

Appendix C
Archaeological Assessment and Cultural Impact Assessment for the Honouliuli WWTP
Secondary Treatment and Facilities Project, Cultural Surveys Hawai'i, Inc. (CSH),
December 2015 and April 2011

DAVID Y. IGE
GOVERNOR OF HAWAII



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February 3, 2016

David Shideler
Cultural Surveys of Hawaii, Inc.
P.O. Box 1114
Kailua, HI 96734

Log No. 2015.03972
Doc. No. 1602KM06
Archaeology

Dear Mr. Shideler,

**SUBJECT: Chapter 6E-8 Historic Preservation Review –
Archaeological Assessment for the Honouliuli Wastewater Treatment
Plant (WWTP) Secondary Treatment and Facilities Project
Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu
TMK: (1) 9-1-013:007**

Thank you for the opportunity to review the revised draft report titled *Archaeological Assessment for the Honouliuli Wastewater Treatment Plant (WWTP) Secondary Treatment and Facilities Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, TMK: [1] 9-1-013:007* (Yucha et al., December 2015). SHPD received the original draft on November 24, 2014, and requested several revisions in a letter dated October 22, 2015 (Log No. 2014.05307, Doc. No. 1509AEM02). We received this revised draft on November 6, 2015; we apologize for the delayed review and thank you for your patience.

This archaeological inventory survey (AIS) was prepared at the request of AECOM Pacific, Inc. The project area totals 101 acres and is bounded by Geiger Road on the south, Roosevelt Avenue on the south and west, Kalo‘i Gulch on the east, and the Oahu Railway and Land (OR&L) Right-of-Way on the north. The subject Parcel 007 consists of two recently consolidated parcels (TMK: [1] 9-1-013:007 and [1] 9-1-069:003). The land owner, the City and County of Honolulu, Department of Environmental Services, proposes to update and expand the existing Honouliuli Wastewater Treatment Plant (WWTP) in order to provide secondary treatment and to accommodate projected increased wastewater flows. Selected facilities for improvement include the Central Laboratory, Ocean Team Facilities, Administration Building, Operations Building, Leeward Regional Maintenance, Central Shops, Warehouse, Truck Wash, Processes Supervisory Control and Data Acquisition, Seepage Receiving Station, Odor Control, Grounds Keeping, Janitorial Service and Security, and Honouliuli Water Recycling Facility.

O‘Hare et al. (2007) completed an archaeological assessment (AA) for the 48.18 acre northern and eastern portions of the project area (formerly TMK: [1] 9-1-069:003) in support of the ‘Ewa Industrial Park Project. The AA report was reviewed and accepted by the SHPD on February 10, 2009 (Log No. 2009.0664, Doc. No. 0902WT22). The remaining 52.82 acres of the project area, which includes the built-up area of the Honouliuli Wastewater Treatment Plant, are addressed within the current AIS (Yucha et al. December 2015).

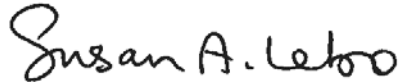
The archaeological inventory survey involved a 100% pedestrian survey and no subsurface testing. Fieldwork was completed on October 24, 2014. No historic properties were identified during the survey. Per Hawaii Administrative Rules (HAR) §13-284-7, the determination of effect is “no historic properties affected” and the report recommends no further archaeological work. Based on the results of the AIS, SHPD concurs with the effect determination and recommendation of no further work. Pursuant to HAR §13-284-5(b)(5)(A), the negative findings of the archaeological inventory survey are reported as an archaeological assessment.

Mr. Shideler
February 3, 2016
Page 2

The revised report adequately addresses the issues and concerns raised in our earlier correspondence (October 22, 2015; Log No. 2014.05307, Doc. No. 1509AEM02). The report provides sufficient discussion of the project, physical environment, cultural and historical background, previous archaeological studies, methods and field findings, and meets the requirements specified in HAR §13-276-5. **It is accepted.** Please send one hardcopy of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library.

Please contact Kimi Matsushima at (808) 692-8027 or at Kimi.R.Matsushima@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

A handwritten signature in black ink that reads "Susan A. Lebo". The signature is written in a cursive, flowing style.

Susan A. Lebo, PhD
Archaeology Branch Chief

Final
Archaeological Assessment for the
Honouliuli Wastewater Treatment Plant (WWTP)
Secondary Treatment and Facilities Project,
Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu
TMK: [1] 9-1-013:007

Prepared for
AECOM Pacific, Inc.

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Kailua, Hawai‘i
(Job Code: HONOULIULI 105)

December 2015

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Management Summary

Reference	Archaeological Assessment* for the Honouliuli Wastewater Treatment Plant (WWTP) Secondary Treatment and Facilities Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: [1] 9-1-013:007 (Yucha et al. 2015)
Date	December 2015
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: HONOULIULI 105
Investigation Permit Number	CSH completed the fieldwork component of this study under archaeological permit number 14-04, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-13-282.
Agencies	SHPD
Land Jurisdiction	City and County of Honolulu – Department of Environmental Services
Project Funding	City and County of Honolulu
Project Location	The project area is located immediately south of the ‘Ewa Villages in central Honouliuli Ahupua‘a in southwest O‘ahu and is bounded by Geiger Road on the south, Roosevelt Avenue on the south and west, Kalo‘i Gulch on the east, and the Oahu Railway and Land (OR&L) Right-of-Way on the north. The project area encompasses two adjacent recently consolidated parcels (TMKs: [1] 9-1-013:007 and the former TMK [1] 9-1-069:003) that have now been combined to comprise TMK: [1] 9-1-013:007. The project area includes the current heavily built-out waste water treatment plant and relatively undeveloped areas to the north and east of the facility. The project area is depicted on the 1998 Ewa and 1999 Pearl Harbor U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles.
Project Description	The City and County of Honolulu is updating their West Mamala Bay Facilities Plan. This project proposes to upgrade and expand the existing Honouliuli WWTP to provide secondary treatment and accommodate projected wastewater flows. Regardless of which treatment alternative is selected, additional improvements at the Honouliuli WWTP are proposed for the following existing facilities: Central Laboratory, Ocean Team Facilities, Administration Building, Operations Building, Leeward Region Maintenance, Central Shops, Warehouse, Truck Wash, Process Supervisory Control and Data Acquisition, Septage Receiving Station, Odor Control, Groundskeeping, Janitorial Service and Security, and Honouliuli Water Recycling Facility. It will also address the potential siting of new facilities at the Honouliuli WWTP to help consolidate island-wide wastewater treatment services.

Project Acreage	<p>The project area includes approximately 101.0 acres (40.9 ha).</p> <p>The 48.18 acre (19.50 hectare) northern and eastern relatively undeveloped portions of the project area (the former TMK [1] 9-1-069:003) was previously addressed an <i>Archaeological Assessment of the 'Ewa Industrial Park Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island</i>, (O'Hare et al. 2007) that was reviewed and accepted in an SHPD § 6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A) and the main, built-up area of the Honouliuli Wastewater Treatment Plant of approximately 52.82 acres (21.38 hectares) is newly addressed.</p>
Historic Preservation Regulatory Context	<p>The northern and eastern relatively undeveloped portions of the project area amounting to an area of 48.18 acres was the subject of an <i>Archaeological Assessment of the 'Ewa Industrial Park Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island</i>, (O'Hare et al. 2007) that was reviewed and accepted in an SHPD §6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A). The present study included a reconnaissance of the O'Hare et al. (2007) project area but only for the purpose of documenting present conditions. No historic properties were identified.</p> <p>The remaining southwestern portion of the project area including the heavily built-out wastewater treatment plant was subject to 100% pedestrian survey coverage during the current study. No historic properties were identified.</p> <p>This document was prepared to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) §6E-42 and HAR §13-13-284. In consultation with SHPD, the archaeological inventory survey investigation was designed to fulfill the State requirements for an archaeological inventory survey per HAR §13-13-276. Because no historic properties were identified within the project area, this investigation is termed an archaeological assessment.</p> <p>This study was revised to address requested revisions to a November 2014 draft supplied in a Chapter 6E-8 Historic Preservation Review dated October 22, 2015 (LOG. NO. 2014.05307, DOC. NO. 1509AEM02)</p>
Fieldwork Effort	Fieldwork was accomplished on 24 October 2014 by Trevor Yucha, B.S. and David W. Shideler, M.A. under the general supervision of Principal Investigator, Hallett H. Hammatt Ph.D. This work required approximately 1 person-day to complete.
Number of Historic Properties Identified	None

Effect Recommendation	No historic properties were identified within the approximately 100-acre project area. Consequently, CSH's effect recommendation for the proposed project is "no historic properties effected."
Mitigation Recommendations	No further cultural resource management work is recommended for the current project.

* CSH completed an archaeological inventory survey, which due to the lack of historic properties is reported as an archaeological assessment.

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Section 1 Introduction

1.1 Project Background

At the request of AECOM Pacific, Inc., Cultural Surveys Hawai‘i, Inc. (CSH) completed an archaeological inventory survey, which due to the lack of historic properties is reported as an archaeological assessment for the Honouliuli Wastewater Treatment Plant (WWTP) Secondary Treatment and Facility, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: [1] 9-1-013:007.

The project area is located immediately south of the ‘Ewa Villages in central Honouliuli Ahupua‘a in southwest O‘ahu and is bounded by Geiger Road on the south, Roosevelt Avenue on the south and west, Kalo‘i Gulch on the east, and the Oahu Railway and Land (OR&L) Right-of-Way on the north. The project area encompasses two adjacent recently consolidated parcels (TMKs: [1] 9-1-013:007 and the former TMK [1] 9-1-069:003) that have now been combined to comprise TMK: [1] 9-1-013:007. The project area includes the current heavily built-out waste water treatment plant and relatively undeveloped areas to the north and east of the facility. The project area is depicted on the 1998 Ewa and 1999 Pearl Harbor U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Figure 1), tax map plats (Figure 2 and Figure 3), and a 2013 aerial photograph (Figure 4).

Of this 101.0 acre (40.9 ha) project area, the 48.18 acre (19.50 hectare) northern and eastern relatively undeveloped portions of the project area (the former TMK [1] 9-1-069:003) was previously addressed an *Archaeological Assessment of the ‘Ewa Industrial Park Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island*, (O‘Hare et al. 2007) that was reviewed and accepted in an SHPD § 6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A) and the main, built-up area of the Honouliuli Wastewater Treatment Plant of approximately 52.82 acres (21.38 hectares) is newly addressed.

The City and County of Honolulu is updating their West Mamala Bay Facilities Plan. This project proposes to upgrade and expand the existing Honouliuli WWTP to provide secondary treatment and accommodate projected wastewater flows. Regardless of which treatment alternative is selected, additional improvements at the Honouliuli WWTP are proposed for the following existing facilities: Central Laboratory, Ocean Team Facilities, Administration Building, Operations Building, Leeward Region Maintenance, Central Shops, Warehouse, Truck Wash, Process Supervisory Control and Data Acquisition, Septage Receiving Station, Odor Control, Groundskeeping, Janitorial Service and Security, and Honouliuli Water Recycling Facility. The project will also address the potential siting of new facilities at the Honouliuli WWTP to help consolidate island-wide wastewater treatment services.

1.2 Historic Preservation Regulatory Context

The northern and eastern relatively undeveloped portions of the project area amounting to an area of 48.18 acres was the subject of an *Archaeological Assessment of the ‘Ewa Industrial Park Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island*, (O‘Hare et al. 2007) that was reviewed and accepted in an SHPD § 6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A). The present study

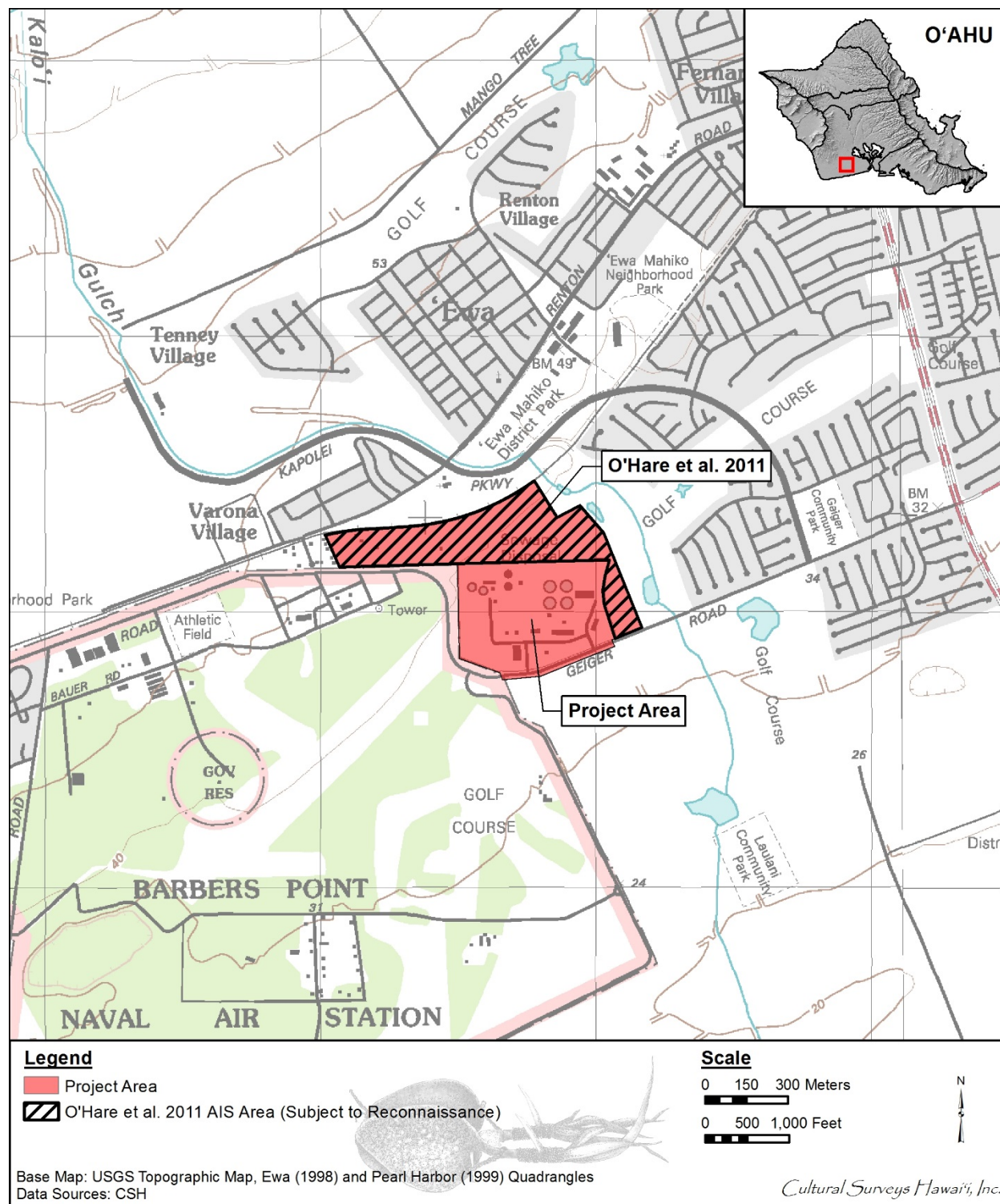


Figure 1. Portion of the 1998 Ewa and 1999 Pearl Harbor USGS 7.5-minute topographic quadrangles showing the location of the project area

