and Hilo are also mentioned in the legendary account titled “*Ka'ao Ho'oniua Pu'uwai no Ka-Miki*” (“The Heart Stirring Story of Ka-Miki”) published in Hilo's Hawaiian language newspaper *Ka Hōkū O Hawai'i* between January 8, 1914 through December 6, 1917 and translated by Maly (1996a). Ka-Miki and his companions, Maka'iole and Keahialaka, continue their journey circumnavigating Hawai'i Island on foot along the *ala loa* (trails) and relates the gurdian and cheifess of Pana'ewa forest, the competitive nature of the Hilo chiefs, as well as associates legendary characters with specific places. That portion of the story describing their journey through Pana'ewa and into Waiākea area reads:

...Ka-Miki, Maka'iole and their companion Keahialaka departed from the compound of Kapu'euhi (in 'Ōla'a) and descended the *ala loa* towards Hilo to continue their journey. The travelers arrived at a large compound and community, where they saw a man coming towards them with a club. This man was Kūkulu-a-hāne'e-a-hina-pū [Kūkulu]. Kūkulu was a guardian of the chiefess and lands called Pana'ewa-nui-moku-lehua [Great Pana'ewa of the *lehua* forest]. Pana'ewa was a sacred chiefess of Hilo and sister of the chiefs Waiākea-nui-kumu-honua and Pi'ihonua-a-ka-lani.

The chiefess' compound and surrounding community were forbidden to strangers, and Kūkulu regularly killed unaware travelers [thus the name “Unjust place”]. Kūkulu challenged Ka-Miki *mā* but he was quickly defeated, and Ka-Miki left him there as an example to other 'ōlohe and to receive his due justice. Ka-miki *mā* then continued their journey into Hilo, seeking out 'Ūpēloa, Ku'u-aho-hilo-loa, and Haili-kula-manu.

The lands of Waiākea were named for the high chief Waiākea-nui-kumuhonua, the brother of Pi'ihonua-a-ka-lani [k] and Pana'ewa-nui-moku-lehua [w]. After departing from Pana'ewa, Ka-Miki *mā* met Haili-kula-manu, who was a guardian of Waiākea. Haili led Ka-Miki and his companions to his chief's compound at Kalepolepo. Arrangements were made for Ka-Miki to compete with the 'ōlohe – experts of Waiākea, with the events to be held at the *kahua* [contest site] at Kalepolepo. 'Ūpēloa the champion, land administrator and war councilor of Waiākea, and an expert fighter with 'ōka'a lā'au [war clubs] was called to Kalepolepo.

The *kūkini* Ku'u-aho-hilo-loa went throughout the region announcing that contests would be held at Kalepolepo, and in a short time the entire area was filled with people, all wondering who would attempt competing against 'Ūpēloa. Ka-Miki *mā* were then called to the arena, thus Ka-Miki, looking the very image of the war club of Ka-uluhe-nui-hihi-kolo-i-uka, entered the *kahua* and the contest rules were set. It was agreed that the method of competition would be 'ōka'a lā'au [war club fighting], and that the loser would be killed and baked in an *imu*.

'Ūpēloa exited the *hālau mokomoko* [contestants long house] with great agility and speed, and the crowd cried out with excitement at his ability. 'Ūpēloa also held his finely worked club, which was called 'Ohi-ka-lau-o-ke-pāhili. The club was also called *Ka-piko-o-Wākea*. 'Ūpēloa was so strong, that no competitors had ever stood up to him. As 'Ūpēloa and Ka-Miki stood on the *kahua*, readying to fight, Pi'ikea, the spear fighting expert of the chief Nā-mau'u-a-Pā'ao asked, “O youth, where is your club that you may stand against the spear fighting warrior of the chief Waiākea-nui-kumuhonua?”

Ka-Miki answered, “I have no club. My only weapon is my hands, but I have learned to use the war club from my club fighting teacher. I have used green *hau* spears, stripped like the *maile* [*Alyxia olivaeformis*], I have used clubs made of the *uhiuhi* [*Mezoneuron kauaiensis*] and the *koai'e* [*Acacia koaia*], the resonant clubs made of the resilient *kauila* [*Alphitonia ponderosa*] trees which grow at Pu'ukapele [Kaua'i]; my expertise covers all manner of war club fighting . . . and protecting myself from the top of my head to the bottoms of my feet.”

'Ūpēloa then told Ka-Miki, “If you could truly escape from my club, your knowledge would be great, beyond compare. But coming here with this boasting, you are full of deceit and impertinence like no other, and you will not be spared from my club.”

Pi'ikea then went to the edge of the *kahua*, and asked 'Ūpēloa to wait a short time before fighting so that he might go get his club for Ka-Miki to use. 'Ūpēloa responded, "No! You are not his teacher, you are not the alternate for this errant youth, that you should give him your club. He says that his hands and fingers are adequate. Unless you wish to be his *moepu'u* [death companion], you will stop this waste of time. Pi'ikea if you are stubborn about it, you and this youth shall both be the pigs that quench the fires of the *imu* today." Ka-Miki called to Pi'ikea, "I greatly appreciate your consideration, but it has been taken as a waste of time." With that, 'Ūpēloa leapt to attack Ka-Miki in the manner of *Ka-piko-o-Wākea*, thinking that he would strike Ka-Miki with the blow. Ka-Miki leapt over 'Ūpēloa and struck his hand. Because of the force of this blow, 'Ūpēloa lost his club and it flew to Maka-'iole who caught the club and held it.

'Ūpēloa moved to attack Maka-'iole, but Ka-Miki leapt in front of 'Ūpēloa and commanded him to back off and maintain the requirements of the contest. 'Ūpēloa did not heed the command because he was so outraged, and he reached to grab Ka-Miki, thinking to break him into little pieces. Ka-Miki then stepped behind 'Ūpēloa and grabbed him by the thighs. He then picked 'Ūpēloa up and threw him from the arena before Maka-'iole and Keahialaka. Keahialaka then grabbed 'Ūpēloa and bound him. Ka-Miki then called out to 'Ūpēloa with a place-name saying that commemorates his name to this day:

Ka manu o Kaupe'a ke 'ope'ope ala i ka ulu hala o 'Ūpēloa e—The bird of Kaupe'a [Ūpēloa himself] is all bundled up like the pandanus which grows at 'Ūpēloa.

Waiākea heard that 'Ūpēloa had been defeated and was greatly surprised that his war counselor and war club fighting expert had fallen. Waiākea then called to his messenger Kapunakō to go get Kaūmana, the foremost teacher of *lua*, *ha'iha'i*, *kākā lā'au* [bone breaking fighting, and spear fighting], and all manner of fighting and bring him to the *kahua*. Upon arriving before his chief, Kaūmana asked Waiākea to send his messenger Kapunakō, to bring Kalanakāma'a. Kaūmana's foremost student, to join him at the *kahua* of Kalepolepo.

[The land of] Kalanakāma'a was named for Kalana-kāma'a-o-uli, the foremost 'ōlohe student of Kaūmana, and champion of Waiākea. Kalanakāma'a was the ward of Kīpuka 'āhina [k], Hale-aloha [w] and Hale-loulou [k], who dwelt above Hilo at Kīpuka 'āhina.

When Kapunakō arrived before Kīpuka 'āhina, he spoke about the great rains and rivers of Hilo, a poetic reference to the many skilled 'ōlohe for which Hilo was famed. It was in this way that Kapunakō described the overwhelming skills of Ka-Miki and his victory over 'Ūpēloa. Kīpuka 'āhina then asked—*'ōlelo no 'eau*:

Māmā Hilo i ka wai?—Is Hilo lightened of [without] its water?

Kapunakō responded—*'Ae māmā Hilo i ka wai 'ole, ua kau i ka lani ka holo [wa'a] ua o Hilo, na ka Māluālua e ki 'i ala i pulu ka liko o ka lehua a me ka māmāne!*—Indeed one can move swiftly through Hilo, for the streams are without water, the water trough [i.e., the clouds] of Hilo are set in the heavens. It is the *Māluālua* which fetches moisture for the budding *lehua* and *māmāne*.

Kīpuka 'āhina then asked in amazement—*Nawai e nele o Hilo i ka wai? He lau ka pu'u, mano ka ihona, he kini nā kahawai o Hilo, e 'au i ka wai o Hilo a pau ke aho!*—Who could possibly make Hilo destitute of water? There are *lau* [400, poetically many] hills. *mano* [4,000, many] places to descend, and *kini* [40,000, many] streams to cross, indeed one is worn out swimming through the waters of Hilo!

It was in this way that Kīpuka 'āhina learned that a master 'ōlohe had come to Hilo challenging its many 'ōlohe. Using his *ipu hōkiokio* [gourd nose flute], Kīpuka 'āhina awakened Kalanakāma'a, for this was the only way in which Kalanakāma'a could be safely awakened, or he would kill who ever awakened him.

Kalanakāma'a joined his teacher Kaūmana, and met with the assembly at Kalepolepo. Carrying his club *Pūpū-kani-oe-i-ka-ua-o-Hilo* [Land-snail singing in the rain of Hilo], Kalanakāma'a entered the *kahua* with Kaūmana and a great cry arose praising the abilities of these Hilo champions. Ka-Miki and Kalanakāma'a exchanged taunts, Ka-Miki stated that Kalanakāma'a would become the *kāma'a lau-'i i hili kuanaka 'ia* [twined ti leaf sandals] that Ka-Miki wore upon his feet. Outraged, Kalanakāma'a leapt to attack Ka-Miki with his club *Pūpū-kani-oe-i-ka-ua-o-Hilo*, Ka-Miki leapt

out of the way, and took 'Ūpēloa's club from Maka-'iole. Seeing his student miss, Kaūmana called out to Kalanākāma'a telling him how to strike Ka-Miki – *'ōlelo no 'eau*:

Kau i ka lani ka holoua o Hilo, hilo 'ia i ke aho a ka ua he 'Io ka hauna lā'au e ki'i ai, a'ohe wahi pā'ole, pā ma ke po'o a hō'ea i nā wāwae, pā no pau ka 'oni, 'oni no he aīwaiwa ia, he hialōloa no ka naele, alaila ho'i hou ka hauna lā'au a ke koa kua makani. Placed in the heavens is the water trough of Hilo, entwined in the cordage of the rains, 'Io [Hawk] is the war club strike to use, for there is no place that can't be hit. Strike at the head and reach to the feet, for once struck, there will be no movement. If there is any movement, he is indeed a skilled expert of the depths [deepest knowledge], then return and strike again in the manner of the wind swept koa tree.

Ka-Miki then attacked Kalanākāma'a and quickly over came him, Kaūmana then leapt to the *kahua* and was beaten as well. After Ka-Miki defeated Kaūmana, word spread throughout the region, and Pi'ihonua, Waiākea's brother called his council together, wondering how they might help regain the honor of Hilo from this stranger.

Hanakāhi told Pi'ihonua that it would be best not to fight. Pi'ihonua then said that perhaps it had been a mistake to honor Hanakāhi with his title as champion, and marriage to 'Ohele. Hanakāhi told Pi'ihonua all of the things that Nā-Mau'u-a-Pā'ao had told Pi'ikea about Ka-Miki, and said it would be unwise to compete, and thus leave all of the champions of Hilo in disgrace.

Hanakāhi himself was a master *'ōlohe* trained by Maulua, of Hilo-Palikū. He was skilled in *kākālā'au* [spear fencing], *pololū* [long spear fighting], *ihe laumeki* [barbed spear fighting], and all manner of knowledge. Hanakāhi told his chief, "It is my desire to go before them [Ka-Miki *mā*], not in the manner of a competitor, but in the spirit of friendship, and to learn from them the things which they have been taught by their teachers. If I succeed, I will be the foremost *'ōlohe* of all Hilo, and I will serve as their guide as they journey from one border of Hilo to the next border of Hilo." Hanakāhi then asked his chief, "Do you agree?" Pi'ihonua told Hanakāhi to go and compete first, then if he was securely bound, to surrender and ask for friendship.

Hanakāhi approached Kalepolepo, and the contest between Ka-Miki and himself was announced. *'Ōka'a .lā'au* [club-spear fighting] was selected as the method of fighting, and when Hanakāhi asked Ka-Miki, "How shall the victory be determined?" Ka-Miki said, "By the breaking of one's spear."

Ka-Miki greatly admired the nature of Hilo-Hanakāhi, and as they competed, Ka-Miki dodged each of the thrusts. To those gathered at the *kahua*, it was as if Ka-Miki was the teacher and Hilo-Hanakāhi was the student. Hilo-Hanakāhi tried each technique he had learned from his teacher, but was unable to score against Ka-Miki. Worn out, Hilo-Hanakāhi collapsed and was taken off of the *kahua*, borne in a net. Hilo-Hanakāhi acknowledged the nature and skills of Ka-Miki and surrendered to him, thus *ke 'ahi kananā* [the fierce tuna] of Hilo befriended Ka-Miki *mā* upon the *kahua*. (Maly 1996a:A-6-9)

Hilo-Hanakāhi returned to the chief Pi'ihonua and they spoke of the events which had taken place at Kalepolepo. Pi'ihonua then sent his messenger to invite Ka-Miki *mā* to his compound in the manner of *'aikāne* (companions). Ka-Miki *mā* were well hosted by Pi'ihonua, and Ka-Miki asked Hilo-Hanakāhi to accompany them to the border of Hilo and Ka'ula in Hāmākua. Thus Hilo-Hanakāhi traveled with Ka-Miki *mā* through out the rest of Hilo. (Maly 1996a)

Waiākea 1820-1848: A Land in Transition and Early Historical Accounts

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

in Hawai'i went from the sandalwood trade, to a short-lived whaling industry, to the more lucrative, but environmentally destructive sugar industry.

The early 1800s heralded a new era in the Hilo Bay area that was marked by numerous rapid changes. During the first two decades of the nineteenth century, sandalwood was harvested and shipped from Hilo Bay and whaling ships were a common sight as they stopped at Hilo for supplies. Some of the earliest written descriptions of Hilo come from the accounts of the first Protestant Missionaries to visit the island, and early Historic visitors to Hilo noted the beauty and fertility of the region. In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai'i seeking out communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal, and described the environs of Waiākea as a well-watered place, with some of the heaviest rains and densest fog he had encountered on the island (Ellis 1963). He considered the inhabitants lucky because of their access to well-stocked fishponds, fertile soil, and to the nearby woods which provided a source of lumber. Ellis (1963) estimated that nearly 400 houses were present near the bay, with a population of not less than 2,000 inhabitants with houses clustered along the beach in the dry lowland areas (Cordy 2000:353–354). During his five-day stay, Ellis characterized Waiākea as:

...the most beautiful we have yet seen. . . The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes, and melons, grow to the greatest perfection.

