Appendix A
U.S. Army Corps of Engineers' Preliminary Jurisdictional Determination, and Ordinary High Water Mark Delineation in Hilea Gulch and Ninole Gulch (January 2015)

DEPARTMENT OF THE ARMY
HONOLULU DISTRICT, U.S. ARMY CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

December 3, 2015

SUBJECT: Preliminary Jurisdictional Determination for Central Federal Lands Highways Division (CFLHD) Hilea and Ninole Stream Bridges at Punaluu, Ka'u District, Hawaii Island, Hawaii. DA File No. POH-2015-00224.

Mr. Mike Will
U.S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highways Division
12300 West Dakota Avenue, Suite 380A
Lakewood, CO 80228-2583

Dear Mr. Will:

The U.S. Army Corps of Engineers, Honolulu District (Corps) has received your letter, dated October 28, 2015, requesting a preliminary jurisdictional determination for the above-subject project. Department of the Army (DA) file number POH-2015-00224 has been assigned this project. Please reference this number in all future correspondence with our office concerning this project.

We have completed review of your submittal pursuant to our authorities at Section 404 of the Clean Water Act (33 U.S.C. 1344)(Section 404) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)(Section 10). Section 404 requires authorization prior to the discharge and/or placement of dredged or fill material into waters of the U.S., including adjacent wetlands. Section 10 requires authorization prior to installing structures or conducting work in, over, under, and affecting navigable waters.

Based on our review of the information submitted and available resources, we have preliminarily determined that the Hilea Stream and the Ninole Stream at each bridge crossing may be a waters of the U.S. subject to the Corps' regulatory jurisdiction (Enclosure 1). Accordingly, a Section 404 DA permit will be required for any activity resulting in the discharge and/or placement of dredged of fill material into the streams below the surveyed ordinary high water mark (OHWM) for non-tidal waters.

This preliminary jurisdictional determination identifies the presence of an aquatic resource that may be water of the U.S. subject to the Corps' regulatory jurisdiction, however, it does not finalize the surveyed OHWM's for the Hilea and Ninole streams as the Corps' jurisdictional limit. The surveyed OHWM, as detailed in OHWM report, *"Ordinary High Water Mark Delineation in Hilea Gulch and Ninole Gulch*", dated revised March 20, 2015 and prepared by AECOS, Inc., is subject to field verification by the

Corps, and shall be used to determine whether a DA permit is required and the type of DA permit will be processed for your project.

The enclosed preliminary jurisdictional determination (JD) is a written indication that wetlands and waterways within your project area may be waters of the U.S. (Enclosure 4). For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected by the permitted activity as if they are jurisdictional waters of the U.S. If you concur with the findings of this preliminary JD, please sign it and return it to the following address within two weeks. If you believe the preliminary JD is inaccurate, you may request an approved JD, which is an official determination regarding the presence or absence of waters of the U.S.

Honolulu District
U.S. Army Corps of Engineers
Regulatory Office, Building 230
Fort Shafter, Hawaii 96858-5440

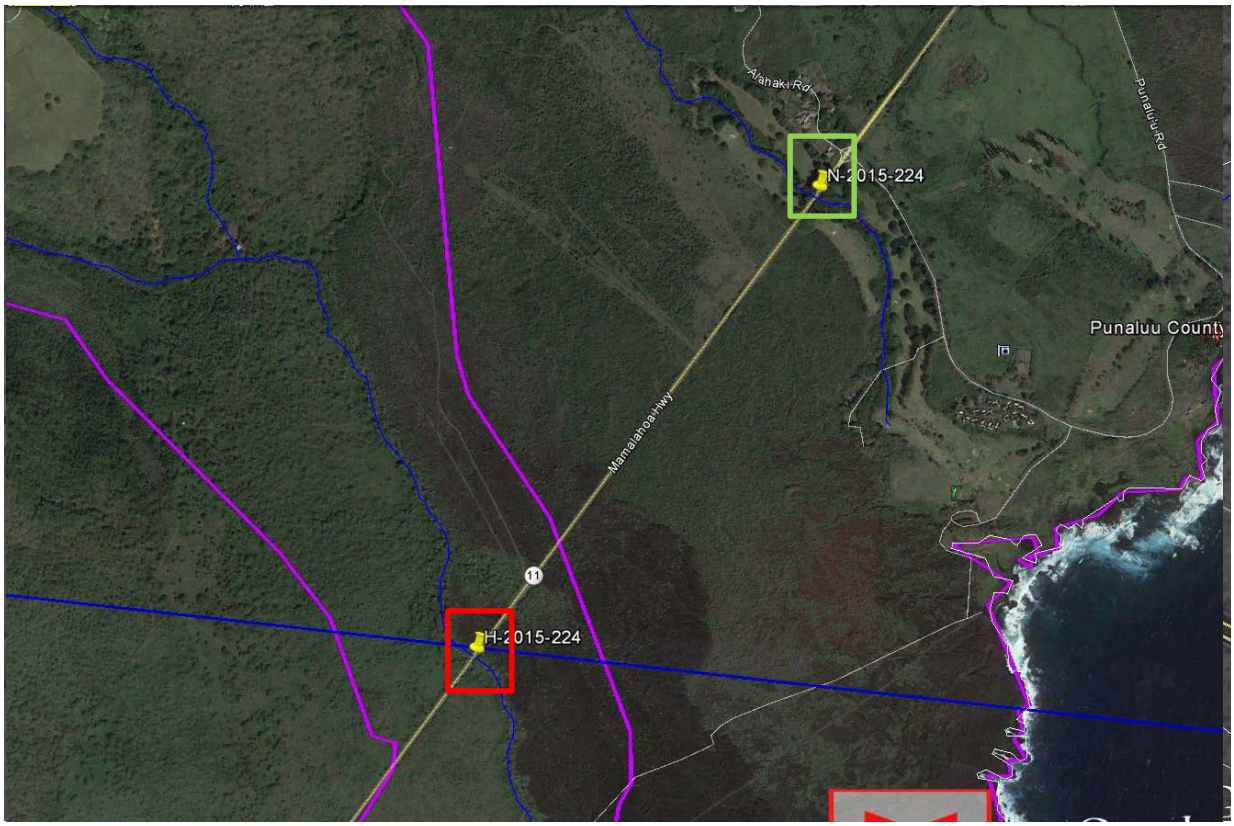
Thank you for your cooperation with the Honolulu District Regulatory Program. Should you have any questions related to this preliminary determination, please contact Ms. Joy Anamizu at (808) 835-4308 or via e-mail at joy.n.anamizu@usace.army.mil . You are encouraged to provide comments on your experience with the Honolulu District Regulatory Office by accessing our web-based customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Sincerely,

Michelle R. Lynch
Chief, Regulatory Office

Enclosures:

Cc via email w/encls:
T. Parker, CFLHD
S. Burr, AECOS



Above: Source – Google Earth, Aerial Imagery (8 Jan 2013) (Hilea project site in red, Ninole project site in green). Below: Source – ORM2, Aerial Imagery w/ USFWS NWI layer (Hilea project site in red, Ninole project site in green).

US Army Corps of Engineers, Honolulu District

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

File Number: POH-2015-00224
Project Title: Central Federal Lands Highways Division (CFLHD) Hilea and Ninole Stream Bridges at Punaluu, Ka'u District, Hawaii Island, Hawaii.
Subject: PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary jurisdictional determination (JD) finds that there "*may be*" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

A. REPORT COMPLETION DATE FOR PRELIMINARY JURSDICTIONAL DETERMINATION: 3 Dec 2015

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Mr. Mike Will
U.S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highways Division
12300 West Dakota Avenue, Suite 380A
Lakewood, CO 80228-2583

C. DISTRICT OFFICE: Honolulu District, CEPOH-RO
FILE NAME: Central Federal Lands Highways Division (CFLHD) Hilea and Ninole Stream Bridges at Punaluu, Ka'u District, Hawaii Island, Hawaii.
FILE NUMBER: POH-2015-00224

D. PROJECT LOCATION(S), BACKGROUND INFORMATION, AND WATERS:

State or Territory: Hawaii
City: Punaluu
County: Hawaii
Center Coordinates of Site (Latitude/Longitude): See table below
Name of nearest waterbody: See table below
Identify the amount of waters in the review area:

- ☒ Non-wetland waters: ___linear feet;____width (ft); __acres (See table below)
  Cowardin Classification:
- ☐ Wetlands: ___acres
  Cowardin Classification:
- ☐ Other:

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: N/A

Non-Tidal: N/A

Waters of the U.S.

Waterbody	*Latitude (ºN)*	*Longitude (°W)*	*Cowardin Class*	*Area (Acre)*	*Length (Feet)*	*Width (Feet)*	*Class of Aquatic Resource*
Hilea Stream	19.124688°	-155.525916°	Riverine	0.90	TBD	TBD	Non-section 10 – non wetland
Ninole Stream	19.138609°	-155.517330°	Riverine	0.53	TBD	TBD	Non-section 10 – non wetland

E. REVIEW PERFORMED FOR SITE EVALUATION:

☒ Office (Desk) Determination. Date: 3 Dec 2015
☐ Field Determination. Date(s):

F. EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting

an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

G. SUPPORTING DATA:

Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: CFLHD project letter, dated 28 Oct 2015, and AECOS WOUS report, dated revised 20 Mar 2015.

☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
- ☐ Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps: .

☐ Corps navigable waters' study: .

☐ U.S. Geological Survey Hydrologic Atlas:
- ☐ USGS NHD data.
- ☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite quad name: Punaluu Quad, 7.5 min series

☐ USDA Natural Resources Conservation Service Soil Survey. Citation:

☒ National wetlands inventory map(s). Cite name: USFWS NWI e-mapper

☐ State/Local wetland inventory map(s): .

☐ FEMA/FIRM maps:

☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date): Aerial imagery, 8 Jan 2013
or ☒ Other (Name & Date): 27 Oct 2014 photos in AECOS WOUS report, dated revised 20 Mar 205

☐ Previous determination(s). File no. and date of response letter: .

☒ Other information (please specify): Hilea Gulch HUC 200100000808 / 20417.33906 sq ac. Ninole Gulch HUC 200100000807 / 16405.646614 sq ac

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

//s// Joy Anamizu, 3 Dec 2015

Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining the signature is impracticable)

Ordinary High Water Mark (OHWM) delineation in Hīlea Gulch and Nīnole Gulch, Kaʻū District, Hawaiʻi

January 9, 2015 *AECOS* No. 1411
Rev. March 20, 2015

Susan Burr
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe , Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: SBurr@aecos.com

Introduction

AECOS, Inc. was contracted by SWCA Environmental Consultants to delineate the ordinary high water mark (OHWM) in Hīlea Gulch and Nīnole Gulch in the vicinity of Hawaii Belt Road (Māmalahoa Hwy.; State Route 11), Kaʻū District, Island of Hawaiʻi (Figures 1, 2, and 3). Permanent improvements are proposed for the highway bridges over each gulch and the project will include staging areas, detour roads, and temporary low-water crossings or bridges during construction (Figures 4 and 5). The purpose of the OHWM delineation is to establish lateral limits of federal jurisdiction along the bottom of each gulch in at the project sites.[1] Our delineated line is not official until accepted by the US Army Corps of Engineers (USACE).

Background Information

Kaʻū District — Hīlea Gulch and Nīnole Gulch are part of a complex of intermittently flowing streams that arise on the southeast slope of Mauna Loa. This is an area marked by an extensive deposit of Pāhala ash (Macdonald and Abbott, 1970), a weathered material resembling tuff. The presence of this material accounts for surface streams in the project area in contrast to the very

[1] Federal jurisdiction includes wetlands, if present. The National Wetlands Inventory (NWI; USFWS, 1983), a mapping of all aquatic environments, does not show wetlands in the project area and we did not find wetlands adjacent to the OHWM.

few streams that exist anywhere else on Mauna Loa or Kīlauea volcanoes due to the youthful nature of the lava flows forming the surfaces of these two mountains. Youthful (relatively recent) flows are too porous to support channelized water flow over any significant distance.

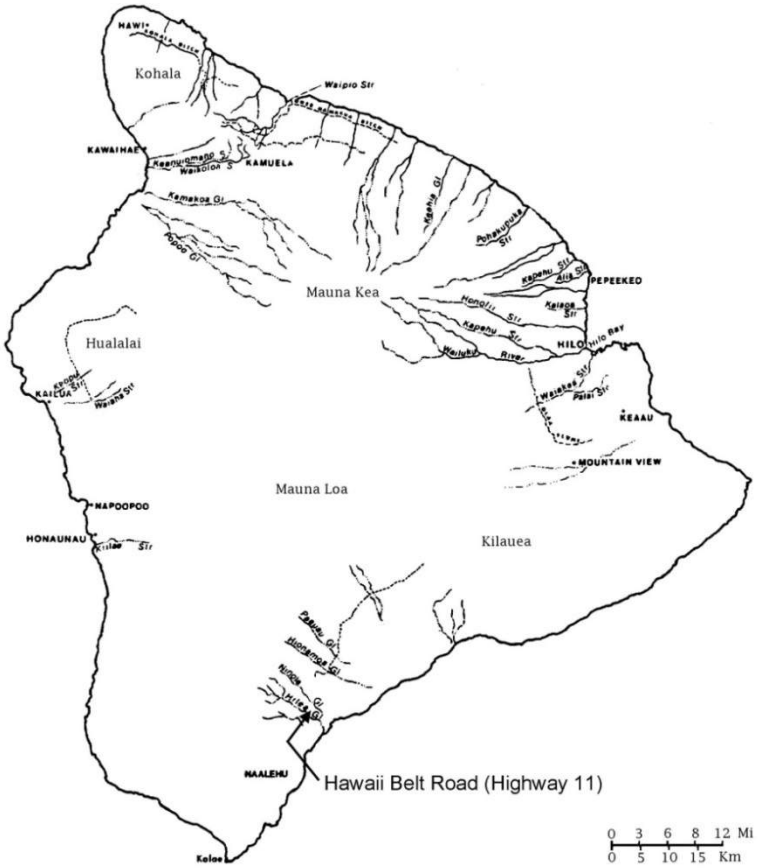


Figure 1. Approximate locations of Hawaii Belt Road at Hīlea Gulch and Nīnole Gulch on a map of the Island of Hawaiʻi showing distribution of streams and diversion ditches.

The lower elevations of the Kaʻū District lie in the rain shadow of Mauna Loa and Kīlauea and experience a relatively dry climate. Annual rainfall ranges from a high of 3000 mm (118 in) mid-slope on Mauna Loa to a low of 1000 mm (39 in) at the coast. Though the rainy season (October through April) is typically wetter than the dry season, most rainfall in this district is the result of storms that can occur any time of the year (Giambelluca et al., 2013).

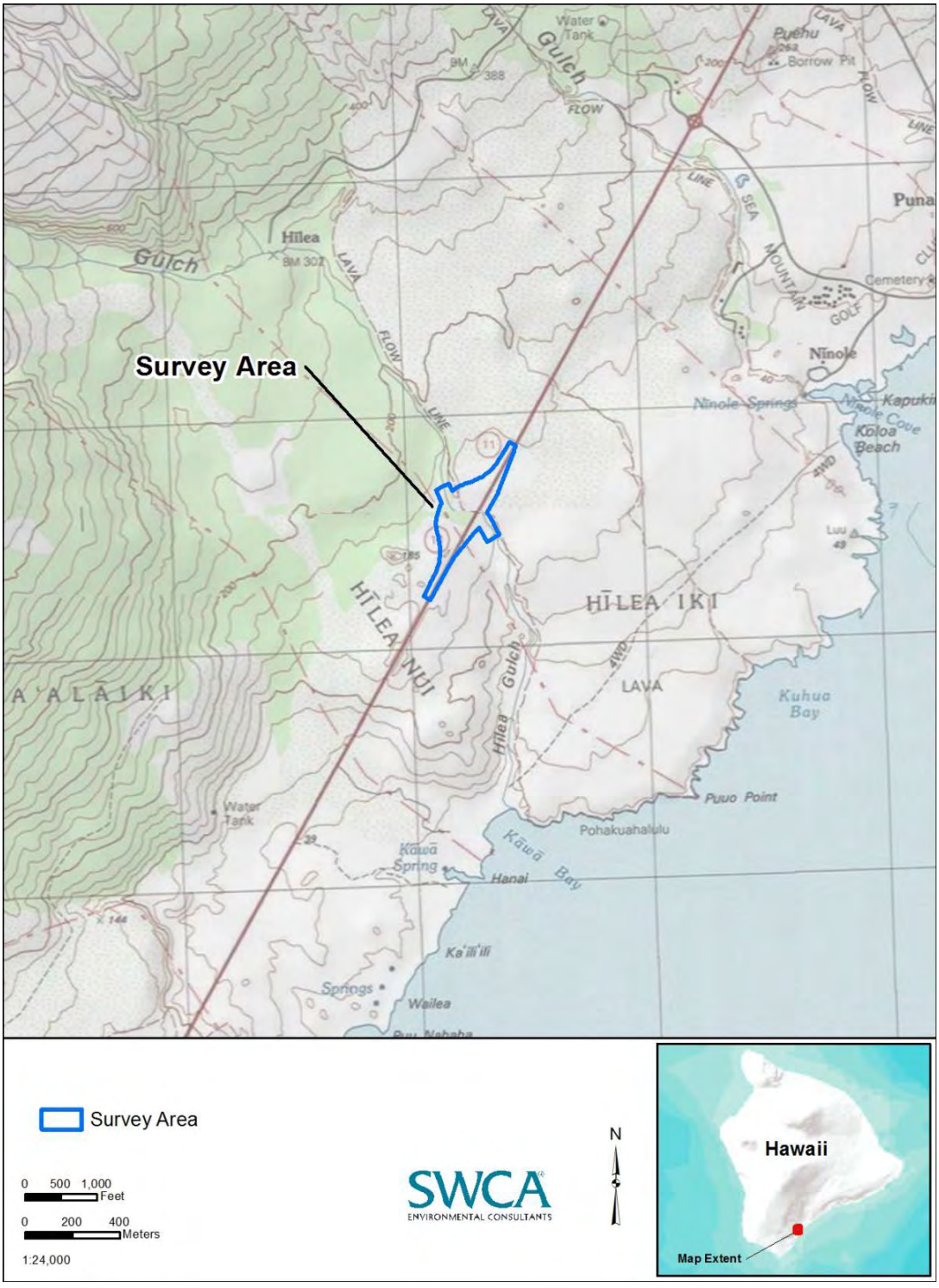


Figure 2. Area in the vicinity of Hīlea Gulch surveyed for biological resources, including upper and lower extents of OHWM survey within the gulch.

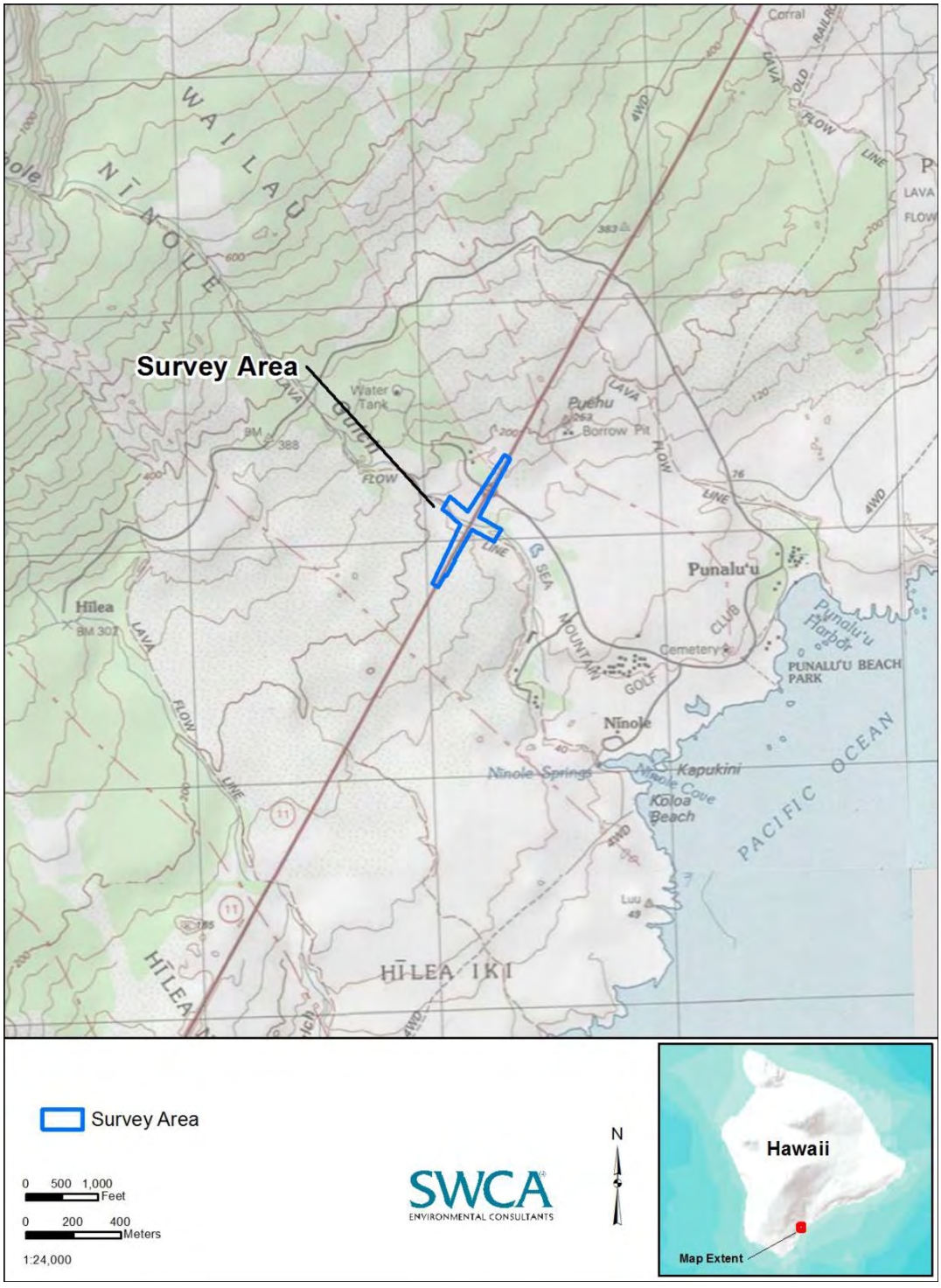


Figure 3. Area in the vicinity of Nīnole Gulch surveyed for biological resources, including upper and lower extents of OHWM survey within the gulch.

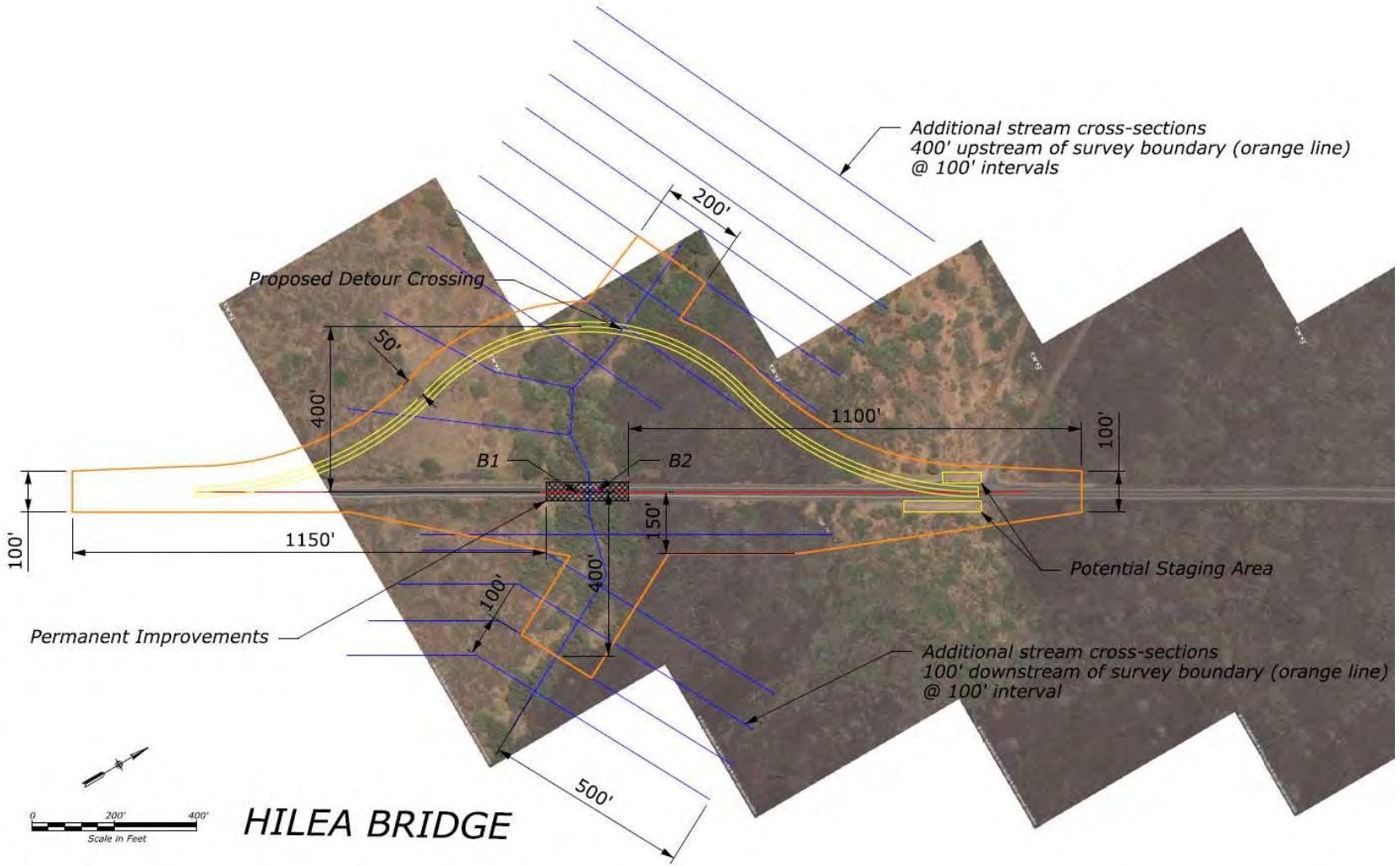


Figure 4. Hīlea Gulch project and vicinity.

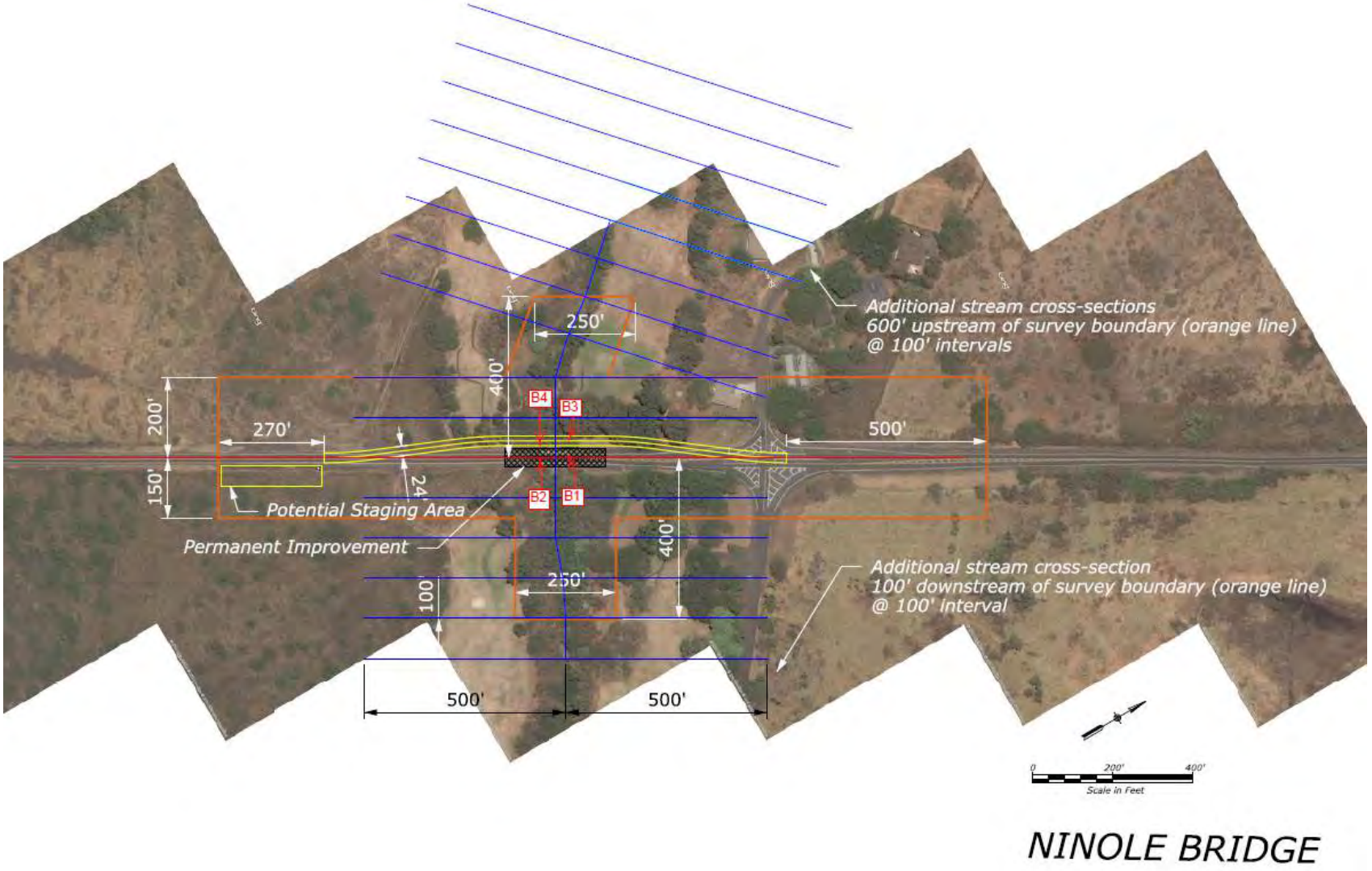


Figure 5. Nīnole Gulch project and vicinity.

In 2014, two large storms hit the main Hawaiian Islands, both primarily affecting the Kaʻū District (NOAA-NWS, 2014a, 2014b). Heavy rains fell from August 7 through 10; on August 8, tropical storm "Iselle" produced rainfall rates as high as 3 to 4 in-per-hour in the project vicinity and Hwy. 11 was closed at Kāwā Flats due to flooding. The Pāhala rain gage recorded 11.99 in for August 2014, 415% of the monthly average. Then, from October 17 through 18, tropical storm "Ana" passed within 100 miles of South Point. Tropical storm Ana produced rainfall rates as high as 8 to 12 inches per hour along the upper Kaʻū slopes and Hwy. 11 was again closed at Kāwā Flats. The Pāhala rain gage recorded 10.54 in for October 2014, 227% of the monthly average.

Figure 6. Hīlea Gulch is usually a dry streambed at Hwy 11.

Hīlea Gulch — Hīlea Gulch (State Code No. 83015) is classified by the Department of Land and Natural Resources, Division of Aquatic Resources (DLNR-DAR) as a "non-perennial stream" with a total channel length of 27.2 km (16.9 mi; DLNR-DAR, 2009). The area of the watershed is 127.5 km^2 (49.2 mi^2), with a maximum elevation of 2,929 m (9,610 ft) above sea level (ASL). The

highest reach of Hīlea Gulch originates at 1400 m (4590 ft) ASL, a little more than midway up the southeastern flank of Mauna Loa. Hwy 11 crosses over Hīlea Gulch at approximately 60 m (200 ft) elevation ASL. The streambed is nearly always dry here (Figure 6, above). Between Hwy 11 and the coast, Hīlea Gulch skirts along the edge of a recent lava flow (dated at between 200-750 years old; Sherrod et al., 2007) and discharges into Kāwā Bay.

Upstream from the highway bridge, the right[2] edge of the gulch is lined with a soil and boulder berm (Figure 7). This berm appears to be man-made, constructed during the sugar cane period to minimize damage from freshets over-topping the gulch and flooding the fields.

Figure 7. The right side of Hīlea Gulch has been built up in a berm to protect the former sugar cane fields from freshets.

The stream bed of Hīlea Gulch in the project area consists of basaltic lava and includes sand- to boulder-sized deposited material. Here, the gulch is incised

[2] By convention, facing in the downstream direction.

about one or two meters relative to the surrounding land. Downstream of the highway bridge, stream flow can occupy up to three channels present there. The two bars around which the stream flows are composed of especially dense basalt and have resisted erosion better than the channel basalt. The channels merge approximately 65 m (215 ft) downstream from the bridge.

Figure 8. Nīnole Stream is typically dry at Hwy 11.

Nīnole Gulch—Nīnole Gulch (State Code No. 83014) is classified by DLNR-DAR as a "non-perennial stream" with a total channel length of 20.1 km (12.5 mi; DLNR-DAR, 2009). The area of the watershed is 50.0 km^2 (19.3 mi^2), with a maximum elevation of 2,330 m (7,644 ft) ASL. The highest reach of Nīnole Gulch originates at 1,180 m (3,871 ft) ASL, about halfway up the southeastern flank of Mauna Loa. Hwy 11 crosses over Nīnole Gulch at approximately 50 m (164 ft) elevation ASL. The streambed is nearly always dry here (Figure 8, above). In the vicinity of the highway, Nīnole Gulch bisects Sea Mountain Golf Course; the gulch merges with the landscape at the *makai* end of the golf course at

approximately 25 m (82 ft) ASL, presumably where it intersects with highly permeable lava. Consequently, when flowing, Nīnole Stream does not empty into the ocean. Whatever water it carries arrives at the coast at Nīnole Cove after dispersing underground.

The US Geological Survey (USGS) established a partial-record station (Sta. No. 16768000) on Nīnole Gulch at 70 m (230 ft) ASL from July 2011 through May 2014 (USGS, 2014). The only measurable flow (minimum measurable flow was 1.6 cfs) during this almost three-year time period was recorded on May 28, 2013: 11.87 ft gage height and 93 cfs.

Figure 9. Sand and gravel deposition is apparent in the gulch downstream of the spillway under the middle bay of the bridge on Nīnole Gulch.

The stream bed of Nīnole Gulch in the project area consists of basalt rock with sand- to boulder-sized deposits. Here, the gulch is incised only about one or two meters relative to the surrounding land. A concrete spillway (Figure 9, above)

directs flow from the middle bay of the bridge into the channel. Stream flow has deposited gravel and sand just downstream from this spillway at a point where stream velocity decreases in a wider channel. Two concrete golf course paths cross Nīnole Gulch near the highway bridge: one ~40 m (~130 ft) upstream from the bridge and one ~60 m (~100 ft) downstream from the bridge.

Methods

The OHWM is defined in the federal regulations [33 CFR 328.3(e); USACE, 1986] as:

> "… the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

On October 27, 2014, *AECOS* scientists established the OHWM of an approximately 305-m (1000-ft) segment of Hīlea Gulch and an approximately 245-m (800-ft) segment of Nīnole Gulch. Within these survey areas, we considered the physical characteristics (Table 1) as provided in a regulatory guidance letter to establish an OHWM (USACE, 2005). As applicable, we also used several of the geomorphic and vegetation indicators used to identify OHWM in arid regions of the continental United States (Lichvar and McColley, 2008), though we did not adhere to the protocol of the arid regions field guide nor did we prepare data sheets based on this protocol.

Table 1. List of physical characteristics typically used to identify OHWM.

Natural line impressed on the bank	Leaf litter disturbed or washed away
Shelving	Scour
Changes in the character of the soil	Deposition
Destruction of terrestrial vegetation	Multiple observed flow events
Presence of litter and debris	Bed and banks
Wracking	Water staining

Due to the extraordinary rainfall in the area in August and October, 2014, many of the Table 1 characteristics were naturally obliterated by the resulting flash floods. That is, these particular freshets established extraordinary high water marks in the gulches, while obliterating some ordinary high water marks from the channel margins. Wracking (collection of floating debris) was observed in the trees above the top of the banks, the gulch bottoms were nearly completely unvegetated, and evidence of apparently recent undercutting, scour, and erosion was present throughout the gulches where surveyed (Figure 10).

Figure 10. Many physical characteristics typically used to identify OHWM were obliterated by extraordinary flows in Hīlea and Nīnole gulches in August and October 2014 (note wracking present approx. 2 m or 6 ft above marked OHWM in Hīlea Gulch).

AECOS scientists marked the OHWM with flagging tape placed in pairs on both sides of each gulch roughly every 10 to 15 m (30 to 45 ft). Twenty-two pairs of flags were used to mark the OHWM in Hīlea Gulch and twenty pairs of flags

were used in Nīnole Gulch. A set of photographs (upstream, left and right bank, and downstream) was taken from the center of the gulch at each pair of flags to document the markings and to characterize the environment. We calculated the area of jurisdictional waters we surveyed using the measuring tool in Adobe Acrobat.

We did not observe any features in the survey area likely to be wetlands; therefore, we did not evaluate any wetland sampling points. While most of the plants present (e.g., Java plum, Guinea grass) are listed (USACE, 2012 , Lichvar, et al., 2014) as facultative, meaning they may grow in both wetlands and non-wetlands, conditions suitable for supporting wetlands are absent. The youthful lava flows of the landscape are porous, the climate of lower elevations of the Kaʻū District is dry, and streamflow is "flashy." None of the soils mapped in the survey area (NRCS, 2015) are listed as hydric (NRCS, 2014). No wetlands (or for that matter, other aquatic features) are shown in the National Wetland Inventory (NWI; USFWS, 1983) for either gulch. The absence of wetlands in the survey area is subject to final confirmation by USACE.

Results

The most frequently encountered indicators of the OHWM in the segment of Hīlea Gulch we surveyed are listed in Table 2. The most frequently encountered indicators of the OHWM in the segment of Nīnole Gulch surveyed are listed in Table 3.

In both Hīlea Gulch and Nīnole Gulch, a break in the bank slope is the most common indicator of an OHWM. Trees (mostly Java plum or *Syzygium cumini*) are located above the OHWM, though exposed roots can be found below the OHWM. Grasses and small shrubs can take root and thrive for a couple of years on the stream bed below the OWHM, though the two recent freshets removed all vegetation growing in these stream beds prior to our survey. Recent wracking is evident in trees well above the OHWM. The wrack line is lower in Nīnole Gulch than Hīlea Gulch, indicating flow from these storms may have been less in the former. Additionally, bed sediment deposition is more evident in Nīnole Gulch than in Hīlea Gulch.

Attachment A presents the OHWM elevation of the two gulches as delineated in the field by *AECOS* and surveyed by Control Point Surveying, Inc. Using the measuring tool in Adobe Acrobat IX, we calculated the amount of jurisdictional waters we surveyed in Hīlea Gulch to be 0.36 ha (0.90 ac) and the amount of

jurisdictional waters in Nīnole Gulch we surveyed to be 0.21 ha (0.53 ac). Photographs taken to document the process are included in Attachment B.

Table 2. Most frequently encountered characteristics used to identify OHWM in Hīlea Gulch.

Below OHWM	**Above OHWM**
Leaf litter disturbed or washed away	Wracking
Shelving	Growth of terrestrial plants
Scour	Soil development
Meander bars	Depositional topography
Deposition	Surface relief
	Mature pioneer trees with upland species
At OHWM	Perennial herbs
Destruction of terrestrial vegetation	Upland species
Break in bank slope	
Highest surface of channel bars	
Change in particle size distribution	
Staining of rocks	

Table 3. Most frequently encountered characteristics used to identify OHWM in Nīnole Gulch.

Below OHWM	**Above OHWM**
Leaf litter disturbed or washed away	Growth of terrestrial plants
Shelving	Soil development
Scour	Depositional topography
Deposition	Surface relief
	Mature pioneer trees with upland species
At OHWM	Perennial herbs
Destruction of terrestrial vegetation	Upland species
Break in bank slope	Wracking
Change in particle size distribution	

Discussion

Our delineation of the OHWM is based upon best professional judgment. However, federal jurisdiction is solely determined by the USACE and is based

upon the USACE accepting our delineation points. Acceptance may require a field visit by a USACE representative from the Regulatory Branch to inspect all or representative flags placed by the author. Our delineation is not official until an accepted letter from the USACE is received by the applicant.

References

Giambelluca, T. W., Q. Chen, A. G. Frazier, J. P. Price, Y. –L. Chen, P. –S. Chu, J. K. Eischeid, and D. M. Delparte. 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94: 313-316. doi. 10.1175/BAMS-D-11-00228.1. Available online at URL: http://rainfall.geography.hawaii.edu/interactivemap.html; last accessed November 17, 2014.

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Lichvar, R. W., M. Butterwick, N. C. Melivin, and W. N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. *Phytoneuron* 2014-41: 1-42.

Macdonald, G. A., and A. T. Abbott. 1970. *Volcanoes in the Sea. The Geology of Hawaii*. University of Hawaii Press, Honolulu. 441 pp.

National Oceanographic and Atmospheric Administration, National Weather Service Forecast Office (NOAA-NWS). 2014a. September 2014 precipitation summary. Available online at: www.prh.noaa.gov/hnl/hydro/pages/sep14sum.php; last accessed on November 18, 2014.

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Attachment A

Ordinary High Water Mark Maps

HAWAII BELT ROAD F.A.P. 18-C(1)

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)

1 inch = 20 ft.

TRUE NORTH

SCALE: 1 IN = 20 FT

Sheet 2 of 2

Hilea makai

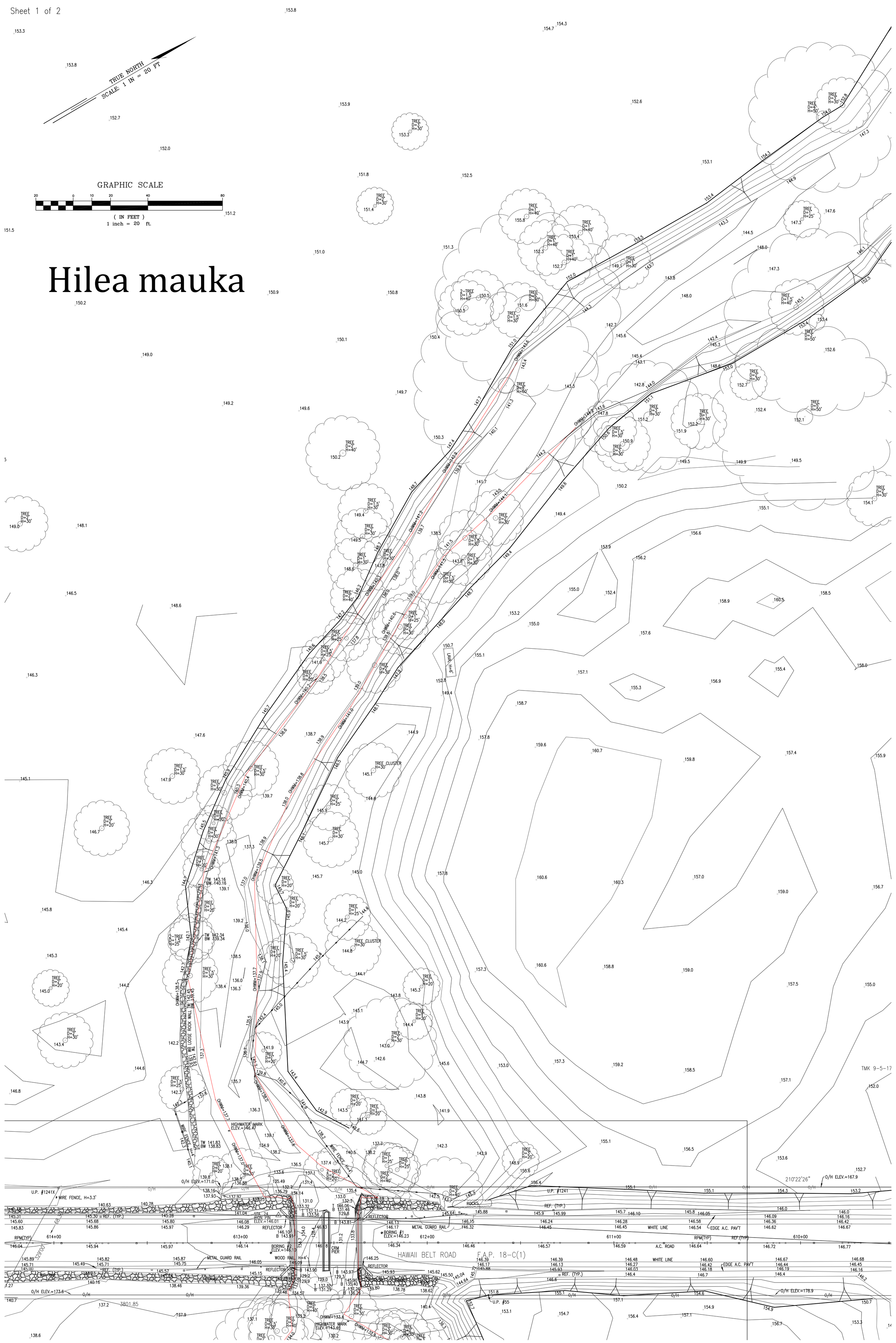
TRUE NORTH
SCALE: 1 IN = 20 FT

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

Hilea mauka

HAWAII BELT ROAD F.A.P. 18-C(1)

TMK 9-5-17



Ninole makai

Sheet 2 of 2

TRUE NORTH
SCALE: 1 IN = 20 FT

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

Ninole mauka

TMK 9-5-19: 24
SEA MOUNTAIN

Attachment B

Ordinary High Water Mark Photographs

Hīlea Flag 1 Upstream

Hīlea Flag 1 Left bank

Hīlea Flag 1Right bank

Hīlea Flag 1 Downstream

Hīlea Flag 2 Upstream

Hīlea Flag 2 Left bank

Hīlea Flag 2 Right bank

Hīlea Flag 2 Downstream

Hīlea Flag 3 Upstream

Hīlea Flag 3 Left bank

Hīlea Flag 3 Right bank

Hīlea Flag 3 Downstream

Hīlea Flag 4 Upstream

Hīlea Flag 4 Left bank

Hīlea Flag 4 Right bank

Hīlea Flag 4 Downstream

Hīlea Flag 5 Upstream

Hīlea Flag 5 Left bank

Hīlea Flag 5 Right bank

Hīlea Flag 5 Downstream

Hīlea Flag 6 Upstream

Hīlea Flag 6 Left bank

Hīlea Flag 6 Right bank

Hīlea Flag 6 Downstream

Hīlea Flag 7 Upstream

Hīlea Flag 7 Left bank

Hīlea Flag 7 Right bank

Hīlea Flag 7 Downstream

Hīlea Flag 8 Upstream

Hīlea Flag 8 Left bank

Hīlea Flag 8 Right bank

Hīlea Flag 8 Downstream

Hīlea Flag 9 Upstream

Hīlea Flag 9 Left bank

Hīlea Flag 9 Right bank

Hīlea Flag 9 Downstream

Hīlea Flag 10 Upstream

Hīlea Flag 10 Left bank

Hīlea Flag 10 Right bank

Hīlea Flag 10 Downstream

Hīlea Flag 11 Left Channel Upstream

Hīlea Flag 11 Left Channel Left bank

Hīlea Flag 11 Left Channel Right bank

Hīlea Flag 11 Left Channel Downstream

Hīlea Flag 11 Right Channel Upstream

Hīlea Flag 11 Right Channel Left bank

Hīlea Flag 11 Right Channel Right bank

Hīlea Flag 11 Right Channel Downstream

Hīlea Flag 12 Left Channel Upstream

Hīlea Flag 12 Left Channel Left bank

Hīlea Flag 12 Left Channel Right bank

Hīlea Flag 12 Left Channel Downstream

Hīlea Flag 12 Right Channel Upstream

Hīlea Flag 12 Right Channel Left bank

Hīlea Flag 12 Right Channel Right bank

Hīlea Flag 12 Right Channel Downstream

Hīlea Flag 13 Left Channel Upstream

Hīlea Flag 13 Left Channel Left bank

Hīlea Flag 13 Left Channel Right bank

Hīlea Flag 13 Left Channel Downstream

Hīlea Flag 13 Right Channel Upstream

Hīlea Flag 13 Right Channel Left bank

Hīlea Flag 13 Right Channel Right bank

Hīlea Flag 13 Right Channel Downstream

Hīlea Flag 14a Left Channel Upstream

Hīlea Flag 14a Left Channel Left bank

Hīlea Flag 14a Left Channel Right bank

Hīlea Flag 14a Left Channel Downstream

Hīlea Flag 14b Left Channel Upstream

Hīlea Flag 14b Left Channel Left bank

Hīlea Flag 14b Left Channel Right bank

Hīlea Flag 14b Left Channel Downstream

Hīlea Flag 14 Middle Channel Upstream

Hīlea Flag 14 Middle Channel Left bank

Hīlea Flag 14 Middle Channel Right bank

Hīlea Flag 14 Middle Channel Downstream

Hīlea Flag 14 Right Channel Upstream

Hīlea Flag 14 Right Channel Left bank

Hīlea Flag 14 Right Channel Right bank

Hīlea Flag 14 Right Channel Downstream

Hīlea Flag 15 Upstream (note left and right channel are visible)

Hīlea Flag 15 Left bank

Hīlea Flag 15 Right bank

Hīlea Flag 15 Downstream

Hīlea Flag 16 Upstream (note only left channel visible)

Hīlea Flag 16 Left bank

Hīlea Flag 16 Right bank

Hīlea Flag 16 Downstream

Hīlea Flag 17 Upstream (note stream splits at Flags 15 and 14; 3 channels are visible)

Hīlea Flag 17 Left bank

Hīlea Flag 17 Right bank

Hīlea Flag 17 Downstream

Hīlea Flag 18 Upstream (note stream splits at Flag 15)

Hīlea Flag 18 Left bank

Hīlea Flag 18 Right bank

Hīlea Flag 18 Downstream

Hīlea Flag 19 Upstream

Hīlea Flag 19 Left bank

Hīlea Flag 19 Right bank

Hīlea Flag 19 Downstream

Hīlea Flag 20 Upstream

Hīlea Flag 20 Left bank

Hīlea Flag 20 Right bank

Hīlea Flag 20 Downstream

Hīlea Flag 21 Upstream

Hīlea Flag 21 Left bank

Hīlea Flag 21 Right bank

Hīlea Flag 21 Downstream

Hīlea Flag 22 Upstream

Hīlea Flag 22 Left bank

Hīlea Flag 22 Right bank

Hīlea Flag 22 Downstream

Nīnole Flag 1 Upstream

Nīnole Flag 1 Left bank

Nīnole Flag 1Right bank

Nīnole Flag 1 Downstream

Nīnole Flag 2 Upstream

Nīnole Flag 2 Left bank

Nīnole Flag 2Right bank

Nīnole Flag 2 Downstream

Nīnole Flag 3 Upstream

Nīnole Flag 3 Left bank

Nīnole Flag 3 Right bank

Nīnole Flag 3 Downstream

Nīnole Flag 4 Upstream

Nīnole Flag 4 Left bank

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Nīnole Flag 5 Upstream

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Nīnole Flag 6 Downstream

Nīnole Flag 7 Upstream

Nīnole Flag 7 Left bank

Nīnole Flag 7 Right bank

Nīnole Flag 7 Downstream

Nīnole Flag 8 Upstream

Nīnole Flag 8 Left bank

Nīnole Flag 8 Right bank

Nīnole Flag 8 Downstream

Nīnole Flag 9 Upstream

Nīnole Flag 9 Left bank

Nīnole Flag 9 Right bank

Nīnole Flag 9 Downstream

Nīnole Flag 10 Upstream

Nīnole Flag 10 Left bank

Nīnole Flag 10 Right bank

Nīnole Flag 10 Downstream

Nīnole Culvert above OHWM on left side between Flags 10 and 11

Nīnole Flag 11 Upstream

Nīnole Flag 11 Left bank

Nīnole Flag 11 Right bank

Nīnole Flag 11 Downstream

Nīnole Flag 12 Upstream

Nīnole Flag 12 Left bank

Nīnole Flag 12 Right bank

Nīnole Flag 12 Downstream

Nīnole Flag 13 Upstream

Nīnole Flag 13 Left bank

Nīnole Flag 13 Right bank

Nīnole Flag 13 Downstream

Nīnole Flag 14 Upstream

Nīnole Flag 14 Left bank

Nīnole Flag 14 Right bank

Nīnole Flag 14 Downstream

Nīnole Flag 15 Upstream

Nīnole Flag 15 Left bank

Nīnole Flag 15 Right bank

Nīnole Flag 15 Downstream

Nīnole Flag 16 Upstream

Nīnole Flag 16 Left bank

Nīnole Flag 16 Right bank

Nīnole Flag 16 Downstream

Nīnole Flag 17 Upstream

Nīnole Flag 17 Left bank

Nīnole Flag 17 Right bank

Nīnole Flag 17 Downstream

Nīnole Flag 18 Upstream

Nīnole Flag 18 Left bank

Nīnole Flag 18 Right bank

Nīnole Flag 18 Downstream

Nīnole Flag 19 Upstream

Nīnole Flag 19 Left bank

Nīnole Flag 19 Right bank

Nīnole Flag 19 Downstream

Nīnole Flag 20 Upstream

Nīnole Flag 20 Left bank

Nīnole Flag 20 Right bank

Nīnole Flag 20 Downstream

Appendix B
EDR Radius Map Report™ with GeoCheck®
(May 13, 2015)

Hilea Bridge & Ninole Bridge
Highway 11/Ninole Loop Road
Naalehu, HI 96772

Inquiry Number: 4293162.2s
May 13, 2015

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

HIGHWAY 11/NINOLE LOOP ROAD
NAALEHU, HI 96772

COORDINATES

Latitude (North):	19.1318000 - 19° 7' 54.48''
Longitude (West):	155.5214000 - 155° 31' 17.04''
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	234760.9
UTM Y (Meters):	2117198.0
Elevation:	156 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	19155-B5 PUNALUU, HI
Most Recent Revision:	Not reported
South Map:	19155-A5 NAALEHU, HI
Most Recent Revision:	Not reported

MAPPED SITES SUMMARY

Target Property Address:
HIGHWAY 11/NINOLE LOOP ROAD
NAALEHU, HI 96772

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	SEA MOUNTAIN GOLF CO	PUNALUU RESORT / HIG	LUST, UST	Lower	3105, 0.588, ENE
2	PUNALUU BEACH PARK -	96-876 GOVERNMENT RD	FINDS	Lower	5614, 1.063, East

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent CERCLIS

SHWS ---------- Sites List

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Permitted Landfills in the State of Hawaii

State and tribal leaking storage tank lists

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

State and tribal institutional control / engineering control registries

ENG CONTROLS ---------- Engineering Control Sites
INST CONTROL ---------- Sites with Institutional Controls

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Response Program Sites

State and tribal Brownfields sites

BROWNFIELDS ---------- Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---------- Clandestine Drug Labs
CDL ---------- Clandestine Drug Lab Listing
US HIST CDL ---------- National Clandestine Laboratory Register

EXECUTIVE SUMMARY

Local Land Records

LIENS 2 ---------- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
SPILLS ---------- Release Notifications
SPILLS 90 ---------- SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---------- RCRA - Non Generators / No Longer Regulated
DOT OPS ---------- Incident and Accident Data
DOD ---------- Department of Defense Sites
FUDS ---------- Formerly Used Defense Sites
CONSENT ---------- Superfund (CERCLA) Consent Decrees
ROD ---------- Records Of Decision
UMTRA ---------- Uranium Mill Tailings Sites
US MINES ---------- Mines Master Index File
TRIS ---------- Toxic Chemical Release Inventory System
TSCA ---------- Toxic Substances Control Act
FTTS ---------- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS ---------- FIFRA/TSCA Tracking System Administrative Case Listing
SSTS ---------- Section 7 Tracking Systems
ICIS ---------- Integrated Compliance Information System
PADS ---------- PCB Activity Database System
MLTS ---------- Material Licensing Tracking System
RADINFO ---------- Radiation Information Database
RAATS ---------- RCRA Administrative Action Tracking System
RMP ---------- Risk Management Plans
UIC ---------- Underground Injection Wells Listing
DRYCLEANERS ---------- Permitted Drycleaner Facility Listing
AIRS ---------- List of Permitted Facilities
INDIAN RESERV ---------- Indian Reservations
SCRD DRYCLEANERS ---------- State Coalition for Remediation of Drycleaners Listing
LEAD SMELTERS ---------- Lead Smelter Sites
PRP ---------- Potentially Responsible Parties
2020 COR ACTION ---------- 2020 Corrective Action Program List
COAL ASH DOE ---------- Steam-Electric Plant Operation Data
PCB TRANSFORMER ---------- PCB Transformer Registration Database
COAL ASH EPA ---------- Coal Combustion Residues Surface Impoundments List
US AIRS ---------- Aerometric Information Retrieval System Facility Subsystem
Financial Assurance ---------- Financial Assurance Information Listing
US FIN ASSUR ---------- Financial Assurance Information
EPA WATCH LIST ---------- EPA WATCH LIST

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---------- EDR Proprietary Manufactured Gas Plants

EDR US Hist Auto Stat ------- EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners ------- EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank
RGA HWS ---------- Recovered Government Archive State Hazardous Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

A review of the LUST list, as provided by EDR, and dated 03/02/2015 has revealed that there is 1 LUST site within approximately 2 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SEA MOUNTAIN GOLF CO	***PUNALUU RESORT / HIG***	***ENE 1/2 - 1 (0.588 mi.)***	***1***	***7***
Facility Id: 9-602981 Release ID: 940184 Facility Status: Site Cleanup Completed (NFA)				

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health's Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 03/02/2015 has revealed that there is 1 UST

site within approximately 2 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SEA MOUNTAIN GOLF CO	***PUNALUU RESORT / HIG***	***ENE 1/2 - 1 (0.588 mi.)***	***1***	***7***
Facility Id: 9-602981				
Date Closed: 08/17/1994				
Tank Status: Permanently Out of Use				

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

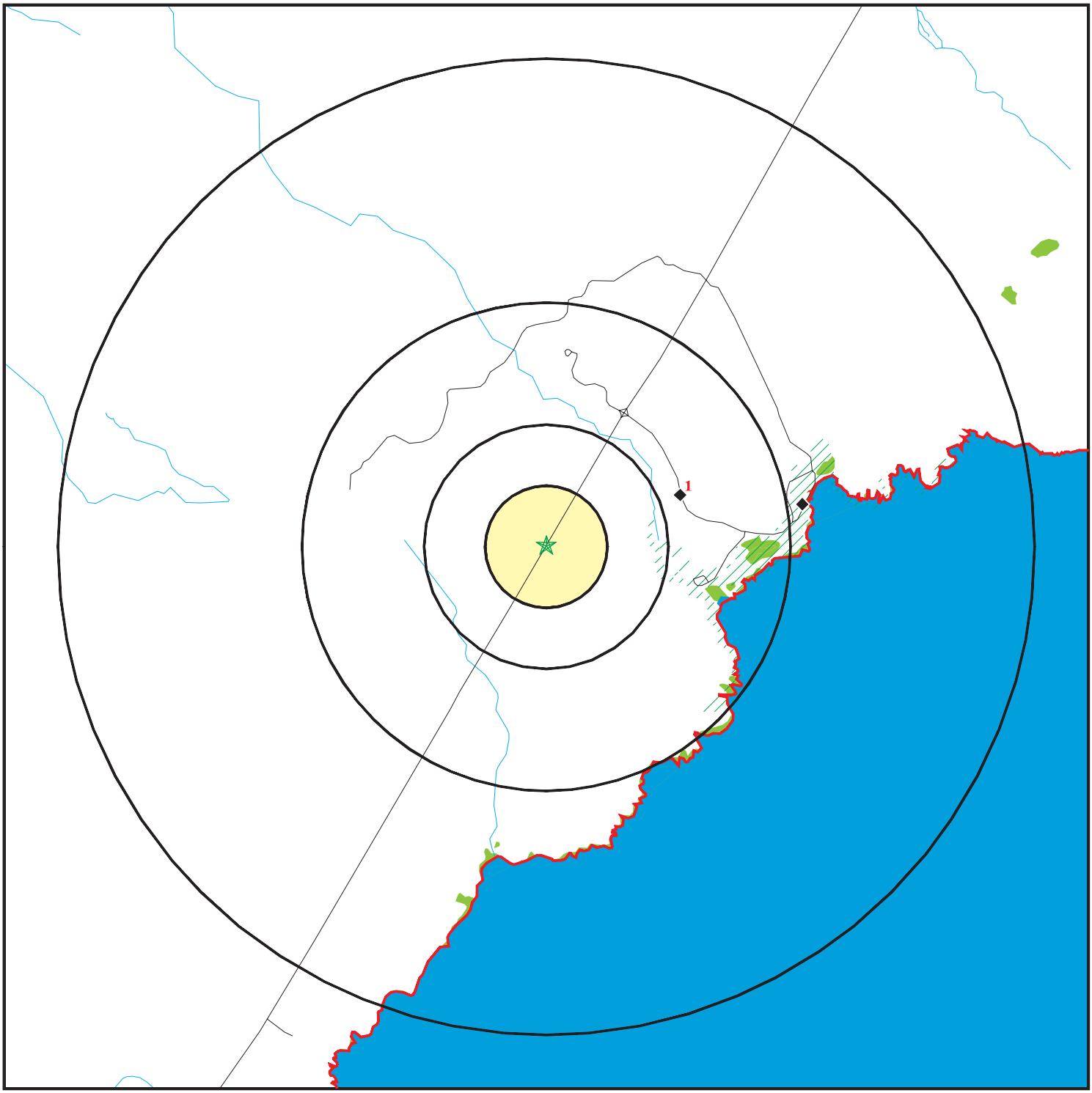
A review of the FINDS list, as provided by EDR, and dated 01/18/2015 has revealed that there is 1 FINDS site within approximately 2 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
PUNALUU BEACH PARK -	96-876 GOVERNMENT RD	E 1 - 2 (1.063 mi.)	2	7

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 4293162.2S

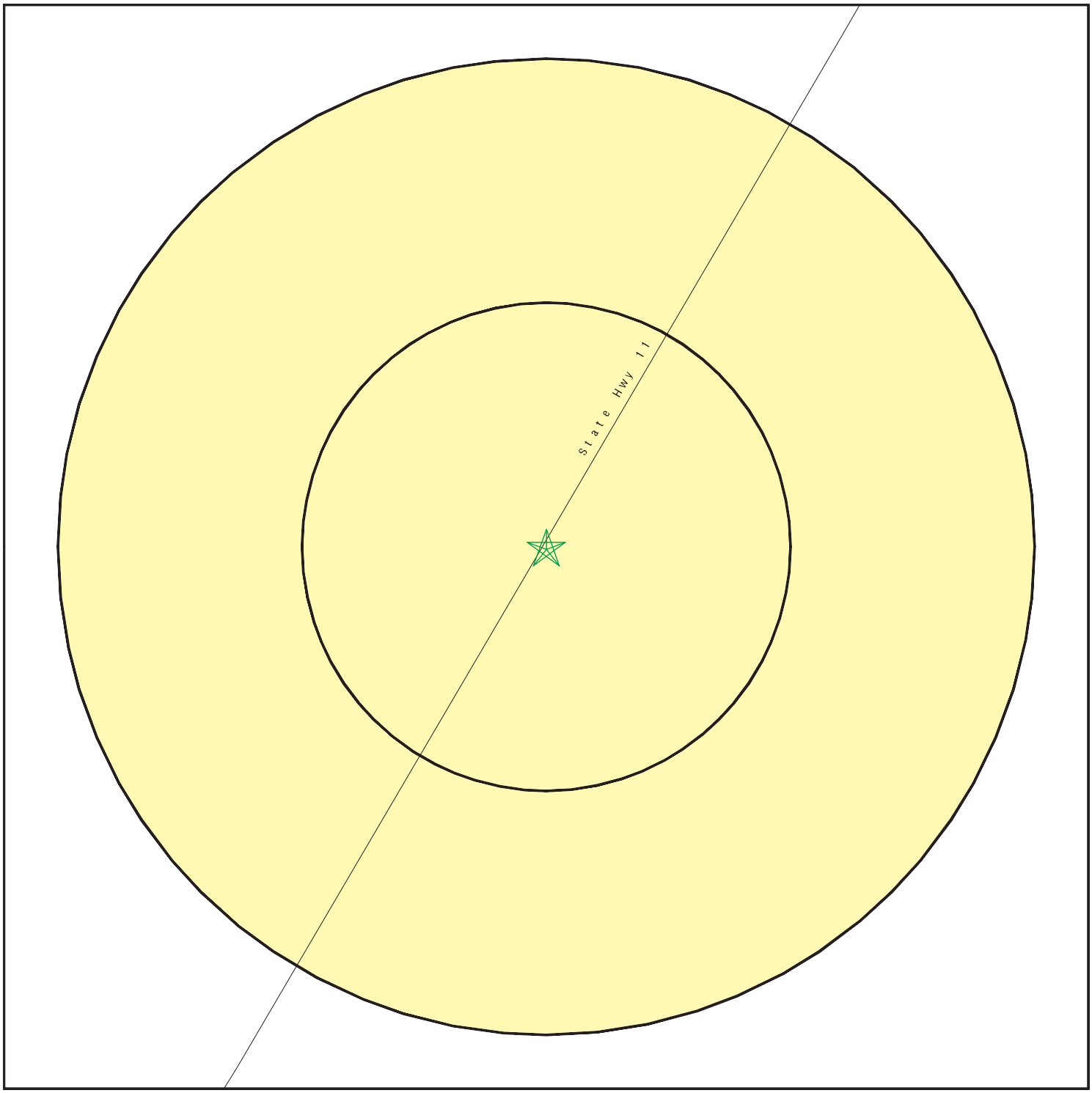


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Hilea Bridge & Ninole Bridge	CLIENT:	CH2M Hill Corporation
ADDRESS:	Highway 11/Ninole Loop Road Naalehu HI 96772	CONTACT:	Lyna Black
LAT/LONG:	19.1318 / 155.5214	INQUIRY #:	4293162.2s
		DATE:	May 13, 2015 5:03 pm

DETAIL MAP - 4293162.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Hilea Bridge & Ninole Bridge	CLIENT:	CH2M Hill Corporation
ADDRESS:	Highway 11/Ninole Loop Road Naalehu HI 96772	CONTACT:	Lyna Black
LAT/LONG:	19.1318 / 155.5214	INQUIRY #:	4293162.2s
		DATE:	May 13, 2015 5:04 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	2.000		0	0	0	0	0	0
Proposed NPL	2.000		0	0	0	0	0	0
NPL LIENS	2.000		0	0	0	0	0	0
Federal Delisted NPL site list								
Delisted NPL	2.000		0	0	0	0	0	0
Federal CERCLIS list								
CERCLIS	2.000		0	0	0	0	0	0
FEDERAL FACILITY	2.000		0	0	0	0	0	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	2.000		0	0	0	0	0	0
Federal RCRA CORRACTS facilities list								
CORRACTS	2.000		0	0	0	0	0	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	2.000		0	0	0	0	0	0
Federal RCRA generators list								
RCRA-LQG	2.000		0	0	0	0	0	0
RCRA-SQG	2.000		0	0	0	0	0	0
RCRA-CESQG	2.000		0	0	0	0	0	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	2.000		0	0	0	0	0	0
US INST CONTROL	2.000		0	0	0	0	0	0
LUCIS	2.000		0	0	0	0	0	0
Federal ERNS list								
ERNS	2.000		0	0	0	0	0	0
State- and tribal - equivalent CERCLIS								
SHWS	2.000		0	0	0	0	0	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	2.000		0	0	0	0	0	0
State and tribal leaking storage tank lists								
LUST	2.000		0	0	0	1	0	1
INDIAN LUST	2.000		0	0	0	0	0	0
State and tribal registered storage tank lists								
UST	2.000		0	0	0	1	0	1

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN UST	2.000		0	0	0	0	0	0
FEMA UST	2.000		0	0	0	0	0	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	2.000		0	0	0	0	0	0
INST CONTROL	2.000		0	0	0	0	0	0
State and tribal voluntary cleanup sites								
INDIAN VCP	2.000		0	0	0	0	0	0
VCP	2.000		0	0	0	0	0	0
State and tribal Brownfields sites								
BROWNFIELDS	2.000		0	0	0	0	0	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	2.000		0	0	0	0	0	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9	2.000		0	0	0	0	0	0
ODI	2.000		0	0	0	0	0	0
INDIAN ODI	2.000		0	0	0	0	0	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	2.000		0	0	0	0	0	0
CDL	2.000		0	0	0	0	0	0
US HIST CDL	2.000		0	0	0	0	0	0
Local Land Records								
LIENS 2	2.000		0	0	0	0	0	0
Records of Emergency Release Reports								
HMIRS	2.000		0	0	0	0	0	0
SPILLS	2.000		0	0	0	0	0	0
SPILLS 90	2.000		0	0	0	0	0	0
Other Ascertainable Records								
RCRA NonGen / NLR	2.000		0	0	0	0	0	0
DOT OPS	2.000		0	0	0	0	0	0
DOD	2.000		0	0	0	0	0	0
FUDS	2.000		0	0	0	0	0	0
CONSENT	2.000		0	0	0	0	0	0
ROD	2.000		0	0	0	0	0	0
UMTRA	2.000		0	0	0	0	0	0
US MINES	2.000		0	0	0	0	0	0
TRIS	2.000		0	0	0	0	0	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA	2.000		0	0	0	0	0	0
FTTS	2.000		0	0	0	0	0	0
HIST FTTS	2.000		0	0	0	0	0	0
SSTS	2.000		0	0	0	0	0	0
ICIS	2.000		0	0	0	0	0	0
PADS	2.000		0	0	0	0	0	0
MLTS	2.000		0	0	0	0	0	0
RADINFO	2.000		0	0	0	0	0	0
FINDS	2.000		0	0	0	0	1	1
RAATS	2.000		0	0	0	0	0	0
RMP	2.000		0	0	0	0	0	0
UIC	2.000		0	0	0	0	0	0
DRYCLEANERS	2.000		0	0	0	0	0	0
AIRS	2.000		0	0	0	0	0	0
INDIAN RESERV	2.000		0	0	0	0	0	0
SCRD DRYCLEANERS	2.000		0	0	0	0	0	0
LEAD SMELTERS	2.000		0	0	0	0	0	0
PRP	2.000		0	0	0	0	0	0
2020 COR ACTION	2.000		0	0	0	0	0	0
COAL ASH DOE	2.000		0	0	0	0	0	0
PCB TRANSFORMER	2.000		0	0	0	0	0	0
COAL ASH EPA	2.000		0	0	0	0	0	0
US AIRS	2.000		0	0	0	0	0	0
Financial Assurance	2.000		0	0	0	0	0	0
US FIN ASSUR	2.000		0	0	0	0	0	0
EPA WATCH LIST	2.000		0	0	0	0	0	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	2.000		0	0	0	0	0	0
EDR US Hist Auto Stat	2.000		0	0	0	0	0	0
EDR US Hist Cleaners	2.000		0	0	0	0	0	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	2.000		0	0	0	0	0	0
RGA LUST	2.000		0	0	0	0	0	0
RGA HWS	2.000		0	0	0	0	0	0
- Totals --		0	0	0	0	2	1	3

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
ENE
1/2-1
0.588 mi.
3105 ft.

SEA MOUNTAIN GOLF COURSE
PUNALUU RESORT / HIGHWAY 11
PAHALA, HI 96777

LUST **U003222392**
UST **N/A**

Relative:
Lower

Actual:
90 ft.

LUST:

Facility ID:	9-602981
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	02/13/1996
Release ID:	940184
Project Officer:	Eric Sadoyama

UST:

Facility ID:	9-602981
Owner:	PUNALU'U DEVELOPMENT, INC
Owner Address:	P.O. BOX 85
Owner City,St,Zip:	Pahala, 96777 96777
Latitude:	19.134348
Longitude:	-155.515078
Horizontal Reference Datum Name:	Not reported
Horizontal Collection Method Name:	Not reported

Tank ID:	R-1
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	08/17/1994
Tank Capacity:	1000
Substance:	Gasoline

Tank ID:	R-2
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	08/17/1994
Tank Capacity:	1000
Substance:	Gasoline

2
East
> 1
1.063 mi.
5614 ft.

PUNALUU BEACH PARK - 5W32 - SEPTIC WITH HORIZONTAL DISPOSAL
96-876 GOVERNMENT RD
PAHALA, HI 96777

FINDS **1014696668**
N/A

Relative:
Lower

Actual:
11 ft.

FINDS:

Registry ID: 110042352628

Environmental Interest/Information System

ICIS (Integrated Compliance Information System) is the Integrated Compliance Information System and provides a database that, when complete, will contain integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA in the Regional offices and it Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate

PUNALUU BEACH PARK - 5W32 - SEPTIC WITH HORIZONTAL DISPOSAL (Continued) **1014696668**

that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/16/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: EPA
Telephone: N/A
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 07/21/2014
Date Data Arrived at EDR: 10/07/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/08/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/09/2014
Date Data Arrived at EDR: 12/29/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 31

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/09/2014
Date Data Arrived at EDR: 12/29/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2014
Date Data Arrived at EDR: 12/29/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/09/2014
Date Data Arrived at EDR: 12/29/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2014
Date Data Arrived at EDR: 12/29/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 09/19/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/26/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 09/19/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/26/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/03/2014
Date Data Arrived at EDR: 12/12/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 48

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/16/2015
Next Scheduled EDR Contact: 06/01/2015
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 09/30/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 37

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/27/2015
Number of Days to Update: 36

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Semi-Annually

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Permitted Landfills in the State of Hawaii

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/17/2012
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 37

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 04/02/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 03/02/2015
Date Data Arrived at EDR: 03/04/2015
Date Made Active in Reports: 03/17/2015
Number of Days to Update: 13

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 02/26/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Semi-Annually

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 01/30/2015
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 32

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/10/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 31

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/03/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 01/28/2015
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 42

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 03/02/2015
Date Data Arrived at EDR: 03/04/2015
Date Made Active in Reports: 03/17/2015
Number of Days to Update: 13

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 02/26/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 01/29/2015
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 42

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/26/2015
Next Scheduled EDR Contact: 05/11/2015
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/30/2015
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 36

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Quarterly

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/13/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites

A listing of sites with engineering controls in place.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/27/2015
Number of Days to Update: 36

Source: Department of Health
Telephone: 404-586-4249
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls

Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/27/2015
Number of Days to Update: 36

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/02/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites
Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/27/2015
Number of Days to Update: 36
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/27/2015
Number of Days to Update: 36
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/22/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 38
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/24/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39
Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137
Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/23/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: No Update Planned

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/03/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Quarterly

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 10/22/2010
Number of Days to Update: 42
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/26/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/03/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37
Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/29/2014
Date Data Arrived at EDR: 12/30/2014
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 69

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

SPILLS: Release Notifications

Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/22/2014
Date Made Active in Reports: 01/28/2015
Number of Days to Update: 37

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/09/2014
Date Data Arrived at EDR: 12/29/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/31/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/05/2015
Next Scheduled EDR Contact: 08/17/2015
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/13/2015
Next Scheduled EDR Contact: 06/22/2015
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 24

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/10/2015
Next Scheduled EDR Contact: 06/22/2015
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/27/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 12/30/2014
Date Data Arrived at EDR: 12/31/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/06/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 01/29/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/27/2015
Next Scheduled EDR Contact: 07/06/2015
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/23/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/23/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/10/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/09/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/17/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 12/29/2014
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 21

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/09/2015
Next Scheduled EDR Contact: 06/22/2015
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 02/27/2015
Date Data Arrived at EDR: 02/27/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/09/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 01/18/2015
Date Data Arrived at EDR: 02/27/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 26

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/09/2015
Next Scheduled EDR Contact: 06/22/2015
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/27/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/24/2015
Next Scheduled EDR Contact: 06/08/2015
Data Release Frequency: Biennially

UIC: Underground Injection Wells Listing

A listing of underground injection well locations.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/12/2013
Date Made Active in Reports: 04/09/2013
Number of Days to Update: 56

Source: Department of Health
Telephone: 808-586-4258
Last EDR Contact: 02/26/2015
Next Scheduled EDR Contact: 06/15/2015
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 01/09/2015
Date Made Active in Reports: 02/11/2015
Number of Days to Update: 33
Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 04/06/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 04/08/2015
Date Data Arrived at EDR: 04/10/2015
Date Made Active in Reports: 04/30/2015
Number of Days to Update: 20
Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 04/06/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34
Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54
Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/18/2015
Next Scheduled EDR Contact: 06/01/2015
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/13/2015
Next Scheduled EDR Contact: 06/22/2015
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 02/16/2015
Next Scheduled EDR Contact: 06/01/2015
Data Release Frequency: Quarterly

Financial Assurance: Financial Assurance Information Listing

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/13/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 8

Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 03/13/2015
Next Scheduled EDR Contact: 06/29/2015
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/14/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: N/A

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/10/2015
Next Scheduled EDR Contact: 07/20/2015
Data Release Frequency: Varies

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 02/13/2015
Next Scheduled EDR Contact: 05/25/2015
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/13/2015
Next Scheduled EDR Contact: 05/25/2015
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/01/2015
Next Scheduled EDR Contact: 08/10/2015
Data Release Frequency: Varies

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88
Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/07/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/15/2015
Next Scheduled EDR Contact: 07/27/2015
Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/30/2015
Next Scheduled EDR Contact: 07/13/2015
Data Release Frequency: Annually

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 191

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/17/2014
Number of Days to Update: 200

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

HILEA BRIDGE & NINOLE BRIDGE
HIGHWAY 11/NINOLE LOOP ROAD
NAALEHU, HI 96772

TARGET PROPERTY COORDINATES

Latitude (North):	19.1318 - 19° 7' 54.48''
Longitude (West):	155.5214 - 155° 31' 17.04''
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	234760.9
UTM Y (Meters):	2117198.0
Elevation:	156 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	19155-B5 PUNALUU, HI
Most Recent Revision:	Not reported
South Map:	19155-A5 NAALEHU, HI
Most Recent Revision:	Not reported

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

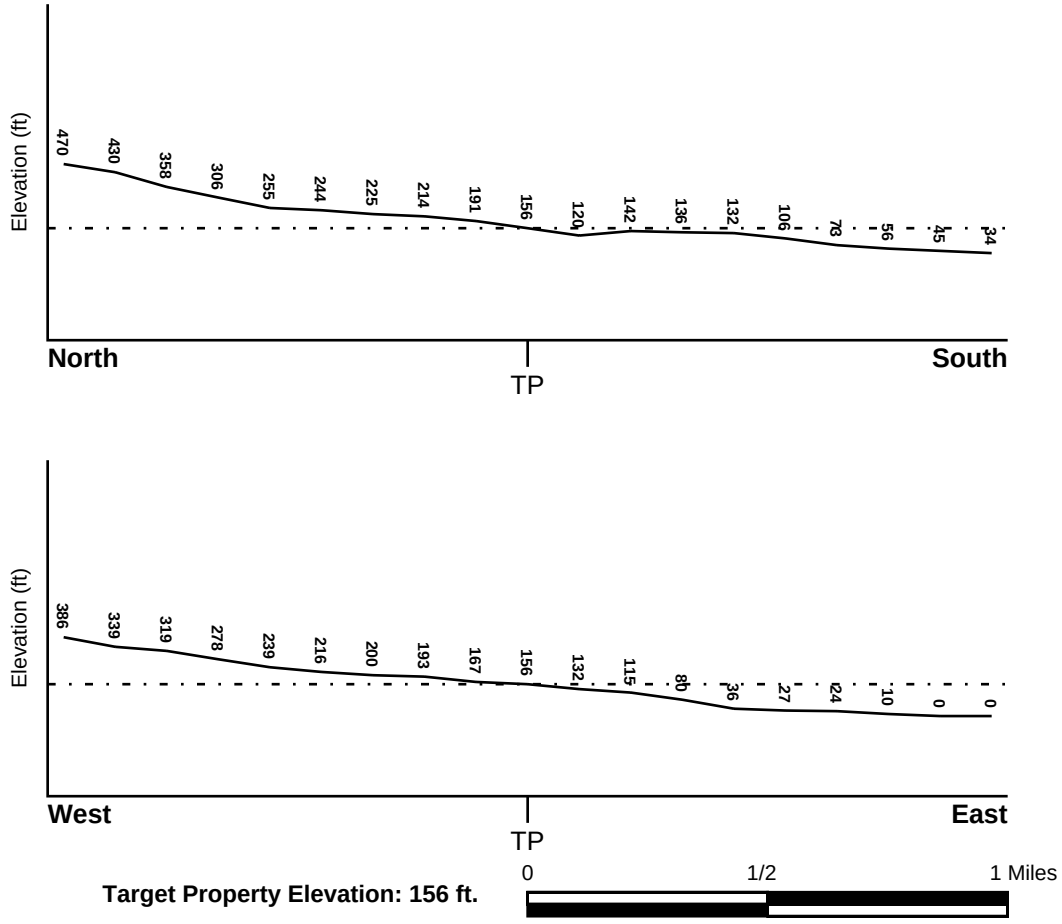
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
HAWAII, HI	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 1551661695C - FEMA Q3 Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
PUNALUU	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

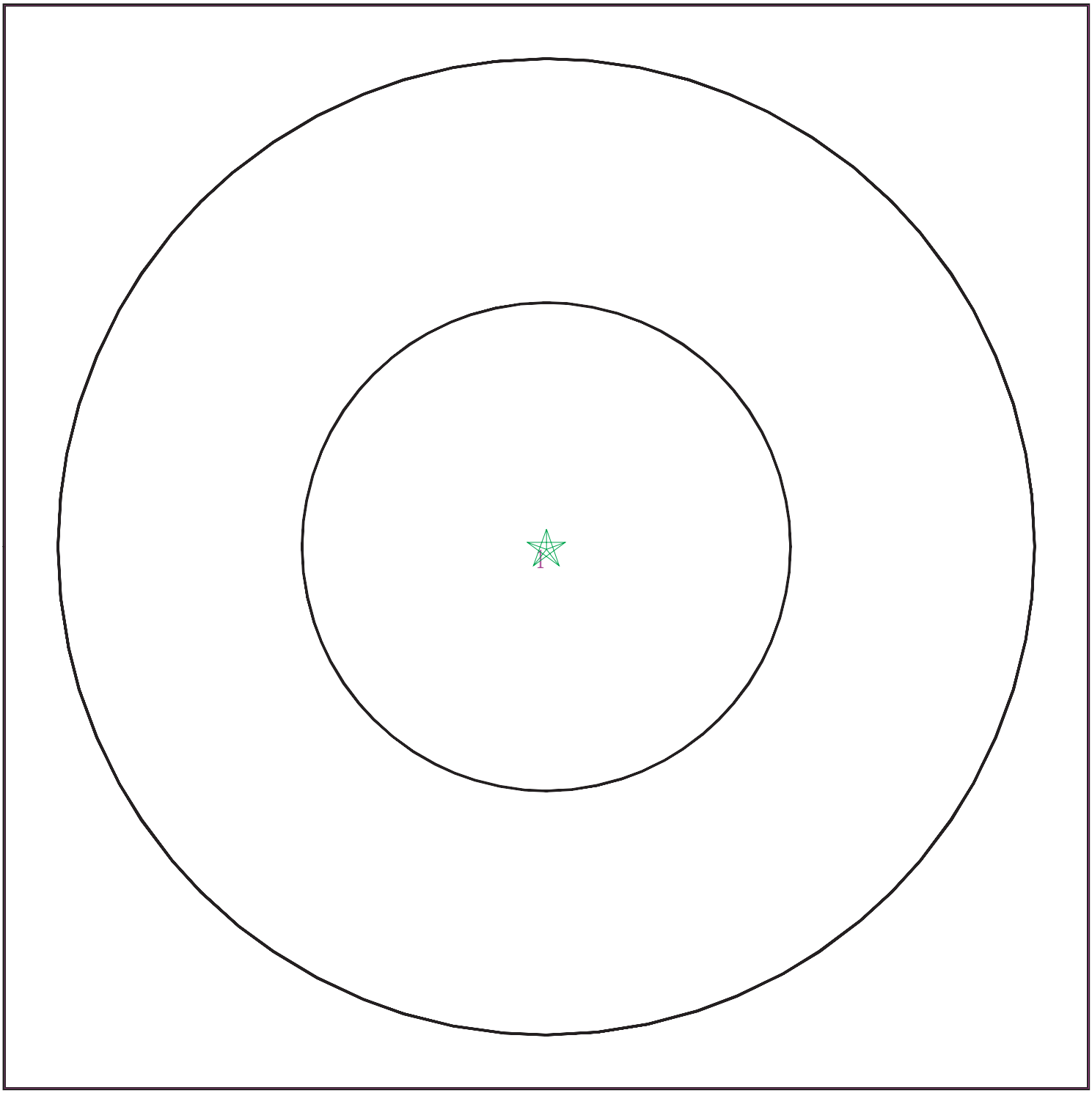
Era: -
System: -
Series: -
Code: N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4293162.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Hilea Bridge & Ninole Bridge	CLIENT:	CH2M Hill Corporation
ADDRESS:	Highway 11/Ninole Loop Road Naalehu HI 96772	CONTACT:	Lyna Black
LAT/LONG:	19.1318 / 155.5214	INQUIRY #:	4293162.2s
		DATE:	May 13, 2015 5:05 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Lava flows, aa

Soil Surface Texture: extremely stony material

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 152 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	59 inches	extremely stony material	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 700 Min: 141	Max: Min:

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	2.000
Federal FRDS PWS	Nearest PWS within 2.000 miles
State Database	2.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	USGS40000268379	1/2 - 1 Mile NNE
A5	USGS40000268381	1/2 - 1 Mile NNE
A7	USGS40000268380	1/2 - 1 Mile NE
B9	USGS40000268378	1 - 2 Miles ENE
C11	USGS40000268382	1 - 2 Miles ENE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

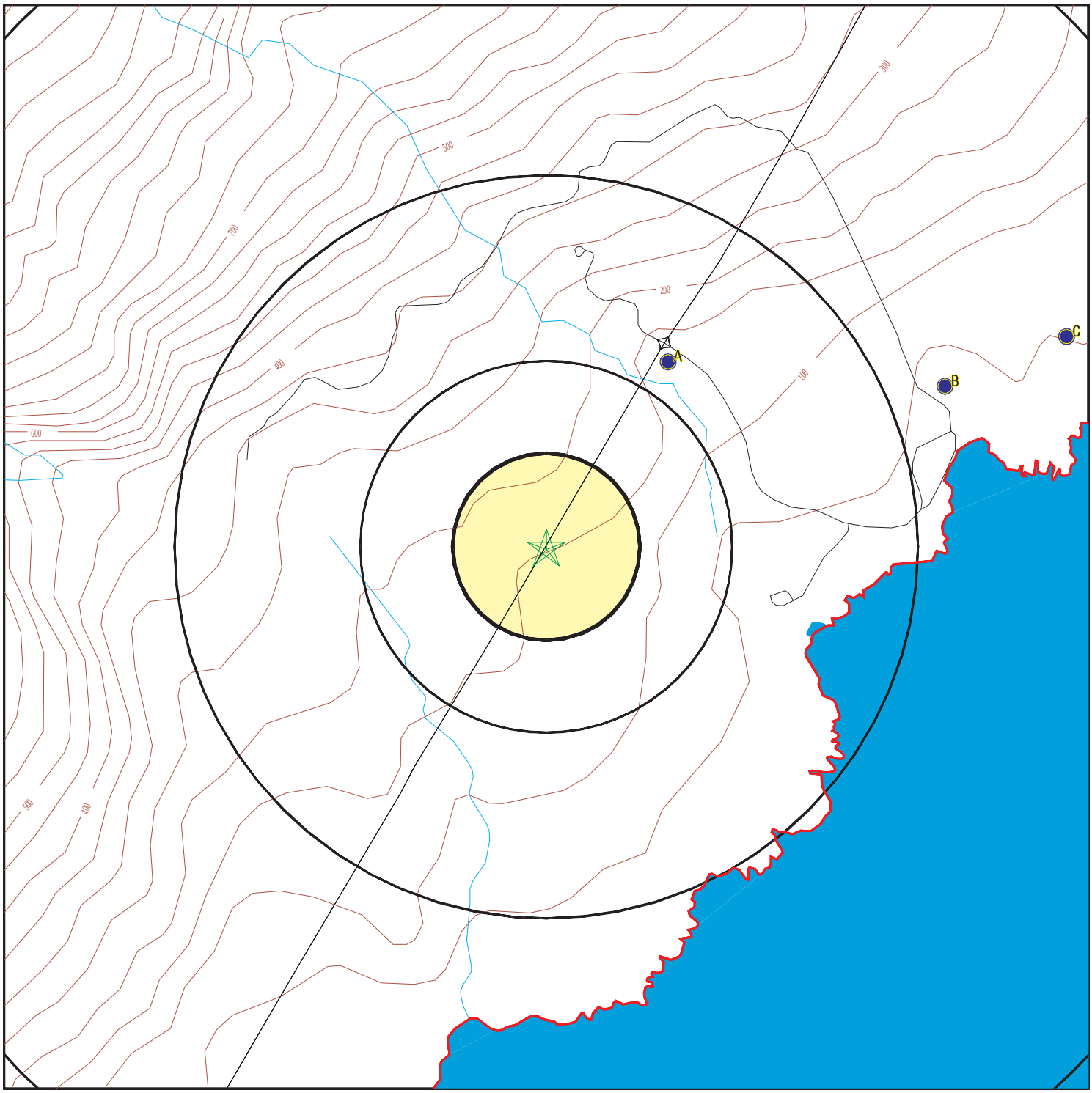
MAP ID	WELL ID	LOCATION FROM TP
A4	HI0000114	1/2 - 1 Mile NNE

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	HI9000000003744	1/2 - 1 Mile NNE
A3	HI9000000003746	1/2 - 1 Mile NNE
A6	HI9000000003745	1/2 - 1 Mile NE
B8	HI9000000003742	1 - 2 Miles ENE
C10	HI9000000003743	1 - 2 Miles ENE

PHYSICAL SETTING SOURCE MAP - 4293162.2s



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location

N

SITE NAME:	Hilea Bridge & Ninole Bridge	CLIENT:	CH2M Hill Corporation
ADDRESS:	Highway 11/Ninole Loop Road Naalehu HI 96772	CONTACT:	Lyna Black
LAT/LONG:	19.1318 / 155.5214	INQUIRY #:	4293162.2s
		DATE:	May 13, 2015 5:05 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A1
NNE
1/2 - 1 Mile
Lower

HI WELLS **HI9000000003744**

Wid:	8-0831-001	Island:	Hawaii
Well name:	Ninole Gu TH-1	Old name:	Not Reported
Yr drilled:	1968		
Driller:	Continental Drilling Hawaii, Inc		
Quad map:	42		
Long83dd:	-155.516944		
Lat83dd:	19.138333		
Gps:	0	Utm:	-1
Owner user:	Hawaiiana Invest. Co., Inc		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	ROT
Casing dia:	3	Ground el:	123
Well depth:	174		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	OBS - Observation		
Use year:	Not Reported		
Init head:	4	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	114		
Test date:	Not Reported	Test gpm:	880
Test ddown:	4.4	Test chlor:	Not Reported
Test temp:	17.2	Test unit:	C
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-51
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	200		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 9-5-019:011
Aqui code:	80503		
Latest hd:	Not Reported	Wcr:	01-JAN-68
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000003744

A2
NNE
1/2 - 1 Mile
Lower

FED USGS **USGS40000268379**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-190831155310901		
Monloc name:	8-0831-03 NINOLE B		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.1389357
Longitude:	-155.5163855	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	128.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19710101	Welldepth:	172
Welldepth units:	ft	Wellholedepth:	172
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

A3
NNE
1/2 - 1 Mile
Lower

HI WELLS **HI9000000003746**

Wid:	8-0831-003	Island:	Hawaii
Well name:	Ninole B	Old name:	Not Reported
Yr drilled:	1971		
Driller:	Roscoe Moss Hawaii Inc		
Quad map:	42		
Long83dd:	-155.516389		
Lat83dd:	19.139167		
Gps:	0	Utm:	-1
Owner user:	Ralph Toyofuku (Kau Agribusiness Co. Inc.)		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	PER
Casing dia:	18	Ground el:	128
Well depth:	172		
Solid case:	112	Perf case:	147
Use:	IRR - Irrigation (non-domestic, non-agriculture)		
Use year:	Not Reported		
Init head:	4.87	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	147		
Test date:	2/22/1972	Test gpm:	1500
Test ddown:	0.5	Test chlor:	165
Test temp:	17.8	Test unit:	C
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-44
Bot solid:	16	Bot perf:	-19
Spec capac:	3000		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 9-5-019:011
Aqui code:	80503		
Latest hd:	Not Reported	Wcr:	01-DEC-71
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000003746

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A4
NNE
1/2 - 1 Mile
Lower | **FRDS PWS** | **HI0000114**

Epa region:	09	State:	HI
Pwsid:	HI0000114		
Pwsname:	PUNALU'U		
City served:	PUNALUU (DHO)	State served:	HI
Zip served:	Not Reported	Fips county:	Not Reported
Status:	Active	Pop srvd:	200
Pwssvcconn:	21	Source:	Groundwater
Pws type:	CWS	Owner:	Private
Contact:	PFUND, ROY		
Contactor gname:	PFUND, ROY		
Contact phone:	808-539-9493	Contact address1:	Punaluu Water and Sanitation
Contact address2:	680 Iwilei Road Suite 700	Contact city:	HONOLULU
Contact state:	HI	Contact zip:	96817
Activity code:	A		

Facid:	32		
Facname:	NINOLE(PUNALUU) A & B CHLORINATOR		
Facility type:	Treatment_plant	Activity code:	A
Treatment obj:	disinfection	Treatment process:	chlorination (frds-1.5)

Location Information:

Name:	PUNALU'U		
Pwstypcd:	CWS	Primsrccd:	GW
Popserved:	200		
Add1:	PUNALUU WATER AND SANITATION		
Add2:	680 IWILEI ROAD SUITE 700		
City:	HONOLULU	State:	HI
Zip:	96817	Phone:	808-539-9493
Cityserv:	PUNALUU (DHO)	Cntyserv:	Not Reported
Stateserv:	HI	Zipserv:	Not Reported

Enforcement Information:

Violation id:	595	Orig cd:	S
Enf fy:	2010	Enf act date:	06/15/2010
Enf act detail:	St Violation/Reminder Notice	Enf act cat:	Informal

Enforcement Information:

Violation id:	595	Orig cd:	S
Enf fy:	2010	Enf act date:	06/24/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	595	Orig cd:	S
Enf fy:	2010	Enf act date:	08/05/2010
Enf act detail:	St Public Notif received	Enf act cat:	Informal

Violations Information:

Violoation id:	595	Orig cd:	S
State:	HI	Viol fy:	2010
Contamcd:	3014		
Contamnm:	E. COLI		
Viol code:	34		
Viol name:	Monitoring, Source Water (GWR)		
Rule code:	140		
Rule name:	GWR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	03/01/2010
Cmpedt:	Not Reported		

PWS ID: HI0000114
Date Initiated: Not Reported Date Deactivated: Not Reported
PWS Name: PUNALUU WATER & SANITATION
SEA MT.
P.O. BOX 85
PAHALA, HI 96744

Addressee / Facility: System Owner/Responsible Party
MR. RIP COLLINS, MANAGER
PUNALU'U DEVELOPMENT, INC.
P.O. BOX 85
PAHALA, HI 96777

Facility Latitude:	19 8 32.0000	Facility Longitude:	155 31 9.0000
Facility Latitude:	19 8 32.0000	Facility Longitude:	155 31 8.0000
City Served:	PUNALUU SEA MT		
Treatment Class:	Treated	Population:	200

Violations information not reported.

ENFORCEMENT INFORMATION:

System Name:	PUNALUU WATER & SANITATION		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-09-01 - 1994-09-30		
Violation ID:	9400005		
Enforcement Date:	1994-10-05	Enf. Action:	State Violation/Reminder Notice
System Name:	PUNALUU WATER & SANITATION		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-09-01 - 1994-09-30		
Violation ID:	9400005		
Enforcement Date:	1994-10-05	Enf. Action:	State Public Notif Requested
System Name:	PUNALUU WATER & SANITATION		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-09-01 - 1994-09-30		
Violation ID:	9400005		
Enforcement Date:	1994-11-16	Enf. Action:	State Public Notif Issued

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A5
NNE **FED USGS** **USGS40000268381**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-190832155310901		
Monloc name:	8-0831-02 Ninole, HI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.1392134
Longitude:	-155.5163855	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	128.50
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Hawaii volcanic-rock aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19711201	Welldepth:	172
Welldepth units:	ft	Wellholedepth:	172
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

A6
NE **HI WELLS** **HI9000000003745**
1/2 - 1 Mile
Lower

Wid:	8-0831-002	Island:	Hawaii
Well name:	Ninole A	Old name:	Not Reported
Yr drilled:	1969		
Driller:	Roscoe Moss Hawaii Inc		
Quad map:	42		
Long83dd:	-155.516111		
Lat83dd:	19.139167		
Gps:	0	Utm:	-1
Owner user:	Ralph Toyofuku (Kau Agribusiness Co. Inc.)		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	PER
Casing dia:	18	Ground el:	128
Well depth:	172		
Solid case:	117	Perf case:	147
Use:	AGR - Crops and Processing		
Use year:	Not Reported		
Init head:	5.7	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	130		
Test date:	9/17/1969	Test gpm:	1250

Test ddown:	1.4	Test chlor:	130
Test temp:	18.6	Test unit:	C
Pump gpm:	1500		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-44
Bot solid:	11	Bot perf:	-19
Spec capac:	893		
Pump mgd:	2.16		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 9-5-019:011
Aqui code:	80503		
Latest hd:	Not Reported	Wcr:	24-SEP-69
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000003745

A7
NE
1/2 - 1 Mile
Lower

FED USGS **USGS40000268380**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-190832155310801		
Monloc name:	8-0831-01 NINOLE TH1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.1392134
Longitude:	-155.5161077	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	125.83
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19680101	Welldepth:	174
Welldepth units:	ft	Wellholedepth:	175
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

B8
ENE
1 - 2 Miles
Lower

HI WELLS **HI9000000003742**

Wid:	8-0830-001	Island:	Hawaii
Well name:	Punaluu	Old name:	Not Reported
Yr drilled:	1972		
Driller:	Not Reported		
Quad map:	42		
Long83dd:	-155.505		
Lat83dd:	19.138056		
Gps:	0	Utm:	-1
Owner user:	Hawaiiana Invest. Co., Inc		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	Not Reported
Casing dia:	10	Ground el:	22
Well depth:	20		
Solid case:	Not Reported	Perf case:	18
Use:	ABN - Sealed		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	212		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	0.6	Test chlor:	212
Test temp:	19	Test unit:	C
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Qk1y		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	2
Bot solid:	Not Reported	Bot perf:	4
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	80503		
Latest hd:	Not Reported	Wcr:	01-JAN-72
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000003742

B9
ENE
1 - 2 Miles
Lower

FED USGS **USGS40000268378**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-190828155302801		
Monloc name:	8-0830-01 PUNALUU		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.1381028
Longitude:	-155.5049966	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	22.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19720113	Welldepth:	20
Welldepth units:	ft	Wellholedepth:	20
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1972-04-12	14.16	

C10
ENE
1 - 2 Miles
Lower

HI WELLS **HI9000000003743**

Wid:	8-0830-002	Island:	Hawaii
Well name:	Punaluu TH-2	Old name:	Not Reported
Yr drilled:	1968		
Driller:	Continental Drilling Hawaii, Inc		
Quad map:	42		
Long83dd:	-155.500556		
Lat83dd:	19.139722		
Gps:	0	Utm:	-1
Owner user:	Ralph Toyofuku (Kau Agribusiness Co. Inc.)		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	ROT
Casing dia:	3	Ground el:	56
Well depth:	90		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IRR - Irrigation (non-domestic, non-agriculture)		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	240		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-34
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		

Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	80804		
Latest hd:	Not Reported	Wcr:	01-JAN-68
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000003743

C11
ENE
1 - 2 Miles
Lower

FED USGS **USGS40000268382**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-190836155300801		
Monloc name:	8-0830-02 PULALUU TH2		
Monloc type:	Well: Test hole not completed as a well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.140325
Longitude:	-155.499441	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	56.00
Vert measure units:	feet	Vertacc measure val:	20
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19680101	Welldepth:	90
Welldepth units:	ft	Wellholedepth:	90
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for HAWAII County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96772

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.300 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

Appendix C
Endangered Species Act Section 7 Consultation Documentation

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
720-963-3647
michael.will@dot.gov

November 21, 2014

In Reply Refer To:
HFPM-16

Ms. Michelle Bogardus
U.S. Department of the Interior
Fish & Wildlife Service
Pacific Islands Fish & Wildlife Office
300 Ala Moana Blvd, Room 3-122
Honolulu, HI 96850

Subject: Notification of Intent to Construct the Hawaii Bridge Program
Request for Species and Critical Habitat List under Section 7, Endangered Species Act

Dear Ms. Michelle Bogardus:

The Federal Highway Administration (FHWA), Central Federal Lands Highway Division (CFLHD), in cooperation with the Hawaii Department of Transportation (HDOT), is planning to undertake environmental studies for the Hawaii Bridge Program. The Program includes work on 12 bridges at 10 locations on the islands of Oahu (4 locations total: 4 locations with 1 bridge each), Kauai (4 locations total: 3 locations with 1 bridge each and 1 location with 3 bridges), and Hawaii (2 locations total: 2 locations with 1 bridge each). Attachment 1, Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu, includes location maps, and project descriptions, for each of the 10 locations.

In accordance with Section 7 of the Endangered Species Act, FHWA-CFLHD and HDOT are requesting a list of threatened, endangered, proposed, and candidate plant and animal species, and critical habitats in the vicinity of each of the bridge projects to enable an appropriate determination for these projects.

Furthermore, to assist us with our assessment, we also respectfully ask for input the USFWS may have in relation to specific avoidance and minimization measures that should be considered for each project. Your response within 30 calendar days of receipt of this letter, as outlined in the ESA Consultation Handbook, would be appreciated.

Should you have any questions, please contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689 or by e-mail at Nicole.Winterton@dot.gov.

Sincerely,

J. Michael Will, P.E.
Program Engineering Manager

Enclosure:

Attachment 1: Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu

cc: Nicole Winterton/FHWA-CFLHD
Paul Luersen/CH2M HILL
Elizabeth Cutler/CH2M HILL

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
720-963-3647
michael.will@dot.gov

November 21, 2014

In Reply Refer To:
HFPM-16

Mr. Frazer McGilvray
Administrator
Department of Aquatic Resources
1151 Punchbowl St. Room 330
Honolulu, HI 96813

Subject: Notification of Intent to Construct the Hawaii Bridge Program
Request for Information

Dear Mr. Frazer McGilvray:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in cooperation with the Hawaii Department of Transportation (HDOT), is planning to undertake environmental studies for the Hawaii Bridge Program. The Program includes work on 12 bridges at 10 locations on the islands of Oahu (4 locations total: 4 locations with 1 bridge each), Kauai (4 locations total: 3 locations with 1 bridge each and 1 location with 3 bridges), and Hawaii (2 locations total: 2 locations with 1 bridge each). Attachment 1, Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu, includes location maps, and project descriptions, for each of the 10 locations.

We are writing to request information you may have regarding known presence of listed species and designated critical habitat in the vicinity of each of the bridge projects to appropriately assess potential impacts for these projects.

Furthermore, to assist us with our assessment, we also respectfully ask for DAR's opinion on the likely impact of each of the bridge projects based on the potential issues of the location considering the proposed construction activities and schedule.

Your response within 30 calendar days of receipt of this letter would be appreciated.

Should you have any questions, please contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689 or by e-mail at Nicole.Winterton@dot.gov.

Sincerely,

J. Michael Will, P.E.
Program Engineering Manager

Enclosure:
Attachment 1: Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu

Cc: Glenn Higashi/DAR
Nicole Winterton/FHWA-CFLHD
Paul Luersen/CH2M HILL
Elizabeth Cutler/CH2M HILL

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
720-963-3647
michael.will@dot.gov

November 21, 2014

In Reply Refer To:
HFPM-16

Ms. Lisa Hadway
Administrator
Division of Forestry and Wildlife
Kalanimoku Building
1151 Punchbowl St. Room 325
Honolulu, HI 96813

Subject: Notification of Intent to Construct the Hawaii Bridge Program
Request for Information

Dear Ms. Lisa Hadway:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in cooperation with the Hawaii Department of Transportation (HDOT), is planning to undertake environmental studies for the Hawaii Bridge Program. The Program includes work on 12 bridges at 10 locations on the islands of Oahu (4 locations total: 4 locations with 1 bridge each), Kauai (4 locations total: 3 locations with 1 bridge each and 1 location with 3 bridges), and Hawaii (2 locations total: 2 locations with 1 bridge each). Attachment 1, Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu, includes location maps, and project descriptions, for each of the 10 locations.

We are writing to request information you may have regarding known presence of listed species and designated critical habitat in the vicinity of the each of the bridge projects to appropriately assess potential impacts for these projects. Furthermore, to assist us with our assessment, we also respectfully ask for input the DOFAW may have in relation to specific avoidance and minimization measures that should be considered for each project

To assist us with our assessment, we also respectfully ask for DOFAW's opinion on the likely impact of each of the bridge projects based on the potential issues of the location considering the proposed construction activities and schedule.

Your response within 30 calendar days of receipt of this letter would be appreciated.

Should you have any questions, please contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689 or by e-mail at Nicole.Winterton@dot.gov.

Sincerely,

J. Michael Will, P.E.
Program Engineering Manager

Enclosure:

Attachment 1: Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu

Cc: Nicole Winterton/FHWA-CFLHD
Paul Luersen/CH2M HILL
Elizabeth Cutler/CH2M HILL

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
720-963-3647
michael.will@dot.gov

November 21, 2014

In Reply Refer To:
HFPM-16

Mr. Aaron Nadig
U.S. Department of the Interior
Fish & Wildlife Service
Pacific Islands Fish & Wildlife Office
300 Ala Moana Blvd, Room 3-122
Honolulu, HI 96850

Subject: Notification of Intent to Construct the Hawaii Bridge Program
Request for Species and Critical Habitat List under Section 7, Endangered Species Act

Dear Mr. Aaron Nadig:

The Federal Highway Administration (FHWA), Central Federal Lands Highway Division (CFLHD), in cooperation with the Hawaii Department of Transportation (HDOT), is planning to undertake environmental studies for the Hawaii Bridge Program. The Program includes work on 12 bridges at 10 locations on the islands of Oahu (4 locations total: 4 locations with 1 bridge each), Kauai (4 locations total: 3 locations with 1 bridge each and 1 location with 3 bridges), and Hawaii (2 locations total: 2 locations with 1 bridge each). Attachment 1, Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu, includes location maps, and project descriptions, for each of the 10 locations.

In accordance with Section 7 of the Endangered Species Act, FHWA-CFLHD and HDOT are requesting a list of threatened, endangered, proposed, and candidate plant and animal species, and critical habitats in the vicinity of each of the bridge projects to enable an appropriate determination for these projects.

Furthermore, to assist us with our assessment, we also respectfully ask for input the USFWS may have in relation to specific avoidance and minimization measures that should be considered for each project. Your response within 30 calendar days of receipt of this letter, as outlined in the ESA Consultation Handbook, would be appreciated.

Should you have any questions, please contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689 or by e-mail at Nicole.Winterton@dot.gov.

Sincerely,

J. Michael Will, P.E.
Program Engineering Manager

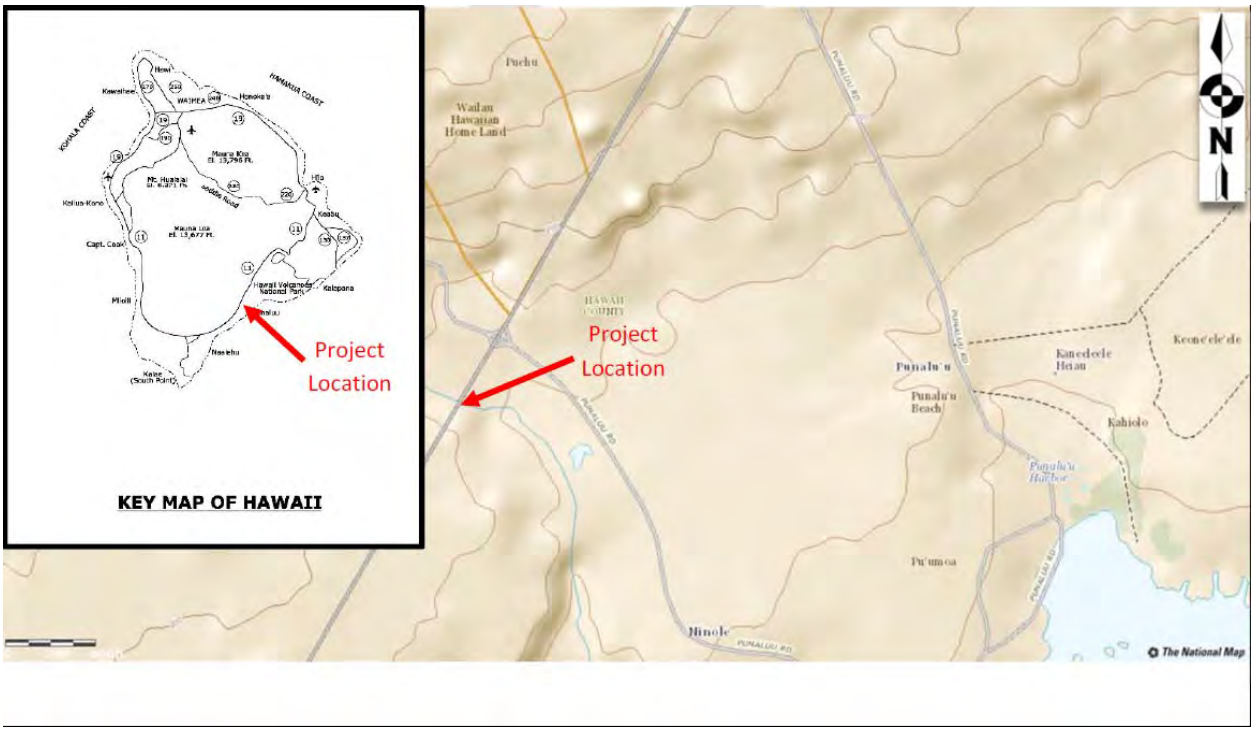
Enclosure:

Attachment 1: Hawaii Bridges Program Summary Map Set - Hawaii, Kauai, and Oahu

cc: Nicole Winterton/FHWA-CFLHD
Paul Luersen/CH2M HILL
Elizabeth Cutler/CH2M HILL

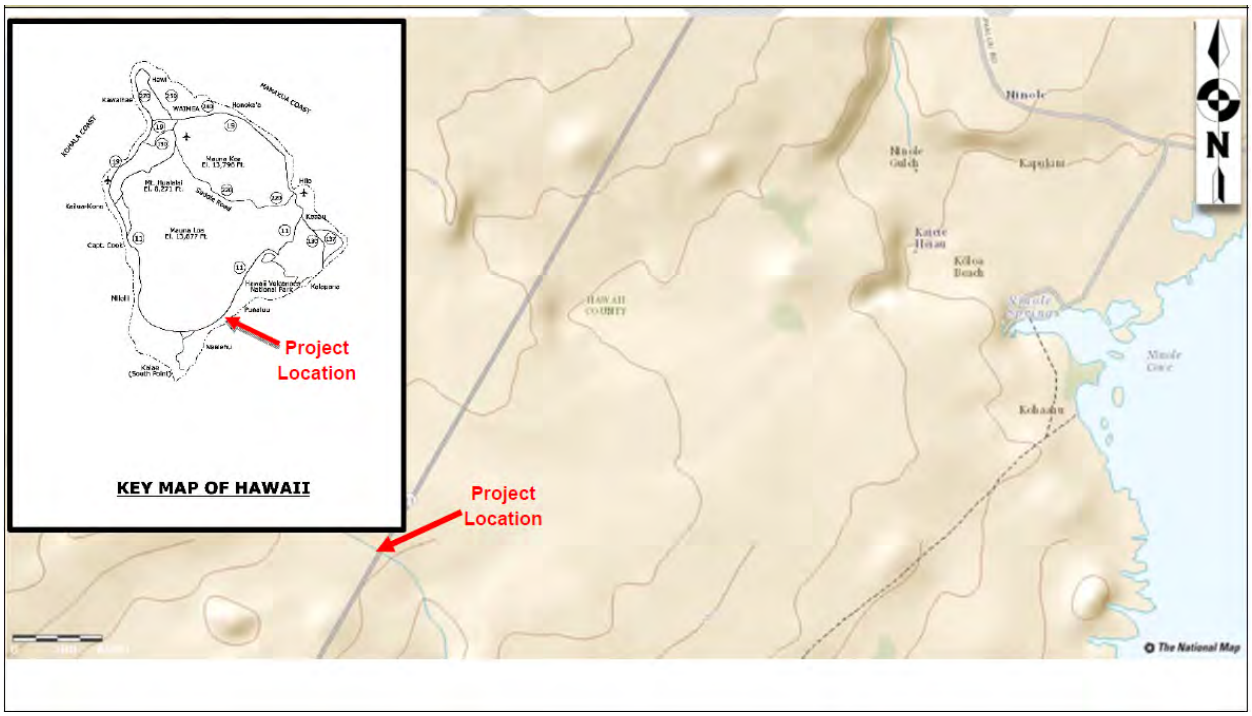
H – Ninole

Mamalahoa Highway, Route 11, is a rural minor arterial on the NHS. Ninole Bridge is located at MP 56.7 and approximately 480’ south of the Punaluu Road/Mamalahoa intersection. The purpose of the project is to replace the existing deficient timber bridge to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches.



H – Hilea

Mamalahoa Highway, Route 11, is a rural minor arterial on the NHS. Hilea Bridge is located at MP 57.7. The purpose of the project is to replace the existing deficient timber bridge to meet current design standards for roadway width, load capacity, bridge railing and transitions.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To:
2015-SL-0081

DEC 2 2 2014

J. Michael Will
U.S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division
12300 West Dakota Avenue, Suite 380
Lakewood, CO 80228

Subject: Species List for Hawaii Bridges Program, Hawaii, Kauai, and Oahu

Dear Mr. J. Michael Will:

The U.S. Fish and Wildlife Service (Service) received your letter, dated November 21, 2014, requesting a list of federally threatened and endangered species, candidate species, plants and animals of special concern, and critical habitats in the vicinity of the proposed bridge projects. The Federal Highways Administration (FHWA), Central Federal Lands Highway Division (CFLHD), in cooperation with the State of Hawaii Department of Transportation (HDOT), is planning to conduct environmental studies for the proposed rehabilitation or replacement of 12 bridges at 10 locations on the islands of Hawaii, Kauai, and Oahu to improve the safety and reliability of the bridges.

On the island of Hawaii, the Ninole Bridge located along Mamalahoa Highway (Route 11) at mile post 56.7 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, and approaches. The Hilea Bridge located on Mamalahoa Highway (Route 11) at mile post 57.7 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, and transitions.

On the island of Kauai, Bridge 7E located along Kaumualii Highway (Route 50), approximately 800 feet west of Maluhia Road intersection, would be rehabilitated or replaced, addressing bridge width, load capacity, railing, and transitions. Hanapepe Bridge located on Kaumualii Highway (Route 50) in Hanapepe town would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, approaches, and effects of scour. Kapaa Stream Bridge located on Kuhio Highway (Route 56) near mile post 10 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, and approaches. This project would also involve improvements to the highway intersection at Mailihuna Road, including roadway

widening, lighting, signing, pavement markings, drainage, and other improvements such as installation of traffic signals. The three Wainiha Stream bridges located on Kuhio Highway (Route 560) at mile post 6.4 and 6.7 would be replaced. Additionally, three load-restricted bridges which cross Waioli, Waipa, and Waikoko streams, located at mile posts 3.4, 3.9, and 4.2, will be studied to determine loads and alternatives such as temporary bridges or supports necessary to provide construction access to the Wainiha Stream bridges.

On the island of Oahu, the Halona Bridge located on Halona Street, which crosses Kapalama Canal, would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, approaches, and pedestrian traffic. The Kawela Bridge located on Kamehameha Highway (Route 83) at mile post 11.4 would be replaced, addressing bridge width, load capacity, railing, transitions, and approaches. The Nanahu Bridge located on Kamehameha Highway (Route 83) at mile post 13.4 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, and approaches. The Roosevelt Bridge located on Kamehameha Highway (Route 99) at mile post 14.4 would be rehabilitated, addressing bridge load capacity, railing, and transitions.

The Service offers the following comments to assist you in your planning process so that impacts to trust resources can be avoided through site preparation, construction, and operation. Our comments are provided under the authorities of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C 1531 *et seq.*).

Our databases, including data compiled by the Hawaii Biodiversity and Mapping Program (HBMP), indicate the following species are known to occur or transit through the vicinity of the proposed project areas at Ninole Bridge and Hilea Bridge on the island of Hawaii: the federally endangered Blackburn's sphinx moth (Manduca blackburni, BSM), Hawaiian goose (*Branta sandvicensis*), Hawaiian hawk (*Buteo solitarius*), Hawaiian hoary bat (*Lasiurus cinereus semotus)*, and Hawaiian petrel (*Pterodroma sandwichensis*); and the threatened Newell's shearwater (*Puffinus auricularis newelli*). There is no designated critical habitat in the vicinity of the proposed project areas on the island of Hawaii.

Our databases, including data compiled by the HBMP, indicate the following species are known to occur or transit through the proposed project areas at Bridge 7E, Hanapepe Bridge, Kapaa Stream Bridge, and the Wainiha Stream bridges on the island of Kauai: the endangered Hawaiian black-necked stilt (*Himantopus mexicanus knudseni)*, Hawaiian moorhen (*Gallinula chloropus sandvicensis*), Hawaiian coot (*Fulica alai*), Hawaiian duck (*Anas wyvilliana*), Hawaiian goose, Hawaiian hoary bat, and Hawaiian petrel; the threatened Newell's shearwater; and a candidate for listing band-rumped storm-petrel (*Oceanodroma castro*). Additionally, our databases indicate the threatened green sea turtle (*Chelonia mydas*) is known to occur in the vicinity of the proposed project areas at the Kapaa Stream Bridge and the Wainiha Stream bridges. There is no designated critical habitat in the vicinity of the proposed project areas on the island of Kauai.

The endangered Hawaiian monk seal (*Monachus schauinslandi*) may use beach habitat in the vicinity of the proposed project at the Kapaa Stream Bridge and the Wainiha Stream bridges. The National Marine Fisheries Service (NMFS) is the Federal agency that consults on potential impacts to monk seals, both in their on-shore and ocean habitats. Therefore, we did not review

the proposed project for potential project impacts to monk seals. We recommend that you contact NMFS regarding the presence of monk seals in the area and potential impacts to the species from the project.

Our databases, including data compiled by the HBMP, indicate the following species are known to occur or transit through the proposed project areas at Kawela Bridge, Nanahu Bridge, and Roosevelt Bridge on the island of Oahu: the endangered Hawaiian black-necked stilt, Hawaiian moorhen, Hawaiian coot, Hawaiian duck, Hawaiian goose, Hawaiian hoary bat, and Hawaiian petrel; and the threatened Newell's shearwater. Hawaiian geese recently arrived on Oahu. A pair was first observed in early January 2014 at the First Wind Kawailoa wind farm facility. They have successfully nested, fledging two goslings at the James Campbell National Wildlife Refuge (NWR) near the town of Kahuku. The pair, originally from Kauai, was translocated to Hilo, Hawaii in February 2012, by the State of Hawaii Division of Forestry and Wildlife, and were apparently attempting to return to Kauai when they arrived on Oahu. As of December 2014 the four birds have been seen at the Mililani Agricultural Park, Mililani golf course, and James Campbell NWR.

Additionally, our databases indicate the endangered Hawaiian hoary bat is known to occur or transit through the proposed project area at Halona Bridge on the island of Oahu. There is no designated critical habitat in the vicinity of the proposed project areas on the island of Oahu.

The Service recommends the following measures to avoid and minimize project impacts to the above listed species.

Island of Hawaii

Blackburn's sphinx moth
Adult Blackburn's sphinx moths feed on nectar from native plants including beach morning glory (*Ipomoea pescaprae*), iliee (*Plumbago zeylanica*), and maiapilo (*Capparis sandwichiana*). BSM larvae feed upon native tree tobacco (*Nicotiana glauca*), which occupies disturbed areas such as open fields and roadway margins, and the native aiea (*Nothocestrum sp.*), which is found in dry to moist forests at elevations ranging from 1,500 to 5,000 feet. We recommend that a qualified biologist survey the project area for the presence of larval host plants. If larval host plants are detected and will be affected during project construction or operation, we recommend that the biologist document 1) general larval plant density; 2) proximity of larval plants to project sites; 3) average height of the larval plants; 4) signs of larval feeding damage on leaves; and 5) presence of BSM larvae on leaves. We recommend that surveys be conducted for BSM and potential host plants approximately four to eight weeks following significant rainfall and during the wettest portion of the year (usually November-April).

Hawaiian Goose
In order to avoid impacts to Hawaiian geese, we recommend a biologist familiar with the nesting behavior of the Hawaiian goose survey the area prior to the initiation of any work, or after any subsequent delay in work of three or more days (during which birds may attempt nesting). If a nest is discovered, work should cease immediately and our office should be contacted for further guidance. Furthermore, all on-site project personnel should be apprised that Hawaiian geese

may be in the vicinity of the project at any time during the year. If a Hawaiian goose (or geese) appears within 100 feet of ongoing work, all activity should be temporarily suspended until the Hawaiian goose (or geese) leaves the area of its own accord.

Hawaiian Hawk
Loud, irregular and unpredictable activities, such as using heavy equipment or building a structure, near an endangered Hawaiian hawk nest may cause nest failure. Harassment of Hawaiian hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators. To avoid impacts to Hawaiian hawks, we recommend avoiding brush and tree clearing during their breeding season (March through September). If you must clear the property during the Hawaiian hawk breeding season, we recommend a nest search of the proposed construction site and surrounding area be conducted by a qualified ornithologist immediately prior to start of construction activities. Surveys should ensure that construction activity will not occur within 1,600 feet of any Hawaiian hawk nest.

Hawaiian Hoary Bat
The Hawaiian hoary bat roosts in both exotic and native woody vegetation and, while foraging, will leave young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). Site clearing should be timed to avoid disturbance to Hawaiian hoary bats in the project area.

Seabirds
Seabirds, including the Newell's shearwater, Hawaiian petrel and band-rumped storm petrel, fly at night and are attracted to artificially-lighted areas resulting in disorientation and subsequent fallout due to exhaustion. Seabirds are also susceptible to collision with objects that protrude above the vegetation layer, such as utility lines, guy-wires, and communication towers. Additionally, once grounded, they are vulnerable to predators and are often struck by vehicles along roadways. To reduce potential impacts to seabirds, we recommend the following minimization measures be incorporated into your project description:

- Construction activities should only occur during daylight hours. Any increase in the use of nighttime lighting, particularly during peak fallout period (September 15 through December 15), could result in additional seabird injury or mortality.

