Memorandum

To: Dave Gomes, Keoni De Rego, Hawaiian Cement

From: Christopher D. Lidstone, Principal, CDLidstone LLC
Hannah Demler, MS, Soils and Botany Specialist

Date: November 19, 2025

Subject: **Amendment to State Special Use Permit**
Puʻunēnē Quarry Maui, Hawaii

Introduction

CDLidstone LLC and Hannah Demler, MS (CDL) were retained to assist Hawaiian Cement (HC) in an independent evaluation of their reclamation efforts to restore mining-disturbed lands to agricultural use following the cessation of mining. In addition, HC has requested professional advice on site reclamation techniques that can be employed should they receive County-approval of their proposed amendment to expand their mining lands to the north (**Figure 1**). This memorandum will address: the field effort conducted in early November 2025; data compilation; and provide recommendations for mining within the proposed Expansion Area (**Figure 2**). Specifically, it will address the historical mine and reclamation that has occurred at the Puʻunēnē Quarry since 2010. It will also address agronomic conditions at the proposed Expansion Area and compare its soils and agronomic conditions to those within the historic mining and reclamation area. The license agreement between HC and the former landowner (Alexander and Baldwin (A&B)) required replacement of soil/overburden to a depth of 24 inches and provided that A&B or their affiliated company, Hawaiian Commercial and Sugar Company (HC&S), would farm it. As of the date of this memorandum, approximately 81.8 acres have been reclaimed by HC, but the land has not been farmed by A&B or their affiliates. Alexander & Baldwin did not apply irrigation water to the current reclamation area and as such the current vegetation type consists of dry land grasses and its current land use remains "cattle forage". Effective January 2027, HC will lose access to the quarry area, and the land will revert to the new landowner, AB Maui Quarries. HC will retain the lease to their processing facility, which falls on State lands. In anticipation of losing their lease, HC has purchased 55 acres from Mahi Pono Holdings and upon approval of the current proposed State Special Permit and Conditional Use Permit, HC will purchase the remaining 70 acres for the total lands identified on **Figures 1** and **2** as the Expansion Area.

Methodology

To address past reclamation practices as they might apply to the Expansion Area, CDL investigated the soil conditions and vegetative cover characteristics of the reclaimed mine areas as well as the proposed quarry expansion area. In this memorandum, we will refer to the previously mined and now reclaimed area as "Reclaimed" and the area proposed for future mining operations as "Expansion". As noted above, the Reclaimed area consists of approximately 81.8 acres of mined area upon which soil has been replaced and buffelgrass (*Cenchrus ciliaris*) stabilizes the surface. The Expansion area consists of the entire 125 acres, the majority of which is planted as a Tahitian lime orchard. Irrigation is no longer available to the 55 acres purchased by HC, and it is anticipated that irrigation will be removed from the remaining 70 acres upon sale to HC. Where irrigation has been removed, the lime orchard is compromised, and trees are beginning to defoliate and die from drought stress.

The area of interest is in central Maui, five miles south of Kahului (latitude 20.8° N, elevation 250 feet). Average annual rainfall at the site is 12 inches and average annual air temperature is 75.1° F (Hawaii Climate Data Portal). Typically, rainfall is concentrated during the wet season of November through March. Historically, the entire area surrounding the Puʻunēnē Quarry was utilized for intensive sugarcane cultivation. As sugarcane operations ceased in recent decades, land use has transitioned to other agricultural uses including citrus orchards, row crops, and grazing, while some areas remain fallow or are being utilized for mining activities.

Soil test pits were dug to observe the depth, characteristics and stratification of the soil as well as to collect samples for soil texture and nutrient analysis. The purpose of the sampling was to characterize the existing (mined and unmined) soils and determine if the act of removing and subsequently replacing the soil for mining has a negative impact on the soils or the long term "farmability" of the property. Five soil test pits were dug in the Reclaimed area (**Figure 3**) across four different reclamation eras (soil replaced on quarry pit floor in 2010, 2011, 2015, and 2018). Test pit logs and photos can be found in **Appendix A-1**. Five soil test pits were also dug across the Expansion area (**Figure 4**). Test pit logs and photos can be found in **Appendix A-2**. Vegetation observations were made throughout the reclaimed area to determine species present and characterize ground cover across the site. Two 50-meter line-point-intercept transects (**Figure 3**) were monitored to calculate estimates of vegetative cover across the reclaimed area. Vegetation transect data is detailed in **Appendix B**.

Microclimate and Topography

The Reclaimed area has a unique topographic appearance and currently lies in a "bowl" approximately 20 feet below the native ground level due to the removal of rock during mining. The ground surface is flat, and a single dirt road bisects the Reclaimed area. A rock wall lines the north, east, and south boundary of the 81.8 acre reclaimed parcel. As such, this area experiences altered wind patterns and lower wind speeds than the surrounding area. Litter, largely consisting of senesced and fallen buffelgrass, covers approximately 65 percent of the soil surface. The altered wind patterns and litter cover promote water retention in the soil by reducing surface evaporation. Drainage is to the west and averages about 1.1 percent.

The Expansion area is relatively flat but falls to the west at a 1.2 percent grade. Vegetation consists of regularly spaced rows of citrus trees throughout the area. Areas between rows consist of grassy and herbaceous weeds that were regularly mowed for weed control and to allow access along the orchard rows. Several dirt roads traverse the area and rock boulders and cobbles can be found on the surface where they were piled during land clearing for sugarcane operations. This area experiences stronger winds than the subdued Reclaimed area, and while trees provide a local windbreak the exposed soil along the roads and unvegetated areas can create dusty conditions when winds are strong.

Soil Characteristics

In the Reclaimed area, average soil depth was 33 inches and reflected an overall "blended soil". The soil is a loam to sandy loam. The soil in most pits was cobbly and lacked distinct structure or stratification. Roots were moderately dense and were concentrated in the top 8.5 inches of soil but present down to approximately 24 inches deep. Soil test pit profiles across the reclamation area were uniform, regardless of reclamation era. There were no developed hard pans, and it appeared that the soils were reasonably well mixed and

balanced. No fertilizer has been applied to the reclaimed soils since their replacement. Common farming practices would be the addition of manure (organic matter) and fertilizer as appropriate. This has not taken place on the reclaimed lands.

Soil chemistry of the Reclaimed area was spatially variable and averaged:

- pH: 8.3
- Texture: sandy loam (16.2% clay, 29.5% silt, 54.3% sand)
- Organic Matter: 0.58%
- Nitrogen: Nitrate-N 3.7 ppm, Ammonium-N 0.7 ppm
- Potassium: 144.6 ppm
- Phosphorous: 11.1 ppm (Olsen P)

In the Expansion area, average soil depth was 28 inches. The soil across the area is largely a silt loam but ranges from cobbly silt loam to silty clay loam (USDA, NRCS Web Soil Survey, Accessed 11/12/2025). The soil observed in the test pits was distinctly stratified and nearly free from rocks throughout the profile. The average depth of the A horizon was 13 inches, while the average depth of the B horizon was 23 inches. The B horizon consisted of a hardened calcium carbonate layer, which is common in drier areas. In several soils pits hard low permeability layers, known as "fragipans" were encountered at depths ranging from 12 to 20 inches. Bulk rooting depth in the expansion area was 9 inches, with limited rooting to approximately 20 inches. Root density was similar to that observed in the Reclaimed area soil test pits. Roots of the lime trees were not directly observed due to placement of the soil test pits; however, Tahitian lime trees generally have dense, shallow root systems with rooting depths between 12 and 24 inches. Soil test pits across the expansion area varied slightly in distinction between soil horizons but overall were similar in depth and soil texture.

Soil chemistry of the Expansion area was spatially and vertically variable and averaged:

- pH: 7.7
- Texture: loam (26.0% clay, 37.8% silt, 36.2% sand)
- Organic Matter: 1.1%
- Nitrogen: Nitrate-N 4.4 ppm, Ammonium-N 1.8 ppm
- Potassium: 185.9 ppm
- Phosphorous: 11.5 ppm (Olsen P)

The soil type and fertility of the Reclaimed area is comparable with the soils of the Expansion area. In general, the pH of the Reclaimed area is higher (8.3 vs. 7.7); available nitrogen, potassium, and organic matter are lower; and available phosphorus is similarly low across both the Reclaimed and Expansion areas. More detailed soil nutrient and physical analysis data can be found in **Appendix A-3**. The soils within the Reclaimed area were blended and replaced on the quarry pit floor to a depth equal to or greater than 24 inches. Although they are sufficiently fertile to allow planting and farming in their current condition, application of fertilizer and additional organic matter is appropriate and is a common farming practice in the area. Fertilizer applications will be dependent on the crop. The Reclaimed soils are a sufficient depth for farming, and the selection of the appropriate crop depends on availability of irrigation water and the demands of future land use.

Vegetation Characteristics

Vegetation across the Reclaimed area is dominated by buffelgrass (*Cenchrus ciliaris*). The buffelgrass was completely senesced at the time of monitoring due to it being the end of the dry season. Kiawe (*Prosopis pallida*) trees are also sparsely present throughout the area. Vegetation cover as measured across the Reclaimed area is similar to the vegetation found on adjacent lands without irrigation. Buffelgrass was not seeded in the reclaimed area following soil replacement but naturally colonized as it is widespread throughout the lowlands of central Maui and thrives in dry, disturbed areas. Buffelgrass is native to Africa but has become naturalized in Hawaiʻi since its introduction as a cattle forage in the early 1900s. Based on two vegetation transects (**Appendix B**) and qualitative observations, vegetative cover is approximately 59 percent and areas between vegetation stems and canopy are largely covered by litter.

The Expansion area is planted with Tahitian limes (*Citrus x latifolia*) with multiple weedy species present including koa haole (*Leucaena leucocephala*), golden crown-beard (*Verbensia encelioides*), and little bell (*Ipomoea triloba*). ʻUhaloa (*Waltheria indica*) and several grasses including mauʻu lei (*Chloris barbata*) and buffelgrass are also present. Vegetation across the expansion area was monitored by observation of plant species and densities in the immediate area of the soil test pit locations. Vegetation transects were not completed in the Expansion area due to it being planted as a citrus orchard with distinct tree rows, alleys, and access roads. There are barren areas along the roads and equipment staging areas across the area.

Proposed Reclamation Practices

The proposed mine plan as it pertains to the Expansion area can be found on **Figure 5**. Mining and reclamation of the proposed 125-acre Expansion area will be similar to that which is currently employed by HC. The Proposed mine plan entails mining in distinct 20-to-30-acre cells with contemporaneous reclamation of each mined cell. HC proposes to lease the unmined land to Mahi Pono while mining and reclamation takes place on individual mine cells.

Contemporaneous reclamation allows:

- the Expansion area to remain in agricultural use while mining is taking place;
- minimizes the acreage of disturbed land at any one time;
- allows topsoil to be directly replaced and reduces the amount of organic matter and fertilizer that needs to be applied.

Prior to mining any mine cell, all large rock, debris, remaining orchard trees, abandoned irrigation and farm equipment will be removed from the land surface and properly disposed of. The "removed" orchard trees will be chipped and will become available for mulch. At the beginning of mining efforts on the first parcel (Cell 1), topsoil (A- and B- Horizon) will be stripped, blended and stockpiled adjacent to the mining area. Based on the soil profiles, stripping depth within the Expansion area will be a minimum of 24 inches and may be as much as 30 inches depending on soil type and quality. The initial soil stockpile will be seeded and left in place until the end of the mining period and then replaced onto the final mined parcel (Cell 5). The existing conveyor will be extended to the Expansion area and will convey the rock to the current Processing Facilities (**Figure 1**). HC will proceed to remove

and process the rock from Cell 1. Once the rock is recovered from Cell 1 (or any individual mine cell), the pit floor will be ripped based on a single pass with a bulldozer or similar piece of equipment. Ripping the pit floor (6 to 12 inches) will promote subsurface drainage and will allow the replaced topsoil a reasonable transition into the underlying pit floor.

Upon completion of Cell 1, the adjacent unmined 20-to-30-acre parcel (Cell 2) will similarly be cleared of all large rock, debris, remaining orchard trees, abandoned irrigation and farm equipment that will be properly disposed of. HC will then remove/strip all existing soil from Cell 2 and this topsoil will be directly replaced onto the previous cell's (Cell 1) ripped pit floor. The final surface will be mulched (with the "chipped" citrus trees) to protect the reclamation surface from wind erosion, conserve any natural moisture and add organic matter to the soils. This parcel will be seeded with an acceptable cattle forage grass, which will serve as a temporary cover. HC will then mine Cell 2, deep rip the pit floor at the conclusion of mining and cover it with topsoil, removed from Cell 3. Cell 2 will then be seeded and mulched, and mining will continue into Cell 3. This process will continue until the end of mining of the 125-acre expansion area. The final parcel (likely Cell 5) is topsoiled with the material which has been in stockpile following the stripping of Cell 1. Depending on the anticipated crop, additional organic matter and fertilizer application may be required. Contemporaneous replacement of topsoil and blending of the upper (A-Horizon) and the lower (B-Horizon) will allow a reduction in fertilizer application rate.

Agricultural Use of Reclaimed Land

In the absence of irrigation, the reclaimed land could support drought-tolerant grass varieties that can be used as cattle forage. Grass species most likely to thrive on the post-mined land without irrigation are buffelgrass or Bermuda grass (*Cynodon dactylon*). Seeding grass on the reclaimed land immediately after soil replacement (as described above) will help prevent soil loss, improve soil fertility and water infiltration, and reduce weeds. Seeding should occur during the wet season to promote germination and plant establishment. Broadcast seeding is a practical seeding method if a drill seeder is not available. However, if seeding does not occur shortly after soil replacement, seed bed management prior to seeding may be necessary to ensure adequate seed-soil contact. It is particularly important to time broadcast seeding efforts with favorable soil moisture under rain-fed conditions due to the seed being sown directly onto the soil surface where it is dependent on consistent rain for germination and seedling establishment. At the end of mining, the 125 acres will be returned to Mahi Pono or the current agricultural lessee at the time. The availability of irrigation and the lessee's agricultural interests will determine a suitable post-mining agricultural usage of the area.

Conclusions

Based on the findings from the soil and vegetation observations and our experience with aggregate mining and mine reclamation, it is our professional opinion that the Expansion area can be reclaimed to productive agricultural land following mining activities, provided proper reclamation techniques are applied. The consistency in soil characteristics and rooting depths across the Reclaimed area suggests that prior reclamation efforts have successfully reestablished arable land. Meanwhile, the Expansion area displays stratified and rock-free soil that, if handled appropriately and replaced in a contemporaneous fashion, will be suitable for future farming operations. Additionally, the reclaimed land surface will be below the previous elevation due to the removal of rock, and this subdued topography will create a microclimate where the reclaimed land is more sheltered from the wind and will

hold water for longer periods of time.

Based on discussions with Mahi Pono, there is an interest in leasing the Expansion area lands for future farming, following the completion of mining and replacement of topsoil. It is practicable that this land could be returned to citrus (limes) if irrigation is restored or used for cattle forage and grazing if irrigation water is not available. The reclaimed land surface will reflect a blended topsoil, characterized as a silt loam soil and will be absent of impermeable layers (e.g. fragipans). As noted above, the subdued topography of the reclaimed land is protected from the wind so if irrigation water becomes available, it can be applied more efficiently than that which is applied on the surrounding land surface.

Based on our analysis of the soils, vegetation and farming practices it is our professional opinion that future diversified agriculture operations will find this mined and reclaimed land suitable for crops that require irrigation, and such water may be applied more efficiently given the new subdued landscape of the reclaimed land. This "created" microclimate, specifically the lowered land surface protected by rock walls, will alter prevailing wind patterns and as such will reduce soil surface evaporation and increase water retention in the soil.

In conclusion the reclaimed land surface will be equal to or better than the native land surface for the purpose of farming. HC recognizes the importance of IAL lands to the local economy. Following HC's implementation of proper reclamation practices, the lands of the Expansion area will be restored to agricultural use and the IAL designation will continue to apply. As part of this commitment and in an effort to meet and address the concerns of the Department of Agriculture & Biosecurity, Hawaiian Cement proposes the following approval condition:

"The Applicant shall undertake quarrying of the 125-acre project site in stages, and the existing agricultural activity will be allowed to continue in non-quarrying areas while mining activities are taking place. Certain buffers may be required in accordance with State of Hawaii and federal (MSHA) rules. The reclamation of each quarried stage shall include topsoil replacement in a contemporaneous fashion. Topsoil shall be removed from each successive quarried stage and replaced on to the previously mined quarried area to a minimum depth of 24 inches. The topsoil shall be derived from the 125-acre project site, which is now and shall be suitable for agricultural use."

Figures

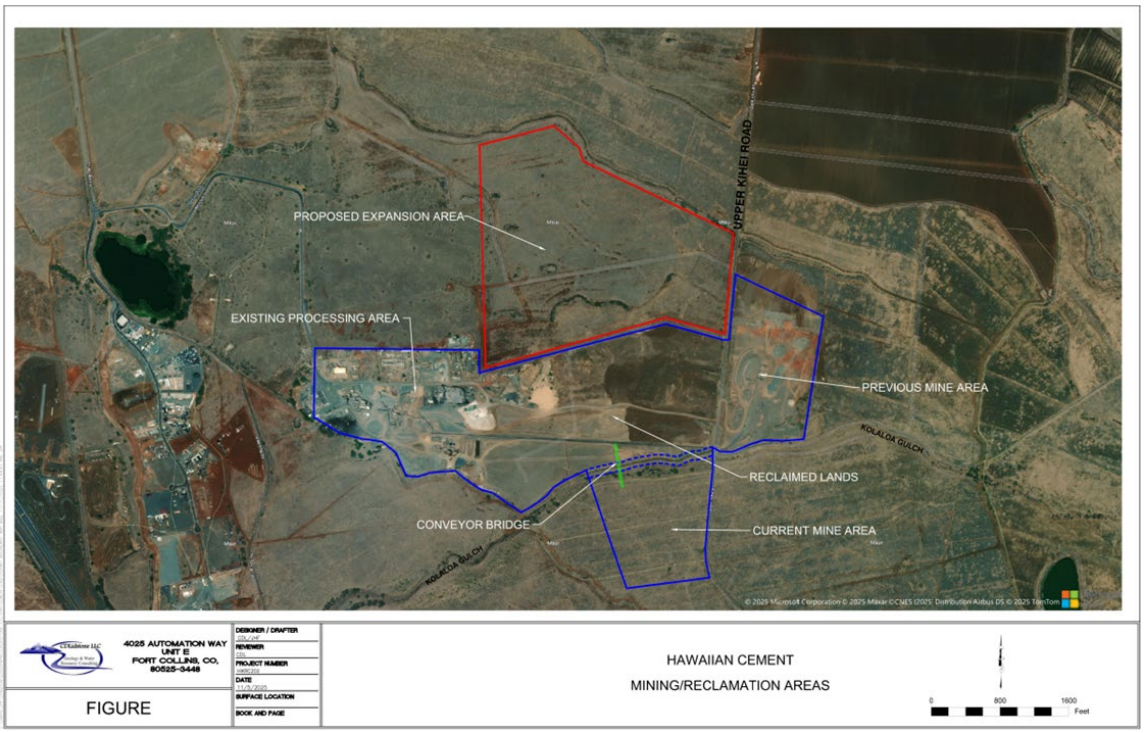


Figure 1: Pu‘unēnē quarry site. Existing processing area, current and previous mine area, and reclaimed areas are outlined in blue. The proposed expansion area is outlined in red.

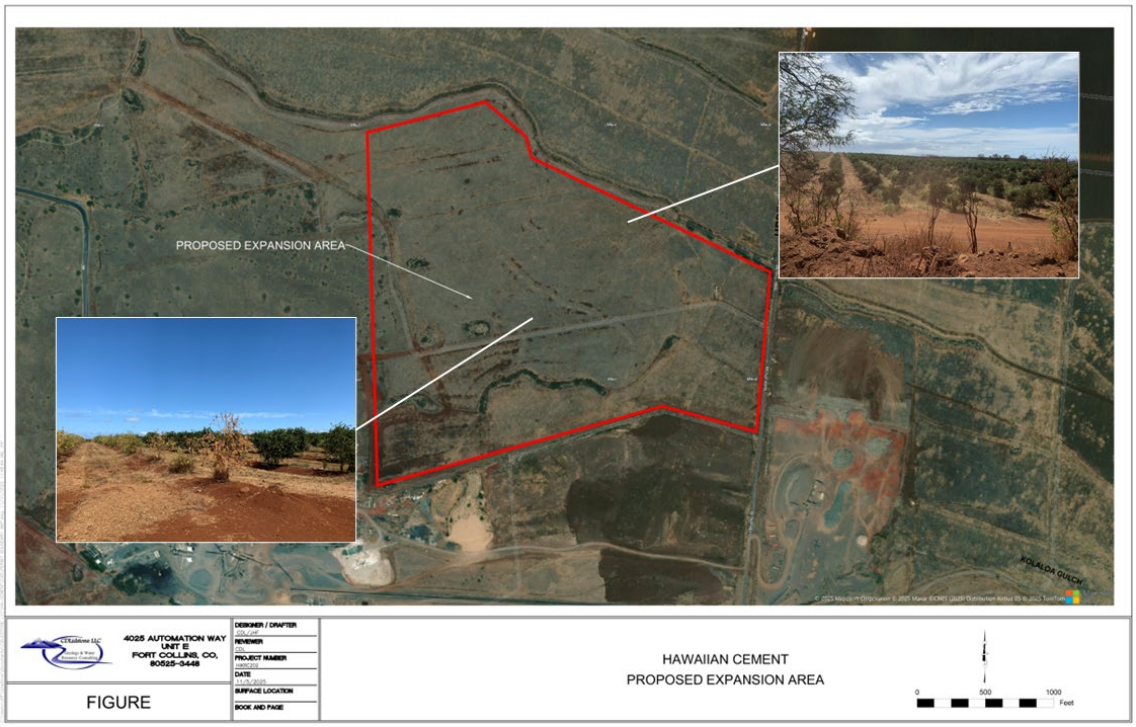


Figure 2: Proposed quarry expansion area. Inset images were taken 11/01/2025.

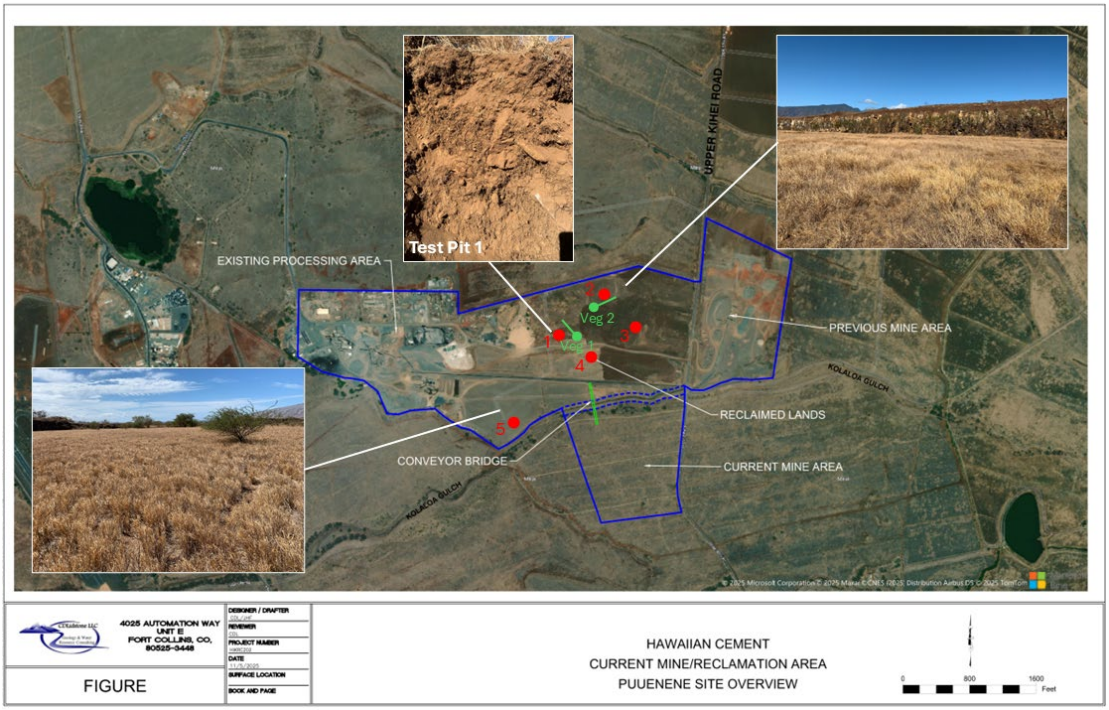


Figure 3: Current quarry areas. Inset images were taken 11/01/2025. Red dots indicate the location of soil test pits, the red number indicates the identification number of each test pit. Green dots indicate the location of the vegetation transects monitored with a line-point-intercept method, attached green lines indicating the direction of the 50-meter transect.

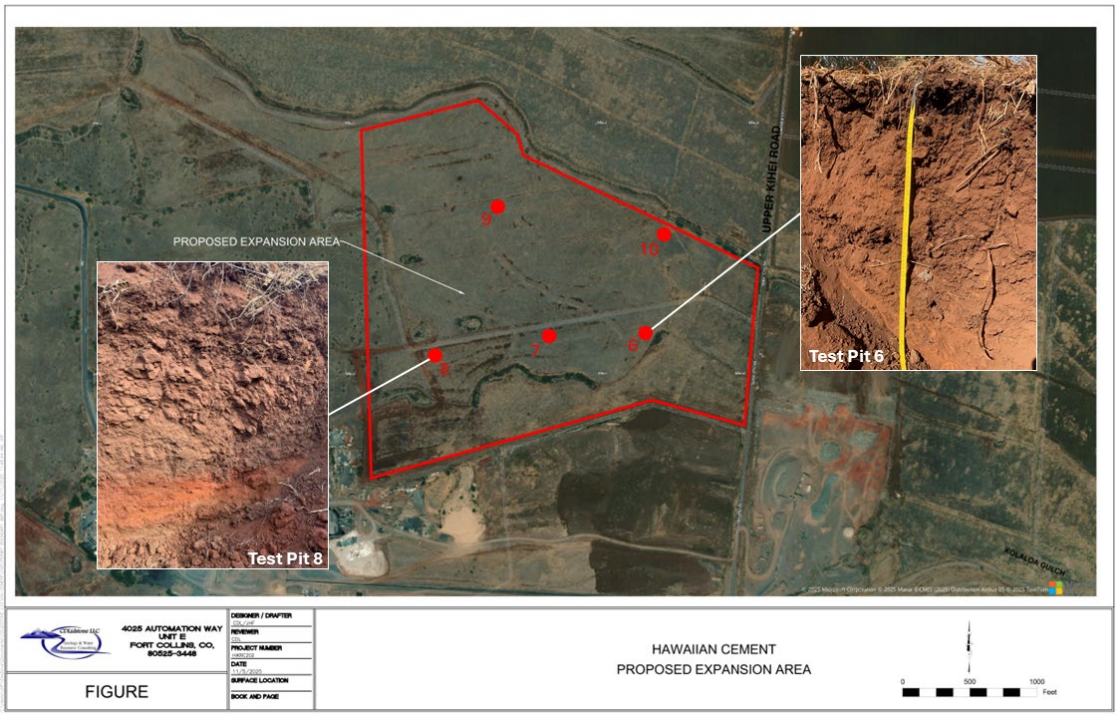


Figure 4: Proposed quarry expansion area. Inset images were taken 11/01/2025. Red dots indicate the location of soil test pits, the red number indicates the identification number of each test pit.

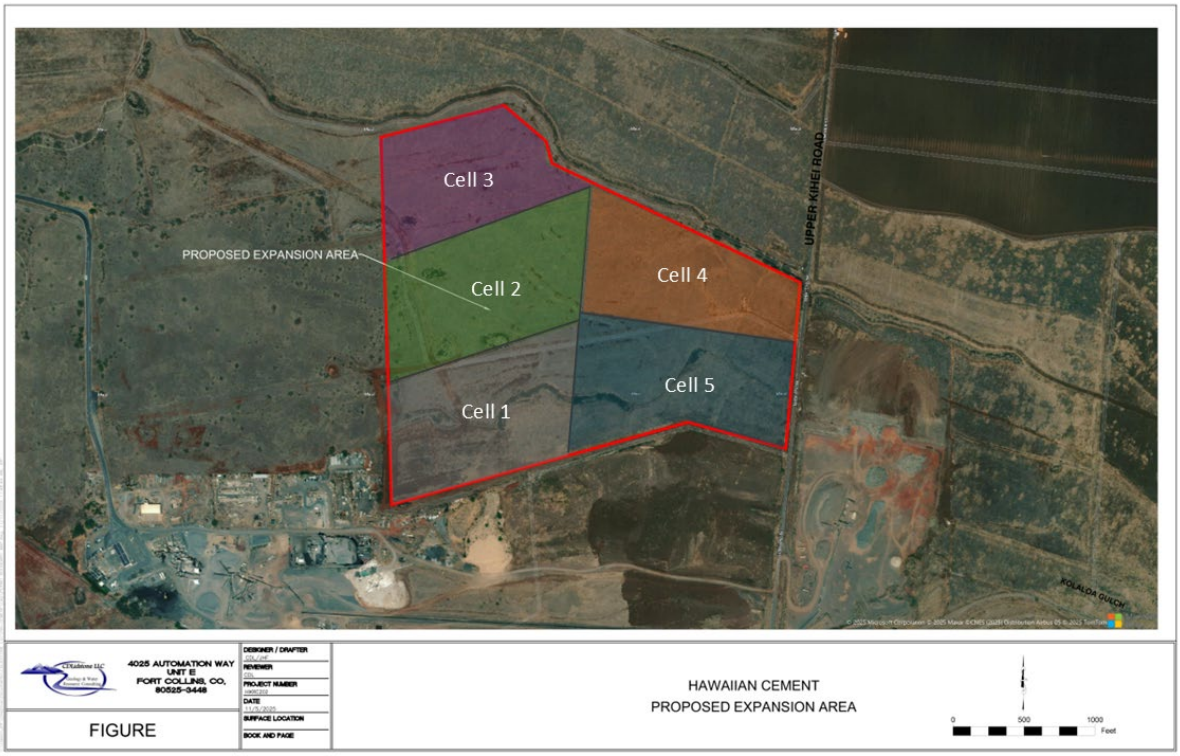


Figure 5: Proposed mining cell order, with cell 1 being mined first and cell 5 being mined last with contemporaneous reclamation upon the completion of mining each cell.

Appendices

Appendix A-1

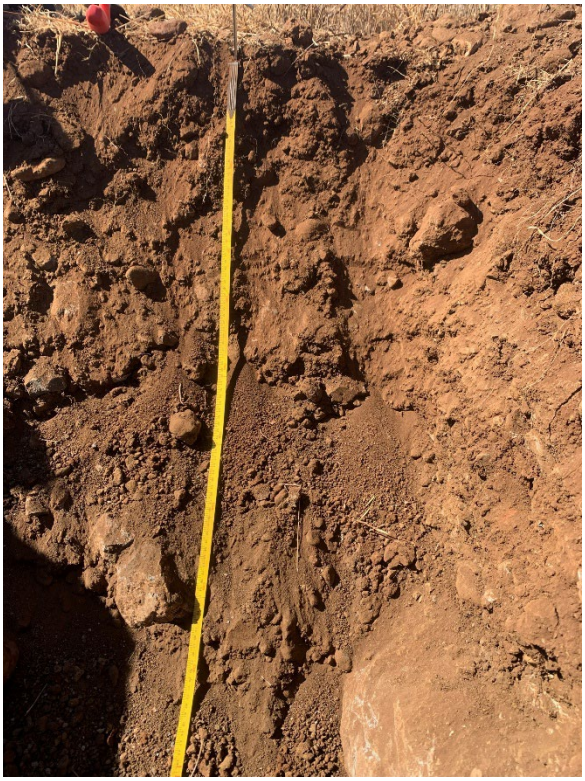
Soil Test Pit Logs from Reclaimed Mine Area

Location indicates the latitude and longitude coordinates of the test pit. Rooting depth indicates the lower limit of the bulk rooting depth where roots were most dense along the soil profile. Stratification refers to the presence or absence of soil horizons; distinct layers present in the soil profile.

Test Pit Number	Test Pit ID	Location	Age of Reclamation	Depth (in)	Rooting Depth (in)	Stratification	Depth A Horizon (in)	Depth B Horizon (in)
1	Reclaimed-1	20.81739 -156.43872	2015	39.4	13.8	No	N/A	
2	Reclaimed-2	20.81859 -156.43751	2018	39.4	7.9	No	N/A	N/A
3	Reclaimed-3	20.81766 -156.43623	2018	39.4	7.9	No	N/A	N/A
4	Reclaimed-4	20.81643 -156.43766	2010	19.7	7.5	No	N/A	N/A
5	Reclaimed-5	20.81457 -156.44025	2011	31.5	7.1	No	N/A	N/A
Average				**33.9**	**8.8**			

Test Pit 1 Reclaimed

Test Pit 2 Reclaimed



Test Pit 3 Reclaimed

Test Pit 4 Reclaimed

Test Pit 5 Reclaimed

Appendix A-2

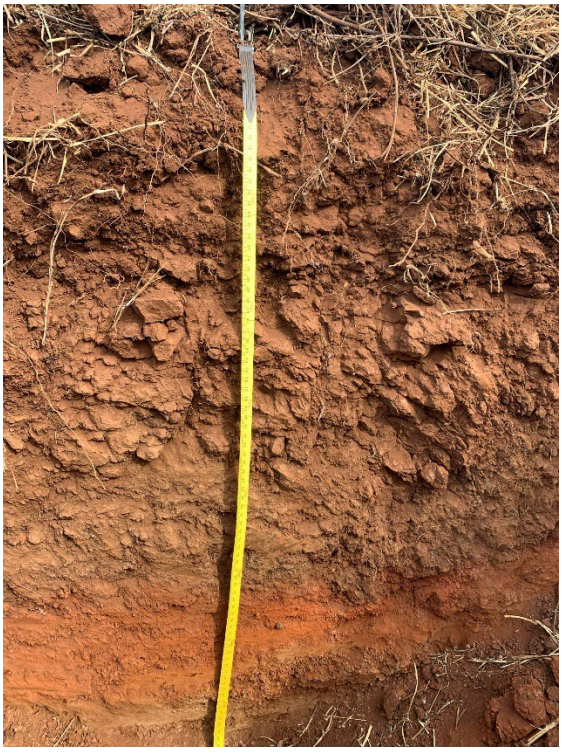
Soil Test Pit Logs from Expansion Mine Area

Location indicates the latitude and longitude coordinates of the test pit. Rooting depth indicates the lower limit of bulk rooting depth where roots were most dense along the soil profile. Stratification refers to the presence or absence of soil horizons; distinct layers present in the soil profile.

Test Pit Number	Test Pit ID	Location	Age of Reclamation	Depth (in)	Rooting Depth (in)	Stratification	Depth A Horizon (in)	Depth B Horizon (in)
1	Expansion-1	20.82098 -156.4361	N/A	23.6	5.1	Yes	19.7	23.6
2	Expansion-2	20.82127 -156.4383	N/A	27.6	9.8	Yes	11.8	27.6
3	Expansion-3	20.82084 -156.44103	N/A	33.5	8.3	Yes	9.8	17.7
4	Expansion-4	20.82387 -156.4391	N/A	25.6	6.7	Yes	13.8	25.6
5	Expansion-5	20.82312 -156.43536	N/A	29.5	15.7	Yes	10.6	20.9
Average				**28.0**	**9.1**		**13.1**	**23.1**

Test Pit 6 Expansion

Test Pit 7 Expansion



Test Pit 8 Expansion

Test Pit 9 Expansion

Test Pit 10 Expansion

Appendix A-3

Soil Nutrient and Physical Analysis Data

	Reclaimed	Expansion		
	Overall Average	**Overall Average**	**A horizon Average**	**B horizon Average**
TEC	28.19	16.33	18.43	13.84
pH (1:1)	8.34	7.65	7.72	7.74
Sulfur	18.86	14.42	9.40	16.00
Phosphorus	2.50	8.00	9.50	8.00
Olsen P	11.14	11.45	17.00	7.40
Calcium	3300.43	1334.42	1743.60	995.20
Magnesium	873.57	864.33	887.20	774.00
Potassium	144.57	185.92	353.20	75.60
Sodium	731.43	311.83	169.20	391.60
Boron	0.95	1.06	1.07	1.19
Iron	66.29	54.33	64.00	42.60
Manganese	58.00	164.00	245.80	145.00
Copper	0.69	1.23	1.86	0.95
Zinc	0.41	0.99	0.99	< 0.4
Aluminum	990.43	851.08	748.00	915.20
Nitrate-N	3.73	4.38	5.10	4.50
Ammonium-N	0.70	1.84	3.25	0.80
Oranic Carbon %	0.58	1.06	1.45	0.81
% clay	16.18	23.46	28.73	23.20
% silt	29.53	40.01	35.33	40.29
% sand	54.29	36.53	35.93	36.51

Soil nutrients are reported in parts per million (mg/kg). Total exchange capacity (TEC) is calculated cation exchange capacity (CEC), reported in meq/100g (cmols/kg). Total organic carbon (TOC) % x 2 ~ % SOM (soil organic matter).

* One outlier was removed from the Expansion Phosphorus and Olsen P averages.

Appendix B

Vegetation Transect Data

Data gathered along the two vegetation transects. Data was gathered according to the line-point-intercept methodology whereby a straight line transect is chosen and ground cover is measured at distinct intervals along the transect. Transect length was 50 meters and spacing interval between points was one meter. Cover is measured as the vegetation or ground cover that intercepts a dropped pin flag at each point along the spacing interval. Canopy height was measured at five regularly spaced points along the transect. CECI: *Cenchrus ciliaris*, L: litter, S: soil. Percent cover is calculated as the percentage of individual points where that type of ground cover was recorded.

