

as the most difficult of the ghosts to overcome. He does not give the location of the signal fire used by Kaululā'au. (There is a village named Kaululā'au on the coast of Pawili Ahupua'a.) The legend ends with Kaululā'au being reunited with his father, mending his mischievous ways, and opening the island of Lāna'i for settlement.

3.1.1.3 Traditional Hawaiian Habitation and Subsistence of the Lāna'i Central Plateau

In terms of place names and people that may be related to mythological and traditional accounts for Lāna'i, Tomonari-Tuggle and others (2000:23) note that there are no known royal genealogies that are preserved and only a few of the names of Lāna'i chiefs are mentioned in the traditions that are available in translation. Literal translations of several of the place names for land areas near to the project area are listed below (see also Figure 7). Most all translations are taken from Emory (1924) and supplemented by Pukui and others (1974) where appropriate:

Hokuao	Morning star (Emory 1924:29)
Hulupu'uniu	Whirling feather hill (Emory 1924:30)
Iwiōle	<i>Lit.</i> , fang bone. Type of adze (Pukui and Elbert 1986). Emory (1924) notes the name of the upper valley of Iwiōle is called Kaiholena. Iwiōle is located just east of Lāna'i City.
Kaiholena	The <i>iholena</i> banana (Emory 1924:31)
Kamoku	<i>Lit.</i> , the district or the cut-off portion (Pukui et al. 1976:82); the piece cut off (Emory 1924:31)
Kaumaikahoku	The stars are out (Emory 1924:32)
Keaku	The standing root (Emory 1924:32)
Kihamānienie (Kihamāniania)	According to Emory (1924), the site of the protestant church, built in 1851. Emory stated that the "smooth hill covered in <i>maniania</i> grass" was the origin of the place name. According to Pukui and Elbert (1986), <i>mānienie 'ula</i> (golden beardgrass, or <i>Chrysopogon aciculatus</i>), is the upland grass found in the region of the church.
Kō'ele	<i>Lit.</i> , dark sugar cane (Pukui et al. 1976:114); Place seized by a chief (Emory 1924:33)
Makapaia	Enclosed eyes (Emory 1924:34)
Nininiwai Hill	<i>Lit.</i> , pour water (Pukui et al 1976). The region of northeastern Lāna'i City, according to Emory 1924a), and site of a reservoir.
Pu'ukoa	<i>Lit.</i> , koa tree hill (Pukui et al. 1976). Emory (1924) shows this hill in the plateau of Kamoku.
Pu'u Nana o Hawai'i	Hill to view Hawai'i (Emory 1924:36)
Pu'u Nēnē	Land section of Lāna'i. <i>Lit.</i> , goose hill (Pukui et al. 1976). Emory (1924) cites two locations, one just above Kō'ele in Kamoku Ahupua'a, and one on a promontory in Ka'ōhai Ahupua'a
Pulehuloa (Pu'ulehuloa)	Big roasting (Emory 1924:36)

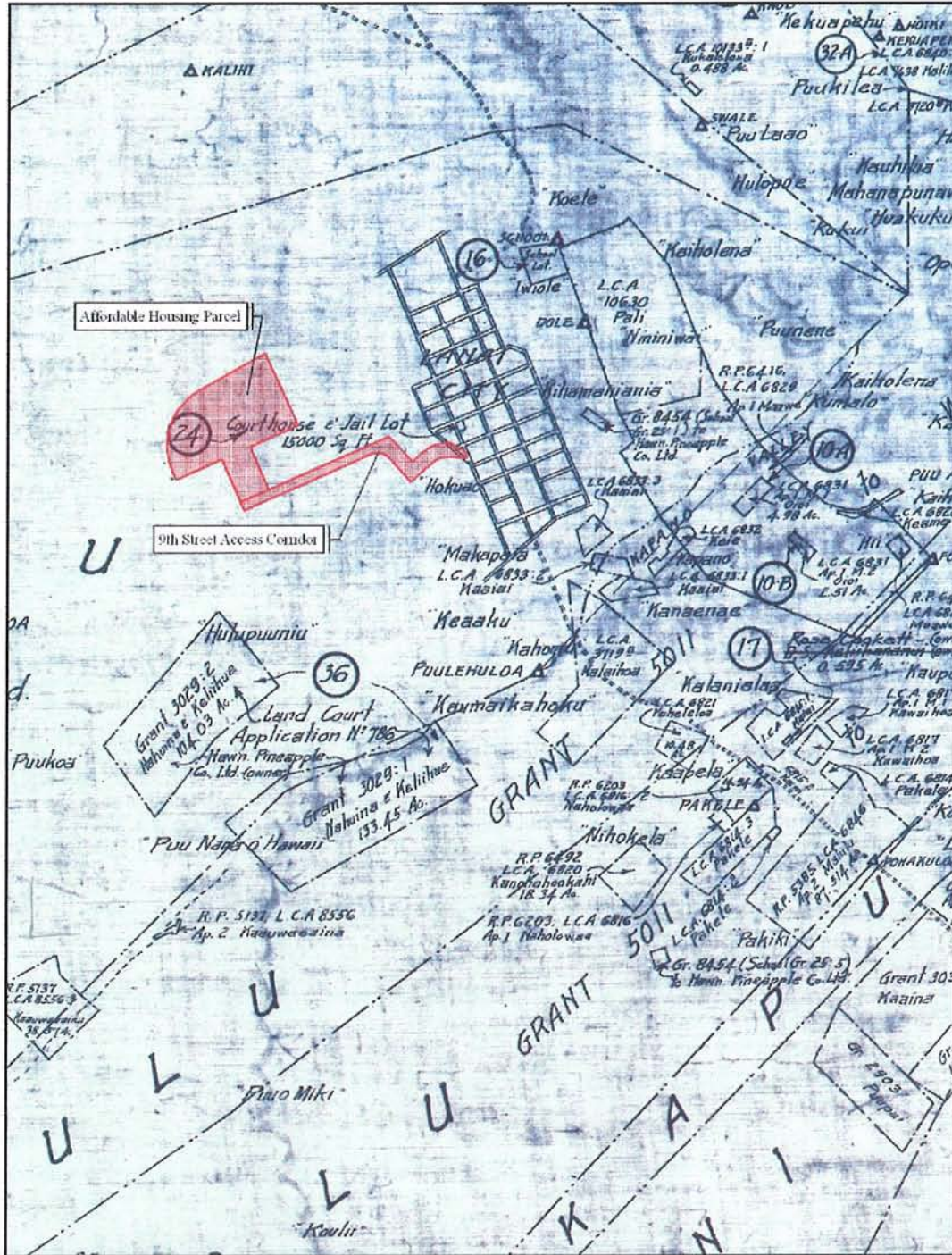


Figure 7. Hawaiian Pineapple Company, Ltd. (1929) survey map showing, place names, areas of Land Commission Awards, and development of Lāna'i City relative to the current project area.

The above place names, together with the environmental data, suggest that the lands of the central plateau basin were productive agriculturally and of great traditional significance. Prior to Polynesian settlement, the current project area was probably below the fringe of the native Hawaiian forest. Even in the early 1900s, vestiges of this forest could still be seen. "Most of the lands along the upper portion of the island were those above the 1,000 ft. elevation, as evidenced by the presence of dead tree skeletons along this elevation and above" (Gay, 1965:51). Clearing of this forest was undoubtedly initiated by traditional Polynesian agriculturists. In Emory's 1920 survey of Lāna'i, he did not observe any house sites within the project area but noted that the upper plateau lands were utilized intensively for agriculture (see also Figure 6).

In this region of Lāna'i, gulches, ridges, hilltops and other terrestrial landmarks were given descriptive names, some referring to heroic characters of Hawaiian mythology, and others suggestive of actions which could be accomplished (i.e., the sighting of the island of Hawai'i) from its' promontory. The upland plateau region was likely of great importance, both in terms of habitation and subsistence during the traditional or pre-contact time period, as well as an area somewhat sheltered from coastal raiding parties from other islands.

Emory (1924a: 122) estimated the aboriginal population of Lāna'i as about 3,150 prior to 1778. He stated that the inhabitants of Lāna'i survived by collecting dew on "oiled *tapas* or whipped from heavy shrubbery." Water that accumulated in natural depressions was husbanded carefully, and a few wells were dug along the coast and were "plastered on the seaward side with mud and straw" to stop the infiltration of sea water. Emory stated that the water derived from these wells was brackish, but usable by the Hawaiians because they had become accustomed to the salinity. He further postulated that survival along the leeward coastline also depended on Hawaiians visiting small springs in the distant hills, and carrying water in gourds back to the coast.

Early historical accounts of Lāna'i attest to the general barrenness and small population (Ellis 1963, Menzies 1920). However, in 1779 Capt. King of the Cook expedition related that Lāna'i "appeared to be well inhabited" and "that it abounds in roots such as yams, sweet potatoes and tarrow" (Emory 1924:6). Emory deduced that the differences in these early descriptions were probably due to the devastating raid on Lāna'i and Kaho'olawe by Kalani'ōpu'u. The *ahupua'a* of Kamoku figures prominently in the recollections of this raid. S.M. Kamakau writes:

During Kalani'ōpu'u's occupancy of Lāna'i, the food ran out, and the men had to eat the root of a wild plant called *kūpala*, this had a loosening effect upon the bowels when eaten in quantity. The war is therefore called "The-land-of-loose-bowels (Kamoku-Hī)" and it is a war still talked of [circa 1866] among the descendants on Lāna'i (Kamakau 1992:91).

Kamoku refers to the *ahupua'a* where the *kūpala* grew thick, and *Hī* refers to a form of dysentery/diarrhea that could result from eating too much *kūpala*. "*Kūpala*" may refer to a variety of famine foods such as an endemic cucurbit (*Sicyos pachycarpus*), and a wild sweet potato or morning glory (Pukui and Elbert 1984:170).

Another explanation of the name of the district "Kamoku - the piece cut off" suggested to Emory that the etymology and history of a similarly named *ahupua'a* in the Hamakua district of the Big Island. In Hamakua C.J. Lyons (Emory 1969:31) recorded an *ahupua'a* named Kamoku

that was once cut off from a number of *ahupua'a* for the use of the whole district, hence its name.

3.1.2 Early Historic Period

Specific events for this time period within the project vicinity are difficult to pinpoint but several significant events for the island as a whole are noteworthy. Lāna'i was first seen by Captain James Cook during his voyage to the Sandwich Islands in January and February of 1779. The expedition had returned to the Hawaiian Islands in order to resupply following many months of mapping the west coast of America (Ellis 1963). William Ellis, Assistant Surgeon to the expedition, noted the first time that the ships *HMS Resolution* and *Discovery* sighted "*Aranni*" [Lāna'i], as the ships made their way past "Kaaowr'vee [Kaho'olawe] nearly adjoining to Mow'wheel" in 1779. It was during this voyage that Ellis went on to describe Lāna'i as an island under the dominion of the king of Maui (Ellis 1969: Vol. 2, 187). Kamehameha conquered O'ahu and Maui in 1795 and soon unified all of the Hawaiian Islands. In 1798, he returned to Lāna'i to make a summer residence at Kaunolū. The sandalwood trade began in 1810 and by the early to mid 1800s there was an increased reliance on western technology, supplies, and commerce which had a dramatic economic impact across the islands. With the death of Kamehameha in 1819 and the arrival of western missionaries in 1820, Hawai'i experienced dramatic changes. Western influence brought increased ship traffic to Lāna'i and in 1826, the American ship "London" was wrecked on Lāna'i but was rescued by an American military schooner (Ashford 1974:18). Between 1830 and 1842 there was a women's penal colony established on Lāna'i at Kaena and a male penal colony was established on Kaho'olawe.

