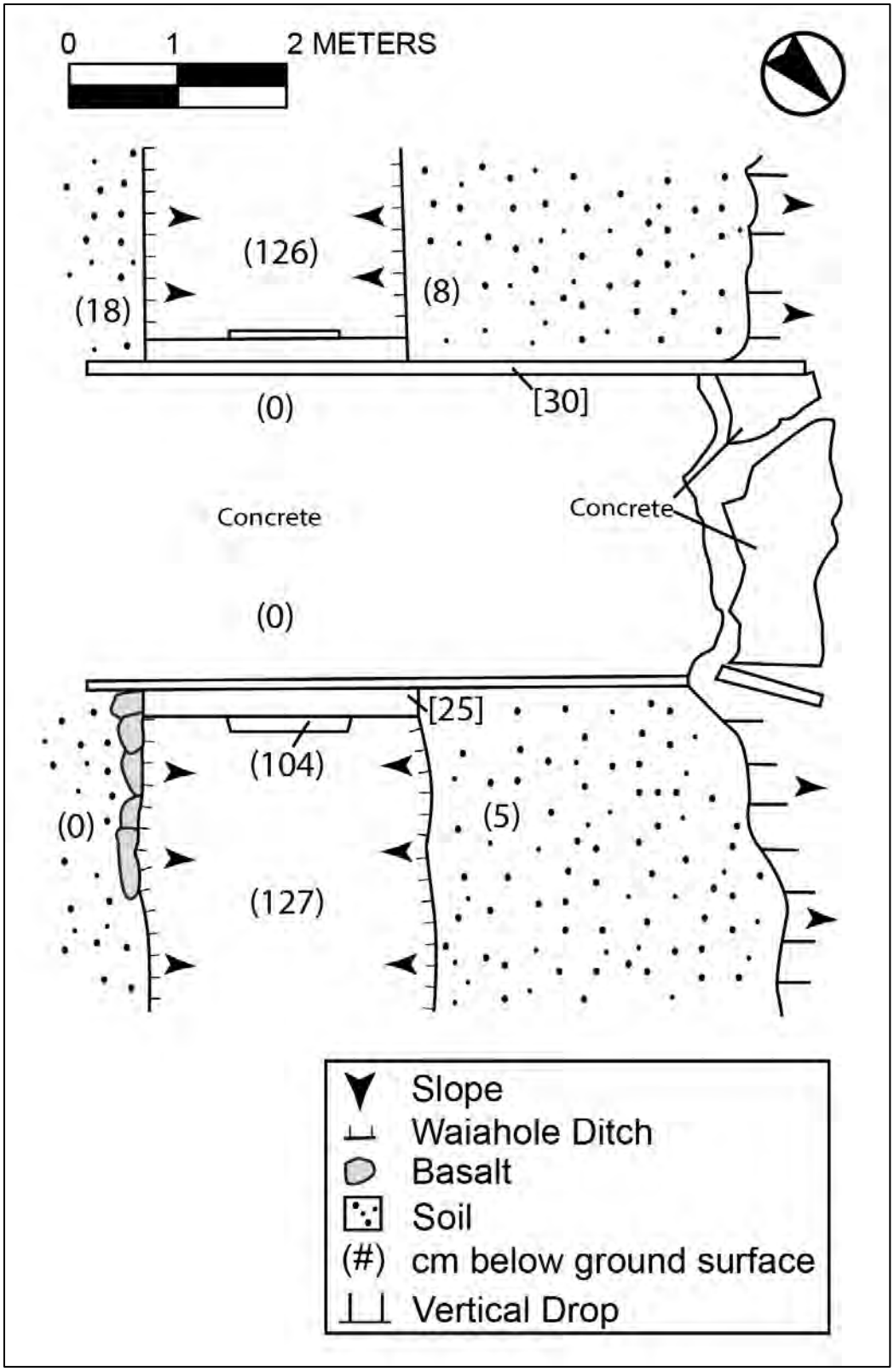

Figure 105. SIHP # 50-80-09-2268 Feature E culvert and ditch plan map

Figure 106. SIHP # 50-80-09-2268 Feature F, basalt and mortar-lined ditch, with metal cross beam (right background), view to north

Figure 107. SIHP # 50-80-09-2268 Feature F, basalt and mortar ditch portion, with metal pipe and cross beam, view to south

Figure 108. Plan view of SIHP # 50-80-09-2268 Feature F, showing pipe, southeast channel, and sluice gate components

Figure 109. SIHP # 50-80-09-2268 Feature F, close-up of southeast channel and sluice gate component, view to north

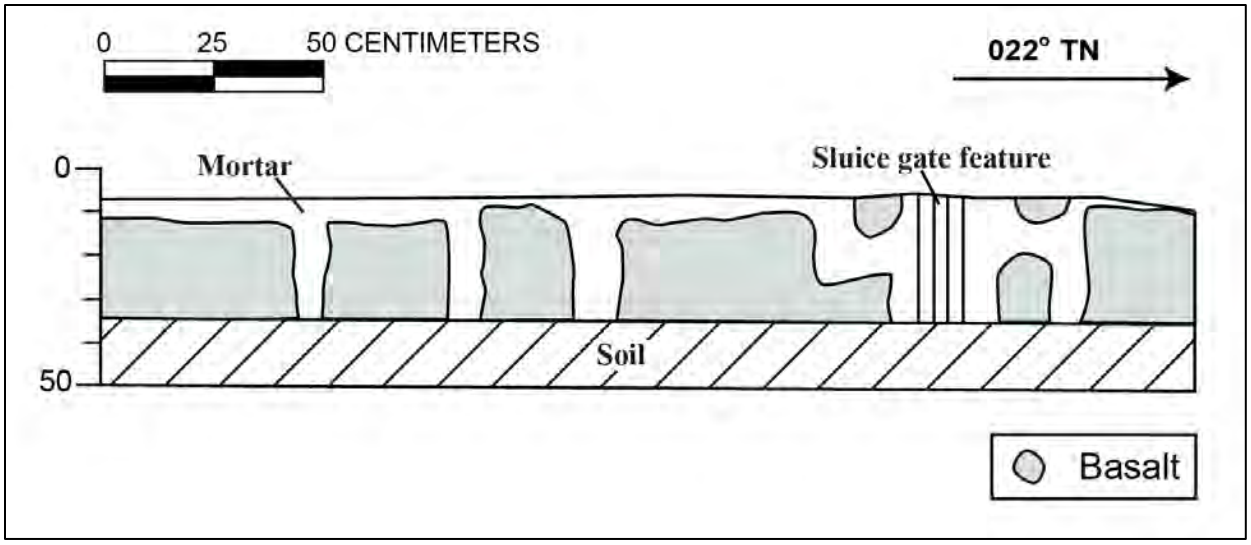

Figure 110. SIHP # 50-80-09-2268 Feature F, west wall of ditch representative profile

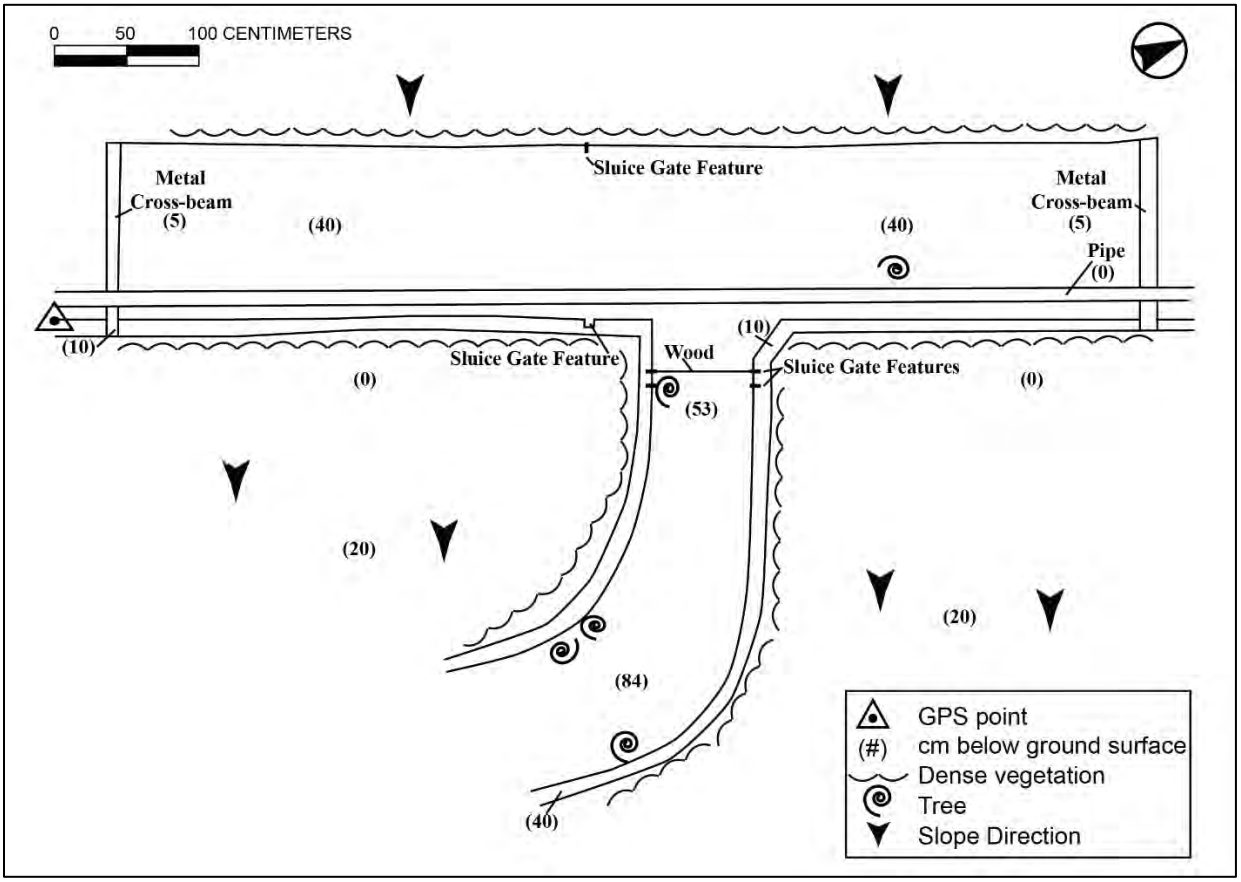

Figure 111. SIHP # 50-80-09-2268 Feature F plan map

Figure 112. SIHP # 50-80-09-2268 Feature G, showing sluice gate component and two metal pipes, view to east

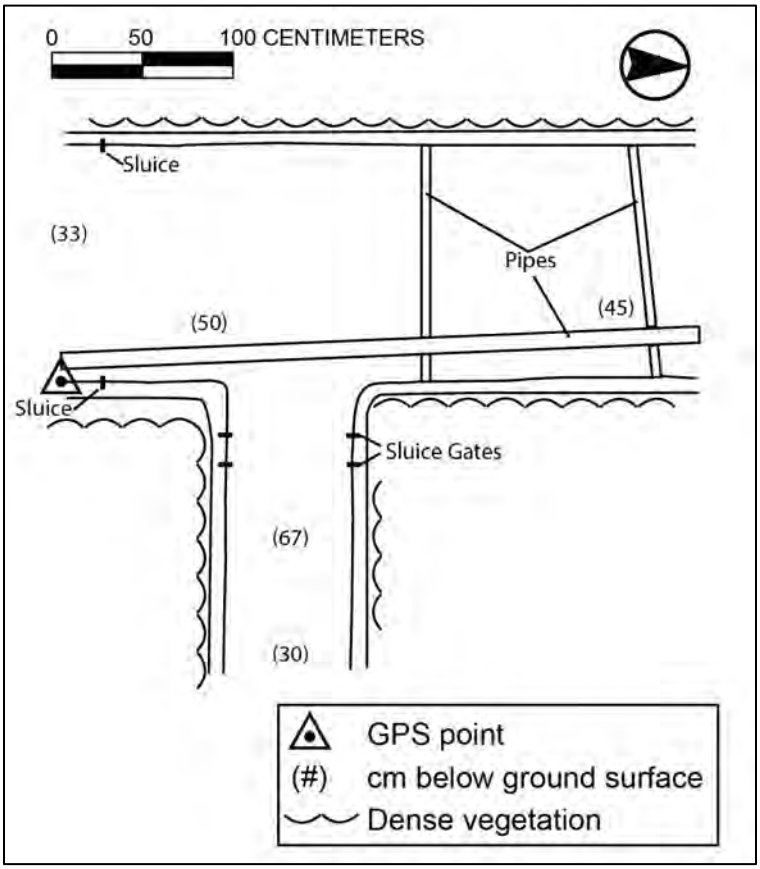

Figure 113. SIHP # 50-80-09-2268 Feature G plan map

Figure 114. Overview of SIHP # 50-80-09-2268 Feature H (left)

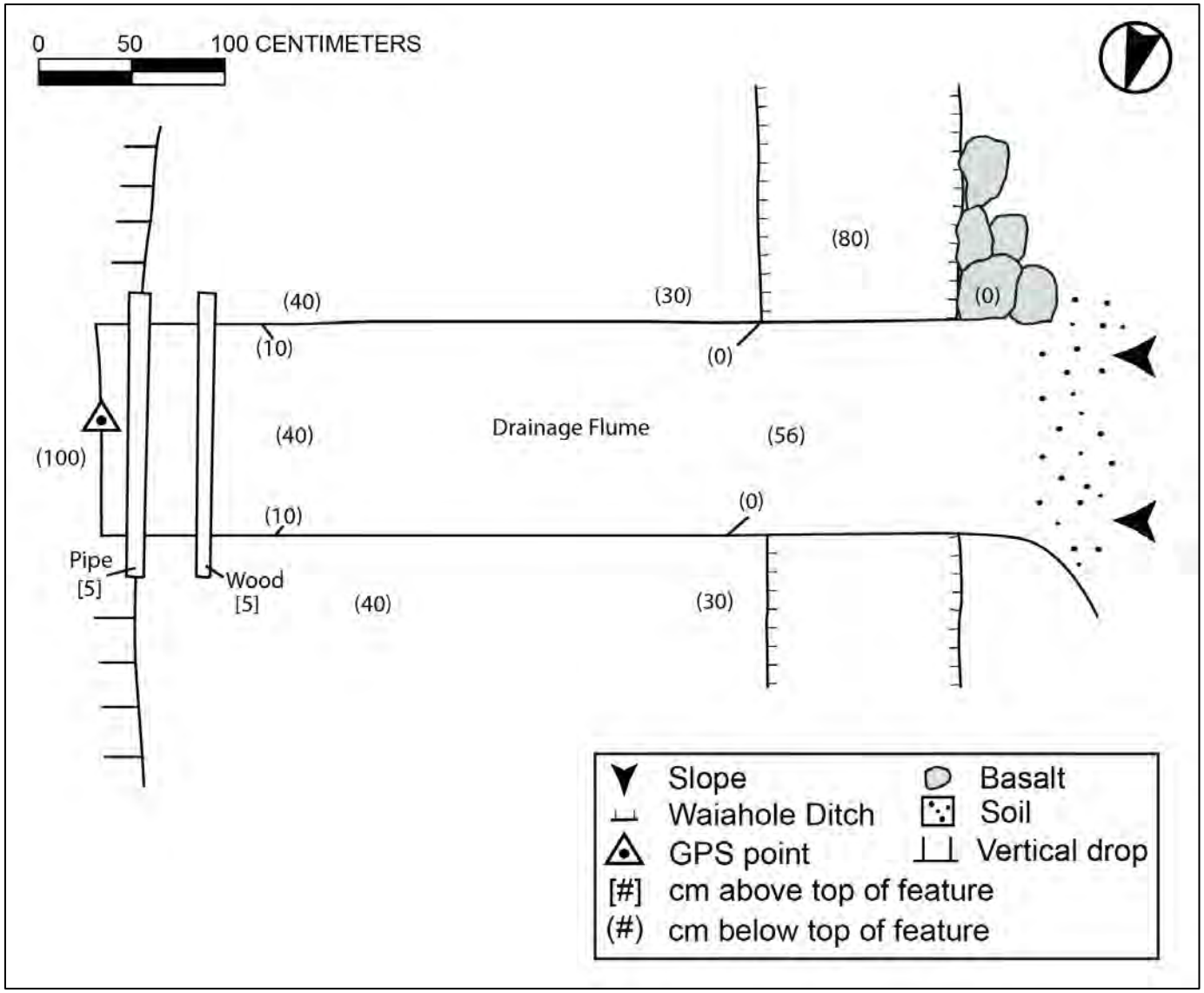

Figure 115. SIHP # 50-80-09-2268 Feature H plan map

oriented northeast-southwest and measures 1.1 m wide and 5.0 m long, and a maximum 56 cm deep (Figure 116). The flume extends toward a vertical drop, at one time funneling water into the gulch below. A decaying wood portion extends perpendicular over the northeast end of the metal chute. Approximately 20 cm from the wood, a metal pipe extends perpendicular over the top of the flume. At the southwest end of the chute, on the south side, there is a pile of mortar and basalt cobbles measuring 1 m wide and 90 cm tall (Figure 117). The flume extends over top of the Waiahole Ditch.

SIHP # 50-80-09-2268 Feature I consists of a portion of the ditch with several associated features, constructed to carry the water over the gulch in the area. This bridge component has four mortared basalt block pillars (Figure 119 through Figure 121). At one time an elevated metal half pipe connected the pillars, the middle of which appears to have collapsed. In the north end a portion of the metal in between the two pillars was still visible, and an incised line was noted, possibly a former space for a sluice gate or similar component (see Figure 120). The middle portion of this feature has largely collapsed, and with much of the footings obscured by earth. Approximately 3.5 m to the south, a basalt and mortar headwall and culvert were observed, measuring 2.5 m long, 20 cm wide, and 95 cm tall.

SIHP # 50-80-09-2268 Feature J is similar to Feature I, another area of components to carry the ditch over gulches in the area. The first component consists of four mortared basalt block pillars connected by an elevated concrete bridge (Figure 122 through Figure 124). The concrete has been entirely filled in with soil and is overgrown, and portions of the pillars are also obscured. A 12-cm metal pipe extends the entire length of this feature and beyond, resting on top of the *makai*/south pillars. The letters “B M +” are inscribed in the mortared surface of the northwestern pillar. Approximately 2 m east of this bridge component is a culvert constructed of mortared basalt, which measures 55 cm tall and 105 cm wide (see Figure 123). Only 80 cm of length is exposed, the remainder covered with earth; however, the tunnel appears to extend toward the ditch wall. Overall, the bridge components of Features J and K span an area approximately 53 m long.

SIHP # 50-80-09-2268 Feature K of the ditch system consists of a culvert and tunnel feature with intact metal sluice gate, along the northern boundary of the project area (Figure 125 through Figure 126). Feature K extends southeast off the ditch, extending under the access road, though the feature could not be identified on the other side of the road. Two concrete patches were noted in the road, which appear to have been used to cover collapsed portions of the tunnel. It is possible the entire tunnel has collapsed. The observable portion of the feature—from the head gate to the end of the second concrete patch—spans 3 m in length and is a maximum of 0.7 m wide. The first, fragmented concrete slab measures 95 cm long and 75 cm wide. The second concrete slab, which is in the middle of the road, measures 1.6 m long by 0.7 m wide. The head wall of Feature I measures 0.9 m long. Overall the feature is in fair condition, as portions of the concrete are fragmented and collapsing.

