

FINAL— Archaeological Monitoring Report for Kamehameha Highway Resurfacing from Mālaekahana Stream Bridge to Kahawainui Stream-Lā‘iewai Bridge, Mālaekahana and Lā‘iewai Ahupua‘a, Ko‘olauloa District, O‘ahu

TMKs: (1) 5-5-009, 5-6-001 through 006, and 5-6-009 (por.)



Prepared For:

Road and Highway Builders
1050 Queen St. Suite 302
Honolulu, HI 96814



June 2017

Keala Pono 

Keala Pono Archaeological Consulting, LLC • PO Box 1645, Kāne‘ohe, HI 96744 • Phone 808.381.2361

**FINAL— Archaeological Monitoring Report for Kamehameha
Highway Resurfacing from Mālaekahana Stream Bridge to
Kahawainui Stream-Lā‘iewai Bridge, Mālaekahana and
Lā‘iewai Ahupua‘a, Ko‘olauloa District, O‘ahu**

TMKs: (1) 5-5-009, 5-6-001 through 006, and 5-6-009 (por.)

Prepared For:

Road and Highway Builders
1050 Queen St. Suite 302
Honolulu, HI 96814



Prepared By:

Windy Keala McElroy, PhD
and
Dietrix Duhaylonsod, BA

June 2017



MANAGEMENT SUMMARY

Archaeological monitoring was conducted for ground disturbing activity associated with the resurfacing of Kamehameha Highway from Mālaekahana Stream Bridge to Kahawainui Stream-Lā'iewai Bridge, in Mālaekahana and Lā'iewai Ahupua'a, Ko'olauloa District, on the island of O'ahu, Hawai'i. The project route covered 1.14 mi. (1.83 km), crossing through portions of TMKs: (1) 5-5-009, 5-6-001 through -006, and 5-6-009. Excavations were very shallow and no archaeological resources were encountered during monitoring. The Archaeological Monitoring Plan for this project was accepted on October 7, 2015 (Log No. 2015.03617, Doc. No. 1510SL02).

CONTENTS

MANAGEMENT SUMMARY	i
FIGURES	iv
TABLES	iv
INTRODUCTION	1
Project Location and Environment	1
BACKGROUND	5
Place Names	5
Traditional Land Use in Mālaekahana	5
Traditional Land Use in Lā'iewai	6
Mo'olelo of Mālaekahana	6
Manuwahi	7
Mo'olelo of both Mālaekahana and Lā'iewai	7
Laniloa	7
Lā'ieikawai and Lā'ielohelohe	7
Manōnihokahi	8
Mo'olelo of Lā'ie	8
The mullet of Lā'ie and Pu'uloa	8
Hi'iakaikapoliopele	9
The Early Historic Period in Mālaekahana	9
The Early Historic Period in Lā'iewai	9
The Māhele	9
Historic Maps	10
Mid-to Late-Historic Land Use in Mālaekahana	15
Mid-to Late-Historic Land Use in Lā'iewai	15
Previous Archaeology in Mālaekahana	17
Previous Archaeology in Lā'iewai	22
Previous Archaeology in Keana and Kahuku	23
Background Summary	25
METHODS	26
RESULTS	27
Stratigraphy	27
Summary of Results	27
SUMMARY AND CONCLUSION	31
GLOSSARY	32
REFERENCES	34

FIGURES

Figure 1. Project location on a 1998 7.5 minute USGS Kahuku quadrangle map.	3
Figure 2. Soils in the vicinity of the project area.....	4
Figure 3. Portion of an 1881 map of O‘ahu (Alexander et al. 1881).....	11
Figure 4. Portion of an 1884 map of Lā‘ie Bay (Jackson 1884).....	12
Figure 5. Portion of a 1928 aerial photo mosaic of Lā‘ie (UH SOEST 1928).	13
Figure 6. Portion of a 1932 Kahuku Forest Reserve map (King 1932).	14
Figure 7. Portion of a 1933 map of Kahuku Point to Lā‘ie (Paton 1933).	16
Figure 8. Location of previous archaeological studies in the vicinity of the project area.	18
Figure 9. Location of recorded archaeological sites in the vicinity of the project area.	19
Figure 10. Excavation with coldplaner.....	26
Figure 11. The project corridor, showing the locations for Profiles 1–3.....	28
Figure 12. Profile 1, west face profile drawing and photo.	29
Figure 13. Profile 2, northeast face profile drawing and photo (Layer II visible in photo).....	29
Figure 14. Profile 3, northeast face profile drawing and photo.	30

TABLES

Table 1. Previous Archaeology in Mālaekahana	20
Table 2. Previous Archaeology in Lā‘iewai	23
Table 3. Previous Archaeology in Keana and Kahuku.....	24
Table 4. Sediment Descriptions.....	29

INTRODUCTION

At the request of Road and Highway Builders, Keala Pono Archaeological Consulting conducted archaeological monitoring in support of the State of Hawai'i Department of Transportation Highway Division's Kamehameha Highway resurfacing from Mālaekahana Stream Bridge to Kahawainui Stream-Lā'iewai Bridge, in Mālaekahana and Lā'iewai Ahupua'a, Ko'olauloa District, on the island of O'ahu. The primary focus of the monitoring was on the identification and appropriate treatment of historic properties that might be affected by construction. The Archaeological Monitoring Plan for this project was accepted on October 7, 2015 (Log No. 2015.03617, Doc. No. 1510SL02).

Archaeological monitoring was conducted in accordance with an Archaeological Monitoring Plan (Hammatt and Shideler 2015) reviewed and accepted by the Hawai'i State Historic Preservation Division (SHPD). This report meets the requirements and standards of both federal and state historic preservation law. These include Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended, Chapter 6E of the Hawai'i Revised Statutes, and SHPD's *Rules Governing Standards for Archaeological Monitoring Studies and Reports* (§13–279).

The highway resurfacing project consists of cold planning and resurfacing of the highway, bus pads, and tops of drainage structures. The work also includes guardrail and signage installation, construction of curbing beneath existing guardrails, as well as placement of a milled centerline, pavement markings, and shoulder rumble strips. Damaged culverts were replaced with a reinforced concrete slab, and utility manholes were adjusted. Excavations were generally very shallow.

The report begins with a description of the project area and an historical overview of land use and archaeology in the area. The next section presents methods used in the fieldwork, followed by the results of the archaeological monitoring. Project results are summarized and recommendations are made in the final section. Hawaiian words and technical terms are defined in a glossary at the end of the document.

Project Location and Environment

The project area consists of a segment of Kamehameha Highway that runs through portions of TMKs: (1) 5-5-009, 5-6-001 through -006, and 5-6-009 (Figure 1). All work took place in the existing rights-of-way for Kamehameha Highway, within a 50–70 ft. (15–21 m) wide, 1.14 mi. (1.83 km) long corridor. This consists of approximately 7.95 ac. (3.22 ha).

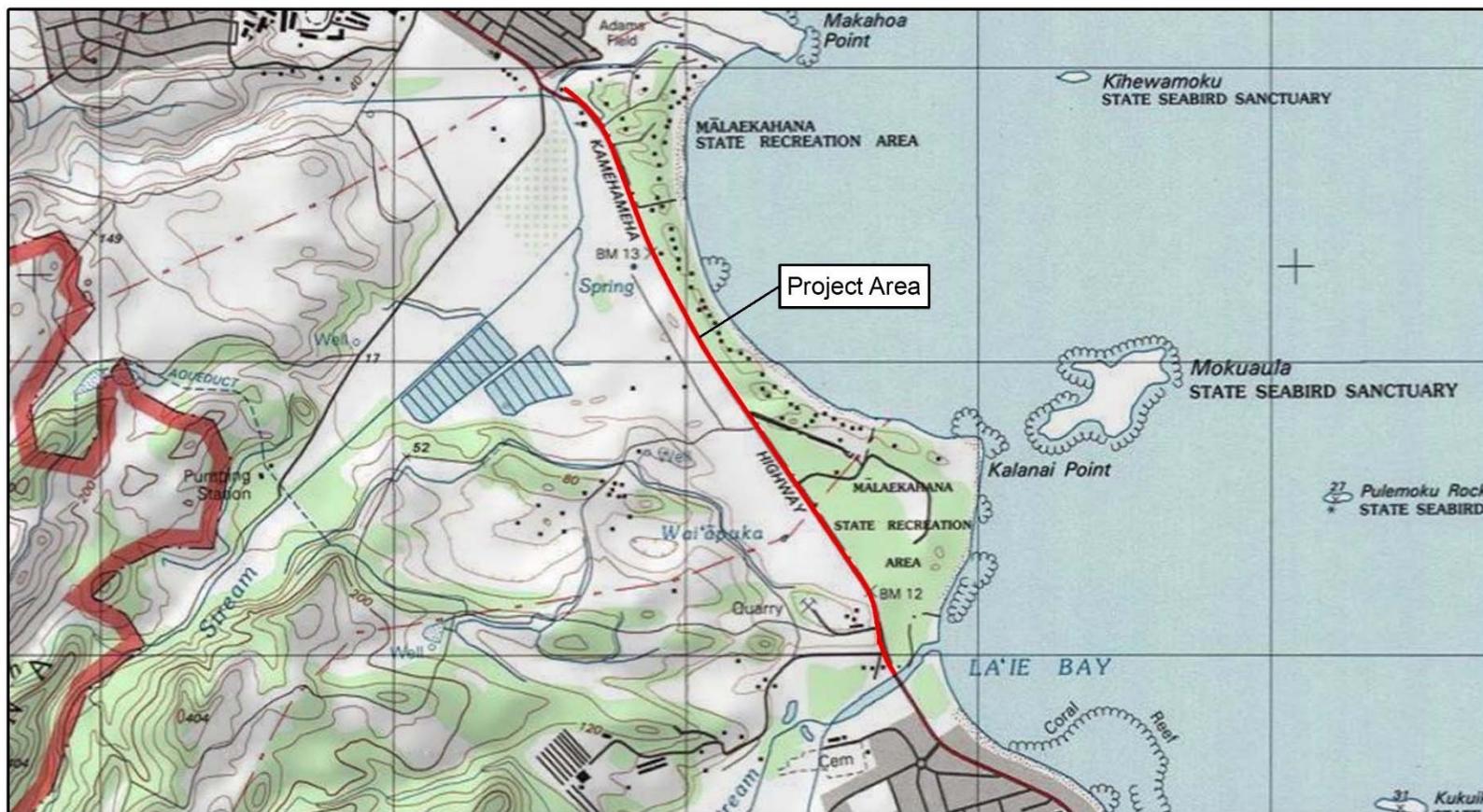
The project corridor extends from the Mālaekahana Stream Bridge to the Kahawainui-Lā'iewai Stream Bridge. This runs through coastal Mālaekahana Ahupua'a and partially into Lā'iewai Ahupua'a both of which are in Ko'olauloa District, on the island of O'ahu. Mālaekahana stretches from the ocean to the Ko'olau Mountain Range, and is bounded by Keana Ahupua'a to the north and Lā'iewai to the south. The beach at Mālaekahana is a crescent-shaped bay, with Makahoa Point at the north end and Kalanai Point at the south. This southern point lies within Lā'ie Ahupua'a, which also encompasses most of the Mālaekahana State Recreation Area.

Like Mālaekahana, Lā'iewai also stretches from the ocean to the Ko'olau summits. It is situated between the districts of Mālaekahana, to the north, and Lā'iemalo'o, to the south. Coastal Lā'iewai extends from the aforementioned Kalanai Point at its Mālaekahana side and Laniloa Point at its Lā'iemalo'o side. The project corridor, however, does not extend across all of Lā'iewai like it does for Mālaekahana. Instead, it enters the Lā'iewai-Mālaekahana boundary and goes only as far as Kahawainui Stream.

The perennial Kahawainui is a major stream in Lā'ie Ahupua'a. It flows into Lā'ie Bay toward the fishing grounds of Lua'awa. On the Mālaekahana side, the closest stream to the project is Waiapuka, roughly 500 m (.31 mi.) to the southwest. Waiapuka is an intermittent stream, however, and the closest perennial stream is Kaukanala'au (also known as Mālaekahana Stream), which lies 1 km (.62 mi.) to the northwest of the project area. Rainfall averages 131 cm (51.5 in.) per year (Giambelluca et al. 2013). Vegetation within the area of study consists mostly of grasses and weeds along the highway.

Geology of the project area centers around the Ko'olau Mountain Range, the massive shield volcano that serves as a backdrop for the windward O'ahu coast. Formed roughly 1.8–2.6 million years ago, the Ko'olau mountains produced tholeiitic and olivine basalts with trace amounts of oceanite (Macdonald et al. 1983). Below the Ko'olau Mountains is the sandy coastal plain that was formed during a time when the sea level was higher.