Table 1 provides census data adapted from Emory (1924) and Schmitt (1973) for different time periods. While, population stability is suggested during 1832 and 1836, the trend shows a steady population decline for Lāna'i that follows similar trends on the other Hawaiian Islands.

Table 1. Population Estimates for Lāna'i from Various Time Periods

Emory estimate (pre-1778)	Missionary estimate (1823)	Missionary census (1832)	Missionary census (1836)	Official census (1850)
3,000	2500	1600	1200	604

It is perhaps noteworthy that during the early Historic Period, there appear to be some discrepancies in historical accounts of the physical descriptions of Lāna'i. Captain King's description previously presented indicates that the island had every appearance of being agriculturally productive and well populated. However, by 1792, Archibald Menzies, who was the surgeon attached to the Vancouver Expedition, described Lāna'i as follows:

...observing the state and naked appearance of the island which seemed thinly covered with shriveled grass in a scorched state. No hamlets or plantations were to be seen, no trees or bushes adorned the face of the country, which swelled out gradually to a moderate height, so that we have reason to think that the island is but very thinly inhabited (Menzies 1920).

Emory (1924) suggested that the dramatic differences portrayed in these descriptions may be attributed to the effects of Kalani'ōpu'u's raid. Fornander (1996:156) states that Kalani'ōpu'u "ravaged the island thoroughly." Kamakau's account of Kalani'ōpu'u's men having to resort to eating *kūpala* would seem to support this theory.

3.1.3 Mid- to late-1800s

In 1848, the Mahele initiated extreme social, economic, and political changes within traditional Hawaiian culture on all of the islands. The Mahele resulted in the division of lands according to a system of private ownership based on Western legal concepts. In the first phase of this process, Kamehameha III subdivided his lands among the highest *ali'i* (royalty) *konohiki* (chiefs), and some favored *haole* (foreigners). This process of redistribution severed the political and social relationships of the traditional system of land use (Moffatt and Fitzpatrick 1995:11). Following this change, *maka'āinana* (commoners) were then permitted to pursue legal title to and ownership of land they had cultivated and inhabited through a Land Commission Award, in addition to the outright purchase of other government lands. At the end of the Mahele, naturalized foreign citizens were given the right to purchase land in Hawai'i. The ultimate result of this decision placed more land in the hands of non-Hawaiians than native Hawaiians between the years of 1850 and 1865 (Moffatt and Fitzpatrick 1995:51). In many cases, the purchases or leases to non-Hawaiians included entire *'ili* (a subdivision of an *ahupua'a*) or *ahupua'a* (land division usually extending from mountain to sea).

An additional aspect of the Mahele was the sale of land to naturalized foreigners. These changes in land tenure had a significant impact across the Hawaiian Islands. On Lāna'i, by the mid-1800s much of the upper plateau lands of Kamoku and adjacent *ahupua'a* had been become open *pili* grasslands. This is indicated in the native and foreign testimonies given during the mid-1800s as part of the Mahele and Kuleana Acts. The *ahupua'a* of Kamoku, in which the project area lies, was "omitted" (Interior Department Memos 1860-70s) at the time of the Mahele (1848) and was subsequently leased as government lands (ca. 1860) (Hammatt, et al. 1988:20).

Based on tax map keys, historic maps, a search of the Waihona 'Aina database (Waihona Aina 2000), and consultation with Mr. Kepa Maly of the Lāna'i Culture and Heritage Center and the Lāna'i Representative to the Maui County Cultural Resource Commission, there are few Land Commission Award records for lands within the uplands of Kamoku Ahupua'a near the current project area (Table 2). This scarcity is a possible result of the omission of the *ahupua'a* during the original division of lands. Examination of the Land Court Map of Lāna'i commissioned by Hawaiian Pineapple Company (1929; see also Figure 7) shows four Land Commission Awards (LCAs) in the upland area of Kamoku Ahupua'a, some of which have boundaries that cross into the *ahupua'a* of Kalulu. One of the awards went to Noa Pali, LCA# 10630 located *mauka* and northeast of the Lāna'i City and the current project area, who was the *konohiki* (headman) and school superintendent of Kamoku. In 1856, Noa Pali corresponded with the Minister of the Interior (under Kamehameha IV) requesting that Kamoku be sold to him because he had been living there since Kamehameha III had granted him the lands in 1841. At this time, there appears to have been confusion as to who owned the *ahupua'a* of Kamoku; however, by 1858 it appeared on a list of Crown Lands and Royal Domain of the Hawaiian Kingdom (Kingdom of Hawaii Legislative Assembly 1890:158). It is apparent that at the time of

the Mahele, Pali was cultivating lands "all over" (Waihona 'Aina 2000) and was wanting to consolidate his holdings within a 112.25-acre area.

Table 2. Summary of Land Commission Awards (LCAs) identified within the upland areas of Kamoku Ahupua'a (Maly 2009).

LCA #	Claimant	Ahupua'a	Land Use
1063	Pali	Kamoku	Houselot=1; Sweet Potatoes=1; Bitter Melon/Gourd=1; Various Other Plants
03719B	Kalaihoa	Kamoku and Kalulu	Apana=1 (no description of land use provided)
6833:1-3	Kaaia	Kamoku and Kalulu	Parcel 1 and 2 = Pili grass areas; Parcel 3=Houselot
85563:3	Kaauwaeaina	Kamoku and Kalulu, <i>ili</i> of Pueo	Planting section (<i>pauku</i> land)=1

In the 1860s Ahsee, a Chinese immigrant, procured a lease for lands within Kamoku to raise goats. Concurrently, Walter Murray Gibson arrived at the Pālāwai Basin Mormon Commune and ultimately gained control, through government leases, over most of Lāna'i, becoming Hawai'i's "Premier of Everything". During the 1880s, Gibson's Lanai Ranch eventually had up to 18,000 goats and 12,000 sheep that were permitted to forage freely, virtually denuding the island of vegetation and causing severe erosion problems.

In 1888, Gibson left the islands for California after a series of troubles as Prime Minister of Hawai'i. His interests in Lāna'i were left to his daughter Talula and her husband, Fredrick Hayselden, and from 1888 to 1902, the Hayseldens were essentially in charge of Lāna'i. At this time, Kō'ele was the sheep ranch center for the island. Tabrah (1976:79) noted that in 1898 there were 174 people on the island and approximately 50,000 sheep. In an effort to control erosion, eucalyptus, and Norfolk pine were planted at Kō'ele and thousands of acres across the island were planted in Bermuda grass (also see Maui County Council 1998).

Charles Gay bought up the Gibson holdings in 1902. The Gay family eventually bought virtually the entire island in fee simple. The ranch center was still at Kō'ele, the location where Gibson's headquarters had been moved in the 1870s. The Gays also successfully cultivated pineapples on Lāna'i, both at Keōmuku and Lālākoa. The Gay family went into considerable debt to get the island converted to fee simple ownership, and was unable to retain the vast holdings. The family was forced to liquidate all holdings, except some 600 acres.

3.1.4 1900s to Modern Era

The period from 1910 to 1922 represents a shift from primarily sheep to cattle ranching. From 1910 to 1917, the Lanai Company Ltd. downsized its sheep operations and eventually sold all of their holdings to Harry and Frank Baldwin. At this point in time, they successfully converted the island into a cattle ranching operation. At the height of this operation, the ranching center at Kō'ele had approximately thirty buildings that included: the ranch manager house, an office, a store, a bachelor's quarters, a blacksmith shop, additional residences, and stables (Maui County Council 1998).

Botanist J. M. Lydgate, visiting Lāna'i with an expedition to obtain rare specimens of trees and flowering plants, reported that 40 continuous years of livestock grazing had, "pretty well

denuded [Lāna'i] of its forest cover; only on the summit of the island ridge was there a somewhat moth-eaten mantle of it left, and only on the slopes of the higher ravines and the steep hillsides was that mantle really intact and undisturbed" (Lydgate 1920). Lydgate also reported the extinction of plant species observed on Lāna'i only four years prior: plants that had been documented by fellow botanist Horace Mann of Harvard University. Lydgate (1920) commented that, "the ravages of cattle, sheep and goats, as well as forest diseases, hastened the decadence of the indigenous forest [of Lāna'i]."

In 1922, the Baldwins sold their holdings on Lāna'i Island to the Hawaiian Pineapple Company (Figure 8) in order to finance a real estate transaction on the island of Maui (Maui County Council, Lāna'i Community Plan 1998:28). The construction of office buildings, warehouses, shops and dwellings for 250 workers and their families began immediately (Figure 9). By 1927, three thousand acres of the Pālāwai Basin had been planted in pineapple, the first construction phase to establish Lāna'i City had been finished, and a roadway linking the new piers at Kaumālapa'u with Lāna'i City had been paved (Freeman 1927). A 1929 aerial photograph (Figure 10) shows the project area, with the exception of the upper portion of the Ninth Street access corridor, and surrounding lands heavily cultivated in commercial pineapple agriculture. The cultivation of pineapple on Lāna'i had become integral in Hawai'i supplying more than 90 percent of the world output of canned pineapple.



Figure 8. The plateau region of Lāna'i is visible in this early photo of pineapple cultivation on the island (*Paradise of the Pacific*, December 1936, Vol. 48, No. 12).

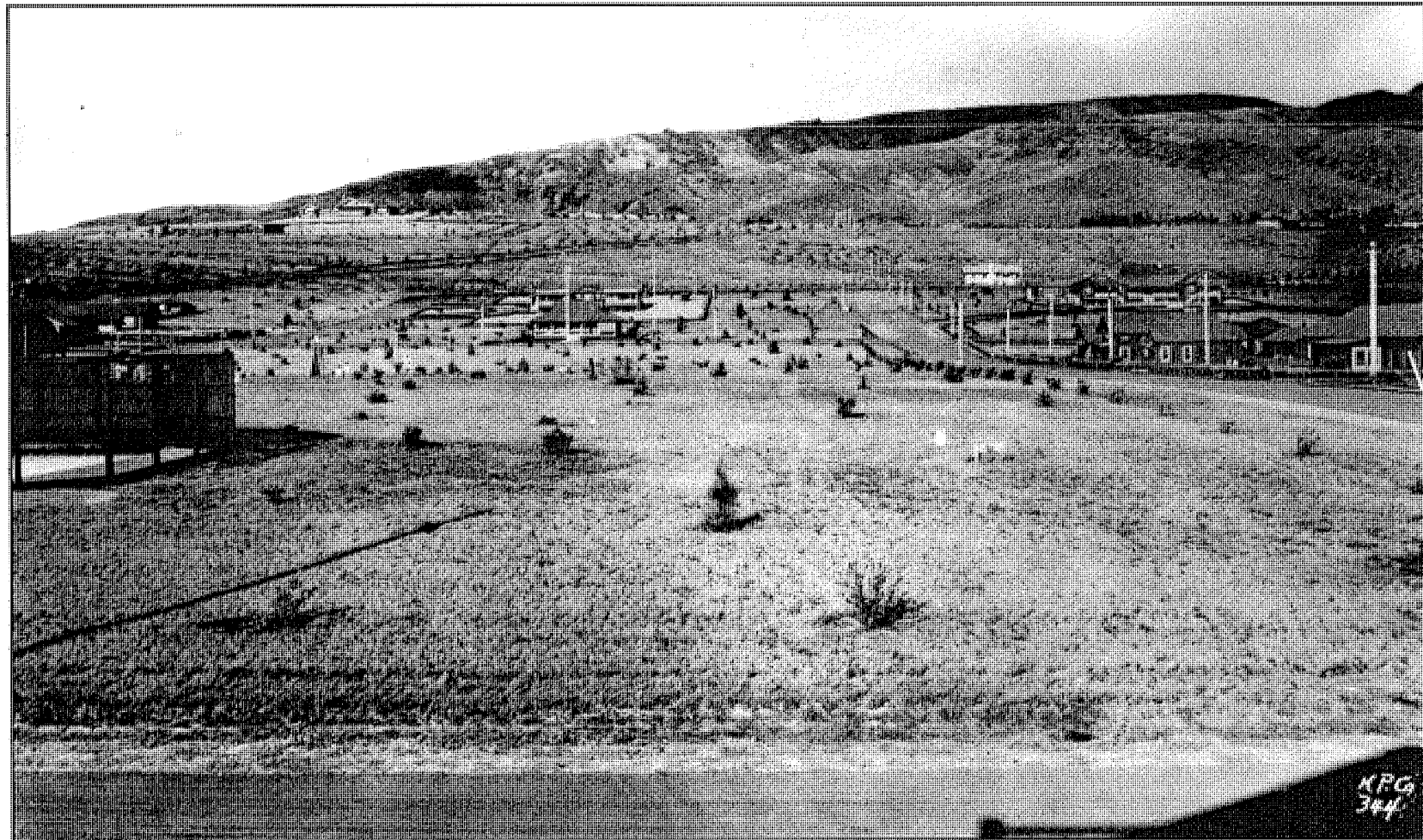


Figure 9. Dole Park circa 1923, following the acquisition of Lāna'i by the Hawaiian Pineapple Company, and the subsequent construction of laborer and management housing. (Hawaiian Pineapple Company photo courtesy of Castle & Cooke Resorts LLC)