- If lights cannot be eliminated due to safety or security concerns, then they should be positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below.

Island of Kauai

Please refer to "Hawaiian goose", "Hawaiian hoary bat", and "Seabirds" under the Island of Hawaii (above) for recommended measures to avoid and minimize impacts to the Hawaiian goose, Hawaiian hoary bat, and Hawaiian petrel, Newell's shearwater, and band-rumped storm petrel.

Hawaiian Waterbirds

The Hawaiian stilt, moorhen, coot, and duck are hereafter collectively referred to as "Hawaiian waterbirds." Our records indicate there is a high probability that Hawaiian waterbirds may occur in the vicinity of the proposed project. We recommend you incorporate the following measures into your project description to avoid and minimize impacts to Hawaiian waterbirds:

- A biological monitor should conduct Hawaiian waterbird and nest surveys at the proposed project site prior to project initiation.
- Any documented nests or broods within the project vicinity should be reported to the Service within 48 hours.
- A 100-foot buffer should be established and maintained around all active nests and/or broods until the chicks/ducklings have fledged. No potentially disruptive activities or habitat alteration should occur within this buffer.
- The Service should be notified immediately prior to project initiation and provided with the results of pre-construction Hawaiian waterbird surveys.
- A biological monitor(s) should be present on the project site during all construction or earth moving activities to ensure that Hawaiian waterbirds and nests are not adversely impacted.
- If a listed Hawaiian waterbird is observed within the project site, or flies into the site while activities are occurring, the biological monitor should halt all activities within 100 feet of the individual(s). Work should not resume until the Hawaiian waterbird(s) leave the area on their own accord.
- A post-construction report should be submitted to the Service with 30 days of the completion of the project. The report should include the results of Hawaiian waterbird surveys, the location and outcome of documented nests, and any other relevant information.

Sea Turtles

Artificial lighting can disorient adult sea turtles and hatchlings by affecting their ability to find the ocean. To minimize potential impacts to sea turtles that may utilize beaches in the project vicinity, no light from the proposed project should be visible from the beach. We recommend installation of shielded lighting at construction sites near beaches and around shoreline developments. Shielded lights reduce the direct and ambient lighting of beach habitats within and adjacent to the project site. Effective light shields should be completely opaque, sufficiently large, and positioned so that light from the shielded source does not reach the beach. Projects should also be designed to minimize adverse impacts to basking or nesting sea turtles from off-leash pets, mammalian predators, and human disturbance.

Island of Oahu

Please refer to "Hawaiian goose", "Hawaiian hoary bat", "Seabirds", and "Hawaiian waterbirds" (above) for recommended measures to avoid and minimize impacts to the Hawaiian goose, Hawaiian hoary bat, Hawaiian petrel, Newell's shearwater, Hawaiian black-necked stilt, Hawaiian moorhen, Hawaiian coot, and Hawaiian duck.

Because the proposed activities may cause soil erosion and sedimentation in sensitive aquatic habitats, we are attaching the Service's recommended Best Management Practices regarding sedimentation and erosion in aquatic environments. We encourage you to incorporate the relevant practices into your project design. In addition to the guidance provided in this letter, the Service anticipates responding to the U.S. Army Corps of Engineers inter-agency notification process and providing further recommendations pursuant to the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended (16 U.S.C. 661 *et seq.*; 48 Stat. 401); and the Clean Water Act (CWA), as amended (33 U.S.C. 1251 *et seq.*; 62 Stat. 1155).

If additional information becomes available, or it is determined that the proposed project may affect federally listed species, we recommend you coordinate with our office early in the planning process so that we may further assist you with Endangered Species Act compliance. We appreciate your efforts to conserve endangered species. Please contact Adam Griesemer, Endangered Species Biologist (phone: 808-285-8261, email: adam_griesemer@fws.gov) should you have any questions pertaining to this response.

Sincerely,

Aaron Nadig
Assistant Field Supervisor:
Oahu, Kauai, NWHI, Am.Samoa

Cc: Paul Luersen, CH2M HILL

U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices

The U.S. Fish and Wildlife Service recommends that the measures below be incorporated into projects to minimize the degradation of water quality and minimize the impacts to fish and wildlife resources.

1. Turbidity and siltation from project-related work shall be minimized and contained within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.

2. Dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.

3. Dredging and filling in the marine/aquatic environment shall be designed to avoid or minimize the loss special aquatic site habitat (beaches, coral reefs, wetlands, etc.) and the function of such habitat shall be replaced.

4. All project-related materials and equipment (dredges, barges, backhoes, etc.) to be placed in the water shall be cleaned of pollutants prior to use.

5. No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.

6. All debris removed from the marine/aquatic environment shall be disposed of at an approved upland or ocean dumping site.

7. No contamination (trash or debris disposal, non-native species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities. This shall be accomplished by implementing a litter-control plan and developing a Hazard Analysis and Critical Control Point Plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) to prevent attraction and introduction of non-native species.

8. Fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.

9. Any under-layer fills used in the project shall be protected from erosion with stones (or core-loc units) as soon after placement as practicable.

10. Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
ACTING CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

FIRST DEPUTY

WILLIAM M. TAM
INTERIM DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 9, 2015

U. S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division
Attn: J. Michael Will, Program Engineering Manager
12300 West Dakota Avenue, Suite 330
Lakewood, CO 80228

via email: michael.will@dot.gov

Dear Mr. Will,

SUBJECT: Notification of Intent to Construct the Hawaii Bridge Program, Request for Information, HFPM-16

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments sent to you dated December 18, 2014, enclosed are additional comments from the Division of Aquatic Resources on the subject matter. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
DEC 03 2014
AQUATIC RESOURCES

DAR #5037

December 2, 2014

MEMORANDUM

TO: **DLNR Agency:**

X Div. of Aquatic Resources
__ Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Land Division – Kauai District
__ Land Division – Maui District
X Land Division – Hawaii District
X Historic Preservation

JK ✓
GH ✓

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Notification of Intent to Construct the Hawaii Bridge Program, Request for Information
LOCATION: Various (see cover letter) including all Districts except Maui
APPLICANT: Federal Highway Administration, Central Federal Lands Highway Division, in cooperation with the Hawaii Department of Transportation

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by December 18, 2014. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: _____
Print Name: William J. Aila Jr.
Date: 12/23/14

RECEIVED
2015 JAN -7 P 2:23
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII
LAND DIVISION

DAVID Y. IGE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

JESSE K. SOUKI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

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

Date: 12/17/14
DAR # 5037

MEMORANDUM

TO: William Aila Jr., Chairperson
DATE: 12/18/14
FROM: Glenn Higashi, Aquatic Biologist GKH
SUBJECT: Notification of Intent to Construct the Hawaii Bridge Program, Request for Information

Comment	Date Request	Receipt	Referral	Due Date
	12/2/14	12/3/14	12/4/12	12/18/14

Requested by: Russell Y. Tsuji, Administrator
Land Division

Summary of Proposed Project

Title: Notification of intent to Construct the Hawaii Bridge Program - Request for information

Project by: Federal Highway Administration, Central Federal Lands Highway Division, in cooperation with the Hawaii Department of Transportation

Location: Hawaii, Kauai, and Oahu

Brief Description:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in cooperation with the Hawaii Department of Transportation (HDOT), is planning to undertake environmental studies for the Hawaii Bridge Program. The program includes work on 12 bridges at 10 locations on the islands of Oahu (4 locations with 1 bridge each - Halona, Kawela, Nanahu, and Kipapa (Roosevelt bridge)); Kauai (4 locations with 3 locations with 1 bridge each and 1 location with 3 bridges - Bridge No. 7E, Hanapepe, Kapaa, and Wainiha; respectively); and Hawaii (2 locations with 1 bridge each - Ninole, Hilea).

The FHWA is requesting information regarding the known presence of listed species and designated critical habitat in the vicinity of each of the bridge projects to appropriately assess potential impacts for these projects.

They are also requesting DAR's opinion on the likely impact of each of the bridge projects based on the potential issues of the location considering the proposed construction activities and schedule.

All the bridge projects would improve the safety and reliability of the existing bridges, through rehabilitation or replacement, addressing bridge width, load capacity, bridge railing and transitions, bridge approaches. Hanapepe bridge project would also include mitigation to the effects of scour. The project for Wainiha would involve the replacement of the 3 existing temporary bridges.

Comments:

For the aquatic biological resources there are no listed aquatic species and no known designated critical habitat in the vicinity of each of the bridge projects that may impose potential impacts for these projects.

The proposed replacement bridges are not expected to have any significant impact on the aquatic resource values in these areas. However, the stream channel should be maintained to provide a continuous connection to the ocean during stream flows resulting from heavy rains to accommodate the upstream migration of postlarval native Hawaiian stream animals and allow the downstream passage of larval drift to the ocean should recruitment or spawning occur.

Mitigative measures should be implemented during the rehabilitation or construction of the replacement bridges and to minimize the potential for erosion, siltation and pollution of the aquatic environment.

1) lands denuded of vegetation should be planted or covered as quickly as possible to prevent erosion and the vegetation cleared along stream banks should be removed and prevented from falling into the stream/estuary environment;
2) scheduling site work (particularly the excavation and demolition of existing bridge abutments, piers, footings and supports, the construction of bridge foundations structures, and stream bank hardening) during periods of minimal rainfall;
3) prevent construction materials, petroleum products, debris and landscaping products from falling, blowing or leaching into the aquatic environment during the rehabilitation /replacement of the bridges and their associated improvements.

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plans, DAR requests the opportunity to review and comment on those changes.

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

January 26, 2016

In Reply Refer To:
HFPM-16

Mary Abrams, Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850

Re: Section 7 Consultation for Proposed Hilea and Ninole Bridge Replacement Project, Mamalahoa Highway (Route 11), Hawaii Island, Hawaii

Dear Ms. Abrams:

The Central Federal Lands Highway Division (CFLHD) of the Federal Highway Administration (FHWA), in cooperation with the State of Hawaii Department of Transportation (HDOT) is proposing to replace the Hilea and Ninole bridges on Mamalahoa Highway (Route 11), in the Kau District on Hawaii Island, Hawaii. The purpose of the project is to improve Hilea and Ninole bridges and their approaches to maintain stream crossings on Mamalahoa Highway so they remain safe and functional components of the regional transportation system for highway users. FHWA is the lead federal agency for this consultation.

The enclosed biological assessment (BA) addresses potential project impacts on federally listed threatened and endangered species, including three seabirds (the endangered Hawaiian petrel [*Pterodroma sandwichensis*], the threatened Newell's shearwater [*Puffinus auricularis newelli*], and the proposed endangered band-rumped storm petrel [*Oceanodroma castro*]), the endangered Hawaiian goose (*Branta sandvicensis*), the endangered Hawaiian hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), and the endangered Blackburn's sphinx moth (*Manduca blackburni*). The BA concludes the following:

- The Hawaiian petrel, Newell's shearwater, and band-rumped storm-petrel are unlikely to occur in the action area because suitable habitat does not exist; however, these seabirds may be attracted to construction lights as they fly over the action area. The proposed project *may affect, but is not likely to adversely affect* the Hawaiian petrel and Newell's shearwater. The proposed project is *not likely to jeopardize the continued existence* of the band-rumped storm petrel, which is proposed for listing.
- The Hawaiian goose may occur in the action area, as there is suitable nesting and foraging habitat. However, impacts would be discountable or insiginificant, such that the project *may affect, but is not likely to adversely affect* the Hawaiian goose.
- The action area is out of the known breeding range for the Hawaiian hawk, but it is possible that the Hawaiian hawk could occasionally forage in the action area. Because impacts would be discountable or insiginificant, the project *may affect, but is not likely to adversely affect* the Hawaiian hawk.

- The action area contains habitat that could support roosting and foraging for the Hawaiian hoary bat. However, the timing of construction and minimal construction footprint will preclude any major or long-term effects, such that the project *may affect, but is not likely to adversely affect* the Hawaiian hoary bat.
- Blackburn's sphinx moth is unlikely to occur in the action area, because larvae host plants were not observed during the site survey. The proposed project *may affect, but is not likely to adversely affect* the Blackburn's sphinx moth.
- No designated or proposed critical habitat for threatened or endangered species occurs in the action area.

To comply with Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(ESA), FHWA is requesting informal consultation on the Hawaiian petrel, Newell's shearwater, Hawaiian goose, Hawaiian hawk, Hawaiian hoary bat, Blackburn's sphinx moth, as well as the proposed endangered band-rumped storm-petrel.

If you require further information or have questions, please contact Nicole Winterton, Environmental Protection Specialist, by email at Nicole.winterton@dot.gov or by phone at (720) 963-3689. We appreciate your assistance with this project.

Sincerely,

Michael Will
Project Manager

Enclosure:
Biological Assessment for the Proposed Hilea and Ninole Bridge Project, Mamalahoa Highway (Route 11), Kau, Hawaii

cc:
Michael Tosatto, National Marine Fisheries Service
Lisa Hadway, State of Hawaii Division of Forestry and Wildlife
Frazer McGilvray, State of Hawaii Department of Aquatic Resources

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ENVIRONMENTAL CONSULTANTS
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Biological Assessment for the Proposed Hīlea and Nīnole Bridge Project, Māmalahoa Highway, Route 11, Kaʻū, Hawaiʻi

Prepared for

Federal Highway Administration, Central Federal Lands Highway Administration

and

CH2M HILL

Prepared by

SWCA Environmental Consultants

January 2016

BIOLOGICAL ASSESSMENT FOR THE PROPOSED HĪLEA AND NĪNOLE BRIDGE PROJECT MĀMALAHOA HIGHWAY, ROUTE 11, KAʻŪ, HAWAIʻI

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SWCA Project No. 27166

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1. INTRODUCTION

The Federal Highway Administration, Central Federal Lands Highway Division (FHWA), in partnership with the Hawaiʻi Department of Transportation (HDOT) is proposing to replace Hīlea and Nīnole Bridges (proposed actions) to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches. The proposed actions are at mileposts 57.7 (Hīlea) and 56.6 (Nīnole) on Māmalahoa Highway (Route 11), which is the only route connecting the towns of Pāhala and Nāʻālehu, on the Island of Hawaiʻi.

CH2M HILL contracted SWCA Environmental Consultants (SWCA), on behalf of FHWA, to complete a biological assessment (BA) for the proposed actions. The purpose of this BA is to evaluate the proposed project in sufficient detail to determine its potential effects on federally listed threatened and endangered species, proposed species, and candidate species for listing. No proposed or designated critical habitat is present within the project action area.

Section 7(a)(1) of the Endangered Species Act (ESA) of 1973 (as amended) directs all federal agencies to participate in the conservation and recovery of threatened and endangered species. Section 7(a)(2) of the ESA states that each federal agency shall consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This project will be federally funded and FHWA is the lead agency for the Section 7 consultation.

The proposed actions at the Hīlea and Nīnole Bridges are combined into a single BA because both bridges are close to each other and have similar species and because the potential impacts to both areas from the proposed action would be similar (personal communication, Adam Griesemer, USFWS, May 1, 2015). The proposed actions are hereafter collectively referred to as the *proposed action*.

1.1. Consultation to Date

Michael Will, Project Manager from the U.S. Department of Transportation, FHWA-Central Federal Lands Highway Division sent a letter to the USFWS on November 21, 2014, requesting a list of federally threatened and endangered species, candidate species, plants and animals of special concern, and critical habitats near the proposed action. USFWS replied to the letter on December 22, 2014, listing the species that may occur on the Island of Hawaiʻi along with recommended measures that USFWS believes will reduce impacts on each species (USFWS 2014a). Conservation measures that will be incorporated into the proposed project are listed in section 2.4.

CH2M HILL hosted a meeting in Honolulu on March 13, 2015, to discuss the Hawaiʻi Bridges Program with the FHWA-Central Federal Lands Highway Division, USFWS, CH2M HILL, State of Hawaiʻi Division of Aquatic Resources, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency, and SWCA. The Hawaiʻi Bridges Program involves improvements at several bridges throughout the islands, including Hīlea and Nīnole Bridges. On December 11, 2014, CH2M HILL and SWCA also met with the U.S. Army Corps of Engineers at their Honolulu District Office. The purpose of these meetings was to introduce the project locations and discuss potential biological and regulatory issues associated with the Hawaiʻi Bridges Program. Additionally, an informal telephone conversation was held between SWCA and Adam Griesemer (USFWS) on May 1, 2015, pertaining to combining BAs for bridges with similar species and potential impacts. As recommended by the USFWS, two Fish and Wildlife Coordination Act (FWCA) meetings were held on December 8 and December 15, 2015, to discuss avoidance and minimization measures for fish and wildlife resources and water quality.

2. PROPOSED ACTION AND PROJECT DESCRIPTION

The proposed action consists of replacing the existing Hīlea and Nīnole Bridges with new single-span bridges to address structural and functional deficiencies. The proposed action would take place on Hīlea Bridge, Nīnole Bridge, temporary bypass roads, approach roadways, potential staging areas, and potential utility relocations. The highway section at the bridges would be closed during the construction period, and at each bridge, a temporary two-way bypass bridge would be provided mauka of the highway. Upon project completion, there would be no changes in highway operations.

Components of the project, construction considerations, a description of the survey area and action area, as well as conservation measures to be incorporated into the project, are described below.

2.1. Survey Area and Project Area

The Hīlea Bridge and Nīnole Bridge survey and project areas are in the Kaʻū District on the Island of Hawaiʻi. The survey area is the area within which field observations were made during site visits by SWCA biologists in October 2014. The survey area was based on the expected project footprint at the time; however, the project area, defined as all areas where direct impacts (permanent and temporary) are proposed to occur, changed slightly following the survey. The survey area encompasses a larger area than the current project area, as shown in Figure 1.

2.1.1. Hīlea

The Hīlea Bridge project area stretches approximately 900 feet (274 meters [m]) along Māmalahoa Highway (Route 11), and extends approximately 75 feet (23 meters [m]) beyond the existing right-of-way (makai side) and 150 feet (46 m) beyond the mauka side of the proposed detour crossing. It is approximately 1.2 miles (1.9 kilometers [km]) south of the Alahaki Road and Nīnole Loop Road intersection. The project area encompasses approximately 3.3 acres (1.4 hectares [ha]), including 2.3 acres (0.9 ha) of a temporary impact area and 1.1 acres (0.4 ha) of a permanent impact area (see Figure 1).

The Hīlea Bridge is at an elevation of approximately 140 feet (43 m) above mean sea level (msl). The terrain is undulating in some parts due to the presence of lava.

The surrounding area is undeveloped. Sea Mountain Golf Course is to the northeast. The closest communities are Nāʻālehu to the southwest and Pāhala to the northeast.

2.1.2. Nīnole

The Nīnole Bridge project area stretches along Māmalahoa Highway (Route 11) for approximately 900 feet (274 m) near milepost 56.6 (see Figure 1). It extends approximately 50 feet (15 m) beyond the existing right-of-way (makai side) and 50 feet beyond the proposed temporary bypass crossing (mauka side). It is approximately 500 feet (152 m) south of the Alahaki Road and Nīnole Loop Road intersection. Where Nīnole Stream crosses beneath Nīnole Bridge, the project limits would extend approximately 400 feet (122 m) along the drainage and would be 200 feet (61 m) wide surrounding the drainage. The project area covers slightly more than 2 acres (0.8 ha). Of this, approximately 1.1 acres (0.4 ha) are expected to be temporarily impacted and nearly 1 acre (0.4 ha) would be permanently impacted (see Figure 1).

Figure 1. Hīlea and Nīnole Bridges project area, survey area, and action area.

The Nīnole Bridge is at an elevation of approximately 140 feet (43 m) above msl with a southeast aspect. The terrain is generally flat.

The surrounding area has been developed into the 18-hole Sea Mountain Golf Course, with the exception of the area along the streambed. The bridge crosses the expanse of Nīnole Stream, which is an intermittent stream that drains approximately 190 acres (77 ha) of the southern slope of Mauna Loa. A concrete golf cart pathway runs under the bridge. The closest communities are Nā'ālehu to the southwest and Pāhala to the northeast.

2.2. Action Area

The action area is defined in the ESA (50 CFR 402.02) as the area within which all of the direct and indirect effects of the project would occur. In other words, it is the geographic area that would be affected by construction and maintenance of the project. The Hīlea Bridge and Nīnole Bridge action areas were determined based on potential for construction noise to travel through the surrounding area. This is because noise would be the most far-reaching impact resulting from the proposed action. The action areas (see Figure 1) extend 1,000 feet (305 m) from each project area, covering a total of 124.3 acres (50.3 ha) and 141.2 acres (57.1 ha) for Hīlea and Nīnole Bridges, respectively. The 1,000-foot (305-m) buffer defines the action areas based on the distance a 100 A-weighted-decibel (dBA) noise (such as a rock drill or paver) would attenuate to background levels (approximately 50 dBA) over flat terrain with little to no vegetation. This area is conservatively defined and likely encompasses an area larger than the area within which all impacts would occur. The actual distance that noise effects would occur is likely smaller than the action areas because quieter equipment would be used and local topography and vegetation would shield the produced noise.

2.3. Proposed Action

The existing Hīlea and Nīnole Bridges would be demolished and replaced with new bridges. The new bridges would consist of single-span structures and would accommodate two 11-foot-wide (3.4-m-wide) traffic lanes, a 9-foot-wide (2.7-m-wide) shoulder on each side, and a 1-foot 2-inch-wide (0.35-m-wide) guardrail (metal railing on the bridge approaches) on each side. The roadway approaches to the bridges would be widened, which would require extending embankment slopes or installing retaining walls.

Bridge railings and transitions would meet requirements for crashworthiness. Concrete post and beam railings would have a height of 3.5 feet (1.1 m). Concrete end posts with metal railings would be provided along the length of the approach slab as a transition from the metal guardrails of the roadway.

During construction, the bridges would be closed. At each bridge, a temporary, 24-foot-wide (7.3-m-wide) two-lane bypass bridge and a bypass road would be used to direct traffic around the bridge replacement site. The bypass route and temporary bridges would be constructed on the mauka side of Māmalahoa Highway. The bypass roads would provide a 10-foot (3-m) lane in each direction, 2-foot (0.6-m) shoulders, and barriers, as needed.

One staging area would serve both Hīlea and Nīnole Bridges. It is located in the immediate vicinity of the existing Hīlea Bridge (south of the bridge on the western side of the highway). A potential secondary staging area is identified on the northwestern side of the existing Nīnole Bridge (on the mauka side of the northern bridge approach). Access to the golf course path below the bridge would be maintained during construction.

Demolition debris would require disposal at an approved landfill. Disposal of any dredged material and water from dewatering activities would require regulatory agency approvals. Ready-mix concrete would

likely come from a ready-mix plant in Hilo or Kona, which are both within approximately 60 miles (97 km) of the project area.

Construction activities are anticipated to begin in mid-2017 and last for approximately 18 months.

2.3.1. Hīlea

Under the proposed action, the replacement Hīlea Bridge would be a straight, single-span, 100-foot-long (30-m-long) bridge. It would have a sloping-downhill profile from south to north, centered on the existing roadway baseline alignment. The structure would be supported on shallow footing foundations bearing on or embedded into hard basalt. The existing stone abutments would be removed, and grading would take place to transition from the existing channel to the new bridge abutments. Wing walls would cantilever off the abutments. The new bridge abutments would be socketed into the underlying basalt strata and would be set back from the main channel to provide greater hydraulic capacity.

The single-span bridge option eliminates interior piers that may be an obstruction during high stream flows. For the proposed bridge to convey the 1-in-50-year flow of 8,100 cubic feet per second (229 cubic meters per second) with a 2-foot freeboard without a need for the roadway to be raised, a wider bridge opening would be required.

Construction would occur in the streambed and within Waters of the U.S. All or portions of the bridge construction area would be dewatered before instream work using a coffer dam or other method, as appropriate for the location. The dewatering structure would be constructed where needed for dewatering between the ordinary high water mark (OHWM) and would be sized as needed to dewater the bridge construction area. The dewatering structure would be removed immediately after it is no longer needed. The area to be temporarily disturbed within the OHWM would be determined prior to application for the Clean Water Act Section 404 and other required permits.

2.3.2. Nīnole

Under the proposed action, the replacement Nīnole Bridge would be a straight, single-span, 65-foot-long (20-m-long) bridge with a sloping-downhill profile from south to north, centered on the existing roadway baseline alignment. The structure would be supported on shallow footing foundations bearing on or embedded into hard basalt. The existing stone (lava-rock facing) pier foundations would be left in place to retain the existing golf cart path, contain the ordinary high water flow, and retain the existing historic stone features. The existing abutments, which are outside of the ordinary high water limits, would be removed and new abutments would be placed farther back from the stream channel than the existing abutments. The southern abutment would be embedded into hard basalt. The northern abutment would be along the paved golf cart path.

No work would be conducted between the OHWM lines to replace the bridge over Nīnole Stream.

2.4. Conservation Measures

Implementation of the proposed action would include a variety of conservation measures to reduce or eliminate project-related impacts and to avoid adverse effects to listed species. Conservation measures for the proposed action include the following:

Nēnē

- A biologist familiar with the nesting behavior of the Hawaiian goose (*Branta sandvicensis*), or nēnē, will survey the area before the initiation of any work, or after any subsequent delay in work of 3 or more days (during which birds may attempt nesting).
- All regular on-site staff will be trained to identify nēnē and will know the appropriate steps to take if nēnē are present on-site.
- If a nēnē is found in the area during ongoing activities, all activities within 100 feet (30 m) of the bird will cease, and the bird will not be approached. If a nest is discovered, USFWS will be contacted. If a nest is not discovered, work may continue after the bird leaves the area of its own accord.

Seabirds

- Construction activity will be restricted to daylight hours during the seabird peak fallout period (September 15–December 15) to avoid the use of nighttime lighting that could attract seabirds. Dark sky procedures will be used outside the peak fallout period if night work is required.
- All outdoor lights will be shielded to prevent upward radiation. This has been shown to reduce the potential for seabird attraction (Reed et al. 1985; Telfer et al. 1987). A selection of acceptable seabird-friendly lights can be found online at the Kauaʻi Seabird Habitat Conservation website (2013).
- Outside lights that are not needed for security and safety will be turned off from dusk through dawn during the peak fallout period.

Hawaiian Hoary Bat

- Any fences that may be erected as part of the project will have barbless top-strand wire to prevent entanglements of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) on barbed wire. No fences in the survey area were observed with barbed wire during the survey; however, if fences are present, the top strand of barbed wire will be removed or replaced with barbless wire.
- In general, no trees taller than 15 feet (4.6 m) will be trimmed or removed as a result of this project between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees; however, if a limited number of trees need to be cleared during that time period, a qualified biologist will use appropriate protocols to surveys for bats before trimming or cutting.

Blackburn's Sphinx Moth

- A survey for potential larval host plants for the Blackburn's sphinx moth (*Manduca blackburni*) (particularly tree tobacco [*Nicotiana glauca*]) will be conducted by biologists before construction/vegetation clearing. Results of the survey will be provided to the USFWS.
- If host plants are found, surveys for Blackburn's sphinx moths will be performed according to most recent USFWS guidance, and preferably during the wet season (January to April) roughly 4–8 weeks following a significant rainfall event. Results of the survey will be provided to the USFWS. Any necessary follow-up actions will be coordinated with the USFWS.

Hawaiian Hawk

- If brush or tree clearing occurs as a result of this project during the Hawaiian hawk breeding season (March through September), a nest survey will be conducted in the action areas, before clearing, by a qualified biologist using appropriate survey methods (Gorresen et al. 2008; USFWS 2008).

In addition to the conservation measures, the following best management practices (BMPs) would be implemented to protect water quality, as recommended by the NMFS Protected Resources Division (NOAA NMFS 2015a) and USFWS (USFWS 2014a). The applicability of these measures to the proposed project will depend on the site-specific construction means and methods chosen. The project would also adhere to the requirements of all applicable permits.

- Erosion and sediment control measures would be in place before initiating earth-moving activities. Functionality would be maintained throughout the construction period.
- A contingency plan to control toxic materials will be developed.
- Appropriate materials to contain and clean potential spills will be stored at the work site and be readily available.
- All project-related materials and equipment placed in the water will be free of pollutants.
- The project manager and heavy equipment operators will perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations will be postponed or halted if a leak is detected, and they will not proceed until the leak is repaired and the equipment is cleaned.
- Fueling of land-based vehicles and equipment will take place at least 50 feet (15.24 m) away from the water, preferably over an impervious surface. Fueling of vessels will be done at approved fueling facilities.
- Turbidity and siltation from project-related work will be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and flow conditions.
- No project-related materials (fill, revetment rock, pipe, etc.) will be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.
- No contamination (trash or debris disposal, invasive species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities.
- Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

3. METHODOLOGY AND SPECIES COVERED IN THE EVALUATION OF POTENTIAL IMPACTS

The USFWS maintains lists of endangered, threatened, proposed, and candidate species known or thought to occur in Hawaiʻi. The USFWS also designates critical habitat in the state for some listed species. Endangered and threatened species are protected under the ESA (16 United States Code [USC] 1531 et seq.). The ESA specifically prohibits *take*, which is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct" of a listed species. *Harm* includes "significant habitat modification or degradation that kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."

All information on the vegetation and wildlife in the action areas was derived from biological surveys conducted by SWCA in October 2014. In addition to recording wildlife and plants during the surveys,

SWCA evaluated habitat for the possible occurrence of federally listed species. As part of that habitat evaluation effort, the presence of any water, wetlands, and special soils was documented.

The species evaluated in this report are all federally protected (endangered and threatened) species, proposed species, or candidates for federal listing.

The determination of potential for local species occurrence was based on 1) existing information on distribution and 2) qualitative comparisons of the habitat requirements of each species with vegetation communities, landscape features, and/or water quality conditions in the survey areas. Possible impacts to these species were evaluated based on reasonably foreseeable project-related activities and the local loss of habitat.

Federally listed species were evaluated for potential to occur in the action areas using the following categories:

- *Known to occur:* The species was documented in the action areas either during or before the field surveys by a reliable observer.
- *May occur:* The action areas are within the species' currently known range, and vegetation communities, soils, water quality conditions, etc., resemble those known to be used by the species.
- *Unlikely to occur:* The action areas are within the species' currently known range, but vegetation communities, soils, water quality conditions, etc., do not resemble those known to be used by the species, or the survey area is clearly outside the species' currently known range.

Species with the potential to occur in the action areas were then further evaluated for possible impacts from the proposed action. However, effect determination categories are defined differently based on the exact legal status of a species and the mandates and responsibilities of the agency tasked to manage or protect that species. Federally protected (i.e., threatened or endangered) species were assigned to one of three categories of possible effect, following USFWS guidelines.

- *No effect:* A determination of no effect means there are absolutely no effects to the species and its critical habitat, either positive or negative. It does not include small effects or effects that are unlikely to occur.
- *May affect, is not likely to adversely affect:* Under this effect determination, all effects to the species and its critical habitat are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without adverse effects to the species (for example, there cannot be "balancing," so that the benefits of the action will outweigh the adverse effects). Insignificant effects relate to the magnitude of the impact and should not reach the scale where take occurs. Discountable effects are considered extremely unlikely to occur. Based on best judgment, a person would not 1) be able to meaningfully measure, detect, or evaluate insignificant effects or 2) expect discountable effects to occur. Determinations of "not likely to adversely affect, due to beneficial, insignificant, or discountable effects" require written concurrence from the USFWS.
- *May affect, is likely to adversely affect:* This effect determination means that the proposed action would have an adverse effect on the species or its critical habitat. Any action that would result in "take" of an endangered or threatened species is considered an adverse effect. A combination of beneficial and adverse effects is still considered "likely to adversely affect," even if the net effect is neutral or positive. The effect on the species and/or critical habitat must be extremely small to qualify as a discountable effect. Likewise, an effect that can be detected in any way or that can be

meaningfully articulated in a discussion of the results of the analysis is not discountable; it is an adverse effect.

As directed by the USFWS, species proposed or candidates for listing are evaluated using the following effect determination categories. *Jeopardy* is defined under the ESA as occurring when "an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced."

- No effect.
- Not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of proposed critical habitat.
- Likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of proposed critical habitat.

4. AFFECTED ENVIRONMENT

SWCA conducted a review of available scientific and technical literature regarding natural resources in and near the survey areas and action areas. This literature review encompassed a thorough search of refereed scientific journals, technical journals and reports, environmental assessments and environmental impact statements, relevant government documents, and unpublished data that provide insight into the natural history and ecology of the area. SWCA also reviewed available geospatial data, aerial photographs, and topographic maps of the survey areas and action areas.

A field reconnaissance of the survey areas was conducted by SWCA biologists on October 6 and 29, 2014. Representative portions of the areas were driven or walked to describe vegetation types, fauna, and wetlands or streams, as well as the known or suspected presence of threatened, endangered, proposed, or candidate wildlife or plant species and their habitats.

4.1. Soils and Hydrology

The action areas are on the lower flank of the Mauna Loa Volcano. It is underlain by Kaʻū Basalt, ranging from 200 to 5,000 years old (Sherrod et al. 2007). The Natural Resources Conservation Service (NRCS) identifies the following two soil types in the survey area: Lava flows, ʻaʻā, 2%–20% slopes and Kanohina-Lava flows complex, 2%–10% slopes (Foote et al. 1972; NRCS 2013). Lava tubes and caves likely occur under portions of the action areas.

Mean annual rainfall for this area of Hawaiʻi Island is approximately 39 inches (990 millimeters [mm]). Rainfall is typically highest in November and lowest in June (Giambelluca et al. 2013). The closest rainfall gauge to the action areas (Pāhala) experienced above-average rainfall for 2014 through the end of October when the surveys were conducted (National Oceanic and Atmospheric Administration/National Weather Service, Weather Forecast Office Honolulu 2014).

4.1.1. Hīlea

The Hīlea Bridge action area is in the Hīlea Watershed, which encompasses roughly 49.2 square miles (127.4 km^2) (Parham et al. 2008). The Hīlea Bridge spans the Hīlea Gulch. The total length of Hīlea Stream is approximately 16.9 miles (27.2 km). The stream was dry at the time of the survey. Hīlea Gulch continues south from the action area for approximately 0.5 mile (0.8 km) before reaching Kāwā Bay (Pacific Ocean). The stream is identified as non-perennial by the State of Hawaiʻi and the U.S. Geological

Survey. However, staff from the HDOT mentioned that the stream at this bridge has overtopped the highway in the past, likely from debris accumulation (CH2M HILL 2014). The National Wetlands Inventory program does not identify any wetlands or waterways in the action area.

4.1.2. Nīnole

The Nīnole Bridge action area is in the Nīnole Gulch Watershed, which encompasses roughly 19.3 square miles (31.1 km^2) (Parham et al. 2008). The Nīnole Bridge spans Nīnole Gulch. The total length of Nīnole Gulch is 12.5 miles (20.1 km). The stream was dry at the time of the survey. The U.S. Geological Survey map does not show Nīnole Gulch connecting with the Pacific Ocean; however, surface water from Nīnole Gulch is reported to discharge into the ocean following heavy rainfall (Group 70 International, Inc. 2006). Nīnole Stream is identified as non-perennial by the State of Hawai'i and the U.S. Geological Survey. The National Wetlands Inventory program does not identify any wetlands or waterways in the action area.

4.2. Vegetation

The following sections describe the vegetation in the Hīlea Bridge and Nīnole Bridge survey areas, because these are the areas that were surveyed and are the areas that can therefore be accurately described. Vegetation surveys consisted of a pedestrian survey on October 29, 2014. All observed vegetation species and vegetation types were noted during the surveys.

4.2.1. Hīlea

No state or federally listed threatened, endangered, proposed, or candidate plant species were recorded during the site visit in the Hīlea Bridge survey area. Eight native Hawaiian plants were seen during the survey: 'ae (*Polypodium pellucidum*), alahe'e (*Psydrax odorata*), *Cyperus polystachyos*, koali 'awa (*Ipomoea indica*), kupukupu (*Nephrolepis exaltata* subsp. *hawaiiensis*), 'ōhi'a (*Metrosideros polymorpha*), 'uhaloa (*Waltheria indica*), and 'ūlei (*Osteomeles anthyllidifolia*). None of these observed native species are considered rare throughout the Hawaiian Islands. A list of all plant species observed by SWCA biologists in the Hīlea Bridge survey area is provided in SWCA's initial biological report (SWCA 2015a).

Five main vegetation types were identified in the Hīlea Bridge survey area along Māmalahoa Highway: Guinea grass grassland, non-native forest, lantana scrubland, 'ōhi'a open forest, and ruderal.

Guinea grass grassland: This vegetation type is characterized by large, open areas of Guinea grass (*Urochloa maxima*) occurring west of the streambed, adjacent to the north side of Māmalahoa Highway (Figure A1; all photographs are in Appendix A). Lantana (*Lantana camara*) and partridge pea (*Chamaecrista nictitans*) grass are commonly found among the Guinea grass. Only two trees are common—monkeypod (*Samanea saman*) and kukui (*Aleurites moluccana*)—which are widely spaced from one another. The native alahe'e is rare in this vegetation type, and the native 'uhaloa is uncommon in this vegetation type.

Non-native forest: Flanking each side of the Hīlea Stream is a non-native forest dominated by Java plum (*Syzygium cumini*) and koa haole (*Leucaena leucocephala*) trees (Figure A2). Monkeypod trees are also common. The most common understory plant is Guinea grass, which grows up to 6 feet (2 m) in height. Few other plants occur with the dense Guinea grass. The only native plant found in this area is kupukupu fern, and only a few isolated individuals were seen within this vegetation type.

Lantana scrubland: The west side of Hīlea Stream along the north side of Māmalahoa Highway is an ʻaʻā lava flow dominated by lantana shrubs that are up to 4.5 feet (1.5 m) in height. Much of the ʻaʻā lava flow is without plants, because soil substrate has yet to develop. Kupukupu fern is abundant, growing low between the lava rocks. Native ʻōhiʻa lehua trees are uncommon in the Hīlea Bridge survey area. Most of the vegetation is concentrated near the streambed and becomes less dense as distance increases eastward and away from the stream.

ʻŌhiʻa Open Forest: A small portion of the Hīlea Bridge survey area, on the northeast tip underlain by ʻaʻā lava, is dominated by scattered ʻōhiʻa trees (Figure A3). Other native species in this vegetation type include kupukupu and ʻūlei. The most common non-native plants are koa haole, sourbush (*Pluchea carolinensis*), and lantana.

Ruderal: This vegetation type occurs in and along the highway ROW and adjacent to parking areas. It is dominated by a mix of non-native plants. Abundant and common herbaceous species found in the ruderal vegetation type are Guinea grass, swollen fingergrass (*Chloris barbata*), pitted beardgrass (*Bothriochloa pertusa*), natal redtop (*Melinis repens*), *Macroptilium atropurpureum,* hairy spurge (*Euphorbia hirta*), and buttonweed (*Spermacoce assurgens*). Low-growing thickets of koa haole trees and Christmas berry (*Schinus terebinthifolius*) are also common in this vegetation type.

4.2.2. Nīnole

No state or federally listed threatened, endangered, proposed, or candidate plant species were recorded in the Nīnole Bridge survey area. Four native plant species were recorded in the Nīnole Bridge survey area during the survey: *Fimbristylis dichotoma*, ʻuhaloa (*Waltheria indica*), koali ʻawa, and kou (*Cordia subcordata*). These species are indigenous, are found in the Hawaiian Islands and elsewhere, and are not considered rare throughout the Hawaiian Islands. A list of all plant species observed by SWCA biologists in the Nīnole Bridge survey area is provided in SWCA's initial biological report (SWCA 2015b).

Three main vegetation types were identified during the survey in the Nīnole Bridge survey area: koa haole – Christmas berry forest, ruderal vegetation, and ornamental landscaping.

Koa haole – Christmas berry forest: This vegetation type is found along the streambed roughly perpendicular to Nīnole Bridge on Māmalahoa Highway. It is characterized by dense stands of koa haole and Christmas berry trees (Figure A4), which create a closed canopy cover over a dry lava rock streambed devoid of plants. Java plum is a common tree in the Nīnole Bridge survey area. Guinea grass is the most abundant understory plant along the streambed edges, and few other non-native herbaceous plants are present. No native species were observed.

Ruderal: Ruderal plant species are dominant within the highway ROW. This vegetation type is dominated by a mix of weedy non-native plants (Figure A5). Abundant and common herbaceous species found in the ruderal vegetation type are Guinea grass, swollen fingergrass, pitted beardgrass, lovegrass (*Eragrostis amabilis*), and coat buttons (*Tridax procumbens*). These weedy areas are likely mowed occasionally. Stands of koa haole are also common.

Ornamental landscaping: Ornamental trees and shrubs are planted adjacent to buildings and golf course facilities. Moreton bay figs (*Ficus macrophylla*) line the highway to the east of the bridge. Other ornamental plantings in the Nīnole Bridge survey area include wedelia (*Sphagneticola trilobata*), peregrine (*Jatropha integerrima*), royal poinciana (*Delonix regia*), century plant (*Agave americana*), and mock orange (*Murraya paniculata*). The fairways on the golf course are planted with Bermuda grass (*Cynodon dactylon*).

4.3. Wildlife

The following sections describe the wildlife in the Hīlea Bridge and Nīnole Bridge survey areas, because these are the areas that were surveyed and are the areas that can therefore be accurately described.

Wildlife surveys consisted of a pedestrian survey on October 6 and 29, 2014, *before* 11 am or *after* 4 pm when wildlife was most likely to be active. Visual and auditory observations were included in the survey results. All observed birds, mammals, reptiles, amphibians, fish, and invertebrate species were noted during the surveys.

Acoustic surveys for the endangered Hawaiian hoary bat or ʻōpeʻapeʻa (*Lasiurus cinereus semotus*) were not conducted; however, areas of suitable habitat for foraging and roosting were noted when present.

4.3.1. Hīlea

Bird species observed in and near the Hīlea Bridge survey area are species typically found in urban areas, gardens, and parklands in Hawaiʻi. In all, 10 species were documented in the survey area (Table 1). One species of migrant shorebird—the Pacific golden-plover (*Pluvialis fulva*)—was detected in a pasture adjacent to the streambed. All other species observed are introduced species, all of which are common to the area.

Although not observed during the survey, the endangered Hawaiian goose, or nēnē, may occasionally be present or fly over the survey area (see section 6.1). Seabirds, particularly the endangered Hawaiian petrel (*Pterodroma sandwichensis*), threatened Newell's shearwater (*Puffinus auricularis newelli*), and proposed endangered band-rumped storm-petrel (*Oceanodroma castro*), may fly over the survey area at night while travelling to and from their upland nesting sites to the ocean (see section 6.3).

Portions of the Hīlea Bridge action area are actively grazed; cattle (*Bos taurus*) and horses (*Equus ferus caballus*) were present at the time of the survey. The mongoose (*Herpestes javanicus*) was observed during the survey. No other mammals were observed during the pedestrian survey. Mammals that could be expected in the survey area include dogs (*Canis familiaris*), cats (*Felis catus*), rats (*Rattus* spp.), and mice (*Mus musculus*).

Table 1. Birds Observed by SWCA in and Near the Hīlea Bridge Survey Area

Common Name	Scientific Name	Status*
Common myna	*Acridotheres tristis*	NN
House finch	*Haemorhous mexicanus*	NN
Japanese white-eye	*Zosterops japonicus*	NN
Northern cardinal	*Cardinalis cardinalis*	NN
Pacific golden-plover	*Pluvialis fulva*	M
Red-billed leiothrix	*Leiothrix lutea*	NN
Spotted dove	*Streptopelia chinensis*	NN
Yellow-billed cardinal	*Paroaria capitata*	NN
Yellow-fronted canary	*Serinus mozambicus*	NN
Zebra dove	*Geopelia striata*	NN
Total		**11**

* Status: NN = non-native permanent resident, M = migrant

One metallic skink (*Niveoscincus metallicus*) was seen during the survey. No other reptiles or amphibians were seen during the survey.

All insects seen in the Hīlea Bridge survey area during the survey are non-native to the Hawaiian Islands and include the honey bee (*Apis mellifera*), the black witch moth (*Ascalapha odorata*), and the koa haole moth (*Macaria abydata*).

4.3.2. Nīnole

The bird species observed in the Nīnole Bridge survey area are species typically found in urban areas, gardens, and parklands in Hawai'i. In all, 13 species were documented (Table 2). One migrant shorebird species—the Pacific golden-plover—was observed on the adjacent golf course property.

Although not observed during the field survey, the endangered Hawaiian goose, or nēnē, has been known to use portions of the golf course (see section 6.1). The native black-crowned night heron (*Nycticorax nycticorax*) can also be expected to be found at the water hazards on the golf course. All other avian species observed were introduced and are common to the area. Seabirds, particularly the endangered Hawaiian petrel, threatened Newell's shearwater, and proposed endangered band-rumped storm-petrel, may fly over the survey area at night while travelling to and from their upland nesting sites to the ocean (see section 6.3).

One mongoose was observed during the survey. No other mammals were observed during the pedestrian survey. Mammals that could be expected in the Nīnole Bridge action area include dogs, cats, rats, and mice.

Table 2. Birds Observed by SWCA in and Near the Nīnole Bridge Survey Area

Common Name	Scientific Name	Status*
Common myna	*Acridotheres tristis*	NN
Domestic duck	*Anas platyrhynchos domesticus*	NN
House finch	*Haemorhous mexicanus*	NN
House sparrow	*Passer domesticus*	NN
Japanese white-eye	*Zosterops japonicus*	NN
Northern cardinal	*Cardinalis cardinalis*	NN
Nutmeg mannikin	*Lonchura punctulata*	NN
Pacific golden-plover	*Pluvialis fulva*	M
Red-billed leiothrix	*Leiothrix lutea*	NN
Spotted dove	*Streptopelia chinensis*	NN
Yellow-billed cardinal	*Paroaria capitata*	NN
Yellow-fronted canary	*Serinus mozambicus*	NN
Zebra dove	*Geopelia striata*	NN
Total		**13**

* Status: NN = non-native permanent resident, M = migrant.

One metallic skink was seen during the survey. No other reptiles or amphibians were seen during the survey.

All insects seen in the Nīnole Bridge survey area are non-native to the Hawaiian Islands and include the honey bee, the black witch moth, and the koa haole moth.

4.4. Cave and Lava Tube Communities

Although none were seen during the survey, naturally occurring caves (e.g., voids and cavities) and lava tubes (subterranean channels created by flowing molten lava) may occur under both action areas. These subsurface environments may support a diverse array of rare cave-adapted plants and invertebrates, and may contain interesting geological or mineral formations and features (Howarth et al. 2007; Stone and Howarth 2007). No federally or state-listed cave-adapted invertebrates occur on the Island of Hawai'i.

Surface alterations (e.g., removal or modification of vegetation; alteration of cave entrances and passages that change the cave microclimate) can adversely impact cave communities. Plant roots that penetrate deep underground to obtain water and nutrients are the main energy source for cave ecosystems (Stone and Howarth 2007). Geophysical methods to determine the presence of voids will be considered during the project development phase (CH2M HILL 2014).

5. SPECIES CONSIDERED/CRITICAL HABITAT CONSIDERED

The species evaluated in this report consist of all federally protected (i.e., endangered and threatened) and proposed and candidate species with potential to occur in the action areas.

5.1. Species

The USFWS lists seven species that may occur in the action areas: five endangered species, one threatened species, and one proposed endangered species (Table 3). Based on current distribution and habitat requirements, three of these species—the Hawaiian goose, Hawaiian hawk (*Buteo solitaries*), and Hawaiian hoary bat—have the potential to use the habitat of the action areas; these species are discussed in further detail in section 6. The Hawaiian petrel, Newell's shearwater, band-rumped storm petrel, and Blackburn's sphinx moth are unlikely to occur in the action areas because suitable habitat does not exist; however, seabirds may be attracted to construction lights as they fly over the action areas.

5.2. U.S. Fish and Wildlife Service Critical Habitat

No designated or proposed critical habitat for threatened or endangered species occurs in the action areas.

Table 3. Species Federally Listed as Endangered or Threatened, Proposed, or Candidate Species

Common Name (scientific name)	Status*	Range or Habitat Requirements†	Potential for Occurrence in Action Areas	Determination of Effect
Hawaiian petrel *(Pterodroma sandwichensis)*	Endangered	Breeding season is from March to October, during which time this species nests in some of the main Hawaiian Islands, notably on Maui, Lānaʻi, and Kauaʻi. They nest in burrows, primarily in remote montane locations, along large rock outcrops, under cinder cones, under old lichen-covered lava, or in soil beneath dense vegetation. Burrows are generally 3–6 feet long (from entrance to nest chamber), although some may be as long as 15 feet. One white egg is laid deep within the burrows. This species was once abundant on all main Hawaiian islands except Niʻihau. Today, the largest known breeding colonies are found at Haleakala Crater on Maui and on the summit of Lānaʻi. Other colonies are on Kauaʻi, the Island of Hawaiʻi, and possibly Molokaʻi.	Unlikely to occur in the action areas. Hawaiian petrels may fly over the action areas at night while transiting between nest sites and the ocean, but they are not likely to land or use habitat because nesting habitat does not occur in the action areas.	May affect, but is not likely to adversely affect.
Newell's shearwater (*Puffinus auricularis newelli*)	Threatened	During their 9-month breeding season from April through November, this species nests in burrows under ferns on forested mountain slopes and needs an open downhill flight path through which it can become airborne. These burrows are used year after year and usually by the same pair of birds. The Newell's shearwater was once abundant on all main Hawaiian islands. Today, Newell's shearwater breed on Kaua'i, the Island of Hawai'i, Moloka'i, and Lehua. Breeding on Maui and Oʻahu has not been confirmed (Mitchell et al. 2005).	Unlikely to occur in the action areas. Newell's shearwater may fly over the action areas at night while transiting between nest sites and the ocean, but they are not likely to land or use habitat because nesting habitat does not exist in the action areas.	May affect, but is not likely to adversely affect.
Band-rumped storm petrel (*Oceanodroma castro*)	Proposed Endangered	This species is found in several areas of the subtropical Pacific and Atlantic Oceans. In Hawaiʻi, it is known to nest on Kauaʻi, Lehua Islet, and the Island of Hawaiʻi. On Hawaiʻi Island, it nest in high-elevation lava fields. Only three inactive nests have ever been found in the Hawaiian Islands; all were located in small caves or crevices. Adults visit the nest site after dark. When not at nest locations, it forages on the open ocean and has regularly been observed in coastal waters around Kauaʻi, Niihau, and Hawaiʻi Island.	Unlikely to occur in the action areas. Band-rumped storm petrel may fly over the action areas at night while transiting between nest sites and the ocean, but they are not likely to land or use habitat because nesting habitat does not exist in the action areas.	Not likely to jeopardize.
Hawaiian goose, or nēnē (*Branta sandvicensis*)	Endangered	Frequents scrubland, grassland, golf courses, sparsely vegetated slopes, and open lowland country. They do not require standing or flowing water for successful breeding but will use it when available. Their current distribution has been highly influenced by captive-bred releases into the wild.	May occur in the action areas. The action areas contain habitats such as ornamental landscaping, ʻōhiʻa open forest, koa haole – Christmas berry forest, and ruderal vegetation types that could provide Hawaiian goose nesting and foraging habitat.	May affect, but is not likely to adversely affect.

Table 3. Species Federally Listed as Endangered or Threatened, Proposed, or Candidate Species

Common Name (scientific name)	Status*	Range or Habitat Requirements†	Potential for Occurrence in Action Areas	Determination of Effect
Hawaiian hawk or ʻio (*Buteo solitarius*)	Endangered	The Hawaiian hawk depends on native forest for nesting, and they are able to use a broad range of habitats for foraging, including papaya and macadamia nut orchards, as well as forests dominated by native and introduced vegetation, from sea level to 6,500 feet.	May occur in the action areas. The action areas are out of the known breeding range for the Hawaiian hawk, and the likelihood of nesting occurring in the action areas is very low. However, it is possible that the Hawaiian hawk could occasionally forage in the action areas.	May affect, but is not likely to adversely affect.
Hawaiian hoary bat (*Lasiurus cinereus semotus)*	Endangered	This species is found primarily from sea level to 7,500 feet, although it has also been observed above 13,000 feet. Most of the available documentation suggests that this elusive bat roosts among trees in forested areas. It has been observed on the Islands of Hawaiʻi, Maui, Molokaʻi, Oʻahu, and Kauaʻi.	May occur in the action areas. The action areas contain habitats that could support Hawaiian hoary bat roosting and foraging.	May affect, but is not likely to adversely affect.
Blackburn's sphinx moth (*Manduca blackburni*)	Endangered	Occurs in topographically diverse landscapes from sea level to 5,000 feet that contain low to moderate levels of non-native vegetation. Most historical records were from coastal or lowland dry forest habitats in areas receiving less than 50 inches annual rainfall.	Unlikely to occur in the action areas. Larvae host plants were not observed during the survey.	May affect, but is not likely to adversely affect.

* **Federal (USFWS) status definitions**:

Endangered: Any species considered by the USFWS as being in danger of extinction throughout all or a significant portion of its range. The ESA specifically prohibits the take of a species listed as endangered. *Take* is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

Threatened: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The ESA specifically prohibits the take (see definition above) of a species listed as threatened.

Proposed: Any species of fish, wildlife or plant that is proposed in the *Federal Register* to be listed under section 4 of the Act.

† Unless otherwise noted, data are from USFWS (2014b).

6. EFFECTS ANALYSIS

Federally protected species that may be affected by the proposed action are discussed in detail in this section. These species are Hawaiian goose; Hawaiian hawk; Hawaiian petrel, Newell's shearwater, and band-rumped storm petrel (collectively referred to as seabirds); Hawaiian hoary bat; and Blackburn's sphinx moth.

6.1. Nēnē

The nēnē is adapted to a terrestrial and largely non-migratory lifestyle in the Hawaiian Islands, with negligible dependence on freshwater habitat. The nēnē is capable of both inter-island and high-altitude flight (Banko et al. 1999; Miller 1937).

After nearly becoming extinct in the 1940s and 1950s, the nēnē population slowly has been rebuilt through captive-breeding programs. Wild populations of nēnē occur on Hawaiʻi, Maui, and Kauaʻi. The population of nēnē was estimated in 2010 at 1888 to 1978 individuals, with the largest population on Kauaʻi (USFWS 2011). The Hawaiʻi Island population at the time was estimated at 480 individuals (USFWS 2011). Approximately 400 birds were slated to be moved from Kauaʻi to Maui, Molokaʻi, and Hawaiʻi, under an emergency declaration by then-governor Abercrombie. A significant portion of these birds has been moved to Hawaiʻi Island.

The nēnē has an extended breeding season, with eggs reported from all months except May, June, and July, although most of birds in the wild nest during the rainy (winter) season between October and March (Banko et al. 1999; Kear and Berger 1980). Nēnē nest on the ground in a shallow scrape in the dense shade of a shrub or other vegetation. During molt, adults are flightless for a period of 4–6 weeks. Molt occurs after hatching of eggs, such that the adults generally attain their flight feathers at about the same time as their offspring. When flightless, goslings and adults are extremely vulnerable to predators such as dogs, cats, and mongoose. From June to September, family groups join others in post-breeding aggregations (flocks), often far from nesting areas.

Nēnē occupy various habitat types ranging from beach strand, shrubland, and grassland to lava rock at elevations ranging from coastal lowlands to alpine areas (Banko 1988; Banko et al. 1999). The geese eat plant material, and the composition of their diet depends largely on the vegetative composition of their surrounding habitats. Most nēnē food items are leaves and seeds of grasses and sedges, leaves and flowers of various herbaceous composites, and various fruits of several species of shrubs (Black et al. 1994; Banko et al. 1999).They appear to be opportunistic in their choice of food plants as long as the plants meet their nutritional demands (Banko et al. 1999; Woog and Black 2001).

The main factor limiting the recovery of nēnē populations is predation by introduced mammals, most notably cats, rats, and mongoose (USFWS 2004; Baker and Baker 1995). Additional threats may include limited access or availability of nutritional resources during breeding and anthropomorphic disturbances, including car strikes, disturbance of nesting and feeding, and fatalities at golf courses. Breeding habitat, particularly at low elevations, may be limited (USFWS 2004).

6.1.1. Effects Analysis and Determination

Nēnē were not observed during the site visit, but suitable habitat for nesting and foraging was noted during the biological survey. The ornamental landscaping and ruderal vegetation types in the action areas are suitable for nēnē foraging. The nēnē has been observed nesting in ʻōhiʻa, Christmas berry, and lantana and could nest in the lantana scrubland, ʻōhiʻa open forest, koa haole – Christmas berry forest, and ruderal

vegetation types in the action areas. Nēnē may be attracted to golf course golf greens and lawns, and they have been known to use portions of the golf course within the Nīnole Bridge action area (personal communication, Kathleen Misajon, Hawai'i Volcanoes National Park, October 8, 2014). Approximately 16.3 acres (6.6 ha) of golf greens and lawns are estimated to occur in the Nīnole Bridge action area (Figure 2).

Permanent removal of foraging and nesting habitat would constitute a long-term *direct* impact. Approximately 2.1 acres would be permanently disturbed under the proposed action (e.g., widening the travel lanes and shoulders and increasing the bridge length). A portion of the permanently disturbed area, such as the existing paved road, is not currently suitable for nesting or foraging, and therefore disturbances in those areas would not affect nēnē. The remainder of the project area would be disturbed temporarily by staging areas and access roads, and would be reclaimed following construction. The impact of removing foraging and nesting habitat would be discountable due to the small area of impact and availability of adjacent foraging and nesting habitat for displaced nēnē to use.

Direct impacts to nēnē could occur during vegetation removal if a nest is damaged or goslings are separated from adults. However, direct impacts are unlikely to occur because conservation measures (e.g., nēnē surveys, staff training, and stop-work provision) would be implemented as described in section 2.4.

In the short term, the human noise and disturbance associated with construction activities could temporarily displace nēnē from nesting and/or foraging habitats. Displacement from available nesting and/or foraging habitat could impact the health of these individuals; however, because a small amount of foraging habitat would be removed, it would not likely affect nest success or population growth. Furthermore, foraging and nesting habitat is available adjacent to the project area in the golf course and other areas, into which the nēnē could move.

Implementation of the proposed action could slightly increase the potential for vehicle strike by increasing the width and length of the current bridges, and therefore, increasing the distance across which the birds would be susceptible to vehicle strike while crossing the road. Wildlife are more susceptible to vehicle strike on roads with higher speeds (Forman et al. 2002). The posted speed on the bridges would remain the same under the proposed action; therefore, there is no higher potential for vehicle strikes due to traffic speed changes.

Because all impacts on the nēnē would be discountable, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of the species.

Figure 2. Golf greens and lawns in the Nīnole Bridge action area.

6.2. Hawaiian Hawk

The Hawaiian hawk is endemic to the Island of Hawai'i and was listed as an endangered species in 1967 (USFWS 2014b). The Hawaiian hawk has two color morphs: dark phase birds are dark brown above and below; light phase birds are dark above and pale below with dark streaking. Intermediates occur between the two extremes. Females are larger than males and often weigh approximately 25% more than males (USFWS 2014b).

Gorresen et al. (2008) report that habitat and region were significantly associated with hawk density. Native-exotic forest, mature native forest, mature native forest with grass understory, and orchards generally support greater densities of hawks than do shrubland, pioneer native forest, or urban habitats. However, densities in certain habitats showed considerable difference among regions. For example, native-exotic forest in Hāmākua had more than four times the hawk density as similar habitats in Puna, and mature native forest in Kona also harbored markedly greater densities than those found in Puna. Data show that Puna generally harbor lower hawk numbers compared to other regions on the Island of Hawai'i. The average density for the Island of Hawai'i is 0.54 + 0.05 birds/km^2 (Gorresen et al. 2008).

Of 51 observed nests, 86% occurred in native trees, with 80% being in 'ōhi'a. Non-native trees used for nesting include eucalyptus (*Eucalyptus* spp.), ironwood (*Casuarina equisetifolia*), mango (*Mangifera indica*), coconut palm (*Cocos nucifera*), and macadamia (*Macadamia integrifolia*). Nests can be used for several years, with nesting material added each breeding season (Griffin et al. 1998). Adult home ranges were estimated to be 4.05 km^2 (1,000 acres) and may overlap with adjacent home ranges (personal communication, Gorresen, 2013).

Nestlings were fed birds (45%) and mammals (56%) consisting mainly of introduced species. The most commonly caught mammals were rats and house mice, whereas Japanese white-eye (*Zosterops japonicus*) and common myna (*Acridotheres tristis*) were the most common species of bird prey. Native or migratory birds recorded as prey for nestlings were 'apapane (*Himatione sanguinea*), Hawai'i 'amakihi (*Hemignathus virens*), and Pacific golden-plover (Griffin et al. 1998).

Loss of native forest to residential, large-scale agriculture, exotic forestry, and to business and industrial areas have had the greatest negative impact on the Hawaiian hawk. The Hawaiian hawk can be seen soaring over or foraging in these changed areas, but they typically do not nest in them. These areas may also be a source of high mortality, especially for young birds. Shooting, vehicle collisions, poisoning, starvation, and predation by introduced mammalian predators are documented sources of mortality (USFWS 1014b).

6.2.1. Effects Analysis and Determination

The Hawaiian hawk was not seen during SWCA's survey and was not detected in the area during previous surveys in 2007 (Gorresen et al. 2008). The action area is approximately 0.35 (0.56 km) outside of the breeding range identified in Gorresen et al. 2008 (Figure 3). The breeding range comprises the nesting and foraging habitat of breeding birds. The bird density in the breeding area closest to the action areas are estimated to be between 0.50 and less than 1 bird/km^2 (Gorresen et al. 2008).

The koa haole – Christmas berry forest vegetation type is found along the Nīnole streambed and is dominated by koa haole and Christmas berry trees with some Java plum trees (Figure A4). Considering that preferred nest tree species are not in the forested portions of the survey areas, and that the action areas are just outside of the extent of the breeding range, the likelihood of nesting occurring in the action areas is very low. However, it is possible that Hawaiian hawks (breeders and non-breeders) could occasionally forage in the action areas.

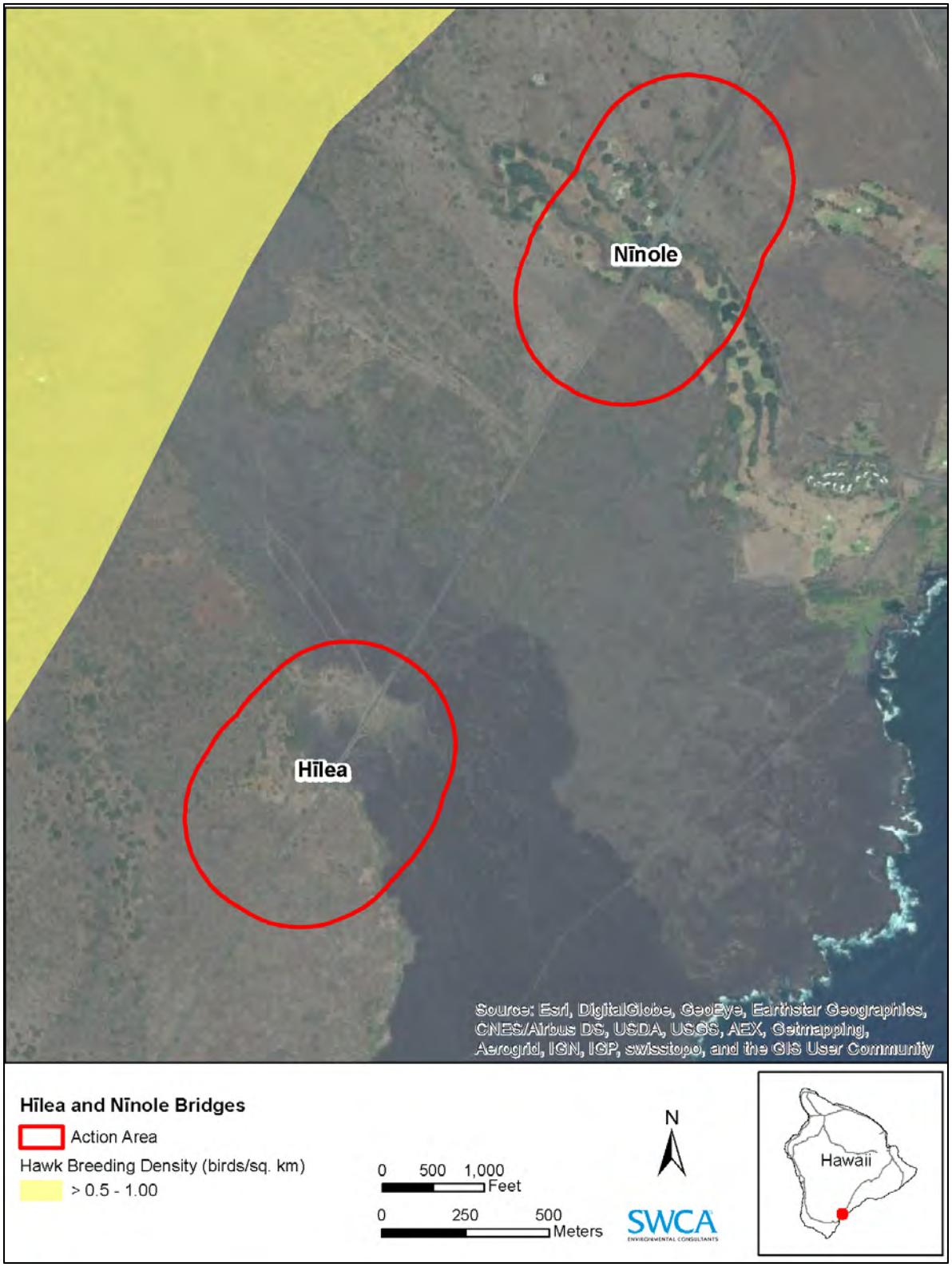

Figure 3. Hawk breeding density in and surrounding the Hīlea and Nīnole Bridge action areas.

If brush or tree clearing occurs as a result of this project during the Hawaiian hawk breeding season (March through September), a nest survey would be conducted in the action areas before clearing. This survey should be conducted by a qualified biologist using appropriate survey methods (Gorresen et al. 2008; USFWS 2008).

Because all impacts on the Hawaiian hawk would be discountable or insignificant, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of the species.

6.3. Seabirds

The endangered Hawaiian petrel, threatened Newell's shearwater, and proposed endangered band-rumped storm-petrel constitute the seabirds group. Because these species share similar habitat needs and biological characteristics, they are discussed as a single group.

The Hawaiian petrel was listed as an endangered species on March 11, 1967. The Hawaiian petrel was once abundant on all main Hawaiian Islands except Niʻihau (Mitchell et al. 2005). The population was most recently estimated to consist of approximately 20,000 individuals, with 4,000–5,000 breeding pairs (Spear et al. 1995).

Band-rumped storm petrels are considered the rarest breeding seabird in Hawaiʻi (Banko et al. 1991; Slotterback 2002). Listing of the band-rumped storm petrel under the ESA is anticipated to occur in 2016. In the Pacific Ocean, breeding colonies have been documented only in the Galapagos Islands, Japan, the Hawaiian Islands, and possibly Cocos Island near Costa Rica (Pyle and Pyle 2009; USFWS 2012). Hawaiian band-rumped storm-petrels are known to nest in high-elevation lava fields on Hawaiʻi Island (USFWS 2015).

The Newell's shearwater was listed as a threatened species by the USFWS in 1975. The largest breeding population of Newell's shearwater occurs on Kauaʻi (Telfer et al. 1987; Ainley et al. 1995, 1997; Day et al. 2003). This species has also been documented on Hawaiʻi (Reynolds et al. 1997), Molokaʻi (Day and Cooper 2002), and Oʻahu (Day and Cooper 2008).

The types of habitat used for seabird nesting are diverse and range from xeric habitats with little or no vegetation, such as at Haleakalā National Park on Maui, to wet forests dominated by ʻōhiʻa with uluhe (*Dicranopteris linearis*) understory, such as those found on Kauaʻi (Mitchell et al. 2005). Nests are located in various naturally occurring features such as lava tubes, cracks in tumuli (fractured hills on the surface of pāhoehoe flows), spaces created by uplift of pāhoehoe slabs, and other miscellaneous natural features (Hu et al. 2001; Mitchell et al. 2005; Pyle and Pyle 2009).

The main factors contributing to population declines of ground-nesting seabirds such as Hawaiian petrels are habitat degradation; the loss of nesting habitat; predation of eggs, hatchlings, and adults at nesting sites by introduced mammals (e.g., dogs, mongooses, cats, rats, and pigs [*Sus scrofa*]); and urban lighting associated with disorientation and fall-out of juvenile birds (Banko et al. 1991; Ainley et al. 1997; Mitchell et al. 2005; Hays and Conant 2007).

6.3.1. Effects Analysis and Determination

The action areas do not provide suitable nesting or foraging habitat for these seabirds. However, breeding individuals may fly over the action areas at night while travelling between upland nesting and ocean foraging sites. Disorientation and fall-out as a result of light attraction could occur to individuals attracted to nighttime construction lighting. The conservation measures regarding nighttime lighting, as listed in

section 2.4, would minimize potential for light attraction, reducing it to an unlikely and discountable impact.

Because all impacts on the Hawaiian petrel would be discountable, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of the species.

Because all impacts on Newell's shearwater would be discountable, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of the species.

Because all impacts on the band-rumped storm petrel would be discountable, the proposed action is *not likely to jeopardize the continued existence* of individuals or populations of the species.

6.4. Hawaiian Hoary Bat

The Hawaiian hoary bat was listed as an endangered species on October 13, 1970, under the ESA and the State of Hawaiʻi's Endangered Species List. Hawaiian hoary bat is found on Hawaiʻi, Maui, Molokaʻi, Oʻahu, and Kauaʻi and has been observed from sea level to approximately 13,000 feet (3,963 m) (USFWS 2014b).

The Hawaiian hoary bat is the only native terrestrial mammal that is still extant within the Hawaiian Islands (USFWS 1998). Hawaiian hoary bats use both closed habitats near vegetation such as tunneled roadways, and open habitats adjacent to forests, above tree canopies, and over open oceans (Jacobs 1996). Hawaiian hoary bats are insectivores and are regularly observed foraging over streams, reservoirs, and wetlands up to 300 feet (100 m) offshore (U.S. Department of Agriculture 2009). Hawaiian hoary bats forage in open, wooded, and linear habitats with a wide range of vegetation types (USFWS 2014b). The bat typically roosts in dense canopy foliage or in the subcanopy when canopy is sparse, with open access for launching into flight (U.S. Department of Agriculture 2009).

Hawaiian hoary bats are believed to be threatened by habitat loss, pesticides, predation, and roost disturbance. Reduction of tree cover and indirect impacts from the use of pesticides may be the primary causes of recent declines (USFWS 2014b).

6.4.1. Effects Analysis and Determination

Acoustic surveys for Hawaiian hoary bats were not conducted, but areas of suitable habitat for roosting and foraging were noted during the biological survey. The stream/river corridor and lantana scrubland vegetation type in the action areas are suitable for bat foraging. The Hawaiian hoary bat has been observed roosting in ʻōhiʻa and banyan (*Ficus* sp.) trees and could roost in the ʻōhiʻa open forest in the Hīlea Bridge action area and ornamental landscaping vegetation types in the Nīnole Bridge action area.

Direct impacts to bats could occur during vegetation removal if a juvenile bat that is too small to fly but too large to be carried by a parent is present in a tree or branch that is cut down. However, because of the conservation measure that trees would not be cut during the breeding season (June 1 through September 15), direct impacts are unlikely to occur. The potential for direct impacts would also be reduced by ensuring the top wire strand of surrounding fences (if present) is barbless, as listed in the conservation measures in section 2.4.

The permanent removal of roosting habitat would constitute a long-term indirect impact. This impact would be discountable because of the small amount of habitat removed under the proposed action and the availability of adjacent roosting habitat for displaced bats to use. Some of the vegetation removal would be permanent (e.g., widening the travel lanes and shoulders, increasing bridge length).

In the short term, the human noise and disturbance associated with construction activities could temporarily displace bats from roosting and/or foraging habitats. This displacement could alter an individual's typical foraging and roosting patters, forcing it to expend energy to search for new foraging and roosting locations. Displacement from roosting habitat could lead to increased predation on individual bats, especially if a bat is forced to leave its roost during daylight hours, making it more visible to potential predators. The potential for these impacts is low considering the project would occur on and immediately adjacent to a roadway, and therefore the bats present would already be accustomed to high levels of background noise. Furthermore, high-quality roosting and foraging areas occur in the action area, into which bats could be displaced.

Because all impacts on the Hawaiian hoary bat would be discountable or insignificant, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of the species.

6.5. Blackburn's Sphinx Moth

The Blackburn's sphinx moth was listed as endangered in February 2000 and was the first listed insect species in Hawaiʻi. It is one of the largest insects in the archipelago with a wingspan of up to 4.7 inches (12 cm). It is closely related to the North American tomato hornworm (*Manduca quinquemaculata*) (Rubinoff et al. 2012). The Blackburn's sphinx moth is currently found in topographically diverse landscapes and in areas with low to very high levels of non-native vegetation. The Blackburn's sphinx moth was once known from all of the Hawaiian Islands, but is currently restricted to Maui, Kahoʻolawe, and Hawaiʻi Island. The population size is unknown, but the species is believed to have been in decline over the past 100 years (USFWS 2005). After an effort led by Bishop Museum staff to find the species in the late 1970s, it was considered extinct (Gagné and Howarth 1985), until 1984, when a population was discovered on Maui (Riotte 1986).

The primary constituent elements required by Blackburn's sphinx moth larvae for foraging, sheltering, and maturation are the two documented native host plant species in the genus *Nothocestrum*, also known as ʻaiea (*N. latifolium* and *N. breviflorum*) (USFWS 2005). Only *N. breviflorum* occurs on Hawaiʻi Island; it is also an endangered species and has been recorded only above 1,804 feet (550 m) in elevation (Wagner et al. 1999). At lower elevations, Blackburn's sphinx moth larvae are found most often on non-native tree tobacco (*Nicotiana glauca*); they have also been found on tobacco (*Nicotiana tabacum*), eggplant (*Solanum melongena*), tomato (*Solanum lycopersicum* var. *cerasiforme*), and the indigenous pōpolo (*Solanum americanum*) (USFWS 2005). The larvae descend from their host plants and search for suitable soil before pupating. They are most likely to pupate within 33 feet (10 m) of the larval host plant, although they may transit farther over paved and hardened surfaces to find a suitable site to enter the ground. The pupal stage of *Manduca* has been suggested to last up to 1 year (Zimmerman 1958); however, no data exist to support this suggestion. Captive reared moths emerged within 6 weeks (Rubinoff and San Jose 2010).

Adult Blackburn's sphinx moths use native nectar-supplying plants mostly with a long, tubular calyx for foraging, sheltering, dispersing, breeding, and egg producing. They feed on nectar from various plants, including the koali ʻawa, ʻilieʻe (*Plumbago zeylanica*), halapepe (*Pleomele auwahiensis*), pōhuehue (*Ipomoea pes-caprae*), and maiapilo (*Capparis sandwichiana*) (USFWS 2005), and may also feed on other plants adapted to moth pollination. The largest populations of Blackburn's sphinx moth are associated with ʻaiea (USFWS 2007); however, because these host species are becoming rare, tree tobacco has become an important host plant for Blackburn's sphinx moth reproduction (Rubinoff and San Jose 2010).

Several factors are believed to have contributed to the decline and disappearance of Blackburn's sphinx moth throughout the Hawaiian Islands. These include habitat loss and fragmentation from urban and

agricultural development, increased wildfire frequency, invasion by non-native invasive weeds, impacts from ungulate grazing, and direct impacts from non-native parasitoid flies and wasps, and insect predators (USFWS 2005). The *Nothocestrum* species required by Blackburn's sphinx moth larvae for foraging, sheltering, maturation, and dispersal are presently listed as endangered. Habitat loss and fragmentation exacerbate the impact of decreased nectar availability during drought, causing further threat to the future viability of population (USFWS 2005).

Alien arthropods are believed to be a major threat to the Blackburn's sphinx moth through predation, parasitism, and direct competition. The main suspected predators include a number of ant (Formicidae) species, such as *Pheidole megacephala*, *Iridomyrmex humilis, Anoplolepis gracilipes, Solenopsis geminata, S. papuana, and Ochetellus glaber* (USFWS 2005). Parasites introduced either intentionally or accidentally are also believed to be a major factor limiting recruitment of the Blackburn's sphinx moth. The impact of parasitoids has not been quantified, but introduced parasitic Braconid and Ichneumonid wasps and Tachinid flies have an abundance of hosts, and are considered a potentially major threat (USFWS 2005).

6.5.1. Effects Analysis and Determination

No specific surveys for adult or larval Blackburn's sphinx moth were conducted in the survey areas; however, botanical surveys noted the presence of host plants in order to determine potential moth habitat.

The action areas are within the pre-human contact range for the species, which ranges from sea level to 5,000 feet (1,525 m) on Hawai'i Island. Historical records of the moth occur in Pāhala near the action areas (USFWS 2005).

No Blackburn's sphinx moth larvae host plants, including tree tobacco or other plants in the Solanaceae family, were observed during the botanical surveys. *Nothocestrum breviflorum*, the primary native larval host plant, is not likely to be present because it is rare on Hawai'i Island and is reported to occur above 1,804 feet (550 m) in elevation (Wagner et al. 1999), which is outside the action area. No tree tobacco plants were observed during the surveys; however, tree tobacco tree is common along disturbed roadsides. It has the potential to occur in the action areas based on elevation, although the species is generally a problem in drier areas.

A few adult host plant individuals were seen during the botanical survey by SWCA; two plants that are known to be used by adult moths were seen in the Hīlea Bridge survey area ('ilie'e and koali 'awa) and one plant species was seen in the Nīnole Bridge survey area (koali 'awa).

Direct impacts to Blackburn's sphinx moth could occur if tree tobacco is determined to provide habitat for moths, and if the plants or pupae still occupying the soil within a 33-foot (10-m) radius of the plants are removed or disturbed as a result of construction. However, because no larval host plants were observed during the initial botanical survey and because very few adult host plants were seen, direct impacts are unlikely to occur. The potential for direct impacts would also be reduced because of the conservation measures outlined in section 2.4 (surveys for potential larval host plants and subsequent surveys for Blackburn's sphinx moths if host plants are found).

Long-term impacts to the Blackburn's sphinx moth are also unlikely because no larval host plants were seen during the botanical survey and additional surveys would be conducted by biologists before construction/vegetation clearing. However, if larval host plants are established in the action areas and provide breeding habitat for the species, permanent removal of these plants would constitute a long-term indirect impact. This impact would be discountable because of the small number of host plants removed under the proposed action. Impacts to Blackburn's sphinx moths resulting from light attraction are not

considered likely, and potential impacts would be avoided by reducing light pollution, as recommended by the USFWS for avoidance of light impacts to seabirds.

Because all impacts on the Blackburn's sphinx moth would be discountable or insignificant, the proposed action *may affect, but is not likely to adversely affect*, individuals or populations of the species.

7. CONCLUSION

Seven of the federally protected species (see Table 3) have the potential to occur in the action areas. The Hawaiian petrel, Newell's shearwater, band-rumped storm petrel, and Blackburn's sphinx moth are unlikely to occur. The Hawaiian goose (nēnē), Hawaiian hawk, Hawaiian hoary bat may occur. Migratory birds are also present. Potential impacts from the proposed action to these species are expected to be temporary, discountable, and insignificant. As detailed above, the timing of construction and other conservation measures and best management practices would likely preclude any major or long-term effects to these federally protected species. In general, no major or long-term effects are anticipated from the implementation of the proposed action.

In conclusion, the proposed project *may affect, but is not likely to adversely affect* the federally listed Hawaiian petrel, Newell's shearwater, Hawaiian goose (nēnē), Hawaiian hawk, Hawaiian hoary bat, and Blackburn's sphinx moth. The proposed project is *not likely to jeopardize the continued existence* of the band-rumped storm petrel, which is proposed for listing.

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Appendix A

Photographs of the Survey Areas

Figure A1. Guinea grass grassland in the Hīlea Bridge survey area.

Figure A2. Mixed non-native forest adjacent to Hīlea Stream.

Figure A3. ʻŌhiʻa forest on the northeast tip of the Hīlea Bridge survey area.

Figure A4. Koa haole – Christmas berry forest vegetation flanking the dry lava streambed of Nīnole Stream.

Figure A5. Ruderal vegetation along Māmalahoa Highway within the Nīnole Bridge survey area.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To:
01EPIF00-2016-I-0186

MAR 3 1 2016

Mr. Michael Will
Central Federal Lands Highway Division
Federal Highway Administration
12300 West Dakota Ave, Suite 380
Lakewood, Colorado 80228

Subject: Informal Consultation on the Hilea and Ninole Bridge Replacement Project, Mamalahoa Highway, Kau, Hawaii

Dear Mr. Will:

The U.S. Fish and Wildlife Service (Service) received your letter on February 4, 2016, requesting an informal section 7 consultation for the Hilea and Ninole Bridge Replacement Project in Kau, Hawaii. The project is funded by the Federal Highway Administration (FHWA). At issue are the potential effects of the proposed project on the endangered Hawaiian goose (*Branta sandvicensis*), Blackburn's sphinx moth (*Manduca blackburni*), Hawaiian hoary bat (*Lasiurus cinereus semotus*), Hawaiian hawk (*Buteo solitaries*), Hawaiian petrel (*Pterodroma sandwichensis*), the threatened Newell's shearwater (*Puffinus auricularis newelli*), and the proposed endangered band-rumped storm petrel (*Oceanodroma castro*). The findings and recommendations in this consultation are based on: (1) your letter dated January 26, 2016; (2) emails and phone calls between Rachel Rounds (Service) and Nicole Winterton (FHWA); and (3) other information available to us. This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). A complete administrative record is on file in our office.

Project Description

The proposed project will replace the existing Hilea and Ninole Bridges with new single-span bridges to address structural and functional deficiencies. The project area includes Hilea Bridge, Ninole Bridge, temporary bypass roads, approach roadways, staging areas, and utility relocations. The highway section at the bridges would be closed during the construction period, and a temporary two-way bypass bridge would be provided upslope of the highway.

The Hilea Bridge project area encompasses approximately 3.3 acres, including 2.3 acres of temporary impact area and 1.1 acres of permanent impact area. The Ninole Bridge project area encompasses 2.1 acres, including 1.1 acre of temporary impact area and 1.0 acre of permanent impact area. Noise from the proposed action would extend 1,000 feet from each project area,

covering a total of 124.3 acres for Hilea Bridge and 141.2 acres for Ninole Bridge. One staging area would serve both bridges, located in the immediate vicinity of Hilea Bridge.

A full project description can be found in the Biological Assessment for the proposed action.

Conservation Measures
The following measures identified in your Biological Assessment will be implemented at the project site to avoid and minimize project impacts to listed species. These conservation measures are considered part of the project description. Any changes to, modifications of, or failure to implement these conservation measures may result in the need to reinitiate this consultation.

1. No woody plants over 15 feet tall will be removed, cut, or trimmed during the sensitive bat pup-birthing and rearing season of June 1 to September 15. If a bat is present at the project site, the area will be avoided. If a bat arrives in the construction area after work begins, work will cease until the animal leaves on its own accord.
2. No brush or tree clearing will occur during the hawk nesting season of March through September. If this time period cannot be avoided, a hawk nest search will be conducted by a qualified biologist, and if hawk nests are present in or near the corridor, all land clearing activity will cease. If a hawk is present at the project site during construction, the area will be avoided. If a hawk arrives in the construction area after work begins, work will cease until the animal leaves on its own accord.
3. To avoid impacts to the Hawaiian goose, contract specifications will require that a biologist familiar with the nesting behavior of the Hawaiian goose survey the area prior to the initiation of any work, or after any subsequent delay in work of three or more days. If a nest is discovered, work will cease immediately and the Service will be contacted for further guidance.
4. All onsite project personnel will be apprised that Hawaiian geese may be in the vicinity of the project at any time during the year. If a Hawaiian goose appears within 100 feet of ongoing work, all activity will be suspended until the animal leaves the area of its own accord.
5. In addition to the survey for larval host plants of the Blackburn's sphinx moth that has already been conducted, the project area will again be surveyed for the presence of larval host plant immediately prior to the beginning of construction. If possible, this survey will occur approximately four to eight weeks following significant rainfall and during the wettest portion of the year. If larval host plants are found during this second survey the Service will be contacted.
6. To avoid impacts to Blackburn's sphinx moth critical habitat, all staging and lay-down areas will be located either within the existing highway footprint or outside designated critical habitat.

Hawaiian goose
Hawaiian geese are known to use the golf course greens within the Ninole Bridge project area. Two acres of potential Hawaiian goose habitat would be permanently disturbed by the proposed action, and human noise and disturbance associated with construction activities could temporarily disturb Hawaiian geese in the area. However, given the small size of the project area, and the large area of golf course greens, this loss of potential habitat is not expected to adversely

affect Hawaiian geese as there is other habitat available to them in the area. By implementing the above conservation measures, the proposed project will avoid potential adverse effects to Hawaiian geese.

Hawaiian hoary bat
The proposed project site is within the range of the Hawaiian hoary bats. By implementing the above conservation measures, the proposed project will avoid potential adverse effects to Hawaiian hoary bats.

Hawaiian hawk
The proposed project site is 0.35 miles outside the breeding range of the Hawaiian hawk, and no hawks were detected in the area during island-wide surveys in 2007. The habitat present within the project area is not suitable for hawk nesting, and therefore it is unlikely that Hawaiian hawks nest in the project area. Hawks could forage or transit the project area, but could easily avoid any disturbance. By implementing the above conservation measures, the proposed project will avoid potential adverse effects to Hawaiian hawks.

Seabirds
The Hawaiian petrel, Newell's shearwater, and band-rumped storm petrel (collectively known as seabirds) may transit the project area at night while travelling between upland nesting and ocean foraging sites. By implementing the above conservation measures, the proposed project will avoid potential adverse effects to listed seabirds.

Blackburn's sphinx moth
No Blackburn's sphinx moth larval host plants were found during surveys of the project area; a few adult host plants were found. The project site is also outside the current range of the moth. By implementing the above conservation measures, the proposed project will avoid potential adverse effects to listed seabirds.

Rapid Ohia Death
Rapid Ohia Death (ROD), a newly identified disease, has killed large numbers of mature ohia trees (*Metrosideros polymorpha*) in forests and residential areas of Hawaii Island. The disease is caused by a vascular wilt fungus (*Ceratocystis fimbriata*). Crowns of affected trees turn yellowish or brown within days to weeks, and dead leaves typically remain on branches for some time. All ages of ohia trees can be affected and can have symptoms of browning of branches or leaves. As of early 2015 the disease was confined to Hilo and the Puna district on Hawaii Island, but has since been confirmed in Volcano, South Kona, and Hamakua districts.

The FHWA has agreed to incorporate the following avoidance and minimization measures into the proposed project to reduce the chances of spreading ROD. Because of on-going research regarding ROD, the FHWA will confirm with any of the names below prior to construction to confirm these measures are still valid.

- A survey of the proposed project site will be conducted within two weeks prior to any tree cutting to determine if there are any infected ohia trees. If infected ohia are suspected at the site, the following agencies should be contacted for further guidance.

- U.S. Fish and Wildlife Service – please contact Rachel Rounds, 808-792-9400, Rachel_Rounds@fws.gov
- Dr. J.B. Friday, University of Hawaii Cooperative Extension Service, 808-969-8254 or jbfriday@hawaii.edu
- Dr. Flint Hughes, USDA Forest Service, 808-854-2617, fhughes@fs.fed.us
- Dr. Lisa Keith, USDA Agriculture Research Service, 808-959-4357, Lisa.Keith@ars.usda.gov

- Both prior to cutting ohia and after the project is complete:
  - Tools used for cutting infected ohia trees will be cleaned a 70 percent rubbing alcohol solution. A freshly prepared 10 percent solution of chlorine bleach and water can be used as long as tools are oiled afterwards, as chlorine bleach will corrode metal tools. Chainsaw blades will be brushed clean, sprayed with cleaning solution, and run briefly to lubricate the chain.
  - Vehicles used off-road in infected forest areas will be thoroughly cleaned. The tires and undercarriage of the vehicle will be cleaned with detergent if they have travelled from an area with ROD or travelled off-road.
  - Shoes and clothing used in infected forests will also be cleaned. Shoes will be decontaminated by dipping the soles in 10 percent bleach or 70 percent rubbing alcohol to kill the ROD Fungus. Other gear can be sprayed with the same cleaning solutions. Clothing can be washed in hot water and detergent.

- Wood of affected ohia trees will not be transported to other areas of Hawaii Island or interisland. All cut wood should be left on-site to avoid spreading the disease. The pathogen may remain viable for over a year in dead wood. The Hawaii Department of Agriculture has passed a new quarantine rule that prohibits interisland movement, except by permit, of all ohia plant or plant parts.

Summary

We concur that the proposed project may affect, but is not likely to adversely affect, the Hawaiian goose, Hawaiian hoary bat, Hawaiian hawk, Hawaiian petrel, Newell's shearwater, and Blackburn's sphinx moth and is not likely to jeopardize the continued existence of the band-rumped storm petrel, based on conservation measures included in the project description.

If you have questions regarding this consultation, please contact Rachel Rounds, Fish and Wildlife Biologist, (phone: 808-792-9400, email: rachel_rounds@fws.gov).

Sincerely,

Michelle Bogardus
Island Team Manager
Maui Nui/Hawaii Island Team

Appendix D
Archaeological Inventory Surveys

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

March 1, 2017

IN REPLY REFER TO:
Log No. 2016.00225
Doc. No. 1703SL03
Architecture, Archaeology

Thomas Parker, Environmental Protection Specialist
Federal Highway Administration
Central Federal Lands Highway Division
12300 W. Dakota Ave., Suite 280
Lakewood, CO 80228

Dear Mr. Parker,

SUBJECT: **Chapter 6E-8 and National Historic Preservation Act Section 106 Review –**
Archaeological Inventory Survey Report for the Hīlea Bridge Replacement Project
Federal Contract No. DTFH68-13-R-00027
Hīlea Ahupua'a, Ka'ū District, Island of Hawai'i
TMK: (3) 9-5-017:007 por. and 008 por.; 9-5-017 Hawai'i Belt Road/Māmalahoa Highway ROW

Thank you for the opportunity to review the revised draft report entitled *Archaeological Inventory Survey Report for the Hīlea Bridge Replacement Project, Hīlea Ahupua'a, Ka'ū District, Hawai'i Island, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD) Contract DTFH68-13-R- 00027 TMKs: [3] 9-5-017: 007 por., 008 por.; and 9-5-017 Hawai'i Belt Road/Māmalahoa Highway ROW* (Belluomini et al., February 2016). The State Historic Preservation Division (SHPD) received the initial draft report on February 1, 2016, and the revised draft via email on February 28, 2017 (Scott Belluomini [Cultural Surveys] to Susan Lebo [SHPD]).

This archaeological inventory survey (AIS) report was prepared at the request of CH2M HILL, on behalf of the Federal Highways Administration (FHWA) Central Federal Lands Highway Division (CFLHD). The agency identified the area of potential effect (APE) as comprising 3.5 acres of primarily land owned by the State of Hawaii. The FHWA is providing funding (Contract DTFH68-13-R-00027) and has determined the project is a federal undertaking as defined by 36 CFR 800.16(y) and is subject to the National Historic Preservation Act (NHPA) Section 106 process. This State of Hawaii Department of Transportation (HDOT) project also is subject to review under Hawaii Revised Statutes (HRS) Chapter 6E-8 historic preservation review process.

This AIS report was completed in support of replacement of the Hīlea Bridge, which is a HDOT and FHWA/CFLHD partnership project. It is one of a number of such proposed bridge improvement and replacement projects in the State of Hawai'i. The replacement bridge would match other new bridges on the highway, and would have an expanded width to accommodate two 11-foot wide lanes and 9-foot wide shoulders. Ground disturbance will include excavations for the removal of the existing bridge, and construction of the new bridge structure.

The AIS fieldwork involved a pedestrian survey and newly identified a single historic property: the Hīlea Bridge. This bridge was originally built in 1940 and is one of the few remaining wooden bridge designs. The Hīlea Bridge was designated during the current AIS project as Site 50-10-74-30298. The State Historic Bridge Inventory Evaluation (MKE Associates LLC/Fung Associates, Inc.) identified Hīlea Bridge as being eligible for listing on the

National Register of Historic Places (NRHP). Furthermore, Ruzicka (2016) determined that Hīlea Bridge is eligible for listing under Criterion C (embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value).

The AIS report assessed Hīlea Bridge as significant under Criterion "c" under Hawaii Administrative Rules (HAR) §13-275-6 and concurred with the Ruzicka (2016) survey results which indicate the bridge retains integrity of location, setting, feeling and association. Integrity of design, materials, workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact.

Two previous archaeological reconnaissance surveys have included portions of the current project APE (Mann 1976, Clark and Rechtman 2013). Both identified archaeological historic properties in the vicinity, but none within the current APE. The Māmalahoa Highway (Site 50-10-47-30187) was newly identified as a historic property within the APE. Site 30187 was previously assessed as significant by Clark et al. (2014:81), pursuant to HAR §13-284-6, under Criteria A and D [sic, Criteria a and d]. This historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association, and is evaluated as eligible for inclusion on the NRHP (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). Additionally, Site 30187 is evaluated as eligible for listing on the Hawai'i Register of Historic Places (per HAR §13-198-8) under Criteria A and D.

The significance assessment and evaluation of evaluation of eligibility is based on the highway's association with "important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity" (Clark et al. 2014:81). Portions of the highway were constructed atop an ancient trail (Site 50-10-27-00002), portions were built as part of the "Old Government Road" and portions were built as a by-pass to the "Old Government Road." The portion of the highway within the current APE is part of the by-pass; Site 00002 and the "Old Government Road" do not occur within the APE.

The AIS report provides an effect determination recommendation of "adverse effect" under NHPA Section 106 and "effect with proposed mitigation commitments" under HAR §13-275-7. The proposed project would have an adverse effect on the Hīlea Bridge (Site 50-10-74-30298). However, the portion of the Māmalahoa Highway (Site 50-10-47-30187) within the APE would not be adversely affected by the proposed project. The integrity and significance of the highway would not be diminished, the alignment would remain unchanged, and the road surface would be replaced in-kind where impacted by project work.

The proposed HAR §13-275-7 mitigation commitments include data recovery in the form of archaeological monitoring for all ground disturbing activities, and architectural recordation is recommended for Site 50-10-74-30298 in the form of Historic American Engineering Record (HAER) Level II documentation. In addition, temporary orange construction fencing would be installed as a precautionary interim protection measure to ensure the project does not impact two archaeological sites (H1-40 and HN-55), outside but proximate to the project APE.

The revisions adequately address the issues and concerns identified in consultation meetings and earlier correspondence. The SHPD has reviewed the submittal pursuant to Hawaii 6E-8, and the State Historic Preservation Officer (SHPO) **concurs** with the site significance assessments (per HAR §13-275-6), eligibility recommendations (per 36 CFR 60.4 and HAR §13-198-8), project effect determination recommendations, and HAR §13-275-7 proposed mitigation commitments. The report meets the requirements of HAR §13-276-5 and the Secretary of the Interior's Standards for Archaeological Documentation. **It is accepted**. Please send two hardcopies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version, to the Kapolei Office, attention SHPD Library.

The SHPO looks forward to receiving FHWA's effect determination pursuant to 36 CFR 800.5. If the FHWA determines that the proposed undertaking will result in an "adverse effect" then the SHPO will consult with FHWA on the development of a Memorandum of Agreement (MOA) to resolve any adverse effects.

Please contact Jessica Puff, Architectural Historian, at (808) 692-8023 or at Jessica.L.Puff@hawaii.gov for questions regarding architectural resources. Please contact Susan A. Lebo, Archaeology Branch Chief, at (808) 692-8019 or at Susan.A.Lebo@hawaii.gov for questions regarding archaeological resources or this letter, or if there is a change in the APE or the scope of work of this project.

Aloha,

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: David Shideler, Cultural Surveys Hawaii (dshideler@culturalsurveys.com)
Michael Will, FHWA (Michael.Will@dot.gov)

Final

Archaeological Inventory Survey Report for the Hīlea Bridge Replacement Project, Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, Federal Highway Administration/ Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-13-R-00027 TMKs: [3] 9-5-017: 007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way

Prepared for
CH2M HILL
and on behalf of the
Federal Highway Administration (FHWA)
Central Federal Lands Highway Division (CFLHD)

Prepared by
Scott A. Belluomini, B.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: HILEA 2)

February 2017

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Management Summary

Reference	Archaeological Inventory Survey Report for the Hīlea Bridge Replacement Project, Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-13-R-00027 TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way (Belluomini and Hammatt 2017)
Date	February 2017
Project Number(s)	• FHWA/CFLHD Contract DTFH68-13-R-00027 • CH2MHILL Project Task ID: 499069.10SU.CS • Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: HILEA 2
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological permit number 15-03, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-13-282.
Agencies	FHWA/CFLHD, SHPD
Land Jurisdiction	State Department of Transportation (HDOT)
Project Proponent	FHWA/CFLHD, HDOT
Project Funding	FHWA/CFLHD, HDOT
Project Location	The project area is located in the immediate vicinity of Hīlea Bridge on Highway 11 (Māmalahoa Highway) within Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island. The project area is depicted on a 1982 Punaluu U.S. Geological Survey (USGS) topographic quadrangle.
Project Description	The purpose of the project is to replace the existing timber bridge and its approaches to meet current design standards for roadway width, load capacity, bridge railing, and transitions. The existing deficient bridge was built in 1940 and does not accommodate the current roadway width or current bridge standards. It does not meet current live load and seismic requirements. The bridge railings and approaches do not meet current crash tested requirements. The replacement bridge would be modern and match other new bridges on the state highway. It would be wider than the existing bridge, to accommodate two 11-foot wide lanes and 9-foot wide shoulders. The concrete post and beam bridge railings would be 2 feet 8 inches high, capped with a 10-inch high metal railing, for a total height of 3 feet 6 inches for bicycle safety. Concrete end posts with metal railings would be installed. These railings would be similar to the railings on the Keaiwa Stream Bridge, which is located on Highway 11 approximately five miles north of Hīlea Bridge.
Project Acreage	The project area comprises approximately 3.5 acres (1.4 hectares).

Area of Potential Effect (APE)	The APE for the current project is defined as the entire 3.5-acre (1.4 hectare) project area.
Historic Preservation Regulatory Context	This AIS investigation was designed to be compliant with both Federal and Hawai‘i State environmental and historic preservation review legislation. Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and, due to funding from the U.S. Department of Transportation, Section 4(f) of the Department of Transportation Act. The proposed project is also subject to Hawai‘i State environmental and historic preservation review legislation, including Hawai‘i Revised Statutes (HRS) §343 and §6E-8, and with Hawaii Administrative Rules (HAR) §13-275 and §13-276. In consultation with the SHPD, this AIS investigation fulfills the requirements of HAR §13-276 and the Secretary of the Interior’s Standards for Archaeology and Historic Preservation. It was conducted to identify, document, and to make site significance assessments (per HAR §13-276-6) and also to evaluate eligibility for inclusion on the National Register of Historic Places (National Register) for significant historic properties within the project APE (per 36 CFR 60.4) and for the Hawai‘i Register of Historic Places (Hawai‘i Register) (per HAR§13-198-8). This report is also intended to support any project-related historic preservation consultation with stakeholders, such as State and County agencies and interested Native Hawaiian Organizations (NHOs) and community groups, as required. A companion architectural study (Ruzicka 2016) was conducted in conjunction with this AISR. An SHPD “Historic Resource Inventory Form–Reconnaissance Level” was completed for the Hīlea Bridge to make a determination of its eligibility for the Hawai‘i and National Registers of Historic Places. This study includes a condition assessment, narrative description, historical context discussion, and significance statement and references historic drawings consulted. The architectural study has been incorporated into the present AIS document as Appendix A. Two previous archaeological reconnaissance-level studies have been conducted that include portions of the current project APE. A reconnaissance survey conducted by Mann (1976) within portions of Hīlea and Ka‘alāiki identified several house sites as well as petroglyphs in the vicinity of the project APE. An archaeological reconnaissance of the County of Hawai‘i Kāwā property conducted by Clark and Rechtman (2013) identified many sites (not currently designated as historic properties) in the vicinity of the current project APE. No historic properties listed in the State Inventory of Historic Places (SIHP) have been previously documented within the project APE. The Hīlea Bridge

	was previously documented (by MKE Associates LLC/Fung Associates, Inc. 2013) in the State Historic Bridge Inventory & Evaluation as Bridge # 001000110306489. Māmalahoa Highway (SIHP # 50-10-47-30187) extends through the project APE.
Fieldwork Effort	Fieldwork was accomplished on 17 June 2015 by Scott Belluomini, B.A. and Nifae Hunkin, B.A., under the general supervision of Principal Investigator, Hallett H. Hammatt, Ph.D. This work required approximately 2 person-days to complete.
Consultation	The Hīlea Bridge Replacement project is part of a HDOT and FHWA/CFLHD partnership project. It is one of a number of proposed bridge improvement and replacement projects in the State of Hawai‘i. Presently, National Historic Preservation Act Section 106 consultation with community, agency, and Native Hawaiian Organizations has been initiated. The National Historic Preservation Act Section 106 consultation process is ongoing. Cultural consultation is also being conducted by CSH in the form of a cultural impact assessment (CIA) for Hīlea Bridge and the nearby Nīnole Bridge (Liborio et al. 2016).
Historic Properties Identified, Significance Assessments and Eligibility Determinations	Two historic properties are present within the project APE: SIHP # 50-10-47-30187, Māmalahoa Highway, was previously assessed as significant by Clark et al. (2014:81) under HAR “§13-284-6” under Criterion “A” for its being associated with events and Criterion “D” for its information potential. It is the understanding of this study that the Clark et al. (2014) assessment of significance was intended for significance under Criteria a and d. Pursuant to HAR §13-275-6, SIHP # 50-10-47-30187, Māmalahoa Highway, is assessed as significant under Criterion a (Be associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (Have yielded, or is likely to yield, information important for research on prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. SIHP # 50-10-47-30187, is evaluated as eligible for inclusion in the National Register (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). SIHP # 50-10-47-30187, is evaluated as eligible for listing on the Hawai‘i Register (per HAR §13-198-8) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). This assessment of significance and evaluation of eligibility is based on the historic properties association with “important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity” (Clark et al. 2014:81).

	SIHP # 50-10-74-30298 is Hīlea Bridge (previously assessed for eligibility for inclusion in the National Register and/or Hawai‘i Register as Bridge # 001000110306489 by MKE Associates LLC and Fung Associates, Inc. (2013), but not given an SIHP number). It is assessed under HAR §13-275-6, in consultation with Mason Architects, Inc. (Ruzicka 2016), as significant under Criterion c (embodies the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value). It retains integrity of location, setting, feeling and association. Integrity of design, materials, workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact. SIHP # 50-10-74-30298 was recommended by Ruzicka (2016) as eligible for inclusion on the National Register (per 36 CFR 60.4) and the Hawai‘i Register (per HAR §13-198-8) due to its significance under Criterion C ("that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction") and its level of integrity, as described above. This eligibility recommendation is consistent with the previous evaluation of Hīlea Bridge (MKE Associates LLC and Fung Associates, Inc. 2013).
Effect Recommendation	In accordance with Federal regulations (36 CFR 800.5), the project-specific effect recommendation is "adverse effect." Under Hawai‘i State historic preservation review legislation, the project's effect recommendation is "effect, with proposed mitigation commitments" (in accordance with HAR §13-13-275-7). The proposed project will have an adverse effect on the Hīlea Bridge (SIHP # 50-10-74-30298). The portion of the Māmalahoa Highway (SIHP # 50-10-47-30187) apart from the portion extending over the Hīlea Bridge will not be adversely affected by the proposed project. The integrity and significance of the highway will not be diminished.
Mitigation Recommendations	Architectural recordation is recommended for SIHP # 50-10-74-30298 in the form of Historic American Engineering Record (HAER) Level II documentation. No further archaeological work is recommended for the Māmalahoa Highway (SIHP # 50-10-47-30187). Although the archaeological sites designated HI-40 and HN-55 are outside the area of potential effect, SHPD recommended a temporary orange construction fence to be installed as an interim protection measure for these two archaeological sites. At the request of the project proponent, precautionary archaeological monitoring is planned as a good faith effort, based on community consultation.

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Section 1 Introduction

1.1 Project Background

At the request of CH2M HILL and on behalf of the Federal Highways Administration (FHWA) Central Federal Lands Highway Division (CFLHD), Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this archaeological inventory survey report (AISR) for the Hīlea Bridge Replacement project, Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, FHWA/ CFLHD contract DTFH68-13-R-00027, TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way. The project area is located in the immediate vicinity of Hīlea Bridge on Highway 11 (Māmalahoa Highway) and includes 3.5 acres (1.4 hectares). The project's area of potential effect (APE) is defined as the entire 3.5-acre (1.4-hectare) project area and is depicted on portions of the 1995 Naalehu and 1982 Punaluu U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and an aerial photograph (Figure 3).

The purpose of the project is to replace the existing timber bridge and its approaches to meet current design standards for roadway width, load capacity, bridge railing, and transitions. The existing deficient bridge was built in 1940 and does not accommodate the current roadway width or current bridge standards. It does not meet current live load and seismic requirements. The bridge railings and approaches do not meet current crash tested requirements.

The replacement bridge would be modern and match other new bridges on the state highway. It would be wider than the existing bridge, to accommodate two 11-foot wide lanes and 9-foot wide shoulders. The concrete post and beam bridge railings would be 2 feet 8 inches high, capped with a 10-inch high metal railing, for a total height of 3 feet 6 inches for bicycle safety. Concrete end posts with metal railings would be installed. These railings would be similar to the railings on the Keaiwa Stream Bridge, located on Highway 11 approximately five miles north of Hīlea Bridge.

1.2 Historic Preservation Regulatory Context

This AIS investigation was designed to be compliant with Federal and Hawai‘i State environmental and historic preservation review legislation. Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and, due to funding from the U.S. Department of Transportation, Section 4(f) of the Department of Transportation Act. The proposed project is subject to Hawai‘i State environmental and historic preservation review legislation (Hawai‘i Revised Statutes [HRS] §343, HRS §6E-8 and Hawai‘i Administrative Rules [HAR] §13-275 and §13-276).

This AIS investigation fulfills the requirements of HAR §13-276 and the *Secretary of the Interior's Standards for Archaeology and Historic Preservation*. It was conducted to identify, document, and make site significance assessments per HAR §13-276-6 and also to evaluate eligibility for inclusion on the National Register of Historic Places (National Register) and for the Hawai‘i Register of Historic Places (Hawai‘i Register) for all significant historic properties within the project area/APE. This report is also intended to support any project-related historic preservation consultation with stakeholders, such as State and County agencies and interested Native Hawaiian Organizations (NHOs) and community groups, as required.

Figure 1. Portion of the 1995 Naalehu and 1982 Punaluu USGS 7.5-minute topographic quadrangles showing the location of the project APE

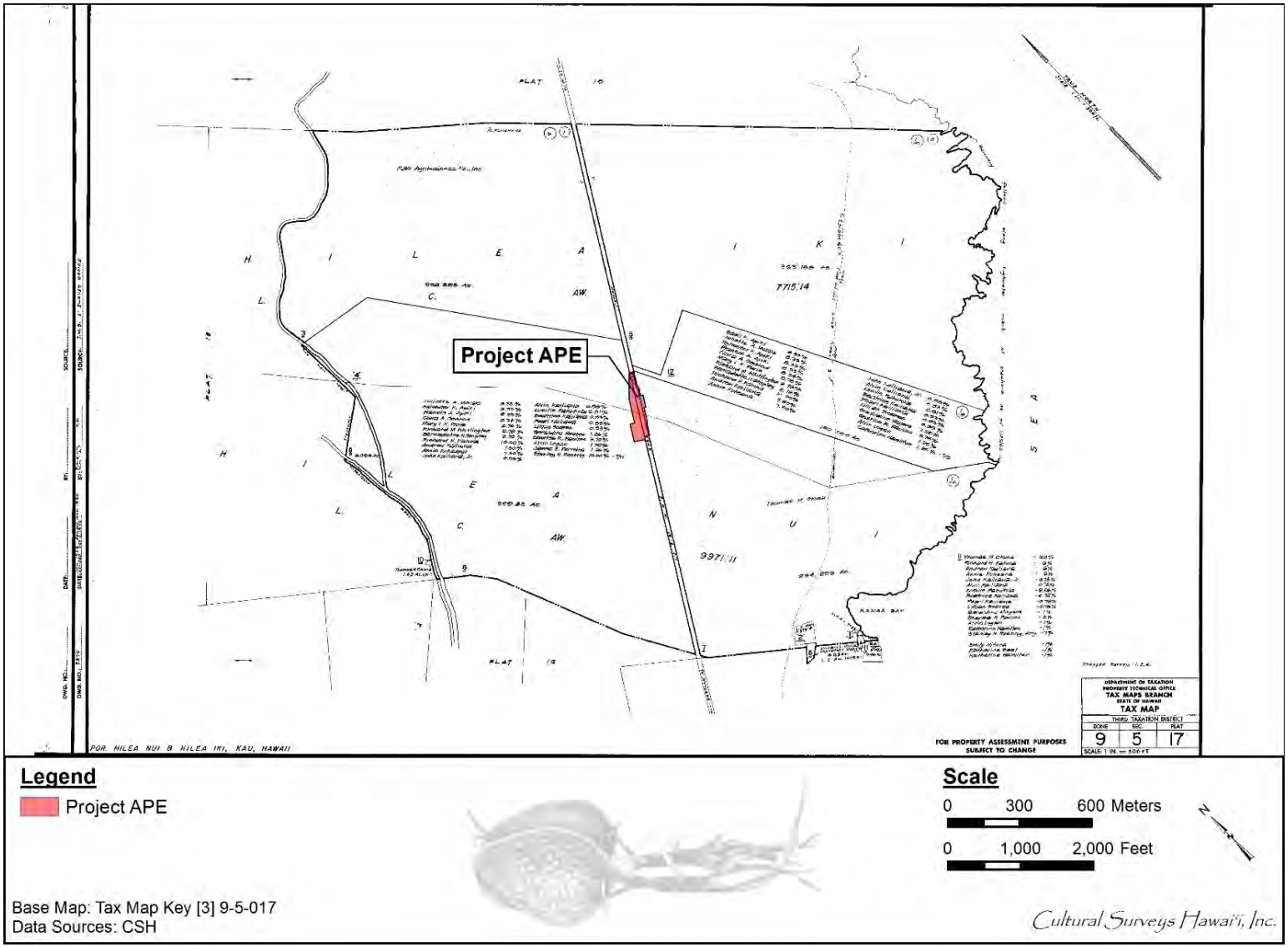

Figure 2. Tax Map Key (TMK) [3] 9-5-017 showing the location of the project APE (Hawai‘i TMK Service 2014)

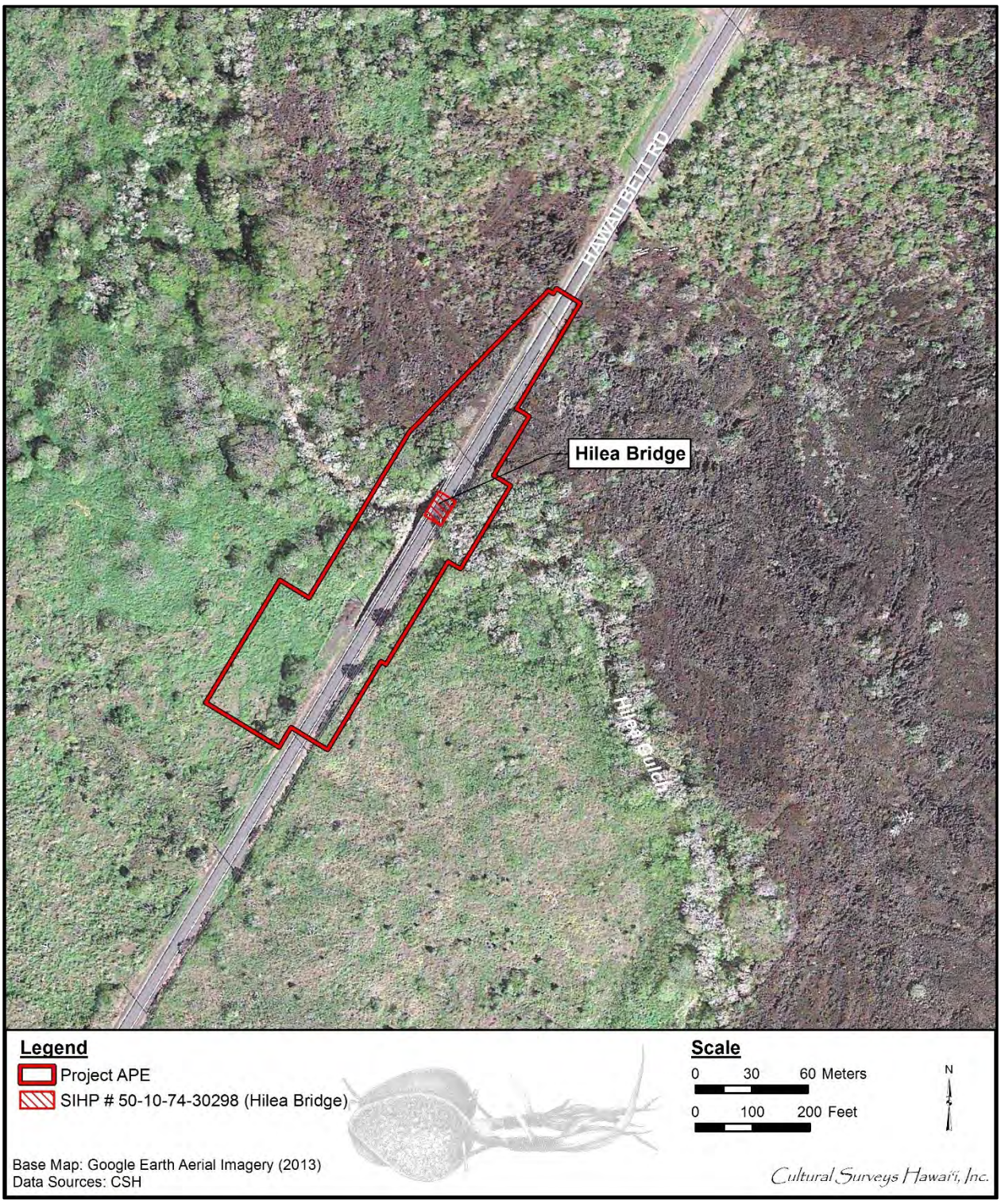

Figure 3. 2013 aerial photograph showing the location of the project APE and the location of Hīlea Bridge (Google Earth 2013)

A companion architectural study (Ruzicka 2016) was conducted in conjunction with this AISR. An SHPD "Historic Resource Inventory Form–Reconnaissance Level" was prepared to make a determination of eligibility for potential historic properties. This study includes a condition assessment, narrative description, historical context discussion, and significance statement and references historic drawings consulted. The architectural study has been incorporated into the present AIS document as Appendix A.

Two previous archaeological reconnaissance-level studies have been conducted that include portions of the current project APE. A reconnaissance survey conducted by Mann (1976) within portions of Hīlea and Ka‘alāiki identified several house sites as well as petroglyphs in the vicinity of the project APE. An archaeological reconnaissance of the County of Hawai‘i Kāwā property conducted by Clark and Rechtman (2013) identified many sites (not currently designated as historic properties) in the vicinity of the current project APE. No historic properties previously designated with an SIHP number are within the current project APE. The Hīlea Bridge was previously documented (by MKE Associates LLC/Fung Associates, Inc. 2013) in the State Historic Bridge Inventory & Evaluation as Bridge # 001000110306489. Māmalahoa Highway extends through the project APE.

1.3 Environmental Setting

1.3.1 Natural Environment

The project APE is located at approximately 150 foot elevation on the southeast slope of Mauna Loa and spans at least two different lava flows (Figure 4). Geologic substrate within the southwestern portion of the project APE consists of Qk1y, Kau Basalt, dating from 3,000 to 5,000 years before present. Geologic substrate within the northeastern portion of the project APE consists of a more recent Qk4, Kau Basalt, deposit dating from 200 to 750 years before present. This relatively new northeastern lava flow is evident on a modern aerial photograph (see Figure 3). At the boundary of these two types of geologic substrate is the narrow Hīlea Gulch, in which Hīlea Stream flows south toward Kāwā Bay where it meets the Pacific Ocean

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Sato et al. (1973), soils within the project APE reflect this volcanic history with *‘a‘ā* lava flows (rLV) in the northeast half of the project APE and *pāhoehoe* (rLW) in the southwest half (Figure 5).

Lava flows, *‘a‘ā* (rLV) are described as follows:

> This lava has practically no soil covering and is bare of vegetation, except for mosses, lichens, ferns, and a few small ohia trees. It is at an elevation ranging from near sea level to 13,000 feet and receives from 10 to 250 inches of rainfall annually. [Sato et al. 1973:34]

Lava flows, *pāhoehoe* (rLW) are described as follows:

> This lava has a billowy, glassy surface that is relatively smooth. In some areas, however, the surface is rough and broken, and there are hummocks and pressure domes. Pahoehoe lava has no soil covering and is typically bare of vegetation except for mosses and lichens. In the areas of higher rainfall, however, scattered ohia trees, ohelo berry, and aalii have gained a foothold in cracks and crevices. [Sato et al. 1973:34]

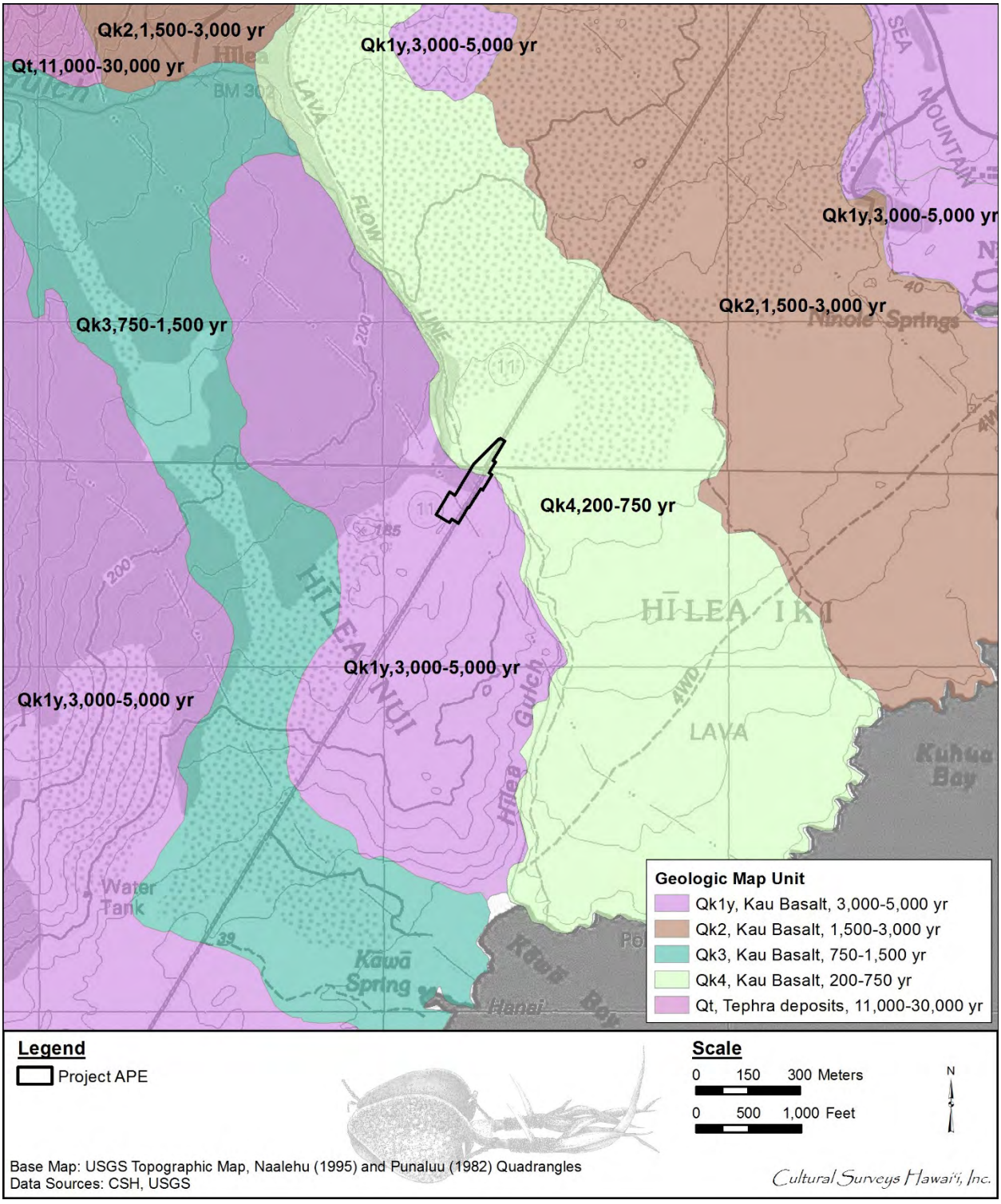

Figure 4. Portion of the 1995 Naalehu and 1982 Punaluu USGS topographic quadrangles, with overlay of geological substrate within and surrounding the project APE

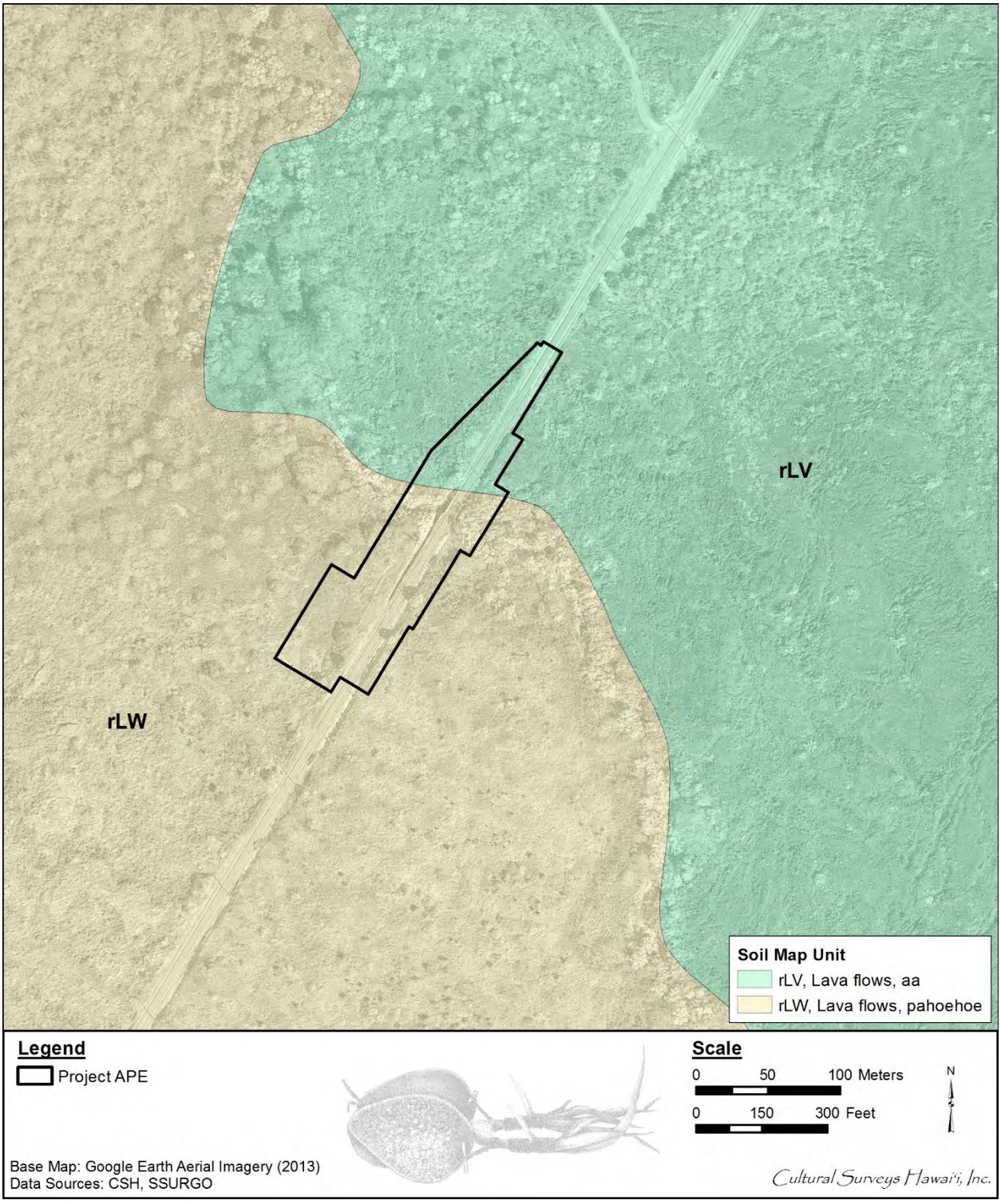

Figure 5. Overlay of *Soil Survey of the State of Hawaii* (Sato et al. 1973) on a 2013 Google Earth aerial photograph, indicating soil types within and surrounding the project APE (USDA SSURGO 2001)

The project APE receives approximately 975-1,000 mm (38-40 inches) of annual rainfall, with increased rainfall at higher elevations (Giambelluca et al. 2013). Average monthly air temperatures range between 70.4˚ and 77.5˚ F in the project APE (Giambelluca et al. 2014). Vegetation in the project APE includes exotic grasses, *koa haole* (*Leucaena leucocephala*), *kukui* (*Aleurites moluccanus*), monkey pod (*Albizia saman*) and Christmas berry (*Schinus terebinthifolia*).