Veg-1 **Location: 20.81846, -156.43756** **Azimuth 311**						**Veg-2** **Location: 20.81733, -156.43809** **Azimuth 50**					
Point	**Top layer**	**Top layer height (in.)**	**Lower layer 1**	**Lower layer 2**	**Soil surface**	**Point**	**Top layer**	**Top layer height (in.)**	**Lower layer 1**	**Lower layer 2**	**Soil surface**
1	CECI		L		S	1					S
2	CECI		L		S	2					S
3	CECI		L		S	3			rock		S
4	CECI				S	4					S
5	CECI				CECI	5			rock		S
6	CECI		L		S	6					S
7	CECI		L		S	7					S
8	CECI		rock		S	8			L		S
9			L		S	9	CECI				CECI
10			L		S	10	CECI	22.4	L		S
11	CECI	21.7	L		S	11	CECI				S
12	CECI		L		S	12			L		S
13	CECI		L		S	13	CECI				CECI
14			L		S	14			L		S
15	CECI		L		S	15			L		S
16			L		S	16			rock		S
17			L		S	17	CECI				S
18	CECI		L		S	18	CECI				S
19	CECI				rock	19	CECI	18.9	L		S
20	CECI	25.2	L		S	20			L		S
21	CECI		L		S	21			L		S
22			L		S	22			rock	L	S
23	CECI				CECI	23			L		S
24	CECI		L		S	24			L		S
25	CECI				CECI	25			L		S
26					S	26	CECI		L		S
27	CECI		L		S	27			L		S
28	CECI				CECI	28			L		S
29	CECI				S	29			L		S
30	CECI	29.9			CECI	30	CECI	21.3			S
31	CECI		L		S	31			L		S
32	CECI				S	32	CECI				S
33	CECI		L		S	33	CECI		L		S
34	CECI				S	34	CECI		L		S
35	CECI				S	35	CECI				CECI
36	CECI		L		S	36	CECI		L		S
37	CECI		L		S	37	CECI		L		S
38			L		S	38	CECI				CECI

Veg-1 **Location: 20.81846, -156.43756** **Azimuth 311**						**Veg-2** **Location: 20.81733, -156.43809** **Azimuth 50**					
Point	**Top layer**	**Top layer height (in.)**	**Lower layer 1**	**Lower layer 2**	**Soil surface**	**Point**	**Top layer**	**Top layer height (in.)**	**Lower layer 1**	**Lower layer 2**	**Soil surface**
39			L		S	39	CECI		L		S
40	CECI	26.0	L		S	40					S
41			L		S	41	CECI	26.0	L		S
42			L		S	42	CECI		L		S
43	CECI		L		S	43	CECI		L		S
44			L		S	44	CECI		L		S
45	CECI				CECI	45	CECI	17.7	L		S
46	CECI		L		S	46			L		S
47	CECI				CECI	47			L		S
48	CECI		L		S	48			L		S
49	CECI	31.9	L		S	49			L		S
50					S	50			L		S
% foliar cover		74				% foliar cover		44			
% bare ground		4				% bare ground		18			
% basal cover		14				% basal cover		8			
Average height		26.9 in				Average height		21.3 in			

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November 25, 2025

Mr. Keʻeaumoku Kapu
ʻAha Moku o Maui
562-A Front Street
Lahaina, Hawaiʻi 96761

SUBJECT: Proposed Hawaiian Cement Puʻunēnē Quarry Relocation

Dear Mr. Kapu:

Thank you for your email dated November 3, 2025, providing comments on the proposed Hawaiian Cement Supplemental Puʻunēnē Quarry project in response to our consultation letter. On behalf of Hawaiian Cement, we offer the following information in response.

Comment No. 1

I am very concerned about the mitigation plans for careful monitoring for these areas that historically are high in concentration of human remains. What archeological company will you be hiring to assist with a monitoring plan or any mitigations plans? I would like to see what was recommended through SHPD.

Also, what are some the methods of practice that will be use for mitigation if you do come across human remains? Will you be doing any ground penetrating work to help minimize the impact to historical areas?

Response: Mahalo for this comment. The status of archaeological work is summarized below.

To assess archaeological resources/impacts, Cultural Surveys Hawaiʻi (CSH) prepared an Archaeological Inventory Survey (AIS) which has been submitted to State Historic Preservation Division (SHPD). The preliminary finding of the AIS was that "no historic properties will be affected in the project area", but the final determination is pending from SHPD. The draft AIS recommended that no further archaeological work would be necessary on the project site. We would be happy to share the draft AIS with you for review if that would be helpful, and we will plan to share the response letter we receive from SHPD after their review of the project. In addition, several other SHPD-reviewed studies have been completed in the vicinity of the site, which also did not document significant archaeological features.

It is noted that SHPD's review will likely not be complete before the Maui Planning Commission meeting scheduled for the project. As such, as a further mitigation measure, the Planning Department has proposed a condition on the State Special Permit (SP) to cease work in the area of any historical finds, if they are

inadvertently discovered during work on the site. SHPD would be contacted for further guidance. Also, Hawaiian Cement is committed to following SHPD's recommendations after their review of the AIS.

We appreciate your review of our letter. Should you have any questions or further comments, or require additional information, please feel free to contact me at (808) 244-2015 or at finn@munekiyohiraga.com.

Very truly yours,

Finn Gibson,
Analyst

FG:de
cc: Brailey Gonsalves, Department of Planning
Kurt Wollenhaupt, Department of Planning
Danny Dias, Department of Planning
Dave Gomes, Hawaiian Cement
Keoni DeRego, Hawaiian Cement
K:\DATA\HawnCemt\PuuneneSupplQuarry\Apps\AHA Moku Consultation\Response\Aha Moku O Maui Response.docx

From: Finn Gibson
To: Brailey K. Gonsalves
Cc: karlynn
Subject: FW: Nā Kūpuna o Lahaina Consultation Letter
Date: Tuesday, November 25, 2025 8:18:34 AM
Attachments: image001.png

Aloha Brailey,

Apologies for not fowarding you this correspondence sooner. Please find the email response we received from Mr. Ke'eaumoku Kapu based on the letters we sent out to Na Kupuna o Lahaina and Aha Moku. This was the only response we received.

Mahalo!

Finn Gibson ANALYST
Email: finn@munekiyohiraga.com

MUNEKIYO HIRAGA

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Maui: 305 High Street, Suite 104, Wailuku, Hawaii 96793 T: 808.244.2015
Planning. Project Management. Sustainable Solutions. www.munekiyohiraga.com

---

From: Ke'eaumoku Kapu <kapukapuakea@gmail.com>
Sent: Monday, November 3, 2025 4:32 PM
To: Finn Gibson <finn@munekiyohiraga.com>
Cc: rinalei@aol.com; MauiFay@me.com
Subject: Re: Nā Kūpuna o Lahaina Consultation Letter

Kala mai Mr Finn and mahalo for including me with this correspondence to Na Kupuna o Lahaina. Apparently I did not get this mapping and proposed plan. Must have got lost in the shuffle but as I am looking through it I am very concerned about the mitigation plans for careful monitoring for these areas historically are high in concentration of human remains. What archeological company will you be hiring to assist with a monitoring plan or any mitigations plans I would like to see what was recommended through SHPD.

Also what are some the methods of practice will be mitigated if you do come across human remains. Will you be doing any ground penetrating work to help minimize the impact to historical areas

This should be one of my top priorities we are majorly concerned about.

Mahalo and I will also be getting with Rina Samson and Na Kupuna o Lahaina to see if they also have other

concerns.

Ke'eaumoku Kapu (CEO)
Aha moku o Maui Inc.
PO Box 11524
Lahaina HI 96761

On Mon, Nov 3, 2025 at 3:40 PM Finn Gibson <finn@munekiyohiraga.com> wrote:

> Aloha Ms. Sampson,
>
> I hope you are well. I am writing to re-send a consultation letter regarding the Hawaiian Cement Puunene Quarry Project for your review and comment. We had originally sent the letter in October, but having heard that Mr. Cody Nemet didn't receive his letter, we wanted to ensure that yours was delivered successfully. Please feel free to reach out with any questions or concerns you may have.
>
> Mahalo!
>
> **Finn Gibson** ANALYST
>
> Email: finn@munekiyohiraga.com
> Oahu: 225 Queen Street, Suite 200, Honolulu, Hawaii 96813 T: 808.983.1233
> Maui: 305 High Street, Suite 104, Wailuku, Hawaii 96793 T: 808.244.2015
> Planning. Project Management. Sustainable Solutions. www.munekiyohiraga.com
>
>

DRAFT
Cultural Impact Assessment for the Hawaiian Cement New Mining Area Project, Pūlehunui Ahupuaʻa, Pūʻali Komohana Moku, Wailuku District, Maui, TMK: (2) 3-8-004:001

Prepared for
Hawaiian Cement

Prepared by
Chantellee Konohia Spencer, B.A.
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.
Kailua, Hawaiʻi
(Job Code: PULEHUNUI 22)

November 2025

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P.O. Box 1114
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Management Summary

Reference	Cultural Impact Assessment for the Hawaiian Cement New Mining Area Project, Pūlehunui Ahupua‘a, Pū‘ali Komohana Moku, Wailuku District, Maui, TMK: (2) 3-8-004:001 (Spencer and Hammatt 2025)
Date	November 2025
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: PULEHUNUI 22
Agencies	Environmental Review Program (ERP)
Land Jurisdiction	Private
Project Location	The project area is within agricultural land (portions of Fields 815 and 818) along the western side of Upper Kīhei Road. It is on the western flank of Haleakalā and near the edge of the central isthmus of Maui. The southern and eastern sides and of the project area are bounded by the current Hawaiian Cement Quarry area, the southwestern corner is bounded by an active industrial area, and the northern and western sides are bounded by agricultural fields. The project area is depicted on portions of the 2017 Paia and 2017 Puu o Kali USGS 7.5-minute topographic quadrangles.
Project Description	Hawaiian Cement proposes to develop a new mining area adjacent to their existing quarry area.
Project Acreage	Approximately 125 acres (50.59 hectares)
Document Purpose and Regulatory Context	This cultural impact assessment (CIA) supports compliance for the Hawaiian Cement New Mining Area Project with: • Ka Pa‘akai O Ka‘aina v. Land Use Commission (94 Hawai‘i 31), in which the Hawai‘i Supreme Court established a three-part analytical framework to assist the state and counties in fulfilling their constitutional obligation to preserve and protect traditional and customary practices (TCP refers to “traditional and customary practices]) exercised by Native Hawaiians, to the extent feasible; • the mandate set forth by the Hawai‘i State Constitution (Articles IX and XII), courts, Hawai‘i Regulatory Statutes (HRS), and Hawai‘i Administrative Rules (HAR) and other Hawai‘i State laws requiring government agencies to promote and preserve cultural beliefs, practices. and resources of Native Hawaiians and other ethnic groups; • the State of Hawai‘i’s environmental review process under HRS §343, which requires consideration of the proposed project’s potential effects on cultural practices and cultural features in order to “promote responsible decision making” (HRS §343); and

	• the State of Hawai‘s historic preservation review process under HAR §13-275-6 and §13-284-6, which requires the identification and mitigation of adverse effects proposed by a potential project in order to “promote the use and conservation of historic properties for the education of the citizens of Hawai‘i” (HAR §13-275-6). This CIA contains information gathered from archival research and consultation, compiled in order to “analyze the impact of a proposed action on cultural practices and features associated with the project area” (Environmental Council 1997). Cultural practices and cultural features may include traditional cultural properties (TCPs), designated significant historic properties under State of Hawai‘i significance Criterion e, pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that “have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity” (HAR §13-275-6 and §13-284-6). This project also includes a Ka Pa‘akai Analysis Study. In Ka Pa‘akai vs Land Use Commission, 94 Hawai‘i (2000) the Court held the following analysis must also be conducted: 1. The identity and scope of valued cultural, historical, or natural resources in the petition area, including the extent to which traditional and customary Native Hawaiian rights are exercised in the petition area; 2. the extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and 3. the feasible action, if any, to be taken to reasonably protect Native Hawaiian rights if they are found to exist.
Results of Background Research	Background research for this project yielded the following information (presented in approximate chronological order): 1. The current project area is located on the western flank of Haleakalā in the *moku* (district) of Kula and *ahupua‘a* (traditional land division usually extending from the mountains to the sea) of Pūlehunui. Overall, Pūlehunui Ahupua‘a begins at Kilohana Peak, on the summit ridge of Haleakalā, and ends at a mid-point on the west shore of the central plains at a shared boundary with Waikapū Ahupua‘a, encompassing a total area of 16,687.78 acres (McCully 1879).

	2. The lands of coastal Pūlehunui were rich in marine resources. Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine resource collection (Kolb et al. 1997:25). 3. Ke Kula o Kama‘oma‘o, or the Plains of Kama‘oma‘o, is a region of the central Maui isthmus close to the present project area that was known by Hawaiians in traditional times as a wandering place of the souls (Beckwith 1970:154). 4. About the year 1776, Kama‘oma‘o Plain saw the battle of Kakanilua between Kalani‘ōpu‘u and Kahekili. Kalani‘ōpu‘u‘s army was annihilated in what was recognized as one of the most legendary battles of pre-contact Hawai‘i (Kamakau 1992:85). 5. During the early and middle 1800’s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from Western disease and nucleation around the developing port towns (Kuykendall 1968:312–313). 6. A total of 13 land commission claims were made in Pūlehunui, and nine were awarded (Land Commission Awards [LCAs] 0327B, 9671, 9019, 4672, 9672, 9673, 8866, 4567, and 5230). Only one of these awards, LCA 5230, is immediately surrounding and inclusive of the current project area. 7. The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. Kula became the area of highest potato production in Hawai‘i and was known as “the potato district” (the area between 2,000 and 5,000 ft elevation). During this time, sugar cultivation and ranching were established in the Kula region (Brown and Haun 1989:C-7 and C-6). 8. During World War II, Pu‘u Nēnē Naval Air Station became the command headquarters for both Navy and Army units on the island of Maui (Command History 1945). 9. The Hawaiian Cement Puunene Quarry started in the late-1970s with 28 acres. The quarry was further expended in 1980 to 194 acres. The primary resource of the quarry is basalt that is crushed and used for road base course, concrete and pavement aggregate, railroad ballast, and many other purposes (Yanik 2018).
Results of Community Consultation	CSH attempted to contact Hawaiian organizations, agencies, and community members as well as cultural and lineal descendants to identify individuals with cultural expertise and/or knowledge of the project area and vicinity. Community outreach letters were sent to 43 individuals or groups; two responded with recommendations for outreach but neither provided written testimony on the project, and none of these *kama‘āina* (native-born) and/or *kūpuna* (elder/of the grandparent’s generation) met with CSH for more in-depth interview(s).

	CSH initiated its outreach efforts in December 2024 and concluded it in November 2025. At the recommendation of the Office of Hawaiian Affairs (OHA), CSH included the community outreach letter in their newsletter (Appendix A) in November 2025, however, CSH received no responses.
Identification of Cultural Resources and Practices	Based on the results of community consultation and background research conducted as part of this CIA, CSH has identified the following cultural resources and practices within Pūlehunui Ahupua‘a: 1. Agricultural and gathering practices 2. Plant resources 3. Coastal and marine resources 4. *Mo‘olelo* (stories) and *wahi pana* (storied places)
Identification of Impacts on Cultural Resources and Practices	No impacts to ongoing cultural resources and practices were identified within the project area during background research and community consultation for this CIA.
Mitigation Possibilities Identified During Background Research and Consultation	The results of background research conducted for this CIA, inform the following mitigation possibilities promoting and preserving cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups: 1. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the State Historic Preservation Division (SHPD) will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* (ancestral remains) are identified, all earth-moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. 2. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.
Ka Pa‘akai Analysis	In Ka Pa‘akai vs Land Use Commission, 94 Hawai‘i (2000) the Court held the following analysis must also be conducted: 1. The identity and scope of valued cultural, historical, or natural resources in the study area, including the extent to which traditional and customary native Hawaiian rights are exercised in the study area;

	2. the extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and 3. the feasible action, if any, to be taken to reasonably protect native Hawaiian Rights if they are found to exist. Based on information gathered from the cultural and historical background, there are no cultural, historical, or natural resources identified within the current project area. However, the lack of in-depth responses from community consultation makes it difficult to determine the true extent of this project on the key aspects of a Ka Paʻakai Analysis. Most of the project area consists of agricultural fields that were formerly cultivated with sugarcane. No historic properties were identified by previous archaeological studies conducted within the project area. Puʻu Nēnē NAS abuts the western boundary of the project area and Camp K-3 is located makai of the project area along the Upper Kihei Road. Camp K-3 was cleared and planted in sugarcane by 1956 (Dagher 2020:41). An AIS was conducted alongside this study and it was concluded that no historic properties were identified or will be impacted by the proposed project. No further work was recommended (Ueki et al. 2025:179). At present, there is no documentation or testimony indicating traditional or customary Native Hawaiian rights are currently being exercised “for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778” (Hawai‘i State Constitution, Article XII, Section 7) within the specific project area. While no cultural resources, practices, or beliefs were identified as currently existing within the project area, Pūlehunui Ahupuaʻa maintains a rich cultural history in the exercise of traditional or customary Native Hawaiian rights within the project ahupuaʻa.

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Section 1 Introduction

1.1 Project Description

At the request of Hawaiian Cement, Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this cultural impact assessment (CIA) report for the Hawaiian Cement New Mining Area Project, Pūlehunui Ahupua‘a, Pū‘ali Komohana Moku, Wailuku District, Maui, TMK: (2) 3-8-004:001. The project area is approximately 125 acres (50.59 hectares) within agricultural land (portions of Fields 815 and 818) along the western side of Upper Kīhei Road. It is on the western flank of Haleakalā and near the edge of the central isthmus of Maui. The southern and eastern sides and of the project area are bounded by the current Hawaiian Cement Quarry area, the southwestern corner is bounded by an active industrial area, and the northern and western sides are bounded by agricultural fields. The project area is depicted on a portions of the 2017 Paia and 2017 Puu o Kali U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Figure 1), a tax map plat (Figure 2), and a 2023 aerial image (Figure 3).

Hawaiian Cement proposes to develop a new mining area adjacent to their existing quarry area. Hawaiian Cement currently operates its quarry, concrete batching, asphalt production, and concrete casting operations at its Pu‘unēnē Quarry within a portion of the existing permitted area of 45.957 acres. The change in mining progression was prompted by the unexpected change in land ownership. The entire 125-acre expansion area is proposed for project-related ground disturbance that will include the removal of the soil deposits overlying bedrock. The parcel is currently privately owned by Mahi Pono Central A, LLC and Hawaiian Cement has purchased 55 of the 125 acres and once permitting is complete, will purchase the remaining 70 acres.

1.2 Regulatory Context

This CIA supports compliance for the Hawaiian Cement New Mining Area Project with:

- Ka Pa‘akai O Ka‘aina v. Land Use Commission (94 Hawai‘i 31), in which the Hawai‘i Supreme Court established a three-part analytical framework to assist the state and counties in fulfilling their constitutional obligation to preserve and protect traditional and customary practices (TCP refers to “traditional and customary practices]) exercised by Native Hawaiians, to the extent feasible;
- the mandate set forth by the Hawai‘i State Constitution (Articles IX and XII), courts, Hawai‘i Regulatory Statutes (HRS), and Hawai‘i Administrative Rules (HAR) and other Hawai‘i State laws requiring government agencies to promote and preserve cultural beliefs, practices. and resources of Native Hawaiians and other ethnic groups;
- the State of Hawai‘i’s environmental review process under HRS §343, which requires consideration of the proposed project’s potential effects on cultural practices and cultural features in order to “promote responsible decision making” (HRS §343); and
- the State of Hawai‘s historic preservation review process under HAR §13-275-6 and §13-284-6, which requires the identification and mitigation of adverse effects proposed by a potential project in order to “promote the use and conservation of historic properties for the education of the citizens of Hawai‘i” (HAR §13-275-6).

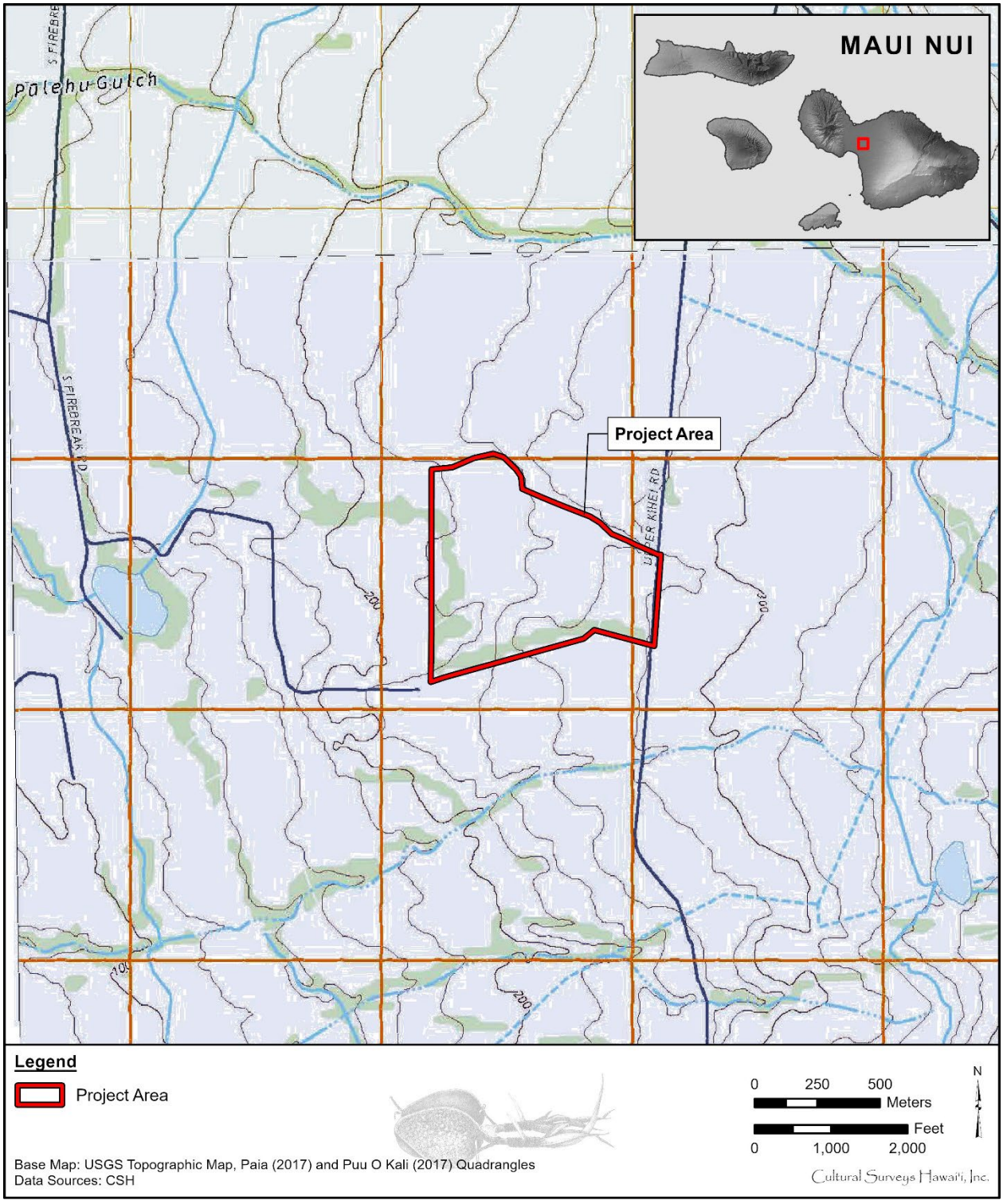


Figure 1. Portions of the 2017 Paia and 2017 Puu o Kali USGS 7.5-minute topographic quadrangles showing the location of the project area (U.S. Geological Survey 2017a, 2017b)

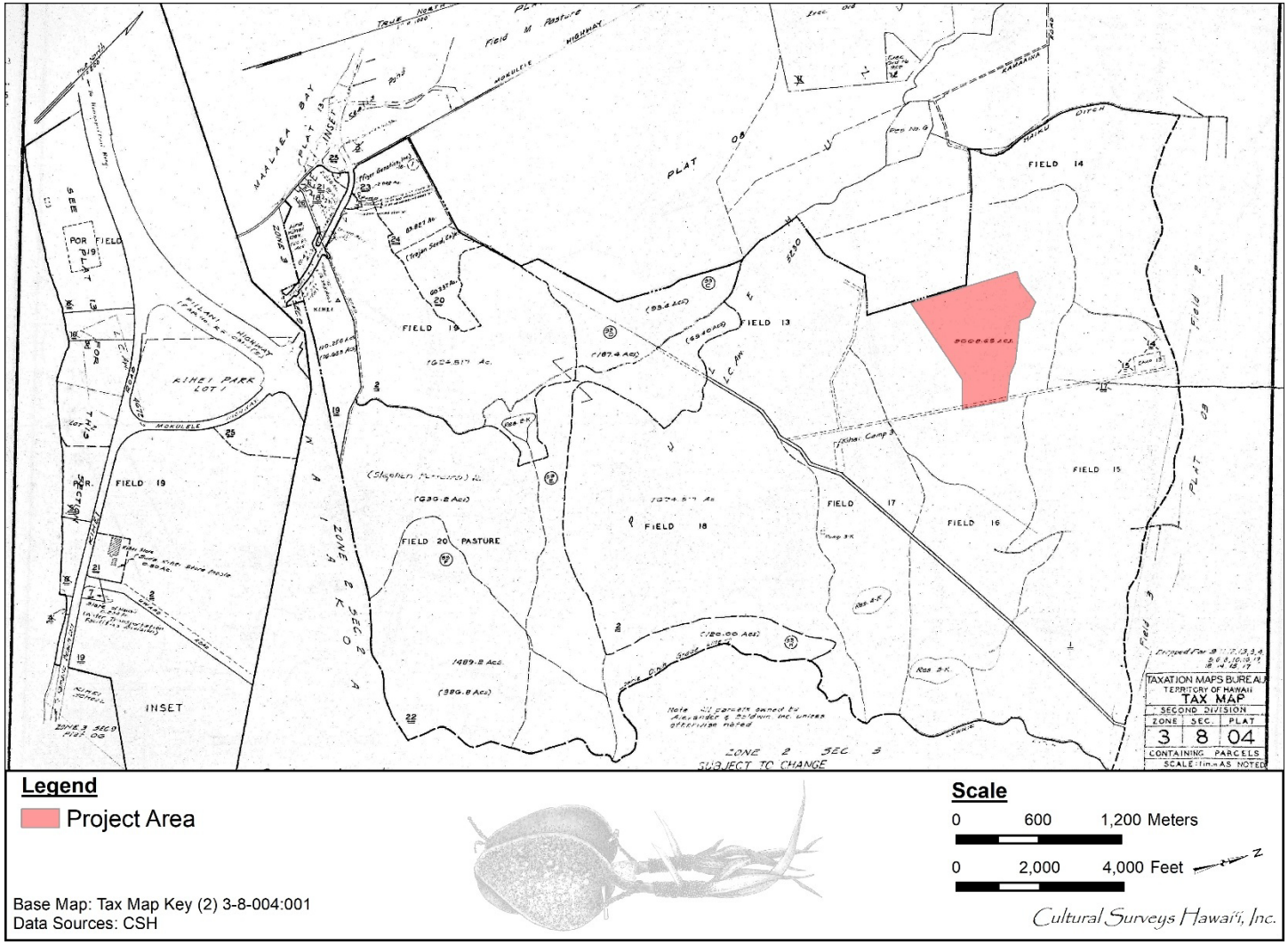


Figure 2. Tax Map Key (TMK) (2) 3-8-004 showing the project area (Hawaii TMK Service 2014)

Figure 3. EagleView Technologies Inc. (2023) aerial image of the project area

1.3 Document Purpose

This CIA contains information gathered from archival research and consultation, compiled in order to “analyze the impact of a proposed action on cultural practices and features associated with the project area” (Environmental Council 1997). Cultural practices and cultural features may include traditional cultural properties (TCPs), designated significant historic properties under State of Hawai‘i significance Criterion e, pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that “have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity” (HAR §13-275-6 and §13-284-6).

This project also includes a Ka Pa‘akai Analysis study. The purpose of the Ka Pa‘akai Analysis is to assist the client and responsible overseeing agencies to ensure the applicant has sufficiently assessed that the proposed project/action will not harm traditional and customary practices exercised by Native Hawaiians; and to provide sufficient documentation to support the overseeing agency’s assessment. In Ka Pa‘akai O Ka ‘Aina v. Land Use Commission, the Hawai‘i Supreme Court

> [...] articulated an analytical framework to assist state agencies in balancing the State‘s obligation to protect traditional and customary practices against private property (as well as competing public) interests, by requiring specific findings and conclusions about:
>
> 1. the identity and scope of ‘valued cultural, historical, or natural resources’ in the relevant area, including the extent to which traditional and customary native Hawaiian rights are exercised in releveant area;
> 2. the extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and
> 3. the feasible action, if any, to be taken by the [agency] to reasonably protect native Hawaiian rights if they are found to exist. [Ka Pa‘akai O Ka ‘Aina v. Land Use Comm‘n, 94 Hawai‘i 31, 35, 47 and 52–53, 7 P.3d 1068, 1072, 1084 and 1089–90 (2000)]

1.4 Natural Environment

The current project area is located on the western flank of Haleakalā along the edge of the level central isthmus of Maui. The project area is approximately 4.53 km (2.81 mi) from the nearest shoreline at Mā‘alaea Bay, and the elevation is ranges from 64 to 86 m (210 to 282 ft) above mean sea level (AMSL). The topography of the project area is a gentle westward slope. The project area, and overall quarry site, is bisected by Kolaloa Gulch, a perennial tributary to Keālia Pond. Other nearby gulches include Pūlehu Gulch to the north of the project area and Keāhuaiwi Gulch to the south of the project area.

In 2014, the average monthly air temperature for the project area was between 21.43°C (70.58°F) in January and 25.50°C (77.90°F) in August, with an average annual air temperature of 23.51°C (74.31°F) (Giambelluca et al. 2014). The vicinity of the project area received a mean annual rainfall of 327.0 mm (12.87 inches) between 1978 and 2007, according to the University

of Hawai‘i 2011 *Online Rainfall Atlas of Hawaii* (Giambelluca et al. 2013). The mean monthly rainfall varied between 1.4 mm (0.06 inch) in June and 82.4 mm (3.24 inches) in January. This pattern of rainfall and low annual precipitation rate once sustained a lowland, dry shrubland, and grassland native ecosystem (Pratt and Gon 1998).

Most of the project area consists of agricultural fields that were formerly cultivated with sugarcane (*Saccharum officinarum*). Under the ownership of Mahi Pono Central A, LLC, the land is within Fields 815 and 818 that are planted with citrus trees. Other vegetation includes *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), and grasses.

1.4.1 *Nā Lepo* (Soils)

According to the U.S. Department of Agriculture (USDA) (2001) Soil Survey Geographic (SSURGO) database and soil survey data gathered by Foote et al. (1972), the project area's soils consist of Pulehu silt loam, 0 to 3 percent slopes (PpA), Pulehu silt loam, 3 to 7 percent slopes (PpB), Pulehu cobbly silt loam, 3 to 7 percent slopes (PrB), Waiakoa very stony silty clay loam, 3 to 7 percent slopes (WgB), Waiakoa silty clay loam, 3 to 7 percent slopes (WeB), and Waiakoa extremely stony silty clay loam, 3 to 25 percent slopes, eroded (WID2) (Figure 4).

Pulehu Series soils are described as follows:

> This series consists of well-drained soils on alluvial fans and stream terraces and in basins. These soils occur on the islands of Lanai, Maui, Molokai, and Oahu. They developed in alluvium washed from basic igneous rock. The soils are nearly level to moderately sloping. Elevations range from nearly sea level to 300 feet. The annual rainfall amounts to 10 to 35 inches. The mean annual soil temperature is 74° F. Pulehu sops are geographically associated with Ewa, Jaucas, Kealia, Lualualei, Waialua, and Mala soils.
>
> These soils are used for sugarcane, truck crops, pasture, homesites, and wildlife habitat. The natural vegetation consists of bermudagrass, bristly foxtail, fingergrass, kiawe, klu, lantana, koa haole, and sandbur. [Foote et al. 1972:115]

Pulehu silt loam, 0 to 3 percent slopes (PpA) is described as follows:

> This soil is similar to Pulehu clay loam, 0 to 3 percent slopes, except that the texture is silt loam. This soil is used for sugarcane. Small acreages are used for homesites.
>
> (Capability classification I if irrigated, IVc if nonirrigated; sugarcane group 1; pasture group 2) [Foote et al. 1972:116]

Pulehu silt loam, 3 to 7 percent slopes (PpB) is described as follows:

> This soil is similar to Pulehu clay loam, 0 to 3 percent slopes, except that the texture is silt loam. Runoff is slow, and the erosion hazard is slight. Included in mapping were small areas underlain by coral sand at a depth of 20 to 36 inches.
>
> This soil is used for sugarcane. (Capability classification IIe if irrigated, IVc if nonirrigated; sugarcane group 1; pasture group 2) [Foote et al. 1972:116]

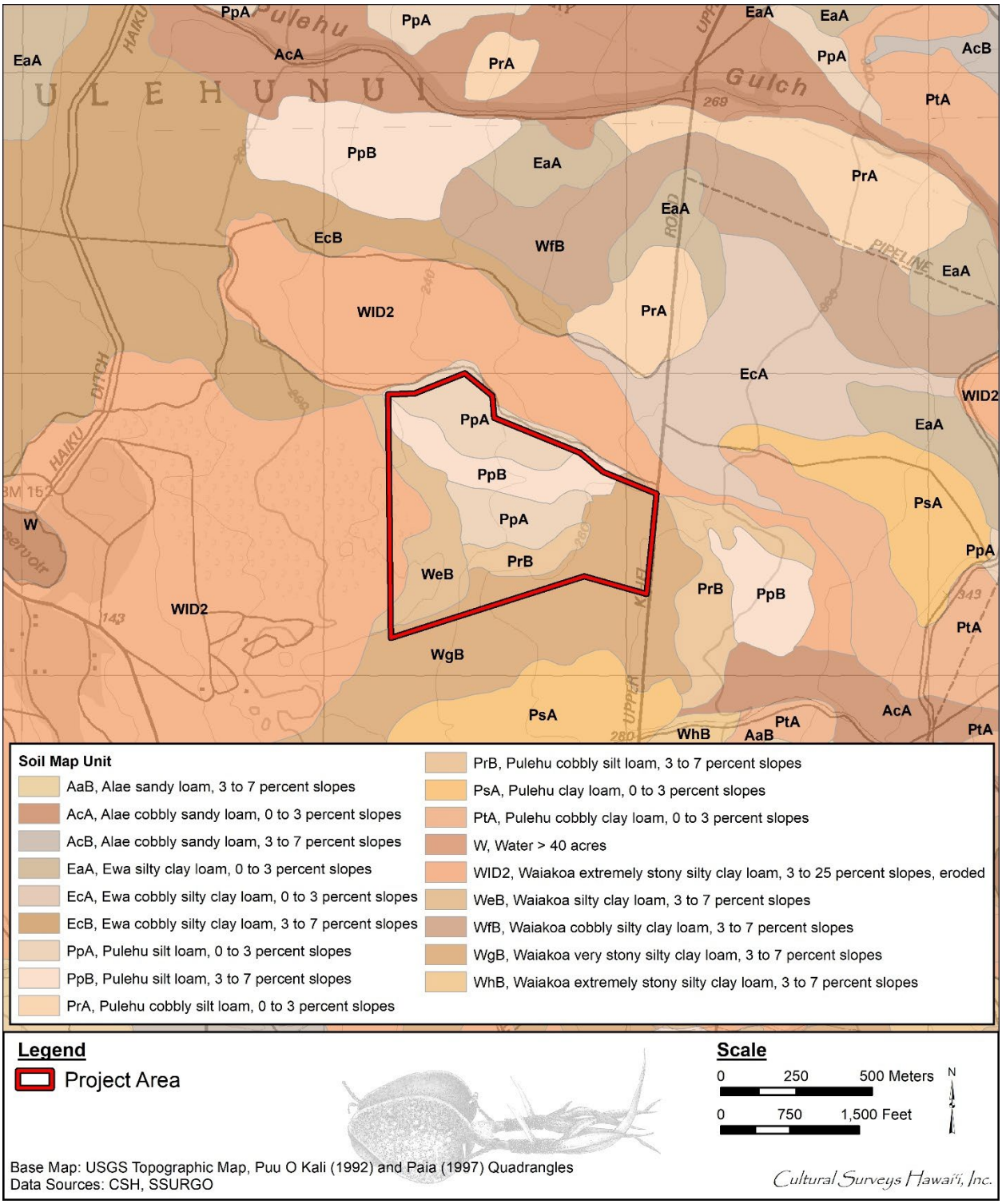


Figure 4. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture 2001)

Pulehu cobbly silt loam, 3 to 7 percent slopes (PrB) is described as follows:

> This soil is similar to Pulehu clay loam, 0 to 3 percent slopes, except that the texture is silt loam, and the surface layer is cobbly. Runoff is slow, and the erosion hazard is slight. Included in mapping were small areas underlain by coral sand at a depth of 20 to 36 inches.
>
> This soil is used for sugarcane. Small areas are used for pasture. (Capability classification IIe if irrigated, IVs if nonirrigated; sugarcane group 1; pasture group 2) [Foote et al. 1972:116]

Waiakoa Series soils are described as:

> This series consists of well-drained soils on uplands on the island of Maui. These soils developed in material weathered from basic igneous rock. The upper part of the profile is influenced by volcanic ash. These soils are gently sloping to moderately steep. Elevations range from 100 to 1,000 feet. The annual rainfall amounts to 12 to 20 inches; most of it occurs in winter. The mean annual soil temperature is 74° F. Waiakoa soils are geographically associated with Keahua and Keawakapu soils.
>
> These soils are used for sugarcane, pasture, homesites, and wildlife habitat. The natural vegetation consists of buffelgrass, feather fingergrass, ilima, kiawe, uhaloa, and zinnia. [Foote et al. 1972:126]

Waiakoa very stony silty clay loam, 3 to 7 percent slopes (WgB) is described as follows:

> This soil is on smooth, low uplands. Included in mapping were small areas of Keahua and Keawakapu soils. Also included were small, nearly level areas.
>
> In a representative profile the surface layer is dark reddish-brown silty clay loam about 2 inches thick. The subsoil, about 23 inches thick, is dark reddish-brown and very dark grayish-brown silty clay loam that has prismatic structure or is massive. The substratum is very dark brown silty clay loam and hard, basic igneous rock. The soil is neutral in the surface layer and slightly acid to neutral in the subsoil.
>
> Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.5 inches per foot of soil. In places roots penetrate to bedrock. [Foote et al. 1972:126]

Waiakoa silty clay loam, 3 to 7 percent slopes (WeB) is described as follows:

> This soil has a profile like that of Waiakoa very stony silty clay loam, 3 to 7 percent slopes, except that it is nonstony. Included in mapping were small, nearly level areas.
>
> This soil is used for sugarcane. Small acreages are used for pasture and homesites. (Capability classification IIe if irrigated, VIs if nonirrigated; sugarcane group 1; pasture group 1) [Foote et al. 1972:127]

Waiakoa extremely stony silty clay loam, 3 to 25 percent slopes, eroded (WID2) is described as follows:

> This soil is similar to Waiakoa very stony silty clay loam, 3 to 7 percent slopes, except that it is eroded and stones cover 3 to 15 percent of the surface. In most areas about 50 percent of the surface layer has been removed by erosion. Runoff is medium, and the erosion hazard is severe. Included in mapping were small, steep areas. Also included were a few cinder cones.
>
> This soil is used for pasture and wildlife habitat. (Capability classification VIIs, nonirrigated; pasture group 1) [Foote et al. 1972:127]

1.4.2 *Nā Makani* (Winds)

Northeasterly trade winds prevail throughout the year, although their frequency varies from 80-95% of the time during the summer months, when high-pressure systems tend to be located north and east of the Hawaiian Islands. During the winter months, the high pressure systems are located farther to the south, decreasing the occurence of the trade winds to about 50-80% of the time (WRCC 2010).