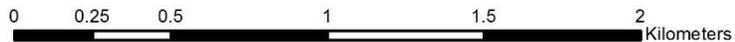
Project area soils consist of Jaucas sand, 0–15% slopes (JaC) and Lahaina silty clay, 7–15% slopes (LaC) (Figure 2). Jaucas series soils are “excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean” (Foote et al. 1972:48). This was a favored environment for human burial in traditional Hawai'i. Lahaina soils are well drained and were often used for sugarcane and pineapple cultivation (Foote et al. 1972:78).



Legend

Project Area

Keala Pono



Layer Credits: USGS Topographical Kahuku Quadrangle Map 1998

Figure 1. Project location on a 1998 7.5 minute USGS Kahuku quadrangle map.

BACKGROUND

A brief historic review of Mālaekahana and Lā'iewai is provided below, to offer a better holistic understanding of the use and occupation of the project area. In the attempt to record and preserve both the tangible (i.e., traditional and historic archaeological sites) and intangible (i.e., mo'olelo) culture, this research assists in the discussion of anticipated finds. Research was conducted at the Hawai'i State Library, the SHPD library, and online on the Office of Hawaiian Affairs website and the Waihona 'Aina database. Archaeological reports and historical reference books were among the materials examined.

Place Names

The ahupua'a of Mālaekahana may have been named after Lā'ieikawai's mother or the name of an image mentioned in the legend of Halemano (Pukui et al. 1976) (see Mo'olelo Section). Handy et al. (1991:462) provide the translation of the ahupua'a name as "Way-clear-for-work". Moku'auia is the largest of five islets off the coast of Mālaekahana. Its name translates to "island to one side" (Pukui et al. 1976). The other islets are Kīhewamoku or Kahiwamoku; Pulemoku, which means "broken prayer;" Kukuiho'olua, which means "oven-baked candlenut;" and Mokuālai, or "island standing in the way" (Pukui et al. 1976). It is said that the islets were formed as Kana and Niheu killed a mo'o and threw pieces of its body into the ocean. Moku'auia later got the name "Goat Island" for the goats that the Mormons moved there (Clark 1977:139). Makahoa is the prominent point on the Kahuku side of the ahupua'a. It translates to "friendly point" (Pukui et al. 1976). Kalanai is the point on the Lā'ie side of the ahupua'a, although no translation is given by Pukui et al. (1976). This is also known as Cooke's Point, referring to the family that lived there in the early 1900s (Clark 2002:52).

The ahupua'a of Lā'iewai, meaning "Wet Lā'ie," and the ahupua'a of Lā'iemalo'o, meaning "Dry Lā'ie," are the two smaller ahupua'a which make up the greater land division known simply as Lā'ie, meaning "Ie leaf" (Pukui et al. 1976). The coastline of Lā'iewai extends from a point at its southern end called Laniloa, meaning "tall majesty," to Kalanai Point, mentioned above, at the northern end of Lā'iewai's coast. Other place names along Lā'iewai's shore include: Lā'ie Beach, also known as Hukilau Beach, which refers to a method of fishing; and Pu'uahi Beach, which means "hill of fire," also known as Temple Beach, which refers to the Mormon temple.

Traditional Land Use in Mālaekahana

Not much has been written regarding traditional land use in Mālaekahana compared to the larger ahupua'a in the vicinity such as Lā'ie and Kahuku. Handy et al. write that the northern ahupua'a of O'ahu's windward coast are less suitable for lo'i cultivation than places such as Kahana and Punalu'u (1991:460), suggesting that wetland agriculture was not a major practice in Mālaekahana. Handy does note that "there were terraces in this ahupua'a [Mālaekahana], irrigated by Kaukanalau Stream" (in Sterling and Summers 1978:154), indicating that lo'i agriculture did occur there, though probably not on a large scale. Handy (1940:75) also states that "sweet potatoes were grown on the northwest coast from Keana to Laie," and other dryland crops may have been cultivated in this environment as well. Handy et al. (1991:462) briefly describe Mālaekahana and the neighboring ahupua'a of Keana:

These two small *ahupua'a* intervening between Lā'ie and Kahuku (the northernmost tip of Oahu) show much the same pattern, in miniature, of dune coasts, elevated coral, and broken level land seaward from the hills. Each has a small stream. There were formerly irrigated terraces in Mālaekahana (Way-clear-for-work), but none in Keana (The-cave).

Ocean resources were plentiful in the ahupua‘a. There are two reefs off of Mālaekahana known as Kō and Hāli‘i, where moi and limu are found in abundance (Clark 1977:138–139). These reefs would have been a location for fishing and collecting limu in the past, and shellfish was likely harvested from nearshore areas. There was also a fishpond in Mālaekahana:

Formerly a fishpond was located near the point [Makahoa] and was known as Waipunaea. There are traditions about the mullet coming to this point from Pearl Harbor... To this day schools of mullet come around the island to this northern point of Malaekahana. They go no farther, and their apparent disappearance still mystifies the Hawaiians. (McAllister 1933:155)

From this scant information, it can be surmised that the small ahupua‘a of Mālaekahana relied on both fishing and farming for subsistence in the pre-Contact era (before the arrival of Westerners in 1778). There were lo‘i for the cultivation of wetland taro, but the population relied on dryland farming as well. Ocean resources such as fish and limu were abundant, and there was a fishpond on Mālaekahana’s shores.

Traditional Land Use in Lā‘iewai

Contrasting with Mālaekahana, the lands of Lā‘ie were better watered, “particularly at the places called Kapuna and Kawai‘eli in Lā‘iewai... noted for its water resources, which were used to flood the lo‘i ‘ai (taro pond fields) and loko i‘a kalo (dual purpose fishponds-taro ponds) for which the land was well known” (Maly and Rosendahl 1995:17). Kawai‘eli appears to refer to an old terraced area “along the lower reaches of Kahawainui Stream... and once watered from a spring.” The land called Kapuna was located further upland “in back of the present Mormon Temple... [and] was watered by one large and several lesser springs.” (Maly and Rosendahl 1995:18). A telling sign which suggests the great agricultural productivity of these lands is that many of the individual terraces had their own names. These cultivated terraces, which are recorded to have brought forth wetland taro, coconut trees, and mango trees, had names such as Kaholi, Kuamoo, Naeluli, Makalii, Poohaili, and Mahanu (Maly and Rosendahl 1995). Additionally, Lā‘ie’s gentle slopes and flat plains, “ideally suited to dryland agriculture... [also yielded] ‘uala (sweet potatoes), kō (Hawaiian sugar canes), ‘ulu (bread fruit), ‘awa (*Piper methysticum*), wauke (the paper mulberry), and other important native crops” (Maly and Rosendahl 1995:18).

The waters off of Lā‘iewai were also rich with natural resources, and one of the surest markers of this was the ko‘a, or fishing shrine, at Kalanai Point, where fishermen offered their catches of kala, or unicorn fish, and enenu, or pilot fish. In the waters near the shrine was a well-known fishing hole called Lua‘awa, a known fishing spot for the awa, or milkfish. Additionally, the Lā‘ie Beach, which fronted Lā‘ie Bay, was also known as Hukilau Beach because people met there to pull in large fishing nets to the beach. This method of fishing is known as “hukilau.”

Another important note about the land use in the area is that McAllister (1933) documented the land of Lā‘ie to be a pu‘uhonua, or place of refuge, in former times. McAllister (1933:157) relays that a manuscript at the Bishop Museum quotes an informant as saying:

At Laie on Oahu was an old city of refuge. They called the boundary on the Kahana side ‘Pa-paa-koko’ or ‘Fence that held the blood.’

Mo‘olelo of Mālaekahana

Mālaekahana was the name of a wooden image featured in the mo‘olelo of Halemano (Fornander 1919:236–237). Halemano was from Wai‘anae and he fell in love with Kamalalawalu from Puna. Halemano’s sister was a sorceress and she advised him to build toys such as kites and carved figures

for Kumukahi, the favorite brother of Kamalalawalu. The sorceress presented Kumukahi with the toys and in exchange, he persuaded Kamalalawalu to go with him to O‘ahu. Their canoe landed at Hau‘ula, where Kumukahi saw the image named Mālaekahana. He liked the image so much that he stayed in Hau‘ula. Halemano ended up marrying Kamalalawalu and they lived in Waialua, while Kumukahi returned home.

Manuwahi

Manuwahi was a kahuna that lived in Mālaekahana. He was the keeper of the god of the same name as the ahupua‘a. It is unclear if this is the same image named Mālaekahana that Kumukahi saw in Hau‘ula. McAllister (1933:156) offers further information on Manuwahi and the battles fought at Mālaekahana:

The Hawaiians are still proud that the district of Malaekahana was never conquered by Kamehameha I. This is not recorded in Hawaiian history so far as I know. It may have been considered too insignificant a matter, or, as Dr. C.M. Cooke, Jr., suggests, an earlier *moi* [mō‘ī] of Oahu may have been unable to wrest Malaekahana from Manuwahi, and he may at present be confused with Kamehameha. The legend collected by Rice (70, p. 113) tells the story of Kamehameha’s sending out Kahalau, who was unable to subdue Manuwahi because this powerful kahuna was aided in battle by the gods. After the battle, Kahalau joined forces with Manuwahi and is still spoken of by the older natives as the chief who revolted against Kamehameha. Many skeletons were unearthed in plowing the cane fields of this region and in digging the foundations for the beach houses, indicative, some think, of many battles in the region.

Mo‘olelo of both Mālaekahana and Lā‘iewai

As expected many mo‘olelo or traditional Hawaiian stories are associated with more than one ahupua‘a. This holds true for many of the windward O‘ahu mo‘olelo as well. In the case of Mālaekahana and Lā‘iewai, several mo‘olelo cross over the boundary which separates these two adjacent land divisions.

Laniloa

The mo‘olelo of Laniloa tells of the creation of the five islets off of Mālaekahana and Lā‘ie:

Laniloa is the name given to a point of land which extends into the ocean from Laie. In ancient times this point was a mo-o, standing upright, ready to kill the passerby.

After Kana and his brother had rescued their mother from Molokai and had taken her back to Hawaii, Kana set out on a journey around the islands to kill all the mo-o. In due time he reached Laie, where the mo-o was killing many people. Kana had no difficulty in destroying this monster. Taking its head, he cut it into five pieces and threw them into the sea, where they can be seen today as the five small islands lying off Malae-kahana: Malualai, Keauakaluapaaa, Pulemoku, Mokuaniwa and Kihewamoku.

At the spot where Kana severed the head of the mo-o is a deep hole which even to this day has never been fathomed. (Rice 1923:112)

Lā‘ieikawai and Lā‘ielohelohe

The epic romance of Lā‘ieikawai features a pool in Mālaekahana known as Wai‘āpuka which also had “an underground cavern on the Lā‘ie side of the Mālaekahana/Lā‘ie border” (O‘Hare et al. 2010:17). Lā‘ieikawai was a high chiefess, whose mother was named Mālaekahana. At the time of her birth Lā‘ieikawai was hidden in a cave by Waka, her mo‘o guardian. The subterranean cave

could only be accessed by diving through the waters of Wai‘āpuka Pool. While Lā‘ieikawai was kept in the cave, her twin sister Lā‘ielohelohe was taken to Kūkaniloko in Wahiawā. They were sequestered because the father of the twins had vowed to kill any baby girls that were born before a male heir. Lā‘ieikawai was later betrayed by her guardian Waka and married a high chief. She went to live in the heavens with her husband, who betrayed her as well and was banished from that realm. Lā‘ieikawai, however was reunited with her sister and revered as a goddess (Beckwith 1918:60–64; 1970:526).

The ahupua‘a of Lā‘ie is named after this legend about Lā‘ieikawai and Lā‘ielohelohe, and it is said that the ‘ōlelo no‘eau, “Lā‘ie i ka ‘ēheu o na manu,” or “Lā‘ie, borne of the wings of birds,” refers to this legend about the twin girls (Pukui 1983:209).

Manōnihokahi

Another mo‘olelo of the area tells of Manōnihokahi, or “Shark-with-one-tooth” (Rice 1923:111). He was a man that could transform into a shark. He lived in Mālaekahana, and “would often pass through a tunnel or water hole in Lā‘ie into the ocean in his shark form” (O’Hare et al. 2010:19). The shark-man would go out to sea and bite and kill women that were fishing. In human form, Manōnihokahi still retained a shark’s mouth on his back, but he concealed it with a covering of kapa. To expose him, the chief of the area ordered everyone to gather together and remove their clothing. When Manōnihokahi refused, they pulled off his kapa and his shark’s mouth was revealed. He was killed and the women of Mālaekahana were now safe.

Mo‘olelo of Lā‘ie

In contrast to the man eater Manōnihokahi, Kaunihokahi was a benevolent shark that looked after the welfare of the people.