5.2.4 Significance

SIHP # 50-80-09-2268, Waiahole Ditch and associated features, has been previously assessed by a variety of studies under various criteria. See Section 7 for a full discussion of prior significance assessments. SIHP # 50-80-09-2268 is assessed as significant under HAR §13-284-6 Criteria a, c, and d. The Waiahole Ditch has yielded information on agricultural history of the area and contributed greatly to the development and evolution of the ‘Ewa Plain throughout its history,

Figure 116. SIHP # 50-80-09-2268 Feature H, drainage flume, along north edge of project area, view to northeast

Figure 117. Mortar and basalt pile south end of SIHP # 50-80-09-2268 Feature H, drainage flume, view to west

Figure 118. Collapsed bridge component of SIHP # 50-80-09-2268 Feature I, view to south

Figure 119. Collapsed bridge component of SIHP # 50-80-09-2268 Feature I, view to southwest

Figure 120. Close-up plan view showing metal portion, collapsed bridge component of SIHP # 50-80-09-2268 Feature I

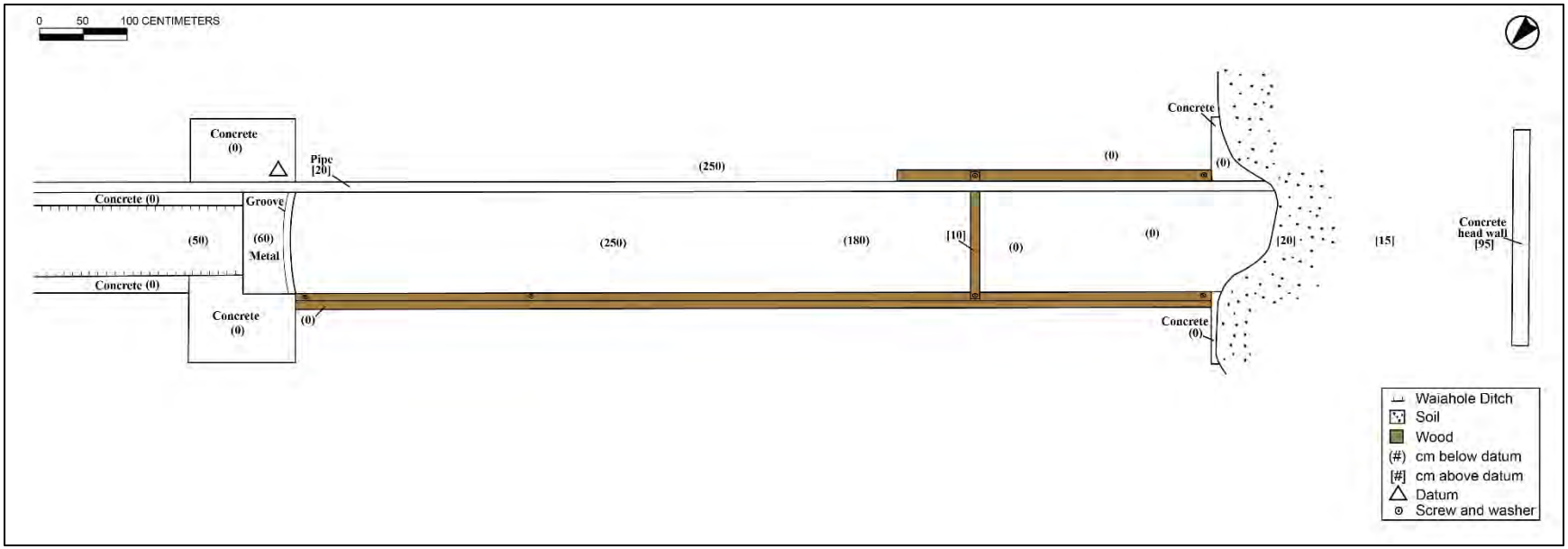

Figure 121. Plan map of SIHP # 50-80-08-2268 Feature I, showing portion of the Waiahole Ditch, collapsed bridge components, and head wall

Figure 122. Overview of bridge component of SIHP # 50-80-09-2268, Feature J, view to southwest

Figure 123. Culvert component of SIHP # 50-80-09-2268 Feature J documented east of bridge component, view to north

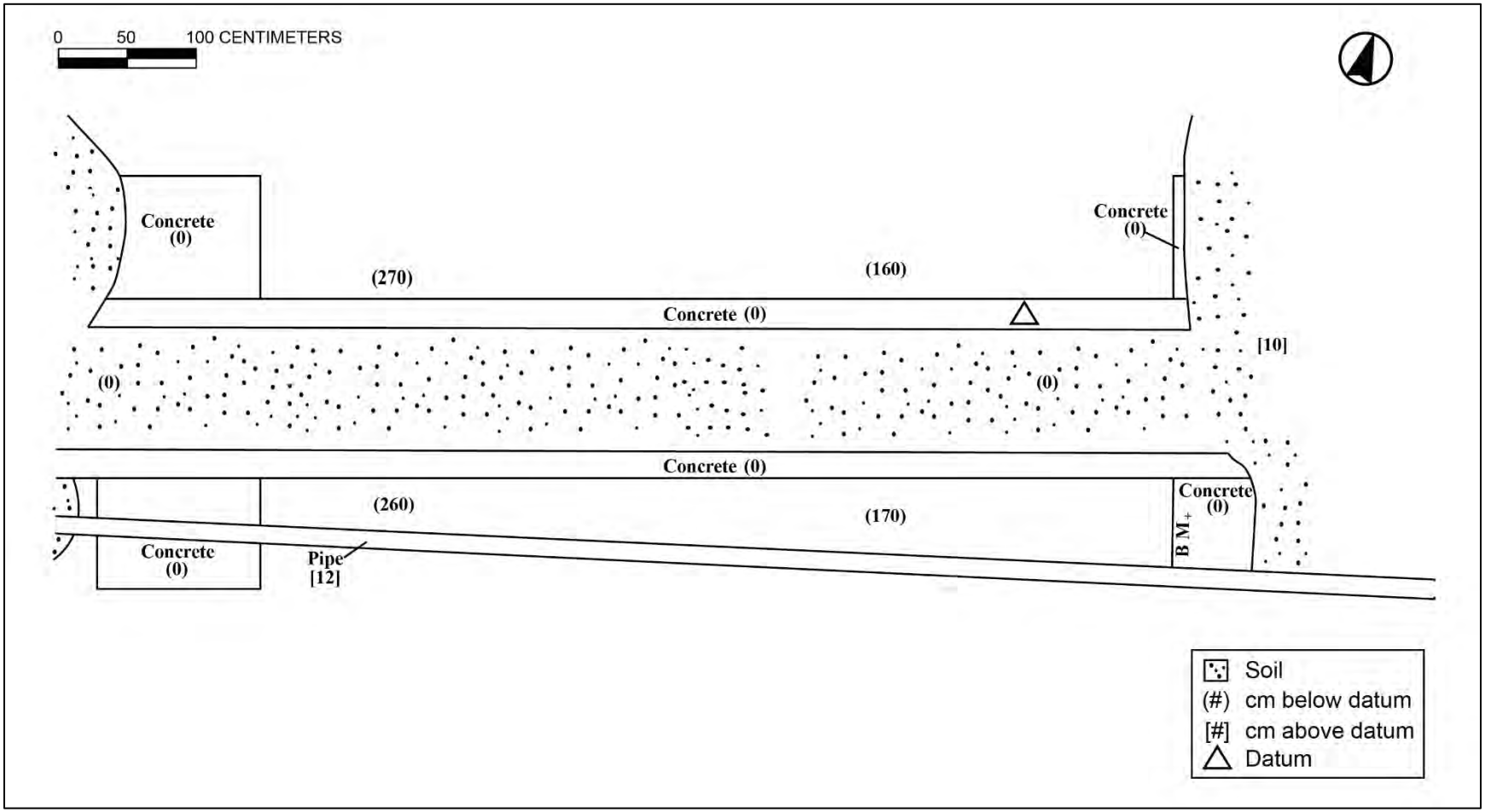

Figure 124. Plan map of SIHP # 50-80-09-2268 Feature J, bridge component

Figure 125. SIHP # 50-80-09-2268 Feature K, culvert and tunnel feature, view to north

Figure 126. SIHP # 50-80-09-2268 Feature K, showing culvert with intact sluice gate, view to east

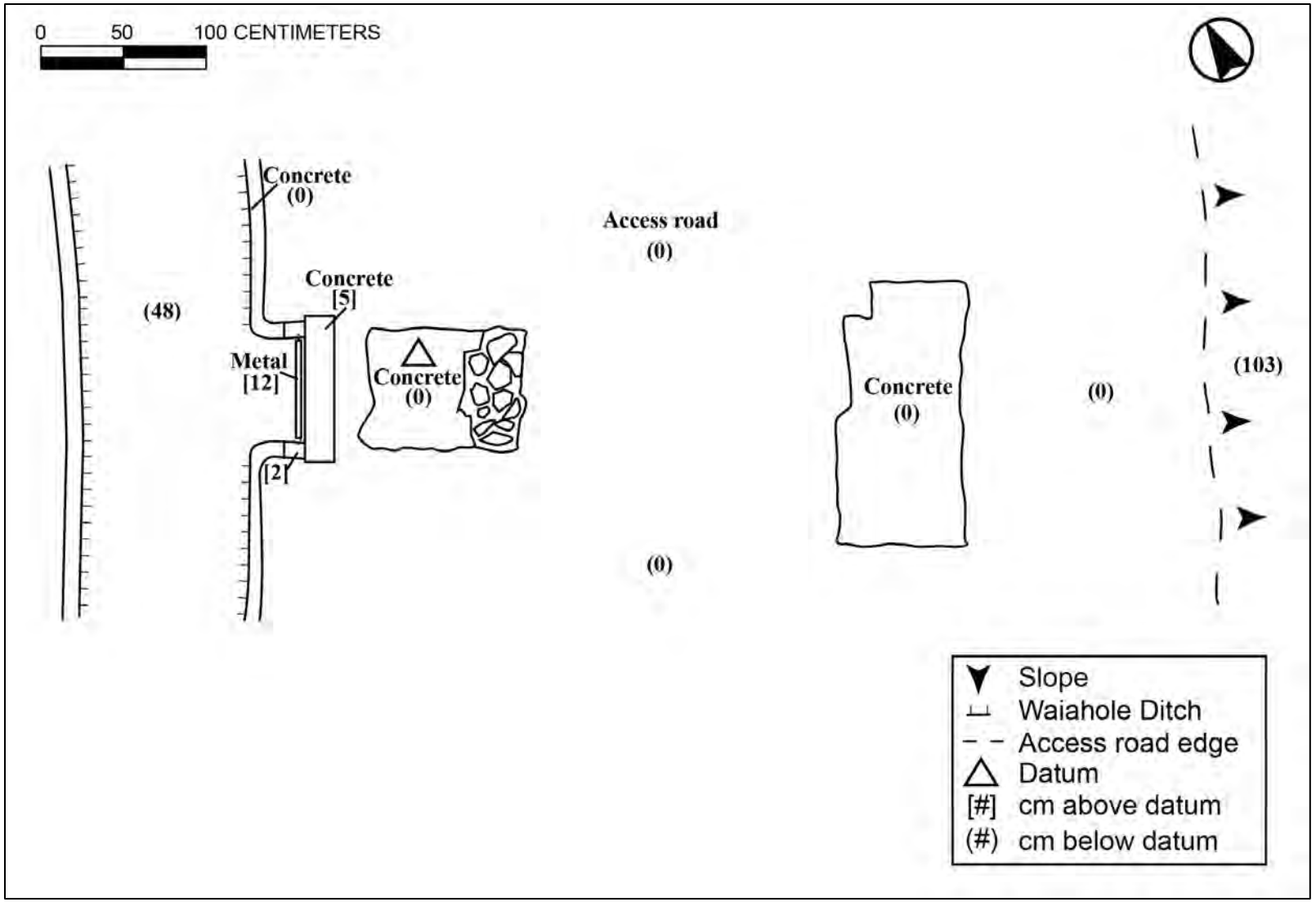

Figure 127. Plan map of SIHP # 50-80-09-2268 Feature K

and may continue to yield additional information on plantation-era history on O‘ahu. However, within the project area, the historic property only retains sufficient integrity of location, which is also diminished in portions of the project area due to erosion and neglect. While there are some portions that retain some integrity of design, materials, and workmanship within the project area, this integrity is diminished. The overall ditch is significant, however, the remnant portion of SIHP # 50-80-09--2268 within the project area does not retain sufficient integrity to be considered significant.

Section 6 Summary and Interpretation

At the request of Tetra Tech, Inc., and on behalf of AES Distributed Energy, CSH has prepared this AISR for the AES West O‘ahu Solar project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, TMK: [1] 9-2-002:007 (por.). The project area is on undeveloped lands in the southeastern foothills of the Wai‘anae Range, northeast of Pu‘u Makakilo and the Makakilo subdivision and about 600 m northwest of the intersection of the H-1 Freeway and the Kualaka‘i Parkway.

Background research indicates little traditional land use in the portion of Honouliuli Ahupua‘a in which the project area is situated. Large settlements were primarily concentrated near the coast, near marine and estuarine resources, or in the irrigated lowlands suitable for wetland cultivation. Any evidence of traditional land use in the area was likely wiped out by historic agricultural and ranching activities that lasted through the mid-twentieth century. The northeast portion of the project area and much of the surrounding land was occupied by Oahu Sugar Company fields by 1925. The Waiahole Ditch, constructed for much needed irrigation of the sugarcane fields, is known to extend through the current project area. Small plantation-related residential camps were the only settlements found in the upper slopes in the early twentieth century, with “Pump Camp 5” existing within the project area, according to historic maps. Various roads and fence lines related to agricultural and/or ranching activities in the region are known to have existed in the project area at one time. Archaeological studies in the vicinity of the project area have documented various plantation-era historic properties including walls, alignments, mounds, ditches and other irrigation features, as well as portions of the Waiahole Ditch (SIHP # 50-80-09-2268).

Fieldwork included 100% pedestrian inspection of the project area, GPS data collection, and documentation of surface historic properties. Two previously identified historic properties were documented within the project area: SIHP # 50-80-08-5593, historic irrigation and plantation infrastructure, and SIHP # 50-80-09-2268, the Waiahole Ditch System. The AIS documented two features of SIHP # 50-80-08-5593: drain-pipes (Feature 1) and a complex of components related to the pump house and mill located just southeast of the project area (Features 2A through 2E). No indications of traditional land use were observed. No remnants of Pump Camp 5 were identified. The majority of the SIHP # 50-80-08-5593 features were identified extending through the northern portion of the project area.

The Waiahole Ditch System (SIHP # 50-80-09-2268) and associated components were identified extending through the western portion of the project area. The AIS documented seven remnant features of SIHP # 50-80-09-2268: a culvert and bridge (Feature E), two ditch portions with metal pipes and sluice gate components (Features F and G), a metal drainage flume (Feature H), two bridge components (Features I and J), and a culvert feature with sluice gate (Feature K). The remnant portion of SIHP # 50-80-09-2268 within the project area is at the far west end of the ditch system. It is not a portion of the continuous transmission line Waiahole Ditch (most of which is still in use), but rather extends from a reservoir fed directly from the ditch that extends from Windward O‘ahu. From the reservoir, Ko‘olau water is fed into various ditches. While the remnant of the ditch within the project area is undoubtedly part of the Waiahole Ditch System as a whole, the portion within the project area and its components are in remnant condition. Additional portions of the remnant ditch and associated components are still extant in the vicinity, outside the project area.

The results of this AIS correspond with the history of the slopes of Honouliuli Ahupua‘a, representing historic agriculture, ranching, and related activities throughout the twentieth century.

Section 7 Significance Assessments

Historic property significance is evaluated and assessed based on the five State of Hawai‘i historic property significance criteria. To be considered significant, a historic property must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and meet one or more of the following broad cultural/historic significance criteria (in accordance with HAR §13-284-6):

a. Be associated with events that have made an important contribution to the broad patterns of our history;

b. Be associated with the lives of persons important in our past;

c. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value;

d. Have yielded, or is likely to yield, information important for research on prehistory or history; or

e. Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

Two previously identified historic properties were documented within the project area. Table 4 lists the historic properties along with their significance assessments and specific mitigation commitments. These mitigation commitments are included in this AISR for the review and concurrence of the SHPD.

SIHP # 50-80-08-5593, historic irrigation system and plantation infrastructure, was previously assessed by Dega et al. (1998) as significant under Hawai‘i State historic property significance Criteria a (be associated with events that have made an important contribution to the broad patterns of our history) and d (has yielded, or may be likely to yield, information important for research on prehistory or history). The current study assesses SIHP # 50-80-08-5593 as significant only under Criterion d. This historic property has yielded information on land utilization and agricultural history of the ‘Ewa Plain. However, it is not associated with specific, impactful events in the area, unlike the Waiahole Ditch, which immeasurably altered the entirety of the landscape. Much of the irrigation system has been buried and destroyed by erosion and livestock. Therefore, the historic property possesses diminished but sufficient integrity of location, design, materials, and workmanship, for which it’s significant.

SIHP # 50-80-09-2268, The Waiahole Ditch System, has a long history of significance evaluation (Table 5).

- The Bishop Museum Public Archaeology Section Applied Research Group (Goodman and Nees 1991) conducted archaeological reconnaissance and inventory surveys of 3,600 acres in the uplands of Waiawa Ahupua‘a, and touched on the Waiahole Ditch (SIHP # 50-80-09-2268) as it crossed their project area (Goodman and Nees 1991:64). The only

Table 4. Archaeological historic property integrity, significance, and project-specific mitigation commitments

SIHP #	Formal Type/ Description	Integrity							Significance	Mitigation Commitments
		Location	Design	Setting	Materials	Workmanship	Feeling	Association		
50-80-08-5593	Historic irrigation system and plantation infrastructure	Y	Y	N	Y	Y	N	N	d	No further work
50-80-09-2268	Waiahole Ditch System	Y	N	N	N	N	N	N	a, c, and d	No further work

Table 5. Significance evaluations for portions of the Waiahole Ditch

Study or Review	General Location	Evaluation in terms of HAR criteria	Evaluation in terms of National/Hawai‘i Register of Historic Places (NRHP/HRHP) criteria
Goodman and Need 1991	3,600 acres in uplands of Waiawa Ahupua‘a	Significance not evaluated: “significance […] has been realized through field and archival research and no further work is recommended”	
Hammatt et al. 1996	1,339 acres within portions of Waipio and Waiawa Ahupua‘a	Significance not evaluated: “If the portion of the Waiahole Ditch which crosses the two parcels of the project area is ever to be impacted by future development, the State Historic Preservation Division should be notified beforehand, so that appropriate mitigative measures, if necessary, can be established.”	
Dega et al. 1998	Proposed University of Hawai‘i West O‘ahu Campus project	Significance not evaluated: “The Waiahole Ditch System has previously been assessed as significant” (refers to Goodman and Nees 1991)	
Tulchin and Hammatt 2004	86-acres at Pālehua in Makakilo	Not evaluated under HAR criteria	Significant under NRHP and HRHP Criterion A and D
Tulchin et al. 2009	Koa Ridge project	HAR significance not evaluated	Significant under NRHP and HRHP Criteria A, C, and D
SHPD acceptance letter for Tulchin et al. 2009	Koa Ridge project	SHPD acceptance letter for this study makes no reference to site significance.	
Hunkin and Hammatt 2009	Makakilo Dr Extension project	HAR significance not evaluated	Significant under NRHP and HRHP Criteria A, C, and D
SHPD review letter for Hunkin and Hammatt 2009	Makakilo Dr Extension project	HAR significance not evaluated	Significant under NRHP and HRHP Criteria A, B, and D
Shideler and Hammatt 2018	Koa Ridge project	HAR significance not evaluated	Evaluated integrity; supports significance assessment made in Tulchin et al. 2009 as significant under NRHP and HRHP Criteria A, C, and D

Study or Review	General Location	Evaluation in terms of HAR criteria	Evaluation in terms of National/Hawai‘i Register of Historic Places (NRHP/HRHP) criteria
SHPD review letter for Shideler and Hammatt 2018	Koa Ridge project	Assessed as significant pursuant to HAR §13-284-6 Criteria a, c, and d	NRHP and HRHP significance not addressed
Zapor et al. 2018	Makakilo Dr Extension project	Assessed as significant pursuant to HAR §13-275-6, under Criteria a, c, and d	Evaluated for listing on the NRHP and HRHP pursuant to 36 CFR 60.4 and HAR §13-198-8

discussion of significance is in their statement “The significance of the following sites has been realized through field and archival research and no further work is recommended: State Sites […] 2268; B4-15 (the Waiahole Ditch)” (Goodman and Nees 1991:137). Thus, while the Waiahole Ditch is assigned an SIHP #, there is really no discussion of significance of the Waiahole Ditch in the Goodman and Nees (1991) study.

- A Hammatt et al. (1996) archaeological inventory survey of 1,339 acres of Castle & Cooke lands within portions of Waipio and Waiawa Ahupua‘a discusses that portion of the Waiahole Ditch within the Koa Ridge area west of the H-2 Freeway. At the time of that study, it was anticipated that a portion of the ditch (which conveyed large volumes of water of significant import) would not be impacted. While the significance of the Waiahole Ditch was noted, the significance was not formally evaluated. It was simply asserted that “If the portion of the Waiahole Ditch which crosses the two parcels of the project area is ever to be impacted by future development, the State Historic Preservation Division should be notified beforehand, so that appropriate mitigative measures, if necessary, can be established” (Hammatt et al. 1996:55).
- The Dega et al. study asserts (1998:22), “The Waiahole Ditch System has previously been assessed as significant (see Goodman and Nees 1991).” The Dega et al. study offers no further discussion of the significance of the Waiahole Ditch System (and avoids any substantive comment regarding the conclusion of the referenced Goodman and Nees 1991 study).
- A Tulchin and Hammatt 2004 AIS of an approximately 86-acre proposed Pālehua Community Association project identified a portion of the Waiahole Ditch System. SIHP # 50-80-09-2268 was evaluated as significant under NRHP and HRHP Criteria A and D (Tulchin and Hammatt 2004:65).
- The Tulchin et al. (2009:66–68) archaeological inventory survey addresses that portion of the Waiahole Ditch within the Koa Ridge project area east of the H-2 Freeway crossing a small northern tributary gulch of Pānakauahi Gulch. Two features have been designated for the Waiahole Ditch during the Koa Ridge project (but without any letter or numeric designations): one for the main ditch including both the open ditch and Pānakauahi siphon and one feature designation including two 1-m long basalt boulder support walls.

  The 2009 archaeological inventory survey provides the following assessment of significance:

  > SIHP # 50-80-09-2268 is assessed as significant under Criterion A (associated with events that have made an important contribution to the broad patterns of our history), Criterion C (embody the distinctive characteristics of a type period or method of construction), and Criterion D (have yielded, or may be likely to yield information important in prehistory or history) of the National and Hawai‘i Registers of Historic Places evaluation criteria. [Tulchin et al. 2009:66]

  The integrity of SIHP # 50-80-09-2268, Waiahole Ditch was not assessed at the time of identification (Hammatt et al. 1996:47–50; Tulchin et al. 2009:89–91). The SHPD acceptance letter for this study dated 10 February 2009 (LOG NO. 2009.0605, DOC. NO. 0902WT21) makes no reference to historic property significance.

- An archaeological inventory survey for a Makakilo Drive Extension project (Hunkin and Hammatt 2009) discusses a portion of the Waiahole Ditch and concludes, “The SIHP # 50-80-09-2268 alignment continues to be significant under criteria A, C, and D” with reference to the criteria established for the NRHP and HRHP (Hunkin and Hammatt 2009:65).