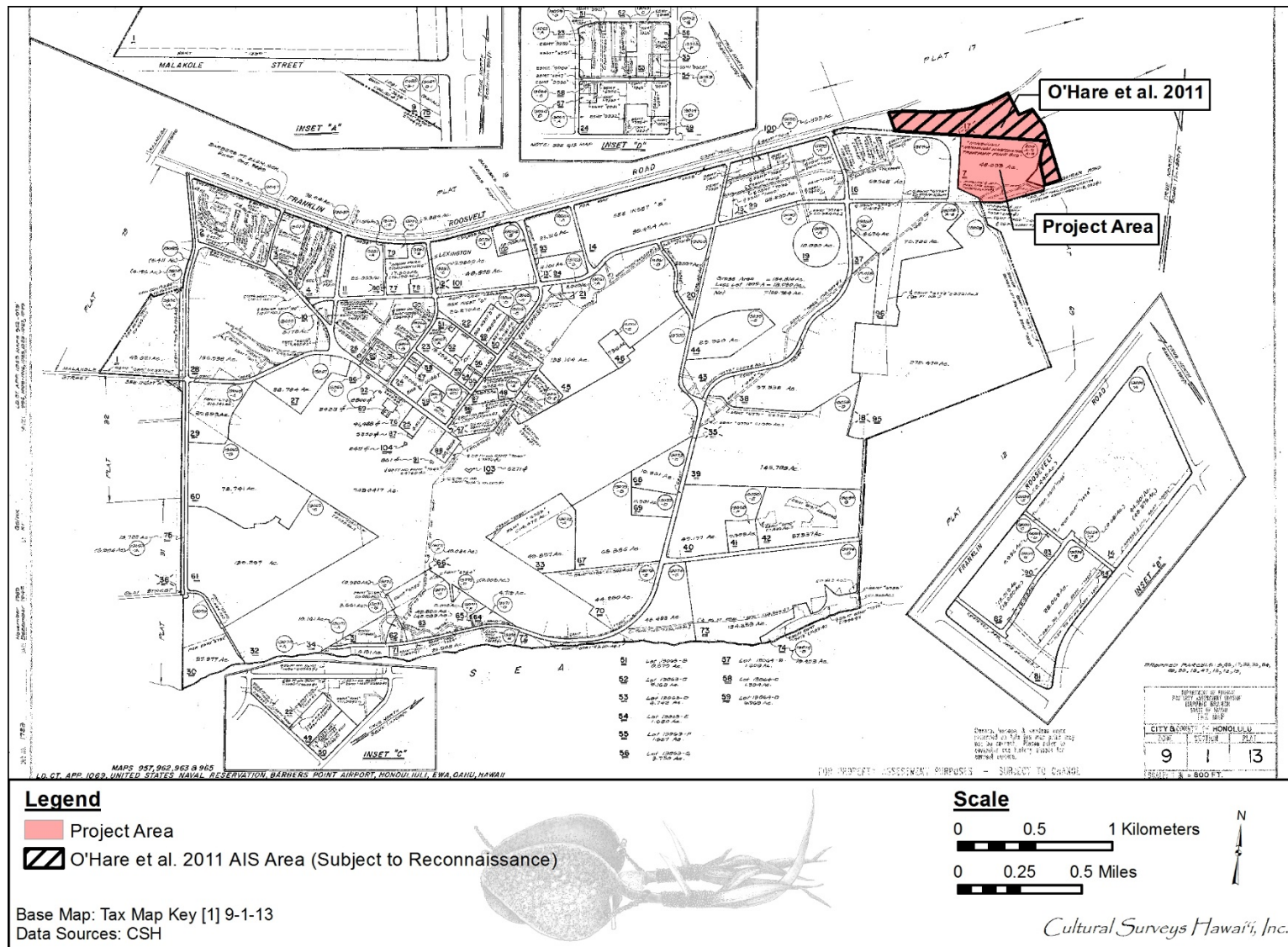


Figure 2. Tax Map Key (TMK) [1] 9-1-013 showing project area

Archaeological Assessment for the Honouliuli WWTP, Honouliuli, 'Ewa, O'ahu

TMK: [1] 9-1-013:007

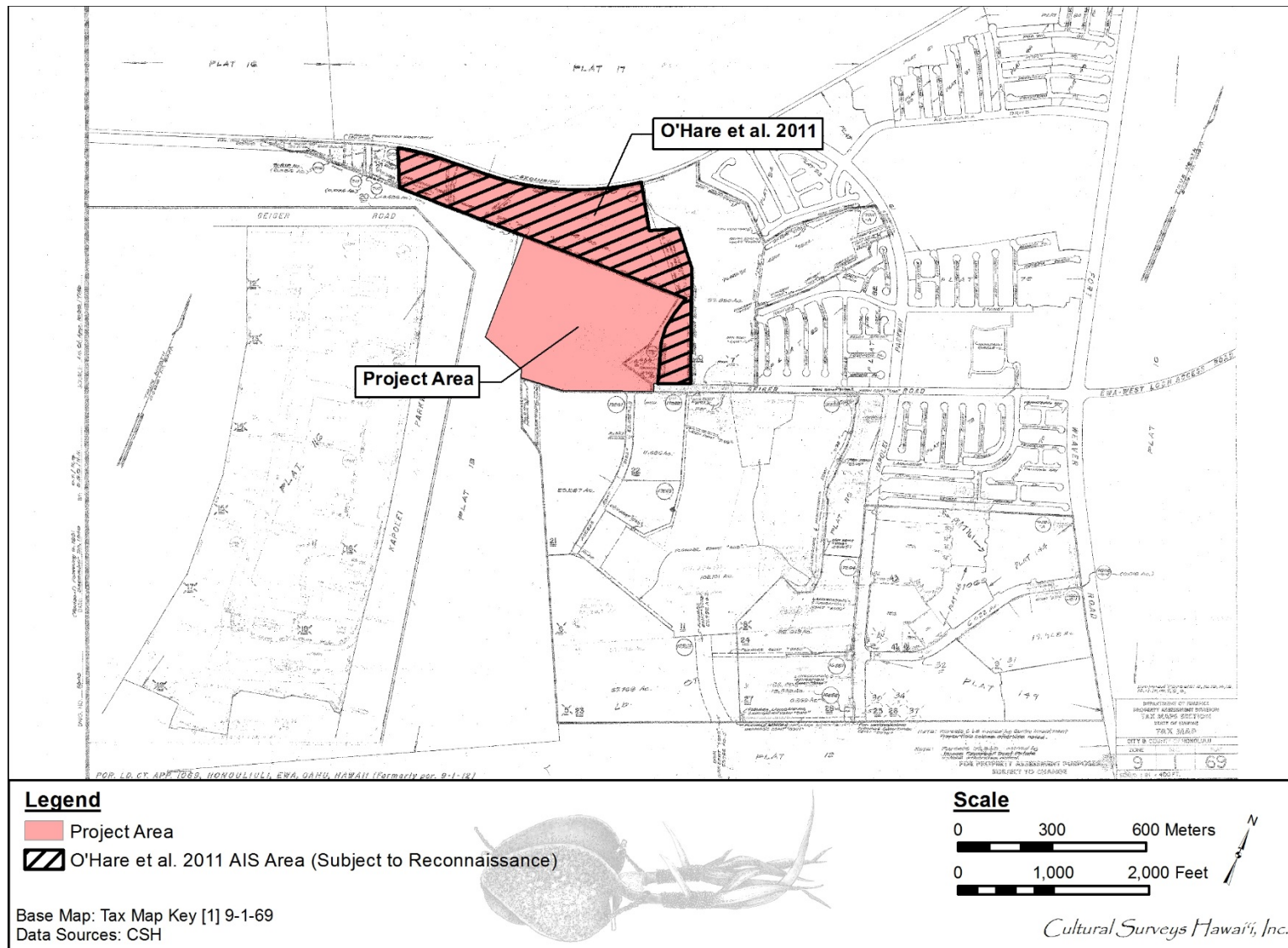


Figure 3. TMK: [1] 9-1-069 showing project area

Archaeological Assessment for the Honouliuli WWTP, Honouliuli, 'Ewa, O'ahu

TMK: [1] 9-1-013:007

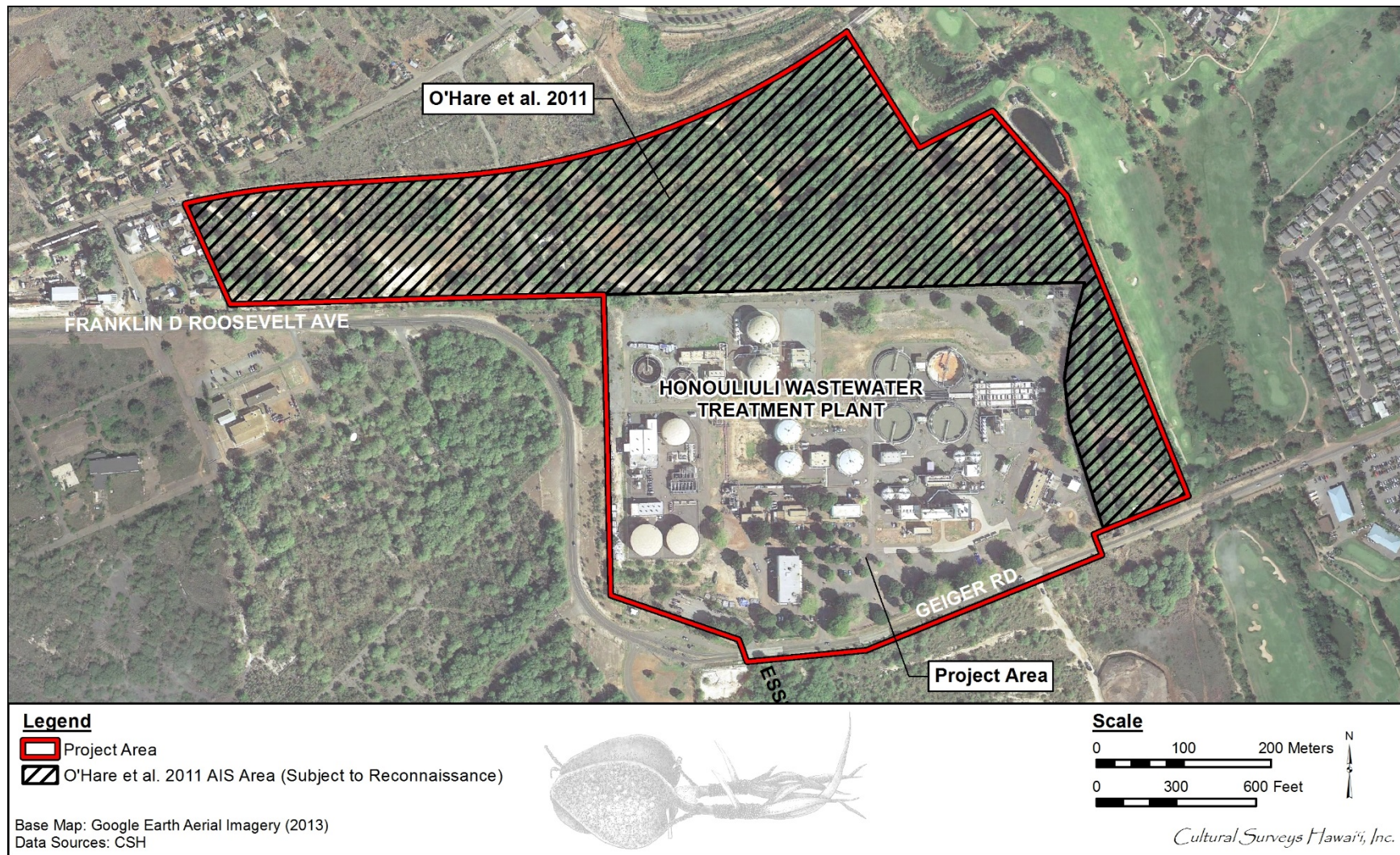


Figure 4. 2013 aerial photograph showing project area (Google Earth 2013)

included a reconnaissance of the O’Hare et al. (2007) project area but only for the purpose of documenting present conditions. No historic properties were identified.

The remaining southwestern portion of the project area including the heavily built-out wastewater treatment plant was subject to 100% pedestrian survey coverage during the current study. No historic properties were identified.

This document was prepared to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) §6E-42 and Hawai‘i Administrative Rules (HAR) §13-13-284. In consultation with SHPD, the archaeological inventory survey investigation was designed to fulfill the State requirements for an archaeological inventory survey per HAR §13-13-276. Because no historic properties were identified within the project area, this investigation is termed an archaeological assessment.

1.3 Environmental Setting

1.3.1 Natural Environment

Honouliuli Ahupua‘a is the largest traditional land unit on O‘ahu, extending from the West Loch of Pearl Harbor in the east, to the border of Nānākuli Ahupua‘a at Pili o Kahe in the west. Honouliuli Ahupua‘a includes approximately 19 km, or 12 miles, of open coastline from One‘ula westward to Pili o Kahe. The *ahupua‘a* (land division) extends *mauka* (inland) from West Loch nearly to Schofield Barracks in Wahiawā. The western boundary is the Wai‘anae Mountain crest running north as far as Pu‘u Hāpapa (or to the top of Ka‘ala Mountain, according to some).

Not only is there a long coastline fronting the normally calm waters of leeward O‘ahu, but there are also 4 miles of waterfront along West Loch.

The project area is located on the ‘Ewa Plain, which is a Pleistocene (>38,000 years old) reef platform overlain by alluvium from the southern end of the Wai‘anae Mountain Range. The land immediately *mauka* of the Pacific coast consists of a flat karstic raised limestone reef forming a level nearly featureless “desert” plain marked in pre-Contact times (previous to alluviation caused by sugar cultivation) by a thin or non-existent soil mantle. The microtopography is notable for containing countless sinkholes in some areas caused by chemical weathering (dissolution) of the limestone shelf.

Along the eastern flank of the Wai‘anae Mountains, numerous gulches have contributed to the alluvial deposits over the coastal limestone shelf. The largest of the gulches is Honouliuli Gulch, which drains into West Loch. The gulches are generally 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 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, as such, do not form stable water sources for traditional agriculture in their upper reaches. The Honouliuli gulches generally do not have valleys suitable for extensive irrigated agriculture; however, this lack is more than compensated for by the rich watered lowlands near West Loch.

Lying in the lee of the Wai‘anae mountain range, the project area is one of the driest areas of O‘ahu with most of the area averaging about 18 inches of rainfall annually (Juvik and Juvik

1998:56). Temperatures range between 60° to 90°F through the year; the highest temperatures are in August and September (Armstrong 1973). Elevation in the project area ranges from 30-50 ft, or 10 to 15 m AMSL (above mean sea level).

The distance from the coast (and generally from fresh water) made these little used areas in the pre-Contact period. The intensive land disturbance of a century of commercial cane cultivation probably removed most of what little evidence of pre-Contact use there ever was. The archaeological sensitivity of these areas is generally regarded as low.

In pre-Contact Hawai'i, the project area would have been mostly lowland dry shrub and grassland, dominated by species such as *wiliwili* (*Erythrina sandwicensis*), *lama* (*Diospyros ferrea*), sandalwood (*Santalum* sp.), 'a'ali'i (*Dodonea eriocarpa*), scrub 'ōhi'a (*Metrosideros collina*) and *pili* grass (*Heteropogon contortus*) (Cuddihy and Stone 1990:12-15). In contrast, the non-cleared portions of the project area are currently dominated by introduced species such as *kiawe* and the prickly Lions Ear (*Leonotis nepetaefolia*).

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), soils within the project area primarily consist of Mamala stony silty clay loam, 0 to 12% slopes (MnC) with Ewa silty clay loam, moderately shallow, 0 to 2% slopes (EmA), Honouliuli clay, 0 to 2% slopes (HxA), and Waialua silty clay, 0 to 3% slopes (WkA) within the southeast corner (Figure 5).

Soils of the Mamala Series are described as follows:

This series consists of shallow, well-drained soils along the coastal plains in the islands of Oahu and Kauai. These soils formed in alluvium deposited over coral limestone and consolidated calcareous sand. They are nearly level to moderately sloping. Elevations range from nearly sea level to 100 feet on Oahu but extend to 850 feet on Kauai. The annual rainfall amounts to 18 to 25 inches, most of which occurs between November and April. [Foote et al. 1972:93]

Soils of the Ewa Series are described as follows:

This series consists of well-drained soils in basins and on alluvial fans on the islands of Maui and Oahu. These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from near sea level to 150 feet. The annual rainfall amounts to 10 to 30 inches. Most of it occurs between November and April. [Foote et al. 1972:29]

Soils of the Honouliuli Series are described as follows:

This series consists of well drained soils on coastal plains on the island of Oahu in the Ewa area. These soils developed in alluvium derived from basic igneous material. They are nearly level and gently sloping. Elevations range from 15 to 125 feet. The annual rainfall amounts to 18 to 30 inches and occurs mainly between November and April. [Foote et al 1972:43]

Soils of the Waialua Series are described as follows:

This series consists of moderately well drained soils on alluvial fans on the island of Oahu. These soils developed in alluvium weathered from basic igneous rock.

They are nearly level to steep. Elevations range from 10 to 100 feet. The annual rainfall amounts to 25 to 50 inches; most of it occurs between November and April. [Foote et al. 1972:128]

This alluvium supported commercial sugar cane cultivation for over a century.

The project area lies on sedimentary deposits (Holocene and Pleistocene caprock) within the designated Southern Oahu Regional Aquifer System with ground-water flow to the SSW (Hunt 1996:B3, B33, B42). A review of historic maps shows the Kalo'i Gulch natural drainage way arcing around the project area to the east but historic maps (see Figure 8 and Figure 11 through Figure 13) often show Kalo'i Gulch as having no clear origin or clear end point. This may be accounted for by Hunt's comment that:

The permeability of calcareous rocks commonly is moderate to very high and results from primary depositional textures, as well as from development of secondary porosity by solution. (Hunt 1996:B-26).

Due to this relatively high permeability Kalo'i Gulch was not a well-developed surface drainage.

1.3.2 Built Environment

The southern portion of the project area is currently occupied by the Honouliuli Wastewater Treatment Plant and facilities. The northern portion of the project area is currently located in vacant land. The project area is bordered by the OR&L ROW to the north, Geiger Road on the south, Kalo'i Gulch on the east, and Roosevelt Avenue on the south and west.

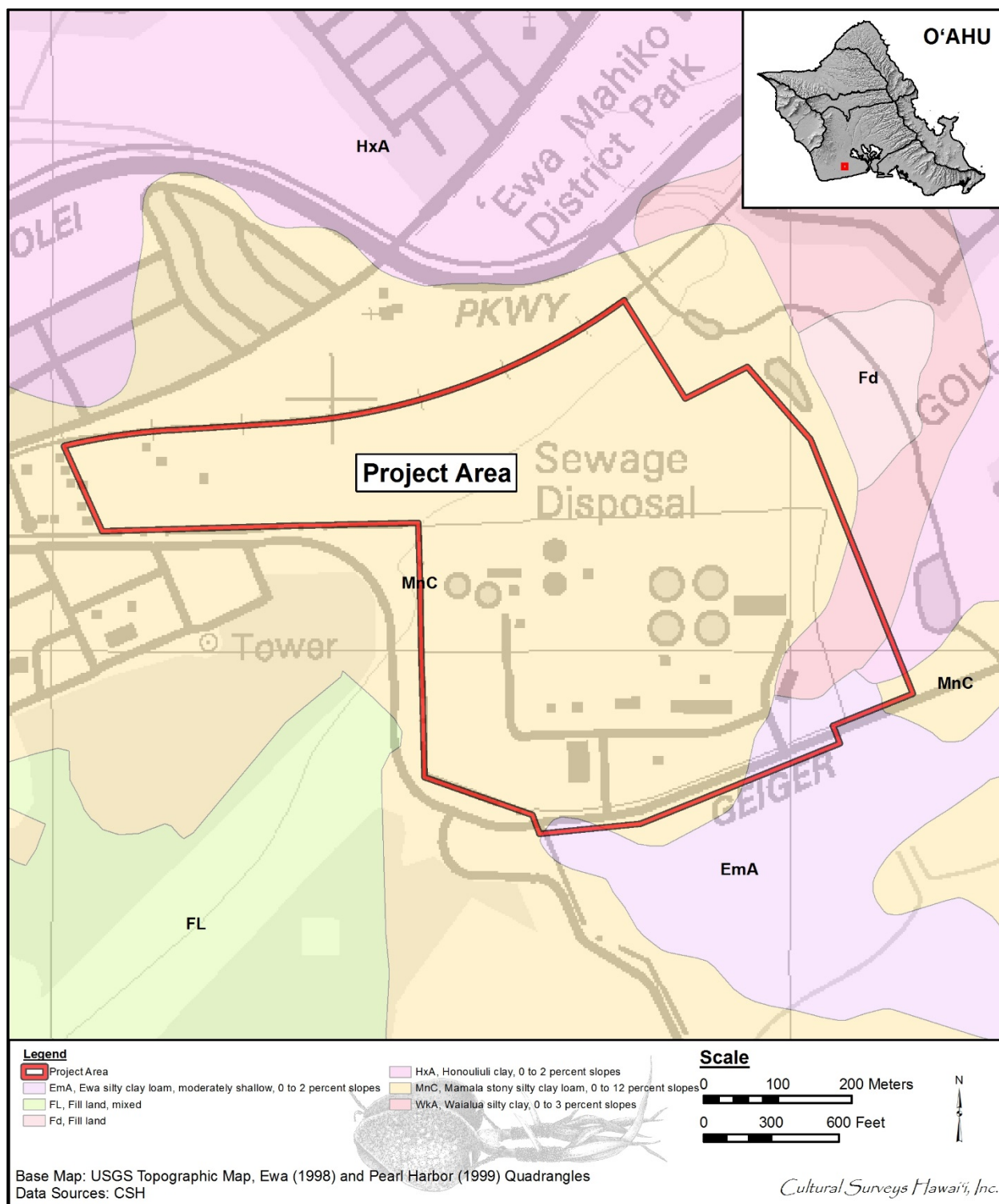


Figure 5. Overlay of a soil survey of the State of Hawai'i (U.S. Department of Agriculture 2001) indicating sediment types within and surrounding the current project area

Section 2 Methods

2.1 Methods Used to Address the Two Different Areas of the Project

The northern and eastern relatively undeveloped portions of the project area (formerly designated TMK [1] 9-1-069:003) amounting to an area of 48.18 acres (19.50 hectares) was the subject of an *Archaeological Assessment of the 'Ewa Industrial Park Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island, TMK: (1) 9-1-069:003* (O'Hare et al. 2007) that was reviewed and accepted in an SHPD §6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A). The present study included a further reconnaissance of the O'Hare et al. (2007) project area but only for the purpose of documenting present conditions. No historic properties were identified.

The previously unsurveyed built-up area of the Honouliuli Wastewater Treatment Plant of approximately 52.82 acres (21.38 hectares) is newly addressed and was subject to the field methods and literature and map review described below.

2.2 Field Methods

2.2.1 Pedestrian Inspection

CSH completed an archaeological inventory survey, which due to the lack of historic properties is reported as an archaeological assessment. The fieldwork was carried out under archaeological research permit number 14-04, issued by the Hawai'i SHPD per HAR §13-13-282. Fieldwork was accomplished on 24 October 2014 by Trevor Yucha, B.S. and David W. Shideler, M.A. under the general supervision of Principal Investigator, Hallett H. Hammatt Ph.D. This work required approximately 1 person-day to complete.