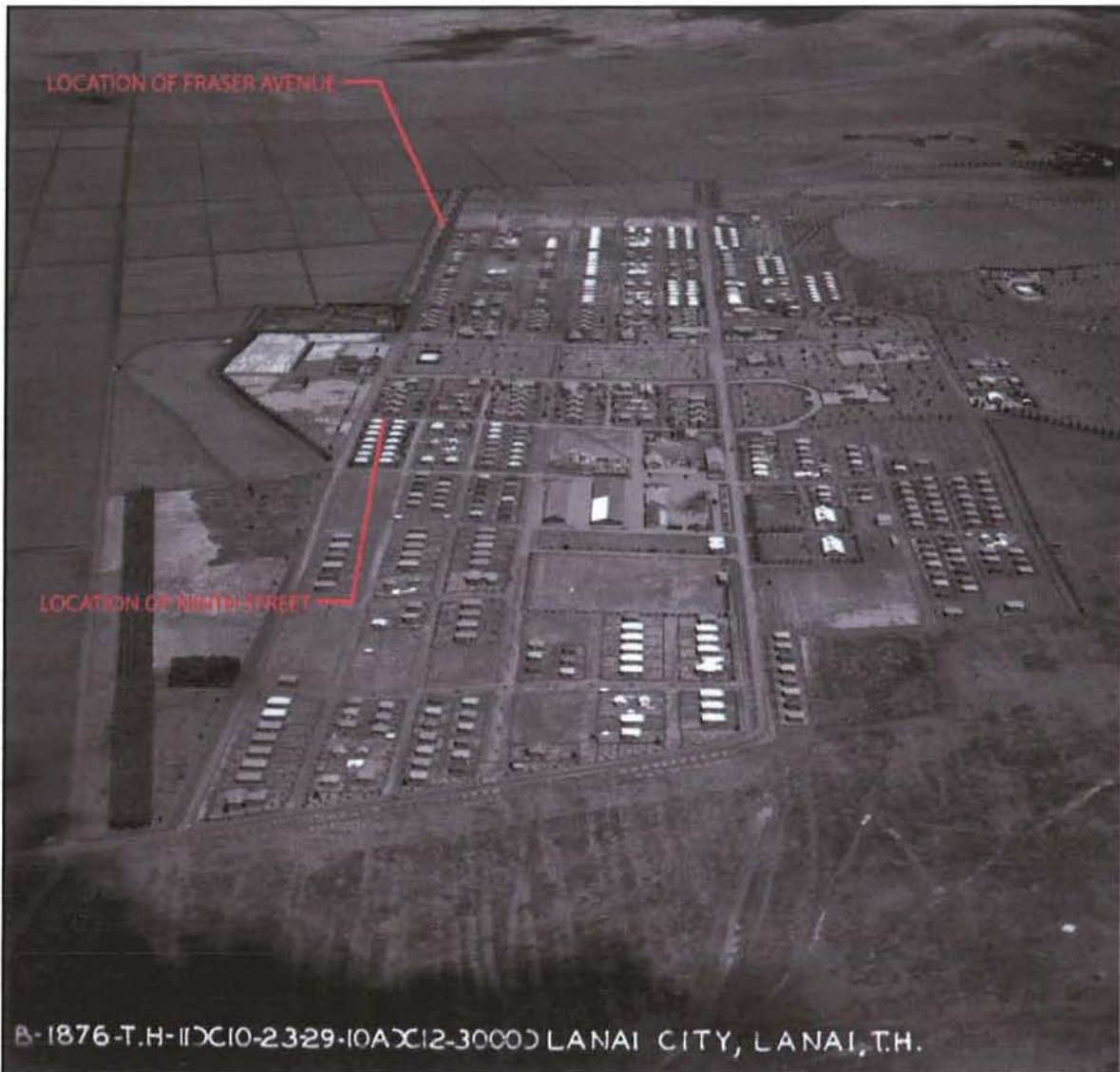


Figure 10. An aerial photograph of Lāna'i City dated 1929 the locations of Ninth Street and Fraser Avenue for reference, project area approximately located to the upper left of frame (aerial courtesy of Castle and Cooke Resorts, LLC.).

Harold T. Stearns traversed the island of Lāna'i between June and August of 1936, conducting studies of the geology and ground-water resources. He was assisted by personnel from the U.S. Geological Survey, completing hydrographic maps for the study. His work highlighted the explorations for ground water in Maunalei and at Kō'ele, to improve sources of drinking water, and for irrigation of the expanding fields of pineapple cultivated on the island (Stearns 1940). He reported that the westernmost slopes of the Pālāwai Basin of Lāna'i "[are] not sheltered by other islands on the southerly side, [and] *kona* storms are unobstructed. Heavy downpours during a single *kona* [southern exposure] storm commonly account for a considerable

part of the annual rainfall, and in some of the arid sections a single rain storm a single rain may contribute as much as 80 percent of the annual total” (Stearns 1940:65).

By 1939, the population of Lāna‘i was reported at four thousand, with virtually all of the residents working to maintain the fifteen thousand acres of pineapple fields. The expansion of the market to accommodate Hawaiian pineapples occurred so rapidly, with so much success, that new machinery was quickly developed to take advantage of the gentle topography of Lāna‘i (Mackie 1939). The long, flat fields could accommodate mechanical harvesters, which operated by straddling rows of pineapple plants, and moving slowly behind men who broke the ripe fruit off their stalks. Once aboard the harvester, pineapples had their crowns removed, were sorted for size, and crated. Pineapples picked in the morning on Lāna‘i, about sixty miles from Honolulu, were barged to Honolulu, canned and ready for shipment by nightfall the same day (McClellan 1939).

In 1961, James D. Dole’s pineapple land on Lāna‘i was merged with the assets of Castle & Cooke, a prominent Hawai‘i-based corporation. World-wide prices for pineapple continued to drop throughout the 1970’s as competing countries supplied the market with cheaper pineapple. While pineapple cultivation continued on Lāna‘i through the 1970s it is clear that some of the fields were starting to transition into fallow agricultural lands (Figure 11) and during the 1980’s, Castle & Cooke began a long-term program to phase the island out of pineapple cultivation and expand tourism. In 1988, David Murdock, Chairman of Castle & Cooke, Inc., opened a resort hotel and companion championship golf course at Mānele Bay. A second resort hotel and golf course in the uplands of Kō‘ele was opened in 1990. The final pineapple harvest and phasing out of all pineapple operations in 1993 (Boyd 1996) marked the end of an era for Lāna‘i Island leaving much of the lands that were once in pineapple, including the current project area, open and fallow.



Figure 11. A portion of the 1979 USGS Orthophotoquad, Lanai City Quadrangle 7.5' Series showing the current project area (shaded in red) in relation to Fraser Avenue, Ninth Street, and lands being transitioned to fallow to the north and southwest.

3.2 Previous Archaeological Research

Archaeological studies that address the general history of Lānaʻi, with specific mentions of the *ahupuaʻa* of Kamoku include: Emory (1924), the statewide survey of Lānaʻi Island, Hommon (1974), Ahlo (1985), Nagata (1987), Walker and Haun (1987), Hammatt and others (1988), Hammatt and Borthwick (1988, 1989 and 1993), Hommon (1974), Borthwick and Hammatt (1989 and 1992), Borthwick and others (1990), Hammatt and others (1990), Hammatt and Chiogioji (1991), Colin and Hammatt (1996), Creed and others (2000), Raymond (2003), Hammatt and Schideler (2004), Dockall and others(2004), and Lee-Greig and Hammatt (2005).

Previous archaeological studies specific to upper plateau of Kamoku Ahupuaʻa are listed in Table 3 according to year and are depicted on Figure 12 with an expanded explanation of studies conducted in the immediate vicinity of the current project area immediately following.

Table 3. Archaeological Studies within, and adjacent to, the outer limits of Lāna'i City.

Reference	Year	Location	Description
Emory	1924a	Island-Wide	Archaeological Reconnaissance: Island-wide survey that recorded house sites to the north of Kamoku Ahupua'a.
Hommon	1974	Island-Wide	Archaeological Inventory Survey: Kō'eie nominated as a historic district and assigned SIHP number 50-40-1004 which included three houses and one church.
Hammatt and Borthwick	1988	Lālākoa III Subdivision	Archaeological Inventory Survey: A scatter of various materials was observed and documented in a fallow pineapple field; historic era artifacts were observed but not collected; coarse-grained basalt fragments collected and determined to come from recently introduced road gravel; numerous fine-grained basalt flakes and basalt artifacts (one finished adze fragment, eight adze performs, a core, and thirteen retouched flakes) collected and determined to have been imported with road gravel from the Ko'i Adze quarry.
Hammatt et al.	1988	Kō'eie	Archaeological Data Recovery: Excavation and analysis of recovered ranch era historic material from two trash pits correlated with events during ranching era.
Borthwick and Hammatt	1989	Iwi'ole Dorms	Archaeological Reconnaissance: Observed basalt and volcanic flake scatters in a disturbed context within fallow pineapple fields.
Hammatt and Borthwick	1989	1) Kō'eie Golf Course; 2) Kō'eie Single Family Housing; 3) Queens Multi-Family Housing; 4) Waialua Annex Subdivision (Olopuia Woods Subdivision)	Archaeological Reconnaissance: Reconnaissance of multiple areas: 1) Four historic ranching era features (three associated with the water system and a historic scatter from the Gay's Homestead), a volcanic glass source, and a lithic concentration were recorded. In addition, 28 lithic artifacts collected within the former pineapple fields in association with road gravel; 2) No historic properties identified; 3) A few basalt flakes encountered in a concentration of road gravel 4) A scatter of basalt flakes mixed with road gravel and modern cultural materials was observed on a fallow pineapple field dirt road and presumed to have been "mechanically transported".
Hammatt and Borthwick	1990	Kō'eie Golf Course	Archaeological Inventory Survey: Survey of 100-acres behind the Kō'eie golf course. No historic properties identified.
Borthwick and Hammatt	1992	Proposed Kō'eie Reservoir	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Chiogioji	1992	Waialua Annex Subdivision	Archaeological Investigation and Monitoring: Previously recorded scatter was not relocated during sewer line installation likely due to grubbing activities.