Ka-U-niho-kahi was a shark akua. He had his lua at La‘ie. A kind, harmless akua but if necessary to hurt for the protection of his people he would hurt them. Sometimes they would feel a nip like a papa‘i (crab). They would find a cut of just one tooth. Sometimes he took the form of a small fish to warn his people not to go any further. (Pukui 1953 in Sterling and Summers 1978:159)

The mullet of Lā‘ie and Pu‘uloa

According to the mo‘olelo of the four sisters, Kaihuopala‘ai, Kaihuko‘a, Ihukoko, and Kaihuku‘una, they sailed back to O‘ahu, landing at Pu‘uloa, then journeyed westward around the island, finally ending in Lā‘ie (Fornander 1919). The mullet accompanied the sisters on their journey, particularly staying in the waters of Pu‘uloa and Lā‘ie. This story may or may not be associated with the fishpond of Waipuanaea at Makahoa Point which attracted the mullet from Pu‘uloa via O‘ahu’s eastern shoreline.

Another version of the mo‘olelo relates that a fisherman planted large quantities of ‘uala but was reprimanded by his wife, who told him to go to Pearl Harbor to sell the ‘uala. The people at Pearl Harbor would not buy the ‘uala, however, and the wife threw them into the sea in anger. The ‘uala attracted schools of fish, and the man traveled toward Kahana Bay, throwing cooked ‘uala into the sea at each bay. Schools of mullet followed him, and he caught them in a net. The mullet still swim from Pearl Harbor to Mālaekahana, stopping in each bay (Raphaelson 1925).

Yet another version of the mo‘olelo states that the mullet travel from Pearl Harbor to Lā‘ie because a woman in Lā‘ie sent for them (Thrum 1998). The woman’s brother lived in Pearl Harbor and had a kū‘ula that made the mullet plentiful.

Hi‘iakaikapoliopele

In the great epic told about Hi‘iaka’s journey from Hawai‘i Island to Kaua‘i, she initially traveled along the windward side of O‘ahu. When she stopped in Lā‘ie, Hi‘iaka extolled the beauty of the place in a traditional chant. This chapter of her journey is recalled by Ho‘oulumāhiechie in the Hawaiian language newspaper, *Ka Na‘i Aupuni*:

They did continue along, and Hi‘iaka eventually saw Laniloa, that long point of land extending out from Lā‘ie, at which time she offered this kau.

*Laniloa soars, peacefully calm
A roaring sea below
I am cleansed by the salt spray.*

They arrived at the places called Lā‘iemalo‘o and Lā‘iewai. When they had passed the ridged boundaries of these lands, they went on through the next district Mālaekahana, and on to Kahuku. (Ho‘oulumāhiechie 2006:156)

The Early Historic Period in Mālaekahana

Several of the early historic expeditions to Hawai‘i passed by O‘ahu’s north shore, beginning with the HMS *Resolution* in 1779. This early voyage described a landscape rich with vegetation, fertile valleys, and large villages (Beaglehole 1967). By 1794, however, the area was said to be sparsely inhabited and not flourishing (Vancouver 1798). Whereas Mālaekahana was not specifically mentioned, this ahupua‘a was likely in a similar state as the surrounding area. Mālaekahana is cited by name in 1828, when the missionary Levi Chamberlain traveled there to inspect O‘ahu’s schools. Chamberlain (1956:35) was “pleased with the appearance of the scholars.”

The Early Historic Period in Lā‘iewai

Chamberlain also mentioned the two land divisions of Lā‘ie, as “Laiewai” and “Laimoro.” His journal noted that the school in Lā‘ie had 60 students and that the main teacher was named Peka. In other missionary records, “missionary censuses show a Lā‘ie population of 452 in 1831, out of a total Koolauloa population of 2891” (Maly and Rosendahl 1995:19).

At the time of initial western contact, that is, during the period following Kamehameha I’s conquest of O‘ahu, the warrior chief from Hawai‘i Island placed Lā‘iewai and Lā‘iemalo‘o in the hands of his half-brother Kalaimamahū. This Kalaimamahū was “the grandfather of [future king] Lunalilo, who later formally received the land in the Māhele of 1848, under the rule of Kamehameha III” (Maly and Rosendahl 1995:19).

The Māhele

The change in the traditional land tenure system in Hawai‘i began with the appointment of the Board of Commissioners to Quiet Land Titles by Kamehameha III in 1845. The Great Māhele took place during the first few months of 1848 when Kamehameha III and more than 240 of his chiefs worked out their interests in the lands of the Kingdom. This division of land was recorded in the Māhele Book. The King retained roughly a million acres as his own as Crown Lands, while approximately a million and a half acres were designated as Government Lands. The Konohiki Awards amounted

to about a million and a half acres, however title was not awarded until the konohiki presented the claim before the Land Commission.

In the fall of 1850 legislation was passed allowing citizens to present claims before the Land Commission for parcels that they were cultivating within the Crown, Government, or Konohiki lands. By 1855 the Land Commission had made visits to all of the islands and had received testimony for about 12,000 land claims. This testimony is recorded in 50 volumes that have since been rendered on microfilm. Ultimately between 9,000 and 11,000 kuleana land claims were awarded to kama'āina totaling only about 30,000 acres and recorded in ten large volumes.

Most of Mālaekahana Ahupua'a was awarded to Analea Keohokālole during the Māhele. A total of 3,280 ac. were given to Keohokālole, who was the matriarch of a powerful line of ali'i, including King Kalākaua and Queen Lili'uokalani. Much of this land would later fall into the hands of the Campbell Estate. Only a few other small Land Commission Awards were made for Mālaekahana. They are less than 1 ac. each and none are near the project area. Testimony for these claims mention 'uala, mai'a, wauke, and house lots.

It was sometime before the Māhele that the districts of Lā'iewai and Lā'iemalo'o were combined to form one Lā'ie, and "the 6,194 acre ahupua'a... was awarded to the thirteen-year-old high chief [and future king of Hawai'i] William Charles Lunalilo" (Moffat et al. 2011:8). Eventually, after commoners were allowed to submit land claims, Lā'ie saw the recognition of several dozen kuleana awards. These awards consisted of various habitation features, agricultural features, animal enclosures, and fisheries. Among these kuleana awardees were the familial "descendants of the chiefess Kekela [and they] remain in Lā'ie to this day" (Maly and Rosendahl 1995:19).

Historic Maps

Historic maps help to paint a picture of Mālaekahana and Lā'iewai in times past and illustrate the changes that have taken place in the region over the years. The earliest map found for this area is dated 1881 (Figure 3). The map shows the entire island of O'ahu so it does not include much detail. "Laiekawai Water hole" is labeled in Mālaekahana, and just mauka of that is "275 acres to Kahuku Ranch." The islets off the coast are named, and the area around Lā'ie Point reads "Dangerous Entrance."

The next map is dated October 1884 and is the result of survey work done by George E.G. Jackson. Titled "Laie Bay Oahu," this map shows a road running along the coast with the famous Lā'ie and Mālaekahana islands drawn to scale just off shore. Kahawainui Stream, although not labeled, is depicted flowing into the sea with houses alongside its banks, while other houses are marked along the beach. The new Mormon settlement is illustrated just south of the waterway, and further south, a large expanse of sugarcane fields is noted beyond the Mormon mission (Figure 4).

An aerial photo mosaic from 1928 shows that Mālaekahana is still very rural (Figure 5). The highway is in place, although there are no houses along the beach. Much of Mālaekahana appears to be open fields/pastures or in sugarcane cultivation.

The next map is labeled "Kahuku Forest Reserve, Koolauloa, Oahu," and is dated to 1932 (Figure 6). The map reflects the changes noted during the resurvey of the makai fenceline of the forest reserve by Thomas C. Ryan. Although it is named the Kahuku Forest Reserve, its boundaries clearly cross the many districts of Ko'olauloa outside of Kahuku, from Kaunala to Lā'ie. Included in the preservation area are 1,428 acres of Mālaekahana uplands and 2,528 acres of Lā'ie uplands. Both the Kamehameha Highway and the Ko'olau Railway are shown near the coastline

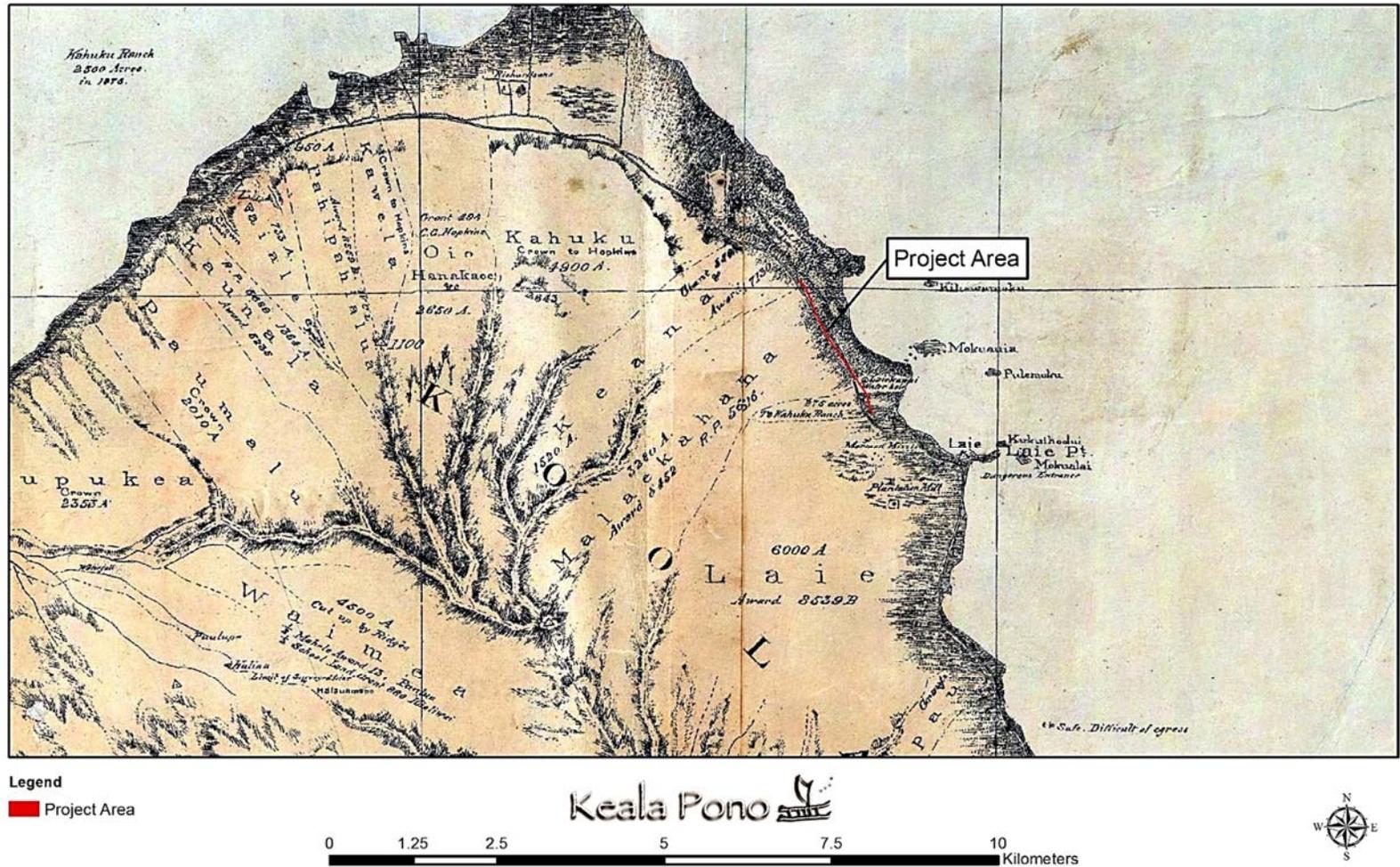


Figure 3. Portion of an 1881 map of O'ahu (Alexander et al. 1881).