Fieldwork included a pedestrian inspection of the entire project area, GPS data collection, and general documentation. The remaining southwestern portion of the project area including the heavily built-out wastewater treatment plant was subject to 100% pedestrian survey coverage during the current study. Because of the extensive infrastructure of the operating wastewater treatment plant standard, parallel, pedestrian sweeps were not possible. Rather the archaeologists attempted to investigate all portions of the facility that were not built upon by walking around the existing infrastructure (see Figure 16 in the Section 4 Results of Fieldwork section). No historic properties were identified.

General documentation included general view photographs of the project area, notes, a track log taken (see Figure 16) with a Garmin model GPSMAP 60CSx with an accuracy: +/- 3-5 m and a photographic log.

2.2.2 Rationale for No Subsurface Testing

Background research produced no evidence of traditional Hawaiian use of the project area which is far from the sea or perennial streams in an area of low rainfall. Field inspection indicated very extensive land disturbance associated with the construction of the existing WWTP.

2.3 Literature and Map Review

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai‘i, the Hawai‘i State Archives, the Mission Houses Museum Library, the Hawai‘i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai‘i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records from the Waihona ‘Aina database (Waihona ‘Aina 2000) were examined.

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 3 Background Research

3.1 Traditional and Historical Background

Hawaiians recognize several land divisions in varying scales, including the *moku* (district or island), the *kalana* (smaller land division than a *moku*), the *ahupua‘a* (land division usually extending from the uplands to the sea), and the *‘ili* (smaller land divisions within an *ahupua‘a*) (Malo 1976:16). S.K. Kuhano wrote in 1873 (cited in Kame‘eleihiwa 1992:330) that O‘ahu was divided into six *kalana* (although later scholars refer to these same divisions as *moku*)—Kona, ‘Ewa, Wai‘anae, Waialua, Ko‘olau Loa and Ko‘olau Poko—that were further divided into 86 *ahupua‘a*. Within ‘Ewa, there were 12 *ahupua‘a* including (from west to east) Honouliuli, Hō‘ae‘ae, Waikele, Waipi‘o, Waiawa, Mānana, Waimano, Waiau, Waimalu, Kalauao, ‘Aiea, and Hālawa (Kame‘eleihiwa 1992:330). Modern maps and land divisions still generally follow the ancient system and use the same land divisions.

‘Ewa is depicted as an abundant and populated land where chiefs of distinguished lineages were born and resided (Cordy 1996:1-6). The land was fertile and well fed by mountain streams that helped sustain the agricultural lifestyle needed to support the chiefs, their households, and their people. An examination of place names reveals that water was a very important factor in this *moku*. Six of the 12 *ahupua‘a* in ‘Ewa Moku—Waikele, Waipi‘o, Waiawa, Waimano, Waiau, and Waimalu—begin with *wai*, the Hawaiian word for water. The fact that there were so many fishponds in ‘Ewa, more than any other *moku* on O‘ahu, indicates agricultural and aquacultural intensification was a direct link to the chiefs who resided there and to the increasing needs of the population.

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 the 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 is the largest *ahupua‘a* in the *moku* of ‘Ewa. The name Honouliuli means “dark water,” “dark bay,” or “blue harbor” (Pukui et al. 1974:51) 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 (*lit.* long hill). Another explanation for the names 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 district Honouliuli was named for the grandfather of Lepeamoa (Westervelt 1923:164-184).

3.1.1 *Mo‘olelo* (Stories) of ‘Ewa

The *mo‘olelo* (stories) of ‘Ewa invoke the deep Hawaiian past. Some *mo‘olelo* make connections with Kahiki, the traditional homeland of Hawaiians in central Polynesia. Most notably, the chief Kaha‘i left from Kalaeloa (coastal area in Honouliuli Ahupua‘a) for a trip to Kahiki, and on his return to the Hawaiian Islands, brought back the first breadfruit (Kamakau 1991a:110) and planted it near the waters of Pu‘uloa (long hill), now known as Pearl Harbor (Beckwith 1940:97). In addition, several *mo‘olelo* associate places in ‘Ewa with the gods Kāne and Kanaloa, the pig god Kamapua‘a, the Hina family, and with the sisters of the Hawaiian volcano goddess Pele, all of whom have strong connections with Kahiki (Kamakau 1991a:111; Pukui et al. 1974:200).

‘Ewa literally means “crooked” or “unequal” (Pukui and Elbert 1986:42). Others interpret it as “strayed” in association with a story about the gods Kāne and Kanaloa, who threw a stone to determine the boundary of the district (see previous section).

3.1.2 *Mo‘olelo* (Stories) of Honouliuli

3.1.2.1 The Coastal Plains of Kaupe‘a and Pu‘uokapolei

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‘i 1959:27, 29; Nakuina 1992:54; E.M. Nakuina 1904 in Sterling and Summers 1978:34). The plain southwest of the hill was called Kaupe‘a.

3.1.2.2 *Pu‘uokapolei, Astronomical Marker and Heiau*

Pu‘u means hill and *Kapolei* means “beloved Kapo,” a reference to the sister of the Hawaiian volcano goddess, Pele. Samuel Kamakau (1976:14) says that ancient Hawaiians used Pu‘uokapolei as an astronomical marker to designate the seasons.

[T]he O‘ahu people who reckoned the time (*Oahu pō‘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 *heiau* was once on Pu‘uokapolei, but 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 making astronomical observations (Fornander 1919:4(2):292). Pu‘uokapolei may have been regarded as the gate of the setting sun, just as Kumukahi in Puna is regarded as the eastern gate of the rising sun; both places are associated with the Hawaiian goddess Kapo (Emerson 1993:41). This somewhat contradicts other Hawaiian cosmologies, in which Kū was the god of the rising sun and Hina, the mother of Kamapua‘a, was associated with the setting sun. Fornander (1919:4(2):292) states that Pu‘uokapolei may have been a jumping off place (also connected with the setting sun) and associated with the wandering souls who roamed the plains of Kaupe‘a and Kānehili, *makai* (inland) of the hill.

3.1.2.3 Pu'uokapolei and Kamapua'a

Pu'uokapolei was the home of Kamapua'a's grandmother, Kamaunuanoho, one of the three migrants from Kahiki that were ancestors to the people of O'ahu (Fornander 1919:5(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.

Kamapua'a subsequently conquered most of the island of O'ahu, and, installing his grandmother [Kamaunuanoho] as queen, took her to Pu'uokapolei, the lesser of the two hillocks forming the southeastern spur of the Wai'anae 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 Kamaunuanoho's house could still be seen at Pu'uokapolei." Another account (*Ka Loea Kālai 'āina* 13 January 1900 in Sterling and Summers 1978:34) speaks of Kekeleaiuku, the older brother of Kamapua'a, who also lived on Pu'uokapolei.

3.1.2.4 Pu'uokapolei and the Plains of Kaupe'a and Kānehili

Pele's sister Hi'iaka sang this bitter chant addressed to Lohiau and Wahine-ōma'o, which uses the association of the Plains of Kaupe'a as a place for the wandering of lost souls:

*Ku'u aikana i ke awa lau o Pu'uloa,
Mai ke kula o Pe'e-kaua, ke noho oe,
E noho kaua e kui, e lei i ka pua o ke kauno'a,
I ka pua o ke akuli-kuli, o ka wili-wili;
O ka iho'na o Kau-pe'e i Kane-hili,
Ua hili au; akahi no ka hili o ka la pomaika'i;
E Lohiau ipo, e Wahine-oma'o,
Hoe 'a mai ka wa'a i a'e aku au.*

We meet at Ewa's leaf-shaped lagoon, friends;
Let us sit, if you will on this lea
And bedeck us with wreaths of Kauno'a,
Of *akuli-kuli* and *wili-wili*,
My soul went astray in this solitude;
It lost the track for once, in spite of luck,
As I came down the road to Kau-pe'a.
No nightmare dream was that which tricked my soul.
This way, dear friends; turn the canoe this way;
Paddle hither and let me embark.
[Emerson 1993:162-163]

Several other Honouliuli places are mentioned in this chant, including Pe'e-kaua, which may be a variation of Kau-pe'e or Kaupe'a, and the plains of Kānehili, the last of which again refers to wandering, as the word *hili* means "to go astray" (Emerson 1993:162). In the chant, Hi'iaka is

moving downhill from Kaupe'a, probably the plains adjacent to Pu'uokapolei, toward the coast, the plain of Kānehili.

3.1.2.5 The Plains of Kaupe'a, Pu'uokapolei, and the Realm of Homeless Souls

There are several places on the 'Ewa coastal plain associated with *ao kuewa*, the realm of the homeless souls. Samuel Kamakau (1991b:47-49) 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* . . . [Kamakau 1991b:47-49]

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 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 O'ahu. If his soul came to Leilono (in Hālawā, 'Ewa near Red Hill), there he 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 pō 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*. . . . " (Kamakau 1991b:47).

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 1991b:49]

The breadfruit tree Leilono was said to have been located on the 'Ewa-Kona border, above Āliamanu. In another section of his account of the dead, Kamakau (1991b:29) calls the plain of wandering souls the "plain at Pu'uokapolei."

There are many who have died and have returned to say that they had no claim to an 'aumakua [realm] (*kuleana 'ole*). These are the souls, it is said, who only wander upon the plain of Kama'oma'o on Maui or on the plain at Pu'uokapolei on Oahu. Spiders and moths are their food. (Kamakau 1991b:29)

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 foster father, the Maui chief Kahekili, after Kahahana became treacherous and killed the high priest Ka'opulupulu.

<p><i>E newa ai o hea make i ka la,</i> <i>Akua noho la i Puuokapolei.</i> <i>E hanehane mai ana ka la i na</i> <i>wahine o Kamao,</i> <i>Akua pee,</i> <i>pua ohai o ke kaha,</i></p>	<p>Go carefully lest you fall dead in the sun, The god that dwells on Kapolei hill The sun is wailing on account of the women of Kamao, A hiding god, blossoming <i>ohai</i> of the banks,</p>
---	---

*I walea wale i ke a-
I ka ulu kanu a Kahai.
Haina oe e ka oo—
E ka manu o Kanehili.*

[Fornander 1919:6(2):297]

Contented among the stones—
Among the breadfruit planted by Kahai.
Thou wast spoken of by the oo—
By the bird of Kanehili.

Fornander provides some notes on this lament. The god dwelling at Kapolei is Kahahana, stating that this is where his soul has gone. Kamao is one of the names of the door to 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 1919:6(2):304).

Pukui (1983:180) offers this Hawaiian saying, which places the wandering souls in a *wiliwili* grove at Kaupe‘a.

Ka wiliwili of Kaupe‘a. The *wiliwili* grove of Kaupe‘a.
In ‘Ewa, O‘ahu. Said to be where homeless ghosts wander among the trees.

Beckwith (1940:154) has stressed that “the worst fate that could befall a soul was to be abandoned by its *‘aumakua* 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.

3.1.2.6 The Plain 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 legend suggests the plain around Pu‘uokapolei was called Pukaua. The legend 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 Kualaka‘i [near Barbers Point] in the evening, they caught these things, *‘a‘ama* crabs, *pipipi* shellfish, 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 *‘a‘ama* 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'ō* (supernatural beings) 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 grove on the hill. These women were named Pu'uokapolei and Nāwaineokama'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.

<i>Ku'u kāne i ke awa lau o Pu'uloa</i>	My man on the many harbored sea of Pu'uloa
<i>Mai ke kula o Pe'ekāua ke noho</i>	As seen from the plain of Pe'ekāua
<i>E noho kāua i ke kaha o ka 'ōhai</i>	Let us dwell upon the 'ohai covered shore
<i>I ka wiliwili i ka pua o ka lau noni</i>	Where the noni blossoms are twisted together
<i>O ka ihona i Kānehili la</i>	Descending along Kānehili
<i>Ua hili ho'i au-e</i>	I am winding along.

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

3.1.2.7 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 1919:5(2):274-276).

3.1.2.8 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 1917:4(3):450-463). Pikoi's skill was commemorated in a saying (Pukui 1983:200):

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

3.1.2.9 Story of Palila

In the legend 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.

Ha‘alele keia ia Ka‘ena, hele mai la a Kalena, a Pōhākea, Maunauna, Kānehoa, a ke kula o Keahumoa, nana ia ‘Ewa. Kū kēia i laila nānā i ke kū a ka ea o ka lepo i nā kānaka, e pahu aku ana kēia i ka la‘au palau aia nei i kai o Honouliuli, kū ka ea o ka lepo, nu lalo o ka honua, me he olai la, makau nā kānaka holo a hiki i Waikele. A hiki o Palila, i laila, e pa‘apu ana nā kānaka i ka nānā lealea a ke ‘li‘i o O‘ahu nei, oai o Ahuapau.

After leaving Ka‘ena, he came to Kalena, then on to Pōhākea, then to Manuauna [a peak in Honouliuli], then to Kānehoa [a peak in Honouliuli], then to the plain of Keahumoa [upland plain from Honouliuli to Waipi‘o] and looked 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 O‘ahu, Ahupau by name. [Fornander 1918:5(1):142-143]

3.1.2.10 The Demi-god Māui

In the stories of the demi-god Māui, Keahumoa is the home of Māui’s grandfather, Kuolokele (Kū-honeycreeper). One day, Māui’s wife, Kumulama, was stolen by the chief Peapeamakawalu, called eight-eyed-Pea-Pea, 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 Honouliuli, 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]

Kuolokele made a *moku-manu* (“bird-ship”) for Māui, who entered the body of the bird and flew to Moanalaha, the land of the chief Peapeamakawalu. 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).

A man named Kaopele, born in Waipi‘o, had a tendency to fall into deep trances for months at a time. While awake, he would create plantations of supernatural proportions. However, he was never able to enjoy the fruits of his labors because he would always fall into another deep sleep. During one profound slumber, Kaopele was believed to be dead; he was taken to Wailua, Kaua‘i to be offered as a sacrifice. Upon awakening, he married a woman named Makalani and stayed on Kaua‘i. They had a son named Kalelealuaka, who was also blessed with supernatural powers.

Kaopele instructed the boy in the arts of war and combat, which Kalelealuaka exhibited during two challenges with kings of Kaua‘i. One day, Kalelealuaka decided to travel to O‘ahu. A boy, Kaluhe, accompanied him and they paddled to Wai‘anae. There, he met another companion who he later named Keinoho‘omanawanui, the sloven. The three traveled toward the old plantation called Keahumoe (Keahumoa), in the *mauka* regions of Waipi‘o, formerly planted by Kaopele.

[T]he three turned inland and journeyed till they reached a plain of soft, whitish rock, where they all refreshed themselves with food. They kept on ascending, until Keahumoe lay before them, dripping with hoary moisture from the mist of the mountain, yet as if smiling through its tears. Here were standing bananas with ripened, yellow fruit, upland *kalo*, and sugar cane, rusty and crooked with age, while the sweet potatoes had crawled out of the earth and were cracked and dry. [Emerson 1998:86-87]

To determine the best settlement location, Kalelealuaka shot an arrow to see where it would land. He then built a mountain house and called it “Lelepua” (meaning “arrow flight”). One night, Kalelealuaka makes known his wish:

The beautiful daughters of Kakuhihewa to be my wives; his fatted pigs and dogs to be baked for us; his choice *kalo*, sugar cane, and bananas to be served up for us; that Kakuhihewa himself send and get timber and build a house for us; that he pull the famous *awa* of Kahuone; that the King send and fetch us to him; that he chew the *awa* for us in his own mouth, strain and pour it for us, and give us to drink until we are happy, and then take us to our house. [Emerson 1998:89]

Upon hearing such a request, the *mō‘ī* (high chief) Kākuhihewa confers with his priests and instead of killing Kalelealuaka, decides to test him in battle with Kūali‘i. Kalelealuaka proves worthy in battle and is given charge of Kākuhihewa’s kingdom.

3.1.2.11 *Hi‘iaka, Sister to the Hawaiian Volcano Goddess, Pele*

The goddess Hi‘iaka, sister of the volcano goddess Pele, passed through ‘Ewa and met women stringing *ma‘o* flowers to make lei. Hi‘iaka offered a chant, making known her wish for a lei around her own neck.

<i>E lei ana ke kula o Ke‘ahumoa i ka ma‘o</i>	The plains of Keahumoa are
	garlanded with <i>ma‘o</i>
<i>‘Olu‘olu wale nā wāhine kui lei o</i>	The lei-stringing women of the forest
<i>ka nahele</i>	are festively adorned
(Ho‘oumāhiehiemalie 2006a:287; 2006b:268)	

3.1.3 Traditional Settlement and Agricultural Patterns

Various Hawaiian legends and early historical accounts indicate ‘Ewa was once widely inhabited by pre-Contact populations, including the Hawaiian *ali‘i* (chiefly class). This would be due for the most part to the plentiful marine and estuarine resources available at the coast, where several sites interpreted as permanent habitations and fishing shrines have been located. Other attractive subsistence-related features of the district include irrigated lowlands suitable for wetland taro cultivation, as well as the lower forest area of the mountain slopes for the procurement of forest resources. Handy and Handy (1972) report the following:

The lowlands, bisected by ample streams, were ideal terrain for the cultivation of irrigated taro. The hinterland consisted of deep valleys running far back into the Ko'olau range. Between the valleys were ridges, with steep sides, but a very gradual increase of altitude. The lower part of the valley sides were excellent for the cultivation of yams and bananas. Farther inland grew the 'awa for which the area was famous. [Handy and Handy 1972:429]

In addition, breadfruit, coconuts, *wauke* (paper mulberry, *Broussonetia papyrifera*, used to make *kapa* for clothing), bananas, and *olonā* (*Touchardia latifolia*, used to make cordage) and other plants were grown in the interior. 'Ewa was known as one of the best areas to grow gourds and was famous for its *māmaki* (*Pipterus* spp.; used to make *kapa* for clothing). It was also famous for a rare taro called the *kāi o 'Ewa*, which was grown in mounds in marshy locations (Handy and Handy 1972:471). The cultivation of this prized and delicious taro led to the saying:

Ua 'ai i ke kāi-koi o 'Ewa. He has eaten the Kāi-koi taro of 'Ewa.

Kāi is O'ahu's best eating taro; one who has eaten it will always like it. Said of a youth of a maiden of 'Ewa, who, like the Kāi taro, is not easily forgotten. [Pukui 1983:305]

The lochs of Pearl Harbor were ideal for the construction of fishponds and fish traps. Forest resources along the slopes of the Wai'anae Range probably acted as a viable subsistence alternative during times of famine and/or low rainfall (Handy 1940:211; Handy and Handy 1972:469-470). The upper valley slopes may have also been a resource for sporadic quarrying of basalt used in the manufacturing of stone tools. At least one probable quarrying site (SIHP # 50-80-12-4322) is present in Makaīwa Gulch at 152 m (500 ft) above mean sea level (Hammatt et al. 1990) in Honouliuli.

3.1.4 Māweke and Overview of the Reign of *Ali'i* in 'Ewa

Many references document that chiefs resided in 'Ewa and that it was a political center in its day. Oral accounts of *ali'i* recorded by noted Hawaiian historian Samuel Kamakau date back to at least the twelfth century.