Groves of cocoa-nut and breadfruit trees are seen in every direction loaded with fruit, or clothed with umbrageous foliage. The houses are mostly larger and better built than those of many districts through which we had passed. We thought the people generally industrious; for in several of the less fertile parts of the district we saw small pieces of lava thrown up in heaps, and potato vines growing very well in the midst of them, though we could scarcely perceive a particle of soil.

There are plenty of ducks in the ponds and streams, at a short distance from the sea, and several large ponds or lakes literally swarm with fish, principally of the mullet kind. The fish in these ponds belong to the king and chiefs, and are tabued from the common people.

Along the stone walls which partly encircle these ponds, we saw a number of small huts, where the persons reside who have the care of the fish, and are obliged frequently to feed them with a small kind of mussel, which they procure in the sands round the bay.

...There are 400 houses in the bay, and probably not less than 2000 inhabitants... (Ellis 1963:337–338)

Ellis eventually set up a mission station in Waiākea that lasted until 1825 before moving to Punahoa 2nd Ahupua'a (Moniz 1994). A large number of churches were commissioned by newly converted *ali'i*, and Missionary journals from this time period describe the growing congregations of people drawn to the Hilo missions. Also in 1825, the H.M.S. *Blonde*, bearing the bodies of Liholiho and his wife Kamāmalu who had both died of measles while in England, arrived in Hilo Bay. Ka'ahumanu declared Hilo Bay would henceforth be known as Byron's Bay in honor of Lord Byron, the Commander of the H.M.S. *Blonde*. During shore-leave Lord Byron stayed at Waiākea, at a large house appropriated by Ka'ahumanu. The officers onboard describe the river of Wailuku and Wailoa as convenient watering places for visiting ships (Kelly et al. 1981:33). Upon leaving Hilo Bay the ship logs neatly summarize the potential of Hilo Bay:

Byron Bay will, no doubt, become the site of the capital of Hawaii. The fertility of the district of Hilo [sic]...the excellent water and abundant fish-pools which surround it, the easy access it has to the sandal-wood district, and also commerce, and the facility it affords for refitting vessels, render it a place of great importance. (Kelly et al. 1981:35)

In June of 1825, an American Protestant missionary by the name of Charles Samuel Stewart visited Hilo. Stewart depicted Hilo as a well-populated residence for natives and missionaries alike:

...The reef runs in a curved direction from the point at the channel, about half a mile to the east, where it joins a romantic little islet covered with cocoanut trees; from that fact, called "Cocoanut island." A small channel runs between this and the main land, which is low, and sweeps round to the western cliffs in a beautifully curved sandy beach of about two miles, making the form of the bay that of a flattened horseshoe. The beach is covered with varied vegetation, and ornamented by clumps and single trees of lofty cocoanut, among which the habitations of the natives are seen, not in a village, but scattered everywhere among the plantations, like farm houses in a thickly inhabited

country. The mission houses were pointed out to us, pleasantly situated near the water, about the middle of the curvature forming the head of the bay. At a very short distance from the beach, bread-fruit trees were seen in heavy groves, in every direction, intersected with the pandanus and kukui, or candle-tree, the hibiscus and the acacia, &c. The tops of these rising gradually one above another, as the country gently ascends towards the mountains in the interior, presented for twenty or thirty miles in the southeast a delightful forest scene, totally different in extent from anything I had before witnessed on the islands. (1828:287)

Hilo Bay's protected waters and sandy shores provided a calm and safe alternative for landfall for ocean going vessels involved in whaling and the sandalwood trade. The sandalwood trade was initiated in the 1790s but did not become successful until 1812; Kamehameha held the monopoly on the trade and oversaw its management by his chiefs until his death. Thereafter, King Liholiho's favored chiefs mismanaged the trade, which led to the depletion of the forests and the end of the sandalwood trade by 1830 (Kelly et al. 1981). According to Kelly et al. (1981), historic accounts about whaling suggest that Hilo Bay was not a preferred port for the whalers due to the missionary influence and the resultant lack of liquor and women; sailors preferred Honolulu and Lahaina as ports-of-call. Whaling declined through the mid to later 1800s and came to a halt in 1892. However, industrial development in Hilo did not cease. Sawmills and early sugar plantations provided milled woods and sugar for export. In an 1840 letter, Reverend Titus Coan, who was stationed in Hilo, remarked on the town's growth:

Industry is increasing. Our ports and places of trade begin to put on the air of activity and life. Temporal improvements and comforts are fast increasing at Hilo, that is, near the station. Two stores of goods are opened here, and three sugar-mills have recently gone into operation near us. Sugar-cane is being planted to a considerable extent; business assumes more tone and energy, and many of the people are approximating towards industry and competence. Probably the amount of cloth worn by the people has increased ten or twenty fold during four years past. Labor is in better demand and wages are rising continually. (Kelly et al. 1981:49)

In 1840, Lieutenant Charles Wilkes, head of the U.S. Exploring Expedition, traveled to Hilo. His narrative provides a similar account to those written by others in earlier times, painting the Hilo settlement as a lush, verdant, and well-watered locale, and remarked upon the agricultural potential of the district, revealing that "the sugar-cane grows here in abundance, and of a large size; coffee succeeds well, as do indigo and the tacca, from which they make a quantity of arrow-root" (Wilkes 1845:223). In addition to mentioning the early commercial sugarcane enterprises that were just emerging in the district, Wilkes further expands on the environs of Hilo and provided an account of his journey from Hilo to Puna through the Pana'ewa forest:

The scene which the island presents as viewed from the anchorage in Hilo Bay, is both novel and splendid: the shores are studded with extensive groves of cocoa-nut and bread-fruit trees, interspersed with plantations of sugar-cane; through these, numerous streams are seen hurrying to the ocean; to this succeeds a belt of some miles in width, free from woods, but clothed in verdure; beyond is a wider belt of forest, whose trees, as they rise higher and higher from the sea, change their characters from the vegetation of the tropics to that of polar regions; and above all tower the snow-capped summits of the mountains. . .

Hilo is a straggling village, and is rendered almost invisible by the luxuriant growth of the sugar-cane, which the natives plant around their houses. A good road has been made through it for the extent of a mile, at one end of which the mission establishment is situated. This consists of several houses, most of which are of modern style, covered with zinc and shingles. One of them however, the residence of the Rev. Mr. Coan, was very differently built, and derived importance in our eyes, from its recalling the associations of home. It was an old-fashioned, prim, red Yankee house, with white sills and casements, and double rows of small windows. No one could mistake the birthplace of the architect, and although thirty degrees nearer the equator than the climate whence its model was drawn, I could not but think it as well adapted to its new as to its original station.

The whole settlement forms a pretty cluster; the paths and roadsides are planted with pine-apples; the soil is deep and fertile, and through an excess of moisture, yields a rank vegetation. . .

The church is of mammoth dimensions, and will, it is said, accommodate as many as seven thousand persons. It is now rapidly falling into decay, and another is in progress of erection. Many of the native houses are surrounded with bread-fruit and cocoa-nut trees, and have a fine view of the bay.

Six miles from Hilo we entered the first wood, and at 6 P.M. we passed, at eight miles distance, the chasm that divides the Hilo from the Puna district. As the darkness set in, we began to experience

the difficulties we had anticipated from our late start: the bustle and noise became every moment more audible along the whole line as the night advanced: what added not a little to our discomfort, was the bad road we now had to encounter, rendered worse as each native passed on in the tracks of those preceding him, until at last it became in places quite miry.

(1845:114–118)

The *Māhele* ‘Āina of 1848

By the mid-19th century, the ever-growing population of Westerners in the Hawaiian Islands forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership. By 1840 the first Hawaiian constitution had been drafted and the Hawaiian Kingdom shifted from an absolute monarchy into a constitutional monarchy. Convinced that the feudal system of land tenure previously practiced was not compatible with a constitutional government, the *Mō‘ī* Kamehameha III and his high-ranking chiefs decided to separate and define the ownership of all lands in the Kingdom (King n.d.). The change in land tenure was further endorsed by missionaries and Western businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be revoked from them at any time. After much consideration, it was decided that three classes of people each had one-third vested rights to the lands of Hawai‘i: the *Mō‘ī* (monarch), the *ali‘i* (chiefs) and *konohiki* (land agents), and the *maka‘āinana* (common people or native tenants).

In 1845 the legislature created the Board of Commissioners to Quiet Land Titles (more commonly known as the Land Commission), first to adopt guiding principles and procedures for dividing the lands and granting land titles, and then to act as a court of record to investigate and ultimately award or reject all claims brought before them. All land claims, whether by chiefs for entire *ahupua‘a* or by tenants for their house lots and gardens, had to be filed with the Land Commission within two years of the effective date of the Act (February 14, 1848) to be considered. This deadline was extended several times for the *ali‘i* and *konohiki*, but not for commoners (Alexander 1920; Soehren 2005).

The *Mō‘ī* and some 245 *ali‘i* (Kuykendall 1938) spent nearly two years trying unsuccessfully to divide all the lands of Hawai‘i amongst themselves before the whole matter was referred to the Privy Council on December 18, 1847 (King n.d.). Once the *Mō‘ī* and his *ali‘i* accepted the principles of the Privy Council, the *Māhele* ‘Āina (Land Division) was completed in just forty days (on March 7, 1848), and the names of all of the *ahupua‘a* and *‘ili kūpono* (nearly independent *‘ili* land division within an *ahupua‘a*) of the Hawaiian Islands and the chiefs who claimed them, were recorded in the *Buke Mahele* (also known as the *Māhele* Book) (Buke Mahele 1848; Soehren 2005). As this process unfolded the *Mō‘ī*, who received roughly one-third of the lands of Hawai‘i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased by his subjects to live on. Accordingly, the day after the division when the last chief was recorded in the *Buke Mahele* (*Māhele* Book), the *Mō‘ī* commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike the *Mō‘ī*, the *ali‘i* and *konohiki* were required to present their claims to the Land Commission to receive their Land Commission Awards (LCAs). The chiefs who participated in the *Māhele* were also required to provide commutations of a portion of their lands to the government to receive a Royal Patent that gave them title to their remaining lands. The lands surrendered to the government by the *Mō‘ī* and *ali‘i* became known as “Government Land,” while the lands that were personally retained by the *Mō‘ī* became known as “Crown Land,” and the lands received by the *ali‘i* became known as “*Konohiki* Land” (Chinen 1958:vii, 1961:13). Most importantly, all lands (Crown, Government, and *Konohiki* lands) identified and claimed during the *Māhele* were “subject to the rights of the native tenants” therein (Garavoy 2005:524). Finally, all lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be formally surveyed as this process expedited the work of the Land Commission.

Prior to the *Māhele* ‘Āina, the entire *ahupua‘a* of Waiākea was retained as the personal lands of Kamehameha, which he passed to his son and heir Liholiho. Waiākea was later inherited by chiefess Kaunūhewa, a grand-daughter of Keawemauhili and *kahu* of Alexander Liholiho (Kame‘eleihiwa 1992), who later relinquished the *ahupua‘a* during the *Māhele* ‘Āina to the Crown. As a result of the *Māhele*, Waiākea *Ahupua‘a* was retained as Crown Lands for Kamehameha III. Although no *kuleana* awards were claimed or granted within Pana‘ewa, twenty-six *kuleana* claims (LCAs) were granted within Waiākea for house lots and cultivation plots. With the exception of the claim made for Honohononui, all remaining LCAs were located along major inland roads or centered around the fishponds located inland of Hilo Bay (Devereux et al. 1997; Moniz 1994). The *‘ili kūpono* of Pi‘opi‘o and Honohononui were claimed in their entirety by Kekuanā‘a on behalf of his chiefly daughter, Victoria Kamāmalu. Table 3 below synthesizes all of the land claims that were granted within Waiākea *Ahupua‘a* and Figure 27, shows the location of these LCAs relative to the study area.

Table 1. Land Commission Awards within Waiākea.

| <i>LC Aw. No</i> | <i>Awardee</i> | <i>Acres</i> | <i>Royal Patent No.</i> |
|------------------|-----------------|--|-------------------------|
| 2327 | Barenaba | 12.25 | 7601 |
| 1279 | Halai | 0.60 | 8191 |
| 4004 | Hale | 4.25 | 2756 |
| 2663 | Kahue | 3.75 | 8063 |
| 2281 | Kaiana | 10.25 | 5713 |
| 11050-B | Kaihenui | 5.19 | 4365 |
| 1333 | Kalolo | 2.25 | 5625 |
| 8854 | Kalua | 3.40 | 1908 |
| 1738 | Kaluhikaua | 2.98 | 1146 |
| 7713 | V. Kamāmalu | ‘ili kū of Pi‘opi‘o and Honohononui | 4475 |
| 8803 | Kamanuhaka | 1.02 | 1927 |
| 1-F | Kapu | 1.60 | 2769 |
| 11174 | Kealiko | 1.0 | 8216 |
| 2402 | Keaniho | 5.0 | 6790 |
| 5018/10505 | Keawe | 0.24 | 1913 |
| 4344 | Kuaio | 1.22 | 6973 |
| 9982 | Leoi | 0.80 | 1874 |
| 4738-B | Lolo | 1.27 | 6632 |
| 1-E | Mahoe | 4.46 | 1147 |
| 4737 | Moealoha | 1.03 | 7616 |
| 4785 | Nakai | 1.05 | 1121 |
| 2603 | Napeahi | 1.30 | 1148 |
| 4737-B | Wahine | 1.01 | 6984 |
| 11173 | Wahinealua | 2.50 | 7135 |
| 10004 | Wahinenohoihilo | 1.69 | 2768 |



Figure 27. Location of Land Commission Awards within Waiākea with study area outlined in red.

Boundary Commission Testimony

In 1862, the Boundary Commission was established to set the legal boundaries of the *ahupuaʻa* that were awarded during the *Māhele*. The commissioners were authorized to certify the boundaries in 1874. The primary informants for the boundary descriptions were older native residents of the specific areas in question. Many times the boundaries of particular *ahupuaʻa* were established through the testimony regarding neighboring *ahupuaʻa*. Such was the case for Waiākea; informants, many of whom were born in the late 1700s, provided boundary data for Keaʻau in Puna, Keauhou in Kaʻu, Kukuau in South Hilo, and Humuʻula in North Hilo, all of which border Waiākea. In describing the *ahupuaʻa* boundaries, references are made to coastal landmarks, then current and former residential areas, planting areas (none extending above about 2000 feet), locations of woods where trees for canoes were acquired (above Hilo at a place called Nehuiki), and areas deep in the forest for bird catching. A point at the summit of Puʻu Kūlani marks the southwestern corner of Waiākea Ahupuaʻa. Puʻu Kūlani, as a named prominent landscape feature that is referenced in legend and chant (Maly and Maly 2004).