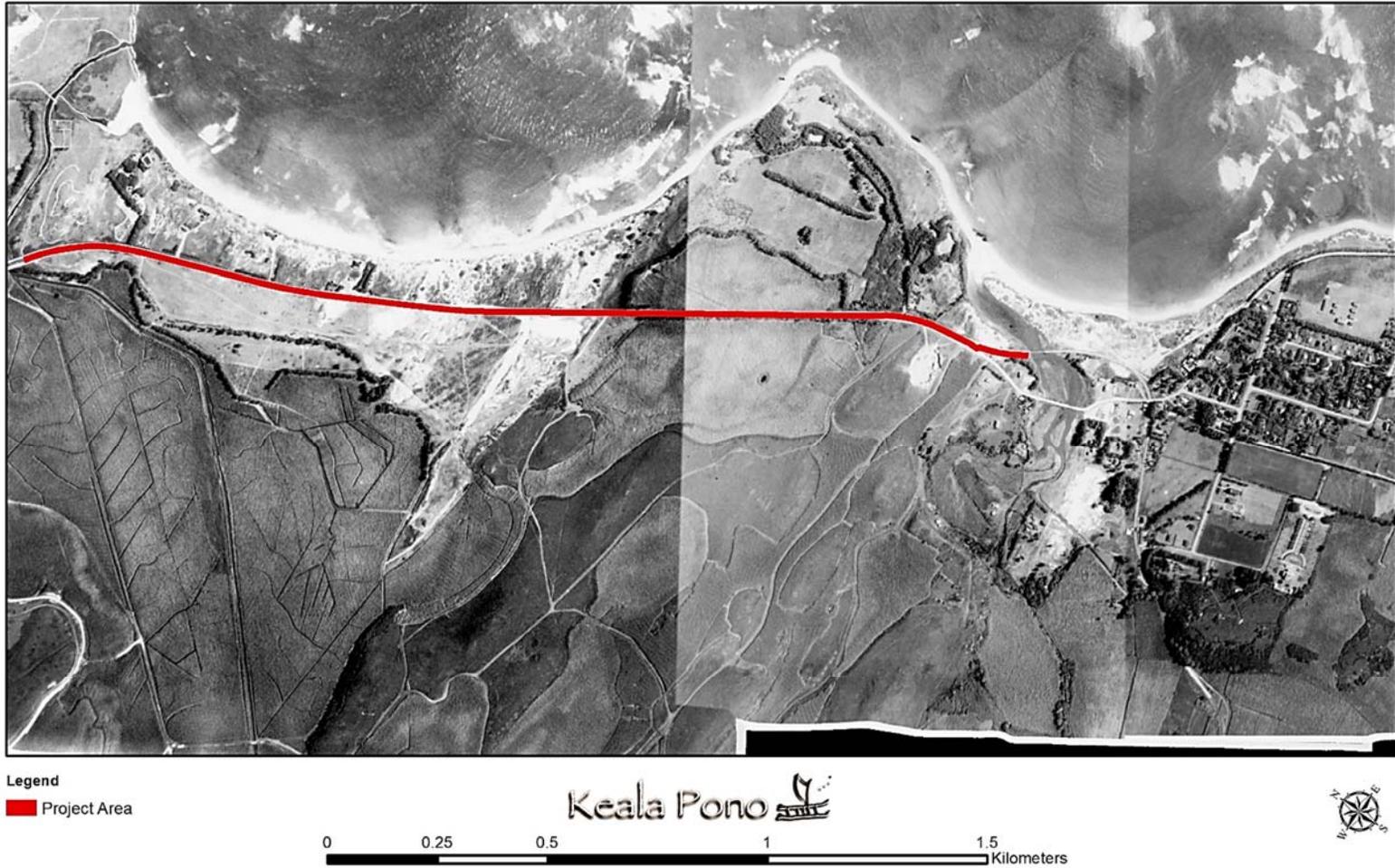


Figure 5. Portion of a 1928 aerial photo mosaic of Lā'ie (UH SOEST 1928).

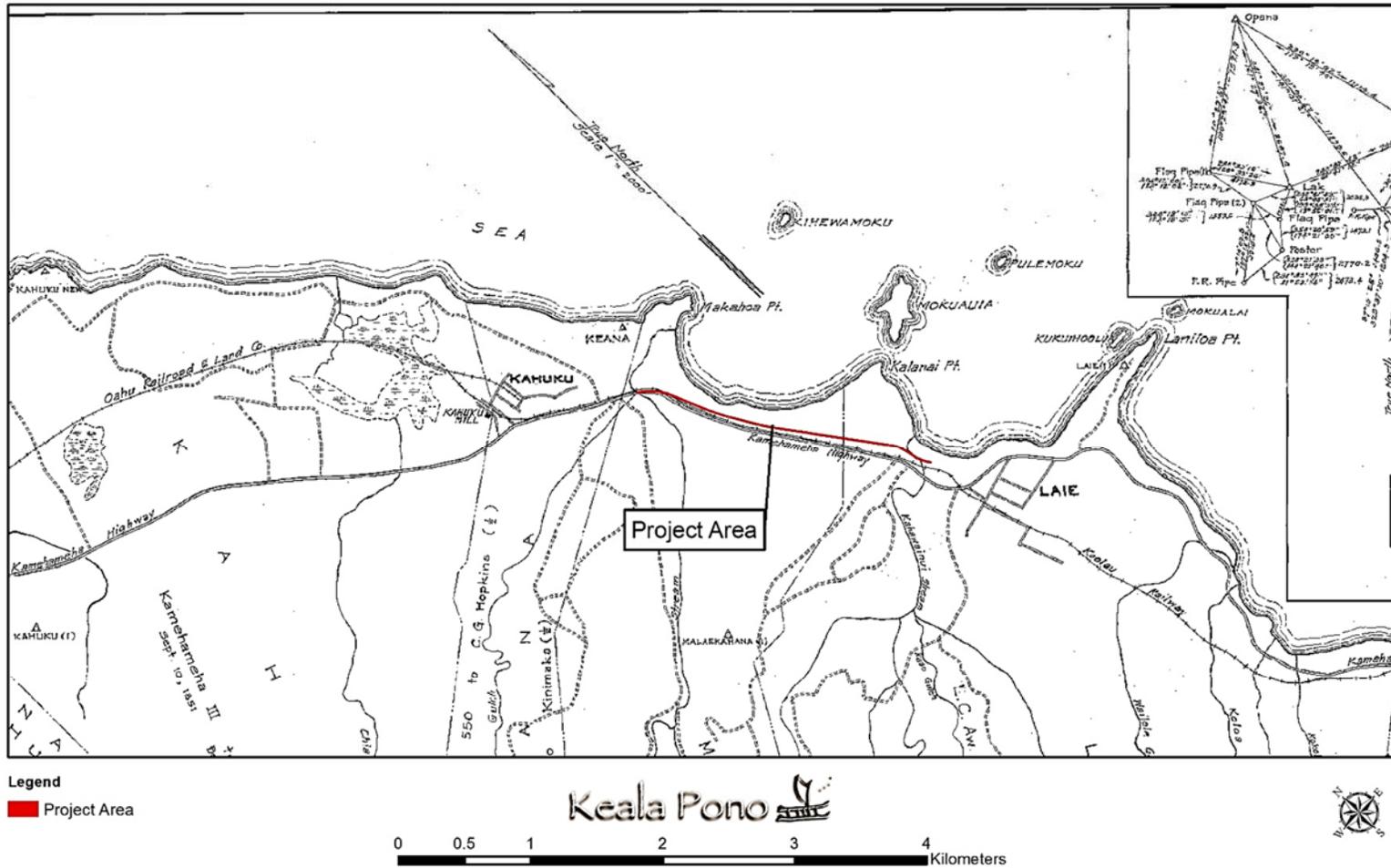


Figure 6. Portion of a 1932 Kahuku Forest Reserve map (King 1932).

intersecting at several points, diverging at others, and running parallel for certain stretches along the way.

Finally, a 1933 map shows the start of development in the project area (Figure 7). A boat house, bath house, and “green roof house” are pictured where Mālaekahana State Recreation area is today. The area makai of the project route is labeled as “grass covered sand dunes.” A fence, water tank, and several structures are also depicted.

Mid-to Late-Historic Land Use in Mālaekahana

By 1863, Englishman Charles Gordon Hopkins owned large tracts of land in Mālaekahana and the neighboring ahupua‘a. He established the Kahuku Ranch, and the area was soon overrun by sheep and cattle, which quickly destroyed the native vegetation. The ranch was later renamed Kahuku and Mālaekahana Ranch, and by 1876 it was in the hands of James Campbell. An article from this year details the transfer:

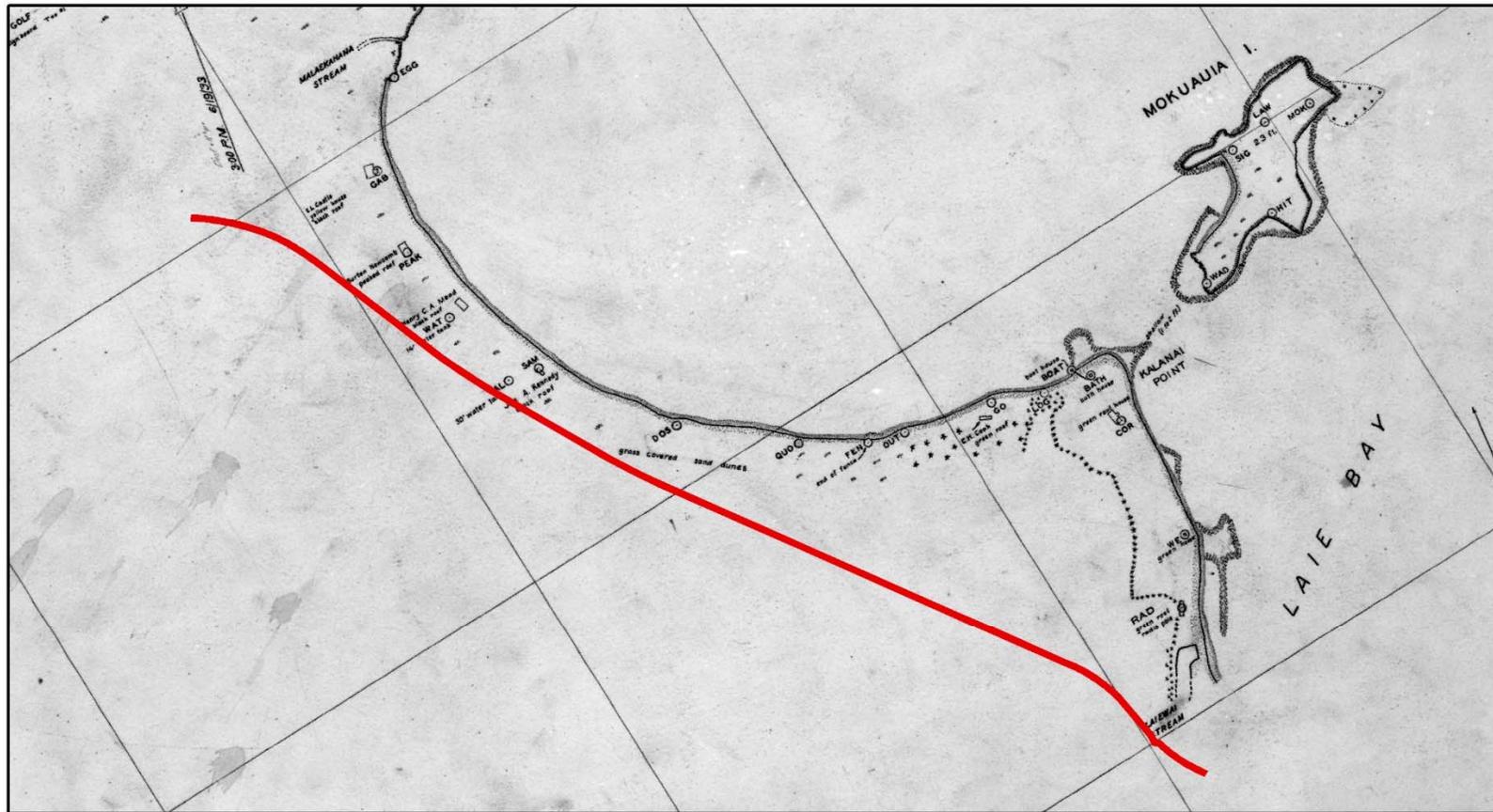
It includes 25,000 acres in fee simple, and large tracts of mountain land under long leases, with \$34,000 worth of livestock, including 3,000 head of cattle, with the choice band of merino sheep and horses now on it. It is unquestionably the best stock ranch of these islands, and it has been brought to a high state of perfection under the management of the late proprietors, who divided the plain into ten or twelve large paddocks, walled with heavy stone walls. It stretches from Laie to Waimea, a distance of thirteen miles, and those who have ever visited it must have admired its lovely green pastures of manienie grass so fattening to stock. It is the intention of Mr. Campbell to increase his band of sheep to 30,000 of the choicest breed. The price paid is a handsome one, securing to its present proprietor the most desirable ranch of the Islands, and to Mr. Richardson a comfortable fortune, the result in part of his industry and good management, and in part of the Reciprocity Treaty, the first fruit from which he has been so fortunate as to reap. (*Hawaiian Gazette* 1876:3:2)

In 1889, Campbell leased the ranch to B.F. Dillingham and it remained in business until the mid-1900s. At this time the Kahuku Sugar Company was established, and soon at least 150 acres of sugarcane fields extended into Mālaekahana. By 1899 the Oahu Railway extended its track to Kahuku, linking the sugar mill with Honolulu, via Ka‘ena Point. By 1903 the railway crossed through Mālaekahana and continued to Lā‘ie. This rail line would eventually be extended all the way to Kahana Bay. In 1916, some of the Kahuku sugarcane lands were leased for pineapple cultivation, although this was not a major enterprise. Sugarcane was grown in the area until 1968, and the railroad continued its Kahuku operations until 1972.