The Hawaiian word for wind is *makani*. *The Wind Gourd of La‘amaomao* tells the story of Pāka‘a and his son Kuāpāka‘a who are descendants of the wind goddess La‘amaomao. With their possession of this special wind gourd, they could control and call forth the winds of Hawai‘i. Pāka‘a’s chant traces the winds of Maui in the *moku* of Wailuku. Five distinct winds are identified in relation to the project area and nearby *ahupua‘a*: *Wawahi-hale, Kololio, I‘a-iki, ‘O‘opu*, and *Kaua‘ula* (Nakuina 1992:51). Pāka‘a’s chant is listed below:

Kololio mai o Waikapu,	Kololio is of Waikapū,
He i‘a iki ko Wailuku,	I‘a-iki is of Wailuku,
He oopu ko Waihee,	‘O‘opu is of Waihe‘e,
Pa ka makani Kauaula,	The Kaua‘ula wind blows,

[Nakuina 1902:68;1992:62]

1.4.2.1 Maui Vortex

Pāka‘a’s wind chant recognizes an upwardly circulating wind pattern in the following lines: “*He pelu ka makani no kai, He kupa he okea ka makani*” which translates to “The wind that doubles up is of the lowlands, Kupa and Okea are the winds,” (Nakuina 1902:69;1992:63). In the iteration of the chant found in Sterling (1998:7), *okea* is written as *okee*, meaning, “To veer, as the wind, to change, as direction; to eddy” (Pukui and Elbert 1986:281).

The Maui Vortex is a diurnal weather pattern, dissipating in the evening when the slopes of Haleakalā cool. It was modelled in 1949 by Luna Leopold, Chief Meteorologist at the Pineapple Research Institute (Leopold 1949), and again in 1966 by the National Weather Service (Peterson 1966).

1.4.3 *Ua* (Precipitation)

Precipitation is a major component of the water cycle, and is responsible for depositing *wai* (fresh water) on local flora. Pre-Contact *kānaka* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer) lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *ho‘oilo* (winter, rainy season) continues through the end

of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more common (Giambelluca et al. 1986:17). Typically the maximum rainfall occurs in January and the minimum in June (Giambelluca et al. 1986:17). Handy and Pukui describe this seasonal change as follows:

> The season of storm and rain was termed Ho‘oilo, including roughly the period of November through March, It commenced with ‘Ikuwa (October-November) whose name means ‘Loud-voice,’ when Lono’s thunder resounds over uplands and plains. Now the long drought of summer, when the intense heat of radiation of sun on black lava combined with the steady tradewinds made the kula kai seared and dry as a black tropical desert and the kula uka brown and arid, gives way to moisture-laden southern warm fronts pressing inshore, as tradewinds lapse. November is a noisy month with variable strong winds; and with the winds come the roaring and pounding surf […] Commencing now and continuing through the rainy months until March, there was and is little deep-sea fishing, and inshore fishing depending on those occasions when the sea was not too rough. [Handy and Pukui 1977:23]

Rainfall accumulation near the project area averages around 15 inches per year with the heaviest rainfall occurring during the winter months (December through February) and little to no rainfall during the summer months (June through August) (Giambelluca et al. 1986). This pattern of rainfall and low annual precipitation rate may have once sustained a lowland, dry shrub land and grassland native ecosystem (Pratt and Gon 1998).

It was a customary and necessary tradition to grant a name for each type of rain. Rains were named to show their action toward plants or the supposed effects on people or their possessions (Pukui and Elbert 1986:361). Names of rain referencing the *moku* of Wailuku include *Hō‘eha‘ili,* the skin-hurting rain of Waiehu (Akana and Gonzalez 2015:36); *Kili*, a delicate gentle rain associated with Waihe‘e (Akana and Gonzalez 2015:81); *Kili‘o‘opu* found at Waihe‘e, Waiehu, Wailuku and Waikapū (Akana and Gonzalez 2015:83); *Ho‘olua* (to talk loudly and pointlessly), a heavy rain and intense north wind (Akana and Gonzalez 2015:40); *Lehua*, the wind and rain name of the *‘ōhi‘a lehua* (*Metrosideros macropus*, *M. collina subsp. polymorpha*) tree (Akana and Gonzalez 2015:146); *Līlīlehua* (tiny drops on the *lehua* blossom) which appears at East Maui, Honokōwai, Kā‘anapali, Kahana, Keka‘a, Pi‘iholo and Waiehu (Akana and Gonzalez 2015:155–158); and *Nahua* (to pelt, sting), a fine rain accompanying tradewinds on the north side of Maui, Hoeuli, Honokōwai, Kā‘anapali, Kahana, Keka‘a and Lāhaināluna (Akana and Gonzalez 2015:180–183). *Uhiwai* (water covering) is the heavy mist or fog of ‘Īao, as in the following phrase: “*Nae iki ‘Īao i ka uhiwai*. (Mount) ‘Īao is barely breathing in the heavy mist.” According to Pukui and Elbert (1986:364), this was a way of describing someone in anguish. *Nāulu* is a sudden shower, cloud and wind associated with ‘Alae, East Maui, Haleakalā, Kama‘oma‘o, Kula, Lau‘ulu, Olinda, Pi‘iholo, and a rain cloud from Kaho‘olawe to ‘Ulupalakua (Akana and Gonzalez 2015:191–193); the *‘Ūkiukiu* is of Makawao (Akana and Gonzalez 2015:259); and *Ulalena* (yellowish-red) is of Liliko‘i (Akana and Gonzalez 2015:262).

1.5 Built Environment

The current project area consists mostly of agricultural fields. The adjacent quarry site includes infrastructure and equipment that are used to quarry, transport, refine, and store quarry products. Infrastructure includes crushing equipment, conveyors, office and maintenance buildings, and storage buildings. The Puunene Armory and Maui Raceway Park are located west of the project area.

Section 2 CIA Methods

2.1 Archival Research

Research centers on Hawaiian activities including *ka‘ao* (legends), *wahi pana* (storied places), *‘ōlelo no‘eau* (proverbs), *oli* (chants), *mele* (songs), traditional *mo‘olelo* (stories), traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawai‘i State Archives, the Bishop Museum Archives, the University of Hawai‘i at Mānoa’s Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau 2014), the State Historic Preservation Division (SHPD) Library, the State of Hawai‘i Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona ‘Aina Corporation’s Māhele database (Waihona ‘Aina 2000), the Office of Hawaiian Affairs (OHA) Papakilo Database (Office of Hawaiian Affairs 2015), and the Ava Konohiki Ancestral Visions of ‘Āina website (Ava Konohiki 2015).

2.2 Consultation

Throughout the course of this assessment, an effort was made to contact and consult with Native Hawaiian Organizations (NHO), agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise and/or knowledge of the *ahupua‘a* of Pūlehunui.

2.2.1 Community Outreach, Interview, and Transcription Methods

2.2.1.1 Scoping for Participants

We begin our consultation efforts with utilizing our in-house contact list from previous outreach efforts to facilitate the interview process. This list often includes *kupuna* (elders), *kama‘āina* (native born), cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior’s NHO list), and community groups. We also contact agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response to the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts.

2.2.1.2 Talk Story Sessions

Prior to the interview, CSH cultural researchers explain the role of a CIA, how the consent process works, the project purpose, the intent of the study, and how their *‘ike* (insight) and *mana‘o* (opinion) will be used in the report. The interviewee is given an Authorization and Release Form to read and sign.

“Talk Story” sessions range from the formal (e.g., sit down and *kūkākūkā* [consultation, discussion] in participant’s choice of place over set interview questions) to the informal (e.g., hiking to cultural sites near the study area and asking questions based on findings during the field outing). In some cases, interviews are recorded and transcribed later.

CSH may conduct group interviews, which range in size. Group interviews usually begin with set, formal questions. As the group interview progresses, questions are based on interviewee’s answers. Group interviews are always transcribed and notes are taken. Recorded interviews assist the cultural researcher in 1) conveying accurate information for interview summaries, 2) reducing misinterpretation, and 3) providing missing details for *mo‘olelo*.

CSH seeks *kōkua* (assistance) and guidance in identifying past and current traditional cultural practices of the study area. Those aspects include general history of the *ahupua‘a*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana*, archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*ka‘ao* and *mo‘olelo*); referrals; and any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area.

2.2.1.3 Interview Completion

After an interview, CSH cultural researchers transcribe and create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the transcription and interview summary to the interviewee for review and ask them to make any necessary edits. Once the interviewee has made those edits, we incorporate their *‘ike* and *mana‘o* into the report. When the draft report is submitted to the client, cultural researchers then prepare a finalized packet of the participant’s transcription, interview summary, and any photos taken during the interview. We also include a thank you card and honoraria. This is for the interviewee’s records.

It is important to CSH cultural researchers to cultivate and maintain community relationships. The CIA report may be completed, but CSH researchers continuously keep in touch with the community and interviewees throughout the year—such as checking in to say hello via email or by phone, volunteering with past interviewees on community service projects, and sending holiday cards to them and their *‘ohana* (family). CSH researchers feel this is an important component to building relationships and being part of an *‘ohana* and community.

“*I ulu no ka lālā i ke kumu*—the branches grow because of the trunk,” an *‘ōlelo no‘eau* (#1261) shared by Mary Kawena Pukui with the simple explanation: “Without our ancestors we would not be here” (Pukui 1983:137). As cultural researchers, we often lose our *kūpuna* but we do not lose their wisdom and words. We routinely check obituaries and gather information from other informants if we have lost our *kūpuna*. CSH makes it a point to reach out to the *‘ohana* of our fallen *kūpuna* and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference.

Section 3 Traditional Accounts

3.1 *Ka‘ao* and *Mo‘olelo* (Legends and Stories)

Hawaiian storytellers of old were greatly honored; they were a major source of entertainment and their stories contained teachings while interweaving elements of Hawaiian lifestyles, genealogy, history, relationships, arts, and the natural environment (Pukui and Green 1995:IX). According to Pukui and Green (1995:XI), storytelling is better heard rather than read for much becomes lost in the transfer from the spoken to the written word and *ka‘ao* are often full of *kaona* or double meanings.

Ka‘ao are defined by Pukui and Elbert as a “legend, tale […], romance, [and/or] fiction” (Pukui and Elbert 1986:108). *Ka‘ao* may be thought of as oral literature or legends, often fictional or mythic in origin, and have been “consciously composed to tickle the fancy rather than to inform the mind as to supposed events” (Beckwith 1970:1). Conversely, Pukui and Elbert define *mo‘olelo* as a “story, tale, myth, history, [and/or] tradition” (Pukui and Elbert 1986:254). The *mo‘olelo* are generally traditional stories about the gods, historic figures or stories that cover historic events and locate the events with known places. *Mo‘olelo* are often intimately connected to a tangible place or space.

In differentiating *ka‘ao* and *mo‘olelo* it may be useful to think of *ka‘ao* as expressly delving into the *wao akua* (realm of the gods), discussing the exploits of *akua* (gods) in a primordial time. However, it is also necessary to note there are exceptions, and not all *ka‘ao* discuss gods of an ancient past. *Mo‘olelo* on the other hand, reference a host of characters from *ali‘i* (chief), to *akua* and *kupua* (supernatural beings), to finally *maka‘āinana* (commoners), and discuss their varied and complex interactions within the *wao kānaka* (realm of man). Beckwith elaborates, “In reality, the distinction between ka‘ao as fiction and mo‘olelo as fact cannot be pressed too closely. It is rather in the intention than in the fact” (Beckwith 1970:1). Thus, a so-called *mo‘olelo*, which may be enlivened by fantastic adventures of *kupua*, “nevertheless corresponds with the Hawaiian view of the relation between nature and man” (Beckwith 1970:1).

Both *ka‘ao* and *mo‘olelo* provide important insight into a specific geographical area, adding to a rich fabric of traditional knowledge. The preservation and passing on of these stories through oration remains a highly valued tradition. Additionally, oral traditions associated with the study area communicate the intrinsic value and meaning of a place, specifically its meaning to both *kama‘āina* as well as others who also value that place.

The following section presents traditional accounts of ancient Hawaiians living in the vicinity of the project area. Many relate an age of mythical characters whose epic adventures inadvertently lead to the Hawaiian race of *ali‘i* and *maka‘āinana*. The *ka‘ao* in and around the project area shared below are some of the oldest Hawaiian stories that have survived; they still speak to the characteristics and environment of the area and its people.

3.1.1 Owl Dieties of the Plains of Kama‘oma‘o

Owls are described as one of the oldest class of *‘aumakua* (personal family gods) in Hawaiian mythology. Beckwith names the owl god Pueo-nui-akea as the restorer of life to souls who drifted the plains (Beckwith 1970:124).

3.1.2 The Story of Pumaia

The story of Pumaia tells the adventures of a man and his friend Wakaina. They traverse the two realms of the living and the dead and run into many creatures of different temperaments along their way home (Fornander 1919:550–554):

> Pumaia was born in Koloa, Kauai. Malaihi was the father and Kuhihewa was the mother. They lived together until the child had grown up, and his body had acquired strength, when Pumaia said to his father, ‘You will please let me go to see the club of my grandmother.’ The father gather his consent. The son went, and arriving at the house of Kiha, his grandmother, he asked, ‘Where is the club?’ ‘Here it is,’ said the grandmother […] He shouldered the club and commenced his journey. He caught up with Wakaina, and the latter inquired, ‘Where are you journeying to?’ ‘Going sightseeing,’ replied Pumaia. ‘Please let me go with you.’ Pumaia consented and they went along.
>
> Puukolea stood forth and called out, ‘Whose offspring are you?’ ‘Our own,’ replied Pumaia. ‘If you excel in strength, you are saved; if your strength is meager, I will kill you.’ Then they commenced to fight. That man, however, had a dual body, while these had the ordinary living body. Pumaia asked Wakaina, ‘Which of us shall be the first one to fight with this man?’ The other replied, ‘It is better that I do it.’ Pumaia consented and Wakaina went to fight Puukolea. Before they commenced fighting, however, he chanted a portion of a song, thus:
>
> Behold! Behold! The mere lehua of Puuoni,
>
> Struggling with the clouds of the air,
>
> Now above, now below the rain clouds.
>
> […] They kept on fighting until Pumaia was weakened. He thought of his club; so when Wakaina came back and inquired, ‘How are you?’ he answered, ‘I am weak; go and fetch my club; perhaps it can do something.’While they yet spoke the other man appeared in a different body. The fought on, and before Pumaia could reach for his club, he was killed by this man; Wakaina also was killed. Their spirits returned on their parents and were seen by them […]
>
> Fear is creeping over us,
>
> Coming for us to go;
>
> We can not; we are held by Waiauau.
>
> Come to give us life!
>
> Life—indeed.
>
> When these ghosts finished their chant the parents came out immediately, but they saw nothing. They looked here and there, but they would not see them. Meanwhile the two had gone as spirits until they met Pupuilima. Some people saw these two coming, but Pupuilima said: ‘Those are not men; those are ghosts.’ ‘How do you know those are ghosts?’ said the others. So they laid wagers. Pupuilima then said

to them, ‘I will spread an ape leaf on the ground; and if it breaks, then they are men, but if it does not, then they area spirits.’ He spread it. Meanwhile Pumaia said to Wakaina, ‘There is our death being prepared.’ ‘How shall we be saved?’ Pumaia explained: ‘Where my feet tread there you tread; because I was raised from my young days until I died, and until I found you; for this process is like that done to Pamano when by the spreading of an ape leaf he was saved.’ So when they proceeded Pumaia trod on the ape leaf and it broke through; the friend treaded after him. They were chased by the prophet until they were caught. This is what I have obtained.

While they were going along they were given chase. They came along until they caught up with Pueonuiokona. The owl, however, did not catch sight of them while they were coming. When they had passed ahead the prophet who was chasing them caught up with Pueonuiokona. The owl asked, ‘What is the cause of this heavy breathing and this perspiring?’ This one answered, ‘That you should be asking “what”? Spirits! And there they are! I am chasing them, but can not catch them; I have been wishing to get near them so that I can kill them, for I am possessed with great anger towards them.’

When the owl heard what the prophet had said, he said to him, ‘You are a prophet, and I am a prophet, still I did not see them; and now I hear you saying that if you catch then they die.’ Where they were holding this conversation, however, was on the plain of Kamaomao. While the others prepared to come for the spirits, Pumaia said to his friend, ‘Here comes our death; but we will wait. If the new one gets ahead of the old one then we have hope for life.’

[…] While the prophets were following, and because Pueonuiokona was the faster, an idea occurred to one of them, and he said to himself, ‘If I catch up to that prophet I shall kill him, for he is simply going after my enemies to save them.’ The owl went along slowly until his fellow prophet thundered after him and gave his hand a jerk. Pueo asked, ‘What wrong has a fellow committed that you should tug at the arm from behind and thereby nearly tripping me?’ The other replied with blazing eyes, ‘Who told you to go after my enemies with the intention of saving them? Why don’t you look for your own, and on them practice saving?’ The owl replied: ‘If you excel in strength you can obtain them, but if you are weak you can not have them; because I, even I, am an old resident of the plain. When spirits from the dead arrive I cause them to revive. Also no prophet comes to this plain; this is the first time that I have seen a prophet on this plain, and that is yourself. Because you complained of my desire to give life to those spirits, so be it! By a test of strength will [we know] whether you obtain them or I do.’

They immediately commenced to fight. Where they fought was at Kalepolepo, near the isthmus. The prophet was killed and his entrails were disemboweled by Pueonuiokona and placed on the *akolea*. That shrub used to be plentiful at that place, but it is destroyed now on account of numerous animals.

August 8, 1872

> Kiliona
>
> [Fornander 1919:550–554]

Beckwith further elaborates the ending of the story as the origin of the traditional name of the native dodder called *pōpolo* (*Cuscuta sandwichiana*), or "intestines of the prophet" (Figure 5):

> The great owl of Kona (Pueo-nui-o-Kona) fights the prophet and his entrails become spred over the akolea ferns that used to grow in that place. 39 [Hence the name of "intestines of the prophet" for the endemic species of the dodder, called popolo and used for love charms, whose yellow stems form a tangle over bushes in some parts of the islands (*Cuscuta sandwichiana.)*] [Beckwith 1970:445]

3.2 *Wahi Pana* (Storied Places)

Wahi pana are legendary or storied places in a landscape. These legendary or storied places can be a variety of natural or human-constructed features. Oftentimes dating to the pre-Contact period, many but not all *wahi pana* are connected to particular *mo‘olelo*. Dr. Davianna McGregor outlines the types of natural and human-made structures that may constitute *wahi pana*:

> Natural places have mana or spiritual power, and are sacred because of the presence of the gods, the akua, and the ancestral guardian spirits, the ‘aumakua. Human-made structures for the Hawaiian religion and family religious practices are also sacred. These structures and places include temples, and shrines, or heiau, for war, peace, agriculture, fishing, healing, and the like; pu‘uhonua, places of refuge and sanctuaries for healing and rebirth; agricultural sites and sites of food production such as the lo‘i pond fields and terraces slopes, ‘auwai irrigation ditches, and the fishponds; and special function sites such as trails, salt pans, hōlua slides, quarries, petroglyphs, gaming sites, and canoe landings. [McGregor 1996:22]

As McGregor makes clear, *wahi pana* can refer to natural geographic locations such as streams, peaks, rock formations, ridges, offshore islands and reefs, or they can refer to Hawaiian land divisions such as *ahupua‘a* or *‘ili* (traditional land division smaller than an *ahupua‘a*), and man-made structures such as fishponds. It is common for places and lanscape features to have multiple names, some of which may only be known to certain *‘ohana* or even certain individuals within an *‘ohana*, and many have been lost, forgotten, or kept secret through time. Place names also convey *kaona* and *huna* (secret) information that may even have political or subversive undertones. Before the introduction of writing to the Hawaiian Islands, cultural information was exclusively preserved and perpetuated orally. Hawaiians gave names to literally everything in their environment, including points of interest that may have gone unnoticed by persons of other cultural backgrounds. Hawaiians have named taro patches, rocks and trees that represented deities and ancestors, sites of houses and *heiau* (pre-Contact place of worship), canoe landings, fishing stations in the sea, resting places in the forests, and the tiniest spots where miraculous or interesting events are believed to have taken place (Pukui et al. 1974:x).

Figure 5. “Intestines of the prophet,” or *pōlolo* (*Cuscuta sandwichiana*). A plant whose name is based on a legend occurring on the Plains of Kama‘oma‘o. Photo courtesy of Native Plants Hawai‘i (University of Hawai‘i 2009)

3.2.1 Place Names near Pūlehu Nui

An analysis of the place name meanings (Table 1) for the region surrounding the project area may yield some insight into the patterns of life in an area. Literal translations of several of the place names for land areas and divisions near to the project area are listed below. Unless otherwise noted, the translations are taken from Pukui and others (1974).

Table 1. Place Names and their Meanings in the Vicinity of the Project Area

Name	***Meaning***
Kakanilua	Sandhills between Wailuku and the mill at Pu‘u Nēnē (Sterling 1998:88)
Kalialinui (Gulch)	Possible literal translation: “Large tree or plant used for medicine” (Pukui and Elbert 1986). Kalialinui Gulch measures some 11 miles long, beginning on the upper slopes of Haleakalā, through the project area, and on across the Wailuku Ahupua‘a, terminating on the flat plains of Kahului just south of Kanahā Pond.
Ka‘ōpala	Lit., “the rubbish”; a dividing line between Pūlehu Nui (Ahupua‘a) and Waikapū (Ahupua‘a).
Kilohana (Boundary Point)	Lit., “lookout point”; Corner of Kamehamenui, Pūlehu Nui, Kalialinui, Papa‘anui on crater rim.
Mana (Heiau)	A *heiau* called Mana, in the vicinity of ‘Ōma‘opio, “of large size and platform character, also in ruins, was found to be now used as a burial place, though in a cactus field (Thrum 1917:59)
‘Ōma‘opio (Ahupua‘a)	Lit., “perhaps, whistling thrush”; Ahupua‘a directly north of Pūlehu Nui.
Papa‘ula	Lit., “red flats”; the region just inland of this promontory is presently a portion of the modern Maui Country Club golf course.
Pūlehu Nui (Ahupua‘a)	Large *pūlehu* where *pūlehu* is literally translated as “broiled”. This *ahupua‘a* abuts the *ahupua‘a* of Wailuku and Waikapū, and constitutes much of the land area of the central isthmus.
Pu‘u Nēnē	Lit., “goose hill.” A cinder cone, once located just inland of Papa‘ula, mined for its gravel during WWII to construct the runways at Naval Air Station (NAS) Kahului. Not to be confused with another Pu‘u Nēnē located just inland of Wawa‘u beach in Wailuku.
Pu‘u Paha	No further information found on this particuar *pu‘u* (hill) but it is depicted on the 1885 Hawaiian Government Survey Map by F.S. Dodge; located on the eastern end of the *ahupua‘a* near the crater of Haleakalā.
Waiakoa (Ahupua‘a)	Lit., “water [used] by warrior”; *ahupua‘a* directly south of Pūlehu Nui.
Waianuhi	No further information found on this particuar feature but it is depicted on the 1885 Hawaiian Government Survey Map by F.S. Dodge.

Name	*Meaning*
Waikapū (Ahupua‘a)	Lit., “water of the conch”, a meaning with reference to the conch shell formerly found in a cave at Waikapū, until it was stolen by a supernatural dog, named Puapualenalena. Also, the scene of a great battle, fought between Kahekili, king of Maui, and Kalani‘opu‘u, king of Hawai‘i Island, at Waikapū Commons.
Wailuku (Ahupua‘a)	Lit., “water of destruction”, possibly a reference to the battle which took place at ‘Īao between the forces of Kamehameha I and the Maui chiefs. Sterling (1998:74) states that Pukui (1974) believes the name is older than the famous battle. Westervelt (1910:146) makes special reference to the waters of Wailuku in ‘Īao (Lit., “asking for clouds”) emptying into the Kahului Harbor. Fornander (1916:304) recorded that Wailuku was known as the place of flying clouds.

3.2.2 Pu‘u Nēnē

Pu‘u Nēnē, is literally translated as “goose hill” according to Pukui and others (1974:49). The site of the Hawaiian Commercial & Sugar (HC&S) sugar mill at Pu‘u Nēnē, the avenue of Pu‘u Nēnē and the school named Pu‘unēnē are not located where the actual “goose hill” once stood. The hill, named for the Hawaiian goose or *nēnē* (*Nesochen sandvicensis*), was a cinder cone built by lavas of the Kula series (Stearns and MacDonald 1942:83), elevation 187 feet (56 meters), that was located some 4 miles northeast of the Pu‘u Nēnē Mill. Most all of the cinder from Pu‘u Nēnē was removed to pave the runways of the Pu‘u Nēnē Naval Air Station (NAS), Kahului during WWII. Families with grave sites were notified by the plantation and the military to remove their burials prior to the excavation of the cinder (Saito 2008).

3.2.3 Kama‘oma‘o: A Wandering Place of Spirits

Ke Kula o Kama‘oma‘o, or the Plains of Kama‘oma‘o, is a region of the central Maui isthmus close to the present project area that was known by Hawaiians in traditional times as a wandering place of the souls (Beckwith 1970:154), a place where dead spirits waited for a friendly escort, perhaps a family *‘aumakua*, to show them the way to eternity:

> The worst fate that can befall a soul is to be abandoned by its aumakua and left to stray, a wandering spirit (kuewa) in some barren and desolate place, feeding upon spiders and night moths. Such spirits are believed to be malicious and to take delight in leading travelers astray; hence the wild places which they haunt on each island are feared and avoided. Such are the plains of Kama‘oma‘o on the island of Maui, the rough country of Kaupea at Pu‘uloa on Oahu, Uhana on Lanai, Maohelaia on Molokai, Mana on Kauai, Halali‘i on Ni‘ihau. In these desolate places lost spirits wander until some friendly aumakua takes pity upon them (Beckwith 1970:154). in leading travelers astray; hence the wild places which they haunt on each island are feared and avoided. Such are the plains of Kama‘oma‘o on the island of Maui, the rough country of Kaupea at Pu‘uloa on Oahu, Uhana on Lanai, Maohelaia on Molokai, Mana on Kauai, Halali‘i on Ni‘ihau. In these desolate places lost spirits wander until some friendly aumakua takes pity upon them. [Beckwith 1970:154]

3.2.4 Mau‘oni and Kanahā

On the north shore of the central isthmus lie the fish ponds named Mau‘oni and Kanahā. A traditional story concerning their construction appears in Sterling (1998:87–88), based on an interview with Mrs. Rosalie Blaisdell in 1923 by J.F.G. Stokes. According to tradition, construction of the pond walls was begun by an O‘ahu chief, but finished by Kamehamehanui, king of Maui in the mid-1700’s. The story established that Kapiiohookalani, the original architect of the two ponds and one-time king of O‘ahu and half of Moloka‘i, was killed in battle before he could complete the construction of the pond walls. His daughter, Kahamaluihiikeaoihilani, sought her brother, Kanahaokalani, and searched Moloka‘i and Maui for him. The pond walls were finished by Kamehamehanui, who placed a *kapu* (prohibition) on the bank, or *kuapa*, dividing the two ponds. The chiefess Kahamaluihii was born of such high rank that she was able to break the *kapu* by walking on the center *kuapa* of the ponds. Following this act, Kamehamehanui allowed her to name the ponds. She named Kanahā for her brother, and Mau‘oni for the identity she travelled by to protect her status as a chiefess of the highest rank.

Sterling (1998:88) also noted a reference by Samuel Kamakau (1992:42) stating that Kihapi‘ilani had built the stonework separating the two ponds at a much earlier time than the work performed by Kamehamehanui. Kanahā is a wetland sanctuary that is home to a large population of native Hawaiian stilts (*‘ae‘o*). Over fifty species of birds have been observed here, including herons, geese, ducks, owls, plovers, sandpipers, tattlers, coots, pheasants, and doves (Pukui et al. 1974:83).

3.2.5 Boundary Commission Testimony of H. Kuihelani

The Boundary Commission was established in 1862 to delineate in legal terms the borders of *ahupua‘a* awarded during the Māhele. Descriptions of land boundaries, environmental features, cultural practices and Native Hawaiian views of the land were captured in the testimonies that were recorded by the Boundary Commission between 1871 to 1896 (Maly and Maly 2006:80).

The following is an excerpt from the testimony of H. Kuihelani that is rich in descriptions of cultural practices in the study area: lineal connections to Wailuku; stewardship of Mau‘oni and Kanahā fish ponds; fish harvesting and salt bundling practices at Pukaulua; the gathering of *ma‘o* (*Gossypium sandvicense*) at Kama‘oma‘o for use in *kapa* (bark cloth) making; references to *pōhaku* (stones) that mark the boundaries of Wailuku, and the spiritual associations of Kama’oma’o (Maly and Maly 2003:357–358):

> *H. Kuihelani hoohikiia a olelo mai:*
>
> *I Wailuku ku‘u wahi i hanau ai, he kanalima paha o‘u M.H. i noho ai ma keia aina o Wailuku nei a keu aku paha. Ua noho ku‘u makua i konohiki no Wailuku nei. Aole au i noho konohiki. Aka ua ike nae au ia Mauoni ame Kanaha. He mau loko ia ma Wailuku nei, mokupuni o Maui. I kuu wa uuku ua hele pu au me ku‘u makuakane ma keia wahi i haiia ae la. He umi paha o‘u makahiki ia manawa. No ka Moi, Elua ia mau loko ia. Ua hele au mahope iho o ka manawa o Kamehameha Ekolu. Ia makou na‘e ka malama oia mau loko. Na makou no e lave i ka i-a.*
>
> *Apau o Kamehameha Ekolu, o Kamehameha Eha iho, aole nae ia makou ka malama ia manawa. O P. Nahaolelua ka mea nana e malama nei i keia mau loko ia i ke ahupuaa o Wailuku, Maui. Keahua ka palena o Wailuku ma ke kai. Ia‘u ka*

malama oia kai mai ku‘u makuakane mai, oia ka aina i oleloia iho nei o Pukaulua. Aia no ia ili aina ia‘u i keia manawa. No ka Moi ke kai. Aole poe i aeia e kii i kela ia iloko o na loko ia, no ka mea ua kapu loa ke kii i ka ia. Aia no a hu ka i-a mawaho o ka loko alaila hiki i kela mea, keia mea ke kii i ka i-a mawaho wale no o na loko. He paakai no kolaila. He opeia ka paakai a laveia na na alii. Aole au i ike i ka aina o Kalialinui e oleloia nei. Aole au i hele i Kalialinui e laveia ai. Ua ike au ia Kamaomao, ua koke no ia Pohaku, ke ahupuaa o Wailuku, Maui nei ko Hawaii Pae Aina…

…Ua hoohuliia kanaka i ke kukulu ana i ka pa mawaho o na loko ia, ma Oopuola. O Kihapiilani ke Alii o Maui ia manawa, nana no i hoohuli na kanaka i ke kukulu ana i ka pa. Ua ike au i ka pohaku o Makaku. O ku‘u lohe he pohaku kela no na uhane e hui ai. Pela mai ka olelo a kekahi poe. Ame Kamaomao kekahi, ua hele makou e ohi i mao no na alii i mea e ala ai na Kapa Aahu o lakou. Aole poe kanaka e ae, o na kanaka wale iho la no o Wailuku, Maui, Hawaii Pae Aina. [Volume No. 1:10–11]

H. Kuihelani, sworn and says:

My birth place is at Wailuku, I have lived on the land of Wailuku for fifty years, a little more perhaps. My father was the konohiki of Wailuku. I was not a konohiki. But, I do know Mauoni and Kanaha. They are fishponds of wailuku, Island of Maui. When I was little I went with my father to this place spoken of. I was perhaps ten years old at the time. For the King, two fishponds. I went after the time of Kamehameha Third. It was us who cared for those ponds. It was us who took the fish.

When Kamehameha Third died, it went to Kamehameha Fourth; we did not take care of them then. P. Nahaolelua is the one who cares for these fishponds in the ahupuaa of Wailuku, Maui. Keahua is the boundary of Wailuku at the shore. I am the one who has stewardship of sea (fishery); it is from my father; that land mentioned is Pukaulua. I have that land section at this time. The fishery is for the King. People are not allowed to take the fish from within the fishponds, because the harvesting of fish is restricted. Though when the fish overflow from the ponds, then this person and that person can harvest the fish that are on the outside of the ponds. There is also salt there. The salt is bundled up and taken by the chiefs. I do not know the land of Kalialinui, spoken of. I did not go to take things from Kalialinui. I know of Kamaomao, the stone is close to pig-cairn (boundary marker) of Wailuku, Maui of the Hawaiian Islands […]

Men were sought out to construct the wall outside of the ponds, at Oopuola. Kihapiilani was the Chief of Maui at that time, it was he who sought out the men to build the wall. I know of the stone of Makaku. What I heard was that it is a stone where the spirits gather. That is what some people say. And Kamaomao is one also; we used to go gather mao [a native hibiscus] for the chiefs, as something with which they would scent their Kapa Clothing. No other people, only the people of Wailuku, Maui, Hawaiian Islands… [Maly, translator] [Maly and Maly 2003:357–358]

3.2.6 *Heiau*

Sterling (1998:253) describes two *heiau* located at Pūlehu Nui:

> Haleokane Heiau, Walker Site 221
>
> Location: At Poonahoahoa above the main road one hundred and fifty years, and beyond the end of the side road.
>
> Description: A small heiau platform only 22 x 30 feet. It is largely hidden in the grass and earth but an edge of the terrace 3 feet high can be seen. In spite of its small size the natives attach considerable importance to it and report noise of drums on the night of Kane. The name Haleokane was given by the old woman on whose property the heiau stands but the other kamaainas did not regard her information as accurate. [Sterling 1998:253]

The second *heiau* mentioned by Sterling is described below:

> Nininiwai Heiau, Walker Sites 222 and 223
>
> Location: Nininiwai was a heiau on the mauka side of the main road near the branch road. It was destroyed in clearing the land for pineapples. The other heiau is located on a hill in the midst of the cactus a mile and a half below the main road and near the branch road.
>
> Description: A medium-sized walled heiau, 50 x 50 feet. It is double-terraced on the north side and the wall is here 10 feet thick. Elsewhere it is 6 feet thick. There is a small enclosure in one corner. Cattle are continually trampling over this heiau and will in a short time reudce it to a shapeless pile of rocks. [Sterling 1998:253]

3.3 *‘Ōlelo No‘eau* (Proverbs)

Hawaiian knowledge was shared by way of oral histories. Indeed, one’s *leo* (voice) is oftentimes presented as *ho‘okupu* (“to cause growth,” a gift given to convey appreciation, to strengthen bonds); the high valuation of the spoken word underscores the importance of the oral tradition (in this case, Hawaiian sayings or expressions), and its ability to impart traditional Hawaiian “aesthetic, historic, and educational values” (Pukui 1983:vii). Thus, in many ways these expressions may be understood as inspiring growth within reader or between speaker and listener:

> They reveal with each new reading ever deeper layers of meaning, giving understanding not only of Hawai‘i and its people but of all humanity. Since the sayings carry the immediacy of the spoken word, considered to be the highest form of cultural expression in old Hawai‘i, they bring us closer to the everyday thoughts and lives of the Hawaiians who created them. Taken together, the sayings offer a basis for an understanding of the essence and origins of traditional Hawaiian values. The sayings may be categorized, in Western terms, as proverbs, aphorisms, didactic adages, jokes, riddles, epithets, lines from chants, etc., and they present a variety of literary techniques such as metaphor, analogy, allegory, personification, irony, pun, and repetition. It is worth noting, however, that the sayings were spoken, and that their meanings and purposes should not be assessed by the Western concepts of literary types and techniques. [Pukui 1983:vii]

Simply, *‘ōlelo no‘eau* may be understood as proverbs. Webster’s Dictionary defines “proverb” as “a phrase which is often repeated; especially, a sentence which briefly and forcibly expresses some practical truth, or the result of experience and observation.” It is a pithy or short form of folk wisdom. Pukui equates proverbs as a treasury of Hawaiian expressions (Pukui 1995:xii). Oftentimes within these Hawaiian expressions or proverbs are references to places. This section draws from the collection of author and historian Mary Kawena Pukui and her knowledge of Hawaiian proverbs describing *‘āina* (land), chiefs, plants, and places. The following proverbs concerning the larger area of Pūlehunui come from Mary Kawena Pukui’s *‘Ōlelo No‘eau* (Pukui 1983).

3.3.1 *‘Ōlelo No‘eau* # 2300

The following *‘ōlelo no‘eau* describes the four main water sources on Maui.

Na wai ‘ehā.

The four waters.

A poetic term for these places on Maui: Wailuku, Waiehu, Waihe‘e, Waikapū, each of which has a flowing water (*wai*). [Pukui 1983:251]

3.3.2 *‘Ōlelo No‘eau* # 2647

The following *‘ōlelo no‘eau* plays on the word *luku* (destruction) in Wailuku.

Pili ka hanu o Wailuku.

Wailuku holds its breath.

Said of one who is speechless or petrified with either fear or extreme cold. There is a play on *luku* (destruction). Refers to Wailuku, Maui. [Pukui 1983:290]

3.3.3 *‘Ōlelo No‘eau* # 2578

The following *‘ōlelo no‘eau* describes two ponds in Kahului, Maui: Mau‘oni and Kanahā.

Pākāhi ka nehu a Kapi‘ioho.

The *nehu* of Kapi‘ioho are divided, one to a person.

Kapi‘ioho, ruler of Moloka‘i, had two ponds, Mau‘oni and Kanahā, built on his land at Kahului, Maui. The men who were brought from Moloka‘i and O‘ahu to build the ponds were fed on food brought over from Moloka‘i. The drain on that island was often so great that the men were reduced to eating *nehu* fish, freshwater *‘ōpae* and *poi*. The saying is used when *poi* is plentiful but fish is scarce and has to be carefully rationed. [Pukui 1983:284]

3.3.4 *‘Ōlelo No‘eau* # 1481

The following *‘ōlelo no‘eau* all pertain to the same area called Kama‘oma‘o. This place was famous for it‘s connection to wandering spirits.

Kama‘oma‘o, ka ‘āina huli hana.

At Kama‘oma‘o, land of activities.

> Ghosts who do not go to the *pō* of their ancestors often wander about in certain areas. Kama‘oma‘o, Maui is such a place. The activities of such ghosts usually annoy the living. [Pukui 1983:160]

3.3.5 *‘Ōlelo No‘eau* # 1514

> *Ka ‘ōlohe puka awakea o Kama‘oma‘o.*
>
> The bare one of Kama‘oma‘o that appears at noonday.
>
> The plain of Kama‘oma‘o, Maui, is said to be the haunt of ghosts (*‘ōlohe*) who appear at night or at noon. Also a play on *‘ōlohe* (nude), applied to one who appears unclothed. [Pukui 1983:164]

3.3.6 *‘Ōlelo No‘eau* # 1761

> *Ke kula o Kama‘oma‘o ka ‘āina huli hana.*
>
> The plain of Kama‘oma‘o—that is the place where plenty of work is to be found.
>
> A taunt to one who talks of looking for work but does not do it. The plain of Kama‘oma‘o, Maui, was said to be the haunt of ghosts whose activities were often terrifying. [Pukui 1983:189]

3.4 *Oli* (Chants)

Oli, according to Mary Kawena Pukui (Pukui 1995:xvi–xvii) are often grouped according to content. Chants often were imbued with *mana* (divine power); such *mana* was made manifest through the use of themes and *kaona*. According to Pukui, chants for the gods (prayers) came first, and chants for the *ali‘i*, “the descendants of the gods,” came second in significance. Chants “concerning the activities of the earth peopled by common humans,” were last in this hierarchy (Pukui 1995:xvi–xvii). Emerson conversely states:

> In its most familiar form the Hawaiians–many of whom [were lyrical masters]–used the oli not only for the songful expression of joy and affection, but as the vehicle of humorous or sarcastic narrative in the entertainment of their comrades. The dividing line, then, between the oli and those other weightier forms of the mele, the inoa, the kanikau (threnody), the pule, and that unnamed variety of mele in which the poet dealt with historic or mythologic subjects, is to be found almost wholly in the mood of the singer. [Emerson 1965:254]

While *oli* may vary thematically, subject to the perspective of the *ho‘opa‘a* (chanter), it was undoubtedly a valued art form used to preserve oral histories, genealogies, and traditions, to recall special places and events, and to offer prayers to *akua* and *‘aumākua* alike. Perhaps most importantly, as Alameida (1993:26) writes, “chants […] created a mystic beauty […] confirming the special feeling for the environment among Hawaiians: their *one hānau* (birthplace), their *kula iwi* (land of their ancestors).”