Reference	Year	Location	Description
Hammatt and Borthwick	1993	Sewerline from Kō'ele to Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Creed et al.	2000	DHHL Lots, Lāna'i City	Archaeological Inventory Survey: Encountered debris from firs Lāna'i Airport. No significant historic properties identified.
Raymond	2003	Lāna'ihale	Cultural Resource Investigations: Reconnaissance of the summit fence line. No historic properties identified within the project APE.
Dockall et al.	2004	Behind Kō'ele Golf Course Clubhouse	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Shideler	2004	Lower west slope of Niniwai Hill	Archaeological Inventory Survey: Documentation of Kihamanienie Church (Site 50-50-98-1946) and associated graveyard
Conley-Kapoi and Hammatt	2005	Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Lee-Greig and Hammatt	2005	Courts Affordable Multifamily Housing Development, Central Lāna'i City	Archaeological Field Inspection with Subsurface Testing: No historic properties identified.
Lee-Greig and Hammatt	2009 (in progress)	Lāna'i High and Elementary School Expansion	Archaeological Assessment: No historic properties identified.

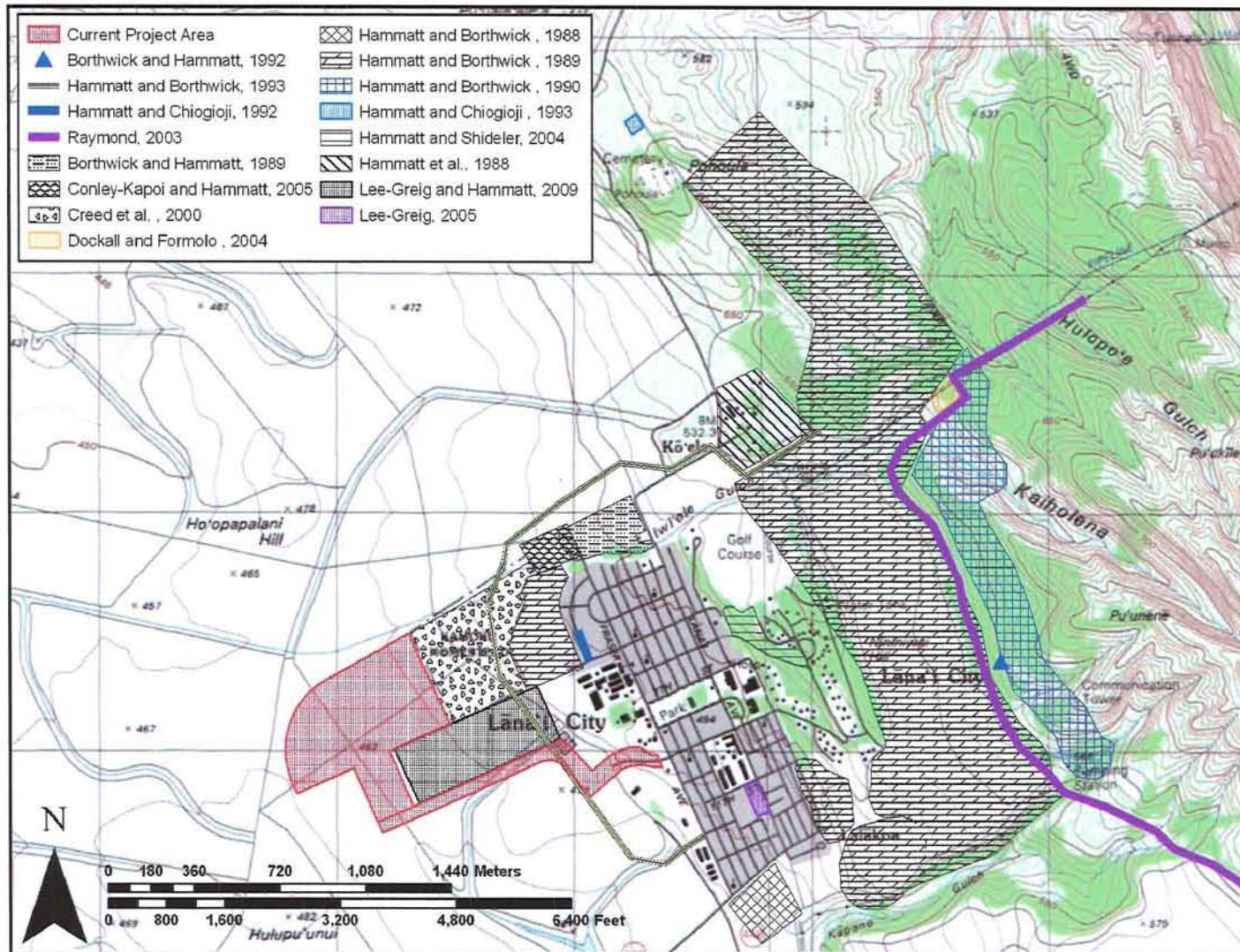


Figure 12. Portion of the South Lāna'i 7.5-minute U.S.G.S. topographic quadrangle showing the locations of previous archaeological investigations in relation to the current project area.

Of the archaeological studies summarized in Table 3 above, four studies were carried out in the vicinity of the current project area. An archaeological reconnaissance was conducted of three areas consisting of the Kō'ele Golf Course; the Kō'ele Single Family Housing; the Queens Multi-Family; and the Waialua Annex Subdivision (currently known as the Olopua Woods Subdivision) (Hammatt and Borthwick 1989). Pertinent to this study is the reconnaissance of the planned 30-acre Waialua Annex Subdivision (Hammatt and Borthwick 1989:27). The pedestrian reconnaissance identified a single concentrated surface scatter of road gravels, modern trash (bottle glass and spent gun cartridges) intermixed with basalt flakes (Hammatt and Borthwick 1989:28). The presence of the scatter on the surface and mixed nature of the materials indicated that the scatter was a secondary deposit likely transported through mechanical means with the roadbed gravels (Hammatt and Borthwick 1989:28). Observations of the nearby Iwiolo Gulch embankments clearly showed the pineapple plow zone ranging from 30-70 cm thick with black plastic fragments (Hammatt and Borthwick 1989:28). This range for the plow zone is consistent with soils documented during backhoe testing conducted for the expansion of the Kanepu'u Subdivision (Conley-Kapoi and Hammatt 2005; see also Figure 12).

In 1992, CSH conducted an investigation and archaeological monitoring of a short length of sewer line within the Waialua Annex Subdivision following the completion of the above reconnaissance (Hammatt and Chiogioji 1992). An inspection of the surface following initial grubbing resulted in no significant findings. During this project site inspection, the material scatter identified during the reconnaissance was not relocated likely due to the ongoing grubbing activities at that time (Hammatt and Chiogioji 1992). Inspection of soil stratigraphy of the sewer line trenches also confirmed the observations made during the reconnaissance survey that the upper stratum (0-75 cm) represented the highly disturbed plow zone consisting of material associated with commercial pineapple cultivation (Hammatt and Chiogioji 1992:5-8). No historically significant cultural materials were identified during the inspection of the sewer line trench sidewalls (Hammatt and Chiogioji 1992:8).

Hammatt and Borthwick (1993) conducted an archaeological inventory survey approximately 13,000 feet of sewer line west of the current survey area, for the proposed Kō'ele Waste Water Treatment Project. While special attention was given to locating flake or midden scatters in the former pineapple fields, no evidence of pre-contact activity was identified within the project corridor (Hammatt and Borthwick 1993:16).

An inventory survey of a fifty-acre Department of the Hawaiian Home Lands parcel (Creed et al. 2000) in former pineapple lands in northwest Lāna'i City was conducted by CSH. With the exception of some historic debris associated with Lāna'i's first airport and modern trash (car parts, PVC pipe fragments, and other trash) the inventory survey found nothing of significance (Creed et al. 2000:18).

Finally, CSH conducted an archaeological inventory survey of an approximate 42-acre area within former pineapple lands. With the exception of a modern era fence line, the archaeological inventory survey did not identify any significant historic properties (Lee-Greig and Hammatt 2009).

3.3 Background Summary and Predictive Model

Research into the historic record indicates that the thick soils of the plateau lands of central Lāna'i were traditionally use for dryland agriculture. This use, although fading, continued into the mid 1850s and is reflected in the *kuleana* testimony for Kamoku and the adjacent *ahupua'a* that mention cultivation of sugar cane, sweet potatoes and gourds. It is not coincidental that all of the LCAs in Kamoku, Kalulu and Kaunolū are well above 1,000 feet in elevation where rainfall was adequate to support dryland crops. Physical remnants of this settlement in along this wetter elevation was identified during Emory's island-wide survey (1924) where house sites were found *mauka* of the current project area and along the base of Lānaihale, the ridge crest of Lāna'i Island.

Before widespread pineapple cultivation, traces of the ancient upland forest were observed as late as the early 1900s (Gay 1964:51). Clearly the pre-contact agricultural pattern involved forest clearing, probably including slash-and-burn methods.

During the mid-to late-1800s the plateau was transformed to open grassland as grazing of goats and later sheep became a dominant land use. In the late 1920s, after successful experimental planting, the entire plateau area of Lāna'i was eventually plowed for large-scale commercial pineapple cultivation.

Lāna'i City was constructed in the 1920s as an entirely new residential area, specific to the Dole Pineapple Plantation. The city has been expanded upon recently in association with the changeover to tourism as the main economic force on Lāna'i City and the increasing need for housing.

Archaeological and historical data suggest that the project area and adjacent areas were suitable for both dryland agriculture and habitation. In Emory's 1920 survey of Lāna'i, house sites were documented within the Kamoku Ahupua'a less than a kilometer to the north-north/west and less and two kilometers to the south-south/east in the adjacent Kalulu Ahupua'a (see also Figure 6). These habitation sites are located in areas with similar natural environments to that of the project area. The parcel is also situated at an elevation were rainfall was documented as being adequate to support dryland crops. For these reasons, it seems possible that pre-contact habitation and/or agriculture activities could have been conducted within the boundaries of the project area.

Previous studies in and around the vicinity have documented lithic scatters and/or artifacts in a disturbed context (Borthwick and Hammatt 1989 and Hammatt and Borthwick 1988 and 1989). In addition, there has been documentation of historic ranching era materials encountered in the Kō'ele region to the northeast. With the history of pineapple cultivation for more than 70 years within the project area, the chances of encountering an intact historic property on the surface would be nominal with a slight potential for sub-surface cultural remains, . The agricultural activities would have destroyed or severely impacted all structural and/or subsurface deposits. While cultural material may be observed occasionally, their archaeological context would be anticipated to have been significantly impacted if not completely destroyed.

Section 4 Results of Fieldwork

The pedestrian survey of the 93-acres was accomplished over a period of two days, April 22nd and 23rd, 2009, while the subsurface testing of the Ninth Street Corridor was completed on May 6th, 2009. The archaeological pedestrian survey crew consisted of Hallett Hammatt, Ph.D.; Tanya Lee-Greig, M.A.; Michael Willman B.A.; and archaeological assistants Kaulana Kaho'ohalahala and Warren Osako of Lāna'i. Subsurface testing was accomplished by Hallett Hammatt, Ph.D.; Tanya Lee-Greig, M.A.; and archaeological assistants Warren Osako, Kaulana Kaho'ohalahala, and Kawena Maly of Lāna'i. A total of two and a half working days were required to complete the fieldwork for the archaeological inventory survey of this parcel.