  The SHPD acceptance letter for this AIS dated 18 August 2009 (LOG NO. 2008.3209, DOC. NO. 0908NM28) asserts that SIHP # 50-80-09-2268, the Waiahole Ditch System is eligible for listing on the NRHP and HRHP under Criteria A, B, and D (the AIS declares significance under Criteria A, C, and D and the acceptance letter specifies A, B, and D).

- A preservation plan for the Koa Ridge project (Shideler and Hammatt 2018) addressed a portion of the SIHP # 50-80-09-2268, Waiahole Ditch System. The report evaluated the significance of the Waiahole Ditch System as follows:

  > SIHP # -7046 is evaluated as possessing integrity of location, design, materials, and workmanship. The setting is evaluated as lacking integrity as the character of the place as a locus of agriculture has been lost and the vegetation is much different. The feeling of agricultural life of the historic property has been lost. The historic property has lost its association with the events and activities of agriculture.
  >
  > The relationship of the historic property to the local history of agriculture and the integrity of location, design, materials, and workmanship is evaluated as supporting the site significance assessment made in 2009. [Shideler and Hammatt 2018:20]

  So while not spelled out per se in the 2018 preservation plan, the preservation plan supports the significance assessment made in 2009 “assessed as significant under Criterion A\[…] Criterion C […] and Criterion D of the NRHP and HRHP evaluation criteria.”

  The SHPD acceptance letter for this preservation plan dated 28 February 2018 (Log No. 2018.00220, Doc. No. 1802JA04) asserts slightly differently that “Site 2268 retains integrity of location, design, materials, and workmanship and is assessed as significant under HAR §13-284-6 Criteria a, c, and d.”

- A supplemental archaeological inventory survey for the Makakilo Drive Extension project (Zapor et al. 2018) further documented previously identified components of the Waiahole Ditch and documented one newly identified feature. Zapor et al. (2018) assess the ditch as significant pursuant to HAR §13-275-6, under Criteria a, c, and d.

Based on the findings of this AIS report, SIHP # 50-80-09-2268 is assessed as significant under HAR §13-284-6 Criteria a, c, and d. The historic property has yielded information on the agricultural history of the area and contributed greatly to the development and evolution of the ‘Ewa Plain throughout its history. However, within the project area, the historic property only retains sufficient integrity of location, which is also diminished in portions of the project area due to erosion and neglect. While there are some portions that retain some integrity of design, materials, and workmanship within the project area, this integrity is very diminished. While the overall ditch is significant, the remnant portion of SIHP # 50-80-09-2268 within the project area does not retain sufficient integrity to be considered significant.

Section 8 Project Effect and Mitigation Commitments

8.1 Project Effect

Two historic properties (SIHP #s 50-80-08-5593 and 50-80-09-2268) were identified within the project area (the same as identified in a prior Dega et al. 1998 study). The portion of SIHP # 50-80-09-2268 within the project area does not retain sufficient integrity to be considered significant, and therefore no further work is recommended for the historic property. This is in keeping with the conclusions of the Dega et al. 1998 study and the SHPD review(s) that accepted that study (see Appendix A).

Sufficient information regarding the location, extent, function, and age of the portion of SIHP # 50-80-08-5593 within the project area has been generated by the current archaeological inventory survey investigation to mitigate any adverse effect caused by the proposed project.

Therefore, pursuant to HAR §13-284-7, the project-specific effect determination is “No historic properties affected.”

8.2 Mitigation Commitments

The proposed project will have no effect on significant historic properties within the project area, therefore no mitigation commitments are required.

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Appendix A SHPD Acceptance of the Dega et al. 1998 AIS

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

February 3, 1999

Mr. Michael Dega, MA
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 777
Honolulu, Hawaii 96813

LOG NO: 22959
DOC NO: 9901EJ28

Dear Mr. Dega:

SUBJECT: **Historic Preservation Review of An Archaeological Inventory Survey of the University of Hawai'i, West O'ahu Campus, District of 'Ewa, Island of O'ahu, Hawaii'i (1998 Dega et al.)**
Honouliuli, 'Ewa, O'ahu
TMK: 9-2-002:001 por.; 9-2-004:005 por.

Thank you for the submittal of the replacement pages for the above report which completes the historic preservation review for this project. We can now conclude that the inventory survey was successfully executed. The report has been added to our library for public use.

Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

Aloha,

Don Hibbard, Administrator
Historic Preservation Division

EJ:jk

FEB 9 1999

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

June 15, 1998

LOG NO: 21708
DOC NO: 9806SC02

Mr. Michael Dega, MA
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 777
Honolulu, Hawai'i, 96813

Dear Mr. Dega:

SUBJECT: Chapter 6E-8 Historic Preservation Review of a Draft Report on an Archaeological Inventory Survey of the Proposed University of Hawai'i, West O'ahu Campus Hono'uli'uli, 'Ewa, O'ahu
TMK: 9-2-002: 001 por.; 9-2-004: 005 por.

Thank you for the recent submission of a draft report documenting the results of an archaeological inventory survey of a 998-acre property near Makakilo, O'ahu (*An Archaeological Inventory Survey of the University of Hawai'i, West O'ahu Campus, District of 'Ewa, Island of O'ahu, Hawai'i [TMK: 9-2-2: 1 por.; 9-2-4: 5 por.]*. 1998. Dega et al.). We provide the following comments.

We believe that the survey was conducted acceptably, with a total of 2 historic sites found: 2268, the Waiahole Ditch, a historic irrigation feature; 5593, a complex of water transport and irrigation features related to 20th century sugar cane production. Before we can accept the report as final, however, we would like to see several minor corrections made. Once we receive these revisions (and they may be submitted on separate pages), we anticipate accepting the report and concluding that the survey was successfully executed.

Should you have any questions, please feel free to call Sara Collins at 587-0013.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

SC:amk

JUN 15 1998

M. Dega
Page 2

ATTACHMENT I: SPECIFIC COMMENTS ON A REPORT ON THE INVENTORY SURVEY OF THE PROPOSED WEST O'AHU CAMPUS SITE SCIENTIFIC CONSULTANT SERVICES, INC.

Research Results

Page 17, Paragraph 2: The Waiahole Ditch system has a SIHP No. (50-80-09-2268) and was previously reported in Goodman & Nees (1991. *Archaeological Reconnaissance and Inventory Surveys of 3,500 Acres in Waiawa Ahupua'a, 'Ewa, O'ahu*). Please add this information and also indicate the location of the site in the project area on Figure 2. Also, could you please provide a summary statement of the numbers and types of features that compose SIHP No. 5593?

Page 18, Figure 7: Is this flume part of SIHP 2268 or 5593?

Page 20, Settlement Pattern: While the project area appears to contain only post-contact sites relating exclusively to commercial agriculture, a couple of additional points should be made in this discussion: (1) Were traditional habitation sites in 'Ewa permanent or temporary? (2) Were agricultural sites of any kind reported in some of the studies you cite? For example, you refer to Wolforth's (1998) recently presented evidence for buried pondfields at the West Loch project area.

Recommendations

General: This section will need to be divided into two, separately headed parts: Significance Assessments and Recommendations.

Page 21, Paragraph 4: In view of the above comments, this section will need to be revised to reflect the presence of two, not one, historic sites in the project area.

Attachment G
Cultural Impact Assessment Report

FINAL
Cultural Impact Assessment for the West Oahu Solar Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: [1] 9-2-002:007

Prepared for
AES Distributed Energy

Prepared by
Kellen Tanaka, B.S.,
David W. Shideler, M.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: HONOULIULI 172)

May 2020

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Management Summary

Reference	Cultural Impact Assessment for the West Oahu Solar Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, TMK: [1] 9-2-002:007 (Tanaka et al. 2020)
Date	May 2020
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: HONOULIULI 172
Agencies	State of Hawai‘i, Department of Health, Office of Environmental Quality Control (DOH/OEQC) and State of Hawai‘i, Land Use Commission (LUC)
Land Jurisdiction	State of Hawai‘i
Project Proponent	AES Distributed Energy
Project Location	The project area is on undeveloped lands located in the southeastern foothills of the Wai‘anae Range, northeast of Pu‘u Makakilo and the Makakilo subdivision and about 600 m northwest of the intersection of the H-1 freeway and the Kualakai Parkway. The project area is depicted on a portion of the 2013 Ewa and Schofield Barracks U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	The West Oahu Solar project consists of an approximately 12.5-megawatt (MW) ground-mounted solar photovoltaic system, coupled with a 50 MW-hour battery energy storage system (BESS) and related interconnection and ancillary facilities. The solar photovoltaic system would include a series of panels arranged into arrays consisting of evenly spaced rows. The panels would be mounted on a racking system installed on posts. The battery storage system would consist of containerized lithium-ion battery units and inverters distributed throughout the project area. The project would connect to a substation via underground electrical conduit. The substation would be constructed adjacent to and would interconnect with an existing Hawaiian Electric Company (HECO) 46kV transmission line that traverses the site. The project would be accessed via the existing gated entry off Kualakai Parkway (near the intersection with Interstate H-1) and would utilize a network of existing and new onsite access roads. Some road improvements may be needed to facilitate access within the project area. In addition, some site grading would be needed to accommodate the project facilities and to comply with stormwater and civil engineering requirements. In December 2019, CSH was notified of a slight modification to the project area to include additional areas along the perimeter of the project area, as well as maintenance of the existing roadways approaching the project area from the southeast.
Project Acreage	The project area is approximately 101.62 acres (41.12 hectares)

Document Purpose	This cultural impact assessment (CIA) was prepared to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project’s potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project’s potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control’s *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be 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). The document will likely also support the project’s historic preservation review under HRS §6E and §6E-8, and HAR §13-275 and §13-284. The document is also intended to support the discretionary land use permitting process including a State Special Use Permit (SUP) from the Land Use Commission (LUC).
Results of Background Research	Background research for this study yielded the following results, presented in approximate chronological order: 1. Honouliuli is the largest *ahupua‘a* (land division usually extending from the uplands to the sea) in the *moku* (district) of ‘Ewa. Honouliuli translates literally as “dark water,” “dark bay,” or “blue harbor,” and thus is named for the waters of Pearl Harbor which marks the eastern boundary of the *ahupua‘a* (Jarrett 1930:22). Another source translates Honouliuli as “The blue bays or inlets” (*Saturday Press*, 11 August 1883). Honouliuli appears in the “Mo‘olelo of Lepeamoa,” the chicken-girl of Pālama, where Honouliuli is the name of the husband of the chiefess Kapālama, and grandfather of Lepeamoa (Westervelt 1923:164–184). 2. Generally, Honouliuli was described as very hot and dry. Evidence for drought-like conditions are further supported by the relative lack of traditional rain names associated with Honouliuli Ahupua‘a. The Nāulu rain is the only known associated rain name for Honouliuli. Due to the lack of rainwater, freshwater resources were accessed via a karstic system. 3. In traditional Hawaiian times, the areas of exposed coral (Pleistocene limestone) outcrop were undoubtedly more extensive.

	According to McAllister (1933), holes and pits in the coral were generally accessed for water, while larger pits, often containing soil, were used for cultivation. McAllister additionally remarked that at the time of his 1930s survey *mai‘a* (banana; *Musaceae*) and *kō* (sugarcane; *Saccharum officinarum*) were being cultivated within the pit caves (sinkholes) (McAllister 1933:109). 4. The traditional *ka‘ao* (legends) associated with the area speak of the *akua* (godly) brothers, Kāne and Kanaloa. It was their supernatural feat of hurling *pōhaku* (stone) across the island that determined the boundaries of land divisions (Sterling and Summers 1987:1). Additional *mo‘olelo* (stories) speak of Hi‘iaka and her travels across the plains of ‘Ewa. In particular, the *wahi pana* (storied place) of Kaupe‘a (located south of the current project area) is described. Kamakau describes Kaupe‘a as a wide plain where a grove of *wiliwili* (*Erythrina sandwicensis*) stands (Kamakau 1991a:47). This plain is an *ao kuewa*, a realm belonging to homeless souls. In general, the *kama‘āina* (native born) of both Honouliuli Ahupua‘a and ‘Ewa District made a point to avoid this place. 5. Pu‘uokapolei is a prominent hill located on the ‘Ewa coastal plain that was the primary landmark for travelers on the trail running from Pearl Harbor to Wai‘anae. A *heiau* (pre-Christian place of worship) was once on the summit of the hill, however, by the time of McAllister’s survey of O‘ahu it had been destroyed (McAllister 1933:108). The hill was also used as a point of solar reference or as a place for celestial observations of the winter and summer solstice. A ceremony at a *heiau* on Pu‘uokapolei provides a vantage point to capture the sun setting directly behind Pu‘ula‘ila‘i, a peak farther west in the Wai‘anae Range. A coinciding ceremony at Kūpalaha Heiau in Waikīkī captures the same essence as the sun sets behind Pu‘uokapolei. 6. Additional *heiau* located within Honouliuli included Pu‘u Ku‘ua located at Palikea, in addition to two unidentified *heiau*. These two unidentified *heiau* are located at the foot of Pu‘u Kanehoa and Pu‘u Kuina, respectively. 7. In later historic times, a network of trails encircled and crossed the Wai‘anae Range, allowing passage from West Loch to the Honouliuli lowlands, past Pu‘uokapolei and Waimānalo Gulch to the Wai‘anae coast and onward circumscribing the shoreline of O‘ahu (‘Ī‘ī 1959:96–98). The main trail along the south shore of O‘ahu would have been approximately 1.5 km to the southeast. A main trail extending up the central valley of O‘ahu would have been approximately 3 km to the east. The 1825 Malden map shows

	a trail extending from the main trail along the south shore of O‘ahu into the uplands in the Pālehua area as passing just a couple hundred meters to the southwest of the project area. 8. The rich resources of Pu‘uloa—the fisheries in the lochs, the shoreline fishponds, the numerous springs, and the irrigated lands along the streams—made ‘Ewa a prize for competing chiefs. ‘Ewa Moku was also a political center and home to many chiefs in its day. Oral accounts of *ali‘i* (royalty) recorded by Hawaiian historian Samuel Kamakau date back to at least the twelfth century. *Ali‘i* associated with Honouliuli and greater ‘Ewa Moku included Kākuhihewa, Keaunui, Lakona, Mā‘ilikūkahi, and Kahahana. 9. In early historic times, the population of Honouliuli was concentrated at the western edge of West Loch in the vicinity of Kapapapuhi Point in the “Honouliuli Taro Lands.” This area was clearly a major focus of population due to the abundance of fish and shellfish resources in close proximity to a wide expanse of well-irrigated bottomland suitable for wetland taro cultivation. 10. Early foreign accounts describe the southwest coast of O‘ahu, including Honouliuli Ahupua‘a, as an area “a little distance from the sea, the soil is rich and all the necessaries of life are abundantly produced” (Vancouver 1798:215). A sailor among Vancouver’s crew observed, however, that “from the number of houses within the harbour it should seem to be very populous; but the very few inhabitants who made their appearance were an indication of the contrary” (Vancouver 1798:216). 11. Following the Māhele of 1848, 99 individual land claims in the *ahupua‘a* of Honouliuli were registered and awarded by King Kamehameha III. No *kuleana* land claims were made for land within the current project area or vicinity. The vast majority of the Land Commission Awards (LCA) were located in Honouliuli near the taro lands of the *‘ili* (land division, smaller than an *ahupua‘a*) of Pu‘uloa and the Pu‘uloa Salt Works. The largest award (Royal Patent 6071, LCA 11216, *‘Āpana* [parcel] 8) in Honouliuli Ahupua‘a was granted to Miriam Ke‘ahi-Kuni Kekau‘onohi on January 1848 (Native Register 1848) who acquired a deed to all unclaimed land within the *ahupua‘a*, including the present project area. 12. Beginning with the time of Western Contact, however, Hawaiian populations were introduced to many virulent western diseases which began to decimate the native populations. Thus, four years following the 1832 census, the ‘Ewa population had dropped to 3,423 (Schmitt 1973:9, 36), “a decrease of 592 in 4 years” (Ewa

	Station Reports 1836). Between 1848 and 1853, there was a series of epidemics of measles, influenza, and whooping cough that often wiped out whole villages. 13. With the increasing foreign interests on O‘ahu Island during the last half of the nineteenth century, an array of agricultural enterprises were attempted. In 1871, John Coney rented the lands of Honouliuli to James Dowsett and John Meek, who used the land for cattle grazing. In 1877, James Campbell purchased most of Honouliuli Ahupua‘a for a total of $95,000. 14. By 1889, the Ewa Plantation Company was established and lands throughout Honouliuli were designated for sugarcane cultivation. Sugar production exploded with the successful drilling of an artesian well by James Campbell on the ‘Ewa Plain. Campbell’s first well was named Waianiani (“crystal waters”) by the *kama‘āina* of Honouliuli (Nellist 1925). By 1930, Ewa Plantation had drilled 70 artesian wells to irrigate cane lands; artesian wells provided fresh water to Honouliuli for nearly 60 years (Ho‘okuleana 2014). 15. In 1897, B.F. Dillingham established the Oahu Sugar Company (OSC) on 12,000 acres leased from the estates of John Papa ‘Ī‘ī, Bishop, and Robinson. The Oahu Sugar Company had over 900 field workers, composed of 44 Hawaiians, 473 Japanese, 399 Chinese, and 57 Portuguese. The first sugar crop was harvested in 1899, ushering in the sugar plantation era in Waipahu (Ohira 1997). Prior to commercial sugar cultivation, these lands were described as being “of near desert proportion until water was supplied from drilled artesian wells and the Waiahole Water project” (Condé and Best 1973:313). 16. The Waiahole Water Company was formally incorporated in 1913 and was originally a subsidiary of the Oahu Sugar Company. The Waiahole Ditch was designed by engineer Jorgen Jorgensen, with recommendations by engineer J.B. Lippencott and assisted by W.A. Wall. Upon its completion in 1916, the Waiahole Ditch was 35 km (21.9 miles) long and cost $2.3 million. The 32 million gallons of daily water enabled the O‘ahu Sugar Company to grow to “some 20 square miles […] ranging in elevation from 10 ft at the Waipio Peninsula […] to 700 ft at the Waiahole Ditch” (Condé and Best 1973:313). The ditch system is included on the state inventory of archaeological sites as Site no. 50-80-09-2268. The Waiahole Ditch System crossed through the western portion of the present project area. 17. The early twentieth century saw the lands of Honouliuli heavily utilized by both civilians and the U.S. military for transportation.