3.4.1 A Travel Chant

Pau ‘ole ko‘u mahalo i ka laulā o	My admiration is endless for the
Kama‘oma‘o	expanse of Kama‘oma‘o
Ka hālana maika‘i a Keālia	The fine rising of the waters of Keālia

Ka hemolele o ka ua ‘Ulalena	The perfection of the ‘Ulalena rain
Lena ka pua o ka māmane pala luhiehu i ka lā	Yellow are the blossoms of the māmane, soft and lovely in the sun

[Akana and Gonzalez 2015:267]

3.4.2 A *Kapa* Chant for Lili‘uokalani (also known at Kamaka‘eha)

‘A‘ahu ‘o Kamaka‘eha i ke kapa kūkai	Kamaka‘eha wears the kapa dipped frequently in the sea
He kapa no ka po‘e ‘akuku o Lele	A kapa of the kapa-beating people of Lele
Pua ma‘o ke kapa, he moe ‘ao‘ao kilohana	Kapa dyed with ma‘o blossoms, the kilohana layer for a bed
Kaula‘i ana i ka ua Līlīlehua	Hanging in the Līlīlehua rain
I ka ua Pa‘ūpili o Kahana	In the Pa‘upili rain of Kahana

[Akana and Gonzalez 2015:156–157]

3.4.3 *Oli Aloha* by Keaulumoku

Born of Kauakahiakuanui and Naohaku, Keaulumoku was a great composer of war chants, love chants, and genealogical chants in the days of Kalani‘opu‘u (Kamakau 1992:112). The following *oli* was composed after he returned to Hawai‘i with Kalani‘opu‘u. His thoughts returned to Maui as he longed dearly for his homeland and this *oli* was written:

Alo—ha, alo—ha--	Affectionate longing, affectionate longing ,
Aloha wale o‘u maku—a la—e o‘u makua,	Affection for my (foster) parents, my parents,
Aloha wale o‘u makua	Affection for my parents
Mai na ‘aina Hamakua,	Who belong to Hamakua,
He mau ‘aina Hamakua elua,	The two districts of Hamakua,
No‘u mua kaikua‘ana i noho ai.	Where my elder brothers live.
He ala pali na‘u he mau ali‘i ia,	My hillside trails are theirs to rule,
O ka hanai ana komo ke aloha,	They nurtured me until I loved them;
Lele hewa au i he mau kaikua‘ana—e	I find myself with other elder brothers
‘A‘ole—he mau mea ‘e wale no o laua.	Who are not the same to me.
He ua i pono–e—pono ia ua.	Let the rain fall, for rain is good.
A he ua i halaka‘, he mahala,	It patters down, it pelts down,
Pehi hewa i ka nahele,	It crushes the forest growth,
Kua‘oa kanikani i ka pua lehua.	It sprinkles musically on the lehua.
Ua ua lehua, he lehua hala,	The lehua trees blossom, the yellow lehua,
Ua i ka lehua o Kailua.	When the rain comes to the lehua of Kailua.
Lehua maka konunu i ka wai,	The lehua petals are heavy with raindrops,
Konunu konunu oha‘ha‘.	Heavy, heavy and full-blown.
Halana makapehu wale no kie ia,	They know not the pangs of thirst

Pehu, ua mae ka maka mua o ka hinalo ho‘i.	That wilt the first-blown pandanus bloom.
Ho‘i ka ua ma Haneho‘i,	The rain returns by way of Haneho‘i,
Ma ka lae o Pu‘umaile i Hoalua,	Along the brow of Pu‘umaile to Hoalua,
Ma kahakua o Pu‘ukoa‘e,	Over the ridge of Puukoa‘e,
Ma ke alo pali o Huelo.	Before the face of the cliff to Huelo.
Ua poha‘ Kaumealani,	There it pours down on Kaumealani,
Ua ko ia e ka pua nui	The rain that brings out the full-blown flowers
Hukia aku la lilo i kai	And draws them close down to the shore.
Lilo aku la ua i ka moana,	The rain goes out to sea,
He maka o Hawini ia ua,	It falls on Hawini like teardrops,
He ua ‘alo ma ka lae,	It passes along over the capes,
Nihi pali nihi lae.	It creeps by the cliffs and capes,
Nihi i ka lae o Mokupapa.	Creeps by the cape of Mokupapa.
Hele wale ka ua a kipa wale,	The rain comes uninvited,
Ka ua pe‘e hala huna kai o—	The rain that hides in the hala groves below,
O—huna huna lauki.	Whose fine drops water the ti plant.
Huna ke kupa i ka hala mua a kau.	The native-born hides away the first hala fruit of the summer.
U-u-e ua wahia e ka ua o ka ho‘oilo.	And weeps over the stormy rains of winter.
E ke kuawa kahi o kau	Oh! For the light summer showers
Nana i ho‘oko‘o nei ka pua!	That brought forth the blossoms!
Aui ka pua noho ‘ao‘ao i ke ka,	The blossoms droop with stem half-broken,
Aui e noho e na pua polo pe‘a;	The blossoms hang wilted and uncared-for;
Pala ka‘ao, ka‘ao ka pola,	The fruit clusters, ripened above,
Loli helele‘i ahu ilalo;	Mildew and fall in heaps to the ground;
Loli ka‘ao ka hala me ka hinalo.	Both fruit and flowers are mildewed.
O ka hala o ka ‘ohi‘a lana i ka wai	The hala fruit and the mountain apples drop into the stream
I ka‘ i ke kahawai o Kakipi,	And are washed down in the stream of Kakipi,
Ilina iluna o ka mau‘u kuku‘,	Washed up on thorny weeds,
I ka pua po‘o o ka mau‘u pu‘uko‘a	Up on the flowers of coarse grasses
I kahi a maua e hele ai,	Where we two have wandred,
Me ku‘u wahine i ka ua hala o Kulo—li,	My wife and I, to the rain-wet hala grove of Kuloli,
A ‘oia loli ke ala iho ma ka lau,	Fragrant among the leaves,

Lauhala—e a ke ʻoʻiʻoʻina ʻoe i	The hala leaves over the resting place
Koʻolahale,	of Koʻolahale,
ʻIke aku i ka mahina hikiʻaloʻalo	Where we watched for the belated moon
One ku a kiʻi ke kaha o Malama,	To rise over the cinder cone of Malama.
Malamalama ke one kea ke hele ia,	The white sands are plainly to be seen if we wish to go there,
Kipa ke alanui mauka o Waiakuna,	Over the upland trail of Waiakuna
He kuna—e.	Winding like the fresh-water eel.
Me he kuna kuhe la ke oho o ke kukui,	The *kukui* leaves look dark like the gobey fish,
I ka hoʻoluʻu lupekolo ia e ke hau	When overshadowed by the twining *hau* trees
A lipo a ʻeleʻele i ka waokoa	Deep in the dusky koa forest.
He ʻeleʻele ko ke kukui noho malu,	Dark are the leaves of the *kukui* in the shade,
He lena hoʻi ka lau o kekahi kukui	The leaves are pale yellowish green
O ke kukui aku i waho i ka la,	In the full light of the sun,
I ka ua ia e ka ua ʻulalena.	Watered by the rainbow-tinted rain.

[Kamakau 1992:112–115]

3.5 *Mele* (Songs)

The following section draws from the Hawaiian art of *mele*, poetic song.

> Words and word combinations were studied to see whether they were auspicious or not. There were always two things to consider: the literal meaning and the *kaona*, or ‘inner meaning.’ The inner meaning was sometimes so veiled that only the people to whom the chant belonged understood it, and sometimes so obvious that anyone who knew the figurative speech of old Hawai‘i could see it very plainly. There are but two meanings: the literal and the *kaona*, or inner meaning. The literal is like the body and the inner meaning is like the spirit of the poem […]
>
> The Hawaiians were lovers of poetry and keen observers of nature. Every phase of nature was noted and expressions of this love and observation woven into poems of praise, of satire, of resentment, of love and of celebration for any occasion that might arise. The ancient poets carefully selected men worthy of carrying on their art. These young men were taught the old *meles* and the technique of fashioning new ones. [Pukui 1949:247]

There are few late nineteenth, twentieth, and twenty-first century *mele* concern or mention Pūlehunui Ahupua‘a. These particular *mele* may also be classified as *mele wahi pana* (songs for legendary or historic places). *Mele wahi pana* such as those presented here may or may not be accompanied by *hula* (dance) or *hula wahi pana* (dance for legendary or historic places). As the Hula Preservation Society notes,

> Hula Wahi Pana comprise a large class of dances that honor places of such emotional, spiritual, historical, or cultural significance that chants were composed for them. Only the composers of the chants could know the deepest meanings, as they would be reflections of their feelings and experiences […] Since the subjects of Wahi Pana compositions are extremely varied, their implementation through hula are as well. Coupled with the differences from one hula style and tradition to the next, Hula Wahi Pana can be exceptionally diverse. They can be done sitting or standing, with limited body movement or wide free movement; with or without the use of implements or instruments; with the dancers themselves chanting and/or playing an implement or being accompanied by the *ho‘opa‘a* [drummer and *hula* chanter (memorizer)]. Beyond the particular hula tradition, what ultimately determines the manner in which a Hula Wahi Pana is performed are the specific place involved, why it is significant, the story being shared about it, and its importance in the composer's view. [Hula Preservation Society 2014]

3.5.1 Maui Nani (Beautiful Maui)

Composed for James Kaupena Wong by Johanna Koana Wilcox, this song describes the beauty that makes up the island of Maui. James Kaupena Wong was well known for his art in hawaiian chanting and as a *hula* dancer.

Hanohano ‘o Maui mai kinohi mai	Regal has Maui been from its
Kuahiwiw kilakila o Haleakalā	With majestic Haleakalā, an imposing sight
Maika‘i na hono a‘o Pi‘ilani	And the charming bays of Pi‘ilani
Ha‘aheo ‘o Maui nani Lanikēhau	Maui is stately with sublime beauty
Uluwehi ka hi‘ona o nā wai ‘ehā	Lush with verdure are four towns
Nā wai kaulana ma ke komohana	Well known towns of West Maui
Wai mililani ‘ia e ka malu o ke ao	Towns fondly caressed by sheltering skies
Ha‘aheo ‘o Maui ‘āina kamaha‘o	Maui is stately with wonders untold
Kaulana e ka ua Laniha‘aha‘a	Famous is the rain pouring from low skies
Ke kupa aiwaiwa nani lā a‘o Hana	Ethereal native of Hana
‘Ano‘ai Ka‘uiki au i ke kai	Greetings to Ka‘uiki reaching into the sea
Ha‘aheo ‘o Maui ka wai ‘anapanapa	Maui is famed for the waters that sparkle
Puana ka wehi ho‘ohenoheno	Now ends my song of adulation
No ka pua miulana nani i ka hano	To the lovely miulana hereby honored
Me ‘oe ka welina o ku‘u aloha	To you, my warm greetings
Ha‘aheo ‘o Maui nani Lanikeha	Maui, you are stately and supremely beautiful

[Huapala n.d.]

3.5.2 Lovely Sunrise Haleakalā

This song, written by John Kameaaloha Almeida, glorifies the beauty of Haleakalā, the most prominent mountain on the island of Maui. The composer, John Almeida, was well-known, not only for the music he composed, but for the fact that he was blind and carried his talent through this disability.

He nani he beauty maoli nō *Oh, lovely sunrise Haleakalā*	Beauty, true beauty, Oh, lovely sunrise Haleakalā
Kuahiwi nani a he kū kilakila *Kehakeha i ka maka la o ka ‘ōpua*	Beautiful mountain so majestic, So prominent in the midst of the clouds.
Kaulana ko inoa puni ka hōnua *Māka‘ika‘i la e nā malihini*	Your name famous around the world, Visitors come to look at you.
Moani ke ‘ala ma ka hikina *No ka pua roselani leo onaona*	Gentle breeze from the east brings, The fragrance of the rose lei.
Kaulana nā Hono a Pi‘ilani *Ho‘oheno pū me nā wai ‘ehā*	Famous are the bays of Pi‘ilani, Cherished together by the four wai named lands,
Puana he beauty maoli nō, *Oh, lovely sunrise Haleakalā*	Tell of the true beauty, Oh, lovely sunrise, Haleakalā.

[Huapala n.d.]

3.5.3 Waikapū/‘Iniki Mālie

This song describes the winds of the four water-lands in Maui: Waikapū, Wailuku, Waiehu, and Waihe‘e.

Waikapū makani Kokololio, *He makani houhou ‘ili ‘inisinisi (‘inikiniki) mālie.*	Waikapū wind in gusts, Skin-stinging wind gently pinching.
Wailuku makani Lawemālie, *He makani houhou ‘ili ‘inisinisi (‘inikiniki) mālie.*	Wailuku wind becoming gentle, Skin-stinging wind gently pinching.
Waiehu makani Hō‘eha‘ili *He makani houhou ‘ili ‘inisinisi (‘inikiniki) mālie.*	Waiehu wind paining the skin, Sking-stinging wind gently pinching
Waihe‘e makani Kili‘o‘opu *He makani houhou ‘ili ‘inisinisi (‘inikiniki) mālie.*	Waihe‘e graceful wind, Sking-stinging wind gently pinching.
Ha‘ina mai ana ka puana, *He makani houhou ‘ili ‘inisinisi (‘inikiniki) mālie.*	Tell the refrain, Sking-stinging wind gently pinching.

[Huapala n.d.]

Section 4 Historic Background

The division of Maui's lands into political districts occurred during the rule of Kaka‘alaneo, under the direction of his *kahuna* (priest), Kalaiha‘ōhi‘a (Beckwith 1970:383). This division resulted in twelve districts, or *moku*, during traditional times: Kula, Honua‘ula, Kahikinui, Kaupō, Kīpahulu, Hāna, Ko‘olau, Hāmākualoa, Hāmākuapoko, Wailuku, Kā‘anapali, and Lāhainā. The current project area is located on the western flank of Haleakalā in the *moku* of Kula and *ahupua‘a* of Pūlehunui. Overall, Pūlehunui Ahupua‘a begins at Kilohana Peak, on the summit ridge of Haleakalā, and ends at a mid-point on the west shore of the central plains at a shared boundary with Waikapū Ahupua‘a, encompassing a total area of 16,687.78 acres (McCully 1879).

4.1 Pre-Contact to Early Post Contact

While the mythological and traditional accounts of the area are relatively scarce, an analysis of the *wahi pana* meanings for the region may yield some insight into the patterns of life in the area prior to Western contact (Table 2). In *Native Planters in Old Hawaii,* E. S. C. Handy et al. (1991:23–24, 42) summarizes the relationship that traditional Hawaiians have had with the natural environment best in the following passage:

> The sky, sea, and earth, and all in and on them are alive with meaning indelibly impressed upon every fiber of the unconscious as well as the conscious psyche. Hawaiian poetry and folklore reveal this intimate rapport with the elements [Handy et al. 1991:23–24]
>
> [T]he relationship which existed from very early times between the Hawaiian people … is abundantly exemplified in traditional mele (songs), in pule (prayer chants), and in genealogical records which associate the ancestors, primordial and more recent, with their individual homelands, celebrating always the outstanding qualities and features of those lands. [Handy et al. 1991:42]

The provided place names, together with the environmental data, suggest that the lands of coastal Pūlehunui were rich in marine resources. Previous research on pre-Contact occupation in Kula District (Kolb et al. 1997:28) has suggested that most permanent habitations were in the uplands with a smaller permanent population located along the coastline. While a reconstruction of the coastal archaeological landscape of Kula Moku underscores the importance of the uplands as a focus of agriculture and habitation, Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine resource collection.

Lands surrounding the current project area were also a site of conflict between the Hawai‘i Island chief Kalani‘ōpu‘u and Maui chief Kahekili and is perhaps an explanation for the origins for such place names as "Waiakoa" and "Keāhuaiwi". Other accounts involve the continuing conflict between Kahekili during the late eighteenth century. Following a losing battle at Kaupō in 1775, Kalani‘ōpu‘u dedicated several war *heiau* on Hawai‘i Island to aid in the defeat of Kahekili. Upon hearing this news Kahekili sent for the *kahuna* Kaleopu‘upu‘u who directed construction of the *heiau* of Kaluli and Pu‘uohala on the north side of Wailuku.

Table 2. Place names documented in the vicinity of the project area from Pukui et al. (1974) unless otherwise noted

Place Name	Meaning/Translation
Alakoa	*Lit.,* “soldier’s street” (p. 9)
Kalaepohaku	*Lit.,* “the stony promontory” (p. 72–73)
Kale‘ia	*Lit.,* “the abundance”, possibly in reference to the resources available from the fishponds and offshore fishing grounds (p. 76)
Kalepolepo	*Lit.,* “the dirt” (p. 77)
Ka‘ōpala	*Lit.,* “the rubbish”; dividing line between Pūlehu Nui and Waikapū Ahupua‘a (p. 86)
Keāhuaiwi	*Lit.,* “the bone pile”; the name of a gulch immediately adjacent to and north of Waiakoa Gulch (p. 101)
Keālia	*Lit.,* “salt encrustation”; a pond near Kīhei and major salt pan location (Sterling 1998:95)
Kīhei	*Lit.,* “cape or cloak”; sandy point and boundary marker between Pūlehu Nui and Waikapu (Sterling 1998:255); commonly used place name for the South Maui area
Kīheipūko‘a	*kīhei* literally translates as “cape or cloak” and *pūko‘a* literally translates as “coral head”; Kīheipūko‘a was a place near Keālia between Kalepolepo and Ma‘alaea (Sterling 1998:257)
Kohemālamalama	*Lit.,* “bright vagina”; also the ancient name for Kaho‘olawe
Kō‘ie‘ie	*Lit.,* “a plaything for floating in the rapids”, ancient name of Kalepolepo (Sterling 1998:252)
Kolaloa	*Lit.,* “much sexual excitement”
Kula (*moku*)	*Lit.,* "plain"; always an arid region (Handy in Sterling 1998:242)
Pūlehu (gulch)	*Lit.,* “broiled”, possibly in reference to abundant sweet potato cultivation in the uplands (p. 193)
Pūlehunui (*ahupua‘a*)	*Lit.,* “large *pūlehu*”
Waiakoa	*Lit.,* “water (used) by warrior”

In 1776, the army of Kalani‘ōpu‘u landed at Keoneo‘o‘io, with their war canoes extending to Makena at Honua‘ula and proceeded to ravage the countryside. Kalani‘ōpu‘u landed with additional forces at Kīhepuko‘a at Kealia to Kapa‘ahu, 800 strong and eager to drink the waters of Wailuku:

> Across the plains of Pu‘u‘ainako (Can-trash-hill) and Kama‘oma‘o shone the feather cloaks of the soldiers … Ka-hekili was at Kalanihale just below Kihahale and above the plateau of Ka‘ilipoe at Pohakuaokahi … Kaleopu‘upu‘u [said] to Ka-hekili, “The fish have entered the sluice; draw in the net.” [Kamakau 1992:85]

The forces of Kahekili descended upon and destroyed the soldiers of Kalani‘ōpu‘u, slaying the *ālapa* (elite soldiers of Kalani‘ōpu‘u) on the sandhills at the southeast of Kalua. Only two men escaped to Kīheipuko‘a to tell Kalani‘ōpu‘u the news of their defeat. After a second day of warfare Kalani‘ōpu‘u sued for peace and was granted such by Kahekili and his messengers at Kīheipuko‘a (Kamakau 1992:88–89).

Furthermore, Kamakau recounts:

> The great battle took place between Waikapu and Wailuku. Ka-lani-‘opu‘u expected to enter Wailuku at Kakanilua, but Ka-hekili‘s men rose at dawn and occupied the sandhills of Kama‘oma‘o, and a portion of them took their stand on the side toward Waikapu turn, so that the forces of Ka-lani-‘opu‘u, who had supposed that the battle would be at Kakanilua, found a divided front from which spears, javelins, and other missiles poured like water. Death-dealing weapons poured down like a swift rainstorm beating the sides of the fisherman‘s canoe and agitating the surface of the sea like a cloudburst over the deep ocean. The terrified soldiers were surrounded and took to flight; they were driven by Ka-hekili‘s men like leaves before a whirlwind. The plains of Kama‘oma‘o became like a fishpond through whose sluice gate the sea flooded, Ka-lani-‘opu‘u‘s men [became] like the mullet driven by the sound of beating into the sluice gate of ‘Uko‘a; and the sea rose up to the walls. Like the fiery petals of the lehua blossoms of Pi‘iholo were the soldiers of Ka-hekili, red among the leaves of the *koa* trees of Liliko‘i or as one glimpses them through the *kukui* trees of Ha‘iku. Like the creeping branches of the *‘ulei,* so moved the cloaked warriors, young and middle-aged, over the *‘ilima*-covered plain of Paholei. A chill seized Ka-lani-‘opu‘u as he crouched in the canoe, mourning the dead who lay like fish stupefied by the poison spread by the great fisherman, Ka-hekili. Like grasshoppers on the plain, easily to be caught by women, so they lay in the heat of the sun snuggled close to the blossoms of the grasses. [Kamakau 1992:87]

Kalani‘ōpu‘u’s army was annihilated in what was called *Ahulau Ka Pi‘ipi‘i i Kakanilua* or Slaughter-of-the-Pi‘ipi‘i-at-Kakanilua (Kamakau 1992:86), one of the most legendary battles of pre-contact Hawai‘i.

Ms. Hōkūlani Holt Padilla, Director of *Ka Hikina O Ka Lā* at University of Hawai‘i Maui College, has discussed the coastal region of Pūlehu Nui as the region referred to in Kamakau’s *Ruling Chiefs of Hawaii* as Kiheipuko‘a. She elaborated on these references to Kiheipuko‘a as a portion of the route used by the forces of Kalani‘ōpu‘u about 1776, during his planned conquest

of Maui. She explained that the ruling chief of Hawai‘i Island, Kalani‘ōpu‘u, landed his army along the coastline of Maui, at Kiheipuko‘a in the Keālia area, with his war canoes visible from Kapa‘ahu (in Puna, on the island of Hawai‘i), and maneuvered his army inland across the central isthmus, possibly close to the present project area. In this way, the army of Kalani‘opu‘u crossed over the areas of Kama‘oma‘o and Pu‘u‘ainako to engage Kahekili’s forces on the sand hills of Kalua, ending in a slaughter of the Hawai‘i Island army known as “Ahulau ka Pi‘ipi‘i i Kakanilua” (Hill et al. 2007:23).

According to Ms. Holt-Padilla, the outcome of the battle for Kakanilua was not decided on the first day. The day following the “Slaughter of the Pi‘ipi‘i at Kakanilua”, the remaining forces of Kalani‘ōpu‘u were again sent to battle Kahekili’s forces, which were expected to be in Wailuku. The Hawai‘i Island army was ambushed at an area close to Waikapū, and was destroyed by the army of Kahekili on the plains of Kama‘oma‘o.

Ms. Holt-Padilla explained that the central isthmus was a dry, hot place with trails leading west toward Waikapū, and east along the Kīhei coastline. She stated that the guardian spirits of men, the *‘aumākua* spirits, were known to wander on the lower, sandy plains of Waikapū. She explained that this place was a special place for the souls of the soldiers killed at Kakanilua.

Coastal Pūlehunui also shows a few vestiges of the lifestyles and subsistence activities of the *maka‘āinana* that lived there as well as the works of powerful *ali‘i*. Keālia Pond has been known as a source of high-quality salt from the pans in its immediate vicinity. Although one contemporary writer notes that little is known about the ancient history of this fishpond,

> judging from its size, it must have been an important producer of fish stock, particularly *awa* (milkfish) and *‘ama‘ama* (mullet). Ditches and sluice gates were built at least 400 years ago to let these and other nearshore fish into the pond. A *ko‘a* (fishing shrine) or possible *heiau* platform stands near the site. [James 2002:71]

Given its location on the leeward shores of the central isthmus of Maui, and its regular access to the freshwater runoff emanating from Waikapū Stream to the north and Kolaloa Gulch to the southeast, the area had access to many resources (salt, fish, irrigation, etc.) valued and utilized by the population. This wetland environment also attracts many species of waterfowl in the winter months when water levels in the pond rise with seasonal flooding. These would have also served as a potential source of nourishment for subsistence communities in the region (James 2002:72).

Further testament of resource gathering in the area comes from neighboring Kō‘ie‘ie Fishpond (Figure 6) which can still be seen along the Kīhei coastline. This fishpond was once part of a broader distribution of these types of structures along the coast:

> In ancient times at least three or four *kuapā* (walled) fishponds were built along the Kīhei (“cloak”) coastline. With the exception of Ko‘ie‘ie pond, the names of the other ponds have been lost, and little is known about any of their histories. In such cases it was said that *Menehune* constructed them.
>
> It [Kō‘ie‘ie] is a small pond of three arces. At low tide, another fishpond ruin can be seen just south of Kō‘ie‘ie Fishpond, and still further south along the coast is yet another nameless ancient pond wall. [James 2002:73–74]

Figure 6. Ko‘ie‘ie Fishpond as viewed from the shore, near former site of Kalepolepo (James 2002:73)

The associations of these fish ponds to the *menehune* (legendary race of small people who worked at night, building fish ponds, roads, temples), placing their times of construction in deep antiquity, suggest that this site may have been in use in very early times. What is known regarding the fishponds here is that they had been rebuilt several times prior to, and during the first days of, Western contact. A contemporary writer documents that:

> It is here at Kalepolepo that Kamehameha I is said to have beached his canoes for battle against Central Maui. The beaches were black with his fleet, and the Waikapū Stream that empties into nearby Keālia Pond was declared *kapu.* Later, Kamehameha, who noticed Kō‘ie‘ie to be in disrepair, had the fishpond rebuilt. It is recorded that chief ‘Umilīloa, in the mid-1500s, also had the pond walls rebuilt. [James 2002:73–74]

Given its history of rehabilitation from conquering Hawai‘i Island chiefs, it is believed that the fishpond at Kō‘ie‘ie was “a royal pond always stocked with the best fish” (James 2002:74). Further associations between Hawaiian royalty and Kō‘ie‘ie Fishpond are also exemplified by a story from the early historic period when Kihawahine, the family *‘aumakua* of the Kamehameha line of chiefs, appeared at Kō‘ie‘ie Fishpond in saffron-yellow robes following the death of one of Kamehameha’s sons at Kalepolepo in 1815 (James 2002:74).

4.1.1 The Attack at Pu‘u Nēnē

First printed in *Ka Nupepa Ku‘oko‘a* in 1866, the following account by Kamakau tells of the battle at Pu‘u Nēnē between Peleioholani and the men of Alapa‘i, led by Kalani‘ōpu‘u and Keoua. At this point, both sides suffered great losses and thus they agreed to end the war and bloodshed. Perhaps another great factor in reconciling was that Kalani‘ōpu‘u and Keoua were the actual sons of Peleioholani (Kamakau 1992:75).

> I ka hoouka kaua nui loa, oia ka la i hoouka ai ma Puunene, mamua o Napili me Honokahua ma Kaanapali. Ua hoopuni ia o Peleiholani a puni ma ke kai mai, a mauka mai hoi, a ua puni na aoao ia Alapai me kona mau alii, me Kalaniopuu me Keoua a me ko lakou mau koa. Ilaila i halawai hou ai na na maka o Alapai me Peleioholani - E hoopau i ke kaua, a e hui aloha hou, no ka mea, ua nui ka poe i make o na aoao elua. (Aole anei oia maoli ke ano o ke kaua Kristiano; ua kaua paha ma ke ano makamaka me ke aloha - pela no ke ano aloha Hawaii i ka manawa kahiko.)
>
> Eia paha kekahi kumu nui o keia mau ike aloha ana o ka Moi o Oahu me ka Moi o Hawaii, no ka mea, no Oahu ka makuahine o Alapai, oia hoi o Kalanikauleleiaiwi Nui, ke kaikamahine a Kaneikauaiwilani, ke keiki a Kauakahikuaanauakana, ke kaikamahine a Kaihikapuakuihewa. Nolaila, ua pili mau hoahanau, a mau kaikaina nalii o Hawaii no Peleioholani. Eia paha kekahi kumu; he mau keiki ponoi o Kalaniopuu me Keoua na Peleioholani, na laua o Kamakaimoku.
>
> O ka wai o Alele, mauka iho o Waipahu, i Waikele, ma Ewa, kahi i loaa ai o Kalaniopuu ia Peleioholani. I ka manawa e noho Moi ana no o Kualii no Oahu. Ua holo mai o Kamakaimoku i ka makuahine ia Umiulaikaahumanu e noho ana ma Waikele, a me kona mau kaikunane. O ka lei Alii o ko Oahu mau Alii Moi, oia ka niho o ke kohola i anai ia me ka opuu niho kohola, oia hoi ka lei palaoa Alii o ko

Oahu poe Alii. O ko Hawaii lei palaoa Alii, ua hana ia me ke lelo; me he makau ea la. Ua kapa aku o Peleioholani i ka inoa o kana keiki, o ka lei Alii o kona makuakane o Kualii. O Kaleiopuu, pela no hoi o Keoua, (aia paha i ka hiki i ka noho aupuni ana.)

I ka pau ana o ka haua kuikahi e hoopau i ke kaua, hoi mai la o Peleioholani me kana kakaolelo o Naili, me kona mau Alii, a me kona mau koa, ma Koolau o Molokai. Nolaila i olelo kaena iho ai ka poe kakaolelo o Hawaii, me ko Maui. "O Peleioholani, ke keiki a Ku, o Hana. O ka pua a keia Alii kipi i make ai, (oia no o W. P. Kinau opio.) I ka pau ana o ke kaua, ua noho ae o Kamehameha Nui i ka noho Alii Moi o Maui, me ka maluhia o ke aupuni, i ko Alapai noho ana aupuni ma Hawaii. A ike iho la o Alapai, ka Moi o Hawaii, ua maluhia ka noho ana aupuni o kana Alii o Kamehameha nui, i ka noho Moi o ke aupuni o Maui, hoi aku la o Alapai i kona aupuni i Hawaii.

Translation:

The hardest fighting, even compared with that at Napili and at Honokahua in Ka‘anapali, took place on the day of the attack at Pu‘unene. Pele-io-holani was surrounded on all sides, *mauka* and *makai,* by the forces of Alapa‘i, led by Ka-lani-‘opu‘u and Keoua. The two ruling chiefs met there again, face to face, to end the war and became friends again, so great had been the slaughter on both sides...

Perhaps the reason for this friendliness on the part of the two chiefs was the close relationship that existed between them. Alapa‘i‘s mother belonged to Oahu. She was Ka-lani-kau-lele-ia-iwi-nui, a dughter of Kane-i-ka-ua-iwi-lani, who was the child of Ka-ua-kahi-a-kua‘ana-au-a-kane, the daughter of Ka-‘ihi-kapu-a-Ku‘ihewa. Moreover Ka-lani-‘opu‘u and Keoua were own sons of Pele-io-holani through their mother Ka-maka‘i-moku. While Kuali‘i was still ruling Oahu, she had come to visit her mother ‘Umi-‘ula-i-ka-‘ahu-manu, who was living at Waikele with her younger brothers, and it was at the water of Alele just above Waipahu in Waikele, ‘Ewa, that Ka-lani-‘opu‘u was begotten by Pele-io-holani. The ruling chiefs of Oahu wore as a neck ornament an ivory whale‘s tooth shaped like a bud (‘opu‘u); the royal neck ornament of Hawaii was a tongue-shaped hook, like a tortoise-shell fishhook. Pele-io-holani named the child Ka-lei-‘opu‘u after the bud-shaped neck ornament of his father Kuali‘i. Thus he begot Ka-lei-‘opu‘u Keoua he probably begot after he became ruling chief.

At the end of the war Kamehameha-nui became ruking chief of Maui. Pele-io-holani retired to Ko‘olau on Molokai with his adviser Na-‘ili and his chiefs and fighting men. The counselors of both Hawaii and Maui boasted, “Pele-io-holani, the son of Ku, belongs to Hana!” [has done his work well] W.P. Kina‘u the younger, who died recently, was a descendant of the rebel chief. Kamehameha-nui ruled Maui in peace and Alapa‘i held the rule over Hawaii, to which he returned after affairs had quieted down on Maui. He had no occasion to renew the war on Maui as in the time of Ke-kau-like, the father of Kamehameha-nui, who was an ambitious chief, a lover of war and greedy for rule over Hawaii. [Kamakau 1992:74–75]

4.2 Early Historic Period

By early 1786, Kahekili had defeated the forces of O‘ahu, and consolidated his control over all of the islands except Hawai‘i. However, in 1790, the defining battle establishing Kamehameha I’s supremacy over the army defending Maui began at Pu‘unēnē. Crossing the channel from the island of Hawai‘i with his war fleet, Kamehameha I overwhelmed the Maui forces in Hāna en route to engaging the main island defense force gathered along Maui’s northern coastline. Kamehameha I assembled his invasion forces at Kahului. With Kahekili on O‘ahu, the defense of Maui fell to his son, Kalanikupule. The Maui forces were swept across the isthmus and destroyed at ‘Īao Valley, above Wailuku. The high chiefs and royalty of Maui fled to other islands, and Kamehameha I went on to defeat the combined forces of Kahekili and Kalanikupule at Nu‘uanu, on O‘ahu in 1795.

Estimates of the early nineteenth-century population of Wailuku are difficult to find. In regions where Protestant missionaries had been stationed, statistical records are plentiful, but the missionary out-station region of Kahului appeared to have received scant attention during the 1820s. In 1830, Protestant missionaries recorded school attendance figures for the out-stations of Wailuku as: 612 students in Waihu [Waihe‘e], 329 students in Waikepu [Waikapū], and 103 students in Waiehu, with no mention of Kahului (Richards and Green 1831). The use of the northern coastline landing at Kahului by early Europeans must have been difficult, for far more records exist of early explorers and merchant ships at anchor off the southern, more protected coastline of Maui than along the exposed, northern coast.

James Jarves (1844:19–20), the first editor of *The Polynesian*, the third English-language newspaper in the Hawaiian Islands, included news about events in Kahului. He noted a “remarkable oscillation of the ocean” that occurred at Kahului on November 7, 1837:

> At Maui, the sea retired about 20 fathoms, and returned with great speed, in one immense wave, which swept before it houses, trees, canoes, and all else exposed to its fury. At the village of Kahului, the inhabitants, as at Honolulu, followed with rapturous delight the retreating wave, when suddenly it turned upon them, rising like a steep wall, rushed forward to the shore, burying the natives in its foam, and destroying the whole hamlet. [Jarves 1844:19–20]

During the early and middle 1800s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from continental diseases and nucleation around the developing port towns. The traditionally Hawaiian population was largely dispersed and although there were royal centers and areas of more concentrated population, these areas never came close to rivaling the populations of the historic port towns that developed on Hawai‘i’s shorelines during the 1800s.

In this regard, R.S. Kuykendall notes that in the period from 1830 to 1854:

> The commercial development during this period, by magnifying the importance of a few ports, gave momentum and direction to a townward drift of population; the population of the kingdom as a whole was steadily going down, but the population of Honolulu, Lahaina and Hilo was growing.[Kuykendall 1968:313]

Kuykendall’s observation likely captures the demographic pattern at the Kalepolepo entrepot, a hub of early historic activity for Kīhei and eventually all of Kula Moku (Kolb et al. 1997:69).

The development of Kalepolepo as an entrepot and a focus of Christian life in the 1840s and 1850s most likely increased the population in the immediate vicinity above the pre-Contact population figures, contrary to the island-wide trend of depopulation. The population and areal extent of the Kalepolepo community appears to have reached its zenith during the mid-1800s:

> The ancient village of Kalepolepo was relatively small, and was built around an economy primarily based upon the exploitation of ocean resources—primarily the excellent fishing grounds as well as three large fishponds. However, as the number of visiting ships increased, Kalepolepo soon became an important provisioning area. By 1850 we know that the economic opportunities were attracting a number of European entrepreneurs. [Kolb et al. 1997:68]

In 1820, the whaling industry was introduced in Hawai‘i. Although the whaling trade centered on Lāhainā, mainly affecting the Kula/Kīhei area through agricultural demands, a small whaling station was maintained at Kalepolepo from the 1840s to the 1860s (Clark 1980:47)

The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. After 1830, dryland agriculture in the old Kula District expanded with a focus on Irish potato cultivation. The California Gold Rush of 1849 further intensified the demand as a California-Hawai‘i potato trade began to flourish. Kula became the area of highest potato production in Hawai‘i and the area between 2,000- and 5,000-ft elevation was known as “the potato district.” During this time, sugar cultivation and ranching were established in the Kula region. According to Helen Wong Smith, sugar was present prior to 1846, with six sugar producers operating on the slopes of Haleakalā, and ranching occurred in the area prior to the 1840s (Brown and Haun 1989:C-7 and C-6). Much of the produce, sugar, and livestock moved down the Kalepolepo and Kekuawaha‘ula‘ula Trails to the landing at Kalepolepo, just south of the project area. That the inundation of land clearing and cultivation associated with the Gold Rush resulted in “deforestation [which] adversely affect[ed] the amount of rainfall in the district, and periods of drought became more common” (Donham 1992:5).

David Malo created a balance for the boisterous whaling crowd by constructing the Kilolani Church at Kalepolepo around 1852. Potato production thrived in Kula from about 1830 to 1850, until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai‘i trade (Burgett and Spear 1995:6–7).

4.3 Mid to Late 1800s

4.3.1 The Māhele and the Kuleana Act

The most significant change in land-use patterns and allocation came with the Māhele of 1848 and the privatization of land in Hawai‘i. This action hastened the shift of the Hawaiian economy from that of a subsistence-based economy to that of a market-based economy. During the Māhele, all of the lands in the Kingdom of Hawai‘i were divided between *mō‘ī* (king), *ali‘i*, *konohiki* (overseer of an *ahupua‘a*), and *maka‘āinana* and passed into the Western land tenure model of private ownership. On 8 March 1848, Kauikeaouli (Kamehameha III) further divided his personal holdings into lands he would retain as private holdings and parcels he would give to the government. This act paved the way for government land sales to foreigners, and in 1850 the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995:41–51).

Native Hawaiians who desired to claim the lands on which they resided were required to present testimony before the Board of Commissioners to Quiet Land Titles. Upon acceptance of a claim, the Board granted a Land Commission Award (LCA) to the individual. The awardee was then required to pay in cash an amount equal to one-third of the total land value or to pay in unused land. Following this payment, a Royal Patent was issued that gave full title of ownership to the tenant. But by 1850, the government of Hawai‘i was offering land for sale to both Native Hawaiians and foreigners. Such lands were referred to as Royal Patent Grants, or simply Grants.