4.1 Pedestrian Survey Findings

4.1.1 Affordable Housing Parcel

The dominant vegetation of the proposed affordable housing parcel consisted of dense, head high lantana (*Lantana camara*) (Figure 13 and Figure 14) and low-growing Christmas berry (*Schinus terebinthifolius*) groves (Figure 15). Other plants observed within the study area included *uhaloa* (*Waltheria indica*), milk thistle (*Silybum marianum*), and patches of an introduced grass species. Ground visibility within the affordable housing parcel of the project area ranged from good in areas of Christmas berry growth to poor in areas of heavy lantana growth and dense grasses. Where ground visibility was good, these areas were thoroughly inspected for indications of cultural activities represented by remnant traditional or historic era cultural materials. Over the course of the pedestrian survey, it became clear that the entire project area had been heavily modified by agriculture activities associated with commercial pineapple cultivation and recent bulldozing. While the ubiquitous remnants of black plastic associated with pineapple cultivation and some modern era trash (e.g. beer bottles, plastic bottles, and corrugated metal) was observed throughout the study area, no surface indications of significant historic properties were identified.

4.1.2 Ninth Street Access Corridor

The vegetation of the Ninth Street access corridor varies with areas of modern use: the eastern terminus of the corridor near the police station and ballpark consists of landscaped grasses and Ironwood trees; the southeast-northeast trending portion was primarily barren and serves as an abandoned vehicle and green waste dump site (Figure 16 and Figure 17); and the northeast to southwest section is comparable to the vegetation of the residential parcel (see Section 4.1.1 above). Ground visibility across the corridor under these conditions ranged from excellent to poor. During the course of the pedestrian survey, it was noted that the entire corridor had been modified by either commercial pineapple cultivation, as remnants of black plastic used in pineapple agriculture were observed throughout the project area, and/or modern era use of the area as evidenced by recent bulldozer push (see also Figure 17) and modern era infrastructure around the ballpark (Figure 18).



Figure 13. Overall project area from the southwest boundary showing dominant vegetation groups, lantana in the foreground, Christmas berry in the middle ground, Lāna'i City in the background, view to northeast.



Figure 14. Central portion of the proposed residential parcel showing vegetation density, view to southwest.



Figure 15. Southwest portion of the proposed residential parcel showing ground visibility in areas of Christmas berry growth, view to northeast.



Figure 16. Ninth Street access corridor, view to west-southwest.



Figure 17. Ninth Street access corridor and green waste dump site, view to west-southwest.



Figure 18. Modern culvert at the base of fill that comprises the ball park, view to north.

Continuous use and modern modifications to the landscape notwithstanding, three historic properties, located along the easternmost terminus of Ninth Street access corridor, were identified and documented during the course of this study (Table 4 and Figure 12). It should be noted that only State Inventory of Historic Properties (SIHP 50-40-98-6649) is located within the area of potential effect (APE) for the Ninth Street access corridor. CSH-2 and CSH-3 are located outside of the corridor APE and reported herein due to the close proximity of these properties to the current study area.

Table 4. Historic Properties Identified Within and Directly Adjacent to the Current Project Area

Temporary Field Number	SIHP (50-40-98-)	Site Type	Function	Age	Significance Criteria
CSH-1	6649	Culvert headwall	Water control	Historic	D
CSH-2	--	Wood board structure	Education	Historic	D
CSH-3	--	Wood board structure	School house; residence	Historic	D

4.1.2.1 SIHP Number 50-40-98-6649

Site Type:	Wall
Site Function:	Water Control, Culvert Headwall
Dimensions:	5.5m(18') m by 0.43m (17') m
Condition:	Good
Age	Historic/Plantation
Significance Criteria:	D

Description: SIHP 50-40-98-6649 (Figure 20 through Figure 23) is a small culvert headwall located within the upper eastern portion of the proposed Ninth Street access corridor along the northern edge of existing pavement. Vegetation surrounding this historic property consists only of maintained lawn grass.

The overall construction of SIHP -6649 consists of four courses of cut basalt blocks held together by fine sand aggregate mortar. The south facing wall appears to have been treated with a thin layer of white plaster that is currently cracking and peeling away. The north face of the culvert headwall does not appear to have undergone any surface treatment. Consistent with most wall structures built by the Lanai Company, a construction date of "1948" was inscribed on the eastern or northeastern end of the wall. Additionally, the letters "H.Shimono" or "H.Shimong" were inscribed at the approximate midpoint of this feature, possibly indicating the name of the mason who constructed this wall.

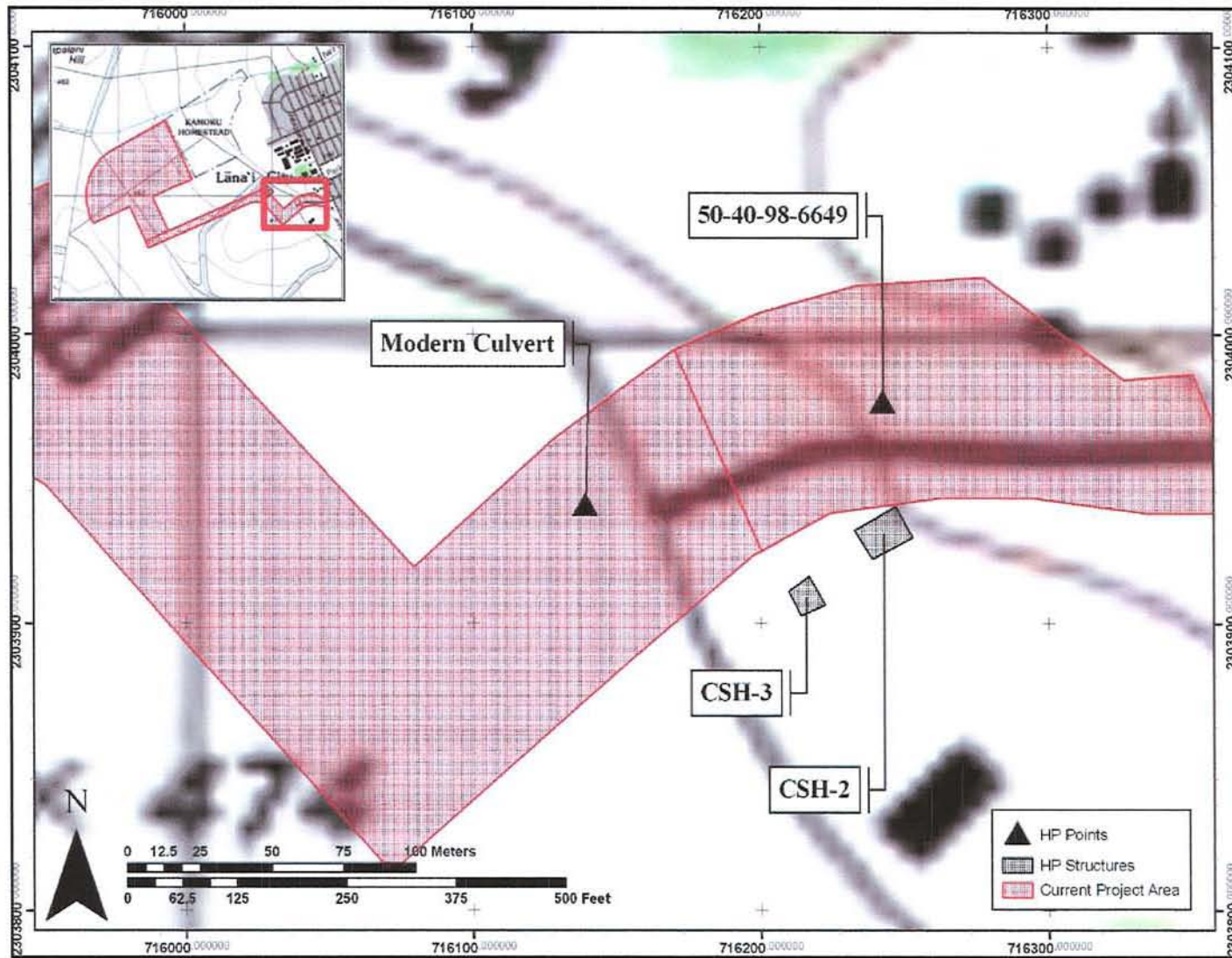


Figure 19. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle, primary frame: historic property locations, inset: entire study area.



Figure 20. SIHP 50-50-98-6649, view to north.



Figure 21. SIHP 50-40-98-6649, view to south.



Figure 22. SIHP 50-40-98-6649, construction date "1948".

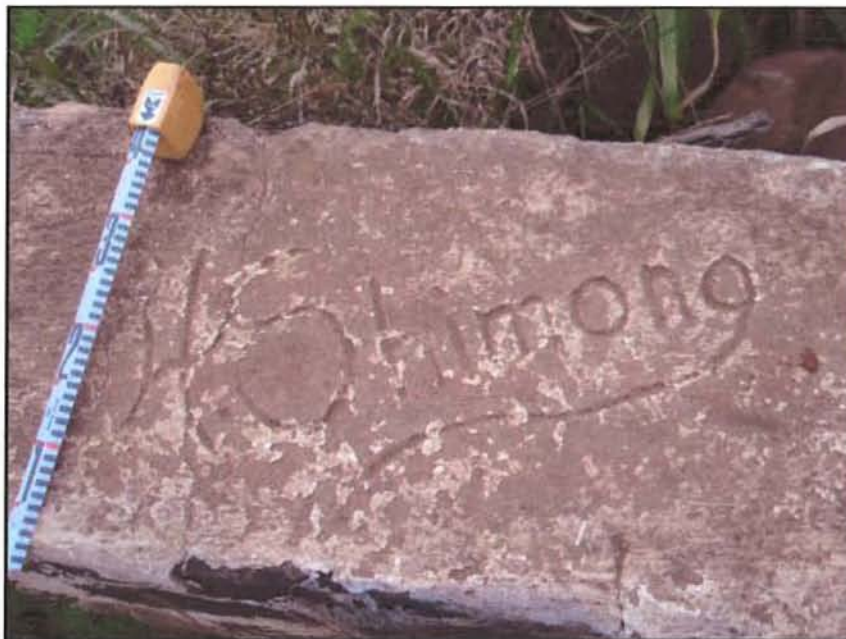


Figure 23. SIHP 50-40-98-6649, name inscription "H. Shimono".

4.1.2.2 CSH-2

Site Type:	Wood board structure
Site Function:	Education, School room
Condition:	Poor
Age	Historic

Description: Constructed around the mid-1920s, CSH-2 is one of three buildings associated with the former Kō'ele school complex (Mr. Kepa Maly – Executive Director of the Lāna'i Cultural Heritage Center, personal communication July 27, 2009) (Figure 24 and Figure 25). This structure is a double-room building with a covered deck or *lanai* fronting the entry ways and an add-on room on the west end of the building and off of the *lanai*. Overall assembly is of single wall construction consisting of timbers and wood boards with horizontal sliding windows. Roof construction is of conventional wood framing and asphalt shingles with cross ventilation facilitated by shuttered vents below the roof line (Figure 26). The interior lighting of both rooms consisted of suspended fluorescent lighting, hanging from a drop ceiling and the floors appear to be of plywood construction.

Room one is an open room with built-in cabinetry and counter space constructed from the floor to window sill (Figure 27). Room two is also an open room floor plan with a green board mounted to a shared wall between rooms one and two (Figure 28).

The floor boards of the *lanai* and a portion of the roof that once sheltered the *lanai* have collapsed. Additionally, the majority of the window glass from the surrounding windows is missing from the framework and the cabinetry and walls have been subject to extensive wood rot. While prominent elements of the building construction are still discernable, on the whole, and as evidenced in the photographs below, CSH-2 is in extremely poor condition. The surrounding vegetation consists of a sparse stand of Ironwood trees (*Casuarina equisetifolia*) and knee-high grasses.



Figure 24. CSH-2, front of structure, view to north.