The chiefs of Līhu'e [upland area in 'Ewa], Wahiawā, and Halemano on O'ahu were called *lō ali'i*. Because the chiefs at these places lived there continually and guarded their *kapu*, they were called *lō ali'i* [from whom a 'guaranteed' chief might be obtained, *loa'a*]. They were like gods, unseen, resembling men. [Kamakau 1991a:40]

In the mid-eleventh century, Māweke, a direct lineal descendant of the illustrious Nānāulu (ancestor of Hawaiian royalty), was a chief of O'ahu (Fornander 1996:47). Keaunui, the second of his three sons, became the head of the powerful 'Ewa chiefs. Tradition tells of him cutting a navigable channel through the Pearl River using his canoe. Keaunui's son, Lakona, became the progenitor of the 'Ewa chiefs around 1400 (Fornander 1996:224-226). Chiefs within his line, the Māweke-Kumuhonua line, reigned until about 1520-1540, with their major royal center in Līhu'e in 'Ewa (Cordy 2002:24). Haka was the last chief of the Māweke-Kumuhonua line. He was slain by his men at the fortress of Waewae near Līhu'e (Fornander 1996:88; Kamakau 1991a:54). Power shifted between the chiefs of different districts from the 1500s until the early 1700s, when Kūali'i achieved control of all of O'ahu by defeating the Kona chiefs. He then defeated the 'Ewa chiefs

and expanded his control on windward Kaua'i. Peleihōlani, the heir of Kūali'i, gained control of O'ahu about 1740, and later conquered parts of Moloka'i. He ruled O'ahu until his death in about 1778 when Kahahana, of the 'Ewa line of chiefs, was selected as the ruler of O'ahu (Cordy 2002:24-41). Somewhere between 1783 and 1785, Kahahana was killed by Kahekili of Maui. The subsequent rebellion amongst the chiefs resulted in a near genocide of the line of monarchy on O'ahu. Oral reports also tell of how the stream of Hō'ai'ai in 'Ewa was choked with the bodies of the slain (Fornander 1996:224-226). Kahekili and the Maui chiefs retained control of O'ahu until the 1790s. Kahekili died at Waikīkī in 1794. His son, Kalanikūpule, was defeated the following year at the Battle of Nu'uau by Kamehameha (Kamakau 1992:376-377). Thus, the supremacy of the 'Ewa chiefs came to a final end.

3.1.5 Ka'ihikapu and Chiefly Rivalry

Around 1600-1620, the entire island of O'ahu was united under the rule of one woman, an *ali'i* named Kala'imanuia (Cordy 2002:30). Before her death, she divided her kingdom between four of her children: She gave the districts of Kona and Ko'olaupoko to Kū-a-Manuia; the *ahupua'a* of Kalauao, 'Aiea, Moanalua, and Hālawa to Ka'ihikapu-a-Manuia; the districts of 'Ewa and Wai'anae to Ha'o; and the districts of Waialua and Ko'olauloa to her daughter Kekela. To Kū, she passed on her title of *mō'i* so that the other three were still subject to their eldest brother. Kū, however, was greedy and began to try to take the lands allotted to his siblings away from them. Ha'o joined with his brother Ka'ihikapu in a battle defending against an attack by Kū, a battle in which Kū was slain. Ka'ihikapu then became *mō'i* and was a benevolent king, taking care of his subjects and making frequent tours around the island to observe the people. On one of these circuits, he visited his brother Ha'o at his court in Waikele and grew jealous of the riches of his brother's home in 'Ewa. Ka'ihikapu sent the carcass of a large man-eating shark that had been caught near his court in Waikīkī to his brother as a gift so that Ha'o could use it as a sacrifice to the gods at his *heiau* in Waikele. Ka'ihikapu's forces attacked Ha'o and his priests at the temple as they were unarmed and busy with the dedication ceremonies (Fornander 1996:270-271).

There are other versions of this *mo'olelo* that describe the shark as similar to the gift of the Trojan Horse, but Fornander (1996:271) believes these "embellishments" may have been made in the post-Contact period. In one version of this *mo'olelo* (Pukui 1983:191), Ka'ihikapu took Ha'o's lands from him.

The chiefs of Waikīkī and Waikele were brothers. The former wished to destroy the latter and laid his plot. He went fishing and caught a large niuhi [man-eating shark], whole skin he stretched over a framework. Then he sent a messenger to ask his brother if he would keep a fish for him. Having gained his consent, the chief left Waikīkī hidden with his best warriors in the 'fish.' Other warriors joined them along the way until there was a large army. They surrounded the residence of the chief of Waikele and linked arms to form a wall, while the Waikīkī warriors poured out of the 'fish' and destroyed those of Waikele. [Pukui 1983:191]

There is a saying concerning this rivalry between the two brothers, "*Ke one kuilima laula o 'Ewa*. The sand on which there was a linking of arms [*kuilima*] on the breadth of 'Ewa" (Pukui 1983:191).

In a different version of this *mo'olelo* (Kamakau 1991a:61-67), Ka'ihikapu cut open the shark captured from the Waikīkī waters, removed all the meat, and left the skin and bones. He sent a

messenger to his brother, Ha‘o, chief of Waikele, offering the shark to him. Ha‘o quickly agreed, and waited for the shark to be delivered to Waikele, where he planned to place it at his *heiau* as an offering to the gods. When the shark was placed on the altar, Ka‘ihikapu and his men jumped out and slaughtered his brother and all of the priests. The slain men were then put into the shark and offered as a sacrifice at the former *heiau* of his brother at Waikele. Kamakau (1991a:67) says that the name of this place of slaughter in Waikele was called Paumakua. Thrum (1922:665) translates this place name as “all fiery eyed.” McAllister (1933:106) located this destroyed *heiau*, called Hapupu, at the site then occupied by the Waipahu plantation stables.

O‘ahu was unified once more when Ka‘ihikapu’s son, Kākuhihewa, married his aunt’s (Kekela) daughter, Nāpūlānahu. Kākuhihewa had royal residences at Waikīkī, Kailua, and ‘Ewa. His descendants lost most of this unified power to the district chiefs over the next three generations (Cordy 2002:31).

3.1.6 Kūali‘i’s Defeat of the ‘Ewa *Ali‘i*

In the first half of the eighteenth century, the island of O‘ahu was ruled by the chief Kūali‘i, who consolidated his supreme power over the entire island by defeating the Kona chiefs and then the ‘Ewa chiefs in battle (Cordy 2002:32). Kūali‘i met ‘Ewa’s competing army on the plains of Keahumoa, but the ‘Ewa chiefs surrendered when they saw Kūali‘i’s overwhelming forces, and they ceded the lands of Ko‘olauloa, Ko‘olaupoko, Waialua, and Wai‘anae to him (Fornander 1917:4(2):366, 400).

3.1.7 The Overthrow of Kahahana and the Rule of Kahekili

O‘ahu was ruled by Kūali‘i’s son and grandson, and then by Kahahana, the son of the ‘Ewa chief Elani and the sister of Kūali‘i’s son Peleiōhalani (Fornander 1919:6(2):282). Kahahana had been raised in the court of the powerful Maui chief, Kahekili.

Thomas Thrum (1998:203-214) translates the legend of the *kahuna* Ka‘ōpulupulu, who lived in Waimea. Kahekili, the king of Maui sent his foster son, Kahahana to rule O‘ahu, around the year 1779 (Cordy 2002:42). Kahahana set up his royal compound in Waikīkī and commanded the priest Ka‘ōpulupulu to attend him there. At first Kahahana valued the wisdom of this wise priest, but after several years, Kahahana began to be cruel to the people, and in protest Ka‘ōpulupulu left Waikīkī to return to his home in Waimea. This angered the king, who sent messengers to order Ka‘ōpulupulu and his son Kahulupue to come to Wai‘anae where Kahahana then resided. They were placed into a special grass hut, one tied to the end post and one tied to the corner post of the house. The next day, Kahahana ordered his men to torture the son, stabbing his eyes and stoning him while his father watched. When Ka‘ōpulupulu saw this, he commanded his son to flee into the sea, saying these words (Pukui 1983), which contained a prophecy.

<i>E nui ke aho, e ku‘u keiki,</i>	Take a deep breath, my son, and lay
<i>a moe i ke kai, no ke kai la</i>	yourself in the sea, for then the land
<i>ho‘i ka ‘āina.</i>	shall belong to the sea.
[Pukui 1983:44]	

When Kahekili heard of this outrage, he sent an army to O‘ahu to depose Kahahana. The O‘ahu force was defeated around the year 1795 (Cordy 2002:19), and Kahahana, his wife, Kekuapoi, and his friend Alapai, fled westward, hiding at many places in ‘Ewa.

Upon the arrival here at Oahu of Kahekili, Kahahana fled, with his wife Kekuapoi, and friend Alapai, and hid in the shrubbery of the hills. They went to Aliomanu, Moanalua, to a place called Kinimakalehua; then moved along to Keanapuaa and Kepookala, at the lochs of Puuloa, and then from there to upper Waipio; thence to Wahiawa, Helemano, and on to Lihue [upper plain of Honouliuli, Hō'ae'ae, and Waipi'o]; thence they came to Poohilo, at Honouliuli, where they first showed themselves to the people and submitted themselves to their care. [Thrum 1998:213-214]

Through treachery, Kahahana was induced to leave Pō'ohilo, Honouliuli and was killed on the plains of Hō'ae'ae. While hiding in Pō'ohilo, and 'ili of Honouliuli:

. . . report thereof was made to Kahekili, the king, who thereupon sent Kekuamanoha, elder brother of Kekuapoi, the wife of Kahahana, with men in double canoes from Waikiki, landing first at Kupahu, Hanapouli, Waipio, and had instructions to capture and put to death Kahahana, as also his friend Alapai, but to save alive Kekuapoi. When the canoes touched at Hanapouli, they proceeded thence to Waikele and Hoaeae, and from there to Poohilo, Honouliuli, where they met with Kahahana and party in conference. At the close of the day Kekuamanoha sought by enticing words to induce his brother-in-law to go on with him and see the father king and be assured of no death condemnation, and by skilled flattery he induced Kahahana to consent to his proposition, whereupon preparation was made for the return. On the following morning, coming along and reaching the plains of Hoaeae, they fell upon and slew Kahahana and Alapai there, and bore their lifeless bodies to Halaulani, Waipio, where they were placed in the canoes and brought up to Waikiki and placed up in the coconut trees by King Kahekili and his priests from Maui, as Kaopulupulu had been. Thus was fulfilled the famous saying of the Oahu priest in 'all its truthfulness.' According to the writings of S.M. Kamakau and David Malo, recognized authorities, the thought of Kaopulupulu as expressed to his son Kahulupue, 'This land is the sea's,' was in keeping with the famous prophetic vision of Kekiopilo that 'the foreigners possess the land,' as the people of Hawaii now realize. [Manu 1904:112-113]

Somewhere between 1783 and 1785, Kahahana was killed by Kahekili of Maui. Kahahana's father 'Elani, along with other O'ahu chiefs, plotted to kill Kahekili and his chiefs who were residing at Kailua, O'ahu, as well as his chiefs residing at 'Ewa and Waialua. The plot was discovered by Kahekili, and a messenger was sent to warn Hū'eu at Wai'alua. For some reason, the messenger never reached Hū'eu and he and his retinue were killed. The murderers of Hū'eu were found in Waipi'o, "therefore Ewa became famed as a land of deadly plots" (*Ka Nūpepa Kū'oko'a*, 5 December 1868 translated in Sterling and Summers 1978:3). This slaughter became known as the Waipi'o *kīmopō*, or the Waipi'o assassination because it originated there. Kahekili avenged the death of Hū'eu by pillaging and destroying the districts of Kona and 'Ewa. It is said that the streams of Makaho and Niuhelewai in Kona as well as Hō'ae'ae in 'Ewa were "choked with the bodies of the slain, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter" (Kamakau 1992:138). It was during this time that the O'ahu chiefly lines were nearly exterminated. It is said that one of the Maui chiefs, Kalaihoa, used the bones of the slain to build a wall around his house at Lapakea in Moanalua. The house was known

as Kauwalua and could be seen as one passed by the “old upper road to ‘Ewa” (Fornander 1996:290).

3.1.8 Early Historic Period

Captain James Cook landed in the Hawaiian Islands in 1778, and ten years later the first published description of Pearl Harbor appeared. Captain Nathaniel Portlock, observing the coast of Honolulu for Great Britain, recorded the investigation of a “fine, deep bay running well to the northward” around the west point of “King George’s Bay” in his journal (Portlock 1789:74). Portlock’s description matches the entire crescent-shaped shoreline from Barbers Point to Diamond Head.

Captain George Vancouver made three voyages to the Hawaiian Islands between 1792 and 1794. In 1793, the British captain recorded the name of the harbor opening as “O-poo-ro-ah” and sent several boats across the sand bar to venture into the harbor proper (Vancouver 1798:884). The area known as “Pu‘u-loa” was comprised of the eastern bank at the entrance to Pearl River. George Vancouver anchored off the entrance to West Loch in 1793, and the Hawaiians told him of the area at “a little distance from the sea, [where] the soil is rich and all the necessities of life are abundantly produced” (Vancouver 1798 in Sterling and Summers 1978:36). Mr. Whitbey, one of Vancouver’s crew, observed, “from the number of houses within the harbor it should seem to be very populous; but the very few inhabitants who made their appearance were an indication of the contrary” (Vancouver 1798 in Sterling and Summers 1978:36).

Captain Vancouver sailed by Kalaeloa (Barbers Point) in 1792, and recorded his impression of the small coastal village of Kualaka‘i and the arid Honouliuli coast.

The point is low flat land, with a reef round it . . . Not far from the S.W. point is a small grove of shabby cocoa-nut trees, and along these shores are a few struggling fishermen’s huts. [Vancouver 1798:1:167]

. . . from the commencement of the high land to the westward of Opooroah [Pu‘uloa], was composed of one very barren rocky waste, nearly destitute of verdure, cultivation or inhabitants, with little variation all the way to the west point of the island . . . [Vancouver 1798:2:217]

This tract of land was of some extent but did not seem to be populous, nor to possess any great degree of fertility; although we were told that at a little distance from the sea, the soil is rich, and all necessities of life are abundantly produced . . . [Vancouver 1798:3:361-363]

The reports left by Artemas Bishop of the Ewa Protestant Station in Waiawa shed light on the massive impact disease was having on the Hawaiian people in the ‘Ewa district. The 1831-1832 census of O‘ahu recorded a population of 4,015 within the ‘Ewa district. Four years later in 1836, the ‘Ewa population had dropped to 3,423 (Schmitt 1973:9, 36), “a decrease of 592 in 4 years” (Ewa Station Report 1836). Reverend Lowell Smith noted the following:

The people of Ewa are a dying people. I have not been able to obtain an exact count of all the deaths & births since the last general meeting. But my impression is that there have been as many as 8 or 10 deaths to one birth. I have heard of but 4 births

on Waiawa during the year, & all of these children are dead. I have attended about 20 funerals on that one land, & 16 of these were adults. [Ewa Station Report 1836]

The population stabilized in the 1830s and early 1840s. In January 1849, the population was 2,386 people but the population dropped with a measles epidemic in October 1849. Although Bishop made an attempt to vaccinate as many individuals as possible, the smallpox epidemic of 1853-1854 killed upwards of 400 people in the 'Ewa District. The comments of Artemas Bishop reflect the destitution people were suffering district wide:

It is not necessary that I go into detail of that season of sorrow and trial which we passed through, and from which I did not myself escape without feeling its influence in my own person. Let it suffice here, that not a house or family in Ewa escaped. In many cases, whole families were cut off. Husbands and wives parents and children, were separated by death. The whole state of society became disorganized, almost every family was broken up. In the whole district between July and October inclusive, upwards of half of the people died and of those who escaped, many are still enfeebled in consequence. In the church we have lost upwards of 400 members, including several of my best men. We feel ourselves very much crippled in consequence. Many sad and affected feelings, mingled with discouragement have followed my labors through the year, and that to a degree far beyond what I ever before suffered. [Ewa Station Report 1854]

Sereno Bishop also remembered his father's efforts to save his congregation, but with limited success in 'Ewa.

The greatest destruction of Hawaiian population took place in the summer of 1853, by an invasion of small-pox. This broke out in Honolulu. Rev. A. Bishop immediately procured a supply of vaccine matter, which proved to be spurious. He then proceeded to inoculate the people with small-pox, thus saving hundreds of lives, and himself coming down with varioloid, having formerly been vaccinated. But more than half of the population of Ewa perished in a few weeks. The earliest cases were pathetic. A young woman in Kalauao was visiting in Honolulu, and contracted the malady. She hastened home in terror and summoned her friends and kindred from all the villages of Ewa to bid her farewell. They all came and kissed her, then returned to their homes and all died. The young woman herself recovered. [Bishop 1916:46]

In 1860, Artemas Bishop reported,

The people of the district are rapidly diminishing, and whole neighborhoods where in former years were numerous families and cultivated lands, there are now no inhabitants, and the land is left to run to waste. The fathers have died off, and the children wander into other parts, and there are none to fill their places. [Ewa Station Report 1860]

Sereno Bishop, recollecting his life at the mission station in 'Ewa in the mid-eighteenth century, commented on the population decline: "Throughout the district of Ewa the common people were generally well fed. Owing to the decay of population great breadths of taro marsh had fallen into disuse, and there was a surplus of soil and water for raising food" (Bishop 1916:44).

At Contact, the most populous *ahupua'a* on the island was Honouliuli, with the majority of the population centered on Pearl Harbor. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years, the population was down to 870 (Schmitt 1973:19, 22). In 1835, there were eight to ten deaths for every birth (Kelly 1991:157-158). Between 1848 and 1853, there was a series of epidemics of measles, influenza, and whooping cough that often wiped out whole villages. In 1853, the population of 'Ewa and Wai'anae combined was 2,451 people. In 1872, it was 1,671 (Schmitt 1968:71). The inland area of 'Ewa was probably abandoned by the mid-nineteenth century, due to population decline and consolidation of the remaining people in the towns of Honouliuli, Waipahu, and Waiawa.

3.1.9 The Māhele and the Kuleana Act

In 1845, the Board of Commissioners to Quiet Land Titles, also called the Land Commission, was established “for the investigation and final ascertainment or rejection of all claims of private individuals, whether natives or foreigners, to any landed property” (Chinen 1958:8). This led to the Māhele, the division of lands among the king of Hawai'i, the *ali'i* (chiefs), and the common people, which introduced the concept of private property into Hawaiian society. Kamehameha III divided the land into four categories: certain lands to be reserved for the king and the royal house were known as Crown Lands; lands set aside to generate revenue for the government were known as Government Lands; lands claimed by *ali'i* and their *konohiki* (supervisors) were called Konohiki Lands; and habitation and agricultural plots claimed by the common people were called *kuleana* (Chinen 1958:8-15).

In 1848, the crown and the *ali'i* received their land titles, known as Land Commission Awards (LCA). Members of the royal family were awarded entire *ahupua'a*, while high-ranking *ali'i* were awarded entire *'ili*, and lesser *konohiki* were awarded half of an *'ili* (Kame'eleihiwa 1992:269, 279). Title to an *ahupua'a* or *'ili* typically included ownership of the area's fishpond and offshore fishing rights (Devaney et al. 1982:143). The lands awarded as Crown Lands and Konohiki Lands, as well as lands designated as Government Lands, were “subject to the rights of native tenants.” The Kuleana Act of 1850 “authorized the Land Commission to award fee simple titles to all native tenants who occupied and improved any portion of Crown, Government, or Konohiki Lands” (Chinen 1958:29). It is through records for Land Commission Awards (LCA) generated during the Māhele that the first specific documentation of life in 'Ewa, as it had evolved up to the mid-nineteenth century, come to light. There are no LCAs located within or in the vicinity of the current project area.