A total of 13 land commission claims were made in Pūlehunui, and nine were awarded (LCAs 0327B, 9671, 9019, 4672, 9672, 9673, 8866, 4567, and 5230). Only one of these awards, LCA 5230, is immediately surrounding and inclusive of the current project area (Figure 7 and Figure 8). Supporting testimony given to the land commissioners indicate that the 1668.78 acres of LCA 5230 were awarded to Keaweamahi by the King in 1843 and never disputed. The testimony given by Kaauwai and Kaiakekaua additionally maintained that a great many natives lived within the *ahupua‘a* of Pūlehunui. The majority of the lands awarded were *kula* (pasture) used for potato (both sweet potato and Irish potato) cultivation and were primarily located along the upper elevations of Kula Moku (Waihona ‘Aina 2000).

In 1879, following the initial division of lands during the Māhele, one of the Pūlehunui boundaries was disputed by the owners of adjacent lands in Waikapū. The western boundary of Pūlehunui that had been specified by the Commissioner of Boundaries and surveyed included approximately 2,000 feet along the coastline from a sand spit known as Kīhei to a point of rocks called Kalaepōhaku. However, a dispute arose because the eastern boundary line that was being claimed for Waikapū would cut Pūlehunui off from the ocean. Testimony was given by *kama‘āina* (Native Hawaiian residents) of Pūlehunui or lands next to it regarding their familiarity with the boundaries of Pūlehunui Ahupua‘a. All witnesses, with the exception of one, consistently stated the line between Pūlehunui and ‘Ōma‘opio was along a ravine or *kahawai*. The line carried along this *kahawai* and continued to follow the same natural boundary to Ka‘ōpala at the bottom of the East Maui slope. Ka‘ōpala meets the bottom of the West Maui slope and creates a depression and this is where the boundary turns course, following the natural depression or shallow *kahawai* to the sea. The court agreed that the boundary likely followed this natural line and concurred with the findings of the Commissioner of Boundaries. As a result, the original 2,000 feet of coastline from Kīhei to Kalaepohaku attributed to Pūlehunui Ahupua‘a was upheld (McCully J Court Opinion, in Sterling 1998:254–257).

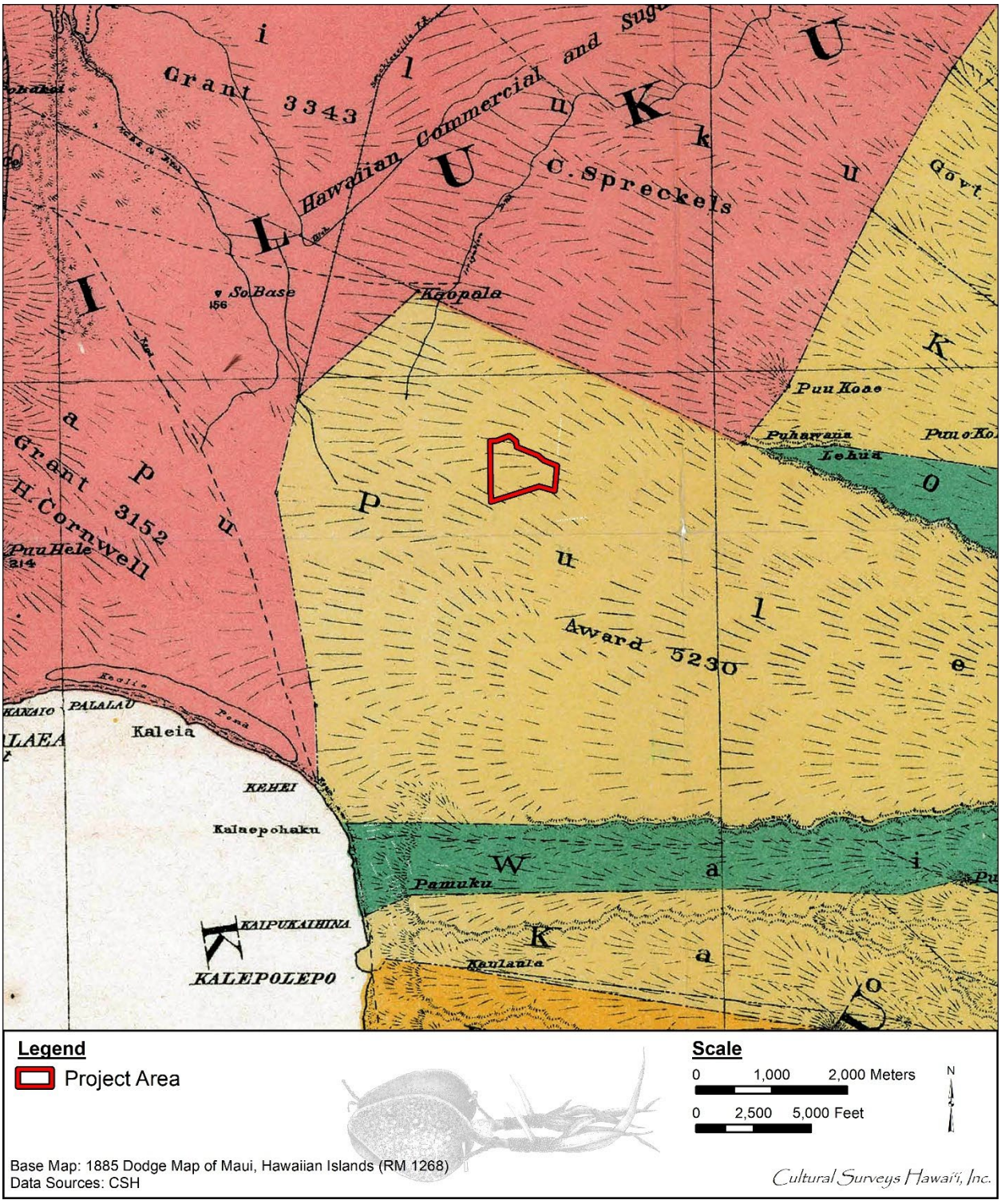


Figure 7. Portion of the Dodge (1885) map of Maui (RM 1268) showing the location of the project area within Award 5230

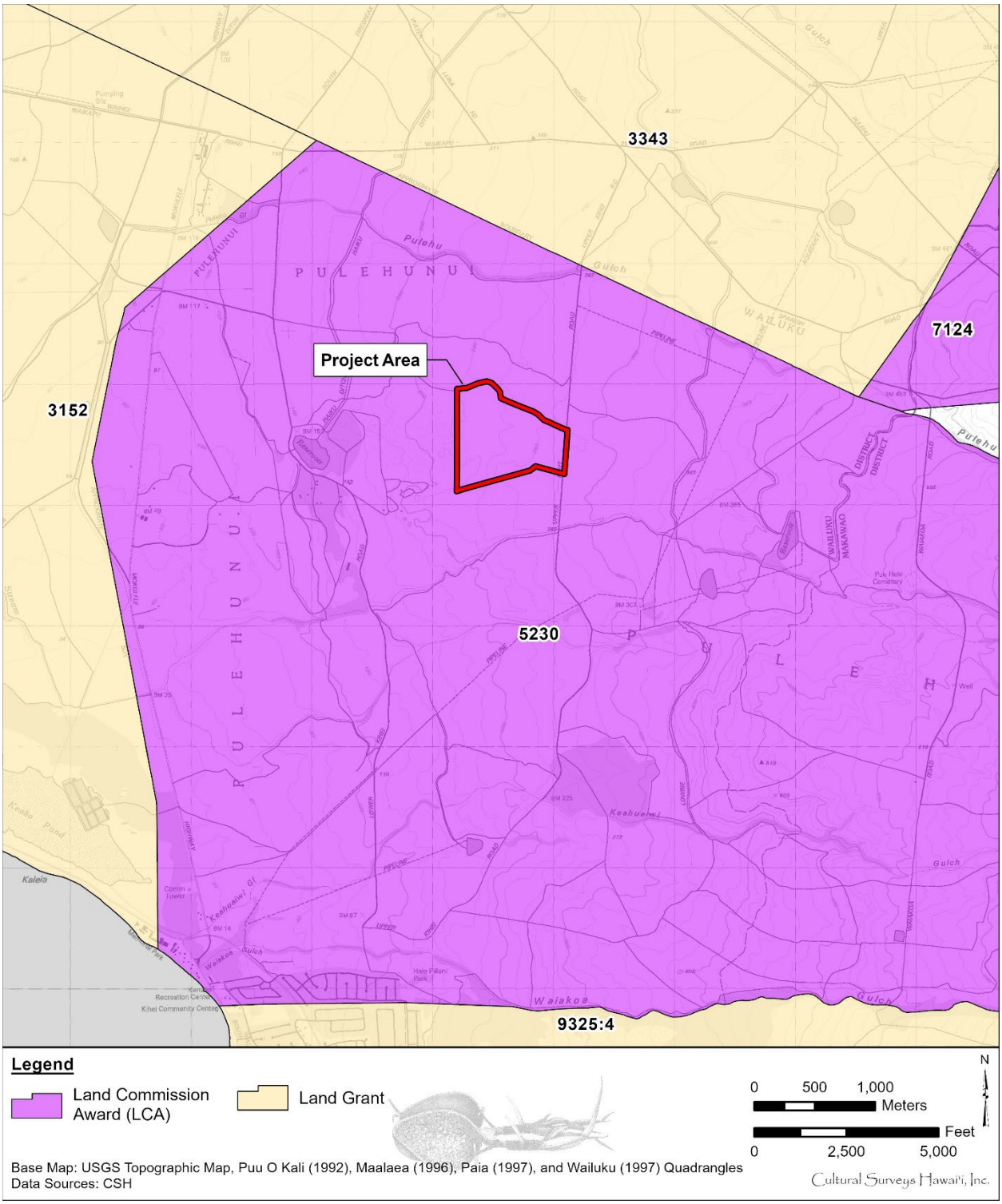


Figure 8. USGS topographic quadrangle map with an overlay of Land Commission Awards and Land Grants recorded in the vicinity of the project area (U.S. Geological Survey 1992, 1996, 1997a, 1997b)

4.4 Late 1800s to Early 1900s

4.4.1 The Sugar Industry

A common crop on nearly all major Hawaiian Islands was sugar cane. Among the early government grants in the upland area of Wailuku Ahupua‘a were lands set aside for the Wailuku Sugar Company, a plantation first organized in 1862 by James Robinson & Company, Thomas Cummins, J. Fuller, and agent C. Brewer & Company. The success of sugar grown in the region resulted in a second large plantation, in Waihe‘e, producing over 757 tons of sugar and 45,000 gallons of molasses in 1865. The Waihe‘e mill manager was Samuel T. Alexander, and the mill’s head foreman was Henry P. Baldwin (Gilmore 1936).

In 1869, Alexander and Baldwin, having resigned from their posts at the Waihe‘e mill, purchased 11.94 acres of land located just west of Pā‘ia. Both men were descended from Lāhainā missionary families, eager to apply their agricultural experience to their own plantation. This initial land purchase was the beginning of the development of the entire central isthmus for sugar cultivation. In rapid succession, Alexander & Baldwin expanded its operations by purchasing other small *kuleana*, setting up a mill, and attracting more investment capital (Dean 1950).

In 1876, a treaty was signed between the Kingdom of Hawai‘i and the United States, which opened larger and more lucrative markets for Hawaiian sugar. Plans were immediately drawn up by Alexander & Baldwin to finance a ditch to bring water from the Hāna region of East Maui to the arid plains of Pā‘ia. The Kingdom of Hawai‘i issued a lease for the construction right-of-way, and in 1878, the successful venture delivered millions of gallons of water to the Pā‘ia region via the Hamakua Ditch (Wilcox 1996:60–61).

Competition was supplied by Claus Spreckels who engineered a similar irrigation ditch from Honomanū in East Maui to lands located just inland of Kahului, where the Spreckelsville mill and plantation camp were built. Spreckels invested three million dollars in the Hawaiian Commercial & Sugar Company and competed for sugar lands, wharf and warehouse space, railway lines, and shipping schedules with Alexander & Baldwin (Dorrance and Morgan 2000:68–69).

In 1882, following his success in building the Honomanū Ditch linking East Maui water sources with his sugar fields in the central isthmus, Spreckels further capitalized on that success to engineer the Waihe‘e Ditch (also named the Spreckels Ditch) in West Maui. The 15-mile-long ditch started at the 435-foot elevation of Waihe‘e Stream, and carried 60 million gallons of water a day to the Wai‘ale Reservoir at the 214 foot elevation of Wailuku. Spreckels became the first plantation owner to irrigate his fields by water from both Haleakalā and the West Maui mountains (Wilcox 1996:63). By 1888, the Spreckels plantation covered 28,000 acres, making it the largest sugar plantation in the world (Wilcox 1996:63). Financial pressures forced Spreckels to give up control of HC&S to Alexander & Baldwin in 1898 after a long and fierce battle (Dean 1950).

4.4.2 Kihei Plantation Company

The Kihei Plantation Company, Ltd. (KPC) was organized late in 1898 with a capitalization of 60,000 shares at $50 par value. Water was the most critical component in the decision to locate sugar cultivation along the leeward shores of Maui’s arid coastline. The discovery of an ample supply of irrigation water early in 1898 led to the drilling of a large, successful well, but the supply of water was limited (Stearns and MacDonald 1942). Over the next four years, two ditches were

developed to supplement the water needs of the 4,873 acres of sugar under cultivation at Kīhei (Gilmore 1936).

The history of the Kihei Plantation Company begins with the annexation of the Hawaiian Islands by the United States in 1898. With annexation came political stability for Hawai‘i, at the same time that worldwide sugar prices were rising due to the outbreak of war between the United States and Spain over the Spanish colonies in Cuba, Puerto Rico, and the Philippines, all major sugarcane producers. Henry P. Baldwin entered HC&S into a partnership with O‘ahu businessman Benjamin F. Dillingham to convert landholdings in Kīhei into a sugar enterprise.

Up to that time, sugar cultivation within the central isthmus of Maui was centered around the main towns of Wailuku and Kahului. Water tunneled from springs in the West Maui Mountains flowed through ditches in Wailuku to irrigate fields as far away as Mā‘alaea. Water from the windward rain belt of Kailua ran through a network of ditches from East Maui to Pā‘ia, to irrigate fields in Pu‘unēnē.

During its existence, the plantation company in Kīhei built bridges to span streams and gulches flowing through the company fields. The plantation had planned the construction of a mill in North Kīhei, and ordered a plant to be built. It was decided that the new HC&S mill under construction at Pu‘unēnē would have more than enough capacity to mill all the cane from the Kīhei fields. The order for the mill was transferred to the ‘Ōla‘a Sugar Company in Hawai‘i, in exchange for a supply of steel rails for new railway requirements at Pu‘unēnē. A large Kona storm hit the plantation on 15 November 1900, and caused immense damage to both Kīhei and the HC&S fields in Pu‘unēnē (Dean 1950). Bridges were knocked out, buildings were flattened, and washouts filled irrigation ditches with silt. Repairs were effected immediately, with the new HC&S mill at Pu‘unēnē commencing operations January 29, 1902.

A well-drilling company from Honolulu, the McCandless Brothers, drilled a successful Maui-Type well (U.S.Geological Survey Well 14 / Hawaiian Commercial & Sugar Well K1) in 1899. It was located just inland from the coast in North Kīhei, between Keālia Pond and the Waiakoa Homestead Lands. This well was drilled vertically to approximately 60 feet through the Honomanū basalts, and tunneled laterally over 1,500 feet in order to skim 10 million gallons of fresh irrigation water per day from sources beneath the Kīhei plains (McCandless 1936:66). The Kihei Plantation Company had the McCandless Brothers drill two or three additional Maui-Type wells on the north side of reservoir K2 at the discharge end of the existing pipeline of Well 14. The well was intended to be named the HC&S K2, and would have included a large pumping station, but the plantation in Kīhei failed in 1908, before the well site was able to be developed (Stearns and MacDonald 1942).

4.4.3 Railway Operations

The KPC planned to construct a railway to move their cane. The sugar agency of Williams, Dimond & Company placed an order for a locomotive from the Baldwin Locomotive Works in Philadelphia. The order was placed April 1899, and the plantation locomotive “Haleakala” was built and sent on to Maui.

By March of 1900, the first annual report of the KPC stated, “It was our intention to complete the main [rail]road only as far as Camp #2, or for about 2 miles, but as the development of Camp #3 required pushing on of the road one and a half miles further, this has been done, having been

completed the 15th of February" (Condé and Best 1973:230). An additional six miles of track connected the Kīhei wharf to the various well pumping stations, and north to meet up with HC&S track (Condé and Best 1973:230). Establishing the railroad at Kīhei made it possible to harvest and transport over two thousand tons of sugar in a single year (Dean 1950) (Figure 9).

The laying of the railroad and the cultivation of the sugar cane in Kīhei was performed primarily by Japanese field labor; the new Maui plantation employing a small part of some 19,908 immigrants from Japan who arrived in Hawai‘i in 1899. Kīhei's plantation Camp #1 was set up inland of the Kīhei wharf and mooring pier. Two stables and a plantation store were located at Camp #1. Hospital services were provided by HC&S in Pu‘unēnē. Kihei Camp #3 was located two and a half miles north of Kihei Camp 1 at Kolaloa Gulch, along the North Kīhei line of the HC&S railroad (Shoemaker 1907).

The three-foot gauge track for the KPC railroad was built to the same specifications as the railway linking the HC&S mill at Spreckelsville to its fields; and to the sugar warehouses at the Kahului wharf. By 1902, with the new Pu‘unēnē mill completed, a new milling contract with HC&S provided that all cane loaded by KPC was to be ground and manufactured into sugar by HC&S.

A 1910 map of the HC&S planation in Pu‘unēnē depicts a portion of the field and rail network surrounding the project area (Figure 10). The "Upper Main R.R. Kihei" extended across Kolaloa Gulch between Increments 2 and 4 of the project area. A spur from this line extended through Increment 4 of the project area to the "K. No 4 Reservoir Ditch. Camp K-3, labeled as "Pump 3-K" is located adjacent to the project area along Makawao Road.

When the plantation was forced to close in 1908 due to diminished returns and underdeveloped water sourcing, the entirety of the company's rolling stock was absorbed by a subsidiary of HC&S. This included a Baldwin ten-ton locomotive, two large flat cars, and approximately 235 cane cars. After this merger the rolling stock of the KPC was absorbed into the larger system that connected Kahului and Kihei to plantations further east of the central isthmus. After acquiring the locomotive, the name was changed from "Haleakala" to "Hawaiian Commercial & Sugar #4," becoming renamed again in 1910 as "Kihei" (Figure 11) (Condé and Best 1973:230–231).

4.4.4 Water Source Development

The Lowrie Ditch project, named for former HC&S manager William J. Lowrie, brought an additional source of water to the Kīhei plains. Lowrie's plan was to begin the ditch at the Pāpa‘a‘ea Reservoir, at the thousand-foot elevation, and maintain a four-foot drop per mile following the ditch's initial plunge from the Kailua reservoir. Steep mountain gulches were traversed using the force of the constant weight of water flowing in a series of siphons. The Halehaku Gulch, at 250 ft deep, and the Māliko Gulch, at over 350 ft deep, were both crossed by giant siphons fabricated of three-eighths-inch iron, and set in place by Japanese laborers. At a weir located above Pā‘ia, the allocation of water began. The first tenth of the water flow in the Lowrie Ditch was divided out to the Paia Plantation (an 11/20ths share) and the Haiku Plantation (a 9/20ths share). The distance traveled, from Kailua to the plantation's Kīhei boundary, was 21.9 miles (Thrum 1900:154–161).

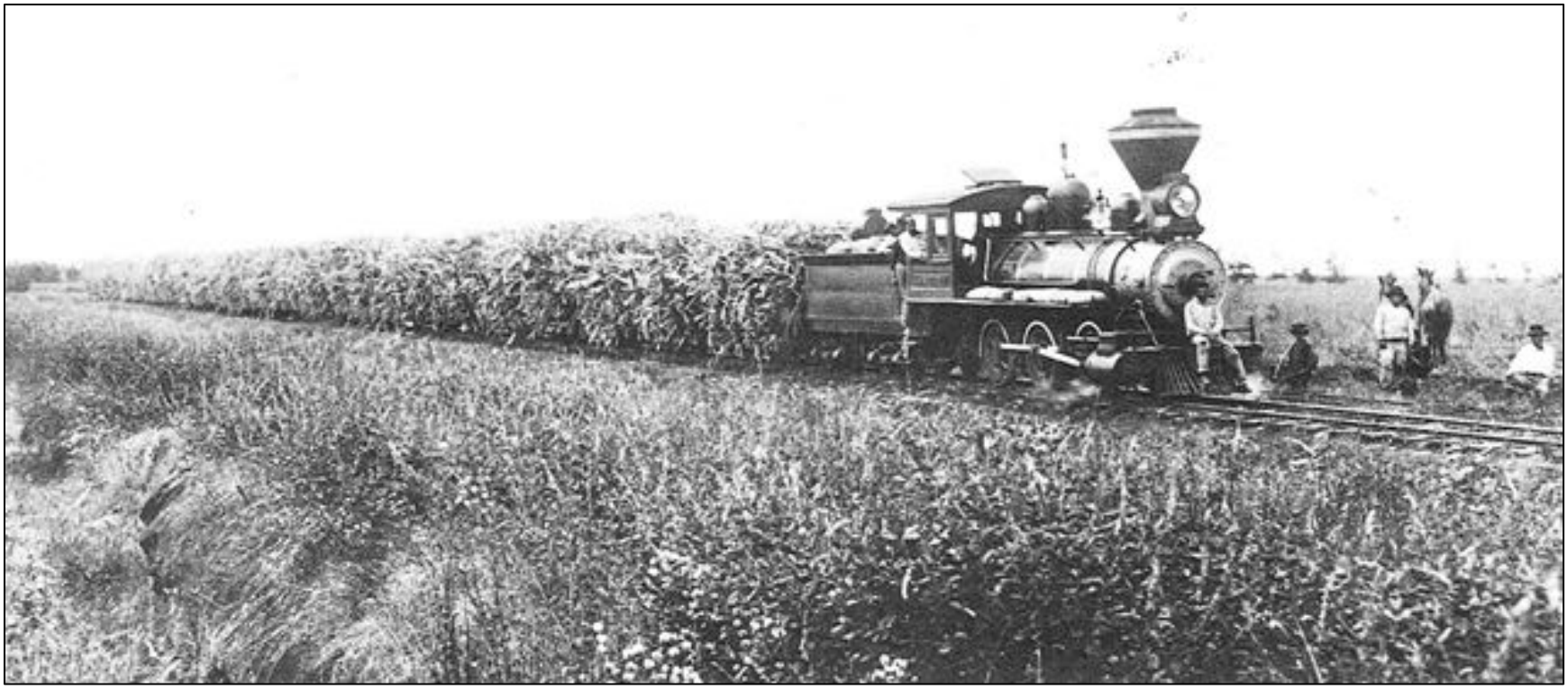


Figure 9. Locomotive “Kahului” pulling long cane train, ca. 1905 (Condé and Best 1973:222)

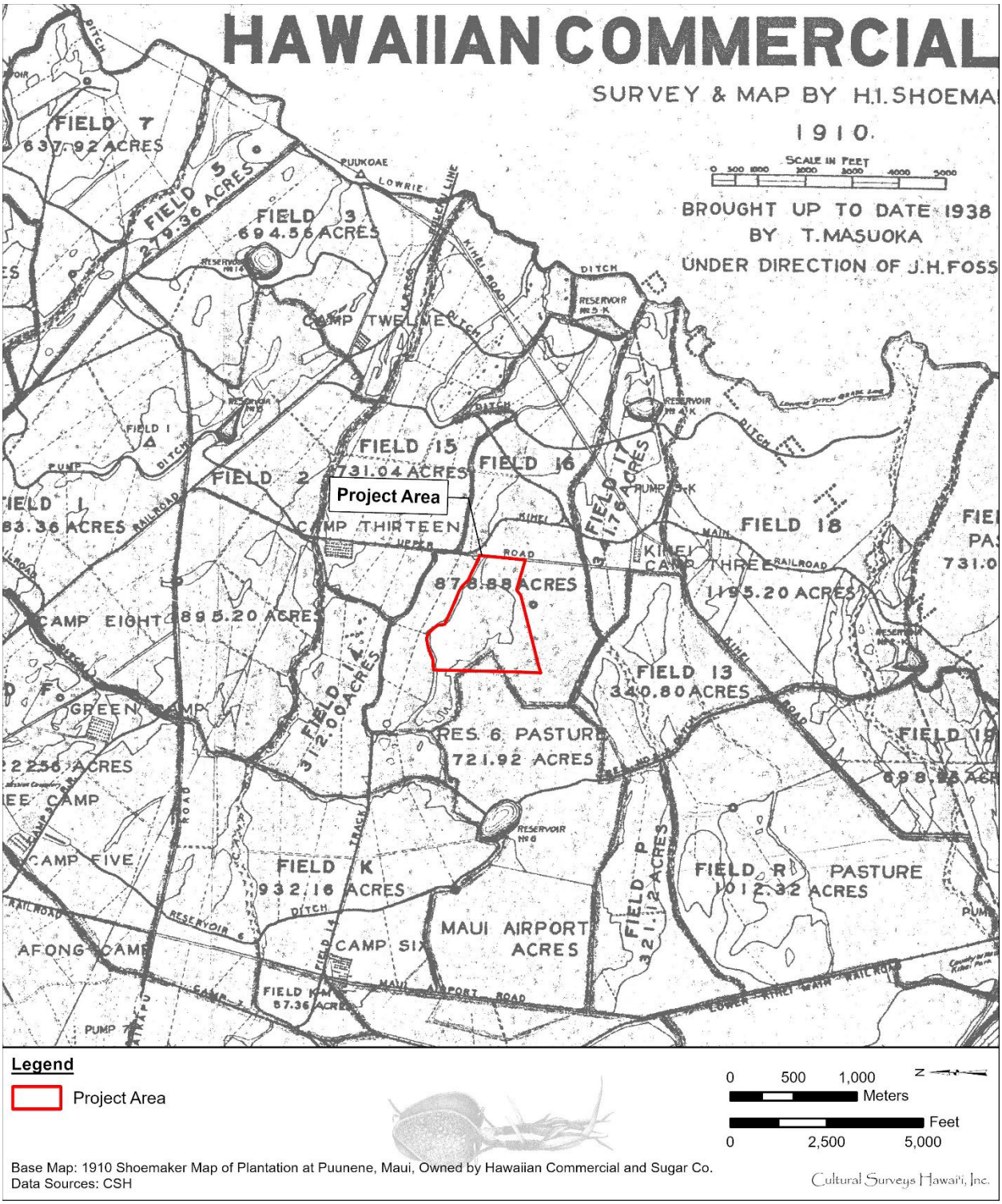


Figure 10. Portion of the Shoemaker (1910) map of the HC&S Plantation in Pu‘unēnē showing the current project area

Figure 11. KPC locomotive servicing HC&S mill as “Hawaii Commercial & Sugar No. 4” (Condé and Best 1973:231)

More water was required from wells and the East Maui watershed. The manager for KPC, W.F. Pogue, asked the management of HC&S for an even larger allocation of water for the Kīhei lands. In 1901, Samuel T. Alexander ordered the construction of a new ditch, tapping the water sources from Nāhiku to Honomanū. It was determined that the KPC would receive two-ninths of the capacity from the enterprise (Dean 1950) (Figure 12).

The inadequate water supply was the key cause of KPC failing to live up to the expectations of its promoters. With the waters of the Ko‘olau Ditch flowing to the Kīhei fields, production appeared to have hit its peak. Although 5,609 tons of sugar were delivered in 1903, high costs required a change of managers in Kīhei, and a reduction of the HC&S milling charge to $7 per ton. The incoming HC&S manager, Frank Fowler Baldwin, determined that the best course of action was to buy out the company for $375,000 (Condé and Best 1973:212, 230).

In 1908, the lands of the KPC were divided up between five new major business entities of HC&S; the Kailua Plantation Company (994 acres), the Kalialinui Plantation Company (923 acres), the Kula Plantation Company (996 acres), the Makawao Plantation Company (982 acres), and the Pulehu Plantation Company (978 acres) acquired the remaining acreage not included in the railroad right-of-way. Water rights reverted to HC&S, and were apportioned between the new plantations (Dean 1950). Sugar operations continued in North Kīhei until ca. 1968, when HC&S leased lands to a corn research farm.

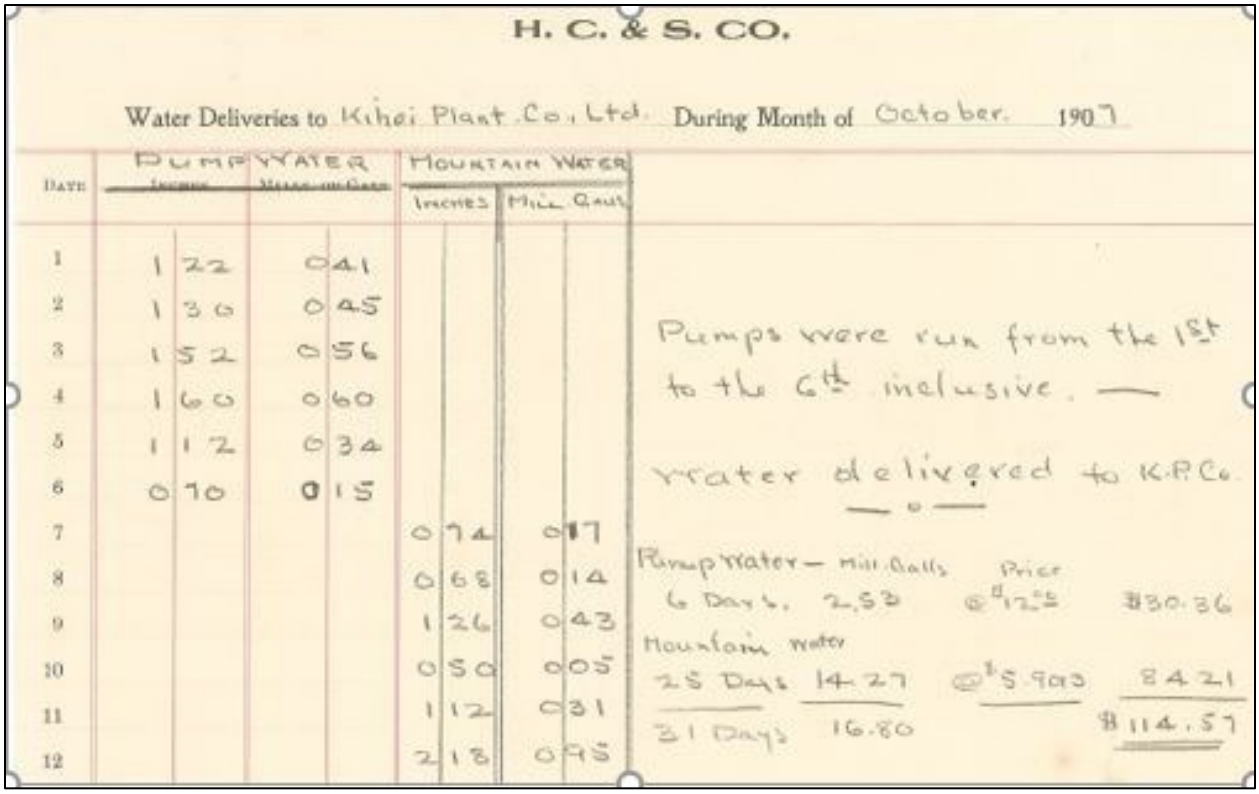
4.5 Early to Mid-1900s

The new mill at Pu‘u Nēnē was planned by HC&S in 1899 and processed its first cane in 1902. From the time it opened and for a several years after, Pu‘u Nēnē was home to the largest sugar mill in the world (Figure 13). Being the largest, at the height of its production, Pu‘u Nēnē mill covered a vast 33,000 acres. A total of 16,000 acres was used for sugar cane and the remaining acreage saw residential camps (Figure 14), a hospital, a grade school, a church, and recreational facilities (Figure 15) for the employees (Bartholomew and Bailey 1994:121).

The McCandless Brothers were retained by the plantation to drill 12 wells at the site. The water was to be used for the operation of the mill, as well as for irrigation. All 12 wells were successes, according to the records of the head engineer, James Sutton McCandless (1936:65–66).

In 1900, most of the port town of Kahului was burned to prevent the spread of bubonic plague. The fire jumped a canebreak and destroyed 575 acres of immature cane. HC&S determined that cultivating the Pu‘unēnē plains required far more water than the original Hamakua Ditch could provide, and to this end, harnessed the Lowrie Ditch and siphoned the Halehaku and Māliko gulches.

The Pu‘unēnē Mill was completed in 1902, supplementing the work done by Alexander & Baldwin’s Pā‘ia Mill. Both mills, and the network of railroad lines connecting the company’s fields and villages, continued to grow. Between 1900 and 1905, acreage harvested doubled, from 2,484 to 4,827 acres. Tons of sugar more than doubled, from 17,857 to 39,411 and the adoption of heavier rails and a wider rail gauge caused HC&S to completely renovate the plantation railroad (Condé and Best 1973:210–211).



H. C. & S. CO.

Water Deliveries to Kihei Plant Co., Ltd. During Month of October. 1907

Date	Pump Water Inches	Pump Water Mill. Gals.	Mountain Water Inches	Mountain Water Mill. Gals.
1	1 22	041		
2	1 30	045		
3	1 52	056		
4	1 60	060		
5	1 12	034		
6	0 70	015		
7			074	017
8			068	014
9			126	043
10			050	005
11			112	031
12			218	095

Pumps were run from the 1st to the 6th inclusive. —

Water delivered to K.P.Co.

— o —

Pump water — mill. Gallons Price

6 Days. 2.53 @ $12.55 $30.36

Mountain water

25 Days 14.27 @ $5.903 84.21

31 Days 16.80 $114.57

Figure 12. Portion of an accounting statement for water delivered to the KPC in 1907 (CSH archives)

Figure 13. Hawaiian Commercial & Sugar Company mill (Bartholomew and Bailey 1994:113)

Figure 14. “Hospital Camp” at Pu‘u Nēnē (Bartholomew and Bailey 1994:114)

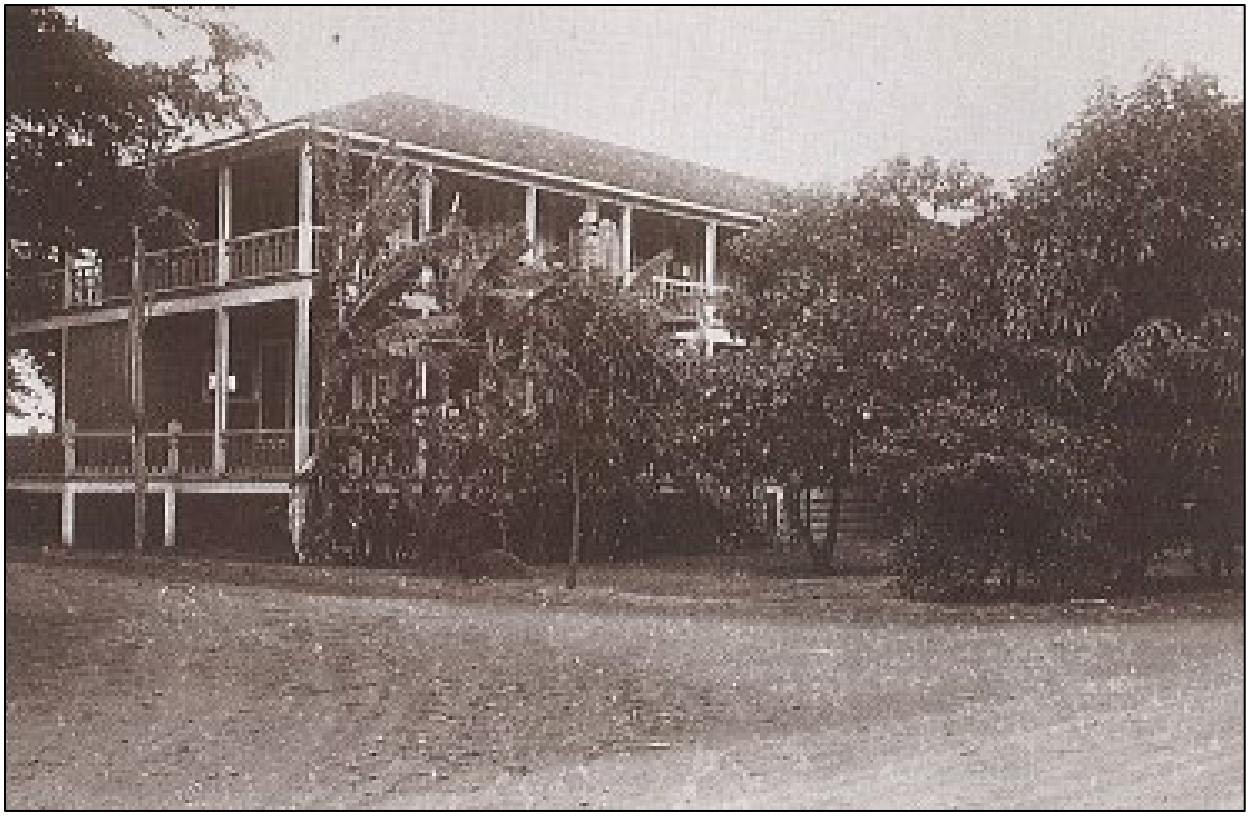


Figure 15. Pu‘u Nēnē Clubhouse. A recreational unit provided by HC&S (Bartholomew and Bailey 1994:113)

In 1906, an east breakwater was constructed by the Territorial Government of Hawai‘i to protect the anchorage at Kahului Harbor. The first wharf was constructed in 1910 and was followed by additional dredging and the construction of the west breakwater by the United States government. The reinforcement of both breakwaters, and the completion of Piers 1 and 2 in 1927 replaced older wharves damaged during a tidal wave in 1923.

The plantation villages of the Pu‘unēnē area grew quickly to surround the new mill. Between a huge influx of immigrant workers in 1909, and the burning of village areas of Pā‘ia and Kahului to control smallpox in 1910, changes to the camp system were in full swing. The plantation workforce continued to expand until 1917, when the United States declared war on Germany, and the accompanying draft depleted the labor pool. By 1919, postwar requirements for sugar had driven the price to $471.40 per ton: an all-time high (Burns 1991). Nine main camps were in place across the Pu‘unēnē plains by the 1920’s, including MeGerrow Camp, Yung Hee Camp, Afong Camp, Spanish B Camp, Alabama Camp, Green Camp, Camp 4, Sam Sing Camp, and Camp 8.