The Transformation of Crown Lands (post-1893)

The late 19th century was a tumultuous time for the Kingdom of Hawaiʻi as the 8th reigning monarch, Queen Liliʻuokalani faced serious pressure from American businessmen to abdicate her throne. On January 17, 1893, a small group of American businessmen and sugar moguls backed by a U.S. consul and marines illegally attacked the Hawaiian Kingdom government and the sovereign, Queen Liliʻuokalani (Beamer 2014). This group, consisting of thirteen men referred to themselves as the Committee of Safety and following the overthrow, they proclaimed to be the Provisional Government that would manage the affairs of the Hawaiian Kingdom (Beamer 2014; Van Dyke 2008). The overthrow of the Hawaiian Kingdom government had a rippling effect that cause major instability for the Hawaiian nation and severely impacted the way Crown lands were allocated, such as those in Waiākea Ahupuaʻa. Van Dyke (2008: 153) states that “some also believed that abrogation of the Monarchy would open up the Government and Crown Lands for exploitation.” This belief was publicized as early as 1872 by Standford B. Dole, the acting President for the Provisional Government. In an article published in the *Pacific Commercial Advertiser* (1872:2) newspaper, Dole asserted that preserving Crown lands as inalienable under an 1865 Statute was a “mistaken policy.” Dole believed that maintaining Crown lands as inalienable hampered the economic development of the islands and argued that these

lands should be made available to foreigners for homesteading (Van Dyke 2008). Following the overthrow in 1893, sizable portions of the previously inalienable Crown lands were divided and sold as Government land grants to both foreign and native residents alike. A large number of land grants that were awarded during this time were centered around the more populated coastal section of Waiākea near the Waiākea fishpond and Wailoa river (see Figure 23).

The 1894 *Biennial Report of the Commissioner of Crown Lands* compiled by Curtis P. Iaukea, described land use across the extent of the entire Waiākea Ahupuaʻa. From his descriptions we learn that the *mauka* portions of Waiākea were heavily utilized for sugarcane cultivation and that the vast region above the cane fields consisted of excellent coffee lands. Additionally, marine based resources were highly valuable and that the forest extended 2 miles short of the coastline. Iaukea's description is presented below in its entirety:

Waiakea.—This head embraces all that land lying on the south side of Hilo and extending from the sea to the slop of Mauna Loa, far above the forest belt, a distance of 15 miles. The land on the coast is very rocky excepting about the bay at the mouth of the Waiakea River, a tract of about 100 acres, which is very valuable. The portions along the volcano road and above or mauka of it are somewhat rocky, but the soil is very rich and is mostly under the cultivation of cane by the Waiakea Mill Company. This section contains about 3,000 acres of good cane land. Above this and extending into the forest, which is very dense, is a vast region of excellent coffee land, equally as good as the Olaa lands. A good road connects the plantation with Hilo town. The sugar from the mill is boated down the Waiakea River about half a mile to the landing. A very good fishery belongs to the land, and several excellent fish ponds. There are no running streams on the land, but several fine springs, especially at the seacoast. The ohia forest extends to within a mile of the coast and 2 miles to the Waiakea side of the harbor. Area, about 95,000 acres (Iaukea 1894:1334)

Commercial Sugar Enterprises in Waiākea, Railroad Development, and Early Historic Accounts

The written history of the late-19th to the early-20th century largely reflects news of new settlers, religious endeavors, and commercial agricultural pursuits in the region. In the decades following the *Māhele ʻĀina*, when land became a commodity, Hawaiians were often forced off their house lots (and livelihoods) simply because they lacked the cash with which to make the purchase (of land) or pay the property tax. The creation of private property also resulted in a shift away from the traditional *mauka-to-makai* management of whole *ahupuaʻa* and conventional transportation methods, as certain industries moved into large swaths of land such as livestock ranching and commercial sugar pursuits in the *mauka* lands of Waiākea. As a result, Hawaiian culture was well on its way towards Western assimilation as industry in Hawaiʻi transitioned from the boom-and-bust sandalwood trade, to a short-lived whaling industry, to the more lucrative, but environmentally destructive sugar and cattle industries.

One of the primary industries that emerged in Waiākea during the mid to late-19th century was commercial sugar cultivation. The Polynesian-introduced *kō* (sugarcane; *Saccharum officinarum*) was grown on all islands, and stands as perhaps the most widely developed and extensively cultivated crop in Precontact Hawaiʻi. Cultivation of sugar for commerce has had the unfortunate effect of diluting the distinguishing characteristics of Hawaiian cane varieties due to the hybridization of traditional and introduced species. Prior to its exploitation for profit, *kō* served as a fixed element in Hawaiian horticulture that served a variety of important uses. *Kō* was traditionally planted in the lowland plains, and Neal (1965) relates that there were approximately forty named varieties cultivated by the Hawaiians. Included in these is the most common *kō kea* (white cane) which was a typically planted near old homesteads. In general, *kō* is purported to grow well in almost all locales, and was “planted at *kihapai* of sweet potato, dry taro and *wauke*, and on the banks of *loʻi* taro patches; and fields of cultivated plants were beautified by plantings of cane along their banks and borders” (Kamakau 1976:39).

Of great curative value, *kō* was considered especially therapeutic and was included as an essential component of medicinal tonics and compounds (Handy 1940). Aside from its role as an active ingredient in medicines, Abbott (1992) opines that it was sometimes used not as a primary constituent, but rather as a flavoring agent to sweeten distasteful bitter herbs in curative compounds. Alternatively, its sweet juice could also be used in a more insidious manner to conceal and accelerate the effects of various poisons (Lincoln 2017). The juice of the *kō* was considered as a very effective remedy for healing deep cuts and wounds, fractured limbs, and severed body parts, healing the skin leaving no evidence of scar tissue (Kaaikamanu and Akina 1922; Krauss 1993). It also served chiefly as sustenance, and was eaten as a snack, condiment, and a famine food. The juice of the *kō* could be toasted over the fire and fed to nursing babies, and was used to strengthen children's teeth by chewing (Handy and Handy 1991). From a more utilitarian aspect, *kō* could be used to thatch the interior of houses when *pili* grass or *lauhala* (pandanus) were not abundant (Handy 1940; Malo 1951).

It was not until 1835 that sugar became established commercially in the islands, replacing the waning sandalwood industry, and early sugar enterprises were attempted in South Hilo as early as the 1840s (Kuykendall and Day 1976; Oliver 1961; Wilkes 1845). During the 1860s, Kamehameha IV leased large portions of Waiākea for pastureland and sugarcane cultivation (Moniz 1994). The majority of the eastern portions of Waiākea however, remained outside the region of sugar cultivation, most likely due to the shallow soils therein. Commercial sugarcane cultivation had a profound impact on the *ahupuaʻa* as a whole, and the declining population of Waiākea began to increase as a result of the industrial and economic growth brought about by the sugar industry (Wolforth 2007). By 1857, there were three sugar mills producing sugar for export in the Hilo area. With the Kingdom-wide economic depression that occurred as a result of the U.S. whaling fleet pulling out of the Hawaiian Islands in 1859, the focus of commercial cultivation shifted from general agriculture to sugarcane (McEldowney 1979). The 1860s not only saw an increase in the appropriation of land by foreigners for commercial sugar cultivation, but additionally in 1861 S. Kipi leased the Crown Lands of Waiākea at the rate of \$600 dollars a year to be used as pasture land for a term of five years (Kelly et al. 1981; Maly 1996). During this time, the study area and lands in the immediate vicinity in Panaʻewa appeared to have been spared by these enterprises, remaining as undeveloped forest lands. One of the earliest maps of Waiākea drawn by W.M. Webster in 1851 shows the boundaries of the Panaʻewa forest in addition to two thoroughfares: the “Road from Olaa to Hilo” west of the study area, and the “Road to Puna” directly to the east of the study area, both of which provided access from Puna to Hilo (see Figure 24).

Although the commercial cultivation of sugar had commenced roughly thirty years prior in South Hilo, it hadn't quite begun to dominate the district yet. Isabella Bird visited Hilo in 1873 and published her experiences in *The Hawaiian Archipelago: Six Months Among the Palm Groves, Coral Reefs, & Volcanoes of the Sandwich Islands* (Bird 1882). Her firsthand accounts of Hilo are dreamy and romanticized: perhaps the most vivid of all foreign accounts regarding the environs of Waiākea and Panaʻewa. In the following excerpt, she describes the region as thickly vegetated, but makes no mention of sugarcane or burgeoning industrialization in the vicinity of the study area. She does, however, note that “above Hilo, broad lands sweeping up cloudwards, with their sugar cane, *kalo*, melons, pine-apples, and banana groves suggest the boundless liberality of Nature” (Bird 1882:36). Bird also provides a colorful depiction of her journey from Puna to Hilo through the 4-mile-wide Panaʻewa forest, on either the old Puna Trail or the road to ʻŌlaʻa (see Figure 24; Figure 28) in the vicinity of the study area:

... We had a delicious gallop over the sands to the Waiakea river, which we crossed, and came upon one of the vast lava-flows of ages since, over which we had to ride carefully, as the *pahoehoe* lies in coils, tortuosities, and holes partially concealed by a luxuriant growth of ferns and convolvuli. The country is thickly sprinkled with cocoanut and breadfruit trees, which merge into the dense, dark, glorious forest, which tenderly hides out of site hideous, broken lava, on which one cannot venture six feet from the track without the risk of breaking one's limbs. All these tropical forests are absolutely impenetrable, except to axe and billhook, and after a trail has been laboriously opened, it needs to be cut once or twice a year, so rapid is the growth of vegetation. This one, through the Puna woods, only admits of one person at a time. It was really rapturously lovely. Through the trees we saw the soft steel-blue of the summer sky: not a leaf stirred, not a bird sang, a hush had fallen on insect life, the quiet was perfect, even the ring of our horses' hoofs on the lava was a discord. There was a slight coolness in the air and fresh mossy smell. It only required some suggestion of decay, and the rustle of a fallen leaf now and then, to make it an exact reproduction of a fine day in our English October. The forest was enlivened by many natives bound for Hilo, driving horses loaded with cocoanuts, breadfruit, live fowls, *poi* and *kalo*, while others with difficulty urged garlanded pigs in the same direction, all as presents for the king. (Bird 1882:129–130)

Not long after Bird's visit to Waiākea, and following the signing of the 1875 Treaty of Reciprocity, a free-trade agreement between the United States and the Kingdom of Hawaiʻi which guaranteed a duty-free market for Hawaiian sugar in exchange for special economic privileges for the United States, commercial sugarcane cultivation and sugar production became the central economic focus for the Hilo area. By 1874, Hilo already ranked as the second largest population center in the islands and within a few years the fertile uplands, plentiful water supply, and port combined to make Hilo a major center for sugarcane production and export. In that same year, the first lease for sugarcane cultivation in Waiākea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996). This lease was eventually transferred to the Waiākea Mill Company, founded by Alexander Young and Theo H. Davies, and the Waiākea sugar plantation was established.

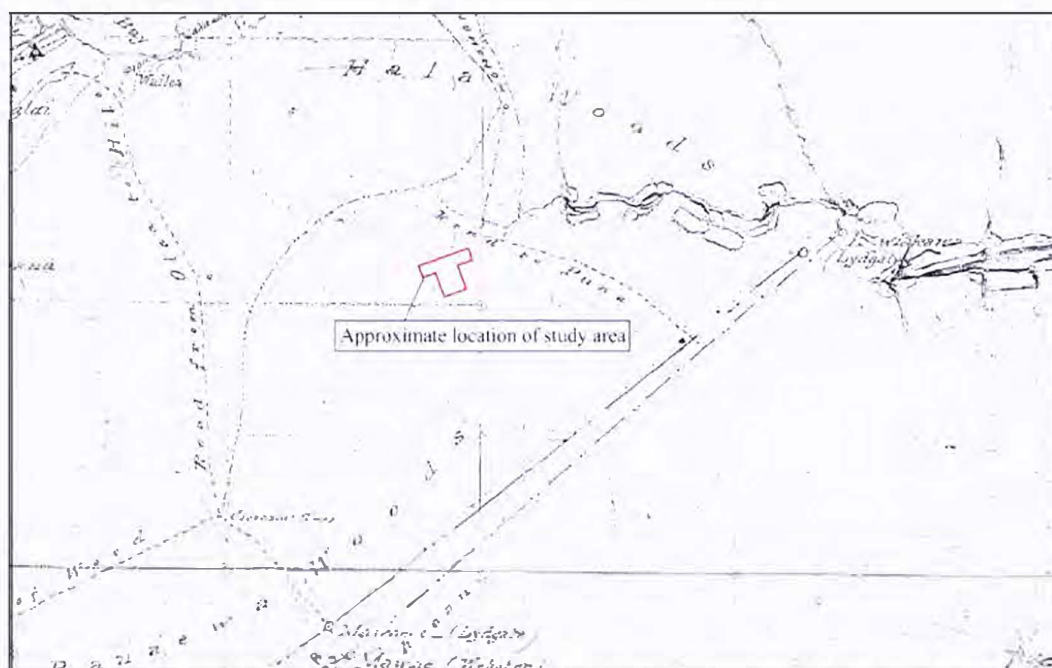


Figure 28. Portion of Hawai'i Registered Map No. 571 by C.J. Lyons (ca. 1870s) of "Central Hawaii Hilo and Hamakua" showing the "Road to Puna" in relation to the current study area within the Pana'ewa forest and the current study area.

In 1879 the Waiākea Mill Company incorporated and began a commercial sugar operation on about 350 acres of land in Waiākea that they acquired from Lyman northeast of the current study area. The Waiākea sugar mill, also built in 1879, was located at the inland end of Waiākea fish pond and by 1931, Hawaiian Cane Products opened a canec plant next to the mill (Rechtman and Lang 2009) (Figures 29 and 30). The company's sugar lands extended south from the mill to the uplands of Waiākea Ahupua'a, but did not include the study area. Rather, the lands in and around the study area remained forested and mostly utilized by individuals traversing between Puna and Hilo on the old Puna Trail. an 1883 account by D.H. Hitchcock paints the route as a "miserable muddy trail to the Panaewa woods, and through these woods on a narrow trail, for most of the time overgrown with ai and guava bushes, until the cocoanut grove was reached" (Hitchcock 1897). The thick density of vegetation in the Pana'ewa forest was also noted in an account from the following year:

... little to be seen along the route [to Hilo from Puna], except the luxury of the tropical forest, the beauty of which increases steadily as we approach the town. It is doubtful if its luxuriance can be surpassed by that of any other country in the world.