1.3.2 Built Environment

The project APE is almost entirely disturbed and developed; it includes a portion of Highway 11 (Māmalahoa Highway) and Hīlea Bridge, a timber stringer bridge constructed in 1940. The roadway is located within a deep cut in the Qk4 basalt, crossing Hīlea Gulch and Hīlea Bridge, and continuing southwest in an area that has been graded, often lower than the surrounding ground level. A portion of the project area, which will be used for equipment and supply storage, is open land used for cattle grazing.

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of this AIS under archaeological permit number 15-03, issued by the SHPD pursuant to HAR §13-13-282. Fieldwork was accomplished on 17 June 2015 by Scott Belluomini, B.A., and Nifae Hunkin, B.A., under the general supervision of Principal Investigator, Hallett H. Hammatt, Ph.D. This work required approximately 2 person-days to complete.

In general, fieldwork included 100% pedestrian inspection of the project APE and GPS data collection.

2.1.1 Pedestrian Survey

A 100%-coverage pedestrian inspection of the project APE was undertaken for the purpose of historic property identification, documentation, significance assessment, and evaluation of eligibility for inclusion in the Hawai‘i and National Registers of Historic Places. The pedestrian survey was accomplished through systematic sweeps spaced 5 m apart.

2.1.1 GPS Data Collection

Historic properties were located with GPS points taken at the corners of the historic properties using a Trimble Pro XH mapping grade GPS unit with a real-time differential correction. This unit provided sub-meter horizontal accuracy in the field. GPS field data was post-processed, yielding horizontal accuracy between 0.5 and 0.3 m. GPS location information was converted into GIS shape files using Trimble’s Pathfinder Office software, version 2.80, and graphically displayed using ESRI’s ArcGIS 10.3.

2.2 Laboratory Methods

No cultural material was collected during the AIS. No laboratory analysis was conducted. All data generated during the course of the AIS are stored at the CSH offices.

2.3 Research Methods

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 at Mānoa, 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 were examined from the Waihona ‘Aina database (Waihona ‘Aina 2000).

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

2.4 **Consultation Methods**

The Hīlea Bridge Replacement project is part of a HDOT and FHWA/CFLHD partnership project. It is one of a number of proposed bridge improvement and replacement projects in the State of Hawai‘i. Presently, National Historic Preservation Act Section 106 consultation with community, agency, and Native Hawaiian Organizations has been initiated. The National Historic Preservation Act Section 106 consultation process is ongoing and will continue until the completion of the Section 106 historic preservation review process. Cultural consultation is also being conducted by CSH in the form of a cultural impact assessment (CIA) for Hīlea Bridge and the nearby Ninole Bridge (Liborio et al. 2016).

Section 3 Background Research

3.1 Mythological and Traditional Accounts

3.1.1 Chief Kohaikalani

Hīlea was the locus of a story of Koha, a famous abusive chief, and of an uprising against him:

> Hilea in Ka‘u was the birthplace of Koha-i-ka-lani. As it was the custom in the olden days to worship fishes, birds, stones, or wood, Koha wished to have a wooden god to worship. Koha was living in the upland of Hilea. There were many houses in this place and life there, in olden times, was pleasant.
>
> The houses stood on ground composed only of earth. The chief desired much to have (his god) made of a big log and have it erected on Makanau hill, close to the village of upper Hilea. He ordered his kahuna [priest/advisor] to ascend with the men to cut the wood and the size of log that he desired was four fathoms in length and girded by three men. Because the kahuna heard the words, they replied, ‘O Chief, if that is your wish here is a large tree near by that only requires cutting. It has a hard wood like the kauila which would not rot when buried in the earth.’ Koha asked, ‘What kind of tree is it?’
>
> ‘Here is a breadfruit tree with the size desired by the chief.’ The chief approved of this, ‘Yes, that is good.’ Then a large breadfruit tree, five fathoms long and could be girded by three men, was cut down, a tree the size desired by the chief.
>
> The breadfruit log was hauled up to the foot of Makanau hill and there it was left. There was one thing that needed doing and that was to carve one end of the breadfruit into an image of a man. Orders were given to the wood carvers and they made it look like a man. After the carvers had finished their work, then it was ready to pull up to the top of Makanau hill where it was erected. Many men climbed to the top of the hill to pull it upward.
>
> Many of the men struggled to lift up the lower end of the log, the chief was among them. This they did all day long and all week. It took a very long time, but it did not budge to move upward. The people were tired and bored with the needless task of the chief’s. They had no time to do their own work, for they were occupied with this wearisome useless work. Therefore, the men who worked below at lifting the log and some of those on the hill met and plotted to put an end to this wearisome task. ‘Tomorrow we shall tell the chief to go directly below the log so that he could plead with his image.’ This was agreed to by those at the foot and at the top of the hill. ‘When you pull the image upward till it gets above the heads of all of those who are lifting, just as it does every day as we work, then you let go. We will tell the chief to get directly under the log.’ In the morning the men gathered where the wooden image was. Those at the top of the hill assembled there and those at the bottom of the hill went there. Then the man who gave the orders to pull, called out to pull the log upward.

> The men on the hill pulled and those below lifted, but it did not rise any higher; it was just as it was before. Some of the men at the foot of the hill said, ‘O chief, today you go directly under the other end of your god and lift it up. It is strange that it would not move. What do you think of this idea?’ ‘It is good.’ The chief went under the end of the log. The people above pulled and those below lifted. Every person below was eager to have the log higher than their heads. Then the call came, ‘Mokua ke kaula’ [Cut the rope]. This was the signal to pull the log up and let it go. The log was pulled up and then it was released. So it was that Koha met his death. This deed of the men of Ka‘u earned for them the name of Makaha (destroyers). This district, Ka‘u, became renowned as Ka‘u Makaha. [Hawaiian Ethnographic Notes, n.d.]

3.1.2 The Uplands of Ka‘ū

A particularly notable landform in the uplands of Ka‘ū is Pu‘u‘enuhe or “cut-wormhill” located within Punalu‘u. Martha Beckwith gives a succinct account of the story, but places Pu‘u‘enuhe in neighboring Hīlea Ahupua‘a:

> Kumu-hea (or *Mo‘o*), son of the god Kū, lives in the hill Pu‘u‘enuhe at Hi‘ilea [Hīlea] in Ka‘ū District and is the god *(‘aumakua*) of the cutworm. He marries a girl but comes to her only at night, for by day he is a worm (or *mo‘o*). He does not support her. With the advice of her parents she ties a hemp string to his back and when he leaves her she follows him to the hill and discovers his true nature. He is angry. Cutworms attack the crop. The parents appeal to Kāne, who cuts up the god; and hence the small *pe‘elua* cutworms (or lizards) of today, which Hawaiians fear to injure. [Beckwith 1970:135]

The uplands of Ka‘ū were traditionally the domain of Kaneikawaiola (Kane-of-the-water-of-life). According to Handy and Pukui (1972) in *The Polynesian Family System in Ka‘ū,* the gods Kuka‘ilimoku—with a *heiau* (temple) dedicated to him that once stood in Hīlea Ahupua’a—and Pele were powerful gods in Ka‘ū, however Kaneikawaiola remained dominant:

> Gone is the land-grabbing, vengeful war god, Ku-ka-‘ili-moku. The rocks of his last temple have been rudely thrust aside by a bulldozer to make more ground for open furrows. From its site on the crest of Makanau hill one looks out on thousands of rolling acres of flourishing cane, on peace, and plenitude nourished by “waters of life” from springs and from clouds over the flank of Mauna Loa. In this favoured locality Kane, the male procreator and god of peace, is lord.
>
> Even fiery Pele the Earth-shaker has not in any recent geologic time been able to threaten his sovereignty here, for the very conformation of these high lands, created by a vastly more ancient volcanic upheaval, has protected its wide-stretching deep-soiled terrain from the ravages of all her lava flows from Mauna Loa and Kilauea rifts and craters within historic times. Her earth-rumblings are still a gigantic force in the land; the fascination of her fiery displays and the threat of fresh desolation are never remote from the minds of Ka-‘u dwellers—exerting their potency today as of old upon the character and temper of the children of her soil, whatever their race. But it seems probable that this thriving green heart-land of tumultuous Ka-‘u will long remain Kane’s primordial domain. [Handy and Pukui 1972:252]

3.1.3 The Blind Men's Trials En Route to Punalu‘u

A traditional story of the neighboring *ahupua‘a* (land division) of Punalu‘u is the account of "Nā Makapō o Moa‘ula (The Blind Men of Moa‘ula)" (Green and Pukui 1936:144-145). In this brief account there once were two men, one of whom was totally blind (*makapō loa*) and the other of whom had very poor vision but could see a little (*‘ike iki*). They lived at Moa‘ula, in the uplands of Ka‘ū and one day they decided to go down to Punalu‘u, with the man who could see a little leading his blind companion. They traversed slowly to the edge of the Punalu‘u Stream where the blind man asked: "How is it? Is there water below (*Pehea, he wai anei ko lalo*)?" The near-sighted man replied, "Yes there is water (*‘Ae he wai*)," and was further queried, "Is there much water (*Nui anei ka wai*)?" He replied, "Yes there is much water below (*‘Ae nui ka wai o lalo*)." They both agreed to jump into the stream and when they did they both broke their legs (*a hakihaki nā wawae*). At a later time the same two companions were again making their way down to Punalu‘u and reached the inland side of the stream bank (*kahawai mauka*). The blind man asked his guide "What do you see? Is the water low (*Pehea kau ‘ike ana? Ua ‘u‘uku anei i ka wai*)?" The near-sighted man replied, "Yes, very low (*‘Ae ‘u‘uku loa*)." The blind man wanted further confirmation asking, "Is that true? Is there no water below (*He mea ‘oiā‘i‘o anei kēnā, ‘a‘ohe wai o lalo*)?" As the audience might guess, the pair went down to the full stream and were swept away (*ua piha ke kahawai i ka wai a lilo lāua*). They were seen struggling and were fetched up out of the water and then returned to the uplands. Never again did they desire to return to Punalu‘u unless they went with someone who could see.

This may just be a simple tale to amuse the audience with the tribulations of the blind that has little to do with Punalu‘u or Ka‘ū District per se. It is worth noting in passing, however, that Ka‘ū District was associated with the most famous blind person in Hawai‘i's pre-Contact traditions—the blind ruling chief I-mai-ka-lani. Possibly the association of Ka‘ū with the famous blind made Punalu‘u an appropriate setting for the story or possibly Ka‘ū District had a greater prevalence of blindness (as hereditary dispositions toward glaucoma or cataracts).

A common Hawaiian theme that may be reflected in the story is the view held by coastal people that the inhabitants of the uplands were foolish bumpkins (as exemplified in the Maui saying that "the people of the Kula uplands scale squids"). A theme specific to Punalu‘u, however, is that of the variability of the Punalu‘u watercourse. All the way along the coast from Hilo to South Point to Kawaihae there may have been no more notable streams than that of Punalu‘u that could quickly go from dry to a raging torrent. Certainly the story emphasizes the stream's variability and serves to warn those who might try to cross it. Another point not to be lost is the general indication of people who resided in the uplands making periodic trips to Punalu‘u and that there were amenities at coastal Punalu‘u that merited undertaking some risk to get there. One could also read into the story an account of the compassion of the coastal people who must have helped the blind pair when they broke their legs and who later fished them out of the stream.

3.1.4 Keouakuahu‘ula and the Moving Cinder Cone

Kamakau (1964) offers an unusual account of a moving cinder cone in the time when a column of troops of Keōua Kū‘ahu‘ula was annihilated on the flanks of Kīlauea. According to Kamakau:

> Several cinder cones were heaped up near Kīlauea at this time. One cone moved straight down toward the sea at ‘Āpua and in less than two weeks reached the sand at Punalu‘u, where Keōua Kū‘ahu‘ula was staying at the time under tabu. This

> cinder heap moved along the sand from ‘Apua to the beach at Punalu‘u where its progress was barred by the highlands at Punalu‘u, Wailau and Nīnole, and there it remains at Punalu‘u to this day. [Kamakau 1964:152]

One can easily conceive of sands from new cinder cones washing from ‘Āpua south to Punalu‘u but Kamakau seems to suggest the entire heap moved as a unit. This is supported by the most likely candidate for the Punalu‘u landform Kamakau is referring to, Pu‘ehu Hill, in that it is well inland. Kamakau relates that the ruling chief Keōua Kū‘ahu‘ula was resident at Punalu‘u at the time and it would seem likely that Punalu‘u was often the residence of ruling chiefs of Ka‘ū.

3.2 Historical and Contemporary Background

3.2.1 Early Historic Period

There are very few western accounts specific to Hīlea in the eighteenth century and few references to Ka‘ū at all. The accounts we do have are briefly summarized below. Lt. James King, sailing off the island of Hawai‘i on the 1779 voyage of Captain James Cook, summarizes Ka‘ū at the first European encounter:

> The coast of Kaoo [Ka‘ū] presents a prospect of the most horrid and dreary kind: the whole country appearing to have undergone a total change from the effects of some dreadful convulsion. The ground is everywhere covered with cinders and intersected in many places with black streaks, which seem to mark the course of a lava that has flowed, not many ages back, from the mountain Roa [Mauna Loa] to the shore. The southern promontory looks like the mere dregs of a volcano. The projecting headland is composed of broken and craggy rocks, piled irregularly on one another, and terminating in sharp points. [King 1784:104]

The only onshore exploration at Ka‘ū involved a search for fresh water:

> When [Mr. Bligh] landed, he found no stream or spring, but only rain-water, deposited in holes upon the rocks; and even that was brackish, from the spray of the sea; and that the surface of the country was entirely composed of flags and ashes, with a few plants here and there interspersed. [King 1784:545]

During Captain George Vancouver’s encounter with the island of Hawai‘i in 1792, his crew visited the Ka‘ū district. Thomas Heddington illustrated the upland village of Macacoupah (Makākupu) near present day Pāhala. The illustration shows thatched houses and extensive field systems (Figure 6).

Missionary William Ellis left Honu‘apo on the morning of 30 July 1823 heading northeast up the coast. He recorded the following account:

> After travelling some time over a wide tract of lava, in some places almost as rugged as any we had yet seen, we reached Hokukano [of Ka‘ū]. Here we found an excellent spring of fresh water, the first we had seen on our tour, though we had traveled upwards of a hundred miles. While we were stopping to drink, and rest ourselves, many natives gathered around us from the neighbourhood . . . [they stop to preach]

Figure 6. Village of Macacoupah, Owhyhee, drawn by Captain Thomas Heddington in 1792, published March 1814 (Heddington 1814)

> We traveled over another rugged tract of lava about two hundred rods wide. It had been most violently torn to pieces, and thrown up in the wildest confusion; in some places it was heaped forty or fifty feet high. The road across it was formed of large smooth round stones, placed in a line two or three feet apart. By stepping along on these stones, we passed over, though not without considerable fatigue. About half-past eleven we reached Hilea, a pleasant village belonging to the governor. As we approached it we observed a number of artificial fish-ponds, formed by excavating the earth to a depth of two or three feet, and banking up the sides. The sea is let into them occasionally, and they are generally well stocked with excellent fish of the mullet kind. We went into the house of the head man, and asked him to collect the people together, as we wished to speak to them about the true God. He sent out, and most of the people of the village, then at home, about two hundred in number, soon collected in his house, which was large . . .
>
> As we left Hilea, our guide pointed out a small hill, called Makanau, where Keoua, the last rival of Tamehameha, surrendered himself up to the warriors under Taiana . . . [the story of the subsequent assassination of Keoua is related] [Ellis 1974:207-209]:

Ellis's account confirms the upland luxuriance that had made the *ahupua‘a* of Wai‘ōhinu a center for the *ali‘i* of Ka‘ū. As Ellis continued his journey he moved closer to the coast—along the "foot of the mountains, in a line parallel with the sea, and about a mile and a half from it" (Ellis 1963:134)—and his journal illumines areas where western eyes had previously seen only a "prospect of the most horrid and dreary kind." Travelling toward Punalu‘u, Ellis found the countryside "more thickly inhabited [as his walk continued] . . . The villages along the sea shore, were near together, and some of them extensive" (Ellis 1963:136). Specific villages Ellis mentions include Honu‘apo, described as an "extensive and populous village" where more than 200 Hawaiians turned out for a sermon; Hōkūkano [Ka‘ū], possessing a freshwater spring; and Hīlea, the site of numerous fishponds and where the *konohiki* reported "hogs, fish, taro, potatoes, and bananas in abundance." Ellis also notes the intervening broad stretches of rough *‘a‘ā* between the habitation areas; these flows had been made traversable by water-worn boulder paths. Ellis thus reveals the desolate coastline described 44 years earlier by James King was in fact the site of a well-populated, organically developed, active culture and economy where habitation centers, though isolated, were accessible to each other and to the resources of land and sea.

During the 1830s, Protestant missionaries based in Kona and Hilo made occasional tours into Ka‘ū but a permanent missionary presence was not present until the early 1840s when Catholic and Protestant missions were established in the district. In 1841 a Catholic priest, Father Marechal, arrived in Ka‘ū and within a few months could boast of 900 converts. The following year, 1842, the Protestant minister John Paris settled in Wai‘ōhinu where he founded a church and school. Marion Kelly offers a good overview of the early mission work at Punalu‘u:

> In 1843, Rev. Paris reported that a stone meeting house (church) had been built at Punalu‘u and that the school's average attendance there was 140. At that time Paris preached three Sundays each month at Wai‘ōhinu and one Sunday at Punalu‘u. By 1844, he reported the Sabbath school at Punalu‘u averaged 75 to 100 students—men, women and children. The average Sunday congregation at Punalu‘u was

> reported to be 350 [Station Report, Ms. (1843, 1844)] The Rev. T.D. Hunt, who had first gone to live in Wai‘ōhinu in 1844, moved to Punalu‘u in February 1845. An increase from 70 to 150 and to 180 in the congregation there was reported at that time. [Kelly 1980:33]

Mission station reports, censuses, and accounts by visitors to Ka‘ū document the changes to the district brought about by natural forces and by the pressures of an increasing western presence. A visitor to Wai‘ōhinu and its environs in 1849 published an anonymous account describing the devastating effects of a drought and fire that had occurred three years earlier:

> [W]e noticed many a tall, stately trunk, branchless and lifeless standing monument-like, all over the country. On enquiry we ascertained that they were the remains of a noble forest, which, with the whole surrounding country, were burnt in 1846. In that year a severe drought visited the Island, the streams dried up, the grass withered, and fire swept over the whole district . . . [Kelly 1980:89]

An 1831-1832 census of Ka‘ū, the first taken within the district, records a total population of 5,800. This number already reflects the district's depopulation—the effect of newly introduced diseases, cultural unravelling and emigration to new commercial centers—but the full precipitousness of the population decline within Ka‘ū is revealed in the totals from subsequent censuses. In 1835 the total population was 4,766. The census data for the vicinity of the present project APE is somewhat obscured by the fact that Hīlea Nui was lumped in with Ka‘alāiki to the south (with a total 1835 population of 238) and Hīlea Iki was lumped in with Nīnole and Wailau to the north (with a total 1835 population of 330). The first official government census, taken in 1847, records the population as having dropped to 3,010. Reverend John Paris wrote in an 1848 mission station report: "Since the year 1845 the work of depopulation of Ka‘ū has gone on with fearful rapidity." He notes during the years 1845 and 1846 a "distressing famine" and a "fire which overran the country"—the same disasters the anonymous visitor of 1849 mentioned. Another visitor to Wai‘ōhinu during the 1840s, Chester H. Lyman, was informed that a "like burning over of nearly the whole district, producing great distress among the inhabitants" had occurred in 1830 or 1831. By the time of the 1853 government census only 2,210 people are recorded in Ka‘ū (Kelly 1980:54-55).

3.2.2 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 19858:8). This led to the Māhele, the division of lands among the king of Hawaii, the *ali‘i*, and the common people, which introduced the concept of private property into Hawaiian society. Kamehameha III divided the land into four divisions: Crown Lands to be reserved for himself and the royal house; Government Lands set aside to generate revenue for the government; Konohiki Lands claimed by *ali‘i* and their *konohiki* (supervisors); and *kuleana,* habitation and agricultural plots claimed by the common people (Chinen 1958:8–15).

The Konohiki award claimant had to pay a commutation fee of one-third of the value of their unimproved lands. Usually this fee was settled when the *ali‘i* "returned" some of his awarded lands, and "retained" others. The returned lands usually then became Government Lands or Crown Lands (Chinen 1958:8). In the petitioning for Land Commission Awards (LCAs) for their *kuleana*

(lands), the commoners had to provide testimony from witnesses, including statements regarding the boundaries of the land and its use. In 1848, the crown and the *ali‘i* received their land titles. Then individual *kuleana* (commoner) lots were awarded pursuant to the 1850 Kuleana Act.

Land Commission Awards of Kuleana Lands (awards to commoners) in the vicinity were given primarily in two clusters with the exception of LCAs to Moa, Maluae, and Keawe. According to Marion Kelly in *Majestic Ka‘u: Mo‘olelo in Nine Ahupua‘a*:

> all the rest of the kuleana within the two Hīlea ahupua‘a were grouped around the site of what later became the old Hīlea mill (1878), along the mauka [inland] road, or around the base and on top of Makanau hill. Most of the seaward portion of the two Hīlea consisted of a large aa lava flow, which stretched from Kāwā Bay to Nīnole at the coastline. [Kelly 1980:62]

No land grants or LCAs are located in the project APE or within a 0.8-km (0.5-mile) radius of the project area (Figure 7). The 1885 map of the Ka‘ū District by Brown does not show any Land Grants within Hīlea Iki and Hīlea Nui (Figure 8), but shows many land grants in the neighboring *ahupua‘a*. An 1887 Monsarrat map shows the two clusters described by Kelly (1980) in the *mauka* portions of the two *ahupua‘a*. The three LCAs near "KAWAA BAY" in the south corner of Hīlea Nui are the three that belong to Moa, Maluae and Keawe. According to the 1887 Monsarrat map, Hīlea Nui was awarded to Leleiohoku as LCA 9971:11 and Hīlea Iki was awarded to L. Kamehameha as LCA 7715:14 (Figure 9). The paucity of LCAs in this area is likely due to the lava flows that cover a large portion of this area.

3.2.3 The Great Ka‘ū Earthquake of 1868

A volcanic eruption from Mauna Loa caused much devastation in Ka‘ū in 1868. The initial eruptions began in late March and "destroyed a large stone church at Kahuku, and also all the stone dwelling houses in that place, including the houses . . . at the foot of the mountain" (Coan 1868: 106). In early April another eruption occurred. Fredrick S. Lyman, who witnessed the eruption first hand, wrote the following:

> Soon after four o'clock p.m. on Thursday we experienced a most fearful earthquake. First the earth swayed to and fro from north to south, then from east to west, then round and round, up and down, and finally in every imaginable direction, for several minutes, everything crashing around, and the trees thrashing as if torn by a hurricane, and there was a sound as of a mighty rushing wind. It was impossible to stand: we had to sit on the ground, bracing with hands and feet to keep from being rolled over . . . we saw . . . an immense torrent of molten lava, which rushed across the plain below . . . swallowing everything in its way;—trees, houses, cattle, horses, goats, and men, all overwhelmed in an instant. This devouring current passed over a distance of about three miles in as many minutes, and then ceased. [*Hawaiian Gazette* 1868:109]

A tsunami was generated within minutes of the initial quake extending as far as 150 yards inland (Sinoto and Kelly 1970:51). Coan (1868:316) reported that the wave destroyed 108 houses in Ka‘ū and drowned 46 people. However, Mann and Bowen (1976) state that other reports claim 201 houses were destroyed, 77 lives lost, and nearly 4,000 animals killed. A 29 April 1868 letter from the School Inspector-General published in the *Hawaiian Gazette* states that the village of Kāwā in Hīlea was destroyed, causing many to move inland. Frederick Lyman, after seeing the devastation,

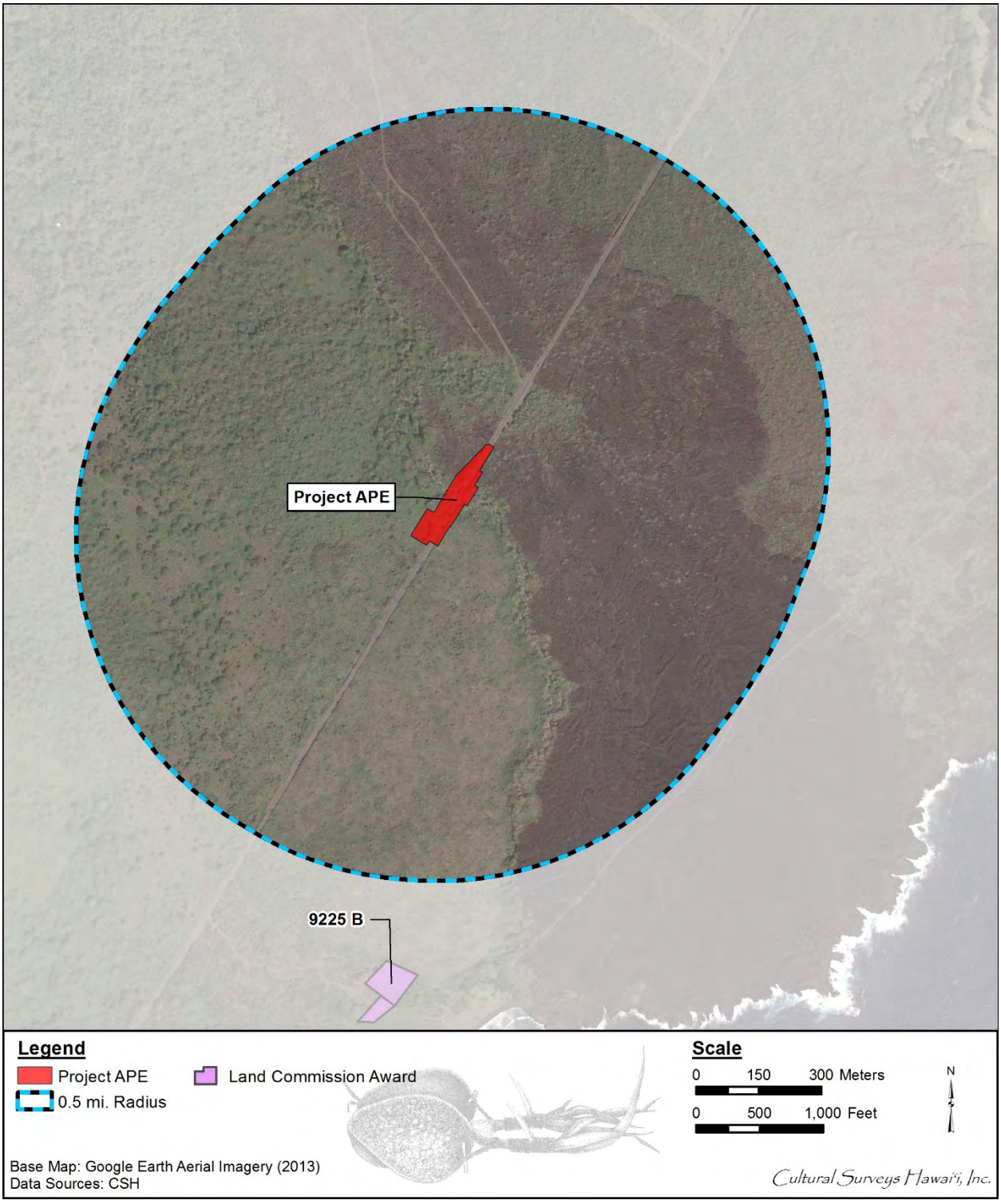

Figure 7. LCAs within a 0.8 km (0.5 mile) radius of the project APE

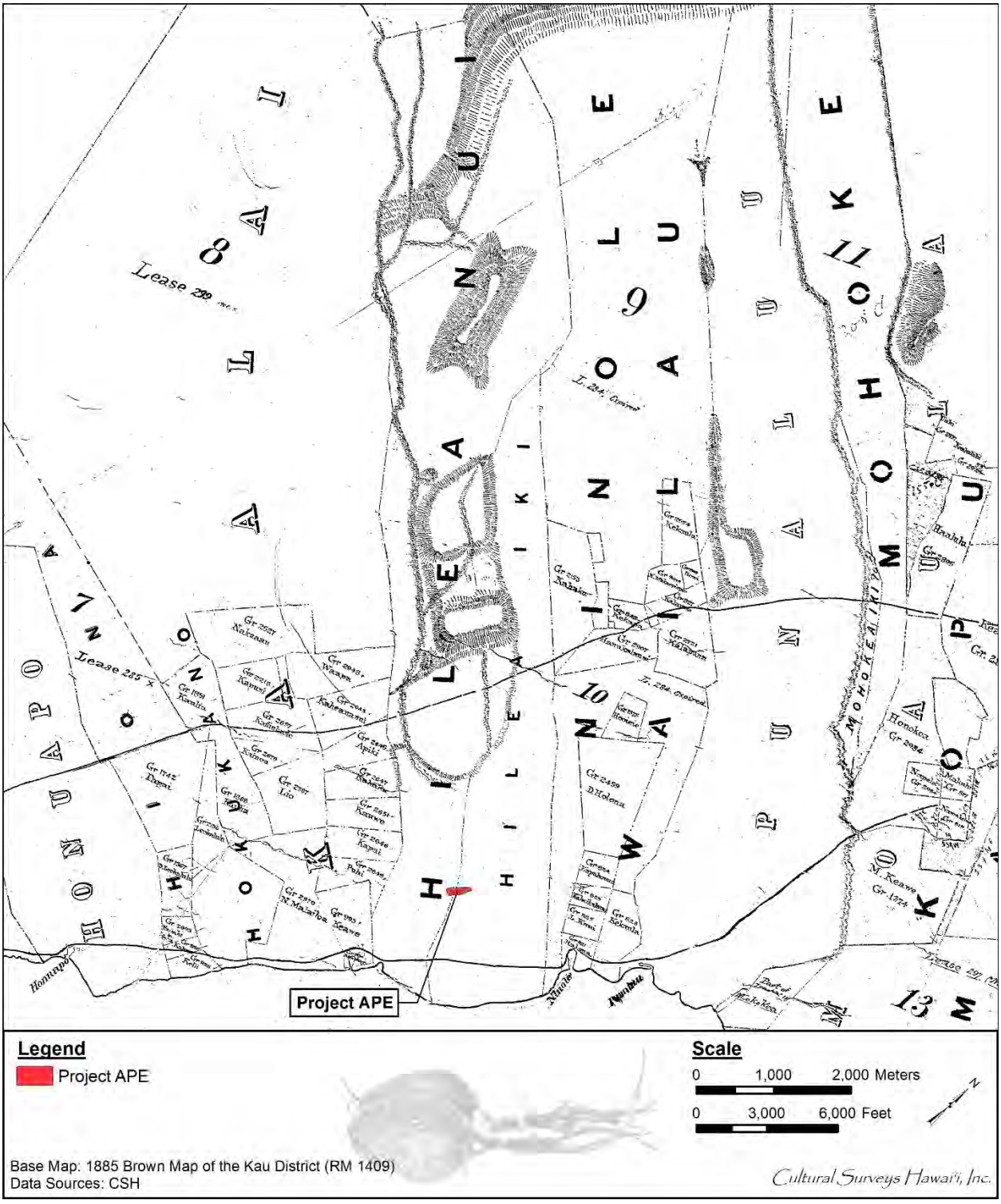

Figure 8. Portion of an 1885 map of the Ka‘ū District by J.F. Brown showing no land grants within the *ahupua‘a* of Hīlea Iki and Hīlea Nui

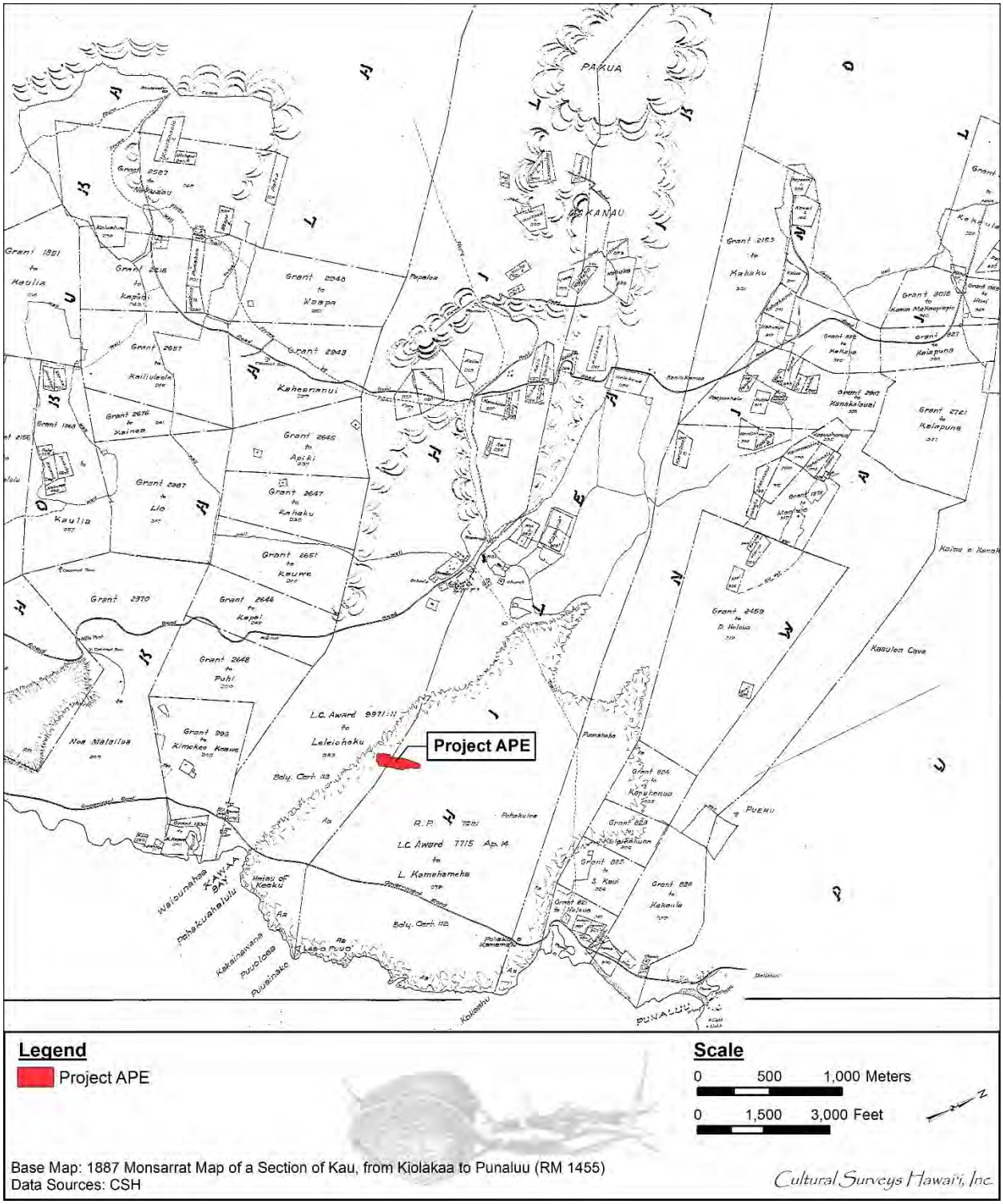

Figure 9. Portion of the 1887 Monsarrat map of a Section of Ka‘ū from Kiolaka‘a to Punalu‘u showing LCAs within Hīlea Iki and Hīlea Nui and many land grants in neighboring ahupua‘a

reported that “the villages on the shore were swept away by the great wave that rushed upon the land immediately after the earthquake. The eruption of earth destroyed thirty-one lives, but the waves swallowed a great number” (*Hawaiian Gazette* 1868:110). A massive landslide also occurred in Hīlea as a result of the eruptions. “This earthly eruption is said to be four to fifteen feet deep, and the disgorgement was so rapid that thirty people . . . were crushed, and all the houses of the village buried from sight” (Coan 1868). A report by William Hillebrand in the *Hawaiian Gazette*, 6 May 1868 states:

> From the upper road from Kapapala to Waiohinu (the lower road has been rendered impassable by the encroachments of the sea), several minor land slides were observed on the hills; most houses were injured more or less; no stonewall remained anywhere. All the people from near the beach had taken refuge on higher lands near the upper road. My professional services were called for by many people who had been injured by the great oceanic earthquake waves. The great wave rose to a height of 25 feet, and according to reliable information, portions of the coast-line have subsided considerably. In some places cocoanut trees formerly out of water are now a foot deep in the sea. Every village along the coast of Kau and part of Puna has been swept away. The whole population of Waiohinu I found encamped on a high hill to the east among the ferns. From two to three hundred people had lived there for two weeks under the scanty shelter of huts made of mats, fern and ki leaves, and could not find it in their hearts to return to their houses and field. Their crops, which before had already suffered from long continued drought, were being invaded by the cattle, no fences remaining to protect them. It is much to be feared that the calamity of a famine will visit the smitten district in addition to the disaster suffered already. [Hillebrand 1868]

3.2.4 The Sugar Industry in Ka‘ū

Apparently great natural disasters could not hinder the pace of foreign business activity in Ka‘ū. In 1868, the same year as the great earthquake, Alexander Hutchinson established the Naalehu Sugar Company and built a mill at that town. More enduring commercially than either wheat or *pulu*, sugar cultivation became the major industry within Ka‘ū, appropriating the focus of life in the district.

During the mid-1870s Waiohinu Plantation was established by John Nott and Company. This operation was bought out in 1877 by Alexander Hutchinson who at the same time founded Hilea Plantation. By the end of the 1870s, sugar mills were operating at Na‘alehu, Hīlea, and Honu‘apo. Though Hutchinson died in 1879, his name survived in the Hutchinson Sugar Company which during the remainder of the nineteenth century continued to expand and consolidate existing plantation operations in Ka‘ū.

Another plantation operation, the Hawaiian Agricultural Company, was established in Pāhala in 1876 by a consortium of Honolulu businessmen and used Punalu‘u as its port. A decade later the company controlled almost 10,000 acres of cane land and constituted the largest plantation in the Hawaiian Islands.

Kelly (1980:16) provides a synopsis from the *Hawaiian Kingdom Statistical and Commercial Directory of 1880-1881* (Bowser 1880) listing three Hīlea sugar planters summarized in Table 1.

Table 1. Sugar Planters Located in Hīlea Ahupua‘a

Name	Occupation	Address	Acres	Acres Cultivated	Owner or Renter
Apiki	Sugar planter	Hīlea	10	Pasture	Owner
Hilea Sugar Plantation and Mill	Sugar planter	Hīlea	5,000	--	Owners
Hilea Plantation and Sugar Mill	Sugar planter	Hīlea	20,000	500	Renters

Kelly (1980:16) also makes reference to two independent or contributory planters at Hīlea: N.C. Haley and William H. Lewis. Whether these were connected with the Hilea Sugar Plantation and Mill and/or the similarly named Hilea Plantation and Sugar Mill is unclear. Kelly (1980:106, drawing upon the Bowser 1880 account) provides the following summary of the Hīlea Sugar Mill:

> The Hilea Sugar Mill and Plantation, Hilea. J.S. Walker, C.M. Spencer, and W.G. Irwin, proprietors; manager, Capt. O.B. Spencer. Owns 500 acres, rents 20,000 acres, available for cultivation 3,000 acres, employs 110 men; agent is W.G. Irwin & Co. Owns 40 yoke oxen, 16 horses and mules, 50 jackasses and 2,000 goats. A large mill is in the course of erection, with all modern improvements . . . will be ready about next October [1881]. [Kelly 1980]

Regarding the goats, Kelly (1980:17) notes, “In the early days of growing cane, some of the plantations raised large numbers of goats, mostly for their hides. A track connected the mill at Hīlea to Honu‘apo Harbor. Most remarkable upon the physical landscape must have been the systems of flumes and railways for transporting the cut cane from fields to mills. Railway lines ran from Na‘alehu and Hīlea to Honu‘apo and from Punalu‘u to Pāhala.

The sugar companies also altered the social landscape of Ka‘ū. During the 1870s, Chinese laborers were brought in by Alexander Hutchinson; by the time of the 1884 government census there were 568 Chinese in the district. Japanese laborers were imported beginning in the latter 1880s and Filipinos began arriving during the first decade of the twentieth century.

The Hīlea Plantation was purchased by the Hutchinson Sugar Plantation in 1890, and the mill at Hīlea was gone by 1907. The 1921 Naalehu and Punaluu USGS topographic quadrangle maps show the Hutchinson Plantation with Volcano Road and a narrow gauge railroad (Figure 10). There are several structures located at the base of Makanau Hill. The 1928 Murray map of the Ka‘ū Forest Reserve shows many trails, plantation camps, railways, and Volcano Road *mauka* of the project APE (Figure 11). There is a lack of transportation and plantation infrastructure illustrated in the vicinity of the project APE. In the 1940s, a portion of the Hawai‘i Belt Road was constructed crossing Hīlea Gulch across the newly constructed Hīlea Bridge.

The 1946 Marks map of a portion of the Ka‘ū Forest Reserve shows the development of the “Government Main Road” (part of the Hawai‘i Belt Road) known today as Māmalahoa Highway (SIHP # 50-10-47-30187) (Figure 12). The “Old Government Road,” the former alignment of Volcano Road located further upslope, is illustrated as being very curvy and indirect. The new “Government Main Road” provided a more linear road (effectively a straightening of the former “Old Government Road” alignment) between Na‘alehu and Pāhala and extended to the more linear portions of Volcano Road near those towns. This straightened section of the “Government Main Road” (as shown on the 1946 Marks map, Figure 12) is understood to date to 1940.

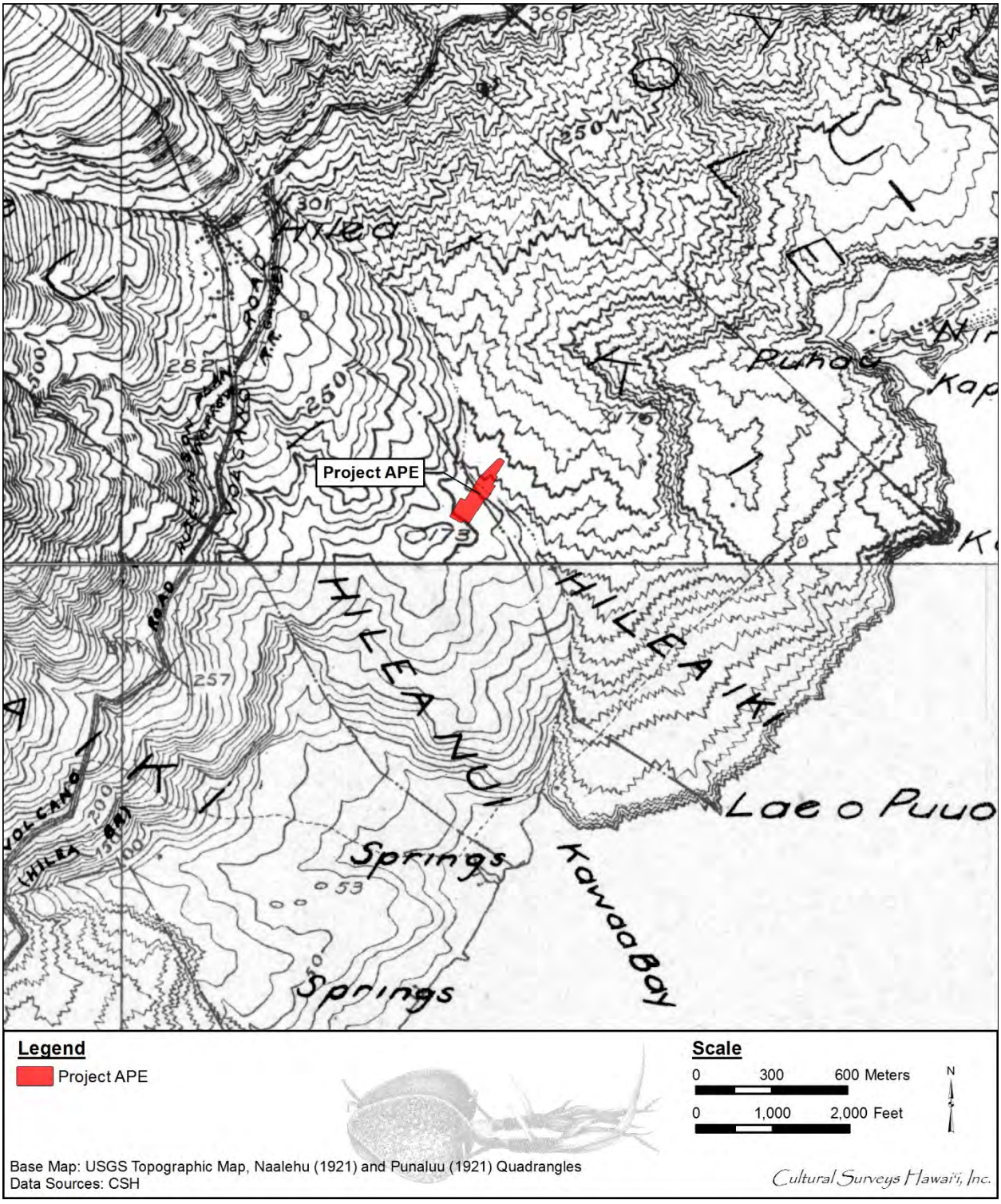

Figure 10. Portion of a 1921 Naalehu and Punaluu USGS topographic quadrangles, showing many structures and infrastructure *mauka* of the project APE

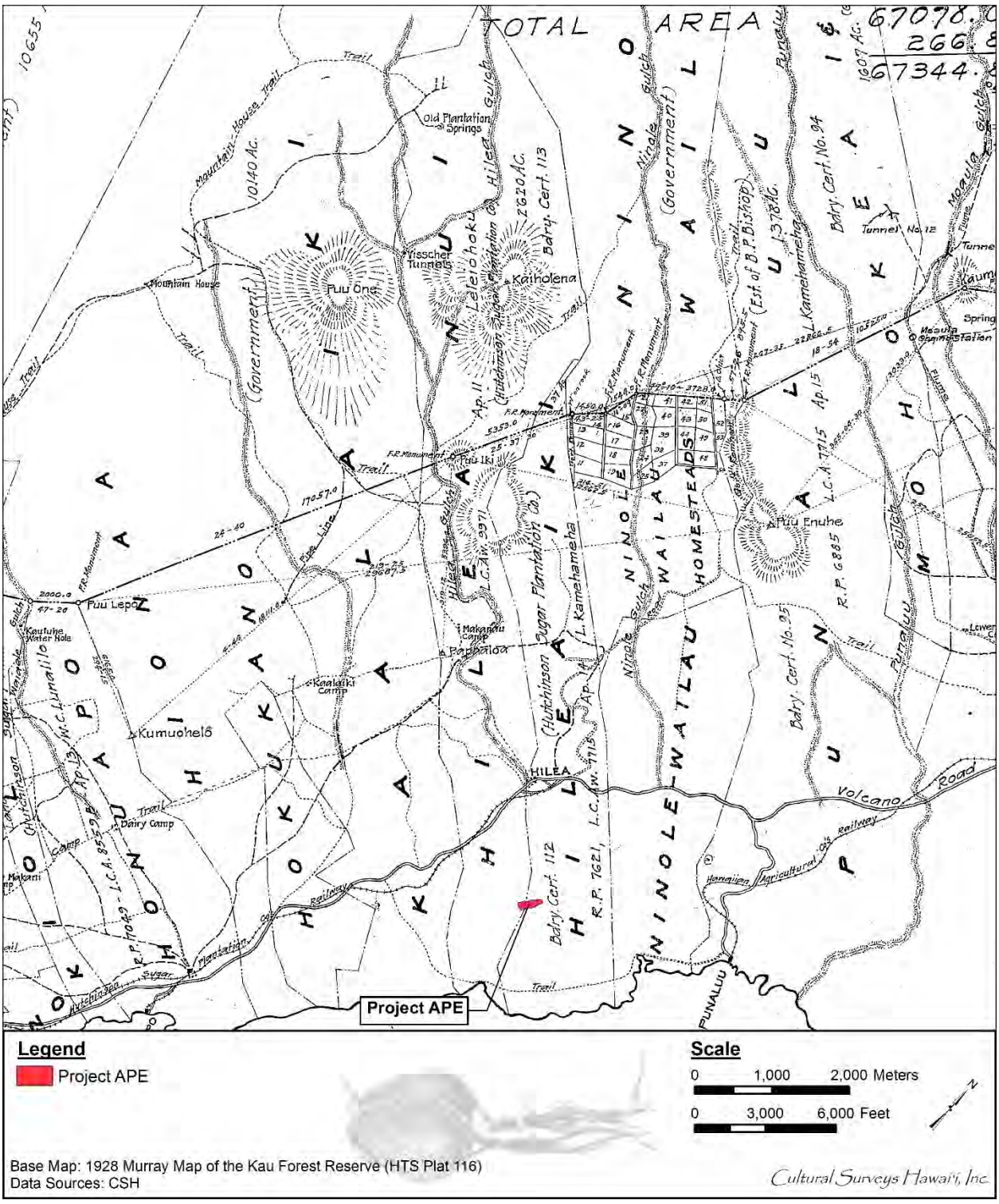

Figure 11. Portion of the 1928 Murray map of the Ka‘ū Forest Reserve showing trails, railways, and roads primarily in the *mauka* portions of Hīlea Iki and Hīlea Nui

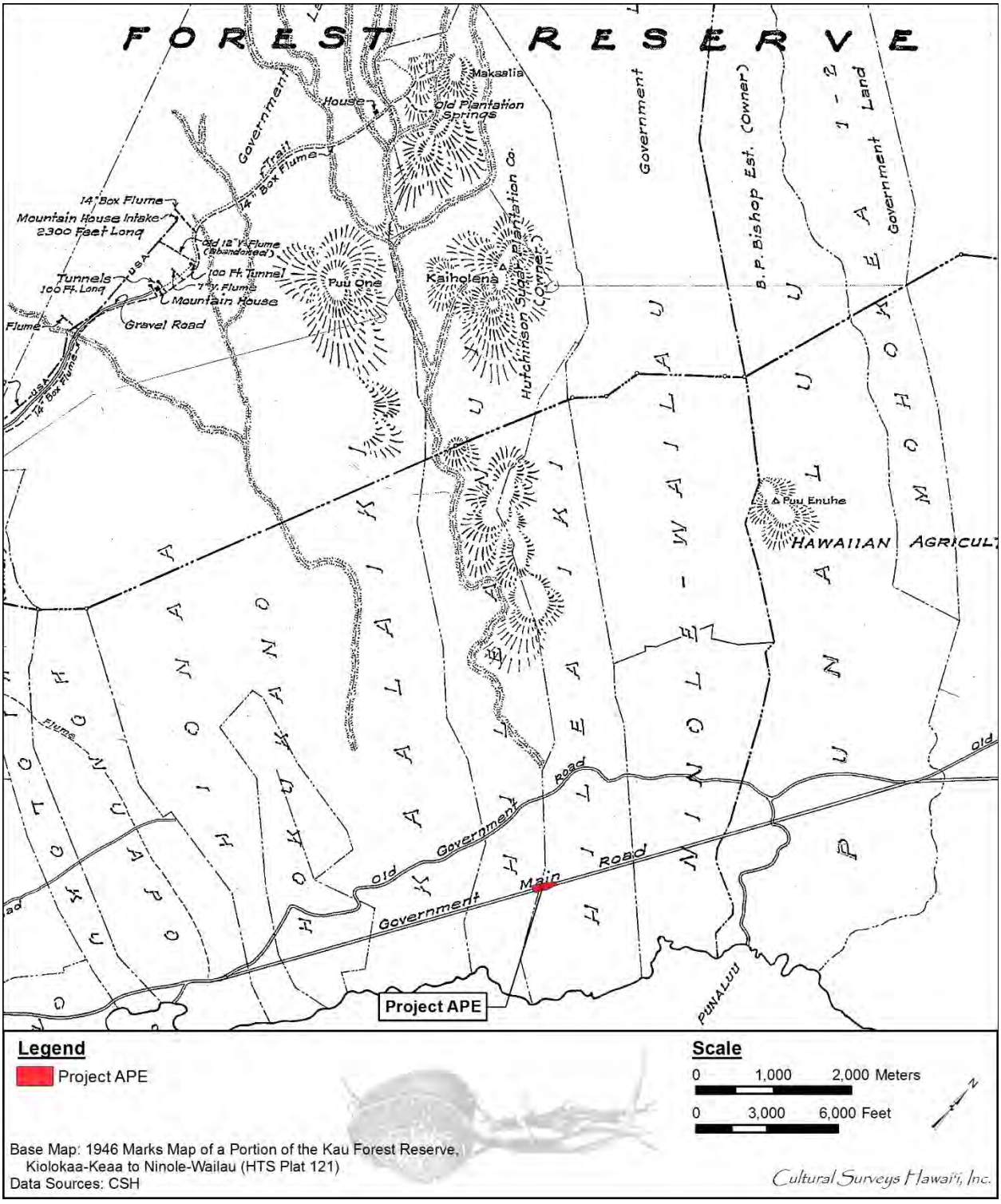

Figure 12. Portion of the 1946 Marks map of a portion of the Ka‘ū Forest Reserve showing the development of the “Government Main Road” known today as Māmalahoa Highway

In 1972, C. Brewer & Company combined the Hutchinson Sugar Plantation and the Hawaiian Agricultural Company and named it the Kau Sugar Company. In 1996, the Kau Sugar Company ceased its operations, thereby ending the sugar industry in Ka‘ū.

3.2.5 Hīlea Contemporary Land Use

After the end of sugar industry operations in Hīlea, ranching operations took over. According to the 1962 Naalehu and 1966 Punaluu USGS topographic quadrangles, only a few structures and a road remained at the base of Makanau Hill and Māmalahoa Highway is the only other depicted road or structure within the *ahupua‘a* (Figure 13). The 1978 Naalehu and Punaluu USGS Orthophotoquad aerial photographs show the limited development and infrastructure within Hīlea Ahupua‘a, with the village of Nīnole to the east (Figure 14). The aerial photograph shows many country roads in the *mauka* portion of Hīlea, corresponding to the ranching and farming activities at the time.

Today, Hīlea is undeveloped with only a few homes and many acres of ranchland. The neighboring *ahupua‘a* of Nīnole contains some houses, the Sea Mountain Golf Course and some hotel accommodations near Nīnole Bay.

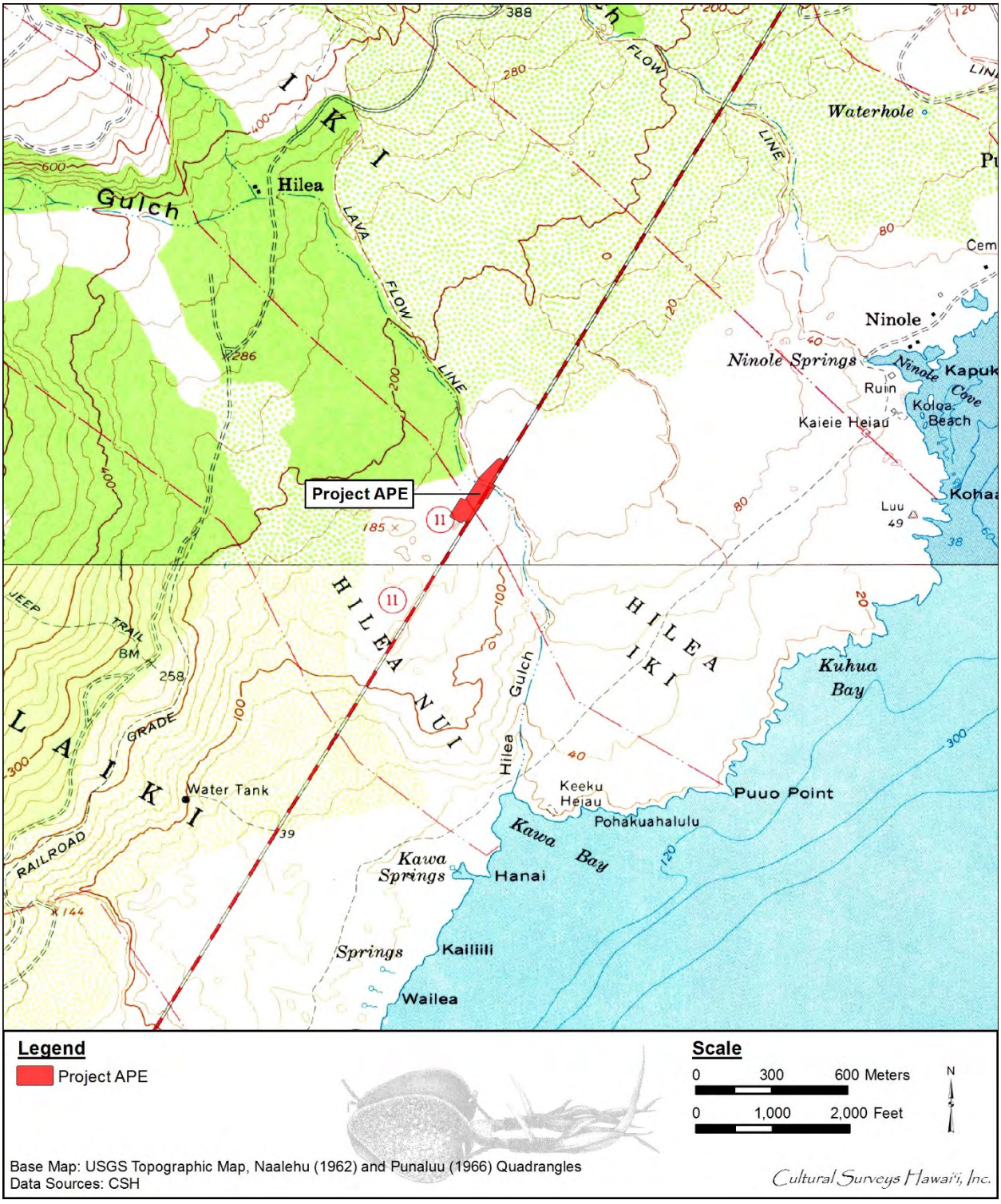

Figure 13. Portion of the 1962 Naalehu and 1966 Punaluu USGS topographic quadrangles showing two structures and two roads as the only infrastructure within Hīlea Ahupua‘a

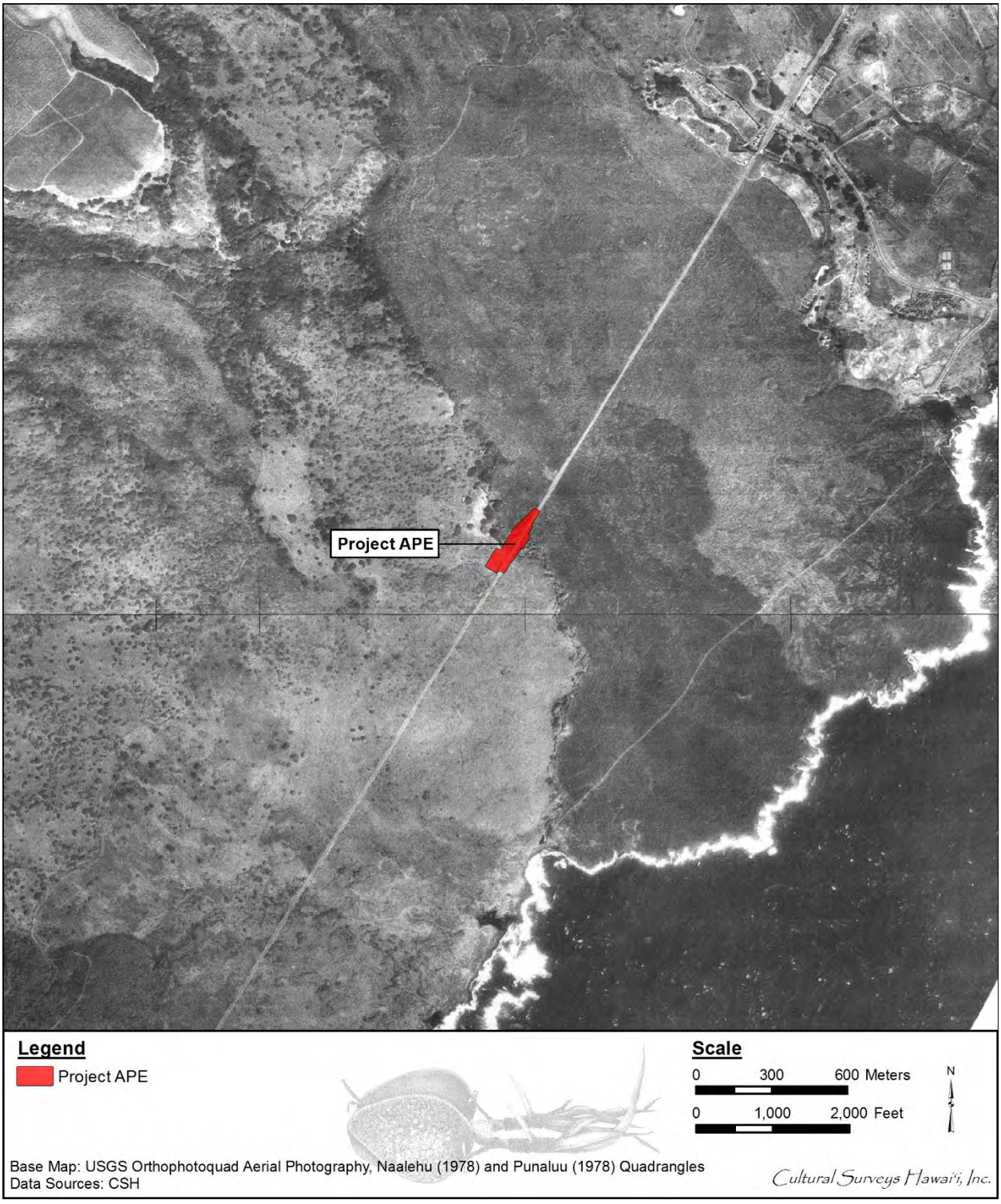

Figure 14. 1978 Naalehu and Punaluu USGS Orthophotoquad aerial photographs showing the project APE with relatively little development within Hīlea Ahupua‘a and the village of Nīnole to the east

3.3 Previous Archaeological Research

The locations of previous archaeological studies conducted within a 0.8 km (0.5 mile) radius of the project APE are shown in Figure 15 and listed in Table 2. No previously documented historic properties designated with SIHP numbers are located within a 0.8-km (0.5-mile) radius of the project APE. Archaeological sites (potential historic properties not designated with an SIHP number) are shown in Figure 16 and listed in Table 3. These studies and findings are discussed in the following paragraphs.

In 1976, Herbert J. Mann conducted an archaeological reconnaissance within portions of Hīlea and Ka‘alāiki. Several house sites including SIHP #s 50-10-74-3533, -3534 and -3552 Feature 8 (later designated as the Kawaa Complex SIHP # -4371) were identified as well as petroglyphs. All sites documented by Mann (1976) are beyond 0.8 km (0.5 miles) away from the project APE.

Kelly (1980) wrote a “historical sketch” covering nine *ahupua‘a* from Honu‘apo in the southwest to Punalu‘u in the northeast including Hīlea Nui and Hīlea Iki. Her study includes research on legends and traditional accounts, presentation of historical background, accounts of early visitors, and investigations of land ownership and settlement patterns. This information is included, in part, in Section 3.2.

Stokes and Dye (1991) present a historic survey of Native Hawaiian temple sites based on fieldwork undertaken by John F.G. Stokes on Hawai‘i Island in 1906. Two *heiau* are reported in Hīlea Ahupua‘a: Ke‘ekū Heiau and Kohāikalani Heiau. Ke‘ekū Heiau is located on the northeast side of Kāwā Bay approximately 1,200 m (3937 feet) south of the Hīlea Bridge project APE. Ke‘ekū Heiau is a very heavy walled enclosure with several platforms (Stokes and Dye 1991:128-129). The sacred precincts are delineated by a low terrace wall on the inland side and include a number of separate platforms, one of which is known as the “king’s house.” The size of the main *heiau* (approximately 150 feet northwest/southeast by 80 feet southwest/northeast suggests a substantial population and/or high degree of political import for the land of Hīlea. Kāwā Bay is a pronounced indentation on the coastline and would have been a natural focus for fishing and canoe travel. Kohāikalani Heiau is located on “the southern brow of Makanau plateau (Stokes and Dye 1991:130). This was the locus of a famous Ka‘ū story of how the ruling chief Kohāikalani was assassinated at this *heiau* (see Section 3.1.1). The size of the *heiau* (approximately 150 feet long north/south by 70 feet wide east/west with walls up to 8 feet wide and 5.5 feet high suggests a substantial population and/or high degree of political import for the land of Hīlea.

In 2013, Rechtman Consulting, LLC conducted an archaeological reconnaissance of the County of Hawai‘i Kāwā property that includes the *makai* portion of the current project APE. Clark and Rechtman (2013) identified many sites and further documented previously identified sites. Rechtman identified several sites within a 0.8-km (0.5-mile) radius of the project APE including seven cairns, five modified outcrops, four enclosures (two designated HI-40, and one designated HN-55 are within 10 m of the project APE), four alignments, three walls, two lava tubes, two depressions, two terraces, two pavements, two trails, one habitation complex, one *pāhoehoe* excavation, one filled crack, one modified boulder, one ‘a‘ā excavation, one complex, one modified *‘a‘ā* flow, one quarry, one L-shaped enclosure, one concrete cairn, and one trail segment. The sites within a 0.8-km (0.5-mile) radius of the project APE are listed in Table 3. Brief descriptions as provided by Clark and Rechtman (2013) of HI-40 and HN-55 (the two sites in close proximity of the project APE) are located in Section 4.

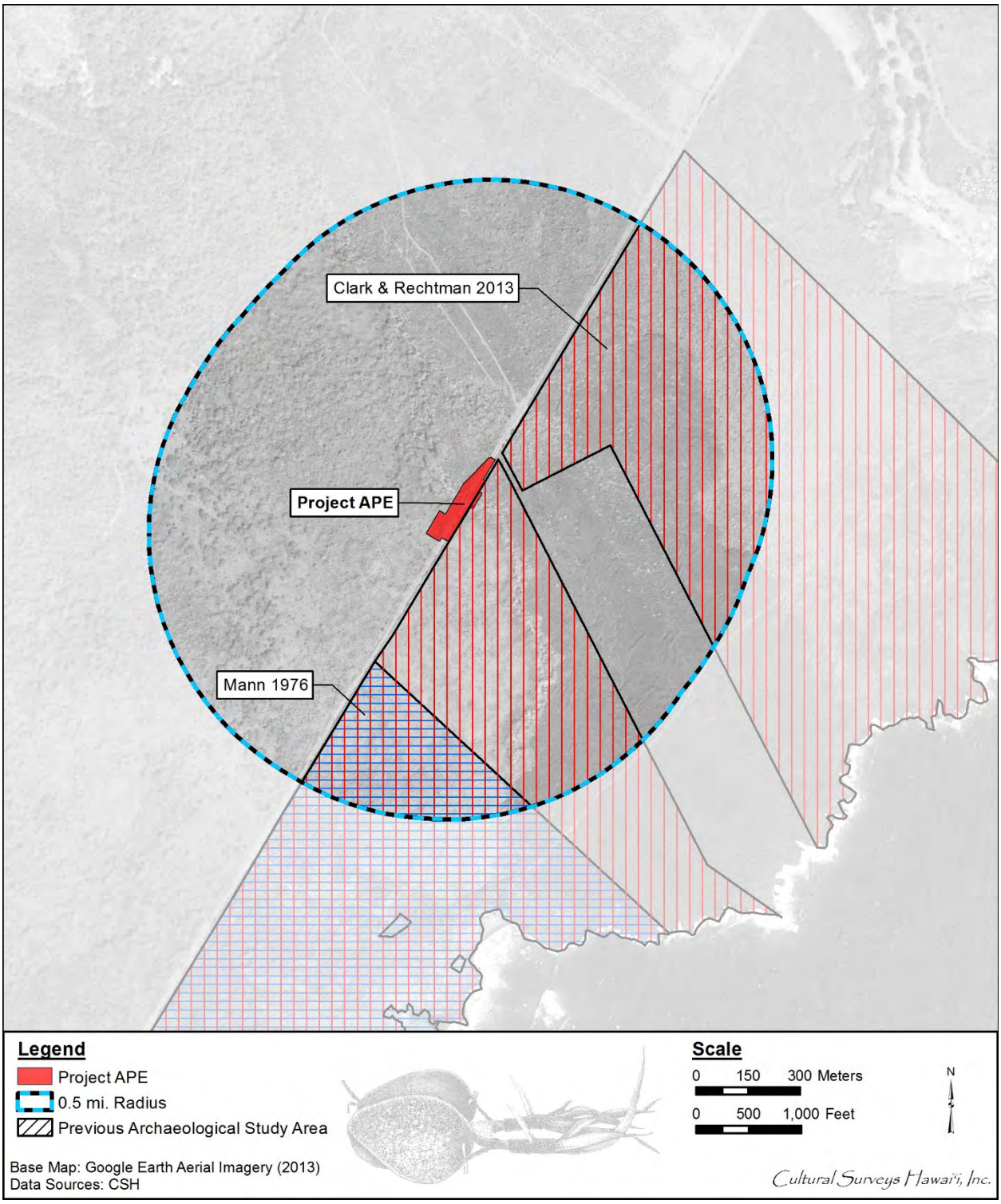

Figure 15. Aerial photograph depicting previous archaeological studies within a 0.8 km (0.5 mile) radius of the project APE (Google Earth 2013)

Table 2. Previous Archaeological Studies within a 0.8-km (0.5-mile) Radius of the Project APE

Reference	Type of Study	Location	Results (SIHP # -50-10-74-xxxx)
Mann 1976	Archaeological reconnaissance	Kāwā; in Hīlea and Ka‘alāiki Ahupua‘a	Documented house sites (SIHP # -3533), walled enclosures (SIHP #s -3534 and -3552) and petroglyph sites (not designated SIHP #s
Kelly 1980	Stories of *ahupua‘a*	Central Ka‘ū	Discusses nine *ahupua‘a* within Ka‘ū including traditional accounts
Stokes and Dye 1991	*Heiau* study	Hawai‘i Island	Documents *heiau* throughout Hawai‘i Island including two *heiau* within Hīlea: Ke‘ekū Heiau near Kāwā Bay and Kohāikalani Heiau on Makanau hill
Clark and Rechtman 2013	Archaeological reconnaissance	Ka‘alāiki, Hīlea Nui and Hīlea Iki Ahupua‘a *makai* of Māmalahoa Hwy	Further documented sites identified by Mann (1976); also identified new sites throughout Hīlea Iki, Hīlea Nui, and Ka‘alāiki; Sites within a 0.8-km (0.5-mile) radius of the project APE include Bernice Pauahi Bishop Museum (BPBM) # 50-Ha-B10-010 (trail), and Clark and Rechtmann (2013) site numbers: HI-04 (trail), HI-05 (pavement), HI-15 (trail segment), HI-39 (concrete cairn), HI-40 (L-shaped enclosure), HI-41 (alignment), HI-42 (quarry), HI-43 (enclosure), HI-44 (modified *‘a‘ā* flow), HI-45 (cairn), HI-46 (pavement), HI-47 (complex), HI-50 (*‘a‘ā* excavation), HI-55 (modified boulder), HI-56 (cairn), HN-21 (wall), HN-22 (cairn), HN-23 (terrace), HN-25 (alignment), HN-36 (alignment), HN-37 (alignment), HN-38 (terrace), HN-39 (cairn), HN-40 (modified outcrop), HN-41 (filled crack), HN-48 (cairn), HN-49 (enclosure), HN-50 (depression), HN-51 (*pāhoehoe* excavation), HN-52 (cairn), HN-53 (wall), HN-54 (wall), HN-55 (enclosure), HN-56 (modified outcrop), HN-57 (modified outcrop), HN-58 (cairn), HN-59 (modified outcrop), HN-60 (lava tube), HN-61 (lava tube), HN-62 (modified outcrop), HN-63 (enclosure), HN-64 (depression), HN-66 (habitation complex); of these sites, one enclosure (HN-55) and one L-shaped enclosure (HI-40) are outside, but close to the project APE

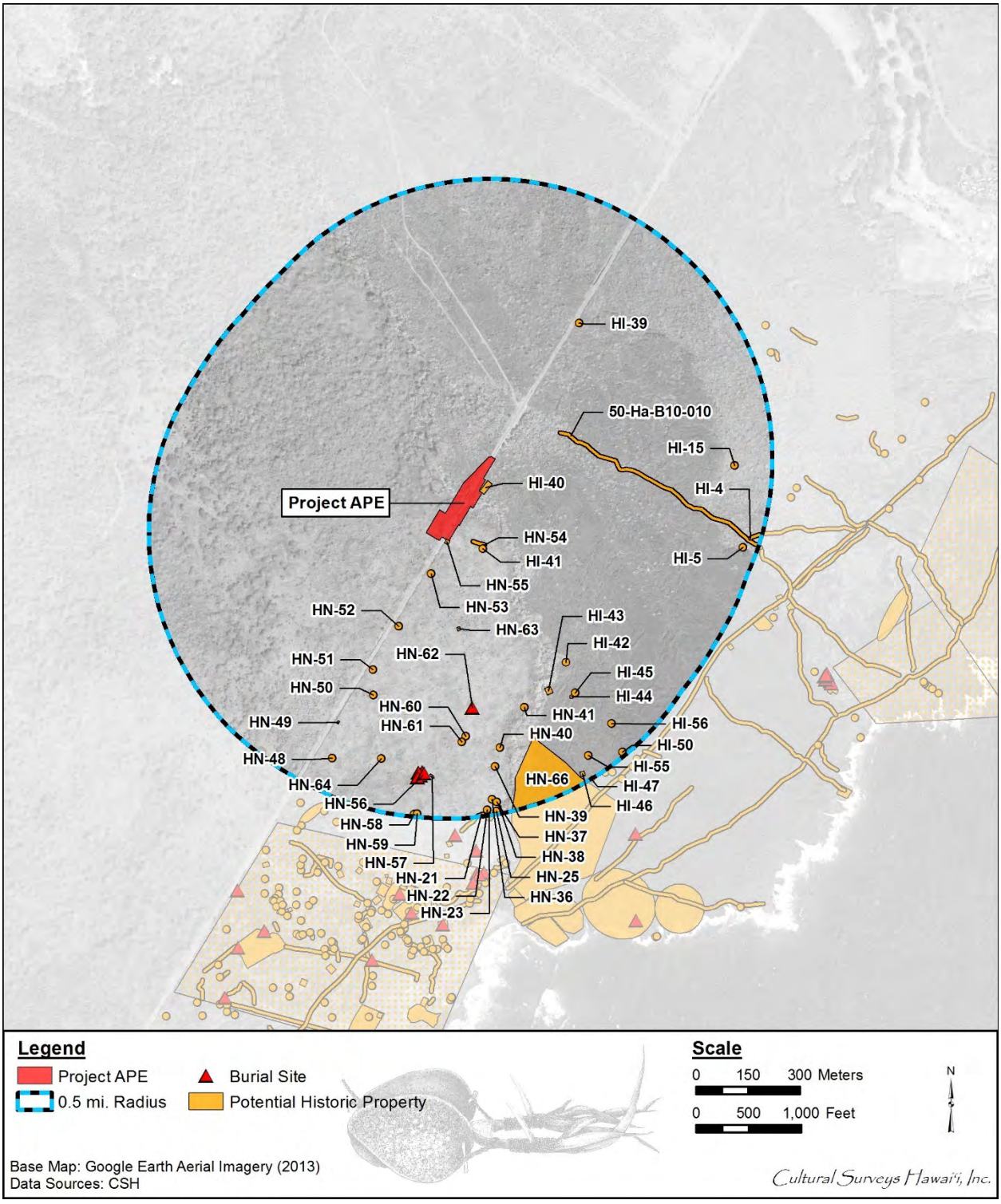

Figure 16. Aerial photograph depicting previously documented sites (not designated with SIHP numbers and not formally assessed as historic properties) within a 0.8-km (0.5-mile) radius of the project APE (Google Earth 2013)

Table 3. Sites Documented by Clark and Rechtman (2013) in the Vicinity of the Project APE; no SIHP #s assigned

Site #	Site Type	Function
50-Ha-B10-010	Trail	Trail
HI-04	Trail	Trail
HI-05	Pavement	Habitation
HI-15	Trail Segment	Trail
HI-39	Concrete cairn	Advertisement
HI-40	L-shaped enclosure	Windbreak shelter
HI-41	Alignment	Unknown
HI-42	Quarry	Possible basalt quarry
HI-43	Enclosure	Habitation
HI-44	Modified *ʻaʻā* flow	Possible scoria quarry
HI-45	Cairn	Marker
HI-46	Pavement	Habitation
HI-47	Complex	Habitation
HI-50	*ʻAʻā* excavation	Possible *ʻaʻā* quarry
HI-55	Modified boulder	Unknown
HI-56	Cairn	Marker
HN-21	Wall	Boundary/livestock control
HN-22	Cairn	Marker
HN-23	Terrace	Habitation
HN-25	Alignment	Unknown
HN-36	Alignment	Unknown
HN-37	Alignment	Unknown
HN-38	Terrace	Habitation
HN-39	Cairn	Marker
HN-40	Modified outcrop	Unknown
HN-41	Filled crack	Landscaping
HN-48	Cairn	Marker
HN-49	Enclosure	Habitation
HN-50	Depression	Agriculture
HN-51	*Pāhoehoe* excavation	Unknown
HN-52	Cairn	Marker

Site #	Site Type	Function
HN-53	Wall	Unknown
HN-54	Wall	Unknown
HN-55	Enclosure	Habitation
HN-56	Modified outcrop	Possible burial
HN-57	Modified outcrop	Agriculture
HN-58	Cairn	Marker
HN-59	Modified outcrop	Unknown
HN-60	Lava tube	Shelter
HN-61	Lava tube	Shelter
HN-62	Modified outcrop	Possible burial
HN-63	Enclosure	Unknown
HN-64	Depression	Agriculture
HN-66	Habitation complex	Habitation

3.4 Background Summary and Predictive Model

There are very few western accounts specific to Hīlea in the eighteenth century and few references to Ka‘ū. William Ellis, while travelling through Hīlea, estimated the population in the early 1800s to be around 220. The village was described as a pleasant village with fishponds.

During the 1830s, Protestant missionaries based in Kona and Hilo made occasional tours into Ka‘ū but a permanent missionary presence was not installed until the early 1840s when Catholic and Protestant missions were established in the district. In 1841 a Catholic priest, Father Marechal, arrived in Ka‘ū and within a few months could boast of 900 converts. The following year, 1842, the Protestant minister John Paris settled in Wai‘ōhinu where he founded a church and school.

An 1831-1832 census of Ka‘ū, the first taken within the district, records a total population of 5,800. This number already reflects the district’s depopulation—the effect of newly introduced diseases, cultural unravelling, and emigration to new commercial centers—but the full precipitousness of the population decline within Ka‘ū is revealed in the totals from subsequent censuses. In 1835 the total population was 4,766. The census data for the vicinity of the present project APE is somewhat obscured by the fact that Hīlea Nui was lumped in with Ka‘alāiki to the south (with a total 1835 population of 238) and Hīlea Iki was lumped in with Nīnole and Wailau to the north (with a total 1835 population of 330). The first official government census, taken in 1847, records the population as having dropped to 3,010. By the time of the 1853 government census only 2,210 people are recorded in Ka‘ū.

In March 1868 a sequence of major earthquakes and eruptions of Mauna Loa began, resulting in many deaths and losses of property and livestock. These disasters were only a prelude to an earthquake in early April that precipitated a tsunami that destroyed coastal villages, dislodged a

cliff side at Kapāpala, blanketing the land below and burying a village, and that opened the Great Crack at Kīlauea, emptying the crater's lava lake into Keauhou.

Change within the Ka‘ū district during the remainder of the nineteenth century and into the twentieth century centered around the activities of the two sugar operations, Hutchinson Sugar Plantation and the Hawaiian Agricultural Company.

Presently, the project APE includes a portion of Highway 11 (Māmalahoa Highway) and the Hīlea Bridge, the focus of the current project. The existing Hīlea Bridge was built in 1940 and spans the Hīlea Gulch.

The previous reconnaissance studies undertaken in the area have identified archaeological sites and features within a 0.8-km (0.5-mile) radius of the project APE; however, no AIS studies have been previously completed and none of the sites and/or features have been documented for inclusion in the SIHP database. The identified sites and features include both pre- and post-Contact house sites, activity areas, and sites associated with habitation and subsistence practices. As the majority of the project APE has been altered for the construction of Māmalahoa Highway and Hīlea Bridge, similar pre- and early post-Contact habitation sites are not likely to be present within the current project APE. However, pre-Contact and post-Contact historic properties such as modified outcrops, cairns, and enclosures are anticipated to be located near the project APE. Stone walls associated with former or active ranching activities may be located along the edge of the highway. Hīlea Bridge (previously evaluated for eligibility for inclusion in the National Register and/or Hawai‘i Register as Bridge # 001000110306489 by MKE Associates LLC and Fung Associates, Inc. 2013, now designated SIHP # 50-10-74-30298) is located within the project APE.

Section 4 Results of Fieldwork

A 100% pedestrian inspection of the project APE was conducted on 17 June 2015 by Scott Belluomini, B.A., and Nifae Hunkin, B.A. The pedestrian inspection included the identification of one newly designated historic property within the project APE, and a description of the overall project APE including ground visibility, modern use or disturbance, and vegetation.

The project APE consists of a portion of Highway 11 (Māmalahoa Highway), including the roadway and associated gravel shoulder (Figure 17 and Figure 18), the Hīlea Bridge that spans Hīlea gulch (Figure 19), and a cleared field used for pastureland (Figure 20 and Figure 21). Vegetation in this area includes exotic grasses, *koa haole* (*Leucaena leucocephala*), *kukui* (*Aleurites moluccanus*), monkey pod (*Albizia saman*) and Christmas berry (*Schinus terebinthifolia*). Ground visibility is good with the majority of the project APE having been recently cleared of dense vegetation. The Qk4, Kau Basalt lava flow (200 to 750 BP) encompasses the northern portion of the project APE. Vegetation in this area is extremely sparse and includes *koa haole* (*Leucaena leucocephala*) and Christmas berry (*Schinus terebinthifolia*).

One newly designated historic property, Hīlea Bridge (SIHP # 50-10-74-30298) and one previously designated historic property, Māmalahoa Highway (SIHP # 50-10-47-30187) was identified within the project APE. The bridge was previously evaluated for eligibility for inclusion in the National Register and/or Hawai‘i Register as Bridge # 001000110306489 by MKE Associates LLC and Fung Associates, Inc. (2013), but not given an SIHP number until this AIS. Built in 1940, Hīlea Bridge is identified as a timber stringer bridge and one of only two timber bridges under HDOT jurisdiction. A complete description of the historic property is provided in Section 5 and an architectural study which documented Hīlea Bridge conducted by Ruzicka (2016) is located in Appendix A.

Highway 11 (Māmalahoa Highway) (SIHP # 50-10-47-30187) extends north to south through the center of the project APE (see Figure 17 and Figure 18). Māmalahoa Highway is thought to have been named for the royal decree of Kamehameha I, *Ke Kānāwai Māmalahoe* (The Law of the Splintered Paddle). The highway was likely built over a number of interconnected foot trails, cart roads, and historic roads, remnant portions of which are still present beyond the highway right-of-way. Historic maps indicate the portion of Highway 11 within the study area was constructed post-1921, likely around the time of the construction of Hīlea Bridge in 1940. The roadway has been repaved and modified in modern times (see Figure 17 and Figure 18). Some minor signs of wear such as cracking were observed. The raised pavement markers are mostly intact and the road surface markings have some cracking but have not faded (Figure 22). No additional historic properties are present within the project APE.

Two previously documented archaeological sites (lacking SIHP numbers) are located outside the project APE, but are in close proximity to the APE. This includes two enclosures designated HI-40, and one enclosure designated HN-55. These sites were briefly described in Clark and Rechtman (2013) and the current study located these sites to verify they are outside the project APE, and to determine any potential effect that may occur to these sites during the proposed project.

HI-40 consists of two L-shaped enclosures located east of Hīlea Bridge on the *makai* side of Māmalahoa Highway on a bluff within the *‘a‘ā* flow (Figure 23). The site was previously

documented by Clark and Rechtman (2013) and confirmed during the current AIS to be outside the current project APE. The L-shaped enclosures were described as windbreak shelters “oriented to block the prevailing trade winds” (Clark and Rechtman 2013:125). They are constructed of loosely stacked basalt cobbles and boulders against a bedrock outcrop to provide a buffer from the prevailing wind from the east. During the current AIS, the sites were measured as being approximately 7 m (23 feet) by 7 m (23 feet) with a maximum wall height of 1.35 m (4.4 feet). As mentioned previously, these sites are on a bluff approximately 5 to 8 m from the project APE and will not be affected by the project.

HN-55 consists of a rectangular habitation enclosure located southwest of Hīlea Bridge on the *makai* side of Māmalahoa Highway on a small bluff. The site was previously and briefly documented by Clark and Rechtman (2013) and confirmed during the current AIS to be approximately 2 m outside the project APE. The portion of the APE closest to the site does not have any major disturbance planned and the site will not be affected by the project.

Figure 17. Portion of Highway 11 (Māmalahoa Highway) (SIHP # 50-10-47-30187) within project APE, view to south

Figure 18. Portion of Highway 11 (Māmalahoa Highway) (SIHP # 50-10-47-30187) within project APE crossing over Hīlea Bridge, *‘a‘ā* seen in background, view to southeast

Figure 19. Hīlea Bridge (SIHP # 50-10-74-30298), view to north

Figure 20. Pasture area proposed for use as staging area, view to southwest

Figure 21. Pasture area proposed for use as staging area, view to northwest

Figure 22. *Makai* shoulder of Māmalahoa Highway on the southwest side of Hīlea Bridge, showing raised surface, view to southeast

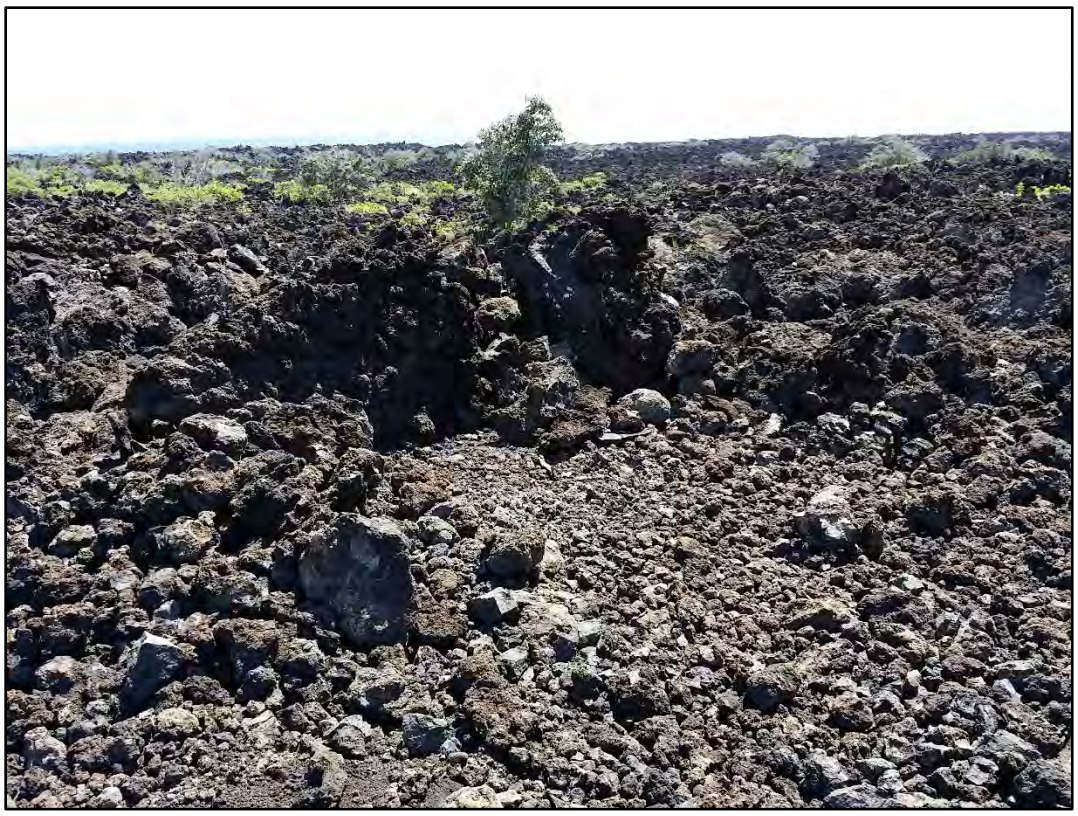

Figure 23. HI-40, L-shaped enclosure, view to east

Section 5 Historic Property Descriptions

Two historic properties were identified within the current project APE during this AIS. The historic properties are summarized in Table 4 and depicted on Figure 24 and Figure 25. Descriptions of these historic properties follow.

Table 4. Historic Properties Identified within the Current Project APE

SIHP #	Formal Type	Function
50-10-47-30187	Māmalahoa Highway	Transportation
50-10-74-30298	Bridge (Hīlea Bridge)	Transportation

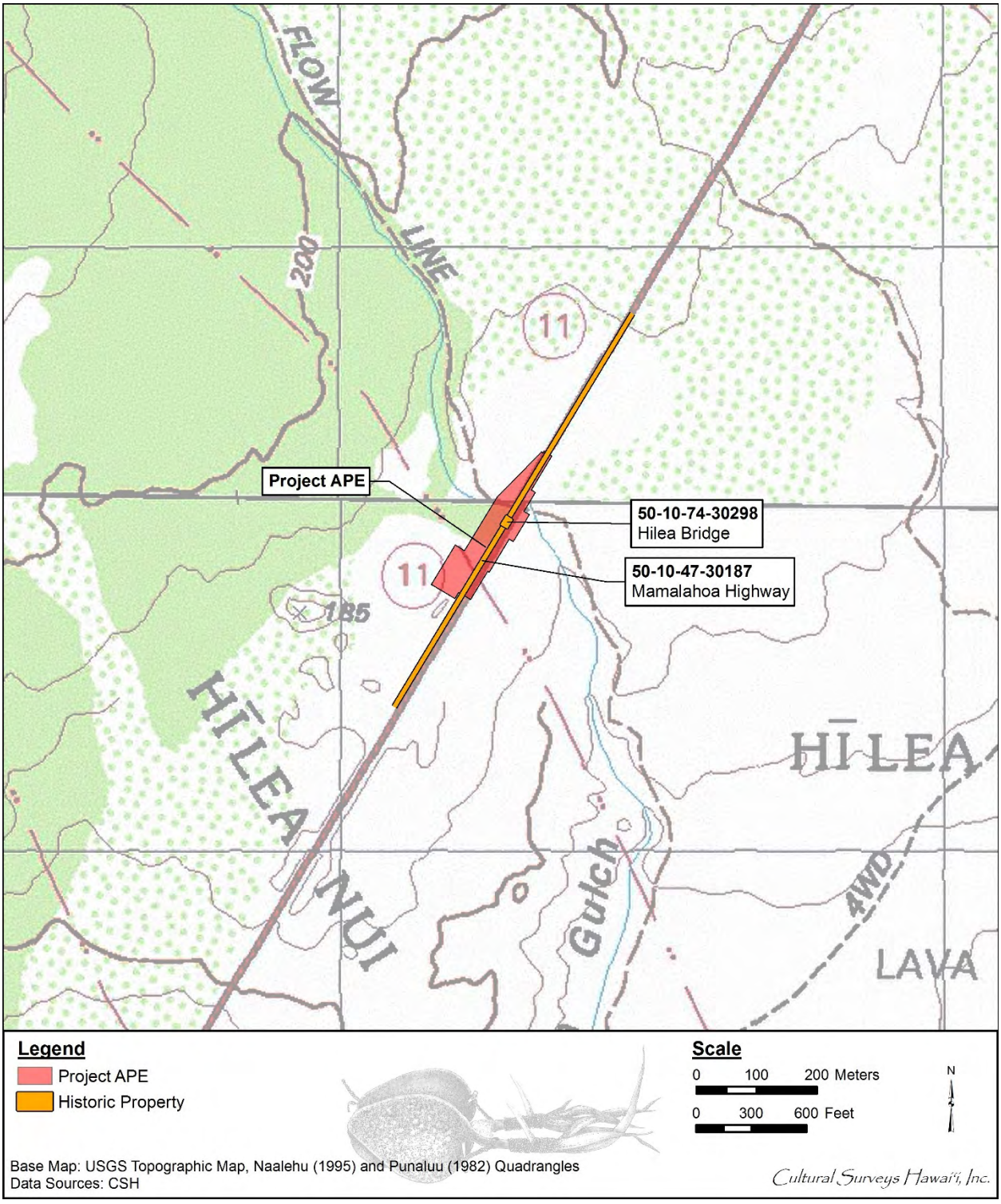

Figure 24. Portion of the 1995 Naalehu and 1982 Punaluu USGS 7.5-minute topographic quadrangles showing the location of historic properties within the project APE

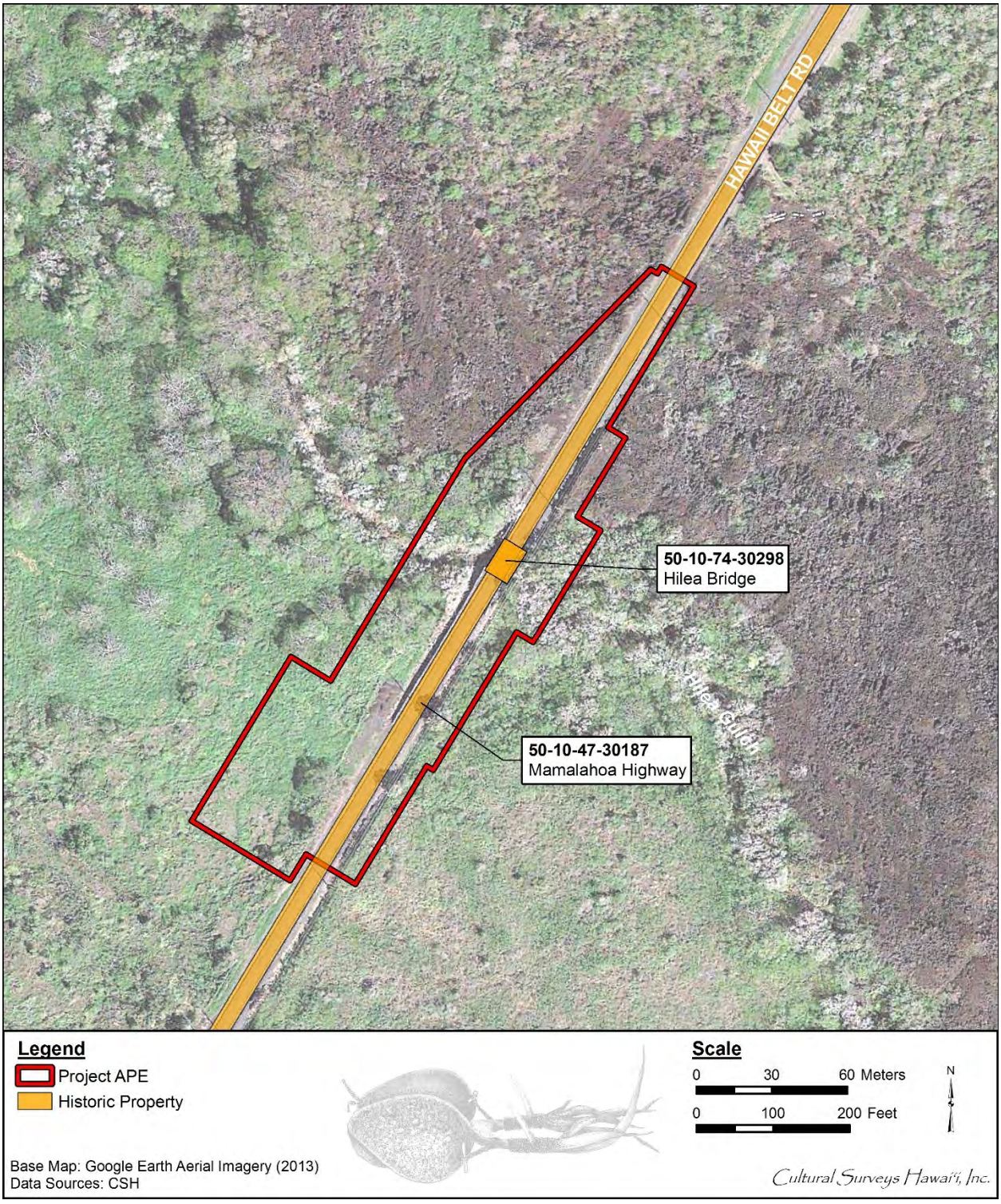

Figure 25. 2013 aerial photograph showing the location of historic properties within the project APE

5.1 SIHP # 50-10-47-30187

FORMAL TYPE:	Māmalahoa Highway
FUNCTION:	Transportation
TOTAL FEATURES:	5 features were designated in South Kona District in Clark et al. 2014; only the actively used, contemporary Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) is designated here
AGE:	Historic/Modern
TAX MAP KEY:	[3] 8-1-009; 8-1-008; 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way
LAND JURISDICTION:	HDOT
PREVIOUS DOCUMENTATION:	Clark et al. 2014; Yucha and Hammatt 2017

5.1.1 SIHP # 50-10-47-30187 Māmalahoa Highway as Described by Clark et al. (2014)

SIHP # 50-10-47-30187 consists of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) including its former and present alignments. The historic property was previously documented by Clark et al. (2014), for a portion of Highway 11 in Ka‘awaloa Ahupua‘a of South Kona. Inclusion of the portion of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) within the present APE under this historic property designation in South Kona resulted from consultation with the SHPD archaeology branch regarding appropriate historic property nomenclature. In accordance with the Clark et al. (2014) description of the historic property, it was determined that this historic property designation applies to the former and present remnants of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) documented in Yucha and Hammatt 2017 (Nīnole Bridge AIS report) and within the current project APE.

SIHP # 50-10-47-30187 initially included five features documented by Clark et al. (2014) in South Kona consisting of a stone revetment (Feature A), two stone retaining walls (Feature B and C), one abandoned segment of roadway (Feature D), one concrete culvert (Feature E).

As the historic property is introduced by Clark et al. (2014):

> [Highway 11] has developed from what was once a footpath (Kealaehu; Maly and Maly 2001), into its current Highway 11 form through incremental improvements over more than a century. The improvements come in the form of straightening, widening, grade changes, and enhanced storm water drainage systems that are upgraded routinely, but especially during large scale construction projects. The first large scale endeavor that transformed this roadway from a footpath/mule trail into one that automobiles could negotiate was the Kona to Ka‘ū portion of the upper Government Road, which was conducted in the late 1800s to early 1900s. By 1933 the Māmalahoa Highway (Hawai‘i Belt Road) was constructed over the same general corridor as the older Government Road, but advances in earth moving technology enabled engineers to cut and fill the sloping land more efficiently, and thus were able to create a more direct, less curvy route. [Clark et al. 2014:52]

Clark et al. (2014) previously documented SIHP # 50-10-47-30187 Features A through E along a portion of Highway 11 at the intersection with Nāpo‘opo‘o Road in South Kona (Figure 26). These features are suggested to be fairly typical for Highway 11.

SIHP # 50-10-47-30187 Feature A in South Kona (representative photograph provided in Figure 27) is described by Clark et al. (2014) as follows:

> Feature A is a sloped revetment consisting of large cobbles and small boulders located along the makai side of an elevated portion of the Highway, in the southeastern portion of the study corridor. Feature A extends 60 meters and is sloped away from the road surface at a roughly 40 degree angle. The lowest point of the adjacent ground surface is at the northwestern end where the base of the revetment measures 3.6 meters below the road surface, and tapers up at the southeast end where the base measures 0.4 meters below the road surface. Between the cobbles and boulders, underlying dark brown soil was observed. At its southeast end, Feature A terminates at [SIHP # 50-10-47-23218], a stacked wall that runs along the makai side of the highway to the southeast. Near its northwestern end is [SIHP # 50-10-47-23219], a boundary wall constructed between TMK: (3) 8-1-09:011 and 057 that terminates two meters makai of the base of Feature A. The sloped revetment stands up to 2.4 meters tall at the location of its junction with [SIHP # 50-10-47-23219]. The revetment was likely constructed as an erosion control device (as opposed to a structural retaining wall) to armor the slope and prevent the loss of fill material during storm events. [Clark et al. 2014:52]

SIHP # 50-10-47-30187 Feature B in South Kona (Figure 28) is described by Clark et al. (2014) as follows:

> Feature B is a sloped retaining wall that forms the makai edge of Māmalahoa Highway. The wall, which is located approximately 195 meters northwest of Feature A, measures approximately 37 meters long, stands 0.5 to 0.7 meters tall, and consists of stacked small to large cobbles and a few small boulders. The wall functions to retain fill material within the road base, which is slightly elevated at this location. The sloped face of the wall, which angles away from the road, provides more retaining strength, and less chance of collapse. The shoulder width from the edge of the retaining wall to the edge of Highway 11 pavement varies from 1.4 to 2 meters. Feature B also defines the mauka edge of TMK: (3) 8-1-09:010, a residential property. A hedge of ti have been planted along the retaining wall in front of the house. Amid the ti plants is a small gap where a set of two poured in place concrete steps [SIHP # 50-10-47-30192]. The steps, which are no longer used, descend from the elevated Highway edge to a concrete path that extends across the lower yard surface to the front entrance of the house on TMK: (3) 8-1-09:010 that was built in 1931. The age of Feature B is not clear, although given its conformity to present roadway layout, it may have been constructed during the last phase of Māmalahoa Highway improvements. [Clark et al. 2014:54]

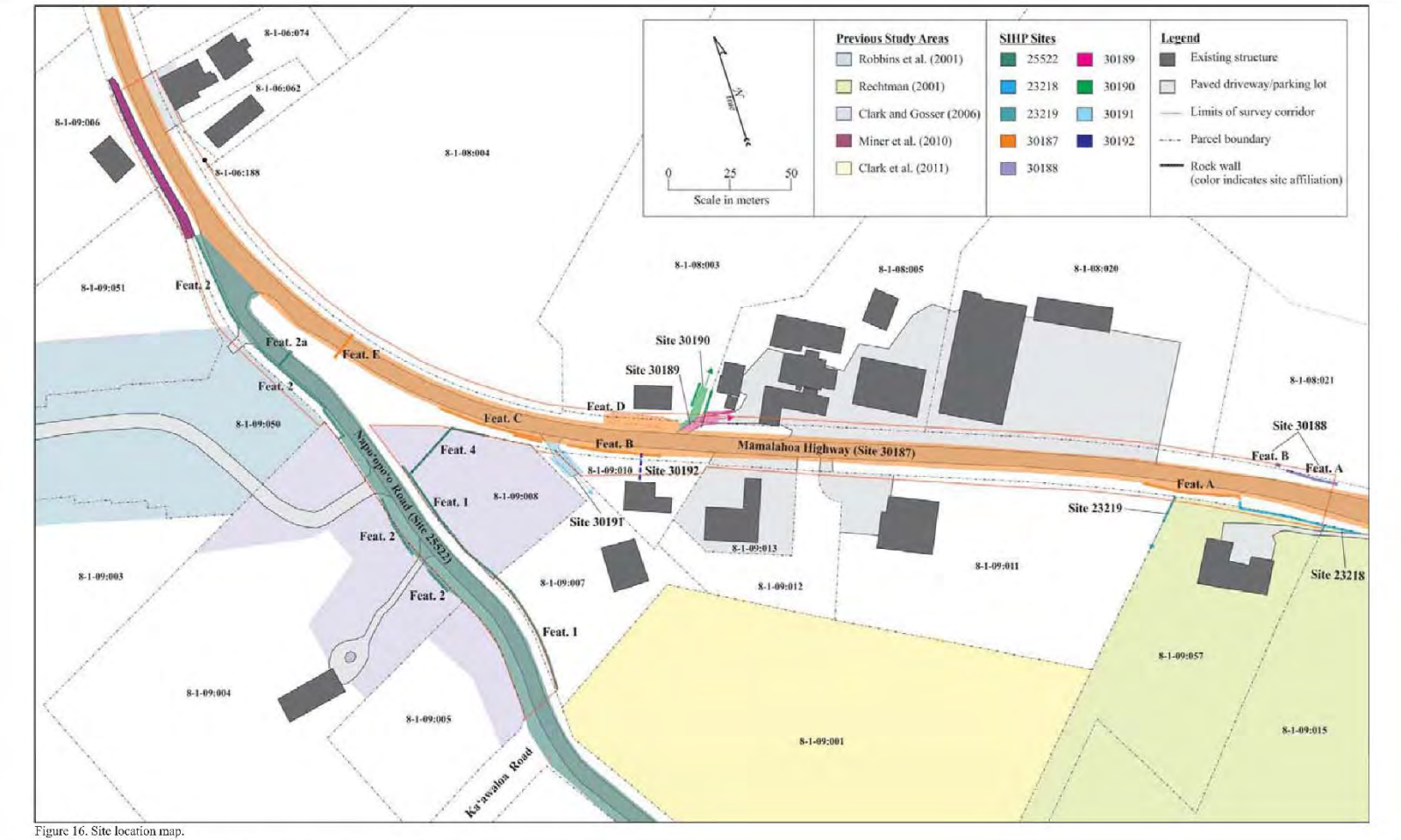

Figure 26. Locations of SIHP # 50-10-47-30189 Features A through E in South Kona (Clark et al. 2014:39)

Figure 27. SIHP # 50-10-47-30187 Feature A sloped revetment in South Kona, view to northwest (Clark et al. 2014:53)

Figure 28. SIHP # 50-10-47-30187 Feature B sloped retaining wall in South Kona, view to northwest (Clark et al. 2014:54)

SIHP # 50-10-47-30187 Feature C in South Kona (Figure 29) is described by Clark et al. (2014) as follows:

> Feature C is a two-tiered retaining wall located along the makai side of Māmalahoa Highway, 32 meters northwest of Feature B. The upper section of retaining wall that retains the existing road bed measures roughly 22 meters long, stands up to 1.3 meters tall, and is constructed of small to large cobbles. This wall was built to retain fill material within the road base, which is elevated and curved in its vicinity. The sloped face of the upper tier wall angles away from the road and provides more retaining strength, with less chance of collapse. At its southeastern end, Feature C stands 40 centimeters tall above a level constructed cobble surface, or lower tier of the wall, but steadily increases in height to a maximum of 1.3 meters tall at its northwestern end. The top of the wall face measures, on average, 60 centimeters from the edge of the Highway pavement, and a guardrail has been installed within the narrow shoulder. The lower tier, which extends 1 to 1.5 meters beyond the base of the upper tier, measures 7 meters long and stands roughly 0.6 meters tall along its southwestern (makai) edge. The northwestern end of the lower tier terminates at bulldozed rubble near the mauka/makai portion of [SIHP # 50-10-47-25522] Feature 4, a previously recorded wall… that extends along the northwestern boundary of TMK:(3) 8-1-09:008. It is not clear if both tiers of the Feature retaining wall were constructed during the same episode, or if the lower tier represents an earlier construction, perhaps associated with an older alignment of the road. [Clark et al. 2014:54]

SIHP # 50-10-47-30187 Feature D in South Kona (Figure 30) is described by Clark et al. (2014) as follows:

> Feature D is a section of former roadway located adjacent to the mauka edge of Māmalahoa Highway, opposite from Feature B, immediately northwest of [SIHP # 50-10-47-30189] and [SIHP # 50-10-47-30190], and approximately 165 meters southeast of the Napoʻopoʻo Road intersection. Feature E fronts a vacant house (built in 1929), which is the lower of two structures on TMK: (3) 8-1-08:003. The abandoned section of road is covered in tall Guinea grass and planted trees line the makai, or highway side of Feature D. The old road bed is level and is elevated approximately 1 meter above the current highway surface. It measures 22 meters long by roughly 4 meters wide. Along the makai edge, at the southeastern end of the section of old road is a 3 meter long remnant of sloped retaining wall. The wall stands 0.9 meters tall and is built of medium to large cobbles and small boulders. It is likely that this retaining wall continued along the former road's edge to the northwest before it was destroyed during the construction of the more recent alignment of the adjacent roadway. The cut into the former roadway reveals construction fill consisting of small to large cobbles and a small amount of soil. At the makai edge of the abandoned road, one section of 10 centimeter thick asphalt pavement was observed on the surface of the former road section in a cut created to accommodate the current highway alignment. The land located northwest of the elevated old road segment has been bulldozed level to the newer highway surface.

Figure 29. SIHP # 50-10-47-30187 Feature C two-tiered retaining wall in South Kona, view to northwest (Clark et al. 2014:55)

Figure 30. SIHP # 50-10-47-30187 Feature D section of former roadway in South Kona, view to northeast (Clark et al. 2014:58)

> This old section of road is believed to be an older segment of road that was abandoned after the more recent alignment of the Māmalahoa Highway was completed in the early 1930s. A 1964 map submitted with Hawai‘i Land Court Application No. 1860 labels the location of Feature E, “Road Remnant”, and lists the State of Hawai‘i as the owner. It appears that after the Feature E roadway segment was abandoned it was then utilized as a driveway accessing the adjacent house structure built in 1929. [Clark et al. 2014:56]

SIHP # 50-10-47-30187 Feature E in South Kona (Figure 31 and Figure 32) is described by Clark et al. (2014) as follows:

> Feature E is a 12 meter long concrete culvert that extends beneath Māmalahoa Highway (Figure 44) approximately 60 meters northwest of Feature C (see Figure 16). The inlet on the mauka side of the road is sunken below road level and is fed by a paved swale that collects runoff from both the southwest and northwest directions. The inlet is situated beneath a steep road cut, and a steel plate has been placed over a portion of the catch pit to prevent loose soil and cobbles from tumbling in to it from the steep slope. At the inlet is a 0.5 meter wide catch pit that is crudely lined with large cobbles, and extends the length of the concrete culvert headwall, which measures 1.8 meters long. The concrete headwall measures 0.28 meters thick, and its flat upper surface is level to the pavement, and set back 0.7 meters from the edge of the driving surface. The headwall and culvert were poured in place, with 6-inch and 12-inch planks used to form the face of the wall, and 3-inch slats used to form the circular culvert portion. The culvert diameter measures 0.95 meters, and is partially filled in at the bottom with sediment. The outlet end of Feature E extends 3 meters (10 feet) beyond the makai edge of the paved road surface. The top of the outlet headwall is roughly 1.3 meters below pavement level, amid a steep slope that is partially reinforced by a dry stacked retaining wall above the southeastern side of the culvert. The retaining wall section is slightly sloped, constructed of large cobbles, and measures approximately 3 meters long by 1 meter tall. The headwall is dimensionally identical to the inlet side. Large cobbles have been stacked, one to two high, on the upper surface of the headwall to retain sloped gravel road fill. From the outlet of Feature E, an excavated channel curves to the northwest and extends for 12 meters, and curves again to the west where it leads to the inlet of a culvert beneath Nāpoʻopoʻo Road [SIHP # 50-10-47-25522 Feature 2a]. [Clark et al. 2014:58]

Figure 31. SIHP # 50-10-47-30187 Feature E concrete culvert inlet in South Kona, view to northeast (Clark et al. 2014:59)

Figure 32. SIHP # 50-10-47-30187 Feature E concrete culvert outlet in South Kona, view to north (Clark et al. 2014:60)

5.1.2 SIHP # 50-10-47-30187 Māmalahoa Highway in the Vicinity of Hīlea Bridge and Nīnole Bridge

The portions of SIHP # 50-10-47-30187 that extends through the current project APE and the nearby Yucha and Hammatt (2017) project APE for the Nīnole Bridge Replacement Project are similar in condition. Highway 11 extends north to south through both project's APE's as a gently crowned, two-lane (one lane in each direction, approximately 11-feet wide) asphalt highway with white line shoulder striping and reflectors down the center (see Figure 17, Figure 18, Figure 34 and Figure 34). This portion of Highway 11 was constructed in the late 1930s and early 1940s, likely around the time of the construction of Hīlea Bridge (SIHP # 50-10-74-30298) and Nīnole Bridge (SIHP # 50-10-68-30299) in 1940 as a straightening of the Old Government Road that is northwest of the project APE. The roadway has been repaved and modified in modern times (see Figure 17, Figure 18 and Figure 34). Some minor signs of wear such as cracking were observed. The raised pavement markers are mostly intact and the road surface markings have some cracking, but have not faded.

SIHP # 50-10-47-30187, Māmalahoa Highway, was previously assessed as significant by Clark et al. (2014:81) under HAR "§13-284-6" under Criterion "A" for its being associated with events and Criterion "D" for its information potential. It is the understanding of this study that the Clark et al. (2014) assessment of significance was explicitly under HAR "§13-284-6" as significant under Criteria a and d. This report supports the Clark et al. (2014) assessment of significance. Therefore, pursuant to HAR §13-275-6, SIHP # 50-10-47-30187, Māmalahoa Highway, is assessed as significant under Criterion a (Be associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (Have yielded, or is likely to yield, information important for research on prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. SIHP # 50-10-47-30187, is evaluated as eligible for inclusion in the National Register (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). SIHP # 50-10-47-30187, is evaluated as eligible for listing on the Hawai‘i Register (per HAR §13-198-8) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). This assessment of significance and evaluation of eligibility is based on the historic properties association with "important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity" (Clark et al. 2014:81).

5.1.3 A Note on Other Identifications of the Māmalahoa Highway as a Historic Property

As designated by Clark et al. (2014:52) and as (in consultation with the SHPD) used here, SIHP # 50-10-47-30187 designates current and former alignments of the Māmalahoa Highway also known as Highway 11 and the Hawaii Belt Road. The authors are aware, as an example, that remnants of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) documented in Tulchin et al. 2006–draft were previously designated as SIHP # 50-10-68-24909. It may be the case that there are other portions of the Māmalahoa Highway that have also previously received other SIHP # designations.

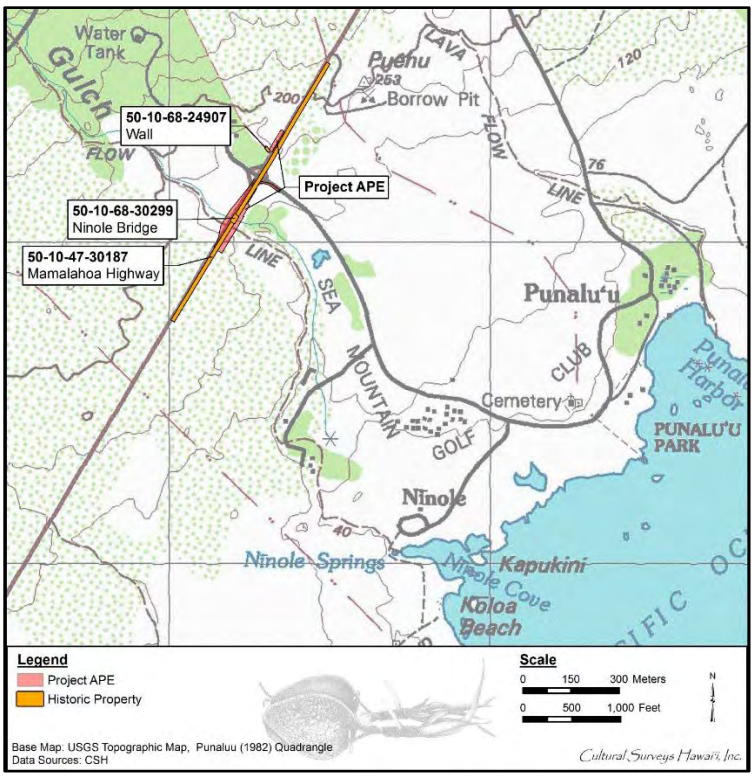

Figure 33. Portion of 1982 Punaluu USGS topographic quadrangle showing the location of SIHP # 50-10-47-30187 crossing Nīnole Bridge (SIHP # 50-10-74-30299, northeast of the present project area) (Yucha and Hammatt 2017: 38)

Figure 34. SIHP # 50-10-47-30187 extending across Nīnole Bridge (SIHP # 50-10-68-30299, northeast of the present project area), view to north (Yucha and Hammatt 2017: 35)

5.2 SIHP # 50-10-74-30298

FORMAL TYPE:	Bridge (Hīlea Bridge)
FUNCTION:	Transportation
TOTAL FEATURES:	1
AGE:	Historic (1940)
TAX MAP KEY:	[3] 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way
LAND JURISDICTION:	HDOT
PREVIOUS DOCUMENTATION:	MKE Associates LLC/Fung Associates, Inc. 2013; Ruzicka 2016

SIHP # 50-10-74-30298 is Hīlea Bridge, located along the Hawai‘i Belt Road (Māmalahoa Highway/Highway 11) (SIHP # 50-10-47-30187) spanning Hīlea Gulch (Figure 35 through Figure 38). The bridge was previously evaluated for eligibility for inclusion on the National Register and/or Hawai‘i Register as Bridge # 001000110306489 by MKE Associates LLC and Fung Associates, Inc. (2013), but not given an SIHP number until this AIS. The bridge is a timber stringer bridge characterized by wooden beams and ties perched upon concrete and stone abutments. Hīlea Bridge was built in 1940. The Hīlea Bridge is an example of one of a few wood bridge designs built in the 1940s still extant. The bridge has a maximum span of 19.0 feet and total length of 41.0 feet.

The State Historic Bridge Inventory Evaluation (MKE Associates LLC/Fung Associates, Inc. 2013:6-75) provides the following description of Hilea Stream Bridge:

> The Hilea Stream Bridge carries the Hawaii Belt Road across the Hilea Stream. This wood bridge is in its original location, is generally in good condition, and its materials remain mostly intact. The bridge has a white wooden parapet on both sides and a wooden deck. Concrete rock masonry abutments support the timber bridge. The workmanship of the bridge has not been obscured by additions or repairs. The MOA between DOT and the Central Federal Lands considering the bridge for replacement in 2013 was completed. [MKE Associates LLC/Fung Associates, Inc. 2013:6–75]

SIHP # 50-10-74-30298 is Hīlea Bridge is assessed under HAR §13-275-6, in consultation with Mason Architects, Inc., as significant under Criterion c (embodies the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value) and has retained full integrity of location, setting, feeling and association. Integrity of design, materials, workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact. SIHP # 50-10-74-30298 was recommended by Ruzicka (2016) as eligible for inclusion on the National Register (per 36 CFR 60.4) and the Hawai‘i Register (per HAR §13-198-8) due to its significance under Criterion C (“that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction”) and as having sufficient integrity, as described above. This determination of eligibility is consistent with the previous evaluation of Hīlea Bridge (MKE Associates LLC and Fung Associates, Inc. 2013).