In 1855 the Land Commission awarded all of the unclaimed lands in Honouliuli, 43,250 acres, to Miriam Ke'ahikuni Kekau'ōnohi (Royal Patent #6971 in 1877; Parcel #1069 in the Land Court office), a granddaughter of Kamehameha I, and the heir of Kalanimōkū, who had been given the land by Kamehameha after the conquest of O'ahu (Indices of Awards 1929; Kame'eleihiwa 1992). Kekau'ōnohi was also awarded the *ahupua'a* of Pu'uloa, but she sold this land in 1849 to a man named Isaac Montgomery, a British lawyer.

Kekau'ōnohi was one of Liholiho's (Kamehameha II's) wives, and after his death, she lived with her half-brother, Luanu'u Kahalai'a, who was governor of Kaua'i (Hammatt and Shideler 1990:19-20:20). Subsequently, Kekau'ōnohi ran away with Queen Ka'ahumanu's stepson, Keli'iahonui, and then became the wife of Chief Levi Ha'alelea. Upon her death on June 2, 1851, all her property was

passed on to her husband and his heirs. A lawsuit (Civil Court Case No. 348) was brought by Ha'alelea in 1858, to reclaim the fishing rights of the Pu'uloa fisheries from Isaac Montgomery, and the court ruled in Ha'alelea's favor. In 1863, the owners of the *kuleana* lands deeded their lands back to Ha'alelea to pay off debts owed to him (Frierson 1972:12). In 1864, Ha'alelea died, and his second wife, Anadelia Amoe, transferred ownership of the land to her sister's husband, John Coney (Yoklavich et al 1995:16). [Souza et al. 2006]

3.1.10 Early Ranching

3.1.10.1 Ranching in Lower Honouliuli

In 1871, John Coney rented the lands of Honouliuli to James Dowsett and John Meek, who used the land for cattle grazing. An 1873 map of Honouliuli depicts the project area within undeveloped Honouliuli in relation to Pu'uloa and the West Loch of Pearl Harbor (Figure 6). In 1877, James Campbell purchased most of Honouliuli Ahupua'a—except the *'ili* of Pu'uloa—for a total of \$95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek, and James Robinson, and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). He let the land rest for one year and then began to restock the ranch, so that he had 5,500 head after a few years (Dillingham 1885 in Frierson 1972:14).

In 1881, a medical student touring the island to provide smallpox vaccinations to the population viewed Campbell's property, called the Honouliuli Ranch:

I took a ride over the Honouliuli Ranch which is quite romantic. The soil is a deep, reddish loam, up to the highest peaks, and the country is well-grassed. Springs of water abound. The *'ilima*, which grows in endless quantities on the plains of this ranch, is considered excellent for feeding cattle; beside it grows the indigo plant, whose young shoots are also good fodder, of which the cattle are fond. Beneath these grows the manieizie grass, and Spanish clover and native grasses grow in the open; so there is abundant pasturage of various kinds here. As I rode, to the left were towering mountains and gaping gorges; ahead, undulating plains, and to the right, creeks and indentations from the sea. A wide valley of fertile land extends between the Nuuanu Range and the Waianae Mountains and thence to the coast of Waialua. There are many wild goats in this valley, which are left more or less undisturbed because they kill the growth of mimosa bushes, which would otherwise overrun the country and destroy the pasturage for cattle. [Briggs 1926:62-63]

In 1880-1881, the Honouliuli ranch was described as follows:

Acreage, 43,250, all in pasture, but possessing fertile soils suitable for agriculture; affords grazing for such valuable stock. The length of this estate is no less than 18 miles. It extends to within less than a mile of the sea coast, to the westward of the Pearl River inlet. . . . There are valuable fisheries attached to this estate . . . [Bowser 1880:489]

From Mr. Campbell's veranda, looking eastward, you have one of the most splendid sights imaginable. Below the house there are two lochs, or lagoons, covered with water fowl, and celebrated for their plentiful supply of fish, chiefly mullet. . . . Besides Mr. Campbell's residence, which is pleasantly situated and surrounded

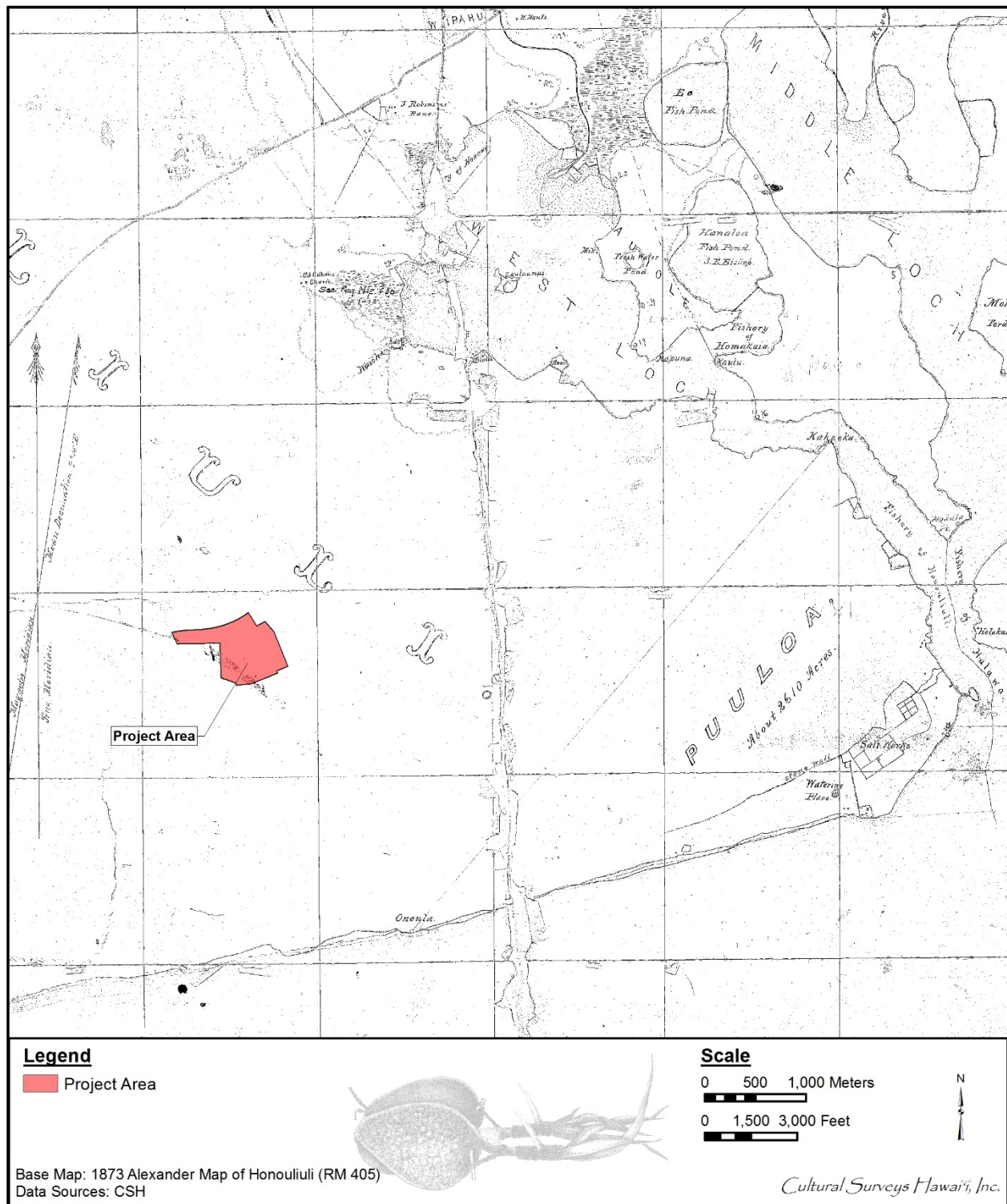


Figure 6. 1873 Alexander map of Honouliuli showing project

with ornamental and shade trees, there are at Honouliuli two churches and a school house, with a little village of native huts. [Bowser 1880:495]

Most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Company 1923:6-7). In 1879, Campbell brought in a well-driller from California to search the 'Ewa plains for water, and the well, drilled to a depth of 240 ft near Campbell's home in 'Ewa, resulted in "a sheet of pure water flowing like a dome of glass from all sides of the well casing" (The Legacy of James Campbell n.d. cited in Pagliaro 1987:3). Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource.

Between the years of 1861 and 1873, parcels of Waiawa were leased to Valdemar Knudsen for use as grazing lands for livestock. A 50-year lease and leaseholds were granted to James Robinson in 1868. After James Robinson's death in 1890, his son, Mark P. Robinson, acquired a 25-year lease. Overwritten on the lease was the "permission granted to assign the lease to the Oahu Railway and Land Company" (Hawaii Bureau of Land Conveyances 1855-1883:115:496). This lease was subleased from Oahu Railway and Land Company (OR&L) to the Oahu Sugar Company for 43 years on 1 January 1897. It is probable that much of the upper grasslands of Hō'ae'ae, Waikele, Waipi'o, and Waiawa were all used for cattle pasture.

3.1.10.2 Ranching in the Uplands of 'Ewa

Sereno Bishop stated that his father was the first to bring cows to 'Ewa:

Waiawa valley above us lay knee deep with the richest of grass, where our cows rioted. Our goats took to the higher ground, where they flourished, being driven in and penned at night. . . . The herd gradually multiplied and in a few years became large. [Bishop 1916:42]

These herds contributed to the deforestation of the upper valley, as noted by Bishop:

There was a very passable road down Ewa and Waianae way. Once while making the trip down to Waialua, to which there was a good horse trail, I discovered that even at that early day [ca. 1858] that cattle had made great inroads into the forests of ti plants which had theretofore clad the foothills and upland pasturages, even to the highest tracts. [Bishop 1916:60]

Subsequent to Western Contact in the area, the landscape of the 'Ewa plains was damaged by the removal of the sandalwood forest and the introduction of domesticated animals and new vegetation species. Domesticated animals including goats, sheep and cattle, were brought to the Hawaiian Islands by Vancouver in the early 1790s and allowed to graze freely about the land for some time after. It is unclear when domesticated animals were brought to O'ahu; however, L.A. Henke reports the existence of a longhorn cattle ranch in Wai'anae by at least 1840 (Frierson 1972:10). During this same time, perhaps as early as 1790, exotic vegetation species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the logging of sandalwood forest and eroded by animal grazing. Within the current project area, the majority of the (non-cultivated) vegetation is comprised of introduced species, mainly grasses.

3.1.11 Pineapple Cultivation

In the early decades of the twentieth century, lands in the *mauka* portion of the central and eastern sections of 'Ewa were being acquired for pineapple cultivation. Records show attempted pineapple irrigation utilizing water from shallow wells in Waiawa Gulch in 1893. Later attempts were made in Waiawa and Honouliuli. James Dole founded the Hawaiian Pineapple Company in 1901. The previous year, Dole had purchased 61 acres of land in Waiawa for growing pineapple. Prior to 1913, most of the upland plateau areas in Waiawa were planted in pineapple (Goodman and Nees 1991:59) and in several 'Ewa *ahupua'a* small plots along gullies not appropriate for sugar cane cultivation were planted in pineapple. Many of these small plots were cultivated by independent farmers who sold the crops at markets or to larger companies. In 1901, the Hawaiian Pineapple Company obtained 61 acres in Waiawa through public auction. Initially, most pineapple was shipped to California for packing. In an attempt to speed up processing, save money, and produce a fresher product, a cannery was constructed in Waiawa. This cannery was constructed by the Pearl City Fruit Company but it became a part of the Hawaiian Pineapple Company operations after the Pearl City Fruit Company went bankrupt. The cannery was in operation from 1905 to 1935.

A 1908 lease from the John 'I'i Estate, Ltd. to Yoshisuke Tanimoto and Kintaro Izumi led to the formation of the Waipio Pineapple Company, which cleared and cultivated approximately 223 acres in portions of Kīpapa Gulch. In 1909, the government appropriated the Waipi'o peninsula from the 'I'i estate. The land was valued at \$10,000 for purposes of fair compensation (Hawai'i Department of Land and Natural Resources 1909:228-235). In 1915, Libby, McNeill & Libby took over Waipio Pineapple Company's leases and continued to cultivate pineapple in the area. By the late 1920s, James Dole's Hawaiian Pineapple Company, incorporated in 1901, was cultivating pineapple on thousands of acres leased from the 'I'i estate in the *mauka* area of Waipi'o.

Pineapples were handpicked, graded, boxed, and loaded into trucks before the introduction of machinery into the harvesting process. The introduction of the mechanical field fruit harvester in 1947 eliminated the labor-intensive process of grading, boxing, and loading. The pineapple industry employed both male and female Japanese and Filipino workers in the fields and in the cannery. Camps were set up throughout 'Ewa to be used as housing for the workers and their families (Goodman and Ness 1991:165). In the 1920s, pineapple was abandoned and by 1935, much of the former pineapple lands were planted in sugar cane.

3.1.12 Other Agricultural Enterprises

Taro and other traditional plants continued to be cultivated in some areas. John Papa 'I'i associated Waiawa, 'Ewa with the brewing of intoxicants in the early 1800s and gives an account of the making of 'ōkolehao, an alcoholic drink made from brewing the roots of the native *ti* plant (*Cordyline fruticosa*).

It was interesting to see how *ti* root was converted into a strong liquor. When the root was boiled on a stove, the liquid came forth like the flowing of sweat from a bud. The hand was wetted with the first drippings and then waved over the flames, when the drippings burned brightly. The first brew was called *loko*, the second *kawai*, and the last *kawai hemo*. ['I'i 1959:85]

An additional agricultural trial was conducted in the Honouliuli area for the cultivation of sisal, a plant used to make fibers for rope and other material. Some sisal was planted before 1898 and production continued until the 1920s (Frierson 1972:16). This was grown mainly on the coastal plain of Honouliuli in Kānehili, just *mauka* of Kualaka'i Beach (now Nimitz Beach). An article in the *Paradise of the Pacific* in 1902 described this venture in glowing terms.

The venture was made and a tract of land containing a large percentage of disintegrated coral, in the neighborhood of Ewa Plantation, where nothing else would grow, was chosen for the planting. . . . The Hawaiian Fiber Co., which Mr. Turner organized, and of which he is now manager, has 755 acres under fence, two and a half miles of which is stone wall with good gates at convenient places. . . . In a large field containing 130 acres, mauka of the Oahu Railway & Land Co. track, the first harvest is to be gathered in a few months. . . . Out of this section of 130 acres the company has figured on securing 50 tons of clean fiber, for which it is offered eight cents per pound in Honolulu or nine cents per pound in San Francisco. (*Paradise of the Pacific* March 1902:17)

As in Honouliuli, the cultivation of sisal was attempted on other arid lands in 'Ewa. Thrum's *Hawaiian Almanac and Annual* speaks of the prospect of sisal cultivation glowingly from 1904 to 1913, but the greater profits to be made from sugar cane cultivation eventually led to the decline of this industry. Upper Hō'ae'ae seems to have been the focus for sisal cultivation in central 'Ewa, as shown in excerpts from the 1909 and 1913 annuals.

The Hawaiian Fiber Co. increases its capital stock to \$150,000, over 500 acres of new planting having been set out on their recently acquired Hoaeae land, and work being pushed to cover the entire tract of some 1,800 acres. [Thrum 1909:167]

New and enlarged machinery for the sisal decorticating mill has been installed at the Pouhala station of the company on the upper Hoaeae lands, with which to care for the fibre product from their enlarging area. Some 1750 acres are now planted out, including the fields of Sisal. [Thrum 1913:170-171]

An attempt to grow cotton was made on "the semiarid uplands at Kunia and Waipahu" in the early twentieth century, but the enterprise was not profitable (Krause 1911:66).

Besides sisal, cotton, and pineapples, other crops were grown in central 'Ewa, such as macadamia nuts.

At Hoaeae, in the Ewa district, is another tract of about six acres on the Robinson estate, reported to be in fine condition. . . Mr. Grant Bailey, manager of the Hoaeae Ranch, kindly furnishes the following data on the infant industry. . . 'Our planting is about six acres. Apparently one would have to wait about ten years before expecting commercial results on the planting. Our oldest trees are seven years old and they are just now beginning to bear.' [Thrum 1927:96]

In spite of these many introduced crops, some Hawaiian families continued to live in 'Ewa and preserve the traditional lifestyle into the early twentieth century, including at the fishing village of Kualaka'i in Honouliuli. One resident, Mrs. Eli Williamson, recalled the following:

In the Honouliuli area the train stopped among the *kiawe* (algaraboa) trees and *malina* (sisal) thickets. We disembarked with the assorted food bundles and water containers. Some of the Kualaka'i 'ohana (family) met us to help carry the 'ukana (bundles) along a sandstone pathway through the *kiawe* and *malina*. The distance to the frame house near the shore seemed long. When we departed our 'ukana contained fresh lobsters, *limu* (algae), fish and *i'a malo'o* (dried fish) . . . [Williamson in Kelly 1985:160]

3.1.13 History of the Oahu Railway and Land Company (OR&L)

In 1886, Campbell and B.F. Dillingham put together the "Great Land Colonization Scheme," which was an attempt to sell Honouliuli land to homesteaders (Thrum 1887:74). This homestead idea failed; two factors for the failure were the lack of water and the distance from 'Ewa to Honolulu. The water problem was solved by the drilling of artesian wells, and Dillingham decided that the area could be used instead for large-scale cultivation (Pagliaro 1987:4). The transportation problem was to be solved by the construction of a railroad, which B. Franklin Dillingham soon began to finance under the company name of the Oahu Railway and Land Company (OR&L).

During the last decade of the nineteenth century, the railroad reached from Honolulu to Pearl City in 1890, to Wai'anae in 1895, to Waialua Plantation in 1898, and to Kahuku in 1899 (Kuykendall 1967:3:100). This railroad line eventually ran across the center of the 'Ewa Plain at the lower boundary of the sugar fields (Figure 7 and Figure 8). To attract business to his new railroad system, Dillingham subleased all land below 200 ft to William Castle, who in turn sublet the area to the newly formed Ewa Plantation Company (Frierson 1972:15). Dillingham's Honouliuli lands above 200 ft that were suitable for sugar cane cultivation were sublet to the Oahu Sugar Company. Throughout this time, and continuing into modern times, cattle ranching continued in the area, and Honouliuli Ranch—established by Dillingham was—the "fattening" area for the other ranches (Frierson 1972:15).

Operations at the OR&L began to slow down in the 1920s, when electric streetcars were built for public transportation within the city of Honolulu and automobiles began to be used by families for transportation outside the city (Chiddix and Simpson (2004:185). The build-up to World War II turned this decline around, as the U.S. military utilized the OR&L lines to transport materials to build defense projects around the island. Historians have noted that one of the most serious mistakes made by the Japanese in their 1941 attack on Pearl Harbor was their decision not to bomb the railway infrastructure. Soon after the attack, the OR&L operated 24 hours a day, transporting war materials and troops from Honolulu to the new and expanded army, naval, and air bases. The huge navy base at Pearl Harbor had its own rail lines that connected to the OR&L rail lines.

In August 1945 the war ended, and so did OR&L's heyday as a military transport line.