Figure 25. CSH-2, back of structure, view to south.



Figure 26. CSH-2, east facing wall, view to west.



Figure 27. CSH-2, interior of room one, view to northwest.



Figure 28. CSH-2, interior of room two, view to north.

4.1.2.3 CSH-3

Site Function:	School house; residence
Site Type:	Wood Board Structure
Condition:	Poor
Age	Historic

Description: CSH-3 is the original Kō‘ele single room school house that was refurbished during the mid-1920s into the Richardson residence (Mr. Kepa Maly – Executive Director of the Lāna‘i Cultural Heritage Center, personal communication July 27, 2009). Currently, the structure is a multi-roomed building of conventional wood frame construction and wood board siding (Figure 29), single hung windows (Figure 30), and a *lanai* that extends off of the apparent front entryway. The roof of this structure consists of corrugated sheet metal while the floors are entirely constructed of plywood.

Like CSH-2, this structure is in extremely poor condition as $\frac{3}{4}$ of the roof is no longer intact, the floor of the *lanai* and south-facing wall has completely collapsed (Figure 31), and the window glass has been completely removed. The surrounding vegetation consists of a single Ironwood tree (*Casuarina equisetifolia*) and ankle- to knee-high grasses.

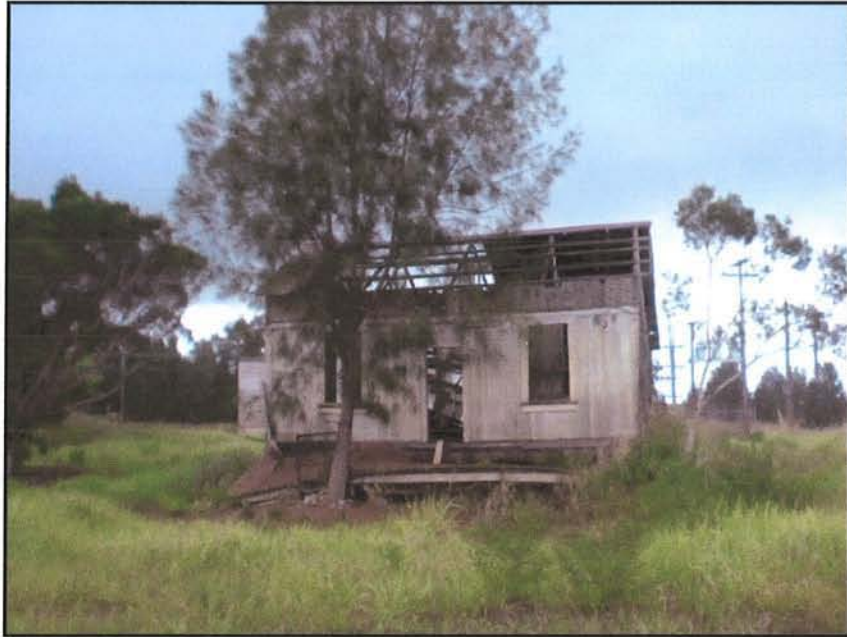


Figure 29. CSH-3, front of structure, view to south.



Figure 30. CSH-3, west facing wall, view to east.



Figure 31. CSH-3, back of structure, view to north.

4.2 Subsurface Testing Findings

Mechanical subsurface testing was conducted of a previously uncultivated portion of the Ninth Street Access corridor, approximately 3-acres, that was accessible for the backhoe, as well as a small portion of accessible land that was previously cultivated in pineapple for comparative purposes (Figure 32 and Figure 33). Due to the dense vegetation growth and low overhead shrubbery of the proposed residential parcel, subsurface testing of the affordable housing parcel was not feasible at this time. Background research further shows that the area of the proposed affordable housing parcel has undergone over 50 years of intensive cultivation related to commercial agriculture and, as a result indicates little to no potential for encountering *in situ* significant subsurface cultural deposits.

In total, the subsurface testing program consisted of the mechanical excavation of five trenches within the overall Ninth Street access corridor. While the initial goal was to standardize the orientation of each trench in either a north-south or east-west direction topographic and potential underground utility constraints dictated a more random trench orientation. The soil and trench sidewalls were inspected for cultural remains during and after excavation.



Figure 32. A portion of the 1979 USGS Orthophotoquad, Lanai City Quadrangle 7.5' Series showing backhoe trench locations within the Ninth Street access corridor of the current project area.

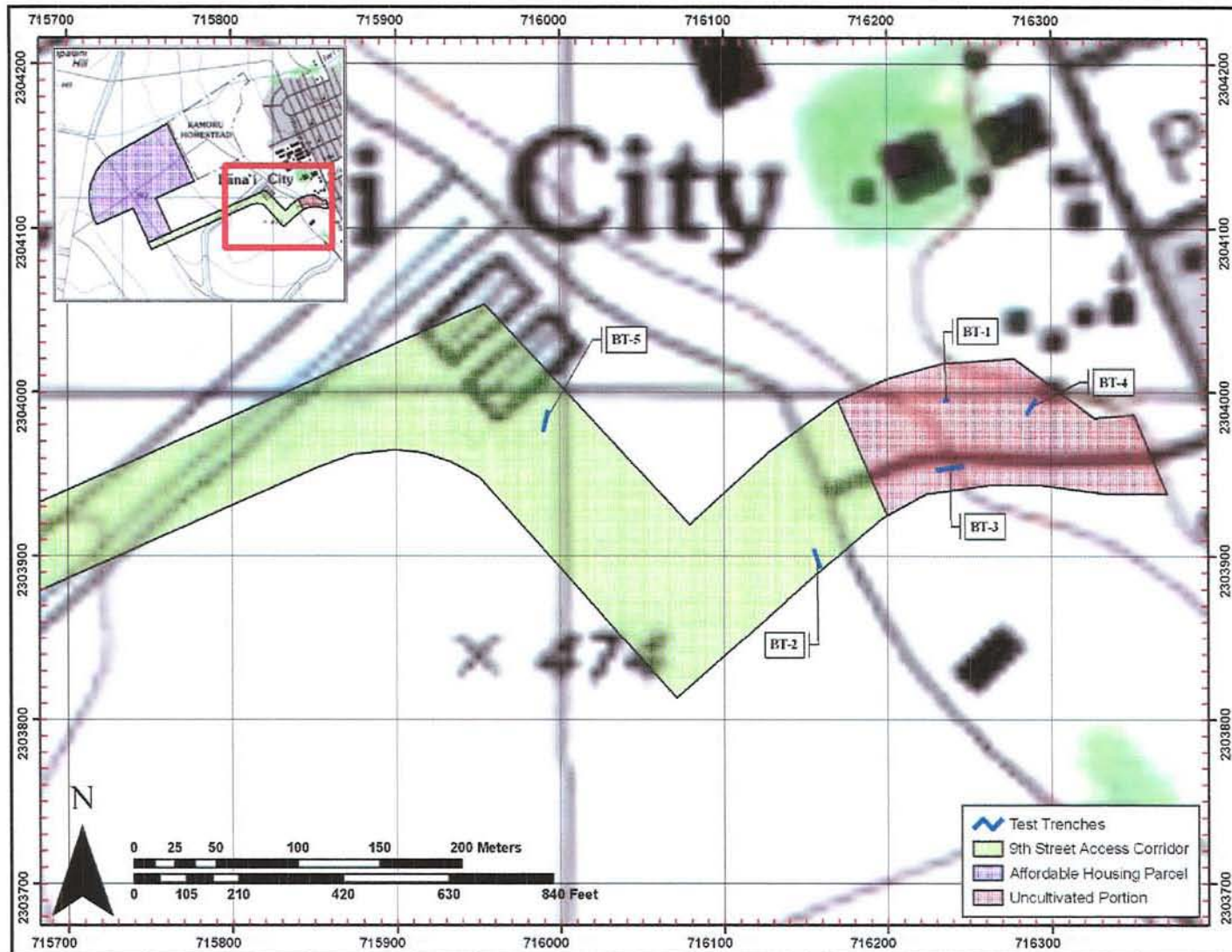


Figure 33. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle showing backhoe trench locations within the Ninth Street access corridor of the current project area.

4.2.1 Lands Previously Uncultivated in Commercial Pineapple

The previously uncultivated portion of the Ninth Street access corridor is in the easternmost segment of the proposed access to the affordable housing parcel (see Figure 32) and, as previously noted, comprises a total of three acres. Three backhoe trenches were laid out and excavated within this portion of the current project area. For the most part, the soils stratigraphy and ground surface topography of the eastern portion of the Ninth Street access corridor shows relatively little disturbance of *in situ* soils along in Backhoe Trenches 3 and 4 with clear B Horizon soils underlying the A Horizon. Backhoe Trench 1, located adjacent to the ballpark, shows a fair amount of fill in Stratum II indicating that fill was imported to the area in order to create and level out the ball field.

4.2.1.1 Backhoe Trench 1 (BT-1)

Backhoe Trench 1 was located north of Ninth Street as it extends into the current project area and nearest to the baseball park (see also Figure 32 and Figure 33). During the course of excavation, a previously unknown irrigation line was punctured at approximately 30 cm below surface (cmbs) effectively halting further excavation (Figure 34). Final trench dimensions measured 4.5m by 1m oriented in an east-west direction (see also Figure 33). A total of two stratigraphic layers, an A horizon overlying a fill layer, were observed within the soil profile (see soil description below). With the exception of black plastic mulch near the surface and within Stratum I, no additional cultural materials were observed within the trench sidewalls or during the course of excavation. Excavation of this trench reached a maximum of 80 cm below surface (cmbs) and was terminated at bedrock.



Figure 34. Backhoe Trench 1, showing the breach in irrigation water pipe, view to southeast.

Soil Description for BT-1

Stratum I (0-20 cmbs)	A Horizon; 5YR 3/3, dark reddish brown silt clay loam; strong, medium, blocky structure; slightly hard dry consistency; sticky wet consistency; slightly plastic; no cementation; clear lower boundary.
Stratum II (20+cmbs)	Fill layer; 5 YR 5/3, reddish brown silt clay loam; moderate, medium, blocky structure; slightly hard dry consistency; sticky wet consistency; no cementation; lower boundary unknown.

4.2.1.2 Backhoe Trench 3 (BT-3)

Backhoe Trench 3 was located directly south of Ninth Street as it extends into the current project area (Figure 35, see also Figure 33) and adjacent to CSH-2. Oriented in an east-west direction, the trench measured 17m (55') long by 1m (3') wide. It was excavated to a maximum depth of 106 cmbs (3 ½') (Figure 35). A modern era trash pit, filled with paper and plastic bag debris, was observed at the eastern terminus of BT-3 and south facing trench wall. Overall, the soil stratigraphy and presence of the modern trash pit in this test trench indicates that this portion of the project area has undergone a moderate level of modification. Unlike BTs 1 and 4, black plastic mulch from commercial pineapple cultivation was surprisingly absent from the upper levels of Stratum I. No historically significant cultural materials or layers were identified during the documentation of this test trench.



Figure 35. Overall view of BT-3, view to east.

Soil Description for BT-3 (Figure 36 and Figure 37)

Stratum I (0-28 cmbs) A Horizon; 10 R 3/4, dusky red; clay; moderate, medium, blocky structure; slightly hard dry consistency; non-plastic; no cementation; clear wavy lower boundary; no plastic mulch.

Stratum II (28-106 cmbs) Weak B Horizon grading to laterite; 10 R 3/4, dusky red clay; moderate, fine, crumb structure; slightly hard dry consistency; plastic; no cementation; lower boundary unknown.