... The approach from Hilo is the most difficult of all, because it involves the necessity of traversing the belt of forest which lies between the middle slopes of the mountain and the sea. No one can imagine the density and exuberance of tropical vegetation until he has seen it. In truth, the forest can be penetrated only by hewing a way through it or by traversing a route which has already been cut by main force. (Report of the Director of the United States Geological Survey 1883)

Over the course of the next few years, the Pana'ewa forest remained as it was, but the sugar industry continued to progress. By 1887, railroads operating on steam and animal power were built on some plantations, although some utilized flumes or cable railways to transport cane from the fields to the coast mills. One year later in 1888, the Waiākea Mill Company further increased its land holdings by acquiring a 30-year lease for additional lands in Waiākea. These lands were systematically cleared and planted in sugarcane in the years to come. In 1889, J. Cumming Dewar voyaged on the SS *Myanza* from Kawaihae to Hilo to meet with the manager of the Waiākea Mill, and succinctly described Hilo and its fields of cane:

After a delightfully fine evening and a smooth passage during the night, we arrived and anchored in Hilo Bay at 10 A.M. on Sunday, January 6. From daybreak till the time of our reaching the port, the scenery as we steamed along the coast was exceedingly attractive. Numerous waterfalls were to be seen precipitating themselves over the cliffs into the sea, whilst ever and anon we passed large plantations of sugar-cane. (Dewar 1892:260–261)



Figure 29. Waiākea Mill and canec plant located near the Waiākea Fishpond in 1932, study area not shown (National Archives and Records Administration).

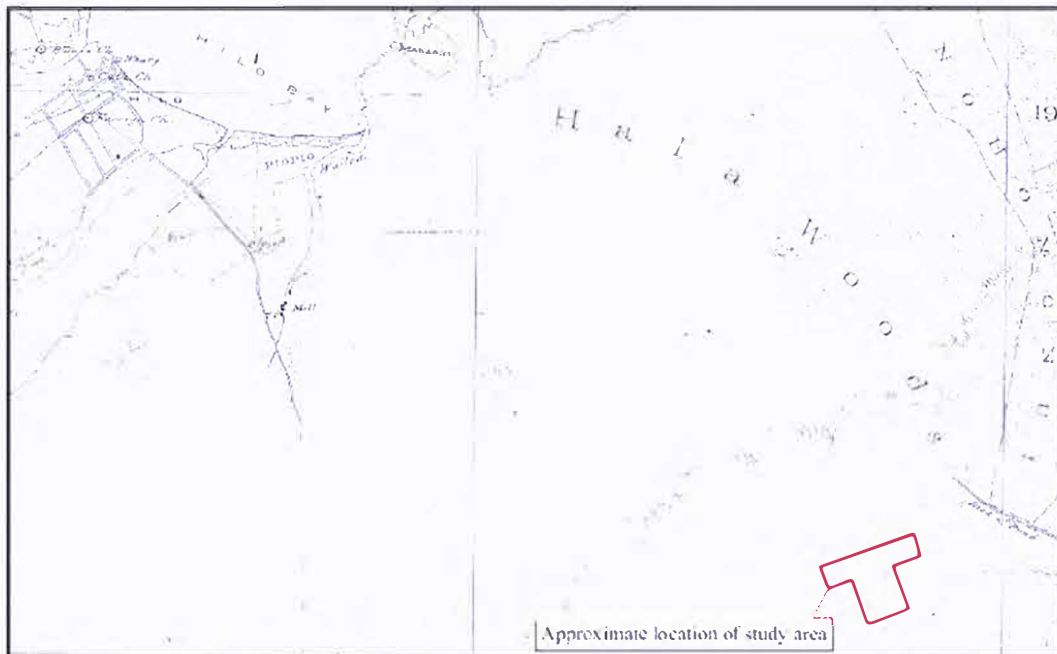


Figure 30. Portion of undated Hawai'i Registered Map No. 842 by Lyons and Covington of showing "Lands of Hilo Hawaii" showing Hilo Bay and Waiākea Mill in relation to study area (outlined in red).

With the annexation of Hawai'i to the United States in 1898 and the granting of Territory status in 1900, Hilo was designated the center of county government in 1905 and remained the second most populated city in the newly formed Territory of Hawai'i. Railroad construction was one of the most important elements of governmental and private sector planning following the Treaty of Reciprocity, as crops and product were still being transported by beast and cart (Dorrance and Morgan 2000). On the Island of Hawai'i, the first major line to be constructed was in North Kohala District, which operated as the Hawaiian Railroad Company. The North Kohala line, however, was envisioned as only the first step toward a much larger system connecting the cane fields of Kohala, Hāmākua, and Hilo with Hilo Harbor, the only protected deep-water port on the island. Beginning in 1899, railroad lines began transporting sugar to the harbor for marine transport, thus Hilo became an important shipping and railroad hub. It was in during this year that the Waiākea Mill Company established a railroad system to carry the cane from the fields to the mill for processing and the Hilo Railroad Company had begun building tracks from Waiākea through the Pana'ewa forest to the 'Ōla'a Sugar Company Mill in the district Puna (Kelly et al. 1981), which would later become part of the Hawai'i Consolidated Railway (HCR). By the early-20th century, the Waiākea Mill Company had increased the area under sugarcane cultivation in Waiākea to nearly 7,000 acres.

The commercial sugar industry provided most of the cargo transported by HRC, but suffered a sharp decline between the years of 1904-1907, which caused a halt of development in Hilo (Thurston 1913). In response, HRC worked with 'Ōla'a Sugar Company to send a representative to Washington D.C. in 1907 to secure funding for the construction of a breakwater that would allow Hilo Bay to accommodate larger ocean-going vessels. Construction on the breakwater began in 1908 and was still ongoing at the time of Thurston's writing (ca. 1914); the breakwater was finally completed in 1929. In exchange for construction of a breakwater in Hilo Bay, the Hilo Railroad was required to build a new wharf, a one-mile rail extension from Waiākea, and a 50 mile rail extension north to Honoka'a Mill (the Hāmākua Division). The funding of the breakwater by HRC resulted in the extension of the railroad through the populated section north of Hilo all the way to Hakalau and Hāmākua (see Figure 26):

When the breakwater project was pending before Congress, opposition was made to the appropriation on account of the limited commerce then being transacted through Hilo harbor.

Assurances were thereupon made by the Hilo Railroad Company, that if the breakwater were constructed, a railroad would be built into the country north of Hilo and suitable wharf facilities provided under the lee of the breakwater. Such assurances had a material effect in securing the appropriation. (ibid.:145)

The extension to Honoka'a would finally connect the sugar mills of Hilo, and Hāmākua with Hilo's protected harbor. Between June 1909 and December 1911, HRC built 12.7 miles of rail extending from Hilo to Hakalau Mill, crossing many gulches and valleys along its route. Ultimately, the cost of the Hāmākua section ruined HRC and they were forced to sell out and reorganize under the name Hawaii Consolidated Railway (HCR) in 1916. Two years later in 1918, the Waiākea Mill Company's lease of Waiākea lands expired, and the land fell under new homesteading laws that required the government to lease portions of it to individual homesteaders who would be willing to grow sugarcane. Some of the most fertile lands in Waiākea, to the southwest of the HCR right-of-way (and the study area) were later subdivided by the Territory of Hawai'i into house lots, homesteads, and cane lots of various sizes for lease and purchase. It was during this time that the Puna Trail (Figure 31) fell into deterioration, and by 1919 it was said to be largely unutilized, particularly with the advent of automobiles, the development of more accommodating and direct thoroughfares, and increasing industrialization in surrounding areas. The following account chronicles the decaying condition of the trail during this time, details its construction methods, and significance prior to its abandonment, and reveals that in the face of burgeoning urbanization that traditional lifeways persisted nevertheless:

There is, for instance, the old Puna trail—or what is left of it. Few have passed that way since automobiles came into general use, yet it leads through charming ways along the coast beyond the Seaside Club. It is no ordinary trail and bears evidence even in the partial decay of being constructed to withstand much traffic. The sides are carefully walled and the footway set with small stones. It is a picturesque relic and with a complementary compilation of the rich legendry which must be identified with it would make an additional showplace for visitors. The trail winds through primitive and riotous jungle, touches secluded bits of shore and discovers here and there tiny huts in which dwell native Hawaiians who appear to be quite happy in knowing little of the world and caring less.

It is not likely that the lands through which this old trail winds will soon be required for commercial use, as most of it is roughly piled aa or pahoehoe full of pukas, but whatever is done with it there should be a strip reserved by the Government to include portions at least of the old Puna trail. It would be a shame to permit its entire obliteration. (Hilo Daily Tribune 1919)

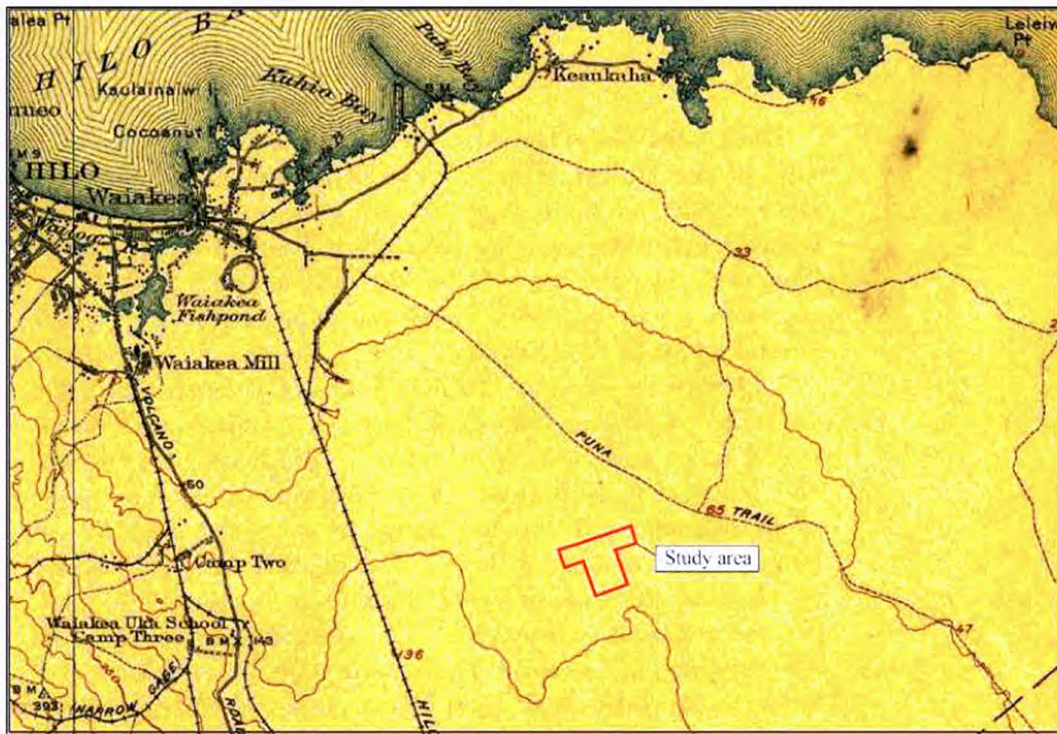


Figure 31. Portion of 1917 USGS Hilo quadrangle map showing current study area (outlined in red) in relation to the “Puna Trail” alignment, Hilo railroad, and Waiākea Mill.

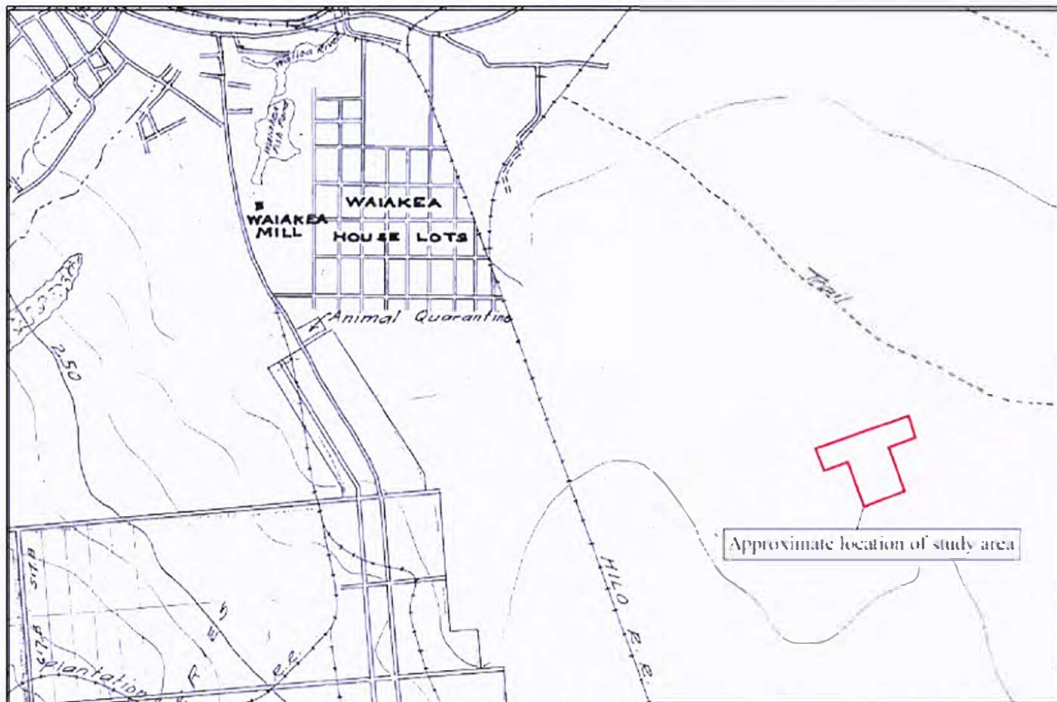


Figure 32. Portion of Hawai'i Territory Survey plat No. 787 by Jos. Iao ca. May 1920 showing study area (outlined in red) in relation to the Hilo Railroad, Puna Trail, Waiākea House Lots, and Waiākea Mill.

By 1921, the large tracts of land within and below the Pana'ewa forest were being recognized for their potential as "an agricultural and pastoral region" and it was opined that "in time to come great enterprise will be built up among the kipukas found all through the Panaewa and Puna sections of this island" (Hilo Daily Tribune 1921). Around this time, the Waiākea Homesteads were established (Figure 32). The sugar industry brought widespread changes to the Hilo area and drastically altered the traditional landscape of the district. As part of the late nineteenth century development of the sugar plantations and related infrastructure, some of Hilo's largest fishponds were filled in, and many old residences, burial sites, trails, *heiau*, formerly located in the cane fields were destroyed as a result. Throughout the 68 years of its operation, the Waiākea Mill Company was a major force in shaping the economic and social growth of Hilo, and certainly left its mark on both the cultural and physical landscapes of the area. By the mid-1940s, contractual and legal problems combined with a declining sugar market and the devastating *tsunami* of 1946 led the Waiākea Mill Company to cease operation the following year in 1947.