Mid-to Late-Historic Land Use in Lā‘iewai

In 1861, Henry H. Howland purchased 298.5 acres of land in Lā‘iewai from the future king, Lunalilo. In 1863, Howland sold this land to Robert Moffitt, who transferred the properties to Charles Hopkins. Hopkins then utilized the Lā‘ie properties, along with other parcels in Mālaekahana and Kahuku, to create the Kahuku Ranch. In 1872, Hopkins sold his Lā‘iewai landholdings to Herman A. Widemann. Two years later, the ranch was sold to Julius L. Richardson, and in 1876 he transferred the ranch to James Campbell. In 1899, the ranch was leased to B.F. Dillingham.

Besides selling the Lā‘ie properties to Moffitt, land which would eventually become the Kahuku Ranch, Howland also sold some Lā‘ie land to Thomas Dougherty. This property would eventually become the foundation for the Mormon Church in Hawai‘i (Maly and Rosendahl 1995).



Legend

█ Project Area

Keala Pono

0 0.125 0.25 0.5 0.75 1 Kilometers



Figure 7. Portion of a 1933 map of Kahuku Point to Lā'ie (Paton 1933).

Dougherty bought the Lā‘ie land from Howland in 1863, and two years later, he sold it to elders of the Mormon Church (Maly and Rosendahl 1995; Moffat et al. 2011). That same year, the first group of Mormon colonizers arrived from Utah, settling in their new home of Lā‘ie. In 1868, the Lā‘ie Mill was built, but within a decade the mill was shut down due to deterioration, and a new sugar mill was erected in 1881. While sugarcane was being cultivated and processed in Lā‘ie, some of the Lā‘ie lands were also being used for rice farming by the area’s Chinese residents. Taro also continued to be cultivated traditionally along Lā‘ie’s coastal tracts.

The religious community oversaw the dedication of a chapel called ‘Īhemolele in 1883, but it was not until 1919, that the community finally constructed and dedicated its temple, Hale La‘a (Maly and Rosendahl 1995).

The Kahuku Ranch eventually leased the sugarcane lands in Lā‘ie from the Mormon Church and continued to cultivate sugarcane until the Kahuku Sugar Company shut down in the 1960s. In the meantime, Mormon Church leaders set about realizing their vision of creating an institution of higher learning for their settlement in Lā‘ie. In 1955, they opened their Church College of Hawaii, which, in the 1970s, would be renamed Brigham Young University-Hawaii (Moffat et al. 2011). Also during this post-war time period, concerns were aired about “finding ways for the students coming up from the islands [across the Pacific] to attend CCH [BYUH] to earn some money as well as preserve their cultures” (Moffat et al. 2011:165), and the Polynesian Cultural Center was established:

In 1961, Edward L. Clissold and Wendell B. Mendenhall discussed the concept of the Polynesian Cultural Center with [Mormon Church] President McKay as a place for students from the islands to share their cultures, as well as earn money for school. Originally referred to as the Polynesian Villages, President Clissold asked Professor Swapp to come up with a better name. At the last minute before the idea was presented to President McKay, Professor Swapp came up with the name “Polynesian Cultural Center,” which linked the project to the college yet would appeal to tourists (Moffat et al. 2011:167–168).

The establishment of the Polynesian Cultural Center in Lā‘ie had a huge impact on the economy and cultural make-up of the community. It remains a major tourist attraction today.

Previous Archaeology in Mālaekahana

Several archaeological studies have been conducted in Mālaekahana. The following discussion provides information on archaeological investigations that have been carried out in the vicinity of the project area, based on reports found in the SHPD library in Kapolei, Hawai‘i (Figure 8 and Table 1). State Inventory of Historic Places (SIHP) site numbers are prefixed by 50-80-02 (Figure 9).

The earliest archaeological work in Mālaekahana comes from McAllister’s (1933) islandwide survey. McAllister recorded four sites in the ahupua‘a. Site 272 is a ko‘a located at Makahoa Point. At the time of his study, only a few rocks remained of the site. McAllister (1933:155) notes that there was once a fishpond near this location, and mullet still return to the area. Site 273 is the house foundation of the kahuna Manuwahi, who was the “keeper of the god at Malaekahana.” It is located in the current Mālaekahana State Recreational Area. Again, only a few rocks remained of the site during the time of McAllister’s study. Site 274 is a ko‘a called Kalanai, in the Lā‘ie portion of Mālaekahana State Recreation Area. Kala and enenu were the fish offered at Kalanai, and in addition to fish remains, McAllister (1933:156) noted a human burial .6 m (2 ft.) below the surface. Site 275 is Wai‘āpuka Pool, located inland from Kamehameha Highway, in what was a

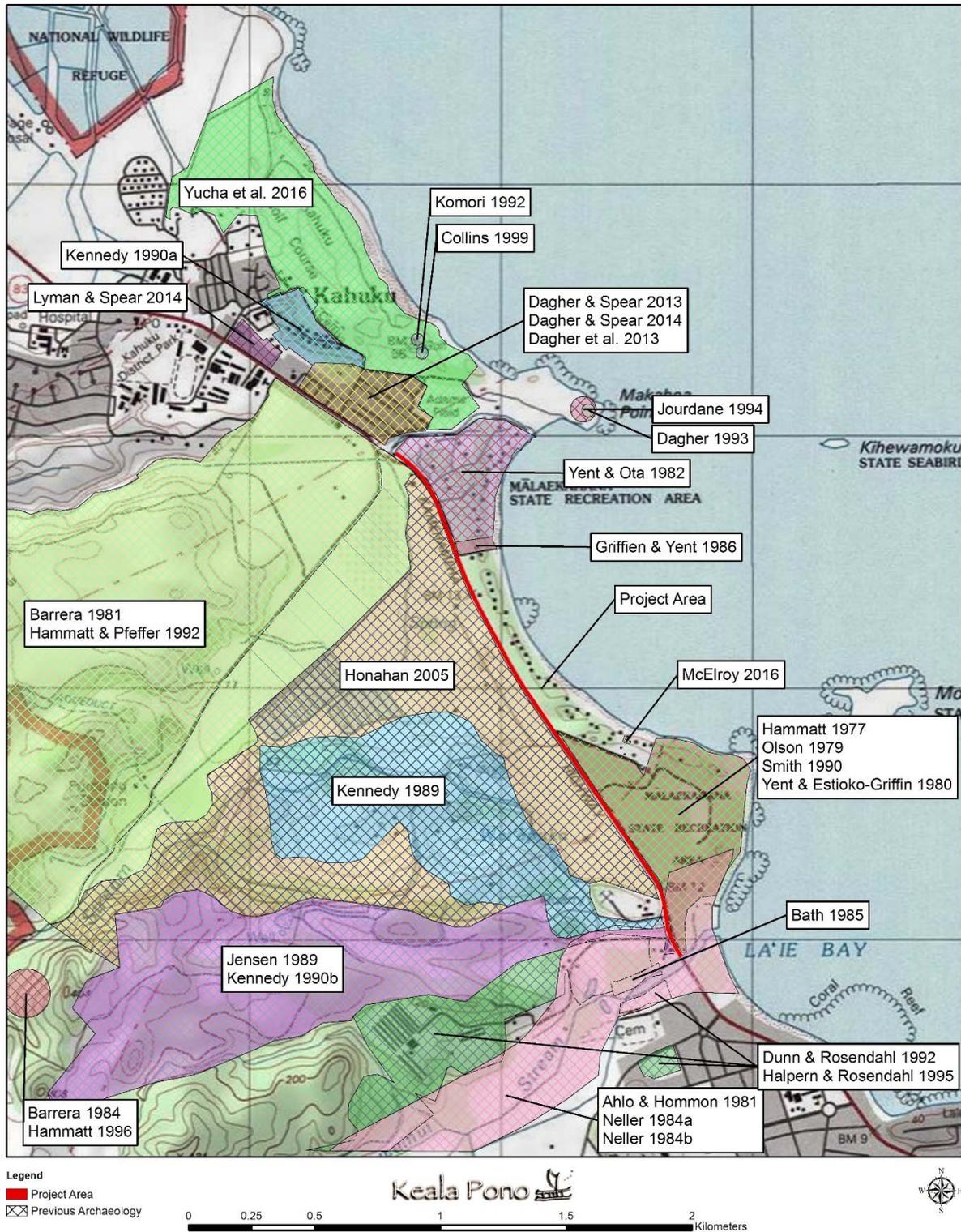


Figure 8. Location of previous archaeological studies in the vicinity of the project area.

Table 1. Previous Archaeology in Mālaekahana

Author and Year	Location	Type of Study	Findings
McAllister 1933	Mālaekahana	Survey	Recorded four sites: two ko‘a, a house foundation, and a pool.
Hammatt 1977	Mālaekahana State Recreation Area	Soil Analysis	Documented two cultural layers.
Olson 1979	Mālaekahana State Recreation Area	Volcanic glass Analysis	Determined 3 fragments to be flakes; 12 fragments to be percussion produced
Yent and Estioko-Griffin 1980	Mālaekahana State Recreation Area	Mapping and Excavation	Recorded Site 2801, which includes the two previously recorded cultural layers, a ko‘a, and two human burials.
Yent and Ota 1982	Mālaekahana State Recreation Area	Subsurface Testing	Further documented the Site 2801 cultural layer.
Barrera 1984	Upland Mālaekahana	Reconnaissance	Noted an agricultural complex outside of the project area.
Griffin and Yent 1986	Mālaekahana State Recreation Area	Subsurface Testing	None.
Jensen 1989	Upland Mālaekahana and Punamanō	Reconnaissance	Identified six sites in Mālaekahana: 4088–4093, consisting of habitation, agricultural, and a possible burial site.
Kennedy 1989	Upland Mālaekahana	Inventory Survey	Recorded 19 sites including traditional habitation and agricultural sites, and a historic gun emplacement and railroad bed.
Kennedy 1990b	Upland Mālaekahana	Survey	Reevaluated the sites recorded by Jensen (1989).
Smith 1990	Mālaekahana State Recreation Area	Subsurface Testing	None.
Dagher 1993	Makahoa Point	Report of Human Remains	Documented Site 4665, a human burial.
Jourdane 1994	Makahoa Point	Report of Human Remains	Recorded Site 4821, a human burial.
Hammatt 1996	Upland Mālaekahana	Reconnaissance	None.
Monahan 2005	Mauka of Kamehameha Hwy.	Inventory Survey	Documented 44 sites in Mālaekahana, the majority of which are historic sites relating to the sugarcane industry.
McElroy 2016	Coastal Mālaekahana	Inventory Survey	None.

sugarcane field during McAllister's survey. The pool is a noted location in the mo'olelo of Lā'ieikawai, where Waka hid Lā'ieikawai until she was grown. Local residents informed McAllister (1933:157) that there was once an underwater entrance in the pool that led to a hidden chamber, but the pool had been silted in during the 25 or so years prior to McAllister's visit.

Between 1977 and 1990, archaeological work was conducted at Mālaekahana State Recreation Area in a sand dune system. In 1977, a short report was generated for the soils analysis in which the stratigraphy of two cultural layers was delineated (Hammatt 1977). A later report provided more details on the work, and human burials and a ko'a were documented at Kalanai Point (Yent and Estioko-Griffin 1980). The cultural layers and ko'a were designated as Site 2801. This site number covers the entire area between Kamehameha Highway, the ocean, and Kahawainui Stream. The site was thought to have been occupied during three distinct periods that occurred between AD 1600 and 1780 (Yent and Estioko-Griffin 1980:xxii). Material remains include postholes, firepits, midden, animal bone, as well as fishing gear and other subsistence-related artifacts. The human remains were a child and an infant that were associated with the ko'a. Further work was conducted at the cultural layer with auger coring (Yent and Ota 1982). This layer was found mostly near the mouth of Mālaekahana Stream. Several years later, two more rounds of auger coring were conducted at the State Recreation Area (Griffin and Yent 1986; Smith 1990). There were no findings. As part of the investigations at Mālaekahana State Recreation Area, volcanic glass was collected from a subsurface cultural deposit, SIHP 50-80-02-2801, then analyzed and dated (Olson 1979). Fifteen of the 63 fragments were examined, three of which were determined to be flakes, and the other twelve were determined to be percussion produced. Initial dating of the site suggested mid-1600s, but those results were later determined to be unreliable and potentially invalid.

A reconnaissance survey was completed in 1984 for a well site in upland Mālaekahana (Barrera 1984). While no archaeological resources were found within the well site project area, a traditional agricultural complex was noted on the opposite side of Mālaekahana Stream.