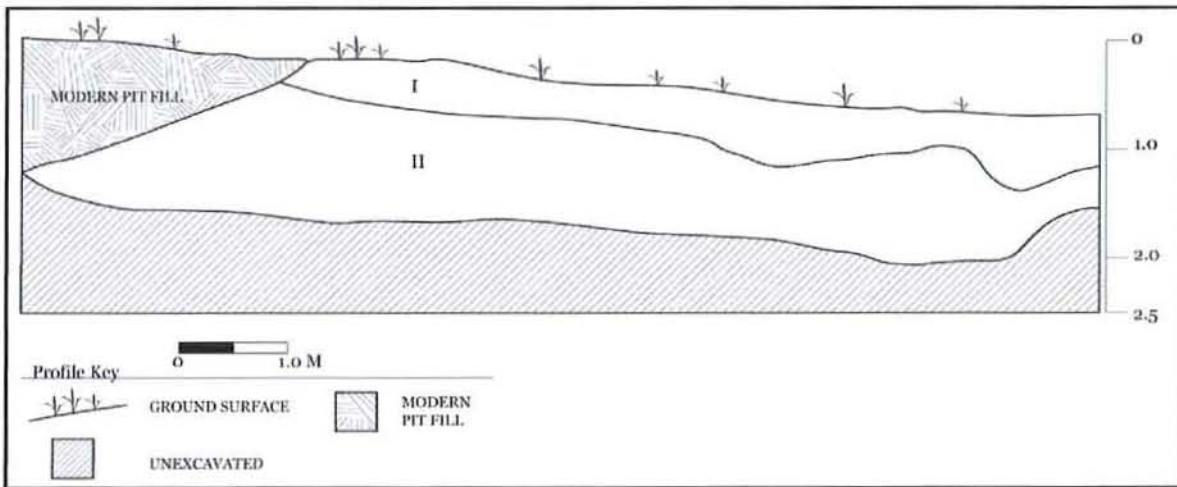


Figure 36. Soil profile for BT-3, south wall.



Figure 37. BT-3, profile type section, south wall.

4.2.1.3 Backhoe Trench 4 (BT-4)

Backhoe Trench 4 was located north of Ninth Street as it extends into the current project area. The trench measures 11m (36') long by 1m (3') wide. In order to avoid encountering the irrigation water pipe discovered during the excavation of BT-1, this test trench was oriented in a northeast-southwest direction (Figure 38, see also Figure 33). Excavation of this trench reached a maximum of 158 cmbs (5') and terminated at the C Horizon. A total of four stratigraphic layers were observed within the soil profile (see soil description below) showing a fairly thin A horizon overlying an equally thin and weak B Horizon. Like BT- 1, black plastic mulch associated with commercial sugar cultivation was identified in the upper depths of Stratum I. Other than the ubiquitous presence of the black plastic, no historically significant cultural materials or layers were observed within the soil profile.



Figure 38. BT-4, post-excitation view to northeast.

Soil Description for Backhoe Trench 4 (Figure 39 and Figure 40)

Stratum I (0-15 cmbs)	A Horizon; 10 YR 4/4, dark yellowish brown medium to coarse, clay loam; strong, medium, blocky structure; very hard dry consistency; non-plastic; no cementation; abrupt wavy lower boundary.
Stratum II (15-36 cmbs)	B Horizon; 2.5 YR 4/8, red silty clay; strong, medium sized blocky structure; hard dry consistency; slightly plastic; no cementation; abrupt wavy lower boundary.

Soil Description for Backhoe Trench 4 (continued)

Stratum III (36-139 cmb) C Horizon; 7.5 YR 7/6, strong brown gravels; strong, medium, blocky structure; slightly hard dry consistency; slightly plastic; no cementation; clear wavy lower boundary; decomposing bed rock.

Stratum IV (139-158 cmb) C Horizon; 10 YR 3/6, dark yellowish brown fine clay; weak, fine, crumb structure; loose moist consistency; non-plastic; no cementation; lower boundary unknown.

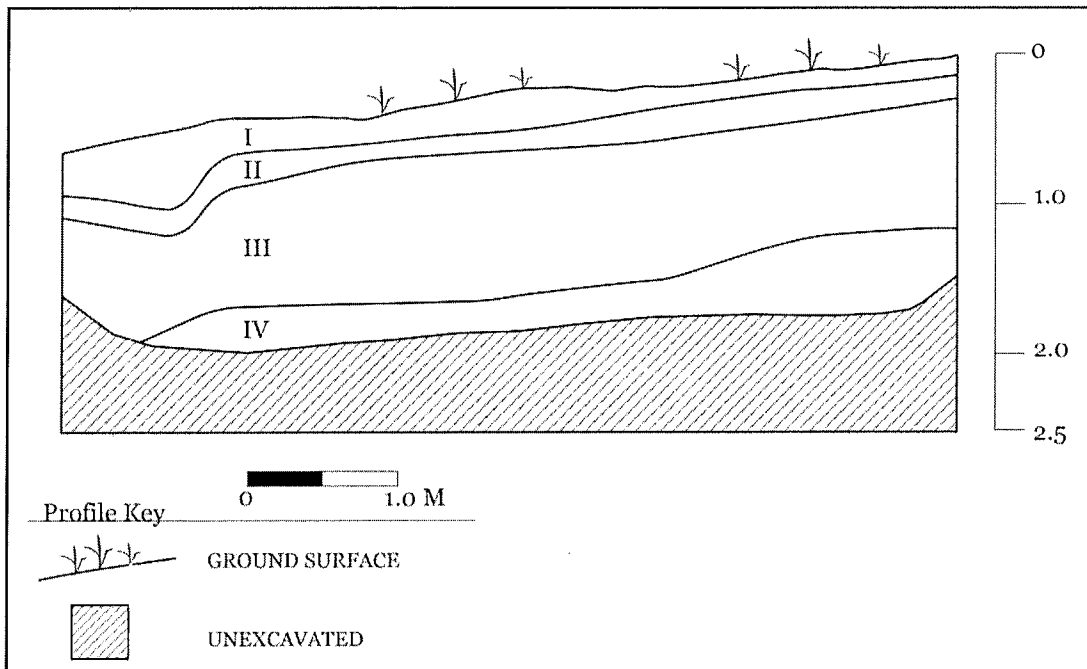


Figure 39. Soil profile for BT-4, west wall.



Figure 40. BT-4, profile type section, west wall.

4.2.2 Lands Previously Cultivated in Commercial Pineapple

For comparative purposes, two backhoe trenches were excavated within accessible portions of the Ninth Street access corridor with trench placement and orientation dictated by vegetation growth and modern use areas (see Figure 32 and Figure 33). The stratigraphic profiles of both backhoe trenches showed a distinct agricultural plow zone (Ap Horizon) measuring 30-35 cm thick. The pedontology of this stratum is consistent with the previous commercial agricultural use of the lands in this portion of the project area. It is of interesting note, however, that while Backhoe Trench 2 revealed a rather thin and weak B Horizon (40cm) with *in situ* inclusions of weathered bedrock, Backhoe Trench 5 represented a soil discontinuity where the Ap Horizon directly overlaid C Horizon soils. Such a profile may indicate a rather short time frame for soil development in this area or an anomalous event that altogether wiped out the B Horizon soils in the immediate area of Backhoe Trench 5.

4.2.2.1 Backhoe Trench 2 (BT-2)

Backhoe Trench 2 measured 11m (36') long by 1m (3') wide and was generally oriented in a north-south direction (Figure 41, see also Figure 33). Excavation of this trench reached a maximum of 134 cmbs (4') and terminated at the C Horizon. A total of four stratigraphic layers were observed within the soil profile and showed a well-defined Ap horizon overlying a thin and weak B Horizon. Black plastic mulch associated with commercial sugar cultivation was identified throughout Stratum I and, other than the ubiquitous presence of the black plastic, no historically significant cultural materials or cultural layers were observed within the soil profile.



Figure 41. BT-2, view to west-northwest.

Soil Description for Backhoe Trench 2 (Figure 42 and Figure 43)

Stratum I (0-30 cmbs)	Ap Horizon; 10 YR 3/6, dark yellowish brown clay loam; moderate-strong, medium, blocky structure; very hard dry consistency; plastic; no cementation; diffuse wavy lower boundary.
Stratum II (30-70 cmbs)	Weak B Horizon; 10 YR 3/4, dark yellowish brown; clay; weak, medium, blocky structure; weakly coherent dry consistency; plastic; no cementation; diffuse wavy lower boundary; in place weathered bedrock.
Stratum III (70-134 cmbs)	C Horizon; 10 YR 4/6, dark yellowish brown clay with granular inclusions; weak-moderate, fine, blocky structure; very friable moist consistency; slightly plastic; no cementation; clear wavy lower boundary.
Stratum IV (134 cmbs+)	C Horizon; 10 YR 2/2, very dark brown clay; weak, fine, blocky structure; firm moist consistency; plastic; no cementation; lower boundary unknown.

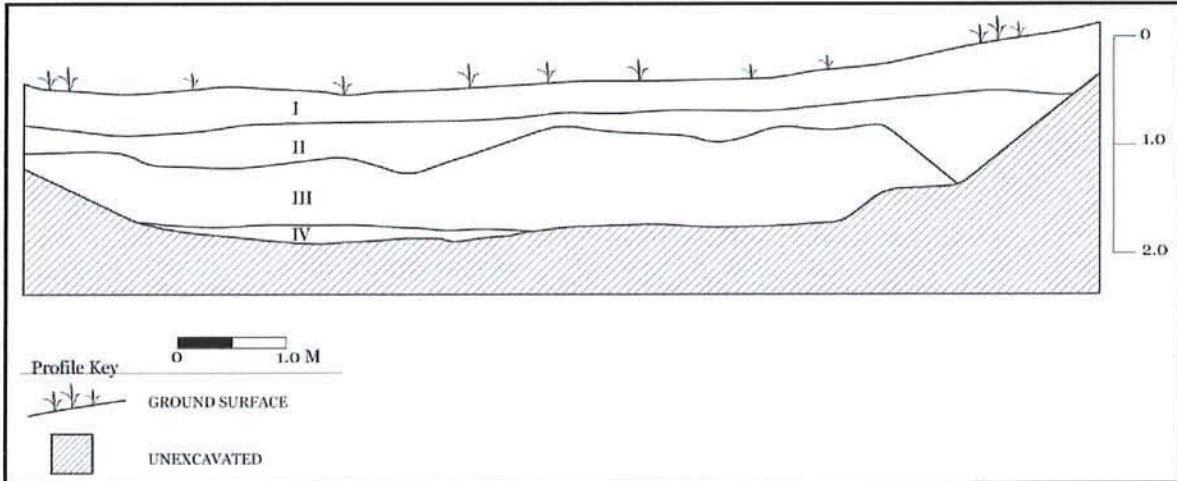


Figure 42. Soil profile for BT-2, west wall.



Figure 43. BT-2, profile type section, west wall

4.2.2.2 Backhoe Trench 5 (BT-5)

Backhoe Trench 5 was located perpendicular to an unimproved former pineapple field road and measured 13m (42') long by 1m (3') wide generally oriented in a north-south direction (Figure 44, see also Figure 33). Excavation of this trench reached a maximum of 160 cmbs (5') and terminated well into C Horizon soils. A total of two stratigraphic layers were observed within the soil profile and showed a well-defined Ap horizon overlying a uniform C Horizon. Black plastic mulch associated with commercial sugar cultivation was identified throughout

Stratum I and, other than the ubiquitous presence of the black plastic, no historically significant cultural materials or cultural layers were observed within the soil profile.