Creation of the Pana'ewa Hawaiian Homesteads and the Hilo Airport

In an effort to help address the indignities faced by Native Hawaiians following the overthrow of the Hawaiian monarchy in 1893, Prince Jonah Kūhiō Kalaniana'ole in his capacity as a U.S. Congressman passed legislation for the Hawaiian Homes Commission Act (HHCA) in 1921, which set aside approximately 200,000-acres in the Territory of Hawai'i as a land trust for homesteading by Native Hawaiians with a blood quantum of 50% or more (Hasager and Kelly 2001; Hawaiian Home Lands 2016). These lands were to be administered by the Hawaiian Homes Commission. With regard to the lands chosen to be developed under the HHCA, Hasager and Kelly (2001:8) explain:

Some of the lands were specifically designated by section 203 of the act, and the rest was to be chosen by the Hawaiian Homes Commission (HHC) from lands designated "available lands." The original selection of "available lands" were by *ahupua'a* or *'ili* (traditional land divisions) name only (according to Kanaka Maoli tradition, in fact), but from each area thus selected were withdrawn lands in sugar cultivation, forest reserves, and under public uses including previous homestead agreements.

According to HHCA of 1920, in the Waiākea portion of the Hilo District, three major tracts of public lands (inclusive of Crown and Government lands) were chosen; a section in Pana'ewa and two other sections in Waiākea-Kai or Keaukaha (labeled as "Tract 1" and "Tract 2" in Figure 33). In 1924, some 621 acres of nearly barren land was set aside for the creation of the Kūhio Settlement located along the coastal section of Waiākea (see Figure 33). The Kūhio Settlement, later dubbed the Keaukaha Homestead, was the second homestead community after the Kalama'ula Homestead on Moloka'i to be established following the passage of the 1921 HHCA. These two communities (the Kalama'ula Homestead and Kūhio Settlement) were the first of its kind to pioneer and determine the success of the HHCA. The first fifty-two native Hawaiian residents were granted leases with the Kūhio Settlement and by 1929, roughly 240 lots were distributed to homesteaders (Dayton 2004; Kapuni-Reynolds 2015). These early residents ultimately transformed this once barren land into a highly productive community thereby dispelling the negative criticism about Kūhiō's HHCA.

In April of 1925, via Executive Order 186, some 100 acres of land in Waiākea, south of the Keaukaha Homestead, was set aside for the creation of the Hilo Airport. (known historically as the General Lyman Field and today as the Hilo International Airport). Work for the airport commenced on July 17, 1925, with prisoners using hand tools to clear and level the ground. By 1927, coral dredged material from the Hilo Wharves was used as the top dressing for the landing strip and used to fill a section of the old Puna Trail, giving both the run way and road a bright white appearance (Figure 41). Although the airport was dedicated in 1928, over the ensuing decades, the airport continued to expand into the Keaukaha Homestead, which wiped out some 300 homestead lots and displaced many homesteaders, some of whom relocated to Pana'ewa (Dayton 2004).

By the 1940s, the first farm lots in Pana'ewa were awarded and some families from Keaukaha held farm lots where they grew various agricultural crops to generate income (Brandt personal communication, 2019). Other families that had been displaced by the airport expansion also relocated to Pana'ewa. It was not until 1976 that the Pana'ewa House and Farm lots were formally mapped (Hawaiian Home Lands 2016). Figure 35 below shows the original extent of the Pana'ewa House and Farm lots, which was divided into two main sections that totaled 1,660 acres. In 1964 the Hawaiian Homestead Commission set aside adjacent lands as industrial/commercial lots to generate revenue (ibid.). Throughout the remainder of the 19th (especially after the devastating 1960 tsunami) and 20th century the Hawaiian Homelands in Pana'ewa continued to expand to include additional residential and commercial/industrial lots. In 2016, the Hawaiian Home Commission reports that with the Pana'ewa tract, there are some 1,615 acres set aside as Farm Lots; 114 acres used as residential lots; 396 acres zoned for industrial/agriculture; and some 1,027 acres of unencumbered lands (ibid.:23).

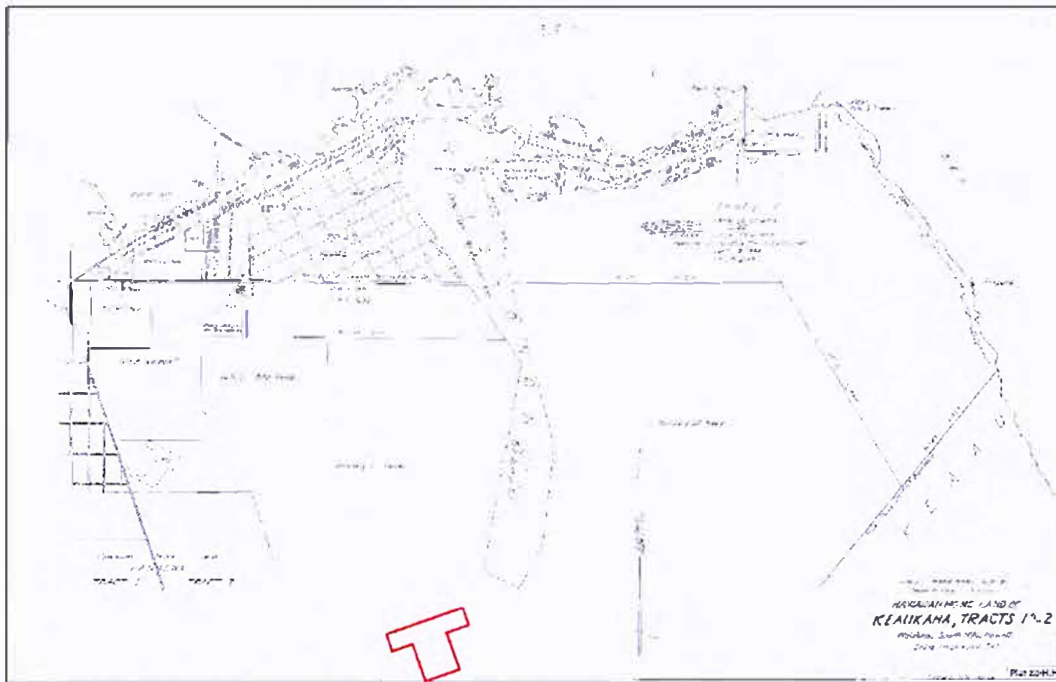


Figure 33. August 1931 map by Jos. Iao showing two tracts of Hawaiian Home Lands in Keaukaha with study area outlined in red.



Figure 34. General Lyman Field and Puna trail decked with white coral dredge material. Note the Kuhio Settlement to the right of General Lyman Field. Study area not shown in photo (Hawaii Aviation 2019)

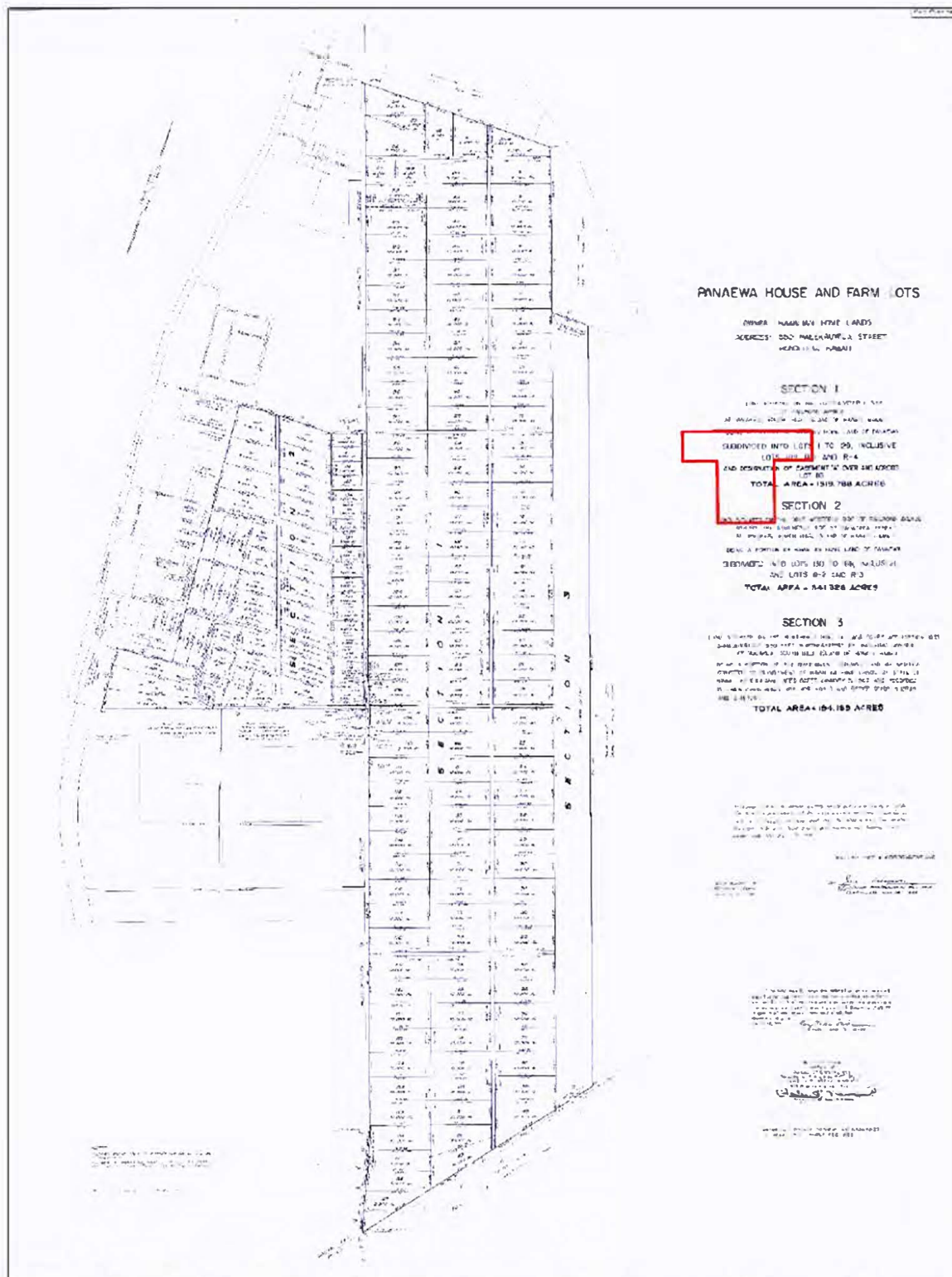


Figure 35. A 1976 map by Nakagawa of the Pana^cwa House and Farm Lots and the location of the study area outlined in red.

The *Tsunami* of 1946 and 1960 and the Lands of the Current Study Area During the 20th Century

On April 1, 1946, a *tsunami* triggered by a 7.1 magnitude earthquake in the Aleutian Islands slammed into the north-facing shores of Hawai'i Island. It claimed the lives of 159 people, destroyed more than 500 buildings, and caused millions of dollars in property damage (Muffler 2015) (Figure 36). The coastal community of Waiākea was decimated by the *tsunami* and associated flooding, which inundated an area spanning from central Hilo eastward to Keaukaha. The waves crushed numerous structures and lifted others off their foundations and swept them inland. The *tsunami* dealt a fatal blow to the already struggling HCR. Tracks around the waterfront were entirely washed out and the Hilo Station was wrecked. An entire span of the Wailuku Bridge was torn out and washed out. Despite the significant damage to Waiākea Town, many residents choose to remain, rebuilding their homes and businesses (ibid.).

Nine years later in 1955, Robert Yamada leased roughly 380 acres of Honohononui, the '*ili kūpono mauka* of Kalaniana'ole Avenue and south of the Hilo Airport, as pasture land. Just five years later, on May 23, 1960, a devastating series of *tsunami* waves triggered by a massive 8.3 earthquake in Chile, South America, swept through Hilo, killing sixty-one people and injuring many others. Hundreds of homes, businesses, and other infrastructure were leveled to the ground causing millions of dollars in damage. The economic loss and high number of casualties resulting from the 1946 and 1960 tsunami prompted Hawai'i County officials to establish the Hawai'i Redevelopment Agency as a means to economic recovery, thereby launching the Project Kaiko'o initiative. In addition to promoting economic recovery, the Hawai'i Redevelopment Agency sought to establish a tsunami buffer zone to prevent future economic and personal loss and between 1962 and 1963 the County of Hawai'i exercised eminent domain to acquire numerous parcels of land in the *tsunami* affected areas of Hilo as part of Project Kaiko'o. The goal of this project was to "designate lands...for such reuse as will minimize the danger of loss of life or damage to property in areas subject to possible inundation and flooding from future seismic waves" (Hawaii Redevelopment Agency 1965:3). Project activities included not only the acquisition of property, but relocation assistance for affected residents and business owners, property management, demolition and building removal, re-zoning of land use and preparation (clearance, grading, and filling) for new development, and disposition of acquired lands by sale or lease at a fair price for new development.



Figure 36. Aftermath from the 1946 tsunami with Waiākea Mill standing near back of Waiākea fishpond, study area vicinity in background. (Hawaii Tribune-Herald 2017)

One year later in 1961, most of Yamada's leased land was chain-dragged and the portion of TMK: (3) 2-1-013:002 that contains the current study area was designated as a 113.382-acre "Borrow Pit Site" as a result of the Hawai'i Redevelopment Agency's Project Kaiko'o. Yamada & Sons, Inc. and the County of Hawai'i also had 40-acre borrow pit sites located to the southwest of the current study area, adjacent to a roughly 192-acre strip of land that was deeded to the Department of Hawaiian Home Lands (DHHL) by the State of Hawai'i on January 8, 1962. Another 40-acre parcel of land adjacent to the northern edge of the borrow pit site eventually became the location of the South Hilo Sanitary Landfill.

By 1965, quarrying activities within the Hawai'i Redevelopment Agency borrow pit had commenced and had intruded slightly into the northern portion of the current study area (Figure 37). Additionally, extensive quarrying activities were being conducted within the original 40-acre Yamada & Sons, Inc. borrow pit site (west of the study area on TMKs: (3) 2-1-013:160, 161, and 163) at this time. Between 1965 and 1970, the leased lands were also used to stockpile sugarcane bagasse. Five years later in 1975, Yamada & Sons, Inc. reduced the number of leasehold lands to encompass only 180 acres, of which 150 acres was used for agricultural purposes with 30 acres being used as a quarry site. During that year, most of the leased lands were mechanically cleared and turned to pastureland. In a seven-year span between 1970 and 1977, much of the study area appears to have been cleared of vegetation, and a 1977 orthographic photo-quadrangle indicates that quarrying activities occurring on the original borrow pit had expanded into the southwestern corner of the study area and also across Parcel D (Figure 38). Additionally, the road that bisects the current study area is evident, as is a connector road that extends northwest to southeast across the northern portion of the area of the proposed quarry site. Although activities associated with quarrying of the current study area appear to have ceased by the early 1990s, as evidenced in a 1992 USGS aerial photograph (Figure 39), quarrying activities at the adjacent borrow pit site to the west have continued to this day. Additionally, that operation expanded its scope in 2007 to include the 14.99-acre "Parcel D" situated directly adjacent to the currently proposed quarry and borrow pit site also to the west.