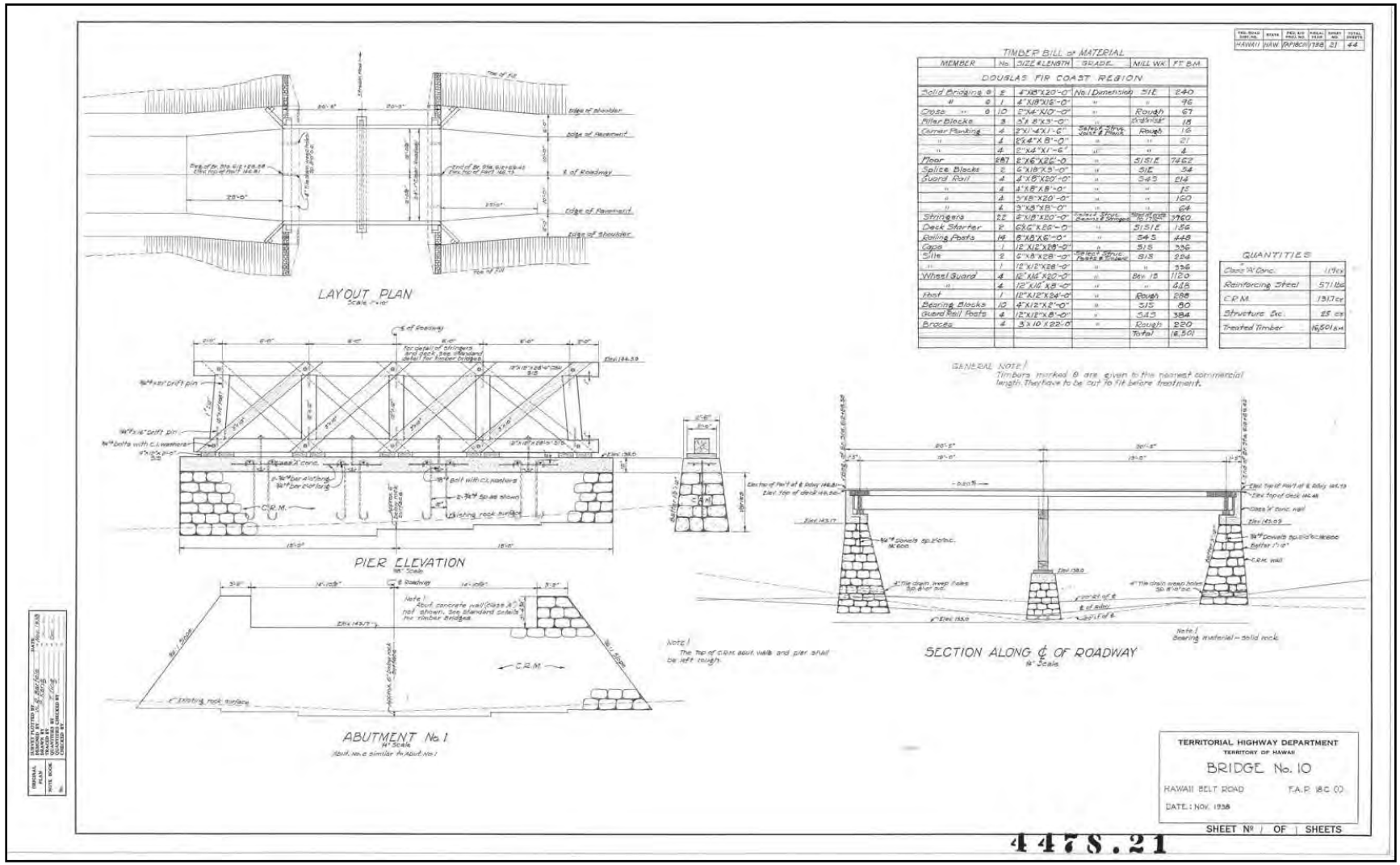

Figure 35. 1938 Territory of Hawaii, Territorial Highway Department, Bridge No. 10 (Hīlea Bridge) plans

Figure 36. Hīlea Bridge (SIHP # 50-10-74-30298) asphalt deck, view to south

Figure 37. Hīlea Bridge (SIHP # 50-10-74-30298) timber columns and footings, view to west

Figure 38. Hilea Bridge (SIHP # 50-10-74-30298) structural support beams and foundation, view to north

Section 6 Summary and Interpretation

At the request of CH2M HILL and on behalf of the FHWA/CFLHD, CSH has completed this archaeological inventory survey report for the Hīlea Bridge, Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, FHWA/CFLHD contract DTFH68-13-R-00027.

Background research included various mythological and traditional accounts as well as early historic information from Ka‘ū as there was little documentation specific to Hīlea Ahupua‘a prior to the nineteenth century. One Land Commission Award was documented within a 0.8 km (0.5 mile) radius of the project APE. This award of Kuleana Land, LCA 9225 B awarded to Keawe is stated by Keawe to contain one *mo‘o* and one *kīhāpai*. Sugar cane farming and milling were the main activities within the *ahupua‘a*. The previous reconnaissance studies undertaken in the area have identified archaeological sites and features within a 0.8-km (0.5-mile) radius of the project APE; however, no AIS studies have been previously completed and none of the sites and/or features have been documented for inclusion in the SIHP database. The identified sites and features by the previous studies include both pre- and post-Contact house sites, activity areas, and sites associated with habitation and subsistence practices. Two of these historic properties, HI-40 (two L-shaped enclosures) and HN-55 (one rectangular enclosure), are within 10 m of the project APE, but are not potentially affected by the proposed project.

A 100% pedestrian inspection of the project APE was conducted on 17 June 2015 by Scott Belluomini, B.A. and Nifae Hunkin, B.A. The pedestrian inspection included the identification of one newly designated historic property, Hīlea Bridge (SIHP # 50-10-74-30298) and one previously designated historic property, Māmalahoa Highway (SIHP # 50-10-47-30187) within the project APE. Hīlea Bridge was previously evaluated for eligibility for inclusion in the National Register and Hawai‘i Register as Bridge # 001000110306489 by MKE Associates LLC and Fung Associates, Inc. (2013), but not given an SIHP number until this AIS.

SIHP # 50-10-47-30187 is Māmalahoa Highway (Highway 11) and includes its former and present alignments. The historic property was previously documented by Clark et al. (2014), for a portion of Highway 11 in Ka‘awaloa Ahupua‘a of South Kona. The portion that extends through the project APE was constructed in the late 1930s and early 1940s as a straightening of the Old Government Road that is north of the project APE. The Hīlea Bridge (SIHP # 50-10-74-30298) was constructed to allow the new highway to extend across Hīlea Gulch.

SIHP # 50-10-74-30298 is Hīlea Bridge, located along the Hawai‘i Belt Road (Māmalahoa Highway/Highway 11) spanning Hīlea Gulch. The bridge is a timber stringer bridge characterized by wooden beams and ties perched upon concrete and stone abutments. Hīlea Bridge was built in 1940. The Hīlea Bridge is an example of one of a few wood bridge designs built in the 1940s still extant.

Section 7 Significance Assessment and Eligibility Determination

Pursuant to HRS §6E and Section 106, assessments of integrity, and significance and evaluations of Hawai‘i and National Register eligibility are included in this section for the two historic property present within the project APE.

7.1 Significance Assessments under HRS §6E

Under HRS §6E, for a historic property to be significant under HAR §13-275-6, the historic property should possess integrity of location, design, setting, materials, workmanship, feeling, and/or association, and meet one or more of the following criterion:

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

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

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

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

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

SIHP # 50-10-47-30187, Māmalahoa Highway, was previously assessed as significant by Clark et al. (2014:81) under HAR “§13-284-6” under Criterion “A” for its being associated with events and Criterion “D” for its information potential. It is the understanding of this study that the Clark et al. (2014) assessment of significance was explicitly under HAR “§13-284-6” as significant under Criteria a and d. This report supports the Clark et al. (2014) assessment of significance. Therefore, pursuant to HAR §13-275-6, SIHP # 50-10-47-30187, Māmalahoa Highway, is assessed as significant under Criterion a (Be associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (Have yielded, or is likely to yield, information important for research on prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. This assessment of significance is based on the historic properties association with “important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity” (Clark et al. 2014:81).

SIHP # 50-10-74-30298 is Hīlea Bridge is assessed under HAR §13-275-6, in consultation with Mason Architects, Inc., as significant under Criterion c (embodies the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value) and has retained full integrity of location, setting, feeling and association. Integrity of design, materials, workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact.

7.2 National Register and Hawai‘i Register Eligibility Determination

Under Section 106, historic property significance is evaluated for eligibility for inclusion on the National Register pursuant to 36 CFR 60.4. An evaluation of eligibility for listing on the Hawai‘i Register pursuant to HAR §13-198-8 is also included in this section. To be considered eligible for listing on the National Register and/or Hawai‘i Register, a historic property should possess integrity as described above, and meet one or more of the following broad significance criteria:

A that are associated with events that have made a significant contribution to the broad patterns of our history;

B that are associated with the lives of persons significant in our past;

C that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;

D that have yielded, or may be likely to yield, information important in prehistory or history;

SIHP # 50-10-47-30187 is evaluated as eligible for inclusion in the National Register (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). SIHP # 50-10-47-30187, is evaluated as eligible for listing on the Hawai‘i Register (per HAR §13-198-8) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. This evaluation of eligibility is based on the historic properties association with “important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity” (Clark et al. 2014:81).

SIHP # 50-10-74-30298 was recommended by Ruzicka (2016) as eligible for inclusion on the National Register (per 36 CFR 60.4) and the Hawai‘i Register (per HAR §13-198-8) due to its significance under Criterion C (“that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction”) and as having sufficient integrity, as described above. This determination of eligibility is consistent with the previous evaluation of Hīlea Bridge (MKE Associates LLC and Fung Associates, Inc. 2013).

Section 8 Project Effect and Mitigation Recommendations

8.1 Project Effect

In accordance with Federal regulations (36 CFR 800.5), the project-specific effect recommendation is “adverse effect.” Under Hawai‘i State historic preservation review legislation, the project’s effect recommendation is “effect, with proposed mitigation commitments” (in accordance with HAR §13-275-7).

The proposed project will have an adverse effect on the Hīlea Bridge (SIHP # 50-10-74-30298). The portion of the Māmalahoa Highway (SIHP # 50-10-47-30187) apart from the small portion extending over the Hīlea Bridge is not likely to be adversely affected by the proposed project. The integrity and significance of the highway will not be diminished.

8.2 Mitigation Recommendations

Architectural recordation is recommended for SIHP # 50-10-74-30298, Hīlea Bridge, in the form of Historic American Engineering Record (HAER) Level II documentation. No further archaeological work is recommended for the Māmalahoa Highway (SIHP # 50-10-47-30187). Although the archaeological sites HI-40 and HN-55 are outside the area of potential effect, SHPD recommended a temporary orange construction fence to be installed as an interim protection measure. At the request of the project proponent, precautionary archaeological monitoring is planned as a good faith effort, based on community consultation.

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Appendix A Ruzicka 2016 Study

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM – Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

GENERAL INFORMATION

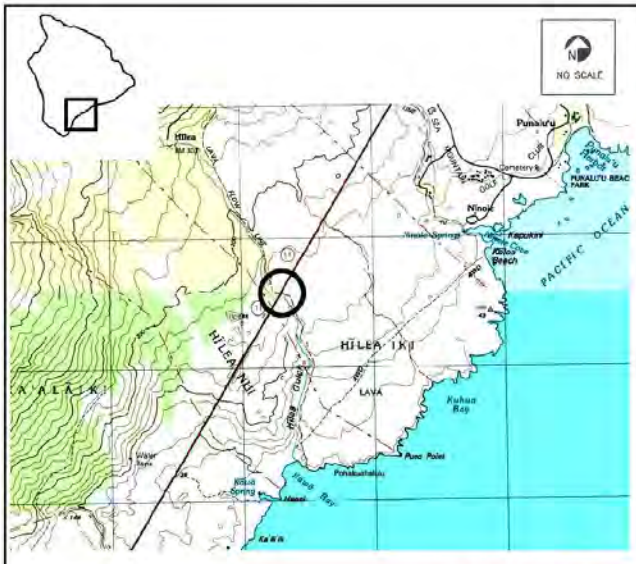
Common / Present Name: Hilea Bridge
Historic Name: Hilea Bridge

Address: Mamalahoa Highway (Rt. 11) at Hilea Stream
City/ Town/ Location: Vicinity Naalehu, Kau
County: Hawaii
TMK [(X)-X-X-XXX:XXX)]: between (3)-9-5-017:008 on west and (3)-9-5-017:007 on east
Subdivision/Neighborhood: n/a
Latitude: 19d-07m-28.86s N
Longitude: 155d-31m-33.33s W

Original Use: Vehicular bridge
Current Use: Vehicular bridge

Architect/ Builder (if known): William R. Bartels, engineer.
Moses Akiona, contractor
Date of Construction (if known): 1940

Hilea Bridge, view facing southwest



LOCATION MAP

1-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM – Reconnaissance Level

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

Prepared By: Dee Ruzicka Consulting Firm:
Mason Architects, Inc.
Address: 119 Merchant St. Suite 501 Honolulu, HI 96813
Telephone Number: 808-536-0556 Email:dr@masonarch.com Date: 06APR2016

CONDITION ASSESSMENT

Category (select all that apply):
- ☐ Building(s)
  - ☐ Residential
  - ☐ Commercial
  - ☐ Educational
  - ☐ Public/Civic
  - ☐ Religious
- ☒ Structure(s)
- ☐ Object(s)
- ☐ Site(s)/Landscape(s)
- ☐ Archaeology or potential for archaeology
  - Describe: _____

Alterations (additions, etc.) if known: **The concrete nosing at the upstream end of the center pier support appears to have been added. The concrete cap of the center pier appears to be original and is shown on an original drawing.(Dwg # 4478.21) The 1987 Hawaii Island Historic Bridge Inventory notes "the pier footing of this bridge has been rebuilt with concrete."(Alvarez, 1987, p. 84) Other alterations to the Hilea Bridge are evident from field inspection and appear to be minimal. The W-beam guardrails at the approaches were added at an undetermined date. These guardrails are free-standing and come to within about 1' of the bridge parapets without touching them. Also, the reflector and concrete housing appear to be additions which cannot be precisely dated.**


Hilea Bridge, view facing southeast


Hilea Bridge, view facing northeast

Original Location, if moved: _____
Reason for move (if known): _____

Condition:
- ☐ Excellent
- ☒ Good
- ☐ Fair
- ☐ Deteriorated

Condition Explanation: _____

Eligibility (select all that apply):
- ☒ National Register of Historic Places
- ☒ State Register of Historic Places
- ☐ Not Eligible

2-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

☒Eligible
☐Listed
☐Contributing to Historic District:
Name of District:
☐Unknown


Hilea Bridge, view facing south

Criteria of Significance (select all that apply)
☐A: Associated with Events
Event:

☐B: Associated with Significant Person(s)
Person(s): ____

☒C: Distinctive characteristics of a type, period or method of construction; work of a master; possess high artistic values (Architecture, Engineering, Design)

☐D: Have yielded or may be likely to yield information important to history or prehistory. Explain: ____

DESCRIPTION

Materials (please check those materials that are visible):

Height
☐Stories: ____
☐Below Ground
☐N/A
☒Other: bridge

Exterior Walls (siding):
☐Aluminum Siding
☐Asbestos
☐Brick
☐Ceramic
☐Concrete
☐Horizontal Wood Siding
☐Log
☐Metal
☐Shingles-Asphalt
☐Shingles-Wood
☐Stone
☐Stucco
☐Vertical Wood Siding
☐Vinyl Siding
☐Engineered Siding
☐Plywood
☐OSB
☐Fiberboard
☐Fiber Cement
☒Other: Wood parapets consisting of timbers and boards.

Roof:
☐Asphalt, shingle
☐Asphalt, roll
☐Other: ____
☐Metal
☐Slate
☐Built Up
☐Ceramic Tile
☐Wood Shingle
☒None

Foundation:
☐Brick
☐Concrete Block
☐Concrete Slab
☐None – on earth
☐Poured Concrete
☐Raised/Pile
☒Stone
☐Other: ____

Structural Support:
☐Baled Hay
☐Concrete Block
☐Concrete Framed
☐Concrete Poured
☒Frame-wood
☐Frame-metal/steel

3-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

☐Brick-load bearing	☐Puddled Clay	☐Sod
☐Stone-load bearing	☐Rammed Earth	☐Other: _____
Windows:		
☐Double Hung Sash	☐Replacement	☐Glass Block
☐Single Hung Sash	☐Aluminum	☒None/Unknown
☐Casement	☐Vinyl	☐Other: _____
☐Fixed	☐Jalousie	
☐Stained Glass	☐Ribbon	
Lanai(s)		
☐Arcade	☐Stoop	☒None
☐Balcony	☐Portico	☐Other: _____
☐Porte-Cochere	☐Verandah	
☐Recessed	☐Wrap-around	
Chimney		
☐Brick	☐Stone	☒None
☐Concrete	☐Stove Pipe	☐Other: _____
☐Stuccoed Masonry	☐Siding	

4-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site #	TMK #

Narrative Description

Narrative Description:

The Hilea Bridge is a 40' long, two-span timber bridge that carries the two traffic lanes of Mamalahoa Highway (Route 11) over the intermittent Hilea Stream in Kau District on Hawaii Island. The bridge lies within the approximate 54 mile long Kau Scenic Byway. The roadway of the bridge is about 14' above the stream bed, which is a natural channel.

The setting of the bridge is rural, with no buildings in the area around the bridge. Vegetation and trees line the stream on both sides of the bridge. Trees line most areas of the highway south of the bridge. North of the bridge the highway is cut about 10' into the earth to provide a gentle grade, and tall grass with some scattered trees are above the exposed lava embankments.

The Hilea Bridge is built of wooden timbers that have been treated with coal tar creosote. The end grain of many of its timbers are oozing this substance, which is soft and pliable. The Hilea Bridge is 24' wide between its painted wooden railings (parapets) and has an asphalt surfaced roadway over a wooden deck. Each parapet is about 3'-5" high and is composed of two, horizontal 8" boards with a horizontal 12 x 14 timber wheel guard at the roadway which acts as a curb. These horizontal members are supported by 8 x 8 posts on 6'-4" spacing, with 12 x 12 posts at the four corners of the bridge. The timber of the wheel guard is battered on the side facing traffic and sheathed with painted sheet metal. Sheet metal-lined scuppers are cut through the wheel guard on about 6'-4" spacing between the posts. About 6" above the wheel guard is a horizontal 4 x 8 board and 6" above that is the top rail of the parapet, a 3 x 8 board. At both ends of each parapet, 6'-4" of the parapet are splayed outward about 3'. This splayed portion has no metal sheathing on the wheel guard. The bridge has no signage. Evidence of earlier signage is visible on the top rail of the splayed northeast and southwest ends of the parapets.

At the south end of the downstream parapet that parallels the roadway, positioned atop the wheel guard, is a concrete housing that contains a 4½" diameter reflector oriented toward the north-bound traffic lane. This housing is about 6½" high and 7½" wide, with a length of about 13½" at the base. The rear of the housing slopes up from the base to the top surface, which is about 8½" long. The front of the housing (containing the reflector) is vertical. This housing is painted and is fixed solidly on top of the metal sheathing of the wheel guard.

The northwest and southeast approaches to the bridge have W-beam guardrails on posts. At the southeast these are 8" square concrete posts. The northwest side guardrail is on steel I-beam posts.

The underside of the Hilea Bridge has battered, concrete rubble basalt lava masonry abutments and one basalt masonry support pier on the stream bed that is about 5' high, 30' long and about 4' wide at its base, tapering to about 2'-6" wide at its top surface, which has a concrete cap. The upstream-facing end of the pier has a concrete nose that is battered and v-shaped in plan. The concrete nosing and cap are likely modifications to the original design. The pier is on 19' spacing from the top edge of the battered abutments. Atop the pier is a wooden transverse bent (about 6' high) that supports the stringers and deck of the bridge. The bent is

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HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

comprised of five, 12 x 12 posts (outer posts are battered) on a horizontal 12 x 12 wooden sill that is set on 4 x 12 bearing blocks on the concrete top surface of the pier. The posts are braced by diagonal 3 x 10 timbers. A wooden 12 x 12 transverse cap beam joins the tops of the five posts and supports the 6 x 18 longitudinal wooden stringers (set on about 2'-10" spacing). The bridge deck atop the stringers is 2 x 6 boards oriented vertically. The asphalt surface roadway is atop the solid 2 x 6 deck.

Hilea Bridge is bridge number 001000110306489 in the National Bridge Inventory database. It was last inspected on October 11, 2012 by the State of Hawaii, Department of Transportation, Highways Division.

Integrity:

The Hilea Bridge retains sufficient integrity to convey its significance and enable NR listing. Integrity of location and setting are fully retained. Integrity of design, materials, and workmanship are somewhat compromised by the alterations, but the major design elements, construction materials and their evident craftsmanship are intact. Integrity aspects of feeling and association are also retained.

Nearby Resources:

During the field inspection of Mamalahoa Highway for a distance of approximately ½ mile on either side of the Hilea Bridge no features were noted.

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HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

Hilea Bridge Survey Area

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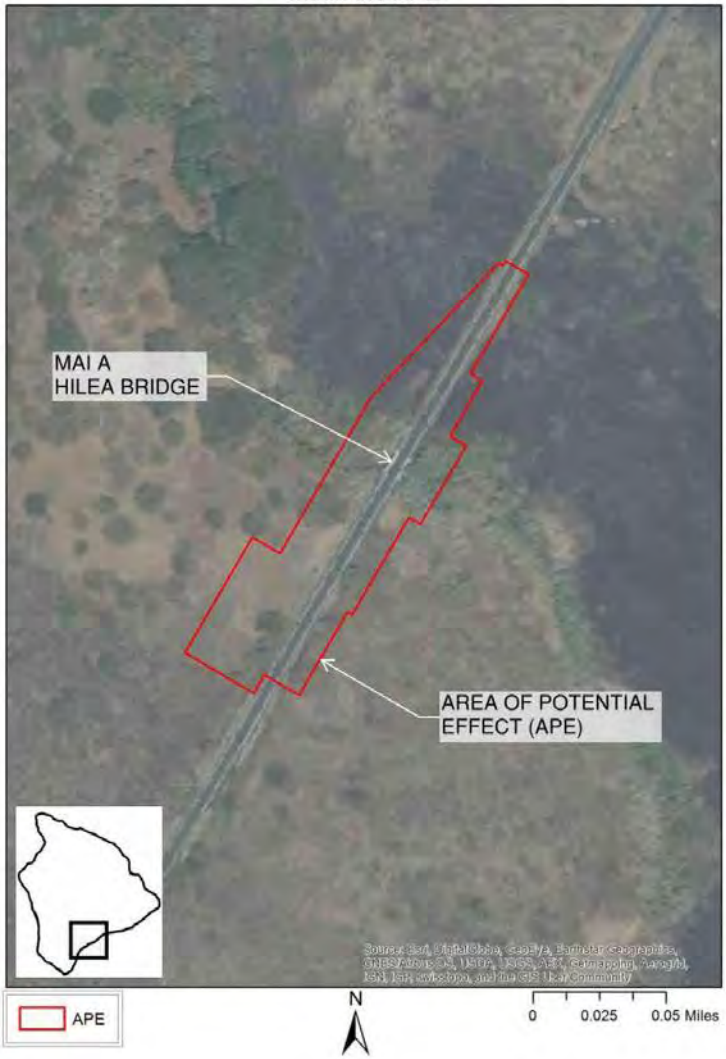
HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

Hilea Bridge APE
Historic Resources
within the APE



8-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site #	TMK #

Statement of Significance

Historical Context:

The Hilea Bridge was part of Federal Aid Project (FAP) 18-C (1) of 1938 that constructed the approximate six mile long section of Mamalahoa Highway (Hawaii Belt Road) from about Punaluu Gulch to Honuapo. Another similar timber bridge at Ninole Stream (approximately 1½ miles north on Mamalahoa Highway) was also constructed under this project. The contract for FAP 18-C (1) was let from the Territorial Highway Department to contractor Moses Akiona for a total cost of $198,132. This total amount consisted of $99,066 in Federal funds and an equal amount in funding from territorial sources. The official completion date of FAP 18-C (1) was May 22, 1940. As early as 1935 annual report to the governor from the Hawaii Territorial Superintendent of Public Works indicates that $100,000 was available from territorial funds and matching federal funds for the improvement of the road (Mamalahoa Highway) from the National Park to Honuapo.

Original drawings for the Hilea Bridge were prepared by the Hawaii Territorial Highway Department. The title sheet for the set of 44 drawings for FAP 18-C (1) are signed by Louis B. Cain, Territorial Highway Engineer and are dated December 30, 1938. Drawing sheet 21 "Bridge No. 10" details the Hilea Bridge. This drawing has a note at the left margin reading "Designed by W. R. Bartels Nov. 1938." William R. Bartels was a bridge engineer for the Hawaii Territorial Highway Department. He received his education and training in Germany and immigrated to Hawaii in 1932 when he commenced working with the Highway Department. He continued his career there until his retirement in 1958. During that period he was a prolific designer, responsible for large and sophisticated bridge construction projects in Hawaii, including many tee-beam and rigid-frame concrete bridges.

In addition to the nearby Ninole Bridge, a similar construction system using masonry support piers and timber superstructure was used on other Territorial Highway Department bridges, such as Makaha Bridges 3 and 3A on Oahu (see Historic American Engineering Record HAER No. HI-90). Although the overall dimensions and parapets for these Makaha bridges differ from the Hilea Bridge, the superstructure uses the same type of masonry piers, 12 x 12 posts with 3 x 10 bracing, 6 x 18 stringers, and 2 x 6 decking.

Significance Statement:

"This bridge is eligible under Criterion C for its association with wood bridge construction in Hawaii. It is a good example of a wood bridge in the 1940s in its use of materials, method of construction, craftsmanship and design" (MKE Assoc., Fung Assoc. 2013, 6-76).

In addition to the conclusions in the 2013 Hawaii State Historic Bridge Inventory, the Hilea Bridge is considered eligible under Criterion C as the work of a master: engineer William R. Bartels. This bridge and the nearby Ninole Bridge, are the last remaining timber bridges in the Hawaii State Highway System, representing rare remaining examples of a historic bridge type.

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HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site #	TMK #

References

Drawings:

Historic drawings are available at the Hawaii Department of Transportation, Highway Design Section database as electronic scans. These include:

Project 18C (1), 44 sheets. Dated November 1938.

Sources:

Alvarez, Patricia M. Historic Bridge Inventory and Evaluation, Island of Hawaii. . Honolulu: State of Hawaii, Department of Transportation, Highways Division. July 1987.

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

March 1, 2017

IN REPLY REFER TO:
Log No. 2017.00388
Doc. No. 1703SL02
Architecture, Archaeology

Thomas Parker, Environmental Protection Specialist
Federal Highway Administration
Central Federal Lands Highway Division
12300 W. Dakota Ave., Suite 280
Lakewood, CO 80228

Dear Mr. Parker,

SUBJECT: **Chapter 6E-8 and National Historic Preservation Act Section 106 Review – Archaeological Inventory Survey for Nīnole Bridge Replacement Project Federal Contract No. DTFH68-13-R-00027 Nīnole Ahupua'a, Ka'ū District, Island of Hawai'i TMK: (3) 9-5-019; (3) 9-5-019:011, 016, 024, 035 por.; 9-5-027:020 por.; 9-5-027 Hawai'i Belt Road/Māmalahoa Highway Right-of-Way**

Thank you for the opportunity to review the revised draft report titled *Archaeological Inventory Survey Report for the Nīnole Bridge Replacement Project, Nīnole Ahupua'a, Ka'ū District, Island of O'ahu, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD) Contract DTFH68-13-R-00027, TMK: (3) 9-5-019:011, 016, 024, 035 por.; 9-5-027:020 por.; 9-5-019, 9-5-027, Hawai'i Belt Road/Māmalahoa Highway Right-of-Way* (Yucha and Hammatt, February 2017). The State Historic Preservation Division (SHPD) received the original draft on February 1, 2016 and a replacement draft in August 2016 (Log No. 2016.00224). A revised draft (Log No. 2017.00388) was received via email on February 28, 2017 (Scott Belluomini [Cultural Surveys] to Susan Lebo [SHPD]).

This archaeological inventory survey (AIS) report was prepared by Cultural Surveys Hawai'i, Inc. (CSH) at the request of CH2M HILL, on behalf of the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD). The agency identified the area of potential effect (APE) as comprising 2.5 acres of land primarily owned by the State of Hawaii. The FHWA is providing funding (Contract DTFH68-13-R-00027) and has determined the project is a federal undertaking as defined by 36 CFR 800.16(y) and is subject to the National Historic Preservation Act (NHPA) Section 106 process. This State of Hawaii Department of Transportation (HDOT) project is also subject to review under the Hawaii Revised Statutes (HRS) Chapter 6E-8 historic preservation review process.

This AIS report was completed in support of the proposed replacement of Nīnole Bridge, as part of a HDOT and FHWA/CFLHD partnership project. It is one of a number of such proposed bridge improvement and replacement projects in the State of Hawai'i. The replacement bridge would match the appearance of other new bridges on the highway, and would have an expanded width to accommodate two 11-foot wide lanes and 9-foot wide shoulders. Ground disturbance will include excavations for the removal of the existing bridge, and construction of the new bridge structure, including foundations and abutments.

The entirety of the APE was included in a previous AIS conducted in support of the approximately 430-acre Sea Mountain at Punalu'u Resort (Tulchin et al. 2006). A total of 34 historic properties (mostly walls, as well as several enclosures, railroad berms, and a burial) were identified, none within the current project APE.

The current AIS fieldwork involved a pedestrian survey which newly identified two historic properties as being wholly or partially within the APE: the Nīnole Bridge and the Māmalahoa Highway. The bridge was originally built in 1940 and was designated during the current AIS project as Site 50-10-74-30299. The State Historic Bridge Inventory Evaluation (MKE Associates LLC/Fung Associates, Inc.) identified Nīnole Bridge as being eligible for listing on the National Register of Historic Places (NRHP) and/or the Hawaii Register of Historic Places (HRHP). Furthermore, Ruzicka (2016) determined that Nīnole Bridge is eligible for listing under Criterion C (embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value).

The AIS report assessed Nīnole Bridge as significant under Criterion c pursuant to Hawaii Administrative Rules (HAR) §13-275-6 and concurred with the Ruzicka (2016) survey results, which indicate Nīnole Bridge retains integrity of location, setting, feeling, and association. Integrity of design, materials, and workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact.

The Māmalahoa Highway (Site 50-10-47-30187) was previously assessed as significant by Clark et al. (2014:81), pursuant to HAR §13-284-6, as being significant under Criteria A and D [sic, Criteria a and d]. This historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association, and is evaluated as eligible for inclusion on the NRHP (per 36 CFR 60.4) under Criterion A (associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (have yielded, or may be likely to yield, information important in prehistory or history). Additionally, Site 30187 is evaluated as eligible for listing on the HRHP (per HAR §13-198-8) under Criteria A and D. The significance assessment and evaluation of eligibility is based on the highway's association with "important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity" (Clark et al. 2014:81). Portions of the highway were constructed atop an ancient trail (Site 50-10-27-00002), portions were built as part of the "Old Government Road" and portions were built as a by-pass to the "Old Government Road." The portion of the highway within the current APE is part of the by-pass; Site 00002 and the "Old Government Road" do not occur within the APE.

The AIS report provides an effect determination recommendation of "adverse effect" under NHPA Section 106 and "effect with proposed mitigation commitments" under HAR §13-275-7. The proposed project would have an adverse effect on the Nīnole Bridge (Site 50-10-74-30299). However, the portion of the Māmalahoa Highway (Site 50-10-47-30187) within the APE would not be adversely affected by the proposed project. The integrity and significance of the highway would not be diminished, the alignment would remain unchanged, and the road surface would be replaced in-kind where impacted by project work.

The proposed HAR §13-275-7 mitigation commitments include data recovery in the form of archaeological monitoring for all ground disturbing activities, and architectural recordation is recommended for Site 50-10-74-30299 in the form of Historic American Engineering Record (HAER) Level II documentation. In addition, temporary orange construction fencing would be installed as a precautionary interim protection measure to ensure the project does not impact nearby sites outside but proximate to the project APE, specifically Site 50-10-68-24907 (post-Contact wall).

The revisions adequately address the issues and concerns identified in consultation meetings and earlier correspondence. The SHPD has reviewed the submittal pursuant to HRS Chapter 6E-8, and the State Historic Preservation Officer (SHPO) **concurs** with the site significance assessments (per HAR §13-275-6), the eligibility recommendations (per 36 CFR 60.4 and HAR §13-198-8), the project effect determination recommendations, and the HAR §13-275-7 proposed mitigation commitments. The report meets the requirements of HAR §13-276-5 and the Secretary of the Interior's Standards for Archaeological Documentation. **It is accepted**. Please send two hardcopies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version, to the Kapolei Office, attention SHPD Library.

The SHPO looks forward to receiving FHWA's effect determination pursuant to 36 CFR 800.5. If the FHWA determines that the proposed undertaking will result in an "adverse effect" then the SHPO will consult with FHWA on the development of a Memorandum of Agreement (MOA) to resolve any adverse effects.

Please contact Jessica Puff, Architectural Historian, at (808) 692-8023 or at Jessica.L.Puff@hawaii.gov for questions regarding architectural resources. Please contact Susan A. Lebo, Archaeology Branch Chief, at (808) 692-8019 or at Susan.A.Lebo@hawaii.gov for questions regarding archaeological resources or this letter, or if there is a change in the APE or the scope of work for this project.

Aloha,

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: David Shideler, Cultural Surveys Hawaii (Dshideler@culturalsurveys.com)
Michael Will, FHWA (Michael.Will@dot.gov)

Final

Archaeological Inventory Survey Report for the Nīnole Bridge Replacement Project, Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, Federal Highway Administration/ Central Federal Lands Highway Division (FHWA/CFLHD) Contract DTFH68-13-R-00027 TMKs: [3] 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way

Prepared for
CH2M HILL
and on behalf of the
Federal Highway Administration (FHWA)
Central Federal Lands Highway Division (CFLHD)

Prepared by
Trevor M. Yucha, B.S.
and
Hallett H. Hammatt, Ph.D.

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Management Summary

Reference	Archaeological Inventory Survey Report for the Nīnole Bridge Replacement Project, Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD) Contract DTFH68-13-R-00027 TMKs: [3] 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way (Yucha and Hammatt 2017)
Date	February 2017
Project Number(s)	• FHWA/CFLHD contract code: DTFH68-13-R-00027 • CH2MHILL Project Task ID: 499067.09.SU.CS • Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: NINOLE 3
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological permit number 15-03, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-13-282.
Agencies	FHWA/CFLHD, SHPD
Land Jurisdiction	State Department of Transportation (HDOT), Private
Project Proponent	FHWA/CFLHD, HDOT
Project Funding	FHWA/CFLHD, HDOT
Project Location	The project area is located at mile post 56.7 on Highway 11 (Māmalahoa Highway) at the Alahaki Road/Nīnole Loop Road intersection within Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island. The project area is depicted on a 1982 Punaluu U.S. Geological Survey (USGS) topographic quadrangle.
Project Description	The purpose of the project is to replace the existing timber bridge and its approaches to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches. The existing deficient bridge was built in 1950 and does not accommodate the current roadway width or bridge standards. It does not meet current live load and seismic requirements. The bridge railings and approaches do not meet current crash test requirements. The replacement bridge would be modern and match other new bridges on the state highway. It would be wider than the existing bridge, to accommodate two 11-foot wide lanes and 9-foot wide shoulders. The concrete post and beam bridge railings would be 2 feet 8 inches high, capped with a 10-inch high metal railing, for a total height of 3 feet 6 inches for bicycle safety. Concrete end posts with metal railings would be installed. These railings would be similar to the railings on the Keaiwa

	Stream Bridge, which is located on Highway 11 approximately six miles north of Nīnole Bridge.
Project Acreage	The project area comprises approximately 2.5 acres (1.0 hectares).
Area of Potential Effect (APE)	The APE for the current project is defined as the entire 2.5-acre (1.0-hectare) project area.
Historic Preservation Regulatory Context	This AIS investigation was designed to be compliant with both Federal and Hawai‘i State environmental and historic preservation review legislation. Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and, due to funding from the U.S. Department of Transportation, Section 4(f) of the Department of Transportation Act. The proposed project is also subject to Hawai‘i State environmental and historic preservation review legislation (Hawai‘i Revised Statutes [HRS] §343, and HRS §6E-8 and Hawai‘i Administrative Rules [HAR] §13-275, respectively). In consultation with the SHPD, this AIS investigation fulfills the requirements of HAR §13-13-276 and the *Secretary of the Interior's Standards for Archaeology and Historic Preservation*. It was conducted to identify, document, and to make site significance assessments per HAR §13-276-6 and also to evaluate eligibility for inclusion in the National Register of Historic Places (National Register) for all historic properties within the project APE. It was also conducted to make Hawai‘i Register of Historic Places (Hawai‘i Register) eligibility recommendations for any historic properties. This report is also intended to support any project-related historic preservation consultation with stakeholders such as State and County agencies and interested Native Hawaiian Organizations (NHOs) and community groups, if applicable. A companion architectural study (Ruzicka 2016) was conducted in conjunction with this AIS Report. An SHPD "Historic Resource Inventory Form–Reconnaissance Level" was prepared to make a determination of eligibility for potential historic properties. This study includes a condition assessment, narrative description, historical context discussion, and significance statement and references historic drawings consulted. The architectural study has been incorporated into the present AIS document as Appendix A. The entire project APE was included in a previous AIS study. In 2005, CSH conducted an AIS of the approximately 430-acre Sea Mountain at Punalu‘u Resort (Tulchin et al. 2006). A total of 34 historic properties were identified, 12 of which are located in the vicinity of the current project APE. No historic properties designated on the State Inventory of Historic Places (SIHP) have been previously documented within the current project APE. The Nīnole Bridge was previously documented (by MKE Associates LLC/Fung Associates, Inc. 2013) in the State Historic

	Bridge Inventory & Evaluation as Bridge # 001000110306600. Māmalahoa Highway (SIHP # 50-10-47-30187) extends through the project APE.
Fieldwork Effort	Fieldwork was accomplished on 17 June 2015 by Scott Belluomini, B.A. and Nifae Hunkin, B.A. under the general supervision of Principal Investigator, Hallett H. Hammatt, Ph.D. This work required approximately 2 person-days to complete.
Consultation	The Nīnole Bridge Replacement project is part of a HDOT and FHWA/CFLHD partnership project. It is one of a number of proposed bridge improvement and replacement projects in the State of Hawai‘i. Presently, National Historic Preservation Act Section 106 consultation with community, agency, and NHOs has been initiated. The National Historic Preservation Act Section 106 consultation process is ongoing. Cultural consultation was also conducted by CSH in the form of a cultural impact assessment (CIA) for Nīnole Bridge and the nearby Hīlea Bridge (Liborio et al. 2016).
Historic Properties Identified, Significance Assessments and Eligibility Determinations	The AIS identified two historic properties within the project APE: SIHP # 50-10-47-30187, Māmalahoa Highway, was previously assessed as significant by Clark et al. (2014:81) under HAR “§13-284-6” under Criterion “A” for its being associated with events and Criterion “D” for its information potential. It is the understanding of this study that the Clark et al. (2014) assessment of significance was explicitly under HAR “§13-284-6” as significant under Criteria a and d. This report supports the Clark et al. (2014) assessment of significance. Therefore, pursuant to HAR §13-275-6, SIHP # 50-10-47-30187, Māmalahoa Highway, is assessed as significant under Criterion a (Be associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (Have yielded, or is likely to yield, information important for research on prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. SIHP # 50-10-47-30187, is evaluated as eligible for inclusion in the National Register (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). SIHP # 50-10-47-30187, is evaluated as eligible for listing on the Hawai‘i Register (per HAR §13-198-8) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). This assessment of significance and evaluation of eligibility is based on the historic properties association with “important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity” (Clark et al. 2014:81).

	SIHP # 50-10-68-30299, Nīnole Bridge, was previously assessed for eligibility for inclusion on the National Register and/or Hawai‘i Register as Bridge # 001000110306600 by MKE Associates LLC and Fung Associates, Inc. (2013). It was designated SIHP 3 50-10-68-30299 during the current AIS and assessed under HAR §13-275-6. In consultation with Mason Architects, Inc., SIHP # 50-10-68-30299 is assessed as significant under Criterion c (embodies the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value). It retains full integrity of location, setting, feeling, and association. Integrity of design, materials, and workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact. SIHP # 50-10-68-30299 was evaluated by Ruzicka (2016) as eligible for inclusion on the National Register (per 36 CFR 60.4) and the Hawai‘i Register (per HAR §13-198-8) due to its significance under Criterion C (“that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction”) and is considered to have sufficient integrity as described above. This significance assessment is also consistent with the previous evaluation of Nīnole Bridge (MKE Associates LLC and Fung Associates, Inc. 2013) and HDOT and FHWA/CFLHD concur with this previous evaluation.
Effect Recommendation	In accordance with Federal regulations (36 CFR 800.5), the project-specific effect recommendation is “adverse effect.” Under Hawai‘i State historic preservation review legislation, the project’s effect recommendation is “effect, with proposed mitigation commitments” (in accordance with HAR §13-13-275-7). The proposed project will have an adverse effect on the Nīnole Bridge (SIHP # 50-10-68-30299). The portion of the Māmalahoa Highway (SIHP # 50-10-47-30187) apart from the portion extending over the Nīnole Bridge is not likely to be adversely affected by the proposed project. The integrity and significance of the highway will likely not be diminished.
Mitigation Recommendations	Architectural recordation is recommended for SIHP # 50-10-68-30299 in the form of Historic American Engineering Record (HAER) Level II documentation. No further archaeological work is recommended for the Māmalahoa Highway (SIHP # 50-10-47-30187). Although SIHP # 50-10-68-24907 (post-Contact wall) is outside the project APE, SHPD recommended a temporary orange construction fence to be installed as an interim protection measure due to the proximity of SIHP # 50-10-68-24907 to the project APE. At the request of the project proponent, precautionary archaeological monitoring is planned as a good faith effort, based on community consultation.

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Section 1 Introduction

1.1 Project Background

At the request of CH2M HILL and on behalf of the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), Cultural Surveys Hawai‘i, Inc. (CSH) has completed an archaeological inventory survey (AIS) for the Nīnole Bridge Replacement project, Nīnole Ahupua‘a, Ka‘ū District, FHWA/CFLHD Contract DTFH68-13-R-00027 (TMKs: [3] 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way. The project area is located along Highway 11 (Māmalahoa Highway) at the Alahaki Road/Nīnole Loop Road intersection and includes approximately 2.5 acres (1.0 hectares). The area of potential effect (APE) is defined as the entire 2.5-acre project area and is depicted on a portion of the 1982 Punaluu U.S. Geological Survey (USGS) topographic quadrangle (Figure 1), tax map plats (Figure 2 and Figure 3), and an aerial photograph (Figure 4).

The purpose of the project is to replace the existing timber bridge and its approaches to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches. The existing deficient bridge was built in 1950 and does not accommodate the current roadway width or bridge standards. It does not meet current live load and seismic requirements. The bridge railings and approaches do not meet current crash test requirements. The replacement bridge would be modern and match other new bridges on the state highway. It would be wider than the existing bridge, to accommodate two 11-foot wide lanes and 9-foot wide shoulders. The concrete post and beam bridge railings would be 2 feet 8 inches high, capped with a 10-inch high metal railing, for a total height of 3 feet 6 inches for bicycle safety. Concrete end posts with metal railings would be installed. These railings would be similar to the railings on the Keaiwa Stream Bridge, located on Highway 11 six miles north of Nīnole Bridge.

1.2 Historic Preservation Regulatory Context

This AIS investigation was designed to be compliant with Federal and Hawai‘i State environmental and historic preservation review legislation. Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act and the National Environmental Policy Act and, due to funding from the U.S. Department of Transportation, Section 4(f) of the Department of Transportation Act. The proposed project is also subject to Hawai‘i State environmental and historic preservation review legislation (Hawai‘i Revised Statutes [HRS] §343, HRS §6E-8 and Hawai‘i Administrative Rules [HAR] §13-275).

This AIS investigation fulfills the requirements of HAR §13-276 and the *Secretary of the Interior’s Standards for Archaeology and Historic Preservation*. It was conducted to identify, document, and make site significance assessments per HAR §13-276-6 and also to evaluate eligibility for inclusion on the National Register of Historic Places (National Register) for all historic properties within the project APE. It was also conducted to make Hawai‘i Register of Historic Places (Hawai‘i Register) eligibility recommendations for any historic properties. This report is also intended to support any project-related historic preservation consultation with stakeholders, such as State and County agencies and interested Native Hawaiian Organizations (NHOs) and community groups, as required.

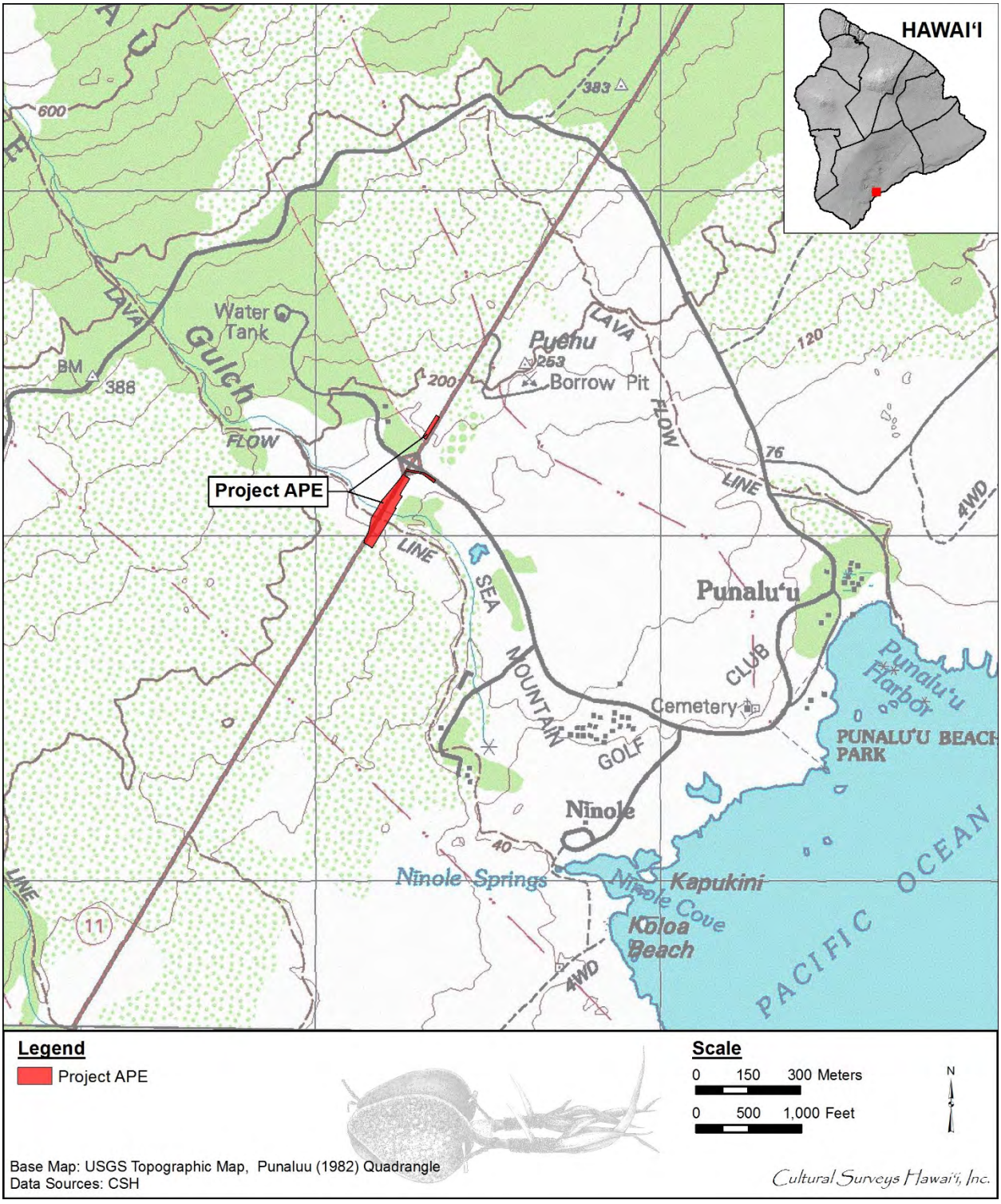

Figure 1. Portion of the 1982 Punaluu USGS 7.5-minute topographic quadrangle showing the location of the project APE

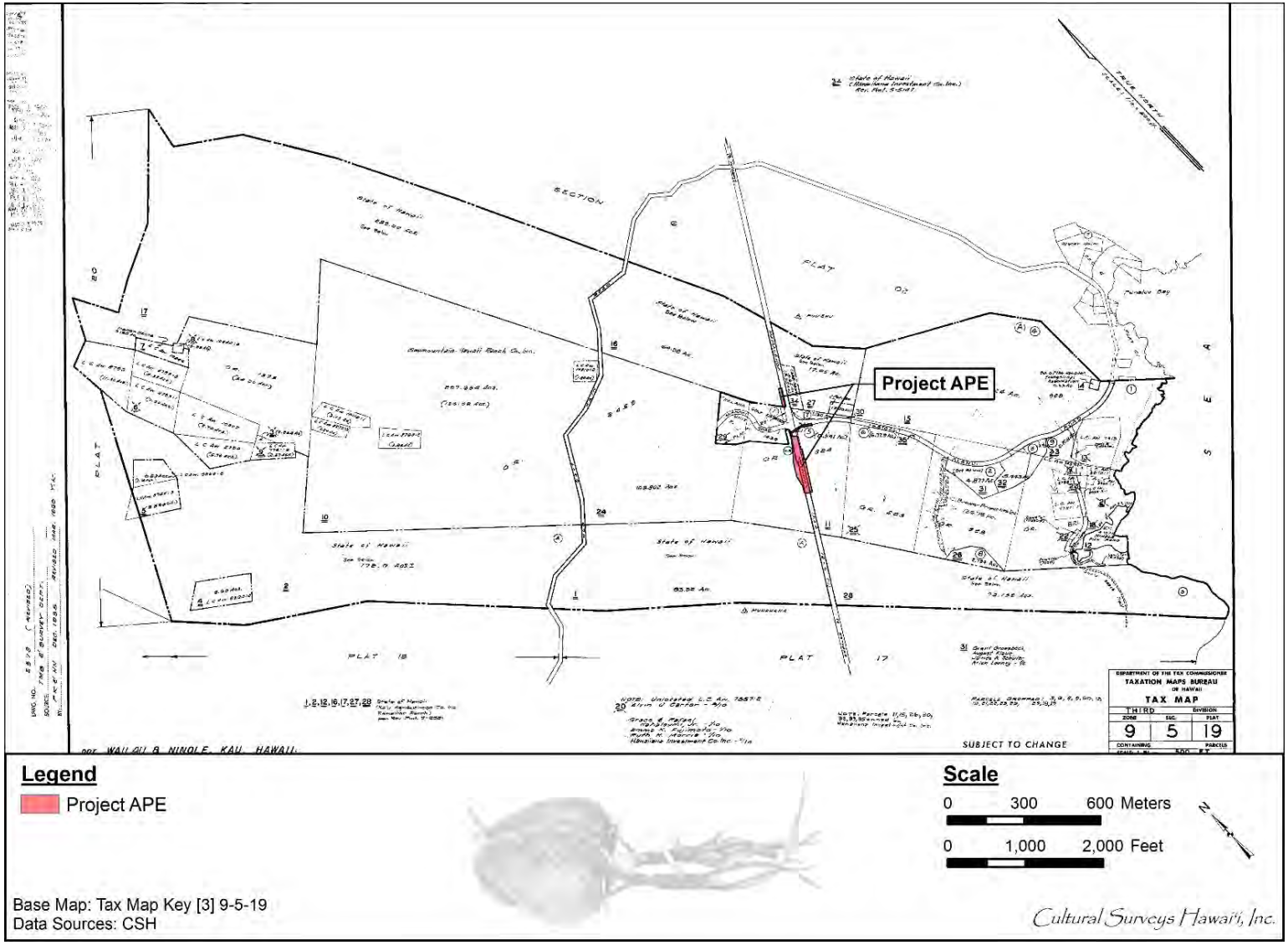

Figure 2. Tax Map Key (TMK): [3] 9-5-019, showing the location of the project APE (Hawai‘i TMK Service 2014)

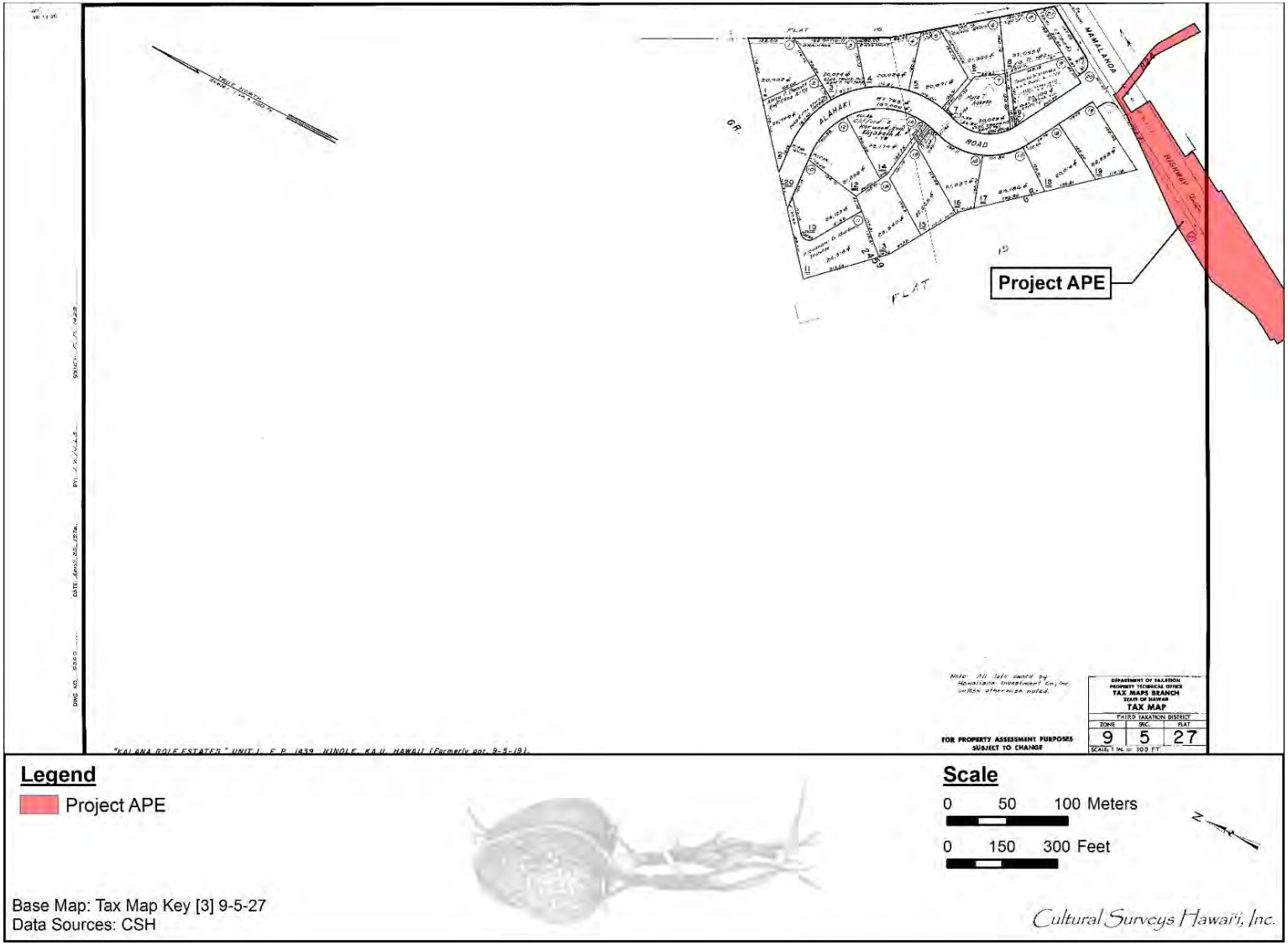

Figure 3. TMK: [3] 9-5-027, showing the location of the project APE (Hawai‘i TMK Service 2014)

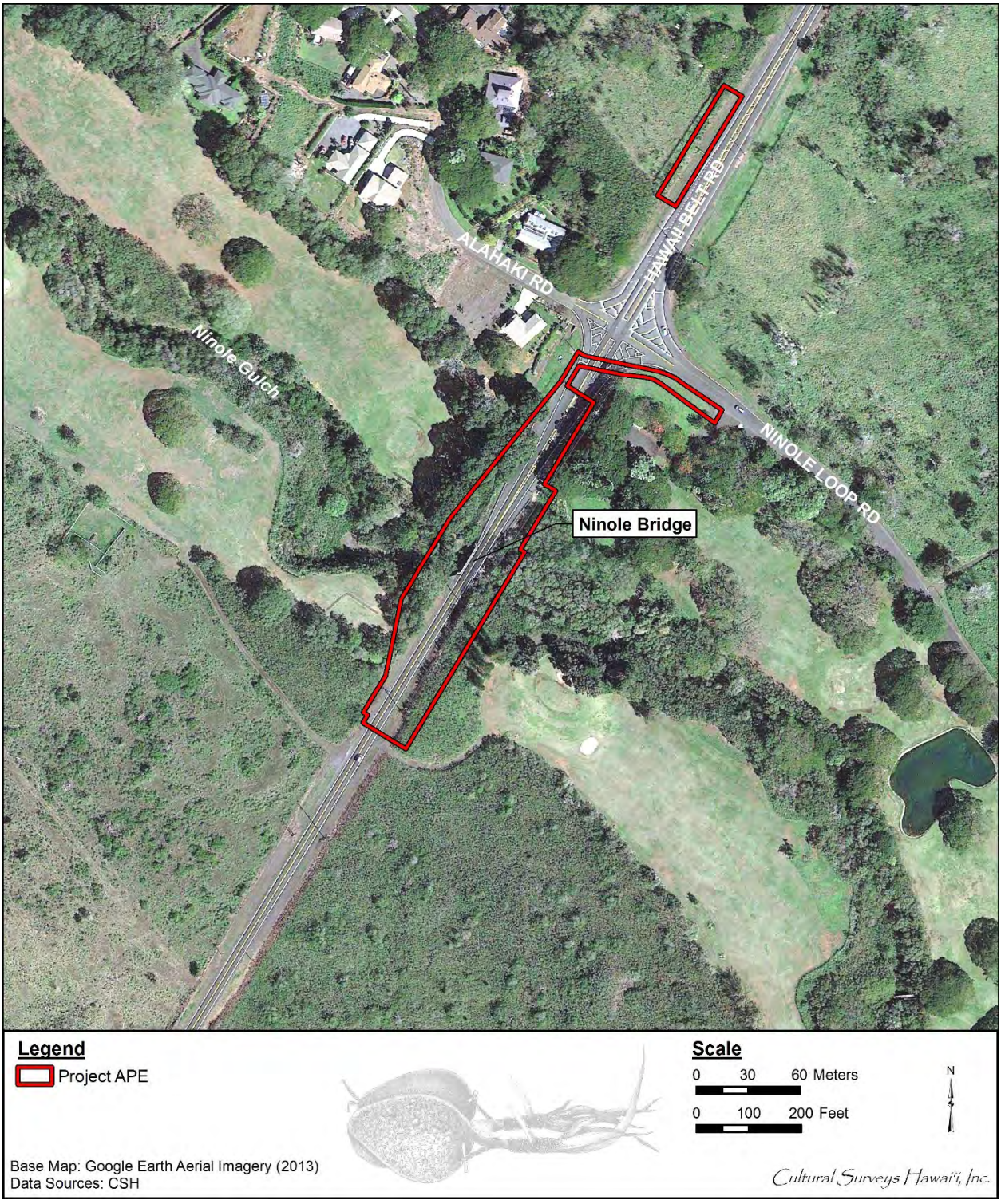

Figure 4. 2013 aerial photograph showing the location of the project APE (Google Earth 2013)

A companion architectural study (Ruzicka 2016) was conducted in conjunction with this AIS Report. An SHPD "Historic Resource Inventory Form–Reconnaissance Level" was completed to make a determination of eligibility for potential historic properties. This study includes a condition assessment, narrative description, historical context discussion, and significance statement and references historic drawings consulted. This architectural study has been incorporated into the present AIS document as Appendix A.

The entire project APE was included in a previous AIS study. In 2005, CSH conducted an AIS of the approximately 430-acre Sea Mountain at Punalu‘u Resort (Tulchin et al. 2006). A total of 34 historic properties were identified, 12 of which are located in the vicinity of the current project APE. No historic properties designated on the State Inventory of Historic Places (SIHP) have been previously documented within the current project APE. The Nīnole Bridge was previously documented (by MKE Associates LLC/Fung Associates, Inc. 2013) in the State Historic Bridge Inventory & Evaluation as Bridge # 001000110306600. Māmalahoa Highway extends through the project APE.

1.3 Environmental Setting

1.3.1 Natural Environment

The project APE is located within 1.3 km of the coast on basaltic lava flows (Figure 5). Geologic substrate within the northeastern half of the project APE, northeast of Nīnole Gulch, consists of Qk1y, Kau Basalt, dating from 3,000 to 5,000 years before present. Geologic substrate within the southwestern half of the project APE, southwest of Nīnole Gulch, consists of a more recent Qk2, Kau Basalt, deposit dating from 1,500 to 3,000 years before present.

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Sato et al. (1973), soils within the project APE consist of *‘a‘ā* lava flows (rLV), Punaluu extremely rocky peat, 6 to 20% slopes (rPYD), and Very stony land (rVS) (Figure 6).

Lava flows, *‘a‘ā* (rLV) are described as follows:

> This lava has practically no soil covering and is bare of vegetation, except for mosses, lichens, ferns, and a few small ohia trees. It is at an elevation ranging from near sea level to 13,000 feet and receives from 10 to 250 inches of rainfall annually. [Sato et al. 1973:34]

Soils of the Punaluu Series are described as follows:

> The Punaluu series consists of well-drained, thin organic soils over pahoehoe lava bedrock. These soils are gently sloping to moderately steep. They are on uplands at an elevation ranging from near sea level to 1,000 feet and receive 60 to 90 inches of rainfall annually. [Sato et al. 1973:48]

Very stony land (rVS) is described as follows:

> Very stony land is a miscellaneous land type consisting of very shallow soil material and a high proportion of Aa lava outcrops. The dominant slope is between 10 and 15 percent. Between the lava outcrops and in the cracks of the lava, the soil material extends to a depth of 5 to 20 inches. This land is at an elevation ranging

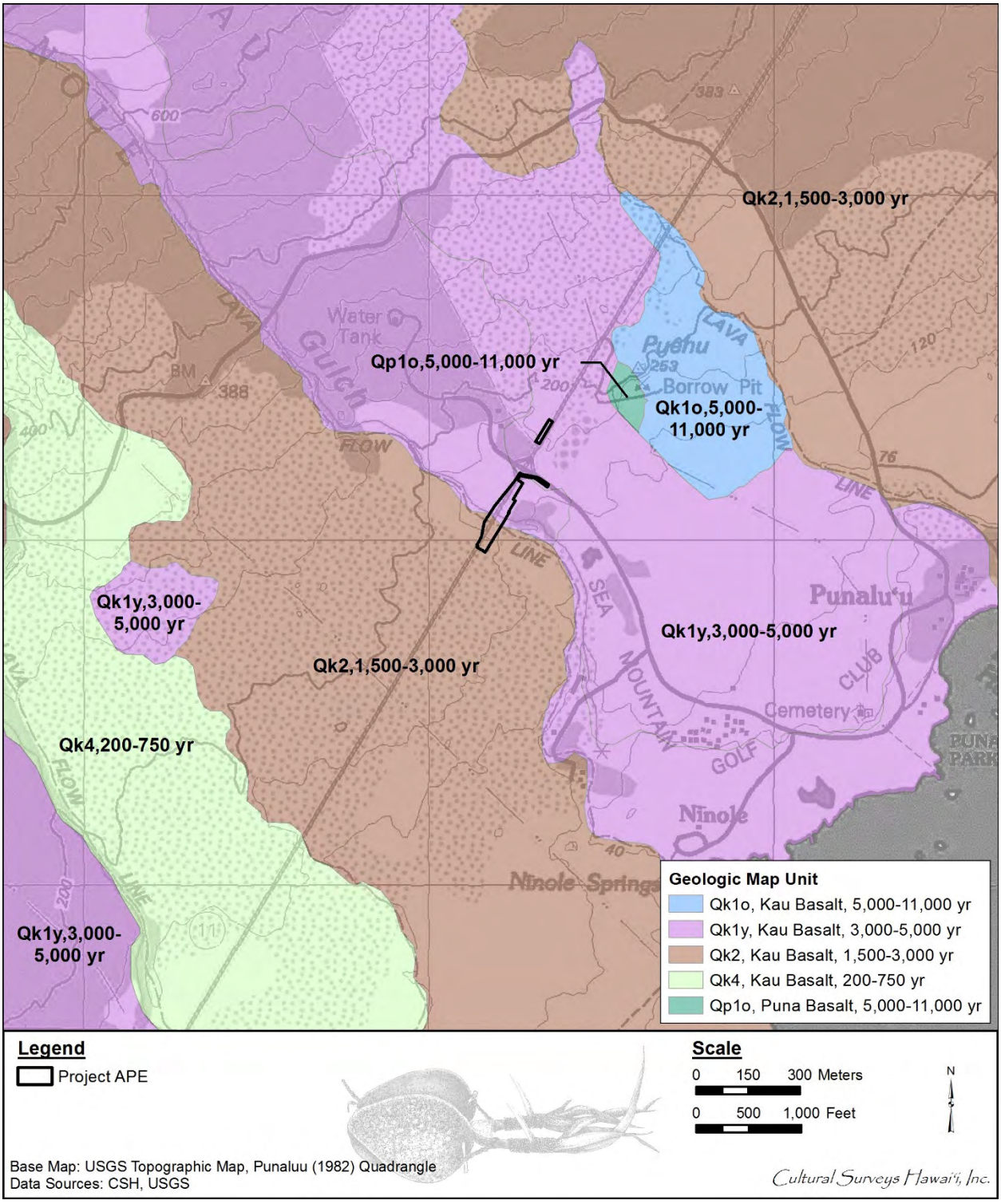

Figure 5. Portion of the 1982 Punaluu USGS 7.5-minute topographic quadrangle with an overlay of USGS geologic data (Sherrod et al. 2007)

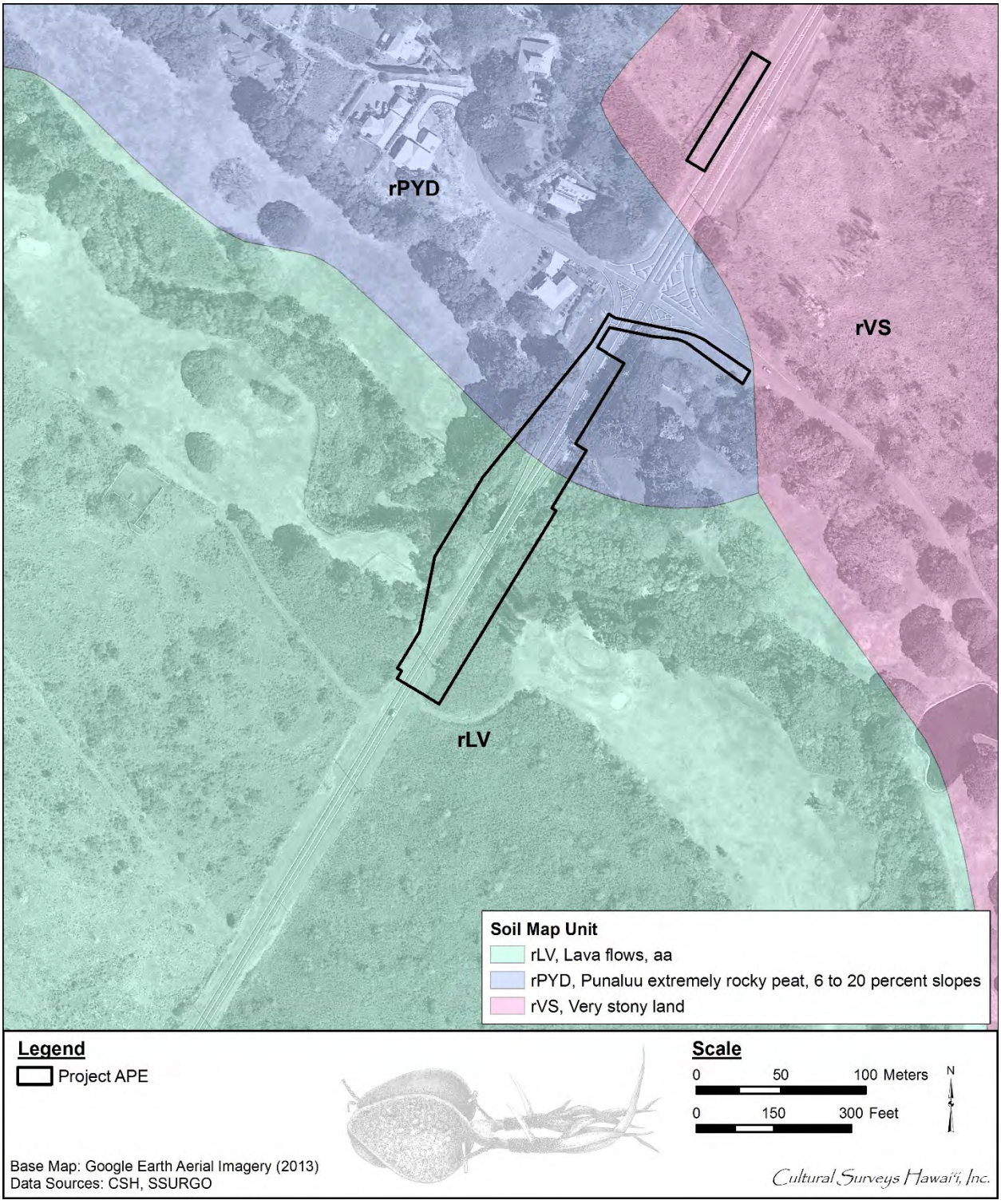

Figure 6. Aerial photograph (Google Earth 2013) with an overlay of the soil survey data gathered by Sato et al. (1973) (USDA SSURGO 2001)

> from near sea level to 13,000 feet and receives from 10 inches to more than 150 inches of rainfall annually. [Sato et al 1972:52]

The project APE receives approximately 1,030-1,060 mm (40.5-41.7 inches) of annual rainfall, with increased rainfall at higher elevations (Giambelluca et al. 2013). Average monthly air temperatures in the project APE range between 73.7 ˚ and 74.1˚ F in the project APE (Giambelluca et al. 2014). Vegetation within the project APE includes exotic grasses, *koa haole* (*Leucaena leucocephala*), and Christmas berry (*Schinus terebinthifolia*).

1.3.2 Built Environment

The project APE's built environment includes a portion of Highway 11 (Māmalahoa Highway) including the intersection of Alahaki Road and Nīnole Loop Road, and the Nīnole Bridge. Portions of the Sea Mountain Golf Course including a cart path are also located within the project APE. Nīnole Bridge is a timber stringer bridge constructed in 1940. The Sea Mountain Golf Course began operation in 1971.

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of this AIS under archaeological permit number 15-03, issued by the SHPD pursuant to HAR §13-13-282. Fieldwork was accomplished on 17 June 2015 by Scott Belluomini, B.A. and Nifae Hunkin, B.A. under the general supervision of Principal Investigator, Hallett H. Hammatt, Ph.D. This work required approximately 2 person-days to complete. In general, fieldwork included 100% pedestrian inspection of the project APE and GPS data collection.

2.1.1 Pedestrian Survey

A 100%-coverage pedestrian inspection of the project APE was undertaken for the purpose of historic property identification and documentation. The pedestrian survey was accomplished through systematic sweeps spaced 5 m apart.

2.1.1 GPS Data Collection

Historic properties were located with GPS points taken at the corners of the historic properties using a Trimble Pro XH mapping grade GPS unit with a real-time differential correction. This unit provided sub-meter horizontal accuracy in the field. GPS field data was post-processed, yielding horizontal accuracy between 0.5 and 0.3 m. GPS location information was converted into GIS shape files using Trimble's Pathfinder Office software, version 2.80, and graphically displayed using ESRI's ArcGIS 10.3.

2.2 Laboratory Methods

No cultural material was collected during the AIS. No laboratory analysis was conducted. All data generated during the course of the AIS are stored at the CSH offices.

2.3 Research Methods

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 at Mānoa, 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 were examined from the Waihona ‘Aina database (Waihona ‘Aina 2000).

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

2.4 Consultation Methods

The Nīnole Bridge Replacement project is part of a HDOT and FHWA/CFLHD partnership project. It is one of a number of proposed bridge improvement and replacement projects in the State of Hawai‘i. Presently, National Historic Preservation Act Section 106 consultation with

community, agency, and Native Hawaiian Organizations has been initiated. Cultural consultation was also conducted by CSH in the form of a cultural impact assessment (CIA) for Nīnole Bridge and the nearby Hīlea Bridge (Liborio et al. 2016).

Section 3 Background Research

3.1 Mythological and Traditional Accounts

Perhaps the most famous story associated with the project APE is that of the reproducing stones of Kōloa. William Ellis relates the following account, presumably from his brief visit there in 1824:

> We had not traveled far [from Hīlea] before we reached Nīnole, a Small village on the sea shore, celebrated on account of a short pebbly beach called Koroa [Kōloa], the stones of which were reported to possess very singular properties; amongst others, that of propagating their species. The natives told us it was a *wahi pana* (place famous) for supplying the stones employed in making small adzes and hatchets, before they were acquainted with the use of iron; but particularly for furnishing the stones of which the gods were made, who presided over most of the games of Hawai‘i. Some powers of discrimination, they told us, were necessary to discover the stones which would answer to be deified. When selected they were taken to the *Heiau*, and there several ceremonies were performed over them. Afterwards, when dressed, and taken to the place where the games were practiced, if the parties to whom they belonged were successful, their fame was established; but if unsuccessful for several times together, they were either broken to pieces, or thrown contemptuously away. When any were removed for the purpose of being transformed into gods, one of each sex was generally selected; these were always wrapped very carefully together in a piece of native cloth. After a certain time, they said a small stone would be found with them, which, when grown to the size of its parents, was taken to the *Heiau*, or temple, and afterwards made to preside at the games.
>
> We were really surprised at the tenacity with which this last opinion was adhered to . . . Koroa [Kōloa] was also a place of importance in times of war, as the best stones used in their slings were procured here . . .
>
> This place is also celebrated as furnishing the small black and white stones used by the natives in playing *kōnane* . . . (Ellis 1969:213)

Skinner (1900), in his review of ancient faiths of Hawai‘i, tells a similar story that may be derived from the Ellis account:

> Among these gods none are more curious than the stones of Kaloa [Kōloa] beach, *Nīnole*, Hawai‘i. The natives who believed that they had sex, and propagated, chose male specimens for their household deities. In order to make sure whether or not they were really gods, the stones were blessed in a temple, wrapped in a dress, and taken to see a game of skill or strength. If the owner of the god won he gave to the piece of stone the credit for his victory and established it in his house; but if he lost, the stone was thrown aside. If the believer wanted to make sure of finding a god he would take a beach pebble of each sex, wrap the two in cloth, and put them away for a time. When they were brought back to the light a smaller pebble, the result of their union, was found with them. This grew, like an animal, until it was of a size

> to be blessed by the priests and formally declared to be a god. The original pebbles are of black trap, compact lava, and white coral. [Skinner 1900:183-184]

Kelly (1956) shares an account of laborers constructing a *Heiau* on Makanau Hill involving stones from Kōloa. She relates the following:

> All the men in the district were conscripted to transport stones from Kōloa Beach at Nīnole. They formed a human chain and passed the stones up to the site in baskets.
>
> The mana or efficacy associated with the stones of Kōloa may have made them particularly appropriate for inclusion within a *Heiau*.[Kelly 1956:37]

A particularly notable landform in the uplands of Punalu‘u is Pu‘u‘enuhe or “cut-wormhill.” Martha Beckwith gives a succinct account of the story but places Pu‘u‘enuhe in neighboring Hīlea Ahupua‘a:

> Kumu-hea (or *Mo‘o*), son of the god Kū, lives in the hill Pu‘u‘enuhe at Hi‘ilea [Hīlea] in Ka‘ū District and is the god *(‘aumakua*) of the cutworm. He marries a girl but comes to her only at night, for by day he is a worm (or *mo‘o*). He does not support her. With the advice of her parents she ties a hemp string to his back and when he leaves her she follows him to the hill and discovers his true nature. He is angry. Cutworms attack the crop. The parents appeal to Kāne, who cuts up the god; and hence the small *pe‘elua* cutworms (or lizards) of today, which Hawaiians fear to injure. [Beckwith 1970:135]

A traditional story of the neighboring *ahupua‘a* of Punalu‘u is the account of “Nā Makapō o Moa‘ula (The Blind Men of Moa‘ula)” (Green and Pukui 1936:144-145). In this brief account there once were two men, one of whom was totally blind (*makapō loa*) and the other of whom had very poor vision but could see a little (*‘ike iki*). They lived at Moa‘ula, in the uplands of Ka‘ū and one day they decided to go down to Punalu‘u, with the man who could see a little leading his blind companion. They traversed slowly to the edge of the Punalu‘u Stream where the blind man asked: “How is it? Is there water below (*Pehea, he wai anei ko lalo*)?” The near-sighted man replied, “Yes there is water (*‘Ae he wai*),” and was further queried, “Is there much water (*Nui anei ka wai*)?” He replied, “Yes there is much water below (*‘Ae nui ka wai o lalo*).” They both agreed to jump into the stream and when they did they both broke their legs (*a hakihaki nā wawae*). At a later time the same two companions were again making their way down to Punalu‘u and reached the inland side of the stream bank (*kahawai mauka*). The blind man asked his guide “What do you see? Is the water low (*Pehea kau ‘ike ana? Ua ‘u‘uku anei i ka wai*)?” The near-sighted man replied, “Yes, very low (*‘Ae ‘u‘uku loa*).” The blind man wanted further confirmation asking, “Is that true? Is there no water below (*He mea ‘oiā‘i‘o anei kēnā, ‘a‘ohe wai o lalo*)?” As the audience might guess the pair went down to the full stream and were swept away (*ua piha ke kahawai i ka wai a lilo lāua*). They were seen struggling and were fetched up out of the water and then returned to the uplands. Never again did they desire to return to Punalu‘u unless they went with someone who could see.

This may just be a simple tale to amuse the audience with the tribulations of the blind that has little to do with Punalu‘u or Ka‘ū District per se. It is worth noting in passing, however, that Ka‘ū District was associated with the most famous blind person in Hawai‘i’s pre-Contact traditions—

the blind ruling chief I-mai-ka-lani. Possibly the association of Ka‘ū with the famous blind made Punalu‘u an appropriate setting for the story or possibly Ka‘ū District had a greater prevalence of blindness (as hereditary dispositions toward glaucoma or cataracts).

A common Hawaiian theme that may be reflected in the story is the view held by coastal people that the inhabitants of the uplands were foolish bumpkins (as exemplified in the Maui saying that “the people of the Kula uplands scale squids”). A theme specific to Punalu‘u, however, is that of the variability of the Punalu‘u watercourse. All the way along the coast from Hilo to South Point to Kawaihae there may have been no more notable stream than that of Punalu‘u that could quickly go from dry to a raging torrent. Certainly the story emphasizes the stream’s variability and serves to warn those who might try to cross it. Another point not to be lost is the general indication of people who resided in the uplands making periodic trips to Punalu‘u and that there were amenities at coastal Punalu‘u that merited undertaking some risk to get there. One could also read into the story an account of the compassion of the coastal people who must have helped the blind pair when they broke their legs and who later fished them out of the stream.

Kamakau (1964) offers an unusual account of a moving cinder cone in the time when a column of troops of Keōua Kū‘ahu‘ula was annihilated on the flanks of Kīlauea. According to Kamakau:

> Several cinder cones were heaped up near Kīlauea at this time. One cone moved straight down toward the sea at ‘Āpua and in less than two weeks reached the sand at Punalu‘u, where Keōua Kū‘ahu‘ula was staying at the time under tabu. This cinder heap moved along the sand from ‘Apua to the beach at Punalu‘u where its progress was barred by the highlands at Punalu‘u, Wailau and Nīnole, and there it remains at Punalu‘u to this day. [Kamakau 1964:152]

One can easily conceive of sands from new cinder cones washing from ‘Āpua south to Punalu‘u but Kamakau seems to suggest the entire heap moved as a unit. This is supported by the most likely candidate for the Punalu‘u landform Kamakau is referring to, Pu‘ehu Hill, in that it is well inland. Kamakau relates that the ruling chief Keōua Kū‘ahu‘ula was resident at Punalu‘u at the time and it would seem likely that Punalu‘u was often the residence of ruling chiefs of Ka‘ū.

3.2 Early Historic Period

There are no western accounts specific to Nīnole in the eighteenth century and few references to Ka‘ū at all (briefly summarized below). Lt. James King, sailing off the island of Hawai‘i on the 1779 voyage of Captain James Cook, summarizes Ka‘ū at the first European encounter:

> The coast of Kaoo [Ka‘ū] presents a prospect of the most horrid and dreary kind: the whole country appearing to have undergone a total change from the effects of some dreadful convulsion. The ground is every where covered with cinders and intersected in many places with black streaks, which seem to mark the course of a lava that has flowed, not many ages back, from the mountain Roa [Mauna Loa] to the shore. The southern promontory looks like the mere dregs of a volcano. The projecting headland is composed of broken and craggy rocks, piled irregularly on one another, and terminating in sharp points. [King 1784:104]

The only onshore exploration at Ka‘ū involved a search for fresh water:

> When [Mr. Bligh] landed, he found no stream or spring, but only rain-water, deposited in holes upon the rocks; and even that was brackish, from the spray of the sea; and that the surface of the country was entirely composed of flags and ashes, with a few plants here and there interspersed. [King 1784:545]

A reference to neighboring Punalu‘u in the eighteenth century comes from Archibald Menzies in the course of his rather circuitous ascent of Mauna Loa in 1794. Leaving the uplands of Wai‘ōhinu and Honu‘apo and 4 to 5 miles from the sea the team stopped “at a plantation belonging to Kamehameha called Punalu‘u” but no details are given (Menzies 1920:187).

Lacking good anchorage and seemingly having little to offer, Ka‘ū was very much a backwater in terms of Western Contact in the first half of the nineteenth century.

The first account of coastal Punalu‘u is from the Reverend William Ellis who passed through briefly in 1823. He approached Punalu‘u by way of Wai‘ōhinu upon which he waxed eloquent:

> open towards the sea, and on both sides adorned with gardens, and interspersed with cottages, even to the summits of the hills.
>
> A fine stream of fresh water, the first we had seen on the island, ran along the centre of the valley, while several smaller ones issued from the rocks on the opposite side, and watered the plantations below.
>
> Our road, for a considerable distance, lay through the cultivated parts of this beautiful valley: the mountain taro, bordered by sugar-cane and bananas, was planted in fields six or eight acres in extent, on the sides of the hills, and seemed to thrive luxuriantly. [Ellis 1963:133-134]

Ellis’s account confirms the upland luxuriance that had made the *ahupua‘a* of Wai‘ōhinu a center for the *ali‘i* of Ka‘ū. As Ellis continued his journey he moved closer to the coast—along the “foot of the mountains, in a line parallel with the sea, and about a mile and a half from it” (Ellis 1963:134)—and his journal illumines areas where western eyes had previously seen only a “prospect of the most horrid and dreary kind.” Travelling toward Punalu‘u, Ellis found the countryside “more thickly inhabited [as his walk continued] . . . The villages along the sea shore, were near together, and some of them extensive” (Ellis 1963:136). Specific villages Ellis mentions include Honu‘apo, described as an “extensive and populous village” where more than 200 Hawaiians turned out for a sermon; Hōkūkano [Ka‘ū], possessing a freshwater spring; and Hīlea, the site of numerous fishponds and where the *konohiki* reported “hogs, fish, taro, potatoes, and bananas in abundance.” Ellis also notes the intervening broad stretches of rough *‘a‘ā* between the habitation areas; these flows had been made traversable by water-worn boulder paths. Ellis thus reveals the desolate coastline described 44 years earlier by James King was in fact the site of a well-populated, active culture and economy where habitation centers, though isolated, were accessible to each other and to the resources of land and sea.

Ellis provides few details of the specific environs of Punalu‘u other than his account of the Kōloa stones quoted above. He mentions a small village on the seashore at Nīnole and then asserts,

> after traveling about two miles, we came to Punaruu [Punalu‘u], where the people of that and the next village, Wailau, collected together in a large house, and were

> addressed on the nature and attributes of the true God . . . we now left the road by the seaside, and directed our course towards the mountains. [Ellis 1964:146]

During the 1830s, Protestant missionaries based in Kona and Hilo would make occasional tours into Ka‘ū but a permanent missionary presence would not be installed until the early 1840s when Catholic and Protestant missions were established in the district. In 1841 a Catholic priest, Father Marechal, arrived in Ka‘ū and within a few months could boast of 900 converts. The following year, 1842, the Protestant minister John Paris settled in Wai‘ōhinu where he founded a church and school. Marion Kelly offers a good overview of the early mission work at Punalu‘u:

> In 1843, Rev. Paris reported that a stone meeting house (church) had been built at Punalu‘u and that the school’s average attendance there was 140. At that time Paris preached three Sundays each month at Wai‘ōhinu and one Sunday at Punalu‘u. By 1844, he reported the Sabbath school at Punalu‘u averaged 75 to 100 students—men, women and children. The average Sunday congregation at Punalu‘u was reported to be 350 [Station Report, Ms. (1843, 1844)] The Rev. T.D. Hunt, who had first gone to live in Wai‘ōhinu in 1844, moved to Punalu‘u in February 1845. An increase from 70 to 150 and to 180 in the congregation there was reported at that time. [Kelly 1980:33]

Mission station reports, censuses, and accounts by visitors to Ka‘ū document the changes to the district brought about by natural forces and by the pressures of an increasing western presence. A visitor to Wai‘ōhinu and its environs in 1849 published an anonymous account describing the devastating effects of a drought and fire that had occurred three years earlier:

> [W]e noticed many a tall, stately trunk, branchless and lifeless standing monument-like, all over the country. On enquiry we ascertained that they were the remains of a noble forest, which, with the whole surrounding country, were burnt in 1846. In that year a severe drought visited the Island, the streams dried up, the grass withered, and fire swept over the whole district . . . [Kelly 1980:89]

An 1831-1832 census of Ka‘ū, the first taken within the district, records a total population of 5,800. This number already reflects the district’s population decline—the effect of newly introduced diseases, cultural unravelling and emigration to new commercial centers—but the full precipitousness of the population decline within Ka‘ū is revealed in the totals from subsequent censuses. In 1835 the total population was 4,766. The first official government census, taken in 1847, records the population as having dropped to 3,010. Reverend John Paris wrote in an 1848 mission station report: “Since the year 1845 the work of depopulation of Ka‘ū has gone on with fearful rapidity.” He notes during the years 1845 and 1846 a “distressing famine” and a “fire which overran the country”—the same disasters the anonymous visitor of 1849 mentioned. Another visitor to Wai‘ōhinu during the 1840s, Chester H. Lyman, was informed that a “burning over of nearly the whole district, producing great distress among the inhabitants” had occurred in 1830 or 1831. By the time of the 1853 government census only 2,210 people were recorded in Ka‘ū.

3.3 The Māhele and the Kuleana Act

In the Māhele of 1848, the *ahupua‘a* of Wailau was retained by the government and the 5,360 acres of the *ahupua‘a* of Punalu‘u were retained as LCA 7715 awarded to Lot Kapuaiwa (the future Kamehameha V). This may have been understood as an inheritance of the lands claimed by Kamehameha I noted by Menzies in 1794.

A total of 91 awardees received lands (total 528.58 acres) in the seven *ahupua‘a* of Ka‘ū. There appears to have been only one Land Commission Award (LCA) within a 0.8 km (0.5 mile) radius of the project APE (Figure 7). LCA 10510:2 was awarded to Nawali. Testimony by Nawali mentions taro, pumpkin, sweet potatoes, a house lot, *olonā*, and an *umu ‘ōhua*, a pile of rocks placed in the sea to attract young fish (see Appendix B). No neighbors are indicated around Nawali's nearest parcel (‘Āpana 2) which was surrounded by *konohiki* (headman of the *ahupua‘a*) lands.

3.4 Mid- to Late 1800s

Already at the middle of the nineteenth century imported livestock roaming freely throughout pasturelands of Ka‘ū were creating new aggravations. Organized ranching of cattle, however, was focused at Kapāpala, Kahuku, and Ka‘alu‘alu at some distance from Nīnole. New industry required better paths and a harbor. In the 1850s Rev. Henry Kinney (cited in Kelly 1972) commented on the "hundreds of goats salted and dried" as well as "upland taro, potatoes and onions" which previously had to be hauled "on the backs of men" overland to Hilo and which could now be taken to the harbor at Ka‘alu‘alu and shipped.

While raising cattle and other livestock were significant elements of the new western economic focus imposed upon Ka‘ū during the nineteenth century, agriculture would have the most extensive impact on the land and people. Among new agricultural pursuits attempted in Ka‘ū was wheat growing:

> But it proved difficult to co-ordinate the size of the wheat crop with the requirements of the flour mills; difficult also to coordinate the output of the mills with the demands of the market, domestic and foreign. The business did not become a permanent one. [Kuykendall 1953:150]

Contributing to the failure of wheat production was the harvesting of *pulu*—tree fern fiber used for stuffing mattresses and pillows—which during the 1860s constituted the major export crop from Ka‘ū. A Mission Station Report of 1860 relates the ruinous effect upon the native population of participation in the *pulu* trade:

> The effect—on them—is not good; not that the *pulu* is not a source from which they might secure comfort to themselves and families, but the actual result is the reverse. They are offered goods to almost any amount, to be paid for in *pulu*; this to a native is a strong temptation to go into debt. Consequently many of them are deeply in debt and almost all to some extent. The policy of the traders is to get them in debt and to keep them there so long as possible . . . [T]hey are almost entirely under the control of their creditors, and are compelled to live in the *pulu* regions, at the peril of losing their houses and lots, and whatever other property they may possess. Thus their homes are almost in reality deserted, ground uncultivated. [W.C Shipman 1860]

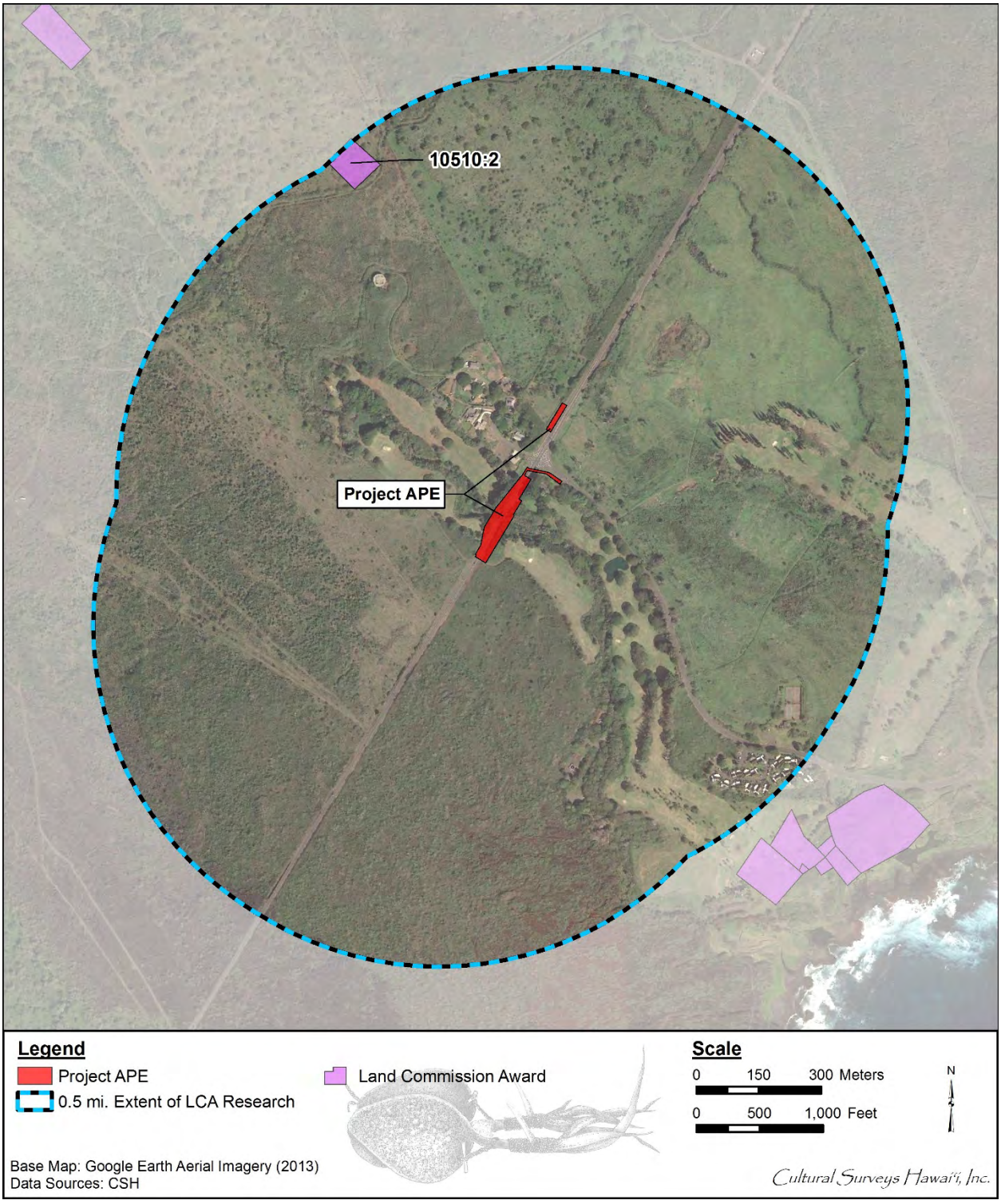

Figure 7. Aerial photograph depicting one LCA within a 0.8 km (0.5 mile) radius of the project APE (Google Earth 2013)

Life in Ka‘ū during the 1860s was further disrupted and devastated by the forces of nature. In March 1868 a sequence of major earthquakes and eruptions of Mauna Loa began that resulted in many deaths and losses of property and livestock. These disasters were only a prelude to an earthquake in early April that precipitated a tidal wave which destroyed coastal villages, dislodged a cliff side at Kapāpala that blanketed the land below and buried a village, and that opened the Great Crack at Kīlauea, emptying the craters lava lake into Keauhou. A subsequent lava flow, this time at the west side of Ka‘ū, buried all of Wai‘Ahukini Valley. Reverend Paris reported on “the earthquake and the tidal wave destroying the villages from Punalu‘u to Ka‘alu‘alu” (Handy and Pukui 1958:240).

Apparently these great natural disasters did not hinder the pace of foreign business interests in Ka‘ū. In 1868, the same year as the great earthquake, Alexander Hutchinson established the Naalehu Sugar Company and built a mill at that town. More enduring commercially than either wheat or *pulu*, sugar cultivation became the major industry within Ka‘ū, appropriating the focus of life in the district.

During the mid-1870s Waiohinu Plantation was established by John Nott and Company. This operation was bought out in 1877 by Alexander Hutchinson who at the same time founded Hilea Plantation. By the end of the 1870s, sugar mills were operating at Na‘alehu, Hīlea, and Honu‘apo. Though Hutchinson died in 1879, his name survived in the Hutchinson Sugar Company which during the remainder of the nineteenth century continued to expand and consolidate existing plantation operations in Ka‘ū.

Another plantation operation, the Hawaiian Agricultural Company, was established in Pāhala in 1876 by a consortium of Honolulu businessmen and used Punalu‘u as its port. A decade later the company controlled almost 10,000 acres of cane land and constituted the largest plantation in the Hawaiian Islands.

The 1885 Brown map of the Ka‘ū District depicts the project APE within one land grant (Figure 8). Grant 824 included 48.75 acres to Kapohonua. It is unclear whether there was any development of the project lands by this grant holder.

Change within the Ka‘ū district during the remainder of the nineteenth century and into the twentieth century centered around the activities of the two sugar operations, Hutchinson Sugar Plantation and the Hawaiian Agricultural Company. Wharves for shipping the sugar were constructed at Punalu‘u and Honu‘apo. The railroad from Punalu‘u to the village of Keaiwa was reported in June 1878 to be “the first railroad in these islands” but Condé and Best (1973:29) note that “no locomotive was to appear on the railroad for several years . . . ” The terrible drought of 1876 to 1877 and an invasion of leafhoppers set the sugar cane industry of Ka‘ū back. An interesting system developed for this engineless track in which “[t]he Pāhala sugar is sent to Punalu‘u, its shipping port, on tramway cars propelled from the mill by gravitation, and hauled back the intervening five miles by mules” Condé and Best (1973:29). This system may have lasted until 1895. By the mid-1880s Punalu‘u had storehouses, a restaurant, a store, and numerous homes constructed of lumber.

Most remarkable upon the physical landscape must have been the systems of flumes and railways for transporting the cut cane from fields to mills. Railway lines ran from Na‘alehu and Hīlea to Honu‘apo and from Punalu‘u to Pāhala. The railroad line from Punalu‘u to Pāhala (dating

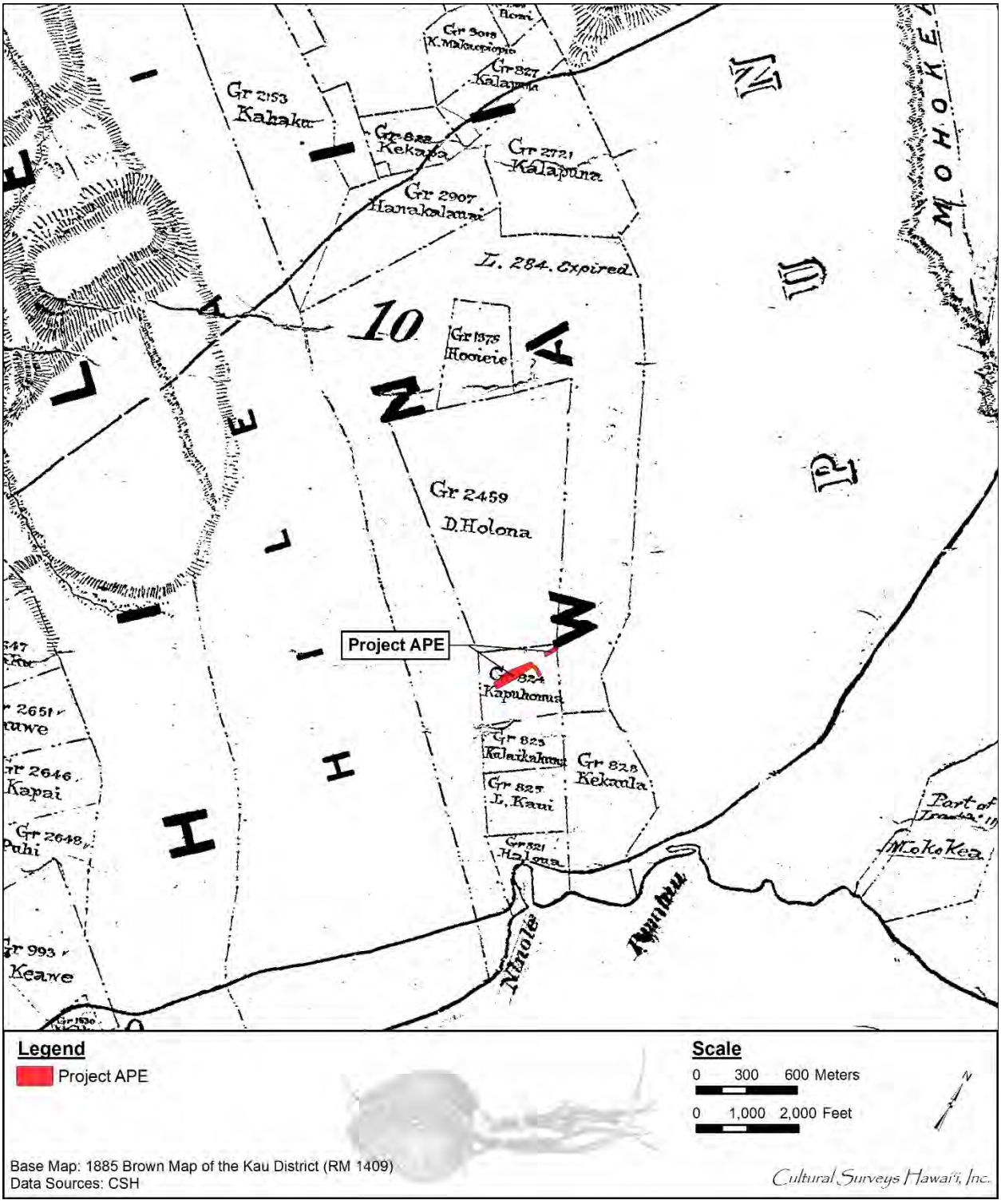

Figure 8. Portion of 1885 Brown map of the Ka‘ū District depicting the project APE within one land grant

to 1878) was straightened out and realigned multiple times (1896 and 1902) and was changed from a 2-ft wide gauge to a 3-ft wide gauge ca. 1903. Railroads continued to operate in Ka‘ū until the 1940s but the Pāhala–Punalu‘u railroad was discontinued in 1929. In 1931 Punalu‘u remained a vibrant community just back from Punalu‘u Bay but soon after this community, which had existed from pre-Contact times and had been revitalized by the sugar trade and use of Punalu‘u as a major harbor, went into significant decline when railroad service ceased.

The sugar companies also altered the social landscape of Ka‘ū. During the 1870s, Chinese laborers were brought in by Alexander Hutchinson; by the time of the 1884 government census there were 568 Chinese in the district. Japanese laborers were imported beginning in the latter 1880s and Filipinos began arriving during the first decade of the twentieth century.

3.5 1900s to Present

No development is depicted within the project APE in the 1920 USGS topographic map (Figure 9). The 1928 Murray map of the Ka‘ū Forest Reserve shows many trails, plantation camps, railways, and Volcano Road *mauka* of the project APE (Figure 10). There is a lack of transportation and plantation infrastructure illustrated in the vicinity of the project APE. In the 1940s, a portion of the Hawai‘i Belt Road was constructed crossing Nīnole Stream across the newly constructed Nīnole Bridge. The 1946 Marks map of a portion of the Ka‘ū Forest Reserve shows the development of the “Government Main Road” (part of the Hawai‘i Belt Road) known today as Māmalahoa Highway (SIHP # 50-10-47-30187) (Figure 11). The “Old Government Road,” the former alignment of Volcano Road, is illustrated as being very curvy and indirect. The new highway provided a more linear road between Na‘alehu and Pāhala and extended to the more linear portions of Volcano Road near those towns.

By the 1960s and 1970s, commercial interests in Ka‘ū began to look beyond the mainstay sugar had provided for almost a century. Macadamia nut growing and resort development were conspicuous attempts to move beyond the uncertain future portended for sugar.

Presently, the project APE includes a portion of Highway 11 (Māmalahoa Highway) at the Alakahi Road intersection and Nīnole Bridge, the focus of the current project. The existing Nīnole Bridge structure was built in 1940 and spans Nīnole Stream. Additional documentation of Nīnole Bridge is provided in Section 5, Historic Property Descriptions. Several houses are located along Alakahi Road in the vicinity of the project APE. The project APE is also located within the boundaries of the Sea Mountain Golf Course, an 18-hole public course that opened in 1971 (hawaiigolf.com 2014). A golf cart path extends through the project APE beneath Nīnole Bridge.

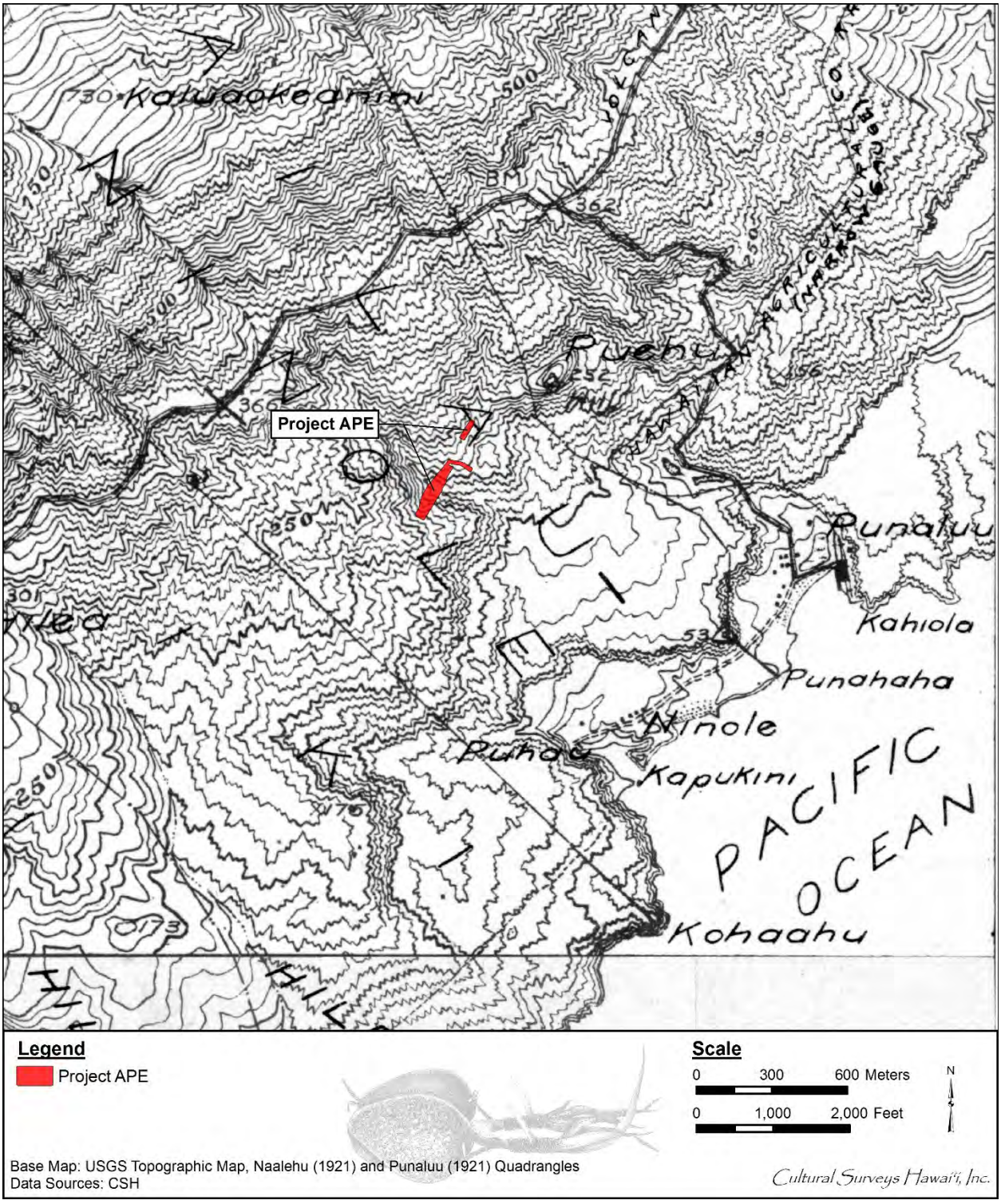

Figure 9. Portion of the 1921 Naalehu and Punaluu USGS topographic quadrangles depicting the location of the current project APE

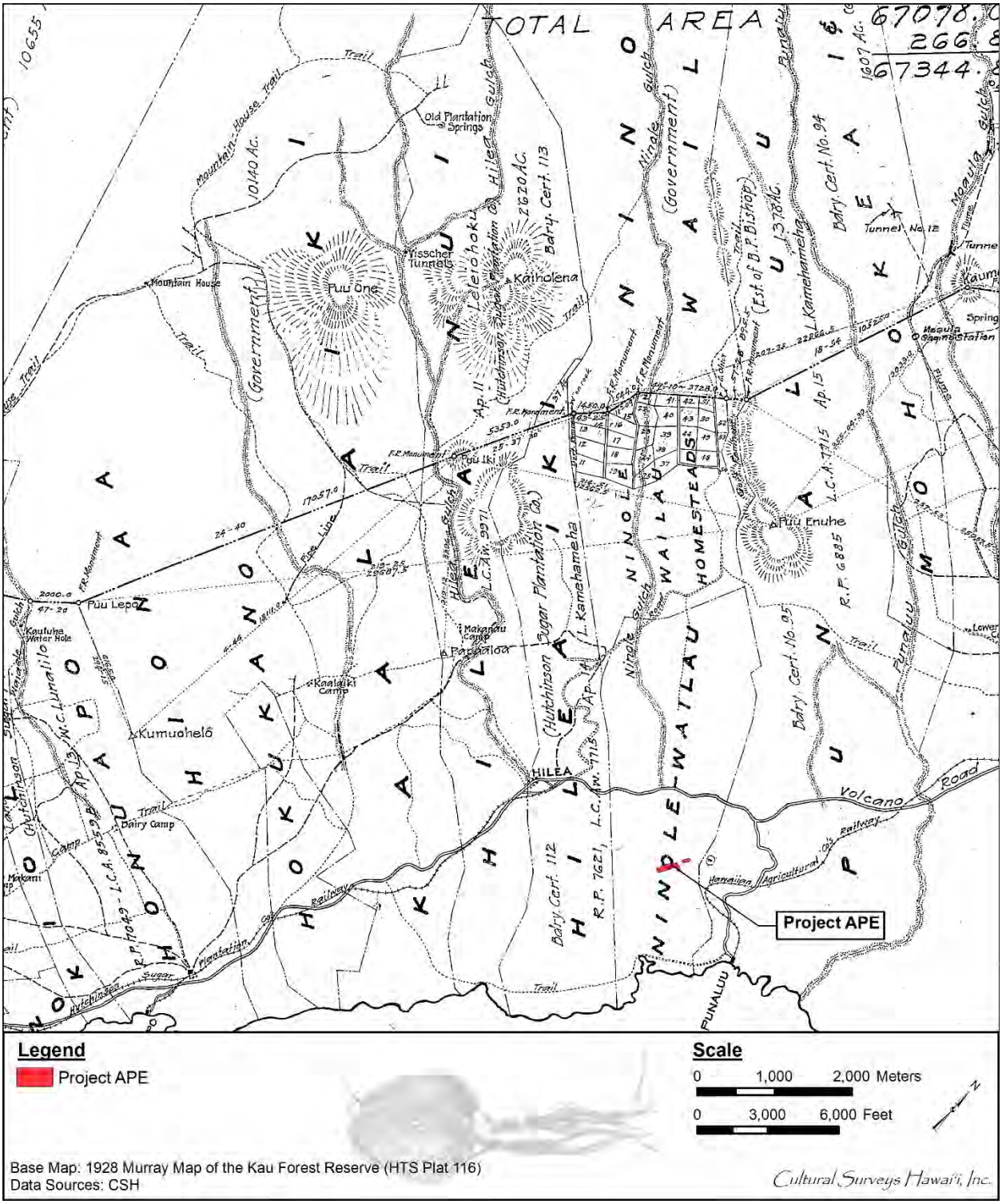

Figure 10. Portion of the 1928 Murray map of the Ka‘ū Forest Reserve showing trails, railways, and roads primarily in the *mauka* portions of “Nīnole-Wailau”

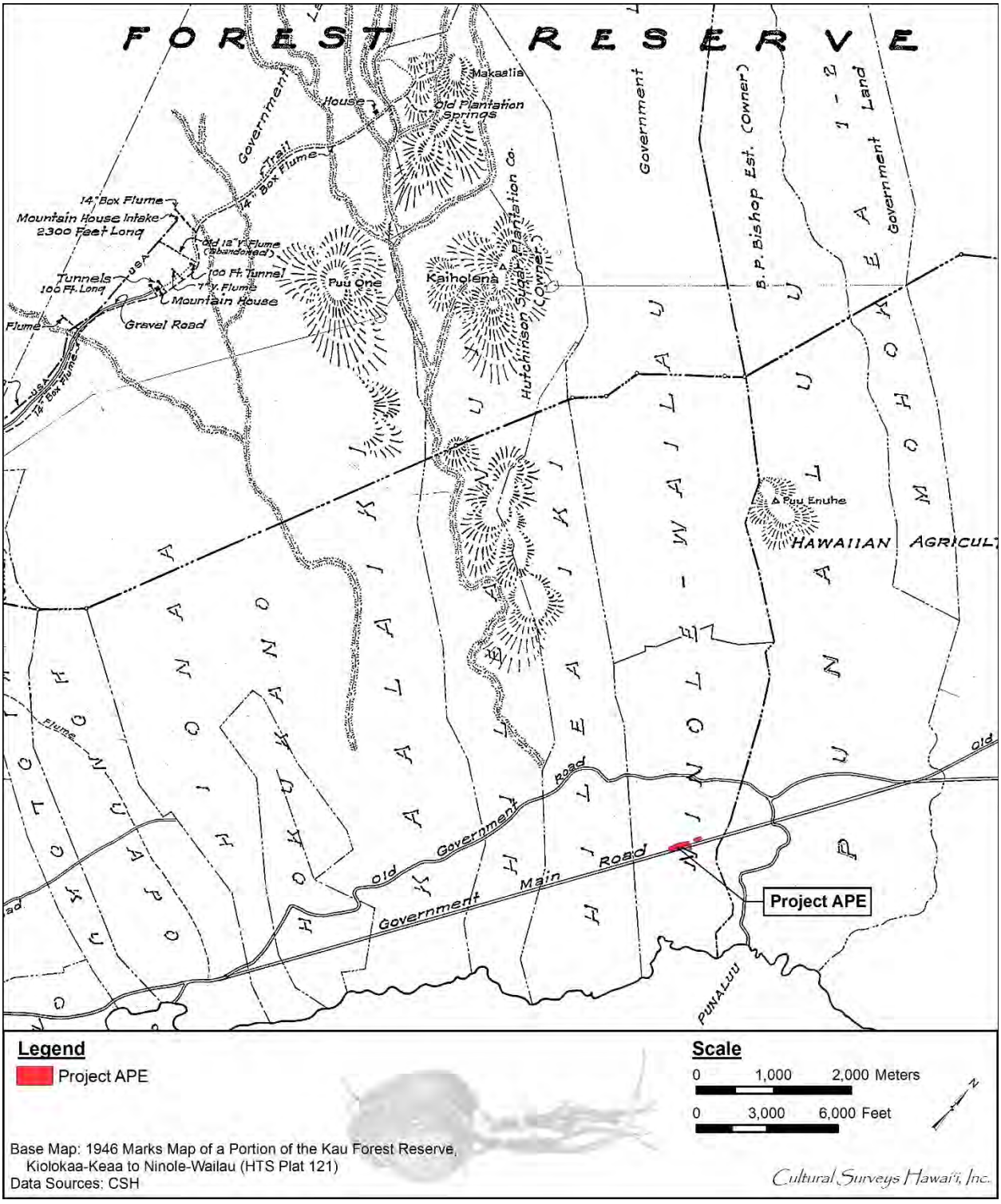

Figure 11. Portion of the 1946 Marks map of a portion of the Ka‘ū Forest Reserve showing the development of the “Government Main Road” known today as Māmalahoa Highway

3.6 **Previous Archaeological Research**

The locations of previous archaeological studies conducted within a 0.8 km (0.5 mile) radius of the project APE are shown in Figure 12 and listed in Table 1. The findings of these archaeological studies are shown in Figure 13 and listed in Table 2. These studies and their findings are discussed in more detail in the following paragraphs.

John F.G. Stokes carried out a survey of Hawai‘i Island *heiau* sites in 1906 documenting three or perhaps four *heiau* in the vicinity of the present project lands. Stokes (1991) gives the following accounts of *heiau* in the vicinity:

> Ka‘ie‘ie Heiau
>
> Heiau of Ka‘ie‘ie, land of Nīnole, Ka‘ū. Situated on the edge of an *‘a‘ā* flow on the west side of Nīnole Bay. Pu‘u Ehu bears 170°50’, 5476 feet. All that was found was a cleared level stretch of *‘a‘ā* paved with beach pebbles. On the east it overhung the sea, the rough *‘a‘ā* forming the other boundaries. On account of these natural limits, it is probable that the place was never enclosed with walls.
>
> Mokini Heiau
>
> Heiau of Mokini, land of Nīnole, Ka‘ū. Perhaps identical with Ka‘ie‘ie Heiau. It was a name heard in Wai‘ōhinu and Honu‘apo, but the single resident of Nīnole I met knew only of Ka‘ie‘ie Heiau.
>
> Lanipao Heiau
>
> Heiau of Lanipao, land of Punalu‘u, Ka‘ū. Located near the southwest boundary of Punalu‘u 1600 feet from the sea. Pu‘u Ehu benchmark bears 131°56’, 2804 feet. This is a small, L-shaped enclosure with walls 6 feet high and from 6 to 7.5 feet thick. The southern portion is occupied by three terraces, each rising 1 foot. Outside and adjoining the western wall is an enclosure with small walls, 3 feet high and wide. This *heiau* is said to have been built by Laka of Kaua‘i. [Stokes 1991:131]

Lanipao Heiau [SIHP # 50-10-68-3512 (50-HA-B8-2)] remains within the east corner of the present project lands and is in much the same condition as Stokes observed in 1906. Stokes provides the following description of the great *luakini heiau* at Punalu‘u:

> Kāne‘ele‘ele *Heiau* Heiau of Kāne‘ele‘ele, Mailekini Heiau, Halelau Heiau, or Punalu‘unui land of Punalu‘u, Ka‘ū. Located east of and adjoining Punalu‘u wharf and warehouses, which are probably built on the heiau premises. Pu‘u Ehu benchmark bears 122°37’, 4532 feet.
>
> This *Heiau* probably extended to near the edge of the cliff bordering Punalu‘u Bay, and its western boundary was destroyed when the face of the cliff was graded for the wharf and the first warehouse, built before 1906. Since that date another, larger warehouse has been erected, and the man in charge of the work has informed me that he had dug into a high bank of artificially laid stones and during the work came across a pit about 10 feet deep and ‘full of bones.’ The site of the bone pit is now occupied by the concrete base of the warehouse engine, at the southeast corner of the building, a mark which will no doubt remain for some time.