Figure 44. BT-5, 1.5m scale view to northwest

Soil Description for Backhoe Trench 5 (Figure 45 and Figure 46)

Stratum I (0-35 cmbs)	Ap Horizon; 5 YR 3/2, dark reddish brown clay; strong, fine, blocky structure; very hard dry consistency; very plastic; strong cementation; clear wavy lower boundary.
Stratum II (35-160 cmbs)	Uniform C Horizon; 3 YR 3/3, dark reddish brown; clay loam; weak, fine, blocky structure; friable moist consistency; plastic; no cementation; lower boundary unknown.

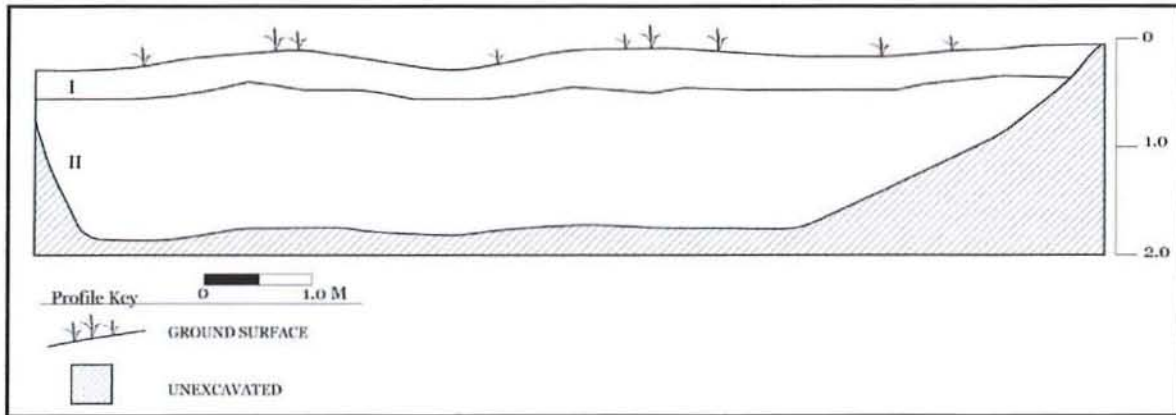


Figure 45. Soil profile for BT-5, west wall.



Figure 46. BT-5, profile type section, west wall.

Section 5 Summary and Interpretation

A review of the historic documentation indicates that the thick soils of the central plateau lands of Lāna'i were once traditionally used for dryland agriculture (see also Section 3.1.1.3). This use, although fading following Western contact, continued into the mid 1850s and is reflected in the *kuleana* testimony for Kamoku and adjacent *ahupua'a* that mention cultivation of sugar cane, sweet potatoes and gourds. It is not coincidental that all of the Land Commission Awards in Kamoku, Kalulu and Kaunolū are within the upper elevations where rainfall would have been adequate to support dryland crops. Traditional use of the *mauka* lands and central plateau may have been represented in the archaeological record by surface structures and cultural material deposits consistent with permanent and recurring habitation, as well as, dryland terraces used in *kula* agriculture. Physical remnants of this type of settlement along the wetter elevations were identified during Emory's island-wide survey (1924) where house sites were found along the base of Lānaihale, the ridge crest of Lāna'i Island, *mauka* of the current project area.

During the mid-to late-1800s the plateau was transformed to open grassland as grazing of goats and later sheep became a dominant land use (see Section 3.1.3). Then, in the late 1920s, after successful experimental planting, the entire plateau area of Lāna'i was eventually plowed over for large-scale commercial pineapple cultivation. To support the growing labor force, Lāna'i City was constructed in the 1920s as an entirely new residential area, specific to the Dole Pineapple Plantation (see Section 3.1.4).

With respect to the current project area, evidence of pre-contact habitation and agricultural use were absent. For the proposed affordable housing parcel and previously cultivated portion of the Ninth Street access corridor, the paucity of pre-contact historic properties can likely be attributed to the fact that the lands in and surrounding the current project area have undergone heavy modifications by commercial pineapple cultivation and the development of Lāna'i City. Such landscape alteration would have effectively eliminated surface archaeological structures and cultural materials and significantly altered subsurface indications of pre-contact historic properties. In the previously uncultivated portion of the Ninth Street access corridor, significant subsurface cultural layers associated with pre-contact habitation were also absent. This scarcity of subsurface indications of pre-contact habitation and agricultural use in an area where the soil stratigraphy indicates fairly little ground alteration, may be attributed to either of two alternatives: the traditional Hawaiian population was both sparse and highly mobile, relative to the other major islands (see Section 3.1.1.3 Traditional Hawaiian Habitation and Subsistence of the Lāna'i Central Plateau) and therefore left little or no archaeological evidence within the current project area of potential effect (APE), or this specific area was not suited for habitation or agriculture because of seemingly shallow and/or underdeveloped B-Horizon soils and accelerated downslope erosion. While community consultation associated with the development of a Cultural Impact Assessment for this project has revealed that lithic artifacts (e.g. *'ulu maika*, *imu* stones, and slingstones) have been found following the tilling of the pineapple fields, there is no apparent recollection or living memory of exact origins of these items or how they may relate to the traditional settlement pattern of the central plateau (Medeiros-Dagan et al. 2009). Lack of pre-contact Hawaiian historic properties notwithstanding, the current inventory survey has documented historic-era infrastructure and architecture related to the early development of the Dole Pineapple Plantation, Lāna'i City and the Kō'ele School Complex.

One historic property was identified within the northeastern portion of the Ninth Street access corridor while two historic era structures were identified in close proximity to the current project area and directly adjacent to the southern boundary of the Ninth Street access corridor (see Figure 19). SIHP 50-40-98-6649 is a historic era culvert headwall likely associated with the expansion of Lānaʻi City and development of the drainage system (see also Section 4.1.2.1). According to the heavy equipment operator who ran the backhoe for the subsurface testing phase of this study, an identical headwall was once located parallel to this feature along the southern edge of Ninth Street as it enters the current project area. At some point in recent history, the southern headwall was removed following the abandonment of this particular utility. Similar historic era culvert headwalls are found elsewhere within Lānaʻi City along Lanai Avenue across from the Courts Affordable Housing Subdivision (Lee-Grieg and Hammatt 2005, Figure 47) and near the Lodge at Kōʻele.



Figure 47. Example of a historic culvert headwall similar to SIHP 50-40-98-6499 located off of Lanai Avenue and across from a former open field and current location of the Courts Affordable Housing Subdivision, view to west (June 1, 2005).

CSH-2 and CSH-3 consists of two of four buildings that once comprised the Kōʻele School Complex (see also Sections 4.1.2.2 and 4.1.2.3). Built during the ranching era and originally consisting of a single room school house, the Kōʻele School expanded sometime around the mid 1920s to include additional buildings (CSH-2, CSH-3 and the former Kindergarten room currently used as a custodial shed for Lānaʻi High and Elementary School [Mrs. Martha Evans – Vice-Principal, Lānaʻi High and Elementary School, personal communication July 27, 2009]). An additional structure, recorded as a part of the Historic Kōʻele District, SIHP 50-40-65-1004 Structure A, was identified as the original single room school house that was built by Charles Gay around 1908 (Kaschko 1986:14-15). SIHP -1004 Structure A, at the time of the Kaschko study was the home of John and Hannah Richardson and relocated to its present location near the Kōʻele Lodge (Kaschko 1986:15). As the name implies, the old school complex was originally

located at Kō'ele and subsequently vacated when the Lāna'i High and Elementary School was established at its present location off of Frasier Avenue in 1937. Around 1985-1986, and through the efforts of Lanaians for Sensible Growth, Hui Malama Pono o Lāna'i, and the community of Lāna'i, two of the former structures of the Kō'ele School Complex were relocated to the bottom of Ninth Street and intended for preservation, restoration, and incorporation into the landscape of Kō'ele as a part of a heritage program through an agreement with Castle & Cooke Resorts, LLC (Mr. Kepa Maly – Executive Director of the Lāna'i Cultural Heritage Center, personal communication July 27, 2009 and Representative Hermina Morita – Hawai'i State Legislature 14th District Representative and Lāna'i Island *kama'aina*, personal communication July 29, 2009). Unfortunately, continued neglect has impacted the integrity of the structures that are directly adjacent to the Ninth Street access corridor and current project area leaving them in an extensive state of disrepair.

Section 6 Assessment of Archaeological Significance

Assessment of archaeological significance has been made in accordance with the State Department of Land and Natural Resources (DLNR) Chapter 13-284, Hawai'i Administrative Rules (HAR), entitled "Rules Governing Procedures for Historic Preservation Review to Comment on Section 6E-42, Hawai'i Revised Statutes (HRS), Projects"; Chapter 13-284-6 entitled "Evaluation of Significance", states:

- a. Once a historic property is identified, then an assessment of significance shall occur. The agency shall make this initial assessment, or delegate this assessment, in writing, to the SHPD. This information shall be submitted concurrently with the survey report, if historic properties are found in the survey.
- b. To be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:
 - a. Sites that are associated with events that have made a significant contribution to broad patterns of our history; or
 - b. Sites that are associated with the lives of persons significant in our past; or
 - c. Sites that embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant or distinguishable entity, whose components may lack individual distinction; or
 - d. Sites which have yielded, or may be likely to yield, information important in prehistory or history; or
 - e. Sites which 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 groups' history and cultural identity.

SIHP 50-40-98-6649 is considered significant under Criterion D because of the potential to yield information important for understanding the history of the region. Because CSH-2 and CSH-3 are located outside of the current project APE, significance assessments for these properties are beyond the scope of this study.

Section 7 Project Effect and Mitigation Recommendations

7.1 Project Effect

Under Hawai'i state historic preservation legislation, the only two possible effect determinations for a given project under historic preservation review are "no historic properties affected" and "effect, with proposed mitigation commitments" (HAR Chapter 13-284-7). In the circumstance of the current project area, one historic property consisting of a historic era culvert headwall (SIHP 50-40-98-6649) was documented within the area of potential effect (APE) for the proposed project. This historic property is recommended as significant for informational content only. We believe that the current inventory survey investigation has adequately recorded the information for SIHP -6649, through location documentation, written descriptions, and photographs.

Because we believe that the information that makes SIHP 50-40-98-6649 historically significant has been well documented and additional historic preservation mitigation would not add to the body of information concerning this historic property, CSH recommends a project specific effect determination of "no historic properties affected." This is believed to be appropriate, despite the potential removal of this feature by the proposed project as the information that makes this historic property significant has been adequately recorded.

7.2 Mitigation Recommendations

Based on the above evaluation of effect, CSH recommends no further historic preservation work for SIHP 50-40-98-6649. While the pedestrian survey did not identify any significant surface historic properties during the course of this study and limited subsurface testing of the eastern portion of the Ninth Street access corridor resulted in negative findings, it should be noted that poor ground visibility throughout the majority of the project area made difficult the identification of low density surface artifact scatters and pre-empted an intensive subsurface testing program. Community consultation has revealed that formal indigenous artifacts, although out of context, have been found within former pineapple fields following tilling after harvest (see also Section 5) thus presenting some possibility for encountering historically significant materials both on the surface and in a subsurface context. Therefore, it is recommended that precautionary archaeological monitoring of the initial grubbing and grading activities associated with the proposed project be implemented as a means to thoroughly evaluate the current project area for historic properties. Continuation and/or termination of the monitoring program following early preparation of the project site should be re-evaluated with SHPD based on the initial monitoring findings.

7.3 Disposition of Materials

All original paperwork, electronic media, and data gathered during this project are on file at the Maui Office of Cultural Surveys Hawai'i, Inc. 1993 Main Street, Wailuku, HI 96793 under CSH Job Code Kamoku 5. Copies are also on file at the O'ahu Office of Cultural Surveys Hawai'i, Inc., 41-1537 Kalaniana'ole Hwy. Suite 200, Waimanalo, HI 96795.

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