	The U.S. Government began acquiring the coastal lands of ‘Ewa for development of a naval base at Pearl Harbor. In 1901, the U.S. Congress formally ratified annexation of the Territory of Hawaii, and the first 1,356.01 acres of Pearl Harbor land were transferred to U.S. ownership. 18. In 1937, 18 miles of roads were built in the coastal Honouliuli area, and in 1939-1940 the U.S. bought 3,500 acres of land in this area (Landrum et al. 1997:62–67), to build several other military camps and installations, including Barbers Point Naval Air Station. 19. Following the Japanese Navy’s attack on Pearl Harbor on 7 December 1941, the Territory of Hawaii was declared under martial law and the writ of *habeas corpus* (the requirement for a person under arrest to be brought before a judge or into court) was suspended (U.S. Department of the Interior 2014:6–7). Persons of Japanese and European ancestry in Hawai‘i suspected of disloyalty to the United States were rounded up and imprisoned by the U.S. military and the Federal Bureau of Investigations (FBI) (U.S. Department of the Interior 2014:xii). In 1943, the Honouliuli Internment Camp was constructed to intern citizens, resident aliens, and prisoners of war. Located in Honouliuli Gulch, east of the project area, the camp was the “last, largest, and longest-used World War II confinement site in Hawai‘i,” holding approximately 320 internees and nearly 4,000 prisoners of war (U.S. Department of the Interior 2014:xiv).
Results of Community Consultation	CSH attempted to contact 70 Hawaiian organizations, agencies, and community members. Of the 12 people that responded, one provided written testimony and three *kama‘āina* (Native-born) and/or *kūpuna* (elders) participated in formal interviews for more in-depth contributions to the CIA. Consultation was received from community members as follows: 1. Christian Kaimanu Yee, *kama‘āina* and knowledgeable of *mo‘olelo* and *wahi pana* 2. Shad Kāne, member of Kapolei Hawaiian Civic Club, Chair of the O‘ahu Council of Hawaiian Civic Clubs Committee on the Preservation of Historic Sites and Cultural Properties, Ali‘i Ai Moku of the Kapuāiwa Chapter of the Royal Order of Kamehameha Ekahi, and ‘Ewa Moku Representative on the State Aha Moku Advisory Committee. 3. Tom Berg, former Councilman, District 1 4. Lynette Paglinawan, cultural practitioner, educator, teaches a course on Native Hawaiian Healing at University of Hawai‘i West O‘ahu On 24 January 2020, an *In-Progress Draft Cultural Impact Assessment for the West O‘ahu Solar Project* was provided via email to two parties representing the Aha Moku Council, two parties at Nā Ala Hele, two

	parties at the State Historic Preservation Division (SHPD) History and Culture Branch, and Office of Hawaiian Affairs (OHA). The parties were invited to review and comment, or provide notification of their intent to comment, prior to the reports inclusion in the Draft Environmental Assessment. CSH followed up with the seven parties via email on 25 February 2020, and has not received any comments or notification of an intent to comment to date.
Impacts and Recommendations	Based on information gathered from the community consultation, participants voiced their concerns in a cultural context. 1. Mr. Shad Kāne stated he is not in opposition to the proposed project. He noted the project area has been previously disturbed by sugarcane production. 2. Mr. Tom Berg stated that the project has been "proposed on a pueo (owl) foraging and breeding ecosystem." He noted that records indicate that per earliest colonial contact, the *pueo* is most abundant on the slopes from Pu‘u Kapua‘i to West Loch, in the area where the project is slated. He added that "Hunehune Gulch, Kaloi Gulch, and Honouliuli Gulch are migratory routes used by the pueo to go from mountain to sea to court, mate, forage, and raise their brood." He stated that the proposed project will "encroach on prime pueo habitat-considered to be graded A+—"a ten (10)"—when it comes to the degree of pueo habitat in use on this project site." 3. Mr. Berg added that the *pueo* has "a direct connection to Native Hawaiian family lineage in Ewa Beach," noting the *pueo* is the *‘aumakua* for the Michael Lee family and their accounts which go back over seven generations are documented at the State Archives Building in Honolulu. 4. Mr. Berg also stated that the project site is "inhabited by the ōpe‘ape‘a [Hawaiian hoary bat, *Lasiurus cinereus semotus*] at various times of the seasons," noting that in 1910, the State of Hawai‘i documented *‘ōpe‘ape‘a* within a half-mile of the project area. 5. Mr. Berg stated his concern that the "property in question will not receive the proper protocol to conclude no endangered species inhabit the area." Mr. Berg recommended that "a thorough and complete protocol is adopted to repeat the inventory exercise for pueo and ‘ōpe‘ape‘a over the course of a calendar year would be in order so the project does not inadvertently contribute to more endangered species habitat loss." He also recommended inquiring with Dr. Melissa Price and Dr. Javier Cotin of the Project Pueo Biologist Team and Department of Fish and Wildlife (DOFAW) Biologist Afsheen Siddiqi regarding *pueo* protocol. 6. Mr. Berg also expressed his concern for the possible negative aspects of light at an adjacent parcel. He expressed concern that a

	solar panel may reflect neighboring lighting operations into “the flight patterns of migrating birds and the *‘ōpe‘ape‘a* and *pueo* in particular need to be addressed.” 7. Ms. Lynette Paglinawan stated that “the area from Waimānalo Gulch over to Kapolei to the location of University of Hawai‘i West O‘ahu (UHWO) was known by very early residents there to be the place where “*ao kuewa*,” wandering spirits, congregated from *makai* [toward the sea] to *mauka* [toward the mountains] up Pālehua and especially near the cluster of *wiliwili* [*Erythrina sandwicensis*] trees in Kaupe‘a.” She expressed her concerns regarding the effects that the proposed project will have on the *ao kuewa*, which she believes are attracted to energy. She also expressed her concerns of the effect of the spirits on the solar panels, noting “that’s high energy. It will be like going to the game room.” She also noted that UHWO experiences numerous electrical problems due to the presence of these spirits. 8. Ms. Paglinawan noted that “this area where the University [of Hawai‘i West O‘ahu] is located has a lot of trails that go from *mauka-makai*, come from Honolulu going towards Nānākuli.” She stated that project proponents should be mindful of the locations of ancient trails, noting that the ancient trails are still used by spirits to travel from *mauka* to *makai* within Honuliuli Ahupua‘a. 9. Ms. Paglinawan recommended planting “a wall of trees” surrounding the proposed project area as restitution to the spirits who may be displaced by the proposed project. She also noted that planting of “a wall of trees” around the proposed project area would have other benefits including the production of oxygen and providing a habitat for Native Hawaiian birds. 10. Ms. Paglinawan also expressed her concerns regarding the psychological impacts for the people that encounter the spirits, noting trauma on workers at the UHWO, as well as, families who live in the area. She was particularly concerned for the children who encounter these spirits, noting her belief that children “see many more things than adults do.” 11. 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 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. 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. 12. 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.
Analysis	The following analysis is a summary of Section 8.4. Based on information gathered from the cultural and historical background and community consultation, no culturally significant resources were identified within the project area. 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 project area. While no cultural resources, practices, or beliefs were identified as currently existing within the project area, Honouliuli Ahupua‘a maintains a rich cultural history in the exercising of traditional or customary Native Hawaiian rights within the project *ahupua‘a*. Honouliuli Ahupua‘a is the largest *ahupua‘a* in the *moku* of ‘Ewa. The environment of Honouliuli is very hot and dry. These environmental limitations forced ingenuity and innovation. *Kama‘āina* of Honouliuli used agricultural sinkholes that accumulated water within them via a subterranean water or karst system; this water also contained nutrient-rich sediment allowing plants such as *kalo, kī*, and *noni* to survive. The post-Contact period brought numerous changes to the *ahupua‘a* of Honouliuli. Traditional agricultural was rapidly replaced by large-scale commercial ventures. The discovery of artesian water beneath the ‘Ewa plains by James Campbell in 1879 led to the establishment of sugarcane plantations in Honouliuli including the Oahu Sugar Company. Much of the *mauka* (upland) lands in western Honouliuli, including ridges and deep gulches, were unsuitable for commercial sugar cultivation and remained pasture land for grazing livestock. The Donn 1906 map suggests the present project area was at the edge of sugarcane cultivation at that time (see Figure 15). By 1920, however, much of the lands of Honouliuli were used for commercial sugarcane cultivation (Frierson 1972:18). The project area is situated between Pu‘u Kapua‘i which is located 0.5 km to the northwest and Pu‘u Makakilo located 1.2 km to the southwest. These are understood as “very late cones [of the Wai‘anae volcano] […] composed of a varied mixture of cinder, spatter and lava flows” (Macdonald et al. 1983:429). Pukui et al. (1974:199) translate “Pu‘u Kapua‘i” as “footprint hill,” however, the association with that name is

	unknown. “Pu‘u Makakilo” is translated as “observing eyes” (Pukui et al. 1974:201). The association of this name is also unknown. The project area is also located between two deeply dissected gulches, Kalo‘i Gulch which is located 300 m to the southwest and Honouliuli Gulch located 700 m to the northeast of the project area. These gulches are at a comparable elevation and are believed to rarely run with water. The name “Ka-lo‘i” translates to “the taro patch” (Pukui et al. 1974:77). Sterling and Summers (1978:35) associate Kalo‘i Gulch with a number of vignettes regarding the “Waihuna” or “Punahuna” hidden spring. It was also noted that the hidden spring “had been one of the principal sources of water for all that country, which was quite heavily populated before the smallpox epidemic of 1840” (Ida E.K. von Holt in Sterling and Summers 1978:35). In traditional times, trails were well used for travel within the *ahupua‘a* between *mauka* and *makai* (shore) and laterally between *ahupua‘a*. A historical trail system existed on O‘ahu extending from Honolulu to Wai‘anae. A cross-*ahupua‘a* (east-west) trail passed through Honouliuli north of Pu‘uokapolei, and continued along the coast to Wai‘anae following the route of the modern Farrington Highway. Early historic maps depict a trail that branches off the cross-*ahupua‘a* trail into the uplands in the Pālehua area. The 1825 Malden map (see Figure 7) shows a trail extending into the Pālehua area a couple hundred meters to the southwest of the project area. A 1919 map (see Figure 16) shows an unimproved road alignment just south of the project area, understood as the Pālehua Road, approximating a traditional Hawaiian footpath into the uplands. However, a 1922 map (see Figure 17 and Figure 18 showing annotations), shows the Pālehua trail as arcing through the western portion of the project area before arcing north of Pu‘u Makakilo. This trail may have always been somewhat braided. The trail appears to only be depicted on the 1922 map (see Figure 17 and Figure 18) and appears to have been largely under Sugar Cane Field 30 in the 1925 map (Figure 19). This trail was not identified on the ground in either of the AIS studies of this area (Dega et al. 1998 and Welser et al. 2019). Interviewee Lynette Paglinawan stated that “this area where the University [of Hawai‘i West O‘ahu] is located has a lot of trails that go from *mauka-makai*, come from Honolulu going towards Nānākuli.” She noted that “spirits travel on ancient trails” which they use to “go from *mauka* going down to *makai*.” She added that these “ancient trails are still in use,” noting that people who live in homes that have been built on or near these ancient pathways have experienced “strange happenings” which she believes are due to the *‘uhane* (spirits) which still use these ancient trails to travel from *mauka* to *makai*. Ms. Paglinawan stated that as a result of the development of the *moku* of ‘Ewa including the *ahupua‘a* of Honouliuli, “we destroyed the habitat of

	the *ao kuewa* which is the *wiliwili* trees." She recommended planting "a wall of trees" surrounding the proposed project area which would provide a home for the displaced spirits. She also discussed the types of plants that were previously found in the area which include *noni* plants, coconut trees, *lauhala* trees, and *‘ulu* trees. She noted that these plants were "very plentiful but sparse not like a big grove where it's like a park of trees, it was interspersed throughout." The "Ewa Karst" which consists of limestone caves formed in the uplifted coral was undoubtedly more extensive during traditional Hawaiian times. Where not covered by alluvium or stockpiled material, this Pleistocene limestone outcrop has characteristic dissolution "pit caves" (Mylroie and Carew 1995) which were sometimes also used as burial caves. Burials have been encountered in the coastal areas of the Honouliuli Ahupua‘a, however, previous archaeological studies (Dega et al. 1998) within the project area have not documented any burials within the project area nor within the vicinity of the project area. An archaeological inventory survey conducted for the University of Hawai‘i West O‘ahu Campus that encompassed the entirety of the project area (Dega et al. 1998) identified no surface Hawaiian features. Dega et al. (1998:i) noted several plantation-era "flumes, aqueducts, ditches, pumps, and other irrigation features occurring within the heavily modified landscape of the project area." The features represented an irrigation complex (State Inventory of Historic Places [SIHP] # 50-80-08-5593) which was used for sugarcane cultivation from the 1920s through more recent times. A portion of the Waiahole Ditch System (SIHP # 50-80-09-2268) was also documented crossing through the northwest section of the project area and continuing southwest through the lower agricultural fields. In written testimony provided to CSH via email on 19 August 2019, Mr. Tom Berg, former City Councilman, stated the project has been "proposed on a pueo (owl) foraging and breeding ecosystem." The *pueo*, which are found on all of the main Hawaiian islands, are listed by the State of Hawai‘i as endangered on the island of O‘ahu (DLNR 2005). The Department of Land and Natural Resources (DLNR) states that *pueo* are most commonly found in "open habitats such as grasslands, shrublands, and montane parklands, including urban areas and those actively managed for conservation" (DLNR 2005). Mr. Berg also noted that records indicate that per earliest colonial contact, the *pueo* is most abundant on the slopes from Pu‘u Kapua‘i to West Loch, adding that "Hunehune Gulch, Kaloi Gulch, and Honouliuli Gulch are migratory routes used by the pueo to go from mountain to sea to court, mate, forage, and raise their brood." He also noted *pueo* are not forest dwellers, preferring "scrub, open fields/dirt landscapes with some grass." He stated that the proposed project will "encroach on prime pueo habitat-

	considered to be graded A+—“a ten (10)”—when it comes to the degree of pueo habitat in use on this project site.” Mr. Berg also stated that the project site is “inhabited by the ōpe‘ape‘a at various times of the seasons.” He noted that in 1910, the State of Hawai‘i documented ‘*ōpe‘ape‘a* within a half-mile of the project area. *‘Ōpe‘ape‘a* is “the only land mammal native to the Hawaiian archipelago” and is found on all of the main Hawaiian islands except for Ni‘ihau (DLNR 2005:3-13). Mr. Berg stated his concern that the “property in question will not receive the proper protocol to conclude no endangered species inhabit the area.” He recommended that “a thorough and complete protocol is adopted to repeat the inventory exercise for pueo and ‘ōpe‘ape‘a over the course of a calendar year would be in order so the project does not inadvertently contribute to more endangered species habitat loss.” He also recommended inquiring with Dr. Melissa Price and Dr. Javier Cotin of the Project Pueo Biologist Team and Department of Fish and Wildlife (DOFAW) Biologist Afsheen Siddiqi regarding *pueo* protocol. Mr. Berg also expressed his concern for the possible negative aspects of lighting operations at an adjacent parcel which may reflect off of a solar panel into “the flight patterns of migrating birds and the *‘ōpe‘ape‘a* and *pueo* in particular need to be addressed.”
Ka Pa‘akai Analysis	In Ka Pa‘akai v. Land Use Commission, 94 Hawai‘i 31, 74, 7 P.3d 1068, 1084 (2000), the Court held the following analysis 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, and the community consultation, culturally significant resources have been identified within the *ahupua‘a*. Although not within the project area, documentation and testimony indicates traditional or customary Native Hawaiian rights are possessed and are currently being exercised within the *ahupua‘a* 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). While no cultural resources, practices, or beliefs were identified as currently existing within the project area, Honouliuli Ahupua‘a maintains a rich cultural history in

	the exercising of traditional or customary Native Hawaiian rights within the project *ahupua‘a*. The proposed action will not affect or impair traditional and customary Native Hawaiian rights exercised in the *ahupua‘a* in which the project area is located. Therefore no action needs to be taken by the LUC to reasonably protect native Hawaiian rights as a result of this project. Therefore, the information provided in the CIA demonstrates the proposed project will not have any adverse effect on traditional and customary Native Hawaiian rights within the *ahupua‘a*.

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Section 1 Introduction

1.1 Project Background

At the request of Tetra Tech, Inc., and on behalf of AES Distributed Energy, Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this cultural impact assessment (CIA) for the West Oahu Solar Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, TMK: [1] 9-2-002:007 (por.). The project area is on undeveloped lands in the southeastern foothills of the Wai‘anae Range, northeast of Pu‘u Makakilo and the Makakilo subdivision and 600 m northwest of the intersection of the H-1 Freeway and the Kualakai Parkway. The project area is depicted on a portion of the 2013 Ewa and Schofield Barracks U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and a 2018 aerial photograph (Figure 3).

The West Oahu Solar Project consists of an approximately 12.5-megawatt (MW) ground-mounted solar photovoltaic system, coupled with a 50 MW-hour battery energy storage system (BESS) and related interconnection and ancillary facilities. The solar photovoltaic system would include a series of panels arranged into arrays consisting of evenly spaced rows. The panels would be mounted on a racking system installed on posts. The battery storage system would consist of containerized lithium-ion battery units and inverters distributed throughout the project area.

The project would connect to a substation via underground electrical conduit. The substation would be constructed adjacent to and would interconnect with an existing Hawaiian Electric Company (HECO) 46kV transmission line that traverses the site. The project would be accessed via the existing gated entry off Kualakai Parkway (near the intersection with Interstate H-1) and would utilize a network of existing and new onsite access roads. Some road improvements may be needed to facilitate access within the project area. In addition, some site grading would be needed to accommodate the project facilities and to comply with stormwater and civil engineering requirements.

In December 2019, the project area was slighty modified to include additional areas along the perimeter of the project area, as well as maintenance of the existing roadways approaching the project area from the southeast.

1.2 Document Purpose

This CIA was prepared to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project’s potential effect on cultural beliefs, practices, and resources. Through document research, this report provides information compiled to date pertinent to the assessment of the proposed project’s potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control’s *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be 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

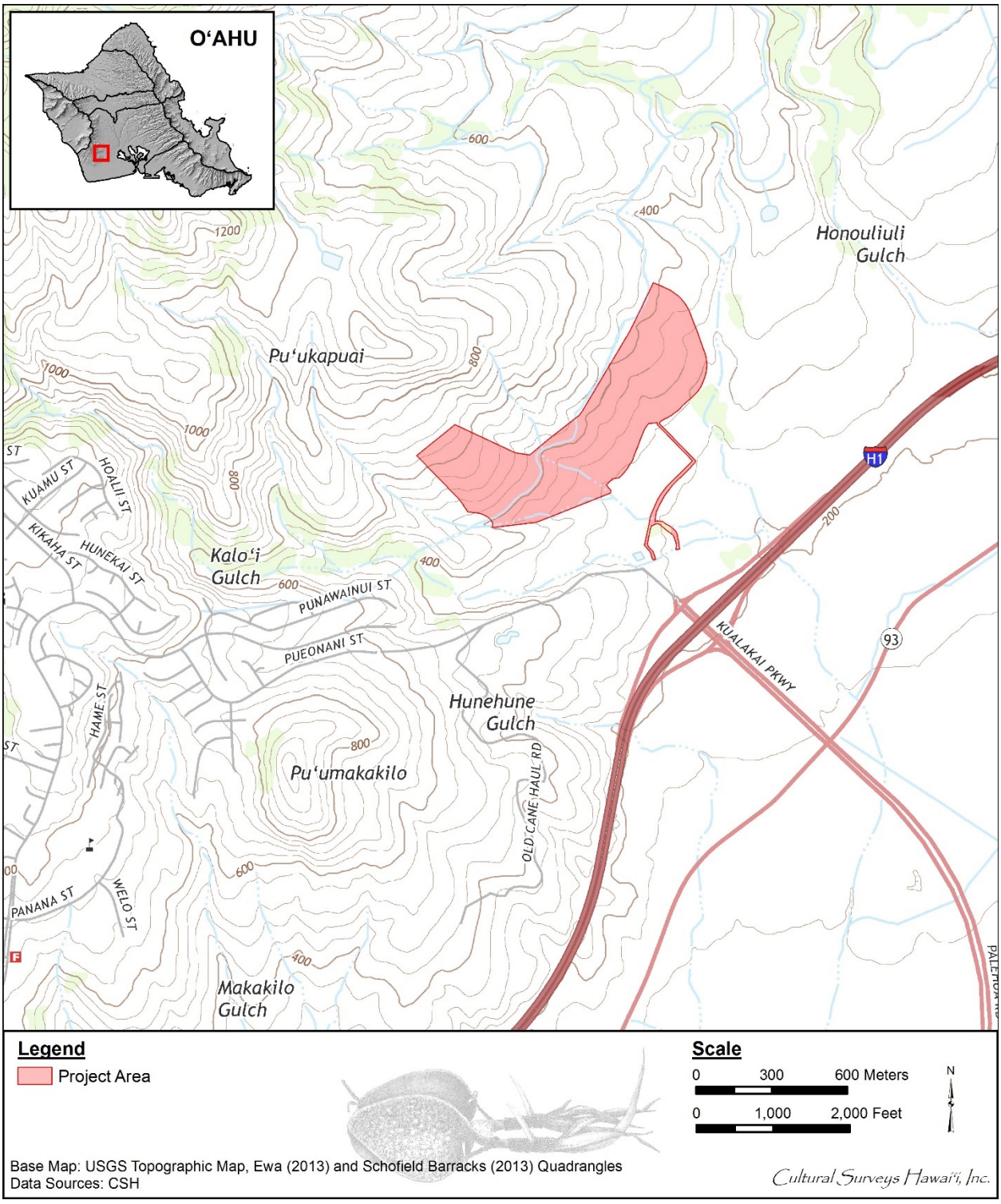

Figure 1. Portion of the 2013 Ewa and Schofield Barracks USGS 7.5-minute topographic quadrangles showing the location of the project area

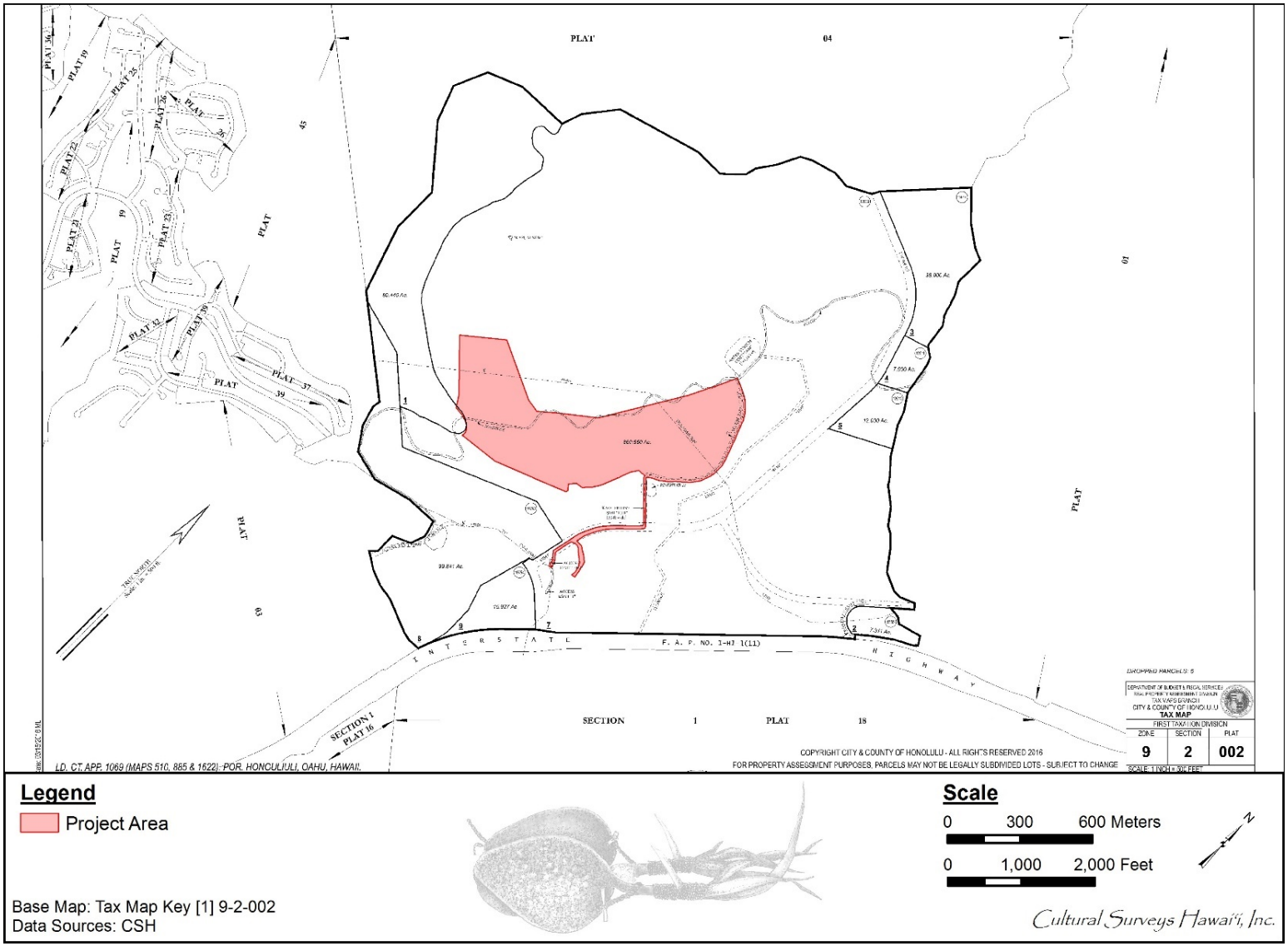

Figure 2. Tax Map Key (TMK) [1] 9-2-002 showing the location of the project area (Hawai‘i TMK Service 2014)