She had served her country well and proudly during the war, but operating round-the-clock on what little maintenance could be squeezed in, had taken a prodigious hit on the locomotives and track. Traffic stayed steady for a short time, but soon dropped precipitously as soldiers and sailors went home, military posts were shrunk or razed, and civilians could again get tires, gasoline and new cars. [Chiddix and Simpson 2004:257]



Figure 7. 1890 photograph of Pearl Harbor with OR&L railroad tracks along the coast (*Honolulu Advertiser Archives*)

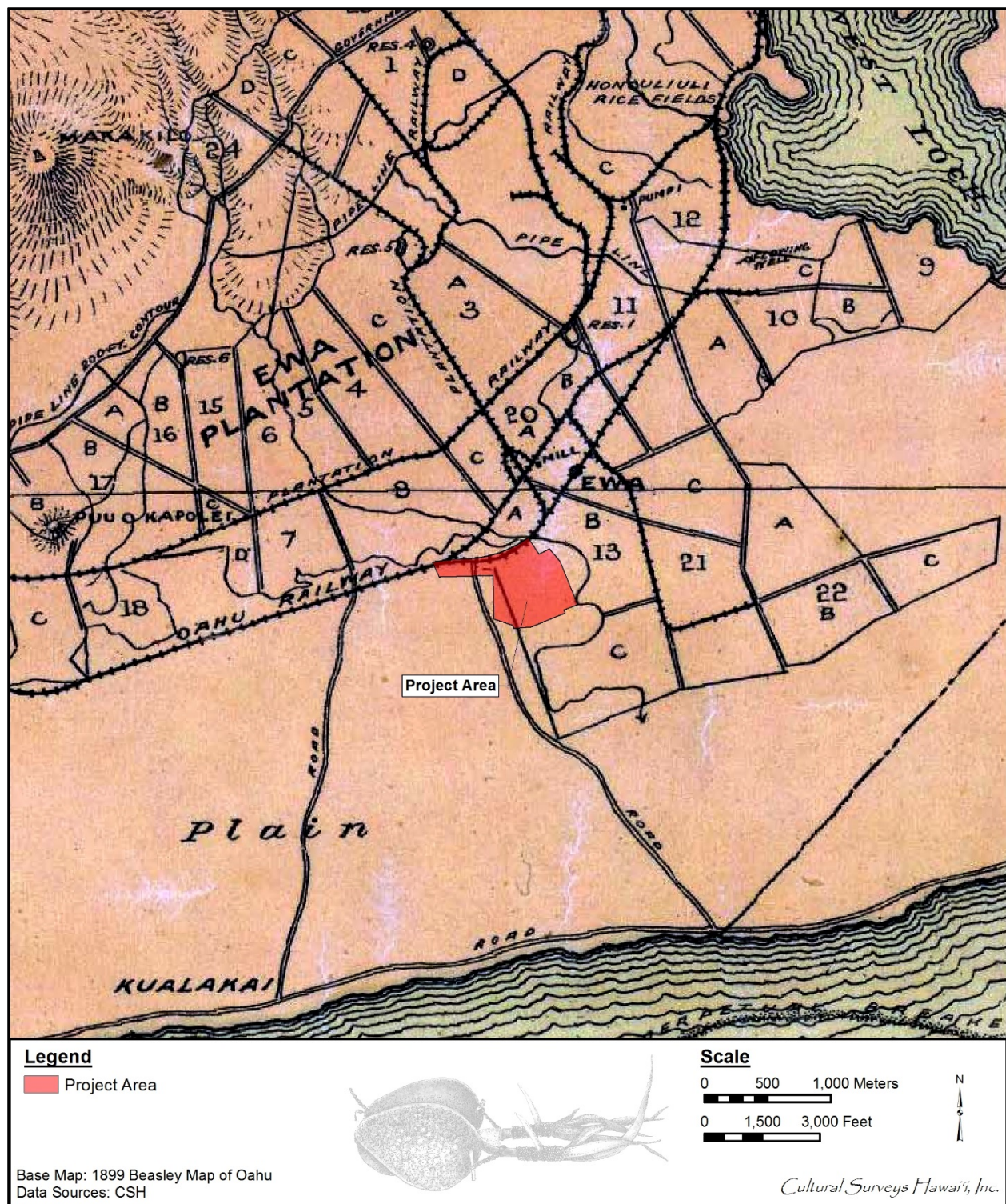


Figure 8. 1899 Beasley map of O'ahu depicting the OR&L railway corridor and the Ewa Plantation Company fields in relation to the current project area

There was no choice but to abandon the OR&L main line and in 1946 Water F. Dillingham, son of B.F. Dillingham, wrote,

The sudden termination of the war with Japan changed not only the character of our transportation, but cut the freight tonnage to a third and the passenger business to a little above the pre-war level. With the increased cost of labor and material and the shrinkage in freight tonnage and passenger travel, it was definite that the road could not be operated as a common carrier. With no prospect of increased tonnage, and the impossibility of increasing rates against truck competition, your management has applied to the Interstate Commerce for authority to abandon its mainline. [Walter Dillingham in Chiddix and Simpson 2004:257]

After the war, most of the 150+ miles of OR&L track were pried up, locomotives were sold to businesses on the U.S. mainland, and railway cars were scrapped. In 1947, the U.S. Navy took over a section of the OR&L track for their own use to transport bombs, ammunition, and torpedoes from the ammunition magazines at Lualualei, West Loch in Pearl Harbor, and Waikele on OR&L’s Wahiawā Branch to Pearl Harbor Naval Base (Treiber 2005:25-26). The track to Waipahu was abandoned in the 1950s, but the line from the magazines in Lualualei to the wharves in West Loch at Pearl Harbor remained open until 1968.

3.1.14 History of the Sugar Plantations of ‘Ewa

Although sugar cane was already being grown as far back as the early 1800s, the industry revealed its economic potential in 1879 when the first artesian well was drilled in ‘Ewa (Ellis 1995:22). The availability of subsurface water resources enabled greater irrigation possibilities for expanding plantations besides the use of water diversions from the surrounding stream systems. This prompted the drilling of many other wells throughout the Hawaiian Islands, thereby commencing the Hawai‘i sugar plantation era. By the early 1900s, all the main Hawaiian islands had land devoted to the production of sugar cane.

Agricultural field systems, railroads, and residential areas in ‘Ewa were developed by three sugar cane companies: the Ewa Plantation, located largely in the *ahupua‘a* of Honouliuli and Hō‘ae‘ae in the western section of ‘Ewa; the Oahu Sugar Company, extending in the areas upland of the Ewa Plantation in central ‘Ewa, including a portion of the uplands of Waiawa; and the Honolulu Plantation Company, with fields extending through Mānana to Hālawa in the eastern section of ‘Ewa.

The Ewa Plantation Company was incorporated in 1890 for sugar cane cultivation (see Figure 8). The first crop, 2,849 tons of sugar, was harvested in 1892 at the Ewa Plantation (Figure 9). Ewa was the first all-artesian plantation, and it gave an impressive demonstration of the part artesian wells were to play in the later history of the Hawaiian sugar industry (Kuykendall 1967:3:69). As a means to generate soil deposition on the coral plain and increase arable land in the lowlands, the Ewa Plantation Company installed ditches running from the lower slopes of the mountain range to the lowlands. When the rainy season began, they plowed ground perpendicular to the slope so that soil would be carried down the drainage ditches into the lower coral plain. After a few years, about 373 acres of coral wasteland were reclaimed in this manner (Immisch 1964:3). By the 1920s, Ewa Plantation was generating large profits and was the “richest sugar plantation in the world” (*Paradise of the Pacific*, December 1902:19-22 in Kelly 1985:171).



Figure 9. Ewa Plantation Company sugar cane fields, Filipino Camp area, ca. 1925 (University of Hawai'i at Mānoa Digital Photograph Collection)

During the twentieth century, the Ewa Plantation continued to grow and by the 1930s, encompassed much of the eastern half of Honouliuli Ahupua'a, including the current project area (Figure 10). This growth impelled the creation of plantation villages to house the growing immigrant labor force working the fields. After the outbreak of World War II, which siphoned off much of the plantation's manpower, along with the changeover to almost complete reliance on mechanical harvesting in 1938, the plantation no longer supported the large multi-racial (Japanese, Chinese, Okinawan, Korean, Portuguese, Spanish, Hawaiian, Filipino, European) labor force that had characterized most of the early history of the plantation. The Oahu Sugar Company took control over the Ewa Plantation lands in 1970 and continued operations until 1995, when they decided to shut down sugar cane production in the combined plantation areas (Dorrance and Morgan 2000:45, 50).

3.1.15 The Military Development of 'Ewa

Major land use changes came to Honouliuli when the U.S. military began development in the area. Military installations were constructed both near the coast, as well as in the foothills and upland areas. Military development within the Honouliuli area included Barbers Point Military Reservation (a.k.a. Battery Barbers Point from 1937–1944). Located at Barbers Point Beach, it was used beginning in 1921 as a training area for firing 155 mm guns (Payette 2003). Also in the vicinity was Gilbert Military Reservation, used from 1922–1944. Barbers Point Naval Air Station, in operation from 1942 into the 1990s, was the largest and most significant base built in the area. It housed numerous naval and defense organizations, including maritime surveillance and anti-submarine warfare aircraft squadrons, a U.S. Coast Guard Air Station, and components of the U.S. Pacific Fleet. Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch), located atop Pu'u Kapolei, was in use from 1931 to 1948 for housing four 3-inch (7.6 cm) anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a NIKE missile base. Palailai Military Reservation, located atop Pu'u Pālailai in Makakilo, was in service from 1921, housing Battery Palailai and Fire Control Station B (Payette 2003).

In 1932, the U.S. government leased 206 acres from the Campbell Estate to construct a mooring mast to receive the dirigible aircraft, the *Akron*. The airship was built in 1931 and was the largest helium filled airship in the world at the time. Before it could arrive on O'ahu, the *Akron* crashed during flight in a storm. The next landing for a large airship was scheduled to be the *Macon*. Like the *Akron*, *Macon* also crashed in a storm. After the disaster, the Navy scaled back its large dirigible program (Tuggle and Tomonari-Tuggle 1997).

The area remained largely unused until 1940, when the Marine Corps Air Station, Ewa, was constructed on the land. The mooring mast that was never used was refitted by the Marines to be a control tower, which gave the field its name, the Ewa Mooring Mast Field. The mast was finally dismantled in 1942 to make room for additional runway expansions and air support. In 1941, the airfield was relatively sparse—two runways, two hangars, 12 buildings, housing, a mess, and some tents (Department of Navy BRAC PMO 2006). By early 1941, units started to arrive in anticipation of possible war. In October 1941, the Pacific Naval Air Command commissioned a station on Barbers Point, thus making it home to two air stations. Although the Marines had been using Mooring Mast Field as emergency support since 1940, Ewa Marine Corps Air Station was officially established on 1 September 1942 and the Naval Air Station Barbers Point was commissioned on 15 April 1942 (Department of Navy BRAC PMO 2006).



Figure 10. 1939 map of the Ewa Plantation Company depicting the location of the current project area

On 7 December 1941, 49 planes were stationed at Ewa Mooring Mast Field, intended as auxiliary support for Naval Air Station Ford Island. When the Japanese attacked Pearl Harbor, they also destroyed nearly half the planes stationed at Barbers Point Station. After the attack and with the United States heading to war, Barbers Point became an important area for staging war in the Pacific theater. Base operations intensified and more hangars, quarters, and administrative buildings were constructed. The main mission for the Air Station was to maintain the Naval aircraft and personnel, train personnel, and store and repair aircraft (Tuggle and Tomonari-Tuggle 1997).

Barbers Point Naval Air Station was eventually decommissioned by the Navy in 1998 as part of the large scale base realignment and closure (BRAC) action. The station was turned over to the state of Hawai'i and renamed Kalaeloa Airport (Department of Navy BRAC PMO 2006).

3.1.16 Residential and Commercial Development in 'Ewa

Three topographic maps show the extensive changes in commercial and residential development in the twentieth century. On a 1919 U.S. War Department map, the proposed Honouliuli Wastewater Facilities project area crosses mainly through undeveloped sugar cane fields, crossed only by the OR&L railroad and its stations, and the numerous railroad track sections of the Ewa Plantation Company, which extended from the inland fields to the sugar mills (Figure 11). On the 1953 topographic map, the crisscross of railroad tracks is missing, replaced with numerous roads and dense residential neighborhoods at 'Ewa Villages (Figure 12). The Barbers Point Naval Air Station can also be seen on this map. By 1968, the buildings in the location of the wastewater treatment plant have been removed, most likely due to construction of the plant (Figure 13). On the 1998 topographic map, many of these naval reservation lands have shrunk, replaced by golf courses, large shopping complexes, and new neighborhoods that extend inland (see Figure 1).

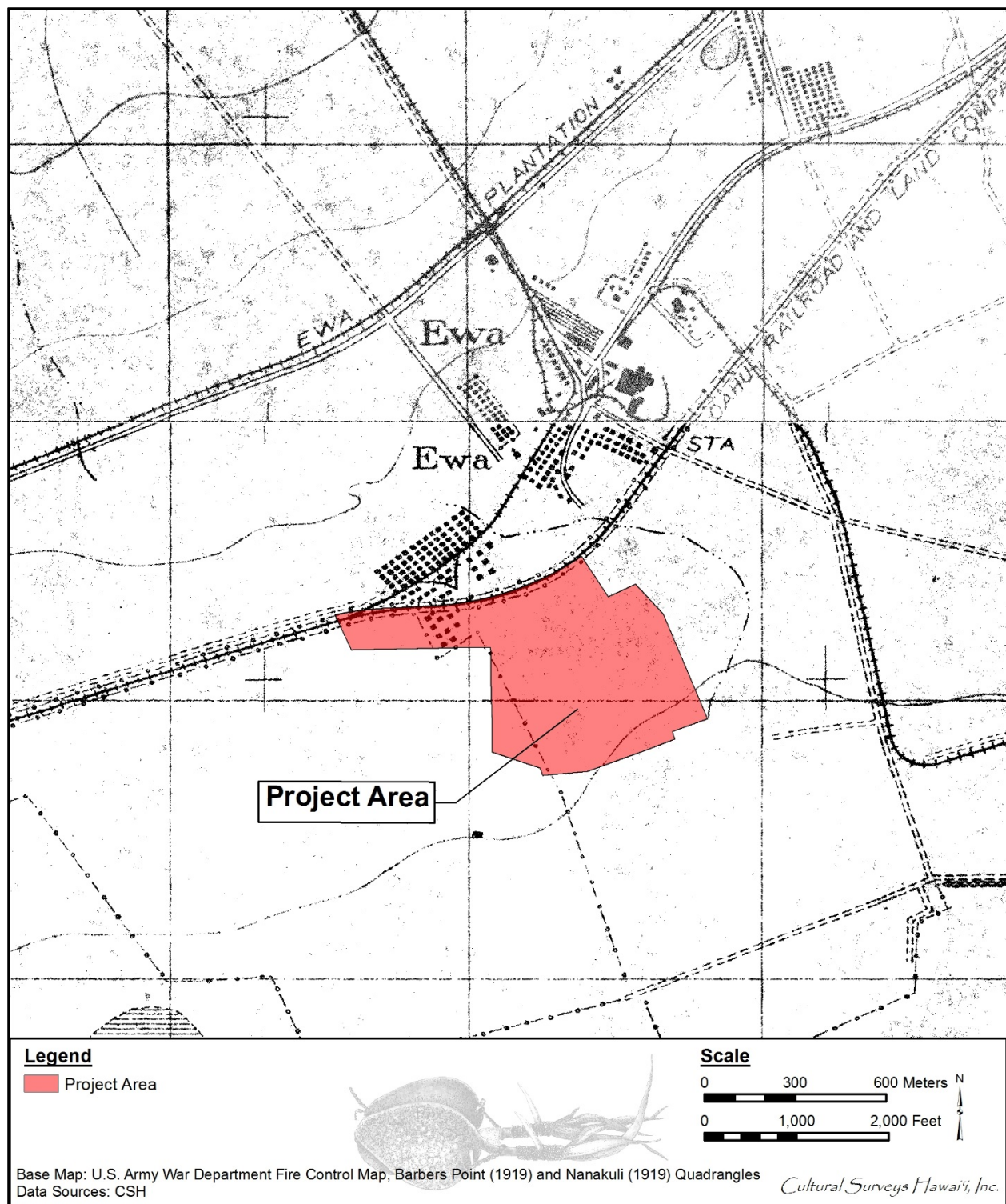


Figure 11. U.S. Army War Department Fire Control map, Barbers Point (1919) and Nanakuli (1919) quadrangles, showing the project area