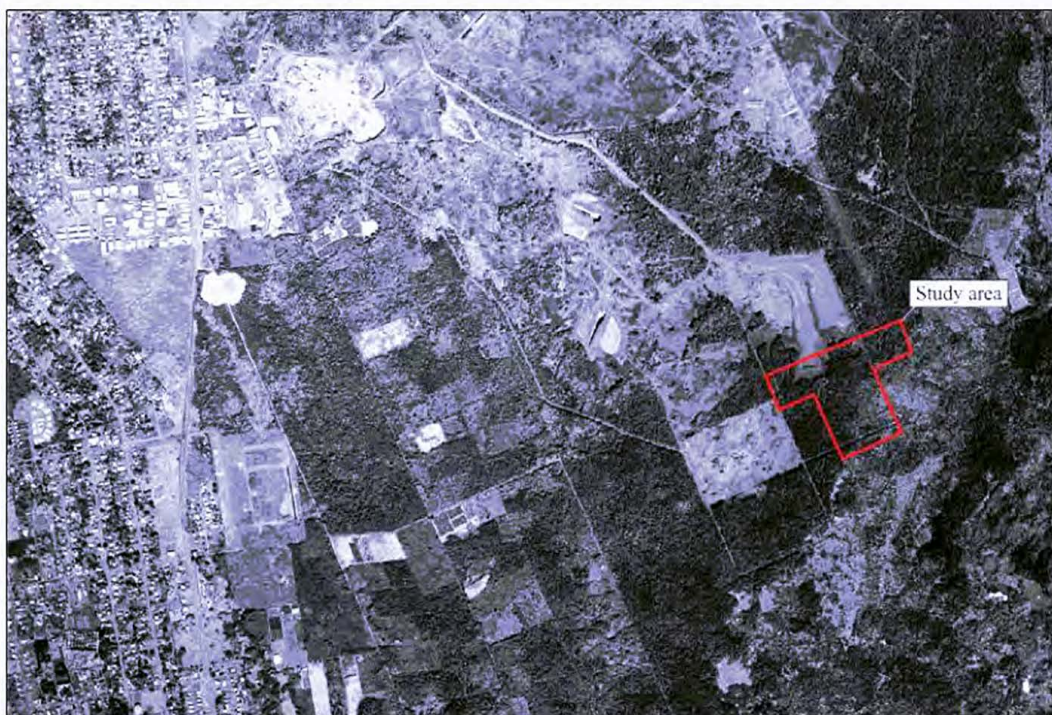


Figure 37. January 16, 1965 USGS aerial photo showing quarry intruding into northern portion of study area (outlined in red).



Figure 38. Portion of a 1977 orthophotoquad showing quarry expansion and network of quarry roads within study area (outlined in red).



Figure 39. Portion of a September 23, 1992 USGS aerial photo showing active quarry site in relation to current study area (outlined in red).

PRIOR STUDIES

A number of archaeological and several cultural studies have been previously conducted within Waiākea and the general Hilo region over the years, most of which have occurred in areas located to the north and west of the current study area and concentrated primarily on the coastal environs. Collectively, site types previously documented within the coastal section of Waiākea include but are not limited to fishponds, burials, Historic-era military structures, the Puna Trail, temporary and permanent habitation sites, lava tubes, modified sinks, overhang shelters, and Historic sugarcane infrastructure. Within the Pana'ewa section of Waiākea, many more archaeological studies have been conducted, however, these studies have generally reported a lack of findings (Carson 1999; Escott 2013a, 2013b, 2015a; Hammatt and Tulchin 2007; Haun and Henry 2002; Rechtman 2003, 2006, 2009a, 2009b; Rosendahl 1988a, 2002; Wheeler et al. 2014a). There have been no prior archaeological studies conducted that have included the current study area. The most proximate studies conducted within Waiākea either within or in close proximity to Pana'ewa are presented in Table 1 and Figure 40 and those that have identified findings are discussed in detail below.

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

| <i>Year</i> | <i>Author(s)</i> | <i>Type of Study</i> |
|-------------|----------------------|---|
| 1974 | Ching and Stauder | Reconnaissance Survey |
| 1979 | Bonk | Archaeological Survey |
| 1997 | Devereux et al. | Reconnaissance Survey |
| 1999 | Carson | Inventory Survey |
| 2000 | Hammatt and Bush | Inventory Survey |
| 2001 | Godby and Tolleson | Data Recovery |
| 2002 | Escott and Tolleson | Inventory Survey |
| 2002 | Haun and Henry | Inventory Survey |
| 2002 | Rosendahl | Reconnaissance Survey |
| 2003 | Rechtman | Archaeological/Limited Cultural Impact Assessment |
| 2006 | Rechtman | Archaeological Assessment |
| 2006 | Wolforth | Inventory Survey |
| 2007 | Tulchin and Hammatt | Archaeological Literature Review and Field Inspection |
| 2009 | Mitchell and Hammatt | Cultural Impact Assessment |
| 2009a | Rechtman | Archaeological Survey |
| 2009b | Rechtman | Archaeological Assessment |
| 2013 | Escott | Archaeological Assessment |
| 2013a | Escott | Archaeological Assessment |
| 2013b | Escott | Archaeological Assessment |
| 2014 | Wheeler et al. | Inventory Survey |
| 2015 | Escott | Archaeological Assessment |
| 2015 | Escott | Cultural Impact Assessment |
| 2016 | Escott | Cultural Impact Assessment |

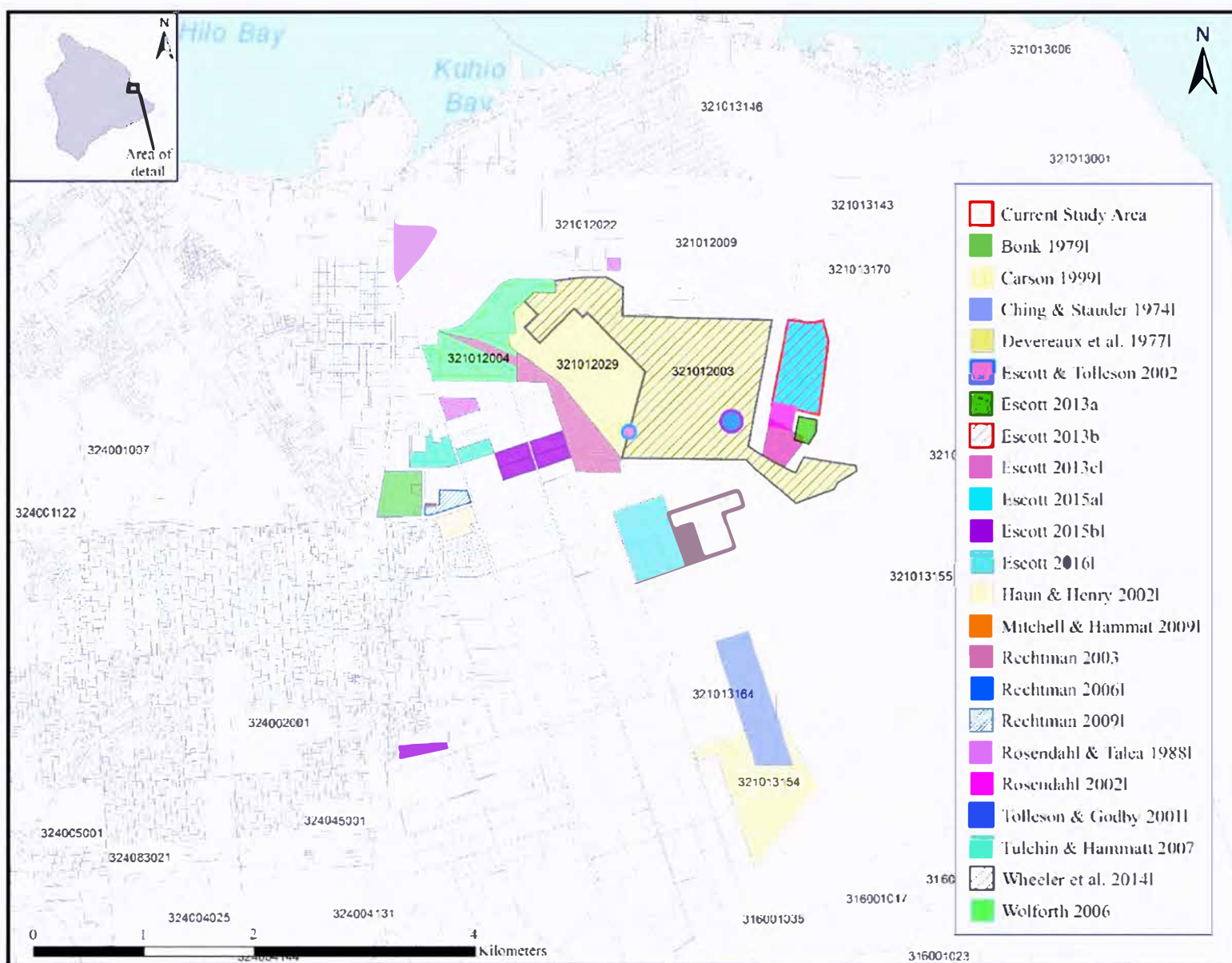


Figure 40. Previous archaeological studies conducted in the vicinity of the current study area..

Early Archaeological Investigations (1900s-1930s)

Thrum and his associates, W.T. Brigham and J.F. Stokes of the Bishop Museum, compiled information on over 130 *heiau* on Hawai'i Island (Thrum 1908a). However, one must take into consideration that Thrum included data on *heiau* that had already been destroyed prior to his data collection efforts in the early 1900s. Regarding the *heiau* of the Hilo district, Thrum stated: "little evidence of their existence now remains, so complete has been their destruction, but though their stones are scattered, much of their history is yet preserved" (1908b:55).

During the early 1930s, A.E. Hudson (Hudson 1932), working under the aegis of the Bernice Pauahi Bishop Museum, also conducted archaeological investigations in East Hawai'i. He found little in the region surrounding the current area of study, although he noted that "there was an important village and trading center around Hilo Bay" (1932:20), but stated that, "no archaeological remains are to be found within the town of Hilo itself except a few stones which are said to have been taken from *heiaus*..." (1932:226). Hudson also relates the following account of a previously existing *heiau* in Waiākea near Coconut Island (Mokuola) and another one near the route of the present Kīlauea Avenue:

Of the several *heiaus* known to have existed in and around Hilo, that at Coconut Island was also a *puuhonua*.

There is some reason to think that the island itself was the place of refuge and that the *heiau* was situated on the mainland opposite. Thrum (65-c, p. 40) locates it on the shore opposite the island. Elsewhere (65-d, p. 56) he says:

"Occasional reference is made to Coconut Island (Mokuola) as the place of refuge of the Hilo district, hence its name, Life Island." Careful inquiry shows that the area of this *puuhonua* included also a portion of the mainland adjoining. The *heiau* connected with it, a named *Makaoku*, was of the Luakini class. Its dimensions are unknown though it is said to have had a pyramid of stone 30 feet high as if for a place of observation. The remaining stones were taken by Captain Thos. Spencer for a boat landing about 1860. The northern part of Mokuola is known as Kaulainewi, being the place where the bones were placed to dry or for airing".

The present archaeological remains consist of a few single stones in the park opposite the island. Mr. Levi Lyman tells me that although they were found on the mainland they have all been moved in making the park. Quite probably they had also been moved several times previously so they are of no use in reconstructing the outlines of the site. Their only significance is in indicating that the structure was built, at least in part, of large lava blocks, rather than beach boulders. (Hudson 1932:256-257)

Hudson also identified one of the inland *heiau* as being in Waiākea, along the old Hilo/Ōla'a trail (not far from the route of modern-day Kīlauea Avenue):

There was a *heiau* named Kapaieie near Honokawailani in Waiākea. Bloxam who passed the site on his way from Hilo to the volcano says that its center was marked by a single coconut tree. At the time of his visit nothing remained but ruined walls choked with weeds. He was told that the priests would lie in wait for passersby and dispatch them with clubs. Thrum [1908:40] states that the site was famed in the Hilo-Puna wars but its size and class are unknown. No remains of any kind could be found and no Hawaiians with whom I talked had ever heard of it. (1932:240)

Subsequent Archaeological and Cultural Studies (1970-present)

It wasn't until the Hawai'i Island portion of the Statewide Inventory of Historic Places (SIHP) conducted during the early 1970s that detailed recording of archaeological sites in the general vicinity of the current study area began. Records on file at the State Historic Preservation Division reveal that as a part of that study, three sites, all dating to the Historic Period, were recorded to the west/northwest of the study area. These sites included the Hawai'i Consolidated Railway's eight-stall roundhouse, or locomotive garage (Site 7432); the "Tsumami Clock" (Site 7452) located along Kamehameha Avenue, and the Wailoa River Bridge (Site 7484).

In 1974, the Archaeological Research Center Hawai'i (Ching and Stauder 1974) conducted a reconnaissance survey for a proposed 2.5 mile alignment of a road located to the southeast of the current study area (Figure 40). As a result of the study, Ching and Stauder (ibid) recorded four archaeological sites in the south portion of their study area including a "stacked *pāhoehoe* wall. . . platform/monument burial, animal enclosure and habitation site" (in Wheeler

et al. 2014a). It was recommended that an archaeological inventory survey (AIS) be undertaken for the proposed development area and that the projected alignment be shifted in an effort to protect archaeological resources.

Five years later in 1979, William Bonk (1979) of the University of Hawai'i at Hilo conducted an archaeological survey of a 39-acre portion of Tract I of the Pana'ewa Hawaiian Home Lands located to the northwest of the current study area (Figure 40). As a result of the survey, two modern features were documented: a segment of a stone wall and a fragment of a wire fence. Additionally, a 15 to a 20-foot-wide section of a roadway was identified, which was intermittently marked by short stone alignments. It was concluded by Bonk (1979) that no further work was the recommended treatment.

By the 1980s, stricter environmental regulations in the United States led to an increased number of archaeological and cultural studies. In 1981, at the request of the U. S. Army Corps of Engineers, the B. P. Bishop Museum Department of Anthropology prepared a chronological history of the Hilo Bay area in an effort to assist in future environmental planning (Kelly et al. 1981). Aside from a limited amount of survey work (Clark and Rechtman 2016; McEldowney 1979; Rechtman 2001) previously conducted in the upper forest area of Waiākea, most of the major previous (and more recent) archaeological studies in the *ahupua'a* were conducted within the vicinity of Hilo town (Carson 1999; Hammatt et al. 1993; Hunt et al. 1993; Jennings 1991; Maly 1994; Maly et al. 1994; Rechtman and Henry 1998; Walker 1994). Collectively, these studies document the ravages that Historic Period land use associated with ranching and sugarcane cultivation (taking place between the 1860s-1940s) and increasing housing development associated with a growing population (from the 1950s through the present) had on the Precontact archaeological record. The acquisition of local building materials (rock and fill) and solid waste disposal are paramount among the infrastructural needs and by 1950, the vicinity of the current study area became the focal point for both of these activities.