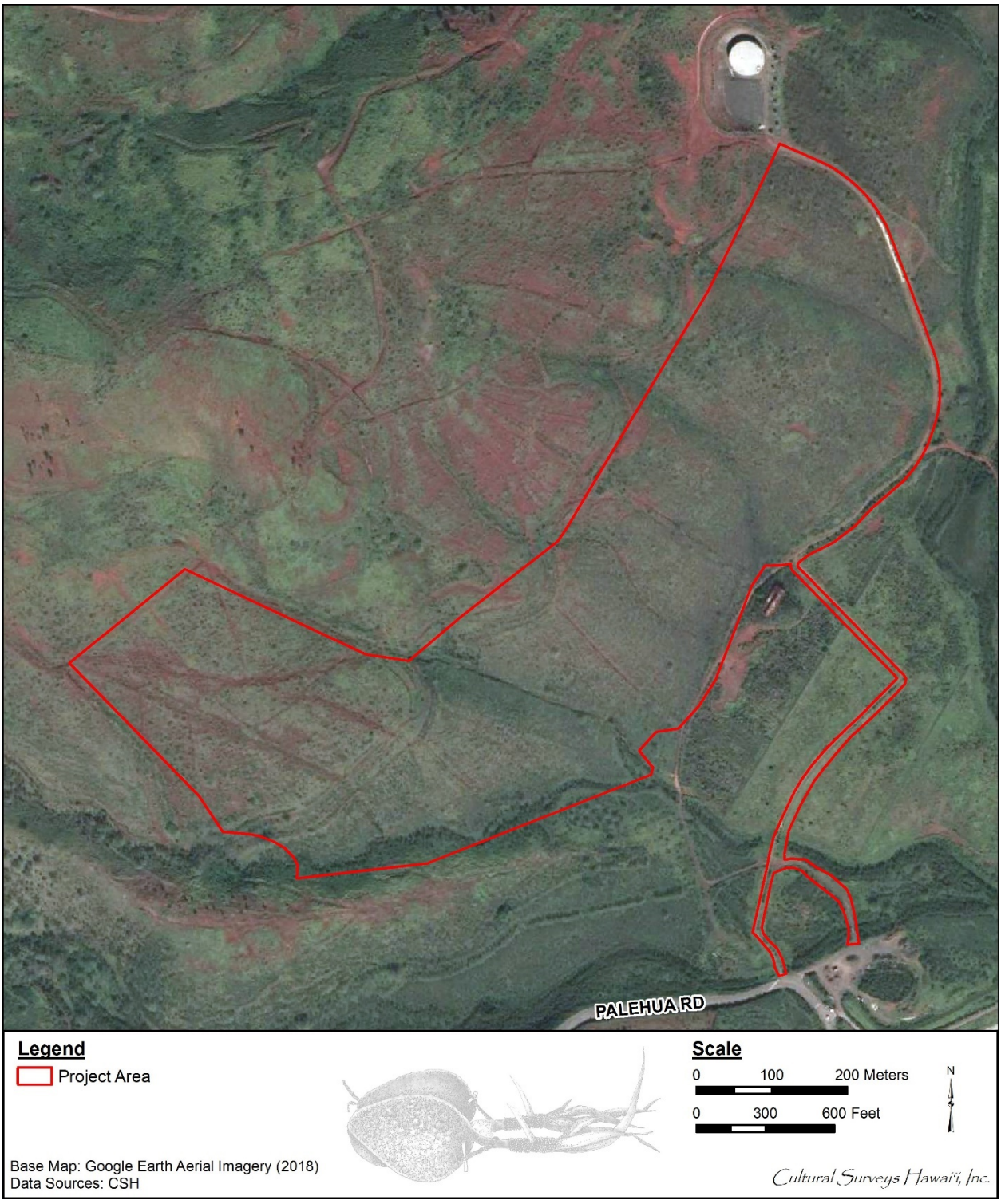

Figure 3. Aerial photograph of the project area (Google Earth 2018)

history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is also intended to support the project's environmental review and the discretionary land use permitting process including a State Special Use Permit (SUP) from the Land Use Commission (LUC).

1.3 Scope of Work

The scope of work for this cultural impact assessment includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 *Ka Lepo* (Soils)

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), the project area's soils consist of Kawaihapai clay loam, 2 to 6% slopes (KIB), Mahana silty clay loam, 6 to 12% slopes, eroded (McC2), Mahana silty clay loam, 12 to 20% slopes, eroded (McD2), Mahana silty clay loam, 20 to 35% slopes, eroded (McE2), Molokai silty clay loam, 7 to 15% slopes (MUC) and Molokai silty clay loam, 15 to 25% slopes (MUD) soils (Figure 4).

Kawaihapai series soils are described as follows:

> This series consists of well-drained soils in drainageways and on alluvial fans on the coastal plains on the islands of Oahu and Molokai. These soils formed in alluvium derived from basic igneous rock in humid uplands. They are nearly level to moderately sloping. Elevations range from nearly sea level to 300 feet. The annual rainfall amounts to 30 to 50 inches. […] These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of kiawe, koa haole, lantana, and bermudagrass. [Foote et al. 1972:63–64]

Further, Kawaihapai clay loam, 2 to 6% slopes soils (KIB), are described as having slow runoff and a slight erosion hazard (Foote et al. 1972).

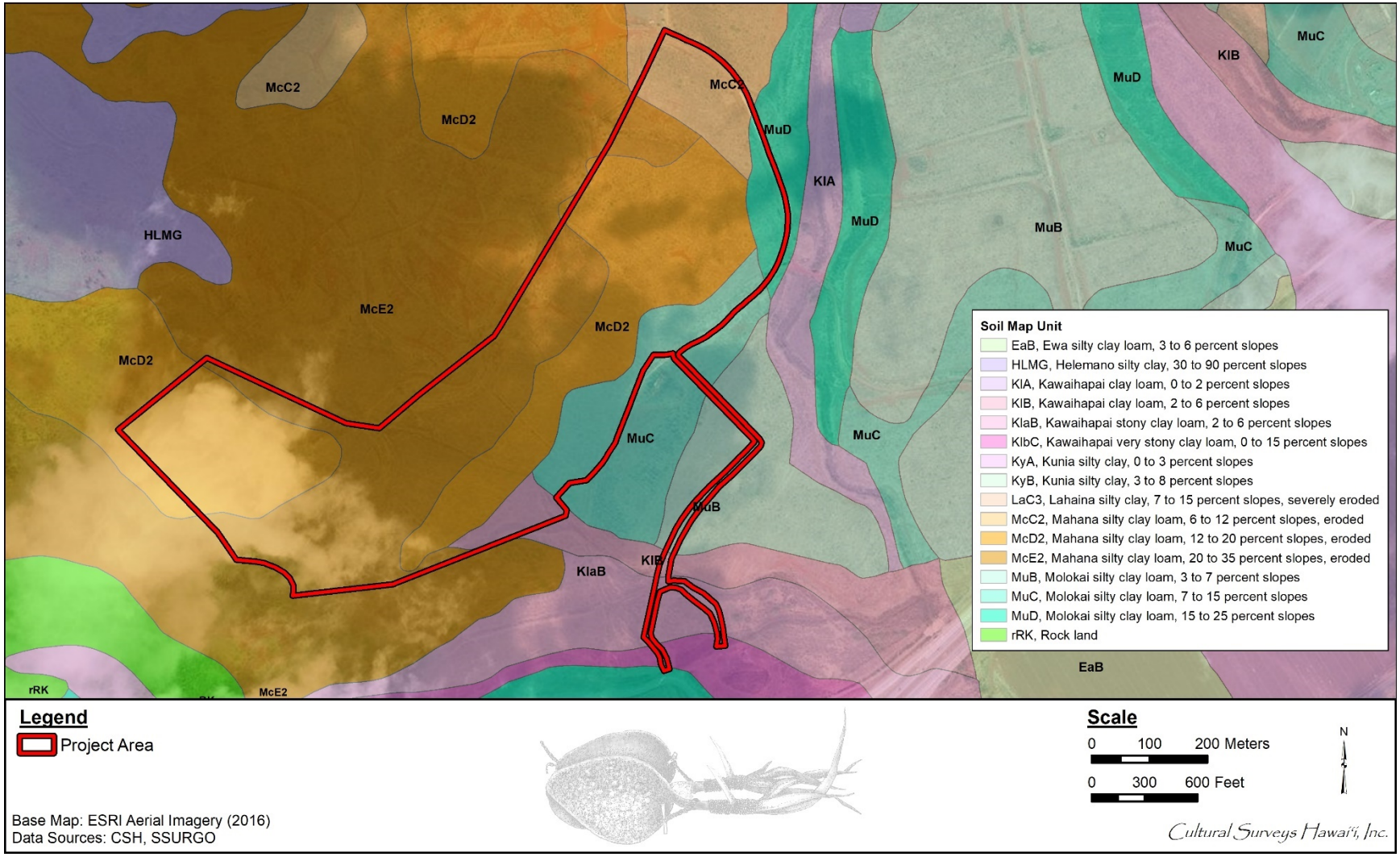

Figure 4. ESRI Aerial Imagery (2016) with overlay of Soil Survey of the State of Hawaii (Foote et al. 1972; USDA SSURGO 2001), indicating soil types within and surrounding the project area

Mahana series soils are described as follows:

> This series consists of well-drained soils on uplands on the islands of Kauai and Oahu. These soils developed in volcanic ash. They are gently sloping to very steep. Elevations range from 1,000 to 3,000 feet. The annual rainfall amounts to 30 to 45 inches. […] These soils are used for pasture, woodland, wildlife habitat, irrigated sugarcane, and water supply. The natural vegetation consists of puakeawe, aalii, ricegrass, molassesgrass, silver oak, yellow foxtail, lantana, joee, Japanese tea, passion flower, and associated plants. [Foote et al. 1972:85]

Mahana silty clay loam, 6 to 12% slopes, eroded (McC2) soils are described as follows:

> This soil occurs on ridgetops and moderately sloping uplands […] Permeability is moderately rapid. Runoff is slow, and the erosion hazard is slight. […] In places roots penetrate to a depth of 5 feet or more. […] This soil is used for pasture, woodland, wildlife habitat, pineapple, and sugarcane. [Foote et al. 1972:85–86]

Mahana silty clay loam, 12 to 20% slopes, eroded (McD2) soils, are described as having medium runoff and a moderate erosion hazard, used for pasture, woodland, wildlife habitat, and sugarcane (Foote et al. 1972).

Mahana silty clay loam, 20 to 35% slopes, eroded (McE2) soils are further described as follows:

> Most of the surface layer has been removed by erosion. Runoff is very rapid, and the erosion hazard is very severe. Included in mapping were areas where all of the surface layer and part of the subsoil have been removed by erosion. Also included were small, stony areas and reddish-colored upland soils that are underlain by a panlike layer at a depth of 15 to 50 inches. This soil is used for pasture, pineapple, and irrigated sugarcane. [Foote et al. 1972:86]

Molokai series soils are described as follows:

> This series consists of well-drained soils on uplands on the islands of Maui, Lanai, Molokai, and Oahu. These soils formed in material weathered from basic igneous rock. They are nearly level to moderately steep. Elevations range mainly from nearly sea level to 1,000 feet but are as much as 1,500 feet on Lanai. The annual rainfall amounts to 20 to 25 inches, most of which occurs between November and April. […] These soils are used for sugarcane, pineapple, pasture, wildlife habitat, and homesites. The natural vegetation consists of kiawe, ilima, uhaloa, feather fingergrass, and buffelgrass. [Foote et al. 1972:96]

Molokai silty clay loam, 7 to 15% slopes (MUC) soils, are described as occurring on knoll slope breaks, with medium runoff and a moderate erosion hazard (Foote et al. 1972). This material is used for sugarcane, pineapple, pasture, wildlife habitat, and home sites (Foote et al. 1972).

Molokai silty clay loam, 15 to 25% slopes (MUD) soils are further described as follows:

> This soil occurs on Oahu. In most places the slope does not exceed 20 percent. Runoff is medium, and the erosion hazard is severe. Workability is slightly difficult because of the slope. Included in mapping were small areas where boulder cores are exposed. This soil is used for sugarcane and pineapple. [Foote et al. 1972:97]

1.4.2 *Ka Makani* (Winds)

Makani is the general Hawaiian term for wind. Each land division was given a name for a specific wind. Names of wind were assigned based on but not limited to its direction of flow, strength, and geographic location. The four commonly known winds associated with the *moku* of ‘Ewa are Māunuunu of Pu‘uloa, Moa‘e kū of Ewaloa, Waikōloa of Līhu‘e, and Kona of Pu‘ukapolei (Alameida 1997). Māunuunu is a strong blistering sea breeze at Pu‘uloa (Andrews 1865; Pukui and Elbert 1986). Moa‘e kū is a northeasterly wind which means to resist, or a foreign wind (Andrews 1865; Pukui and Elbert 1986). Waikōloa is a cold northwest wind (Pukui and Elbert 1986). Kona is a name of the southwest wind (Andrews 1865). Another mentionable wind found in most chants associated with the *moku* of ‘Ewa is Wai‘ōpua. Its literal translation means the water of cloud banks (Pukui and Elbert 1986). Below are clips of chants that emphasize the importance of these winds.

In the traditional story *The Wind Gourd of La‘amaomao*, Pāka‘a and his son Kūapāka‘a are descendants of the wind goddess La‘amaomao whose traditional home was in a gourd that also contained all of the sacred winds of Hawai‘i. La‘amaomao controlled and called forth the winds by chanting their names (Nakuina 1992). Pāka‘a’s chant traces the winds from the *moku* of ‘Ewa. The winds of the region Moa‘e kū and Kona are poetically recalled:

He Moae-ku ko Ewaloa	*Moa‘e-ku is of Ewaloa*
He Kehau ko Waiopua	*Kēhau is of Waiopua*
He Waikoloa ko Lihue	*Waikōloa is of Līhu‘e*
He Kona ko Puuokapolei	*Kona is of Pu‘uokapolei.*

[Ke Au Okoa, Volume III, Number 30, 14 November 1867; Nakuina 1992:51]

In *The Epic Tale of Hi‘iakaikapoliopele*, the goddess Hi‘iaka, the youngest sister of the fire goddess Pele, born an egg and carefully warmed and nourished by Pele herself (Westervelt 1916:69), embarks on a quest to retrieve her older sister’s lover, Lohi‘au. While traversing the island chain, Hi‘iaka encounters various gods and demi-gods, spirits and shapeshifters, as well as chiefs and commoners. According to the *mo‘olelo* (story), Hi‘iaka watches as her beloved friend Hōpoe is killed by the embers of her sister Pele. She chants atop of Pōhākea and tells of the cold harsh wind of Waikōloa, Maunauna and Wai‘ōpua.

KAU HO‘OKAHI HANERI A	CHANT ONE HUNDRED
ME KANALIMAKUMAMĀKOLU	AND FIFTY-THREE
Aloha ku‘u hoa i ka pū‘ali lā	Alas my friend of the rugged mountain pass
A luna i Pōhākea, he luna o Kamaoha	On high at Pōhākea, above Kamaoha
He lae ‘ino ‘o Maunauna *‘O Līhu‘e ke hele ‘ia*	Maunauna is a dangerous escarpment Līhu‘e’s high plain yet to be traversed
Honi i ke ‘ala mau‘u	Inhaling the scent of the grasses
I ke ‘ala o ke kupukupu	The fragrance of kupukupu fern

E linoa ala e ka Waikōloa	Entwined by the Waikōloa breeze
E ka makani he Wai‘ōpua	By the wind called Wai‘ōpua
Ku‘u pua, me he pua lā i ku‘u maka	My blossom, like a flower in my sight
Ka ‘oni i ka haku ‘ōnohi, kā ka wai lā i li‘u	Moving before my eyes, washed salty by tears
I ku‘u maka lā, e uē au lā.	There in my sight, I weep.

[Ho‘oulumahiehie 2008a:280; Ho‘oulumahiehie 2008b:262]

1.4.3 *Ka Ua* (Rains)

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). Being on the leeward side of O‘ahu, ‘Ewa is typically very hot and dry. Honouliuli receives an annual rainfall of about 550 mm (22 inches) on the coastal and inland region of the *ahupua‘a* and about 1,200 mm (39 inches) in the northern region up into the Wai‘anae Mountain Range (Giambelluca 2013). Each small geographic area on O‘ahu had a Hawaiian name for its own rains. According to Akana and Gonzalez (2015),

> Our kupuna had an intimate relationship with the elements. They were keen observers of their environment, with all of its life-giving and life-taking forces. They had a nuanced understanding of the rains of their home. They knew that one place could have several different rains, and that each rain was distinguishingable from another. They knew when a particular rain would fall, its color, duration, intensity, the path it would take, the sound it made on the trees, the scent it carried, and the effect it had on people. [Akana and Gonzalez 2015:XV]

Honouliuli was no exception to this naming practice. Despite the relative lack of rainfall in this area, the Nāulu rain is known to be associated with the *ahupua‘a* of Honouliuli. This rain is generally understood as a sudden shower, and more commonly associated with Kawaihae, Hawai‘i and Ni‘ihau (notoriously dry locations as well) (Akana and Gonzalez 2015:187). The Nāulu rain is mentioned in a *oli* (chant) offered by Hi‘iakaikapoliopele. During Hi‘iaka’s travel through ‘Ewa she recites this affectionate *oli* as she recalls the Kai‘okia edict placed on her and Lohi‘au by Pele:

‘A‘ole au e hele i ke kaha o Kaupe‘a	I shall not tread Kaupe‘a’s expanse
Kēlā kaha kūpā koili a ka lā i ke kula	That stretch where the sun beats down on the plain
Ua kūpono a‘ela ka lā i ka piko o Wākea	The sun is right overhead, at the navel of Wākea
Ola i ke ahe a ka makani Māunuunu	I am spared by the Māunuunu wind

I ka hapahapai mai a ka makani ‘Ao‘aoa	By the uplifting ‘Ao‘aoa breeze
Ke koi lā i ke ao o ka Nāulu *e hanini i ka wai*	Urging the Nāulu storm clouds to pour down their waters
Ola ihola nā kupa kama‘āina i ka wai *a ka ‘ōpua*	The natives here survive on water from the clouds
Ke halihali a‘ela nā ‘ōpua i ke awa lau	Which billowing clouds carry along to the branching lochs
E koi mai ana iā Hi‘iaka e kūo‘e hele *i ke kula*	Compelling Hi‘iaka to trudge that open stretch
I kuleana i lāhui ai ka moe i laila	Duty making rest forbidden there
I laila au lohe i ke kani leo le‘a a ka *‘ō‘ō i ke kula*	There I heard the happy trill of the *‘ō‘ō* bird on the plain
Ho‘āikāne ana lāua me ke kai o *Wāwaemoku*	Befriending the sea of Wāwaemoku
Mokumokuāhua loko, kupākupā koili *i ka ‘ino*	My heart grieves, thrashed by harm
I ‘ino ho‘i au i kēia kanaka i ka hiki *‘ana mai*	I may be harmed by this person upon arrival
I kāhela a‘ela ka ‘ai a ka manu	Leaving the birds to feed expansively
I ka pua o ka wiliwili	On the blossoms of the *wiliwili* trees
Wili a‘ela nā ‘ōpua i luna	The clouds spin above
No luna wau	I am from above
Wili a‘ela nā ‘ōpua i lalo	The clouds spin below
Lalo ē!	Below indeed!
Lilo i lalo ka hele ‘ana a ke kanaka	The movement of mankind is cast down
Kalakala ke ao no Hawai‘i	Craggy are the clouds from Hawai‘i
I ka pā ‘ia mai e kēia makani	Blown here by this wind
‘A‘ole a‘u makana i ka lā o ka hilahila	I have no gift to offer on this day of shame
E hili hewa paha auane‘i au	I shall perhaps end up astray
Wilia i na‘e, wilia i lalo	Spiraling windward, or to the lee
Wilia i kai, wilia i uka	Spinning toward the sea, toward the highlands
‘O kauhale a ka ‘ōlelo	O house made of words

Ho‘ohiki ihola i kānāwai	Utter as an edict
Kau ihola i kānāwai	Place as a law
He kānāwai ‘okia	An order of separation
‘Ālina ihola kā ‘o Pu‘uloa	Thus Pu‘uloa is branded by epithet
He ‘āina kauā.	A land of outcasts and slaves.