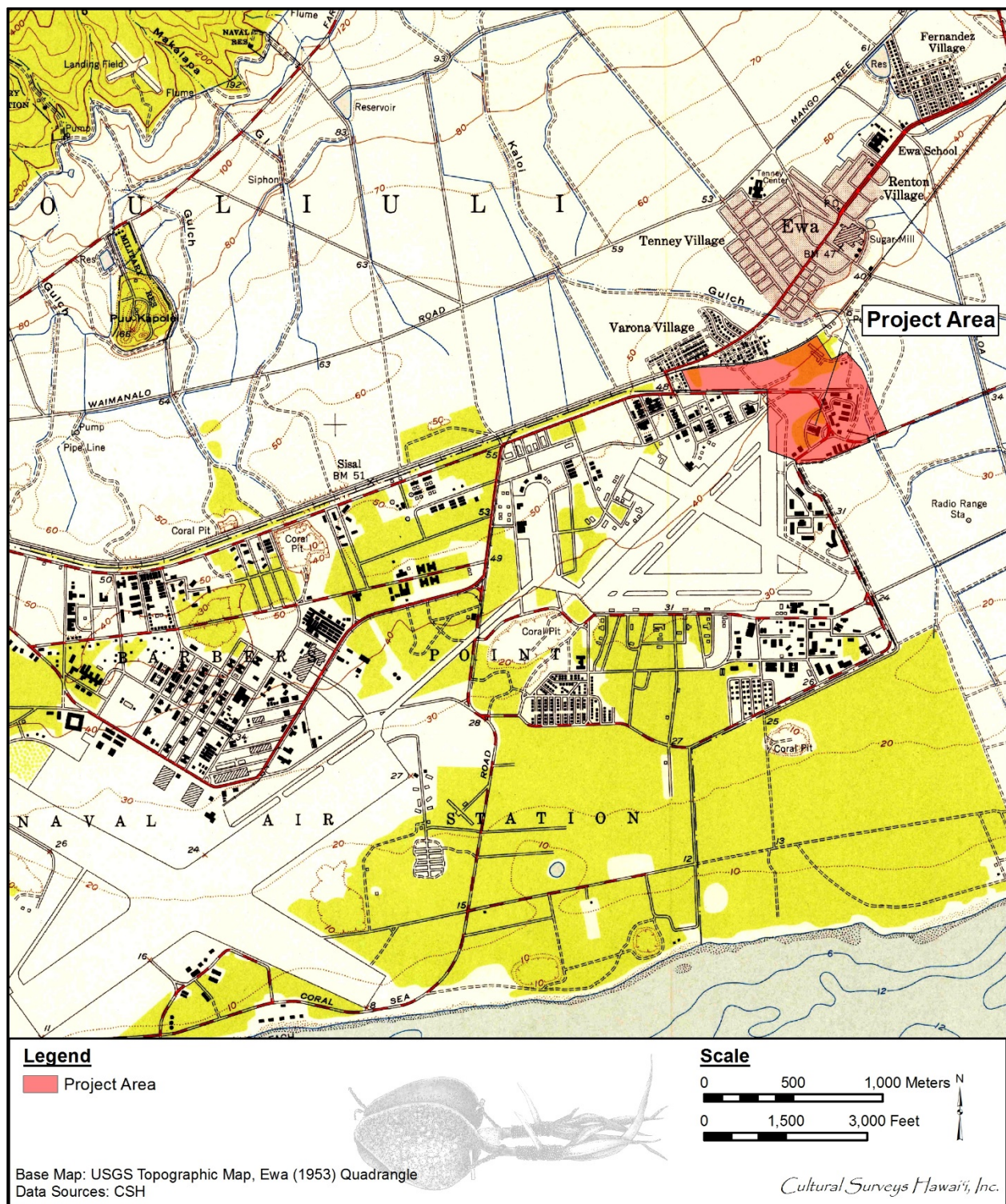


Figure 12. Portion of 1953 Ewa USGS topographic quadrangle, showing project area

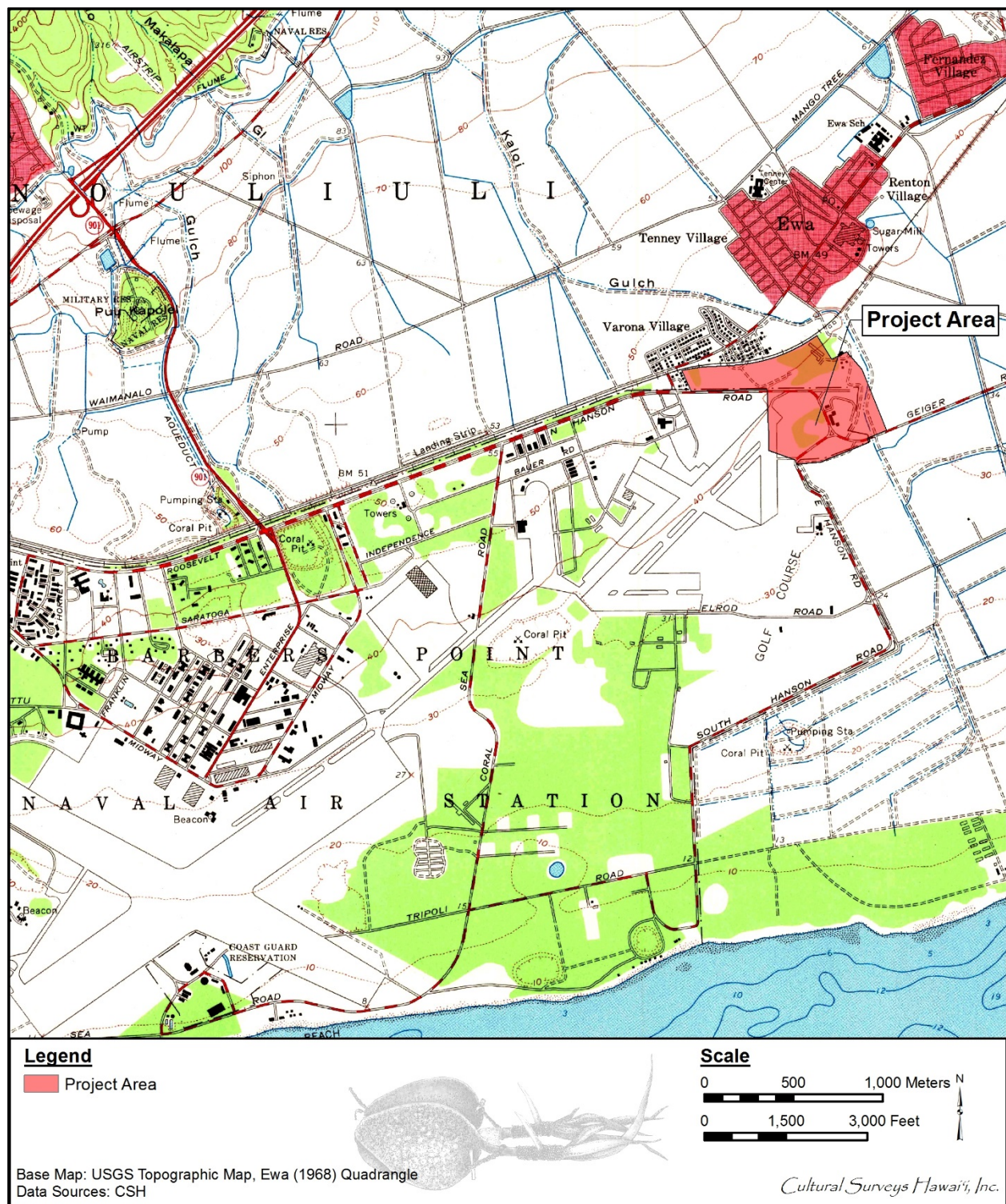


Figure 13. 1968 Ewa USGS 7.5-Minute topographic quadrangle, showing project area

3.2 Previous Archaeological Research

Previous archaeological studies conducted within a 0.8 km (0.5 mile) radius of the current project area are listed in Table 1 and depicted on Figure 14. Previously recorded historic properties are depicted on Figure 15 and listed in Table 2. A discussion of the projects conducted within and in the immediate vicinity of the project area is listed below.

Table 1. Previous Archaeological Studies in the Vicinity of the Project Area

Reference	Type of Study	Location	Results (SIHP # 50-80-12)
Welch 1987	Archaeological reconnaissance survey	Ewa Marine Corps Air Station at Barbers Point Naval Air Station	Two sites, SIHP #s -3721 and -3722, documented; both sites recommended eligible for National Register
Davis 1988	Sub-surface survey	‘Ewa Gentry	No historic properties recorded; no additional work recommended
Kennedy 1988	Archaeological reconnaissance survey	‘Ewa Gentry	No potential for subsurface properties; no additional work recommended
Hammatt and Shideler 1989	Archaeological and paleontological assessment	‘Ewa Marina	No cultural features recorded; recommended intensive archaeological survey for Phase I lands
Hammatt et al. 1990	Archaeological reconnaissance survey	‘Ewa Village	No additional sites documented, ‘Ewa Village Historic District confirmed and recommended eligible for National Register
Jones 1993	Phase I archaeological survey	Barbers Point Naval Air Station	Recorded 274 sites, only seven not recommended for further study
Spear 1996	Archaeological reconnaissance	North and west of ‘Ewa	No cultural resources documented and no additional recommendations
Hammatt and Chiogioji 1997a, b	Archaeological reconnaissance survey	Proposed corridor connecting H-1 to <i>makai</i> portions of ‘Ewa	No further work recommended; consultation needed for two historic properties, SIHP #s -9786 (‘Ewa Village Historic District) and -9814 (OR&L ROW)
Tuggle and Tomonari-Tuggle 1997	Cultural resource inventory	Barbers Point Naval Air Station	Recorded 101 sites and 107 buildings; all recommended eligible for National Register

Reference	Type of Study	Location	Results (SIHP # 50-80-12)
McIntosh and Cleghorn 1999	Archaeological archival research report	Honouliuli Wastewater Treatment Plant	Determined little likelihood of encountering surface resources, but subsurface resources in form of sinkholes or burials possible
O'Hare et al. 2007	Archaeological assessment	Ewa Industrial Park, TMK: [1] 9-1-069:003	Identified no historic properties in area adjacent to north and east sides of Honouliuli Wastewater Treatment Plant (considered for shafts 1A, 1B, and 1C)
Runyon et al. 2010	Archaeological monitoring	North-South Rd (H-1 to Kapolei Pkwy)	No archaeological cultural deposits identified
O'Hare et al. 2011	Archaeological field inspection and literature review	Honouliuli Wastewater Treatment Plant and incoming pipe easements	Inspected 67 acres over entire Ewa and central portions of Honouliuli, Hō'ae'ae, Waikele, Waiawa, Mānana, Waimalu, and Hālawa Ahupua'a; recommended on-call and inventory survey for various locations
Hammatt and Shideler 2012	Archaeological field inspection and literature review	Coral Sea Rd intersections and Roosevelt Ave at Philippine Sea Rd	No historic properties; monitoring plan recommended due to potential for historic properties

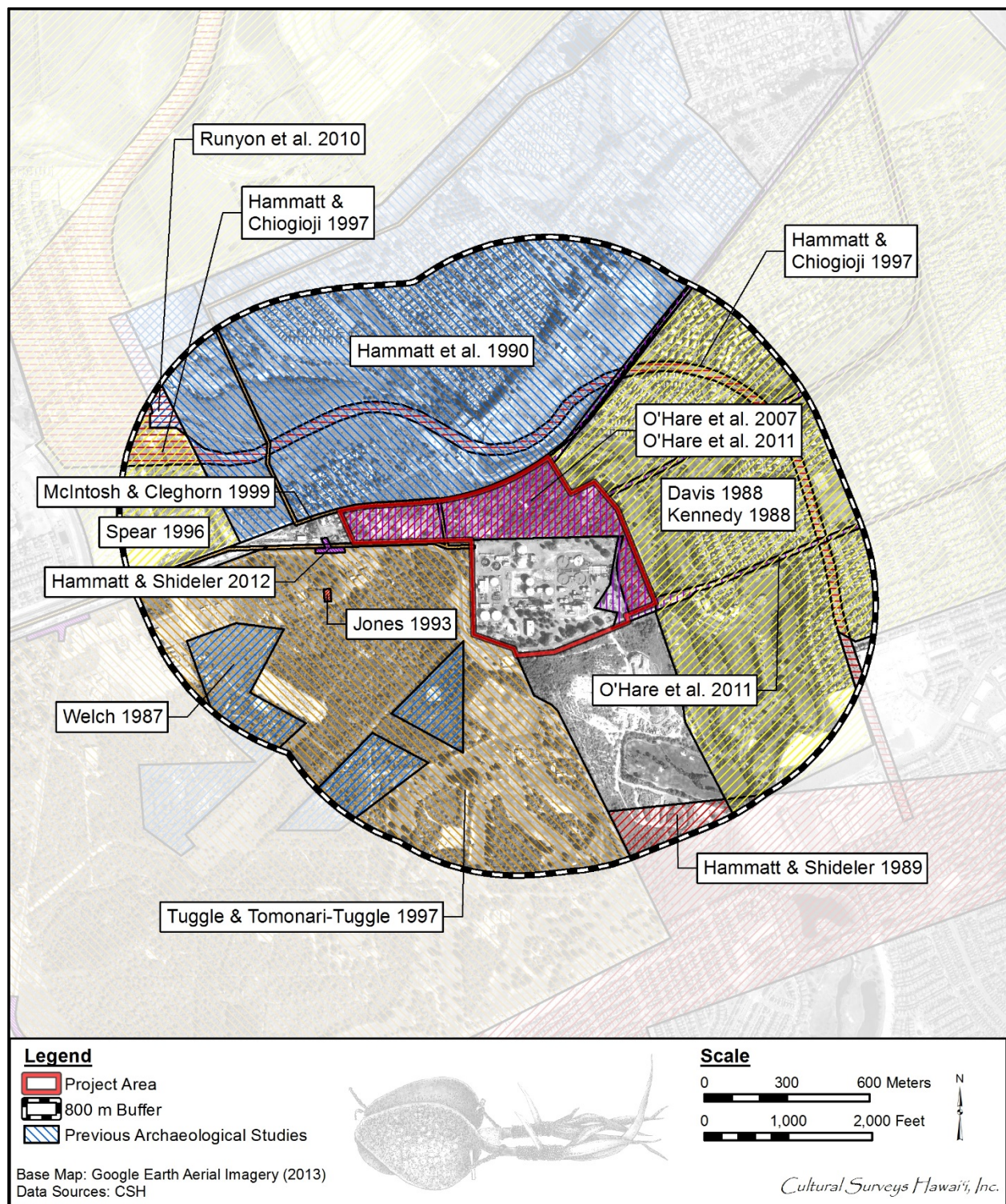


Figure 14. Previous archaeological investigations in Honouliuli in the vicinity of the Honouliuli WWTP

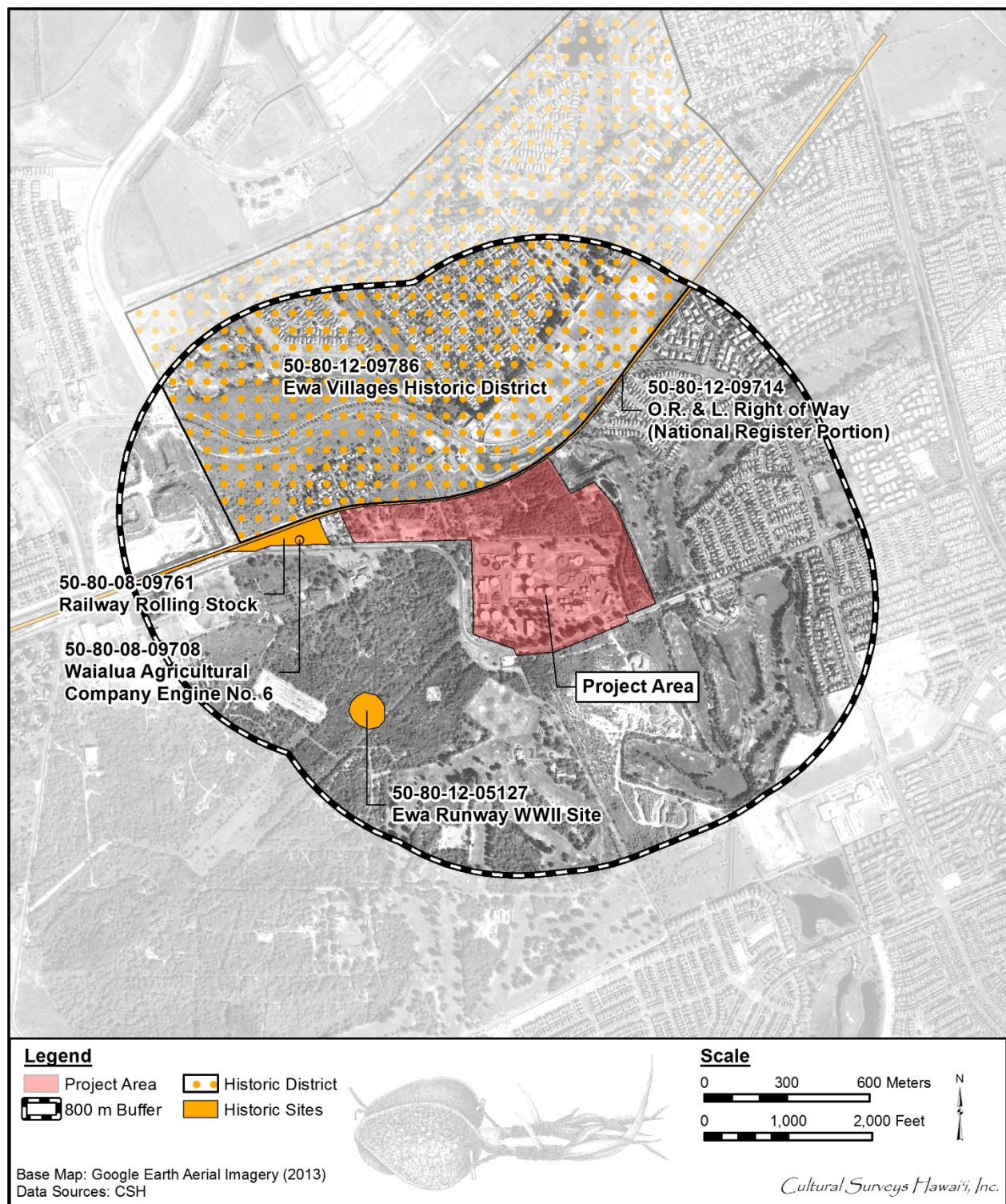


Figure 15. Previously recorded archaeological sites within a 0.8 km (0.5 mile) radius of the project area

Table 2. Sites Located within a 0.8 km (0.5 mile) Radius of the Project Area

SIHP # 50-80-12-	Site type	Description	Significance	Reference
5127	Military	7 December 1941 WWII 'Ewa runway site	A and D, per HAR §13-284- 6	Tuggle and Tomonari-Tuggle 1997
9708	Sugar plantation Infrastructure	Waialua agricultural company Engine No. 6	On National Register	NRHP nomination form
9714	Sugar plantation Infrastructure	OR&L ROW	On National Register	Hammatt and Chiogioji 1997
9761	Sugar plantation Infrastructure	Railway rolling stock	On Hawai'i Register	HRHP nomination form
9786	Sugar plantation Infrastructure	'Ewa Village Historic District	On National Register	Hammatt and Chiogioji 1997

3.2.1 Barbers Point (Ewa Marine Corps Air Station and Naval Air Station Barbers Point) (Welch 1987; Jones 1993; Tuggle and Tomonari-Tuggle 1997)

In 1987, International Archaeological Research Institute, Inc. (IARII) (Welch 1987) conducted an archaeological reconnaissance at the former Ewa Marine Corps Air Station for a proposed light anti-aircraft missile battalion. Fieldwork included pedestrian survey of the 100-acre project area. Two archaeological sites were recorded, SIHP #s -3721 and -37722. SIHP # -3721 consists of a complex of five traditional Hawaiian features including walls and C-shape shelters. SIHP #-3722 consists of a coral wall related to early historic ranching and farming. Both sites were determined eligible for inclusion in the National Register and mitigation in the form of intensive survey and data recovery was recommended.

In 1993, IARII conducted a Phase I archaeological inventory survey of proposed Barbers Point family housing (Jones 1993). A 100% pedestrian survey was conducted of the area. This survey was supplemented with targeted excavations of archaeological features. In total, 274 archaeological features were recorded, with five sites previously recorded by the Bishop Museum confirmed. Of the 247 sites recorded, only seven were recommended as not eligible for the National Register and no further work was recommended.

In 1997, IARII conducted a cultural resource inventory for the Naval Station at Barbers Point (Tuggle and Tomonari-Tuggle 1997). The report is part of a larger inventory of archaeological, paleontological, and paleoenvironmental studies of the area. As a result of the survey, 101 archaeological sites and 107 historic buildings were recommended eligible for the National Register and all were recommended for further work.

3.2.2 'Ewa Marina (Hammatt and Shideler 1989)

In 1989, CSH conducted an archaeological and paleontological assessment of the Phase II 'Ewa Marina Lands in Honouliuli (Hammatt and Shideler 1989). The result of the survey determined that a vast majority of the land had been intensively cultivated for many years. No cultural resources were recorded within Phase II lands, but based on prior recommendations from Davis (1979), it was recommended that the Phase I lands be subjected to intensive survey prior to construction.

3.2.3 'Ewa Village (Hammatt et al. 1990; Spear 1996)

In 1990, CSH (Hammatt et al. 1990) conducted an archaeological reconnaissance survey of the 616-acre 'Ewa Villages project area, which is adjacent to the northern border of the current project area. The project area included three extant plantation villages (Renton Village, Tenney Village, and Varona Village), the sites of three former plantation villages (C Village, Mill Village, and Middle Village), and several other sites associated with the 'Ewa Plantation infrastructure, (the Plantation Cemetery, the 'Ewa Japanese School, 'Ewa Depot, the site of a previous Buddhist temple burned down in World War II, and a former reservoir site), and fields then under sugar cane cultivation. The surface survey of the land found no evidence of any prehistoric features within the project area and concluded that no further archaeological research in association with concerns for Hawaiian prehistory was necessary. However, because of the historic preservation concern 'Ewa Villages has merited, further documentation of some of the ruined historic sites was recommended.

In 1996, Scientific Consultant Services (Spear 1996) conducted an archaeological survey in an area west of the Tenney and Varona plantation villages and north of the Honouliuli Treatment Plant. No archaeological sites were identified.

The northeast boundary of the project area (outside the fenced area) is the alignment of the OR&L ROW. This railroad bed, from the intersection with Fort Weaver Road to the intersection of Farrington Highway and Lualualei Road in Nānākuli is currently listed on the National Register of Historic Places (Site 50-80-12-9714).