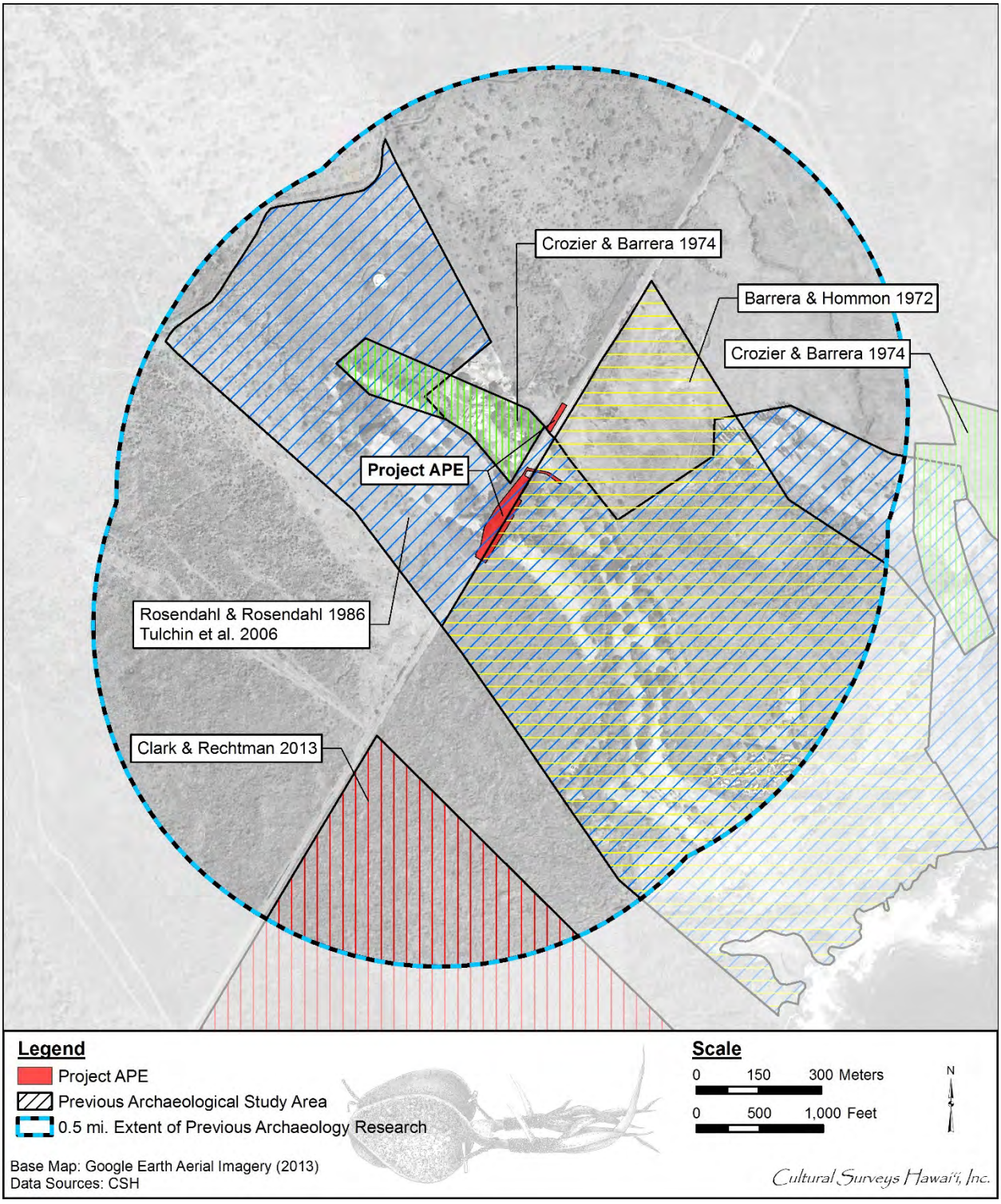

Figure 12. Aerial photograph depicting previous archaeological studies within a 0.8 km (0.5 mile) radius of the project APE (Google Earth 2013)

Table 1. Previous Archaeological Studies within a 0.8-km (0.5-mile) Radius of the Project APE

Reference	Type of Study	Location	Results
Stokes (and Dye) 1906/1991	Survey of Hawai‘i Island *heiau*	Island-wide	Documents three, perhaps four *heiau* in vicinity of project APE; not in Figure 12
Stokes 1910	Study of petroglyphs	Archipelago-wide	Documents petroglyph site in coastal Punalu‘u; not in Figure 12
Hommon n.d. (1971)	Archaeological survey	Coastal Wailau and Nīnole Ahupua‘a	Precursor to Barrera and Hommon (1972) report; not in Figure 12
Barrera and Hommon 1972	Salvage archaeology at Wailau-Nīnole, Ka‘ū	Coastal Wailau and Nīnole Ahupua‘a	Documented 111 archaeological sites including 216 features; pre-Contact and historic habitation, agricultural, and burial sites
Crozier 1972	Archaeological survey and excavations	Coastal Punalu‘u Ahupua‘a	Precursor to Crozier and Barrera (1974) report; not in Figure 12
Crozier and Barrera 1974	Archaeological survey and excavations	Coastal Punalu‘u Ahupua‘a	Documented 25+ archaeological sites; noted bulldozing in area prior to study
Rosendahl and Rosendahl 1986	Preliminary and full archaeological reconnaissance surveys	Punalu‘u and Wailau Ahupua‘a	Provides summary of previous work and reports new sites
Tulchin et al. 2006	Archaeological inventory survey	Sea Mountain at Punalu‘u Resort	Documented 34 historic properties comprised of over 125 archaeological features
Clark and Rechtman 2013	Archaeological reconnaissance	Nīnole, Ka‘alāiki , Hīlea nui and Hīlea ‘iki Ahupua’a *makai* of Māmalahoa Highway	Further documented sites previously identified as well as identified many new sites throughout Nīnole, Hīlea and Ka‘alāiki. Site HI-14, a pavement, was identified within a 0.8-km (0.5-mile) radius of the project APE

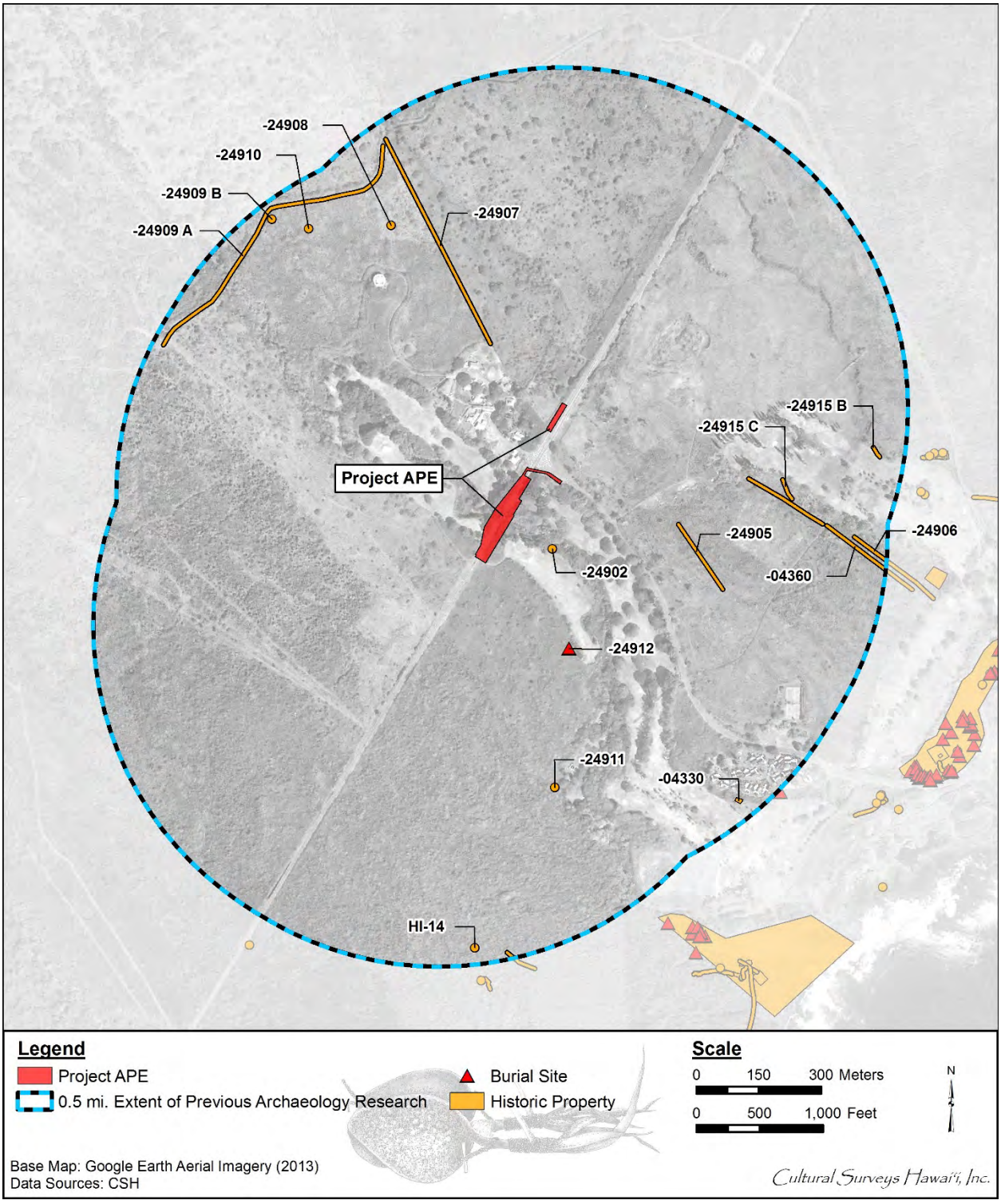

Figure 13. Aerial photograph depicting previously documented historic properties and sites within a 0.8 km (0.5 mile) radius of the project APE (Google Earth 2013)

Table 2. Previously Documented Historic Properties within a 0.8-km (0.5-mile) Radius of the Project APE

SIHP #	Site Type/Name	Source
50-10-68-4330	Enclosure (post-Contact)	Barrera and Hommon 1972
50-10-68-4360	Wall (post-Contact)	Barrera and Hommon 1972
50-10-68-24902	Wall (pre-Contact)	Tulchin et al. 2006
50-10-68-24905	Wall (post-Contact)	Tulchin et al. 2006
50-10-68-24906	Wall (post-Contact)	Tulchin et al. 2006
50-10-68-24907	Wall (post-Contact)	Tulchin et al. 2006
50-10-68-24908	Enclosure (pre-Contact)	Tulchin et al. 2006
50-10-68-24909A	Historic Government Rd	Tulchin et al. 2006
50-10-68-24909B	Retaining wall (post-Contact)	Tulchin et al. 2006
50-10-68-24910	Mound (pre-Contact)	Tulchin et al. 2006
50-10-68-24911	Wall (unknown age)	Tulchin et al. 2006
50-10-68-24912	Burial (pre-Contact)	Tulchin et al. 2006
50-10-68-24915B	Railroad berm (post-Contact)	Tulchin et al. 2006
50-10-68-24915C	Railroad berm (post-Contact)	Tulchin et al. 2006

> As seen in 1906, the *heiau* site consisted of a large level area of *‘a‘ā* about 700 by 500 feet, which had been leveled off and partly paved with beach pebbles. The only definite feature remaining was a large wall on the eastern side, 8.5 feet high and 9 feet thick; it ran 341°30’ for 648 feet. From either extreme, broken walls continued at right angles towards the west for about 230 feet. Outside the southern wall was a large flat stone, called locally ‘the sacrificial stone.’ East of and adjoining the large wall was another paved area, measuring about 500 feet each way. It was not enclosed and was better and more evenly paved with beach pebbles than the first portion described.
>
> The immensity of the place for a *heiau* would denote a temple of great importance, and it was a matter of keen regret that no features of the internal arrangement were definite enough to plot. The name Kāne‘ele‘ele has been selected on Thrum’s authority. It was on the list furnished me by Mr. Thrum but was not known in Punalu‘u. The first name heard locally was Mailekini, and later another native stated that there were two *heiau*, that on the south being known as Halelau and that on the north as Punalu‘unui. [Stokes 1991:132–133]

Stokes (1910:52) also recorded a petroglyph cluster “along the low lava shore between Nīnole and Punalu‘u village” including linear human figures, curved arms and legs, family groups, fish (?), dots, and circles +/- 25 units. These petroglyphs appear to be those located in the modern enclosure immediately north of the Punalu‘u Beach Park parking lot (SIHP # 50-10-68-3513).

The first systematic surveying of archaeological sites in the Nīnole area was by Violet Hansen between 1968 and 1974. Her early work was followed up in a report by Robert Hommon (n.d. ca. 1971) and particularly in the Salvage Archaeology report by Barrera Jr. and Hommon (1972). The Barrera and Hommon (1972) study documents a total of 114 sites with 216 component features. Typically the site description is a brief sentence followed by some measurements. Many of these former sites were destroyed during the construction of the Sea Mountain Golf Course. However, fieldwork indicates bulldozing was quite extensive in other portions of the project APE as well and approximately 80% of these sites are understood to have been destroyed in the 1970s. Two of the historic properties identified by Barrera and Hommon (1972) are located within a 0.8 km (0.5 mile) radius of the project APE. SIHP # 50-10-68-4330 is a post-Contact enclosure related to animal husbandry. SIHP # 50-10-68-4360 includes post-Contact walls that may have been a property boundary or cattle barrier.

A review of the results presented by Barrera and Hommon (1972) shows that for many of the archaeological sites (walls, enclosures, depressions), no clear determination of function was possible based on the available data. Certain patterns do, however, appear.

Burial sites are indicated in two general areas: 1) the cliff line extending southwest from the church and cemetery, and 2) along the cliff line extending northwest from Nīnole Cove. Permanent habitation sites are widely scattered in a zone extending 500 m (1640.4 ft) back from the coast with a few scattered permanent habitations further inland. Temporary shelters show much the same distribution pattern as permanent house sites but tend to be set slightly farther back from the coast. The pens or agricultural sites are similarly dispersed but notably tend not to be in close proximity to either permanent habitation or temporary shelter sites. Site density in general drops quite sharply 500 m (1640.4 ft) back from the coast (assuming the intensity of archaeological survey and

previous land disturbance were approximately the same across the project APE). Again, these are only suggested to be gross patterns developed within the constraints of the data.

Crozier (1972) presents data on four separate areas within coastal Punalu‘u Ahupua‘a. The Crozier and Barrera Jr. (1974) study presents all of the Crozier (1972) documentation verbatim but includes discussions of three additional sites (B8-8, B8-36, and B8-52 in the vicinity of Lanipao Heiau). All three are reported as having been bulldozed (Crozier and Barrera Jr. 1974:15-16). Of particular interest is their Site B8-36, reported as a *heiau* located perhaps 100 m (328 ft) southeast of Lanipao Heiau. The size is estimated to have been a considerable 25 m (82 ft) by 36 m (118.1 ft) but virtually the only other information provided is that "Today [1974] all that is left are a few of Violet Hansen's marking flags and a rubble pile." Given that the historic grave (B8-53) was located just 9 m (29.5 ft) from this *heiau* it seems likely that it too was lost by 1974.

Margaret and Paul Rosendahl prepared an archaeological reconnaissance survey for an EIS for the Punalu‘u Resort in 1986 (Rosendahl and Rosendahl 1986). This study identified a total of 32 archaeological sites (83+ component features) of which 25 sites had been previously identified and seven sites were newly discovered.

In 2005, CSH conducted an archaeological inventory survey of the approximately 430-acre Sea Mountain at Punalu‘u Resort (Tulchin et al. 2006). Proposed development within the Tulchin et al. (2006) project area included realignment of the existing golf course and subdivision of much of the undeveloped lands for residential house lot, condominium, and resort development. Minimally, land disturbing construction would include grubbing, major grading, excavations associated with golf course feature construction, dwelling construction, and excavations for the installation of subsurface utilities. A total of 34 historic properties, comprised of over 125 archaeological features, were identified within the Tulchin et al. (2006) project area. Twenty-three of the historic properties were previously identified and 11 were newly recorded. A total of 12 historic properties identified by Tulchin et al. (2006) are located within a 0.8 km (0.5 mile) radius of the project APE (see Table 2). These include five walls, two railroad berm sections, a mound, an enclosure, a burial, a retaining wall, and a portion of an historic government road.

Clark and Rechtman (2013) conducted an archaeological reconnaissance within Nīnole, Hīlea, and Ka‘alāiki Ahupua‘a, *makai* of Māmalahoa Highway. Previously identified sites were further documented as well as new sites throughout Nīnole, Hīlea and Ka‘alāiki. One of the sites, HI-14, is located within a 0.8 km (0.5 mile) radius of the project APE. No SIHP # was assigned to HI-14 by Clark and Rechtman (2013). HI-14 was determined to be a potential pavement that may have been used for habitation purposes (Clark and Rechtman 2013).

3.7 Background Summary and Predictive Model

There are no western accounts specific to Nīnole in the eighteenth century and few references to Ka‘ū at all. A reference to neighboring Punalu‘u in the eighteenth century comes from Archibald Menzies in the course of his rather circuitous ascent of Mauna Loa in 1794. Leaving the uplands of Wai‘ōhinu and Honu‘apo and 4 to 5 miles from the sea the team stopped "at a plantation belonging to Kamehameha called Punalu‘u" but no details are given (Menzies 1920:187).

Lacking good anchorage and seemingly having little to offer, Ka‘ū was very much a backwater in terms of Western Contact in the first half of the nineteenth century.

During the 1830s, Protestant missionaries based in Kona and Hilo made occasional tours into Ka‘ū but a permanent missionary presence was not installed until the early 1840s when Catholic and Protestant missions were established in the district. In 1841 a Catholic priest, Father Marechal, arrived in Ka‘ū and within a few months could boast of 900 converts. The following year, 1842, the Protestant minister John Paris settled in Wai‘ōhinu where he founded a church and school.

An 1831-1832 census of Ka‘ū, the first taken within the district, records a total population of 5,800. This number already reflects the district's depopulation—the effect of newly introduced diseases, cultural unravelling and emigration to new commercial centers—but the full precipitousness of the population decline within Ka‘ū is revealed in the totals from subsequent censuses. In 1835 the total population was 4,766. The first official government census, taken in 1847, records the population as having dropped to 3,010.

A total of 91 awardees received lands (total 528.58 acres) in the seven *ahupua‘a* of Ka‘ū. There appears to have been only one LCA within a 0.8 km (0.5 mile) radius of the project APE. LCA 10510:2 was awarded to Nawali. Testimony by Nawali mentions taro, pumpkin, sweet potatoes, a house lot, *olonā*, and an *umu ‘ōhua*, a pile of rocks placed in the sea to attract young fish.

In March 1868 a sequence of major earthquakes and eruptions of Mauna Loa began that resulted in many deaths and losses of property and livestock. These disasters were only a prelude to an earthquake in early April that precipitated a tidal wave that destroyed coastal villages, dislodged a cliff side at Kapāpala that blanketed the land below and buried a village, and that opened the Great Crack at Kīlauea, emptying the crater's lava lake into Keauhou.

Change within the Ka‘ū district during the remainder of the nineteenth century and into the twentieth century centered around the activities of the two sugar operations, Hutchinson Sugar Plantation and the Hawaiian Agricultural Company.

Presently, the project APE includes a portion of Highway 11 (Māmalahoa Highway) at the Alakahi Road intersection and Nīnole Bridge, the focus of the current project. The existing Nīnole Bridge structure was built in 1940 and spans Nīnole Stream.

Previous archaeological studies have identified 14 historic properties within a 0.8 km (0.5 mile) radius of the project APE that include both pre- and post-Contact structures, predominately walls, as well as one burial site. Similar historic properties are anticipated within or in the vicinity of the current project APE. Stone walls and wall segments associated with former or active ranching activities are likely to be located along the edge of the highway. Nīnole Bridge (assessed for eligibility for inclusion on the National Register and/or Hawai‘i Register as Bridge # 001000110306600 by MKE Associates LLC and Fung Associates, Inc. 2013) is located within the project APE. It was designated as SIHP # 50-10-68-30299 during the current AIS.

Section 4 Results of Fieldwork

A 100% pedestrian inspection of the project APE was conducted on 17 June 2015 by Scott Belluomini, B.A. and Nifae Hunkin, B.A. The pedestrian inspection included the identification of one newly identified historic property within the project APE, and a description of the overall project APE including ground visibility, modern use or disturbance, and vegetation.

The project APE is discontinuous with a north and south section. The northern section is a rectangular area located on the northeast shoulder of the highway. This area is proposed as an equipment/material staging area. Vegetation in the northern section of the project APE includes exotic grasses, *koa haole* (*Leucaena leucocephala*), and Christmas berry (*Schinus terebinthifolia*). In this area, the vegetation growth has obscured the ground surface and limited visibility. A portion of a dry-stacked basalt stone wall is approximately 1 m outside the APE boundary of the northern section of the project APE (Figure 14). This wall portion was determined to be an extension of SIHP # 50-10-68-24907, a boundary/animal husbandry wall previously documented by Tulchin et al. (2006). A complete description of the historic property is provided in Appendix C.

The southern section primarily consists of a portion of Highway 11 (Māmalahoa Highway), including the roadway and associated gravel shoulder as well as the Nīnole Bridge that spans Nīnole Gulch (Figure 15 through Figure 17). Vegetation in this area includes exotic grasses, *koa haole* (*Leucaena leucocephala*), Christmas berry (*Schinus terebinthifolia*), and some newly planted landscaped bushes associated with the Sea Mountain Golf Course. Ground visibility in this area was good as the vegetation is relatively young and sparse. One newly designated historic property, Nīnole Bridge (SIHP # 50-10-68-30299) and one previously designated historic property, Māmalahoa Highway (SIHP # 50-10-47-30187) was identified within the project APE. Built in 1940, Nīnole Bridge is identified as a timber stringer bridge, one of only two timber bridges under HDOT jurisdiction. A complete description of this historic property is provided in Section 5.

Highway 11 (Māmalahoa Highway) (SIHP # 50-10-47-30187) extends through the center of the south section of the project APE. The Māmalahoa Highway extends northeast to southwest within the current project APE. This portion of the highway includes Nīnole Bridge at mile post 56.7. Māmalahoa Highway is thought to have been named for the royal decree of Kamehameha I, *Ke Kānāwai Māmalahoe* (The Law of the Splintered Paddle). The highway was likely built over a number of interconnected foot trails, cart roads and historic roads, remnant portions of which are still present beyond the highway right-of-way. Historic maps indicate the portion of Highway 11 within the study area was constructed post-1921 and likely around the time of the construction of Nīnole Bridge in 1940. The roadway has been repaved and modified in modern times (see Figure 16 and Figure 17). Some minor signs of wear such as cracking were observed. The portion overlying the Nīnole Bridge has been recently repaved. The raised pavement markers are intact and the road surface markings have some cracking but have not faded. No additional historic properties were observed in the southern section.

A modern dry-stacked stone wall was identified within the southern portion of the project APE along Māmalahoa Highway (Figure 18). The wall was built during the construction of the Sea Mountain Golf Course around 1971 by Sea Mountain employees (personal communication, 2014). Dozer scarring was observed on many of the basalt boulders (Figure 19). The wall was determined to be less than 50 years old and not a historic property.

Figure 14. Boundary wall (SIHP # 50-10-68-24907) observed near the north section, view to north

Figure 15. Nīnole Bridge (SIHP # 50-10-68-30299) spanning Nīnole Gulch, view to northeast

Figure 16. Highway 11 (Māmalahoa Highway) (SIHP # 50-10-47-30187) extending through the south section of the project APE, view to south

Figure 17. Highway 11 (Māmalahoa Highway) (SIHP # 50-10-47-30187) extending through the south section of the project APE, view to north

Figure 18. Modern wall associated with the Sea Mountain Golf Course along northwest edge of the project APE south of Nīnole Bridge, view to northwest

Figure 19. Dozer scarring on modern wall, view to northwest

Section 5 Historic Property Descriptions

Two historic properties were identified within the current project APE during this AIS. The historic properties are summarized in Table 3 and depicted on Figure 20 and Figure 21. Descriptions of these historic properties follow.

Table 3. Historic Properties Identified within the Current Project APE

SIHP #	Formal Type	Function
50-10-47-30187	Māmalahoa Highway	Transportation
50-10-68-30299	Bridge (Nīnole Bridge)	Transportation

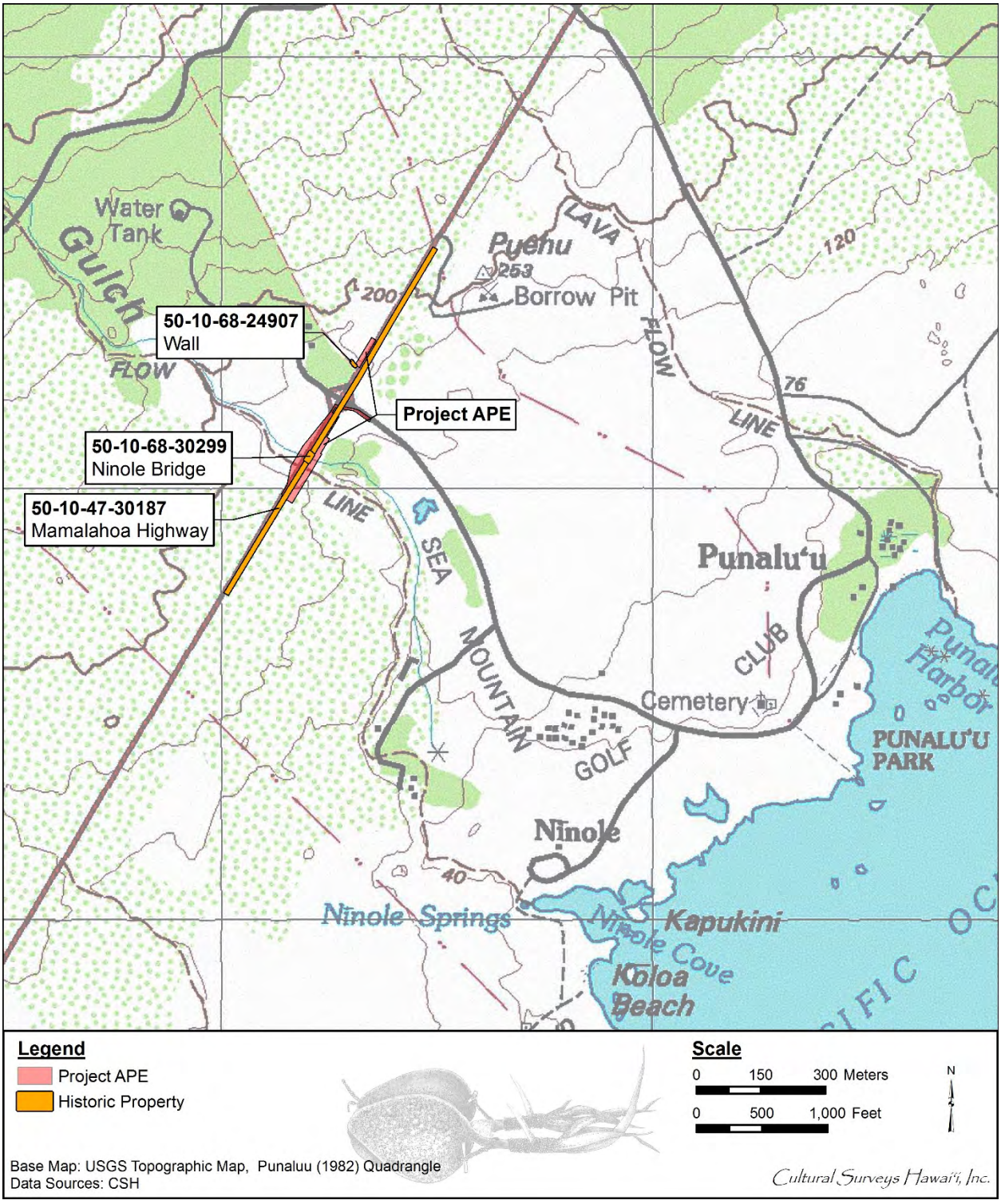

Figure 20. Portion of the 1982 Punaluu USGS 7.5-minute topographic quadrangle showing the locations of SIHP # 50-10-47-30187 and SIHP # 50-10-68-30299 within project APE and SIHP # 50-10-68-24907 outside of the northern portion of the project APE

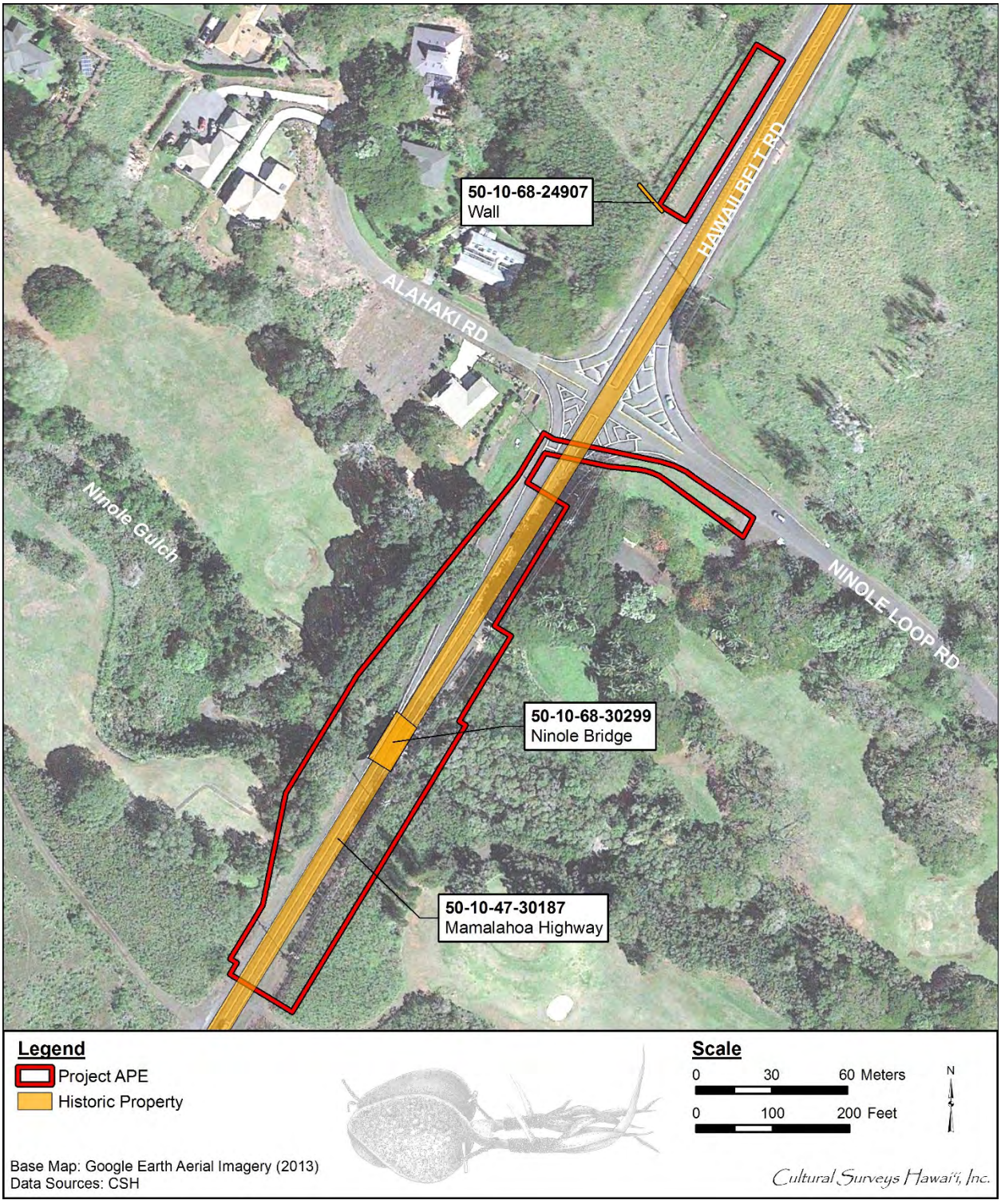

Figure 21. 2013 aerial photograph showing locations of SIHP # 50-10-47-30187 and SIHP # 50-10-68-30299 within project APE and SIHP # 50-10-68-24907 outside of the northern portion of the project APE (Google Earth 2013)

5.1 SIHP # 50-10-47-30187

FORMAL TYPE:	Māmalahoa Highway
FUNCTION:	Transportation
TOTAL FEATURES:	5 features were designated in South Kona District in Clark et al. 2014; only the actively used, contemporary Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) is designated here
AGE:	Historic/Modern
TAX MAP KEY:	[3] 8-1-009; 8-1-008; 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way
LAND JURISDICTION:	HDOT
PREVIOUS DOCUMENTATION:	Clark et al. 2014; Tulchin et al. 2006–draft; Belluomini and Hammatt 2017

5.1.1 SIHP # 50-10-47-30187 Māmalahoa Highway as Described by Clark et al. (2014)

SIHP # 50-10-47-30187 consists of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) including its former and present alignments. The historic property was previously documented by Clark et al. (2014), for a portion of Highway 11 in Ka‘awaloa Ahupua‘a of South Kona. Inclusion of the portion of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) within the present APE under this historic property designation in South Kona resulted from consultation with the SHPD archaeology branch regarding appropriate historic property nomenclature. In accordance with the Clark et al. (2014) description of the historic property, it was determined that this historic property designation applies to the former and present remnants of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) documented in Belluomini and Hammatt 2017 (Hīlea Bridge AIS report) and within the current project APE.

SIHP # 50-10-47-30187 initially included five features documented by Clark et al. (2014) in South Kona consisting of a stone revetment (Feature A), two stone retaining walls (Feature B and C), one abandoned segment of roadway (Feature D), one concrete culvert (Feature E).

As the historic property is introduced by Clark et al. (2014):

> [Highway 11] has developed from what was once a footpath (Kealaehu; Maly and Maly 2001), into its current Highway 11 form through incremental improvements over more than a century. The improvements come in the form of straightening, widening, grade changes, and enhanced storm water drainage systems that are upgraded routinely, but especially during large scale construction projects. The first large scale endeavor that transformed this roadway from a footpath/mule trail into one that automobiles could negotiate was the Kona to Ka‘ū portion of the upper Government Road, which was conducted in the late 1800s to early 1900s. By 1933 the Māmalahoa Highway (Hawai‘i Belt Road) was constructed over the same general corridor as the older Government Road, but advances in earth moving technology enabled engineers to cut and fill the sloping land more efficiently, and thus were able to create a more direct, less curvy route. [Clark et al. 2014:52]

Clark et al. (2014) previously documented SIHP # 50-10-47-30187 Features A through E along a portion of Highway 11 at the intersection with Nāpo‘opo‘o Road in South Kona (Figure 22). These features are suggested to be fairly typical for Highway 11.

SIHP # 50-10-47-30187 Feature A (representative photograph provided in Figure 23) in South Kona is described by Clark et al. (2014) as follows:

> Feature A is a sloped revetment consisting of large cobbles and small boulders located along the makai side of an elevated portion of the Highway, in the southeastern portion of the study corridor. Feature A extends 60 meters and is sloped away from the road surface at a roughly 40 degree angle. The lowest point of the adjacent ground surface is at the northwestern end where the base of the revetment measures 3.6 meters below the road surface, and tapers up at the southeast end where the base measures 0.4 meters below the road surface. Between the cobbles and boulders, underlying dark brown soil was observed. At its southeast end, Feature A terminates at [SIHP # 50-10-47-23218], a stacked wall that runs along the makai side of the highway to the southeast. Near its northwestern end is [SIHP # 50-10-47-23219], a boundary wall constructed between TMK: (3) 8-1-09:011 and 057 that terminates two meters makai of the base of Feature A. The sloped revetment stands up to 2.4 meters tall at the location of its junction with [SIHP # 50-10-47-23219]. The revetment was likely constructed as an erosion control device (as opposed to a structural retaining wall) to armor the slope and prevent the loss of fill material during storm events. [Clark et al. 2014:52]

SIHP # 50-10-47-30187 Feature B in South Kona (Figure 24) is described by Clark et al. (2014) as follows:

> Feature B is a sloped retaining wall that forms the makai edge of Māmalahoa Highway. The wall, which is located approximately 195 meters northwest of Feature A, measures approximately 37 meters long, stands 0.5 to 0.7 meters tall, and consists of stacked small to large cobbles and a few small boulders. The wall functions to retain fill material within the road base, which is slightly elevated at this location. The sloped face of the wall, which angles away from the road, provides more retaining strength, and less chance of collapse. The shoulder width from the edge of the retaining wall to the edge of Highway 11 pavement varies from 1.4 to 2 meters. Feature B also defines the mauka edge of TMK: (3) 8-1-09:010, a residential property. A hedge of ti have been planted along the retaining wall in front of the house. Amid the ti plants is a small gap where a set of two poured in place concrete steps [SIHP # 50-10-47-30192]. The steps, which are no longer used, descend from the elevated Highway edge to a concrete path that extends across the lower yard surface to the front entrance of the house on TMK: (3) 8-1-09:010 that was built in 1931. The age of Feature B is not clear, although given its conformity to present roadway layout, it may have been constructed during the last phase of Māmalahoa Highway improvements. [Clark et al. 2014:54]

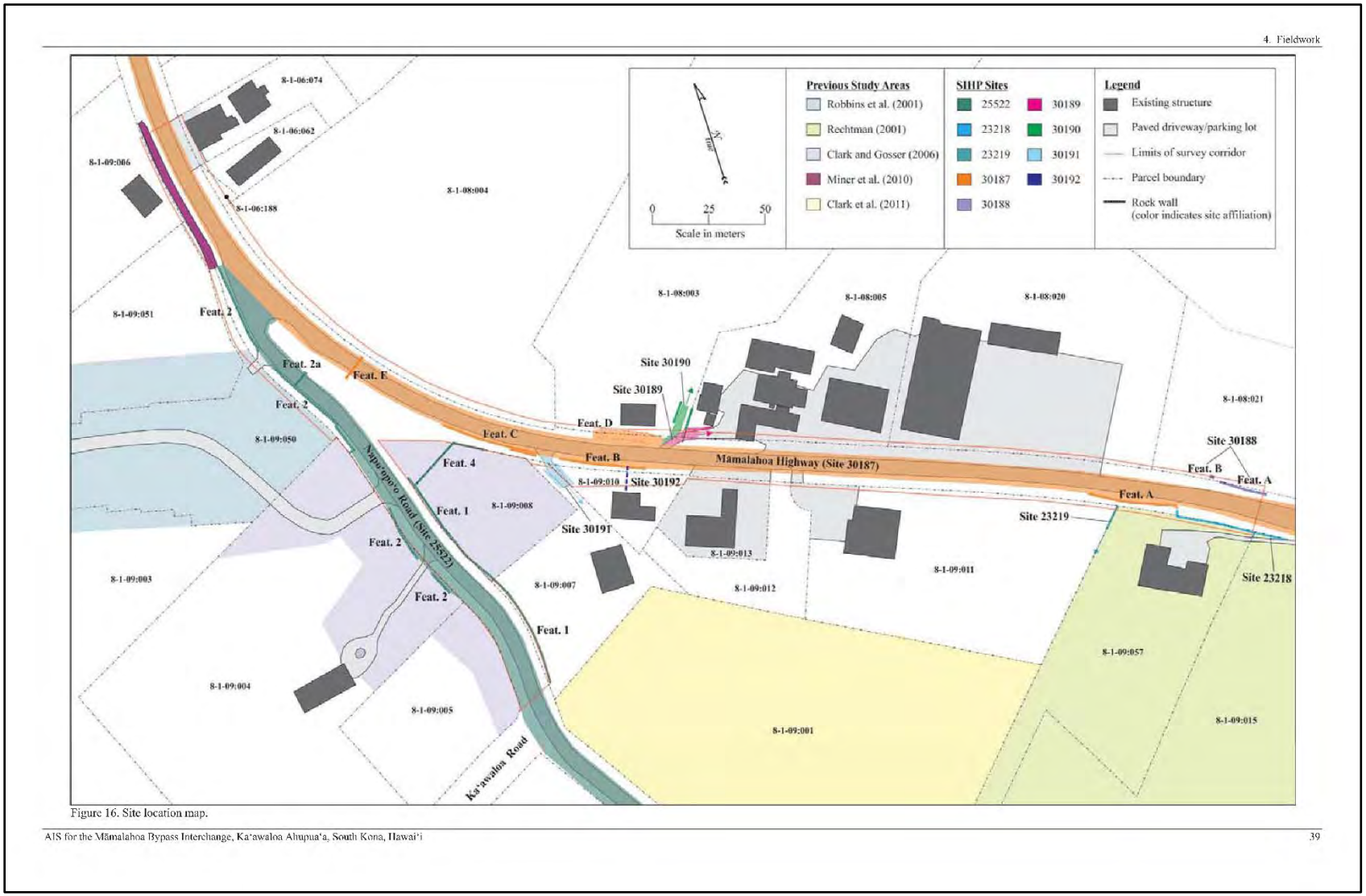

Figure 16. Site location map.

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Figure 22. Locations of SIHP # 50-10-47-30189 Features A through E (Clark et al. 2014:39)

Figure 23. SIHP # 50-10-47-30187 Feature A sloped revetment in South Kona, view to northwest (Clark et al. 2014:53)

Figure 24. SIHP # 50-10-47-30187 Feature B sloped retaining wall in South Kona, view to northwest (Clark et al. 2014:54)

SIHP # 50-10-47-30187 Feature C (Figure 25) is described by Clark et al. (2014) as follows:

> Feature C is a two-tiered retaining wall located along the makai side of Māmalahoa Highway, 32 meters northwest of Feature B. The upper section of retaining wall that retains the existing road bed measures roughly 22 meters long, stands up to 1.3 meters tall, and is constructed of small to large cobbles. This wall was built to retain fill material within the road base, which is elevated and curved in its vicinity. The sloped face of the upper tier wall angles away from the road and provides more retaining strength, with less chance of collapse. At its southeastern end, Feature C stands 40 centimeters tall above a level constructed cobble surface, or lower tier of the wall, but steadily increases in height to a maximum of 1.3 meters tall at its northwestern end. The top of the wall face measures, on average, 60 centimeters from the edge of the Highway pavement, and a guardrail has been installed within the narrow shoulder. The lower tier, which extends 1 to 1.5 meters beyond the base of the upper tier, measures 7 meters long and stands roughly 0.6 meters tall along its southwestern (makai) edge. The northwestern end of the lower tier terminates at bulldozed rubble near the mauka/makai portion of [SIHP # 50-10-47-25522] Feature 4, a previously recorded wall… that extends along the northwestern boundary of TMK:(3) 8-1-09:008. It is not clear if both tiers of the Feature retaining wall were constructed during the same episode, or if the lower tier represents an earlier construction, perhaps associated with an older alignment of the road. [Clark et al. 2014:54]

SIHP # 50-10-47-30187 Feature D in South Kona (Figure 26) is described by Clark et al. (2014) as follows:

> Feature D is a section of former roadway located adjacent to the mauka edge of Māmalahoa Highway, opposite from Feature B, immediately northwest of [SIHP # 50-10-47-30189] and [SIHP # 50-10-47-30190], and approximately 165 meters southeast of the Napo‘opo‘o Road intersection. Feature E fronts a vacant house (built in 1929), which is the lower of two structures on TMK: (3) 8-1-08:003. The abandoned section of road is covered in tall Guinea grass and planted trees line the makai, or highway side of Feature D. The old road bed is level and is elevated approximately 1 meter above the current highway surface. It measures 22 meters long by roughly 4 meters wide. Along the makai edge, at the southeastern end of the section of old road is a 3 meter long remnant of sloped retaining wall. The wall stands 0.9 meters tall and is built of medium to large cobbles and small boulders. It is likely that this retaining wall continued along the former road’s edge to the northwest before it was destroyed during the construction of the more recent alignment of the adjacent roadway. The cut into the former roadway reveals construction fill consisting of small to large cobbles and a small amount of soil. At the makai edge of the abandoned road, one section of 10 centimeter thick asphalt pavement was observed on the surface of the former road section in a cut created to accommodate the current highway alignment. The land located northwest of the elevated old road segment has been bulldozed level to the newer highway surface.

Figure 25. SIHP # 50-10-47-30187 Feature C two-tiered retaining wall in South Kona, view to northwest (Clark et al. 2014:55)

Figure 26. SIHP # 50-10-47-30187 Feature D section of former roadway in South Kona, view to northeast (Clark et al. 2014:58)

> This old section of road is believed to be an older segment of road that was abandoned after the more recent alignment of the Māmalahoa Highway was completed in the early 1930s. A 1964 map submitted with Hawai‘i Land Court Application No. 1860 labels the location of Feature E, “Road Remnant”, and lists the State of Hawai‘i as the owner. It appears that after the Feature E roadway segment was abandoned it was then utilized as a driveway accessing the adjacent house structure built in 1929. [Clark et al. 2014:56]

SIHP # 50-10-47-30187 Feature E in South Kona (Figure 27 and Figure 28) is described by Clark et al. (2014) as follows:

> Feature E is a 12 meter long concrete culvert that extends beneath Māmalahoa Highway approximately 60 meters northwest of Feature C. The inlet on the mauka side of the road is sunken below road level and is fed by a paved swale that collects runoff from both the southwest and northwest directions. The inlet is situated beneath a steep road cut, and a steel plate has been placed over a portion of the catch pit to prevent loose soil and cobbles from tumbling in to it from the steep slope. At the inlet is a 0.5 meter wide catch pit that is crudely lined with large cobbles, and extends the length of the concrete culvert headwall, which measures 1.8 meters long. The concrete headwall measures 0.28 meters thick, and its flat upper surface is level to the pavement, and set back 0.7 meters from the edge of the driving surface. The headwall and culvert were poured in place, with 6-inch and 12-inch planks used to form the face of the wall, and 3-inch slats used to form the circular culvert portion. The culvert diameter measures 0.95 meters, and is partially filled in at the bottom with sediment. The outlet end of Feature E extends 3 meters (10 feet) beyond the makai edge of the paved road surface. The top of the outlet headwall is roughly 1.3 meters below pavement level, amid a steep slope that is partially reinforced by a dry stacked retaining wall above the southeastern side of the culvert. The retaining wall section is slightly sloped, constructed of large cobbles, and measures approximately 3 meters long by 1 meter tall. The headwall is dimensionally identical to the inlet side. Large cobbles have been stacked, one to two high, on the upper surface of the headwall to retain sloped gravel road fill. From the outlet of Feature E, an excavated channel curves to the northwest and extends for 12 meters, and curves again to the west where it leads to the inlet of a culvert beneath Nāpo‘opo‘o Road [SIHP # 50-10-47-25522 Feature 2a]. [Clark et al. 2014:58]

Figure 27. SIHP # 50-10-47-30187 Feature E concrete culvert inlet in South Kona, view to northeast (Clark et al. 2014:59)

Figure 28. SIHP # 50-10-47-30187 Feature E concrete culvert outlet in South Kona, view to north (Clark et al. 2014:60)

5.1.2 SIHP # 50-10-47-30187 Māmalahoa Highway in the Vicinity of Hīlea Bridge and Nīnole Bridge

The portion of SIHP # 50-10-47-30187 that extends through the current project APE and the nearby Belluomini and Hammatt (2017) project APE for the Hīlea Bridge Replacement Project are similar in condition. Highway 11 extends north to south through both project's APE's as a gently crowned, two-lane (one lane in each direction, approximately 11-feet wide) asphalt highway with white line shoulder striping and reflectors down the center (see Figure 16, Figure 17, Figure 29 and Figure 30). This portion of Highway 11 was constructed in the late 1930s and early 1940s, likely around the time of the construction of Hīlea Bridge (SIHP # 50-10-74-30298) and Nīnole Bridge (SIHP # 50-10-68-30299) in 1940 as a straightening of the Old Government Road that is northwest of the project APE. The roadway has been repaved and modified in modern times (see Figure 16, Figure 17, Figure 29 and Figure 30). Some minor signs of wear such as cracking were observed. The raised pavement markers are mostly intact and the road surface markings have some cracking, but have not faded.

SIHP # 50-10-47-30187, Māmalahoa Highway, was previously assessed as significant by Clark et al. (2014:81) under HAR "§13-284-6" under Criterion "A" for its being associated with events and Criterion "D" for its information potential. It is the understanding of this study that the Clark et al. (2014) assessment of significance was explicitly under HAR "§13-284-6" as significant under Criteria a and d. This report supports the Clark et al. (2014) assessment of significance. Therefore, pursuant to HAR §13-275-6, SIHP # 50-10-47-30187, Māmalahoa Highway, is assessed as significant under Criterion a (Be associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (Have yielded, or is likely to yield, information important for research on prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. SIHP # 50-10-47-30187, is evaluated as eligible for inclusion in the National Register (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). SIHP # 50-10-47-30187, is evaluated as eligible for listing on the Hawai‘i Register (per HAR §13-198-8) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). This assessment of significance and evaluation of eligibility is based on the historic properties association with "important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity" (Clark et al. 2014:81).

5.1.3 A Note on Other Identifications of the Māmalahoa Highway as a Historic Property

As designated by Clark et al. (2014:52) and as (in consultation with the SHPD) used here, SIHP # 50-10-47-30187 designates current and former alignments of the Māmalahoa Highway also known as Highway 11 and the Hawaii Belt Road. The authors are aware, as an example, that remnants of the Māmalahoa Highway (Highway 11/Hawai‘i Belt Road) documented in Tulchin et al. 2006–draft were previously designated as SIHP # 50-10-68-24909. It may be the case that there are other portions of the Māmalahoa Highway that have also previously received other SIHP # designations.

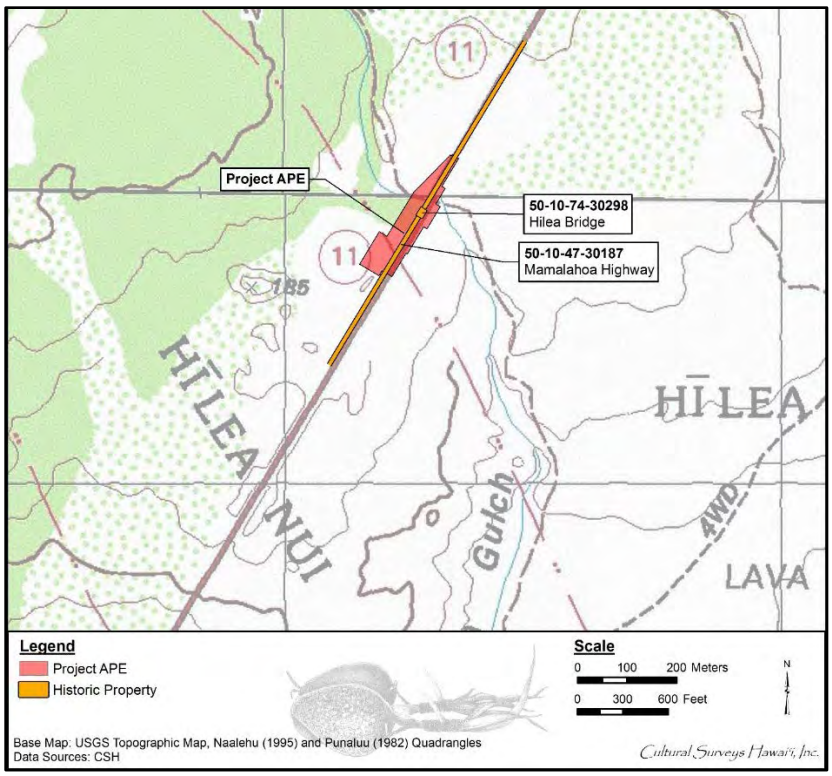

Figure 29. Portion of 1982 Punaluu USGS topographic quadrangle showing the location of SIHP # 50-10-47-30187 crossing Hīlea Bridge (SIHP # 50-10-74-30299, southwest of the present project area) (Belluomini and Hammatt 2017:44)

Figure 30. SIHP # 50-10-47-30187 extending across Hīlea Bridge (SIHP # 50-10-74-30298), view to north (Belluomini and Hammatt 2017:39)

5.2 SIHP # 50-10-68-30299

FORMAL TYPE:	Bridge (Nīnole Bridge)
FUNCTION:	Transportation
NUMBER OF FEATURES:	1
AGE:	Historic (1940)
TEST EXCAVATIONS:	None
TAX MAP KEY:	[3] 9-5-019, 9-5-027 (Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way)
LAND JURISDICTION:	HDOT
PREVIOUS DOCUMENTATION:	MKE Associates LLC/Fung Associates, Inc. 2013

SIHP # 50-10-68-30299 is Nīnole Bridge, located at mile post 56.7 along Hawai‘i Belt Road (Māmalahoa Highway/Highway 11) (SIHP # 50-10-47-30187) and entirely within the project APE. The existing Nīnole Bridge structure was built in 1940 and spans Nīnole Gulch (Figure 31 through Figure 35). Nīnole Bridge is identified as a timber stringer bridge, one of only two remaining timber bridges under HDOT jurisdiction. Nīnole Bridge includes three spans totaling a length of 18.3 m (60.0 ft) and a width of 8.2 m (26.9 ft).

The State Historic Bridge Inventory Evaluation (MKE Associates LLC/Fung Associates, Inc. 2013:6-153) provides the following description of Nīnole Bridge:

> The Ninole Stream Bridge carries Hawaii Belt Road across the Ninole Stream. This timber bridge has an asphalt deck and is in its original location. It is generally in good condition. The bridge has timber railings and concrete footings. The asphalt deck is supported by timber columns with concrete rubble masonry footings and concrete rubble masonry abutments. The simple design of the bridge retains its historic feeling. The MOA between DOT and the Central Federal Lands considering the bridge for replacement in 2013 was completed. [MKE Associate LLC/Fung Associates, Inc. 2013:6-153]

The State Historic Bridge Inventory Evaluation (MKE Associates LLC/Fung Associates, Inc. 2013:6-154) provides the following register eligibility recommendation for Nīnole Bridge:

> This bridge is eligible under Criterion C for its association with early developments in timber bridge construction in Hawaii. It is a good example of a 1940’s timber bridge that is typical of its period in its use of materials, method of construction, craftsmanship, and design. It is also one of the last district owned timber bridges. [MKE Associates LLC/Fung Associates, Inc. 2013:6-154]

SIHP # 50-10-68-30299 is Nīnole Bridge (previously evaluated for eligibility for inclusion on the National Register and/or Hawai‘i Register as Bridge # 001000110306600 by MKE Associates LLC and Fung Associates, Inc. 2013, but not given an SIHP number until this AIS) is assessed under HAR §13-275-6, in consultation with a Mason Architects, Inc. architectural historian, as significant under Criterion c (embodies the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value) and has retained full

integrity of location, setting, feeling, and association. Integrity of design, materials, and workmanship are not fully retained, however, the major design elements, construction materials, and their evident craftsmanship are intact. SIHP # 50-10-68-30299 was evaluated by Ruzicka (2016) as eligible for inclusion on the National Register (per 36 CFR 60.4) and the Hawai‘i Register (per HAR §13-198-8) due to its significance under Criterion C (“that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction”) and is considered to have sufficient integrity as described above. This evaluation is also consistent with the previous evaluation of Nīnole Bridge (MKE Associates LLC and Fung Associates, Inc. 2013).

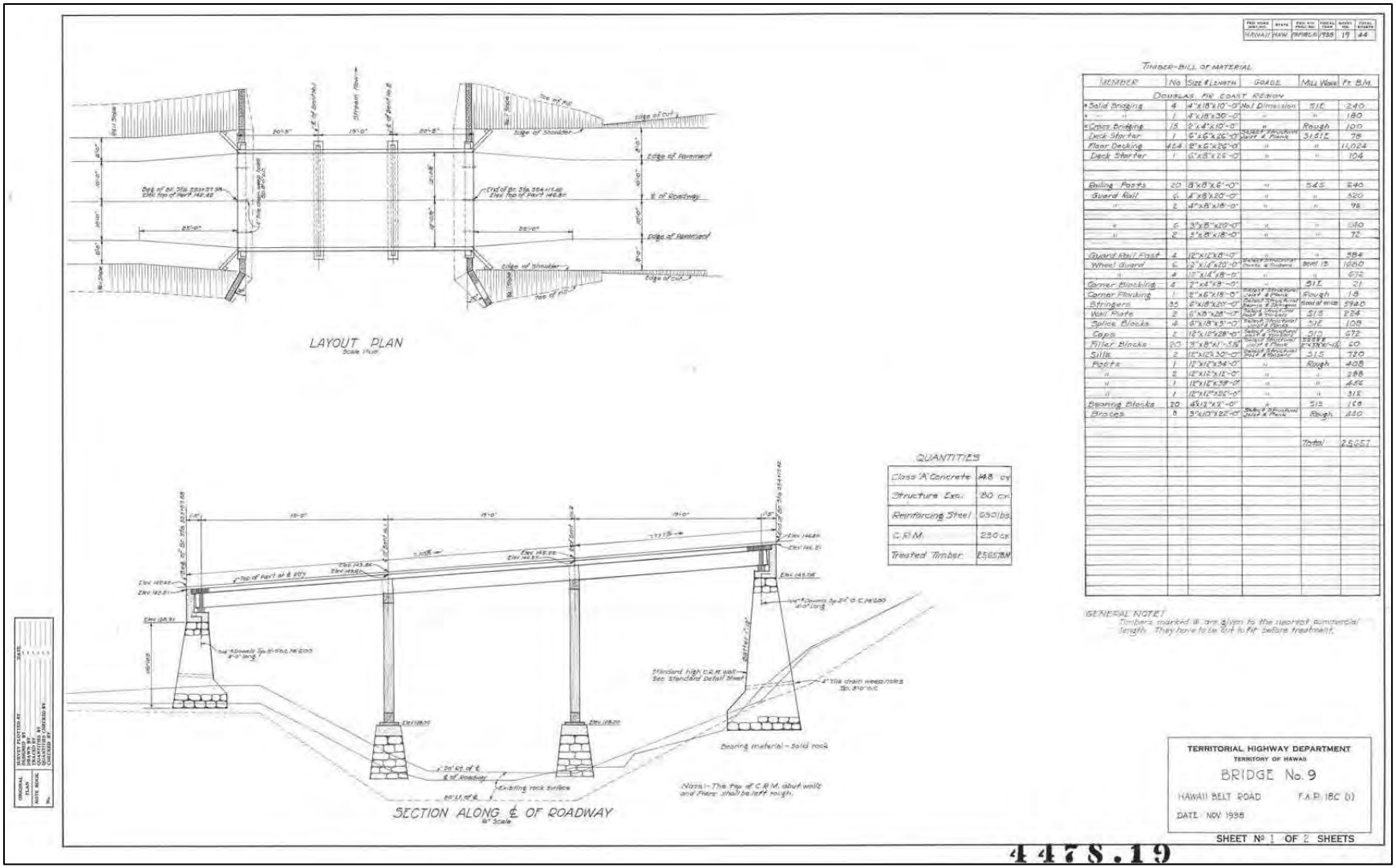

Figure 31. 1938 Territory of Hawaii, Territorial Highway Department, Bridge No. 9 (Nīnole Bridge) plans sheet 1 of 2

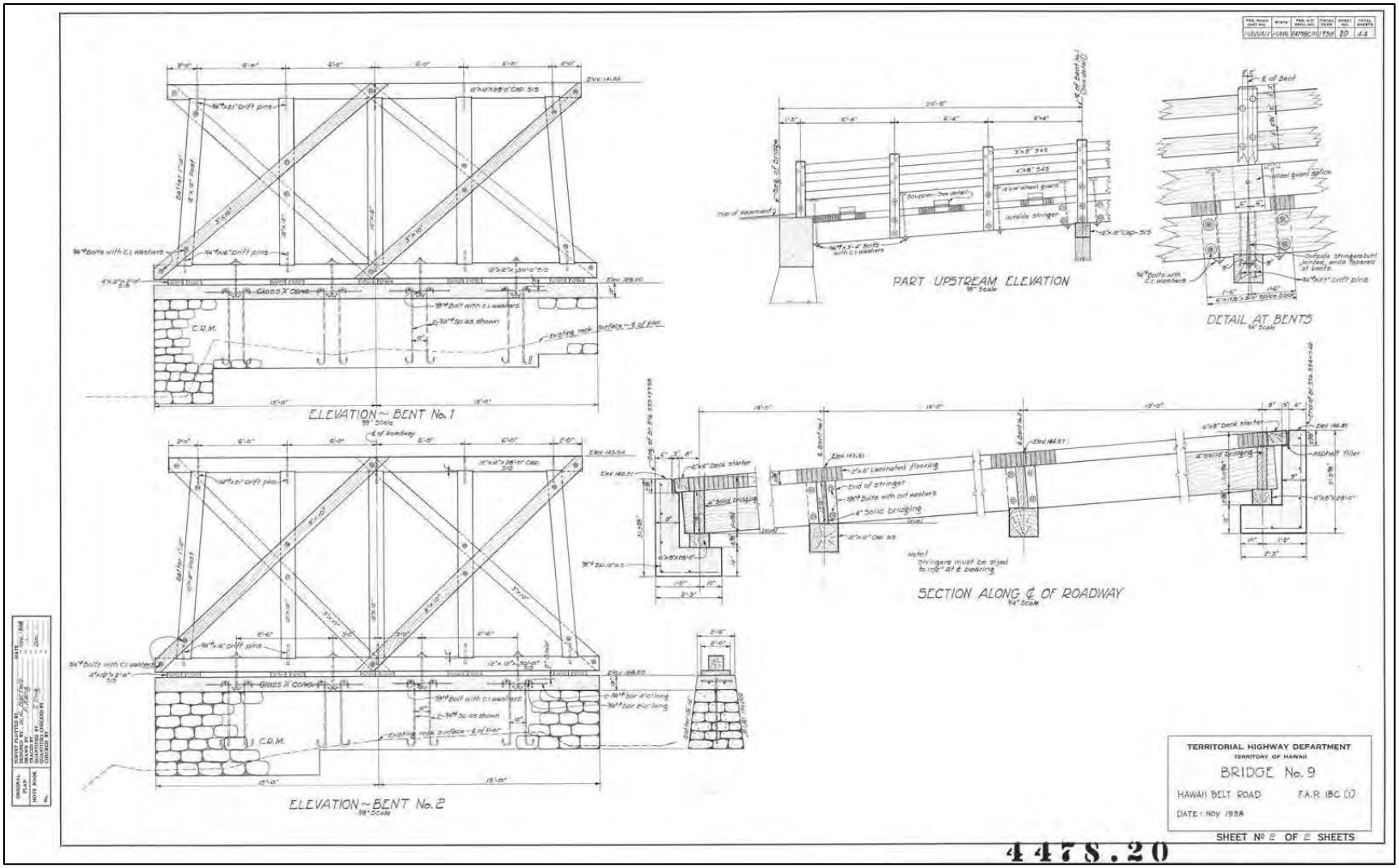

Figure 32. 1938 Territory of Hawaii, Territorial Highway Department, Bridge No. 9 (Nīnole Bridge) plans sheet 2 of 2

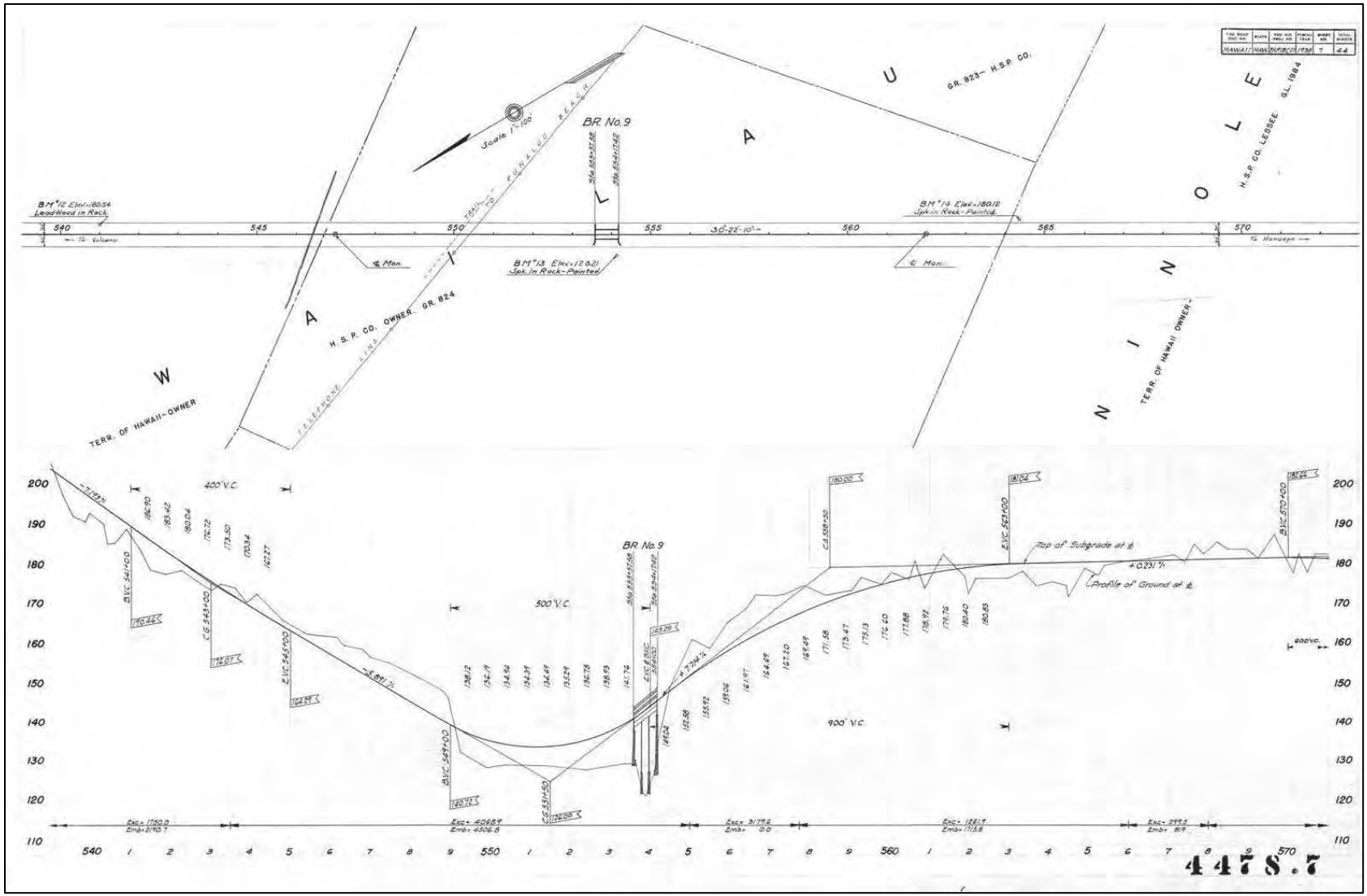

Figure 33. 1938 Territory of Hawaii, Territorial Highway Department, highway plan and profile showing the location of Bridge No. 9 (Nīnole Bridge) along Highway 11 (Māmalahoa Highway)

Figure 34. SIHP # 50-10-68-30299, Nīnole Bridge asphalt deck, view to northeast

Figure 35. SIHP # 50-10-68-30299, Nīnole Bridge timber columns and footings, view to northwest

Section 6 Summary and Interpretation

At the request of CH2M HILL and on behalf of the FHWA/CFLHD, CSH has completed this AIS report for the Nīnole Bridge Replacement project, Nīnole Ahupua‘a, Ka‘ū District, FHWA/CFLHD Contract DTFH68-13-R-00027 (TMKs: [3] 9-5-019:001, 011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way.

Background research included various mythological and traditional accounts as well as early historic information from Ka‘ū as there was little documentation specific to Nīnole Ahupua‘a prior to the nineteenth century. One Land Commission Award (LCA) was documented within a 0.8-km (0.5-mile) radius of the project APE. LCA 10510:2 was awarded to Nawali. Testimony by Nawali mentions taro, pumpkin, sweet potatoes, a house lot, *olonā*, and an *umu ‘ōhua*, a pile of rocks placed in the sea to attract young fish. Also, two land grants were identified within portion of the project APE on the 1885 Brown map of the Ka‘ū District (see Figure 8). Grant 2459 included 290 acres to D. Holona (Holowa). Grant 824 included 48.75 acres to Kapohonua. It is unclear whether there was any development of the project lands by these grant holders. No development is depicted within the project APE in the 1921 USGS topographic map (see Figure 9). Previous archaeological studies have identified 14 historic properties within a 0.8-km (0.5-mile) radius of the project APE that include both pre- and post-Contact structures, predominately walls, as well as one burial site.

A 100% pedestrian inspection of the project APE was conducted on 17 June 2015 by Scott Belluomini, B.A. and Nifae Hunkin, B.A. The pedestrian inspection newly identified a historic property (SIHP # 50-10-68-30299) within the project APE and further documented a previously identified historic property (SIHP # 50-10-68-24907) near the northern section of the project APE.

SIHP # 50-10-47-30187 is Māmalahoa Highway (Highway 11) and includes its former and present alignments. The historic property was previously documented by Clark et al. (2014), for a portion of Highway 11 in Ka‘awaloa Ahupua‘a of South Kona. The portion that extends through the project APE was constructed in the late 1930s and early 1940s as a straightening of the Old Government Road that is north of the project APE. The Nīnole Bridge (SIHP # 50-10-68-30299) was constructed to allow the new highway to extend across Nīnole Gulch.

SIHP # 50-10-68-30299 is Nīnole Bridge, located at mile post 56.7 along Highway 11 (Māmalahoa Highway) and entirely within the project APE. The existing Nīnole Bridge structure was built in 1940 and spans Nīnole Gulch. Nīnole Bridge is identified as a timber stringer bridge, one of only two remaining timber bridges under HDOT jurisdiction.

Section 7 Significance Assessment and Eligibility Determination

Pursuant to HRS §6E and Section 106, assessments of significance and integrity are included in this section for the one historic property present within the project APE.

7.1 Significance Assessments under HRS §6E

Under HRS §6E, for a historic property to be significant under HAR §13-275-6, the historic property should possess integrity of location, design, setting, materials, workmanship, feeling, and/or association, and meet one or more of the following criterion:

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

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

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

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

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

SIHP # 50-10-47-30187, Māmalahoa Highway, was previously assessed as significant by Clark et al. (2014:81) under HAR "§13-284-6" under Criterion "A" for its being associated with events and Criterion "D" for its information potential. It is the understanding of this study that the Clark et al. (2014) assessment of significance was explicitly under HAR "§13-284-6" as significant under Criteria a and d. This report supports the Clark et al. (2014) assessment of significance. Therefore, pursuant to HAR §13-275-6, SIHP # 50-10-47-30187, Māmalahoa Highway, is assessed as significant under Criterion a (Be associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (Have yielded, or is likely to yield, information important for research on prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. This assessment of significance is based on the historic properties association with "important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity" (Clark et al. 2014:81).

SIHP # 50-10-68-30299 is Nīnole Bridge (was previously evaluated for eligibility for inclusion on the National Register and/or Hawai‘i Register as Bridge # 001000110306600 by MKE Associates LLC and Fung Associates, Inc. 2013, but not given an SIHP number). It is assessed here under HAR §13-275-6, in consultation with Mason Architects, Inc. as significant under Criterion c (embodies the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value) and as retaining integrity of location, setting, feeling, and association. Integrity of design, materials, and workmanship are not fully

retained; however, the major design elements, construction materials, and their evident craftsmanship are intact.

7.2 National Register and Hawai‘i Register Eligibility Determination

Under Section 106, significant historic properties are evaluated for inclusion on the National Register pursuant to 36 CFR 60.4. An evaluation of eligibility for listing on the Hawai‘i Register pursuant to HAR §13-198-8 is also included in this section. To be considered eligible for listing on the National Register and/or Hawai‘i Register, a historic property should possess integrity as described above, and meet one or more of the following broad significance criteria:

A that are associated with events that have made a significant contribution to the broad patterns of our history;

B that are associated with the lives of persons significant in our past;

C that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;

D that have yielded, or may be likely to yield, information important in prehistory or history;

SIHP # 50-10-47-30187 is evaluated as eligible for inclusion in the National Register (per 36 CFR 60.4) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). SIHP # 50-10-47-30187, is evaluated as eligible for listing on the Hawai‘i Register (per HAR §13-198-8) under Criterion A (that are associated with events that have made a significant contribution to the broad patterns of our history) and Criterion D (that have yielded, or may be likely to yield, information important in prehistory or history). The historic property retains integrity of location, design, setting, materials, workmanship, feeling, and association. This evaluation of eligibility is based on the historic properties association with “important late nineteenth and early twentieth events in establishing a regional transportation network that has its roots in antiquity” (Clark et al. 2014:81).

SIHP # 50-10-68-30299 was evaluated by Ruzicka (2016) as eligible for inclusion on the National Register (per 36 CFR 60.4) and the Hawai‘i Register (per HAR §13-198-8) due to its significance under Criterion C (“that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction”) and as having sufficient integrity, as described above. This eligibility determination is also consistent with the previous evaluation of Nīnole Bridge (MKE Associates LLC and Fung Associates, Inc. 2013).

Section 8 Project Effect and Mitigation Recommendations

8.1 Project Effect

In accordance with Federal regulations (36 CFR 800.5), the project-specific effect recommendation is “adverse effect.” Under Hawai‘i State historic preservation review legislation, the project’s effect recommendation is “effect, with proposed mitigation commitments” (in accordance with HAR §13-13-275-7).

The proposed project will have an adverse effect on the Nīnole Bridge (SIHP # 50-10-68-30299). The portion of the Māmalahoa Highway (SIHP # 50-10-47-30187) apart from the small portion extending over the Nīnole Bridge is not likely to be adversely affected by the proposed project. The integrity and significance of the highway will not be diminished.

8.2 Mitigation Recommendations

Architectural recordation is recommended for SIHP # 50-10-68-30299, Nīnole Bridge, in the form of Historic American Engineering Record (HAER) Level II documentation. No further archaeological work is recommended for the Māmalahoa Highway (SIHP # 50-10-47-30187). Although SIHP # 50-10-68-24907 (post-Contact wall) is outside the project APE, SHPD recommended a temporary orange construction fence to be installed as an interim protection measure due to the proximity of SIHP # 50-10-68-24907 to the project APE. At the request of the project proponent, precautionary archaeological monitoring is planned as a good faith effort, based on community consultation.

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Appendix A Ruzicka 2016

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM – Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

GENERAL INFORMATION

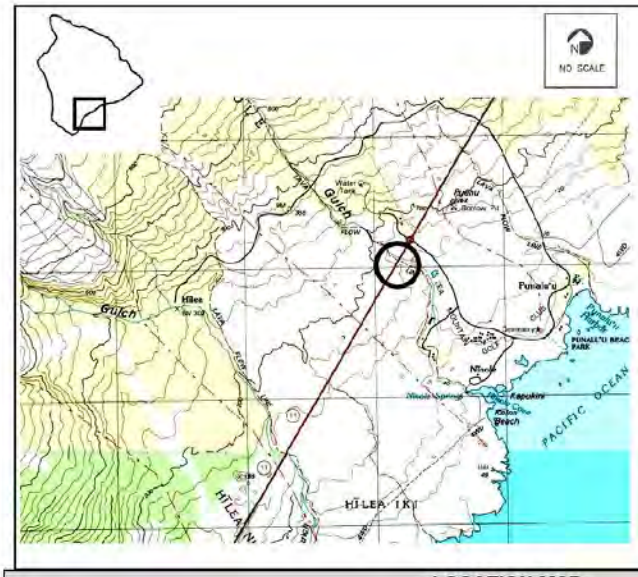
Common / Present Name: Ninole Bridge
Historic Name: Ninole Bridge

Address: Mamalahoa Highway (Rt. 11) at Ninole Stream
City/ Town/ Location: Vicinity of Pahala, Kau
County: Hawaii
TMK [(X)-X-X-XXX:XXX)]: between (3)-9-5-019:024 on west and (3)-9-5-019:011 on east
Subdivision/Neighborhood: n/a
Latitude: 19d-08m-18.97s N
Longitude: 155d-31m-02.45s W

Original Use: Vehicular bridge
Current Use: Vehicular bridge

Architect/ Builder (if known): William R. Bartels, engineer. Moses Akiona, contractor.
Date of Construction (if known): 1940

Ninole Bridge, view facing north



LOCATION MAP

1-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM – Reconnaissance Level

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

Prepared By: Dee Ruzicka Consulting Firm:
Mason Architects, Inc.
Address: 119 Merchant St. Suite 501 Honolulu, HI 96813
Telephone Number: 808-536-0556 Email:dr@masonarch.com Date: 06APR2016

CONDITION ASSESSMENT

Category (select all that apply):
- ☐ Building(s)
  - ☐ Residential
  - ☐ Commercial
  - ☐ Educational
  - ☐ Public/Civic
  - ☐ Religious
- ☒ Structure(s)
- ☐ Object(s)
- ☐ Site(s)/Landscape(s)
- ☐ Archaeology or potential for archaeology
  - Describe: _____


Ninole Bridge, view facing northeast


Ninole Bridge, view facing south

Alterations (additions, etc.) if known: **Several alterations to the bridge are evident from field inspection, although none can be dated precisely. They include the addition of W-beam guardrails on the approaches. These guardrails are free-standing and come to within about 1' of the bridge parapets without touching them. Beneath the bridge, a golf cart path has been constructed along the north side and at the south side a concrete covering over the stream bed and concrete base to the abutment have been added. Additional sistered posts and bracing were added to the south timber bent. All of these four alterations were done before ca. 1987. A concrete apron has been added downstream of the bridge. The roadway has likely been resurfaced at least once.**

Original Location, if moved: _____
Reason for move (if known): _____

Condition:
- ☐ Excellent
- ☐ Good
- ☒ Fair
- ☐ Deteriorated

Condition Explanation: South timber bent is reinforced with sistered timbers.

Eligibility (select all that apply):
- ☒ National Register of Historic Places
- ☒ State Register of Historic Places
- ☐ Not Eligible

2-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

☒Eligible
☐Listed
☐Contributing to Historic District:
Name of District:
☐Unknown


Ninole Bridge, view facing northeast

Criteria of Significance (select all that apply)
☐A: Associated with Events
Event:

☐B: Associated with Significant Person(s)
Person(s): ____

☒C: Distinctive characteristics of a type, period or method of construction; work of a master; possess high artistic values (Architecture, Engineering, Design)

☐D: Have yielded or may be likely to yield information important to history or prehistory. Explain: ____

DESCRIPTION

Materials (please check those materials that are visible):

Height
☐Stories: ____
☐Below Ground
☐N/A
☒Other: bridge

Exterior Walls (siding):
☐Aluminum Siding
☐Asbestos
☐Brick
☐Ceramic
☐Concrete
☐Horizontal Wood Siding
☐Log
☐Metal
☐Shingles-Asphalt
☐Shingles-Wood
☐Stone
☐Stucco
☐Vertical Wood Siding
☐Vinyl Siding
☐Engineered Siding
☐Plywood
☐OSB
☐Fiberboard
☐Fiber Cement
☒Other: Wood parapets consisting of timbers and boards.

Roof:
☐Asphalt, shingle
☐Asphalt, roll
☐Other: ____
☐Metal
☐Slate
☐Built Up
☐Ceramic Tile
☐Wood Shingle
☒None

Foundation:
☐Brick
☐Concrete Block
☐Concrete Slab
☐None – on earth
☐Poured Concrete
☐Raised/Pile
☒Stone
☐Other: ____

Structural Support:
☐Baled Hay
☐Concrete Block
☐Concrete Framed
☐Concrete Poured
☒Frame-wood
☐Frame-metal/steel

3-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

☐Brick-load bearing	☐Puddled Clay	☐Sod
☐Stone-load bearing	☐Rammed Earth	☐Other: _____

Windows:

☐Double Hung Sash	☐Replacement	☐Glass Block
☐Single Hung Sash	☐Aluminum	☒None/Unknown
☐Casement	☐Vinyl	☐Other: _____
☐Fixed	☐Jalousie	
☐Stained Glass	☐Ribbon	

Lanai(s)

☐Arcade	☐Stoop	☒None
☐Balcony	☐Portico	☐Other: _____
☐Porte-Cochere	☐Verandah	
☐Recessed	☐Wrap-around	

Chimney

☐Brick	☐Stone	☒None
☐Concrete	☐Stove Pipe	☐Other: _____
☐Stuccoed Masonry	☐Siding	

4-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

Narrative Description

Narrative Description:

The Ninole Bridge (Feature MAI A) is a 60' long, three-span timber bridge that carries the two traffic lanes of Mamalahoa Highway (Route 11) over the intermittent Ninole Stream in Kau District on Hawaii Island. The road way of the bridge is about 22' above the stream bed, which flows between the two support piers. The space between the north abutment and the north support pier is a paved path for golf carts and the space between the south abutment and the south pier has concrete covering the stream bed.

The setting of the bridge is rural, with vegetation and trees lining the stream bed on both sides of the bridge. The Sea Mountain Golf Course straddles the highway at the Ninole Bridge and its fairways, although nearby, are mostly concealed by the trees along the stream bed. The 15' wide paved cart path under the north portion of the bridge provides golf cart access to the course. About 500' northeast of the bridge, Mamalahoa Highway intersects with Punaluu Road at a large intersection with right and left turn lanes. This intersection is the roadway to the Sea Mountain Golf Club and Punaluu Beach County Park. Trees line the highway between the bridge and intersection, concealing the several small buildings located near the intersection. Southwest of the bridge, the trees lining the roadway diminish as the highway crests a small rise about 400' from the bridge.

The Ninole Bridge is built of wooden timbers that have been treated with coal tar creosote. The end grain of many of its timbers are oozing this substance, which is soft and pliable. The Ninole Bridge is 24' wide between its painted wooden railings (parapets) and has an asphalt-surfaced roadway over a wooden deck. Each parapet is about 3'-5" high and is composed of two, horizontal 8" boards with a horizontal 12 x 14 timber wheel guard at the roadway which acts as a curb. These horizontal members are supported by 8 x 8 posts on 6'-4" spacing, with 12 x 12 posts at the four corners of the bridge. The timber of the wheel guard is battered on the side facing traffic and sheathed with painted sheet metal. Sheet metal-lined scuppers are cut through the wheel guard on about 6'-4" spacing between the posts. About 6" above the wheel guard is a horizontal 4 x 8 board and 6" above that is the top rail of the parapet, a 3 x 8 board. At both ends of each parapet, 6'-4" of the parapet are splayed outward about 3'. This splayed portion has no metal sheathing on the wheel guard. Small painted aluminum signs reading "NINOLE BR." are located on the top rail at the splayed northeast and southwest ends of the parapets.

At the approaches to the bridge are W-beam guardrails on posts of steel I-beams. At the southeast approach there are three, 8" concrete posts that support the W-beam. The approach at the southwest has no W-beam guardrail.

The underside of the Ninole Bridge has battered, concrete rubble basalt lava masonry abutments and (two) basalt masonry support piers on the stream bed. The south abutment has an approximate 8' high concrete portion at its base. Each masonry support pier is about 5' high, 30' long and about 4' wide at its base, tapering to about 2'-6" wide at its top surface, which has a concrete cap. The piers are on 19' spacing (o.c.) from the top edge of the battered abutments. Atop each pier are wooden transverse bents (about 15' high) that support the

5-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY: Site # Click here to enter text. TMK # Click here to enter text.

stringers and deck of the bridge. Each bent is comprised of five, 12 x 12 posts (outer posts are battered) on a horizontal 12 x 12 wooden sill that is set on 4 x 12 bearing blocks on the concrete top surface of each pier. The posts are braced by diagonal 3 x 10 timbers. A wooden 12 x 12 transverse cap beam joins the tops of the five posts and supports the 6 x 18 longitudinal wooden stringers (set on about 2'-10" spacing). The bridge deck atop the stringers is 2 x 6 boards oriented vertically. The asphalt surface roadway is atop the solid 2 x 6 deck.

The timber framing at the south bent has had some additional support members added. The three center 12 x 12 posts and the upstream post have added 12 x 12 posts sistered to them on the upstream side using through-bolts. This bent also has added bracing of 2 x 8 at all posts.

The golf cart path between the north abutment and the north masonry pier occupies the entire 15'-6" width of that space. The path is nearly level and is built up to within about 6" of the top of the pier. A 5" wide concrete curb is at the stream-side edge. The stream bed in the space between the south abutment and south masonry pier is concrete that has been applied as a spillway over the stone bed of the stream. This spillway rises to a level of about 2' below the top surface of the concrete cap of the masonry pier. Immediately downstream of the masonry piers, the stream bed has an approximate 22' long concrete apron between the cart path and the south spillway.

Ninole Bridge is bridge number 001000110306600 in the National Bridge Inventory database. It was last inspected on October 11, 2012 by the State of Hawaii, Department of Transportation, Highways Division.

Integrity:

The Ninole Bridge retains sufficient integrity to convey its significance and enable NR listing. Integrity of location is retained. Integrity of setting is largely retained, it is somewhat reduced by the construction of the golf cart path. Integrity of design, materials, and workmanship are somewhat compromised by the alterations, but the major design elements, construction materials and their evident craftsmanship are intact. Integrity aspects of feeling and association are also retained.

Nearby Resources:

Within the Area of Potential Effect (APE), an additional resource was identified:

Feature MAI C: Dry stack stone wall. Location: West side of Mamalahoa Highway about 40' south of Ninole Bridge. Description and evaluation: This stone wall appears to be of recent construction and is typically about 3' high and about 1½ ' thick. It parallels the highway and extends about 140' in length. This stone wall appears to be less than 50 years old and is evaluated as not eligible for the National Register of Hhistoric Places.

During the field inspection of Mamalahoa Highway for a distance of approximately ½ mile on either side of the Ninole Bridge the following features were noted that are outside the APE:

6-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

Feature MAI B: Dry stack stone wall. Location: West side of Mamalahoa Highway about 650' north of Ninole Bridge. Description and evaluation: This stone wall, construction date unknown, is typically about 3' high and about 2' thick. Oriented at an approximate right angle to the highway, it is located within thick vegetation and appears to be at least about 25' long. This stone wall is outside the APE and was not evaluated for eligibility for the National Register of Historic Places.

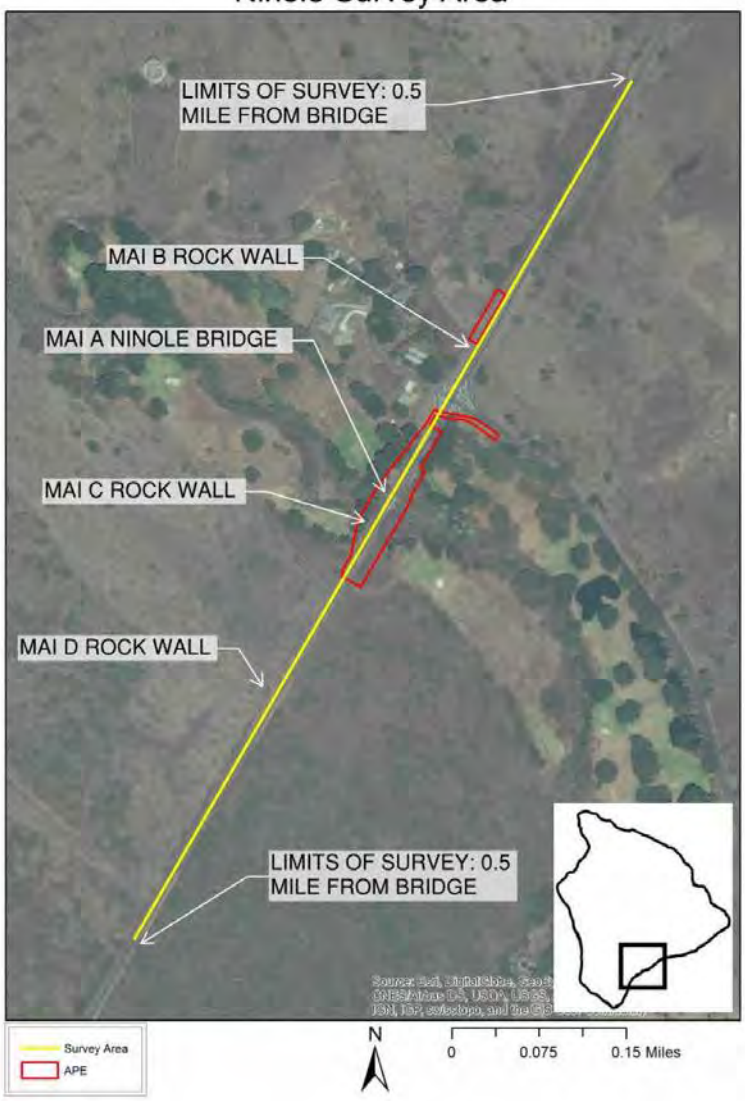
Feature MAI D; Dry stack stone wall. Location: West side of Mamalahoa Highway about 950' south of Ninole Bridge. Description and evaluation: This stone wall, construction date unknown, is typically about 2' high and about 2' thick. It is oriented parallel to the highway and extetends about 450' in length. This stone wall is outside the APE and was not evaluated for eligibility for the National Register of Historic Places.

7-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

Ninole Survey Area

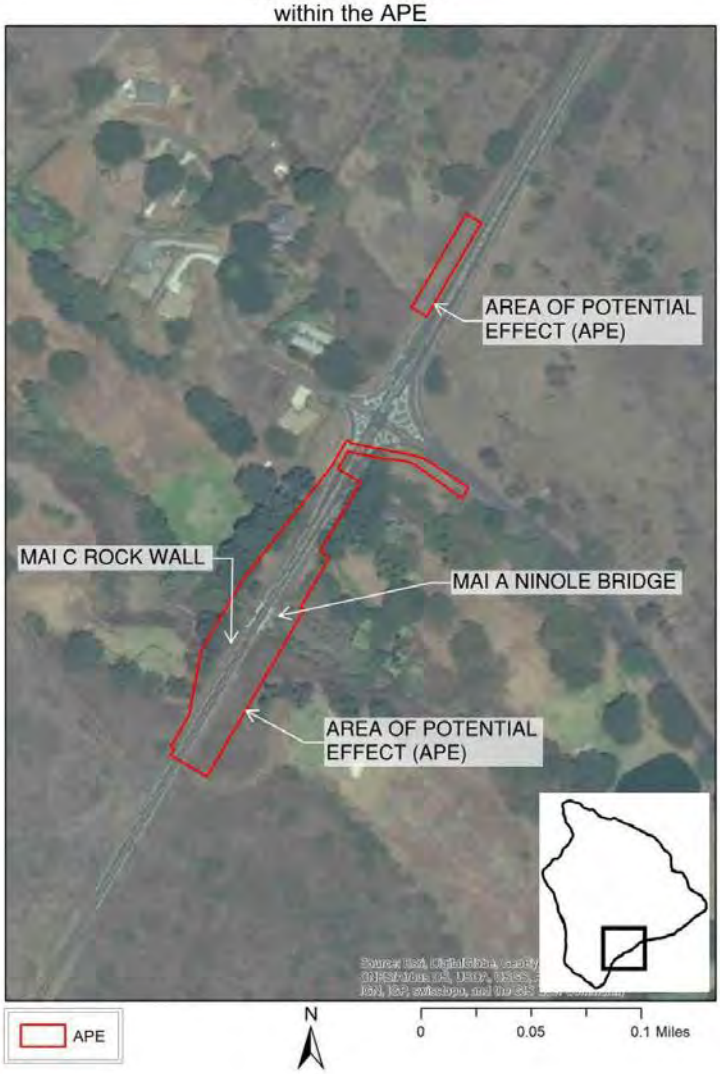


8-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

Ninole APE
Historic Resources
within the APE



9-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text.	TMK # Click here to enter text.

Statement of Significance

Historical Context:

The Ninole Bridge was part of Federal Aid Project (FAP) 18-C (1)of 1938 that constructed the approximate six mile long section of Mamalahoa Highway (Hawaii Belt Road) from about Punaluu Gulch to Honuapo. Another similar timber bridge at Hilea Stream (approximately 1½ miles south on Mamalahoa Highway) was constructed under this project. The contract for FAP 18-C (1) was let from the Territorial Highway Department to contractor Moses Akiona for a total cost of $198,132. This total amount consisted of $99,066 in Federal funds and an equal amount in funding from territorial sources. The official completion date of FAP 18-C (1) was May 22, 1940. As early as 1935, an annual report to the governor from the Hawaii Territorial Superintendent of Public Works indicates that $100,000 was available from territorial funds and matching federal funds for the improvement of the road (Mamalahoa Highway) from the National Park to Honuapo.

Original drawings for the Ninole Bridge were prepared by the Hawaii Territorial Highway Department. The title sheet for the set of 44 drawings for FAP 18-C (1) are signed by Louis B. Cain, Territorial Highway Engineer and are dated December 30, 1938. Drawing sheets 19 and 20 "Bridge No. 9" detail the Ninole Bridge. Drawing 20 has a note at the left margin reading "Designed by W. R. Bartels Nov. 1938." This indicates that William R. Bartels was the designer of the bridge. Bartels was a bridge engineer for the Hawaii Territorial Highway Department. He received his education and training in Germany and immigrated to Hawaii in 1932 when he commenced working with the Highway Department. He continued his career there until his retirement in 1958. During that period he was a prolific designer, responsible for large and sophisticated bridge construction projects in Hawaii, including many tee-beam and rigid-frame concrete bridges.

In addition to the nearby Hilea Bridge, a construction system using masonry support piers and timber superstructure was used on other Territorial Highway Department bridges, such as Makaha Bridges 3 and 3A on Oahu (see Historic American Engineering Record HAER No. HI-90). Although the overall dimensions and parapets for these Makaha bridges differ from the Ninole Bridge, the superstructure uses the same type of masonry piers, 12 x 12 posts with 3 x 10 bracing, 6 x 18 stringers, and 2 x 6 decking.

Significance Statement:

"This bridge is eligible under Criterion C for its association with early developments in timber bridge construction in Hawaii. It is a good example of a 1940s timber bridge that is typical of its period in its use of materials, method of construction, craftsmanship and design. It is also one of the last district owned timber bridges" (MKE Assoc., Fung Assoc. 2013, 6-154).

In addition to the conclusions in the 2013 Hawaii State Historic Bridge Inventory, the Ninole Bridge is considered eligible under Criterion C as the work of a master: engineer William R. Bartels. This bridge and the nearby Hilea

10-4

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM –Reconnaissance Level

FOR SHPD USE ONLY:	Site # Click here to enter text	TMK # Click here to enter text

Bridge, are the last remaining timber bridges in the Hawaii State Highway System, representing rare remaining examples of a historic bridge type.

References

Drawings:

Historic drawings are available at the Hawaii Department of Transportation, Highway Design Section database as electronic scans. These include:

Project 18C (1), 44 sheets. Dated November 1938.

Sources:

Alvarez, Patricia M. Historic Bridge Inventory and Evaluation, Island of Hawaii. Honolulu: State of Hawaii, Department of Transportation, Highways Division. July 1987.

Cultural Surveys Hawaii, Inc. "Draft, Phase I Archaeological Survey Report for the Ninole Bridge Improvements Project." Prepared for CH2MHill on behalf of the Federal Highways Administration Central Federal Lans Highway Division. October 2014.

MKE Associates, LLC, and Fung Associates, Inc. *Hawaii State Historic Bridge Inventory and Evaluation.* Honolulu: State of Hawaii, Department of Transportation, Highways Division. November 2013.

State of Hawaii, Department of Transportation,Highways Division. "NBI Bridge Inspection Report, Bridge Number 001000110306600." October 11, 2012. The current bridge inspection report for this bridge, available at the Hawaii Department of Transportation, Highway Division, Bridge Design Office.

Superintendent of Public Works, Territory of Hawaii. *Report to the Governor, Territory of Hawaii by the Superintendent of Public Works.* Honolulu: Advertiser Publishing Co., LTD. Various dates. .

Appendix B LCA Documentation

Waihona 'Aina
Your ultimate resource for hawaiian history and land use

Review Cart & Checkout

Document Delivery

Mahele Database Documents
Number: 10510

Claim Number:	10510		
Claimant:	Nawali		
Other claimant:			
Other name:			
Island:	Hawaii		
District:	Kau		
Ahupuaa:	Wailau, Ninole		
Ili:			
Apana:	5	Awarded:	1
Loi:		FR:	
Plus:		NR:	656v8
Mala Taro:	4	FT:	
Kula:		NT:	404v8
House lot:	1	RP:	
Kihapai/Pakanu:		Number of Royal Patents:	
Salt lands:		Koele/Poalima:	No
Wauke:	1	Loko:	No
Olona:	1	Lokoia:	No
Noni:		Fishing Rights:	Yes
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:	2	Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	No
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	No
Bitter Melon/Gourd:		Stream/Muliwai/River:	Yes

Sugar Cane:		Pali:	**No**
Tobacco:		Disease:	**No**
Koa/Kou Trees:		Claimant Died:	**No**
Other Plants:		Other Trees:	
Other Mammals:	**No**	Miscellaneous:	**Awarded 2 apana,has uma ohua in sea to attract young fish**

No. 10510, Nawali
N.R. 656v8

Hear ye, ye Land Commissioners at Honolulu: I am a claimant of land in Wailau in Kau. There are kihapais of taro, sweet potato and wauke. In Ninole are 3 kihapai of taro, 1 of pumpkin, 1 of sweet potatoes, a lot, a house lot, 6 kihapai of olona, and an umu ohua /a pile of rocks placed in the sea to attract young fish./
NAWALI

N.T. 404v8
No. 10510, Nawali, 2 November

Kekapa, sworn, he has seen Nawali's 5 sections of land.

Section 1 - Moo of Manowai at Wailau.
Section 2 - Field in Moo of Pue.
Section 3 - Field in Makenala moo in Ninole.
Section 4 - Field in Paako.
Section 5 - Field in Makenala moo in Ninole.

Section 1 Kepapa had given Nawali in 1845. Section 2 from Koapapaa in 1840. Section 3 from Nawali's parents in 1819. Section 4 from Makuaole in 1845. Section 5 from Komaia in 1819. He has always lived there in peace. No objections. The boundaries are:

Section 1:
Mauka by land of Kapuuhonua
Puna by land of Papa
Makai and Kona by land of Kalapuna.

Section 2:
Mauka by Ninole stream
Puna, Makai, Kona by land of Koapapaa.

Section 3: Land of Komaia surrounds this section.

Section 4: Land of Makuaole is on all sides.

Section 5: Land of Komaia is on all sides.

[Award 10510; Wailau Kau; 2 ap.; 4.3 Acs]

Helu 10510 Nawali Wailau Kau Hawaii

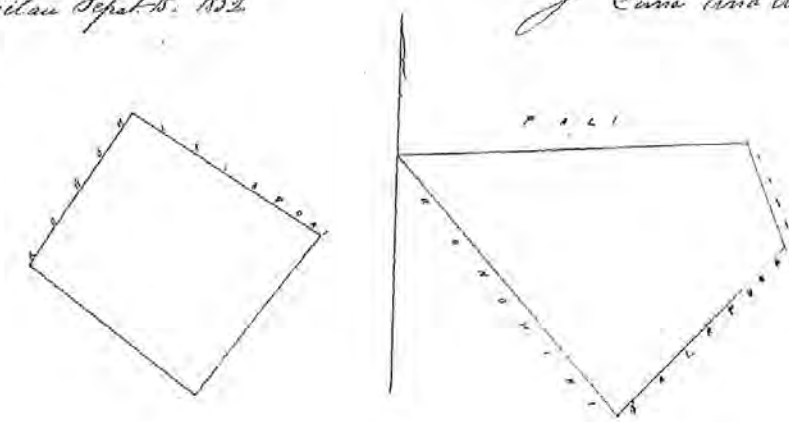
He aina o Nawali ma Wailau Kau.

Apana 1. E hoomaka ma ke kihi Hema, a e holo 1 Akau 43°15' Hikina 497 kh. ma ka aina o Kalapuna. 2 Akau 22°45' Komohana 229 kh. ma ka aina o Kalapuna 3 Hema 66° Komohana 230 kh. ma ka aina o Sale. 4 Hema 42°15' Hikina 270 kh. ma ka aina o Konohiki, a hiki i kahi i hoomaka ai = 2 ½ Eka.

Apana 2. E hoomaka ma ke kihi Komohana a e holo 1 Hema 55° Hikina 439 kh. ma ka aina o Konohiki 2. Akau 36°30' Hikina 410 kh. ma ka aina o Konohiki 3 Akau 57°15' Ko- 462 kh. ma ka aina o Konohiki 4 Hema 33° Komohana 355 kh. ma ka aina o Konohiki, a hiki i kahi i hoomaka ai = 1 9/10 Eka

Wailau Sept 15. 1852

J. Fuller
Luna ana Aina



23

Uku pau loa $4

W. L. Lee

J. Kahaulelio
G. M. Robertson
J. H. Smith
Loanui

Honolulu June 19. 1859.

Appendix C Historic Property Description for SIHP # 50-10-68-24907

FORMAL TYPE:	Wall
FUNCTION:	Boundary/Animal Husbandry
NUMBER OF FEATURES:	1
AGE:	Historic
TEST EXCAVATIONS:	None
TAX MAP KEY:	[3] 9-5-019:016
LAND JURISDICTION:	State of Hawai‘i (DHHL)
PREVIOUS DOCUMENTATION:	Tulchin et al. 2006

SIHP # 50-10-68-24907 consists of a wall that extends northwest to southeast along the southern boundary of the northern section of the project APE. A portion of the wall was previously documented by Tulchin et al. (2006) originating at an old government road (old Māmalahoa Road; SIHP # 50-10-68-24909) and terminating at a residential sub-division outside the current project APE. During the current AIS, an extension of the wall alignment from Highway 11 (Māmalahoa Highway) to the residential subdivision was documented just outside of the current project APE. Tulchin et al. (2006) described SIHP # 50-10-68-24907, stating the wall is as follows:

> . . . constructed of stacked basalt boulders and cobbles, 3-5 courses high. The wall measured a maximum of 0.8 m in height and 1.0 m wide. Metal posts and barbed wire fencing were also incorporated into the wall construction. Several gated breaks in the wall were observed along the wall at intersections with ranch roads.
>
> SIHP # -24907 is interpreted to be a historic ranch-related cattle wall. The wall functions in restricting the movement of cattle, as well as demarcating the property line. The wall has been modified in the modern era with the addition of barbed wire fencing, associated with the continued usage of this portion of the project area as pasture for grazing cattle. SIHP # -24907 is relatively intact and in good condition, with limited areas of collapse. As SIHP # -24907 was constructed during the historic ranching era and the surrounding area continues to be used for ranching purposes, the wall continues to be used for the purpose in which it was originally constructed. [Tulchin et al. 2006:54]

The description provided by Tulchin et al. (2006) is consistent with the portion of SIHP # -24907 observed near the current project APE. The wall measures 1.2 m in maximum height with an average width of 0.8 m (Figure 36 through Figure 40). The wall is mostly in good condition, however, a portion of the wall has been removed to allow for access between pastures (Figure 39). Other portions of the wall exhibit areas of minor collapse (Figure 40).

SIHP # 50-10-68-24907 is comprised of a wall utilized as a boundary marker/animal husbandry and is assessed as significant under Criterion “d” (Have yielded, or is likely to yield, information important for research on prehistory or history) of the State of Hawai‘i significance criteria.

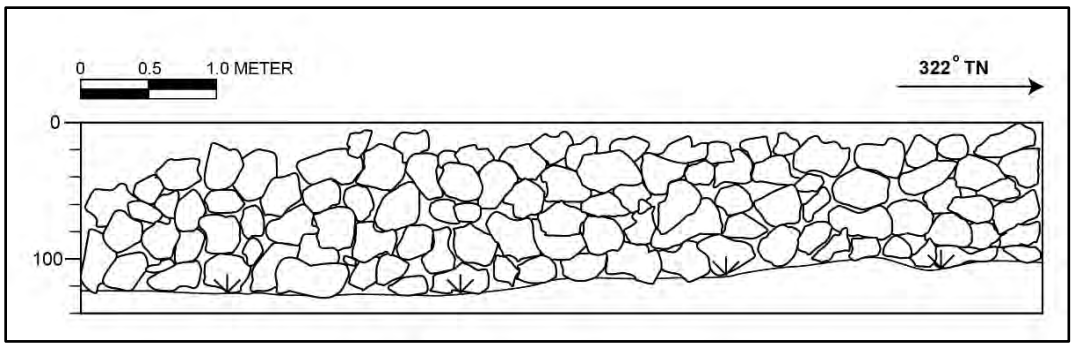


Figure 36. SIHP # 50-10-68-24907, portion of northwest wall profile outside the project APE

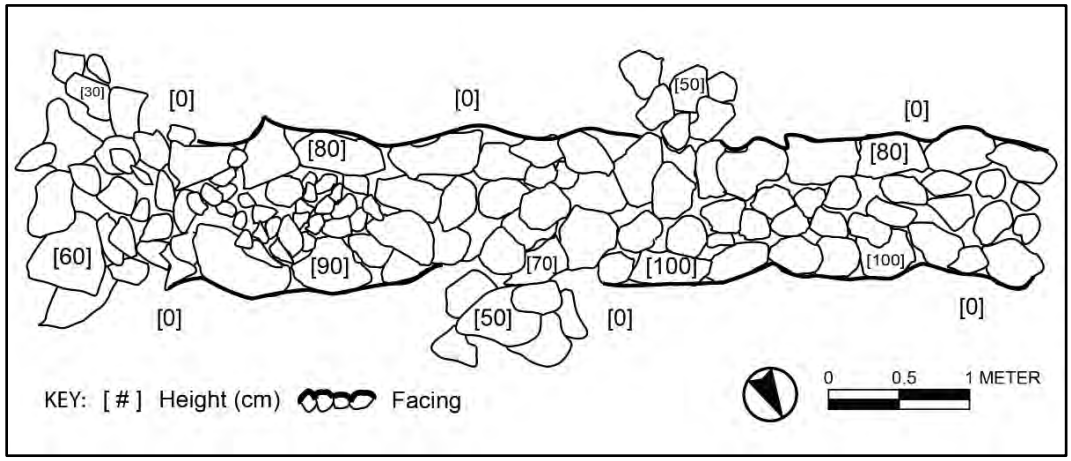


Figure 37. SIHP # 50-10-68-24907, plan view of the wall portion outside the project APE

Figure 38. SIHP # 50-10-68-24907, view of wall portion outside the project APE, view to west

Figure 39. SIHP # 50-10-68-24907, portion of wall intentionally collapsed for crossing between pastures, view to northwest

Figure 40. SIHP # 50-10-68-24907, portion of wall showing areas of minor collapse, view to southeast

Appendix E
Historic Architecture Studies

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

November 6, 2016

Thomas Parker, Environmental Protection Specialist
Federal Highway Administration
Central Federal Lands Highway Division
12300 W. Dakota Ave., Suite 280
Lakewood, CO 80228

IN REPLY REFER TO:
LOG: 2016.02580
DOC: 1611JLP09
Architecture

Dear Mr. Parker:

SUBJECT: **Chapter 6E-8 and National Register of Historic Places (NHPA) Section 106 Review – Reconnaissance Level Architectural Inventory Survey for Hīlea Bridge Replacement Project Federal Highway Admin/Central Federal Lands Highway Div. Contract No. DTFH68-13-R-00027 Hīlea Ahupua'a, Ka'ū District, Island of Hawai'i TMK: (3) 9-5-017:007 and 008 por.; 9-5-017 Hawai'i Belt Road/Māmalahoa Highway ROW**

Thank you for the opportunity to review the *Hīlea Bridge Reconnaissance Level Survey (RLS) Form*. The State Historic Preservation Division (SHPD) received this submittal on July 6, 2016.

The RLS form was prepared by Mason Architects, on behalf of the Hawaii Department of Transportation (HDOT) and the Federal Highways Administration, Central Federal Lands Highway Division (CFL). The purpose of the RLS was to describe the bridge and to evaluate its eligibility for inclusion in the Hawaii Register of Historic Places and/or in the National Register of Historic Places.

The proposed Hīlea Bridge replacement project is subject to Hawaii Revised Statutes (HRS) 6E historic preservation review and, as it has been determined to be a federal undertaking defined by 36 CFR 800.16(y) due to the use of federal funds, it also is subject to the National Historic Preservation Act (NHPA) Section 106 process.

SHPD has reviewed the above cited survey form and concurs with the findings. Hīlea Bridge is **eligible** for listing in the Hawaii Register of Historic Places and in the National Register of Historic Places, under Criterion C, for its distinctive characteristics of a type, period, or method of construction. Hilea Bridge is a 40-ft. long, three-span, timber, bridge with concrete and basalt masonry abutments and support pier.

The RLS form is accepted. Please send one digital, Microsoft Word, version of the document, clearly marked FINAL, along with a copy of this review letter to the Kapolei office, attention Jessica L. Puff, Architectural Historian.

Please contact Jessica Puff, Architectural Historian, at (808) 692-8023 or at Jessica.l.puff@hawaii.gov regarding any questions about this letter or SHPD's findings of eligibility and acceptance.

CFL is the office of record for this undertaking. Please maintain a copy of this letter with your environmental review record.

Sincerely,

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Dee Ruzicka, Mason Architects, dr@masonarch.com
Michael Will, FHWA, Michael.will@dot.gov

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

GENERAL INFORMATION

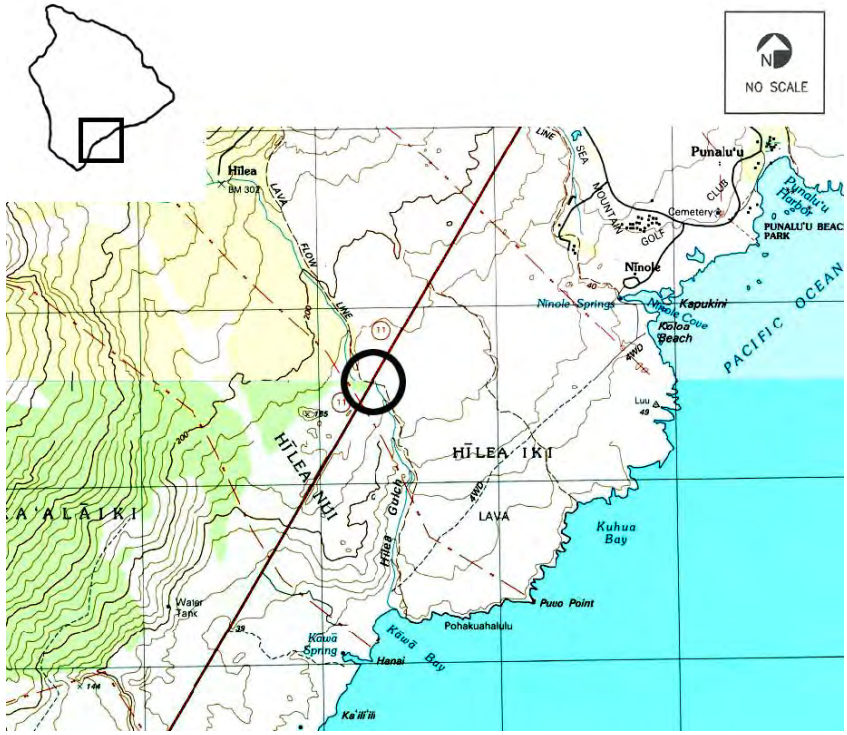
Common / Present Name: Hilea Bridge
Historic Name: Hilea Bridge

Address: Mamalahoa Highway (Rt. 11) at Hilea Stream
City/ Town/ Location: Vicinity Naalehu, Kau
County: Hawaii
TMK [(X)-X-X-XXX:XXX)]: between (3)-9-5-017:008 on west and (3)-9-5-017:007 on east
Subdivision/Neighborhood: n/a
Latitude: 19d-07m-28.86s N
Longitude: 155d-31m-33.33s W

Original Use: Vehicular bridge
Current Use: Vehicular bridge

Architect/ Builder (if known): William R. Bartels, engineer.
Moses Akiona, contractor
Date of Construction (if known): 1940

Hilea Bridge, view facing southwest



LOCATION MAP

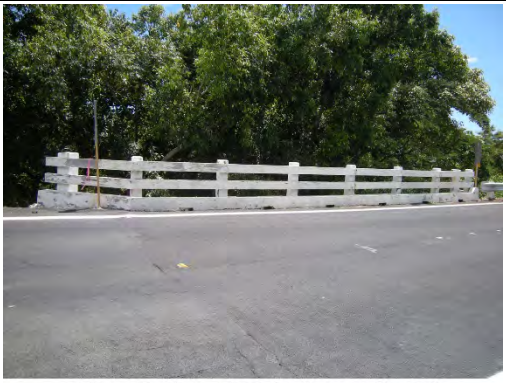
FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

Prepared By: Dee Ruzicka Consulting Firm:
Mason Architects, Inc.
Address: 119 Merchant St. Suite 501 Honolulu, HI 96813
Telephone Number: 808-536-0556 Email:dr@masonarch.com Date: 06APR2016

CONDITION ASSESSMENT

Category (select all that apply):

- ☐ Building(s)
  - ☐ Residential
  - ☐ Commercial
  - ☐ Educational
  - ☐ Public/Civic
  - ☐ Religious
- ☒ Structure(s)
- ☐ Object(s)
- ☐ Site(s)/Landscape(s)
- ☐ Archaeology or potential for archaeology
  - Describe: _____



Hilea Bridge, view facing southeast

Hilea Bridge, view facing northeast

Alterations (additions, etc.) if known: The concrete nosing at the upstream end of the center pier support appears to have been added. The concrete cap of the center pier appears to be original and is shown on an original drawing.(Dwg # 4478.21) The 1987 Hawaii Island Historic Bridge Inventory notes "the pier footing of this bridge has been rebuilt with concrete."(Alvarez, 1987, p. 84) Other alterations to the Hilea Bridge are evident from field inspection and appear to be minimal. The W-beam guardrails at the approaches were added at an undetermined date. These guardrails are free-standing and come to within about 1' of the bridge parapets without touching them. Also, the reflector and concrete housing appear to be additions which cannot be precisely dated.

Original Location, if moved: _____
Reason for move (if known): _____

Condition:

- ☐ Excellent
- ☒ Good
- ☐ Fair
- ☐ Deteriorated

Condition Explanation: _____

Eligibility (select all that apply):

- ☒ National Register of Historic Places
- ☒ State Register of Historic Places
  - ☐ Not Eligible

FOR SHPD USE ONLY: **Site #**Click here to enter text. **TMK #** Click here to enter text.

☒Eligible
☐Listed
☐Contributing to Historic District:
Name of District:
☐Unknown


Hilea Bridge, view facing south

Criteria of Significance (select all that apply)

☐A: Associated with Events
Event:

☐B: Associated with Significant Person(s)
Person(s): _____

☒C: Distinctive characteristics of a type, period or method of construction; work of a master; possess high artistic values (Architecture, Engineering, Design)

☐D: Have yielded or may be likely to yield information important to history or prehistory. Explain: _____

DESCRIPTION

Materials (please check those materials that are visible):

Height

☐Stories: _____
☐Below Ground
☐N/A
☒Other: bridge

Exterior Walls (siding):

☐Aluminum Siding
☐Asbestos
☐Brick
☐Ceramic
☐Concrete
☐Horizontal Wood Siding
☐Log
☐Metal
☐Shingles-Asphalt
☐Shingles-Wood
☐Stone
☐Stucco
☐Vertical Wood Siding
☐Vinyl Siding
☐Engineered Siding
☐Plywood
☐OSB
☐Fiberboard
☐Fiber Cement
☒Other: Wood parapets consisting of timbers and boards.

Roof:

☐Asphalt, shingle
☐Asphalt, roll
☐Other: _____
☐Metal
☐Slate
☐Built Up
☐Ceramic Tile
☐Wood Shingle
☒None

Foundation:

☐Brick
☐Concrete Block
☐Concrete Slab
☐None – on earth
☐Poured Concrete
☐Raised/Pile
☒Stone
☐Other:_____

Structural Support:

☐Baled Hay
☐Concrete Block
☐Concrete Framed
☐Concrete Poured
☒Frame-wood
☐Frame-metal/steel

FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

☐Brick-load bearing
☐Stone-load bearing
☐Puddled Clay
☐Rammed Earth
☐Sod
☐Other: _____

Windows:
☐Double Hung Sash
☐Single Hung Sash
☐Casement
☐Fixed
☐Stained Glass
☐Replacement
☐Aluminum
☐Vinyl
☐Jalousie
☐Ribbon
☐Glass Block
☒None/Unknown
☐Other: _____

Lanai(s)
☐Arcade
☐Balcony
☐Porte-Cochere
☐Recessed
☐Stoop
☐Portico
☐Verandah
☐Wrap-around
☒None
☐Other: _____

Chimney
☐Brick
☐Concrete
☐Stuccoed Masonry
☐Stone
☐Stove Pipe
☐Siding
☒None
☐Other: _____

FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

Narrative Description

Narrative Description:

The Hilea Bridge is a 40' long, two-span timber bridge that carries the two traffic lanes of Mamalahoa Highway (Route 11) over the intermittent Hilea Stream in Kau District on Hawaii Island. The bridge lies within the approximate 54 mile long Kau Scenic Byway. The roadway of the bridge is about 14' above the stream bed, which is a natural channel.

The setting of the bridge is rural, with no buildings in the area around the bridge. Vegetation and trees line the stream on both sides of the bridge. Trees line most areas of the highway south of the bridge. North of the bridge the highway is cut about 10' into the earth to provide a gentle grade, and tall grass with some scattered trees are above the exposed lava embankments.

The Hilea Bridge is built of wooden timbers that have been treated with coal tar creosote. The end grain of many of its timbers are oozing this substance, which is soft and pliable. The Hilea Bridge is 24' wide between its painted wooden railings (parapets) and has an asphalt surfaced roadway over a wooden deck. Each parapet is about 3'-5" high and is composed of two, horizontal 8" boards with a horizontal 12 x 14 timber wheel guard at the roadway which acts as a curb. These horizontal members are supported by 8 x 8 posts on 6'-4" spacing, with 12 x 12 posts at the four corners of the bridge. The timber of the wheel guard is battered on the side facing traffic and sheathed with painted sheet metal. Sheet metal-lined scuppers are cut through the wheel guard on about 6'-4" spacing between the posts. About 6" above the wheel guard is a horizontal 4 x 8 board and 6" above that is the top rail of the parapet, a 3 x 8 board. At both ends of each parapet, 6'-4" of the parapet are splayed outward about 3'. This splayed portion has no metal sheathing on the wheel guard. The bridge has no signage. Evidence of earlier signage is visible on the top rail of the splayed northeast and southwest ends of the parapets.

At the south end of the downstream parapet that parallels the roadway, positioned atop the wheel guard, is a concrete housing that contains a 4½" diameter reflector oriented toward the north-bound traffic lane. This housing is about 6½" high and 7½" wide, with a length of about 13½" at the base. The rear of the housing slopes up from the base to the top surface, which is about 8½" long. The front of the housing (containing the reflector) is vertical. This housing is painted and is fixed solidly on top of the metal sheathing of the wheel guard.

The northwest and southeast approaches to the bridge have W-beam guardrails on posts. At the southeast these are 8" square concrete posts. The northwest side guardrail is on steel I-beam posts.

The underside of the Hilea Bridge has battered, concrete rubble basalt lava masonry abutments and one basalt masonry support pier on the stream bed that is about 5' high, 30' long and about 4' wide at its base, tapering to about 2'-6" wide at its top surface, which has a concrete cap. The upstream-facing end of the pier has a concrete nose that is battered and v-shaped in plan. The concrete nosing and cap are likely modifications to the original design. The pier is on 19' spacing from the top edge of the battered abutments. Atop the pier is a wooden transverse bent (about 6' high) that supports the stringers and deck of the bridge. The bent is

comprised of five, 12 x 12 posts (outer posts are battered) on a horizontal 12 x 12 wooden sill that is set on 4 x 12 bearing blocks on the concrete top surface of the pier. The posts are braced by diagonal 3 x 10 timbers. A wooden 12 x 12 transverse cap beam joins the tops of the five posts and supports the 6 x 18 longitudinal wooden stringers (set on about 2'-10" spacing). The bridge deck atop the stringers is 2 x 6 boards oriented vertically. The asphalt surface roadway is atop the solid 2 x 6 deck.

Hilea Bridge is bridge number 001000110306489 in the National Bridge Inventory database. It was last inspected on October 11, 2012 by the State of Hawaii, Department of Transportation, Highways Division.

Integrity:

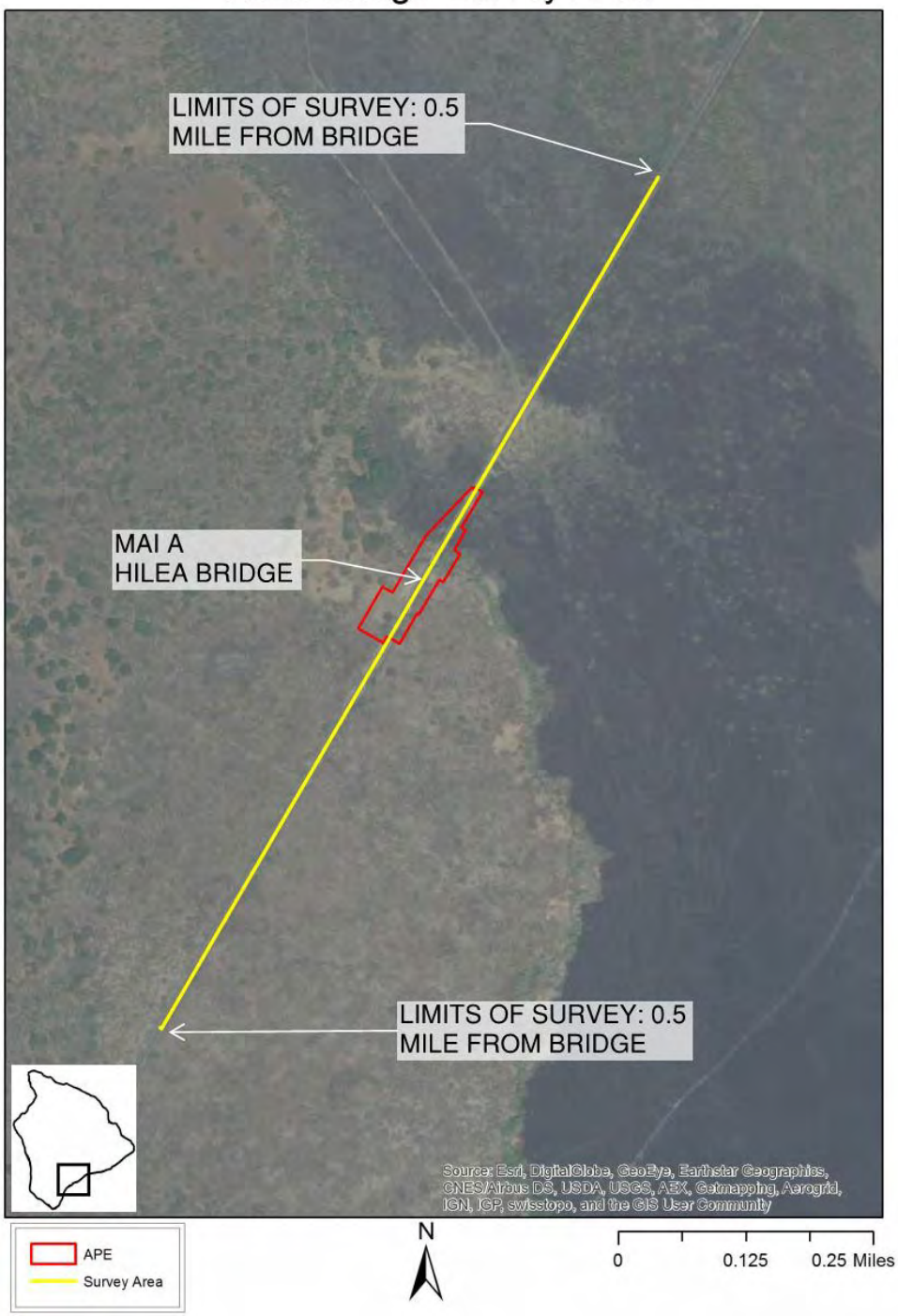
The Hilea Bridge retains sufficient integrity to convey its significance and enable NR listing. Integrity of location and setting are fully retained. Integrity of design, materials, and workmanship are somewhat compromised by the alterations, but the major design elements, construction materials and their evident craftsmanship are intact. Integrity aspects of feeling and association are also retained.

Nearby Resources:

During the field inspection of Mamalahoa Highway for a distance of approximately ½ mile on either side of the Hilea Bridge no features were noted.

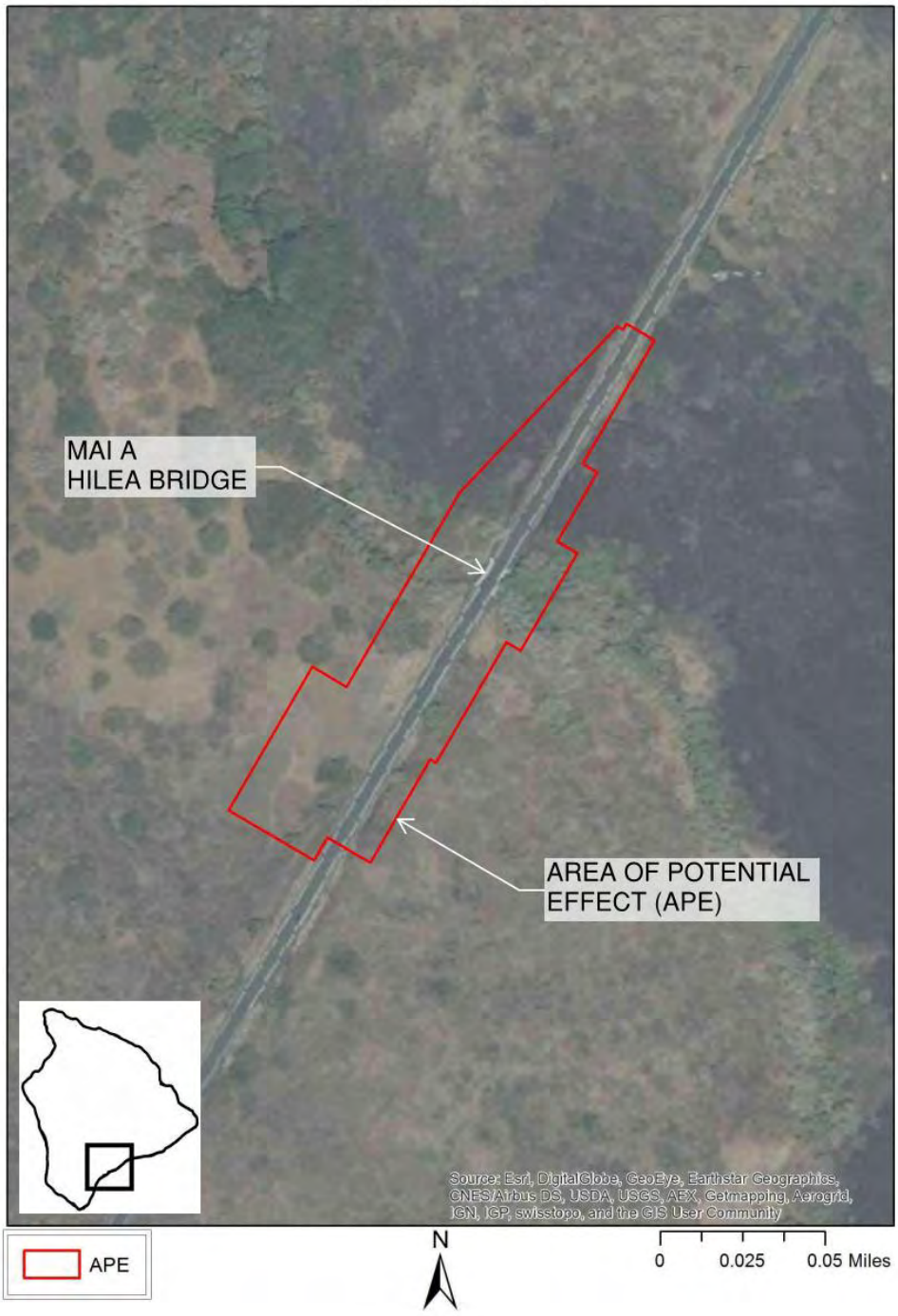
FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

Hilea Bridge Survey Area



FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

Hilea Bridge APE
Historic Resources
within the APE



FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

Statement of Significance

Historical Context:

The Hilea Bridge was part of Federal Aid Project (FAP) 18-C (1) of 1938 that constructed the approximate six mile long section of Mamalahoa Highway (Hawaii Belt Road) from about Punaluu Gulch to Honuapo. Another similar timber bridge at Ninole Stream (approximately 1½ miles north on Mamalahoa Highway) was also constructed under this project. The contract for FAP 18-C (1) was let from the Territorial Highway Department to contractor Moses Akiona for a total cost of $198,132. This total amount consisted of $99,066 in Federal funds and an equal amount in funding from territorial sources. The official completion date of FAP 18-C (1) was May 22, 1940. As early as 1935 annual report to the governor from the Hawaii Territorial Superintendent of Public Works indicates that $100,000 was available from territorial funds and matching federal funds for the improvement of the road (Mamalahoa Highway) from the National Park to Honuapo.