Harold T. Stearns traversed the island of Maui between 1932 and 1942, conducting studies of the geology and ground-water resources. Between 1939 and 1940, Gordon A. MacDonald completed geologic maps for the study. Their combined work highlighted the then-recent explorations for water in Pūlehu Nui, both as a source of drinking water, and for dust control during construction of the airport (Stearns and MacDonald 1942). They reported that the isthmus of Maui

> was without trees and covered with drifting sand prior to the planting of cane. Old residents report that red dust storms were nearly a daily occurrence. It seems possible that very little water existed under the Maui isthmus, prior to irrigation. If so, the annual pumpage of 45.500 million gallons [average over the 10-year period between 1928 and 1938] represents mostly return flow from the 78.271 million gallons of surface water imported for irrigation. [This measurement establishes that] recovery from wells is about 58% of surface water deliveries. [Stearns and MacDonald 1942]

In 1936, a schoolteacher at the Pu‘unēnē School began a competitive swimming program. Soichi Sakamoto trained promising young swimmers in the plantation ditches adjacent to the schoolyard. Although Sakamoto was a respected health and science teacher, his swimmers were not allowed to use the HC&S pool, which was reserved for plantation supervisors and their families. Sakamoto’s goal was to train his students for the 1940 Tokyo Olympics. Training was difficult, not only because Sakamoto demanded dedication from his team, but also because HC&S supervisors on horseback had been ordered to chase the swimmers out of the ditches.

In 1937, Sakamoto’s fledgling team won recognition against a team composed of territorial champions. The harassment by the irrigation supervisors stopped, and special training hours were instituted by the plantation for the use of the supervisors’ pool. Eventually, a pool was constructed at Camp 5. In 1939, one of Sakamoto’s girls, Fujiko “Katsutani” Matsui, won the 200-meter breaststroke event at the National Amateur Athletic Union Games. Another of Sakamoto’s swimmers, Keo Nakama, won six titles at the 1939 Australian Nationals and placed high enough to qualify for the 1940 Olympic Games. Japan’s war with China caused the 1940 Olympics to be transferred to Finland, but conditions in Europe prevented the games from taking place at all. Fujiko Matsui again won the 200-meter breaststroke event at the 1940 National Amateur Athletic

Union Games and qualified for the Olympics, but the swimmer from Pu‘unēnē School was thwarted from competition by the cancellation of the Olympic Games.

In 1939, Pu‘u Nēnē was chosen as the primary location for the Maui Airport. As plans were put into motion, military needs turned the idea of Maui’s airport into the Pu‘u Nēnē NAS instead. At the end of the war, the station was abandoned and the airport was constructed at its current location in Kahului (Bartholomew and Bailey 1994:121).

In the early 1940’s, the harbor town of Kahului was transformed from a sleepy plantation mercantile area to an important military defense depot. Following the entry of the United States in World War II, the rapid construction of military defensive structures demanded the immediate use of plantation wharf space, heavy equipment, and operators. Plantation employees from Wailuku and Kahului were pressed into emergency service until military construction personnel arrived in Hawai‘i. By early 1942, the Navy’s 39th Construction Battalion had reinforced the pre-war construction gangs composed of Pacific Naval Air Bases (PNAB) personnel and plantation labor. Completion of Naval Air Station was accelerated, and coastal defenses were further strengthened (Woodbury 1946).

Immediately following the end of World War II, Pu‘uunēnē NAS was completely dismantled. Over a thousand acres of fertile growing land in north Kīhei were returned to sugar cultivation by HC&S. On the development side, more improvements were made to the lands of Kahului NAS to create a modern civilian airport where the U.S. Navy’s second Carrier Air Service Unit (CASU) had once been based.

In the early morning of 1 April 1946, coastal residents of Kahului, Kahului NAS, Spreckelsville, Kaunoa, and Pā‘ia found themselves floundering in a quickly rising tide of ocean where their houses had once been. A series of tsunamis slammed into the Hawaiian Islands, destroying residences and devastating the landscape. These waves flattened the HC&S Officers’ Club and caught the manager of the HC&S Company, Frank F. Baldwin, and his wife Harriet in their home at Spreckelsville Beach. Frank Baldwin watched the first wave wash through his garage and pick up his four cars as if they were toys. He recalled that the tidal wave of 1923 had done the same thing, and felt there was no further cause for alarm. But an unexpected second wave struck their home and washed Frank Baldwin through a glass wall. Servants helped Frank and Harriet Baldwin escape, but their house was destroyed (Burns 1991).

4.5.1 World War II (1941-1945)

With the outbreak of war between Japan and the United States, Pu‘u Nēnē NAS became the command headquarters for both Navy and Army units on the island of Maui. Plantation heavy equipment and plantation operators worked side by side with U.S. Engineering Department personnel to accelerate construction of defensive positions and immediately lengthen runways at the base. The call for an immediate extension of the runways to military specifications involved extensive engineering to reroute miles of irrigation culverts for HC&S. The dispersion of facilities planned for Pu‘u Nēnē NAS would come to utilize over 2,500 acres of land and involve housing for over 5,000 men (Command History 1945).

The attack on Pearl Harbor, on 7 December, 1941, forced the “Project Dog” program at Pu‘u Nēnē NAS to assign its research to safer bases in the mainland United States. Wartime operations for VJ-3 would concentrate exclusively on providing radio-controlled aircraft as realistic targets

for fleet anti-aircraft gunnery training exercises (Foundation 2002:56–60). Under wartime conditions, responsibilities for VJ-3 included maintaining an intense schedule of weather flights, rescue flights, and anti-submarine reconnaissance flights in the waters surrounding Maui.

Early in 1942, the first Carrier Air Service Unit, CASU-4, was commissioned, and the utility squadron personnel of VJ-3 were reinforced by Naval Air Station Officers. In June, Navy Fighting Squadron 72, the first of over 150 squadrons of U.S. Navy fighter, bomber, and scout aircraft, arrived for advanced training prior to moving into forward combat areas (Wilcox 2004). For four days in early June, 1942, as the Battle of Midway raged 600 miles to the northwest, NAS Pu‘u Nēnē personnel were ordered into shelters and revetments, expecting bombing raids by Japanese aircraft sweeping across the Hawaiian archipelago (Vint 2000). With the success of American naval forces at Midway, the threat of imminent invasion vanished, and efforts to outfit military bases in the Hawaiian Islands for wartime training were redoubled.

Anti-aircraft gun emplacements and protective aircraft revetments were given top construction priority by the U.S. Pacific Naval Air Bases supervisors. Heavy equipment and civilian operators from Wailuku Sugar Company and HC&S were employed at Pu‘u Nēnē NAS, with their pay charged back to the U.S. government. Milling at the plantation sugar mills was confined to daylight hours until “blackout” procedures were approved (HC&S Archives).

U.S. Engineering Department (U.S.E.D.) civilian construction contractors were entirely replaced at Pu‘u Nēnē NAS by military PNAB personnel by July, 1942. Domestic water pipelines were laid by HC&S to supply military camps being constructed at ten separate locations across the central Maui plains, including the Camp 6 location proximate to Pu‘u Nēnē NAS. The main government road and the railroad line that served the wharf at North Kīhei were rerouted, as Pu‘u Nēnē NAS expanded. The Army National Guard’s 108th Regiment, 27th Infantry Division, took up defensive duties along Maui’s coastlines beginning in March of 1942, and occupied formal headquarters at Pu‘u Nēnē NAS. On 16 November 1942, 400 men forming an advance echelon of the Navy’s 39th Construction Battalion arrived at Pu‘u Nēnē NAS, to begin construction of underground fuel bunkers, bombproof buildings, ammunition magazines, and an aviation ground school.

The establishment in 1943 of Pu‘u Nēnē NAS as a “Top Gun” school for fighter-aircraft tactics was based on the Navy’s use of highly decorated veteran fighter pilots, such as Commanders Edward “Butch” O’Hare, James “Jimmy” Flatley, and James Thach, to relay the latest intelligence from the front lines to new pilots rotating into combat (Feightner 1996). “Maui Group Local Naval Defense Forces”, based at Pu‘u Nēnē NAS, controlled the training airspace over the Kaho‘olawe aerial bombing ranges, and administered the training schedule (Lundstrom 1990). Aircraft carriers were modified for combat in the Pacific Ocean at the Pearl Harbor Navy Yard, while their air groups were flown to one of nine Navy airfields in Hawai‘i for advanced training, Pu‘u Nēnē NAS being the premiere airfield (Morison 1953).

Army National Guard Divisions were assigned to occupation, guard, and training stations in the Hawaiian Islands during World War II. Shoreline defenses held by the 27th Infantry Division on Maui were replaced by men of the 40th Infantry Division. As elements of both the 27th and 40th Divisions were combined and sent to the South Pacific for combat duty, they were replaced on Maui by regiments from the 33rd Infantry Division. A resident of Maui during WWII said, “It was common to see groups of soldiers wearing their unit insignias all over Maui: the “Sunshine” [40th

Division], and “Golden Cross” [33rd Division], and the last ones stationed here were the “Mohawks” [98th Division]” (Sanford 2006).

As of 6 March 1943, the 48th Construction Battalion replaced the 39th “Seabees”, and immediately began construction of a new sewer and water system for Pu‘u Nēnē NAS (Turner 1946). Newsletters published by the 39th Seabees (*Shore Lines*) and the 48th Seabees (*Trade Wind*) were joined by an official Pu‘u Nēnē NAS newspaper, *To All Hands* (later renamed *The Island Breeze*). Although military news in these papers was censored, personnel changes, “scuttlebutt” gossip columns, and sports highlights featuring teams organized within military leagues on Maui attracted the largest readership (Figure 16).

The 127th SeaBees relieved the 48th SeaBees in May of 1944, and finished an extensive network of ammunition magazines located toward Kīhei of the main air base. The completion of expanded housing areas, a second CASU area, and additional “SeaBees” housing was accomplished before the end of 1944. Two Mobile Construction Battalion Units, CBMU 563 and CBMU 575, arrived to maintain the refrigeration and water purification systems.

On 1 July 1945, Pu‘u Nēnē NAS personnel numbered 565 officers and 2,798 enlisted service members, including seven Navy nurses, eight WAVES (Women Accepted for Volunteer Emergency Service) officers, and 92 WAVES enlisted personnel (Command History, Monthly Station Report of On-Board Personnel, NAS Puunene, Confidential, 1 July 1945). Total aircraft on board numbered 271 (Monthly Station Report of On-Board Aircraft, Confidential, 1 June 1945). The total number of structures built numbered over 300 (Figure 17).

Immediately following the August 1945 surrender of Japan to the military forces of the United States, facilities essential to the operation of Kahului NAS began to be removed from Pu‘u Nēnē. The bowling alley, bakery, and other specialized structures at Pu‘unēnē NAS were relocated to Kahului NAS, only to be partially or entirely destroyed by the tsunamis of 1 April 1946 (*Flyer* 1946).

During 1946, Maui residents were allowed to rent structures in Housing Area “A”, the area closest to the Reservoir 6 known as “Airport Village”. The cost was reportedly $36.00 per month (Cabos 2000). By 1947, postwar use of the airstrip at Pu‘u Nēnē for civilian aviation led some residents to believe that the site might be further expanded (Belknap 1947). But by the end of 1948, the site of the former Naval Air Station at Kahului had been chosen to replace the Pu‘u Nēnē site for all future civilian flight operations.

By quitclaim deed dated 31 December 1948, the lands of the former air base were transferred from the United States back to the Territory of Hawai‘i. The remaining base facilities, most of which were wooden structures, had, by that time, been abandoned or demolished.

In May 1951, the operations of Hawaiian Airlines and Trans-Pacific Airlines (later Aloha Airlines) were moved to the new civilian airport at Kahului, which utilized the runways of the former Naval Air Station Kahului. Thereafter, Pu‘u Nēnē airfield was placed on “caretaker status”, and sugar cultivation reclaimed much of the land area formerly dedicated to the aerodrome.

Figure 16. Torpedo Squadron 6 (VT-6) football team, fall of 1943, Puʻu Nēnē, Maui (Photo courtesy of the Naval Historical Center, Washington Navy Yard)

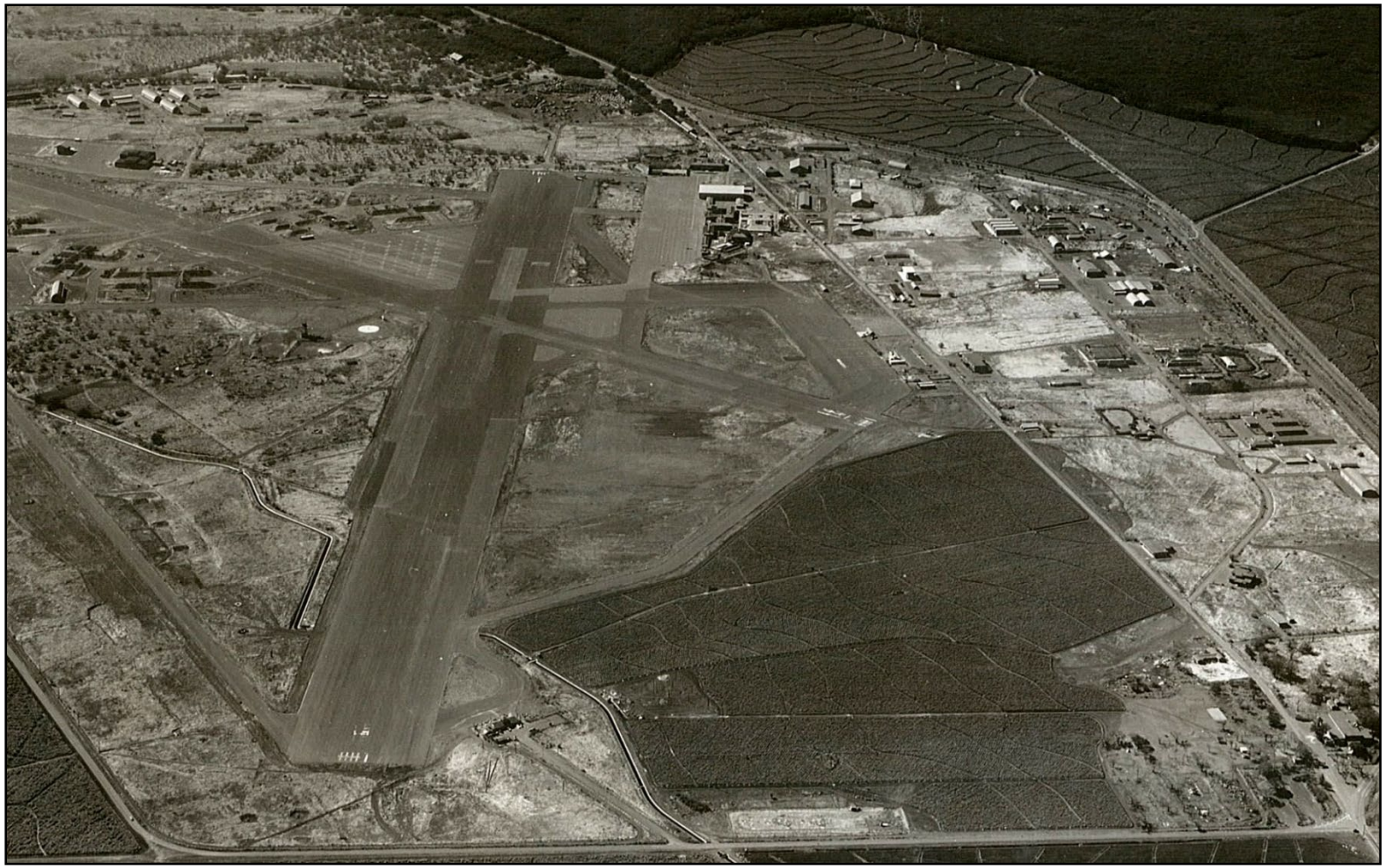


Figure 17. U.S. Air Forces oblique photograph taken 2-12-47. A number of the base buildings are dismantled, and a portion of the base is planted in sugar (photo courtesy of the Naval Historical Center, Washington Navy Yard, Washington, D.C.).

4.6 Contemporary Land Use

Postwar Maui saw the wholesale development of Kahului as a master-planned community providing fee-simple ownership of single-family homes. The majority of the homes, located between Baldwin High School and Pu‘unēnē Avenue, were purchased by plantation employees and servicemen returning from duty overseas. This trend continued throughout the 1950’s, with plantation camp populations falling in the outlying communities, including Pu‘u Nēnē, and rising in the central town site of Kahului’s new “Dream City” (Dean 1950).

The early postwar years (1946-1950) saw the construction of larger infrastructure, including projects such as the Maui Memorial Hospital in Wailuku. Areas once occupied by the military returned to cattle ranching and pineapple and sugar cultivation. The pace of social change began to accelerate. The political power base of the County of Maui began to include Nisei, second-generation Japanese Americans, who had returned from service in Europe during WWII. Their involvement in county politics began to swing political power from the large agribusiness owners to the union leaders representing plantation workers eager for a change (Speakman 1978:148–149).

In the years during the Korean War (1950-1953), the modernization of the workforce and stronger unions brought a host of changes to the central region of Maui. Gone were the railroads of the prewar age, replaced by trucks and mechanized sugar and pineapple harvesters. The modernization of the Kahului Harbor meant that canned pineapple, bulk sugar and molasses could be loaded onto ships faster. Following statehood for Hawai‘i in 1959, mainland retail giants S.H. Kress & Co. and the National Dollar Stores Ltd. expanded their existing locations in Wailuku, and a Ben Franklin Store anchored the new Kahului Shopping Center. Manpower for the construction of new tourist resorts in the outlying leeward areas of Maui would come almost exclusively from Maui’s central district (Bartholomew and Bailey 1994:132).

Statehood also saw the establishment of the Kanahā Pond Wildlife Sanctuary (SIHP 50-50-05-1783). This project was accomplished by the State of Hawai‘i to protect the cultural remains of the original fish pond wall structure, and three endangered wetland bird species: the Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica alai*), and Hawaiian duck (*Anas wyvilliana*).

In 1966, what was once the quarry department of the Kahului Railroad and the ready-mix concrete and concrete products department of A&B Commercial Company combined to form Concrete Industries Inc., a wholly-owned subsidiary of Honolulu Concrete and Draying, Ltd.

The Hawaiian Cement Puunene Quarry started in the late-1970s with 28 acres. The quarry expanded in 1980 to 194 acres. The primary resource of the quarry is basalt that is crushed and used for road base course, concrete and pavement aggregate, railroad ballast, and many other purposes (Yanik 2018).

By 1988, after 125 years of sugar operations and varied attempts at diversified agriculture, the Wailuku Sugar Company mill was closed and scrapped, and the site redeveloped as an industrial park. The current land use of the corridor connecting Kahului with Wailuku includes a mix of residential, warehousing, light industrial, and commercial use, with retail sales centered primarily in Kahului.

Until December 2016 when HC&S announced its closure, most of the land area of Wailuku Ahupua‘a was in sugar cultivation. HC&S was the last sugar plantation still in operation in the State of Hawai‘i.

Section 5 Previous Archaeological Research

The earliest archaeological studies on the island of Maui were island-wide surveys conducted in the early 1900s (Stokes 1917; Walker 1931). These studies tended to focus on the generation of descriptive lists of large-scale architecture or traditional ceremonial *heiau* sites. No *heiau* or other archaeological sites were documented in the immediate vicinity of the current project area. Between 1931 and 1976, only sporadic archaeological studies were undertaken in the region and none in the vicinity of the project area. Following the passage of the National Historic Preservation Act in 1966 and HRS Chapter 6E, which established the Historic Preservation Program in 1976, archaeological studies occurred as a condition of development on a more frequent basis.

Six archaeological studies were conducted in the vicinity of the current project, which include an archaeological reconnaissance survey and AIS investigations (Figure 18 and Table 3). These studies have identified Pu‘u Nēnē NAS, consisting of 59 standing structures and 165 total features (SIHP # 50-50-09-04164), post-war ranching features (SIHP # 50-50-09-04801), the Kīhei Railroad bed (SIHP # 50-50-09-04802), the Haiku Ditch and reservoir (SIHP # 50-50-09-04803), and 90 other historic properties (SIHP #s 50-50-10-06693 through -10-06774) consisting of features associated with the sugar plantation, ranching, and/or WWII period (Figure 19).

5.1 Kennedy (1990)

In 1990, Archaeological Consultants of Hawaii, Inc. (ACH) completed an archaeological walk-through reconnaissance survey of the proposed Hawaiian Cement Puunene Quarry site, TMK: (2) 3-8-004:001. (Kennedy 1990). The survey included an inspection of Kolaloa Gulch and the surrounding agricultural fields. The study documented that the entire property was covered in sugarcane with the exception of Kolaloa Gulch. No historic properties were identified, and no further work was recommended.

5.2 Tomonari-Tuggle et al. (2001)

From 8 October to 4 November 1999, International Archaeological Research Institute, Inc. (IARII) conducted an intensive AIS of approximately 1,875 acres of the former Pu‘u Nēnē NAS, TMK: (2) 2-3-008:008 (Tomonari-Tuggle et al. 2001). The study area is directly west of the current project area and was used primarily for sugarcane cultivation following the closure of Pu‘u Nēnē NAS in 1946. The identified historic properties were categorized into five functions and summarized as follows:

> Sites and features recorded include (1) all of the existing features of NAS Puunene; (2) remains of a cattle ranch dating from the late 1940s to the 1950s; (3) the area of pre-war plantation Camp Six with surface artifacts but no surviving features; (4) abandoned features of the HC&S sugar operations such as a 1930s cane road and irrigation canals of various periods, including a possible pre-1914 section of the Haiku Ditch, and (5) remains of the Puunene Mill to Kīhei railroad line. Evidence for early 1960s Civil Defense activity and late 1980s timber processing was also identified. No pre-contact or early post-contact Hawaiian sites were identified. No human remains were found, nor were any sites or locations identified that have the potential for containing human remains. [Tomonari-Tuggle et al. 2001:iii]

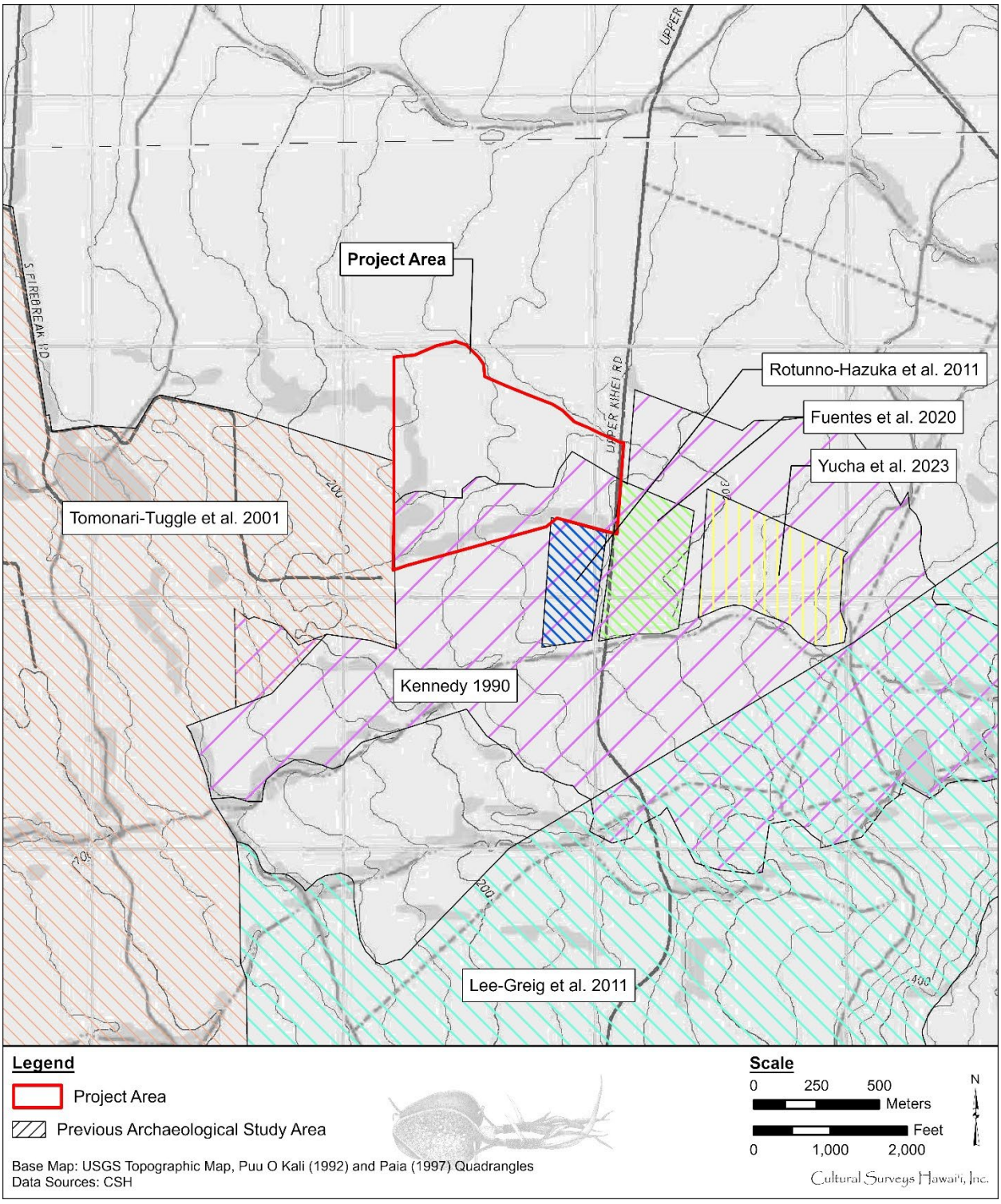


Figure 18. Portions of the 1992 Puu o Kali and 1997 Paia USGS topographic quadrangles depicting previous archaeological studies in the vicinity of the current project area (U.S. Geological Survey 1992, 1997)

Table 3. Previous archaeological studies in the vicinity of the project area

Reference	Type of Study	Location	Results (SIHP # 50-50-)
Kennedy (1990)	Archaeological reconnaissance survey	Hawaiian Cement Puunene Quarry; TMK: (2) 3-8-004:001	No historic properties identified
Tomonari-Tuggle et al. (2001)	AIS	Former Pu‘u Nēnē NAS; TMK: (2) 2-3-008:008	Identified 165 individual features of Pu‘u Nēnē NAS (SIHP # -09-04164), 7 plantation features (SIHP # -09-04800), 2 postwar ranching features (SIHP # -09-04801), a railroad feature (SIHP # -09-04802) and 5 plantation irrigation features (SIHP # -09-04803)
Lee-Greig et al. (2011)	AIS	Approximately 3165 acres located northeast and extending *mauka* (toward the mountains) from the present project area	Identified 90 historic properties, SIHP #s -10-06684 through -10-06774, consisting of features associated with the sugar plantation, ranching and/or WWII period
Rotunno-Hazuka et al. (2011)	AIS	Hawaiian Cement Puunene Quarry Expansion Increment 1; TMK: (2) 3-8-001 (por.)	No historic properties identified
Fuentes et al. (2020)	AIS	Hawaiian Cement Puunene Quarry Expansion Increment 3; TMK: (2) 3-8-001 (por.)	No historic properties identified
Yucha et al. (2023)	AIS	Hawaiian Cement Puunene Quarry Expansion Increment 4; TMK: (2) 3-8-004:001 (por.)	No historic properties identified

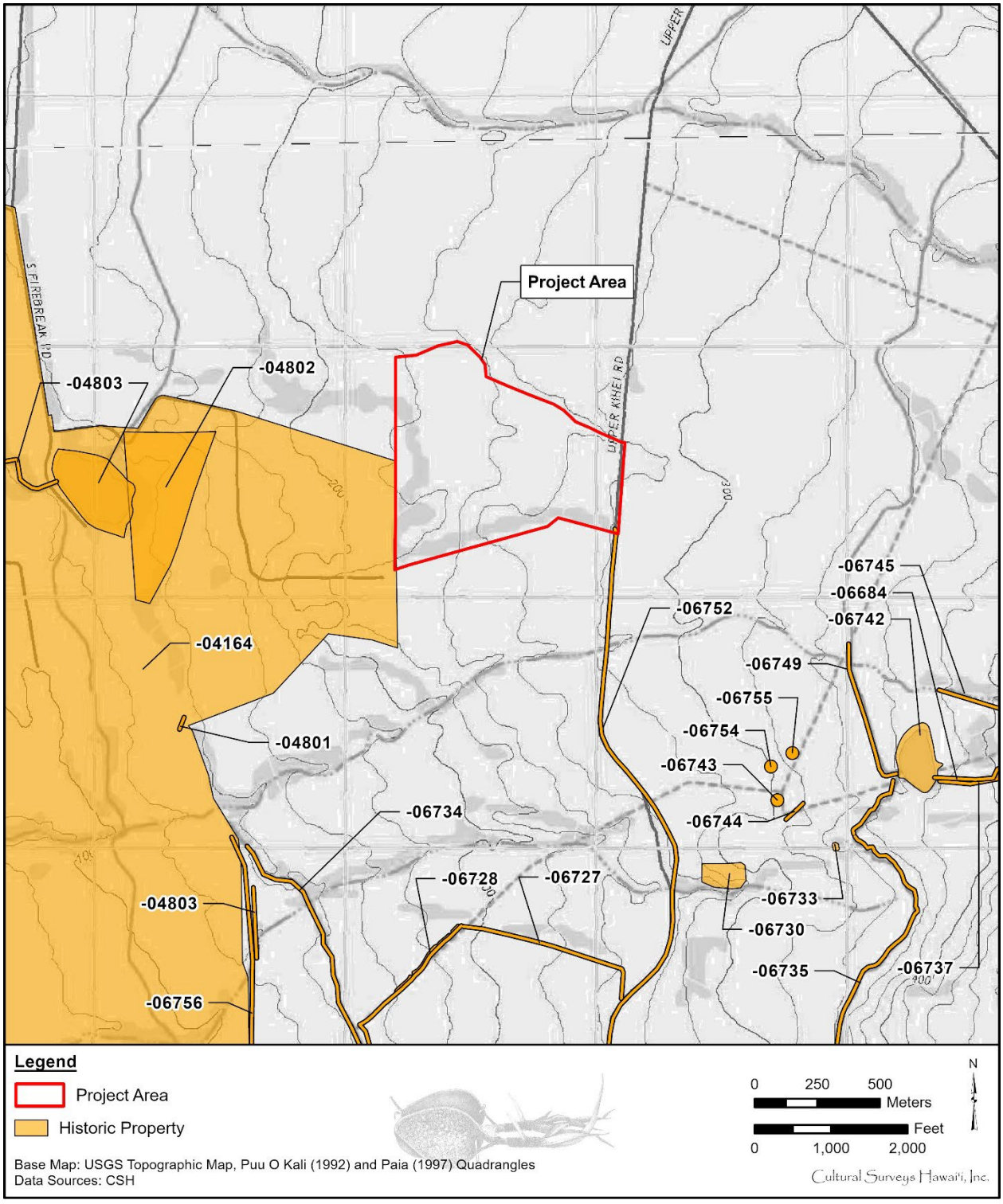


Figure 19. Portions of the 1992 Puu o Kali and 1997 Paia USGS topographic quadrangles depicting historic properties in the vicinity of the current project area (U.S. Geological Survey 1992, 1997)

The Pu‘u Nēnē NAS was previously identified as SIHP # 50-50-09-04164. The study documented 165 features associated with SIHP # -09-04164. Four historic properties were newly identified, SIHP #s 50-50-09-04800 through -09-04803. SIHP # -09-04800 is a complex of seven sugar plantation features. SIHP # -09-04801 is a complex of ranching features (fences, corrals, watering troughs) from post-WWII. SIHP # -09-04802 is the Kīhei railroad, and SIHP # -09-04803 consists of five features relating to the Haiku ditch and reservoir.

SIHP # -09-04164, was assessed as eligible to the National and State Registers of Historic Places and significant under Criteria A (be associated with events that have made an important contribution to the broad patterns of our history), C (embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value), and D (have yielded, or is likely to yield, information important for research on prehistory or history). SIHP #s 09-04800, 09-04802, and 09-04803 were assessed as eligible to the National Register of Historic Places (NRHP) under Criteria A and D. SIHP # -09-04801 was assessed as not eligible to the NRHP as it likely dated to the early 1950s and not yet over 50 years old.

5.3 Lee-Greig et al. (2011)

From October through December 2009 and in February 2010, CSH conducted an AIS of approximately 3,165 acres in Pūlehunui for a proposed agricultural subdivision (Lee-Greig et al. 2011). Ninety historic properties (SIHP #s 50-50-10-06684 through -10-06774) were documented, consisting of features associated with the sugar plantation, ranching and/or WWII period (Table 4).

5.4 Rotunno-Hazuka et al. (2011)

In 2010, ASH conducted an AIS for the 24.476 acres for expansion within Increment 1 of the Hawaiian Cement Quarry, TMK: (2) 3-8-001 (por.) (Rotunno-Hazuka et al. 2011). The study included the excavation of 20 backhoe-assisted test excavations that documented the agricultural plow zone developed over eroding and solid basalt bedrock. No historic properties were identified, and the study was termed an “archaeological assessment” in accordance with §13-284-5(5)(A). No further work was recommended.

5.5 Fuentes et al. (2020)

In 2014, ASH conducted an AIS of Increment 3 of the Hawaiian Cement Quarry, TMK: (2) 3-8-001 (por.) (Fuentes et al. 2020). The study included the excavation of 17 backhoe-assisted test excavations with no historic properties identified. Due to negative findings, the study was termed an “archaeological assessment” in accordance with §13-284-5(5)(A).

5.6 Yucha et al. (2023)

In December 2022, CSH conducted an AIS for the Hawaiian Cement Quarry Mining Site Increment 4 Expansion Project, TMK: (2) 3-8-004:001 (por.) (Yucha et al. 2023). The investigation included a 100% pedestrian inspection and the excavation of 20 backhoe-assisted test excavations. No historic properties were identified, and the study was termed an “archaeological assessment” in accordance with §13-284-5(5)(A). Overall, the stratigraphy throughout most of the project area included a modern agricultural plow zone surface (Ap horizon) overlying natural alluvial soil and chemically eroded bedrock.

Table 4. Historic properties documented by Lee-Greig et al. (2011:64–68)

SIHP # 50-50-10-	Feature	Feature Type	Function	Probable Age	Condition
-06684	None	Irrigation Pipe	Water Control	Historic Plantation	Fair to Poor
-06689*	None	Fence Line	Animal Husbandry	Historic Ranch	Good
-06704*	None	Fence Line	Animal Husbandry	Historic Ranch	Fair
-06727	None	Fence Line	Indeterminate	Historic Ranch	Poor
-06728	None	Irrigation Ditch	Water Control	Historic Plantation	Remnant
-06729*	None	C-Shape	Indeterminate	Possible Historic	Good
-06730	Overall	Plantation Camp 3	Habitation	Historic Plantation	Good to Remnant
	A	Platform	Habitation	Historic Plantation	Good to Fair
	B	Wall	Indeterminate	Historic Plantation	Fair
	C	Wall	Indeterminate	Historic Plantation	Fair
	D	Depression	Indeterminate	Historic Plantation	Fair to Poor
	E	Mound	Indeterminate	Historic Plantation	Good
	F	Wall/Depression	Indeterminate	Historic Plantation	Poor
	G	U-Shape	Indeterminate	Historic Plantation	Poor
	H	Depression/Hole	Habitation	Historic Plantation	Poor
	I	Terrace	Habitation	Historic Plantation	Remnant
-06733	None	Reservoir	Agriculture	Historic Plantation	Good
-06734	None	Irrigation Ditch	Water Control	Historic Plantation	Good
-06735	Overall	Irrigation Ditch and Component Gates	Water Control	Historic Plantation	Good to Fair
	A	Irrigation Ditch	Water Control	Historic Plantation	Good
	B	Irrigation Gates	Water Control	Historic Plantation	Fair
-06737	None	Irrigation Ditch	Water Control	Historic Plantation	Good
-06742	None	Reservoir	Agriculture	Historic Plantation	Good
-06743	None	Pump House	Agriculture	Historic Plantation	Remnant
-06744	None	Fence Line	Animal Husbandry	Historic Ranch	Remnant
-06745	None	Fence Line	Possible Boundary Marker	Historic Plantation	Poor
-06748*	None	Reservoir	Agriculture	Historic Plantation	Good
-06749	None	Irrigation Ditch	Water Control	Historic Plantation	Good
-06752	None	Historic Road	Transportation	Historic Plantation	Good to Poor

SIHP # 50-50-10-	Feature	Feature Type	Function	Probable Age	Condition
-06754	None	WWII-Era Bomb Shelter	WWII Military	WWII Military	Excellent
-06755	None	Concrete Cistern	Water Control	Historic Plantation	Good
-06756	None	Historic Road	Transportation	Historic Plantation	Good to Poor
-06757*	None	Historic Road	Transportation	Historic	Poor
-06758*	None	Irrigation Pipeline	Agriculture	Historic Plantation	Good to Fair
-06759*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06760*	None	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06761*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06762*	None	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06763*	None	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06764*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06765*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06766*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06767*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06768*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06769*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06770*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06771*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06773*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair
-06774*	Multiple	Field Clearing Mounds	Agriculture	Historic Plantation to Modern Era	Good to Fair

*Not depicted in Figure 19

Section 6 Consultation Results

6.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with NHO, agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise and/or knowledge of the *ahupua‘a* of Pūlehunui. CSH initiated its outreach effort in December 2024 through letters, emails, and/or telephone calls. CSH concluded its outreach efforts in November 2025. At the recommendation of the Office of Hawaiian Affairs (OHA), the community outreach letter was included in the OHA newsletter (Appendix A) in November 2025, however, CSH received no responses.

6.2 Community Outreach Letter

Letters along with maps and aerial photographs of the project area were mailed with the following text:

> *Aloha mai kākou,*
>
> With this letter, Cultural Surveys Hawai‘i (CSH) humbly requests your *mana‘o* and *‘ike* (experience, insights, and perspectives) regarding past and ongoing cultural, practices, beliefs, and resources within the Pūlehunui Ahupua‘a.
>
> Consultation with traditional cultural practitioners, *kūpuna*, *kama‘āina*, and Hawai‘i’s diverse ethnic communities is an important and deeply valued part of our work and the environmental review process for proposed projects in Hawai‘i. Your contributions will revitalize and keep alive knowledge of cultural practices, storied places, and life experiences that will remind Hawai‘i’s children of their history for generations to come.
>
> Project Description
>
> At the request of Hawaiian Cement, CSH is conducting a cultural impact assessment (CIA) for Hawaiian Cement’s New Mining Area Project. The project area is depicted on a portion of the 1992 Puu O Kali and 1997 Paia U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangle (Figure 1) and a detailed 2020 ESRI aerial image (Figure 2).
>
> Hawaiian Cement proposes to develop a new mining area adjacent to their existing quarry area, approximately 125 acres, within a portion of TMK (2) 3-8-004:001 CPR 2. The parcel is currently owned by Mahi Pono Central A, LLC.
>
> Purpose of this Study
>
> The purpose of a CIA is to gather information on Hawai‘i’s cultural resources, practices, or beliefs that have occurred or still occur within the proposed project area and Pūlehunui Ahupua‘a. This is accomplished through consultation and background research using previously written documents, studies, and interviews. This information is used to assess potential impacts by the proposed project to the specific identified resources, practices, and beliefs in the project area and

throughout Pūlehunui Ahupua‘a. As a traditional cultural practitioner and holder of long-term knowledge, your insight, input, and perspective provide a valuable contribution to the assessment of potential effects of this project and an understanding of how to protect these resources and practices.