3.2.4 ‘Ewa Gentry (Kennedy 1988; Davis 1988; McIntosh and Cleghorn 2003)

In the initial reconnaissance of the 1,016 acre ‘Ewa Gentry survey area (Kennedy 1988), no surface evidence of potentially significant pre-Contact remains was found. The old OR&L railroad bed/ROW (Site 50-80-12-9714) did form a portion of the *mauka* boundary. According to historic maps, a Filipino Camp for sugar cane workers once existed near the intersection of the OR&L bed and a cane road near Fort Weaver Road, but the archaeologists did not find any surface remains for this camp. A subsequent subsurface exploration was undertaken. Eighteen backhoe trenches were excavated; however, “no evidence of past in situ cultural activity was found anywhere in the ‘Ewa Gentry project area” (Davis 1988). The archaeologists found that soil was only about 1 m deep over a coral substrate, and that their project area was “apparently situated on an ancient upper rim of Hono‘uli‘uli Valley” (Davis 1988:4).

In 2003, Pacific Legacy (McIntosh and Cleghorn 2003) conducted an archaeological survey of the proposed ‘Ewa Gentry Makai Development project area, which is adjacent to the southern (*makai*) boundary of the ‘Ewa Gentry project area for the 1988 surface and subsurface inventory surveys (Kennedy 1988; Davis 1988). No surface pre-Contact features were noted.

3.2.5 North-South H-1 Connection (Hammatt and Chiogioji 1997; Runyon et al. 2011)

In 1997, CSH conducted an archaeological reconnaissance survey of a 8,872 m (20,100 ft) alignment of a proposed connection from ‘Ewa to the H-1 interstate (Hammatt and Chiogioji 1997). No prehistoric or early historic Hawaiian archaeological sites or surface finds were encountered during the archaeological reconnaissance within the project area. Plantation constructions—remnants of flumes and a ditch—and roadways were observed within portions of the corridor that have not been developed since the sugar cane era. No further archaeological investigations were recommended for the entire project area corridor and on-site or on-call monitoring was not justified during future construction activities.

In 2010, CSH conducted archaeologic monitoring for the construction of the north-south connection from Kapolei Parkway to the H-1 (Runyon et al. 2010). Ground disturbance included filling, grading, for the new road, trenching for subsurface utilities, excavation of a flood control canal along the eastern side of the roadway, trenching for drainage culverts beneath the roadbed, and the excavation of large drainage basins at the *makai* end of the project area. No archaeological cultural deposits were identified as a result of the project’s monitoring program. Due to heavy commercial use of the project area and extensive construction work conducted in association with the current project, archaeological monitoring for future projects within the current project area was not recommended.

3.2.6 Ewa Industrial Park (O'Hare et al. 2007)

In 2007, CSH (O'Hare et al. 2007) conducted an assessment of the proposed Ewa Industrial Park. The project area was in a 48.18-acre fenced lot, bound on the north by the ROW along the existing track of the OR&L, which runs parallel to the *makai* side of Renton Road. The parcel was bound on all other sides by existing properties; a southern dog-leg section extends south to Geiger Road. The western portion of the project area (and a portion of the eastern section) was open, with livestock pastures and paddocks, houses and out-buildings. The central section had been extensively cleared of all vegetation and large rocks; this area was leased to private parties (such as for graduation parties, overnight scout troops, and the bon dance). Everywhere, there are large piles of rocks, trash and beer bottle piles, concrete, piled brush, and other evidence of extreme ground disturbance. No traditional surface Hawaiian features were found, and with the evidence of extreme ground disturbance in mind, it is highly unlikely there are any subsurface Hawaiian features intact. No sinkholes were found. There was also little evidence of post-Contact use by the Ewa Plantation, the OR&L Company, or the military.

3.2.7 Honouliuli Wastewater Treatment Plant (O'Hare et al. 2011)

In 2011, CSH (O'Hare et al. 2011) conducted an archaeological literature review and field inspection for various long-term improvements to the wastewater collection and disposal systems for the Honouliuli Wastewater Treatment Plant. The project took place in the Honouliuli, Waipahu, and Pearl City areas, within the Honouliuli, Hō'ae'ae, Waikele, Waiawa, Manana, Waimalu, and Hālawā *ahupua'a*. Because of the large and expansive project area, various recommendations were made for different areas of the project. For the areas concerning the current project area, it was recommended that on-call monitoring take place. It is noted that the area is of relatively low archaeological concern and has been extensively disturbed by prior infrastructure construction (O'Hare et al. 2011).

3.2.8 Kalaeloa Life Safety Improvements (Hammatt and Shideler 2012)

In 2012, CSH conducted a field inspection and literature review for the proposed improvements to five separate sections of the Kalaeloa Life Safety Improvements (Hammatt and Shideler 2012). These five sections include the intersection of Coral Sea Road and Roosevelt Avenue, the intersection of Coral Sea Road and San Jacinto Street, the intersection of Coral Sea Road and Tripoli Street, the intersection of Coral Sea Road and Eisenhower Road, and the intersection of Roosevelt Avenue and Philippine Sea Road (approximately 1 km east of the intersection of Coral Sea Road and Roosevelt Avenue). These study areas are located on the eastern side of the former Barbers Point Naval Air Station. No archaeological sites were recorded during the course of the survey.

3.3 Background Summary and Predictions

The *ahupua'a* of Honouliuli is the largest traditional land unit on the island of O'ahu. Honouliuli includes all the land from the western boundary of Pearl Harbor (West Loch) westward to the 'Ewa/Wai'anae District Boundary with the exception of the west side of the harbor entrance, which is in the *ahupua'a* of Pu'uloa (the 'Ewa Beach/Iroquois Point area). This comprises approximately 12 miles of open coastline from One'ula westward to Pili O Kahe. The *ahupua'a* extends *mauka* (almost pie-shaped) from West Loch nearly to Schofield Barracks, and the western boundary is the Wai'anae Mountain crest running *makai* to the east ridge of Nānākuli Valley.

Not only is there a long coastline fronting the normally calm waters of leeward O'ahu, but there are also 4 miles of waterfront along West Loch. The land immediately *mauka* of the Pacific coast consists of a flat karstic raised limestone reef forming a level nearly featureless "desert" plain marked in pre-Contact times (previous to alluviation caused by sugar cultivation) by a thin or non-existent soil mantle. The microtopography is notable for containing countless sinkholes in some areas caused by chemical weathering (dissolution) of the limestone shelf.

Along the eastern flank of the Wai'anae Mountains, numerous gulches have contributed to the alluvial deposits over the coastal limestone shelf. The largest of the gulches is Honouliuli Gulch, which drains into West Loch. The gulches are generally 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 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, as such, do not form stable water sources for traditional agriculture in their upper reaches. The Honouliuli gulches generally do not have valleys suitable for extensive irrigated agriculture; however, this lack is more than compensated for by the rich watered lowlands near West Loch

In inland areas of concern, including the vicinity of the Honouliuli WWTP, there are no commoner Land Commission Awards and previous archaeological studies in these vicinities have indicated no concerns. The distance from the coast (and generally from fresh water) made these little used areas in the pre-Contact period.

As noted above (Figure 15 and Table 2), all of the previously recorded archaeological sites within a 0.8 km (0.5 mile) radius of the project area are post-contact in origin relating to sugar plantation Infrastructure, the OR&L or mid-twentieth century military activities.

The intensive land disturbance of a century of commercial cane cultivation probably removed most of what little evidence of pre-Contact use there ever was. The archaeological sensitivity of these areas is generally regarded as low.

Section 4 Results of Fieldwork

Fieldwork was accomplished on 24 October 2014 by Trevor Yucha, B.S. and David W. Shideler, M.A. under the general supervision of Principal Investigator, Hallett H. Hammatt, Ph.D. This work required approximately 1 person-day to complete.

4.1 Pedestrian Inspection Results

The northern and eastern relatively undeveloped portions of the project area amounting to an area of 48.18 acres was the subject of an archaeological assessment of the 'Ewa Industrial Park project, Honouliuli Ahupua'a, 'Ewa District, O'ahu (O'Hare et al. 2007) that was reviewed and accepted in an SHPD §6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A). The present study included a reconnaissance of the O'Hare et al. (2007) project area (Figure 16) but only for the purpose of documenting present conditions.

Presently, the northern and eastern undeveloped portions of the project area are overgrown with *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), and exotic grasses. An unimproved access road extends roughly northwest-southeast within the eastern portion of the project area along the boundary of the current project area (Figure 17). In certain locations, features of the adjacent golf course are present along the access road and adjacent to the project area, including a plastic-lined retention pond and modern roofed structure (Figure 18). At the northernmost point of the project area, the OR&L ROW was observed on the north side of a chain link fence. The OR&L ROW extends along the entirety of the northern project area boundary (Figure 19). The modern agricultural structures noted by O'Hare et al. (2007) were confirmed and observed to be abandoned (Figure 20). These structures are constructed of plastic and wire fencing with plywood walls and cinder block foundations. These structures appear to be modern construction and are not considered historic properties. A modern gravel road was observed west of the agricultural structures extending from the north over the OR&L ROW and into the project area (Figure 21). The modern road appears to access an electrical substation and base yard area (Figure 22). No historic properties were identified within the undeveloped portions of the current project area.

The remaining southwestern portion of the project area including the heavily built-out wastewater treatment plant was subject to 100% pedestrian survey coverage during the current study (Figure 16). The wastewater treatment plant includes office and personnel buildings near the entrance off Geiger Road (Figure 23). Behind these buildings are various tanks, pools, and above-ground piping associated with the wastewater treatment process (Figure 24 and Figure 25). Asphalt paved access roads and parking areas are present throughout the facility. A dry drainage basin was observed on the southwestern corner of the project area (Figure 26). A storage shed with a nearby scatter of modern midden was observed along the western edge of the project area, just outside the treatment plant facilities (Figure 27). The entire facility is surrounded by chain link fence. No historic properties were identified within the wastewater treatment plant portion of the project area.

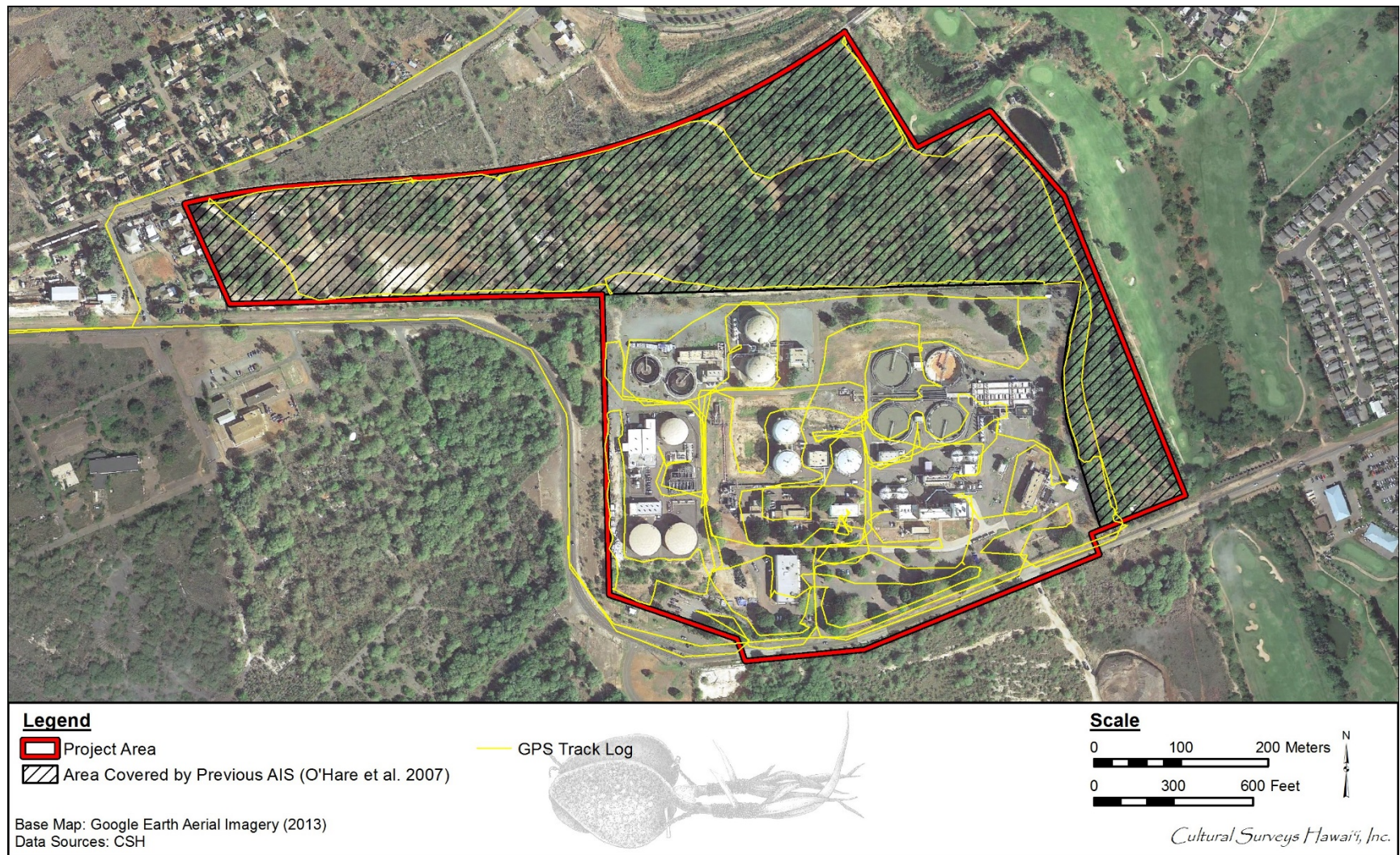


Figure 16. Track log of one of the two archaeologists during the pedestrian inspection



Figure 17. Overview of an unimproved access road in the eastern portion of the project area, view to northwest



Figure 18. View of portions of the adjacent golf course showing a retention pond and roofed structure, view to east



Figure 19. View of the OR&L ROW from the northernmost corner of the project area, view to north



Figure 20. View of the abandoned modern agricultural structures observed within the northern portion of the project area, view to southeast



Figure 21. View of gravel road extending northwest-southeast within the project area, view to southeast



Figure 22. View of electrical substation along gravel road, view to southeast



Figure 23. View of office or personnel buildings near the plant entrance off Geiger Road, view to northwest



Figure 24. Overview of wastewater treatment plant infrastructure, view to northeast



Figure 25. Overview of wastewater treatment plant infrastructure, view to south



Figure 26. View of dry drainage basin in the southwestern corner of the project area, view to west



Figure 27. View of storage shed with modern midden scatter (*‘opihī*), view to west

Section 5 Summary

At the request of AECOM Pacific, Inc., CSH completed an archaeological inventory survey, which due to the lack of historic properties is reported as an archaeological assessment, for the Honouliuli Wastewater Treatment Plant (WWTP) Secondary Treatment and Facility, Honouliuli Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1-013:007.

The northern and eastern relatively undeveloped portions of the project area amounting to an area of 48.18 acres was the subject of an *Archaeological Assessment of the 'Ewa Industrial Park Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island* (O'Hare et al. 2007) that was reviewed and accepted in an SHPD §6E-42 Historic Preservation Review dated 10 February 2009 (LOG NO.: 2009.0664, DOC NO.: 0902WT22; included here as Appendix A).

The fieldwork component of this archaeological inventory survey, which due to the lack of historic properties is reported as an archaeological assessment, was carried out under archaeological research permit number 14-04 issued by the Hawai'i SHPD per HAR §13-13-282. Fieldwork was accomplished on 24 October 2014 by Trevor Yucha, B.S. and David W. Shideler, M.A. under the general supervision of Principal Investigator, Hallett H. Hammatt Ph.D. This work required approximately 1 person-day to complete. Fieldwork included a pedestrian inspection of the entire project area, GPS data collection, and general documentation. No historic properties were identified within the project area.

Section 6 Project Effect and Mitigation Recommendations

6.1 Project Effect

No historic properties were identified within the approximately 100-acre project area. Consequently, CSH's effect recommendation for the proposed project is "no historic properties affected."

6.2 Mitigation Recommendations

No historic properties were identified within the current project area. The northern and eastern portions of the project area consist of undeveloped land initially surveyed by O'Hare et al. (2007) and inspected again during the current archaeological inventory survey, which due to the lack of historic properties is reported as an archaeological assessment. The southern portion of the project area has been entirely developed with infrastructure related to the Honouliuli Wastewater Treatment Plant. No further cultural resource management work is recommended for the project area.

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Appendix A SHPD Acceptance of Prior Archaeological Assessment for the North and East Portions of the Project Area

<p>LINDA LINGLE GOVERNOR OF HAWAII</p> 	 <p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES STATE HISTORIC PRESERVATION DIVISION 601 KAMOKILA BOULEVARD, ROOM 555 KAPOLEI, HAWAII 96707</p>	<p>LAURA H. THIELEN CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p> <p>RUSSELL Y. TSUJI FIRST DEPUTY</p> <p>KEN C. KAWAHARA DEPUTY DIRECTOR - WATER</p> <p>AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>
<p>February 10, 2009</p> <p>Mr. David Shideler Cultural Surveys Hawai'i P. O. Box 1114 Kailua, Hawai'i 96734</p> <p>Dear Mr. Shideler:</p> <p>SUBJECT: 6E-42 Historic Preservation Review-- Archaeological Assessment-- of the 'Ewa Industrial Park Project, Hono'uli'uli, 'Ewa District, O'ahu Island, Hawai'i. TMK: (1) 9-1-069: 003</p> <hr style="width: 60%; margin-left: 0;"/> <p>Thank you for the opportunity to review this DRAFT Archaeological Assessment (<i>Archaeological Assessment of the 'Ewa Industrial Park Project, Hono'uli'uli, 'Ewa District, O'ahu Island, Hawai'i. TMK: (1) 9-1-069: 003 [O'Hare, Shideler and Hammatt PhD, March 2007]</i>). The survey area is 48.18 acres. The proposed project is the construction of an industrial park. No historic properties were recorded.</p> <p>The initial communication from our office (LOG NO: 2006.3755/DOC NO: 0611amj12) requested some revisions. They included changes in wording in the Scope of Work, a clarification of the distance between crew members during pedestrian survey, an update of Figures 5 and 6, and a discussion on karstic sinkholes. The report was resubmitted and more revisions were requested by Lauren Morawski. These changes are clarification on the need for subsurface testing in the Introduction section; the distance between parallel sweeps in the Methods section; the addition of "View toward" in the captions for two photos, and a sinkhole discussion.</p> <p>This report is accepted and it meets the minimum requirements for compliance with 6E-8 and Hawaii Administrative Rules (HAR) §13-13-276 <i>Rules Governing Standards for Archaeological Inventory Studies and Reports</i>.</p> <p>The complete, finalized report should be free of errors, contain good quality color photographs, color maps and assigned State site numbers. Once this subject archaeological assessment survey report has received final acceptance pursuant to HAR §13-276, please send one hardcopy of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version on CD to the attention of Wendy Tolleson "SHPD Library" at the Kapolei SHPD office.</p>		

Mr. David Shideler
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Please call Wendy Tolleson at (808) 692-8024 if there are any questions or concerns regarding this letter.

Aloha,

A handwritten signature in cursive script that reads "Nancy A. McMahon". The signature is written in black ink and is positioned above the printed name and title.

Nancy A. McMahon (Deputy SHPO)
State Historic Preservation Officer