Original drawings for the Hilea Bridge were prepared by the Hawaii Territorial Highway Department. The title sheet for the set of 44 drawings for FAP 18-C (1) are signed by Louis B. Cain, Territorial Highway Engineer and are dated December 30, 1938. Drawing sheet 21 "Bridge No. 10" details the Hilea Bridge. This drawing has a note at the left margin reading "Designed by W. R. Bartels Nov. 1938." William R. Bartels was a bridge engineer for the Hawaii Territorial Highway Department. He received his education and training in Germany and immigrated to Hawaii in 1932 when he commenced working with the Highway Department. He continued his career there until his retirement in 1958. During that period he was a prolific designer, responsible for large and sophisticated bridge construction projects in Hawaii, including many tee-beam and rigid-frame concrete bridges.

In addition to the nearby Ninole Bridge, a similar construction system using masonry support piers and timber superstructure was used on other Territorial Highway Department bridges, such as Makaha Bridges 3 and 3A on Oahu (see Historic American Engineering Record HAER No. HI-90). Although the overall dimensions and parapets for these Makaha bridges differ from the Hilea Bridge, the superstructure uses the same type of masonry piers, 12 x 12 posts with 3 x 10 bracing, 6 x 18 stringers, and 2 x 6 decking.

Significance Statement:

"This bridge is eligible under Criterion C for its association with wood bridge construction in Hawaii. It is a good example of a wood bridge in the 1940s in its use of materials, method of construction, craftsmanship and design" (MKE Assoc., Fung Assoc. 2013, 6-76).

In addition to the conclusions in the 2013 Hawaii State Historic Bridge Inventory, the Hilea Bridge is considered eligible under Criterion C as the work of a master: engineer William R. Bartels. This bridge and the nearby Ninole Bridge, are the last remaining timber bridges in the Hawaii State Highway System, representing rare remaining examples of a historic bridge type.

FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

References

Drawings:

Historic drawings are available at the Hawaii Department of Transportation, Highway Design Section database as electronic scans. These include:

Project 18C (1), 44 sheets. Dated November 1938.

Sources:

Alvarez, Patricia M. Historic Bridge Inventory and Evaluation, Island of Hawaii. . Honolulu: State of Hawaii, Department of Transportation, Highways Division. July 1987.

Cultural Surveys Hawaii, Inc. "Draft, Phase I Archaeological Survey Report for the Hilea Bridge Improvements Project." Prepared for CH2MHill on behalf of the Federal Highways Administration Central Federal Lands Highway Division. October 2014.

MKE Associates, LLC, and Fung Associates, Inc. *Hawaii State Historic Bridge Inventory and Evaluation*. Honolulu: State of Hawaii, Department of Transportation, Highways Division. November 2013.

State of Hawaii, Department of Transportation,Highways Division. "NBI Bridge Inspection Report, Bridge Number 001000110306489." October 12, 2012. The current bridge inspection report for this bridge, available at the Hawaii Department of Transportation, Highway Division, Bridge Design Office.

Superintendent of Public Works, Territory of Hawaii. *Report to the Governor, Territory of Hawaii by the Superintendent of Public Works.* Honolulu: Advertiser Publishing Co., LTD. Various dates. .

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

November 6, 2016

Thomas Parker, Environmental Protection Specialist
Federal Highway Administration
Central Federal Lands Highway Division
12300 W. Dakota Ave., Suite 280
Lakewood, CO 80228

IN REPLY REFER TO:
LOG: 2016.02584
DOC: 1611JLP05
Architecture

Dear Mr. Parker:

SUBJECT: **Chapter 6E-8 and National Register of Historic Places (NHPA) Section 106 Review –**
Reconnaissance Level Architectural Inventory Survey for Ninole Bridge
Federal Highway Admin/Central Federal Lands Highway Div. Contract No. DFH68-13-R-00027
Nīnole Ahupuaʻa, Kaʻū District, Island of Hawaiʻi
TMK: (3) 9-5-019:011, 016, 024, 035 por.; 9-5-027:020 por.; 9-5-019, 9-5-027
Hawaiʻi Belt Road/Māmalahoa Highway Right-of-Way

Thank you for the opportunity to review the *Ninole Bridge Reconnaissance Level Survey (RLS) Form*. The State Historic Preservation Division (SHPD) received this submittal on July 6, 2016.

The RLS form was prepared by Mason Architects, on behalf of the Hawaii Department of Transportation (HDOT) and the Federal Highways Administration, Central Federal Lands Highway Division (CFL). The purpose of the RLS was to describe the bridge and to evaluate its eligibility for inclusion in the Hawaii Register of Historic Places and the National Register of Historic Places.

The proposed Ninole Bridge replacement project is subject to Hawaii Revised Statutes (HRS) 6E historic preservation review and, as it has been determined to be a federal undertaking defined by 36 CFR 800.16(y) due to the use of federal funds, it also is subject to the National Historic Preservation Act (NHPA) Section 106 process.

SHPD has reviewed the above cited survey form and concurs with the findings. Ninole Bridge is **eligible** for inclusion in the Hawaii Register of Historic Places and the National Register of Historic Places, under Criterion C, for its distinctive characteristics of a type, period, or method of construction. Ninole Bridge is a 60-ft. long, three-span, timber, bridge with concrete and basalt masonry abutments and support piers.

The RLS form is accepted. Please send one digital, Microsoft Word, version of the document, clearly marked FINAL, along with a copy of this review letter to the Kapolei office, attention Jessica L. Puff, Architectural Historian.

Please contact Jessica Puff, Architectural Historian, at (808) 692-8023 or at Jessica.l.puff@hawaii.gov regarding any questions about this letter or SHPD's findings of eligibility and acceptance.

CFL is the office of record for this undertaking. Please maintain a copy of this letter with your environmental review record.

Sincerely,

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Dee Ruzicka, Mason Architects, dr@masonarch.com
Michael Will, FHWA, Michael.will@dot.gov

HAWAII STATE HISTORIC PRESERVATION DIVISION
HISTORIC RESOURCE INVENTORY FORM – Reconnaissance Level

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

GENERAL INFORMATION

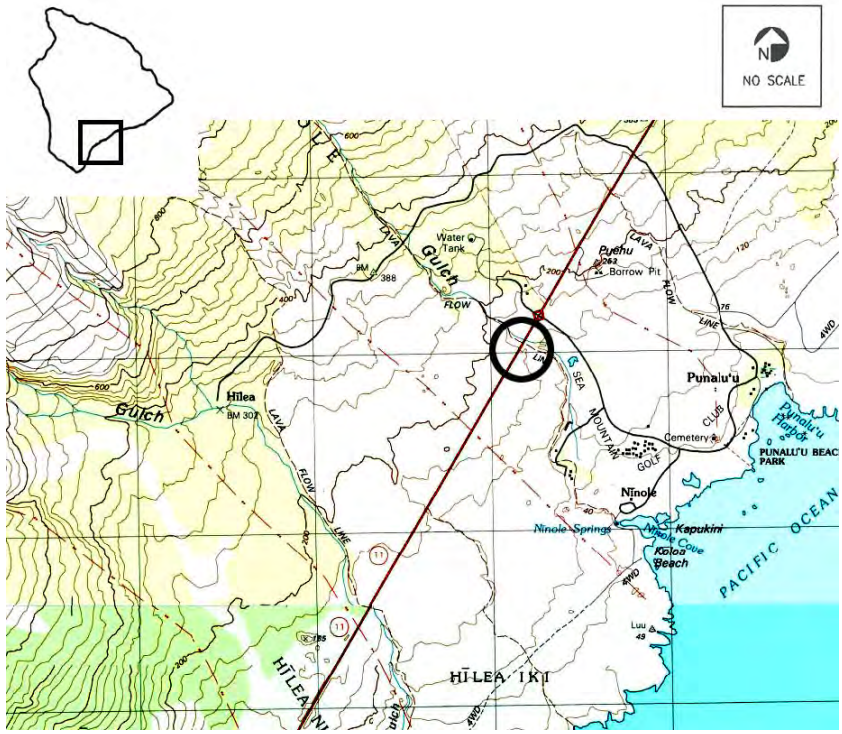
Common / Present Name: Ninole Bridge
Historic Name: Ninole Bridge

Address: Mamalahoa Highway (Rt. 11) at Ninole Stream
City/ Town/ Location: Vicinity of Pahala, Kau
County: Hawaii
TMK [(X)-X-X-XXX:XXX)]: between (3)-9-5-019:024 on west and (3)-9-5-019:011 on east
Subdivision/Neighborhood: n/a
Latitude: 19d-08m-18.97s N
Longitude: 155d-31m-02.45s W

Original Use: Vehicular bridge
Current Use: Vehicular bridge

Architect/ Builder (if known): William R. Bartels, engineer. Moses Akiona, contractor.
Date of Construction (if known): 1940

Ninole Bridge, view facing north



LOCATION MAP

FOR SHPD USE ONLY: **Site #** Click here to enter text. **TMK #** Click here to enter text.

Prepared By: Dee Ruzicka Consulting Firm:
Mason Architects, Inc.
Address: 119 Merchant St. Suite 501 Honolulu, HI 96813
Telephone Number: 808-536-0556 Email:dr@masonarch.com Date: 06APR2016

CONDITION ASSESSMENT

Category (select all that apply):

- ☐ Building(s)
  - ☐ Residential
  - ☐ Commercial
  - ☐ Educational
  - ☐ Public/Civic
  - ☐ Religious
- ☒ Structure(s)
- ☐ Object(s)
- ☐ Site(s)/Landscape(s)
- ☐ Archaeology or potential for archaeology
  - Describe: _____

Ninole Bridge, view facing northeast

Ninole Bridge, view facing south

Alterations (additions, etc.) if known: Several alterations to the bridge are evident from field inspection, although none can be dated precisely. They include the addition of W-beam guardrails on the approaches. These guardrails are free-standing and come to within about 1' of the bridge parapets without touching them. Beneath the bridge, a golf cart path has been constructed along the north side and at the south side a concrete covering over the stream bed and concrete base to the abutment have been added. Additional sistered posts and bracing were added to the south timber bent. All of these four alterations were done before ca. 1987. A concrete apron has been added downstream of the bridge. The roadway has likely been resurfaced at least once.

Original Location, if moved: _____
Reason for move (if known): _____

Condition:

- ☐ Excellent
- ☐ Good
- ☒ Fair
- ☐ Deteriorated

Condition Explanation: South timber bent is reinforced with sistered timbers.

Eligibility (select all that apply):

- ☒ National Register of Historic Places
- ☒ State Register of Historic Places
  - ☐ Not Eligible

FOR SHPD USE ONLY: **Site #**Click here to enter text. **TMK #** Click here to enter text.

☒Eligible
☐Listed
☐Contributing to Historic District:
Name of District:
☐Unknown


Ninole Bridge, view facing northeast

Criteria of Significance (select all that apply)

☐A: Associated with Events
Event:

☐B: Associated with Significant Person(s)
Person(s): _____

☒C: Distinctive characteristics of a type, period or method of construction; work of a master; possess high artistic values (Architecture, Engineering, Design)

☐D: Have yielded or may be likely to yield information important to history or prehistory. Explain: _____

DESCRIPTION

Materials (please check those materials that are visible):

Height

☐Stories: _____
☐Below Ground
☐N/A
☒Other: bridge

Exterior Walls (siding):

☐Aluminum Siding
☐Asbestos
☐Brick
☐Ceramic
☐Concrete
☐Horizontal Wood Siding
☐Log
☐Metal
☐Shingles-Asphalt
☐Shingles-Wood
☐Stone
☐Stucco
☐Vertical Wood Siding
☐Vinyl Siding
☐Engineered Siding
☐Plywood
☐OSB
☐Fiberboard
☐Fiber Cement
☒Other: Wood parapets consisting of timbers and boards.

Roof:

☐Asphalt, shingle
☐Asphalt, roll
☐Other: _____
☐Metal
☐Slate
☐Built Up
☐Ceramic Tile
☐Wood Shingle
☒None

Foundation:

☐Brick
☐Concrete Block
☐Concrete Slab
☐None – on earth
☐Poured Concrete
☐Raised/Pile
☒Stone
☐Other:_____

Structural Support:

☐Baled Hay
☐Concrete Block
☐Concrete Framed
☐Concrete Poured
☒Frame-wood
☐Frame-metal/steel

FOR SHPD USE ONLY:	Site #Click here to enter text.	TMK # Click here to enter text.

☐Brick-load bearing
☐Stone-load bearing
☐Puddled Clay
☐Rammed Earth
☐Sod
☐Other: _____

Windows:
☐Double Hung Sash
☐Single Hung Sash
☐Casement
☐Fixed
☐Stained Glass
☐Replacement
☐Aluminum
☐Vinyl
☐Jalousie
☐Ribbon
☐Glass Block
☒None/Unknown
☐Other: _____

Lanai(s)
☐Arcade
☐Balcony
☐Porte-Cochere
☐Recessed
☐Stoop
☐Portico
☐Verandah
☐Wrap-around
☒None
☐Other: _____

Chimney
☐Brick
☐Concrete
☐Stuccoed Masonry
☐Stone
☐Stove Pipe
☐Siding
☒None
☐Other: _____

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Narrative Description

Narrative Description:

The Ninole Bridge (Feature MAI A) is a 60' long, three-span timber bridge that carries the two traffic lanes of Mamalahoa Highway (Route 11) over the intermittent Ninole Stream in Kau District on Hawaii Island. The road way of the bridge is about 22' above the stream bed, which flows between the two support piers. The space between the north abutment and the north support pier is a paved path for golf carts and the space between the south abutment and the south pier has concrete covering the stream bed.

The setting of the bridge is rural, with vegetation and trees lining the stream bed on both sides of the bridge. The Sea Mountain Golf Course straddles the highway at the Ninole Bridge and its fairways, although nearby, are mostly concealed by the trees along the stream bed. The 15' wide paved cart path under the north portion of the bridge provides golf cart access to the course. About 500' northeast of the bridge, Mamalahoa Highway intersects with Punaluu Road at a large intersection with right and left turn lanes. This intersection is the roadway to the Sea Mountain Golf Club and Punaluu Beach County Park. Trees line the highway between the bridge and intersection, concealing the several small buildings located near the intersection. Southwest of the bridge, the trees lining the roadway diminish as the highway crests a small rise about 400' from the bridge.

The Ninole Bridge is built of wooden timbers that have been treated with coal tar creosote. The end grain of many of its timbers are oozing this substance, which is soft and pliable. The Ninole Bridge is 24' wide between its painted wooden railings (parapets) and has an asphalt-surfaced roadway over a wooden deck. Each parapet is about 3'-5" high and is composed of two, horizontal 8" boards with a horizontal 12 x 14 timber wheel guard at the roadway which acts as a curb. These horizontal members are supported by 8 x 8 posts on 6'-4" spacing, with 12 x 12 posts at the four corners of the bridge. The timber of the wheel guard is battered on the side facing traffic and sheathed with painted sheet metal. Sheet metal-lined scuppers are cut through the wheel guard on about 6'-4" spacing between the posts. About 6" above the wheel guard is a horizontal 4 x 8 board and 6" above that is the top rail of the parapet, a 3 x 8 board. At both ends of each parapet, 6'-4" of the parapet are splayed outward about 3'. This splayed portion has no metal sheathing on the wheel guard. Small painted aluminum signs reading "NINOLE BR." are located on the top rail at the splayed northeast and southwest ends of the parapets.

At the approaches to the bridge are W-beam guardrails on posts of steel I-beams. At the southeast approach there are three, 8" concrete posts that support the W-beam. The approach at the southwest has no W-beam guardrail.

The underside of the Ninole Bridge has battered, concrete rubble basalt lava masonry abutments and (two) basalt masonry support piers on the stream bed. The south abutment has an approximate 8' high concrete portion at its base. Each masonry support pier is about 5' high, 30' long and about 4' wide at its base, tapering to about 2'-6" wide at its top surface, which has a concrete cap. The piers are on 19' spacing (o.c.) from the top edge of the battered abutments. Atop each pier are wooden transverse bents (about 15' high) that support the

stringers and deck of the bridge. Each bent is comprised of five, 12 x 12 posts (outer posts are battered) on a horizontal 12 x 12 wooden sill that is set on 4 x 12 bearing blocks on the concrete top surface of each pier. The posts are braced by diagonal 3 x 10 timbers. A wooden 12 x 12 transverse cap beam joins the tops of the five posts and supports the 6 x 18 longitudinal wooden stringers (set on about 2'-10" spacing). The bridge deck atop the stringers is 2 x 6 boards oriented vertically. The asphalt surface roadway is atop the solid 2 x 6 deck.

The timber framing at the south bent has had some additional support members added. The three center 12 x 12 posts and the upstream post have added 12 x 12 posts sistered to them on the upstream side using through-bolts. This bent also has added bracing of 2 x 8 at all posts.

The golf cart path between the north abutment and the north masonry pier occupies the entire 15'-6" width of that space. The path is nearly level and is built up to within about 6" of the top of the pier. A 5" wide concrete curb is at the stream-side edge. The stream bed in the space between the south abutment and south masonry pier is concrete that has been applied as a spillway over the stone bed of the stream. This spillway rises to a level of about 2' below the top surface of the concrete cap of the masonry pier. Immediately downstream of the masonry piers, the stream bed has an approximate 22' long concrete apron between the cart path and the south spillway.

Ninole Bridge is bridge number 001000110306600 in the National Bridge Inventory database. It was last inspected on October 11, 2012 by the State of Hawaii, Department of Transportation, Highways Division.

Integrity:

The Ninole Bridge retains sufficient integrity to convey its significance and enable NR listing. Integrity of location is retained. Integrity of setting is largely retained, it is somewhat reduced by the construction of the golf cart path. Integrity of design, materials, and workmanship are somewhat compromised by the alterations, but the major design elements, construction materials and their evident craftsmanship are intact. Integrity aspects of feeling and association are also retained.

Nearby Resources:

Within the Area of Potential Effect (APE), an additional resource was identified:

Feature MAI C: Dry stack stone wall. Location: West side of Mamalahoa Highway about 40' south of Ninole Bridge. Description and evaluation: This stone wall appears to be of recent construction and is typically about 3' high and about 1½ ' thick. It parallels the highway and extends about 140' in length. This stone wall appears to be less than 50 years old and is evaluated as not eligible for the National Register of Hhistoric Places.

During the field inspection of Mamalahoa Highway for a distance of approximately ½ mile on either side of the Ninole Bridge the following features were noted that are outside the APE:

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Feature MAI B: Dry stack stone wall. Location: West side of Mamalahoa Highway about 650' north of Ninole Bridge. Description and evaluation: This stone wall, construction date unknown, is typically about 3' high and about 2' thick. Oriented at an approximate right angle to the highway, it is located within thick vegetation and appears to be at least about 25' long. This stone wall is outside the APE and was not evaluated for eligibility for the National Register of Historic Places.

Feature MAI D; Dry stack stone wall. Location: West side of Mamalahoa Highway about 950' south of Ninole Bridge. Description and evaluation: This stone wall, construction date unknown, is typically about 2' high and about 2' thick. It is oriented parallel to the highway and extetends about 450' in length. This stone wall is outside the APE and was not evaluated for eligibility for the National Register of Historic Places.

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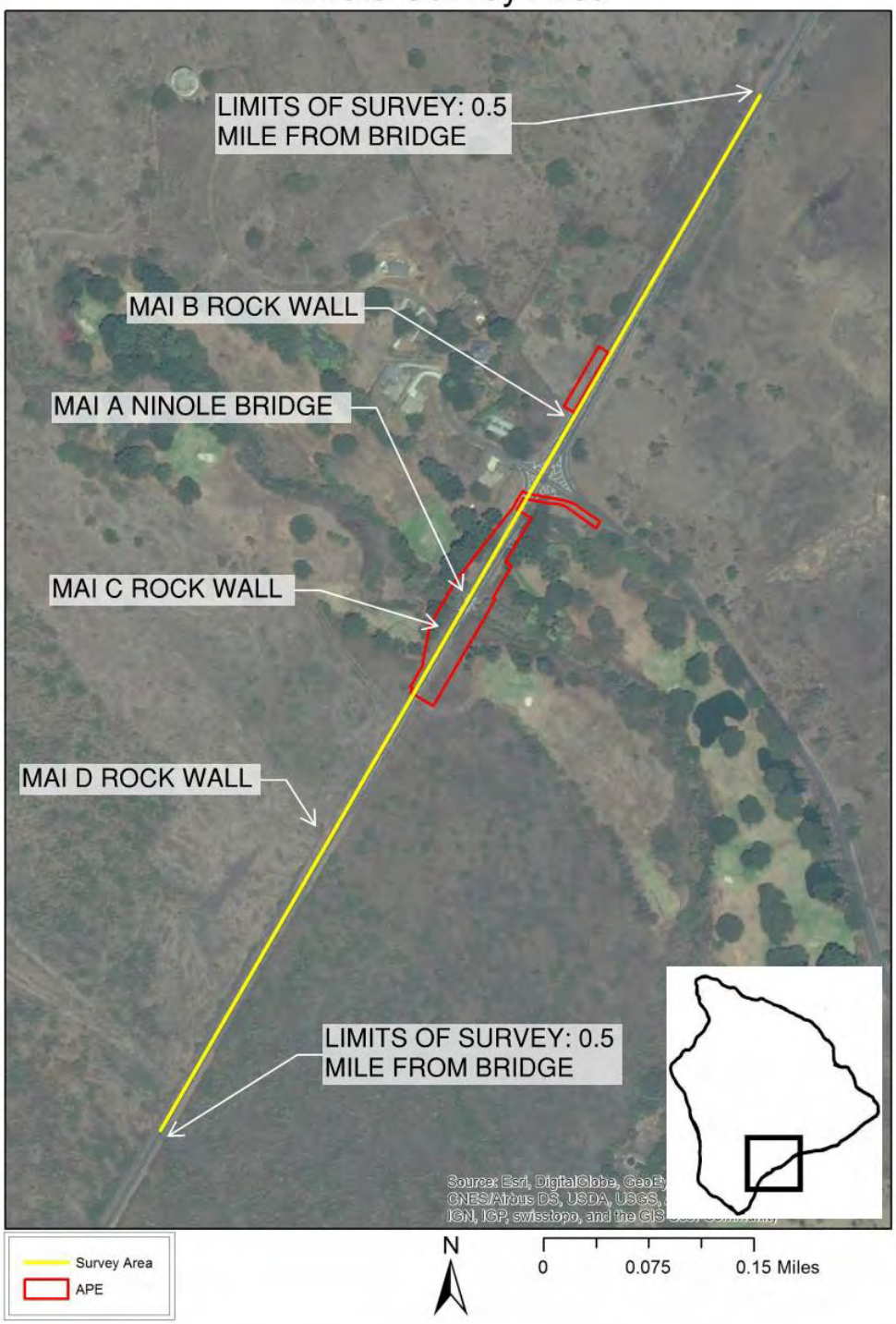
Ninole Survey Area



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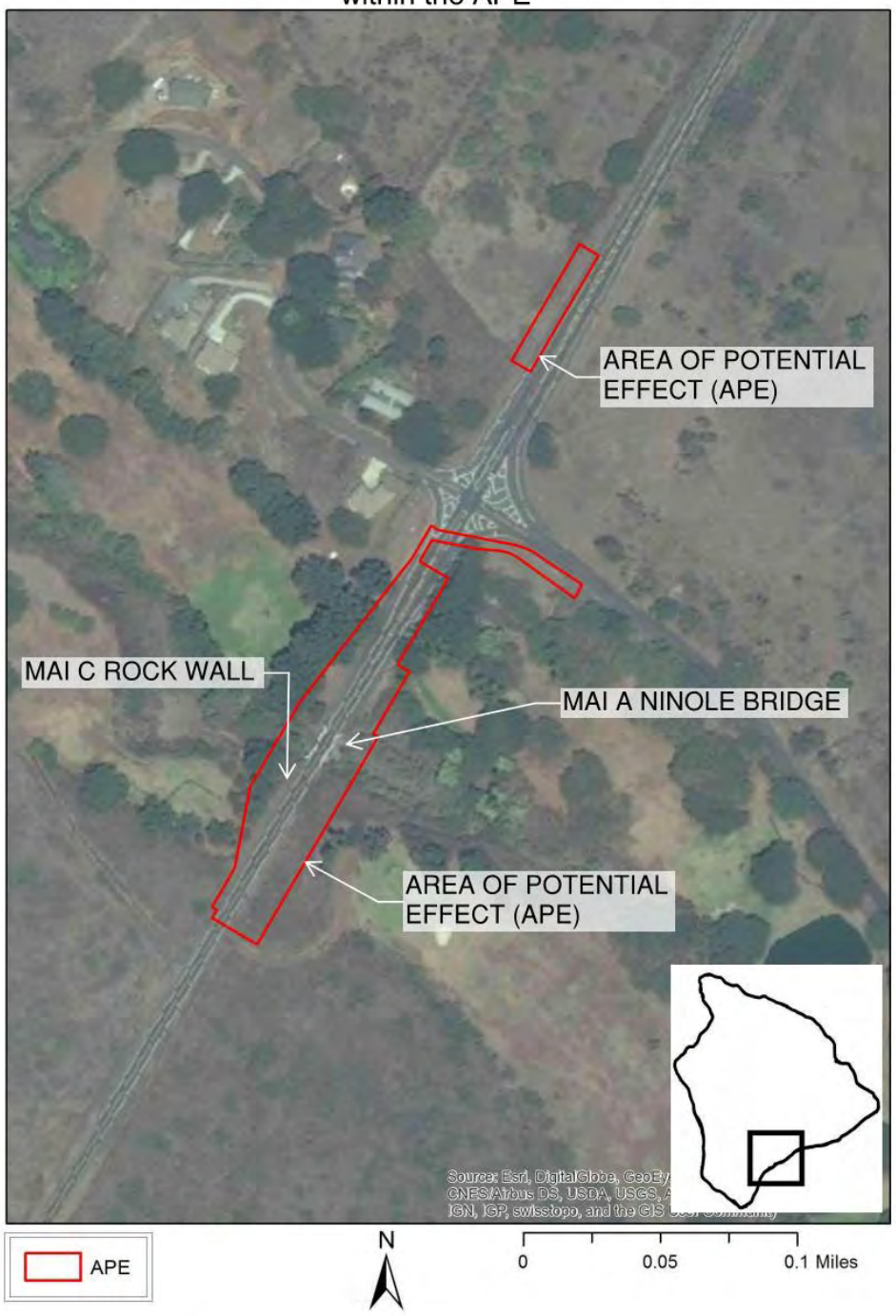
Ninole APE
Historic Resources
within the APE



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Statement of Significance

Historical Context:

The Ninole Bridge was part of Federal Aid Project (FAP) 18-C (1)of 1938 that constructed the approximate six mile long section of Mamalahoa Highway (Hawaii Belt Road) from about Punaluu Gulch to Honuapo. Another similar timber bridge at Hilea Stream (approximately 1½ miles south on Mamalahoa Highway) was constructed under this project. The contract for FAP 18-C (1) was let from the Territorial Highway Department to contractor Moses Akiona for a total cost of $198,132. This total amount consisted of $99,066 in Federal funds and an equal amount in funding from territorial sources. The official completion date of FAP 18-C (1) was May 22, 1940. As early as 1935, an annual report to the governor from the Hawaii Territorial Superintendent of Public Works indicates that $100,000 was available from territorial funds and matching federal funds for the improvement of the road (Mamalahoa Highway) from the National Park to Honuapo.

Original drawings for the Ninole Bridge were prepared by the Hawaii Territorial Highway Department. The title sheet for the set of 44 drawings for FAP 18-C (1) are signed by Louis B. Cain, Territorial Highway Engineer and are dated December 30, 1938. Drawing sheets 19 and 20 "Bridge No. 9" detail the Ninole Bridge. Drawing 20 has a note at the left margin reading "Designed by W. R. Bartels Nov. 1938." This indicates that William R. Bartels was the designer of the bridge. Bartels was a bridge engineer for the Hawaii Territorial Highway Department. He received his education and training in Germany and immigrated to Hawaii in 1932 when he commenced working with the Highway Department. He continued his career there until his retirement in 1958. During that period he was a prolific designer, responsible for large and sophisticated bridge construction projects in Hawaii, including many tee-beam and rigid-frame concrete bridges.

In addition to the nearby Hilea Bridge, a construction system using masonry support piers and timber superstructure was used on other Territorial Highway Department bridges, such as Makaha Bridges 3 and 3A on Oahu (see Historic American Engineering Record HAER No. HI-90). Although the overall dimensions and parapets for these Makaha bridges differ from the Ninole Bridge, the superstructure uses the same type of masonry piers, 12 x 12 posts with 3 x 10 bracing, 6 x 18 stringers, and 2 x 6 decking.

Significance Statement:

"This bridge is eligible under Criterion C for its association with early developments in timber bridge construction in Hawaii. It is a good example of a 1940s timber bridge that is typical of its period in its use of materials, method of construction, craftsmanship and design. It is also one of the last district owned timber bridges" (MKE Assoc., Fung Assoc. 2013, 6-154).

In addition to the conclusions in the 2013 Hawaii State Historic Bridge Inventory, the Ninole Bridge is considered eligible under Criterion C as the work of a master: engineer William R. Bartels. This bridge and the nearby Hilea

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Bridge, are the last remaining timber bridges in the Hawaii State Highway System, representing rare remaining examples of a historic bridge type.

References

Drawings:

Historic drawings are available at the Hawaii Department of Transportation, Highway Design Section database as electronic scans. These include:

Project 18C (1), 44 sheets. Dated November 1938.

Sources:

Alvarez, Patricia M. Historic Bridge Inventory and Evaluation, Island of Hawaii. . Honolulu: State of Hawaii, Department of Transportation, Highways Division. July 1987.

Cultural Surveys Hawaii, Inc. "Draft, Phase I Archaeological Survey Report for the Ninole Bridge Improvements Project." Prepared for CH2MHill on behalf of the Federal Highways Administration Central Federal Lans Highway Division. October 2014.

MKE Associates, LLC, and Fung Associates, Inc. *Hawaii State Historic Bridge Inventory and Evaluation*. Honolulu: State of Hawaii, Department of Transportation, Highways Division. November 2013.

State of Hawaii, Department of Transportation,Highways Division. "NBI Bridge Inspection Report, Bridge Number 001000110306600." October 11, 2012. The current bridge inspection report for this bridge, available at the Hawaii Department of Transportation, Highway Division, Bridge Design Office.

Superintendent of Public Works, Territory of Hawaii. *Report to the Governor, Territory of Hawaii by the Superintendent of Public Works.* Honolulu: Advertiser Publishing Co., LTD. Various dates. .

Appendix F
Final Cultural Impact Assessment Report for the Ninole and Hilea Bridge Replacement Project (October 2016)

FINAL

Cultural Impact Assessment Report for the Nīnole and Hīlea Bridge Replacement Project, Nīnole and Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, Federal Highway Administration/ Central Federal Lands Highway Division TMKs: [3] 9-5-017:007 por., 008 por., 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-017, 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Rights-of-Way

Prepared for
CH2M HILL
and on behalf of the
Federal Highway Administration (FHWA)
Central Federal Lands Highway Division (CFLHD)

Prepared by
S. Māhealani Liborio, B.A.,
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Cultural Surveys Hawai‘i, Inc.

Kailua, Hawai‘i

(Job Code: NINOLE 2)

October 2016

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Management Summary

Reference	Cultural Impact Assessment Report for the Nīnole and Hīlea Bridge Replacement Project, Nīnole and Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD), TMKs: [3] 9-5-017:007 por., and 008 por., 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-017, 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Rights-of-Way. (Liborio et al. 2016)
Date	October 2016
Project Number(s)	• FHWA/CFLHD Contract DTFH68-13-R-00027 • CH2MHILL Project Task ID: 499069.10SU.CS
Job Code	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: NINOLE 2
Agencies	State of Hawai‘i Department of Health/Office of Environmental Quality Control (DOH/OEQC)
Project Location	The Nīnole Bridge study area is located at mile post 56.7 on Route 11 (Māmalahoa Highway) at the Alahaki Road / Nīnole Loop Road intersection within Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Rights-of-Way (ROW). The Hīlea Bridge project area is located in the immediate vicinity of Hīlea Bridge on Route 11 (Māmalahoa Highway) in Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-017:007 por., and 008 por., and 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway ROW. The study areas are depicted on a 1995 Punaluu and Naalehu U.S. Geological Survey (USGS) topographic quadrangles.
Project Description	The purpose of the project is to replace the existing deficient timber bridges to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches. The existing deficient timber stringer bridge in Nīnole was built in 1940 and does not accommodate the current roadway width or bridge standards. The existing deficient Hīlea timber stringer bridge was built in 1940 and does not accommodate the current roadway width or current bridge standards. It does not meet current live load and seismic requirements.
Project Acreage	The area of potential effect (APE) is defined as the approximately 29.7-acre project area in total. While this investigation focuses on the project APE, this study considered the whole *ahupua‘a* (land division extending from the mountain to the sea) of Nīnole and Hīlea.
Document Purpose	This cultural impact assessment (CIA) was prepared to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project’s potential effect on cultural beliefs, practices, and resources.

	Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai‘i significance criterion "e," pursuant to HAR §13-275-6 and §13-284-6. Significance criterion "e" refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project's environmental review and may also serve to support the project's historic preservation review under HRS §6E-8 and HAR §13-284.
Results of Background Research	Background research for this study yielded the following results which are presented in approximate chronological order: 1. Nīnole literally translates to "bending" (Pukui et al. 1974:165). Hīlea translates to "careless" (Pukui et al. 1974:45). The *ahupua‘a* of Hīlea is technically split into two: Hīlea Iki ("small Hīlea") and Hīlea Nui ("great Hīlea"). 2. Nīnole Ahupua‘a consists of one waterway, the Nīnole Gulch, which branches off into two parallel streams that carry water *makai* (toward the ocean) but never deposit into the ocean. Hīlea Gulch and river system carries water from *mauka* (toward the mountain) to *makai* where it eventually empties into Kāwā Bay. 3. The most famous *wahi pana* (legendary place, storied place) associated with the Nīnole study area is the reproducing stones of Kōloa Beach. The stones are said to reproduce (*‘ili‘ili hānau*, birth pebbles believed to reproduce themselves; the smooth nonporous being male, the porous being female) and create small, smooth stones. The beach at Kōloa is covered in the smooth, round pebbles. 4. Several *heiau* (pre-Christian place of worship) can be found within Nīnole Ahupua‘a including Ka‘ie‘ie Heiau and Mokini Heiau. Two springs can be found near Kōloa Beach: Pūhau and Kauale. Pūhau Springs feeds into Nīnole Fishpond, which is located *makai* and fronts Kōloa Beach. Kauale is east of Pūhau and said to be the female counterpart to Pūhau, the male spring.

	5. Ke‘eku Heiau is a heavy-walled enclosure on the northeastern side of Kāwā Bay. The massive *heiau* consists of several platforms and features including a *kū‘aha* (altar or place of worship in a private house), *lele* (sacrificial altar), and *kahua ho‘omaha* (platform for resting). In the *mauka* region on Pu‘u Makanau is Kohāikalani Heiau. The enclosure overlooks Hīlea Iki Ahupua‘a. A majority of the walls along with the interior features have been dozed due to sugarcane cultivation. 6. Early accounts of the Ka‘ū district describe the area as ridden with lava, often lacking water and resources. However, in 1823 during Reverend William Ellis’ visit, he described neighboring Punalu‘u Ahupua‘a being abundant in fresh water and cultivated in sugarcane, taro, and bananas. Land Commission Awards indicate crops of taro, pumpkin, sweet potatoes, and *olonā* (*Touchardia latifolia*) were being cultivated. 7. Life in the Ka‘ū district was disrupted during the 1860s by the forces of nature. In March 1868, a sequence of major earthquakes and eruptions at Mauna Loa began that resulted in loss of property and livestock as well as human death. The following month an earthquake, which precipitated a *tsunami* (Japanese for tidal wave), destroyed villages along the coastline and created landslides. 8. Tragedy and natural disasters did not hinder foreign business interests in Ka‘ū. In 1868, the same year as the streak of natural disasters, Alexander Hutchinson established the Naalehu Sugar Company and built a mill in Na‘alehu town. Wharves, flumes, and a railway were built to accommodate the sugar plantations in the area. In June 1878 the first railroad was constructed that traveled from Punalu‘u to the village of Keaiwa (Condé and Best 1973:29). Multiple rail lines were built and realigned spanning from Na‘alehu to Hīlea to Honu‘apo and from Punalu‘u to Pāhala. The railroads continued to operate until the 1940s.
Results of Community Consultation	CSH attempted to contact Hawaiian organizations, agencies, and community members as well as cultural and lineal descendants of Nīnole and Hīlea Ahupua‘a in order to identify individuals with cultural expertise and/or knowledge of the project area and vicinity. Below is a list of individuals who shared their *mana‘o* (opinion) and *‘ike* (knowledge) about the project area and Nīnole and Hīlea Ahupua‘a: 1. Earl Louis, *kama‘āina* (native born) of Ka‘ū and caretaker of Makanau Heiau 2. Demetrius Oliveira, *kama‘āina* of Ka‘ū and caretaker of Makanau Heiau

	3. Kawehi and Debbie Ryder, cultural practitioners and caretakers of Nīnole Fishpond and adjacent sites
Impacts and Recommendations	Based on the information gathered from the cultural and historic background, the proposed project may potentially impact undetected *iwi kūpuna* (ancestral bones). CSH identifies potential impacts and makes the following recommendations. Previous archaeology conducted south and southeast of the project areas have yielded *iwi kūpuna*. Based on these findings, there is a possibility *iwi kūpuna* may be present within the current project areas and that land disturbing activities during construction may uncover presently undetected burials or other cultural finds. Should burials (or other cultural finds) be encountered during ground disturbance or via construction activities, all work should cease immediately and the appropriate agencies should be notified pursuant to applicable law, HRS §6E. A community concern was erosion that would occur during the construction period and the use of excess stones from the construction and erosion. Community participant, Kawehi Ryder, has voiced that his organization could benefit from any excess stones stemming from construction and erosion.

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Section 1 Introduction

1.1 Project Background

At the request of CH2M HILL and on behalf of the Federal Highways Administration (FHWA) Central Federal Lands Highway Division (CFLHD), Cultural Surveys Hawai‘i, Inc. (CSH) completed this cultural impact assessment (CIA) report for the Nīnole and Hīlea Bridge projects.

Nīnole Bridge is located in the Nīnole Ahupua‘a, Ka‘ū District, TMKs: [3] 9-5-019:011, 016, 024, 035 por., 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Rights-of-Way (ROW). The study area is located at mile post 56.7 along Route 11 (Māmalahoa Highway) at the Alahaki Road/Nīnole Loop Road intersection.

Hīlea Bridge is located in the Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-017:007 por., 008 por. and 9-5-017 Hawai‘i Belt Road/ Māmalahoa Highway ROW. The study area is located in the immediate vicinity of Hīlea Bridge on Route 11 (Māmalahoa Highway).

Hīlea iki and nui and Nīnole are next to each other in the middle of the nine *ahupua‘*a (traditional land division extending from the mountains to the sea) of Ka‘ū District. The study areas are depicted on portions of the 1995 Naalehu and Punaluu U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Figure 1), aerial photographs (Figure 2 and Figure 3), and tax map plats (Figure 4 and Figure 5).

The purpose of the project is to replace the existing deficient timber bridges to meet current design standards for roadway width, load capacity, bridge railing, and transitions. The existing deficient Nīnole Bridge was built in 1940 and does not accommodate the current roadway width or bridge standards, and the existing deficient Hīlea bridge was built in 1940 and does not accommodate the current roadway width or current bridge standards. Neither meets current live load and seismic requirements. The bridge railings and approaches do not meet current crash test requirements. The base assumption is that the entire bridges will be replaced with a 44-foot (ft) wide (out to out) concrete single span bridge. The length of the bridge will be determined by the hydrologic/hydraulic analysis. Bridge alternatives are a frame with walls socketed into the basalt near the existing abutments and an 80-ft long structure with shallow foundations located behind the existing abutments.

The total combined study area includes approximately 29.7 acres. For the purposes of this cultural impact assessment, the area of potential effect (APE) is defined as the entire 29.7-acre study area.

1.2 Document Purpose

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

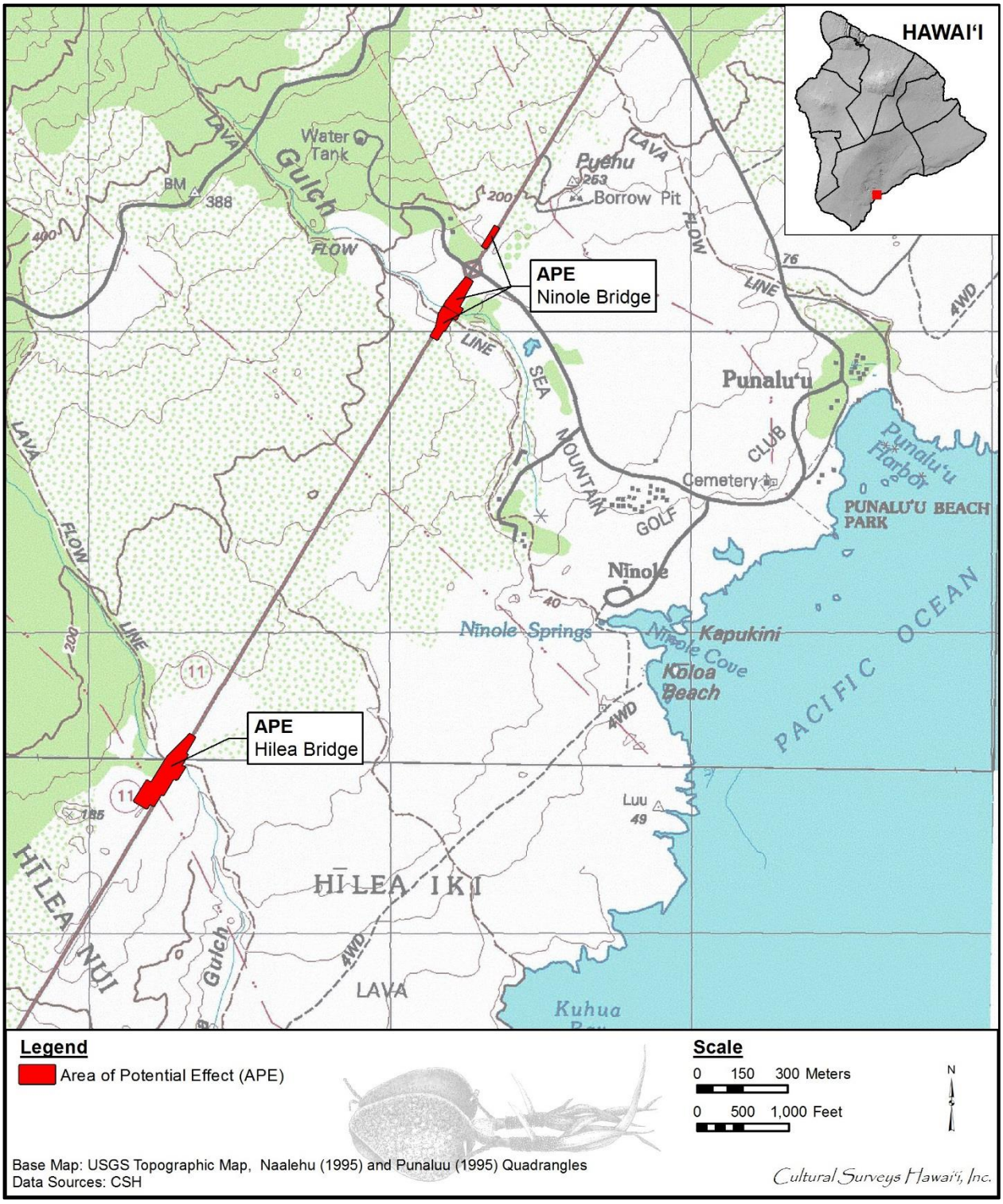

Figure 1. Portion of the 1995 Naalehu and Punaluu USGS 7.5-minute topographic quadrangles showing the location of the study area

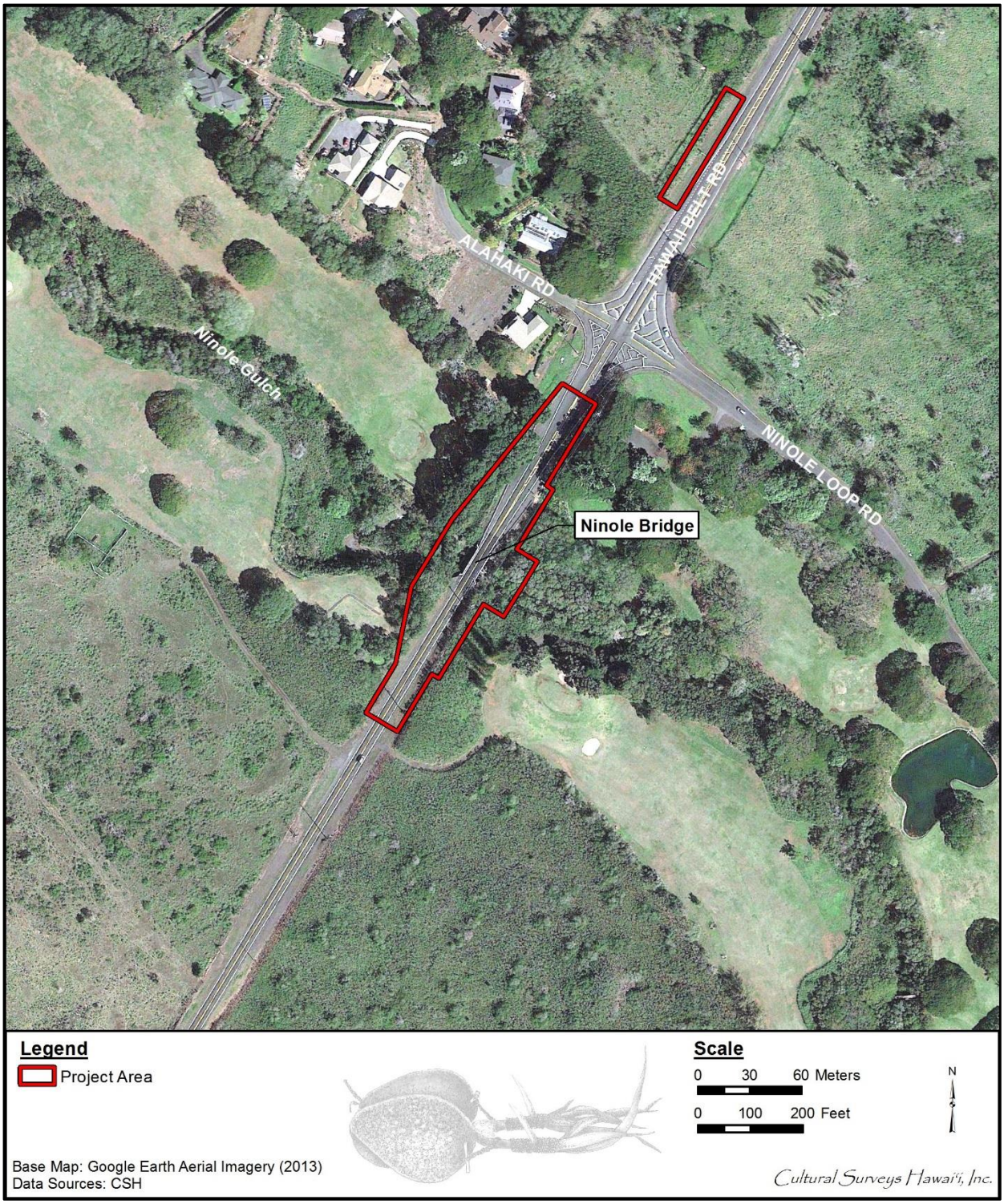

Figure 2. 2013 aerial photograph showing the location of the Nīnole Bridge (Google Earth 2013)

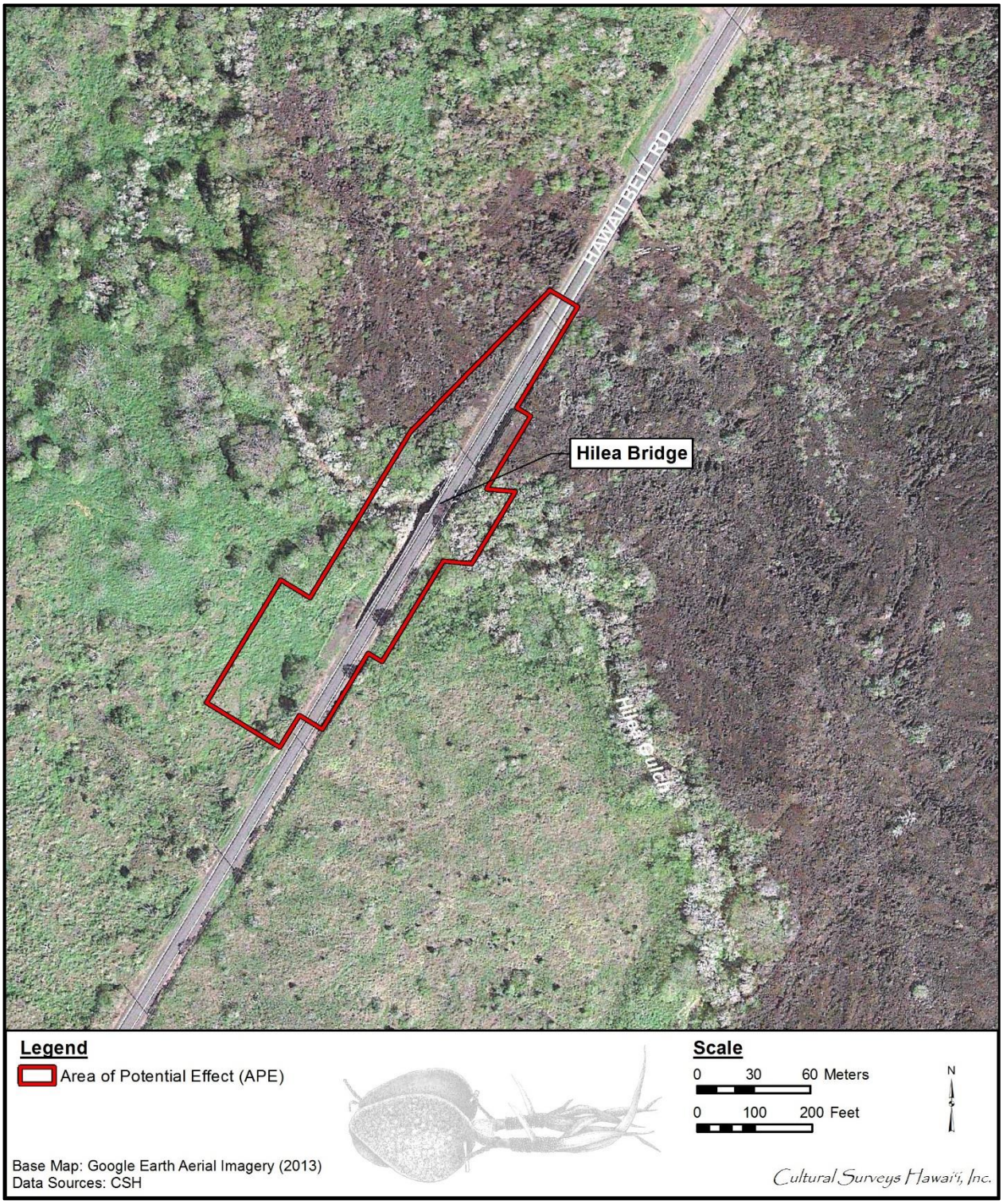

Figure 3. 2013 aerial photograph showing the location of the Hīlea Bridge (Google Earth 2013)

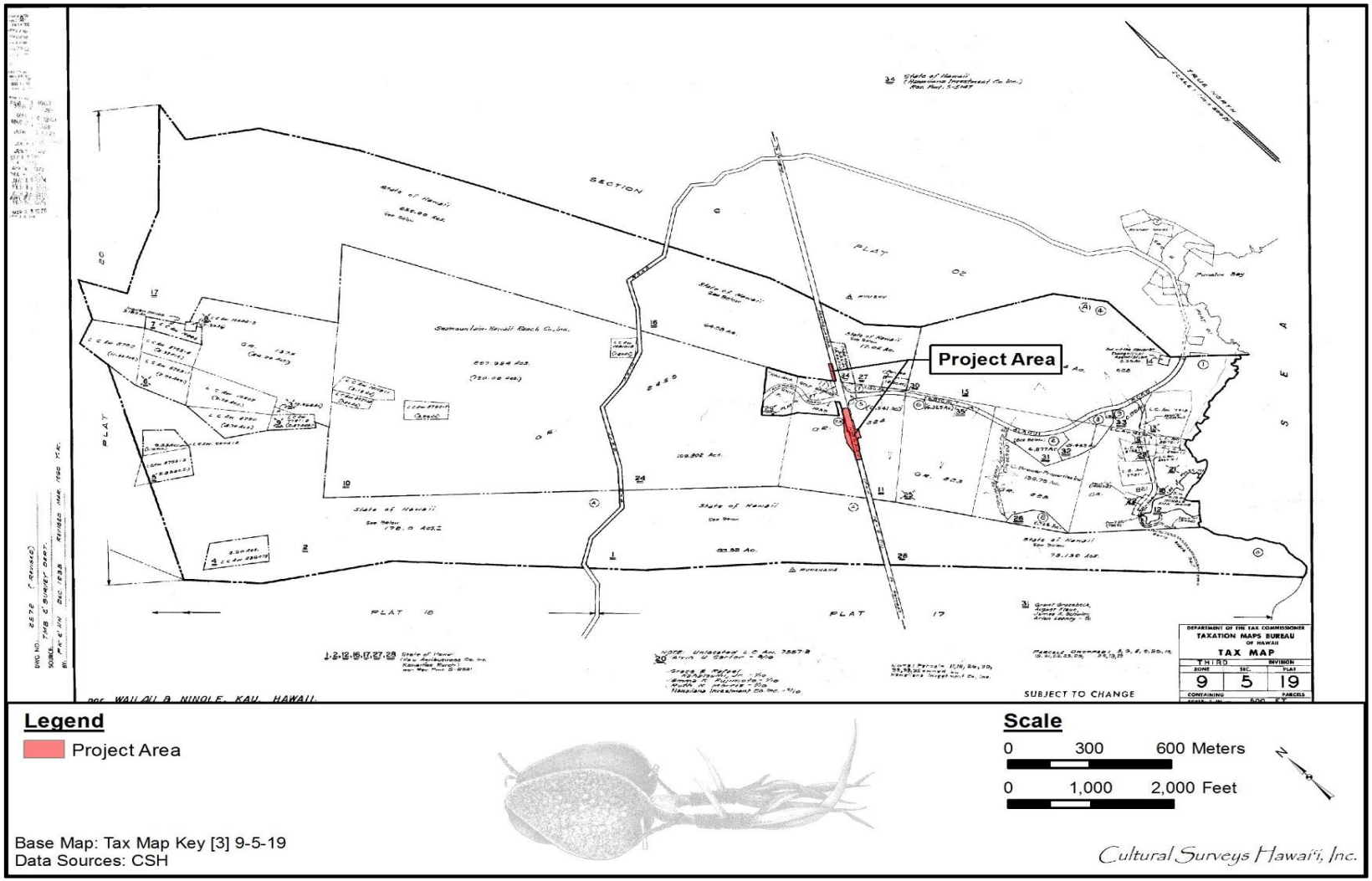

Figure 4. Tax Map Key (TMK) [3] 9-5-19 with project areas for Nīnole Bridge (Hawai‘i TMK Service 2014)

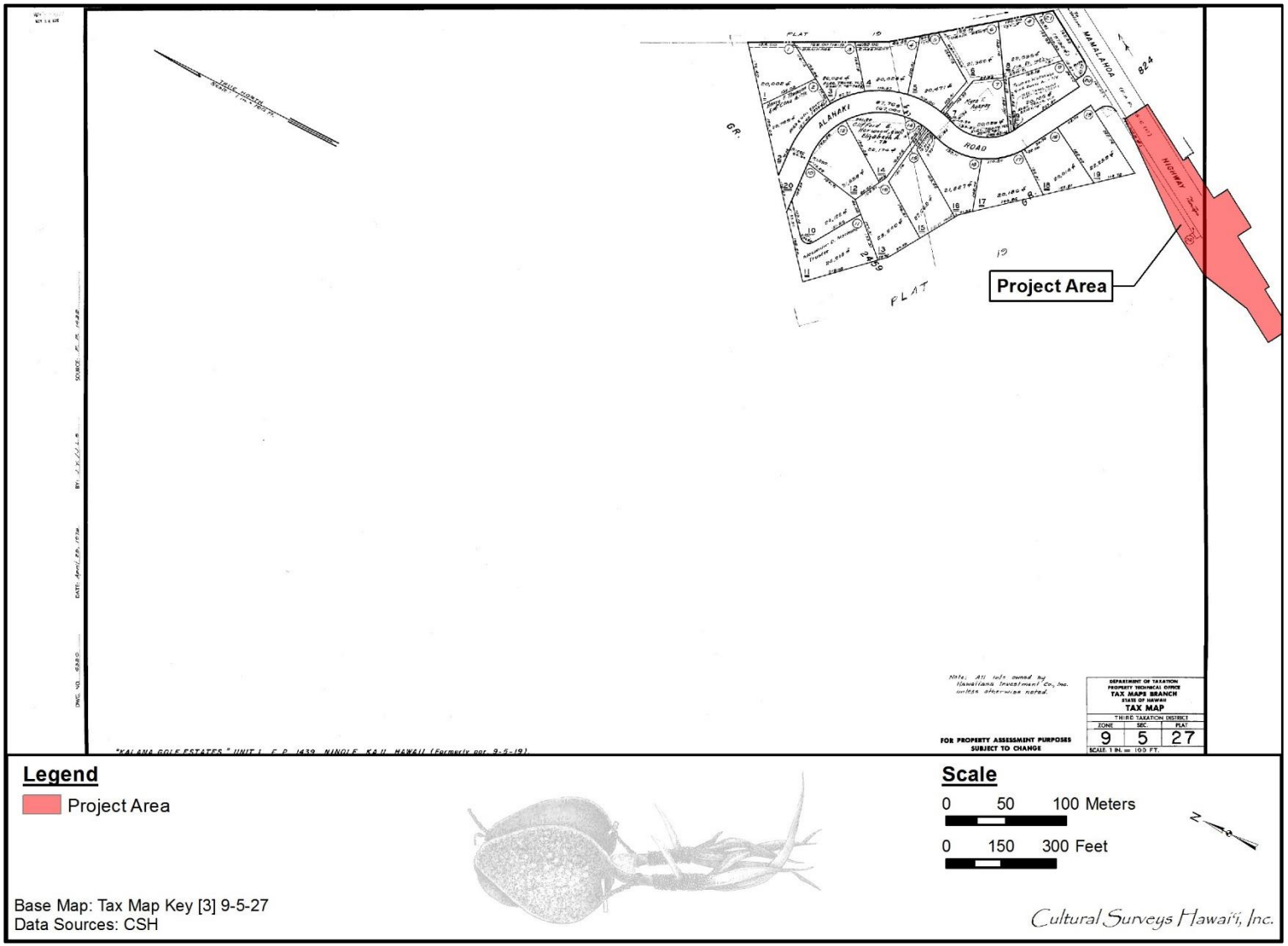

Figure 5. TMK: [3] 9-5-27 with project area for Hīlea Bridge (Hawai‘i TMK Service 2014)

Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance criterion "e" refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project's environmental review and may also serve to support the project's historic preservation review under HRS §6E-8 and HAR §13-284.

Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and Section 4(f) of the Department of Transportation Act. The proposed project is also subject to Hawai‘i State environmental and historic preservation review legislation (HRS §343 and HRS §6E-8/ HAR §13-275, respectively).

1.3 Scope of Work

The scope of work for this CIA includes the following:

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

1.4 Environmental Setting

1.4.1 Natural Environment

The *ahupua‘a* of Nīnole and Hīlea extend across slender land segments from Kīlauea to the sea. The Nīnole Bridge project area is bound by Punaluʻu Ahupuaʻa to the north and Hīlea-iki Ahupuaʻa to the south. The Hīlea Bridge project area sits on the border of Hīlea-iki and Hīlea-nui Ahupuaʻa.

> The interior community of Hīlea and the shore community of Punaluʻu were closely related, peopled probably by one *‘ohana* or family stock. Between the two places foods and other materials of local productions flowed. The two adjoining *ahupua‘a* of Hīlea-nui and Hīlea-iki had no favorable coastal outlet as did Ninole and Punaluʻu. [Handy and Handy 1973:610]

1.4.1.1 *Makani* (Prevailing Wind)

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

Hawaiians recognized different weather characteristics and named each of the predominant winds with an expressive term descriptive of the wind's direction and velocity. *Makani* is the Hawaiian word for wind. A‘e Loa is a predominate Hawaiian name given to the northeasterly trade winds (Nakuina 1990:138). A‘e, Moa‘e, and Na‘e are other names given to this island trade wind (Pukui and Elbert 1986:3). Two additional winds are found in the Ka‘ū district: "Piuohooilo is of Ka‘ū" (Nakuina 1992:49) and Hoolapa, meaning "energetic, cavorting" (Nakuina 1992:138) Hoolapa is a famous wind of Ka‘ū (Pukui and Elbert 1986:194) and Fornander gives Puahiohio as a wind of Ka‘ū as well (Fornander 1918:5:92).

1.4.1.2 *Ua* (Precipitation)

Precipitation is the main component of the water cycle responsible for depositing *wai* (fresh water) on local flora. Pre-Contact *kānaka* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer) lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *ho‘oilo* (winter, rainy season) continues through the end of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more common (Giambelluca et al. 1986:17). Typically the maximum rainfall occurs in January and the minimum in June (Giambelluca et al. 1986:17). Handy and Pukui describe the seasons as they affect the Ka‘ū district on the Big Island of Hawai‘i.

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

The mean annual rainfall in the project area is approximately 1,000 mm (39.37 inches) (Giambelluca et al. 1986:99). Rainfall aggregates between 25 and 150 mm, higher volume occurring mostly in the rainy season between November and April (Giambelluca et al. 1986:99–111). Many rains are given Hawaiian names and are associated poetically with particular places, often times referring to the action of the rain on plants, or showing the supposed effects of rain on people or their possessions (Pukui and Elbert 1986:361). Awa and Hele are Hawaiian names given

to the Ka‘ū rains (Unknown 1987:54 and 84). Ha‘ao is a rain spoken of in a chant as a rain that falls at Wai‘ōhinu, Ka‘ū (Pukui 1949:256).

1.4.1.3 *Nā Puna* (Springs)

According to Handy and Handy:

> There are here at Ninole the most abundant springs that are to be found anywhere along the coast line, gushing into a pond on all three sides inshore, flowing out just under the surface of the *pahoehoe* [smooth, unbroken type of lava] which surrounds the pond named Hilo‘e. These springs, called Puhau, form an inner pond which empties into another encosed area by the sea which is tidal in level. The old name of the springs was Puaihau, meaning “Bubbling-icy-water.” [Handy and Handy 1972:606]

They also say that attempts to tap these springs have always been unsuccessful because of the hard overlying basalt.

A third pond borders the second on the Punalu‘u side of Nīnole, fed evidently by another set of springs named Kauhewa (Handy and Handy 1972:606).

Although the following two springs are in Waiohinu, they are related to Hilea by the the forest god Kumauna. Kai-a-ka-‘ilio (Water-belong-to-the-dog) is a spring in Waiohinu, but this dog, the Handys assume, was one of “the dog ‘forms’ of the forest god like Ku-mauna, who stands as a great stone in the forest above Hilea, a stone potent as a rain maker. Ku-mauna might appear in the form of a dog to assist travelers or hunters lost in the uplands” (Handy and Handy 1972:591-592).

Elsewhere the Handys mention that the famous rock is known as one of the bodies of Ku-mauna (Mountain-Ku), the *kupua* (demigod) who controlled the rain in this forest zone. Also connected with Kumauna is Ha‘ao spring, which was also the name of a *mo‘o wahine* (lizard goddess) and she was the grand-daughter of Kumauna (Handy and Handy 1972:596).

1.4.1.4 *Wai* (Streams, Rivers, and Estuaries)

The Nīnole Gulch branches off into two parallel streams and carries water from *mauka* to *makai* (mountain to sea), running the length of 13,049.23 m, but does not deposit into the sea. The Hīlea Gulch and river system also carries water from the *mauka* (inland)area where it makes its way to the sea and empties into Kāwā Bay.

1.4.1.5 *‘Ā Pele* (Lava Flow)

The Nīnole project area is located within 1.3 km of the coast on basaltic lava flows (Figure 6). The geology of the northeastern half of the project area, northeast of Nīnole Gulch, is Ka‘ū Basalt, 3,000 to 5,000 yr (Qk1y). The geology of the southwestern half of the project area, southwest of Nīnole Gulch, is Ka‘ū Basalt, 1,500 to 3,000 yr (Qk2).

The Hīlea project area is located at approximately 150 ft elevation on the southeast slope of Mauna Loa volcano and spans at least two different lava flows (Figure 7). The southern portion of the project area lies on a Qk1y, Kau Basalt dating from 3,000 to 5,000 years before present. The west central portion of the project area includes a narrow band of Qt Tephra deposits dating from 11,000 to 30,000 years before present. Most striking is the northeast half of the project area that

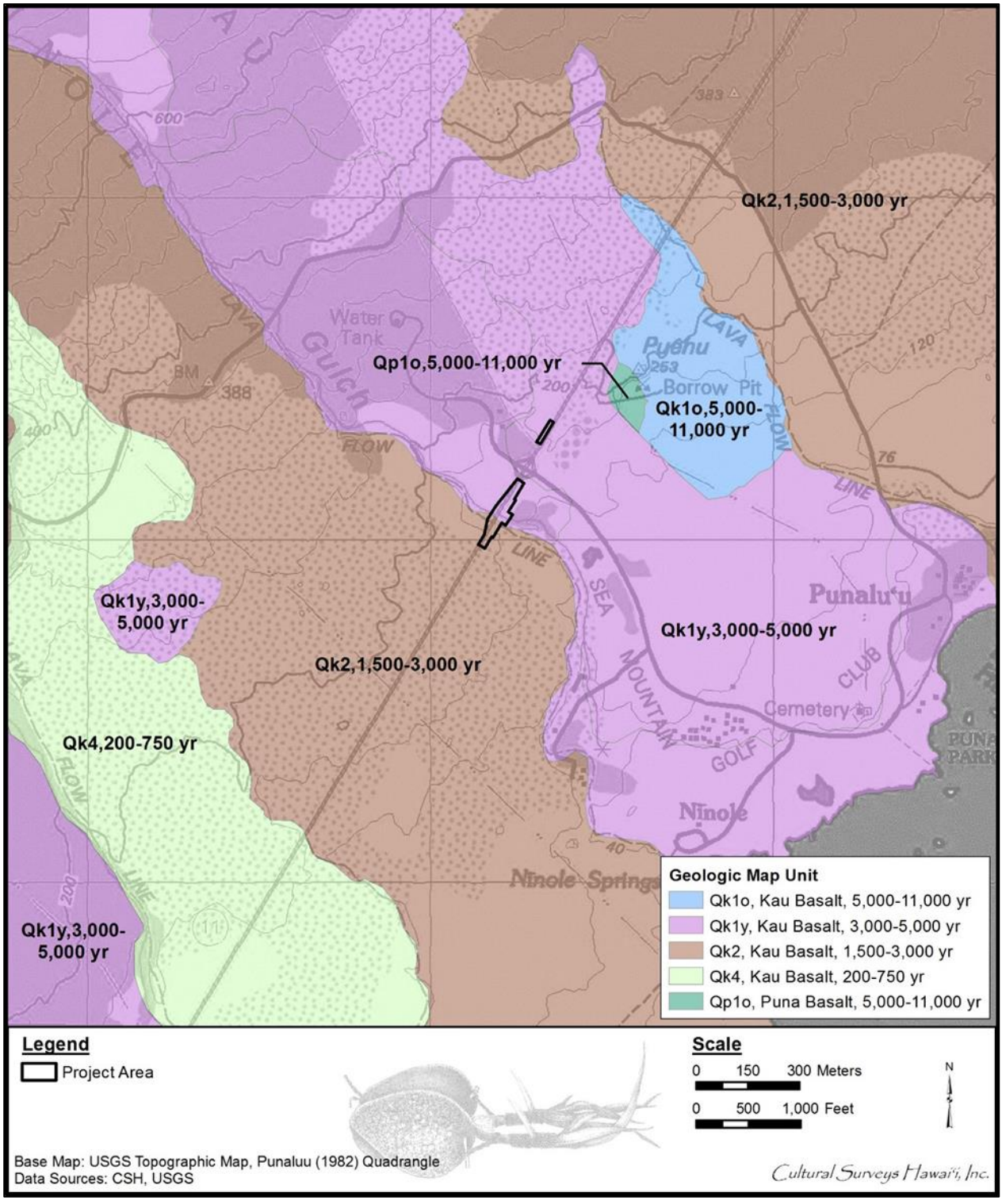

Figure 6. A portion of the 1982 Punaluu USGS 7.5-minute topographic quadrangle with an overlay of USGS geologic data (Sherrod et al. 2007)

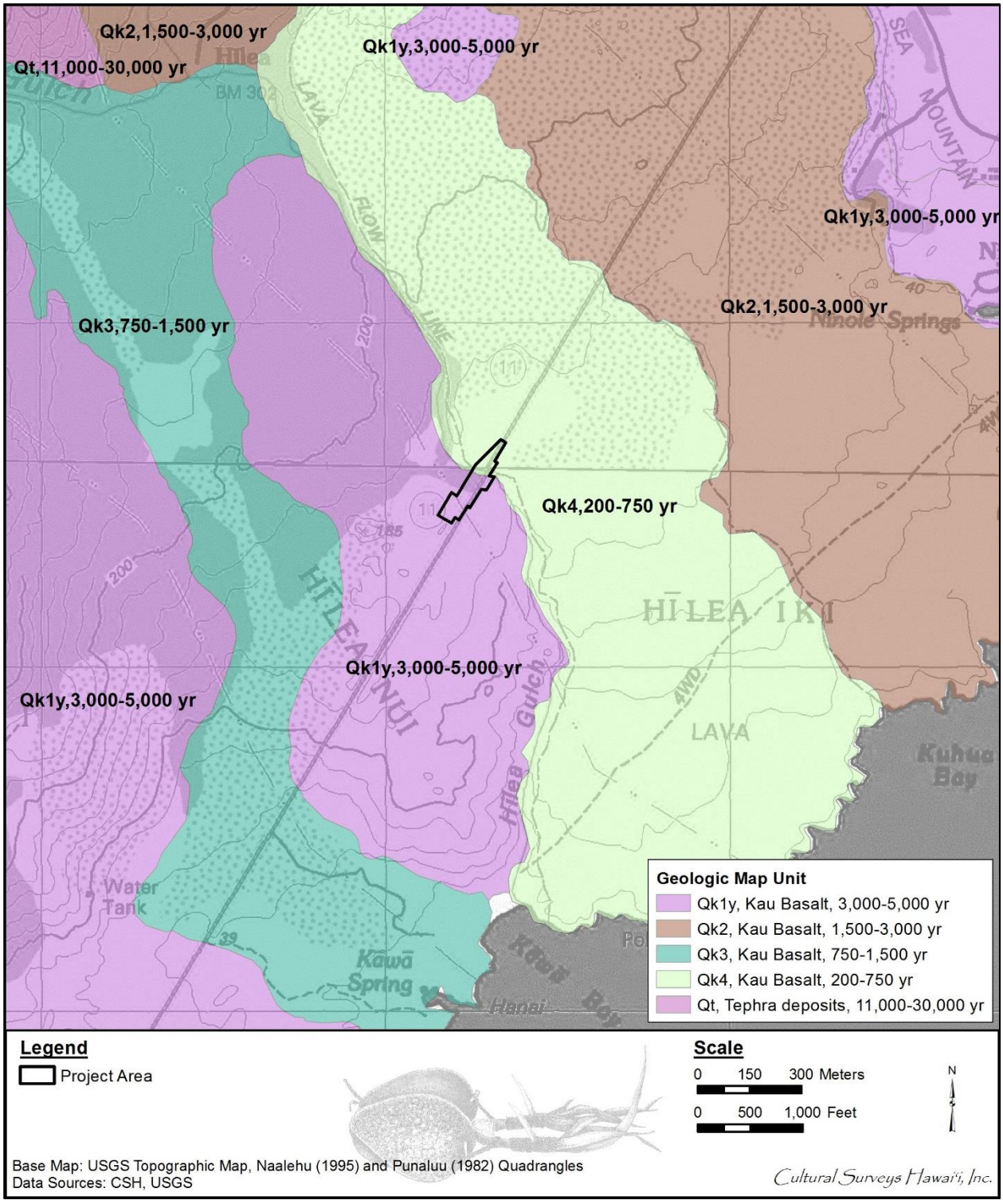

Figure 7. Portion of the 1995 Naalehu and 1982 Punaluu USGS topographic quadrangles, showing geological data (Sherrod et al. 2007)

overlies quite new Qk4, Kau Basalt deposits dating from 200 to 750 years before present. This relatively new northeastern lava flow is quite evident on a modern aerial photograph.

1.4.1.6 Soil Surveys

1.4.1.6.1 Nīnole Bridge

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Sato et al. (1973), soils within the study area consist of Lava flows, *ʻAʻā* (to burn, blaze) (rLV), Punaluu extremely rocky peat, 6 to 20% slopes (rPYD), and Very stony land (rVS) (Figure 8).

Lava flows, *ʻaʻā* are described as follows:

> This lava has practically no soil covering and is bare of vegetation, except for mosses, lichens, ferns, and a few small ohia trees. It is at an elevation ranging from near sea level to 13,000 feet and receives from 10 to 250 inches of rainfall annually. [Sato et al. 1973:34]

Sato continues on to describe the lava as rough and broken and having "a mass of clinkery, hard, glassy, sharp pieces piled in tumbled heaps" (Sato et al. 1973:34). In areas of high rainfall, *ʻaʻā* is a contributing factor to underground water supply in watershed settings.

Soils of the Punaluu Series are described as follows:

> The Punaluu series consists of well-drained, thin organic soils over pahoehoe lava bedrock. These soils are gently sloping to moderately steep. They are on uplands at an elevation ranging from near sea level to 1,000 feet and receive 60 to 90 inches of rainfall annually. [Sato et al. 1973:48]

Punaluu extremely rocky peat, 6 to 20% slopes is a soil found on the leeward side of Mauna Loa. The surface layer consists of black peat approximately four inches thick. Under the surface layer is *pāhoehoe*. The soil is medium acid and is used for pasture (Sato et al. 1973:48).

Very stony land is described as follows:

> Very stony land is a miscellaneous land type consisting of very shallow soil material and a high proportion of *ʻAʻā* lava outcrops. The dominant slope is between 10 and 15 percent. Between the lava outcrops and in the cracks of the lava, the soil material extends to a depth of 5 to 20 inches. This land is at an elevation ranging from near sea level to 13,000 feet and receives from 10 inches to more than 150 inches of rainfall annually. [Sato et al 1972:52]

Vegetation for rVS ranges. In dry areas there is sparse coverage. However, in areas of high rainfall, ferns and *ʻōhiʻa* (*Metrosideros macropus*) can be found. There is a slight hazard for erosion and the water is usually utilized for pasture, watershed, and wildlife (Sato et al. 1973:52).

1.4.1.6.2 Belt Road/Māmalahoa Highway

Parts of the southern half of the Hawai‘i Belt Road were known during the Territorial days as the Kaʻū Belt Road. The names "Hawai‘i Belt Road" and "Māmalahoa Highway" refer to the road system that encircles the entire island. Different sections of the highway today have local names. The Māmalahoa trail was a foot trail built in the nineteenth century, which developed into

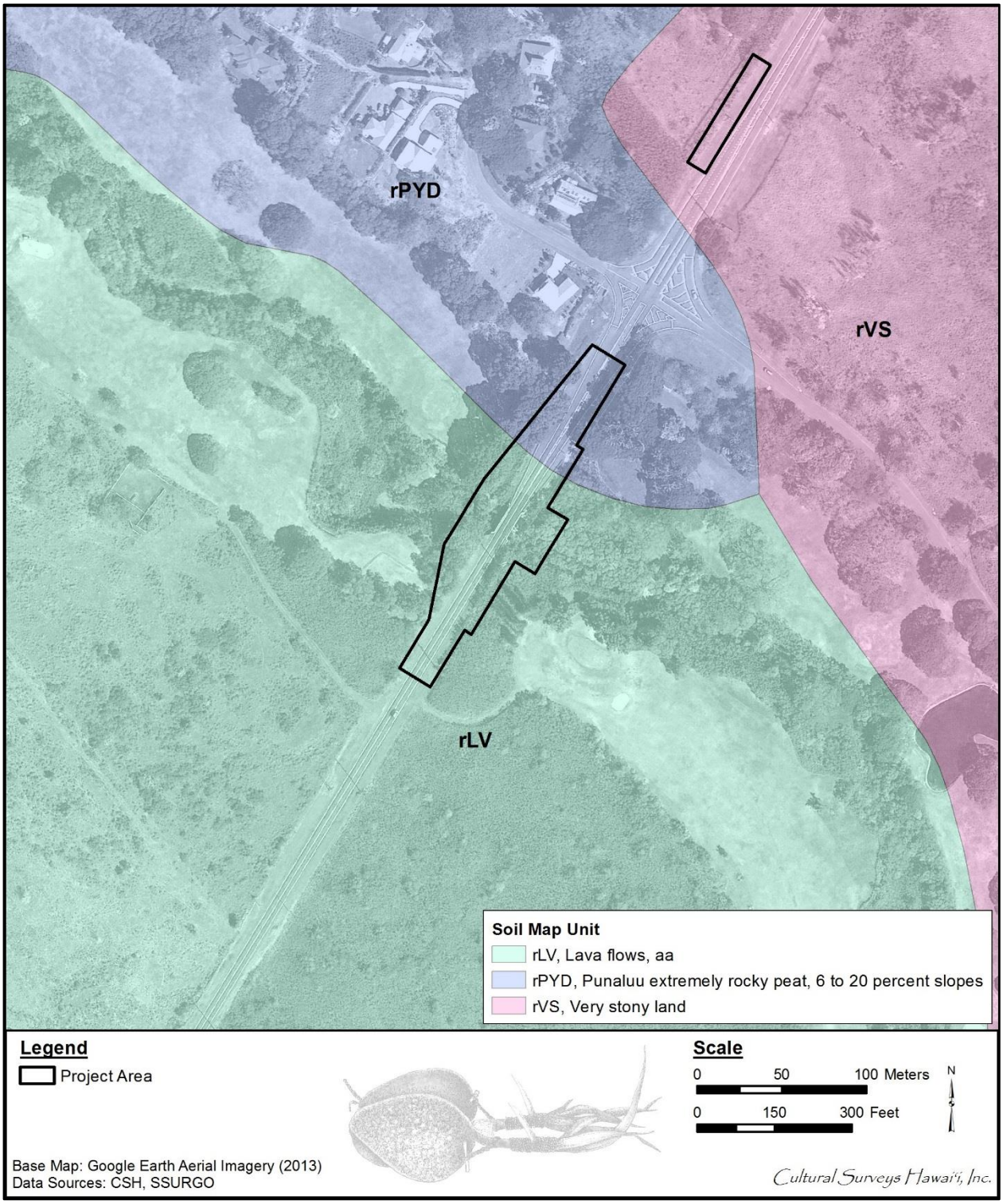

Figure 8. Aerial photograph (Google Earth 2013) with an overlay of the USDA SSURGO database (2001) and soil survey data (Sato et al. 1973)

Māmalahoa Highway. Various parts were widened and realigned over the years. The project areas are both along this highway.

1.4.1.6.3 Hīlea Bridge

According to the USDA SSURGO database (2001) and soil survey data gathered by Sato et al. (1973), soils within the study area reflect this volcanic history with the northeast half of the study area in *ʻAʻā* lava flows (rLV) and the southwest half in *pāhoehoe* (rLW) (Figure 9).

Lava flows, *pāhoehoe* (rLW) are described as follows:

> This lava has a billowy, glassy surface that is relatively smooth. In some areas, however, the surface is rough and broken, and there are hummocks and pressure domes. Pahoehoe lava has no soil covering and is typically bare of vegetation except for mosses and lichens. In the areas of higher rainfall, however, scattered ohia trees, ohelo berry, and alii have gained a foothold in cracks and crevices. [Sato et al. 1973:34]

This particular soil type varies in elevations ranging from sea level to 13,000 ft (Sato et al. 1973:34). Annual rainfall varies as well from 10 inches to more than 140 inches. Flat slabs of *pāhoehoe* are used for the construction of buildings and fireplaces. In areas of higher rainfall, this particular lava contributes to ground water supply.

1.4.1.7 *Nahele* (Vegetation)

Vegetation within the study area as viewed by CSH includes exotic grasses, *koa haole* (*Leucaena leucocephala*), and Christmas berry (*Schinus terebinthifolius*). Other vegetation found along the shore includes *pohuehue* (beach morning glory; *Ipomea*), *naupaka* (*Scaveola*), and *hinahina* (Silversword; *Heliotropium*). The native and endemic vegetation is of an open savanna dominated by sparse, scattered medium-sized *ʻōhiʻa lehua* trees, *ʻōhelo* (small native shrub in the cranberry family; *Vaccinium reticulatum*), *pūkiawe* (Black-eyed Susan; *Styphelia tameiameiae*), *ʻaʻaliʻi* (*Dodonaea* sp.), *ʻukiʻuki* (*Dianella sandwicensis*), *moa* (*Psilotum nudum* and *P. complanatum*) and *hāpuʻu* (endemic tree fern; *Cibotium splendens*). Ground visibility is generally good in this open native landscape, although the terrain is rough and undulating.

1.4.2 Built Environment

1.4.2.1 Nīnole Bridge

The study area's built environment includes a portion of Route 11 (Māmalahoa Highway) including the intersection of Alahaki Road and Nīnole Loop Road, and the Nīnole Bridge. Portions of the Sea Mountain Golf Course including a cart path are also located within the study area. Nīnole Bridge is a timber stringer bridge constructed in 1940 (Figure 10). The Sea Mountain Golf Course began operation in 1971.

1.4.2.2 Hīlea Bridge

The study area's built environment remains relatively undisturbed except for a portion of Route 11 and the Hīlea Bridge, a timber stringer bridge constructed in 1940 (Figure 11).

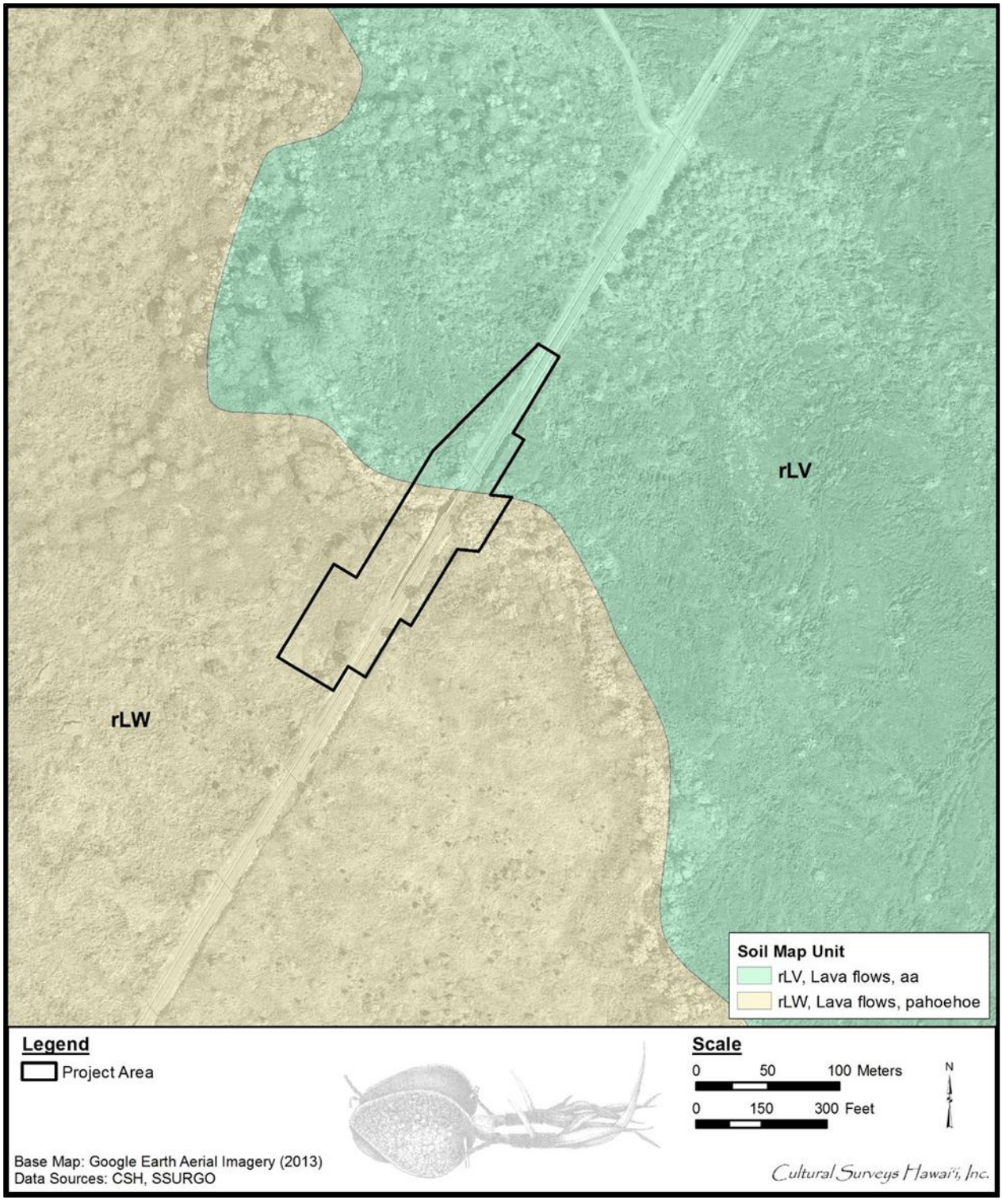

Figure 9. Aerial photograph (Google Earth 2013) with an overlay of the USDA SSURGO database (2001) and soil survey data (Sato et al. 1973)

Figure 10. Photograph taken of the Nīnole Bridge asphalt deck, view to northeast (CSH)

Figure 11. Hīlea Bridge asphalt deck, view to southeast (CSH)

Section 2 Methods

2.1 Archival Research

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

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

2.1 Community Consultation

2.1.1 Scoping for Participants

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

2.1.2 “Talk Story” Sessions

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

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

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

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

2.1.3 Interview Completion

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

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

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

Section 3 Traditional *Ka‘ao* and *Mo‘olelo*

3.1 Traditional *Ka‘ao* and *Mo‘olelo* Associated with Nīnole and Hīlea

3.1.1 Overview

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

Beckwith notes that Hawaiians use the term *ka‘ao* "for a fictional story or one in which fancy plays an important part"; *mo‘olelo* is "a narrative about a historical figure, one which is supposed to follow historical events. Stories of the gods are *mo‘olelo*." In reality, the distinction between *ka‘ao* as fiction and *mo‘olelo* as fact cannot be "pressed too closely. It is rather in the intention than in the fact" (Beckwith 1970:1). Thus a so-called *mo‘olelo*, which may be enlivened by fantastic adventures of *kupua*, "nevertheless corresponds with the Hawaiian view of the relation between nature and man" (Beckwith 1970:1). A *ka‘ao*, on the other hand, is "consciously composed to tickle the fancy rather than to inform the mind as to supposed events" (Beckwith 1970:1).

The following section brings to life the oral stories as they were transmitted throughout generations, originating before the time of the first Hawaiian to an age of mythical characters whose epic adventures inadvertently led to the Hawaiian race of *ali‘i* (chief, ruler) and *maka‘āinana* (commoner) alike. The *ka‘ao* shared below from in and around the project area are some of the oldest Hawaiian stories that have survived and still speak to the characteristics and environment of the area and its people.

While there are many tales and many are verions or variants of tales from other places, we include here the ones that specifically mention Ka‘ū.

3.1.2 Nā Ali‘i Ho‘oluhi o Ka‘ū ("The Despotic Chiefs of Ka‘ū ")

The passage below discusses the *ali‘i* of Ka‘ū Moku:

> Ua kapa ‘ia kela ‘āina rna waena o Kona a me Puna ‘o Ka’ū, he ‘āina Makaha. He ‘ekolu ali‘I ho‘o luhi o ia wahi I ka wā kahiko, a penei ko lākaou mau mo‘olelo.
>
> HALA‘EA
> He ali‘i ‘anunu i’a ‘o Hala’ea. I kēlā lā a me kēia lā e hele ana ‘o ia e nānā I nā ‘au wa’a lawai’a a kānaka, a lawe a’ela i nā i’a a pau nānā a me kona ‘ohua. Ua ‘ai ‘uha‘uha lākou i ka i‘a, he ho‘omāunauna maoli i kahi wā. ‘O nā kānaka ho‘i, ‘o ka lawai‘a wale iho nō, ‘a‘ohe kahi i‘a e ho‘iho‘i aku ai i ka ‘ohana. Hala nō ka lā i ka lau nahele ‘o ka ‘āina.
>
> Oi hana mau ihola nō ia ‘o ke ali‘i penei, a uluhua kānaka, a ‘imi i wahi no lākou e maha ai i kā Hala‘ea mau han a ho‘oluhi. ‘A‘ohe wā a lākou i hele ai i ka moana a ho‘i mai i nele ai nō ho‘i i ka leo o ka haku ‘o lākou i ka hea mai, ‘Na‘u ka i‘a! Mai, na‘u kēnā i‘a!’

I ka wā kau ‘ahi, ua kuahaua ‘ia i nā po‘o lawai‘a e hele pū me ke ali‘i i ka lawa‘a ‘ahi. Ho‘akoakoa nā po‘o lawai‘a i ko lākou mau wa‘a, na ‘upena, maunu, a pēlā wale aku, a kūkākūkā iho nei lākou e hā‘awi i kā lākou i‘a a pau loa i ke ali‘i, a ho‘i pololei i ka ‘āina me ka nānā ‘ole aku i hope. I ka hiki ‘ana mai o ka lā i koho ‘ia no ka lawai‘a ‘ana, ua ‘ākoakoa nā wa‘a mai Wai‘ahukini a Keauhou.

I ka loa‘a ‘ana o ka i‘a a ka wa‘a mua, ho‘īli ‘ia a pau i luna o ka wa‘a o ke ali‘i, a laila ho‘i i uka i kuaone. ‘A‘ole i pau ka hea 'ana a ke ali'i, ‘Mai, na‘u ka i‘a! Mai, na‘u ka i‘a!’ Pēlā i hana ‘ia ai e ka lua ‘o ka wa‘a, ‘o ke kolu, a ka hā, ka lima, a pēlā wale aku, a piha loa ka wa‘a o ke ali‘i i ka i‘a.

‘Ike iho nei ke ali‘i i ke ‘ano pihō piholo o ka wa‘a i ke kaumaha i ka i‘a, kāhea maila, ‘Ua lawa ke ali‘i i ka i‘a!’‘A‘ole pēlā,’ wahi a kanaka, ‘Eia mai ka puni a ke ali‘i!’ Ho‘omau nō lākou i ka ho‘oili i ka i'a, a ka wa‘a hope loa nō ho‘i, piholo ka wa‘a o ke ali‘i. Nānā a‘e nei ke ali‘i i kōkua nona, ‘a‘ohe wa‘a kokoke rna laila, ‘a‘ohe kanaka nānā e aloha mai--ua pau loa i ka ho‘i!

A make nō ‘o Hale‘ea i ke kqai, i waena o nā puni a ua ali‘i ‘ānunu nei.

KOI HALA

No Ka‘u nō kēia ali‘i ho‘oluhi 'o Koihala. I kona hele ‘ana i Kona, ua ho‘ounauna aku nei ‘o ia i kāna kūkini e holo i Ka‘ū e ‘ōlelo i nā kānaka e ho‘omākaukau i ka ‘ai, a hele a‘e i Wai‘ahukini e kali ai iā ia. I ka mākau- kau ‘ana o na mea ‘ai, ua hele nā kānaka i Wa‘'ahukini.

Iā lākou e nonoho nei, ‘ike ‘ia ka wa‘a a ke ali‘i e holo ana i Kā‘iliki‘i. ‘O ka hāpai nō ia o nā kānaka i nā mea ‘ai, a hele i kahi i mana‘o ‘ia ai e pae ana ke ali‘i. ‘A‘ole na'e pēlā; ia lākou nei a hiki i Kā‘iliki‘i, ua ho‘i hou ke ali‘i i Kapu‘a!

Hāpai nō kānaka i ka ‘ai, a hahai nō ma uka. Iā lākou nei a hiki i Kapu‘a, ‘ike ‘ia ke ali‘i e holo ana i Ka‘alu‘alu. Ho‘i hou no kānaka i laila.

Ua hele nā kino a māluhiluhi, no laila ho‘oholo lākou e nānā, a inā e pae koke ‘ole ke ali‘i, e ‘ai a pau ka ‘ai. ‘A‘ohe nō i ho‘opae ke ali‘i i kona wa‘a, akā, ua noho nō i waho e nānā ai i kānaka. ‘O ka nonoho nō ia o kānaka e ‘ai, a pau, ho‘opiha ‘ia nā laulau a me nāa ‘umeke i ka pōhaku.

‘Ike ke ali‘i i ke ‘ano ‘ē o kānaka, hoe ‘ino ‘o ia i ka wa‘a ona, a komo i Ka‘alu‘alu; no kēia kumu i hiki mai ai kia ‘ōlelo no‘eau, ‘Kau ‘ino ‘au wa‘a o Ka‘alu‘alu.’ Pi‘i aku nei ‘o ia a kahi a kānaka e nonoho mai ana, ho'okahuli i ia mau mea a pau. hea aku nei,’‘Ea! E ‘ai kakou, e ‘ai ke ali‘i!’ ‘‘Ae!” i pane mai ai nā kānaka, ‘Eia kō ‘ai me kō i‘a!’ ‘O ka hailuku ‘ia nō ia o ua ali‘i ho‘oluhi nei, a make loa!

KOHAIKALANI

He ali‘i ho‘ounauna ‘ino ‘o Kohāikalani. E ‘imi mau ana o ia i hana kaumaha no nā kānaka. I kona kūkulu ‘ana i kona heiau i ka pu‘u Ka‘ulakalani, ua kauoha ‘ia kānaka e ki‘i i ka pōhaku ‘alā i Kāwā, he wahi mamao aku ia. Ua ho‘omanawanui nō lākou i ka ‘auamo ‘ana, mai ke kai a ka pu‘u a ke kahua o ka heiau.

I ka lawa ‘ana o ka pōhaku, ua hō‘ea mai he mau kāhuna e nānā i ke ‘ano o ke kūkulu ‘ana o ka heiau, a i ko lāua ‘ike ‘ana i nā pōhaku ‘alā o Kāwā, ‘o ko lāua huli mai nō ia

i nā kānaka me ka ‘ī ‘ana, ‘‘'Auē! He nui nō ho‘i nā pōhaku rna ‘ane‘i, ‘o ko ‘oukou ho‘oluhi ‘ia nō kā ia e hele i Kāwā i pohaku! I pa‘a ka heiau o ke ali‘i o ‘oukou, o ko ‘oukou kino nō ka luaahi! I kauoha a‘e nei ia ‘oukou i ‘ohi‘a, ‘ōlelo aku nānā no e ki‘i i kāna, a na ‘oukou e huki i luna nei. A laila ho‘i paha, ola ‘oukou!’

Ho‘olohe na kānaka i ke a‘o p kēia mau kāhuna. I ka ho‘ouna ‘ia ‘ana e hele rna lalo o ka pali i kumu ‘ōhi‘a, pane maila kānaka, ‘E Kalani ē! Nānā ‘oe a kāu lā‘au i makemake ai, kulai ‘oe, a na mākou e hāpai mai i luna nei.’ ‘Ae nō ke ali‘i. No ka ikaika loa, ho‘okahi nō uhuki ‘ana, hemo ke kumu ‘ōhi'a nui!

I ka pau ‘ana o nā lālā i ka ‘okioki, ‘ōlelo mai nei ke ali‘i e ho‘i ‘o ia i luna e huki ai i ke kaula i ho‘opa‘a ‘ia ai ke kumu ‘ohi‘a, a na lākou e pahu a‘e rna lalo. Hō‘ole aku nei kānaka, na lākou e huki, a na ke ali‘i e pahu, ‘oaiai ua ‘oi kona ikaika i ko lākou. ‘Ae nō ho‘i ke ali‘i i kā lākou noi. Huki kānaka i ka ‘ōhi‘a a hapalua like o ka pali, ho‘oku‘u lākou i ke kaula. ‘O ke kaka‘a nō ia o ke kumu o ka ‘ōhi‘a ma luna o ke ali‘i, a ‘o ka make nō ia o ua ali‘i ho‘oluhi nei!

Ma hope mai o ke au o kēia po‘e ali‘i ho‘oluhi, ua kaulana ‘o Ka‘ū i ka mākaha. He maka‘u nā ali‘i i ka ‘ōlelo a‘e, “He ali‘i nui mākou!” He ‘āina ali‘i ‘o Ka‘ū; na kekahi ali‘i ka ho‘ounauna, ho‘okō kekahi; a na kahi ke kauoha, hana kekahi. Pēlā lākou i noho ai, a na kēia au na‘auao i ho‘okāhuli i ia mau mea a pau. [Pukui and Green 1995:131–133]

Translation

That district lying between Kona and Puna, Ka‘ū, in the old days was called a land of oppression because of three despotic chiefs who lived there. These are tales told about them.

HALAEA
A greedy chief was Halaea. Every day he visited the fleet of fishing canoes and took for himself and his retainers all the fish he could find. Then he held a feast, carousing and often wantonly wasting the food that remained. As for the fishermen, they were obliged to catch the fish without ever having any to take home to their families. Day after day, they ate herbs for food.

This conduct of the chief greatly vexed the people, and they sought means to rid themselves of his oppression. Never did they go out upon the ocean without hearing on their return the voice of their chief crying, ‘The fish is mine! Give me the fish!’

At last came the season for ‘ahi, the tuna, and a proclamation was made, summoning the head fishermen to accompany their chief to the fishing grounds. So they gathered together and prepared their canoes, looking after the nets, the bait, and whatever else was required for the expedition. Also, they held a council at which it was agreed to deposit all their fish in the chief's canoe and themselves return to the shore without even a backward glance. At the day appointed, everything was in readiness from Wa‘iahukini to Keauhou.

When the first canoe-load was conveyed to the chief's canoe, even then the voice of the chief could be heard protesting, ‘Bring me the fish! Bring me the fish!’ But when the second, third, fourth, fifth, and succeeding canoes had deposited their loads into the

chief's canoe and he saw there was danger of swamping the canoe with their weight, he called out, ‘The chief has fish enough!’

‘Not so!’ cried the men. ‘Here is all the fish that the chief desires!’ They piled in the last load, and the canoe began to sink rapidly. The chief looked about for help, but there was no canoe at hand and no man to show compassion; all had gone back to land.

So perished Hala‘ea in the sea, surrounded by the objects of his greed.

KOIHALA

An irresolute chief was Koihala. When the chief was visiting in Kona, he dispatched a messenger to Ka‘ū with the order for food to be prepared and taken to Wai‘ahukini to meet him. When all was ready, the servants bore it to Wai‘ahukini. As they sat awaiting his appearance, they saw the chief's canoe heading for Ka‘ilik‘i, so they took up the food again and went on to the place where they expected him to land. But when they got to Ka‘iliki‘i, he was heading for Kapu‘a.

Again the men shouldered the food and followed toward the mountain, but as they reached Kapu‘a, they perceived the chief heading for Ka‘alu‘alu, and they immediately proceeded thither.

By this time they were hungry and tired, and they therefore agreed to watch and, if the chief did not arrive shortly, to eat the food themselves. The chief delayed landing, simply sitting idly in the canoe and gazing at the men. So the servants ate the food that had been prepared and then they put stones in the ti-Ieaf packets in which the fish had been wrapped and in the empty calabashes of vegetable food. The chief, seeing these things, paddled furiously until he reached Ka‘alu‘alu. Hence has arisen the proverb ‘Kau ‘ino ‘au wa‘a O Ka‘alu‘alu,’ that is, ‘The canoes arrive hurriedly at Ka‘alu‘alu.’ Hastening up the beach to the spot where the men sat, he cried, ‘Say! Let us eat! Let the chief eat!’

‘Yes, indeed!’ answered the servants. ‘Here is vegetable food and fish!’ Whereupon they stoned the despotic chief to death.

KOHĀIKALANI

An evil man was the chief, laying heavy burdens upon his people whenever opportunity offered. When he built a temple for himself on the hill Ka‘ulakalani, he commanded the men of the place to bring large, smooth stones from Kāwā, many miles distant. Patiently, the heavy loads slung on poles over their shoulders, they bore the rock from the seashore to the hill where the foundation of the temple was to be laid. When much stone had been collected, two priests (*kahuna*) arrived to supervise the erection of the structure, and upon seeing the quantity of stone brought from Kāwā, they turned to the men and exclaimed, ‘Look you! There was stone enough already without your exerting yourselves to bring more from Kāwā! It is clear that your chief intends when this temple is completed to offer your bodies as sacrifice. Hence, when he commands you to bring an ‘ō*hi‘a* tree to be used in the building, you must tell him to select one for himself and that you will then help him pull it up here. In this way you may save your lives.’

The people heeded the priests’ warning, and when they were commanded to descend the cliff after a tree, they replied, ‘O heavenly one, listen! It is better for you to choose the tree to your liking and uproot it, and we will haul it up hither.’ The chief consented.

> He was so strong that with one pull he uprooted a great tree. He lopped the branches and then proposed to ascend the cliff and pull the tree up from the top while the men pushed from below. This, however, they refused to do; they wanted to pull while the chief pushed from below, and to this the chief acquiesced. The men pulled at the tree until it was half the distance up the cliff, then released the rope. The great tree rolled over on top of the chief, and death came to the oppressor.
>
> Since the rule of these despotic chiefs, Ka‘ū has become noted as a land where people look out for themselves and their own family. The rulers fear to say ‘We are great chiefs’ lest a reckoning come from the people. In the old days, Ka‘ū was a despotic district; a chief would command and be instantly obeyed-one would give orders which were at once fulfilled. Thus did they live. But these days of civilization have overturned all those customs. [Pukui and Green 1995:74–76]

3.1.3 *Nā Wiliwili o Pā‘ula*/The Wiliwili Trees of Pā‘ula

Mary Kawena Pukui along with Laura Green gives this story in *Folktales of Hawai‘i/He Mau Ka‘ao Hawai‘i.* The story takes place in Pā‘ula, south of the project areas, but within Ka‘ū Moku:

> He ‘eha ko lākou nui i hānau ‘ia mai ai e ko lākou makuahine. ‘O Moholani ka hiapo, ‘o Wiliwili‘ohe‘ohe mai, ‘o Wiliwilipe‘ape‘a, ‘a ‘o Wiliwilikuapu‘u nō ho‘i ko lākou muli loa. ‘O Moholani ka u‘i o lākou a pau. He u‘i nō ho‘i ‘o Wiliwili‘ohe‘ohe, ‘o ka ‘ōhule na‘e. He u‘i nō ho‘i o Wiliwilipe‘ape‘a o ka ‘ōpe‘ape‘a ho‘i o kona ‘ano. Ke puhi mai ka makani, e kīlepalepa wale ana nō kona lauoho ma ‘ō a ma ‘ane‘i. Ma kona inoa nō ho‘i kākou e ho‘omaopopo ai he u‘i kuapu‘u ‘oWiliwilikuapu‘u.
>
> ‘O Moholani wale nō ka mea i ho‘āo ‘ia me ke kāne, a ho‘okahi a lāua keiki, o Kauilamākēhāokalani. Ua ho‘iho‘i ‘ia o Kauilamākēhāokalani me nā akua o lākou e hānai ‘ia ai i Kuaihelani, ka ‘āina huna i ke ao.
>
> I ka hele mau o ke kāne a Moholani i ka lae kahakai, ‘ike mai nei kekahi mau wāhine kupua o ke kai i ka u‘i o kēia kanaka. ‘O ko lāua ho‘ohihi nō ia. ‘O ‘Ahikananā ka inoa o kekahi wahine, a ‘o ‘Ahikāhuli ho‘i kekahi. I nā wā a pau e ho‘owalewale mau ana lāua i ke kāne a Moholani, rna ke oli ‘ana i nā mele o ke kai, a ka ha‘i ‘ana nō ho‘i i nā ka‘ao o ka moana kūlipolipo. Hele iho nei ua kanaka nei a puni iā lāua lā; ‘o ka lu‘u nō ia i loko o ke kai, a ho‘i pū me lāua i ko lāua ana i ka papakū o ka moana.
>
> Kakali mai ‘o Moholani, a ‘o ka ho‘i ‘ole aku o ke kāne, ‘imi nei i nā wahi a pau āna i ‘ike ai. Ua ha‘i mai kekahi po‘e i ‘ike ua lilo iā ‘Ahikananā a me ‘Ahikāhuli. Iā ia i kokoke mai ai i kahi o ke kaikaina e noho ana, hea mai nei ‘o ia, ‘E Wiliwili‘ohe‘ohe ē! Kū mai nei ē! E Wiliwili‘ohe‘ohe ē! Kū mai nei ē! Ua ‘ike paha ‘oe i ku‘u kāne i lawe ‘ia e ‘Ahikananā e ‘Ahikāhuli? ‘Ili‘ili pekepeke, ‘ili‘ili nehe!’ Nānā mai nei ‘o Wiliwili‘ohe‘ohe, a pane mai nei me ke keu, ‘Ē! Kāne nui palaualelo! ‘A‘ohe au i ‘ike i kāu kāne!’
>
> Hele aku nei nō ‘o Moholani me ka halo‘ilo‘i o kona waimaka i ka lua o ke kaikaina, a hea maila, ‘E Wiliwilipe‘ape‘a ē! Kū mai nei ē! E Wiliwilipe‘ape‘a ē! Kū mai nei ē! Ua ‘ike paha ‘oe i ku‘u kāne i lawe ‘ia e ‘Ahiknanā, e ‘Ahikāhuli? ‘Ili‘ili

> pekepeke, ‘ili‘ili nehe!’ Ua like nō kā Wiliwilipe‘ape‘a pane me kā kona mua a‘e. ‘Ē! Kāne nui palaualelo! ‘0 wai ka mea i ‘ike i kāu kāne!’
>
> Ho‘omau aku nei ‘o Moholani i ka hele ‘ana a kahi o ko lākou muli loa, a hea maila e like nō me kāna i hea mua ai. ‘A‘ohe nō ho‘i i ‘oko‘a ka pane a Wiliwilikuapu‘u mai kā nā kaikua‘ana mai, ‘‘Ē! Kāne nui palaualelo! ‘A‘ohe au i ‘ike iā ia!’
>
> No ka ‘ike o Moholani ike aloha ‘ole o nā pōki‘i, hea aku nei i ke keiki, me ke kaukau pū i nā kahu hānai akua o ke keiki e ho‘oku‘u mai iā ia. Ua hele maila ‘o Kauilamākēhāokalani, a i ka lohe ‘ana i ke kaukau o kona makuahine iā ia, hele aku nei ‘o ia e ki‘i i ka makua kāne e ho‘i mai. ‘A‘ole i ‘ae ‘o 'Ahikananā lāua ‘o 'Ahikāhuli e ho‘oku‘u i ka ipo a lāua
>
> No ko lāua ‘au‘a loa, pi‘i a‘e nei ka huhū o Kauilamākēhāokalani. Loli a‘e nei ke kino kanaka ona a ke kino uila. I ka ‘oaka ‘ana o ka uila i ka papakū o ka moana, ua ‘oki‘oki ‘ia ua mau wāhine nei a paukūkū. Lilo a‘e nei nā paukū i i‘a, a mai laila mai i loa‘a ai kēlā ‘ano i‘a, he ‘ahi. Pau ka hiki ‘ana o ua mau wāhine nei e ho‘owalewale i kā ha‘i kāne, ‘oiai ua lilo loa a‘ela i i‘a!
>
> No ke aloha ‘ole o na kaikaina iā Moholani, ua ho‘olilo ‘ia lākou i mau kumu wiliwili. No ka ‘ōhule o Wiliwil‘'ohe‘ohe, ua lilo ‘o ia i kumu la‘au mā‘ohe‘ohe lau ‘ole. ‘O ko Wiliwilipe‘ape‘a mau lau e kīlepalepa mau ana i ke aheahe a ka makani. E like nō me ke kuapu‘u o Wiliwilikuapu‘u, pēia nō ke keke‘e o kona kumu. ‘A‘ole i hele ‘auana hou ke kāne a Moholani, no ka mea ua ‘ike ‘o ia he keiki ho‘oponopono ‘ole kāna ke hūhū iho. [Pukui with Green 1995:107–108]

The tale is translated below:

> There were four daughters born to their mother—Moholani the first born, next Wiliwili‘ohe‘ohe, then Wiliwilipe‘ape‘a, and last of all Wiliwilikuapu‘u. Moholani was the most beautiful of them, for the beauty of Wiliwili‘ohe‘ohe was marred by baldness, and Wiliwilipe‘ape‘a had a mass of tangled hair which tossed here and there when the wind blew. As for Wiliwilikuapu‘u, the hunchbacked one, we can see from her name that she lacked beuty altogether.
>
> Moholani was the only one who was married. She had one child, named Kauilamākēhāokalani, which means ‘Lightning flashing from the heavens.’ This son was given into the care of the gods to be brought up in Kuaihelani, the land hidden in the clouds.
>
> Moholani’s husband often went to a point on the seashore, where he was seen and admired for his vigorous bearing by certain women *kupua* of the sea. They endeavored to ensnare him. ‘Ahikananā was the name of one of these women and ‘Ahikāhuli of the other. They seized every opportunity to tempt him by chanting the songs of the sea and relating tales of the deep blue ocean. Finally, bewitched by their wiles, he plunged into the sea and accompanied them to their cavern at the ocean floor.
>
> After waiting long for her husband to return, Moholani went in search of him to every place she knew, and those who had seen him told her of his being ensnared

> by the enchantresses. So as she neared the spot where her sisters lived, she called, ‘O Wiliwili‘ohe‘ohe, listen! Come to my aid! O Wiliwili‘ohe‘ohe, come to my aid! Do you know if my husband has been carried away by ‘Ahikananā and ‘Ahikāhuli to the place where the little stones rattle?’
>
> But Wiliwili‘ohe‘ohe looked at her crossly and answered, ‘Ugh! He is a big, worthless man! I do not know where your husband is!’
>
> Moholani went on to the home of her youngest sister and cried out the same words, but she got no different answer than from her other sisters, for Wiliwilikuapu‘u said, ‘Ugh! He is a big, worthless man! I do not know where your husband is!’
>
> Now, Moholani, perceiving that she was to get no sympathy from her sisters, sought her son, requesting the gods who were his foster parents to allow him to leave them. Kauila, upon hearing his mother’s lament, went forth to seek his father.
>
> When ‘Ahikananā and ‘Ahikāhuli refused to relinquish their lover, the boy’s wrath flashed forth; because of obstinacy, he changed his body into a lightning flame, and at the glancing of this lightning on the ocean floor, the women were cut into pieces and transformed so that from them come all that kind of fish called mackerel. Gone forever was their power to tempt other women’s husbands, for they were now nothing but fishes!
>
> Because of their unkindness to Moholani, the three sisters were transformed into *wiliwili* trees. Because Wiliwili‘ohe‘ohe was bald, she became a tree which is almost leafless; Wiliwilipe‘ape‘a became a tree whose leaves flutter in the whispering breeze; and as Wiliwilikuapu‘u was a hunchback, her trunk became crooked.
>
> As for Moholani’s husband, he refrained from wandering again, for he realized that he had a son whose anger, once aroused, could not be assuaged. [Pukui and Green 1995:13–14]

3.1.4 Kaikapu

Martha Beckwith recounts the tale of Kaikapu, part of the Laka tradition, told to her by Mary Kawena Pukui. Kaikapu or (Tapusea) is found in several other Hawaiian stories in other places. Ninole was the name of a beautiful woman who was the daughter of the cannibal woman Kaikapu. Ninole was beautiful but cruel. While she and her mother lived by the pools, the people of Punalu‘u were afraid to go there for water.

The spring on the east side of the Ninole ponds was named Kau-wale, meaning “Useless-landing.” Ninole, an ogress once frequented a beach near this spring, where she could be seen by men passing in canoes. She would beckon to them and they would come ashore. She invited them to eat, and led them to the cave in which her mother lived. When they entered, the cave mouth would close. The men were trapped; some were eaten, some were tormented and starved.

> Old Woman Kaikapu lives in a cave in Ninole, Kau district on Hawaii. She is a cannibal and uses her pretty granddaughter Ninole to decoy travelers to her cave, whereupon she will take them out one by one and kill and devour them raw. She

> eats her own grandson, Ninole's brother, before she discovers who he is. [Beckwith 1970:264]

3.1.5 The Caterpillar Kumuhea of Hīlea:

A notable landform in the uplands of Ka‘ū is Pu‘u‘enuhe or “cut-wormhill” located within Punalu‘u. Beckwith gives a brief account of the story, but places Pu‘u‘enuhe in neighboring Hīlea Ahupua‘a:

> Kumu-hea (or Mo‘o), son of the god Kū, lives in the hill Pu‘u‘enuhe at Hi‘ilea [Hīlea] in Ka‘ū District and is the god (‘aumakua) of the cutworm. He marries a girl but comes to her only at night, for by day he is a worm (or mo‘o). He does not support her. With the advice of her parents she ties a hemp string to his back and when he leaves her she follows him to the hill and discovers his true nature. He is angry. Cutworms attack the crop. The parents appeal to Kāne, who cuts up the god; and hence the small pe‘elua cutworms (or lizards) of today, which Hawaiians fear to injure. [Beckwith 1970:135]

3.1.6 Keouakuahu‘ula and the Moving Cinder Cone

Kamakau (1964) offers an unusual account of a moving cinder cone in the time when a column of troops of Keōua Kū‘ahu‘ula was annihilated on the flanks of Kīlauea. According to Kamakau:

> Several cinder cones were heaped up near Kīlauea at this time. One cone moved straight down toward the sea at ‘Āpua and in less than two weeks reached the sand at Punalu‘u, where Keōua Kū‘ahu‘ula was staying at the time under tabu. This cinder heap moved along the sand from ‘Apua to the beach at Punalu‘u where its progress was barred by the highlands at Punalu‘u, Wailau and Nīnole, and there it remains at Punalu‘u to this day. [Kamakau 1964:152]

One can easily conceive of sands from new cinder cones washing from ‘Āpua south to Punalu‘u but Kamakau seems to suggest the entire heap moved as a unit. This is supported by the most likely candidate for the Punalu‘u landform, Pu‘ehu Hill, in that it is well inland. Kamakau relates that the ruling chief Keōua Kū‘ahu‘ula was resident at Punalu‘u at the time and it would seem likely that Punalu‘u was often the residence of ruling chiefs of Ka‘ū (Yucha and Hammatt 2015:11–12).

3.1.7 Nānaele/The Story of Nānaele

Nānaele, a high chiefess of Ka‘alāiki in Ka‘ū was kind, beautiful, and loved by her people. One day a band of travelers came from Kohala and immediately thought that Nānaele would be a great wife for their chief, Nāliko (Pukui and Green 1995:77). When this proposition was made to Nānaele she consented to the arranged marriage after the Kohala visitors reported their chief to be pleasant, handsome, modest, and industrious. Upon returning to Kohala, the travelers reported to their chief of Nānaele. Nāliko was thrilled with the arrangement and within a few months, the two were married at Ka‘alāiki and returned to Kohala where they would reside.

Soon Nānaele learned her husband was not what the people of Kohala reported. He left her for days with no sustenance while he was out with other women. Upon his return home, Nānaele gave Nāliko an ultimatum, “O Nāliko, listen! A new life for me; I shall never see you. You have provoked me too much with your unkindness” (Pukui and Green 1995:78). But even with her warning, Nāliko left her at home alone.

Nānaele crept out of the house one day in search of food. She crawled until she collapsed at a pig pen. A passerby found her and took her in his home where his wife cared for her (Pukui and Green 1995:78). Nānaele's strength improved over time, however, the news of her nearly dying traveled to Ka‘ū where the people of Ka‘alāiki and Kāwā were nearly heartbroken. They took it upon themselves to fetch their chiefess and bring her back home to Ka‘alāiki (Pukui and Green 1995:78). A year passed and Nāliko heard that his wife recovered, had become twice as beautiful, and had many suitors. Nāliko then traveled from Kohala to Ka‘ū to fetch his wife once again. Her people heard of Nāliko's intentions and hid their chiefess in Kāwā. When Nāliko arrived at Ka‘alāiki, he was informed that his wife had gone to the sea to bathe and she would return. Nānaele's people were plotting to kill Nāliko and hide his body in a cave, but an old man took pity on the abusive husband and told him, "They mean to kill you! Here! Delay is perilous! I will guide you to a place where you can hide. Come with me!" (Pukui and Green 1995:79). Nāliko and the old man escaped Ka‘alāiki and traveled to an underground cave where they reached an area near the present day Kapāpala stock ranch between Hualālai and Maunaloa. The man left Nāliko so he could travel back to Kohala Moku. Nāliko traveled back to Kohala alone and realized he would never be with Nānaele again (Pukui and Green 1995:79).

3.2 Wahi Pana of Nīnole

Wahi pana are legendary or storied places of an area. These legendary or storied places may include a variety of natural or human-made structures. Oftentimes dating to the pre-Contact period, most *wahi pana* are in some way connected to a particular *mo‘olelo*, however, a *wahi pana* may exist without a connection to any particular story. Davianna McGregor outlines the types of natural and human-made structures that may constitute *wahi pana*:

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

As McGregor makes clear, *wahi pana* can refer to natural geographic locations such as streams, peaks, rock formations, ridges, offshore islands and reefs, or they can refer to Hawaiian land divisions such as *ahupua‘a* or *‘ili*, and man-made structures such as fishponds. In this way, the *wahi pana* of Ka‘ū Moku tangibly link the *kama‘āina* (native born) of the area to their past. It is common for places and landscape features to have multiple names, some of which may only be known to certain *‘ohana* or even certain individuals within an *‘ohana*, and many have been lost, forgotten or kept secret through time. Place names also convey *kaona* (hidden meanings) and *huna* (secret) information that may even have political or subversive undertones. Before the introduction of writing to the Hawaiian Islands, cultural information was exclusively preserved and perpetuated orally. Hawaiians gave names to literally everything in their environment, including individual garden plots and *‘auwai* (water courses), house sites, intangible phenomena such as meteorological and atmospheric effects, *pōhaku* (rock, stone), *pūnāwai* (freshwater springs), and many others.

According to Landgraf (1994), Hawaiian *wahi pana* “physically and poetically describes an area while revealing its historical or legendary significance” (Landgraf 1994:v).

In a Hawaiian cultural worldview, a sense of place relies on keeping the integrity of the cultural landscape (Maly 2001). Historian Kepā Maly succinctly articulates this connection between a sense of place and the cultural landscape: “The integrity of the land- and ocean-scapes [landscape], and their sense of place depends upon the well-being of the whole entity, not only a part of it. Thus, what we do on one part of the landscape has an affect [*sic*] on the rest of it” (Maly 2001:2).

3.2.1 Nīnole (*Ahupua‘a*)

Nīnole literally translates as “bending” (Pukui et al. 1974:165). One *wahi pana* relates to the granddaughter of a cannibalistic *mo‘o* (lizard, water spirit), Kaikapū (Pukui et al. 1974:165). See Section 3.1.4 for an expanded story of the *mo‘olelo* of Kaikapū.

3.2.2 The Reproducing Stones of Kōloa Beach in Nīnole:

Perhaps the most famous *wahi pana* associated with the study area is that of the reproducing stones of Kōloa (Figure 12). William Ellis relates the following account, presumably from his brief visit there in 1824:

> We had not traveled far [from Hīlea] before we reached Nīnole, a Small village on the sea shore, celebrated on account of a short pebbly beach called Koroa [Kōloa], the stones of which were reported to possess very singular properties; amongst others, that of propagating their species.
>
> The natives told us it was a wahi pana (place famous) for supplying the stones employed in making small adzes and hatchets, before they were acquainted with the use of iron; but particularly for furnishing the stones of which the gods were made, who presided over most of the games of Hawai‘i. Some powers of discrimination, they told us, were necessary to discover the stones which would answer to be deified. [Ellis 1979:145]

Skinner (1900), in his review of ancient faiths of Hawai‘i, tells a similar story that may be derived from the Ellis account:

> Among these gods none are more curious than the stones of Kaloa [Kōloa] beach, Nīnole, Hawai‘i. The natives, who believed that they had sex, and propagated, chose male specimens for their household deities. In order to make sure whether or not they were really gods, the stones were blessed in a temple, wrapped in a dress, and taken to see a game of skill or strength. If the owner of the god won he gave to the piece of stone the credit for his victory and established it in his house; but if he lost, the stone was thrown aside. If the believer wanted to make sure of finding a god he would take a beach pebble of each sex, wrap the two in cloth, and put them away for a time. When they were brought back to the light a smaller pebble, the result of their union, was found with them. This grew, like an animal, until it was of a size to be blessed by the priests and formally declared to be a god. The original pebbles are of black trap, compact lava, and white coral. [Skinner 1900:183–184]

Figure 12. Photo of Kōloa Beach; *‘ili‘ili hānau* to the right mid-ground (CSH 2015)

3.2.3 Heiau

3.2.3.1 Ka‘ie‘ie Heiau

John F. Stokes was tasked with the job of surveying all the sites on Hawai‘i Island in 1906 (Stokes and Dye 1991:10). The Ka‘ie‘ie Heiau (pre-Christian place of worship) was noted to be situated at the edge of Pu‘u Ehu located on the west side of Nīnole Bay. The *heiau* is paved with *‘a‘ā* (rough lava) while the inside floor is comprised of beach pebbles, most likely from Kōloa Beach based on its close proximity. The *mauka* wall measured 7.5 to 8 feet (ft) in length and 4.5 ft in height; the *makai* wall at 4.5 to 6 ft in length and 5.5 ft in height; the north wall was approximately 9 ft in length and 5.5 ft high; and the south wall consisted of an entrance and measured 5 ft in length and 5 ft high (Stokes and Dye 1991:10).