A reconnaissance of upland Mālaekahana identified six sites, while another 20 sites were recorded in Punamanō (Jensen 1989). The Mālaekahana sites were assigned numbers 4088–4093. Three of these are overhang habitations, two are cave habitations, one is an agricultural ditch and tunnel, and one is a platform that may be a human burial. The sites were later reevaluated by Kennedy (1990b), although there were no significant new findings in Mālaekahana.

Another upland survey of Mālaekahana recorded an additional 19 sites (Kennedy 1989). The sites consisted of traditional habitation and agricultural areas, as well as a historic gun emplacement and railroad bed. SIHP numbers were not assigned at that time.

A human burial was found in 1993 at Makahoa Point (Dagher 1993). The burial was designated as Site 4665. It was exposed during high surf and was in poor condition. One historic artifact was possibly associated with the remains.

Another human burial was encountered at Makahoa Point the following year (Jourdan 1994). The remains were partially exposed in the sand and were thought to represent a single individual.

A reconnaissance survey was conducted for a proposed well site in upland Mālaekahana (Hammatt 1996). There were no archaeological findings, as the area showed evidence of disturbance by bulldozing.

An archaeological inventory in 2005 recorded 43 sites in Mālaekahana (Monahan 2005). The sites are located mauka of Kamehameha Highway and mostly consist of historic-era remains of the sugarcane industry. Traditional sites include rockshelters, habitation or agricultural sites, a cultural

layer, and Wai‘āpuka Pool. Two human burials were also recorded. Radiocarbon dates ranged from the 14th century AD to the 17th century (Monahan 2005:ii).

A recent survey of a coastal parcel in Mālaekahana reported no findings (McElroy 2016). Nevertheless, archaeological monitoring was recommended.

Previous Archaeology in Lā‘iewai

Several archaeological projects have been conducted in Lāiewai. The following discussion provides information on archaeological investigations that have been carried out in the vicinity of the project area, based on reports found in the SHPD library in Kapolei, Hawai‘i (see Figure 8 and Table 2). State Inventory of Historic Places (SIHP) site numbers are prefixed by 50-80-02 (see Figure 9).

In the 1930s J.G. McAllister conducted his famous island-wide survey of archaeological sites around O‘ahu. McAllister documented several sites of significance in the Lā‘ie area: the ko‘a at Kalanai; the natural crevice of Waikuukuu; the fishpond called Paeo; the natural tunnel of Manonihokahi; the temples of Moohekili and Nioi; the taro lands of Kanaana; and the sacred area of Hanapepe which once held the akua stone of Kamehaikana.

In 1981, an archaeological reconnaissance survey was conducted along the Kahawainui Stream for a flood control project (Ahlo and Hommon 1981). Although some archaeological sites were noted in the area, it was stated that nothing was significant. It was also noted that extensive ground disturbance had occurred previously due to agricultural activities.

In 1984, the Hawai‘i State Historic Preservation Division formally disputed the report by Ahlo and Hommon in 1981 (Neller 1984a). This follow-up report suggested that many sites in the area were incorrectly dismissed as insignificant such as a habitation site, a cultural deposit, a graveyard, and a Shinto shrine. In addition, the graves and the Paeo Fishpond were suggested to be eligible for the National Register of Historic Places. A second report was submitted by SHPD which recorded the reconnaissance survey conducted along the Lā‘iewai Stream and also further discussed the previous work done along the Kahawai Stream (Neller 1984b).

In 1985, archaeological testing and mapping was conducted as a follow up to the work previously started at Kahawainui Stream (Bath 1985). The findings revealed evidence from both the pre-Contact, post-Contact eras, and modern eras, including a historic graveyard and another more recent graveyard. A subsurface pre-Contact site dated to a time period between AD 1415 and 1645. SIHP numbers were not assigned for the site.

Also in 1992, an archaeological inventory survey was conducted in Lā‘iewai and Mālaekahana for the Lā‘ie Master Plan project (Dunn and Rosendahl 1992). A total of 121 features from 23 sites were identified, although none are in the immediate vicinity of the current project corridor. The site types varied from agricultural to habitation to burials to boundary markers. Some of the sites that were assigned SIHP numbers are: 4093, an irrigation ditch and tunnel; 4465, a historic house and a cemetery; 4468, a cemetery; 4469, an upright stone marker; 4471, an agricultural complex; 4472, a burial; 4473, an agricultural complex; and 4475, a retaining wall. In a follow-up to this report, additional work was conducted focusing on SIHP 4458 and 4460 (Halpern and Rosendahl 1995), both of which were thought to be the Nioi Heiau Complex first described by McAllister (1933). It was noted that pre-Contact burials are probably still present in the complex.

Table 2. Previous Archaeology in Lā‘iewai

Author	Location	Work Completed	Findings
McAllister 1933	Lā‘ie	Survey	Recorded seven sites: a ko‘a, two heiau, a fishpond, taro lands, a natural crevice, a natural tunnel, and a sacred area that once held an akua stone.
Ahlo and Hommon 1981	Along Kahawainui Stream	Reconnaissance Survey	Archaeological sites noted, but none deemed significant.
Neller 1984a	Along Kahawainui Stream	Follow-Up Report	Disputed the findings of the Ahlo and Hommon (1981) report; suggested that the Pao Fishpond and a graveyard in the area were both eligible for the NRHP.
Neller 1984b	Along Kahawainui Stream	Reconnaissance Survey	Nothing significant recorded.
Bath 1985	Along Kahawainui Stream	Archaeological Testing and Mapping	Previously recorded sites along the stream were dated to the post-Contact era and the pre-Contact era (1415–1645 AD).
Dunn and Rosendahl 1992	Areas in Lā‘iewai and Mālaekahana within the Laie Master Plan Project	Inventory Survey	Recorded 121 features from 23 agricultural, habitation, burial sites, and boundary markers (including Sites 4093, irrigation ditch and tunnel; 4465, historic house and cemetery, 4468, cemetery; 4469, upright stone marker; 4471, agricultural complex; 4472, burial; 4473, agricultural complex; 4475, retaining wall).
Halpern and Rosendahl 1995	Areas in Lā‘iewai and Mālaekahana within the Laie Master Plan Project	Inventory Survey and Addendum Report	Focused on documenting Sites 4458 and 4460, the Nioi Heiau Complex.

Previous Archaeology in Keana and Kahuku

Some of the previous archaeological work in the adjacent ahupua‘a of Keana and Kahuku come near to the boundaries of our current project area (Table 3; see Figure 8). The reports for those studies are summarized here.

A subsurface testing project was completed for a Kahuku sand mining endeavor (Kennedy 1990a). A 20th century dump was identified that contained cultural material related to historic habitation of the area.

In 1981, an archaeological reconnaissance survey was conducted for the proposed Kahuku Agricultural Park (Barrera 1981). A coral fragment, two marine shells, and some possible flaked basalt fragments were identified, as well as a concentration of historic bottle and ceramic fragments. Further survey work was recommended.

In 1992, an archaeological reconnaissance survey was conducted for the proposed expansion of the Kahuku Agricultural Park (Hammatt and Pfeffer 1992). No new archaeological features were identified, but an archaeological inventory survey was recommended.

Table 3. Previous Archaeology in Keana and Kahuku

Author	Location	Work Completed	Findings
Barrera 1981	Kahuku Agricultural Park	Reconnaissance Survey	Nothing significant recorded.
Kennedy 1990a	Between Kahuku Golf Course and Kamehameha Hwy.	Subsurface Testing	Recorded a 20 th C. dump.
Hammatt & Pfeffer 1992	Kahuku Agricultural Park	Reconnaissance Survey	Nothing significant recorded.
Komori 1992	Kahuku Golf Course	Burial Report	Recorded human remains of at least two individuals, designated at SIHP 04531.
Collins 1999	Kahuku Golf Course	Burial Report	Recorded one set of human remains, SIHP 5773.
Dagher & Spear 2013	Kahuku Plantation Village	Archaeological Inventory Survey	Documented SIHP 7508: one late pre- Contact to early Contact feature and nine plantation era features.
Dagher et al. 2013	Kahuku Plantation Village	Preservation Plan, Burial Component of Data Recovery Plan	Developed recommendations for SIHP 7508.
Dagher & Spear 2014	Kahuku Plantation Village	Archaeological Monitoring	Recorded six sites: 7508 (the Kahuku Village); 7511 (an inadvertent burial discovery); 7398 (three cesspools); 7399 (another inadvertent burial discovery); 7400 (a piggery); and 7401 (a railroad segment).
Lyman & Spear 2014	Kahuku Village	Inventory Survey	Identified plantation houses, SIHP 7508.
Yucha et al. 2016	Near Makahoa Point to Kahuku	Inventory Survey	No findings in Mālaekahana.

Also in 1992, human remains were identified at the Kahuku Golf Course (Komori 1992). Designated as SIHP 04531, the remains represented at least two individuals. Human remains were again recorded at the Kahuku Golf Course several years later (Collins 1999). This set of remains was from a sub-adult female, likely of Native Hawaiian ancestry. They were designated at SIHP 5773.

In 2013, an archaeological inventory survey was conducted for the Kahuku Plantation Village Subdivision project (Dagher and Spear 2013). One late pre-Contact to early Contact feature and nine plantation era features were identified and collectively designated as Site 7508. Also in 2013, a preservation plan for Site 7511 along with a burial component report for the data recovery of Site 7399 was completed (Dagher et al. 2013).

A 2014 archaeological inventory survey at the Kahuku Plantation Village identified one site (Lyman and Spear 2014). This consisted of SIHP 7508, historic structures of the Kahuku Plantation Village. Later archaeological monitoring for construction activity produced additional information on the history of the area (Dagher and Spear 2014). This included further documentation of Site 7508 (the Kahuku Village); as well as identification of Site 7511 (an inadvertent burial discovery), Site 7398 (three cesspools), Site 7399 (another inadvertent burial discovery), Site 7400 (a piggery), and Site 7401 (a railroad segment).

A report (Yucha et al. 2016) was completed for an archaeological inventory survey conducted in 2008 for the Kahuku Village Subdivision Project and its associated field inspection which was completed in 2015. Among the sites recorded or re-recorded were: 7508, Kahuku Plantation Village; 7789, historic structural remnants; 7792, remnants of a road; 7794 & 7795, two plantation cemeteries; and 7816, a gun emplacement. An attempt to no avail was made to relocate two previously recorded sites of human remains, 4531 & 5773. Subsurface testing revealed a historic trash layer below the surface (Site 7790), and also a buried cultural layer from the late pre-Contact to early post-Contact layer (Site 7791). Further data recovery was recommended for the subsurface cultural layer (Site 7791), and also the preparation of a burial treatment plan was recommended for the previously recorded sites of human skeletal remains.

Background Summary

The lands of Mālaekahana and Lā‘ie go back in Hawaiian history to the earliest times of ancestral legendary figures, both benevolent and otherwise. As in other parts of the islands, land use in Mālaekahana and Lā‘ie consisted of sustainable agriculture through the engineering of lo‘i kalo and the cultivation of other important native plants, while the sea provided a variety of marine resources from the deep waters to the nearshore fishponds. After the arrival of westerners to Hawai‘i, this region saw its share of missionary influence as the newcomers set about to educate and convert the population. Eventually, the political and economic systems of Hawai‘i saw a drastic transformation, and Mālaekahana and Lā‘ie were not spared the changes. As land ownership became available to the commoner class and to the foreigners, the region saw large-scale operations of sugarcane production and ranching enterprises. Also, the Mormon Church entered the area and invested in a new settlement centered in Lā‘ie, and that too changed the fabric of the community. After Hawai‘i transitioned into the modern era, large scale ranching and agricultural ventures eventually faded away, but the Mormon Church endured to have an enormous footprint in the area. Today, much of Mālaekahana and Lā‘ie is considered to be country living with a large coastal area set aside as a state park favored by many. Beside the rural community, the Mormon Church continues to have a great presence on the landscape along with two other large operations that the church started: the Brigham Young University at Lā‘ie and the Polynesian Cultural Center.

METHODS

Archaeological monitoring was carried out by Jeffrey Lapinad on April 19–27, 2016 and by Trisha Drennan, MA on July 11–15, 2016, for a total of 13 work days. The archaeological monitor was on site full time for all excavation below base course between the Mālaekahana Stream Bridge and Kahawainui Stream-Lā'iewai Bridge, as prescribed by the archaeological monitoring plan (Hammatt and Shideler 2015). Windy McElroy, PhD served as Principal Investigator, overseeing all aspects of the project.

On the first day of work, the archaeological monitor spoke with the construction team to ensure that they understood the purpose of the monitoring and that the monitor has the authority to halt construction activity. A variety of heavy equipment was on site, although excavation was conducted primarily with a coldplaner (Figure 10).