Since the late 1980s, archaeological studies conducted near the current study area have concentrated largely on the development and continued expansion of the Hilo Industrial area, situated north and northeast of the study area. These studies focused primarily on the proposed implementation and development of rock quarrying and stockpiling sites, waste sorting locales, industrial plants, and the expansion of the Keaukaha Military Reserve (KMR), (Bush et al. 2000; Devereux et al. 1997; Escott 2013b, 2013a; Escott and Tolleson 2002; Rechtman 2006; Rosendahl 1988a, 1988b, 2002; Tolleson and Godby 2001; Wheeler et al. 2014a)

There have been several archaeological studies conducted within the Keaukaha Military Reserve (KMR), situated north of the current study area beginning in 1996 when Cultural Surveys Hawai'i (CSH) (Devereux et al. 1997) conducted a selective archaeological reconnaissance survey of a 500-acre parcel within KMR. Portions of their survey area bordered the current study area to the west, south, and east (Figure 40). As a result of their study, two archaeological sites were identified; however, one of these was subsequently reinterpreted to be a modern bulldozer push pile. The other, temporary site CSH-1, is a C-shaped enclosure located near a Jeep road that was interpreted to have served as a temporary habitation shelter. Devereux et al. (ibid.) suggested that the Jeep road may have been a remnant of the old Puna Trail (Site 18869) and that the C-shaped shelter may have been an ancillary feature of the trail. In addition to the C-shape, Devereux et al. (ibid.) also recorded ten historic buildings associated with KMR. No further work was the recommended treatment for the historic buildings. However, it was recommended that a more intensive AIS be conducted within the undisturbed forested areas along what they believed to be the old Puna Trail alignment, located to the northeast of the current study area.

Three years later in 2000, CSH (Bush et al. 2000) returned to the KMR and conducted a Phase II inventory survey in the forested areas and other sections that were determined during Phase I fieldwork to have been only minimally impacted by previous disturbance. As a result of their revisit, they documented the previously identified C-shape as Site 21657 and interpreted it as being military in origin. Additionally, they identified two new sites: Site 21658, a complex comprised of five *ahu* (rock mounds) interpreted as a location marker for a water source or temporary shelter; and Site 21659, a modified lava blister interpreted as a traditional Hawaiian agricultural feature. Bush and Hammatt (ibid.) also documented a section of the previously recorded Puna Trail (Site 18869).

A year later, Scientific Consultant Services (SCS) (Tolleson and Godby 2001) conducted a survey of a 100 square meter portion of the KMR, situated to the north of the current study area (Figure 40), which resulted in the identification of a newly identified site complex (Site 21771) consisting of four features (a platform, an enclosure, a possible *imu*, and a meadow) dating to the late 1800s. It was determined that Site 21771 was associated with the construction and maintenance of the Puna Trail, which Tolleson and Godby (ibid.) opined was widened from a foot

trail to a Government Road during the late 1800s to accommodate horses and wagons. Limited data recovery (excavation of two test units) was undertaken at Site 21771.

In 2002, SCS conducted an additional archaeological inventory survey (Escott and Tolleson 2002) of the KMR (Figure 40). As a result of that study, four sites previously identified by Bush and Hammatt (2000) were re-recorded (Sites 18869 and 21657, 21658, and 21659). Also in 2002, Paul H. Rosendahl Inc. (PHRI) conducted a 14.99-acre archaeological reconnaissance survey (Rosendahl 2002) located to the southeast of General Lyman Field (Hilo Airport). No historic properties or cultural resources were encountered as a result of that study.

In 2006, SCS conducted an archaeological inventory survey (Wolforth 2006) of a 147-acre industrial subdivision for the proposed development of the Mana Industrial Park project situated immediately west of the KMR and to the northwest of the current study area (Figure 40). Four WWII-era sites were identified within the study area including Site 25538, a Historic breakwater quarry and railroad line and Naval Air Station fuel station; Site 25539, a fuel station road; Site 25540, the southern end of the airport parking area; and Site 25541, a warehouse area. All of the identified sites were found to be characteristic with the known U.S. Navy and Army occupation of the area. No further work was the recommended treatment for all of the sites.

In 2009, CSH prepared a cultural impact assessment study (Mitchell and Hammatt 2009) for the Kamoleao Laulima Community Resource Center situated northwest of the current study area. Their study included a traditional and historical background of Waiākea Ahupua'a, as well as the history of land use. Four Native Hawaiian organizations were contacted, and two groups responded with brief comments. As a result of the study, Mitchell and Hammatt (*ibid.*) concluded that the proposed project will have little impact on Hawaiian traditional cultural practices within the project area, and that they recommended that the proposed project "incorporate the planting of native Hawaiian plant resources to serve future members of the Panaewa Community and its youth" (*ibid.*: 34).

In June of 2012, SCS conducted archaeological fieldwork (Escott 2013a) for a proposed 10.05-acre expansion of the quarry. As a result of the pedestrian survey, no archaeological sites or features were observed within their study area. In addition, very little natural landscape was present in the project area as a result of past and ongoing quarrying activity. Escott summarized his field observations thusly,

Three quarters of the 50-acre parcel has been quarried in the past. Only the northeast corner of the project area is unaltered forest. The entire 50.0 acres were surveyed during the current study. At present, there are no cultural resources or modern structures on the study parcel. (*ibid.*:ii)

In July of 2013, SCS conducted archaeological fieldwork for the proposed expansion of the existing quarry (Escott 2013b). As a result of the roughly ninety-acre pedestrian survey, no archaeological sites or features were identified within the current project area. Escott summarized the terrain of the project area thusly:

Roughly one quarter of the project area is previously quarried ground surface. The remainder of the project area has north-south bulldozer cuts through it, or has been completely bulldozed in the past. (*ibid.*:6)

Escott (2013b) also included the following conclusion based on his review of previous archaeological studies within the vicinity of the current project area, all of which report a low site density:

The studies suggest that the lack of sites in this region is the result of the rugged and inhospitable landscape, having little fertile soil or arable land, being thickly forested, and subject to high rates of rainfall. (*ibid.*:21)

Escott (2013b) goes on to suggest that although no cultural resources were identified within the project area, undiscovered archaeological features may exist within the limited previously undisturbed areas of thick vegetation. As a result he recommended that a qualified archaeological monitor be present during initial ground clearing and grubbing operations for the proposed expansion.

In 2014, CSH conducted an AIS (Wheeler et al. 2014a) of a 405.3-acre portion of the KMR situated to the north of the current study area, roughly 600 meters north of the study area's northeastern boundary (Figure 40). While it was determined that the majority of KMR had been subject to intensive previous disturbance, the survey fieldwork primarily focused on areas which had been subject to minimal disturbance. As a result of the survey, a total of eleven archaeological sites (Sites 18869, 21657, 21658, 21771, 23273, 30008-30012, and 30038) were documented: four of which were previously identified during the inventory survey conducted by Bush and Hammatt (2000) and one (Site 21771) that was previously identified by Godby and Tolleson (2001). Specific site types identified during the Wheeler et al. (2014a) study included two segments of the Puna Trail (Site 18869 and Site 30038); a C-shaped enclosure (Site 21657); a complex comprised of five *ahu* (Site 21658); a complex of twelve features associated with potential

temporary habitation or agriculture (Site 21771); a remnant segment of a secondary Precontact/early Historic trail (Site 23273); a modified lava tube (Site 30008); a complex comprised of three temporary habitation features associated with a modified outcrop (Site 30009); a complex comprised of five features associated with temporary habitation or agriculture (Site 30010); a two-feature complex of indeterminate function (Site 30011); and a 15-meter-long segment of another secondary curbed trail (Site 30012). The trail segment designated Site 30038 was interpreted as an intact remnant of the Puna Trail alignment and was assigned a separate site number because it diverts from the modern Jeep road alignment that had been assigned the earlier Puna Trail designation (Site 18869). Collectively, all of the sites identified during the Wheeler et al. (2014a) study were interpreted either as ancillary features of the Puna Trail or associated with possible intermittent agricultural activities. It was concluded that the section of Waiākea in which KMR is situated was only marginally inhabited during the Precontact and Historic periods, with traditional settlements being concentrated mostly along the coast. As a result of extensive military-associated modification throughout the 20th century within KMR, many of the previously extant archaeological sites had been obliterated. While no further work was the recommended treatment for seven of the identified sites, including the segment of the Puna Trail, Wheeler et al. (2014a) did recommend preservation through avoidance (conservation) as the proposed treatment for three sites (Sites 21658, 21771, and 30038) and proposed future subsurface testing for Sites 21771 and 30010. Archaeological monitoring was recommended as a mitigation measure for all ground-disturbing activities, and a subsequent archaeological monitoring plan was prepared by CSH (Wheeler et al. 2014b).

In August of 2015, SCS prepared an archaeological monitoring report that consisted of descriptions of four of the aforementioned previously recorded sites (SIHP Sites 21658, 30008, 30009, and 30038) located in closest proximity to the current study area, within the adjacent KMR property. According to Escott (2015b:1), “The sites are located between 100 and 300 meters southeast of the existing Glover quarry boundary and between 300 and 600 meters southeast of the proposed quarry expansion project area boundary.”

In October of 2015, SCS prepared a cultural impact assessment (Escott 2015c) for five ten-acre parcels of Department of Hawaiian Home Lands (DHHL) property located in the Pana‘ewa region (TMK: (3) 2-1-025: 006, 007, 047, 048; and (3) 2-1-061: 002). Their study included a historical and cultural context of the project area as well as the history of land use from the Precontact period to modern times. A group interview was conducted with Native Hawaiian organizations including members of the Keaukaha-Pana‘ewa Farmers Association, the Pana‘ewa Community Association, DHHL, and state representatives. Escott states that although some interviewees knew of the history of the project area, no cultural practices were mentioned or identified during the consultation process. The study concluded that “no past or ongoing cultural practices associated with the project area lands were identified” (ibid.: 28).

In 2016, SCS conducted an archaeological assessment (Escott 2016a) and a CIA (Escott 2016b) for eighty-acres of modern quarry land (TMK: (3) 2-1-013: 142, 160, 161, and 163) located in the Pana‘ewa region. As a result of the fieldwork survey no archaeological sites or historic resources were identified. Consultation was conducted as part of the archaeological assessment and three individuals responded to the public notices request for information. These individuals included Lei Leihua Kane, Carmen Maluanao, and Aunty Carmelita Dutchie Safferey. Two individuals, Carmen Maluanao and Aunty Dutchie Safferey, stated they were not aware of any historic properties or cultural practices associated with the project area. However, Lei Leihua Kane shared “that her family used to travel along the coastal trail east of the Pana‘ewa forest and chant on their way to make offerings to Pele” but indicated that was “not aware of any historic properties or past/ongoing cultural practices associated with the project lands” (ibid.:6). Escott concluded that no historic properties will be affected by the proposed undertaking.

3. CONSULTATION

Gathering input from community members with genealogical ties and long-standing residency or relationships to the study area is vital to the process of assessing potential cultural impacts to resources, practices, and beliefs. It is precisely these individuals that ascribe meaning and value to traditional resources and practices. Community members often possess traditional knowledge and in-depth understanding that are unavailable elsewhere in the historical or cultural record of a place. As stated in the OEQC Guidelines for Assessing Cultural Impacts, the goal of the oral interview process is to identify potential cultural resources, practices, and beliefs associated with the affected project area. It is the present authors' further contention that the oral interviews should also be used to augment the process of assessing the significance of any identified traditional cultural properties. Thus, it is the researcher's responsibility to use the gathered information to identify and describe potential cultural impacts and propose appropriate mitigation as necessary.

INTERVIEW METHODOLOGY

In an effort to identify individuals knowledgeable about traditional cultural practices and/or uses associated with the current study area, a public notice was submitted to the Office of Hawaiian Affairs (OHA) for publication in their monthly newspaper, *Ka Wai Ola*. The notice was submitted via email on April 19th and was subsequently published in the May 2019 issue (*Ka Wai Ola* 2019:21)(Appendix A). As of the date of the current report, no responses have been received from the public notice.

Although no responses were received as a result of the *Ka Wai Ola* publication, nine individuals and three organization were contacted via email, mail, and/or phone regarding the preparation of the current CIA. Table 3 below is a listing of all individuals contacted. Of the nine individuals contacted, three individuals responded to our request with either brief comments, referrals, or accepted the interview request (see Table 3). Of the three individuals that responded to our interview request, Nāko'olani Warrington provided written comments via email stating that she has lived on Auwae Road since 1983 and has heard of folks who would gather *maile lau li'i* from the Pana'ewa forest, but with the expansion of houses and stores, this practice has ceased. With respect on ongoing cultural practices, Nāko'olani stated that "taking care of our 'āina and our people/family (neighbors taking care of neighbors) since we are indeed family here in Pana'ewa, just like those practices of old. Here also, we are constantly thinking and working towards making Railroad Avenue safe because the practice of being responsible for safety belongs to us." Nāko'olani also recommended that ASM staff reach out to Maile Lu'ukia, the President of the Keaukaha-Pana'ewa Farmers Association. Summaries of the two additional interviews are provided below.

Additionally, consultation letters were mailed to William Ailā from the Department of Hawaiian Home Lands; Maile Lu'uwai, President of Keaukaha-Pana'ewa Farmers Association; Patrick Kahawaiola'a, President of the Keaukaha Community Association; William Brown, President of the Pana'ewa Hawaiian Home Land Community Association; and a representative of the Office of Hawaiian Affairs (OHA), and to date, no response has been received.

The interviewees were asked a series of questions regarding their background, and their experience and knowledge of the proposed quarry site. Additional questions focused on any known cultural uses, traditions, or beliefs associated with the general Pana'ewa area. The interviewees were then asked about their general thoughts about the proposed quarry project and whether they were aware of any potential cultural impacts that could result from the development of the quarry site. The interviewees were then asked whether they had any recommendations to mitigate any identified cultural impacts as well as share any additional thoughts about the proposed action.

As part of the interview process and with the consent of the interviewees, some of the interviews were audio-recorded for note-taking purposes only (audio files not available). Where audio recordings were not permitted, ASM staff recorded notes throughout the interview process. Upon completion of the interview, ASM staff prepared an interview summary, which was emailed to the interviewees for review. The interviewees were given the opportunity to review the summary for accuracy and allowed to make any necessary edits. With the approval of the interviewees, the finalized version of the summaries are been presented below.