The name Ka‘ie‘ie was thought to refer to the *‘ie‘ie* (*Freycinetia arborea*), an endemic woody vine used for the construction of fish traps and also considered to be one of five plants used on the *hula* altar (Pukui and Elbert 1986; Save Punalu‘u 2006).

3.2.3.2 Mokini Heiau

Mokini Heiau was said to be identical to Ka‘ie‘ie Heiau. However, the name was frequently heard in neighboring areas of Wai‘ōhinu and Honu‘apo. Stokes met with a resident of Nīnole who reported that they only knew of Ka‘ie‘ie Heiau (Stokes and Dye 1991:131).

3.2.4 Nā Puna Pūhau and Kauale (Springs)

Commonly known as Nīnole Springs, Pūhau was the Hawaiian name for the freshwater spring adjacent to Nīnole Fishpond (Kelly 1980:25). Occasionally, Nīnole Fishpond was also referred to Pūhau, as the spring fed the pond (Clark 1985:62). Pukui et al. (1974:192) translate the word to “icy springs” with *pū* being short for the term *puna* (spring).

To the east of Pūhau was another spring called Kauale. It was said to be a female spring and complemented Pūhau, which was the male spring of the area (Clark 1985:62–63).

3.2.5 Nīnole Fishpond

In 1868, a *tsunami* (Japanese for tidal wave) destroyed the homes along the Nīnole shoreline (Clark 1985:62). Eventually the homes were rebuilt. Near the shore of Kōloa Beach lies the Nīnole Fishpond, the brackish pond famous for its mullet (Clark 1985:62) (Figure 13). The pond is fed by Pūhau Springs and was sometimes referred to as Pūhau as well.

Historian and anthropologist Marion Kelly visited the Ka‘ū district dating from 1954. During her numerous *huaka‘i* (field trip) to Ka‘ū, she learned about the history of the area and conducted interviews with *kama‘āina*. She later documented her findings in a study called *Majestic Ka‘ū: Mo‘olelo of Nine Ahupua‘a* (Kelly 1980:22). She described the walls of Nīnole Fishpond appearing to be modest when she first saw the pond in 1954. However, David Malo’s writings indicate the Ka‘ū chief, Koihala, overworked the people of the *moku* (district) by building several fishponds with heavy stone walls (Malo 1951:202). Kelly suggests the original Nīnole Fishpond wall may have been much larger than what she observed in 1954. A massive *tsunami* hit the Hawaiian Islands on 23 May 1960 destroying Hilo Bay and killing 61 people in Hilo (History 2015). It is possible the *tsunami* affected other parts of Hawai‘i Island as well.

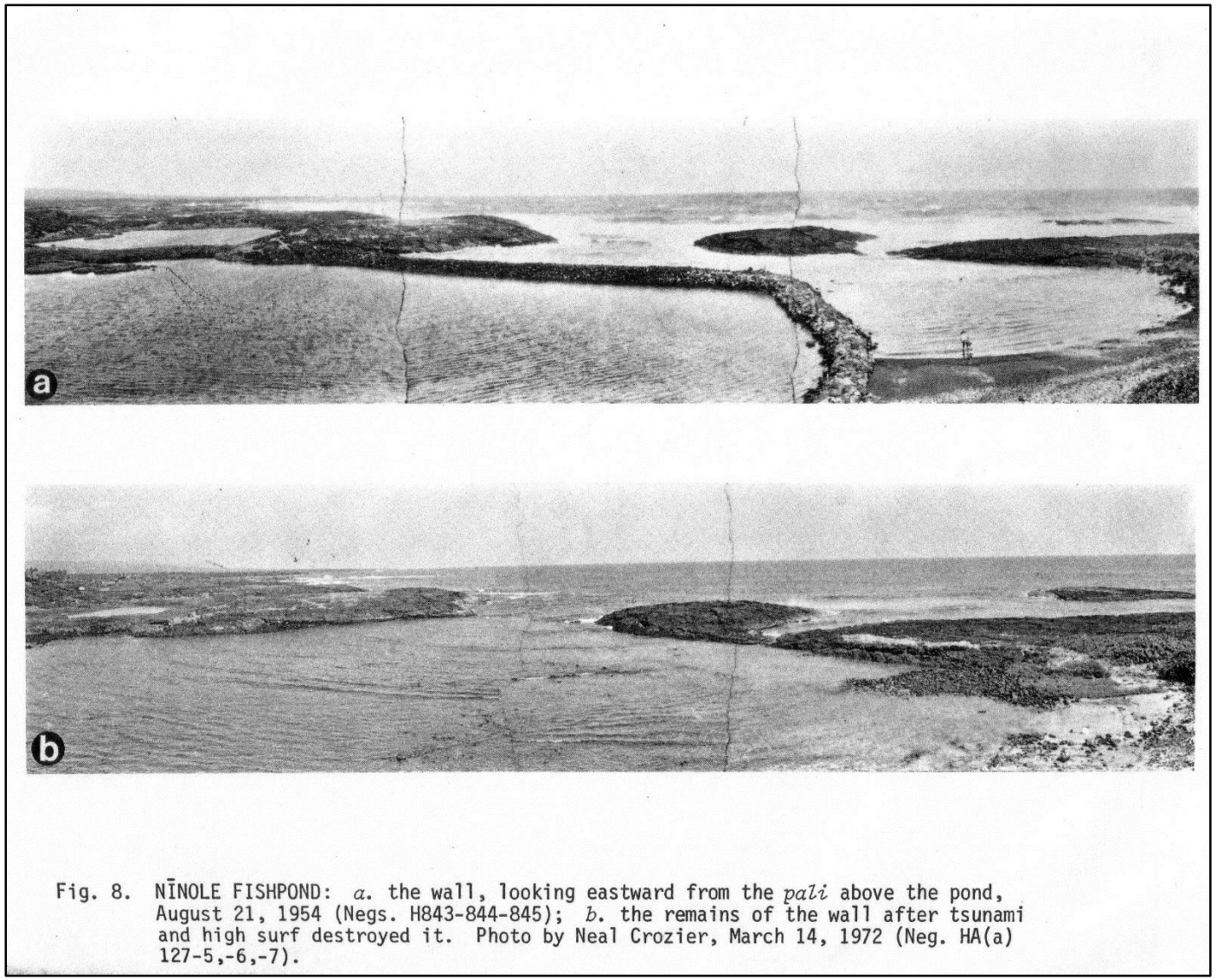

Fig. 8. NĪNOLE FISHPOND: *a.* the wall, looking eastward from the *pali* above the pond, August 21, 1954 (Negs. H843-844-845); *b.* the remains of the wall after tsunami and high surf destroyed it. Photo by Neal Crozier, March 14, 1972 (Neg. HA(a) 127-5,-6,-7).

Figure 13. Photo of Nīnole Fishpond (Hawai‘i County 2015)

3.3 *Wahi Pana* of Hīlea

3.3.1 Hīlea (Ahupua‘a)

Hīlea translates as “careless” (Pukui et al. 1974:45). The *ahupua‘a* is technically split into two: Hīlea Iki and Hīlea Nui. Hīlea Iki is the land section below Pu‘u Makanau and is closest to Nīnole Ahupua‘a. Hīlea Iki literally translates to “small Hīlea” (Pukui et al. 1974:45). Hīlea Nui is south of Hīlea Iki and literally translates to “great Hīlea” (Pukui et al. 1974:45). The 4,400-acre Hīlea Nui (LCA 9971) was awarded to Leleiohoku; the 2,015 acres Hīlea Iki (LCA 7715) to Lot Kamehameha.

3.3.2 Kāwā (Bay, Spring)

Kāwā Bay and springs can be found in Hīlea Nui Ahupua‘a. The name literally translates to “distance” (Pukui et al. 1974:96). In pre-Contact times, the Ka‘ū coastline boasted three famous surf breaks: Punalu‘u, Paiaha‘a, and Kāwā (Clark 1985:64). The waves are still surfed regularly, however, the break is known now as Windmills, named for the small windmill in a cattle pasture that was visible onshore. Fishermen also frequent this area (Clark 1985:64).

At the eastern edge of Kāwā Bay is a massive *‘a‘ā* flow where the ruins of Ke‘ekū Heiau stand. The *heiau* location captures the *makai* as well as the *mauka* landscape. Looking *mauka,* you can see the hill of Makanau (Clark 1985:65). A black sand beach with olivine rims part of Kāwā Bay, while the northeastern end of the beach consists of primarily *‘ili‘ili* (pebbles) and *pa‘alā* (cobblestones). The area scattered in *‘ili‘ili* and *pa‘alā* fronts a small brackish pond fed by Hīlea Stream (Clark 1985:65).

3.3.3 Ke‘ekū Heiau

Located on the point at the northeastern side of Kāwā Bay lies Ke‘ekū Heiau (Stokes and Dye 1991:128). This heavy walled enclosure consists of several platforms. The cliff the *heiau* stands on is approximately 30 ft, however, the southwest wall of the structure has been destroyed by the ocean. Stokes and Dye (1991:128) point out that one of the more interesting features of the *heiau* is the almost level, paved floor consisting of waterworn stones. Stokes and Dye continue their description as follows:

> It contrasts with the rough, broken stones of the walls and platforms. The floor has been raised 2.5 feet above the level of the ground outside. On the inside the walls are 6 feet high, and on the outside from 7 to 9 feet high.
>
> The inner portion of the northwest wall has been built as a bench 4 feet higher than the floor and 4.5 feet wide. In the north corner of the enclosure is a long platform 2 feet high, with a square pit, 1.5 feet deep, in the middle. This platform is said to have supported ‘the king’s house.’ South of this is a smaller platform a foot high. Adjoining the southeast wall is a small square platform 5 feet high, approached by two broad steps each 1.5 feet high. This platform is said to be the sacrificial altar (*kū‘aha*).
>
> In the south east corner and adjoining the *kū‘aha* is a pavement of beach pebbles a foot lower than the floor level. Two feet higher than the pavement and adjoining it on the northwest is a platform with its outer wall curved; it contains a stone-curbed

> pit 7 feet deep and 4 feet wide. The curved platform is a foot higher than the main floor. The *lele* is said to have been in the eastern corner.
>
> The platform adjoining the wall on the outside near the entrance is 2.5 feet high and that on the southwest 2 feet high. There was, it is said, a *kahua ho‘omaha* (platform for resting) in this vicinity.
>
> To the west of the temple proper and inside the sacred boundary are two other platforms, the larger in area 1.5 feet high and the smaller 6 feet high. They seem to have been joined by a wall to the west corner of the temple proper, but the lines were too indefinite to follow. North of the high and low platforms, near the entrance in the outer boundary, are two square pits 4 feet deep. The pit nearer the entrance is partly enclosed with a low wall. These are said to have been for the *ho‘okupu* [a Hawaiian ceremonial presentation of gifts formerly offered as tribute to a chief]. The ground to the northwest of the temple proper, while now much disturbed, seems to have been levelled off formerly. This has not been done, however, between the boundary wall and the temple proper on the northeast, the ground here being low and much broken. [Stokes and Dye 1991:128]

3.3.4 Fishponds

Ellis noted that the fishponds near Hīlea Village was “well stocked with excellent fish of the mullet kind” (Ellis 1963:142).

3.3.5 Makanau (*Pu‘u*)

Makanau is a *pu‘u* (peak) above Hīlea Iki, which literally translates to “surly eyes” (Pukui et al. 1974:141). It was also the site of Kohāikalani Heiau and later a plantation camp. Several *pu‘u* in Kaʻū Moku are connected to *mo‘olelo* including the Caterpillar of Kumuhea. The son of the god Kū, Kumu-hea, lives on Puʻuʻenuhe (“cut-wormhill”).

3.3.6 Makanau/Kohāikalani Heiau

Makanau/Kohāikalani Heiau is located on Puʻu Makanau, which overlooks Hīlea Iki Ahupuaʻa. The enclosure measured 4.5 to 5.5 ft in height on the inner walls. The exterior walls averaged 6.5 ft in height (Stokes and Dye 1991:130). A majority of the exterior walls of the *heiau* have been dozed along with all the interior features due to sugarcane cultivation (Stokes and Dye 1991:130). The entrance to the *heiau* was located in the southern corner and was supposedly built by Kaiawa and Kohāikalani. The latter was the king of Kaʻū Moku who was killed at his own *heiau*: Pukui et al. share a story in relation to the *heiau*:

> A *heiau* on the brow of the hill was named Kohā-i-ka-lani (resound in the sky) for the chief who ordered his men to carry the famous pebbles (*‘ili‘ili hānau*) from Puna-luʻu to be used in construction of the *heiau* so that it would be unique. After building the *heiau* the men were ordered to fell on an *‘ōhia* tree for an image; they then killed the chief. He was the grandfather of chiefs mentioned in the ʻUmi story. The *heiau* was later destroyed when sugarcane was planted there. [Pukui et al. 1974:141]

Kelly (1956) shares an account of the construction of Kohāikalani Heiau:

> All the men in the district were conscripted to transport stones from Kōloa Beach at Nīnole. They formed a human chain and passed the stones up to the site in baskets.
>
> The mana or efficacy associated with the stones of Kōloa may have made them particularly appropriate for inclusion within a *Heiau*. [Kelly 1956:37]

3.4 *Oli* (Chant)

3.4.1 Perch Perch from the People of Nīnole

This is a chant for *pala ‘ie,* a loop and ball game. It is chanted in rhythm as the game is played. The chant refers to the *‘io* (Hawaiian hawk; *Buteo solitarius*) bird perched high in the tree. This was passed down in oral tradition from the people of Nīnole. It was sung by Nā‘ālehu villagers and other villages of the district of Ka‘ū on the Big Island.

E kau, e kau e ‘io e epi‘i i wai no kā—u—a
I –he-a ka wai e pi‘i ai i uka wale o Nī—no—le
He a-ha ka lā‘au e kau ai ho ‘ōhi‘a la a he la-ma
O he-le ka hōkū ka mā-la-ma kau pū me ka mā-hi-na-hi-na
Nā wai ke ahi kau ‘u-i-‘u—i—ki nā Pe-le i Kī-lau—e—a.

Translation:

Perch, perch, o ‘io bird go up to get us water
Where is the water? In the upland of Ninole
On what shall I perch? On the ‘ohi‘a or the lama
As the star light brightens and the moon glows
What light is flickering above? It is Pele at Kilauea
E Kau, E Kau
(Perch, Perch) [Beamer 1982:10]

3.4.2 For Keoua Kuahu‘ula

Pukui relates the following:

> Many chants remain unchanged, however, in 1935, in a gathering of aged relatives, one chanted the dirge composed for our chief Keoua Kuahu‘ula. Although more than a century had passed since his death at Kawaihae, the old people still weep of the conqueror. We younger ones understand the feeling of our old folks, yet I believe there is none among us who bears any grudge against the man who became the supreme ruler of the islands. This is but a part of the dirge:
>
> *Ku‘u Haku i ka ua Ha‘ao e,*
> *Ke lele a‘e la ka ua mauka o ‘Au‘aulele.*
> *Lele ka ua, lele pu me ka makani,*
> *E lele po‘o ana i ka wai o kaha*
> *Kuu haku mai ka ua ha‘ule po‘o e.*

Translation:

My lord in the rain of Haao,
The rain flies fast,
Flies over the plain of Auaulele
The rain flies, driven by the wind,
The rain drives down the cliffs above.
The tears of my chief drop down on the heads of the people.
[Pukui 1949:256]

Padraic Colum, who came to Hawai‘i in 1923 to learn myth and folklore from those who still knew the old stories, relates a chant in the story “When the Little Blond Shark Went Visiting” from Thomas Thrum’s “Ka-ehu-iki-mano-o-puu-loa.” In the original printed version below from Thrum, we have the chant or *oli* where the father of Ka-ehu-iki gives him the names of famous King-sharks that his son will meet in his travels around the island of Hawai‘i and who will eventually travel with him to Tahiti before returning home.

Ka-panila, the king-shark of Hilo.
Kaneilehia, king-shark of Kau;
Kua, king-shark of Kona,
Mano-kini, king-dhark of Kohala,
Ka-pu-lena, king-shark of Hamakua. [Colum 1973:84; Thrum 1923:295]

Kane-i-lehia means the Kane skilled in fishing. In this story famous shark names are also given for places on Kaho‘olawe, Moloka‘i, O‘ahu, Kaua‘i, Ni‘ihau, and Kaula Islands.

3.5 *‘Ōlelo No‘eau* of Ka‘ū, Nīnole, and Hīlea

Hawaiian knowledge was shared by way of oral history, and many often competed in poetic battles of wit to see who could ascribe the most *kaona* to the simplest phrase. Mary Kawena Pukui is known to many as one of the greatest contributors to the preservation of the Hawaiian language, a scholar, and ethnographer. The following section draws from Pukui’s knowledge of Hawaiian folk tale, proverbs, and sayings to describe the *‘āina* in the project area. The *‘ōlelo no‘eau* is first described, then the Hawaiian is copied, then Pukui’s English translation is given.

3.5.1 *‘Ōlelo No‘eau* #773

He lono mamua, he kulina

mahope; kulikuli wale ka makani o Ka‘ū

Report went first, heedlessness followed; what a din the wind of Ka‘ū raised!

Pukui adds that this is from a chant for Kaumuali‘i of Kaua‘i [Pukui 1983:85]

3.5.2 *‘Ōlelo No‘eau* #1620

The following *‘ōlelo no‘eau* describes the natives of the *moku* of Ka‘ū who considered themselves as one *‘ohana*:

Ka‘ū lepo ‘ula‘ula.

Ka‘ū of the red earth.

Said of the natives of old Ka‘ū, who were one vast family. Because of pride in their own people and homeland, Ka‘ū people intermarried until they were of one blood and as one with their homeland. The *kauwā* were the only exceptions to this rule—they were despised and considered a people apart. [Pukui 1983:175]

3.5.3 *‘Ōlelo No‘eau* #1629

The proverb below describes the warriors who hail from Ka‘ū Moku:

Ka‘ū mākaha.

Ka‘ū of the fierce fighters.

The district of Ka‘ū, Hawai‘i, was known for its fierce and independent warriors. Kohāikalani, Koihala, and Hala‘ea, selfish and oppressive chiefs, were each destroyed by rebellious subjects. [Pukui 1983:176]

3.5.4 *‘Ōlelo No‘eau* #1630

The following proverb discusses the agricultural conditions of Ka‘ū and the difficulties the farmers faced there:

Ka‘ū malo ‘eka, kua wehi.

Ka‘ū of the dirty loincloth and black back.

The soil of Ka‘ū is not easy to till. The farmers there squatted on their haunches and worked the soil with short digging sticks. The sun darkened the backs of the workers. [Pukui 1983:176]

3.5.5 *‘Ōlelo Noeau* #1632

The *‘ōlelo no‘eau* describes the weather conditions of Ka‘ū Moku:

Ka‘ū nui kua makani.

Great Ka‘ū of the windblown back.

The wind always blows in Ka‘ū. [Pukui 1983:176]

3.5.6 *‘Ōlelo No‘eau* #731

The following *‘ōlelo no‘eau* describes the tiny pebbles found at Kōloa Beach in Nīnole Ahupua‘a.

Hele aku nei e ‘imi i ka ‘ili‘ili hānau o Kōloa.

Went to seek the pebbles that give birth at Kōloa.

Said of one who goes and forgets to come home. These pebbles were found at a small beach called Kōloa, in Punalu‘u, Ka‘ū. [Pukui 1983:81]

3.5.7 *‘Ōlelo No‘eau* #1404

The following *‘ōlelo no‘eau* describes the tiny stones found on the southeastern beach of Kōloa and the surf at Kāwā on the Big Island of Hawai‘i. The stones are used in a way similar to the

Spanish castanets, two stones are held in one hand and clapped together. This percussion instrument is used in the *hula*.

Ka ‘ili‘ili hānau o Kōloa; ka nalu ha‘i o Kāwā.

The reproducing pebbles of Kōloa; the breaking surf of Kāwā.

In Punalu‘u, Ka‘ū, is a small beach called Kōloa. The pebbles found here were believed to reproduce—the smooth ones being males and the porous ones, females. These were considered the best on the island of Hawai‘i for the *hula ‘ili‘ili*. Kāwā is just beyond Kōloa toward Honu‘apo. [Pukui 1983:152]

3.5.8 *‘Ōlelo No‘eau* #1030

The following *‘ōlelo no‘eau* poetically references a situational moment that reflected poorly on the people who hail from Hīlea. The proverb expresses carelessness.

Ho‘i i Hīlea, i kalo ‘eka‘eka.

Go to Hīlea of the dirty taro.

Said of a careless person. Once, Kohāikalani, a chief of Ka‘ū, was living at Punalu‘u. *Poi* was brought for him from various parts of the district, and a tiny speck of taro peeling was found in the *poi* from Hīlea. The makers of the *poi* were put to death. To say that someone hails from Hīlea is to say that he is unclean. [Pukui 1983:110]

3.5.9 *‘Ōlelo No‘eau* #2701

The following proverb is a seasonal marker for surfers, swimmers and boaters; it is most often cited just as “When the wiliwili tree blooms, the sharks bite,” but there is more—the second and final lines, which are not usually cited, add another layer of understanding when we see the *wiliwili* compared to a pretty girl.

Pu aka wiliwili nanahu ka manō;

Pua ka wahine u‘I nanahu

Ke kānāwai

When the wiliwili tree blooms,

The sharks bite; when a pretty

Woman blossoms, the law bites.

A beautiful woman attracts young men—sharks—who become fierce rivals over her. The law prevents the rivalry from getting out of hand—it can ‘bite.’ It is said that when the *wiliwili* trees are in bloom the sharks bite, because it is their mating season. [Pukui 1995:295]

3.6 *Mele*

The following section draws from the Hawaiian art of *mele*, poetic song intended to create two styles of meaning.

> Words and word combinations were studied to see whether they were auspicious or not. There were always two things to consider the literal meaning and the *kaona*, or ‘inner meaning.’ The inner meaning was sometimes so veiled that only the people to whom the chant belonged understood it, and sometimes so obvious that anyone who knew the figurative speech of old Hawaii could see it very plainly. There are but two meanings: the literal and the *kaona*, or inner meaning. The literal is like the body and the inner meaning is like the spirit of the poem. [Pukui 1949:247]

> The Hawaiians were lovers of poetry and keen observers of nature. Every phase of nature was noted and expressions of this love and observation woven into poems of praise, of satire, of resentment, of love and of celebration for any occasion that might arise. The ancient poets carefully selected men worthy of carrying on their art. These young men were taught the old meles and the technique of fashioning new ones. [Pukui 1949:247]

3.6.1 Ka Iwalani

Kaulana e ka holo a ka ‘Iwalani,
Ke ka‘upu hehi ‘ale a o ka moana.
‘Aole i ana iho ko‘u makemake.
I na ‘iwa‘iwa o ka uka o Ha‘ao.
I ahona Honu‘apo i ka lau niu,
I ka holu i ke ahe a ka makani.
Aia I Punalu‘u, ka‘u aloha la,
I ke kai kauhaa a ka ‘Iwalani,
E‘ike i ke kai malino a o Kona.
No Kona ka makani, he kula‘i pau,
Kiki‘i Kapakahi o ka ‘Iwalani.

Translation:

Well liked is the sailing of the Iwalani,
Moving like a sea eagle over the waves.
Endless indeed is my admiration,
For the maiden hair ferns of Haao.
Honuapo is made pleasant by the coconut leaves,
That sway with the wafting of the breeze.
Over at Punaluu is the one I love,
Beside the dancing sea, the delight of visitors.
Now the Iwalani is on its homeward way,
To the smooth sea of Kona.
To Kona belongs the gusty wind
That heels the Iwalani over to its side.

> The *Iwalani* was a ship that came with passengers and freight to the ports in Kau in the olden days, when my mother was a child. The captain was a handsome part-Hawaiian, well liked and quite a lady’s man. It was he who was referred to in the chant as the *Iwalani*, and not his ship. The maiden hair ferns were two beautiful girls that lived in Haao, and the coconut of Honuapo was none other than a very tall, slim girl who looked frail enough for the wind to blow about. The loveliest of all was the Punaluu girl, whom I remember as a fine looking old lady. On his return to Kona, his girl there heard of his friendship with the beauties of Kau and stormed in her wrath, hence the wind heeled the *Iwalani* over on its side. Every one of these Kau women was related to my mother. The *kaona* in this *mele* is concerned in veiling the characters even more that the happenings. [Pukui 1949:248]

3.6.2 Name Song for Kukake‘e:

There are some poems that have no inner meaning, and to read such meaning into them is folly. One of these is the *mele inoa*, or song of praise of our beloved *ali‘i* (chief), Kukake‘e.

‘Aole au i makemake ia Kona,
O Ka-‘u ka‘u.
O ka wai o Kalae e kahe ana i ka po a ao.
I ke kapa, i ka ‘upi i kekaha wai
Kulia i lohe ai he ‘aina wai‘ole
I Mana, i Unulau ka wai kali
I ka pona maka o ka i‘a ka wai aloha e,
Aloha i ka wai malama a kane
E hi‘i ana ke keiki i ke hokeo,
E hano ana, e kani ‘ouo ana,
Ka leo o ka huewai i ka makani
Me he hoene lua a ka ipu e o nei.
E lono i kou pomaika‘i, Eaia!
Mamuli o kou hope ‘ole, ‘oko‘a ka ho‘i,
A ma ke wa kamali‘i nei, mihi malu,
‘U wale iho no.
Aloha ‘ino no ka ho‘i ke kau mamua.
‘U‘ina ‘ino noho‘i ke kau i hala aku nei.

Translation:

I do not care for Kona,
For Ka-‘u is mine.
The water from Kalae is carried all night long.
(Wrung) from tapas and some from sponges.
This land is heard of as having no water,
Except for the water that is waited for at Mana and Unulau.
The much prized water is found in the eye socket of the fish,
The water prized and cared for by the man

The child carries a gourd container in his arms.
It whistles, whistles as the wind blows into it,
The voice of the water gourd is produced by the wind
Sounding like a nose flute at midnight,
This long-drawn whistling of the gourd, we hear.
Hearken, how fortunate you are!
There is no going back, (our) ways are different.
In childhood only does one regret in secret,
Grieving alone.
(Look) forward with love for the season ahead of us.
Let pass the season that is gone.
(From a name chant for Kukake‘e) [Pukui 1949:252]

Section 4 Historical Accounts

The following section provides a summary of the significant historical events within Nīnole and Hīlea Ahupua‘a. Focusing on geographic and temporal scales, this section traces the exploration of the Pacific Ocean and the subsequent delivery, settlement, and expansion into the Hawaiian archipelago. The historical background illustrates changes to the project area from the arrival of Captain Cook in 1778, the first western explorer to visit Hawai‘i through the present era.

4.1 Early Historical Figures (Foreigners)

4.1.1 Captain James Cook 1779

There are no western accounts specific to Nīnole in the eighteenth century and few references to Ka‘ū at all (briefly summarized below). Lt. James King, sailing off the island of Hawai‘i during the 1779 voyage of Captain James Cook, summarizes Ka‘ū at the first European encounter:

> The coast of Kaoo [Ka‘ū] presents a prospect of the most horrid and dreary kind: the whole country appearing to have undergone a total change from the effects of some dreadful convulsion. The ground is every where covered with cinders and intersected in many places with black streaks, which seem to mark the course of a lava that has flowed, not many ages back, from the mountain Roa [Mauna Loa] to the shore. The southern promontory looks like the mere dregs of a volcano. The projecting headland is composed of broken and craggy rocks, piled irregularly on one another, and terminating in sharp points. [King 1784:104]

The only onshore exploration at Ka‘ū involved a search for fresh water:

> When [Mr. Bligh] landed, he found no stream or spring, but only rain-water, deposited in holes upon the rocks; and even that was brackish, from the spray of the sea; and that the surface of the country was entirely composed of flags and ashes, with a few plants here and there interspersed. [King 1784:545]

4.1.2 Captain George Vancouver 1792

During Captain George Vancouver’s encounter with the island of Hawai‘i in 1792, his crew visited the Ka‘ū district; Thomas Heddington illustrated the upland village of Macacoupah (Makākupu) near present day Pāhala. The illustration shows thatched houses and extensive field systems (Figure 14).

4.1.3 Archibald Menzies 1794

A reference to neighboring Punalu‘u in the eighteenth century comes from Archibald Menzies in the course of his rather circuitous ascent of Mauna Loa in 1794. Leaving the uplands of Wai‘ōhinu and Honu‘apo and four to five miles from the sea the team stopped “at a plantation belonging to Kamehameha called Punalu‘u” but no details are given (Menzies 1920:187).

Lacking good anchorage and seemingly having little to offer, Ka‘ū was very much a backwater in terms of Western Contact in the first half of the nineteenth century.

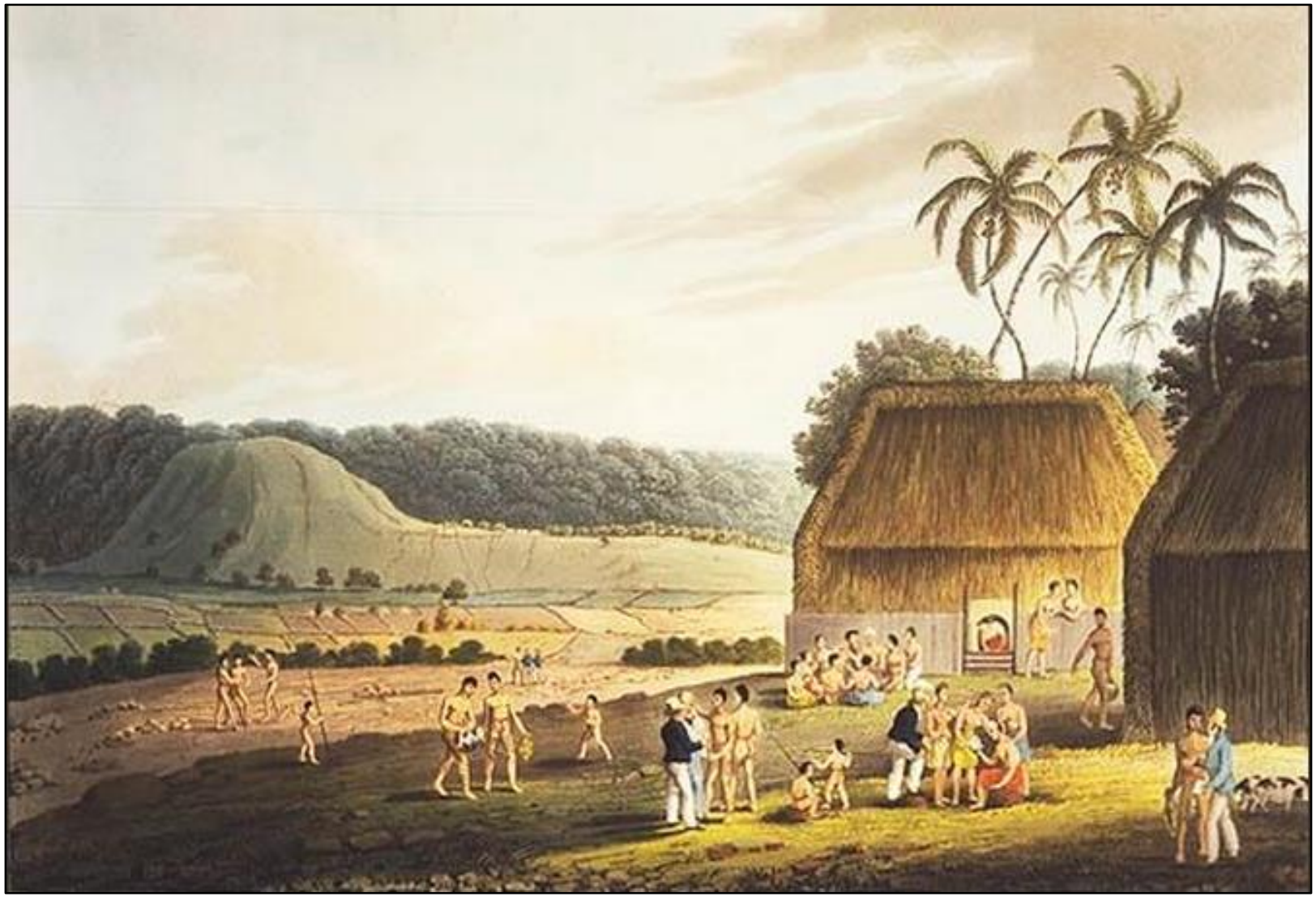

Figure 14. Village of Macacoupah, Owhyhee, drawn by Captain Thomas Heddington in 1792, published March 1814 (Heddington 1814)

4.1.4 Reverend William Ellis 1823

The first account of coastal Punalu‘u is from the Reverend William Ellis who passed through briefly in 1823. He approached Punalu‘u by way of Wai‘ōhinu upon which he waxed eloquent:

> Open towards the sea, and on both sides adorned with gardens, and interspersed with cottages, even to the summits of the hills.
>
> A fine stream of fresh water, the first we had seen on the island, ran along the centre of the valley, while several smaller ones issued from the rocks on the opposite side, and watered the plantations below.
>
> Our road, for a considerable distance, lay through the cultivated parts of this beautiful valley: the mountain taro, bordered by sugar-cane and bananas, was planted in fields six or eight acres in extent, on the sides of the hills, and seemed to thrive luxuriantly. [Ellis 1963:133–134]

Ellis's account confirms the upland luxuriance that had made the *ahupua‘a* of Wai‘ōhinu a center for the *ali‘i* of Ka‘ū. As Ellis continued his journey he moved closer to the coast—along the "foot of the mountains, in a line parallel with the sea, and about a mile and a half from it" (Ellis 1963:134)—and his journal illumines areas where western eyes had previously seen only a "prospect of the most horrid and dreary kind." Travelling toward Punalu‘u, Ellis found the countryside "more thickly inhabited [as his walk continued] . . . The villages along the sea shore, were near together, and some of them extensive" (Ellis 1963:136). Specific villages Ellis mentions include Honu‘apo, described as an "extensive and populous village" where more than 200 Hawaiians turned out for a sermon; Hōkūkano (Ka‘ū), possessing a freshwater spring; and Hīlea, the site of numerous fishponds and where the *konohiki* (headman of an *ahupua‘a* land division under the chief) reported "hogs, fish, taro, potatoes, and bananas in abundance." Ellis also notes the intervening broad stretches of rough *‘a‘ā* between the habitation areas; these flows had been made traversable by waterworn boulder paths. Ellis thus reveals the desolate coastline described 44 years earlier by James King was in fact the site of a well-populated, organically developed, active culture and economy where habitation centers, though isolated, were accessible to each other and to the resources of land and sea.

Ellis provides few details of the specific environs of Punalu‘u other than his account of the Kōloa stones quoted above. He mentions a small village on the seashore at Nīnole and then states,

> After traveling about two miles, we came to Punaruu [Punalu‘u], where the people of that and the next village, Wailau, collected together in a large house, and were addressed on the nature and attributes of the true God . . . we now left the road by the seaside, and directed our course towards the mountains. [Ellis 1964:146]

Missionary William Ellis left Honu‘apo on the morning of 30 July 1823 heading northeast up the coast. He recorded the following account:

> After travelling some time over a wide tract of lava, in some places almost as rugged as any we had yet seen, we reached Hokukano [of Ka‘ū]. Here we found an excellent spring of fresh water, the first we had seen on our tour, though we had traveled upwards of a hundred miles. While we were stopping to drink, and rest

> ourselves, many natives gathered around us from the neighbourhood . . . [they stop to preach]
>
> We traveled over another rugged tract of lava about two hundred rods wide. It had been most violently torn to pieces, and thrown up in the wildest confusion; in some places it was heaped forty or fifty feet high. The road across it was formed of large smooth round stones, placed in a line two or three feet apart. By stepping along on these stones, we passed over, though not without considerable fatigue. About half-past eleven we reached Hilea, a pleasant village belonging to the governor. As we approached it we observed a number of artificial fish-ponds, formed by excavating the earth to a depth of two or three feet, and banking up the sides. The sea is let into them occasionally, and they are generally well stocked with excellent fish of the mullet kind. We went into the house of the head man, and asked him to collect the people together, as we wished to speak to them about the true God. He sent out, and most of the people of the village, then at home, about two hundred in number, soon collected in his house, which was large . . .
>
> As we left Hilea, our guide pointed out a small hill, called Makanau, where Keoua, the last rival of Tamehameha, surrendered himself up to the warriors under Taiana . . . [the story of the subsequent assassination of Keoua is related]. [Ellis 1974:207–209]

4.1.5 Reverend John Paris 1842

During the 1830s, Protestant missionaries based in Kona and Hilo made occasional tours into Ka‘ū but a permanent missionary presence was not be installed until the early 1840s when Catholic and Protestant missions were established in the district. In 1841 a Catholic priest, Father Marechal, arrived in Ka‘ū and within a few months could boast of 900 converts. The following year, 1842, the Protestant minister John Paris settled in Wai‘ōhinu where he founded a church and school. Marion Kelly offers a good overview of the early mission work at Punalu‘u:

> In 1843, Rev. Paris reported that a stone meeting house (church) had been built at Punalu‘u and that the school’s average attendance there was 140. At that time Paris preached three Sundays each month at Wai‘ōhinu and one Sunday at Punalu‘u. By 1844, he reported the Sabbath school at Punalu‘u averaged 75 to 100 students—men, women and children. The average Sunday congregation at Punalu‘u was reported to be 350 [Station Report, Ms. (1843, 1844)] The Rev. T.D. Hunt, who had first gone to live in Wai‘ōhinu in 1844, moved to Punalu‘u in February 1845. An increase from 70 to 150 and to 180 in the congregation there was reported at that time. [Kelly 1980:33]

Mission station reports, censuses, and accounts by visitors to Ka‘ū document the changes to the district brought about by natural forces and by the pressures of an increasing western presence. A visitor to Wai‘ōhinu and its environs in 1849 published an anonymous account describing the devastating effects of a drought and fire that had occurred three years earlier:

> [W]e noticed many a tall, stately trunk, branchless and lifeless standing monument-like, all over the country. On enquiry we ascertained that they were the remains of a noble forest, which, with the whole surrounding country, were burnt in 1846. In

> that year a severe drought visited the Island, the streams dried up, the grass withered, and fire swept over the whole district . . . [Kelly 1980:89]

An 1831-1832 census of Ka‘ū, the first taken within the district, records a total population of 5,800. This number already reflects the district’s depopulation—the effect of newly introduced diseases, cultural unravelling and emigration to new commercial centers—but the full precipitousness of the population decline within Ka‘ū is revealed in the totals from subsequent censuses. In 1835 the total population was 4,766. The first official government census, taken in 1847, records the population as having dropped to 3,010. Reverend John Paris wrote in an 1848 mission station report: “Since the year 1845 the work of depopulation of Ka‘ū has gone on with fearful rapidity.” He notes during the years 1845 and 1846 a “distressing famine” and a “fire which overran the country”—the same disasters the anonymous visitor of 1849 mentioned. Another visitor to Wai‘ōhinu during the 1840s, Chester H. Lyman, was informed that a “like burning over of nearly the whole district, producing great distress among the inhabitants” had occurred in 1830 or 1831. By the time of the 1853 government census only 2,210 people are recorded in Ka‘ū.

4.2 Historical Figures (Indigenous)

4.2.1 Hala‘ea

Hala‘ea was a greedy chief who abused his fishermen and was killed by them (Kelly 1980:3).

4.2.2 Kohāikalani

Kohāikalani (“resounding-in-the-sky”) was an abusive chief of Ka‘ū who abused his laborers (Kelly 1980:4). In one version Kelly notes Kohāikalani built the *heiau* of his name and another version mentions Kaiawa. Puku‘i states this chief was “the grandfather of chiefs mentioned in the ‘Umi story.” In the story written by Z.P. Kalokuokamaile and translated by Pukui, Hīlea, Ka‘ū was the birth place of Koha-i-ka-lani (Hawaiian Ethnographic Notes, Vol. 2:147–148, Bishop Museum Library). See Section 3.3.6 for an expanded version of the *mo‘olelo* regarding the *heiau* Kohāikalani built.

4.2.3 Koihala

Koihala, an abusive chief from Ka‘ū, was killed because of his cruel ways of his people (Kelly 1980:22). According to historian David Malo, Koihala made the people of Ka‘ū Moku work vigorously constructing the walls of several fishponds near Hīlea and Nīnole. Marion Kelly points out that although the walls of Nīnole pond seemed modest when observed in 1954, there is a possibility that the original pond was much larger (Kelly 1980:22). Kelly points out there were similarities in leadership in Koihala and Kohāikalani where they both overworked their people and were eventually rebelled against (Kelly 1980:98).

4.2.4 Henry ‘Ōpūkaha‘ia

‘Ōpūkaha‘ia was a native of Nīnole, born in 1792. In 1796, while Kamehameha I was on O‘ahu attempting to invade Kaua‘i, the chiefs of Ka‘ū under Nāmakehā were planning to rebel against Kamehameha. As soon as Kamehameha heard of the rebellion he returned to Ka‘ū and his warriors killed all the rebels and their families. ‘Ōpūkaha‘ia’s entire family was killed. He fled Nīnole with his baby brother on his back when a warrior caught up with him. ‘Ōpūkaha‘ia’s life was spared, but not the baby’s life. ‘Ōpūkaha‘ia was taken to Kohala as a captive, but was able to meet his maternal uncle, a priest at Hikiau Heiau in Kealakekua. He was able to meet with his uncle, Paha,

however, ‘Ōpūkaha‘ia was not free to leave Hikiau Heiau. He boarded the *Triumph* three different times in Kealakekua Bay and asked to sail. Captain Bricknell agreed after ‘Opūkaha‘ia’s uncle and grandmother approved. ‘Ōpūkaha‘ia had a young Hawaiian mate aboard ship, Thomas Hopu, who knew some English and helped ‘Ōpūkaha‘ia. They sailed to North America and converted to Christianity. ‘Ōpūkaha‘ia died in Cornwall, Massachusetts (Cook 2015:175).

4.2.5 Kuluwaimaka

Kuluwaimaka was a chanter for Queen Emma and later performed and taught in Waikīkī. “He does not seem to have performed it with *pahu* or with *hula* movements” (Kaeppler 1993:27). James Palea Kapihenui Kuluwaimaka was perhaps the greatest chanter of the late nineteenth and early twentieth centuries. According to Theodore Kelsey, Kuluwaimaka’s great-grandfather was very close to Kamehameha I and fought with the warrior chief in battles at Hāmākua and Hilo Palikū. Kelsey calls Kuluwaimaka “a singing man... [He] chanted for Queen Emma. She retained him and after her death he became chanter to King Kalākaua, and after Kalākaua’s death he retired to his home and married three times to professional hula women” (Tatar 1982:iii).

4.2.6 Mary Kawena Pukui

Mary Kawena Pukui was a scholar, educator, dancer, composer, and writer. She was a pioneer in the revitalization of Hawaiian culture and language. Her father, Henry Nathaniel Wiggin, was from Salem, Massachusetts and her mother was Mary Pa‘ahana Kanaka‘ole Wiggin. Born in Ka‘ū, she was a *hānai* (foster child) to her grandmother, Nali‘ipo‘aimoku, a dancer in the court of Queen Emma and her grandfather, Keli‘ikanaka‘ole-o-Haililani, was a traditional healer. Her grandparents taught her the Hawaiian language, which included numerous *oli*, *‘ōlelo no‘eau*, and *mo‘olelo* (Pukui and Green 1995:ix).

4.3 The Māhele and the Kuleana Act/Land Commission Awards

To try to maintain sovereignty over the land, the *mōī* (king, sovereign) Kauikeaouli (Kamehameha III) in 1846–1848 supervised the Māhele—the division of Hawaiian lands—that transformed the land system in Hawai‘i from collective to private ownership. Modeled after western concepts, Crown Lands were to be reserved for himself and the royal house, Konohiki Lands were claimed by *ali‘i* and their *konohiki* (supervisors), and Government Lands were set aside to generate revenue for the government. In 1850, these three categories of land were subject to the rights of the *maka‘āinana* (commoners) and other tenants (naturalized foreigners, non-Hawaiians born in the islands, or long-term resident foreigners), who could make claims for their habitation and agricultural plots, known as *kuleana* (Native land rights) parcels (Chinen 1958:8–15).

Under the Kuleana Act of 1850, the *maka‘āinana* were required to file their claims with the Board of Commissioners to Quiet Land Titles (Land Commission) within a specified time period in order to apply for fee-simple title to their lands. The claim could only be filed after the claimant arranged and paid for a survey, and two witnesses testified that they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land since 1839, and knew that no one had challenged the claim. Then, the *maka‘āinana* could present their claims to the Land Commission to receive their Land Commission Award (LCA) (Kame‘eleihiwa 1992).

Not everyone who was eligible to apply for *kuleana* lands did so and not all of those claims filed were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. In addition, some *maka‘āinana* may have been reluctant to claim *‘āina* (land) that had been traditionally controlled by their *ali‘i*, some may have not been familiar with the concept of private land ownership, and some may have not known about the Māhele, the process of making claims or the strict deadline for making claims. Further, the Land Commission was comprised largely of foreign missionaries, so the small number of claimants and awards may reflect only those *maka‘āinana* who were in good standing with the church (Kame‘eleihiwa 1992:296–297). Significantly, the surveying of the land was not standardized.

A total of 14,195 claims were filed and 8,421 awards were approved to about 29% of the 29,220 adult Native Hawaiian males living at the time of the Māhele, averaging 3 acres each (Kame‘eleihiwa 1992:295). Out of the potential 2,500,000 acres of Crown and Government lands, 28,658 acres of land were awarded to the *maka‘āinana*, less than 1% of the total acreage of Hawai‘i (Kame‘eleihiwa 1992:295). The small number of *kuleana* awards and their small size were significant enough to prevent the *maka‘āinana* from maintaining their independent subsistence lifestyle (Chinen 1958:32).

Although many Hawaiians did not submit or follow through on claims for their lands, the distribution and written testimonies of Land Commission Awards (LCAs) can provide insight into patterns of residence and agriculture. Many of these patterns probably had existed for centuries. Examination of the patterns of *kuleana* LCA parcels in the vicinity of the project areas can show the likely intensity and nature of Hawaiian activity in the area.

A total of 91 awardees received lands (total 528.58 acres) in the seven *ahupua‘a* of Ka‘ū. Land Commission Awards of Kuleana Lands were given primarily in two clusters with the exception of recipients Moa, Maluae, and Keawe. According to Marion Kelly in *Majestic Ka‘ū: Mo‘olelo in Nine Ahupua‘a*:

> All the rest of the kuleana within the two Hīlea ahupua‘a were grouped around the site of what later became the old Hīlea mill (1878), along the mauka [inland] road, or around the base and on top of Makanau hill. Most of the seaward portion of the two Hīlea consisted of a large aa lava flow, which stretched from Kāwā Bay to Nawaihonaīnole at the coastline. [Kelly 1980:62]

The 4,400-acre Hīlea Nui (LCA 9971) was awarded to Leleiohoku. The 2,015 acres of Hīlea Iki (LCA 7715) was awarded to Lot Kamehameha. And Nīnole was given to the Government by Lunalilo (Kelly 1980:51) with no amount of land specified. She also notes that Nīnole was “turned over to the Hawaiian Government in lieu of commutation fees” (Kelly 1980:ix).

Only one of the LCA parcels in Hīlea is located within a 0.8-km (0.5-mile) radius of the study area (Figure 15). This award of Kuleana Land, LCA 9225 B to Keawe contains one *mo‘o* (narrow strip of land) and one *kīhāpai* (cultivated patch or small farm).

The Wright map of 1907 (Figure 17) shows both LCAs and Land Grants, the old Government Road near the upland LCAs and does not show the Belt Road of our project area (Figure 16). The Brown 1885 map shows the Land Grants (Figure 18).

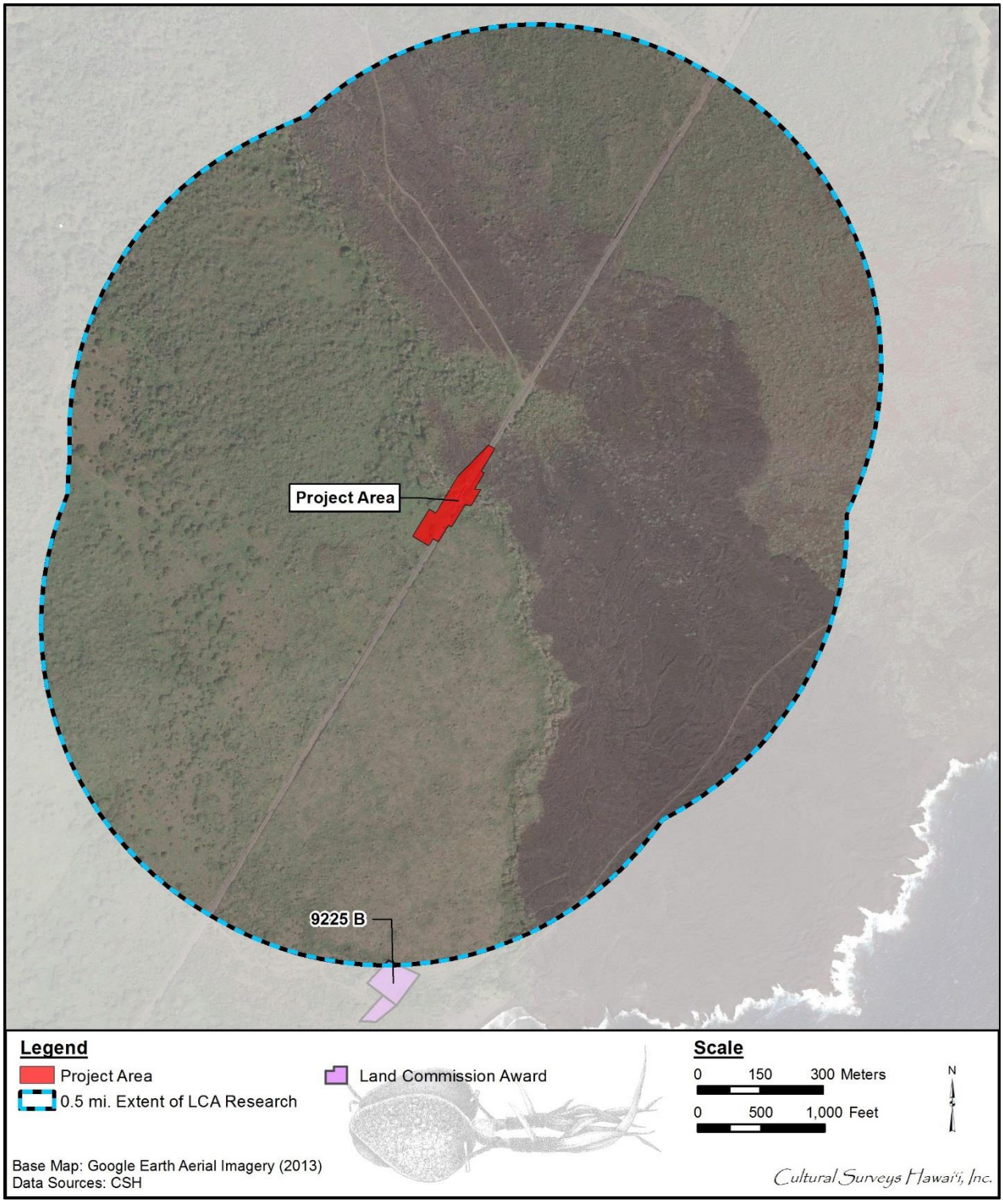

Figure 15. LCAs in the vicinity of the Hīlea Bridge project area

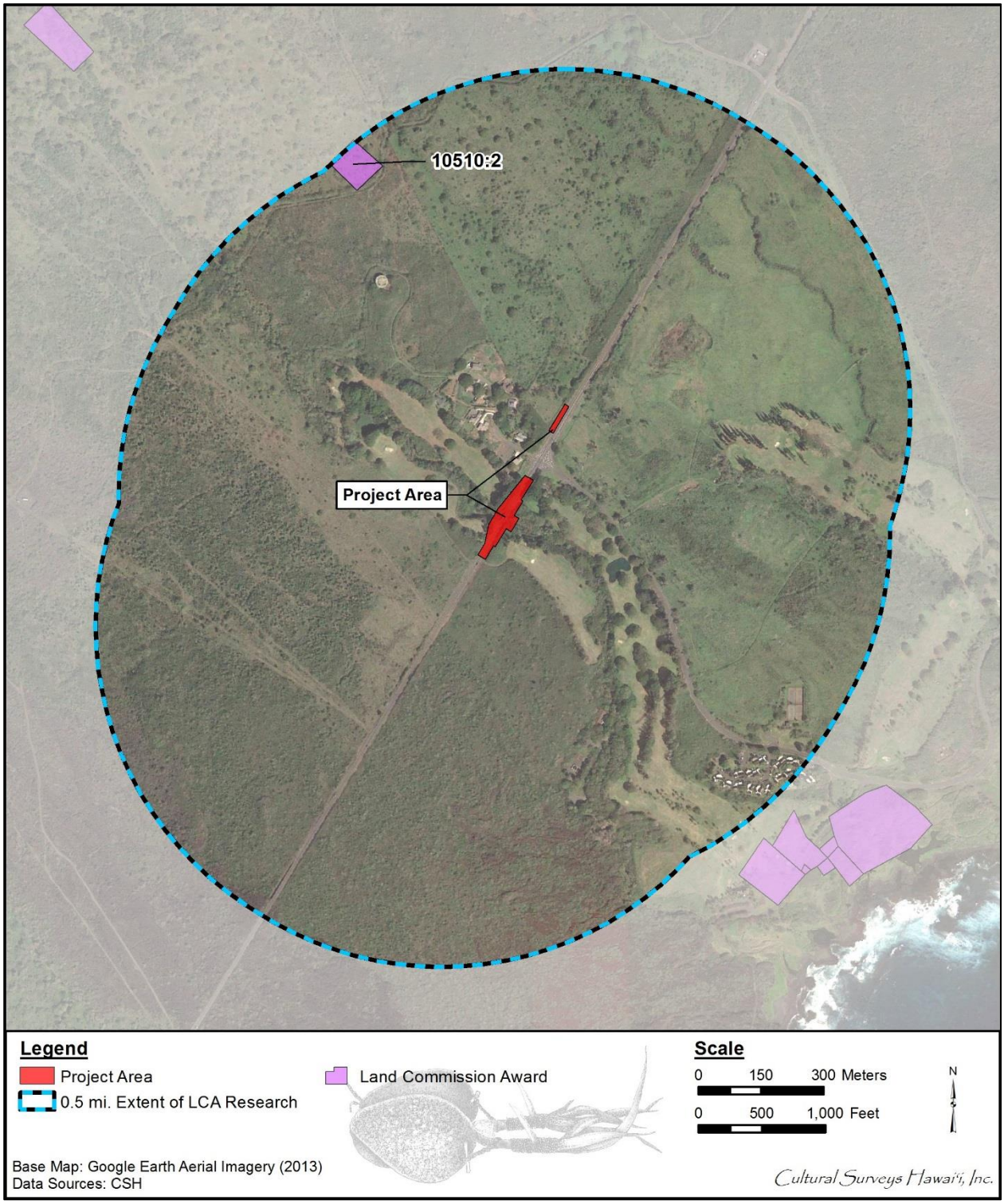

Figure 16. LCAs in the vicinity of the Nīnole Bridge project area

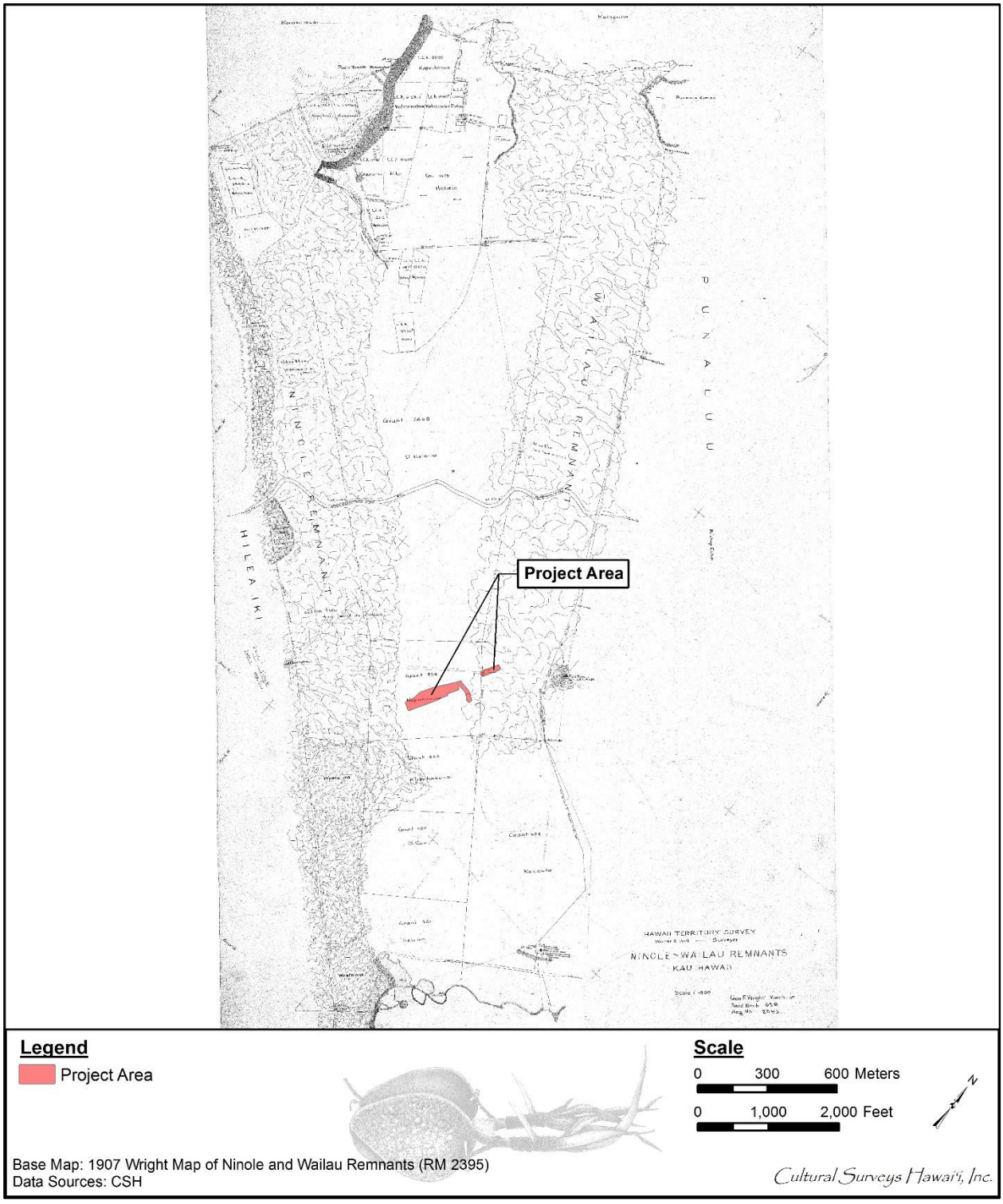

Figure 17. 1907 Wright map of Nīnole and Wailau remnants

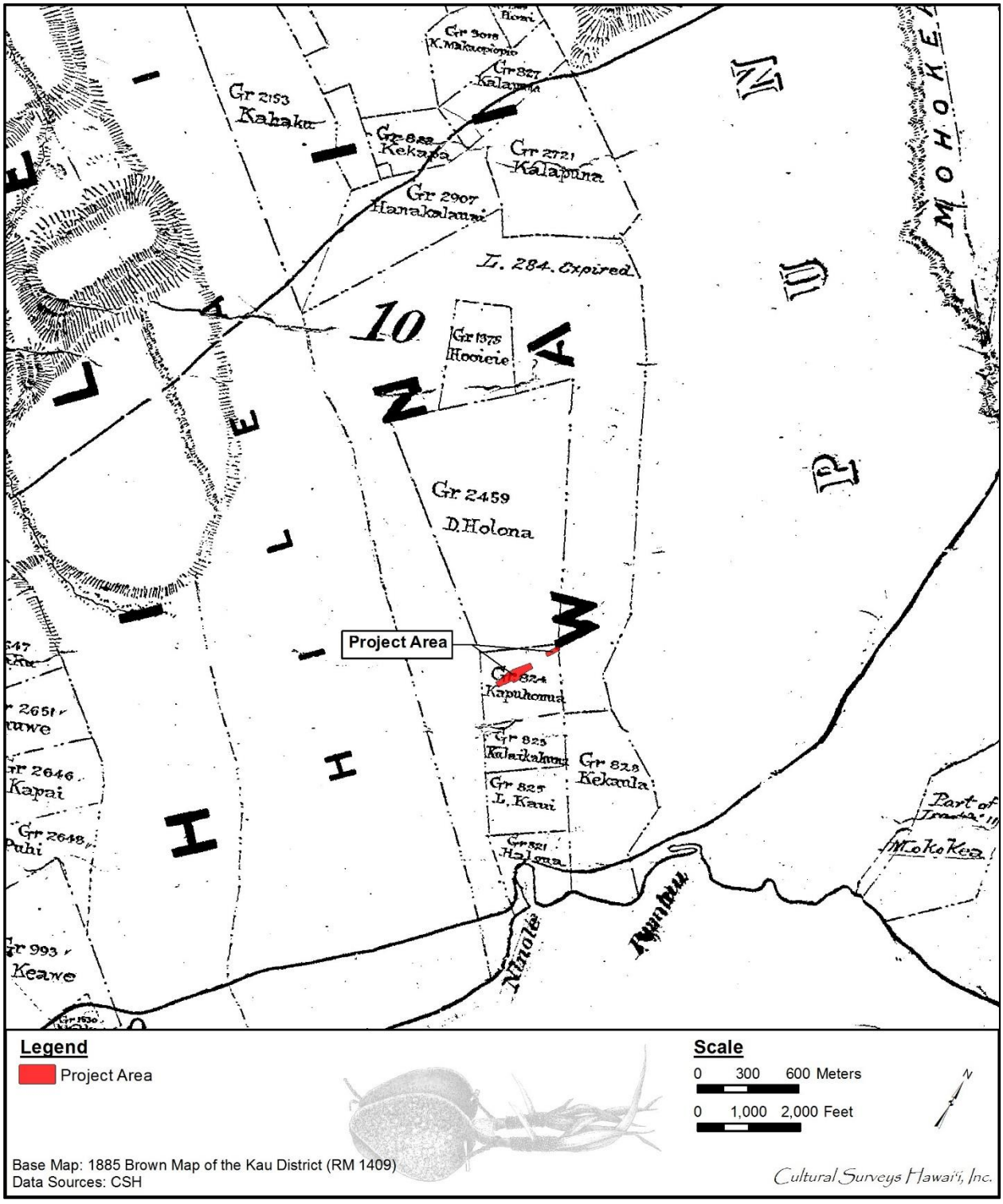

Figure 18. 1885 Brown map of the Ka‘ū District with Nīnole project areas covering Land Grant 824 and a corner of Grant 2459

There appears to have been only one Land Commission Award within a 0.8-km (0.5-mile) radius of the Nīnole study area (see Figure 16). LCA 10510:2 was awarded to Nawali. Testimony by Nawali mentions taro, pumpkin, sweet potatoes, a house lot, *olonā* (*Touchardia latifolia*), and an *umu ʻōhua*, a pile of rocks placed in the sea to attract young fish.

4.3.1 Land Use

In Nīnole, among the 29 claimants, 20 received Land Commission Awards. Charles Kanaina, Asa Kaeo, and W.C. Lunalilo claimed Nīnole among many other lands. Also, the amount of land in Nīnole was never defined. Today Nīnole is combined with Wailau and Ka‘a Ahupua‘a with 36,604 acres. Ordinary claimants differed in how they designated their taro crops, some said *mo‘o* taro, some said *mala* (garden) taro, and some said *kīhāpai* (cultivated patch) taro. Claimants sometimes said fields. If the claimant used a specified crop with *kihapai* it is counted as that crop for the purposes of showing the variety of crops. Often *kihapai* is used alone without mentioning what kind of crop or multi-uses it might have. A few times a claimant said a *mo‘o* and explained that it would include a *kīhāpai wauke* (paper mulberry; *Broussonetia papyrifera*). Given the fluidity of the meanings, we have done our best to show the variety of crops being raised.

Whether or not a claim was awarded, it is probable that all those who claimed land tilled it. And there would have been some who did not claim their lands for various reasons. Thus, the resulting table of crops is probably somewhat underestimated. “Most of sthe seaward portion of the two Hīlea consisted of a large as lava flow” (Kelly 1980:82). Nīnole land surrounds Wailau and continues *mauka*. No acreage has been recorded. Kelly did note that most parcels were approximately a mile or more inland (Kelly 1980:82).

Table 1. Nīnole and Hīlea land use

Nīnole Land Use from Claims	**Total of Nīnole Claims**	**Hīlea Land Use from Claims**	**Total of Hīlea Claims**
House lot	10	House lot	6
Pond	2	Pond	1
Pig pen	1	Pig pen	0
Mo‘o, *mala* or *kīhāpai* taro	41	*Mo‘o*, *mala* or *kīhāpai* taro	9
Kīhāpai, unspecified crop	42	*Kīhāpai*	44
Mo‘o, unspecified crop	19	*Mo‘o*, unspecified crop	14
Wauke	8	*Wauke*	4
Olonā	7	*Olonā*	0
‘Ohe	1	*‘Ohe*	0

Nīnole Land Use from Claims	Total of Nīnole Claims	Hīlea Land Use from Claims	Total of Hīlea Claims
Field, unspecified crop	5	Field, unspecified crop	9
Sugarcane	2	Sugarcane	0
Banana	1	Banana	1
Lauhala	1	*Lauhala*	0
Sweet potatoes	9	Sweet potatoes	3
Pumpkin	1		
Passenger basin	1		

4.3.2 Land Grants (1852-1915) in Nīnole

There were no early Land Grants in Hīlea ‘Iki and Hīlea Nui. However, there were 31 grants for land in Nīnole between 1852 and 1915. The early grants in 1852 averaged about 46 acres per grantee. Three large grants for 111.5, 157, and 290 acres were purchased between 1856 and 1859. The 19 grants issued between 1879 and 1915 are for Nīnole/Wailau homestead lands, and these averaged about 17 acres each. Presumably these included homes and gardens and perhaps pasture land. The grants spanned *makai* to *mauka.*

The 1885 Brown map of the Ka‘ū District depicts two land grants within the study area (see Figure 18). Grant 2459 included 290 acres to D. Holoua/Holona/Holowa. Grant 824 included 48.75 acres to Kapohonua (see Appendix C).

Grant 824 to Kapuhonua in 1852 lies on all sides of the Nīnole Bridge totaling 48.75 acres. The Nīnole Gulch flows beneath the bridge and has had repeated flood incidents. The grant description starts at Kekaula’s fence on the northwest and goes to a cairn boundary marker. Along the south side is an *‘a‘ā* lava flow. Turning to the east we reach the western corner of Kulaikahuna’s land and then go along his fence to the beginning. The mention of fences would suggest there were cattle to keep either in or out.

Only a corner of Grant 2459 to Holoua/Holowa meets the project area. The grant states that along one side is a boundary of a stone ridge and there are *ahu* or cairns or stone mounds along Government property and then those of Hooieie and of Holawa.

4.4 Nineteenth Century Historical Accounts

4.4.1 1868 Earthquakes and Eruptions

Life in Ka‘ū during the 1860s was further disrupted and devastated by the forces of nature. In March 1868 a sequence of major earthquakes and eruptions of Mauna Loa began that resulted in many deaths and loss of property and livestock. These disasters were only a prelude to an earthquake in early April that precipitated a tidal wave that destroyed coastal villages, dislodged a cliff side at Kapāpala that blanketed the land below and buried a village, and that opened the Great Crack at Kīlauea, emptying the crater’s lava lake into Keauhou. A subsequent lava flow, this time

at the west side of Ka‘ū, buried all of Wai ‘Ahukini Valley. Reverend Paris reported on “the earthquake and the tidal wave destroying the villages from Punalu‘u to Ka‘alu‘alu.” (Handy and Pukui 1958:240).

4.4.2 The Great Ka‘ū Earthquake of 2 April 1868

A volcanic eruption from Mauna Loa caused much devastation in Ka‘ū in 1868. The initial eruptions began in late March and “destroyed a large stone church at Kahuku, and also all the stone dwelling houses in that place, including the houses . . . at the foot of the mountain” (Coan 1868: 106). In early April another eruption occurred. Fredrick S. Lyman, who witnessed the eruption first hand, wrote the following:

> Soon after four o’clock p.m. on Thursday we experienced a most fearful earthquake. First the earth swayed to and fro from north to south, then from east to west, then round and round, up and down, and finally in every imaginable direction, for several minutes, everything crashing around, and the trees thrashing as if torn by a hurricane, and there was a sound as of a mighty rushing wind. It was impossible to stand: we had to sit on the ground, bracing with hands and feet to keep from being rolled over . . . we saw . . . an immense torrent of molten lava, which rushed across the plain below . . . swallowing everything in its way;—trees, houses, cattle, horses, goats, and men, all overwhelmed in an instant. This devouring current passed over a distance of about three miles in as many minutes, and then ceased. [*Hawaiian Gazette* 1868:109]

A *tsunami* was generated within minutes of the initial quake extending as far as 150 yards inland (Sinoto and Kelly 1970:51). Coan (1868:316) reported that the wave destroyed 108 houses in Ka‘ū and drowned 46 people. However, Mann and Bowen (1976) state that other reports claim 201 houses were destroyed, 77 lives lost, and nearly 4,000 animals killed. A 29 April 1868 letter from the School Inspector-General published in the *Hawaiian Gazette* states that the village of Kāwā in Hīlea was destroyed, causing many to move inland. Frederick Lyman, after seeing the devastation, reported that “the villages on the shore were swept away by the great wave that rushed upon the land immediately after the earthquake. The eruption of earth destroyed 31 lives, but the waves swallowed a great number” (*Hawaiian Gazette* 1868:110). A massive landslide also occurred in Hīlea as a result of the eruptions. “This earthly eruption is said to be four to fifteen feet deep, and the disgorgement was so rapid that thirty people . . . were crushed, and all the houses of the village buried from sight” (Coan 1868). A report by William Hillebrand in the *Hawaiian Gazette*, 6 May 1868 states,

> From the upper road from Kapapala to Waiohinu (the lower road has been rendered impassable by the encroachments of the sea), several minor land slides were observed on the hills; most houses were injured more or less; no stonewall remained anywhere. All the people from near the beach had taken refuge on higher lands near the upper road. My professional services were called for by many people who had been injured by the great oceanic earthquake waves. The great wave rose to a height of 25 feet, and according to reliable information, portions of the coast-line have subsided considerably. In some places cocoanut trees formerly out of water are now a foot deep in the sea. Every village along the coast of Kau and part of Puna has been swept away. The whole population of Waiohinu I found encamped on a high

> hill to the east among the ferns. From two to three hundred people had lived there for two weeks under the scanty shelter of huts made of mats, fern and ki leaves, and could not find it in their hearts to return to their houses and field. Their crops, which before had already suffered from long continued drought, were being invaded by the cattle, no fences remaining to protect them. It is much to be feared that the calamity of a famine will visit the smitten district in addition to the disaster suffered already. [Hillebrand 1868]

Apparently great natural disasters could not hinder the pace of foreign business interests in Ka‘ū. In 1868, the same year as the great earthquake, Alexander Hutchinson established the Naalehu Sugar Company and built a mill at that town. More enduring commercially than either wheat or *pulu*, sugar cultivation became the major industry within Ka‘ū, appropriating the focus of life in the district.

4.4.3 Cattle Ranching

Already at the middle of the nineteenth century imported livestock roaming freely throughout pasturelands of Ka‘ū were creating new aggravations. Organized cattle ranching, however, was focused at Kapāpala, Kahuku, and Ka‘alu‘alu at some distance from Nīnole. New industry required better paths and a harbor. In the 1850s Rev. Henry Kinney (cited in Kelly 1972) commented on the “hundreds of goats salted and dried” as well as “upland taro, potatoes and onions” which previously had to be hauled “on the backs of men” overland to Hilo and which could now be taken to the harbor at Ka‘alu‘alu and shipped.

While raising cattle and other livestock were significant elements of the new western economic focus imposed upon Ka‘ū during the nineteenth century, agriculture had the most extensive impact on the land and people. Among new agricultural pursuits attempted in Ka‘ū was wheat growing:

> But it proved difficult to co-ordinate the size of the wheat crop with the requirements of the flour mills; difficult also to coordinate the output of the mills with the demands of the market, domestic and foreign. The business did not become a permanent one. [Kuykendall 1953:150]

Contributing to the failure of wheat production was the harvesting of *pulu*—tree fern fiber used for stuffing mattresses and pillows—which during the 1860s constituted the major export crop from Ka‘ū. A Mission Station Report of 1860 relates the ruinous effect upon the native population of participation in the *pulu* trade:

> The effect—on them—is not good; not that the *pulu* is not a source from which they might secure comfort to themselves and families, but the actual result is the reverse. They are offered goods to almost any amount, to be paid for in *pulu*; this to a native is a strong temptation to go into debt. Consequently many of them are deeply in debt and almost all to some extent. The policy of the traders is to get them in debt and to keep them there so long as possible . . . [T]hey are almost entirely under the control of their creditors, and are compelled to live in the *pulu* regions, at the peril of losing their houses and lots, and whatever other property they may possess. Thus their homes are almost in reality deserted, ground uncultivated. [Shipman 1860]

4.4.4 The Sugar Industry in Ka‘ū

The Hawaiian Agricultural Company was established in Pāhala in 1876 by a consortium of Honolulu businessmen and used Punalu‘u as its port. A decade later the company controlled almost 10,000 acres of cane land and constituted the largest plantation in the Hawaiian Islands.

Change within the Ka‘ū district during the remainder of the nineteenth century and into the twentieth century centered around the activities of the two sugar operations, Hutchinson Sugar Plantation and the Hawaiian Agricultural Company. Wharves for shipping the sugar were constructed at Punalu‘u and Honu‘apo. The railroad from Punalu‘u to the village of Keaiwa was reported in June 1878 to be “the first railroad in these islands” but Condé and Best (1973:29) note that “no locomotive was to appear on the railroad for several years . . .” The terrible drought of 1876 to 1877 and an invasion of leafhoppers set the sugarcane industry of Ka‘ū back. An interesting system developed for this engineless track in which “[t]he Pāhala sugar is sent to Punalu‘u, its shipping port, on tramway cars propelled from the mill by gravitation, and hauled back the intervening five miles by mules” Condé and Best (1973:29). This system may have lasted until 1895. By the mid-1880s Punalu‘u had storehouses, a restaurant, a store, and numerous homes constructed of lumber.

Most remarkable upon the physical landscape must have been the systems of flumes and railways for transporting the cut cane from fields to mills. Railway lines ran from Na‘alehu and Hīlea to Honu‘apo and from Punalu‘u to Pāhala. The railroad line from Punalu‘u to Pāhala (dating to 1878) was straightened out and realigned multiple times (1896 and 1902) and was changed from a 2-ft gauge to a 3-ft gauge ca. 1903. Railroads continued to operate in Ka‘ū until the 1940s but the Pāhala–Punalu‘u railroad was discontinued in 1929. In 1931 Punalu‘u remained a vibrant community just back from Punalu‘u Bay but soon after this community, which had existed from pre-Contact times and had been resurrected by the sugar trade and use of Punalu‘u as a major harbor, went into significant decline due to discontinuation of the railroad.

The sugar companies also altered the social landscape of Ka‘ū. During the 1870s, Chinese laborers were brought in by Alexander Hutchinson; by the time of the 1884 government census there were 568 Chinese in the district. Japanese laborers were imported beginning in the latter 1880s and Filipinos began arriving during the first decade of the twentieth century.

Kelly (1980:16) provides a synopsis from the *Hawaiian Kingdom Statistical and Commercial Directory of 1880-1881* (Bowser 1880) listing three sugar planters at Hīlea (Table 2).

Table 2. Sugar planters located in Hīlea Ahupua‘a

Name	Occupation	Address	Acres	Acres Cultivated	Owner or Renter
Apiki	Sugar planter	Hīlea	10	Pasture	Owner
Hilea Sugar Plantation and Mill	Sugar planter	Hīlea	5,000	--	Owners
Hilea Plantation and Sugar Mill	Sugar planter	Hīlea	20,000	500	Renters

Kelly (1980:16) also makes reference to two independent or contributory planters at Hīlea: N.C. Haley and William H. Lewis. Whether these were connected with the Hilea Sugar Plantation and

Mill and/or the similarly named Hilea Plantation and Sugar Mill is unclear. Kelly (1980:106, drawing upon the Bowser 1880 account) provides the following summary of the Hilea Sugar Mill:

> The Hilea Sugar Mill and Plantation, Hilea. J.S. Walker, C.M. Spencer, and W.G. Irwin, proprietors; manager, Capt. O.B. Spencer. Owns 500 acres, rents 20,000 acres, available for cultivation 3,000 acres, employs 110 men; agent is W.G. Irwin & Co. Owns 40 yoke oxen, 16 horses and mules, 50 jackasses and 2,000 goats. A large mill is in the course of erection, with all modern improvements . . . will be ready about next October [1881]. [Kelly 1980]

Regarding the goats, Kelly (1980:17) notes, “In the early days of growing cane, some of the plantations raised large numbers of goats, mostly for their hides.” A track connected the mill at Hīlea to Honu‘apo Harbor.

The Hilea Plantation was purchased by the Hutchinson Sugar Plantation in 1890, and the mill at Hīlea was gone by 1907. The 1921 Naalehu and Punaluu USGS topographic quadrangles show the Hutchinson Plantation with Volcano Road and a narrow gauge railroad (Figure 19). There are several structures located at the base of Makanau Hill. In 1972, C. Brewer & Company combined the Hutchinson Sugar Plantation and the Hawaiian Agricultural Company and named it the Kau Sugar Company. In 1996, the Kau Sugar Company ceased its operations, thereby ending the sugar industry in Ka‘ū.

4.5 Contemporary Land Use

4.5.1 Nīnole Ahupua‘a

No development is depicted within the study area in the 1920 USGS topographic map (Figure 20). By the 1960s and 1970s, commercial interests in Ka‘ū began to look beyond the mainstay sugar had provided for almost a century. Macadamia nut growing and resort development were conspicuous attempts to move beyond the uncertain future portended for sugar.

Presently, the study area includes a portion of Route 11 (Māmalahoa Highway) at the Alakahi Road intersection and Nīnole Bridge, the focus of the current project. The existing Nīnole Bridge structure was built in 1940 and spans Nīnole Stream. Several houses are located along Alakahi Road in the vicinity of the study area. The study area is also located within the boundaries of the Sea Mountain Golf Course, an 18-hole public course that opened in 1971 (hawaiigolf.com 2014). A golf cart path extends through the study area beneath Nīnole Bridge.

4.5.2 Hīlea Ahupua‘a

After the end of sugar industry operations in Hīlea, ranching operations took over. According to the 1962 Naalehu and 1966 Punaluu USGS topographic quadrangles, only a few structures and a road remained at the base of Makanau Hill and Māmalahoa Highway is the only other depicted road or structure within the *ahupua‘a* (Figure 21). 1978 Naalehu and Punaluu USGS Orthophotoquad aerial photographs show the limited development and infrastructure within Hīlea Ahupua‘a, with the village of Nīnole to the east (Figure 22). The aerial photograph shows many country roads in the *mauka* portion of Hīlea, corresponding to the ranching and farming activities at the time.

Today, Hīlea is undeveloped with only a few homes and many acres of ranchland. The neighboring *ahupua‘a* of Nīnole contains some houses, the Sea Mountain Golf Course.

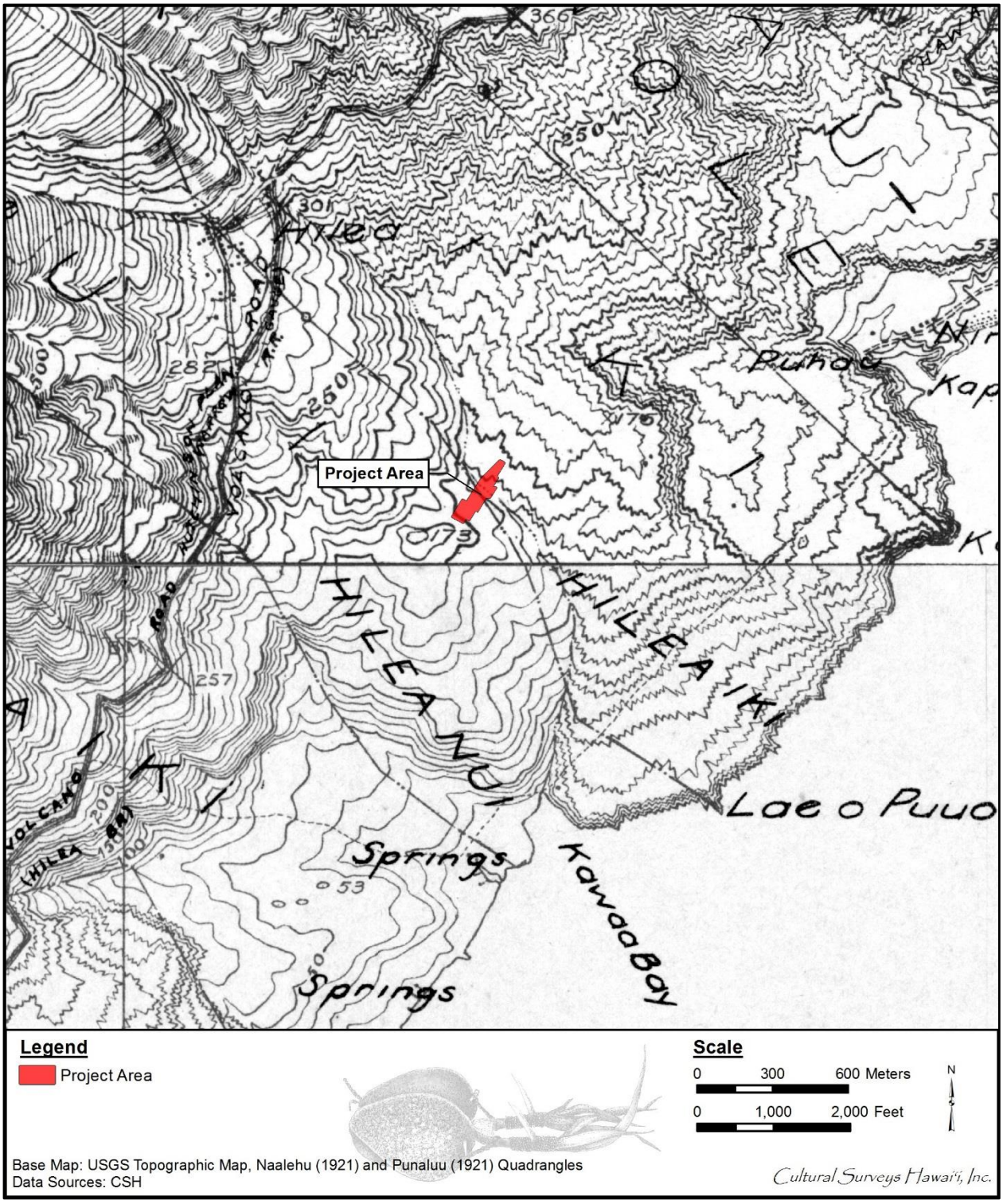

Figure 19. 1921 Naalehu and Punaluu USGS topographic quadrangles depicting Hīlea Bridge project area

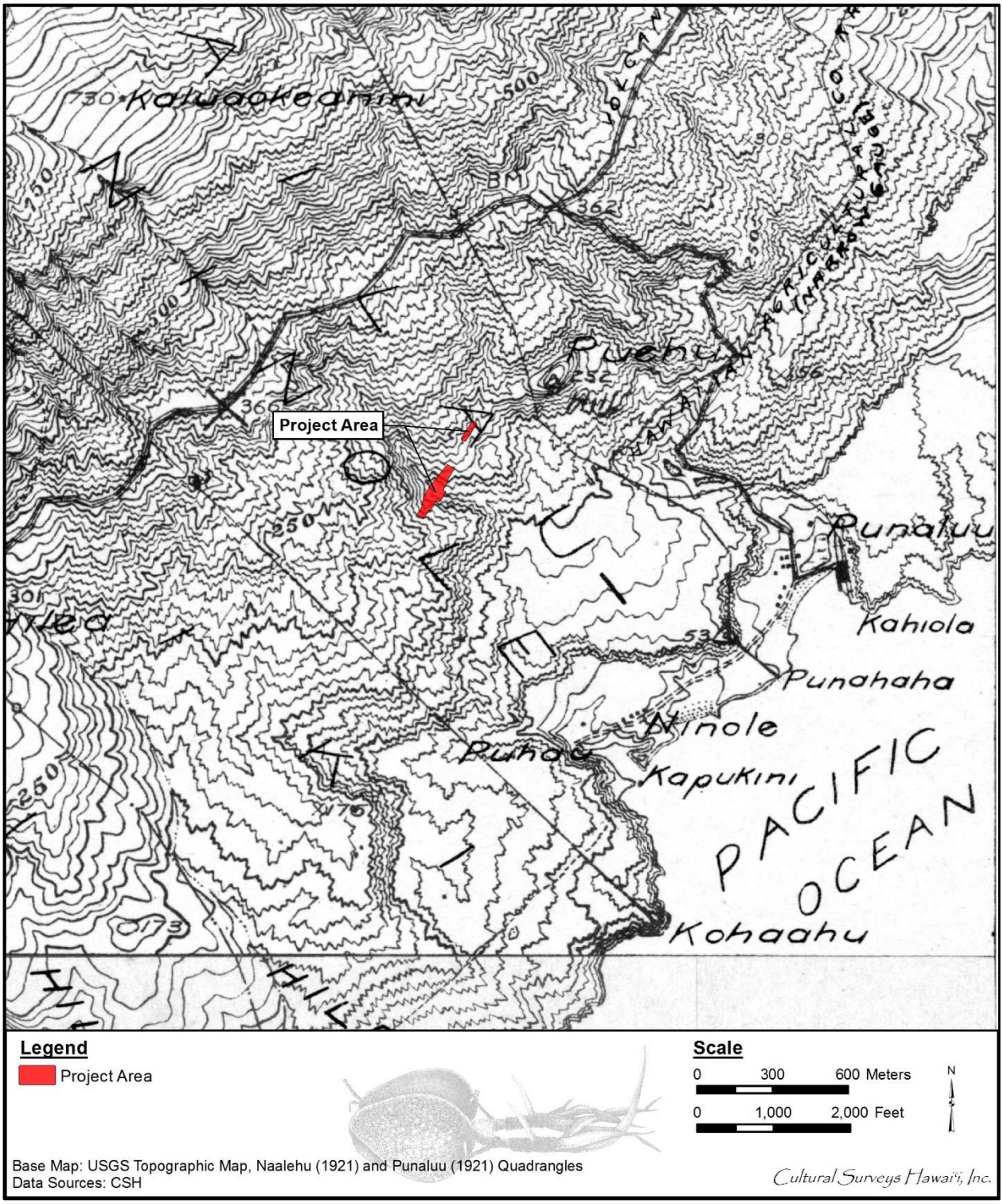

Figure 20. 1921 Naalehu and Punaluu USGS topographic quadrangles depicting Nīnole Bridge project area

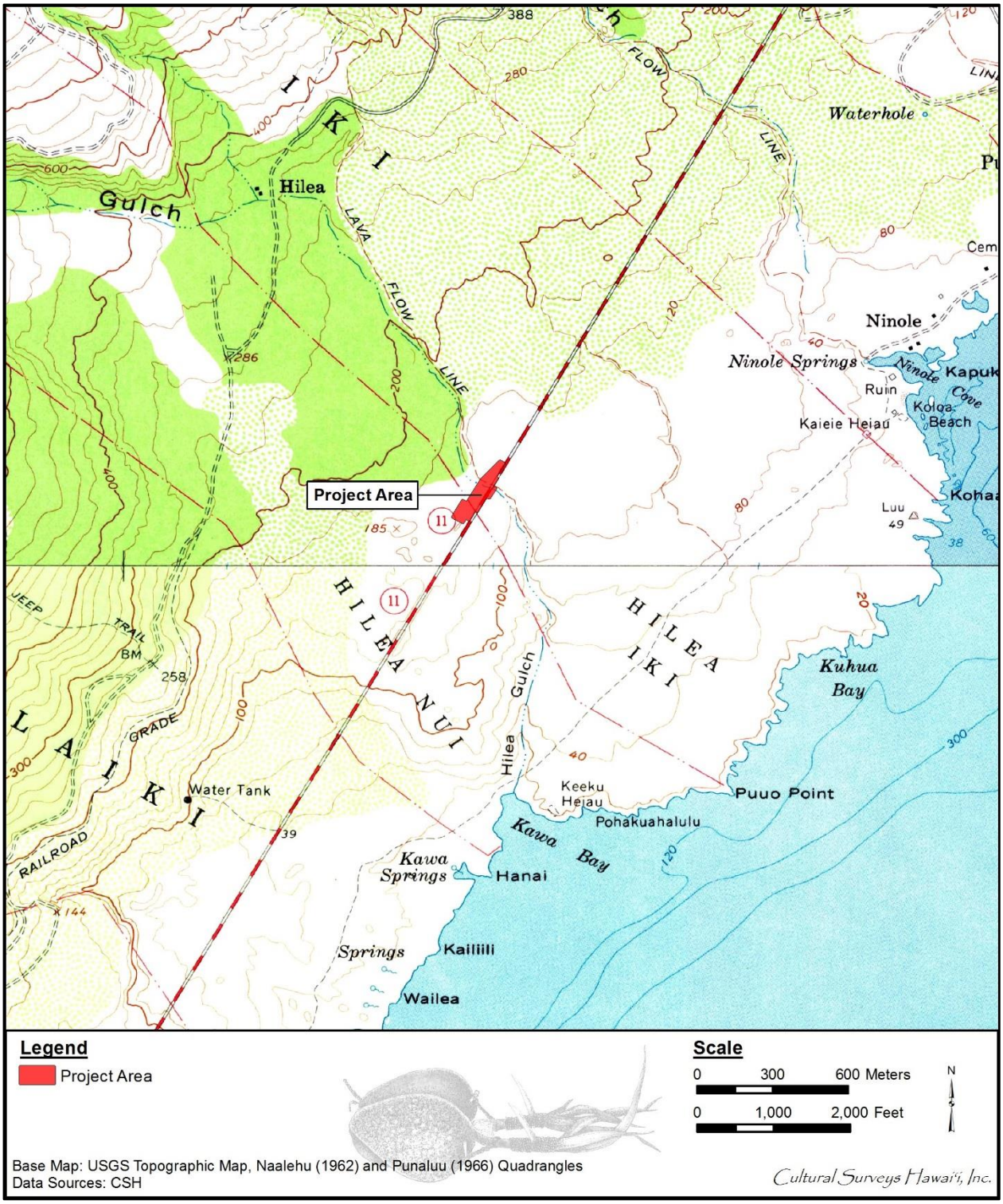

Figure 21. 1962 Naalehu and 1966 Punaluu USGS topographic quadrangles depicting the Nīnole Bridge project area

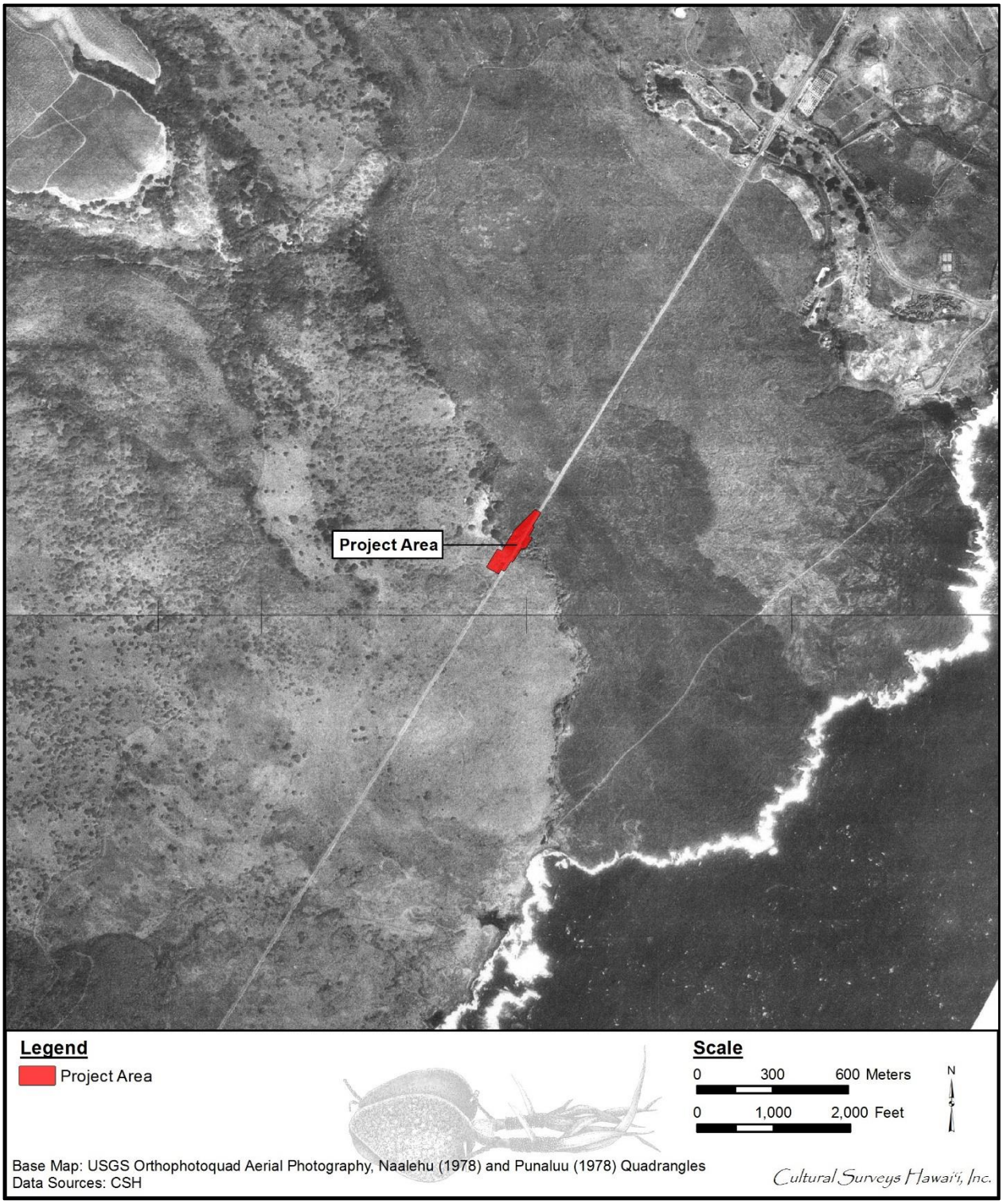

Figure 22. 1978 Naalehu and Punaluu USGS Orthophotoquad aerial photograph with Nīnole Bridge project area

4.6 Previous Archaeology

4.6.1 Nīnole Bridge

The locations of previous archaeological studies conducted within a 0.8-km (0.5-mile) radius of the project area are shown in Figure 23 and listed in Table 3. Historic properties identified in the area are shown in Figure 24 and listed in Table 4. These studies and their findings are discussed in more detail in the following paragraphs.

John F.G. Stokes carried out a survey of Hawai‘i Island *heiau* sites in 1906 documenting three or perhaps four *heiau* in the vicinity of the present project lands. Stokes and Dye (1991) give the following accounts of *heiau* in the vicinity:

> Ka‘ie‘ie Heiau
>
> Heiau of Ka‘ie‘ie, land of Nīnole, Ka‘ū. Situated on the edge of an *‘a‘ā* flow on the west side of Nīnole Bay. Pu‘u Ehu bears 170º50’, 5476 feet. All that was found was a cleared level stretch of *‘a‘ā* paved with beach pebbles. On the east it overhung the sea, the rough *‘a‘ā* forming the other boundaries. On account of these natural limits, it is probable that the place was never enclosed with walls.
>
> Mokini Heiau
>
> Heiau of Mokini, land of Nīnole, Ka‘ū. Perhaps identical with Ka‘ie‘ie Heiau. It was a name heard in Wai‘ōhinu and Honu‘apo, but the single resident of Nīnole I met knew only of Ka‘ie‘ie Heiau. [Stokes and Dye 1991:131]

Stokes (1910:52) also recorded a petroglyph cluster “along the low lava shore between Nīnole and Punalu‘u village” including linear human figures, curved arms and legs, family groups, fish, dots, and circles +/- 25 units. These petroglyphs appear to be those located in the modern enclosure immediately north of the Punalu‘u Beach Park parking lot (State Inventory of Historic Places [SIHP] # 50-10-68-3513).

The first systematic survey of archaeological sites in the Nīnole area was undertaken by Violet Hansen between 1968 and 1974. Her early work was followed up in a report by Robert Hommon (n.d. ca. 1971) and particularly in the salvage archaeology report by Barrera Jr. and Hommon (1972). The Barrera and Hommon (1972) study documents a total of 114 sites with 216 component features. Typically the site description is a brief sentence followed by some measurements. Many of these former sites were destroyed during the construction of the Sea Mountain Golf Course. However, fieldwork indicates bulldozing was quite extensive in other portions of the project area as well and approximately 80% of these sites are understood to have been destroyed in the 1970s. Two of the historic properties identified by Barrera and Hommon (1972) are located within a 0.8-km (0.5-mile) radius of the project area. SIHP # -4330 is a post-Contact enclosure related to animal husbandry. SIHP # -4360 includes post-Contact walls that may have been a property boundary or cattle barrier.

A review of the results presented by Barrera and Hommon (1972) shows that for many of the archaeological sites (walls, enclosures, depressions), no clear determination of function was possible based on the available data. Certain patterns do, however, appear. Burial sites are indicated in two general areas: 1) the cliff line extending southwest from the church and cemetery, and 2) along the cliff line extending northwest from Nīnole Cove. Permanent habitation sites are

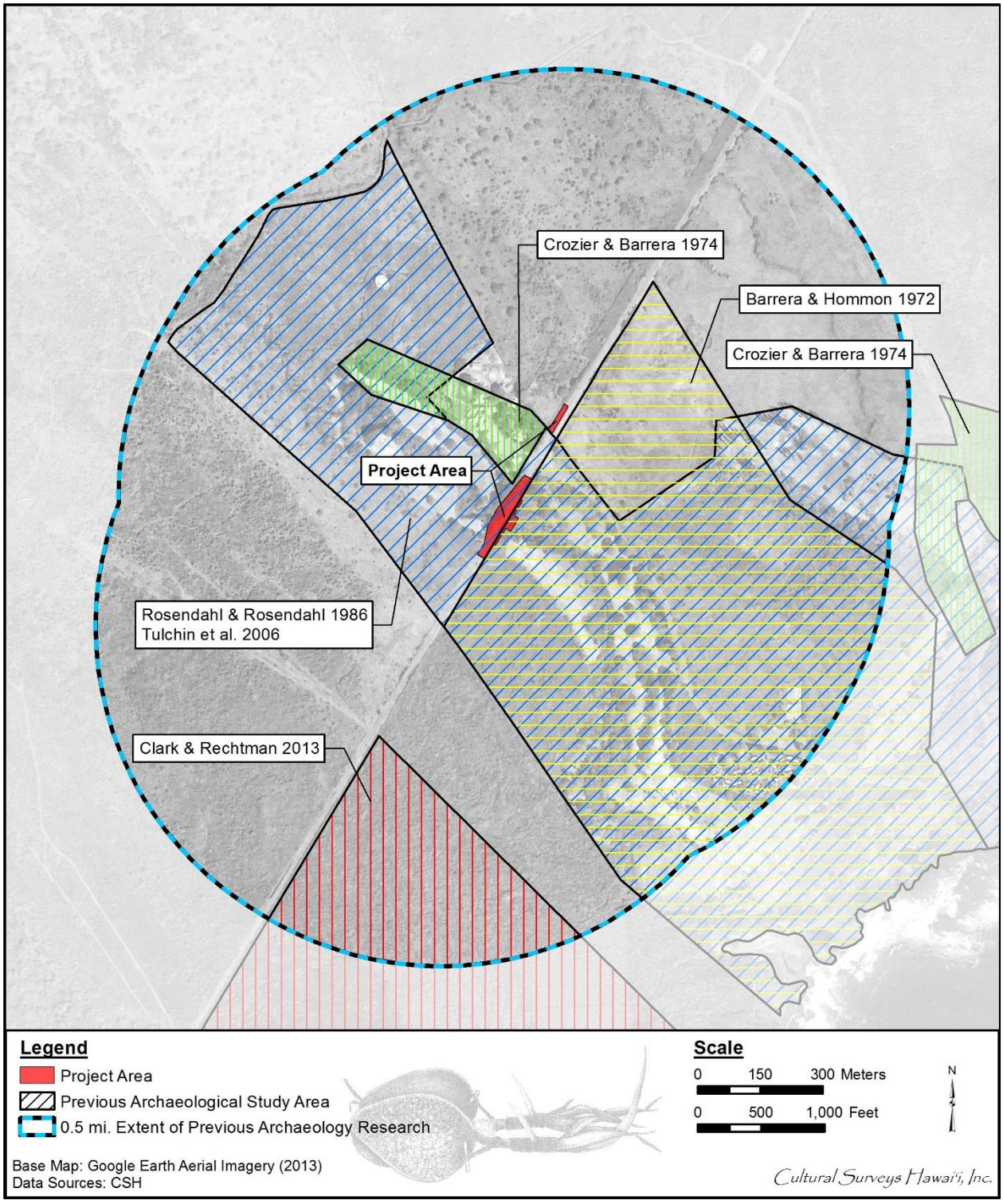

Figure 23. Aerial photograph depicting previous archaeological studies within a 0.8-km (0.5-mile) radius of the Nīnole Bridge project area (Google Earth 2013)

Table 3. Previous archaeological studies within a 0.8-km (0.5-mile) radius of the Nīnole Bridge project area

Reference	Type of Study	Location	Results
Stokes (and Dye) 1906/1991	Survey of Hawai‘i Island *heiau*	Island-wide	Documents three, perhaps four *heiau* in vicinity of project area
Stokes 1910	Study of petroglyphs	Archipelago-wide	Documents petroglyph site in coastal Punalu‘u
Hommon n.d. (1971)	Archaeological survey	Coastal Wailau and Nīnole Ahupua‘a	Precursor to Barrera and Hommon (1972) report (not included on Fig. 22)
Barrera and Hommon 1972	Salvage archaeology at Wailau-Nīnole, Ka‘ū	Coastal Wailau and Nīnole Ahupua‘a	Documented 111 archaeological sites including 216 features; pre-Contact and historic habitation, agricultural, and burial sites
Crozier 1972	Archaeological survey and excavations	Coastal Punalu‘u Ahupua‘a	Precursor to Crozier and Barrera (1974) report (not included on Fig. 22)
Crozier and Barrera 1974	Archaeological survey and excavations	Coastal Punalu‘u Ahupua‘a	Documented 25+ archaeological sites; noted bulldozing in area prior to study
Mann 1976	Archaeological reconnaissance of Kāwā	Coastal Hīlea	Petroglyphs described, fishhooks, buckles, house sites witih *‘ili‘ili* paving
Rosendahl and Rosendahl 1986	Preliminary and full archaeological reconnaissance surveys	Punalu‘u and Wailau Ahupua‘a	Provides summary of previous work and reports new sites
Tulchin et al. 2006	Archaeological inventory survey	Sea Mountain at Punalu‘u Resort	Documented 34 historic properties comprised of over 125 archaeological features
Clark and Rechtman 2013	Archaeological reconnaissance	Nīnole, Ka‘alāiki , Hīlea Nui and Hīlea ‘Iki Ahupua’a *makai* of Māmalahoa Hwy	Further documented sites previously identified as well as many new sites throughout Nīnole, Hīlea, and Ka‘alāiki; Site HI-14, a pavement, identified within a 0.8-km (0.5-mile) radius of the project area

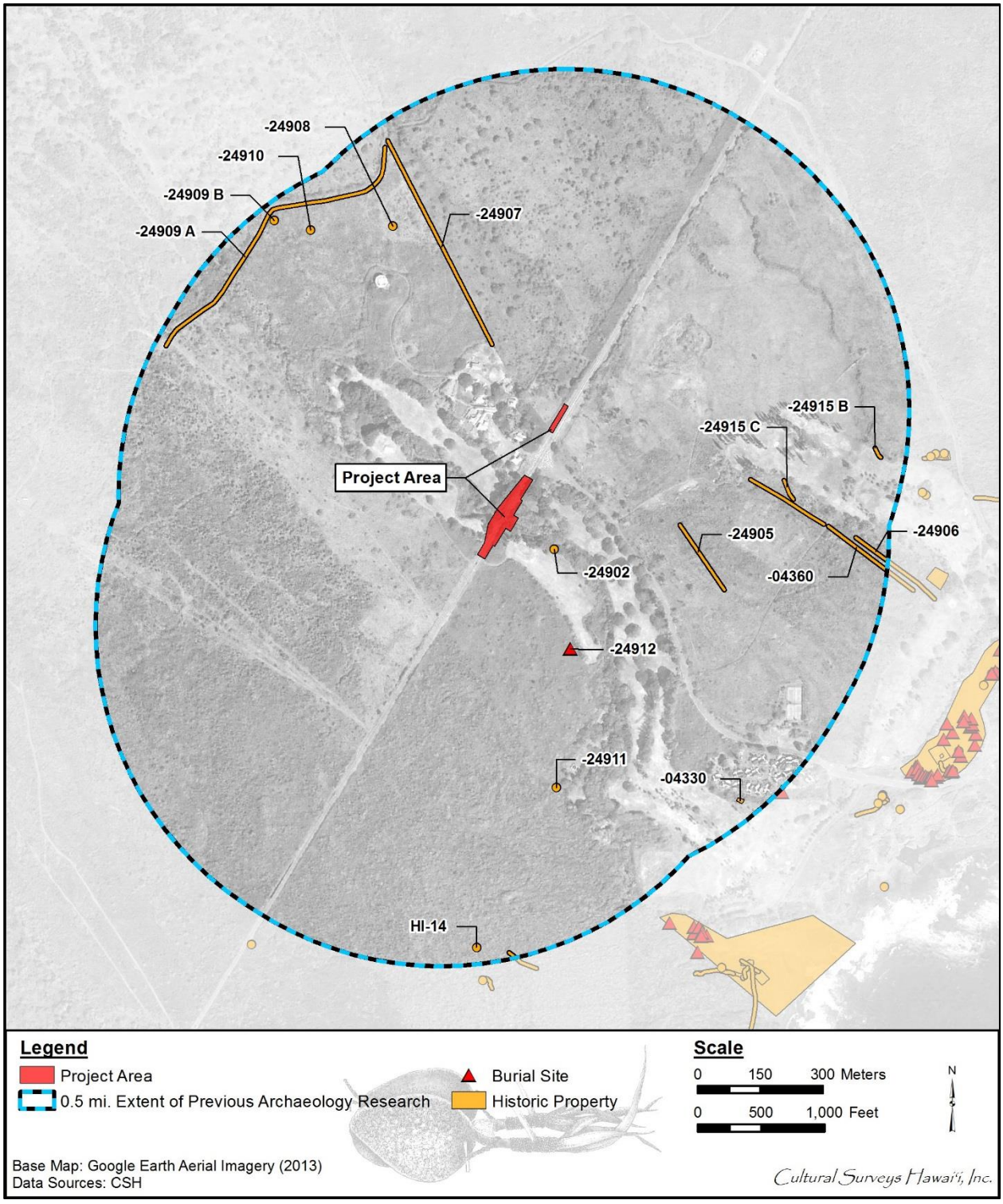

Figure 24. Aerial photograph depicting previously documented historic properties and sites within a 0.8-km (0.5-mile) radius of the project area (Google Earth 2013)

Table 4. Previously documented historic properties within a 0.8-km (0.5-mile) radius of the Nīnole Bridge project area

SIHP #	Site Type/Name	Source
50-10-68-4330	Enclosure (post-Contact)	Barrera and Hommon 1972
50-10-68-4360	Wall (post-Contact)	Barrera and Hommon 1972
50-10-68-24902	Wall (pre-Contact)	Tulchin et al. 2006
50-10-68-24905	Wall (post-Contact)	Tulchin et al. 2006
50-10-68-24906	Wall (post-Contact)	Tulchin et al. 2006
50-10-68-24907	Wall (post-Contact)	Tulchin et al. 2006
50-10-68-24908	Enclosure (pre-Contact)	Tulchin et al. 2006
50-10-68-24909A	Historic Government Rd	Tulchin et al. 2006
50-10-68-24909B	Retaining wall (post-Contact)	Tulchin et al. 2006
50-10-68-24910	Mound (pre-Contact)	Tulchin et al. 2006
50-10-68-24911	Wall (unknown age)	Tulchin et al. 2006
50-10-68-24912	Burial (pre-Contact)	Tulchin et al. 2006
50-10-68-24915B	Railroad berm (post-Contact)	Tulchin et al. 2006
50-10-68-24915C	Railroad berm (post-Contact)	Tulchin et al. 2006
HI-14	Pavement	Clark and Rechtman 2013

widely scattered in a zone extending 500 m (1640.4 ft) back from the coast with a few scattered permanent habitations further inland. Temporary shelters show much the same distribution pattern as permanent house sites but tend to be set slightly farther back from the coast. The pens or agricultural sites are similarly dispersed but notably tend not to be in close proximity to either permanent habitation or temporary shelter sites. Site density in general drops quite sharply 500 m (1640.4 ft) back from the coast (assuming the intensity of archaeological survey and previous land disturbance were approximately the same across the project area). Again, these are only suggested to be gross patterns developed within the constraints of the data. They also note that the Nīnole portion of the old Alanui Aupuni (Government Road) had been destroyed.

Crozier (1972) presents data on four separate areas within coastal Punalu‘u Ahupua‘a. The Crozier and Barrera Jr. (1974) study presents all of the Crozier (1972) documentation verbatim but includes discussions of three additional sites (B8-8, B8-36, and B8-52 in the vicinity of Lanipao Heiau). All three are reported as having been bulldozed (Crozier and Barrera Jr. 1974:15–16). Of particular interest is their Site B8-36, reported as a *heiau* located perhaps 100 m (328 ft) southeast of Lanipao Heiau. The size is estimated to have been a considerable 25 m (82 ft) by 36 m (118.1 ft) but virtually the only other information provided is that "Today [1974] all that is left are a few of Violet Hansen's marking flags and a rubble pile." Given that the historic grave (B8-53) was located just 9 m (29.5 ft) from this *heiau* it seems likely that it too was lost by 1974.

Herbert J. Mann (1976) did an archaeological reconnaissance study of Kāwā, Ka‘ū. In it he found no "unmistakably" pre-European contact sites but had nine sites and four families known to have lived in the house sites. Hilltop areas where there may have been occupation were badly disturbed by tidal wave action (Mann 1976 unnumb. page, Section V, Archaeology: Special Features). He notes that Kāwā Bay, with its black sand beach, affords a fair canoe landing, but he adds that the landing to the north of Ke‘ekū Heiau can be used when adverse surf conditions block off Kawa‘a landing (Mann 1976:8). He also notes fishing is good. The planting pits and petroglyphs he found are shown on his Figure 28 which may be along the northeast side of the *ahupua‘a*. Some petroglyphs are found in yards of house sites, along with fishhooks, shells, and buckles. His sites all have Bishop Museum numbers.

Margaret and Paul Rosendahl prepared an archaeological reconnaissance survey for an environmental impact statement (EIS) for the Punalu‘u Resort in 1986 (Rosendahl and Rosendahl 1986). This study identified a total of 32 archaeological sites (83+ component features) of which 25 sites had been previously identified and seven sites were newly discovered.

In 1988, Ross Cordy wrote *An Overview of Ka‘u District & Some Thoughts on Island-Wide Settlement patterns,* using Reverend Ellis for his source of information in Hilea. "Livestock were raised in the region, witness the pigs recorded by Ellis in 1823 at coastal Hilea" (Cordy 1988:15; Ellis1963:148). He also mentions major train ills. The Hokukano to Hilea portion across ‘a‘ā "was formed of large smooth round stones placed in a line two or three feet apart" (Ellis 1963:142).

In 2005, CSH conducted an archaeological inventory survey of the approximately 430-acre Sea Mountain at Punalu‘u Resort (Tulchin et al. 2006). Proposed development within the project area included realignment of the existing golf course and subdivision of much of the undeveloped lands for residential house lot, condominium, and resort development. Minimally, land disturbing construction would include grubbing, major grading, excavations associated with golf course feature construction, dwelling construction, and excavations for the installation of subsurface

utilities. A total of 34 historic properties, comprised of over 125 archaeological features, were identified within the project area. Twenty-three of the historic properties were previously identified and 11 were newly recorded. A total of 12 historic properties identified by Tulchin et al. (2006) are located within a 0.8-km (0.5-mile) radius of the project area (see Table 4). These include five walls, two railroad berm sections, a mound, an enclosure, a burial, a retaining wall, and a portion of an historic government road.

Clark and Rechtman (2013) conducted an archaeological reconnaissance within Nīnole, Hīlea, and Ka‘alāiki Ahupua‘a, *makai* of Māmalahoa Highway. Previously identified sites were further documented as well as new sites throughout Nīnole, Hīlea, and Ka‘alāiki. One of the sites, HI-14, is located within a 0.8-km (0.5-mile) radius of the project area. HI-14 was determined to be a potential pavement that may have been used for habitation purposes (Clark and Rechtman 2013).

CSH (February 2015) did an archaeological reconnaissance of the Hīlea project area and documented four cultural resources (historic properties) and a modern wall with no exceptional importance: CSH 1 is Nīnole Bridge, a timber stringer bridge built in 1940; CSH 2 is Route 11 (Māmalahoa Highway); CSH 3 and CSH 4 are historic rock walls. CSH 5 is a modern dry-stacked stone wall with no exceptional importance (Yucha and Hammatt 2105).

In 2016, CSH completed an archaeological inventory survey for the replacement of Nīnole Bridge (Yucha and Hammatt).

4.6.2 Hīlea Bridge

The locations of previous archaeological studies conducted within a 0.4-km (0.25-mile) radius of the project area are shown in Figure 25 and listed in Table 5. Previously documented historic properties are shown in Figure 26 and listed in Table 6. Archaeological sites not designated as an historic property are listed in Table 7. These studies and findings are discussed in the following paragraphs.

In 1976, Herbert J. Mann conducted an archaeological reconnaissance within portions of Hīlea and Ka‘alāiki. Several house sites including SIHP #s 50-10-74-3533, -3534 and -3552 Feature 8 (later designated as the Kawaa Complex SIHP # -4371) were identified as well as petroglyphs.

Kelly (1980) wrote a “historical sketch” covering nine *ahupua‘a* from Honu‘apo in the southwest to Punalu‘u in the northeast including Hīlea Nui and Hīlea ‘Iki. Her study includes research on legends and traditional accounts, presentation of historical background, accounts of early visitors, and investigations of land ownership and settlement patterns.

Stokes and Dye (1991) present a historic survey of Native Hawaiian temple sites based on fieldwork undertaken by John F.G. Stokes on Hawai‘i Island in 1906. Two *heiau* are reported in Hīlea Ahupua‘a: Ke‘ekū Heiau and Kohāikalani Heiau. Ke‘ekū Heiau is located on the northeast side of Kāwā Bay approximately 1,200 m (3937 ft) south of the Hīlea Bridge project area. Ke‘ekū Heiau is a heavy walled enclosure with several platforms (Stokes and Dye 1991:128–129). The sacred precincts are delineated by a low terrace wall on the inland side and include a number of separate platforms, one of which is known as the “king’s house.” The size of the main *heiau* (approximately 150 ft northwest/southeast by 80 ft southwest/northeast) suggests a substantial population and/or high degree of political import for the land of Hīlea. Kāwā Bay is a pronounced indentation on the coastline and would have been a natural focus for fishing and canoe

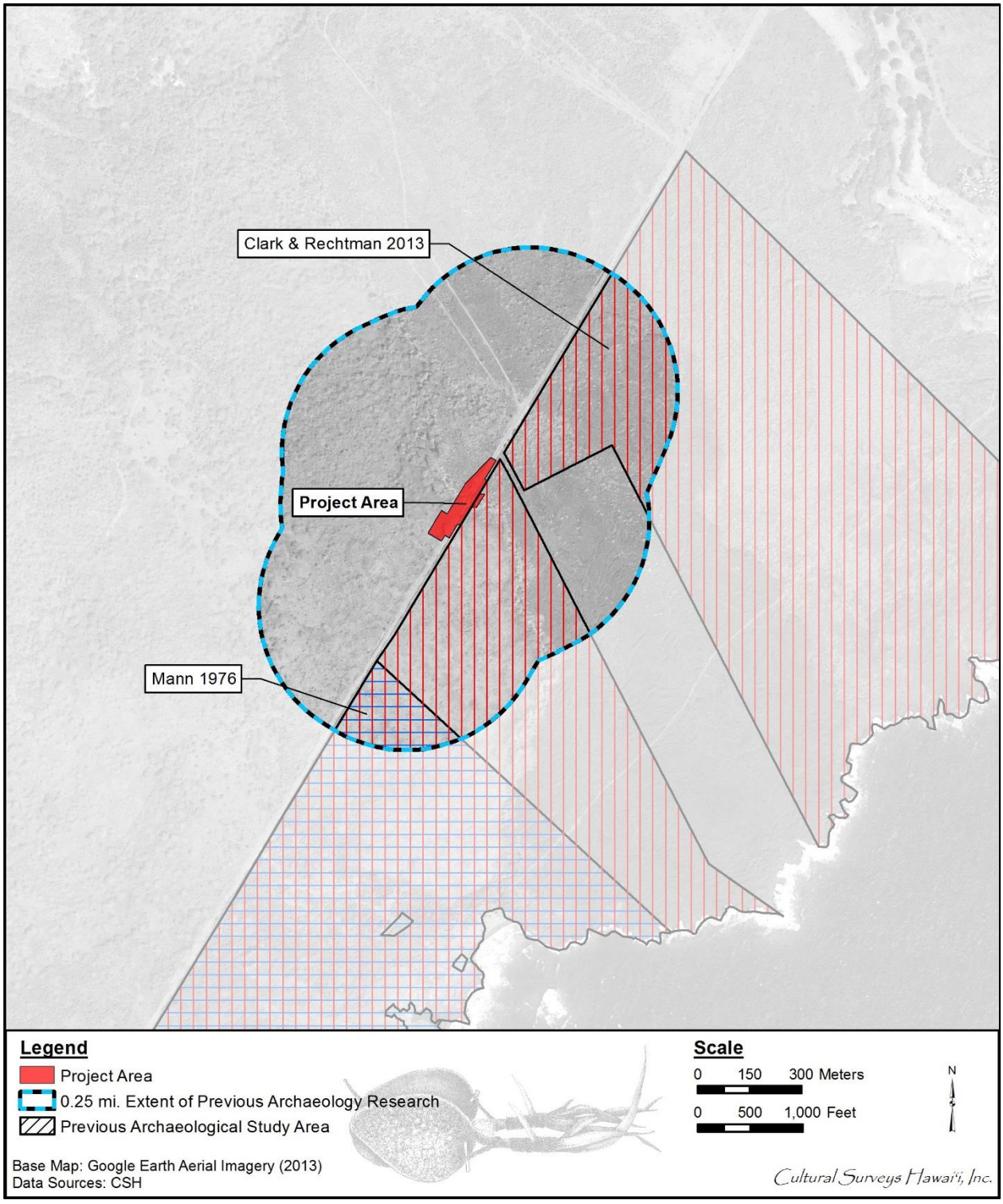

Figure 25. Aerial photograph depicting previous archaeological studies within a 0.4-km (0.25-mile) radius of the Hīlea Bridge project area (Google Earth 2013)

Table 5. Previous archaeological studies within a 0.4-km (0.25-mile) radius of the Hīlea Bridge project area

Reference	Type of Study	Location	Results (SIHP # -50-10-74-xxxx)
Mann 1976	Archaeological reconnaissance	Kāwā; in Hīlea and Ka‘alāiki Ahupua‘a	Documented house sites (SIHP # -3533), walled enclosures (SIHP #s -3534 and -3552) and petroglyph sites including petroglyphs P2, P3, and P4 within the vicinity of the project area
Kelly 1980	Stories of *ahupua‘a*	Central Ka‘ū	Discusses nine *ahupua‘a* within Ka‘ū including traditional accounts
Stokes and Dye 1991	*Heiau* study	Hawai‘i Island	Documents *heiau* throughout Hawai‘i Island including two *heiau* within Hīlea: Ke‘ekū Heiau near Kāwā Bay and Kohāikalani Heiau on Makanau Hill
Rechtman 2011	Comprehensive archaeological survey	Māmalahoa drainage improvements project, Ka‘alāiki Ahupua‘a	Five cultural resources documented (SIHP #s -28504, a post-Contact wall complex with ten features; -28505, a post-Contact wall; -28507, a pre-Contact enclosure site of two features; -28508, including six possibly pre-Contact rock piles; and – 28509, a post-Contact enclosure; none within the vicinity of the project area
Clark and Rechtman 2013	Archaeological reconnaissance	Ka‘alāiki, Hīlea Nui and Hīlea ‘Iki Ahupua‘a *makai* of Māmalahoa Hwy	Further documented sites identified in Mann 1976; also identified many new sites throughout Hīlea and Ka‘alāiki; identified several sites within the vicinity of the project area including seven cairn, six modified outcrops, four enclosures, three modified flow areas (possible basalt quarries), two modified depressions, two walls, two lava tubes, one lava blister, one filled crack, one *pāhoehoe* excavation, one L-shaped enclosure, and an alignment; one cairn (HN-52), one enclosure (HN-55), one wall (HN-53), one L-shaped enclosure (HI-40), and one alignment (HI-41) identified within project area
Hammatt 2015	Archaeological reconnaissance	Hīlea Bridge	Six cultural resources noted, a C-shape, six rock shelters, the bridge and hwy

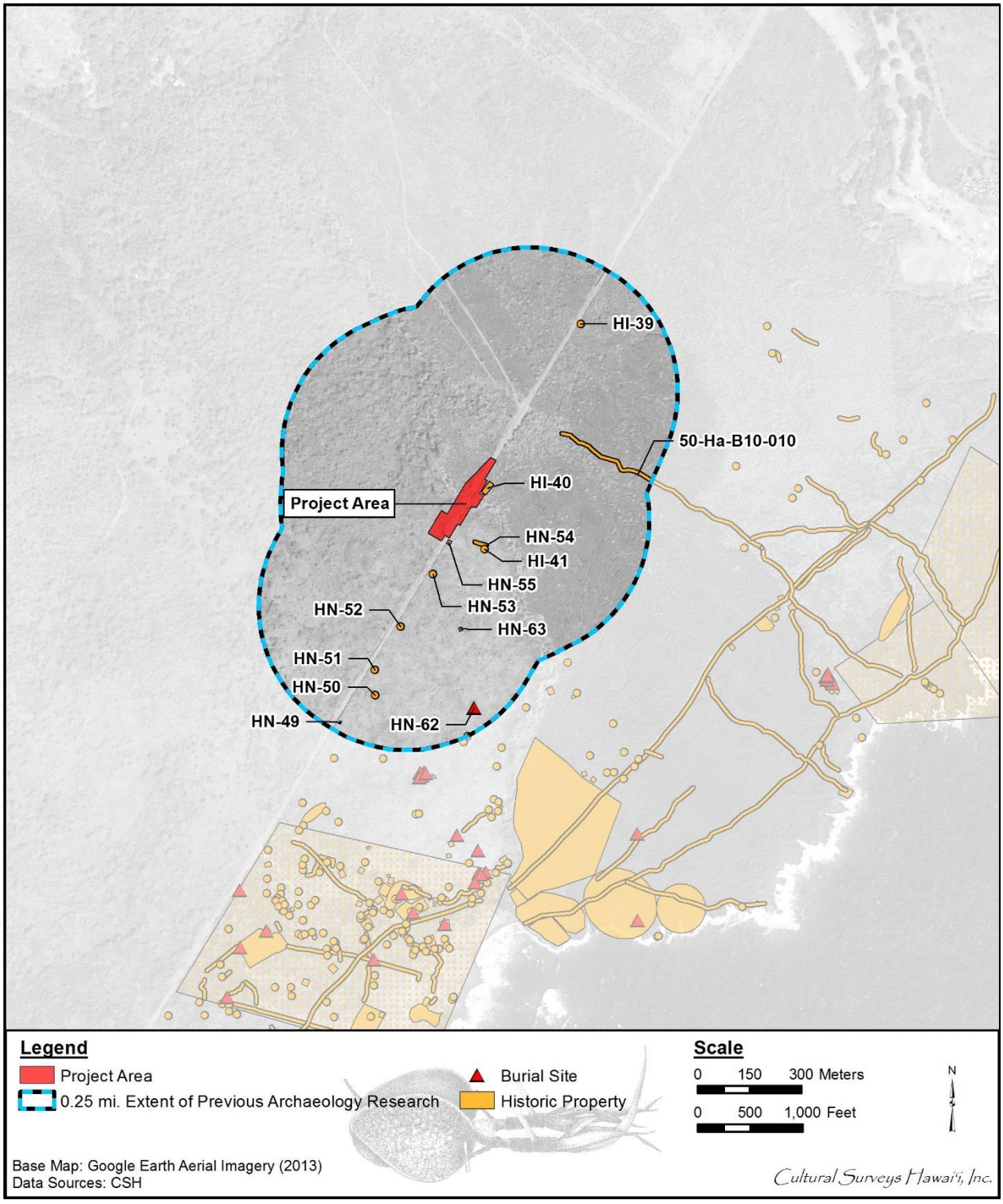

Figure 26. Aerial photograph depicting previously documented sites within a 0.4-km (0.25-mile) radius of the Hīlea Bridge project area (Google Earth 2013)

Table 6. Previously documented historic properties within a 0.4-km (0.25-mile) radius of the Hīlea Bridge project area

SIHP # 50-10-74-xxxx	Site Type	Description	Source
-4371	Kawaa Complex	A complex of house compounds, enclosures and possible burial platforms	Clark and Rechtman 2013
-3533/-4371	House site	Remains of rectangular rock-walled structure; house remains located in inner court	Mann 1976
-3534/-4371	House site	Adjoins B10-4 N side; very disturbed rectangular rock-walled structure	Mann 1976
-3552/-4371	House site	A disturbed rock-walled structure; possible door at the S end	Mann 1976

Table 7. Sites documented by Clark and Rechtman (2013) in the vicinity of the Hīlea Bridge project area (not designated as an historic property)

Site #	Site Type	Function
BPBM # 50-HA-B10-010	Trail	Trail
HI-39	Concrete cairn	Advertisement
HI-40	L-shaped enclosure	Windbreak shelters
HI-41	Alignment	Unknown
HI-42	Quarry	Possible basalt quarry
HI-43	Enclosure	Habitation
HN-41	Filled crack	Landscaping
HN-48	Cairn	Marker
HN-49	Enclosure	Habitation
HN-50	Depression	Agriculture
HN-51	*Pāhoehoe* excavation	Unknown
HN-52	Cairn	Marker
HN-53	Wall	Unknown
HN-54	Wall	Unknown
HN-55	Enclosure	Habitation
HN-56	Modified outcrop	Possible burial
HN-62	Modified outcrop	Possible burial
HN-63	Enclosure	Unknown
HN-64	Depression	Agriculture
HN-66	Habitation complex	Habitation

travel. Kohāikalani Heiau is located on “the southern brow of Makanau plateau” (Stokes and Dye 1991:130). This was the locus of a famous Ka‘ū story of how the ruling chief Kohāikalani was assassinated at this *heiau* (which he was said to have been building). The size of the *heiau* (approximately 150 ft long north/south by 70 ft wide east/west with walls up to 8 ft wide and 5.5 ft high) suggests a substantial population and/or high degree of political import for the land of Hīlea.