Representative profiles were drawn and photographed. Profile locations were recorded with a 3 m-accurate Garmin 62st unit. Digital photos were taken of various stages of the work and also where profiles were drawn. Sediments were described using Munsell Soil Color Charts, a sediment texture flow chart (Thien 1979), and the U.S. Department of Agriculture soil manual.

The scale in all field photographs is marked in 10 cm increments. The north arrow on all maps points to magnetic north. Throughout this report rock sizes follow the conventions outlined in *Field Book for Describing and Sampling Soils*: Gravel <7 cm; Cobble 7–25 cm; Stone 25–60 cm; Boulder >60 cm (Schoeneberger et al. 2002:2-35). No material was collected and no laboratory analyses were conducted. Photographs and field notes are being archived at the Keala Pono office.



Figure 10. Excavation with coldplaner.

RESULTS

Archaeological monitoring was conducted for 13 work days between the Mālaekahana Stream Bridge and Kahawainui Stream-Lā'iewai Bridge. Excavations were very shallow, generally extending to just below the asphalt or the base course. No cultural material or deposits were encountered.

Stratigraphy

Three representative profiles are presented here; they were taken at various points along the project corridor (Figure 11). Excavations were very shallow, and most times only asphalt and base course were exposed, although the top of a Jaucas sand layer was occasionally encountered (Table 4). No cultural resources were observed throughout the project.

Profile 1 was recorded approximately 80 m south of the Mālaekahana State Recreation Area entrance (see Figure 11). The excavation was extended to only 10 cm below surface (cmbs), and only asphalt was exposed (Figure 12).

Profile 2 was drawn approximately 700 m to the northeast of Profile 1 (see Figure 11). The excavation extended to 31 cmbs. Three layers were encountered, consisting of asphalt, base course, and the top of the natural Jaucas sand layer (Figure 13).

Profile 3 was recorded 1,000 m to the northeast of Profile 2, near the Mālaekahana Stream Bridge (see Figure 11). The excavation extended to 40 cmbs. Two layers were encountered, consisting of asphalt with the natural Jaucas sand below (Figure 14).

Summary of Results

In sum, shallow excavations were monitored between the Mālaekahana Stream Bridge and Kahawainui Stream-Lā'iewai Bridge. Stratigraphy consisted of fill below the asphalt and base course. No cultural material or deposits were found.



Figure 11. The project corridor, showing the locations for Profiles 1–3.

Table 4. Sediment Descriptions

Location	Layer	Depth (cmbs)	Color	Description	Interpretation
1	I	0–10+	N/A	Asphalt; base of excavation.	Road
2	I	0–10	N/A	Asphalt; smooth, very abrupt boundary.	Road
	II	10–28	10YR 3/3	Silty clay; 80% basalt and coral cobbles and gravel; smooth, clear boundary.	Road Base
	III	28–31+	10YR 8/2	Fine marine sand, base of excavation.	Jaucas Sand, Natural
3	I	0–35	N/A	Asphalt; base of excavation.	Road
	II	35–40+	10YR 8/2	Fine marine sand, base of excavation.	Jaucas Sand, Natural

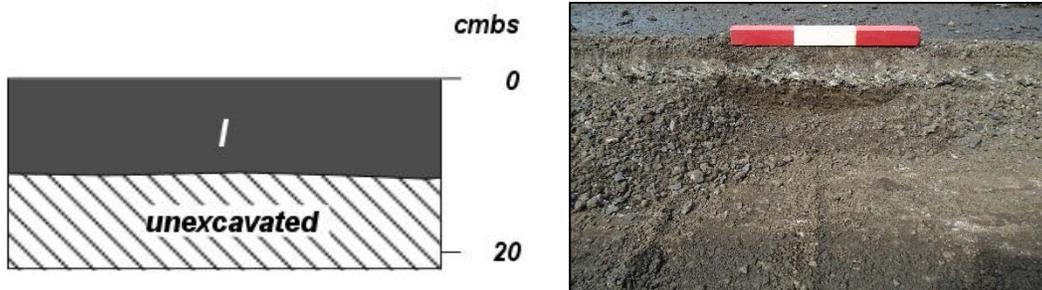


Figure 12. Profile 1, west face profile drawing and photo. Profile drawings are 50 cm wide.

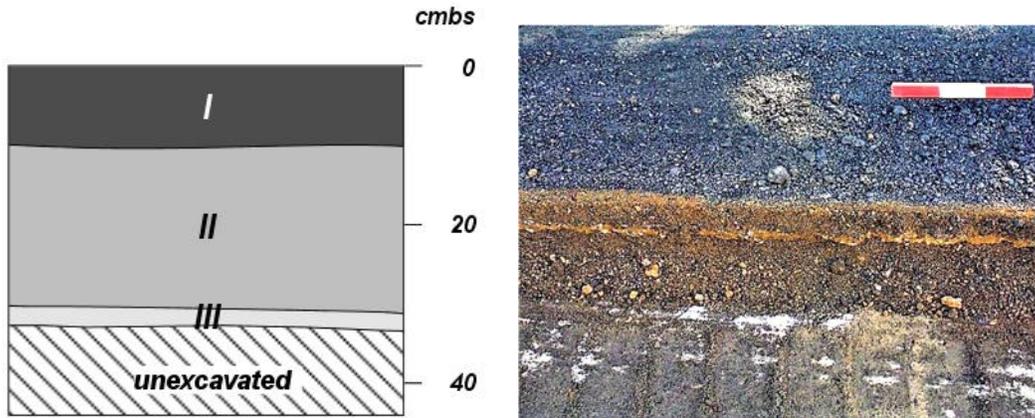


Figure 13. Profile 2, northeast face profile drawing and photo (Layer II visible in photo). Profile drawings are 50 cm wide.

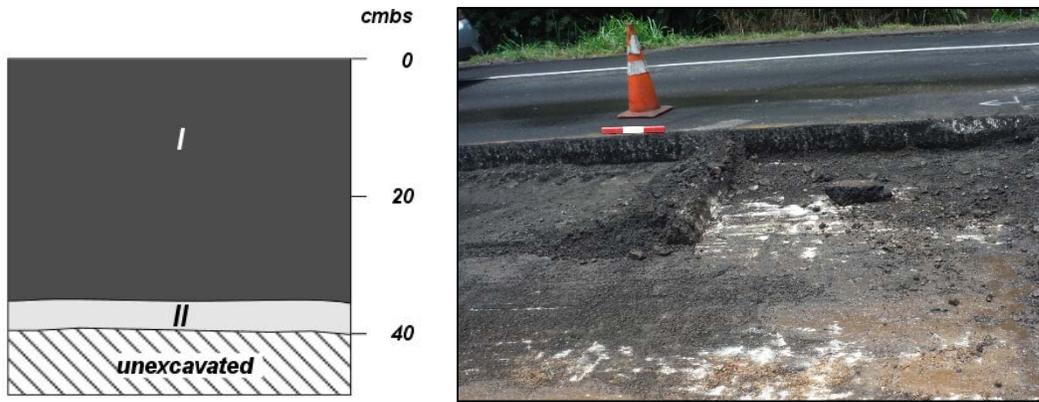


Figure 14. Profile 3, northeast face profile drawing and photo. Profile drawings are 50 cm wide.

SUMMARY AND CONCLUSION

In summary, archaeological monitoring was conducted for shallow excavations associated with the resurfacing of Kamehameha Highway from Mālaekahana Stream Bridge to Kahawainui Stream-Lā'iewai Bridge, in Mālaekahana and Lā'iewai Ahupua'a, Ko'olauloa District, on the island of O'ahu. The project route covered 1.14 mi. (1.83 km), crossing through portions of TMKs: (1) 5-5-009, 5-6-001 through 006, and 5-6-009. As prescribed by the archaeological monitoring plan (Hammatt and Shideler 2015), archaeological monitoring was conducted for all excavation below base course within this area. No cultural material or deposits were encountered during monitoring. Nevertheless, because of the potential for cultural resources to occur along the project route, it is recommended that archaeological monitoring is conducted for any future work in the vicinity.

GLOSSARY

ahupua‘a	Traditional Hawaiian land division usually extending from the uplands to the sea.
akua	God, goddess, spirit, ghost, devil, image.
ali‘i	Chief, chiefess, monarch.
‘awa	The shrub <i>Piper methysticum</i> , or kava, the root of which was used as a ceremonial drink throughout the Pacific.
boulder	Rock 60 cm and greater.
cobble	Rock fragment ranging from 7 cm to less than 25 cm.
enenuē	Var. of nenuē, the chub, rudder, or pilot fish (<i>Kyphosus bigibbus</i> , <i>K. vaigiensis</i>).
gravel	Rock fragment less than 7 cm.
heiau	Place of worship and ritual in traditional Hawai‘i.
hukilau	A net for fishing; to fish with a net.
‘ie	The aerial root of the vine ‘ie‘ie (<i>Freycinetia arborea</i>).
‘ie‘ie	The vine <i>Freycinetia arborea</i> , an endemic, woody branching climber that grows at altitudes of 300–600 m. In ancient Hawai‘i, vines were considered sacred and used in basketry and for ceremonial purposes.
kahuna	An expert in any profession, often referring to a priest, sorcerer, or magician.
kala	The surgeonfish or unicorn fish, <i>Teuthidae</i> .
kapa	Tapa cloth.
kau	Season, especially summer, period of time; to place, hang, or perch; to ride, mount, or rise up; to place in sacrifice or come to rest.
kō	The Polynesian introduced <i>Saccharum officinarum</i> , or sugarcane, a large grass traditionally used as a sweetener and for black dye.
ko‘a	Fishing shrine.
konohiki	The overseer of an ahupua‘a ranked below a chief; land or fishing rights under control of the konohiki; such rights are sometimes called konohiki rights.
kuleana	Right, title, property, portion, responsibility, jurisdiction, authority, interest, claim, ownership.
ku‘ula	A stone god used to attract fish, an altar near the sea, or a hut where fishing gear was kept with ku‘ula images to invoke their power.
limu	Refers to all sea plants, such as algae and edible seaweed.
lo‘i, lo‘i kalo	An irrigated terrace or set of terraces for the cultivation of taro.
loko i‘a kalo	Pond for both fish and taro cultivation.
Māhele	The 1848 division of land.
mai‘a	The banana, or <i>Musa sp</i> , whose fruit was eaten and leaves used traditionally as a wrapping for cooking food in earth ovens.
makai	Toward the sea.

mānienie	<i>Cynodon dactylon</i> , or Bermuda grass, often used in lawns.
mauka	Inland, upland, toward the mountain.
midden	A heap or stratum of refuse normally found on the site of an ancient settlement. In Hawai‘i, the term generally refers to food remains, whether or not they appear as a heap or stratum.
mō‘ī	King.
moi	The threadfish <i>Polydactylus sexfilis</i> , a highly prized food item.
mo‘o	Lizard, dragon, water spirit.
mo‘olelo	A story, myth, history, tradition, legend, or record.
pane	Reply, answer, response; to speak or answer.
pāpa‘i	General term for crabs.
pu‘uhonua	Place of refuge.
stone	Rock fragment ranging from 25 cm to less than 60 cm.
‘uala	The sweet potato, or <i>Ipomoea batatas</i> , a Polynesian introduction.
‘ulu	The Polynesian-introduced tree <i>Artocarpus altilis</i> , or breadfruit.
wauke	The paper mulberry, or <i>Broussonetia papyrifera</i> , which was made into tapa cloth in traditional Hawai‘i.

REFERENCES

- Ahlo, H. and R.J. Hommon
1981 *An Archaeological Reconnaissance Survey of the Flood Control Study Area, Kawainui Stream, Laie, Oahu, Hawaii*. Science Management, Inc., Honolulu.
- Alexander, W.D., C.J. Lyons, J.F. Brown, M.D. Monsarrat, and W. Webster
1881 *Oahu Hawaiian Islands*. Scale 1:60,000.
- Barrera, W.M., Jr.
1981 *Cultural Resources Reconnaissance of the Kahuku Agricultural park Project Area*. Chiniago, Inc., Kamuela.

1984b *Malaekahana, O'ahu: Archaeological Survey At Proposed Well Locations*. Chiniago Inc., Honolulu.
- Bath, J.
1985 *Archaeological Testing and Mapping at Kahawainui Stream in Lā'ie, O'ahu, Hawai'i (TMK: 1-5-5-005, 1-5-5-009)*. Department of Land and Natural Resources, Honolulu.
- Beaglehole, J.C. (Ed.)
1967 *The Journals of Captain James Cook on His Voyages of Discovery: The Voyage of the Resolution and Discovery, 1776–1780. Vol. III, Part 1*. Hakluyt Society, Cambridge.
- Beckwith, M.
1918 *The Hawaiian Romance of Laiekawai*. Introduction and translation by Martha Beckwith from account in *Ka Hiwahiwa o Paliuli* April 11, 1863, by S.N. Haleole. Bureau of American Ethnology Annual Report for 1911–1912, Volume 33:285–677.
- Cachola-Abad, C.K.
1995a *An Evaluation of the Function of Sites 4460 and 4458. (Lā'ie Wastewater Reclamation Facility)*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

1995b *Hawaiian Cultural Assessment of the Impacts to Nioi Heiau Produced by Hawaii Reserve, Inc.'s Proposed Lā'ie Wastewater Reclamation Facility, (TMK 1-5-5-006)*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.
- Chamberlain, L.
1956 *Tour Around Oahu, 1828*. Hawaiian Historical Society Annual Report 56:25–41.
- Clark, J.R.K.
1977 *Beaches of O'ahu*. University of Hawaii Press, Honolulu.