Table 3. Persons contacted for consultation.

| <i>Name</i> | <i>Initial Contact Date</i> | <i>Response</i> | <i>Comments</i> |
|---------------------------------------|-----------------------------|-----------------|--|
| Kala Mossman | 5/8/2019; 7/23/2019 | Yes | Unable to secure interview |
| William Brown | 5/8/2019 | No | No response |
| Nako'olani Warrington | 5/8/2019 | Yes | Written comments. Referred ASM staff to Maile Lu'uwai. |
| Maile Lu'uwai | 5/9/2019 | No | No response |
| Gail Makuakane Lundin | 5/9/2019 | Yes | Unable to secure interview |
| Grant Kainalu Borges | 5/10/2019 | Yes | See summary below |
| Ray Bumatai | 5/14/2019 | Yes | Declined interview |
| Maka'ala Joshua Rawlins | 7/12/2019 | Yes | See summary below |
| Patrick Kahawaiola'a | 7/12/2019 | No | No response |
| Office of Hawaiian Affairs | 7/12/2019 | No | No response |
| Department of Hawaiian Home Lands | 7/12/2019 | No | No response |
| Keaukaha-Pana'ewa Farmers Association | 7/24/2019 | No | No response |

GRANT KAINALU BORGES

On April 23rd and July 12th, 2019, ASM staff, 'Iolani Ka'uhane conducted an interview with Grant Kainalu "Nalu" Borges, a Pana'ewa resident and a current board member of the Keaukaha-Pana'ewa Farmers Association. Nalu's family is recognized in the community as being one of the first families to move into the Pana'ewa Hawaiian Homestead community. Their home is situated along the *mauka* side of Railroad Avenue between Manuia Road and Mahi'ai Street. Nalu spent the majority of his life living in Pana'ewa where he learned to gather the natural resources from the area for subsistence and other traditional cultural practices, which are further described below.

When asked about his knowledge of the proposed study area, Mr. Borges reflected on his childhood when his family began homesteading on the plot of land that they currently reside in. He shared that when his family moved to their homestead lot in 1979, they started by clearing small sections of land where they slept in a tent and planted guava to help generate income. Nalu's memories of the area are strongly connected to when he was about seven or eight years old and recounted how he and his father, Ammon Nalei Borges, would explore the forest lands located east of their homestead lot, which during that time was undeveloped. Nalu shared that because they were homesteading and building their house, his family was highly dependent on the forest. They would catch wild boars and have "plenty of food" which they used to feed their family. Nalu also described gathering *maile* (*Alyxia olivaeformis*) which they sold to supplement the family income. Nalu emphasized that gathering *maile* and hunting wild pigs were their primary activities conducted by his family near the study area vicinity. When asked about specific practices associated with the gathering of *maile*, Nalu described that when his family or when other families in the community needed *maile* they would walk to the forest from their house lot and handpick the *maile*. Nalu explained that his family no longer gathers resources from the study area vicinity because of the increased development of residential lots and the expansion of the industrial area.

While the Pana'ewa forest provided the means for Nalu's family to survive, he also described how these resources (wild boars and *maile*) were used in *lū'au* (traditional feast), which were organized for important milestone celebrations such as graduations, birthdays parties as well as church events. Nalu's father was an active member of the Mormon Church and would access the forest to hunt wild boars that were used to supply food for large church gatherings and mission-related feasts. *Maile* was also collected from the forest and were given as gifts during *lū'au*.

Nalu also expressed that it is very important for Hawaiians living today to protect what Pana'ewa was traditionally known for, which is the massive 'ōhi'a (*Metrosideros polymorpha*) trees. He described the Pana'ewa forest as having ancient 'ōhi'a trees, and during the bulldozing of their homestead lot, they encountered giant trees but given the circumstances of that time, they were more focused on surviving and planting guava to generate income. With the threat of Rapid 'Ōhia Death (ROD), Nalu is very concerned for the loss of the Pana'ewa 'ōhi'a and that current bulldozing practices in Pana'ewa maybe spreading ROD. Nalu comments that the 'ōhi'a is a vital cultural resource to the Hawaiian people and is utilized in many ways from cooking to craft making. Nalu advocated for the protection of this resource and stated that we all utilized the tree in some form.

When asked about recommendations for the proposed quarry site, Nalu would like to see all large 'ōhi'a trees, especially those that do not show signs of ROD preserved in place. Nalu stated that if the trees cannot be preserved in

place then the project managers should contact the Pana'ewa community so that the trees can be collected and repurposed.

MAKA'ALA JOSHUA RAWLINS

An in-person interview was conducted by 'Iolani Ka'uhane on July 13, 2019, with Maka'ala Rawlins, a Pana'ewa resident and current board member of the Keaukaha-Pana'ewa Farmers Association (KPFA). Maka'ala is the grandson of Genesis Namakaokalani Lee Loy and Elizabeth Genevieve Luahiwa Ho'opi'i and currently lives on the Hawaiian Homestead lot that was granted to his grandparents in the early 1970s. This lot is situated west of the current study area along Auwae Road. Maka'ala explained that before Pana'ewa Homesteads was opened up for residential lots, his grandparents and family lived in Keaukaha. When the State of Hawaii was dividing up the lands for the Hilo International Airport between 1960 and 1967, Maka'ala's grandfather and his uncles as well as other people like Uncle Randy Ahuna and his wife Auntie Maka, sued the Department of Hawaiian Home Lands (Ahuna vs State) to open up lands in Pana'ewa for agricultural and homestead purposes. In 1972-73, Maka'ala's grandparents were awarded their homestead lot and began growing *Beaumont* guavas, through a partnership with the University of Hawai'i Hilo. Ten years later in 1983, Maka'ala and his family moved to the Pana'ewa homestead lot, when Railroad Avenue was a dirt road and the surrounding area was predominately forest and tall cane grass.

When asked about his knowledge of the proposed study area, Maka'ala responded that the Pana'ewa forest was famous for its natural resources such as '*ōhi'a*, *maile*, *lama* (*Diospyros sandwicensis*), and '*ie'ie* (*Freycinetia arborea*). He expressed that the Pana'ewa forest was known for its large '*ōhi'a* and *maile lau loa*—a variety of *maile* known for its long and broader leaves which differs from the more commonly known, *maile lau li'i* (small-leaved *maile*), which is common to the islands of O'ahu and Kaua'i. Maka'ala recounts seeing an old newspaper article referring to *kahuna*, or priest, who sought out the Pana'ewa *maile* for its *mana*, or spiritual strength, and that the forest was named after the *mo'ō* deity, Pana'ewa. He remembers as a kid seeing an abundance of '*ōhi'a*, *maile*, and *lama* growing in the general vicinity of the study area and shared that his grandfather kept some of the large '*ōhi'a* and *lama* trees on their property. He also described an instance when his uncle was awarded a homestead lot located near his grandfather's place, in which they kept the majority of the native trees intact during the initial development of his uncle's lot. They discovered an abundance of '*ōhi'a*, *maile*, and *lama* and also a wild variety of '*awa (*Piper methsticum*) growing which they still have on their farms today.*

In the late 1980s to the early 1990s, his grandfather found a variety of '*awa, called Pana'ewa '*awa, near the study area by the Hilo Transfer Station, that initiated a Hawaiian association of '*awa growers, which included the late Jerry Konanui, Ed Johnson, and his grandfather. The association was created to increase '*awa growing and to promote its cultural uses in the early 1990s. Maka'ala explained that the presence of '*awa in the forest indicated that Pana'ewa used to have '*awa and that this variety has adapted to Pana'ewa's weather and climate, resulting in a new strain. When asked how his grandfather discovered the Pana'ewa '*awa, Maka'ala responded that his grandfather's and uncle's house lots (Maka'ala's current residence) are situated on the northeast back portion of the Pana'ewa Hawaiian Homesteads located near an abandoned auxiliary road that extended from the Hilo Transfer Station area to their lots. His family would utilize the auxiliary road and look for native plants in the vicinity of the current study area.*******

Maka'ala expressed that the area of the current study area where his grandfather discovered the '*awa is still an essential region of the Pana'ewa forest that he utilizes for collecting native plants and seeds. He mentioned that there are many native plants in the vicinity of the current study area including '*ōhi'a*, *maile*, and *lama*, and notes that *lama*, once common but now rare, can be found in high numbers. Maka'ala is concerned with the growing development that is occurring in the vicinity of the current study area and stated that these undisturbed areas of forest serve as seed banks for the Pana'ewa community. Instead of planting and growing native species from other districts of Hawai'i Island, we should be taking care of our forest areas in our communities and utilize those seeds and native plants to be incorporated back into the Pana'ewa communities.*

4. IDENTIFICATION AND MITIGATION OF POTENTIAL CULTURAL IMPACTS

The OEQC guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The guidelines also identify the types of potential cultural resources, associated with cultural practices and beliefs that are subject to assessment. Essentially these are natural features of the landscape and historic sites, including traditional cultural properties. In the Hawai'i Revised Statutes—Chapter 6E a definition of traditional cultural property is provided.

“Traditional cultural property” means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community’s history and contribute to maintaining the ethnic community’s cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

The origin of the concept of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service. “Traditional” as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. “Cultural” refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term “Property” defines this category of resource as an identifiable place. Traditional cultural properties are not intangible; they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them.

It is however with the definition of “Property” wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. However offensive the concept of boundaries may be, it is nonetheless the regulatory benchmark for defining and assessing traditional cultural properties. As the OEQC guidelines do not contain criteria for assessing the significance for traditional cultural properties, this study will adopt the state criteria for evaluating the significance of historic properties, of which traditional cultural properties are a subset. To be significant the potential historic property or traditional cultural property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- a Be associated with events that have made an important contribution to the broad patterns of our history;
- b Be associated with the lives of persons important in our past;
- c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- d Have yielded, or is likely to yield, information important for research on prehistory or history;
- e Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

While it is the practice of the DLNR-SHPD to consider most historic properties significant under Criterion d at a minimum, it is clear that traditional cultural properties by definition would also be significant under Criterion e. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa‘akai O Ka ‘Āina* vs Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical, or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights will be affected or impaired; and third, specify any mitigative actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

A review of the culture-historical background material, and as expressed by the consulted parties, the Pana‘ewa forest is associated with multiple traditional *mo‘olelo* that associate the creation of this forest to several Hawaiian *akua* (deities), *kupua* (culture heroes), and *mo‘o* (guardians of fresh water sources). The Pana‘ewa forest is arguably one of the most storied forests in east Hawai‘i celebrated in traditional lore and chants for its grand stands of ‘ōhi‘a, its *hala* forest, its unique variety of *maile*, and its ‘awa that were transported by birds and grew in the trees. All of the consulted parties described the traditional practice of gathering *maile* while some also spoke about the gathering of ‘ōhi‘a. Collectively, these *mo‘olelo* and the natural resources found therein are the major contributing elements that make the Pana‘ewa region a culturally significant place. These *mo‘olelo* enhance our understanding of traditional

perspectives and values associated with the Pana'ewa forest, which include the dangers of traversing the forest, the creation of forests by divine forces, and its role in storing the life giving element, *wai* (water).

Some of these *mo'olelo*, especially those associated with *mo'o* (i.e. the *Epic Tale of Hi'iakaikapoliopele*) are foundational cultural beliefs associated with water resources as well as the unpredictable and unforgiving landscape of Pana'ewa. According to Maka'ala Rawlins, *mo'o* deities served as cultural indicators for freshwater and he made reference to the coastal region of the Pana'ewa forest where he has seen many surface water features. Many of the *mo'olelo* associated with the Pana'ewa forest also describe two main trail routes, one that passed through the forest while the other along the coast (old Puna Trail), which connected Waiākea to Kea'au in the Puna District. As evidenced in the ancient accounts, caution was taken when traversing through this area. As learned from the story of Hi'iakaikapoliopele, Hi'iaka calls forth the fires of her siblings to slay Pana'ewa, thereby providing a safe passage for travelers. Although these fires ultimately destroy the forest, through her supernatural powers, she restores the growth. The message of ridding the forest of its dangers is also echoed in the *mo'olelo* of "*Ka'ao Ho'oniua Pu'uwai no Ka-Miki*" ("The Heart Stirring Story of Ka-Miki"), when Ka-Miki and his companions encountered and defeated Kūkulu, guardian of the chiefess Pana'ewa-nui-moku-lehua. In all of the traditional *mo'olelo*, the name Pana'ewa is said in referenced to a high ranking *ali'i* or *mo'o* that inhabited and guarded the forest.

While the gathering of natural resources from the Pana'ewa forest remains an important part of the cultural practices of this community, no explicit reference was made to such practices occurring in the study area. While it is not anticipated that the proposed quarry project will impact these cultural practices, based on the information obtained through the consultation efforts, continued development into the undeveloped forest, has impacted the area's natural resources by hindering access to or eliminating them completely from the landscape. As expressed by Nāko'olani Warrington, continued development, has for many years impeded upon the traditional practices associated with the Pana'ewa forest natural resources. As shared by Nalu Borges, Pana'ewa was known for its forest with large '*ōhi'a*' trees and *maile*, and that to maintain the natural character of the forest is integral to maintaining the cultural essence and beauty of the area. Nalu also added that Rapid 'Ōhi'a Death has also resulted in the loss of important forest resources. While the consulted parties described the presence of *lama*, '*ōhi'a*', *maile*, and '*awa*' within this general area of the Pana'ewa forest, none of these species, with the exception of '*ōhi'a*', was observed within the proposed quarry site.

It is the findings of the current study that the proposed development of the quarry will have no direct impact on any historic properties or traditional and customary native Hawaiian practices. While we recognize that intact sections of the Pana'ewa forest are valued cultural and natural resources, there is only one small section of such forest within the proposed quarry site. Based on our findings, it is recommended that Yamada and Sons Inc. make efforts to preserve or avoid disturbing the small and seemingly healthy portion of intact native '*ōhi'a*' forest that is present within the southeast section of the proposed quarry site. This effort would serve to mitigate any potential impacts to the valued cultural and natural resources that may result from the development of the proposed Yamada and Sons' quarry site.

5. POST-STUDY UPDATE

Following the submission of the draft CIA, Ron Terry of Geometrician Associates, LLC shared the above described potential cultural impacts and recommendations with the staff and planners for the proposed Yamada quarry site project. Based on the recommendations in the draft CIA, Yamada & Sons Inc. (the applicant) agreed to reduce the size of the proposed quarry site to exclude a seemingly healthy section of '*ōhi'a*' forest that is located in the southeast section of the original 51.192 acre proposed quarry site. The proposed project area in the revised Yamada quarry site plan has been reduced from 51.192 acres to 37.882 acres and now excludes the section of '*ōhi'a*' forest as well as the Drag Strip road (Figure 41). The elimination of 13.31 acres from the original quarry site project area thereby mitigates the above described potential cultural impacts. Under the revised quarry site plan (see Figure 41), it is the findings of the current study that the revised quarry site project area will not directly impact any historic properties, traditional and customary native Hawaiian practices or any culturally valued forest resources.



Figure 41. Revised Yamada & Son's Inc. quarry site plan which excludes 'ōhi'a forest located in the southwest section of the study area.

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