Insights focused on the following topics in the project area (shown on the attached Figures 1 and 2) are especially helpful and appreciated:

- Your knowledge of traditional cultural practices of the past within the proposed project area and Pūlehunui Ahupua‘a
- Your specific traditional cultural practice and its connection to the proposed project area and Pūlehunui Ahupua‘a
- The different natural resources associated with your specific traditional cultural practice
- Legends, stories, or chants associated with your specific traditional cultural practices and their relationships to the proposed project area and Pūlehunui Ahupua‘a
- Referrals to other *kūpuna*, *kama‘āīna*, and traditional cultural practitioners knowledgeable about the proposed project area and Pūlehunui Ahupua‘a
- Your comments or thoughts on the potential impacts the proposed project may have on your ongoing traditional cultural practices and natural resources within the proposed project area and Pūlehunui Ahupua‘a
- Your knowledge of cultural sites and *wahi pana* (storied places) within the proposed project area and Pūlehunui Ahupua‘a
- Your comments or thoughts on the potential impacts the proposed project may have on cultural sites and wahi pana within the proposed project area and Pūlehunui Ahupua‘a

<u>Consultation Information</u>

Consultation is an important and deeply valued part of the CIA and environmental review process. Your contributions will revitalize and keep alive our combined knowledge of past and ongoing cultural practices, historic places, and experiences, reminding our children of their history generation after generation.

With your agreement to participate in this study, your contributions will become part of the comprehensive understanding of traditions of the area, and part of the public record. As part of this process, your knowledge may be used to inform future CIAs and other heritage studies of cultural practices and resources that need protection from impacts of proposed future projects. If you engage in consultation, and the *mana‘o* and *‘ike* you provide appears in the study, we would like to recognize your contribution by including your name. If you prefer not to allow your name to be included, your information can be attributed to an anonymous source.

The consultation interview structure and format are flexible. We will accommodate your preference on how to get together; talk story, over the phone, by email correspondence, remotely via Zoom, MS Teams, Google Chat or other remote meeting platforms.

Your knowledge of the resources and potential effect of the project on traditional practices in the project area and Pūlehunui Ahupua‘a focusing on the topics in the bullet points above can also be submitted in a written statement. CSH will provide return postage of your written statement on request. CSH is happy to provide a list of topics for discussion, a more structured questionnaire of interview questions, or any other assistance that might be helpful.

[…]

Mahalo a nui,

[…]

6.3 Community Outreach Table

Below in Table 5 are names, affiliations, dates of contact, and comments from NHOs, individuals, organizations, and agencies contacted for this project. Results are presented below in alphabetical order.

Table 5. Community Outreach Table

Name	Affiliation	Comments
Ahia, Jennifer Noelani	Malama Kakanilua	Letter and figures sent via email 5 December 2024 Second round letter and figures sent via email 12 February 2025
Ampong, Foster	*Kama‘āina*	Letter and figures sent via email 5 December 2024 Second round letter and figures sent via email 12 February 2025
Apana, Clare	Cultural Practitioner; Malama Kakanilua; Aha Moku Council Burial Committee	Letter and figures sent via email 12 February 2025
Bisgard, Bill	Former engineer, Hawaiian Commercial and Sugar Company (HC&S)	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Buland, Holly	Assistant Director, Alexander & Baldwin Sugar Museum	Letters and figures sent via USPS 4 December 2024

Name	Affiliation	Comments
		Second round letter and figures sent via email 12 February 2025
Butler, Kelly	District Manager, Maui County Soil and Water Conservation District	Letter and figures sent via email 12 February 2025
Eaton, Antoinette “Toni”	Maui District Office Supervisor, Department of Hawaiian Home Lands	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Feiteira, Blossom	Advocacy Director, Kū Pono Ka Leo o Ka ‘Āina (KPKOA)	Letter and figures sent via email 12 February 2025 Email invalid
Ferreira, Stacy	Ka Pouhana, OHA	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via email 12 February 2025
Fisher, Scott	Director of ‘Āina Stewardship, Hawaiian Islands Land Trust (HILT)	Letter and figures sent via email 12 February 2025
Freeland, Denby	*Kapa* Artist	Letter and figures sent via email 12 February 2025
Gomes, Noah	Ethnographer, SHPD	Letter and figures sent via email 12 February 2025 Mr. Gomes replied to CSH: *Mahalo for reaching out. I do not have any recommendations for this project at this time. If something does come up, or comes my way, I will be sure to let you know.* CSH replied with thanks.
Hall, Dana	Hui Alanui o Makena	Letter and figures sent via email 12 February 2025
Hokoana, Lui	President, Central Maui Hawaiian Civic Club	Letters and figures sent via USPS 4 December 2024 Returned to sender
Holt-Padilla, Hokulani	Kumu Hula, Pā‘ū o Hi‘iaka/Cultural Specialist/Chancellor of Maui College	Letter and figures sent via email 12 February 2025

Name	Affiliation	Comments
Ho‘opi‘i, Michelle	Maui/Lana‘i Island Burial Council, Wailuku Rep	Letter and figures sent via email 12 February 2025
Iaukea, Lesley	Acting History & Culture Branch Chief, SHPD	Letter and figures sent via email 12 February 2025
Kahalehau, Clyde	Aha Moku, Maui – Na Hono A‘o Pi‘ilani - Wailuku Moku	Letter and figures sent via email 12 February 2025
Kalanikau, Paula	*Kama‘āina/Kupuna*	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Kalili, Dre	*Pelekikena* (President), Association of Hawaiian Civic Clubs	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Kaluna-Palafox, Vicky	Wailuku Representative, Wai ‘Aha Moku O Maui Committee	Letter and figures sent via email 12 February 2025
Kamaunu, Johanna	Former Maui/Lāna‘i Burial Council—Wailuku	Letter and figures sent via email 12 February 2025
Kamaunu, Kaniloa	Aha Moku Council Wailuku Representative; Aha Moku Council Burial Committee	Letter and figures sent via email 12 February 2025
Kamekona, Carol Lee	Ahahui Kaahumanu - Wailuku	Letter and figures sent via email 12 February 2025
Kapahulehua, Leonard Kimokeo	Founder, Kimokeo Foundation	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Kapu, Ke‘eaumoku	CEO, Aha Moku o Maui/Koani Foundation (501C3)	Letter and figures sent via email 12 February 2025
Kapu, Uilani	Treasurer, Na Aikane o Maui	Letter and figures sent via email 12 February 2025
Kawaihae, Niniau	Community Engagement Director, OHA	Letter and figures sent via email 12 February 2025 Email invalid
Lake-Farm, Sissy	Executive Director, Maui Museum/Kumu Hula, Nā Hanona Kūlike ‘o Pi‘ilani	Letters and figures sent via USPS 4 December 2024

Name	Affiliation	Comments
		Second round letters and figures sent via email 12 February 2025
Lee, Carol-Marie Kaonohi‘okala	*Kama‘āina*	Letter and figures sent via email 12 February 2025
Lu‘uwai, Kalei	*Kama‘āina*	Letters and figures sent via USPS 4 December 2024
Maluo-Pearson, Kahulu	*Kumu Hula*, Hālau Kamaluokaleihulu	Letter and figures sent via email 12 February 2025
Nakahashi, Ikaika	Cultural Historian, SHPD	Letter and figures sent via email 12 February 2025
Nakihei, Sarah	Maui Homestead Farmers and Ranchers Association	Letter and figures sent via email 12 February 2025
Pellegrino, Hokuao	Nohoana Farm Owner; Manager and Land Education Specialist for Kamehameha Schools Maui	Letter and figures sent via email 12 February 2025
Phillips, Kealana	Burial Sites Specialist (Maui, Moloka‘i, and Lāna‘i)	Letter and figures sent via email 12 February 2025
Pundyke, Kawewehi	Wailuku Representative, ‘Āina ‘Aha Moku O Maui Committee; Program Director, Loiloa	Letter and figures sent via email 12 February 2025
Purdy, Malia	Executive Director, Hui No Ke Ola Pono	Letter and figures sent via email 12 February 2025
Pyle, Bill	Former HC&S employee	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Raymond, Ki‘ope	Hawaiian Studies Teacher, UH Maui	Letter and figures sent via email 12 February 2025 Mr. Raymond responded: *I have no comments at this time.* CSH replied with thanks.
Schattenburg-Raymond, Lisa	Horticulturalist/Former Executive Director, Maui Nui Botanical Gardens	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025

Name	Affiliation	Comments
Smith, Jade Alohalani	Representative; Moku o Kaupo	Letters and figures sent via USPS 4 December 2024 Second round letter and figures sent via USPS 12 February 2025
Tanahy, Dalani	Kapa Maker	Letter and figures sent via email 12 February 2025

To date, there have been no responses to include in this CIA report. It should be noted that this does not suggest the community is against or in favor of the project, but simply that they did not respond to the invitation for consultation. At the recommendation of OHA, CSH included the community outreach letter in their newsletter (Appendix A) in November 2025, however, CSH received no responses.

Section 7 Traditional Cultural Practices

Timothy R. Pauketat succinctly describes the importance of traditions, especially in regard to the active manifestation of one's culture or aspects thereof. According to Pauketat,

> People have always had traditions, practiced traditions, resisted traditions, or created traditions […] Power, plurality, and human agency are all a part of how traditions come about. Traditions do not simply exist without people and their struggles involved every step of the way. [Pauketat 2001:1]

It is understood that traditional practices are developed within the group, in this case, within the Hawaiian culture. These traditions are meant to mark or represent aspects of Hawaiian culture that have been practiced since ancient times. As with most human constructs, traditions are evolving and prone to change, resulting from multiple influences including modernization as well as other cultures. It is well known that within Hawai‘i, a "broader 'local' multicultural perspective exists" (Kawelu 2015:3). While this "local" multicultural mix is deservedly celebrated, it must be noted that it often comes into contact with "traditional Hawaiian culture." This contact among cultures and traditions has undoubtedly resulted in numerous cultural entanglements. These cultural entanglements have prompted questions regarding the legitimacy of newly evolved traditional practices. The influences of "local" culture are well noted throughout this section and understood to represent survival or "the active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy and victimry" (Vizenor 1999:vii). Acknowledgement of these "local" influences helps to inform nuanced understandings of entanglement and of a "living [Hawaiian] contemporary culture" (Kawelu 2015:3). This section strives to articulate traditional Hawaiian cultural practices within the *ahupua‘a* in ancient times, and the aspects of these traditional practices that continue to be practiced today; however, this section also challenges "tropes of authenticity" (Cipolla 2013) and acknowledges the multicultural influences and entanglements that may "change" or "create" a tradition.

This section integrates information from Sections 1–6 in examining cultural resources and practices identified within or in proximity of the project area in the broader context of the encompassing Pūlehunui landscape.

7.1 Agricultural and Gathering Practices

A total of 13 land commission claims were made in Pūlehunui, and nine were awarded (LCAs 0327B, 9671, 9019, 4672, 9672, 9673, 8866, 4567, and 5230). The majority of the lands awarded were *kula* used for potato (both sweet potato and Irish potato) cultivation and were primarily located along the upper elevations of Kula Moku (Waihona ‘Aina 2000).

In H. Kuihelani's testimony submitted to the Boundary Commission in 1862, recalled gathering *ma‘o* at Kama‘oma‘o for use in making *kapa* (Maly and Maly 2003:357–358).

The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. Although the whaling trade centered on Lāhainā, mainly affecting the Kula/Kīhei area through agricultural demands, Clark (1980:47) notes that "From the 1840s to the 1860s a small whaling station was maintained at Kalepolepo [Kīhei]."

After 1830, dryland agriculture in the old Kula District expanded with a focus on Irish potato cultivation. Kula became the area of highest potato production in Hawai‘i and the area between 2,000- and 5,000-ft elevation was known as “the potato district.” Potato production thrived in Kula from about 1830 to 1850, until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai‘i trade (Burgett and Spear 1995:6–7). During this time, sugar cultivation and ranching were established in the Kula region (Brown and Haun 1989:C-7 and C-6). Much of the produce, sugar, and livestock moved down the Kalepolepo and Kekuawaha‘ula‘ula Trails to the landing at Kalepolepo, just south of the project area.

As the demand for locally produced agriculture dropped with the closure of the nearby entrepot at Kalepolepo, upland agricultural pursuits gradually gave way to ranching activities. Lower Kula consisted primarily of pastureland for ranching (Donham 1992:B-6). The *kiawe* tree was imported and cultivated around 1840 as a source of cattle feed, and the low plains of Pulehunui were soon covered in *kiawe* forests (Handy and Handy 1972:510–511).

In 1898, KPC was organized. Water was the most critical component in sugar cultivation along the arid coastline of Maui’s leeward shores. Two ditches were developed to supplement the water needs of the 4,873 acres of sugar under cultivation at Kīhei (Gilmore 1936). Water tunneled from springs in the West Maui Mountains flowed through ditches in Wailuku to irrigate fields as far away as Mā‘alaea. Water from the windward rain belt of Kailua ran through a network of ditches from East Maui to Pā‘ia, to irrigate fields in Pu‘unēnē (Wilcox 1996:60–61). In 1908, the lands of the KPC were divided up between five new major business entities of HC&S: the Kailua Plantation Company (994 acres), the Kalialinui Plantation Company (923 acres), the Kula Plantation Company (996 acres), the Makawao Plantation Company (982 acres), and the Pulehu Plantation Company (978 acres). Sugar operations continued in North Kīhei until ca. 1968, when HC&S leased lands to a corn research farm.

7.2 Coastal and Marine Resources

The lands of coastal Pūlehunui were rich in marine resources. Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine resource collection (Kolb et al. 1997:25).

Kolb et al. (1997:68) note that the “ancient village of Kalepolepo was relatively small, and was built around an economy primarily based upon the exploitation of ocean resources—primarily the excellent fishing grounds as well as three large fishponds.”

Keālia Pond has been known as a source of high-quality salt from the pans in its immediate vicinity. James (2002:71) also states that Keālia Pond “must have been an important producer of fish stock, particularly *awa* (milkfish) and *‘ama‘ama* (mullet)” and noted that a “*ko‘a* (fishing shrine) or possible *heiau* platform stands near the site.”

James (2002:74) noted the belief that Kō‘ie‘ie Fishpond was “a royal pond always stocked with the best fish.”

In testimony submitted to the Boundary Commission in 1862, H. Kuihelani discussed his family’s *kuleana* as overseers of Mau‘oni and Kanahā fishpond, which belonged to the *ali‘i* at the time, Kauikeaouli (Kamehameha III). He also noted that salt that was gathered there was given to the *ali‘i* (Maly and Maly 2003:357–358).

The wetland environment of coastal Pūlehunui attracts many species of waterfowl in the winter months when water levels in the pond rise with seasonal flooding. These would have also served as a potential source of nourishment for subsistence communities in the region (James 2002:72).

Kanahā is a wetland sanctuary that is home to a large population of native Hawaiian stilts (*‘ae‘o*). Over fifty species of birds have been observed here, including herons, geese, ducks, owls, plovers, sandpipers, tattlers, coots, pheasants and doves (Pukui et al. 1974:83).

7.3 *Mo‘olelo* and *Wahi Pana*

Ke Kula o Kama‘oma‘o, or the Plains of Kama‘oma‘o, is a region of the central Maui isthmus. In traditional times, Kama‘oma‘o was known as a wandering place of the souls (Beckwith 1970:154). It was on this plain that souls waited to be ushered to their next life, to eternity. Hoyt (1976) mentions that Kama‘oma‘o was a place known for the “Marchers of the Night.” Perhaps this could explain why this region was not populated at all but gives insight as to its purpose as a battle field.

These plains are home to owl deities, considered one of the oldest guardian gods in Hawaiian mythology. Pueo-nui-akea was the name of the owl who traversed these plains and restored life to wandering souls (Beckwith 1970:124).

Fornander (1919:550–554) recalls the story of Pumaia, a heroic young man who fell to the hands of the spirit Puukolea. This spirit had a dual body, capable of shape-shifting in ways Pumaia, a mere human, could not. After his mortal body was slain by Puukolea, Pumaia’s spirit returned home but continued to be chased by Puukolea. Pumaia fled till he reached the plains of Kama‘oma‘o. There, an owl by the name of Pueonuiokona battled Puukolea and ultimately killed him, scattering his entrails about the plains.

Pu‘u Nēnē is easily noticeable as a cinder cone protruding from the plains of Kama‘oma‘o. Pu‘u Nēnē, literally translates as “goose hill” according to Pukui and others (1974:49). The hill, named for the Hawaiian goose or *nēnē*, was a cinder cone built by lavas of the Kula series (Stearns and MacDonald 1942:83), elevation 187 feet (56 meters), located some four miles northeast of the Pu‘u Nēnē Mill.

Mau‘oni and Kanahā fishponds are located on the north shore of the central isthmus. According to *mo‘olelo*, Kanahā is named for Kanahaokalani, the brother of Kahamaluihiikeaoihilani, a high chiefess who broke the *kapu* of the ponds by walking on the center *kuapa* (bank) of the ponds. Mau‘oni is named for the identity she travelled by to protect her status as a chiefess of the highest rank (Sterling 1998:87–88).

Two *heiau* were known to be erected in Pūlehunui: Haleokane Heiau (Walker Site 221) and Niniwai Heiau (Walker Site 222 and 223) (Walker in Sterling 1998:253).

Section 8 Ka Pa‘akai Analysis

8.1 Overview

In *Ka Pa‘akai vs Land Use Commission*, 94 Hawai‘i (2000) the Court held the following analysis must also be conducted:

1. The identity and scope of valued cultural, historical, or natural resources in the project area, including the extent to which traditional and customary native Hawaiian rights are exercised in the project area;
2. The extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and
3. The feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian Rights if they are found to exist.

Based on information gathered from the cultural and historical background, there are no cultural, historical, or natural resources identified within the current project area. However, the lack of in-depth responses from community consultation makes it difficult to determine the true extent of this project on the key aspects of a Ka Pa‘akai Analysis.

Most of the project area consists of agricultural fields that were formerly cultivated with sugarcane. No historic properties were identified by previous archaeological studies conducted within the project area. Pu‘u Nēnē NAS abuts the western boundary of the project area and Camp K-3 is located *makai* of the project area along the Upper Kihei Road. Camp K-3 was cleared and planted in sugarcane by 1956 (Dagher 2020:41). An AIS was conducted alongside this study and it was concluded that no historic properties were identified or will be impacted by the proposed project. No further work was recommended (Ueki et al. 2025:179).

At present, there is no documentation or testimony indicating traditional or customary Native Hawaiian rights are currently being exercised “for subsistence, cultural and religious purposes and possessed by *ahupua‘a* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778” (Hawai‘i State Constitution, Article XII, Section 7) within the specific project area. While no cultural resources, practices, or beliefs were identified as currently existing within the project area, Pūlehunui Ahupua‘a maintains a rich cultural history in the exercise of traditional or customary Native Hawaiian rights within the project *ahupua‘a*.

8.2 Archaeological Resources

Of the six previous archaeological studies conducted within the vicinity of the project area, only one study (Kennedy 1990) is located within the current project area, and three other studies (Tomonari-Tuggle et al. 2001, Rotunno-Hazuka et al. 2011, and Fuentes et al. 2020) abut the boundaries of the project area. Kennedy (1990) conducted an archaeological reconnaissance survey for the Hawaiian Cement Pu‘unēnē Quarry (TMK: [2] 3-8-004:002), which is located within the southern portion of the current project area. No historic properties were identified and no further work was recommended. An AIS was conducted by CSH (Ueki et al. 2025) as a companion study to the current CIA for the proposed project. No historic properties or cultural

materials were identified within the project area and no further work was recommended (Ueki et al. 2025:179).

Historic properties related to commercial sugarcane cultivation, ranching, and military use at the former Naval Air Station Puunene were identified by previous archaeological studies in the project area vicnity. The Pu‘u Nēnē NAS (-04164), consisting of 59 standing structures and 165 total features, abuts the western boundary of the project area. Other historic properties are located to the west and south of the current project area.

Based on a review of historical maps, Camp K-3 is located south of the current project area along Upper Kihei road. However, the camp area was cleared and planted in sugarcane by 1956 (Dagher 2020:41).

8.3 Burials

No burials were identified within or in the vicinity of the project area.

Saito (2008) mentioned that prior to the excavation of the cinder from Pu’u Nēnē, families with grave sites were notified by the plantation and military to remove their burials during WWII.

8.4 Faunal Resources

The coastal lands of Pūlehunui were rich in marine resources, as evidenced by the presence of four fishponds (Kolb et al. 1997:25). Keālia Pond “must have been an important producer of fish stock, particularly *awa* (milkfish) and *‘ama‘ama* (mullet)” and noted that a “*ko‘a* (fishing shrine) or possible *heiau* platform stands near the site” (James 2002:71). Keālia Pond has been known as a source of high-quality salt from the pans in its immediate vicinity. The wetland environment of coastal Pūlehunui attracts many species of waterfowl in the winter months when water levels in the pond rise with seasonal flooding. These would have also served as a potential source of nourishment for subsistence communities in the region (James 2002:72). Keālia Pond is a habitat for many endangered and migratory birds. Based on previous consultation and background research, the following birds were mentioned residing at Keālia: *ae‘o*, *‘alae ke‘oke‘o*, *koloa maoli*, *kōlea*, *hunakai*, *‘akeke‘e*, *‘ūlili*, northern pintail, and northern shoveler (USFWS 2021a). Other animals include Blackburn’s Sphinx Moth, *‘ōpe‘ape‘a*, and the endangered *honu‘ea* also nest on the beach adjacent to the refuge (USFWS 2021b).

H. Kuihelani discussed his family’s *kuleana* as overseers of Mau‘oni and Kanahā fishpond and noted that the salt gathered there was given to the *ali‘i* (Maly and Maly 2003:357–358). Kanahā is a wetland sanctuary that is home to a large population of native Hawaiian stilts (*‘ae‘o*). Over fifty species of birds have been observed here, including herons, geese, ducks, owls, plovers, sandpipers, tattlers, coots, pheasants and doves (Pukui et al. 1974:83).

8.5 Earth Resources

No traditional use of the stones (or soft sediments) within the project area has been documented.

8.6 Plant Resources

Based on LCA research, the majority of the lands awarded were used for potato (both sweet potato and Irish potato) cultivation and were primarily located along the upper elevations of Kula

Moku (Waihona ‘Aina 2000). Potato production thrived in Kula from about 1830 to 1850, until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai‘i trade (Burgett and Spear 1995:6–7). As the demand for locally produced agriculture dropped with the closure of the nearby entrepot at Kalepolepo, upland agricultural pursuits gradually gave way to ranching activities. Lower Kula consisted primarily of pastureland for ranching (Donham 1992:B-6). The *kiawe* tree was imported and cultivated around 1840 as a source of cattle feed, and the low plains of Pulehunui were soon covered in *kiawe* forests (Handy and Handy 1972:510–511).

Most of the project area consists of agricultural fields that were formerly cultivated with sugarcane. Under the ownership of Mahi Pono Central A, LLC, the land is within Fields 815 and 818 that are planted with citrus trees. Other vegetation includes *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), and grasses.

In H. Kuihelani’s testimony submitted to the Boundary Commission in 1862, recalled gathering *ma‘o* at Kama‘oma‘o for use in making *kapa* (Maly and Maly 2003:357–358).

8.7 Trails

No trails were identified or documented within the project area.

Ms. Holt-Padilla explained that the central isthmus was a dry, hot place with trails leading west toward Waikapū, and east along the Kīhei coastline (Hill et al. 2007:23).

8.8 *Wahi Pana*

No *wahi pana* were identified or documented within the project area.

Ke Kula o Kama‘oma‘o, also known as the Plains of Kama‘oma‘o, was a region of sandy plains of the central Maui isthmus. This *wahi pana* was known as a wandering place of the souls, more specifically for the souls of the soldiers killed during the battle named *Ahulau ka Pi‘ipi‘i i Kakanilua* (Battle of Kakanilua), also known as the Battle of Wailuku Common. It was also associated with being the home of owl deities.

Pu’u Nēnē is a cinder cone built by lavas of the Kula series (Stearns and MacDonald 1942:83), elevation 187 feet (56 meters), located some four miles northeast of the Pu‘u Nēnē Mill. According to Pukui et al. (1974:49), “Pu‘u Nēnē translates as “goose hill,” named for the Hawaiian goose or *nēnē*.

Other *wahi pana* in the vicinity include Mau‘oni and Kanahā fishponds located on the north shore of the central isthmus. Kanahā is named for Kanahaokalani, the brother of Kahamaluihiikeaoihilani, a high chiefess who broke the *kapu* of the ponds by walking on the center *kuapa* (bank) of the ponds. While Mau‘oni is named for the identity she travelled by to protect her status as a chiefess of the highest rank (Sterling 1998:87–88).Two *heiau*, Haleokane and Niniwai Heiau, are also located in Pūlehunui.

8.9 Valued Cultural, Historical, or Natural Resources in the Project Area

The background research conducted for this study including cultural and historical data, there are no cultural, historical, or natural resources that have been identified within the current project area. Regarding historical resources, Camp K-3 is located adjacent to the project area along Upper Kihei Road and the Pu‘u Nēnē NAS is located west of the project area, which abuts the western boundary. Regarding natural resources, Keālia Pond is located *makai* of the project area where various native bird and plant species are located. Under the ownership of Mahi Pono Central A, LLC, the land is within Fields 815 and 818 that are planted with citrus trees. Other vegetation includes *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), and grasses. The companion AIS study (Ueki et al. 2025) conducted alongside this CIA and Ka Pa‘akai study identified no historic properties within the project area.

8.10 The Extent to which Traditional and Customary Native Hawaiian Resources will be Affected by the Proposed Action

Most of the project area consists of agricultural fields that were formerly cultivated with sugarcane. As the historic properties stated above are located outside of the project boundaries, there are no anticipated impacts to these sites. Camp K-3 was cleared and planted in sugarcane by 1956 (Dagher 2020:41). There is also a lack of native flora and fauna within the project area and no impacts to natural resources are anticipated. The companion AIS concluded no historic properties are anticipated to be affected by the proposed action.

8.11 Feasible Action, if any, to be Taken to Reasonably Protect Native Hawaiian Rights

The companion AIS recommended no further work (Ueki et al. 2025:179).

Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. Should any potential historic properties be identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended.

Should *iwi kūpuna* and/or cultural finds be encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Section 9 Summary and Recommendations

9.1 Results of Background Research

Background research for this project yielded the following information (presented in approximate chronological order):

1. The current project area is located on the western flank of Haleakalā in the *moku* of Kula and *ahupua‘a* of Pūlehunui. Overall, Pūlehunui Ahupua‘a begins at Kilohana Peak, on the summit ridge of Haleakalā, and ends at a midpoint on the west shore of the central plains at a shared boundary with Waikapū Ahupua‘a, encompassing a total area of 16,687.78 acres (McCully 1879).
2. The lands of coastal Pūlehunui were rich in marine resources. Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine resource collection (Kolb et al. 1997:25).
3. Ke Kula o Kama‘oma‘o, or the Plains of Kama‘oma‘o, is a region of the central Maui isthmus close to the present project area that was known traditionally by Hawaiians as a wandering place of the souls (Beckwith 1970:154).
4. About the year 1776, the forces of Kalani‘ōpu‘u and Kahekili met on Kama‘oma‘o Plain in the Battle of Kakanilua. Kalani‘ōpu‘u’s army was annihilated in what was recognized as one of the most legendary battles of pre-contact Hawai‘i (Kamakau 1992:85).
5. During the early and middle 1800’s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from Western disease and nucleation around the developing port towns (Kuykendall 1968:312–313).
6. A total of 13 land commission claims were made in Pūlehunui, and nine were awarded (LCAs 0327B, 9671, 9019, 4672, 9672, 9673, 8866, 4567, and 5230). Only one of these awards, LCA 5230, is immediately surrounding and inclusive of the current project area.
7. The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and, in particular, the long-lasting Irish potato. Kula became the area of highest potato production in Hawai‘i and was known as “the potato district” (the area between 2,000 and 5,000 ft elevation). During this time, sugar cultivation and ranching were established in the Kula region (Brown and Haun 1989:C-7 and C-6).
8. During World War II, Pu‘u Nēnē Naval Air Station became the command headquarters for both Navy and Army units on the island of Maui (Command History 1945).
9. The Hawaiian Cement Puunene Quarry started in the late 1970s with 28 acres. The quarry was further expended in 1980 to 194 acres. The primary resource of the quarry is basalt that is crushed and used for road base course, concrete and pavement aggregate, railroad ballast, and many other purposes (Yanik 2018).

9.2 Summary of Community Consultation

CSH attempted to contact Hawaiian organizations, agencies, and community members as well as cultural and lineal descendants in order to identify individuals with cultural expertise and/or knowledge of the project area and vicinity. Community outreach letters were sent to 43 individuals or groups; two responded with recommendations for outreach but neither provided written testimony on the project, and none of these *kama‘āina* and/or *kūpuna* met with CSH for more in-

depth interview(s). At the recommendation of OHA, CSH included the community outreach letter in their newsletter in November 2025, however, CSH received no responses.

9.3 Impacts and Mitigations

9.3.1 Identification of Cultural Resources and Practices

Based on the results of community consultation and background research conducted as part of this CIA, CSH has identified the following cultural resources and practices within Pūlehunui Ahupua‘a:

1. Agricultural and gathering practices
2. Coastal and marine resources
3. *Mo‘olelo* and *wahi pana*

9.3.2 Identification of Impacts to Cultural Resources and Practices

No impacts to ongoing cultural resources and practices were identified within the project area during background research and community consultation for this CIA.

9.3.3 Mitigation Possibilities Identified During Background Research and Consultation

The results of community consultation, underscored by background research conducted for this CIA, inform the following mitigation possibilities promoting and preserving cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups:

1. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction, all construction-related activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* (Native Hawaiian skeletal remains) are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40.
2. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with lineal and/or cultural descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Section 10 References Cited

Akana, Collette Leimomi and Kiele Gonzalez
2015 *Hanau Ka Ua: Hawaiian Rain Names*. Kamehameha Publishing, Honolulu.

Alameida, Roy Kakulu
1993 Land Tenure and Land Use in Kawaihapai, O‘ahu. Master’s thesis in History. University of Hawai‘i at Mānoa, Honolulu.

Ava Konohiki
2015 Ancestral Visions of ‘Āina website. Available online at http://www.avakonohiki.org/.

Bartholomew, Gail and Bren Bailey
1994 *Maui Remembers, A Local History*. Mutual Publishing, Honolulu.

Beckwith, Martha W.
1970 *Hawaiian Mythology*. University of Hawaii Press, Honolulu.

Belknap, William "Jazz, " Sr.
1947 Puunene Air Station Now Ghost Town; NASKA Faces Same Fate. *The Maui News 28* May 28.

Brown, Roderick S., and Alan Haun
1989 Archaeological Inventory Survey, Keokea and Waiohului Subdivisions, Lands of Keokea and Waiohuli, Makawao, Island of Maui. Paul H. Rosedahl, Inc., Hilo, Hawai‘i.

Burgett, Berdena, and Robert L. Spear
1995 *An Archaeological Inventory Survey of 22.25 acres of Land in Kula, Kaonoulu Ahupua‘a Makawao District, Island of Maui (TMK 2-2-06:105).* Scientific Consultant Services, Inc., Kāne‘ohe, Hawai‘i.

Burns, Irma Gerner
1991 *Maui’s Mittee and the General: A glimpse into the lives of Mr. and Mrs. Frank Fowler Baldwin.* Ku Pa‘a Inc., Honolulu.

Cabos, August
2000 Personal communication (Reunion, 48th Seabees, Maui Lu Resort, Kīhei).

Cipolla, Craig N.
2013 Native American Historical Archaeology and the Trope of Authenticity. *Historical Archaeology.* Vol. 47, ed. 3:12–22.

Clark, John R. K.
1980 *The Beaches of the Maui County*. University of Hawai‘i Press, Honolulu.

Command History
1945 *History, Naval Air Station Puunene, Maui, T.H., CONFIDENTIAL, May 1940 to 1 July 1945*, Transmitted by Commander J.L. Cotton to the CNO, U.S. Navy, 7 July, 1945. Supplement to History transmitted 26 October.

Condé, Jesse C., and Gerald M. Best
1973 *Sugar Trains: Narrow Gauge Rails of Hawaii*. Glenwood Publishers, Felton, California.

Dagher, Cathleen A.
2020 A Cultural Impact Assessment Report in Advance of the Proposed Puunene Quarry Expansion Project, Pūlehunui Ahupua‘a, Wailuku (Kula) District, Island of Maui, Hawai‘i [TMK: (2) 3-8-004:001 por. and 002 por.]. Scientific Consultant Services, Inc. Honolulu, Hawai‘i.

Dean, Arthur L.
1950 *Alexander & Baldwin, Ltd. and the Predecessor Partnerships*. Alexander & Baldwin Ltd. and Advertiser Publishing Company, Honolulu.

Dodge, F.S.
1885 *Maui, Hawaiian Islands. Registered Map 1268*, 1:90,000. Hawaiian Government Survey. Library of Congress Geography and Map Division, Washington, D.C.

Donham, Theresa K.
1992 *Surface Survey of the Koyanagi Subdivision, Omaopio, Kula, Maui TMK 2-3-03:129*. State of Hawai‘i Department of Land and Natural Resources, State Historic Preservation Division, Wailuku, Hawai‘i.

Dorrance, William H., and Francis S. Morgan
2000 *Sugar Islands: The 165-Year Story of Sugar in Hawai‘i.* Mutual Publishing, Honolulu.

EagleView Technologies Inc.
2023 Aerial Image. EagleView Technologies, Inc. Bellevue, WA.

Emerson, Nathaniel B.
1965 *The Unwritten Literature of Hawaii: The Sacred Songs of the Hula*. Collected by Nathaniel B. Emerson. Charles E. Tuttle Company, Rutland, Vermont and Tokyo.

Environmental Council, State of Hawai‘i
1997 *Guidelines for Assessing Cultural Impacts Adopted by the Environmental Council, State of Hawai‘i, November 19, 1997*. Office of Environmental Quality Control, Hawai‘i.

Feightner, Rear Admiral Edward L. "Whitey"
1997 Naval aviation combat training at NAS Puunene under the instruction of Edward "Butch" O'Hare edited by Robert Hill. appears in CSH reports PULEH-1 to date, regarding the history of NAS Puunene during WWII, originally interviewed on behalf of the Maui Military Museum, in Pensacola, Florida. ed.

Flyer, The
1946 Base newspaper NAS Kahului, published every second Saturday. Originally published as “*The Fly Paper*”, it was renamed “*The Flyer*” 29 September.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens
1972 *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*. Soil Conservation Service, United States Department of Agriculture, Washington, D.C.

Fornander, Abraham
1916-1919 *Fornander Collection of Hawaiian Antiquities and Folk-Lore*. Bishop Museum Memoirs (Vols. IV, V, and VI). Bishop Museum Press, Honolulu.

Fuentes, Reynaldo, Lisa Rotunno-Hazuka, Jenny O‘Claray-Nu, and Jeffrey Pantaleo
2020 *Archaeological Assessment Report for Hawaiian Cement Quarry Expansion Located at TMK: (2) 3-8-001 pors., Pulehu Nui Ahupua'a, Kula Moku; Wailuku District Island of Maui.* Archaeological Services Hawaii, Wailuku, Hawai‘i.

Giambelluca, T. W., M. A. Nullet and T. A. Schroeder
1986 *Rainfall Atlas of Hawai‘i*. Report: Division of Water and Land Development R76. Department of Land and Natural Resources, Division of Water and Land Development, Honolulu.

Giambelluca, Thomas W., Q. Chen, A.G. Frazier, J.P. Price, Y.L. Chen, P.S. Chu, J.K. Eischeid, and D.M. Delparte
2013 Rainfall Atlas of Hawai‘i. *Bulletin of the American Meteorological Society volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1.* University of Hawai‘i at Mānoa, Honolulu.

Giambelluca, Thomas W., X. Shuai, M.L. Barnes, R.J. Alliss, R.J. Longman, T. Miura, Q. Chen, A.G. Frazier, R.G. Mudd, L. Cuo, and A.D. Businger
2014 *Evapotranspiration of Hawai‘i. Final report submitted to the U.S. Army Corps of Engineers—Honolulu District, and the Commission on Water Resource Management, State of Hawai‘i.* University of Hawai‘i at Mānoa, Honolulu.

Gilmore, A. B.
1936 *The Hawaii Sugar Manual 1934-1935.* Hawaiian Sugar Planters Association, New Orleans.

Handy, E.S. Craighill, and Elizabeth G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.

Handy, E.S. Craighill, Elizabeth Green Handy, and Mary Kawena Pukui
1991 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Revised ed. Bernice P. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.

Handy E.S. and M. Pukui
1977 *The Polynesian Family System in Ka‘ū*. Hawaiian Polynesian Society, Inc., Wellington, New Zealand.

Hawai‘i TMK Service
2014 *Tax Map Key (2) 3-8-004* [map]. Hawaii TMK Service.

Hill, Robert R., Tanya L. Lee-Greig, and Hallett H. Hammatt
2007 *An Archaeological Literature Review and Field Inspection Report for an 81.50-Acre Parcel located at Pūlehu Nui and Waikapū Ahupua‘a, Wailuku District, Maui Island TMK (2) 3-8-008: 7 (por.), 8 (por.)* Cultural Surveys Hawai‘i, Inc., Wailuku, Hawai‘i.

Hoyt, Helen P.
1976 *The Night Marchers*. Vol. 13, 14 Vols. The Hawaiian Bicentennial Library. Island Heritage Limited, Norfolk Island, Australia.

Huapala
n.d. *Lovely Sunrise Haleakalā,* Electronic document, http://www.huapala.org/Lo/Lovely_Sunrise_Haleakala.html.
n.d. *Maui Nani (Beautiful Maui),* Electronic document, http://www.huapala.org/Mau/Maui_Nani.html.
n.d. *Waikapū/‘Iniki Mālie,* Electronic document, http://www.huapala.org/Wai/Waikapu.html.

Hula Preservation Society
2014 Hula Preservation Society website. Electronic document, http://hulapreservation.org.

James, Van
2002 *Ancient Sites of Maui, Moloka‘i and Lāna‘i: Archaeological Places of Interest in the Hawaiian Islands.* Mutual Publishing, Honolulu.

Jarves, James J.
1844 *Scenes & Scenery in the Sandwich Islands . . . during the Years 1837–1842.* James Munroe and Company, Boston.

Kamakau, Samuel Mānaiakalani
1992 *Ruling Chiefs of Hawaii*. Revised ed. The Kamehameha Schools Press, Honolulu.

Kawelu, Kathleen L.
2015 *Kuleana and Commitment: Working Toward a Collaborative Hawaiian Archaeology.* University of Hawai‘i Press, Honolulu.

Kennedy, Joseph
1990 *Archaeological Walk-Through Reconnaissance Survey of the Proposed Hawaiian Cement Puunene Quarry, Located at Pulehunui, Wailuku, (Kula), Maui, TMK: 3-8-04:01 ((por.)) and 3-8-04:02 ((por.)).* Archaeological Consultants of Hawaii, Hale‘iwa, Hawai‘i.

Kolb, Michael J., Patty J. Conte, and Ross Cordy
1997 *Kula: The Archaeology of Upcountry Maui in Waiohuli and Keokea, An Archaeological and Historical Settlement Survey in the Kingdom of Maui.* State of Hawai‘i Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

Kuykendall, R.S.
1968 *The Hawaiian Kingdom: 1778-1854, Foundation and Transformation.* University of Hawaii Press, Honolulu.