[Ho‘oulumāhiehie 2008a:294–295; Ho‘oulumāhiehie 2008b:275–276]

The general lack of rain names is indicative of historic environmental conditions within the *ahupua‘a*; these conditions, in turn, shaped agricultural practices in the area. Environmental limitations forced ingenuity and innovation. McAllister provides written evidence of the innovative ways in which Honouliuli's *kama‘āina* approached agricultural activities:

> […] It is probable that the holes and pits in the coral were formerly used by Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. [McAllister 1933:109]

1.4.4 *Nā Kahawai* (Streams)

Honouliuli Ahupua‘a, and the encompassing ‘Ewa District, are notoriously dry. Agricultural sinkholes were especially important on the ‘Ewa plain. In traditional Hawaiian times, the areas of exposed coral (Pleistocene limestone) outcrop were undoubtedly more extensive. Limestone outcrop, composed of detritus, calcareous sand, reef dwelling organisms, and coralline algae, is subject to dissolution from water. This dissolution has formed a series of connected and isolated caves under the ‘Ewa Plains. Although invisible to human eyes, streams flow under the surface of Honouliuli via the karsic system. “Sink holes” would accumulate water within them via a subterranean water or karst system; this water also contained nutrient-rich sediment that allowed plants such as *kalo* (taro; *Calocasia esculenta*), *kī* (ti; *Cordyline fruticosa*), and *noni* (Indian mulberry; *Morinda citrifolia*) to survive.

Proceeding *mauka* from this limestone plain is a series of gulches draining the Wai‘anae Mountains. The largest of these is Honouliuli Gulch toward the east side of the plain that drains into West Loch. The gulch is bisected by the Honouliuli Stream, the primary water body of the Honouliuli Watershed. The “perennial/intermittent” Honouliuli Stream and its tributaries “have a total stream length of 32.5 miles” (O‘ahu Resource Conservation and Development Council 2013:16).

To the west are fairly steep gradient gulches forming a more linear than dendritic drainage pattern. The major gulches from east to west are Kalo‘i, Hunehune, Makalapa, Makakilo, Awanui, Pālailai, Makaīwa, Waimānalo, and Limaloa. These gulches are steep-sided in the uplands and generally of a high gradient until they emerge onto the flat ‘Ewa plain. The alluvium they have carried has spread out in delta fashion over the *mauka* portions of the plain, which comprises a dramatic depositional environment at the stream gradient change. These gulches are generally dry, but during seasonal Kona storms they carry immense quantities of runoff onto the plain and into the ocean. As typical drainages in arid slopes, they are either raging uncontrollably or are dry, and

do not form stable water sources for traditional agriculture in their upper reaches. The western Honouliuli gulches, in contrast to those draining into Pearl Harbor to the east, do not have valleys suitable for extensive irrigated agriculture. However, this lack is more than compensated by the rich watered lowlands at the base of Honouliuli Gulch.

Topography of the area is moderately sloping. In terms of hydrology, the area is drained by two deeply dissected gulches, Kalo‘i Gulch 300 m to the southwest and Honouliuli Gulch 700 m to the northeast. These gulches at a comparable elevation are believed to rarely run with water. Historic maps indicate a spring located approximately 2.2 km to the north. Such infrequent springs may have been key to the early human activity on the southeast Wai‘anae slope.

The lowlands fronting the west loch of Pearl Harbor (Kaihuopala‘ai) were suitable for the cultivation of the traditional Hawaiian staple crop, *kalo*. For spiritual and dietary reasons, *kalo* was a sacred staple in the Hawaiian diet. According to Hawaiian mythology, man was born from the taro plant.

The *Kumulipo* (“origin, genesis”) details this kinship. Hāloa, “he of the long breath,” is the second son of Wākea and Papa. Wākea and Papa’s first born, Hāloa-naka was born premature and died shortly after his birth (Kanahele 1995:17). After burying Hāloa-naka, a *kalo* plant sprouted at his grave. Shortly after, a second son (Hāloa) was born. A human child, Hāloa symbolizes *kalo* and man. *Kalo* is a metaphor for life, Kanahele explains as follows:

> In the mythologies of many cultures, plants have been used to symbolize human spiritual growth. Hawaiians made taro a metaphor for life because, like the taro plant, it needs to be rooted in good soil and to be constantly nourished with the waters of *Kāne*. As the stalk grows taller with its leaves reaching toward the light of the sun, symbolized by *Wākea*, so Hawaiians grow aspiring to be closer to their heavenly spirit. Just as every young shoot can become a full-grown plant, so can they become gods as descendants of Hāloa. As every plant must die, however, they too must die. And from the remains a new plant lives again. In this continuity of life, both plant and man repeat the mystery of the unending cycle. [Kanahele 1995:18]

However, by the mid-nineteenth century traditional agriculture was becoming quickly supplanted by large-scale commercial ventures. The focus of agricultural production soon shifted toward sugarcane and pineapple, with concerted efforts made to turn open space into plantations. The drilling for artesian wells began in 1879 with cattle rancher James Campbell on the ‘Ewa Plains (Board of Water Supply, City and County of Honolulu 2017). Utilizing a well driller, Campbell drilled several hundred feet down until reaching a large supply of pure, fresh water (Board of Water Supply, City and County of Honolulu 2017). According to the Board of Water Supply (2017):

> This discovery led to a water boom on the island, as ranchers and plantation developers began drilling furiously for more of the precious resource. Within 20 years, the boom came to a bust. Artesian wells, abandoned and neglected, wasted millions of gallons of water. By the turn of the century, Oahu suffered a water panic. Wells were salting up. Water levels were dropping. The problem was that the system had grown too much, too fast and too haphazardly. [Board of Water Supply 2017]

Campbell’s first well was named Waianiani (“crystal waters”) by the *kama‘āina* of Honouliuli (Nellist 1925). By 1930, Ewa Plantation had drilled 70 artesian wells to irrigate cane lands; artesian wells provided fresh water to Honouliuli for nearly 60 years (Ho‘okuleana 2014). Campbell’s original Honouliuli well was finally sealed by the City and County of Honolulu in 1939 (Ho‘okuleana 2014).

1.4.5 *Lihikai a me ka Moana* (Seashore and Ocean)

There exist several naming traditions for Honouliuli. Invaraibly, there are several explanations for Honouliuli’s name. One tradition notes that Honouliuli means “dark water,” “dark bay,” or “blue harbor,” and was named for the waters of Pearl Harbor (Jarrett 1930:22), which marks the eastern boundary of the *ahupua‘a*. The Hawaiians called Pearl Harbor, Pu‘uloa (“long hill”). According to *mo‘olelo*, this location was a storied place, due to the presence of Ka‘ahupāhau. Ka‘ahupāhau, queen of all sharks of O‘ahu, dwelled in a large cavern on the Honouliuli side of Pearl Harbor (Clark 1977:69).

> The Hawaiians knew Pearl Harbor as Pu‘uloa, and they believed that there, dwelling in a large cavern on the Honouliuli side of the harbor, Ka‘ahupāhau, the queen of all sharks on O‘ahu, made her home. Her chief guard was a brother shark, who lived in a pit at the entrance to the lochs. The Hawaiian people said the drydock was built over the cavern of Ka‘ahupāhau’s son, who also lived in Pu‘uloa. Angered by the violation of his home, the shark prince destroyed the imposing structure. The engineers in charge of the project attributed the collapse of the foundation to hydrostatic pressure. Whatever the cause, several years’ work was wrecked within minutes […] this time, before starting to rebuild, they asked the Hawaiians to bless the site. After that the work continued without further trouble. [Clark 1977:69–70]

Both seashore and ocean provided physical and spiritual sustenance (NOAA 2017) for the people of Honouliuli. According to Malo, the ocean was divided into smaller divisions, stretching from *‘ae kai* (water’s edge) to *moana* (pelagic zone) (Malo 1951:25–26). Outside the coastal areas was the belt known as *kua-au*, where the shoal water ended (Malo 1951:26). Further out was the *kai-au*, deeper waters designated for surfing, swimming, or spearing squid (Malo 1951:26). For Honouliuli Ahupua‘a, specifically between Kalaeloa and Kūalaka‘i, the sea of this region was identified as Hilo-one. It appears the name is drawn from an on-shore locality known as Hilo-one. According to Maly and Maly (2012),

> That place, Hilo-one, […] is situated on the northern side of Kualakai, towards Kalaeloa. And the name of the spring in which Hiiaka looked and saw her reflection was Hoakalei (Reflection of a lei). It was at this place that Hiiaka saw the two lehua trees growing, from which she picked the blossoms too make her four garlands. [Maly and Maly 2012:125]

While walking the coastline between Kalaeloa and Kūalaka‘i, the goddess sang out the following,

O Hiiaka ka wahine,	Hiiaka is the woman
Ke ako la i ka pua o Hoakalei,	Who picked the flowers of Hoakalei,

Ke kui la, ke uo la i ka manai	And with a needle strung and made them into
Eha ka lei, ka apana lei lehua	four garlands, the sectioned lei of the
a ka wahine la,	woman
Kuu pokii.	O my younger sibling.
Kuu pokii mai ke ehu makani o lalo.	My younger sibling who came from the place where the dusty wind rises from below
Lulumi aku la i ke kai o Hilo-one.	Overturned in the sea of Hilo-one.
No Hilo ke aloha, Aloha wale ka lei—e.	The *aloha* is for Hilo, Love for the *lei.*

[Ka Na‘i Aupuni, Volume II, Number 6, 7 June 1906, Ka Moolelo o Hiiaka-i-ka-poli-o=Pele; Maly and Maly 2012:125]

Moving westward from Pu‘uloa are Iroquis Beach, Pu‘uloa Beach Park (formerly ‘Ewa Beach Park), One‘ula Beach Park, in addition to Keahi Point. These beaches comprise the coastal portion of Honouliuli; use of these beaches increased during the plantation era, when employees of the nearby sugar plantations utilized the coastal areas for subsistence and recreation.

Traditionally, the seashore and ocean areas were vitally important for resource extraction in the early days of settlement. Fishermen along the coast maintained a respected status within traditional Hawaiian society; Kanahele asserts that “early Hawaiians regarded fishing as the oldest, and hence the most prestigious, of professions” (Kanahele 1995:17).

According to Charles Howard Edmondson (1946:5), the coastal waters of Pearl Harbor were “a natural aquarium for many varieties of marine animals.” Titcomb (1952:7) identifies the Pearl Harbor area as the only large natural inland lagoon, famous for its fish and fishponds. The *nehu* (anchovy; *Anchoviella purpurea*) was said to fill the lochs of Pearl Harbor. Citing Kamakau, Margaret Titcomb writes that the *nehu*, “filled the lochs from the channel of Pu‘uloa (Pearl Harbor) inland to the Ewas” (Titcomb 1952:97). Due to the presence of the *nehu*, the *kama‘āina* of Honouliuli and ‘Ewa developed this saying,

> *He kai puhi nehu, puhi lala ke kai o ‘Ewa e, e noho i ka la‘i o ‘Ewa nui a La‘akona*
> (“A sea that blows up *nehu*, blows them up in rows, is ‘Ewa, until they rest in the calm of great ‘Ewa-a-La‘akona”). [Kamakau 1991a:84]

1.4.6 Built Environment

The project area was utilized for commercial sugarcane from the early twentieth century into the late 1970s. Some of the sugarcane plantation infrastructure in the vicinity was relatively elaborate with the Waiahole Ditch (partially within the project area) transporting irrigation water from windward O‘ahu into the foothills of the southern Wai‘anae Range. The sugarcane fields have remained fallow for decades. Some plantation infrastructure is still present in the form of cane haul roads and remnant irrigation features (see Figure 3). The project area is otherwise undeveloped. The H-1 Freeway is approximately 800 m south of the project area.

Section 2 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*, 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 Community Consultation

2.2.1 Scoping for Participants

We begin our consultation efforts with utilizing our previous contact list to facilitate the interview process. We then review an in-house database of *kūpuna* (elders), *kama‘āina*, 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 on 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.

2.2.2 “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* (knowledge) and *mana‘o* (thought, 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 participants 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 also conducts group interviews, which ranges 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) missing details to *mo‘olelo*.

CSH seeks *kōkua* (assistance) and guidance on 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.

2.2.3 Completion of Interview

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 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 that were 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 did 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 *Ka‘ao* and *Mo‘olelo*

Hawaiian storytellers of old were greatly honored; they were a major source of entertainment and their stories contained lessons 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), storytelling is better heard 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 (1986:108) as a "legend, tale […], romance, [and/or], fiction." *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 (1986:254) define *mo‘olelo* as a "story, tale, myth, history, [and/or] tradition." The *mo‘olelo* are generally traditional stories about the gods, historic figures or stories which cover historic events and locate the events with known places. *Mo‘olelo* are often intimately connected to a tangible place or space (*wahi pana*).

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. *Mo‘olelo* on the other hand, reference a host of characters from *ali‘i* (royalty) to *akua*; *kupua* (supernatural beings) to *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 *Ka‘ao*

3.1.1 The Naming of Honouliuli

Honouliuli is the largest *ahupua‘a* in the *moku* of ‘Ewa. One translation of the name for this district is given as "unequal" (*Saturday Press*, 11 August 1883). Others translate the word as "strayed" and associate it with the legends of the gods Kāne and Kanaloa:

> When Kane and Kanaloa were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now Ewa. To mark boundaries of land they would throw a stone and where the stone fell would

> be the boundary line. When they saw the beautiful land lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as far as the Waianae range and it landed somewhere, in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So Ewa (strayed) became known by the name. The stone that strayed. [Told to E.S. by Simeon Nawaa, 22 March 1954 in Sterling and Summers 1978:1]

Honouliuli means “dark water,” “dark bay,” or “blue harbor,” and was named for the waters of Pearl Harbor (Jarrett 1930:22), which marks the eastern boundary of the *ahupua‘a*. Another source translates Honouliuli as “The blue bays or inlets” (Saturday Press, 11 August 1883). Another explanation for the name comes from the “Legend of Lepeamoa,” the chicken-girl of Pālama. In this legend, Honouliuli is the name of the husband of the chiefess Kapālama and grandfather of Lepeamoa. The land of Honouliuli was named for the grandfather of Lepeamoa (Thrum 1923:164–184).

It is likely that the boundaries of the westernmost *ahupua‘a* of ‘Ewa were often contested with people of the neighboring Wai‘anae District. The ‘Ewa people could cite divine sanction that the dividing point was between two hills at Pili o Kahe:

> This is a spot where two small hills of the Waianae range come down parallel on the boundary between Honouliuli and Nanakuli (Ewa and Waianae). The ancient Hawaiians said the hill on the Ewa side was the male and the hill on the Waianae side was female. The stone was found on the Waianae side hill and the place is known as Pili o Kahe (*Pili* = to cling to, *Kahe* = to flow). The name refers, therefore, to the female or Waianae side hill. And that is where the boundary between the two districts runs. [Told to E.S. by Simeon Nawaa, 22 March 1954 in Sterling and Summers 1978:1]

3.1.2 Kāne and Kanaloa and the *Loko I‘a* (Fishpond) of Pu‘uloa

According to an account in the Hawaiian newspaper *Ka Loea Kālai‘āina* (10 June 1899), several of the fishponds in the Pu‘uloa area were made by the brother gods, Kāne and Kanaloa. A fisherman living in Pu‘uloa, named Hanakahi, prayed to unknown gods until one day two men came to his house. They revealed to him that they were the gods to whom he should pray. Kāne and Kanaloa then built fishponds at Ke‘anapua‘a, but were not satisfied. Then they built the fishpond Kepo‘okala, but were still not satisfied. Finally, they made the pond Kapākule, which they stocked with all manner of fish. They gifted all of these fishponds to Hanakahi and his descendants (Handy and Handy 1972:473; *Ka Loea Kālai‘āina*, 8 July 1899, Volume III, Number 26).

Mary Pukui (1943:56–57), who visited Kapākule Fishpond when she was young, writes that the pond was built by the *menehune* (legendary race of small people who worked at night, building fishponds, roads, temples) under the direction of the gods Kāne and Kanaloa. Pukui describes several unique aspects of this pond:

> On the left side of the pond stood the stone called Hina, which represented a goddess of the sea by that name. Each time the sea ebbed, the rock became gradually visible, vanishing again under water at high tide. Ku, another stone on the right, was never seen above sea level. This stone represented Ku‘ula, Red Ku,

> a god for fish and fishermen. From one side of the pond a long wall composed of driven stakes of hard wood, ran toward the island [Laulaunui] in the lochs. When fish swam up the channel and then inside of this wall, they invariably found themselves in the pond. A short distance from the spot where the pond touched the shore was a small ko‘a or altar composed of coral rock. It was here that the first fish caught in the pond was laid as an offering to the gods. [Pukui 1943:56]

The fishpond contained many fish, especially the *akule* (bigeye scad; *Selar crumenophthalmus*), thus its name, “the enclosure for *akule* fish” (Pukui 1943:56–57). The pond was destroyed when the channel to Pearl Harbor was dredged in the early twentieth century. The caretaker of the pond took the stones Kū and Hina to a deep place in the ocean and sunk them so “none would harm or defile them.” Cobb (1905:733) writes that the pond was used to catch the larger *akule* (goggler), *‘ōpelu* (mackerel scad; *Decapterus macarellus*), *weke* (goat fish; *Mullidae*), *kawakawa* (bonito; *Euthynnus affinis*), and sharks. It was unusual for having walls made of coral. This contradicts much of the *mo‘olelo* saying that sharks were not killed in Pearl Harbor. However, Kamakau does relate that Kekuamanoha and Kauhiwawaeono, two conspirators against Kamehameha I, lived at Pu‘uloa. The chief Kauhiwawaeono was known to murder people and use their bodies as shark bait (Kamakau 1992:182, 232).

Samuel Kamakau adds more information on the pond Kapākule, and a second pond called Kepo‘okala.

> At Pu‘uloa on Oahu were two unusual ponds [fish traps]—Kapakule and Kepo‘okala. Kapakule was the better one. The rocks of its walls, *kuapa*, could be seen protruding at high tide, but the interlocking stone walls (*pae niho pohaku*) of the other pond were still under water at high tide […] It [Kapakule] was said to have been built by the *‘e‘epa* people [mysterious people] at the command of Kane *ma* [ma=and others, company] […]
>
> This is how the fish entered the pond. At high tide many fish would go past the *mauka* side of the pond, and when they returned they would reach the row of tree trunks seaward [of them]. The would become frightened by the projecting shadows of the trunks, and would go into the opening. The fish that went along the edge of the sand reached the seaward wall, then turned back toward the middle and entered the *anapuni* (the arced portion of the trap) A man ran out and placed a “cut-off” seine net (*‘omuku lau*) in the opening, and the fish shoved and crowded into it. The fish that were caught in the net were dumped out, and those not caught in the net were attacked with sharp sticks and tossed out, or were seized by those who were strong. [Kamakau 1976:88]

3.1.3 Pu‘okapolei, Astronomical Marker and Heiau

Pu‘uokapolei was the primary landmark for travelers on the cross-*ahupua‘a* trail that ran from Pearl Harbor in the east to Wai‘anae in the West (‘Ī‘ī 1959:27, 29; Nakuina 1992:54; E.M. Nakuina 1904 in Sterling and Summers 1978:34). *Pu‘u* means “hill” and Kapolei means “beloved Kapo,” a reference to the sister of the goddess, Pele. Kamakau says ancient Hawaiians used Pu‘uokapolei as an astronomical marker to designate the seasons:

> […] the Oahu people who reckoned the time (Oahu *po‘e helu*) called the season Kau for the setting of the sun from Pu‘uokapolei, a hill in Honouliuli, ‘Ewa, to the opening of Mahinaona (*i ke kawaha o Mahinaona*). When the sun moved south from Pu‘uokapolei—and during the season of the sun in the south—for the coming of coolness and for the sprouting of new buds on growing things—the season was called Ho‘oilo [winter, rainy season]. [Kamakau 1976:14]

A ceremony commemorating the changing of the seasons is still observed each year in the beginning of May at Waikīkī and Honouliuli. This ceremony was documented in a previous cultural impact assessment conducted by CSH (Genz et al. 2012). Sam ‘Ohukani‘ōhi‘a Gon III, Na Wa‘a Lalani Kahuna O Pu‘u Koholā, and the late Kumu Hula John Keola Lake’s *hula hālau* (*hula* instruction) perform *oli* and *hula* (dance), explaining that the *kilo hōkū* (astronomers) of O‘ahu observed how, from the perspective of Waikīkī, the sun sets in a southerly direction over the ocean during the winter solstice and in a northerly direction behind the ‘Ewa ridgeline during the summer solstice. During the springtime, the position of the setting sun marches steadily northward each day, and at the beginning of May, the sun sets behind Pu‘uokapolei, perfectly centered within its depression from the vantage point of Kūpalaha Heiau just west of the Waikīkī Aquarium. A coinciding ceremony at a *heiau* on Pu‘uokapolei similarly views the setting of the sun behind Pu‘ula‘ila‘i farther west, and a line of sight extending eastward from Pu‘ula‘ila‘i, Pu‘uokapolei, and the former site of Kūpalaha Heiau ends at the closely associated Papa‘ena‘ena Heiau. Mr. Gon suggests Papa‘ena‘ena Heiau may have been part of the ceremonies of this astronomical event.

3.1.4 Kamapua‘a and Kamaunuaniho at Pu‘uokapolei

Pu‘uokapolei was known to be the home of Kamapua‘a’s grandmother, Kamaunuaniho, one of the three migrants from Kahiki that were ancestors to the people of O‘ahu (Legend of Kamapuaa, Fornander 1919a:5[2]:318; Kahiolo 1978:81, 107). Kamapua‘a, the Hawaiian pig god, once lived in Kaluanui on the windward side of O‘ahu, but he escaped to ‘Ewa when he was pursued by the chief Olopana.