2002 *Hawai'i Place Names*. University of Hawaii Press, Honolulu.
- Collins, S.
1995 *Report of Field Visit to Vicinity of Nioi Heiau, Lā'ie, Ko'olau Poko, O'ahu, (TMK 1-5-5-006:001, 1-5-5-006:005)*. Department of Land and Natural Resources, Kapolei.

1999 *Recovery of Human Remains from Kahuku Gold Course TMK: 5-6-002:010 Site 50-80-02-5773 (SHPD Memo)*. Kapolei, Hawai'i.

- Dagher, C.
1993 *Inadvertent Discovery of a Human Burial At Makahoa Point, Malaekahana, Ko'olaupua, O'ahu*. State Historic Preservation Division, Kapolei, Hawai'i.
- Dagher, C., K. Lyman, and R. Spear
2013 *Burial Site Component of the Archaeological Data Recovery for State Site 50-80-02- 7399 and Preservation Plan for State Sites 50-80-02-7511 and IF-1 Keana Ahupua'a, Ko'olaupua District, Island of O'ahu, Hawai'i [TMK (1) 5-6-002:027, 047 por., and 049 (previously 046 por.)]*. Scientific Consultant Services, Inc., Honolulu.
- Dagher, C. and R. Spear
2013 *Archaeological Inventory Survey for the Kahuku Village Subdivision Project, Keana Ahupua'a, Ko'olaupua District, Island of O'ahu, Hawai'i [TMK: (1) 5-6-002:027]*. Scientific Consultant Services, Inc., Honolulu.
- 2014 *Draft: An Archaeological Monitoring Report for the Kahuku Village Subdivision Project, Keana and Malaekahana Ahupua'a, Ko'olaupua District, Island of O'ahu, Hawai'i [TMK (1) 5-6-002:013, 014]*. Scientific Consultant Services, Inc., Honolulu.
- Dunn, A.E. and P.H. Rosendahl
1992 *Archaeological Inventory Survey, Laie Master Plan Project, Lands of Malaekahana and Laie, Koolauloa District, Island of Oahu*. Paul H. Rosendahl, Inc., Hilo, Hawai'i.
- Foote, D., E. Hill, S. Nakamura, and F. Stephens
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*. United States Department of Agriculture, Soil Conservation Service. Published in cooperation with the University of Hawaii Agricultural Experiment Station, Washington, D.C.
- Fornander, A.
1919 *Fornander Collection of Hawaiian Antiquities and Folk-Lore, Vol. V, Part II*. Bishop Museum Press, Honolulu.
- Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte
2013 Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.
- Griffin A. and M. Yent
1986 *Auger Coring at Malaekahana State Park, Phase II*. Department of Land and Natural Resources, Division of State Parks, Honolulu.
- Halpern, M. and P. Rosendahl
1995 *Addendum: Archaeological Inventory Survey, Laie Master Plan Project, Lands of Malaekahana and Laie, Koolauloa District, Island of Oahu*. Paul H. Rosendahl, Inc., Hilo, Hawai'i.
- Hammatt, H.H.
1977 *Soil Analysis for Archaeological Investigation of Malaekahana State Park*. Hallett H. Hammatt, Honolulu.

- 1996 *Archaeological Reconnaissance for Proposed Malaekahana Exploratory Wells Malaekahana, O'ahu*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.
- Hammatt, H.H. and M.T. Pfeffer
1992 *Archaeological Reconnaissance of Kahuku Agricultural Park*. Cultural Surveys Hawai'i, Inc., Kailua.
- Hammatt, H.H. and D.W. Shideler
2015 *Archaeological Monitoring Plan for the Kamehameha Highway Resurfacing Project: Malaekahana Stream Bridge to Kahawainui Stream-Laiewai Bridge, Mālaekahana and Lā'iewai Ahupua'a, Ko'olaupoko District, O'ahu, TMKs: [1] 5-5-009, 5-6-001 through 006, and 5-6-009*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.
- Handy, E.S.C.
1940 *The Hawaiian Planter, Vol. I*. Bishop Museum Bulletin 161. Bernice P. Bishop Museum, Honolulu.
- Handy, E.S.C., E.G. Handy, and M.K. Pukui
1991 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Revised Edition. Bernice P. Bishop Museum Bulletin 23, Bishop Museum Press, Honolulu.
- Haun, A.E.
1996 *Archaeological Inspection-Lā'ie Water Reclamation Facility Expansion Project, (TMK 1-5-5-005, 1-5-5-006)*. Paul H. Rosendahl, Inc., Hilo, Hawai'i.
- Hawaiian Gazette*
1876 Untitled Article, 4 October (3):2.
- Ho'oulumāhiehie
2006 *The Epic Tale Of Hi'ikaikapoliopole*. Translated by P. Nogelmeier. Awaiaulu: Hawaiian Literature Project, Honolulu.
- Jackson, G.E.
1884 *Laie Bay Oahu* Hawaiian Government Survey. Register Map 1347. Scale 1:6,000.
- Jensen, P.M.
1989 *Archaeological Inventory Survey, Punamano and Malaekahana Golf Courses, Lands of Ulupehupehu, Punalau, Kahuku, Malaekahana, and Laie, Koolauloa District, Island of Oahu*. Paul H. Rosendahl, Ph.D., Inc., Hilo, Hawai'i.
- Jourdane, E.
1994 *Inadvertent Discovery and Removal of Human Burial, Makahoa Point, Laie Koolauloa, Oahu*. State Historic Preservation Division, Honolulu.
- Kennedy, J.
1989 *Archaeological Inventory Survey for the Proposed Malaekahana Golf Course, A Portion of the Country Courses at Kahuku*. Archaeological Consultants of Hawai'i, Hale'iwa, Hawai'i.
1990a *Kahuku Sand Mining Project: Archaeological Subsurface Testing Results*. Archaeological Consultants of Hawai'i, Hale'iwa, Hawai'i.

- 1990b *Archaeological Assessment and Reevaluation Report Concerning the Recently Surveyed, Proposed Punamano Golf Course: A Portion of the Country Courses at Kahuku*. Archaeological Consultants of Hawai'i, Hale'iwa, Hawai'i.
- King, R.D.
1932 *Kahuku Forest Reserve*. Hawaii Territory Survey Plat 2068-A. Traced from Govt. Survey Reg. Map 2736 and U.S. Geological Survey Map of 1928. Scale 1 in. = 2,000 ft.
- Komori, E.
1992 *Inadvertent Discovery of Burial Kahuku, O'ahu TMK: 1-5-6-02:009* (SHPD Burial Documentation). State Historic Preservation Division, Kapolei, Hawai'i.
- Lyman, K. and R. L. Spear
2014 *Archaeological Inventory Survey for the Kahuku Village Subdivision Project, Keana Ahupua'a, Ko'olaupoko District, Island of O'ahu, Hawaii, [TMK (1) 5-6-002:047 por.]*. Scientific Consultant Services, Inc. Honolulu.
- Macdonald, G.A., A.T. Abbot, and F.L. Peterson
1983 *Volcanoes in the Sea the Geology of Hawaii*. Second Edition. University of Hawaii Press, Honolulu.
- Maly, K. and P.H. Rosendahl
1995 *Cultural Assessment Study Lā'ie Wastewater Reclamation Facility (Lwrf) Project, Cultural Significance of "Nioi Heiau" and Other Sites Within its Immediately Adjoining Lands Vol. I. Ethnographic Study for Amended Supplemental EIS (TMK 1-5-5-005, 1-5-5-006)*. Paul H. Rosendahl, Inc., Hilo, Hawai'i.
- McAllister, J.G.
1933 *Archaeology of Oahu*. Bernice P. Bishop Museum Bulletin 104. Bernice P. Bishop Museum, Honolulu.
- McElroy, W.K.
2016 *Archaeological Assessment for TMK: (1) 5-6-001:028 (por.), Mālaekahana Ahupua'a, Ko'olaupoko District, Island of O'ahu, Hawai'i*. Keala Pono Archaeological Consulting, Kāne'ohe, Hawai'i.
- Moffat, R.M, F.E. Woods, and J.N. Walker
2011 *Gathering To Lā'ie*. Jonathan Napela Center for Hawaiian and Pacific Island Studies, Lā'ie, Hawai'i.
- Monahan, C.M.
2005 *An Archaeological Inventory Survey Report On An Approximately 500-Acre Area In Mālaekahana, Mālaekahana And Lā'ie Ahupua'a, Ko'olaupoko District, O'ahu Island, Hawai'i [TMK: (1) 5-6-006: 006 And 058]*. Scientific Consultant Services, Inc., Honolulu.
- Neller, E.
1984a *Comments on the Kahawai Stream Flood Control Study from the Perspective of Historic Preservation and Cultural Resources Management*. Department of Land and Natural Resources, Honolulu.
- 1984b *Comments on the Kahawai Stream Flood Control Study's Archaeological Reconnaissance Survey, Including the Results of an Archaeological Reconnaissance Survey*

Along Laiewai Stream, Laie, Oahu (TMK: 5-5-05 and 09). Department of Land and Natural Resources, Honolulu.

O'Hare, C.R., D.F. Borthwick, and H.H. Hammatt

2010 *Archaeological Field Inspection and Literature Review for the HDOT Lā'ieloa Bridge Replacement Project, Lā'ie Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK [1] 5-5-003:201, 202, 205, 5-5-011:007, 008, 043, 065, 066, 067, 068, 070, 5-5-013:075, 076, 078, 079, 080, 092, 5-5-014:001, 5-5-015:033.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Olson, L.G.

1979 *Volcanic Glass Research Report: Malaekahana & Keawaula Dune.* UH Archaeology Laboratory, Honolulu.

Paton, H.A.

1933 *Kahuku Point to Laie N.E. Coast of Oahu Hawaiian Is.* Topographic Survey No. 4755. Scale 1:5,000.

Pukui, M.K., S.H. Elbert, and E.T. Mookini

1976 *Place Names of Hawaii.* University of Hawai'i Press, Honolulu.

Raphaelson, R.

1925 *Kings, Gods and Wars Along Oahu's Roads, Legend Lore of Kamehameha Highway.* *Honolulu Star-Bulletin*, January 17, 1925.

Rice, W.H.

1923 *Hawaiian Legends.* Bernice P. Bishop Museum Bulletin 3, Honolulu.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and W.D. Broderson (editors)

2002 *Field Book for Describing and Sampling Soils, Version 2.0.* Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Smith, M.

1990 *Subsurface Testing at Malaekahana State Recreation Area, Phase I, Sewer And Water Improvements (Job No. 85-OP-F2), Laie And Malaekahana, Koolauloa, Oahu.* Division of State Parks, Honolulu.

Sterling, E.P. and C.C. Summers

1978 *Sites of Oahu.* Bishop Museum Press, Honolulu.

Thien, S.

1979 A Flow Diagram for Teaching Texture-By-Feel Analysis. *Journal of Agronomic Education* 8:54-55.

Thrum, T.G.

1998 *Hawaiian Folk Tales: A Collection of Native Legends.* Mutual Publishing, Honolulu.

UH SOEST (University of Hawai'i School of Ocean and Earth Science Technology)

1928 Aerial photo mosaic, Laie. Online at <http://soest.hawaii.edu/coastal/webftp/Oahu/mosaics/>

Vancouver, G.

1798 *A Voyage of Discovery to the North Pacific Ocean, and Round the World Performed in the Years 1790-1795.* Vol. 3. G.G. & J. Robinson, London.

Yent, M. and A. Estioko-Griffin

1980 *Archaeological Investigations at Malaekahana (50-80-02-2801), Windward Oahu.*

Department of Land and Natural Resources, Division of State Parks, Honolulu.

Yent, M. and J. Ota

1982 *Results of Auger Coring Conducted at Malaekahana State Recreation Area, Phase II,*

Ko'olaupua, Oahu. TMK: 5-6-01:24,45-47,49,51,53,55-65. Department of Land and Natural Resources, Division of State Parks, Honolulu.

Yucha, T.M., S.A. Belluomini, and H.H. Hammatt

2016 *Archaeological Inventory Survey Report for the Kahuku Village Subdivision Project, Kahuku, Keana, and Mālaekahana Ahupua'a, Ko'olaupua District, O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.