Lee-Greig, Tanya L., Katie Sprouse, Michael Willman, Todd McCurdy, and Hallet H. Hammatt
2011 *An Archaeological Inventory Survey Report for an Agricultural Subdivision of Approximately 3165 Acres Pulehu Nui Ahupua'a, Wailuku District, Maui Island*

TMKs: (2) 3-8-04:002, 020, and 024, Volume 2 of 2. Cultural Surveys Hawai‘i, Inc., Wailuku, Hawai‘i.

Leopold, L.B.

1949 The Interaction of Trade Wind and Sea Breeze, Hawaii. *Journal of Meteorology* 6:312-320.

Lundstrom, John B., and Steve Ewing

1990 *The First Team, Pacific Naval Air Combat from Pearl Harbor to Midway.* Naval Institute Press, Annapolis.

Maly, Kepa and Onaona Maly

2003 *Ka Hana Lawai‘a A Me Nā Ko‘a O Na Kai ‘Ewalu A History of Fishing Practices and Marine Fisheries of the Hawaiian Islands.* Kumu Pono Associates, Hilo, Hawai‘i.

2006 *He Mo‘olelo No Maui Hikina—Kalialinui I Uka A Me Nā ‘Āina O Lalo: A Cultural-Historical Study of East Maui—The Uplands of Kalialinui, and the Lands that Lie Below, Island of Maui "The Waikamoi Preserve."* Kumu Pono Associates, Hilo, Hawai‘i.

McCandless, James Sutton

1936 *Development of Artesian Well Water in the Hawaiian Islands, 1880-1936.* Advertiser Publishing Company, Honolulu.

McCully, J.

1879 In the Matter of the Boundaries of Pulehunui, Supreme Court of the Hawaiian Kingdom. *Hawaiian Journal of Law and Politics*.

McGregor, Davianna Pomaika‘i

1996 *An Introduction to the Hoaaina and Their Rights.* The Hawaiian Journal of History, Volume 30: 1-28. University of Hawai‘i Press, Honolulu.

Moffat, Riley M., and Gary L. Fitzpatrick

1995 *Surveying the Mahele: Mapping the Hawaiian Land Revolution.* Palapala‘āina. Editions Limited, Honolulu.

Morison, Samuel Eliot

1953 *Coral Sea, Midway, and Submarine Actions, May 1942 - August 1942*. History of United States Naval Operations in World War II. Little, Brown & Co., Boston.

Nakuina, Moses

1902 *Moolelo Hawaii o Pakaa a me Ku-a-Pakaa.* Kalamakū Press, Honolulu.

1992 *The Wind Gourd of La‘amaomao*. First edition. Esther T. Mookini and Sarah Nākoa, translators. Kalamakū Press, Honolulu.

Office of Hawaiian Affairs

2015 *Papakilo Database.* Office of Hawaiian Affairs cultural and historical database. Electronic document, http://papakilodatabase.com/main/index.php.

Pauketat, Timothy R.

2001 *The Archaeology of Traditions*. University Press of Florida, Gainesville, Florida.

Peterson, C.M.

1966 *The Trade Wind Regime of Central and Western Maui* (Technical Memo NWS PR NO. 1).

Pratt, Linda W. and Samuel M. III Gon

1998 Terrestrial Ecosystems. In *Atlas of Hawai‘i Third Edition.*, edited by S. P. Juvik and J. O. Juvik, pp. 121-129. University of Hawai‘i Press, Honolulu.

Pukui, Mary Kawena

1949 Songs (Meles) of Old Ka‘u, Hawaii. *Journal of American Folklore*, July-September: 247–258.

1983 *‘Olelo No‘eau : Hawaiian Proverbs and Poetical Sayings*. Bernice P. Bishop Museum special publication no. 71. Bishop Museum Press, Honolulu.

1995 *Na Mele Welo: Songs of Our Heritage.* University of Hawai‘i Press, Honolulu.

Pukui, Mary Kawena and Laura Green

1995 *Folktales of Hawai‘i. He Mau Ka‘ao Hawai‘i.* Collected and translated by Mary Kawena Pukui with Laura C.S. Green. Bishop Museum Press, Honolulu.

Pukui, Mary Kawena and Samuel H. Elbert

1986 *Hawaiian Dictionary: Hawaiian-English, English-Hawaiian*. Revised and enlarged ed. University of Hawai‘i Press, Honolulu.

Pukui, Mary Kawena, Samuel H. Elbert, and Esther K. Mookini

1974 *Place Names of Hawaii*. Revised and enlarged ed. University Press of Hawai‘i, Honolulu.

Richards, William, and Jonathan Smith Green

1831 Extracts from a Letter of Messrs. Richards and Green, Dated at Lahaina, Oct. 2, 1830. *In The Missionary Herald Containing the Proceedings at Large of the American Board of Commissioners for Foreign Missions; with a General View of Other Benevolent Operations for the Year 1831, Vol XXVII*, edited by American Board of Commissioners for Foreign Missions, pp. 180-184. Samuel T. Armstrong, Crocker & Brewster, Printers, Boston.

Rogers II, USN, Captain E. Earle

2002 Declassified *Foundation Magazine*: 56-60.

Rotunno-Hazuka, Lisa, Reynaldo Fuentes, Jenny O‘Claray, and Jeffrey Pantaleo

2011 *Archaeological Assessment Report for Hawaiian Cement Quarry Expansion Located at TMK: (2) 3-8-001 pors., Pulehu Nui Ahupua‘a, Kula Moku; Wailuku District Island of Maui.* Archaeological Services Hawaii, Wailuku, Hawai‘i.

Saito, Norman

2008 *Maalaea Airport.* Cultural Surveys Hawai‘i, Inc., Wailuku, Hawai‘i.

Sanford, Mary Cameron

2006 *Civilian interaction with military forces on Maui during WWII.* Robert Hill, ed. Cultural Surveys Hawai‘i, Makawao, Hawai‘i.

Shoemaker, H.I.
1910 Map of Sugar Plantation at Puunene, Maui, T.H., Owned by Hawaiian Commercial and Sugar Company, 1:1200.

Shoemaker, H.J.
1907 Approximate Map of Kihei Plantation Compiled from various Sources, 500=1". Pu‘u Nēnē, Hawai‘i.

Speakman Jr., Cummins E.
1978 *Mowee: An Informal History of the Hawaiian Island.* Nimrod Press, Boston.

Stearns, Harold T. and Gordon A. MacDonald
1942 *Geology and Ground-Water Resources of the Island of Maui, Hawaii (Including Haleakala Section, Hawaii National Park).* Territory of Hawaii, Division of Hyrdrography in cooperation with the Geological Survey, United States Department of the Interior, Honolulu.

Sterling, Elspeth P.
1998 *Sites of Maui*. Bishop Museum Press, Honolulu.

Stokes, John F. G.
1917 Report on the Heiau of Maui. *Hawaiian Alamanac and Annual for 1913: The Reference Book of Information and Statistics Relating to the Territory of Hawaii, of Value to Merchants, Tourists and Others.* Edited by T. G. Thrum. Thos. G. Thrum, Honolulu.

Thrum, Thomas G.
1900 Lowrie Irrigating Canal. *Hawaiian Almanac and Annual for 1901*. Thomas G. Thrum, Honolulu.

1917 More Maui Heiau Sites. *Thrum’s Hawaiian Annual for 1918*. Thomas G. Thrum, Honolulu.

Tomonari-Tuggle, M.J., H. David Tuggle, Dawn Deunsing, Coral Magnuson, and Usha Prasad
2001 *Fire on the Land: Archaeology, Architecture, and Oral History of Former Naval Air Station Pu‘unene, Pulehunui, Maui.* International Archaeological Research Institute, Inc., Honolulu.

Turner, Jack W.
1946 Souvenir Edition Tradewinds. 48th U. S. Naval Construction Battalion 60.

Ulukau
2014 *Māhele Database.* Hawaiian Electronic Library, http://ulukau.org/cgi-bin/vicki?l=en..

U.S. Department of Agriculture, Natural Resources Conservation Service
2001 Soil Survey Geographic (SSURGO) database for Island of Maui, Hawaii (hi980). U.S. Department of Agriculture, Natural Resources Conservation Service.

USFWS (U.S. Fish and Wildlife Service)
2021a *Birds*. Electronic document, https://www.fws.gov/refuge/Kealia_Pond/wildlife_and_habitat/ Birds_of_Kealia_Pond_National_Wildlife_Refuge.html.

2021b *Hawksbill Turtle*. Electronic document, https://www.fws.gov/refuge/Kealia_Pond/wildlife_and_habitat/Hawksbill_Turtle.html.

U.S. Geological Survey

1976 *Puu o Kali Orthophoto Quadrangle*. United States Department of the Interior, USGS, Reston, Virginia.

1992 *Puu o Kali Quadrangle, Hawaii*, 1:24,000. United State Department of the Interior, USGS. Reston.

1996 *Maalaea Quadrangle, Hawaii [map]*, 1:24,000. United State Department of the Interior, USGS. Reston, Virginia.

1997a *Paia quadrangle, Hawaii*, 1:24,000. United State Department of the Interior, USGS. Reston.

1997b *Wailuku quadrangle, Hawaii*, 1:24,000. United State Department of the Interior, USGS. Reston, Virginia.

2017a *Paia Quadrangle, Hawaii*. United States Department of the Interior, USGS. Reston, Virginia.

2017b *Puu O Kali Quadrangle, Hawaii*. United States Department of the Interior, USGS. Reston, Virginia.

University of Hawai‘i

2009 Native Hawaiian plants database managed by the University of Hawai‘i. University of Hawai‘i, Honolulu.

Vint, Paul

2000 Personal communication (Reunion, 48th Seabees, Maui Lu Resort, Kihei).

Vizenor, Gerald

1999 *Manifest Manners: Narratives on Postindian Survivance*. University of Oklahoma Press, Lincoln, Oklahoma.

Waihona ‘Aina

2000 *The Māhele Database*. Electronic document, http://waihona.com.

Walker, Winslow

1931 *Archaeology of Maui.* Manuscript. Bernice Pauahi Bishop Museum. Honolulu.

Western Regional Climate Center (WRCC)

2010 1961-1990 Monthly Climate Summary for Kawailoa.

Westervelt, William D.

1910 Legends of Ma-ui a Demi God of Polynesia and of His Mother Hina. Hawaiian Gazette Co., Ltd., Honolulu.

Wilcox, Carol

1996 *Sugar Water: Hawaii’s Plantation Ditches*. University of Hawai‘i Press, Honolulu.

Wilcox, Robert K.

2004 *First Blue: The Story of WWII Ace Butch Voris and the Creation of the Blue Angels*, St. Thomas Press, New York.

Woodbury, David O.
1946 *Builders for Battle.* E.P. Dutton and Co., New York.

Yanik, Kevin
2018 Hawaii operation overcomes waste coarse aggregate issue. *Pit & Quarry*.

Yucha, Trevor M., Josephine M. Yucha, and Hallett H. Hammatt
2023 *Archaeological Assessment Report for the Hawaiian Cement Quarry Mining Site Increment 4 Expansion Project, Pūlehunui Ahupua‘a, Pū‘ali Komohana District, Maui Island, TMK: (2) 3-8-004:001 (por.)*. Cultural Surveys Hawai‘i, Inc., Wailuku, Hawai‘i.

Appendix A Invitation for consultation in the November Issue of the OHA Newsletter

Public Notice | November 2025

By **Ka Wai Ola Staff** - November 1, 2025

Cultural Impact Assessment and Ka Pa‘akai Analysis: Hawaiian Cement New Mining Area Project, Pūlehunui, Maui

Cultural Surveys Hawai‘i (CSH), on behalf of Hawaiian Cement, is conducting a cultural impact assessment (CIA) and Ka Pa‘akai Analysis for the proposed Hawaiian Cement New Mining Area Project, Pūlehunui, Wailuku, Maui (TMK: [2] 3-8-004:001). Hawaiian Cement proposes to develop a new mining area of approximately 125 acres adjacent to their existing quarry area within a portion of TMK: (2) 3-8-004:001 CPR 2. The subject portion of the parcel is currently owned by MP Central A LLC and Hawaiian Cement. CSH seeks your knowledge, insight, and input on the following topics:

- Your knowledge of traditional cultural practices within the proposed project area and Pūlehunui Ahupua‘a
- The different natural resources associated with your specific cultural practice
- Referrals to other kūpuna, kama‘āina, and traditional cultural practitioners knowledgeable about the proposed project area and Pūlehunui Ahupua‘a
- Your comments or thoughts on the potential impacts the proposed project may have on cultural sites, practices, and resources within the proposed project area and Pūlehunui Ahupua‘a

If you are interested in participating in this study, please contact CSH Cultural Researcher, Chantellee Spencer by email at cspencer@culturalsurveys.com no later than Monday, November 17.

PROPOSED HAWAIIAN CEMENT PU‘UNĒNĒ SUPPLEMENTAL QUARRY, PU‘UNĒNĒ, MAUI, HAWAI‘I

Maui Planning Commission Meeting

November 25, 2025

MUNEKIYO HIRAGA

PROJECT TEAM

Applicant.....Hawaiian Cement

Civil Engineer…….. RT Tanaka Engineers, Inc.

Archaeology and Cultural Consultant.....Cultural Surveys Hawai‘i

Agriculture Consultant.....CDLidstone LLC

Planning Consultant.....Munekiyo Hiraga

MEETING PURPOSE

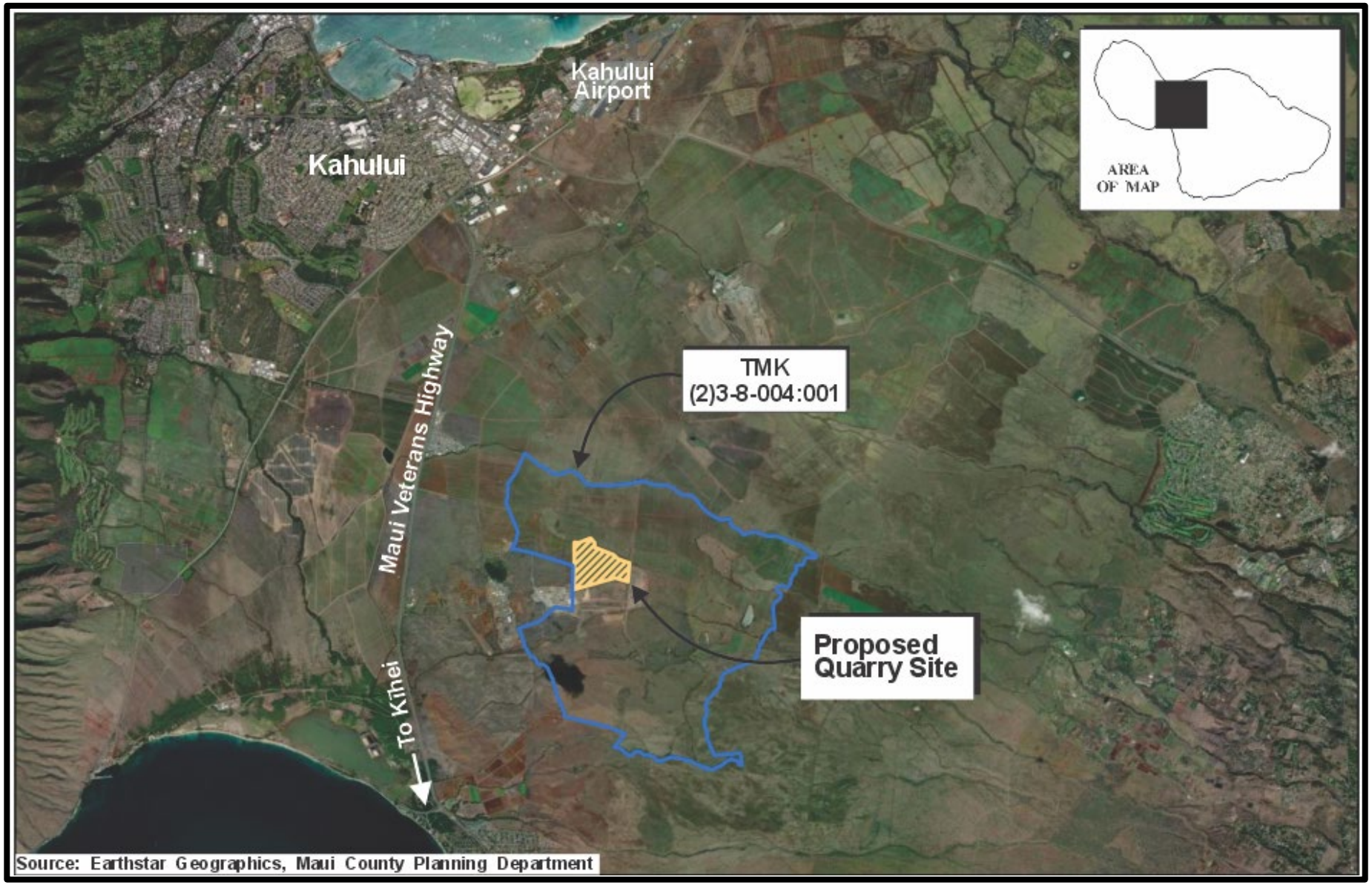
We respectfully request consideration and approval of the amendment to the subject County Special Use Permit (CUP 2006/0002) and recommendation for approval of the amendment to the State Land Use Commission Special Permit (SP92-380) for the proposed Hawaiian Cement Puʻunēnē Supplemental Quarry. Both applications request removal of current quarry area and addition of a new Supplemental Quarry Site.

PROJECT BACKGROUND

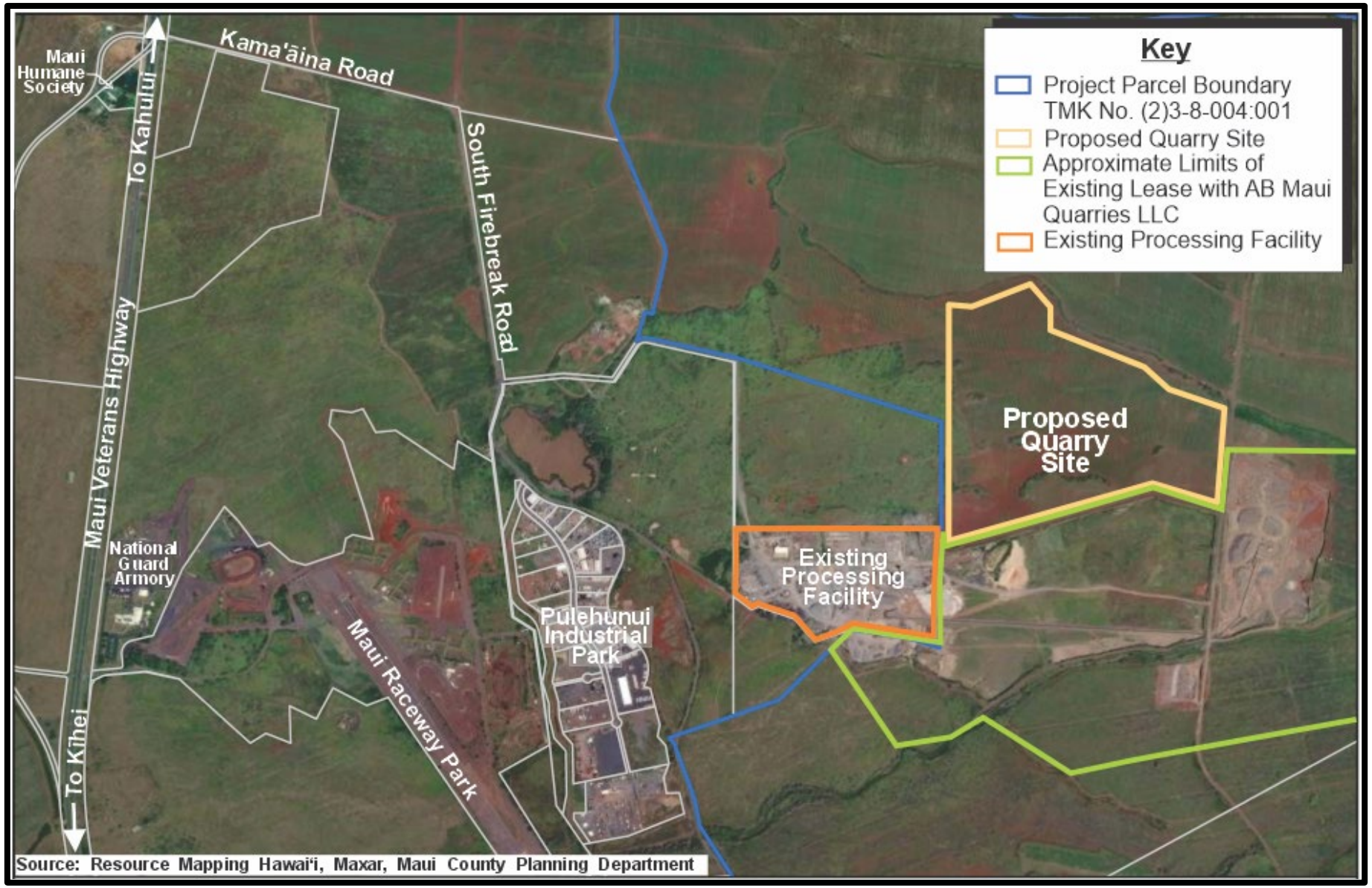
SITE HISTORY AND OVERVIEW

- Hawaiian Cement has operated a quarry in the Pu‘unene area since the early 1990’s. Rock quarrying, cement and other related industrial uses have existed at the project area by other operators since the late 1970’s.
- Hawaiian Cement’s existing Pu‘unene Quarry is a portion of a larger TMK which was initially owned by A&B. The parcel is now owned by MP Central A, LLC and AB Maui Quarries, LLC.
- Hawaiian Cement also holds a long term lease and access easement from the State of Hawai‘i for one (1) additional TMK parcel where the concrete batching and aggregate processing operations take place, and where vehicle access to the quarry and concrete operations is provided.
- Access to the Quarry and concrete operation is provided via Kama‘āina Road, at a signalized intersection with Maui Veteran’s Highway.

PROPOSED SUPPLEMENTAL SITE MAP
(REGIONAL)



PROPOSED SUPPLEMENTAL SITE MAP



Site Overview

Puʻunēnē Quarry

PERMITTING TIMELINE

- 1992: Hawaiian Cement received SP 92-380 approval for 46-acre quarry area on TMK (2)3-8-008:031 (CUP was not required for the proposed use at that time).
- 1996: First amendment to SP 92-380 was approved for use of 60 additional acres on TMK (2)3-8-004:001 for quarrying.
- 2006: Second amendment to SP 92-380 was approved, further expanding quarry area. CUP 2006/0002 was also obtained, required as of 1998 for special uses of more than 15 acres on ag zoned lands.
- 2014: Third amendment to SP 92-380 was approved, along with first amendment to CUP 2006/0002. Amendment was to add additional acreage to the SP and CUP.

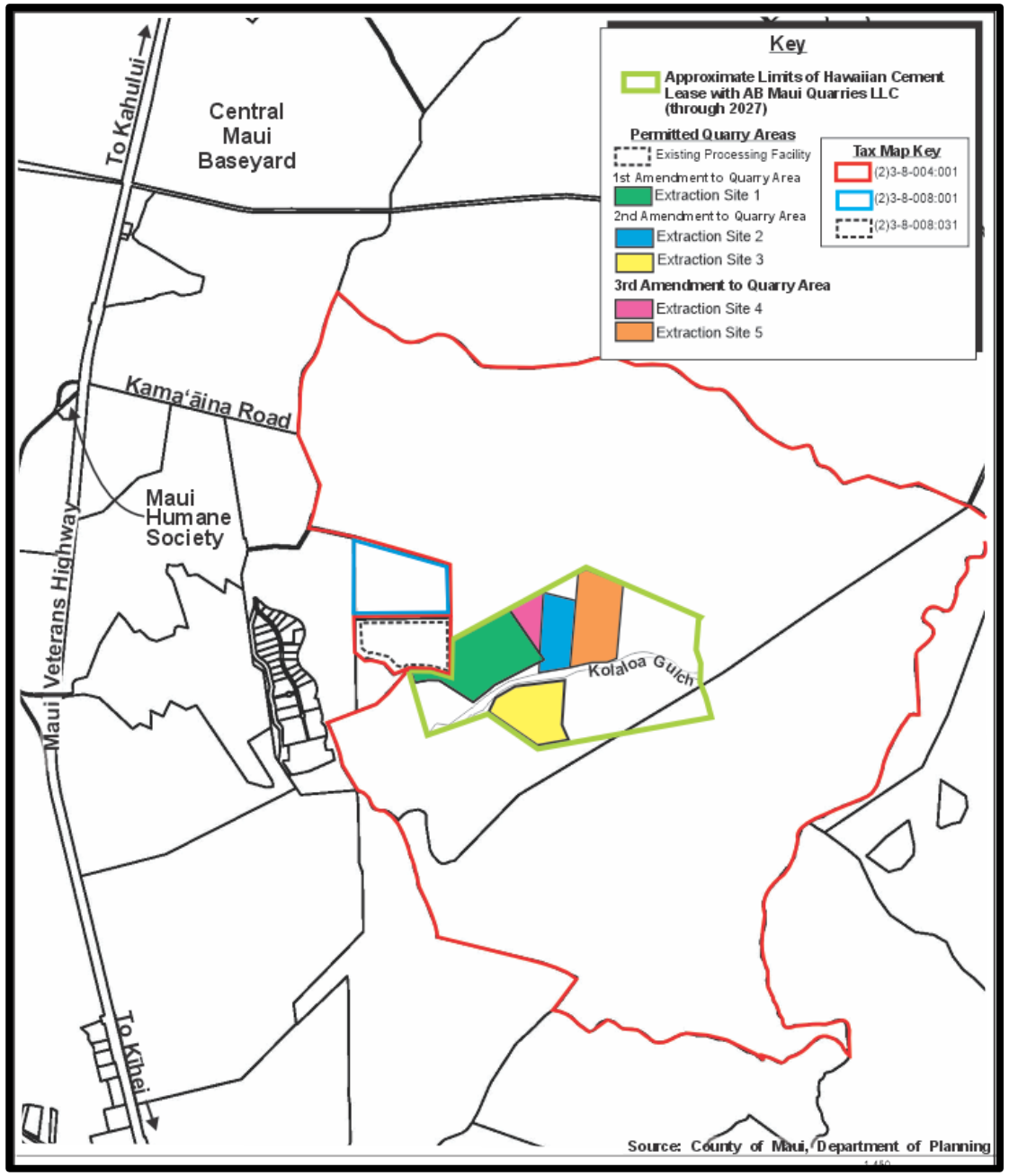
PERMITTING TIMELINE
(CONTINUED)

- 2021: Hawaiian Cement submitted applications for fourth and second amendments to SP 92-380 and CUP 2006/0002, respectively, again adding further land areas for quarrying.
- 2022: Maui Planning Commission (MPC) approved second amendment to CUP 2006/0002 and recommended approval of fourth SP amendment to SLUC.
- 2023: State Land Use Commission (SLUC) review was delayed due to new requirement that landowners agree to permit conditions. In addition, the Office of Planning and Sustainable Development requested that further archaeological work be done. Archaeological work was completed; amendment request was sent back to MPC to amend the record.

PERMITTING TIMELINE
(CURRENT REQUEST)

- 2024: The amendment areas (existing quarry site) on TMK (2)3-8-004:001 were purchased by AB Maui Quarries, LLC. Hawaiian Cement was informed that their lease would be terminated effective January 2027.
- 2024: Hawaiian Cement identified new potential quarry site of 125 acres on a different portion of TMK (2)3-8-004:001, which was owned by MP Central A, LLC. Hawaiian Cement has since purchased 55 acres of the site, and intends to purchase the remaining 70 should the permit amendments receive approval.

EXISTING QUARRY MAP



EXISTING PU‘UNENE QUARRY PERMIT HISTORY SUMMARY

Permit	1992	1996	2006	2014	2022	2025
SP 92-380	Initial approval	First amendment approval (added permitted quarry area and time extension)	Second amendment approval (added permitted quarry area and time extension)	Third amendment approval (added permitted quarry area and time extension)	Fourth amendment MPC recommendation of approval. No SLUC action	Fourth amendment revisited by MPC with new information provided. SLUC review to follow
CUP 2006/0002	No action	No action	Initial approval	First amendment approval (added permitted quarry area and time extension approval)	Second amendment approval (added permitted quarry area)	Third amendment under review by MPC

PERMITTING TIMELINE
(CURRENT REQUEST)

2025: Hawaiian Cement submitted a County Special Use Permit (CUP) amendment and supplemental information for the current State Special Permit (SP) amendment, requesting:

- Removal from consideration of all current permitted quarry lands on TMK (2)3-8-004:001 (while keeping lands on TMK (2)3-8-008:031) effective January 25, 2027.

- Addition of the new 125-acre quarry site.

Procedural notes:

- The CUP amendment application is for a new, third amendment to CUP 2006/0002, since the MPC approved the second amendment in 2022.

- The SP application is an addendum to the fourth amendment application for SP 92-380 (first reviewed by MPC in 2022), since that application was never approved by the SLUC.

QUARRYING ACTIVITY

The present requests do not propose any changes to quarrying activity, only quarry location:

- Stone would be mined incrementally, with at most 30 acres of the 125-acre site used for active mining at any given time.
- Mined rock would be transported to processing facility (TMK (2)3-8:008:031) by conveyor belt or other means.
- Processing facility produces aggregates and concrete using mined material.
- Drainage basins will be installed in the lowest portion of the site to contain additional runoff from active quarry areas.

No change is proposed to the processing facility operations.

PROJECT NEED

- Demand for construction materials is anticipated to grow in the near future to support rebuilding efforts in West Maui.
- If approved, the quarry will provide essential building materials for Maui Island.
- Having more on-island sources of aggregate has significant economic benefits, including reduced costs, as the material is on island instead of imported. Hawaiian Cement also currently employs 61 people on Maui.
- In order to continuously operate, Hawaiian Cement hopes to transition to the new site in 2026.

ARCHAEOLOGICAL RESOURCES

Cutural Surveys Hawai‘i (CSH) prepared a draft Archaeological Inventory Survey (AIS) for the proposed project to assess potential impacts:

- The AIS testing strategy was approved by State Historic Preservation Division (SHPD) on April 9, 2025, and the draft AIS was submitted for SHPD review on September 18, 2025.
- During fieldwork for the AIS, no significant archaeological features were found. The draft AIS recommends that no further archaeological work be undertaken.
- Several other SHPD-reviewed studies have been completed in the vicinity of the proposed project, which also did not document significant archaeological features.

CULTURAL RESOURCES

CSH also prepared the Cultural Impact Analysis (CIA) for the project:

- Agricultural practices, plant resources, coastal and marine resources, and mo‘olelo and wahi pana were identified as cultural resources in the vicinity of the supplemental quarry site.
- The CIA did not identify any adverse impacts to cultural resources as a result of the proposed quarry relocation.
- If cultural artifacts are inadvertently discovered during ground disturbance, work will cease and SHPD will be contacted for assistance.
- Per suggestions from Office of Hawaiian Affairs, a request for comment was placed in the November issue of Ka Wai Ola to supplement community consultation in the CIA, and a Ka Pa‘akai Analysis was added to the CIA after submission of the amendment requests.

Consultation letters were sent to ‘Aha Moku o Maui and Na Kūpuna o Lahaina to obtain additional insight from local cultural experts. Initial comments were received from ‘Aha Moku and a response letter was prepared and shared with the Department of Planning.

FLORA AND FAUNA RESOURCES

- A Flora and Fauna Survey Report was prepared for the proposed project by AECOS, Inc.
- No endangered or endemic plant species were found on the project site; three (3) common native species were documented.
- Fauna Resources Recommendations:
  - Blackburn's sphinx moth was not found on the site, but the Applicant should regularly survey for and remove tree tobacco plants on the site to avoid attracting the endangered moths.
  - Nēnē (Hawaiian goose) were observed during the avian survey. Work should cease if nēnē nests are discovered within 150 feet of human activity, and the Applicant should conduct additional nesting surveys as necessary.
  - Seabirds passing over the site will be protected by minimizing nighttime work and keeping any lighting shielded downwards. The Applicant should work to prevent standing water from remaining in quarry areas to avoid attracting ae'o (Hawaiian stilt).
  - The Applicant should avoid removal of woody vegetation taller than 15 feet during the breeding season of ope'ape'a (Hawaiian hoary bat). Barbed wire will not be used.

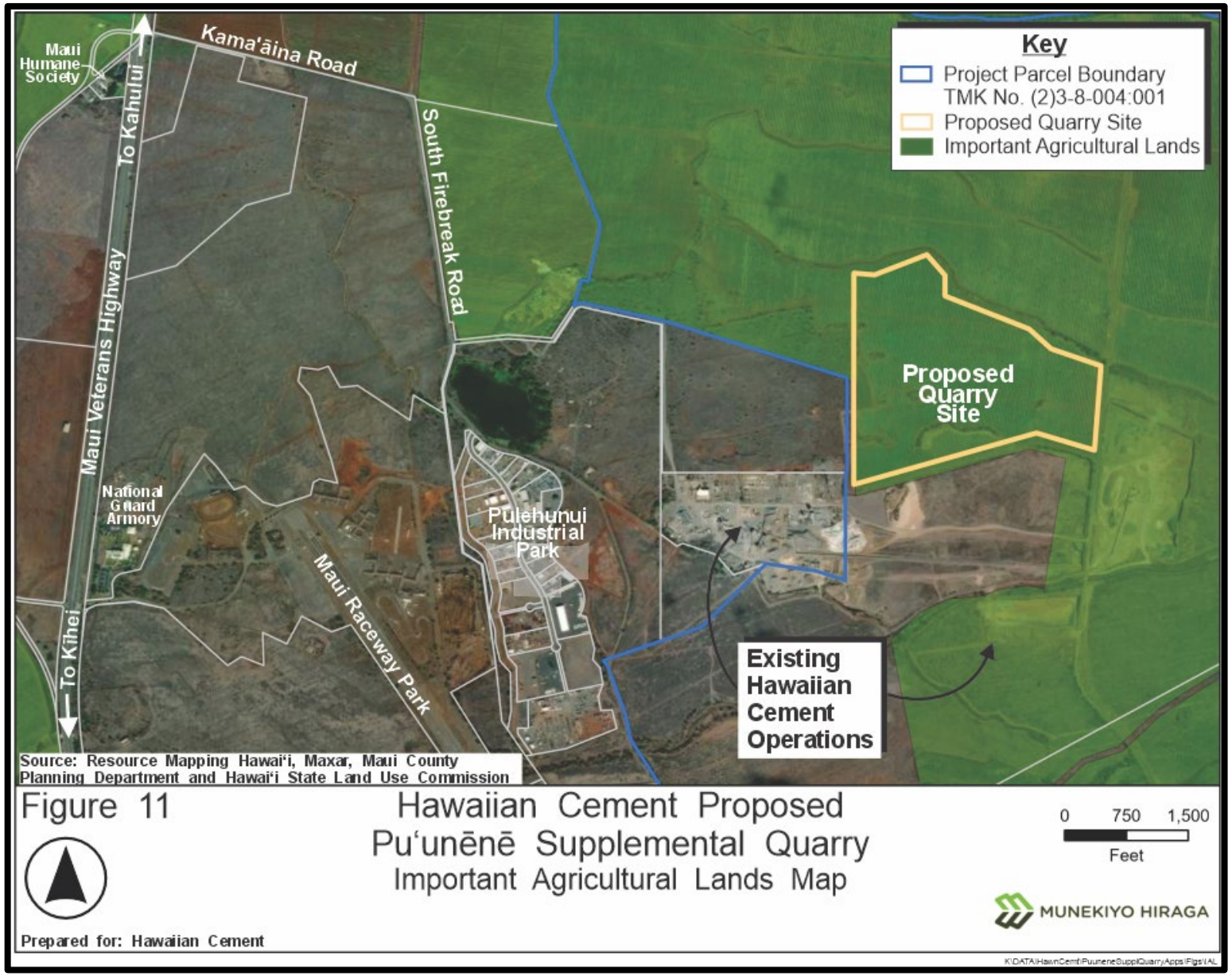
AGRICULTURAL LANDS

- The proposed supplemental quarry site is located within the over 25,000 acres of Important Agricultural Lands (IAL) designated by A&B on Maui.
- The site has been utilized for a citrus orchard, operated by Mahi Pono.
- Soil removed from each mining area will be replaced such that it is at least 24 inches deep after mining is complete. The agricultural impact memo prepared for the project concluded that this strategy would allow the Supplemental Quarry site to become a productive agricultural area after mining is complete.
- Mahi Pono has expressed interest in using the quarrying lands for agricultural use after quarrying is complete on the site.
- It is noted that, even if the site is made available for agricultural use, lack of access to water for irrigation may make cultivation of crops, including reinstatement of the citrus orchard, difficult on the site. The Applicant does not have access to an irrigation water source for the property.

RECLAMATION PLAN AND POST-MINING AGRICULTURAL LAND USE

- The Project's Agricultural consultants reviewed the conditions at the existing and proposed supplemental quarry site and prepared a summary memo of their findings and recommendations.
- Soil and vegetation observations and testing indicate that the supplemental quarry area can be reclaimed to productive agricultural land following mining activities.
- The reclamation plan involves mining the land in ~30-acre sections and contemporaneous reclamation. The plan will include breaking up the quarry floor to allow subsurface drainage, removal of soils from the adjacent ("to be mined") section and direct placement to a minimum depth of 24 inches onto the fully "mined" section. Soils will be plowed, seeded and mulched with wood chips sourced from trees removed from the adjacent section. Concurrent reclamation allows minimal handling and stockpiling of topsoil and will ensure soils quality/fertility.
- The reclaimed land will feature a new subdued topography (micro-climate) which will be partially protected from the wind, will be subject to less evapo-transpiration and promote greater water retention within the soils.
- Soils across the previously mined and reclaimed areas are comparable to soils in the expansion area in terms of depth and nutrient content. This indicates that, handled appropriately, replaced soils on the expansion area will lead to land with equal to or greater agricultural potential. The type of agricultural operation suitable for the reclaimed land will depend on water availability.

IMPORTANT AGRICULTURAL LANDS MAP



AIR AND WATER QUALITY

Air quality impacts:

- Mining activity may generate fugitive dust. BMPs, including regular watering, will be implemented to contain dust.
- The Applicant will modify its existing Air Quality permit from the State of Hawai‘i, Department of Health (DOH) prior to commencement of mining activity in the Supplemental Quarry area. The Applicant will adhere to all provisions of the Air Permit approval.

Water quality impacts:

- No streams or wetlands are located on or adjacent to the proposed project site.
- The full increase in peak stormwater runoff will be contained in new detention ponds on the downhill side of the site.
- The Applicant will modify its existing National Pollutant Discharge Elimination System (NPDES) from DOH, prior to commencement of quarrying activity.

SP AND CUP CRITERIA

- The proposed quarry relocation is in compliance with the SP criteria contained in Hawai‘i Administrative Rules (HAR) Section 15-15-95 and the CUP criteria contained in Maui County Code (MCC) Section 19.510.070.
- The proposed relocation does not contravene the goals, objectives, and policies of the Maui Countywide Policy Plan, Maui Island Plan, or Kihei-Makena Community Plan.

REQUEST

We respectfully request approval of the subject amendments to the CUP and recommendation of approval of the amendments to the SP from the Maui Planning Commission for the proposed Hawaiian Cement Puʻunēnē Supplemental Quarry Project.

MAHALO!