> Kamapuaa subsequently conquered most of the island of Oahu, and, installing his grandmother [Kamaunuaniho] as queen, took her to Puuokapolei, the lesser of the two hillocks forming the southeastern spur of the Waianae Mountain Range, and made her establish her court there. This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show his absolute power over all. [Nakuina 1904:50–51]

Emma Nakuina goes on to note, “A very short time ago [prior to 1904] the foundations of Kamaunuaniho’s house could still be seen at Puuokapolei” (Nakuina 1904:51). Another account (*Ka Loea Kālai‘āina*, 13 January 1900 in Sterling and Summers 1978:34) speaks of Kekele‘aikū, the older brother of Kamapua‘a, who also lived on Pu‘uokapolei.

In Lilikalā Kame‘eleihiwa’s version of the *mo‘olelo* of Kamapua‘a, Pele and Kamapua‘a meet and a battle ensues on Hawai‘i Island between the two. Kamapua‘a tells Kekele‘aikū,

> ‘Listen to me, elder brother. You wait here. When you smell the stench of burning bristles, then you must assume I am dead. However, if indeed you do not smell the

> stench of the bristles, you will know that your younger brother has not been harmed and that he has “eaten of the cooked taro.” ’ [Kame‘eleihiwa 1996:62]

Kamapua‘a travels to Hawai‘i Island where Pele chases him with fire out of the *lehua* (*Metrosideros macropus, M. collina subsp. polymorpha*) forest. Kamapua‘a ran from Pele but could only cling to an *‘ama‘uma‘u* (*Sadleria cyatheoides*) fern (Kame‘eleihiwa 1996:95). The fire continued to burn around Kamapua‘a as he clung on for his life. His bristles began to burn as well, sending a stench of burning pig bristles around the Hawaiian Islands. Kekele‘aikū smelled the stench of burning pig bristles and began to cry, thinking that his brother perished in battle with Pele (Kame‘eleihiwa 1996:95). Kekele‘aikū then hung himself, deeply saddened for the loss of his beloved brother, Kamapua‘a. Kekele‘aikū’s body was left at Pu‘uokapolei with his grandmother.

3.1.5 Kahalaopuna at Pōhākea Pass

One of the most popular legends of O‘ahu is that of Kahalaopuna (or Kaha), a young woman of Mānoa who was slandered by others and then killed by her betrothed, Kauhi, a chief from Ko‘olau, O‘ahu. While the numerous accounts (e.g., Day 1906:1-11; Fornander 1919b:5:188–192; Kalākaua 1990:511–522; Nakuina 1904:41–45; Patton 1932:41–49; Skinner 1971:220–223; Thrum 1907:118–132) vary in details they typically have Kahalaopuna slain and then revived repeatedly with the aid of a protective owl spirit. Kauhi forces her to hike west from Mānoa through the uplands until they get to Pōhākea Pass through the southern Wai‘anae Range in north Honouliuli. At Pōhākea Pass, Kauhi beats her with a stick until she is very dead (“*Ia hahau ana a Kauhi i ka lā‘au, make loa o Kahalaopuna*”). Her spirit (*‘uhane*) flies up into a *lehua* tree and chants for someone to go notify her parents of her fate. Upon hearing the news, her parents fetched Kahalaopuna back to Mānoa and she was restored to life.

3.1.6 *Mo‘o* at Maunauna

Moses Manu in recounting the Legend of Keaomelemele makes a reference to a *mo‘o* (lizard or water spirit) named Maunauna who lived above Līhu‘e (presumably at the landform of that name in extreme northern Honouliuli) and who was regarded as a bad lizard (*Kuokoa* 25 April 1885 in Sterling and Summers 1978:37).

3.1.7 Coastal Village of Kūalaka‘i

“Legend of the Children” is a tale that foretold the breaking of the eating *kapu* (taboo) by the *ali‘i*. A young brother and sister always fished at Kūalaka‘i, a beach area on the southern coast of Honouliuli. On this day, they laid out their nets, but all they caught was one *palani* (surgeonfish; *Acanthurus dussumieri*), a fish that was *kapu* for men; only women could eat it.

> […] They fished again and again until the afternoon and nothing was caught. The children were weary and went home without fish. When they came as far as Puu-o-Kapolei where the blossoms of the ma‘o looked golden in the sunlight, the sister sat down to make ma‘o leis for themselves. When the leis were made they went across the breadth of Kaupe‘a to Waipio. [*Ka Loea Kālai‘āina*, 22 July 1899:15; translation in Sterling and Summers 1978:7]

They stopped at the stream of Ka‘aimalu on the way to their home and the sister convinced her brother to share the fish between the two, thus breaking the *kapu*. “Because these children ate fish secretly, the spot is called Kaai-malu (Secret eating) to this day” (Sterling and Summers 1978:7).

3.1.4 The First Breadfruit Brought from Kahiki

The chief Kaha‘i left from Kalaeloa, a coastal area in Honouliuli, for a trip to Kahiki. On his return to the Hawaiian Islands, he brought back the first breadfruit (Kamakau 1991b:110) and planted it near the waters of Pu‘uloa or “long hill,” now known as Pearl Harbor (Beckwith 1940:97).

3.1.5 The Traveling Mullet of Honouliuli

The story of (Ka) Ihuopala‘ai is largely associated with the tradition of the *‘anae-holo* or traveling mullet (Thrum 1907:270–272):

> The home of the anae-holo is at Honouliuli, Pearl Harbor, at a place called Ihuopalaai. They make periodical journeys around to the opposite side of the island, starting from Puuloa and going to windward, passing successively Kumumanu, Kalihi, Kou, Kalia, Waikiki, Kaalawai, and so on, around to the Koolau side, ending at Laie, and then returning by the same course to their starting-point. [Thrum 1907:271]

In Thrum’s account, Ihuopala‘ai is a male who possesses a *kū‘ula*, or fish god, which supplied the large mullet known as *‘anae* (also *‘ama‘ama*; *Mugil cephalus*; when 12 inches or more, they are referred to as *‘anae*). His sister lived in Lā‘ie and there came a time when there were no fish. She sent her husband to visit Ihuopala‘ai who was kind enough to send the fish following his brother-in-law on his trip back to Lā‘ie.

This story is associated with a poetical saying documented by Mary Kawena Pukui about Honouliuli:

> ***‘Ōlelo No‘eau* #1330**
>
> *Ka i‘a hali a ka makani*
>
> The fish fetched by the wind. [Pukui 1983:145]

Pukui (1983:145) explains, “The *‘anaeholo*, a fish that travels from Honouliuli, where it breeds, to Kaipāpa‘u on the windward side of O‘ahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong.”

McAllister offers a variation of the *mo‘olelo*:

> The site is named for Kaihuopalaai, said to be a daughter of Konikonia and his wife Hinaaimalama. Fornander (37, vol. 5, p. 270) writes: ‘. . . on Oahu, Kaihuopalaai saw a godly man by the name of Kapapaapuhi [see Site 139] who was living at Honouliuli, Ewa; she fell in love with him and they were united, so Kaihuopalaai has remained in Ewa to this day. She was changed into that fishpond in which mullet are kept and fattened, and this fish is used for that purpose to this day.’ [McAllister 1933:108]

Kaihuopala‘ai, which means “the nose of Pala‘ai” (Pukui et al. 1974:68) is also the name the Hawaiians used for the west loch of Pearl Harbor. McAllister recorded that other Hawaiians say there never was a fishpond by that name.

> According to old Hawaiians, there never was a fishpond by this name. In another version (77, p. 270), Ihuopalaai is the brother of a woman living in Laie. As the fish were scarce in Laie, this woman sent her husband to Ihuopalaai, who had the mullet follow her husband on his return trip which was made along the shore around Makapuu Point with the mullet following in the water. Makea tells me that Kaihuopalaai's sister was named Malaekahana. Another story tells of a man who lured the mullet around the island by tossing sweet potatoes into the sea (68, p. 38). [McAllister 1933:108]

Beckwith (1918) says that Kaihuopala‘ai changed into the fishpond near Kapapapuhi Point, which means "the eel flats."

There is also a famous *pōhaku*, or rock, associated with the traveling mullet of Pearl Harbor.

> I […] asked the person sitting on my left, 'What place is this?' Answer – 'This is Pearl City.' It was here that mullets were bred in the ancient times and that flat stone there was called Mullet Rock or Pōhaku Anae. It lies near the beach by Ewa mill. [*Ka Nūpepa Kū‘oko‘a*, 2 October 1908 in Sterling and Summers 1978:53]

3.1.6 Ka-lua-ōlohe Caves of Honouliuli

'Ewa was famous for the many limestone caves formed in the uplifted coral, called the "Ewa Karst." This Pleistocene limestone outcrop, where not covered by alluvium or stockpiled material, has characteristic dissolution "pit caves" (Mylroie and Carew 1995), which are nearly universally, but erroneously, referred to as "sink holes" (Halliday 2005). These pit caves, or sinkholes, vary widely in areal extent and depth, with some of the more modest features comparable in volume to 5-gallon buckets, while some of the larger features, although usually irregularly shaped, are several meters wide and several meters deep. In traditional Hawaiian times, the areas of exposed coral outcrop were undoubtedly more extensive.

Some of these caves, called *ka-lua-‘ōlohe* were inhabited by the *‘ōlohe*, a type of people that looked like other humans but had tails like dogs (Beckwith 1940:343). These people were skilled in wrestling and bone-breaking and often hid along narrow passes to rob travelers; they were also reputed to be cannibals. One famous cannibal king, Kaupe, who lived in Līhu‘e in upland Honouliuli, was an *‘ōlohe*.

The caves of Pu‘uloa were sometimes also used as burial caves. In 1849, Keali‘iahonui, son of Kaua‘i's last king, Kaumuali‘i, died. He had once been married to the chiefess Kekau‘ōnohi, who had stayed with him until 1849. She wanted to bury her deceased-husband at sea.

> It seems that by Kekauonohi's orders, the coffin containing her late husband's remains was removed to Puuloa, Ewa, with the view of having it afterwards taken out to sea and there sunk. It was temporarily deposited in a cavern in the coral limestone back of Puuloa, which has long been used for a burial place, and has lately been closed up. [Alexander 1907:27]

After some initial objections by the niece of Keali‘iahonui, the body was removed from the outer coffin, the rest was sunk, and the coffin was later buried somewhere in Pu‘uloa.

3.1.7 Kanekua‘ana

Kanekua‘ana is a *kia‘i* (guardian) in the form of a *mo‘o* that took care of the people that lived from Honouliuli to Hālawa. Even those who were not her descendants were cared for in times of need. When *i‘a* (marine food) became scarce they would build a *waihau heiau* (a *heiau* for *mo‘o*) and pray for Kanekua‘ana’s blessing. She blessed them with an abundance of *i‘a*.

> The *pipi* (pearl oyster)—strung along from Namakaohalawa to the cliffs of Honouliuli, from the *kuapa* fishponds of inland ‘Ewa clear out to Kapakule. That was the oyster that came in from deep water to the mussel beds near shore, from the channel entrance of Pu‘uloa to the rocks along the edges of the fishponds. They grew right on the *nahawele* mussels, and thus was this *i‘a* obtained. Not six months after the *hau* branches [that placed a *kapu* on these waters until the *pipi* should come in] were set up, the *pipi* were found in abundance—enough for all ‘Ewa—and fat with flesh. Within the oyster was a jewel (*daimana*) called a pearl *(momi*), beautiful as the eyeball of a fish, white and shining; white as the cuttlefish, and shining with the colors of the rainbow—reds and yellows and blues, and some pinkish white, ranging in size from small to large. They were of great bargaining value (*he waiwai kumuku‘ai nui*) in the ancient days, but were just ‘rubbish’ (*‘opala*) in ‘Ewa. [Kamakau 1991b:83]

The people were also blessed with many other *i‘a* including *‘ōpae huna*, transparent shrimp (*pariambus typicus*), *‘ōpae kākala*, spiked shrimp (*caridina gracilirostris*), *nehu maoli*, *nehu pala*, types of anchovy, *mahamoe*, and *‘ōkupe*, types of bivalves. Some of these marine resources are no longer seen today (Maly and Maly 2003:60).

A clarification of the story of Kanekua‘ana and the pearl oysters of Pearl Harbor is given, in which it seems an overseer had set a ban on the *pipi* for several months a year so that they could increase. A poor widow, a relation of the *mo‘o*, took some of the *pipi* and hid them in a basket. The *konohiki* (overseer) found the hidden shells, and took them from her, emptying them back into the sea, which was proper. However, after this he followed the woman home and also demanded that she pay a stiff fine in cash, which she did not have. The *mo‘o* thought this was unjust and the next night she took possession of a neighbor who was a medium.

> […] After the overseer had gone back to Palea the lizard goddess possessed her aged keeper [a woman of ‘Ewa] and said to those in the house, ‘I am taking the pipi back to Kahiki and they will not return until all the descendants of this man are dead. Then shall the pearl oysters be returned. I go to sleep. Do not awaken my medium until she wakes up of her own accord.’ The command was obeyed and she slept four days and four nights before she awoke. During the time that she slept the pearl oysters vanished from the places where they were found in great numbers, as far as the shore […] The few found today are merely nothing […] [*Ka Loea Kālai‘āina*, 3 June 1899, translation in Sterling and Summers 1978:49–50]

3.1.8 Palila

In the *mo‘olelo* of the hero Palila, the famous warrior had a supernatural war club. He could throw the club a long distance, hang on to the end of it, and fly along the club’s path. Using this power, he touched down in several places in Honouliuli, Waipi‘o, and Waikele. One day he used

his supernatural war club to carry himself to Ka‘ena Point at Wai‘anae, and from there east across the district of ‘Ewa. Fornander writes:

> *Haalele keia ia Kaena, hele mai la a Kalena, a Pohakea, Maunauna, Kanehoa, a ke kula o Keahumoa, nana ia Ewa. Ku keia i laila nana i ke ku a ka ea o ka lepo i na kanaka, e pahu aku ana keia i ka laau palau aia nei i kai o Honouliuli, ku ka ea o ka lepo, nu lalo o ka honua, me he olai la, makau na kanaka holo a hiki i Waikele. A hiki o Palila i laila, e paapu ana na kanaka i ka nana lealea a ke ‘lii o Oahu nei, oai o Ahuapau.* [Fornander 1918:143]
>
> After leaving Kaena he came to Kalena, then on to Pohakea, then to Manuauna [a peak in Honouliuli], then to Kanehoa [a peak in Honouliuli], then to the plain of Keahumoa [upland plain from Honouliuli to Waipio] and looking toward Ewa. At this place he stood and looked at the dust as it ascended into the sky caused by the people who had gathered there; he then pushed his war club toward Honouliuli. When the people heard something roar like an earthquake they were afraid and they all ran to Waikele. When Palila arrived at Waikele he saw the people gathered there to witness the athletic games that were being given by the king of Oahu, Ahupau by name. [Fornander 1918:142]

3.1.9 Kākuhihewa

The Hawaiian *ali‘i* were also attracted to the region of the project area. One historical account of particular interest, appearing in the newspaper *Ke Au Hou*, refers to an *ali‘i* residing in Ko‘olina, southwest of the project area:

> Koolina is in Waimanalo near the boundary of Ewa and Waianae. This was a vacationing place for chief Kakuhihewa and the priest Napuaikamao was the caretaker of the place. Remember reader, this Koolina is not situated in the Waimanalo side of the Koolau side of the island but the Waimanalo in Ewa. It is a lovely and delightful place and the chief, Kakuhihewa loved this home of his. [*Ke Au Hou,* 13 July 1910, Volume I, Number II, Sterling and Summers 1978:41]

3.2 Wahi Pana

Wahi pana are legendary or storied places of an area. These legendary or storied places may include a variety of natural or human-made structures. Oftentimes dating to the pre-Contact period, most *wahi pana* are in some way connected to a particular *mo‘olelo*, however, a *wahi pana* may exist without a connection to any particular story. 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*, and man-made structures such as fishponds. In this way, the *wahi pana* of Honouliuli tangibly link the *kama‘āina* of Honouliuli to their past. It is common for places and landscape 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 individual garden plots and *‘auwai* (water courses), house sites, intangible phenomena such as meteorological and atmospheric effects, *pōhaku*, *pūnāwai* (freshwater springs), and many others. According to Landgraf (1994), Hawaiian *wahi pana* "physically and poetically describes an area while revealing its historical or legendary significance" (Landgraf 1994:v). Place names and *wahi pana* of Honouliuli are identified on Figure 5.

3.2.1 *Heiau* (Pre-Christian Place of Worship)

Heiau were pre-Christian places of worship. Construction of some *heiau* was elaborate, consisting of large communal structures, while others were simple earth terraces or shrines (McAllister 1933:8). *Heiau* are most commonly associated with important religious ceremony; large structures with platforms or altars of one or more terraces were indicative of such function (McAllister 1933:8). Archaeologist Gilbert McAllister reports on two known *heiau* in the *ahupua‘a* of Honouliuli, as well as two other sites that could have possibly been *heiau*. These *heiau* were located on Pu‘u o Kapolei, on Pu‘u Ku‘ua, at the foot of Pu‘u Kanehoa, and at the foot of Mauna Kapu (McAllister 1933).

3.2.1.1 Pu‘u o Kapolei

A *heiau* was once located on Pu‘u o Kapolei, but it had been destroyed by the time of McAllister's (1933:108) survey of the island in the early 1930s. The hill was used as a point of solar reference or as a place for such observations (Fornander 1919c:6[2]:297). Pu‘uokapolei may have been regarded as the gate of the setting sun, just as the eastern gate of Kumukahi in Puna is regarded as the gate of the rising sun; both places are associated with the Hawaiian goddess Kapō (Emerson 1915:41). This somewhat contradicts some Hawaiian cosmologies, in which Kū was the god of the rising sun, and Hina, the mother of Kamapua‘a, was associated with the setting of the sun. Fornander (1919:6[2]:292) states that Pu‘uokapolei may have been a *leina,* jumping off point associated with the wandering souls who roamed the plains of Kaupe‘a and Kānehili, *makai* (toward the sea) of the hill.

McAllister writes that the stones from the *heiau* supplied the rock crusher located on the side of this elevation, about 100 ft away on the sea side. There was once a large rock shelter on the *makai* side where it is said to have been the residence of Kamapua‘a and his grandmother. (McAllister 1933:108). After conquering the majority of O‘ahu, he established his grandmother as queen of this *wahi* (Pukui et al. 1974:203).

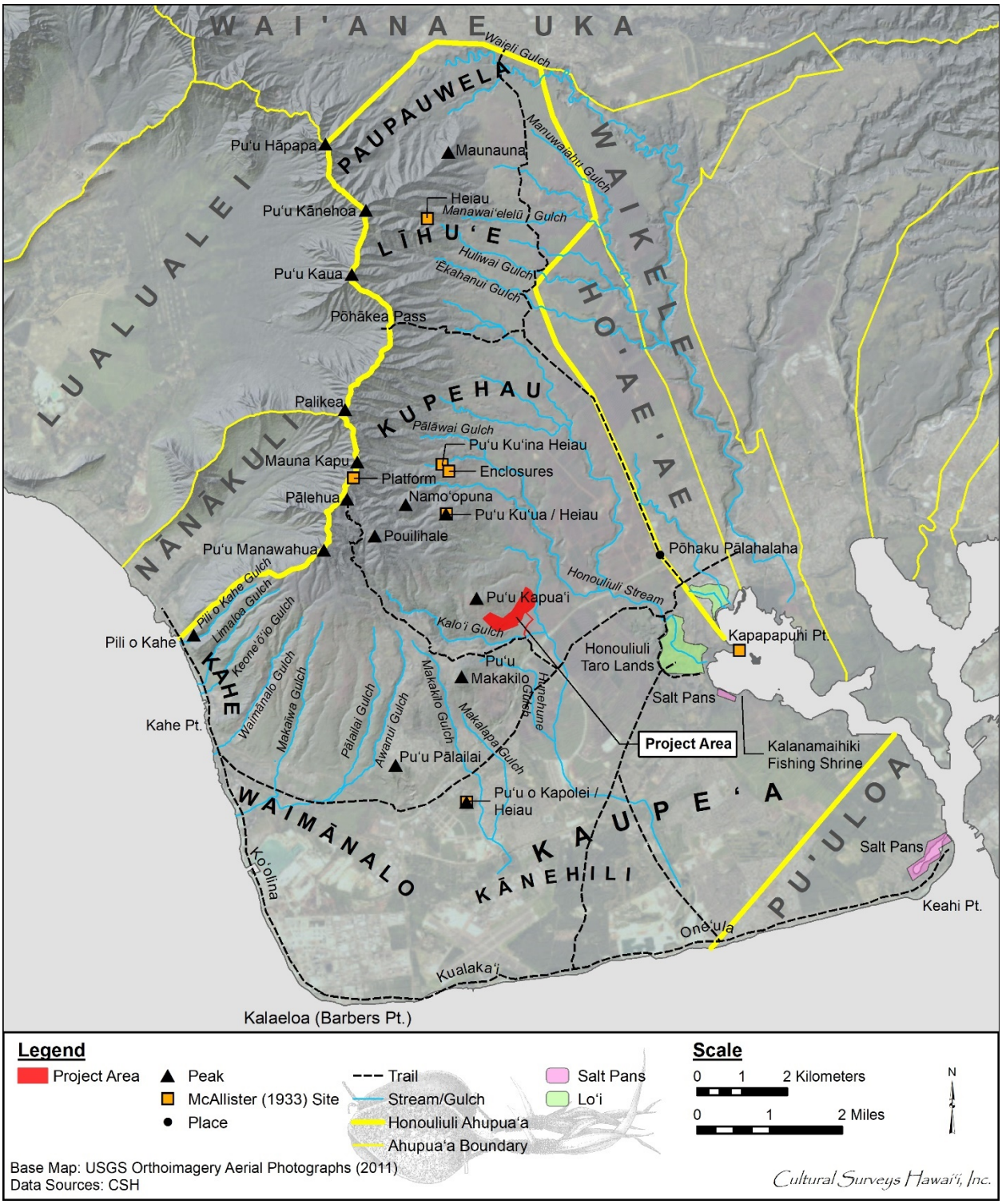

Figure 5. Portion of a 2011 USGS Orthoimagery aerial photograph showing place names, trails and streams of Honouliuli Ahupua‘a and the location of the project area

3.2.1.2 Pu‘u Ku‘ua

Pu‘u Ku‘ua Heiau located in Palikea, Honouliuli, overlooks both Honouliuli and Nānākuli, and is at the height of approximately 1,800 feet (ft). Most of the stones from the *heiau* were used for a cattle pen located on the *makai* side of the site. The part of the *heiau* that hadn't been cleared for pineapples has been planted in ironwoods (McAllister 1933:108).

3.2.1.3 Unidentified heiau at the foot of Pu‘u Kanehoa

Located at the foot of Pu‘u Kanehoa is a small enclosure thought to have possibly been a *heiau*. McAllister writes:

> My informant, Reiney, recalls the respect the old Hawaiians had for the place when he was punching cattle with them in his youth. It is a walled inclosure 25 by 35 feet. On the inside the walls are between 2 and 3 feet high, and on the outside they range from 2 to 5 feet, depending upon the slope of the land. On three sides the walls are 2 feet wide, but the fourth is 3 feet wide. The walls are evenly faced with a fill of smaller stones. At present the site is surrounded with a heavy growth of *Lantana*; but only a thick growth of grass and two small guava bushes are in the interior, which is most unusual unless human hands keep the interior clear. Possibly this is not a *heiau* but a small inclosure considered sacred for some reason. [McAllister 1933:107]

3.2.1.4 Unidentified heiau at the foot of Pu‘u Kuina

Located in Aikukai, Honouliuli, at the foot of Pu‘u Kuina what looked to be a terrace is all that remained when McAllister cataloged Site 134. He notes of the inability to determine the size of the *heiau* or the number of terraces that once stood (McAllister 1933:107).

3.2.2 Plains of ‘Ewa

3.2.2.1 The Plains of Kaupe‘a

Several places on the ‘Ewa coastal plain are associated with *ao kuewa*, the realm of the homeless souls. Samuel Kamakau explains Hawaiian beliefs in the afterlife:

> There were three realms (*ao*) for the spirits of the dead […] There were, first, the realm of the homeless souls, the *ao kuewa*; second, the realm of the ancestral spirits, the *ao ‘aumakua*; and third, the realm of Milu, *ke ao o Milu.*
>
> The *ao kuewa*, the realm of homeless souls, was also called the *ao ‘auwana*, the realm of wandering souls. When a man who had no rightful place in the *‘aumakua* [family or personal gods] realm (*kanaka kuleana ‘ole*) died, his soul would wander about and stray amongst the underbrush on the plain of Kama‘oma‘o on Maui, or in the *wiliwili* grove of Kaupe‘a on Oahu. If his soul came to Leilono [in Hālawa, ‘Ewa near Red Hill], there it would find the breadfruit tree of Leiwalo, *ka‘ulu o Leiwalo*. If it was not found by an *‘aumakua* soul who knew it (*i ma‘a mau iaia*), or one who would help it, the soul would leap upon the decayed branch of the breadfruit tree and fall down into endless night, the *po pau ‘ole o Milu*. Or, a soul that had no rightful place in the *‘aumakua* realm, or who had no relative or friend

> (*makamaka*) there who would watch out for it and welcome it, would slip over the flat lands like a wind, until it came to a leaping place of souls, *a leina a ka ‘uhane*.
>
> On the plain of Kaupe‘a beside Pu‘uloa [Pearl Harbor], wandering souls could go to catch moths (*pulelehua*) and spiders (*nanana*). However, wandering souls could not go far in the places mentioned earlier before they would be found catching spiders by *‘aumakua* souls, and be helped to escape. [Kamakau 1991a:47, 49]

This association of Pu‘uokapolei and Kānehili with wandering souls is also illustrated in a lament on the death of Kahahana, the paramount chief of O‘ahu, who was killed by his father, Kahekili, after Kahahana became treacherous and killed the high priest Ka‘opulupulu.

E newa ai o hea make i ka lā,	Go carefully lest you fall dead in the sun,
Akua noho la i Pu‘uokapolei.	The god that dwells on Kapolei hill.
E hanehane mai ana ka lā i nā	The sun is wailing on account of the
wahine o Kamao,	women of Kamao,
Akua pe‘e, pua ‘ohai o ke kaha,	A hiding god, blossoming ohai of the banks
I walea wale i ke a-	Contented among the stones
I ka ulu kanu a Kahai.	Among the breadfruit planted by Kahai.
Haina ‘oe e ka oo-	Thou hast spoken of by the oo-
E ka manu o Kānehili.	By the bird of Kānehili.

> [*Ka Nupepa Kuokoa*, Volume VII, Number 23, 6 June 1868, He Mele Kanikau no Walia Kahaha na ka moi o Oahu; Fornander 1919c:6[2]:297]

Fornander provides some notes on this lament. The god dwelling at Kapolei is the god Kahahana, stating that this is where his soul has gone. Kamao is one of the names to the door of the underworld. This lament draws an association with wandering souls and the place where the first breadfruit tree was planted by Kaha‘i at Pu‘uloa (Fornander 1919c:6[2]304).

Pukui (1983) offers this Hawaiian saying, which places the wandering souls in a *wiliwili* (*Erythrina sandwicensis*) grove at Kaupe‘a:

> *Ka wiliwili o Kaupe‘a.*
>
> The *wiliwili* grove of Kaupe‘a
>
> In ‘Ewa, O‘ahu said to be where homeless ghosts wander among the trees.
>
> [Pukui 1983:180]

Pukui also shared her personal experience with the wandering spirits on the plain of Kaupe‘a.

> A wide plain lies back of Keahi and Pu‘uloa where the homeless, friendless ghosts were said to wander about. These were the ghosts of people who were not found by their family *‘aumakua* or gods and taken home with them, or had not found the leaping places where they could leap into the nether world. Here [on the plain of Honouliuli] they wandered, living on the moths and spiders they caught. They were often very hungry for it was not easy to find moths or to catch them when found.

> Perhaps I would never have been told of the plain of homeless ghosts if my cousin's dog had not fainted there one day. My cousin, my aunt and I were walking to Kalaeloa, Barber's Point, from Pu‘uloa accompanied by Teto, the dog. She was a native dog, not the so-called poi dog of today, with upright ears and body the size of a fox terrier. For no accountable reason, Teto fell into a faint and lay still. My aunt exclaimed and sent me to fetch sea water at once which she sprinkled over the dog saying, '*Mai hana ino wale ‘oukou i ka holoholona a ke kaikamahine. U oki ko ‘oukou makemake ‘ilio*.' 'Do not harm the girl's dog. Stop your desire to have it.' Then with a prayer to her *‘aumakua* for help she rubbed the dog. It revived quickly and, after being carried a short way, was as frisky and lively as ever.
>
> Then it was that my aunt told me of the homeless ghosts and declared that some of them must have wanted Teto that day because she was a real native dog, the kind that were roasted and eaten long before foreigners ever came to our shores. [Pukui 1943:60–61]

Beckwith (1970:154) has stressed that "the worst fate that could befall a soul was to be abandoned by its ‘aumakua (ancestral spirit) and left to stray, a wandering spirit (kuewa) in some barren and desolate place." These wandering spirits were often malicious, so the places where they wandered were avoided.

3.2.2.2 The Plains of Pukaua

The Hawaiian language newspaper *Ka Loea Kālai‘āina* (13 January 1900) relates that near Pu‘uokapolei, on the plain of Pukaua, on the *mauka* side of the road, there was a large rock. This *mo‘olelo* suggests the plain around Pu‘uokapolei was called Pukaua. The *mo‘olelo* is as follows:

> If a traveler should go by the government road to Waianae, after leaving the village of gold, Honouliuli, he will first come to the plain of Puu-ainako and when that is passed, Ke-one-ae. Then there is a straight climb up to Puu-o-Kapolei and there look seaward from the government road to a small hill. That is Puu-Kapolei […] You go down some small inclines, then to a plain. This plain is Pukaua and on the mauka side of the road, you will see a large rock standing on the plain […] There were two supernatural old women or rather peculiar women with strange powers and Puukaua belonged to them. While they were down fishing at Kualakai [near Barbers Point] in the evening, they caught these things, aama crabs (Grapsus tenuicrustatus), pipipi shellfish (Nerita picea), and whatever they could get with their hands. As they were returning to the plain from the shore and thinking of getting home while it was yet dark, they failed for they met a one-eyed person [bad omen]. It became light as they came near to the plain, so that passing people were distinguishable. They were still below the road and became frightened lest they be seen by men. They began to run—running, leaping, falling, sprawling, rising up and running on, without a thought of the aama crabs and seaweeds that dropped on the way, so long as they would reach the upper side of the road. They did not go far for by then it was broad daylight. One woman said to the other, 'Let us hide lest people see us,' and so they hid. Their bodies turned into stone and that is one of the famous things on this plain to this day, the stone body. This is the end of these strange women. When one visits the plain, it will do no harm to glance on the upper

> side of the road and see them standing on the plain. [*Ka Loea Kālai‘āina*, 13 January 1900, translation in Sterling and Summers 1978:39]

In another version of this story, the two women met Hi‘iaka as she journeyed toward the ‘Ewa coast. The women were *mo‘o* and were afraid that Hi‘iaka would kill them, so they changed into their lizard form. One of the lizards hid in a little space on a stone beside the coastal trail, and the other hid nearby (*Ka Hōkū o Hawai‘i*, 15 February 1927, translated in Maly 1997:19). From that time on the stone was known as “Pe‘e-kāua,” meaning “we two hidden.” Hi‘iaka greeted the two women but did not harm them, and passed on.

When she reached Pu‘uokapolei, she also greeted two old women who lived at an *‘ohai* (*Sesbania tomentosa*) grove on the hill. These women were named Pu‘uokapolei and Nāwahineokama‘oma‘o (*Ka Hōkū o Hawai‘i*, 22 February 1927, translated in Maly 1997:19). As she continued her travels, she looked to the ocean and saw the canoe carrying Lohi‘au:

Kuu kane i ke awa lau o Puuloa	My man on the many harbored sea of Pu‘uloa
Mai ke kula o Peekaua ke noho	As seen from the plain of Pe‘ekāua
E noho kaua i ke kaha o ka ohai	Let us dwell upon the *‘ōhai* covered shore
I ka wiliwili i ka pua o ka lau noni	Where the *noni* blossoms are twisted together
O ka ihona i Kanehili la	Descending along Kānehili
Ua hili hoi au-e	I am winding along.

[*Ka Hōkū o Hawai‘i,* 22 February 1927, translated in Maly 1997:20]

3.2.2.3 The Inland Plain of Keahumoa

In several legends of ‘Ewa, mention is made of the “plain of Keahumoa.” John Papa ‘Ī‘ī (1959:96) has this plain opposite the trail to Pōhakea Pass, stretching across the *ahupua‘a* of Honouliuli and Hō‘ae‘ae. McAllister (1933:107) states that the plain was west of Kīpapa Gulch in Waikele. It is also mentioned in legends of Waipi‘o. Thus, this is probably a general name for the flat plain *mauka* of the productive floodplain area directly adjacent to Pearl Harbor. This plain would have been east of the present corridor alignment.

3.2.2.3.1 Legend of Nāmakaokapao‘o

Nāmakaokapao‘o was a Hawaiian hero of legendary strength. Nāmakaokapao‘o’s mother was Pokai and his father was Kaulukahai, a great chief of Kahiki, the ancestral home of the Hawaiians. The two met in Hō‘ae‘ae and conceived their child there. The father returned to his home in Kahiki before the birth of his son, leaving his O‘ahu family destitute. A man named Puali‘i saw Pokai and married her. The couple then resided on the plains of Keahumoa, planting sweet potatoes. Nāmakaokapao‘o was a small, brave child who took a dislike to his stepfather, and pulled up the sweet potatoes Puali‘i had planted at their home in Keahumoa. When Puali‘i came after Nāmakaokapao‘o with an axe, Nāmakaokapao‘o delivered a death prayer against him, and slew Puali‘i, hurling his head into a cave in Waipouli, near the beach at Honouliuli (Fornander 1919d:5[2]:274–276).

3.2.2.3.2 Legend of Pikoi

Pikoi was a legendary hero, the son of a crow (*‘alalā*) and brother to five god-sisters in the form of rats. He was famous for his ability to shoot arrows, and often made bets that he could hit rats from a long distance (Fornander 1917a:4[3]:450–463). Pikoi’s skill was commemorated in a saying (Pukui 1983:200):

Ku aku la i ka pana a	Shot by the arrow of Pikoi-[son]
Pikoi-a-ka-‘alalā, keiki pana	of-the-crow, the expert rat-shooter
‘iole o ke kula o Keahumoa.	Of the plain of Keahumoa.

3.2.2.3.3 The Demi-god Māui

In the stories of the demi-god Māui, Keahumoa is the home of Māui‘s grandfather, Kūolokele (Kū-honeycreeper). One day, Māui’s wife, Kumulama, was stolen by the chief Pe‘ape‘amakawalu, called the eight-eyed-bat, who is identified in the creation chant, *Kumulipo*, as the octopus god (Beckwith 1951:136). The chief disappeared with Kumulama in the sky beyond the sea, and escaped so quickly that Māui could not catch him. To recover his wife, Māui’s mother advised him to visit the hut of his grandfather at Keahumoa:

> Maui went as directed until he arrived at the hut; he peeped in but there was no one inside. He looked at the potato field on the other side of Poha-kea, toward Hono-uli-uli, but could see no one. He then ascended a hill, and while he stood there looking, he saw a man coming toward Waipahu with a load of potato leaves, one pack of which, it is said, would cover the whole land of Keahumoa. [Thrum 1923:253–254]

Kūolokele made a *moku-manu* (“bird-ship”) for Māui, who entered the body of the bird and flew to Moanaliha, the land of the chief Pe‘ape‘amakawalu. This chief claimed the bird as his own when it landed on a sacred box, and took it with him into the house he shared with Māui’s wife. When Peapeamakawalu fell asleep, Māui killed him, cut off his head, and flew away back to O‘ahu with his wife and the chief’s head (Thrum 1923:252–259).

3.2.3 Paupauwela and Līhu‘e

Paupauwela, also spelled Popouwela (derivation unknown), is the name of the land area in the extreme *mauka* section of Honouliuli Ahupua‘a. The land area of Līhu‘e is just *makai* of this land, and extends into the *ahupua‘a* of Waipi‘o (adjacent to the eastern border of Honouliuli). Both place names are mentioned in a chant recorded by Abraham Fornander, which was composed as a *mele* for the O‘ahu king, Kūali‘i, as he was preparing to battle Kuiaia, the chief of Wai‘anae:

*Ihea, ihea la ke kahua,*Where?	Where is the battle field
Paio ai o ke koa-a?	Where the warrior is to fight?
I kai i kahua i Kalena,	On the field of Kalena,
I Manini, i Hanini	At Manini, at Hanini,
I ninia i ka wai akua,	Where was poured the water of the god
I ko hana i Malamanui	By your work at Malamanui;
Ka luna o Kapapa, i Paupauwela,	On the heights of Kapapa, at Paupauwela,

I ka hilinai i ke kalele,	Where they lean and rest;
Ka hala o Halahalanui maauea,	At the hala trees of indolent Halahalanui,
E kula ohia ke Pule-e,	At the ohia grove of Pule-e
Ke ‘kua o Lono o Makalii	The god of Lono, of Makalii
Ka lala aalao Ukulonoku,	The fragrant branch of the Ukulonoku,
No Kona paha, no Lihue.	Mayhap from Kona, from Lihue,
No ka la i Maunauna,	For the day at Maunauna
No ka wai i Paupauwela.	For the water at Paupauwela.
Ula ka wai i Paupauwela,	Red is the water of Paupauwela,
Ke kilau o Malamani	,From the slain at Malamani,
Ka moo kilau I Kapapa.	The slain on the ridge at Kapapa.

[Fornander 1917b:4[2]:384–386]

3.2.4 Maunauna

The hill Maunauna lies between the lands Paupauwela and Līhu‘e. One translation of Maunauna is “mountain sent [on errands].” Two servant *mo‘o* who lived here had no keepers to supply their needs” (Pukui et al. 1974:149). It was at Maunauna, according to one tradition, that the forces of the chiefs Kūali‘i and Kuiaia of Wai‘anae met to do battle, which was averted when a *mele* honoring the god Kū was chanted (see Section 3.5.1). (Fornander 1917b:4[2]:348). In the Legend of Ke-ao-melemele, a woman named Paliuli traveled in this area.

> In a very short time she [Paliuli] walked over the plain of Ewa; Ewa that is known as the land of the silent fish (pearl oysters) […] She went on to the plain of Punalu‘u and turned to gaze at Maunauna point and the plain of Lihue. [Manu 1885, translation in Sterling and Summers 1978:21]

Certain place names in the uplands, including Maunauna, are also mentioned in the story of Lolale’s Lament. The place of Lolale’s residence is given in King Kalākaua’s version of this story (Kalākaua 1990:232): “There lived there at that time in Lihue, in the district of Ewa, on the island of O‘ahu, a chief named Lo-Lale, son of Kalona-iki, and brother of Piliwale, the *alii-nui*, or nominal sovereign, of the island, whose court was established at Waialua.”

In this story, Lolale was a chief of O‘ahu who asked his friend Kalamakua to find him a bride (Kalākaua 1990:228–246; Skinner 1971:217–219). Kalamakua traveled to Maui and chose Kelea, the chief’s sister, and returned with her to O‘ahu; during this time the two grew close. Kelea lived with Lolale for a while, but he was a silent type who was often away from home playing sports and walking in the woodlands. Longing for Kalamakua, Kelea decided to leave her husband, Lolale voiced no “spoken bitterness;” however, after she left, he sang this lament:

> Farewell, my partner of the lowland plains,
>
> On the waters of Pohakeo,
>
> Above Kanehoa,
>
> On the dark mountain spur of Mauna-una!
>
> O, Lihue, she is gone!

Sniff the sweet scent of the grass,
The sweet scent of the wild vines
That are twisted by Waikoloa,
By the winds of Waiopua,
My flower!
As if a mote were in my eye.
The pupil of my eye is troubled;
Dimness covers my eyes. Woe is me!
[Kalākaua 1990:228–246]

3.2.5 Kūalaka‘i

Kūalaka‘i is the name of an area near Barbers Point, located on the southwestern side of Honouliuli Ahupua‘a. Clark (1977:74) says it is named for a type of sea cucumber that squirts a purple fluid when squeezed. Pukui identifies the sea creature as *Tethys* a member of the invertebrate family *Aplysiidae* commonly called sea hares (Pukui et al. 1974:119). Pukui adds this area was once the site of a spring called Hoaka-lei ("lei reflection") "because Hi‘iaka picked *lehua* flowers here to make a *lei* (garland) and saw her reflection in the water" (Pukui et al. 1974:119).

3.2.6 Kalaeloa

Kalaeloa literally means "the long point" (Pukui et al. 1974:72). Kalaeloa Point was the home of Uhu Makaikai, a *kupua* who could take the form of a man or a giant parrotfish (*uhu).* He is mentioned in several legends concerning the hero Kawelo and with Kawelo's struggles with the ruling chief of Kaua‘i, ‘Aikanaka.

> This friend was Kauahoa also an alii of Wailua (Kauai). Their king, Aikanaka, in the time of Kakuhihewa of Oahu and Lonoikamakahiki of Hawaii. Aikanaka got offended with Kawelo and sent him to live at Waikiki. Cause. The king at a surf bathing told Kawelo to get a calabash of water for him to wash off with, but on Kawelo's failing to do it, he took a calabash of soft poi and threw it over Kawelo and sent him off as already stated. At Waikiki, Kawelo studied the art of fighting to be revenged on Aikanaka. A kupua, Uhu makaikai, a fish was his teacher. Makuakeke was his helper in the canoe. The fish lived at Pohaku o Kawai near Kalailoa (Kalaeloa), Oahu (Barber's Point) . . . [Hawaiian Ethnological Notes, Bishop Museum Vol. II:114, translation in Sterling and Summers 1978:41]

3.2.7 *Ala Hele* (Trails)

John Papa ‘Ī‘ī describes a network of Leeward O‘ahu trails (Figure 6 through Figure 8) which in later historic times encircled and crossed the Wai‘anae Range, allowing passage from West Loch to the Honouliuli lowlands, past Pu‘uokapolei and Waimānalo Gulch to the Wai‘anae coast and onward circumscribing the shoreline of O‘ahu (‘Ī‘ī 1959:96–98). The main trail along the south shore of O‘ahu would have been approximately 1.5 km to the southeast. A main trail extending up the central valley of O‘ahu would have been approximately 3 km to the east. The