Robert Rechtman (2011) carried out an archaeological survey for a Māmalahoa Highway drainage improvements project along an approximately 800-m (2624.7-ft) long stretch of Belt Highway 11 just to the southwest of the present project area in Ka‘alāiki Ahupua‘a. Five archaeological properties were documented just outside the 0.4-km (0.25-mile) radius of the extent of previous archaeological research: SIHP #s -28504, a post-Contact wall complex; -28505, a post-Contact wall; -28507, a pre-Contact enclosure site of two features; -28508, six possibly pre-Contact rock piles; and -28509, a post-Contact enclosure.

In 2013, Rechtman Consulting, LLC conducted an archaeological reconnaissance of the County of Hawai‘i Kāwā property that encompasses the *makai* portion of the current project area. Clark and Rechtman (2013) identified many sites and further documented previously identified sites. Rechtman identified several sites within a 0.4-km (0.25-mile) radius of the project area including seven cairn, six modified outcrops, four enclosures (one of which is within the project area, HN-55), three modified flow areas (possible basalt quarries), two modified depressions, two walls (one of which is near the project area, HN-53), two lava tubes, one lava blister, one filled crack, one *pāhoehoe* excavation, one L-shaped enclosure (one of which is within the project area, HN-40), and an alignment. The sites within the near vicinity of the project area are listed in Table 7.

Section 5 Community Consultation

5.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with Native Hawaiian Organizations (NHO), agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise and/or knowledge of the *ahupua‘a* of Nīnole and Hīlea. CSH initiated its outreach effort in August 2015 through letters, email, telephone calls, and in-person contact. CSH completed the community consultation in December 2015.

5.2 Community Contact Letter

In the majority of cases, letters, along with a map and an aerial photograph of the project were mailed with the following text:

> At the request of CH2M HILL and on behalf of the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), Cultural Surveys Hawai‘i Inc. (CSH) is conducting a cultural impact assessment (CIA) for the Nīnole Stream Bridge and Hīlea Stream Bridge replacement project located in Nīnole Ahupua‘a and Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island.
>
> The Nīnole Stream Bridge is located in Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, Tax Map Keys (TMKs): [3] 9-5-019: 011, 016, 024, 035 por., and [3] 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way. The project area is located at mile post 56.7 along Route 11 (Māmalahoa Highway) at the Alahaki Road/Nīnole Loop Road intersection. Built in 1940, Nīnole Bridge is identified as a timber stringer bridge and one of only two timber bridges under HDOT jurisdiction. Nīnole Bridge includes three spans totaling a length of 60.0 ft and a width of 26.9 ft. The purpose of the project is to replace the existing deficient timber bridge to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches. The entire bridge would be replaced with a concrete single span bridge. During construction, a temporary two-lane bypass road would be constructed around the project site on the mauka side of the highway. The total project area for the Nīnole Bridge is 2.13 acres.
>
> The Hīlea Stream Bridge is located in Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/ Māmalahoa Highway Right-of-Way. The project area is located in the immediate vicinity of Hīlea Bridge on Route 11 (Māmalahoa Highway). The bridge is a timber stringer bridge characterized by wooden beams and ties perched upon concrete and stone abutments. Hīlea Bridge is an example of one of a few wood bridge designs built in the 1940s still extant. The existing bridge has a width of 28.0 ft and total length of 41.0 ft., and is proposed for replacement with a single span concrete bridge. The purpose of the Hīlea project is the same as the Nīnole project, to replace the existing deficient timber bridge in order to meet current design standards for roadway width, load capacity, bridge railing, and transitions. During construction,

a temporary two-lane bypass road would be constructed around the project site on the mauka side of the highway. The total project area for the Hīlea Bridge is 3.35 acres.

The total combined project area includes 5.48 acres. The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgeable about this area. The research and interviews assist us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

•General history and present and past land use of the project area.

•Knowledge of cultural sites- for example, historic sites, archaeological sites, and burials.

•Knowledge of traditional gathering practices in the project area, both past and ongoing.

•Cultural associations of the project area, such as legends and traditional uses.

•Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the project area and the surrounding ahupua‘a lands.

•Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.

Copies of sample letters can be seen in Figure 27 and Figure 28.

Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai‘i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: NĪNOLE 2 mliborio@culturalsurveys.com amitchell@culturalsurveys.com www.culturalsurveys.com

August 12, 2015

Aloha mai kāua,

At the request of CH2M HILL and on behalf of the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), Cultural Surveys Hawai‘i Inc. (CSH) is conducting a cultural impact assessment (CIA) for the Nīnole Stream Bridge and Hīlea Stream Bridge replacement project located in Nīnole Ahupua‘a and Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island.

The Nīnole Stream Bridge is located in Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, Tax Map Keys (TMKs): [3] 9-5-019: 011, 016, 024, 035 por., and [3] 9-5-027:020 por., and 9-5-019, 9-5-027 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way. The project area is located at mile post 56.7 along Route 11 (Māmalahoa Highway) at the Alahaki Road/Nīnole Loop Road intersection. Built in 1940, Nīnole Bridge is identified as a timber stringer bridge and one of only two timber bridges under HDOT jurisdiction. Nīnole Bridge includes three spans totaling a length of 60.0 ft and a width of 26.9 ft. The purpose of the project is to replace the existing deficient timber bridge to meet current design standards for roadway width, load capacity, bridge railing and transitions, and bridge approaches. The entire bridge would be replaced with a concrete single span bridge. During construction, a temporary two-lane bypass road would be constructed around the project site on the *mauka* side of the highway. The total project area for the Nīnole Bridge is 2.13 acres.

The Hīlea Stream Bridge is located in Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/ Māmalahoa Highway Right-of-Way. The project area is located in the immediate vicinity of Hīlea Bridge on Route 11 (Māmalahoa Highway). The bridge is a timber stringer bridge characterized by wooden beams and ties perched upon concrete and stone abutments. Hīlea Bridge is an example of one of a few wood bridge designs built in the 1940s still extant. The existing bridge has a width of 28.0 ft and total length of 41.0 ft., and is proposed for replacement with a single span concrete bridge. The purpose of the Hīlea project is the same as the Nīnole project, to replace the existing deficient timber bridge in order to meet current design standards for roadway width, load capacity, bridge railing, and transitions. During construction, a temporary two-lane bypass road would be constructed around the project site on the *mauka* side of the highway. The total project area for the Hīlea Bridge is 3.35 acres.

The total combined project area includes 5.48 acres. The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgeable about this area. The research and interviews assist us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

- **General history and present and past land use of the project area.**
- **Knowledge of cultural sites- for example, historic sites, archaeological sites, and burials.**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing.**

1

Figure 27. Community consultation letter

- **Cultural associations of the project area, such as legends and traditional uses.**
- **Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua‘a* lands.**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.**

We invite you to contact us at (808) 262-9972 or (e-mail: mliborio@culturalsurveys.com or amitchell@culturalsurveys.com) if you have any information you would like to share.

Mahalo nui loa,

S. Māhealani Liborio
Cultural Researcher
Cultural Surveys Hawai‘i Inc.
Archaeological and Cultural Impact Studies
P.O. Box 1114
Kailua, Hawai‘i 96734 Ph.: (808) 262-9972

Figure 28. Community consultation letter, page two

5.3 Community Contact Table

Table 8 contains names, affiliations, dates of contact, and comments from NHOs, individuals, organizations, and agencies contacted for this project. Results are presented in alphabetical order.

Table 8. Results of community consultation

Name	Affiliation	Comments
Browning, Mililani	Alala Outreach Coordinator, State of Hawai‘i – Division of Forestry and Wildlife	Letter and figures sent via email 13 August 2015
Chang, Debbie	Beekeeper and Master Gardener Knowledge in *nā ala hele* (trails) and cultural resources	Letter and figures sent via email 13 August 2015
Cross, John	Land Manager, Edmund C. Olson Trust II and Ka‘ū Farms Management	Letter and figures sent via email 13 August 2015
Crysdale, Shalan	Hawai‘i Island Natural Resource Manager for The Nature Conservancy	Letter and figures sent via email 13 August 2015
Dancil, Kamakani	Land Manager, Kamehameha Schools	Letter and figures sent via email 13 August 2015
Galimba, Michelle	Kuahiwi Ranch	Letter and figures sent via email 13 August 2015
Ka‘awa, Nohealani	Outreach Specialist, State of Hawai‘i – Department of Land and Natural Resources	Letter and figures sent via email 13 August 2015
Laimana, Kalei	Family is *kama‘āina* of Ka‘ū Hawaiian Studies Lecturer, Leeward Community College	Letter and figures sent via email 13 August 2015
Louis, Earl	*Kama‘āina* of Ka‘ū Caretaker of Makanau Heiau	Referred by Kawehi Ryder Mr. Earl Louis called CSH and provided some background information on the *ahupua‘a* of Hīlea and his *mana‘o* on the project on 10 December 2015; CSH asked if Mr. Louis

Name	Affiliation	Comments
		would be interested in participating in an interview and he agreed. Interview scheduled for 16 December 2015; will meet in Pāhala and interview at Makanau Heiau in Hīlea Ahupua‘a Mr. Louis called CSH on 15 December 2015 to confirm interview CSH interviewed Mr. Louis and Mr. Demetrius Oliveira at Makanau Heiau on 16 December 2015; authorization forms signed CSH sent transcription to Mr. Demetrius Oliveira via email on 15 July 2016; notified of revised project area CSH sent a follow up email to Mr. Oliveira on 25 July 2016 Corrections were provided by Mr. Oliveira and Mr. Louis via email on 25 July 2016 Interview summary was sent via email to Mr. Oliveira on 27 September 2016 A follow-up email was sent to Mr. Oliveira regarding interview summary approval on 4 October 2016 Interview summary approved via email on 6 October 2016
Manfredi, Chris	Ka‘ū Farm and Ranch Company	Letter and figures sent via email 13 August 2015
Neal, Julia	Publisher, *Ka‘ū Calendar* (community newspaper of the Ka‘ū District)	Letter and figures sent via email 13 August 2015 Ms. Neal replied via email on 13 August 2015 with the following: *We publish the newspaper online daily and mail to 5,500 folks monthly. We could write about looking for history of cultural practices and other info. Let me know.* CSH replied to Ms. Neal via email on 13 August 2015; CSH would need further coordination internally to formulate an ad with appropriate language and a timeline CSH replied to Ms. Neal via email on 14 August 2015 with the following: *Mahalo nunui loa for giving CSH the opportunity to reach out via the Ka‘u Calendar Newspaper. We really appreciate your kōkua! After discussing this matter amongst the CIA Hui and*

Name	Affiliation	Comments
		our client, all parties agree to posting the attached letter in the newspaper. However, just a few things we would like to add: *1. We would need a deadline for responses so that we can gather data. If the notice will run in September's issue, can we add: Please respond by October 1st to Mahealani Liborio via email (mliborio@culturalsurveys.com)* *2. We also need to add: Respondents feedback will be summarized for a cultural impact assessment and added to the appendix. In addition, respondents understand and agree that their 'ike (knowledge) and mana'o (thought) will be available to the public.* Ms. Neal responded via email on 14 August 2015 stating she would add CSH's additions CSH emailed Ms. Neal 3 September 2015 to follow up on the posting of the ad Ms. Neal replied via email 3 September 2015 that the paper was mailed out yesterday, however, the deadline and some of the added info was omitted
Oliveira, Demetrius	*Kama'āina* of Ka'ū Caretaker of Makanau Heiau	Referred by Kawehi Ryder Met with Mr. Earl Louis and Mr. Demetrius Oliveira for a site visit to Makanau Heiau and a sit down interview on 16 December 2015 Authorization form signed by Mr. Oliveira on 16 December 2015 CSH sent transcription to Mr. Oliveira via email on 15 July 2016; notified of revised project area CSH sent a follow up email to Mr. Oliveira on 25 July 2016 Corrections were provided by Mr. Oliveira and Mr. Louis via email on 25 July 2016 Interview summary was sent via email to Mr. Oliveira on 27 September 2016 A follow up email was sent to Mr. Oliveira regarding interview summary approval on 4 October 2016 Interview summary approved via email on 6 October 2016
Petrie, Bill and Lani	Kapapala Ranch	Letter and figures sent via email 13 August 2015

Name	Affiliation	Comments
Ryder, Kawehi and Debbie	Cultural practitioner Caretaker of Nīnole Fishpond and adjacent sites	Referred by CH2M HILL Letter and figures sent via email 7 October 2015 Mr. Ryder called CSH on 8 October 2015; Mr. Ryder will be out of town for a work trip; he has obtained a two-year lease to *mālama* (take care of) Nīnole Fishpond and the adjacent sites; has a working model for the restoration project CSH emailed Mr. Ryder 13 November 2015 to follow up on a possible site visit and interview to his restoration project in Nīnole Ahupua‘a CSH called Mr. Ryder 16 November 2015 to follow up on possible site visit and interview; left message Called Mr. Ryder 17 November 2015; left message with one of the caretakers of the fishpond; also left message on his cell phone Mr. Ryder called CSH 18 November 2015 discussing his restoration project and concerns; he is fine with site visit and interview Confirmed with Mr. Ryder, site visit and interview with CSH on 24 November 2015 Site visit and interview with Mr. Ryder on 24 November 2015 at Nīnole Fishpond and his home in Pāhala Authorization form signed by Mr. Ryder 24 November 2015 CSH emailed Mr. Ryder a draft transcription for review on 14 December 2015 CSH dropped off a hard copy of a draft transcription for review on 16 December 2015 CSH followed up with Mr. Ryder via email on 20 December 2015 CSH followed up with Mr. Ryder via email on 6 January 2016 Mr. Ryder made corrections to transcription via email on 11 January 2016 CSH emailed Mr. Ryder a draft interview summary via email on 17 May 2016 and notified of revised project area CSH followed up via email on approval of draft interview summary on 8 July 2016 CSH called Mr. Ryder on 15 July 2016 to follow up; interview summary approved

5.4 *Kama‘āina* Interviews

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *mana‘o* and *‘ike* with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and in no way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

5.4.1 Kawehi Ryder

CSH interviewed Kawehi Ryder on 24 November 2015. Mr. Ryder escorted CSH to Hilo‘e Fishpond located in Nīnole Ahupua‘a followed by a sit down interview at his home in Pāhala.

Born and raised in Kahalu‘u, O‘ahu, Mr. Ryder is one of six children. His father worked for the Hawaiian Telephone Company and his mother worked for the State of Hawai‘i. The family resided on *kuleana* land *makai* of St. John’s By the Sea Church on Kamehameha Highway. The *wahi pana* was known as Wailau. Mr. Ryder described growing up in Kahalu‘u:

> It was beautiful! It was really, you know, a lot of the community should be today. But anyway, it was a good growing up environment and then in our community, because we had *kuleana* land, we were raised on the ocean . . . it was a very learning, growing-up environment. The culture was very alive and evolving. It was a living environment. So, it was good learning.

During the weekends, Mr. Ryder’s father would take his *keiki* (children) to the ocean. A typical weekend would consist of waking up early and heading out to Kāne‘ohe Bay. The tide or moon phase would determine the type of ocean activity that would take place that day. Normally, he would dive for *he‘e* (octopus; *Polypus* sp.). Because the family lived on Kāne‘ohe Bay and given the topography of the reef, if the tide was right the Ryder ‘Ohana would *hukilau* or surround the fish:

> The concept of the ‘*hukilau*’ evolved differently, which is a bag net system and then leaves attached to the rope, and then you walk on top of the reef, as the tide is coming up. And then what you do is, you try to corral the fish as they were eating the coral. Mainly, the fish we were getting was the *uhu* [parrotfish; *Scarus perspicillatus*] that feeds on the coral and the algae on the coral. In one day that was that. Unless it was a *pā‘ina* [small party with dinner] that was being done, we would all partake in different chores. To put together all the food. For the gathering. Anything from *kalua*-ing [bake in the ground oven] the pig, to making the raw squid, to cleaning the *wana* [sea urchin; *Diadema paucispinum*, *Echinothrix diadema*], to cleaning the *loli* [sea cucumber; *Holothuria spp.*] and mixing it with the *ina* . . . That’s a condiment you don’t hear, let alone see, and people don’t even know what it is. It’s a sea cucumber that attaches itself underneath the rock. And the brown sea urchin, not the black one, the brown one which is called the *‘ina* [small sea urchin; *Echinometra* spp.]. The black one is called the *wana*. That’s what we mix. We put the two together as a Hawaiian delicacy. So in one day in Kahalu‘u, growing up, as well as still today, we still do that. That’s what my childhood was about. And embracing grandparents, parents, and extended family.

Mr. Ryder eventually left Kahalu‘u to attend college at the University of Hawai‘i at Hilo. His work over the years has included working in the school system as a counselor and doing contract work involving cultural enrichment and cultural restoration. He also acquired two contractor licenses: one in landscaping and the other in general mason work. He has successfully restored family *kuleana* land consisting of *lo‘i* (irrigated terrace) in Kahalu‘u Mauka. In 2007, his contractor license in general masonry work took him to Lāna‘i. He resided on Lāna‘i for six years where he restored a drystack rock wall. While on Lāna‘i, Mr. Ryder and his wife Debbie, a *kumu hula* (*hula* teacher), began a community festival, which included *hula*, crafts, and general community engagement. They have successfully put together five community festivals on Lāna‘i at the Hawaiian Botanical Garden in Dole Park. In 2014, the couple moved from Lāna‘i to Pāhala on Hawai‘i Island to continue their restoration efforts at Hilo‘e Fishpond in Nīnole Ahupua‘a and they continue to put on community festivals. They have done two community festivals in Pāhala since they moved and plan to continue their efforts in the small plantation town.

His connection to Pāhala is through friends he met during the 1970s when he attended school at the University of Hawai‘i at Hilo. He often fished in the Pāhala area. Growing up in Kahalu‘u, Mr. Ryder’s was one of two families who would *mālama* Kahonua Fishpond. He described Kahonua Fishpond as being a wedding attraction today with the *loko* (pond) as a backdrop. Now that Mr. Ryder has relocated to Pāhala, his main focus is to practice sustainability with an emphasis on taro farming and restoration of Hilo‘e Fishpond via his non-profit, *‘Uhane Pōhaku Na Moku o Hawai‘i* (“the embodiment of our ancestors is within the stone”). The non-profit uses the *‘āina* as a tool for healing clients:

> *‘Uhane* is the spirit. And that embodies the stone, which represents our ancestors that lay, well, embraces the all the *moku*, islands. That make up Hawai‘i. So that literally, is the definition of our non-profit . . . our focus is working with juveniles, females right now. We have developed a group home, a safe house, and we’re working with girls first. So that is one of our antidotes or the ingredients of medicine that I kind of symbolize of use. That what we have on the land, that can come up with a good healing. That could be applied to the hurt that these kids have acquired through their life.

Mr. Ryder has acquired approximately 20 acres in Wood Valley, which is 4 miles *mauka* from Pāhala Town to grow *kalo* (taro; *Colocasia esculenta*):

> On the *mauka* land that we lease, is where we’re planting taro in a systematic way. We plant 100 feet by 30 feet rows and we’re going to start that sequence in December [2015]. Now that I was able to get the tractor, so. It’s kind of hard with just a tiller. We harvested already and then when you’re growing dryland, different from growing wetland.

Dryland varieties Mr. Ryder is cultivating include *makokonaueia*, *mana lauloa*, *lehua*, and *mana ulu*. He has also brought back some *lū‘au* (young taro tops) leaf varieties from Moloka‘i to cultivate as well. His plan is to create babies via *huli* (taro top, as used for planting) and eventually share with the community to spread the food source:

> So that’s part of what we’re looking at, to grow the taro, just enough to feed this community, and then by doing a sequence like that, we’ll have enough, and then we’ll sell it to the community for an affordable price, like $5 probably a pound of

> *pa‘i ‘ai* [hard, pounded but undiluted taro], which is about the cheapest . . . So you’ll end up with two pounds . . . When you stretch them. And then we’ll also include a pounder, if you want to learn how to pound *poi*. Like I have all that, the boards.

His involvement with Hilo‘e Fishpond is to restore the *loko* due to environmental disasters that have affected the pond (Figure 29). In particular, flooding, *tsunami* damage, and sedimentation from plantations that once existed *mauka* of the pond. The fishpond was once fed by Pu‘ihau Springs, however, the springs and the area around the springs are now completely covered due to years of diverted debris from the plantation that created excessive erosion; the plantation was run by C. Brewer & Company, Ltd. He also shared a Hawaiian method of utilizing the fishpond and growing *kalo* simultaneously:

> . . . you know, part of the pond down there, because of the fresh water, could be made, where you can raise by mounding, Hawaiians called that *pu‘u* [hill, peak], the *puipui* [plump, stout] style, where you plant the taro around, so you can have the water level rise, where the fish can integrate in and around those mounds . . . So then you can plant the taro on the top of these mounds . . . So that was one way that they cultivated taro in harmony with the fish. The *kuapā* [wall of a fish pond] is generally just one pond enclosure that raises just fish alone. The *lo‘i kalo i‘a* is a combination fish with taro.

Ka‘ie‘ie Heiau is adjacent to the fishpond and stands on a rocky knoll that overlooks the ocean. He connects the *heiau* to the resources of the area (Figure 30):

> I think because of the fishery there had to be an attached to a fishing kind of site. Because of the abundance of the resource and the dependency of the fish. For the diet.

An *alanui* (street, road, highway) spans the back side of Ka‘ie‘ie Heiau and runs north to south. The *alanui* later was converted to a carriage road (Figure 31). Across from the *heiau* is another site which overlooks Pu‘ihau Springs and Hilo‘e Fishpond. Mr. Ryder believes this site is a *ko‘a* or fishing shrine:

> Because of my background in fishing and whatnot, and then looking at the pond there, you know, I think to me, it has those qualities and probably mindset that I think was partly what that was intended for. For giving your gratitude, and giving your prayers, and just being in communion. With their ancestors.

Mauka of the *ko‘a* is a circular enclosure Mr. Ryder believes is a learning site. The enclosure is walled with a paved circular center consisting of *‘ili‘ili* and an upright stone surrounded by medium *pōhaku* (rock, stone) and coral. The entire site is encircled by *naupaka* and overlooks Pu‘ihau Springs and Hilo‘e Fishpond (Figure 32).

Mr. Ryder has acquired a two-year contract with the State of Hawai‘i in conjunction with the Department of Land and Natural Resources – State Historic Preservation Division to remove the debris including invasive plants (such as buffalo grass) and to identify the fishpond and its surrounding features. The second phase of the project is to remove all sedimentation from the water system and to connect the springs and ocean to the fishpond again. Eventually a *makahā* (sluice gate) system will be constructed, regulating fish propagation.

Figure 29. Remnants of Hilo‘e Fishpond with Pu‘u Makanau in left background (CSH 2015)

Figure 30. Entrance to Ka‘ie‘ie Heiau (CSH 2015)

Figure 31. *Alanui* between *ko‘a* (left) and Ka‘ie‘ie Heiau (right) looking towards Kōloa (CSH 2015)

Figure 32. Circular enclosure with *naupaka* (CSH 2015)

Mr. Ryder described other cultural sites along the *alanui* that spans between the *ahupua‘a* of Hīlea and Nīnole:

> The *alanui* that connects Nīnole to Kauwā, you have to pass between the two, Hīleaiki and Hīleanui. It’s about one mile and a half to two miles that connects you all the way to the next village which is Kauwā, and just before that you’re passing the district of the *ahupua‘a* of Hīleanui, which is where the other bridge [project] will be . . . That was the original coastal road, which was the *alanui* that eventually became a carriage road. Which is widened to approximately six feet . . . when you begin to walk in the direction of Honu‘apo, on the *alanui*, that is now *aupuni*—widened road that was mandated by the Monarchy in the 1800s—you will traverse these small little fishing settlements, that maybe, that had maybe, twelve, maybe a population about . . . a dozen people because of the harshness of the environment, the heat, the *a‘a*. But you see those sites all the way along the coastline. At least I’ve been about three areas. Where I’ve seen these small little sites along that roadway that is in close proximity to where we’ve been looking at doing this pond restoration.
>
> . . . so this idea about restoring and doing the fishpond is to empower and to get the community involved . . . because it’s not going to be about raising X amount of pounds of fish so you can make the money, it’s about the learning process and understanding that we have these resources, having the pond and the Ka‘ie‘ie Heiau having those important visual sites, to be able to *mālama* it, to take care, to heal them, to build them, to put them back in preservation, so it can be shared with the community, with visitors.

The abundance of ocean resources is an attribute constantly mentioned in regards to the cultural landscape of the Ka‘ū coastline. Inshore fish includes *enenue* (chub fish; *Kyphosus bigibbus, K. vaigiensis*), *manini* (convict tang; *Acanthurus triostegus*), *āholehole* (Hawaiian flagtail; *Kuhlia sandvicensis*), *moi* (threadfish; *Polydactylus sexfilis*), mullet, and *pāpi‘o* (juvenile crevalle). Pelagic fish include *‘ahi* (Hawaiian tuna; *Thunnus albacares*) and *ono* (large mackerel type fish; *Acanthocybium solandri*). *‘Opihi* was also plentiful due to the roughness of the surf. Unfortunately, there is an issue of overharvesting ocean resources for personal interest:

> All that *‘opihi* comes from the Big Island. And by looking at the shell, you can tell from what districts. So predominantly, a lot of the *‘opihi* is coming from any of three districts, so it can come from the Ka‘ū District, it can come from the Puna District, and it will come from the Hāmākua District. And those are the three major districts. That right now, I think, is sending a lot of the *‘opihi*, that you see in the seafood department at the major food stores, like Foodland, Tamashiro Market.

Due to the limited accessibility of *‘opihi* in the Ka‘ū District, especially in Nīnole Ahupua‘a, the rocky terrain and high surf prevents overharvesting. *Limu* is also plentiful. Species found on the shores of Nīnole Ahupua‘a include *limu kohu*, *limu kala*, *līpoa*, and *limu pahe‘e*. Mr. Ryder has not come across the *huluhuluwaena* or *manauea* varieties. When harvesting, he instructs to “snip” and “not pull” to keep the root intact for regeneration. *He‘e* (octopus) can be found on the south side of the *ahupua‘a* near Wai‘ōhinu. During the spring, *he‘e* reproduce. Larger *he‘e* can be found during the months of August to December at a larger weight of four to six pounds.

Mr. Ryder also described the various ways he prepares dishes with the marine life he catches and/or gathers:

> When we make our condiments, when we make our fish, we use the *limu*, when we make our *lomi* [massage, knead] salmon . . . When I make *lomi* salmon, we put, I put the *limu kohu* inside. I put the *wakame*. We make ours a little different. And then we also have an *ahupua‘a* salad . . . so that’s a combination of fern shoots . . . the *hō‘io*, the Hawaiians call it *warabi* . . . Mix that. Put tomato, put onion, put *limu*, put *limu kohu*, some people put *‘ōpae* [shrimp], and then the *wakame*, so that’s the dry seaweed, the Japanese one, the one they put in *miso* [traditional Japanese season produced by feremented soybeans] soup.
>
> Even with the *lomi* salmon, it makes a nice color contrast, when you make Hawaiian food . . . But, see these are all traditional stuff . . . It’s not the normal *lomi* salmon, like how everybody knows it. It’s a little bit creative.
>
> . . . *‘ōpelu* [mackerel scad; *Decapterus pinnulatus*] we eat it raw, mainly raw. We use the insides, when you make it, the gills. Because you have all the blood. And the kidney and the heart. Then you squeeze all the blood that it holds. And then you put it all on the fish . . . So you put even more, if you like that blood taste, because that has a lot of the health benefits. It gives you a lot of the iron. That’s the true way like the old folks how they used to eat it. Then you dry it . . . Because everybody loves the dried *‘ōpelu*. Then the other kind fish we fry.

Mr. Ryder’s main concerns regarding the project are minimizing erosion that would occur during the construction period and the use of excess stones from the construction and erosion. The excess stones stemming from construction and erosion could be utilized by Mr. Ryder and his organization in restoration efforts. Mr. Ryder referred Alvin Kailiawa, Earl Louis, Demetrius Oliveira, and Ka‘ū Kākou for consultation on the current project.

5.4.2 Earl Louis

CSH met with Earl Louis at Kohāikalani Heiau on Pu‘u Makanau in Hīlea Ahupua‘a on 16 December 2015. Mr. Louis was born and raised in Pāhala, a small plantation town located in Nīnole Ahupua‘a, northeast of Hīlea. His father was a plantation worker and his mother was a healer. He had four older brothers. On the weekends, Mr. Louis recalled hiking into the mountains:

> We used to go to the forest. So, I really when enjoy being in the mountains. You know, how it evolves . . . we learned a lot of things, and that was part of living off the *‘āina*, so. Live sustainable, self-sufficient living. One of the purposes. Like some weekends we went to the ocean, to Kamehame to catch fish, throw *‘upena* [fishing net]. We lived off the ocean too. I remember doing that. My parents was always going outdoors and doing . . . taking us to sacred places.

His mother was from Kona and they would sometimes visit his maternal grandparents. His maternal grandfather, Anon Kealamakia, was a principal at Hōnaunau School in South Kona. His maternal grandmother was a *lawai‘a* (fisherman) specializing in catching *‘ōpelu*: “She used to go in the canoe and catch *‘ōpelu*. That was her whole practice of doing things. I remember going to her house and eating *‘ōpelu* when I was a small little boy. With *poi* [cooked and pounded taro]. Kerosene stove they had at that time.”

He pointed out that his grandmother and mother would often converse in *‘ōlelo Hawai‘i* (Hawaiian language) but attended Christian church services on Sundays and fellowship meetings. But even though they practiced Christianity, his mother practiced *hunamana* (Hawaiian healing practice). She applied her skills of *hunamana* on family members including Mr. Louis. He added that his mother knew he was special and often referred to him as “my Hawaiian son”: “I look more Hawaiian than my brothers. My brother, my older brother looks Hawaiian too. Dark. My other brothers look more Portuguese. My mom used to call me her Hawaiian son . . . They knew [on being spiritual]. But they all knew it.”

He shared his memory of having a bad accident and nearly losing his life:

> I had an accident that happened to me during my younger life, when I was in my early twenties . . . almost time for me to leave. You know, I had a major break in my femur bone. Guess who found me? One pure Hawaiian man found me. His name was Richard Kaukini. So you know, when I got accident, hurt on the job . . . he said he wasn’t going to drive that way, but this *‘uhane* came to him, telling ‘go that way, find this boy.’ And he told me the story. He not going pass there, but this spirit told him ‘Go that way!’ And when he found me, my leg was all swelling. If he no find me, I no be here talking to you right now. But he found me and it was not my time to go yet. So my purpose, evolving from that purpose, going through my twenties, and reaching my thirties.

Shortly after losing his mother, Mr. Louis met his wife. After her passing, his place of solace was at Black Sand Beach. This is where he met his wife, Keolalani (“the life of the heavens”). Her *‘ike* (knowledge) and healing powers assisted him in the mourning of his mother’s death. Although the couple was unable to have children of their own, Mr. Louis emphasized that children loved his wife. She began a summer program for *keiki* (children) called Kukulu Kumuhana o Kaʻū at Punaluʻu, which serves children ranging from seven to 17 years old. The program focuses on assisting children to develop life skills that strengthen their identity through Hawaiian values with a hands-on approach. Despite the passing of Keolalani, the program continues to thrive via the *kōkua* (help) of donations that cover meals, lessons, medical care, and educator costs.

The district of Kaʻū is larger than the island of Oʻahu with one of the biggest forest reserves in the state. Many caves, hiking trails, fresh spring water, and distinctive species such as *koa* (*Acacia koa*) exist within the *moku*. “It’s so beautiful and pristine. It’s untouchable. Some places are so beautiful,” Mr. Louis exclaimed. The dividing line between Kaʻū and South Kona is the *ahupua‘a* of Manukā. It’s evident Mr. Louis has a profound and spiritual connection with the *moku* of Kaʻū including Kohāikalani Heiau, which sits atop Puʻu Makanau. He believes his existence and purpose is to *mālama* (to take care of) Kaʻū:

> So, that was already the first day, the first *hā* [breath] that we take. You know. The intuition of us start to grow, but as a child, who comes up, I always knew that I was connected to Kaʻū, from the *‘āina* itself. So, by going through adolescence, as a child, and growing up until, I came older . . . Yeah, we knew this place was special.

Approximately four years ago, Mr. Louis and Demetrius Oliveira, another resident of Pāhala, began vegetation removal and restoration on the Kohāikalani Heiau. The pair approached the landowner, Ed Olson, who bought the former sugar lands from C. Brewer and Campbell Estate in 2000, to see if they could begin restoring the site. A lot of the *heiau* has been destroyed by the

former plantations, which cleared the land for sugarcane crops. Today, a portion of the retaining wall exists with remnants of paving on the back side. Christmas berry, ti, strawberry guava, and some *mai‘a* (banana; *Musa xparadisciaca*) can be found at the site. When they first began vegetation removal, the majority of the site was covered in Christmas berry:

> The rockwall was all vegetation on it . . . It was all covered up. So, eventually that guava tree is going, because we gotta restore the wall. And part of the Christmas Berry tree, that gotta go too . . . But the rest, we'll keep it for canopy for now. For . . . Keep the rain. And we'll plant *kukui* [candlenut; *Aleurites moluccana*] trees and native trees around here.

When Mr. Louis and Mr. Oliveira began to do research on Makanau, Pāhala resident and cultural practitioner Kawehi Ryder found out that *‘uala* (sweet potato; *Ipomoea batatas*) was originally planted and grown on the hillside of Pu‘u Makanau (Figure 33 and Figure 34). Mr. Louis plans to plant the hillside with *‘uala* and *kalo* (taro; *Colocasia esculenta*). The pair believe there was a second retaining wall that has now fallen away. They refer to the late historian and anthropologist Marion Kelly who wrote the report *Majestic Ka‘ū: Mo‘olelo of Nine Ahupua‘a*, which chronicles the pre- and post-Contact history of the *moku*. In her report, Kelly supplies the dimensions of the *heiau*, a feat that Mr. Oliveira states could only be done "if it was still semi-intact."

The *heiau* was originally designated as a war temple. Later, during the *ali‘i* Kohāikalani's reign, the *heiau* was designated as a *luakini* (sacrificial) *heiau*, but no blood was ever shed on the site. As the pair continues to restore the *heiau*, they note that things have come together. They pointed out this is no coincidence, but rather a spiritual plan, from assembling fencing to extra help materializing to work on cleaning the area. They have also learned more about the *heiau* based on cleaning and observing. They have found a piece of coral, a common marker used to designate a religious site or burial according to cultural practitioners; old bottles; and *‘ili‘ili* (pebble), which the pair remarked can only be found near the ocean; they note someone had to transport the pebbles *makai* to *mauka* making the site intentional.

Another *heiau* Mr. Louis discussed is located at Ka Lae, also known as South Point. Ka Lae is the southernmost point of Hawai‘i Island and is still within Ka‘ū Moku. Kalahea Heiau is located at the very tip and is intact today. Mr. Louis pointed out that if you look at the ocean from Ka Lae, you can see a line where the two currents converge. At a certain time of the year, the current at Ka Lae can take you to New Zealand. Mr. Louis continued to discuss the area:

> So the story of Ka Lae, it's a powerful place. It's one of the oldest spots of Hawai‘i. A lot of the ancestors arrived there. With *nā wa‘a* [canoe]. Even Nainoa Thompson came there with his Hōkūle‘a, so that place is really respected, the southern point of this island. There you get a lot of burial sites . . . You do archaeological work. You got a lot of *heiau* that is in Kamehameha lands. It's a powerful place. It's all connected . . . Pu‘u Ali‘i . . . We got *iwi kūpuna* [ancestral bones] there. And then we have a hole in the ground that we call Palahemo.

According to Mr. Louis, another important site within Ka‘ū district is Palahemo. This "bottomless" watering hole consists of green water and can be found east of the southernmost tip of Ka Lae. Slightly northeast of Palahemo is Mahana Bay, a green sand beach. The green sand is made up of olivine, a mineral that occurs in basalt, peridotite, and other igneous rocks.

Figure 33. Photo taken atop Pu‘u Makanau looking down on the *ahupua‘a* of Nīnole (CSH 2015)

Figure 34. Photo taken on Pu‘u Makanau looking down on Hīlea Ahupua‘a and towards Ka Lae (CSH 2015)

A *wahi pana* that Mr. Louis pointed out is Kūmauna, an area found behind Pu‘u Makanau (Figure 35). The area consists of streams, waterfalls, and pockets of quick sand. Mr. Louis relateed the story of Pele and Kūmauna, *kahuna* (priest):

> One time Pele and Kūmauna came here in the beginning. And he said, ‘You know, I reside in Ka‘ū,’ and then Pele said, ‘Yeah,’ to Kūmauna, ‘You can reside here. So, what you picking? What you going get?’ . . . So Pele told him, ‘If you bring your bananas, I’ll let you go up in the back of these *pu‘u*s here and reside here, Kūmauna.’ So he when plant his bananas, and, you know, he didn’t her . . . This is the story that I heard from my mother-in-law and my father-in-law. This is what . . . I’m just telling the story what they told me. I’m repeating their story. They’re *kūpuna*s. They told me that, you know, Pele never . . . you know, that Kūmauna didn’t give her the first bunch of bananas . . . The first bunch of bananas. So she when turn him into one *pu‘uula*, one rock . . . They when battle, when battle eh and she turned him into a rock, so. His rock was right there by the water pool in back of this *pu‘u*. So, in that time, when the Hawaiians came up, when Ka‘ū became dry and windy. At certain times they didn’t get rain. So the people in the *kuahiwi* [mountain, high hill] yeah, in the inner lands, the ones who live there, come up to the *pu‘u*, they still go up, to Kūmauna and give him offering of *‘opelu*, from the ocean you get this special *‘opelu* [*Lobelia hypoleuca*] grass . . . It’s a silver grass that Kūmauna liked for offering. So they would *oli* and chant and ask him for *ua*, rain. So when they gave him that, the rain would come. Oh, it would come, and they were grateful and thankful. And those Hawaiians that live in that area could levitate, they could float, they could do *hunamana* because they were magical.

When Kau Sugar Company first opened, one of the first plantation owners visited Kūmauna *pōhaku*. As Mr. Louis described it, “And so, that arrogance, or the ego in the Western belief, ‘Why don’t we break those stones?’” One night the owner got drunk and hiked to Kūmauna, setting dynamite into the rock:

> So the town of Hīlea with the bridge, where they’re going to repair, had a great flood . . . So the gulch here, on the left hand side of us, get one gulch. Above Hīlea, right here, Hīlea Gulch. It say right here . . . Stay right on the side of this mountain, so this river that’s running down here, is going to . . . to the bridge. So the gulch is right here. So, a flood of water came down and when flood out the town of Hīlea. So, I don’t know where that man was, he was living on the side of this gulch. His home when get destroyed. Yep, the stones and the flood came through. They found him dead and the pigs was eating him. That is the *mo‘olelo* of Kūmauna. The wrath of him.

Today, the *pōhaku* can still be found in the Hīlea Mauka with a chunk of the rock missing. Mr. Louis and Mr. Oliveira make it clear that the *pōhaku* still exists.

During the plantation era, residents normally stayed in their own *ahupua‘a* where they resided. Mr. Louis described this practice as being “a little bit military like.” Many times residents gathered within these confines *mauka* to *makai*:

Figure 35. Photo taken from the backside of Pu‘u Makanau looking towards Kūmauna (center) (CSH 2015)

> The people just stay in their *ahupua‘a*, but when the plantation days came, this side was considered Nā‘ālehu people side. From the Pu‘enuhe that way back to Kāpapala, that was for Pāhala. So Pāhala them never come this side. It was a territorial thing. So this was belonged to the town of Nā‘ālehu. People that lived in the town of Nā‘ālehu, this was their mountains.

Prior to the plantation days, people hunted in the *mauka* sections for pig, wild turkey, pheasants, and doves. In the *makai* sections, people hunted for goats on sea cliffs and turtle. In 1978, green sea turtles were listed as threatened under the United States Endangered Species Act. Since then it is illegal to harass, feed, hunt, capture, or kill the *honu* (turtle). Mr. Louis described how they prepared turtle prior to the ban in 1978:

> . . . my dad and his friend would cut the head and take out the veins and . . . And they cut off the back feet out and then they would just take the meat from the top, but in the middle, where the shell was, no had meat. Yeah, it was kind of all intestinal things, whateva. Was fat. Mostly it was the veins and the . . . Get little bit, but not that much. On the shell got mostly . . . Because of the blubber, but I remember because it was green meat. *Limu* yeah [what they ate]? It was very good, you barbeque them and make stew. Yeah, yeah. Soft like a barbeque . . . You make ‘em from the Hawaiian way. Make them like the *lū‘au* and throw the *kalo* leaf inside.

The pair pointed out there is an overabundance of turtles, which have now begun to deplete the *limu* and other fish resources. Now the fish are unable to eat, which throws off the balance of resources. Other *makai* resources include *‘opihi*, *‘a‘ama* (black crab; *Grapsus grapsus tenuicrustatus*), *limu kohu*, *manini*, and *āholehole* (Hawaiian flagtail; *Kuhlia sandvicensis*). They noted there has been an increase of outsiders coming to the coastal areas via jet skis to pick *‘opihi*. A lot of times these outsiders are not gathering for personal consumption, but rather for profit. Mr. Louis stated, “People need to go back to *kapu* [taboo, prohibition] times, when the fish spawn and you cannot hunt the fish . . . Yeah, yeah at a certain time of the year.”

Mr. Louis has no concerns about the project or project area. He stated that both bridges were built during the 1940s and it is time to repair them. He pointed out that there are many accidents and lives that have been lost at Hīlea Bridge. When asked if any *iwi kūpuna* are in the vicinity of the bridge, he stated that the area is a flood zone, so if any *iwi* existed it would be swept *makai*. Kūmauna is connected to Hīlea Bridge in terms of the waterway that passes by the *pōhaku* and below the bridge. Figure 36 is a compilation of *wahi pana* in Nīnole and Hīlea Ahupua‘a Mr. Louis and Mr. Oliveira pointed out to CSH during the interview process.

5.4.3 Demetrius Oliveira

CSH met with Demetrius Oliveira at Kohāikalani Heiau on 16 December 2015. The *heiau* is located atop Pu‘u Makanau, a hill located in the *mauka* section of Hīlea Ahupua‘a. Mr. Oliveira was born and raised in Pāhala, a small plantation town in the neighboring *ahupua‘a* of Nīnole. He is the youngest of five children. He has four sisters. His paternal grandparents are Manuel Oliveira and Abigail Kanakaole. They both came from Kapāpala Ranch, which is located in Ka‘ū Moku. His mother, Momi Ahia, is from O‘ahu. His mother’s family is originally from Ka‘ū. His mother worked for Volcano House for a little while, but her primary job was a homemaker and healer:

> We grew up doing healing work—spiritual. My mom used to do *opu ka huli* [turning of the stomach], *lā‘au kahea* [type of faith healing of broken or crushed bones or sprains], all kinds of . . . But, people would constantly come to the house. Like, we’re talking about every other day, we would have someone coming, if not from Ka‘ū, from some other island or someplace far way, come to be healed.

His mother learned from her mother, Jeannie Kaehukaiopuaena Ahia. His grandmother learned from her father, Sylvester Kamakaiwa Kepelino, whose specialty was in *lā‘au kahea*: “He would pass his hand over the person and he would just *hā* [makes *hā* noise] and their bones would fuse back together. So he was always in our family, doing that type of *hunamana*—healing.”

Mr. Oliveira noted that although he has four older sisters, they are only coming into their *‘ike* now. He was the designated person within his *‘ohana* to carry on the *kuleana* of spiritual healing and guidance. Training and gathering for this entailed the following:

> We did some of that with my mom [gathering]. We were taught the protocols with gathering *lā‘au* [medicine]. You only gathered it earlier in the day, when the sun was coming up. And you gathered it from the side of the tree where the sun would hit it at first sun in the morning because it was *ola* [life]. And by lunchtime, because the sun is over. You know, what was taught to us, was if you’re kind of tired by lunchtime, then the *ola* of the plant would be also be kind of waning. So if you do your gathering early in the morning. And you always do *pule* [prayer] and you’d ask. And even if you went up to the plant, you’d *pule* and you’d ask. You know, before gathering.

A musician by trade, Mr. Oliveira played in the band Ka‘ū and recorded an album in 1998-1999. Today, his spiritual healing and training are his primary pursuits while his music has taken a back seat. Raised as a Christian but practicing *hunamana,* Mr. Oliveira’s mother melded the two religious practices:

> They didn’t see any conflict between being Christian and practicing the healing aspects of our culture . . . Because it worked together. Of course, others in the community, you know, think that our family, they thought that my mom was a witch . . . But you know what? It was those church-going people who would come to our house . . . A big part of the actual *hunamana*. There’s a lot of battling or binding of the dark forces in the dream world.

He explained this metaphysical process: “They believe there’s energy or spirit behind them. So then, they have the physical warriors that stand on the front line—they fight. And the *kahuna* who stands behind and works with those energies, behind those movements.”

The first step in spiritual healing is to believe in the possibility of healing spiritually: “That space that void, the universal law, all void shall be filled. And if you can even be open to the possibility that it’s possible—it’s a matter of time before an energy will come to fill that space. To manifest. It becomes real.” Spiritual healing should not be for “the sole purpose of gaining *mana* [divine power].” Another aspect is aligning yourself with like-minded individuals:

> When you’re in a group of people that nurture that same style, like the *kahuna*, they would have groups or colonies of *kahuna*, and they would live together and practice

> together, there is a synergism, there is a synergistic kind of energy that helps to nurture the development.

Pu‘u Makanau is also one of four energy points in Ka‘ū Moku. The other three include Punalu‘unui, Lanipau Heiau, and a Buddhist temple in Wood Valley. According to Mr. Oliveira, the Buddhist monks chose the site of the temple because they felt the energy of that area:

> And where they interact [these four energy points], is really important, where really important vortexes open up. And there are some places where there is entrances to Pō [the realm of the gods] . . . Where it's *kapu*, you know at Waipi‘o Valley, have one, where the river comes down . . . There's so much drownings that happen there, in that area that area where the entrance is to Pō. A lot of people have died and drowned there. So, we consider it as a kind of like a negative, I like only say negative because like I think of a positive negative. But some places are *kapu* that you wouldn't want to go . . . But this is more of like one healing . . . vortex. Healing . . . energy.

Earl Louis, a long-time resident of Pāhala, and Mr. Oliveira received a vision approximately three years ago that they would be the caretakers of Kohāikalani Heiau:

> When we approached the land owners, Ed Olsen. And the *kūpunas* gave us the vision of what it would happen, how to do it, how to go about approaching these guys . . . [*kūpunas*] From another realm, yes, the ancestors. And everything that they showed us . . . what we didn't get was the timing. Because that one thing about the vision that hard to judge, if it's near future or far in the future. But, three years ago, we approached it. It was the day before my birthday and then a year later on my birthday, a second time, and then we're now we're up here actually cleaning it. But everything that the ancestors have shown us, that would happen, as we're doing it, is happening, from the help coming from nowhere, to the help with the fencing, and the cleaning . . . There's no ego with this group. It's weird, it's like, the people who have knowledge in stone building . . . when they come and they share their *mana‘o*, everybody else respect . . . Everybody's kind of . . . if you have knowledge in one area, there's no ego in the group at all . . . It's just like, a natural flow.

The initial steps included clearing the rock wall, which was covered in vegetation. The majority of the wall was covered in snarling Christmas berry. Some of the Christmas berry has remained for canopy, but will be removed in the near future and replaced with native trees such as *kukui* and *‘uala*. After conducting research, fellow Pāhala resident Kawehi Ryder discovered the *heiau* was once covered in sweet potatoes. Mr. Oliveira added, "So we want to bring back those things. Things to grow." The slope of Pu‘u Makanau is ideal for sweet potato and *kalo*.

Mr. Oliveira believes the *heiau* was much larger than it is today. He believes a second retaining wall enveloped the current structure, but that outside wall has since fallen away. He referenced the late anthropologist and activist Marion Kelly and her report, *Majestic Ka‘ū*, which chronicled the pre- and post-Contact history of Ka‘ū Moku and the nine *ahupua‘a* within that district. In the report, she provides the dimensions of Kohāikalani Heiau. Mr. Oliveira mentioned, "The only way she could have done that [record the dimensions of the *heiau*] was if it was still semi-intact."

The *heiau* is named after the chief Kohāikalani. However, prior to his rule the *heiau* was designated as *luakini* and used as a war *heiau*. The site is paved with *‘ili‘ili* that have been intentionally brought up from the shoreline.

So far, only a dozen people have visited the site including Mr. Oliveira’s family, which consists of his sisters, nephews, and nieces. Another Hawaiian family has shown interest in visiting the site as well. Mr. Oliveira and Mr. Louis have been passing out copies of a map from the 1800s that contains *kuleana* lands with family names connected to these parcels in hopes of putting these *‘ohana* back on their *‘āina* to restore these areas. An issue they face is that many of the families are scared to help because of supernatural occurrences:

> The ancestors that are here, the ones that have come to us, they are all in white and they have this huge white, pure white dog that was seen. And there are also *mo‘olelo* that talk about this dog that was seen, seen running from the mountain, and it’s as big as a horse. It’s a gigantic dog. It runs from the mountains all the way down to Punalu‘u. I’ve seen the dog. And there was some when they purchased this place . . . And there was some *po‘e haole* [foreigners] that came up and I remember I came up with one of the groups because I wanted to monitor who was coming up. And this one group of people I told them, ‘Do not walk into the *heiau*,’ ‘cause I lived here all my life and I’ve never been beyond this wall . . . And the people go, ‘Oh, don’t tell us, we know,’ . . . It’s kind of like . . . No *po‘e haole*. They just walked in. I was like . . . they stepped over the water and said, ‘Oh, see. Nothing, nothing.’ They went home that night and all of them had dreams of seeing the dog, but it was pitch black . . . And snarling at them . . . So they call me up and said, ‘Oh D, I think we offended someone.’ I said, ‘No shit.’ I was like I told you guys, ‘I’ve lived here all my life and I’ve never been beyond this wall,’ you know what I mean? So I told her what to do, what she needed to do, do this ancient ceremonial, finding this *Puolu*, a *pōhaku*, and asking for forgiveness and then taking it and bury um. Bury um. Because that way, any energy that gets sent to her, goes to the *pōhaku*. It’s like a decoy, don’t go to her. So she did that and everything kind of shift and now she comes up and she helps clean. But now she has great respect for this place . . . And I told her, ‘All my life I’ve seen that dog, he’s been pure white and beautiful.’ She said she saw black and it was like pitch black and snarling at her . . . Even like the guy that was filming, the camera guy, that was filming. I told him not to film. He was secretly running his film, and he’s a Hawaiian, running his film up in the mountain acting as if he wasn’t. ‘Oh no, I’m not filming with this camera.’ He said, when he got home, the camera only work up to the gate, coming up the backroad, up to the gate. As soon as they entered in, it was pitch black—no audio and no video. Then he came up here and then he went back down and the audio and video worked at the gate. So I said, ‘I told you so a couple of times.’

Mr. Oliveira continued to emphasize that many occurrences are not coincidental, but are meant to be. He recalled how he met Kawehi Ryder several years back at the Lāna‘i Music Festival:

> It’s interesting the story of Uncle Kawehi, when they were still living on Lāna‘i, four years ago, and when the spirits, when the ancestors came to us, about restoring this place, we needed help. So I went . . . I played music on Lāna‘i in the Lāna‘i

> Music Festival. When I went, I went to uncle’s *ahu* [altar]. He said, ‘Oh good.’ I wanted to go and make one offering. So when I went and made an offering on the *ahu*, I asked the *kūpuna*s of Lāna‘i, if they would allow Uncle and Aunty to come to help us, because we need help in Ka‘ū. And when we were leaving, they told me, ‘Take all the pictures you can, because you’re not ever coming back here again.’ So, I called the group of *hula* girls, who had come from Ka‘ū, ‘Take all the pictures you guys can, because we’re not going to come back to Lāna‘i. I don’t know why.’ As we were leaving, the dolphins were breaching and it was just a powerful experience. We came home, and it wasn’t about like about a week or two later, and we get a phone call. Uncle Kawehi is leaving Lāna‘i. They’re looking for one place to live, and they want to live here . . . So I was just like, I just wanted to borrow them . . . And then, Uncle guys is so well versed and educated in doing this type of restoration project.

Prior to their meeting on Lāna‘i, Uncle Kawehi Ryder had traveled to Ka‘ū approximately five or six years earlier. He hiked to Kūmauna, an area in back of Pu‘u Makanau, and picked a special variety of bananas that grows only in the *mauka* section of Ka‘ū. Mr. Oliveira added that Kūmauna’s banana patch is sacred and that Mr. Ryder is special as he was allowed to enter the patch, pick the *mai‘a*, and replant them in his yard in Pāhala. Mr. Oliveira shared a *mo‘olelo* regarding Kūmauna:

> Kūmauna, when he came, he came with, he set up his, his banana patch was actually a sacred community of *kahuna*s. And the story was that he didn’t want to give a banana to Pele, it was actually, Pele had an eye for one of his *kahuna*s. She wanted him. Pele gets what Pele wants . . . She wanted one of his *kāne* [men], it was this very powerful *kahuna*, and he said, ‘No, that’s mine.’ It wasn’t a community of *kahuna* tucked away from everybody, it was a training area. But the cover story, there’s always a cover story, so it’s about the sacred banana patch and he never like give it to her. It was actually one of his own *haumana* [student]. That’s the *kaona* behind the story.

Again, the relation of the *mo‘olelo* to the meeting of Uncle Kawehi Ryder underscores that correlations are not happenstance but destiny.

Another special area within Ka‘ū Moku is Ka Lae, commonly known as South Point, which is the southernmost point on Hawai‘i Island. Mr. Oliveira stated, “They all say the *kūpuna* always used to say, ‘You’ve never seen Ka‘ū, if you’ve never been to Ka Lae.’ You need to actually swim in the water, to say that you’ve been to Ka‘ū. It’s like this old saying. And the water will turn red when the *‘ōpae* comes up. The whole water will turn red.” Slightly east of Ka Lae is an area known as Pu‘uali‘i, where many archaeological sites including *heiau* are located. Northeast of Pu‘uali‘i is Palahemo, a “bottomless” hole that contains greenish water. The *mauka* sections of Ka‘ū Moku consist of pristine forests and bottomless caves that Mr. Olivera described as “you can literally drop a car into it.” The *mauka* region, especially in Hīlea Ahupua‘a, has an abundance of water. The waterway that flows under the Hīlea Bridge stems from the upper regions near Kūmauna.

The upper portions of Hīlea are also used by hunters who hunt for pig, pheasant, wild turkey, and dove. In the *makai* region, turtle was a favored protein when it was legal to catch for consumption. Mr. Oliveira recalled the meat being green; it was used in stew with *lū‘au* and

pa‘akai (salt). In 1979, the green sea turtle was listed under the United States Endangered Species Act outlawing the practice of harvesting. Because of the ban, there is now an overpopulation of turtles that Mr. Oliveira believes is “throwing off the balance” of the marine eco-system. The excessive turtle population has created competition in dietary needs with fish. The area is also abundant in *‘opihi*, however, many people not from Ka‘ū Moku ride in the area via jet skis to gather:

> Get outsiders that come in. They’ve been coming in on jet skis along the coast, and they pick *‘opihi* . . . From outside, like Hilo or Kona side. You don’t even see them . . . You don’t even see them come down to the beach. They come in along the shore on jet skis. They just rape the land.

In regards to the project, Mr. Oliveira had no concerns or recommendations. Figure 36 is a compilation of *wahi pana* in Nīnole and Hīlea Ahupua‘a Mr. Oliveira and Mr. Louis pointed out to CSH during the interview process.

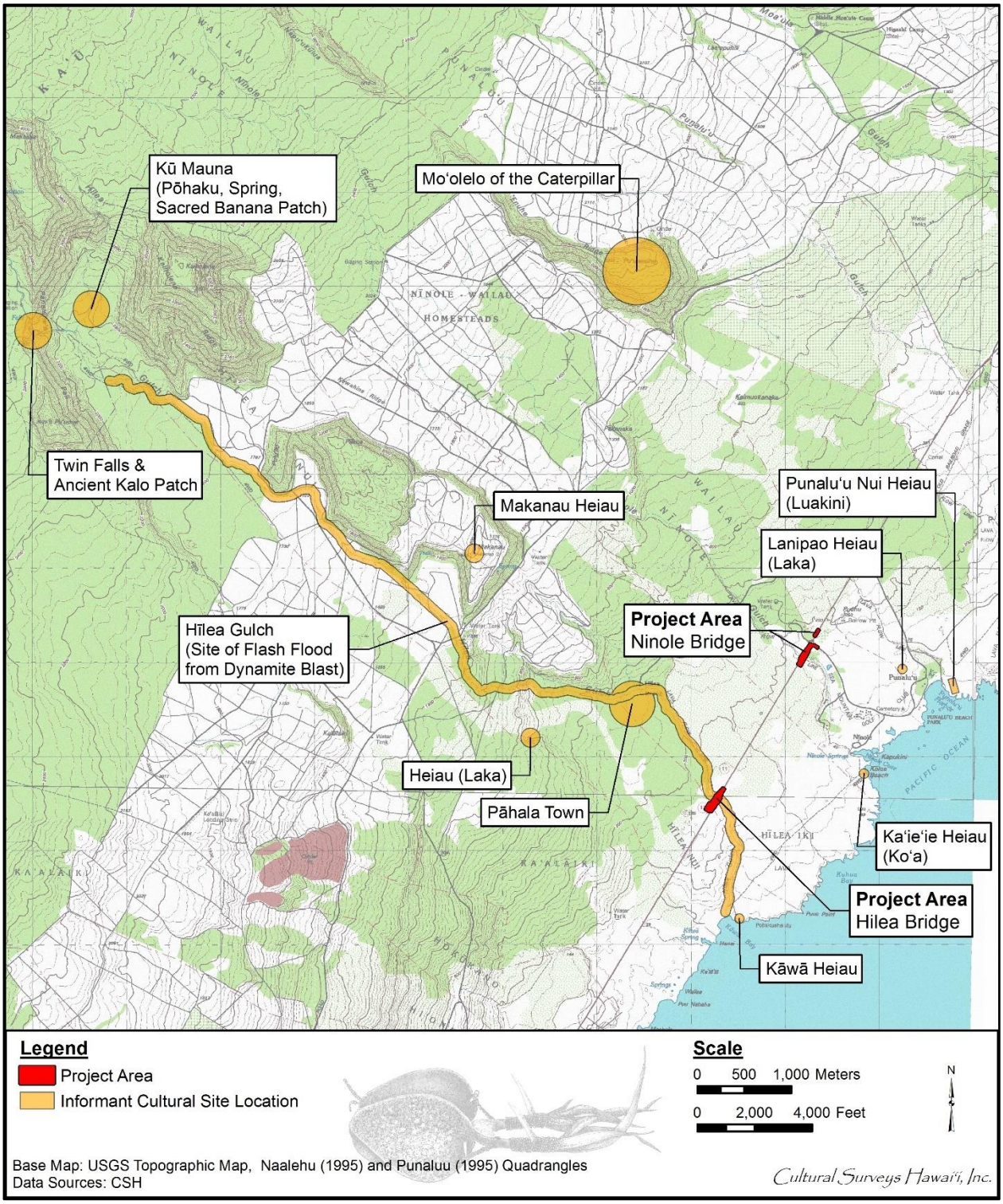

Figure 36. 1995 USGS Topographic Map, Naalehu and Punaluu Quadrangles, depicting *wahi pana* pointed out by Mr. Earl Louis and Mr. Demetrius Oliveira

5.5 Summary of *Kama‘āina* Interviews

CSH interviewed Kawehi Ryder, Pāhala resident specializing in the restoration of cultural sites and community engagement who runs the non-profit organization ‘Uhane Pōhaku Na Moku o Hawai‘i; and Earl Louis and Demetrius Oliveira, residents of Pāhala who *mālama* Kohāikalani Heiau on Pu‘u Makanau.

Mr. Ryder’s organization focuses on working with female juveniles and putting them back on the *‘āina* as therapy. Mr. Ryder has acquired approximately 20 acres in Wood Valley located *mauka* of Pāhala, to grow *kalo*. He plans to plant various types of *kalo* with hopes of eventually providing *pa‘i ‘ai* at an affordable price in conjunction with workshops instructing how to pound *poi*. His involvement with Hilo‘e Fishpond is two-fold. He currently has a two-year contract with the State of Hawai‘i in conjunction with the Department of Land and Natural Resources – State Historic Preservation Division to remove debris and to identify the fishpond and its surrounding features. The second phase of the project is to remove all sedimentation from the water system and to connect the springs and ocean to the fishpond again. Eventually a *makahā* will be constructed to regulate fish propogation and water flow. Mr. Ryder envisions his program, the restoration of the fishpond, and the planting of *kalo* to “empower and to get the community involved.” He emphasized that “it’s about the learning process and understanding that we have these resources” rather than the money that will be made from these resources.

All three interviewees stressed that the Ka‘ū coastline is abundant in aquaculture. Inshore fish include *enenue*, *manini*, *āholehole*, *moi*, mullet, and *papi‘o*. Pelagic fish include *‘ahi* and *ono*. *‘Opihi* is plentiful due to the roughness of the surf. Unfortunately, there is an issue of overharvesting *‘opihi* for personal consumption and capital gain. Mr. Ryder stated that a lot of the *‘opihi* available in the marketplace comes from the Big Island. The three districts the majority of the *‘opihi* come from include Ka‘ū, Puna, and Hāmākua. He added that by looking at the shell, you can tell exactly where the *‘opihi* came from. Mr. Demetrius Oliveira added that people outside the Ka‘ū district have been coming in via jet ski along the coast. *Limu* is also plentiful along the shores of Nīnole and Hīlea. Varieties found include *limu kohu*, *limu kala*, *līpoa*, and *limu pahe‘e*. *‘A‘ama* has also been spotted along the shoreline. Mr. Louis and Mr. Oliveira once ate turtle regularly until they became protected in 1978 under the Endangered Species Act. Mr. Louis either barbequed the turtle meat or used it in stew. When used in stew, it was made *lū‘au* style with *kalo* leaves.

Many *wahi pana* were visited or pointed out during consultation. Hilo‘e Fishpond was once fed by Pu‘ihau Springs, but it has since been covered by debris from the plantation once run by C. Brewer & Company, Ltd. Ka‘ie‘ie Heiau is adjacent to the fishpond and can be found on a rocky knoll that overlooks the ocean. An *alanui*, a historic trail converted into a carriage road, spans the back side of the *heiau* running north to south. Across from the *heiau* is another site that overlooks the former site of the spring and the fishpond. Mr. Ryder believes this site is a possible *ko‘a* or fishing shrine:

> Because of my background in fishing and whatnot, and then looking at the pond there, you know, I think to me, it has those qualities and probably mindset that I think was partly what that was intended for. For giving your gratitude, and giving your prayers, and just being in communion. With their ancestors.

Mauka of the *ko‘a* is a circular enclosure. Mr. Ryder believes this is a learning site. The enclosure is walled with a paved circular center consisting of *‘ili‘ili* and an upright stone surrounded by medium *pōhaku* and coral.

CSH met with Mr. Louis and Mr. Oliveira atop Pu‘u Makanau located in Hīlea Ahupua‘a. At the very top of the *pu‘u* is Kohāikalani Heiau. A lot of the *heiau* has been destroyed by the former plantations of the area run by C. Brewer and Campbell Estate. Today, a portion of the retaining wall exists along with remnants of paving on the back side. The site is strewn with Christmas berry, ti, strawberry guava, and some *mai‘a*. The outside of the *heiau* is surrounded by grass and cows that still graze on the surrounding lands. Both Mr. Louis and Mr. Oliveira are actively cleaning the *heiau* by removing vegetation. Mr. Ryder conducted research and found that Makanau was once covered in *‘uala*. Mr. Louis and Mr. Oliveira plan to restore the area to what it once was by planting sweet potatoes and taro.

Other *wahi pana* pointed out in Ka‘ū include Ka Lae, commonly known as South Point, which is the southernmost point of Hawai‘i Island. Kalahea Heiau is also located near Ka Lae and is still intact today. According to Mr. Louis, if you look out at the ocean from Ka Lae, you can see a line where the two currents converge. During a certain time of the year, the current can take you to New Zealand. Pu‘u Ali‘i is located to the northeast of Ka Lae and contains *iwi kūpuna*. Palahemo, which is in the vicinity of Pu‘u Ali‘i, is described as a “bottomless” watering hole consisting of green water. Near Palahemo is Mahana Bay, an olivine sand beach.

Mr. Louis also shared a *mo‘olelo* concerning Pele and Kūmauna, a *kahuna* who resided in the *mauka* region of Hīlea Ahupua‘a:

> One time Pele and Kūmauna came here in the beginning. And he said, ‘You know, I reside in Ka‘ū,’ and then Pele said, ‘Yeah,’ to Kūmauna, ‘You can reside here. So, what you picking? What you going get?’ . . . So Pele told him, ‘If you bring your bananas, I’ll let you go up in the back of these *pu‘u*s here and reside here, Kūmauna.’ So he when plant his bananas, and, you know, he didn’t her . . . This is the story that I heard from my mother-in-law and my father-in-law. This is what . . . I’m just telling the story what they told me. I’m repeating their story. They’re *kūpuna*s. They told me that, you know, Pele never . . . you know, that Kūmauna didn’t give her the first bunch of bananas . . . The first bunch of bananas. So she when turn him into one *pu‘uula*, one rock . . . They when battle, when battle eh and she turned him into a rock, so. His rock was right there by the water pool in back of this *pu‘u*. So, in that time, when the Hawaiians came up, when Ka‘ū became dry and windy. At certain times they didn’t get rain. So the people in the *kuahiwi* yeah, in the inner lands, the ones who live there, come up to the *pu‘u*, they still go up, to Kūmauna and give him offering of *‘opelu*, from the ocean you get this special *‘opelu* grass . . . It’s a silver grass that Kūmauna liked for offering. So they would *oli* and chant and ask him for *ua*, rain. So when they gave him that, the rain would come. Oh, it would come, and they were grateful and thankful. And those Hawaiians that live in that area could levitate, they could float, they could do *hunamana* because they were magical.

Mr. Oliveira added:

Kūmauna, when he came, he came with, he set up his, his banana patch was actually a sacred community of *kahuna*s. And the story was that he didn't want to give a banana to Pele, it was actually, Pele had an eye for one of his *kahuna*s. She wanted him. Pele gets what Pele wants . . . She wanted one of his *kāne*, it was this very powerful *kahuna*, and he said, 'No, that's mine.' It wasn't a community of *kahuna* tucked away from everybody, it was a training area. But the cover story, there's always a cover story, so it's about the sacred banana patch and he never like give it to her. It was actually one of his own *haumana*. That's the *kaona* behind the story.

Section 6 Traditional Cultural Practices

6.1 Hawaiian Habitation

Both Nīnole and Hīlea Ahupua‘a rely on a gulch that carries water *mauka* to *makai*. Nīnole Ahupua‘a relies on Nīnole Gulch, while Hīlea Ahupua‘a relies on Hīlea Gulch. Nīnole Gulch eventually branches into two streams but does not deposit water into the ocean. Hīlea Gulch eventually empties into the ocean at Kāwā Bay. The *ahupua‘a* of Nīnole consisted of two springs that could be found *makai*: Pūhau and Kauale. Pūhau was the Hawaiian name for the freshwater spring adjacent to Nīnole Fishpond. Occasionally Nīnole Fishpond was referred to as Pūhau, as it was also the spring that fed the pond. To the east of Pūhau was Kauale; said to be the female counterpart of Pūhau. Hīlea Ahupua‘a also had a spring located *makai* near Kāwā Bay.

Early historical accounts frequently mention the broken lava that covers the Ka‘ū district. An illustration by Thomas Heddington captured Captain George Vancouver’s 1792 visit to Makākupu village near present day Pāhala. The illustration depicts thatched homes, extensive cultivated fields, and villagers interacting with the foreigners. Reverend William Ellis briefly passed through Punalu‘u in 1823 and documented cultivated *kalo* [taro] patches, sugarcane, and bananas (Ellis 1963:133–134).

Māhele documents reveal the majority of LCAs were awarded in the *mauka* regions of Nīnole and Hīlea Ahupua‘a with the exception of a few land claims in the *makai* portions. Testimony given by Nawali for LCA 10510 in Nīnole Ahupua‘a mentions the cultivation of taro, pumpkin, sweet potatoes, and *olonā*. The claim also included a house lot and an *umu ‘ōhua*, a pile of rocks placed in the ocean used to attract young fish. Nīnole Fishpond was famous for its mullet as well. Although the terrain of Ka‘ū is rough, early accounts and testimony depicted a somewhat abundant village with fresh water, fisheries, and cultivated lands.

6.2 Traditional Methods of Subsistence and Gathering

Taro is one of the main staples of the Hawaiian diet. Māhele records indicate there were more cultivated patches (*mo‘o, mala, kīhāpai*) than house lots, thus revealing that both Hīlea and Nīnole were in fact abundant in food resources. Consultation has also indicated both *ahupua‘a* continue to be productive for food sources.

Mr. Kawehi Ryder has acquired approximately 20 acres in Wood Valley, located 4 miles *mauka* from Pāhala. He plans to grow dryland *kalo* in a systematic way to be able to provide food for the community. Varities he plans to cultivate include *makokonaueia, mana lauloa, lehua,* and *mana ulu*. He would like to sell *pa‘i ‘ai* for $5 per pound and also set up a workshop so the public can pound their own *poi* if they wish. He has also acquired a two-year contrct with the State of Hawai‘i to remove debris and invasive plants at Hilo‘e Fishpond, which is *makai* of the Nīnole Bridge project area. Eventually a sluice gate system will be constructed to regulate fish propogation and water flow.

All interviewees attested to the abudance in aquaculture. Inshore fish include *enenue, manini, āholehole, moi,* mullet, and *papi‘o*. Pelagic fish include *‘ahi* and *ono. ‘Opihi* and *limu* are also plentiful. Varieties of *limu* that have been found offshore include include *limu kohu, limu kala,*

līpoa, and *limu pahe‘e.* Turtle was once a main staple in the diet until it became a protected species under the Endangered Species Act.

6.3 Ritual and Ceremonial Practices

Mr. Louis and Mr. Oliveira both discussed the practice of *hunamana.* Mr. Oliveira described the process of having “a lot of battling or binding or the dark forces in the dream world.” He continued to explain the metaphysical process: “They believe there’s energy or spirit behind them. So then, they have the physical warriors that stand on the front line—they fight. And the *kahuna* who stands behind and works with those energies, behind those movements.”

Growing up, Mr. Oliveira did a lot of spiritual healing work including *opu ka huli*, *lā‘au kahea,* and gathering of *lā‘au.* He was taught to gather early in the day when the sun was rising. *Pule* was always conducted prior to gathering and during plant selection.

6.4 *Wahi Pana*

Many *wahi pana* were visited or pointed out during consultation. Hilo‘e Fishpond was once fed by Pu‘ihau Springs, but it has since been covered by debris from the plantation once run by C. Brewer & Company, Ltd. Ka‘ie‘ie Heiau is adjacent to the fishpond and can be found on a rocky knoll that overlooks the ocean. A historic trail converted into a carriage road spans the back side of the *heiau* running north to south. Across from the *heiau* is another site that overlooks the former site of the spring and the fishpond. Mr. Ryder believes this site is a possible fishing shrine. *Mauka* of the *ko‘a* is a circular enclosure. Mr. Ryder believes this is a learning site. The enclosure is walled with a paved circular center consisting of *‘ili‘ili* and an upright stone surrounded by medium *pōhaku* and coral.

Consultations with Mr. Louis and Mr. Oliveira were conducted atop Pu‘u Makanau located in Hīlea Ahupua‘a. At the very top of the *pu‘u* is Kohāikalani Heiau. A lot of the *heiau* have been destroyed by the former plantations of the area run by C. Brewer and Campbell Estate. Today, a portion of the retaining wall exists along with remnants of paving on the back side.

Other *wahi pana* pointed out in Ka‘ū include Ka Lae, commonly known as South Point, which is the southernmost point of Hawai‘i Island. Kalahea Heiau is also located near Ka Lae and is still intact today. According to Mr. Louis, if you look out at the ocean from Ka Lae, you can see a line where the two currents converge. During a certain time of the year, the current can take you to New Zealand. Pu‘u Ali‘i is located to the northeast of Ka Lae and contains *iwi kūpuna*. Palahemo, which is in the vicinity of Pu‘u Ali‘i, is described as a “bottomless” watering hole consisting of green water. Near Palahemo is Mahana Bay, an olivine sand beach.

6.5 *Mo‘olelo*

Mr. Louis and Mr. Oliveira shared a *mo‘olelo* concering Pele and Kūmauna, a *kahuna* who resided in the *mauka* region of Hīlea Ahupua‘a. Mr. Louis related the following:

> One time Pele and Kūmauna came here in the beginning. And he said, ‘You know, I reside in Ka‘ū,’ and then Pele said, ‘Yeah,’ to Kūmauna, ‘You can reside here. So, what you picking? What you going get?’. . . So Pele told him, ‘If you bring your bananas, I’ll let you go up in the back of these *pu‘u*s here and reside here, Kūmauna.’ So he when plant his bananas, and, you know, he didn’t her . . . This is

> the story that I heard from my mother-in-law and my father-in-law. This is what . . . I'm just telling the story what they told me. I'm repeating their story. They're *kūpuna*s. They told me that, you know, Pele never . . . you know, that Kūmauna didn't give here the first bunch of bananas . . . The first bunch of bananas. So she when turn him into one *pu'uula*, one rock . . . They when battle, when battle eh and she turned him into a rock, so. His rock was right there by the water pool in back of this *pu'u*. So, in that time, when the Hawaiians came up, when Ka'ū became dry and windy. At certain times they didn't get rain. So the people in the *kuahiwi* yeah, in the inner lands, the ones who live there, come up to the *pu'u*, they still go up, to Kūmauna and give him offering of *'opelu*, from the ocean you get this special *'opelu* grass . . . It's a silver grass that Kūmauna liked for offering. So they would *oli* and chant and ask him for *ua*, rain. So when they gave him that, the rain would come. Oh, it would come, and they were grateful and thankful.

6.6 Burials

Previous archaeological studies indicate one pre-Contact burial (SIHP # -24912) was found half a mile *makai* of the Nīnole Bridge project area. Outside the 0.5-mile radius (as depicted in Figure 24) are clusters of burials found along the Kōloa shoreline. Studies indicate one burial was found southeast of the Hīlea Bridge project area (HN-62, a modified outcrop and possible burial). Outside the 0.5-mile radius of the Hīlea Bridge project area are also clusters of burials spanning south and southeast of the project area near the shoreline (see Figure 25).

Section 7 Summary and Recommendations

CSH undertook this CIA at the request of CH2M HILL and on behalf of the FHWA/CFLHD. The research broadly covered the entire *ahupua‘a* of Nīnole and Hīlea, including the current project areas.

7.1 Results of Background Research

Background research for this study yielded the following results, which are presented in approximate chronological order:

1. Nīnole literally translates to “bending” (Pukui et al. 1974:165). Hīlea translates to “careless” (Pukui et al. 1974:45). The *ahupua‘a* of Hīlea is technically split into two: Hīlea Iki (“small Hīlea”) and Hīlea Nui (“great Hīlea”).
2. Nīnole Ahupuaʻa consists of one waterway, the Nīnole Gulch, which branches off into two parallel streams that carry water *makai* but never deposit into the ocean. Hīlea Gulch and river system carries water from *mauka* to *makai* where it eventually empties into Kāwā Bay.
3. The most famous *wahi pana* associated with the Nīnole study area are the reproducing stones of Kōloa Beach. The stones are said to reproduce (*‘ili‘ili hānau*) and create small, smooth stones. The beach at Kōloa is covered in the smooth, round pebbles.
4. Several *heiau* can be found within Nīnole Ahupuaʻa including Kaʻieʻie Heiau and Mokini Heiau. Two springs can be found near Kōloa Beach: Pūhau and Kauale. Pūhau Spring feeds into Nīnole Fishpond, which is located *makai* and fronts Kōloa Beach. Kauale is east of Pūhau and is said to be the female counterpart to Pūhau, the male spring.
5. Keʻeku Heiau is a heavy walled enclosure on the northeastern side of Kāwā Bay. The massive *heiau* consists of several platforms and features including a *kū‘aha*, *lele*, and *kahua ho‘omaha*. In the *mauka* region on Puʻu Makanau is Kohāikalani Heiau. The enclosure overlooks Hīlea Iki Ahupuaʻa. A majority of the walls along with the interior features have been dozed due to sugarcane cultivation.
6. Early accounts of the Kaʻū district describe the area as ridden with lava, often lacking water and resources. However, in 1823 during Reverend William Ellis’ visit, he described neighboring Punaluʻu Ahupuaʻa being abundant in fresh water and cultivated in sugarcane, taro, and bananas. Land Commission Awards indicate crops of taro, pumpkin, sweet potatoes, and *olonā* were being cultivated.
7. Life in the Kaʻū district was disrupted during the 1860s by the forces of nature. In March 1868, a sequence of major earthquakes and eruptions at Mauna Loa began that resulted in loss of property and livestock as well as death. The following month an earthquake, which precipitated a *tsunami*, destroyed villages along the coastline and created landslides.
8. Tragedy and natural disasters did not hinder foreign business interests in Kaʻū. In 1868, the same year as the streak of natural disasters, Alexander Hutchinson established the Naalehu Sugar Company and built a mill in Naʻalehu town. Wharves, flumes, and a railway were built to accommodate the sugar plantations in the area. In June 1878, the first railroad was constructed that traveled from Punaluʻu to the village of Keaiwa (Condé and Best 1973:29). Multiple rail lines were built and realigned spanning from Naʻalehu to Hīlea to Honuʻapo and from Punaluʻu to Pāhala. The railroads continued to operate until the 1940s.

7.2 Results of Community Consultation

CSH attempted to contact NHOs, agencies, and community members. Below is a list of individuals who shared their *mana‘o* and *‘ike* about the project area and Nīnole and Hīlea Ahupua‘a:

1. Earl Louis, *kama‘āina* of Ka‘ū and caretaker of Makanau Heiau
2. Demetrius Oliveira, *kama‘āina* of Ka‘ū and caretaker of Makanau Heiau
3. Kawehi and Debbie Ryder, cultural practitioners and caretakers of Nīnole Fishpond and adjacent sites

7.3 Impacts and Recommendations

Based on the information gathered from the cultural and historic background, the proposed project may potentially impact undetected *iwi kūpuna*. CSH identifies potential impacts and makes the following recommendations.

1. Previous archaeology conducted south and southeast of the project areas have yielded *iwi kūpuna*. Based on these findings, there is a possibility *iwi kūpuna* may be present within the current project areas and that land disturbing activities during construction may uncover presently undetected burials or other cultural finds. Should burials (or other cultural finds) be encountered during ground disturbance or via construction activities, all work should cease immediately and the appropriate agencies should be notified pursuant to applicable law, HRS §6E.
2. A community concern was erosion that would occur during the construction period and the use of excess stones from the construction and erosion. Community participant Kawehi Ryder has voiced that his organization could benefit from any excess stones stemming from construction and erosion.

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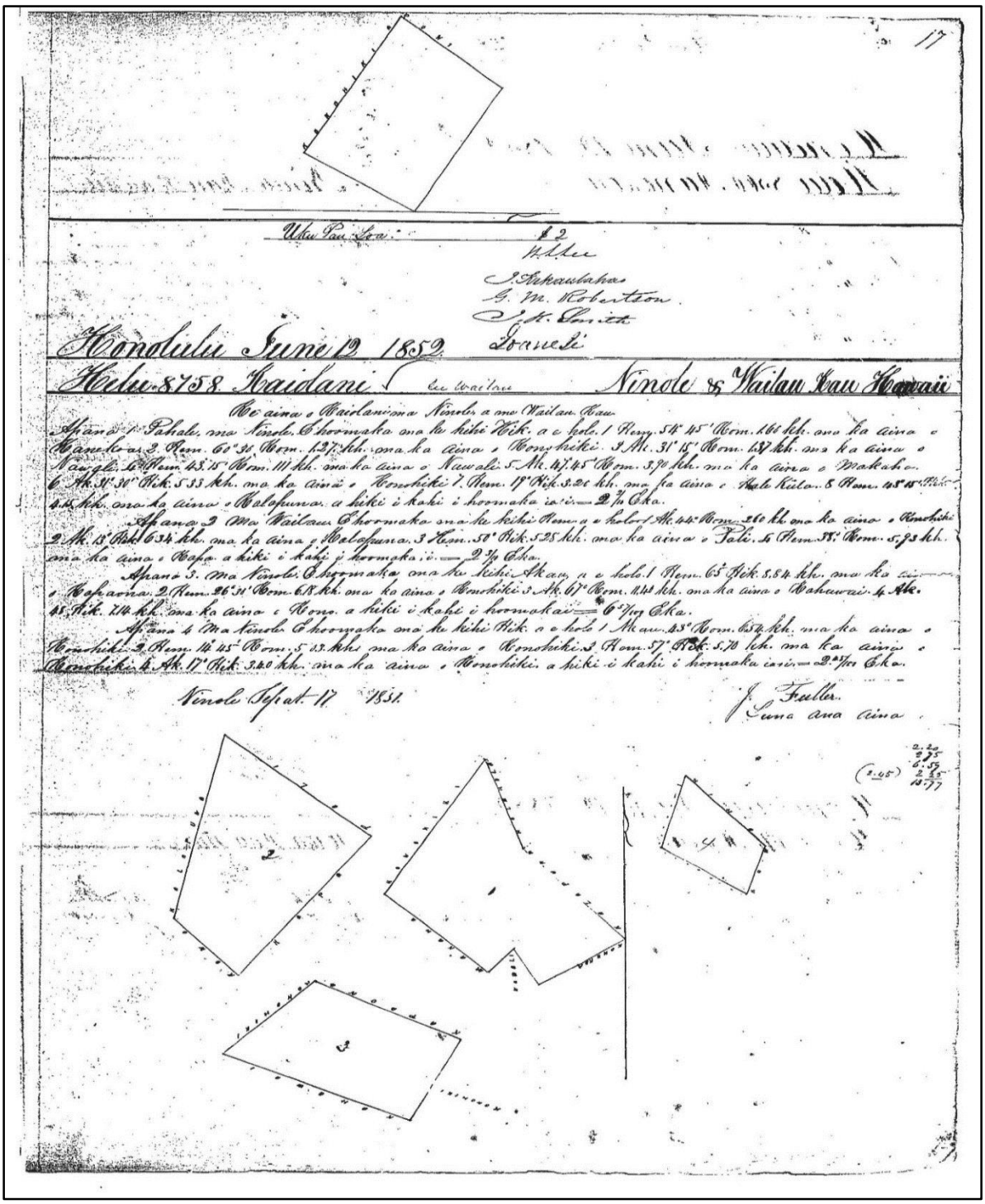
Appendix A Māhele Awards for 8559B & 10510



Honolulu June 12 1852

Helu 8758 Kaidani

Ninole & Wailau Hawaii

Uku Pau Loa $6 31

W. L. Lee

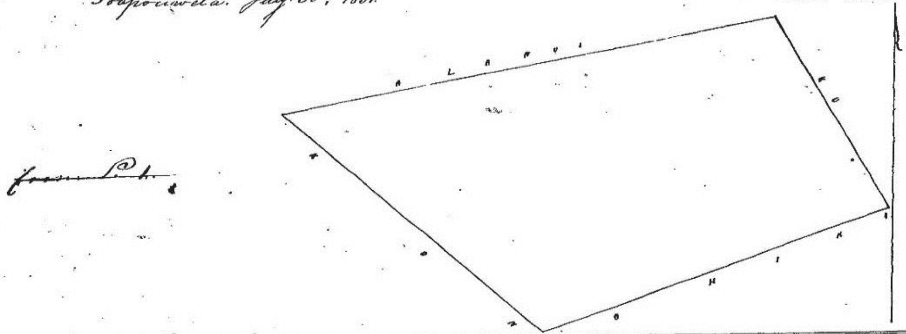
J. H. Smith
G. M. Robertson
J. Kekaulahao

Honolulu June 12, 1852.

Helu 11028 Samuela Peke ✓ Poupouwela Kau Hawaii

1. Apana aina ma Poupouwela Kau.
E hoomaka ma ke kihi Komohana a e holo. 1 Akau 15° Hikina 11.41 kh. ma ka aina o Hannu 2 Hema 26°30' Hik. 5.83 kh. ma ka aina o Ku. 3 Hema 64°15' Komohana 8.53 kh. ma ka aina o Konohiki 4 Akau 45°45' Komohana 8.30 kh. ma ka aina o Konohiki, a hiki i kahi i hoomaka ai. Iloko o keia aina he 6 55/100 Eka.
Poupouwela. July. 30; 1851.

J. Fuller
Luna Ana Aina



Uku Pau Loa $5

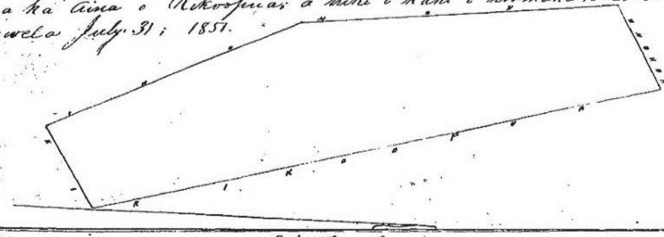
W. L. Lee
G. M. Robertson
J. H. Smith
J. Kekaulahao

Honolulu June 12, 1852.

Helu 9225 B. Keawe ✓ Poupouwela Kau Hawaii

1. Apana aina ma Poupouwela Kau.
E hoomaka ma ke kihi Hema Hikina, a e holo 1 Hema 61° Komohana 4.86 kh. ma ka aina o Konohiki 2. Akau 31°30' Komohana 12.78 kh. ma ka aina o Konohiki 3. Akau 8° Komohana 14.23 kh. ma ka aina o Konohiki. 4 Akau 63°15' Hik. 4.95 kh. ma ka aina o Kahana. 5 Hema 16°30' Hikina 26.41 kh. ma ka aina o Kikoopunai a hiki i kahi i hoomaka ai. Iloko o keia aina he 16 4/10 Eka.
Poupouwela July. 31; 1851.

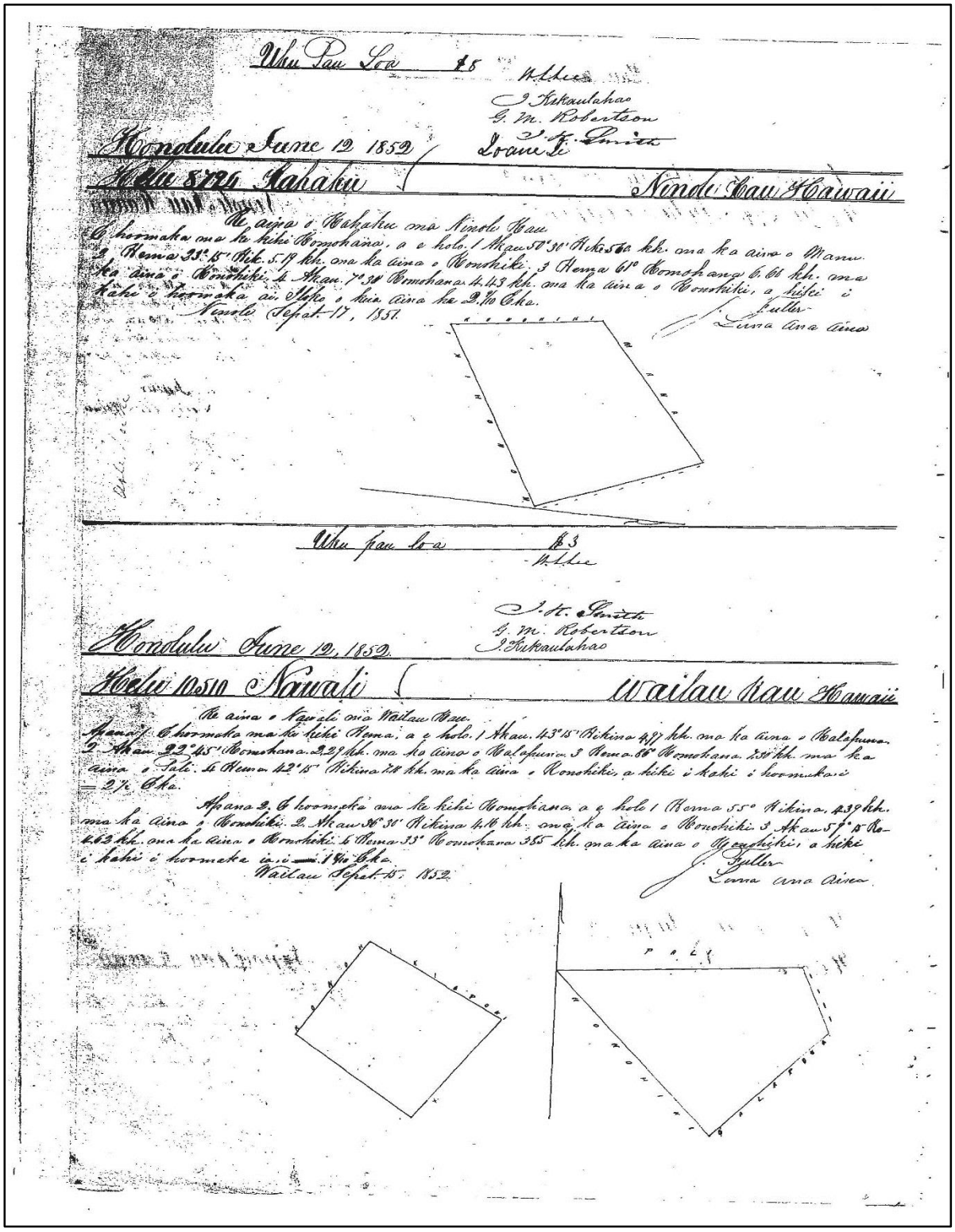
J. Fuller. Luna ana aina



Uku Pau Loa $10.

W. L. Lee
G. M. Robertson
J. Kekaulahao
Loomadi
J. H. Smith

Honolulu June 12, 1852



Uku Pau Loa 18
Helu
J. Kekaulahao
G. M. Robertson
J. F. Pinia
Honolulu June 12 1852
Helu 5124 Kahaku
Ninole Kau Hawaii

Ke aina o Kahaku ma Ninole Kau.
Moolelo ma ke kiki Komohana, o e holo 1 Akau 50° 30' Hikina 58 kk. ma ka aina o Manu.
2 Hema 33° 15' Kuk. 5.19 kk. ma ka aina o Konohiki. 3 Hema 61° Komohana 6.61 kk. ma ka aina o Konohiki. 4 Akau 7° 30' Komohana 4.43 kk. ma ka aina o Konohiki, a hiki i Kahi o Hoomaka ai. Aupa o kia aina ka 2.70 Eka.
Ninole Sepat 17, 1851.
J. Fuller
Luna ana Aina

Uku pau loa 13
Helu
J. K. Piikoi
G. M. Robertson
J. Kekaulahao
Honolulu June 12, 1852.
Helu 10510 Nawahi
Wailau Kau Hawaii

Ke aina o Nawahi ma Wailau Kau.
Apana 1. Hoomaka ma ke kiki Komohana, a e holo 1 Akau 43° 15' Hikina 417 kk. ma ka aina o Kalaheuna. 2 Akau 22° 45' Komohana 2.29 kk. ma ka aina o Kalaheuna. 3 Hema 86° Komohana 2.50 kk. ma ka aina o Puli. 4 Hema 42° 15' Hikina 118 kk. ma ka aina o Konohiki, a hiki i kahi i hoomaka ai = 2¾ Eka.
Apana 2. Hoomaka ma ke kiki Komohana, a e holo 1 Hema 55° Hikina 4.39 kk. ma ka aina o Konohiki. 2 Akau 86° 30' Hikina 4.16 kk. ma ka aina o Konohiki. 3 Akau 5° 15' Komohana 4.62 kk. ma ka aina o Konohiki. 4 Hema 35° Komohana 3.85 kk. ma ka aina o Mookuhiki, a hiki i kahi i hoomaka ai. = 1 ¾ Eka.
Wailau Sepat 15, 1852.
J. Fuller
Luna ana Aina

Appendix B: Land Use in Claims for Hīlea 1 & 2 and Nīnole Ahupua‘a

LCA#	Claimant	Ahupua‘a	‘Ili	Land Use	Acreage if awarded
43*H, 43B*	Catholic Mission	Hilea		Mission house	
11070 & 10554	Aea	Hilea		4 kihapai	3.56 acs
9212B &8108	Helahewa	Hilea	Aholama, Wahawahaiki	5 fields, houselot	9.4 acs
9125	Kaia	Hilea		2 mo‘o, 2 kihapai	4.5 acs
7489	Kaele	Hilea	Keaa, Kuhonui, Papai	1 mala taro, 2 kihapai	
8532	Kaiwi	Hilea	Waialaea	1 mo‘o, 13 kihapai	7.2 acs
9094	Kaiwinui	Hikea			
8760F, 8760G!	Kalakohe	Hilea		1 mo‘o, field	7 acs
10217B & 10217!	Kamaio	Hilea	Kaualii, Kuuhonu	‘ili	
7440	Kanaemoku	Hilea	Keamoalii, Upai	Kihapai taro, houselot	
9100	Kamaluhilani	Hilea	Papa, Kanehale, Kaumoalii	4 kihapai taro	
9195	Kanehaelua	Hilea		1 mo‘o, 3 kihapai	5.0 acs
7440	Kanaemoku	Hilea	Keamoalii, Upai	Taro kihapai, houselot	
9085	Kaoo	Hilea	Waialaia, Miomio, Keaha	Mo‘o, 4 kihapai, 2 sw. potatoes, kalo	
9204	Kapaana	Hilea		1 mo‘o	

7317	Kapuni	Hilea 1		4 mala taro & 2 wauke, 1 banana	3.56 acs
9089	Kapuaa	Hilea		4 kihapai	
7715*h	Kapuaiwa, Lota	Hilea 1		Ahupua‘a	2015 acs
8759 & 9095	Kaui	Hilea	Ikikaloa, Paanau	Kihapai taro, sw. potatoes	
9225B	Keawe d / Keohomu	Hilea	Kanehale 2	1 mo‘o, kihapai	16.4 acs
9091	Kekaa d./ Keamaolonaheia	Hilea		Mo‘o of 2 kihapai	3.6 acs
8453	Kekahuna	Hilea		1 kihapai	
9093	Keleka	Hilea		2 mo‘o	
9088	Kepewa	Hilea		9 kihapai, houselots	9.9 acs
9234	Koleaka	Hilea	Papai, Keamoalii, Lamaula	7 kihapai (2 taro)	
9092	Konohiki, I.	Hilea		2 kihapai	
9172	Kuoho	Hilea	Waialaea, Wapulea	1 mo‘o, 3 kihapai, 2 taro & wauke	3.6 acs
9971*H	Leleiohoku, W.P.	Hilea		Ahupua‘a	
10019	Lohi	Hilea		4 kihapai	
9214B	Lonoaniho	Hilea		Mo‘o, kihapai	3.65 acs
10073	Mahuka	Hilea	Kalihi, Wahawahaiki	1 mo‘o, 2 fields, 6 kihapai	11.8 acs
10094	Makapohoa	Hilea	Kalihi	4 kihapai	4.32 acs
7733	Moa	Hilea	Wahawahaiki, Kalama	3 taro mo‘o	8.9 acs
9212C	Nailieha	Hilea	Wahawahaiki, Aholama	6 fiekds	2 apana, 8.03 acs

10321	Nalepa	Hilea		3 kihapai	
10371	Nawahine	Hilea		4mala taro, wauke, house lot	4.5 acs
8260	Okea	Hilea		1 mo‘o, some kihapai	
10746	Pahau	Hilea		1 kihapai	
10760	Palea	Hilea		4 mala taro	
10607	Piko	Hilea	Makenala, Kalapalapa, Paako, Haukoi	3 kihapai	
10685	Pua	Hilea	Papai, Miomio, Lamaula	6 kihapai	2.3 acs
10654	Pueo	Hilea		mo‘o, 11 kihapai	10.05 acs
10914	Uluhani	Hilea		1 kihapai	4.96 acs
10952	Waapa	Hilea	Haiholena, Kamoku	Mo‘o, kihapai	4.5 acs

LCA#	Claimant	Ahupua‘a	Ili	Land Use	Acreage if awarded
5320*H	Kaeo, Asa	Ninole		Houselot	
8790	Kahananui.	Ninole		Houselot, pig sty, 4 taro mo‘o	2 apana, 6.8 acs
8794	Kahaka	Ninole		Mo‘o, 2 kihapai, wauke	
8793B	Kahelemalu	Ninole		Mo‘o	5.3 acs
8760DD	Kahuakainui	Ninole	Makema;a	Mo‘o, olona, wauke	9.25 acs
8758	Kaiolani	Ninole	Homaikalono, Puako, Pue, Paako	Some kihapai, bamboo, houselot	11.22 acs
7606D	Kalaikahuna	Ninole	Pue, Haukoi	Mo‘o, & field	5.56 acs
8793	Kalanawahine & Kahelemalu	Ninole		Wauke, cane, bananas, taro	2 apana, 9.1 acs
7545	Kalaua	Ninole	Moaula	Mo‘o, kihapai	
8782 & 8982B	Kalua	Ninole		Kihapai taro, wauke, 3 hihapai & sw. potatoes	5.75 Acs
8559*H	Kanaina, Ch	Ninole		Ahupua‘a	
8360 & 8853	Kanekoa	Ninole		Houselot, 10 mala taro, 4 mala sw. potatoes	2 apana, 6.8 acs
9204	Kapaana	Ninole		Mo‘o, 2 kihapai taro, fields	7.86acs
8791	Kapuuhonua	Ninole		Mo‘o, and wauke	11.3 acs
8760E	Kaui	Ninole	Waihi	Taro & potatoes, basin for passengers?	3.25 acs

8979	Kekapa	Ninole	Homaikalono, Lani	3 kihapai of 2 taro 1 wauke	2 apana, 2.8 acs
9088	Kepewa	Ninole		Houselot	
9167	Komaia	Ninole		13 kihapai, lauhala, houselot	4.75 acs
8791	Kuopapa	Ninole	Pue	Taro, sw. potatoes, kihapai	
8559b*H	Lunalilo, W.C.	Ninole		Ahupua‘a	
7732	Makaha	Ninole	Keopuka, Paako, Waihi	2 ponds, (squid spearing sea	2 apana, 6.12 acs
10094	Makapohoa	Ninole	Kalihi	4 kihapai	
10115	Makuaole	Ninole	Puehu, Paako, Keopuka	Wauke, mo‘o, houselot	9 acs
10116 & 8760E	Mano	Ninole		Mo‘o, 8 kihaspai	
10093	Manu	Ninole		3 taro, 1 sw. potatoes	6.66 acs
10112	Mauna	Ninole	Pueo, Makenala	3 kihapai, sugar cane, wauke, 2 taro	1.38 acs
8553B & 10510	Nawali	Ninole		3 kihapai taro, sw. potatoes, pumpkin, house lot, 6 lots olona	8 acs
10607	Piko	Ninole	Paako, Houkoi	1 mo‘o, 5 kihapai, 4 taro, 1 field, house	9.7 acs
10847	Pulehu	Ninole	Pue, Haukoi	1 mo‘o, 2 kihapai	8.7 acs.

Appendix C: Land Grants 824 and 2459

No. 824, Kapuhonua, Ninole Ahupuaa, District of Kau, Island of Hawaii, Book 5, pps. 51-52 [LG Reel 2, 00615-00616]

Helu 824
Palapala Sila Nui

Ma keia palapala Sila Nui ke hoike aku nei o Kamehameha III, ke Alii nui a ke Akua i kona lokomaikai i hoonoho ai maluna o ko Hawaii Pae Aina, i na kanaka a pau, i keia la, nona iho, a no kona mau hope Alii, ua haawi lilo loa aku oia ma ko ano alodio ia Kapuhonua i kona wahi kanaka i manao pono ia ia, i kela apana aina a pau e waiho la ma Ninole, Kau ma ka Mokupuni o Hawaii, a penei hoi ka waiho ana o na Mokuna.

E hoomaka ana keia ma ka papohaku ma ke kihi mauka o ka aina o Kekaula, a e holo ana
Akau 45 1/2° Komohana 20 Kaulahao a hiki i kahi ahupohaku, alaila e holo ana
Hema 45° Komohana 23 Kaulahao iloko o ke aa, alaila
Hema 43° Hikina 21.82 Kaulahao a hiki i ke kihi Komohana o Kulaikahuna, alaila e holo ana ma ka palena o Kulaikahuna
Akau 41° Hikina 24.06 Kaulahao a hiki ma kahi i hoomaka’i.

Koe ke Kuleana o na Kanaka a me ka Loko

[page 52]

a maloko o ia Apana 48 75/100 eka a oi iki aku, emi iki mai paha.

Eia ke kumu o ka lilo ana; ua haawi mai oia iloko o ka waihona waiwai o ke Aupuni i $12.25. Aka, ua koe i ke Aupuni na mine minerala a me na mine metala a pau.

No Kapuhonua, ua aina la i haawiia, no na mau loa aku no, ma ke ano alodio, a no ko na mau hooilina, a me ko na waihona, ua pili nae ka auhau a ka Poe Ahaolelo e kau like ai ma na aina alodio a pau i kela manawa i keia manawa.

A i mea e ikea’i, ua kau wau i ko’u inoa, a me ka Sila Nui o ko Hawaii Pae Aina ma Honolulu i keia la 19 o Julai, 1852.

Inoa/ Kamehameha

Inoa/ Keoni Ana

[Land Patent Grant No. 824, Kapuhonua, Ninole Ahupuaa, District of Kau, Island of Hawaii, 48.75 Acres, 1852]

[No. 2459, Holoua/Holowa, D., Ninole Ahupuaa, District of Kau, Island of Hawaii, Vol. 12, pps. 147-148 [LG Reel 4, 00716-00717]

Helu 2459
Palapala Sila Nui

Ma keia Palapala Sila Nui ke hoike aku nei o Kamehameha IV, ke Alii nui a ke Akua i kona lokomaikai i hoonoho ai maluna o ko Hawaii Pae Aina, i na kanaka a pau, i keia la, nona iho; a no kona mau hope alii, ua haawi lilo loa aku oia ma ko ano alodio ia D. Holowa i kona [left blank] kanaka i manao pono ia ia i kela apana aina a pau e waiho la ma Ninole, Kau ma ka Mokupuni o Hawaii, a penei hoi ka waiho ana o na Mokuna.

E hoomaka ma ke kihi Hema o keia ma kahi ahu pohaku a e holo ma ka iwi o Hilea,
Akau 61 Komohana 72.80 Kaulahao i kahi ahu pohaku, alaila ma ko ke Aupuni a me ka aina o Hooieie
Akau 39 Hikina 37.88 Kaulahao i kahi Kumu Wiliwili, alaila ma ko ke Aupuni
Akau 37 1/2 Hikina 17.08 Kaulahao
Hema 36 Hikina 66.80 Kaulahao i kahi ahu pohaku, alaila ma ka aina o D. Holowa
Hema 48 1/4 Komohana 234 Kaulahao a hiki i kahi mua.
290 Eka

Koe nae ke kuleana o na kanaka

[page 148]

A maloko o ia Apana 290 eka a oi iki aku, emi iki mai paha.

Eia ke kumu o ka lilo ana; ua haawi mai oia iloko o ka waihona waiwai o ke Aupuni i na dala he $36.25. Aka, ua koe i ke Aupuni na mine minerala a me na mine metala a pau.

No D. Holowa, ua aina la i haawiia, no na mau loa aku no, ma kea no alodio, a me ko na mau hooilina, a me ko na waihona, ua pili nae ka auhau a ka Poe Ahaolelo e kau like ai ma na aina alodio a pau i kela manawa i keia manawa.

A i mea e ikea’i ua kau wau i ko’u inoa, a me ka Sila Nui o ko Hawaii Pae Aina ma Honolulu i keia la 17 o Feby [sic], 1858.

Kamehameha
Kaahumanu

[Land Patent Grant No. 2459, Holoua/Holowa, D., Ninole Ahupuaa, District of Kau, Island of Hawaii, 290 Acres, 1858]

Land Grant No. 821 to Holoua at the shore including Nīnole Fishpond.

> Beginning at mouth of stream at seashore, 1 ch [chain] makai of road, run N. 31 1/4 E. 13.74 ch, 906.9 ft along sea shore; N 11 E, 4.86 ch, 320.8 ft to S. corner of Kekaula's; N 42 W, 16.50 ch, 1089.0 ft along boundary of Kekaula's to pile of stones in aaatmakai corner of Kaui's; then S 48 1/4 W, 23.48 ch, 1549.7 ft along boundary of Kaui's to aa; S 57 1/2 E, 24.50 ch. 1617.0 ft along inside aa to place of beginning. July 19, 1852, Area 42.65 acres (Kau Grant Book, p. 133). (IN Kelly 1980:107).

Appendix D: Boundary Commission Reports for Hīleaiki and Hīleanui

Hileaiki Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, Hawaii, Volume A, No. 1, pps 430-435

The Ahupuaa of Hileaiki, District of Kau, Island of Hawaii, 3d Judicial Circuit

On the 16th day of October A.D. 1853, the Commission of Boundaries for the Island of Hawaii met at the house of J. Kauhane, Keaiwa, Kau, on the application of C. K. Apiki and others for the hearing of testimony for the settlement of the boundaries of Hileaiki, Kau, Island of Hawaii, aforesaid. Due notice personally served on owners or agents of adjoining lands as far as known. Present: C. K. Apiki and three other owners; J. Kauhane for the Hawaiian Government; J.G. Hoapili for Her Excellency, R. Keliikolani.

Petition read as follows:
Copy
Keaiwa, Kau, October 16th 1873.

To the Honorable R.A. Lyman, Commissioner of Boundaries for the Third Judicial Circuit.
Sir:
The undersigned would respectfully represent to you, that we are the owners of the land or Ahupuaa of Hileaiki situated in the District of Kau, Island of Hawaii. That the said land or ahupuaa of Hileaiki was awarded to L. Kamehameha by Land Commission Award No. 7715, apana 14, and conveyed to the undersigned by L. Kamehameha, the deed dated May 8th 1857 and recorded at the Registrar's office in Liber 9, pages 215 &216 and that the boundaries of said land have not as yet been described or defined by Land Commission Award Royal Patent or by deed from the King; That the said land is within the jurisdiction of the Honorable Commissioner of Boundaries for the Third Judicial Circuit; that the lands adjoining the said land of Hileaiki, and the owners of the same as far as known to your petitioner are as follows: [page 431]

Name of Lands, Owners
Hileanui or Hilea 1st, R. Keelikolani
& Ninole, D. Holona, Hawaiian Government
Kahuku, G.W.C. Jones and C.E. Richardson

Wherefore your petitioners pray that a day and place may be appointed for the taking of testimony in reference to the boundaries of said lands; and that the owners of the adjoining lands be notified to appear and show cause, if any, why a certificate of Boundaries should not be issued tot he undersigned according to law.

And, as in duty bound your petitioners will every pray, &c, &c,
(Signed), Kaohokapu Kahaku, C.K. Apiki, aina Kapiewa, Kona, Kaha X, C. Kamauu, Manuhauipo, Kahalekai, Kahoaoioi

Note: for boundaries between Hileanui and Hileaiki see Testimony of the boundaries of Hileanui.
Testimony
Kalili, Kane, sworn, (Same witness as on Hileanui), Hileanui bounds Hileaiki on the Kona side commencing at the sea shore at a point called Puuainako, thence across aa to Keahupuaa at the government road, thence to Ahupoho; thence to ahupae near the gate; thence along the brow of the pa; and along the top of awaawa Wahawahaiki to the mauka road; thence up the pali to Makauau, a heiau, the boundary passing some distance on the Hilo side of said Heiau; thence down the pali to the Kona side of Punahai; thence up kualapa Pakina, along the kualapa and into the awaawa; thence down the pali to Pakua on the Hilo side of Alona [olona] ground (do not know the name of this place); thence the boundary runs towards Hilo till you come to aa; thence along the aa [page 432] and along the awaawa by the aa to near a kualapa on the Hilo side of Kaiholena and opposite to it. I have been told that the boundary runs along the edge of the aa to A Poohina, and is there cut off by Kahuku. I have heard that Kaalaiki cuts Hileanui off and bounds Hileaiki in the upper edge of the woods, but I do not know where, as I have never been there.

The boundary at shore between Hileaiki and Ninole is at point of roads at an awaawa on the Kona side of Kokoaahu; thence along Ninole on aa to Keahuakamalumalu, a stone on the mauka side of the Government road; thence to Pohakuloa, a large high rock on aa; thence to the Hilo side of a hill of stones, called Puunahaha; thence to Puuohe, a pali; thence to Kaniokamoa, an ahua - Puna, near a large rock at the mauka road; thence to Hoopahulu, a hill; hence to Waihaka, an awaawa. Walahaka, ano mawae, kauhale; thence to a mau ae running mauka, from this point I have not seen the boundaries but have heard that they run along the mawae to A Poohina. Have heard that the aa runs clear through the woods to A Poohina.
Cross-examined.

Kekapa, Kane, sworn, (Same witness as on Hileanui). The boundary at shore between Ninole and Hileaiki is at an ana kai between the point of Ahunui on Ninole and Kapukini, a point on Hileaiki (Kokoaahu is a point on Ninole near the boundary); thence mauka to Pohaku a Kamamalu, a rock at the road where Kamamalu slept; thence mauka to Puunahaha[?], thence along on the aa to Kaniakamoa to ahupuaa, a pile of stones by the mauka road, thence mauka to Hoopahulu, on the top of a kualapa. This is as far as I have run the boundaries. Have heard it runs from there to Alahaka, an awaawa, when people going after mamaki made a haka or bridge across the awaawa; have heard that this aa runs through the woods to A Poohina, and that it is on Hilea, but which Hilea I do not know. After the dispute I heard that Ninole and Hileanui cut off Hileaiki at Kukauakahi, a grove of palm trees. Have heard [page 433] the a [aa] is wide in the woods. I did not hear before the dispute what lands cut Hileaiki off mauka.
Cross-examined.

Case continued till further notice to all interested parties. Makaha, a witness for Ninole is in Honolulu.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit.

Keaiwa, October 18th 1873

The Commission of Boundaries met at the house of Kauhane after due notice to all interested parties. Present: J.G. Hoapili, J. Kauhane and C.K. Apiki on Kahooniauauanui.

Kailiawa, Kane, sworn, I was born at Hookukano, Kau at the time of Kuiwai, and I have lived there and at Kaalaiki ever since and know a part of the boundaries of Hileanui. I have heard from Kaele that Hileaiki ends at Ooanui; this I heard this year at the time the Hileaiki people were disputing with him about the boundaries of the land.

The Hileaiki people said it ended at Kohana makai of Kaiholena, a place where banana trees and olona are growing. I have always been in the habit of going to Kaawahine after olona; under the konohiki of Hileanui; there is no olona on Hileaiki. Kaawahine is makai of Kaiholena. I have heard of the place Kapae Loulu o Kanakahi. Have heard that Makaha's kupunakane planted it but I do not know what land it is on. Have never heard that Hileaiki runs through the woods. Heard that the water fall Panunu was on the boundary between Hileanui and ~~Hileaiki~~ Kaalaiki. I have not had any conversation with any one about the boundaries of Hilea during the last few days.
Cross-examined.

Nicholas George, Kane, sworn, I have lived in Kau over twelve years, keeping a store and gathering pulu. I learned the land of Haleanui from shore to Kuahiwi for [page 434] eight years. I leased Hileaiki for three years from fourteen persons, who owned the land. I leased the former land in 1862 and the latter in 1865. After I had leased the land I had a dispute with C.N. Spencer, who had leased Kaalaiki and Ninole, in regard to the boundaries. I then went on the boundary between Hileanui and Kaalaiki with Nilimanui [?] now dead) as my kamaaina; and Holona and Makaha as C.N. Spencer's kamaaina. I afterwards sent them on the boundary of Hileaiki, and they returned with Kahaku, one of the owners of Hileaiki, and said, that Ninole cut Hileaiki off at Kilohana; that the boundary of Hileaiki was at Kaawahine, and that Hileanui ran to Kilohana with Ninole. The olona was all on Hileanui and I divided it with Komokino of Hileanui. I never heard of any olona on Hileaiki during the three years I had it. Kaawahine is a sort of pali below Kaiholena. Kilohana is an awaawa with olona &c mauka of Kaiholena. At the mauka road Kahaku showed me the boundary in the middle of the aa, and said it run[s] to Kaawahine. I went with him twice, to settle disputes about the boundary.

The lease I had from them did not say that Hileaiki ran through the woods, but as the lease was read to me, they leased me the whole land from the shore to Kaawahine and makai of Kilohana. Said lease was acknowledged and sent to Honolulu to be recorded.
Cross-examined: I have not a copy of lease now.

Testimony closed
Decision.
Boundaries are decided to be as given in evidence of witness as to boundaries between Hileanui and Hileaiki to top of pali on Hilo side of Kaawahine, and from shore as given in testimony of boundary between Hileaiki and Ninole to a point opposite Kaawahine, and to be cut off there by Ninole to top of pali near Kaawahine. [page 435]
R.A. Lyman, Commissioner of Boundaries 3d Judicial Circuit.

Keaiwa, Kau, October 20th 1873
C.K. Apiki noted appeal to Circuit Court 3d Judicial Circuit
Costs not paid at that time.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Appeal not perfected
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

For Certificate of Boundaries see No. 112, Folio 259 Liber I or No. 3
Costs see Folio 262, Liber I.

Hileaiki Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, Hawaii, Volume 1, 3, p. 258

[Written from left bottom to upper right Notice]: Copied according to new formula – See opposite page]

Land Boundary Commission
Hawaii, Third Judicial Circuit

No. 112

Certificate of the Boundaries of the Land of Hilea iki, District of Kau, Island of Hawaii, Third Judicial Circuit.

Upon the application of [left blank] and by virtue of the authority vested in me by law, as sole Commissioner of Land Boundaries for the Island of Hawaii, Third Judicial Circuit, I hereby decide and certify the boundaries of the Ahupuaa of Hilea iki, situated in the District of Kau, Island of Hawaii

[Written across entire text:] Copied according to new formula, See opposite page

Hileaiki ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, Hawaii, Volume C, No. 3, pps 259-262

See Folio 430, Book A.

No. 112

Certificate of the Boundaries of the Land of Hilea iki, District of Kau, Island of Hawaii, Commission of Boundaries, 3d Judicial Circuit, R.A. Lyman, Esquire, Commissioner

In the Matter of the Boundaries of the land of Hilea iki, District of Kau, Island of Hawaii

Judgment

An application to decide and certify the Boundaries of the Land of Hilea iki, District of Kau, Island of Hawaii, having been filed with me on the 16th day October 1873 by Keohokapu Kahaku, C.K. Apiki & Ruth Kapewakonakeha, C. Kamauu, Manuhauipo, Kehalekai, Kahaoioi, in accordance with the provisions of an Act to facilitate the settlement of Boundaries &c, approved on the 22d day of June A.D. 1868; now, therefore having duly received and heard all the testimony offered in reference to the said boundaries ~~and having gone on the said land at the request of~~ and having endeavored otherwise to obtain all information possible to enable me to arrive at a just decision, which will more fully appear by reference to the records of this matter by me kept in ~~Liber~~ Book No. 1, A. pages [sic] 430, and it appearing to my satisfaction that the true, lawful and equitable boundaries, are as follows, viz.;

E hoomaka ma kahakai, e pili ana me Hilea nui, ma kahi i kapa ia o Puuainako, a e holo iuka, e pili ana me Hilea nui penei.

Akau 66 1/5° Komohana 28 kaulahao i ke ahu pohaku e pili ana me ke Alanui Aupuni;
Akau 33 1/2° Komohana 37.15 kaulahao i kahi ahu pohaku ma ka pahoehoe [page 260]
Akau 40½° Komohana 26.40 kaulahao i kahi ahu pohaku ma ka pahoehoe;
Akau 55½° Komohana 32.00 kaulahao i kahi ahu pohaku ma ka pahoehoe;
Akau 50 1/4° Komohana 27.70 kaulahao i kahi ahu pohaku ma ka pali, ma ka pa pohaku;
Akau 27° 00' Komohana 22.20 kaulahao a hiki iluna ka pali;
Akau 61 3/4° Komohana 37.90 kaulahao ma ka aoao Hema o ke Awaawa.
Akau 58° 00' Komohana 11.60 kaulahao i kahi kumu kukui kokoke i ke Alanui ma ka aoao Hema o ke Awawa;
Akau 59½° Komohana 23.00 kaulahao a hiki iluna o ka puu i kapa ia "Makanau."
Akau 64 1/4° Komohana 16.65 kaulahao i ka aoao mauka o Makanau maluna pono;
Akau 69° 20' Komohana 38.25 kaulahao;
Akau 45 1/4° Komohana 5.00 kaulahao a hiki iluna o ka puu i kapa ia "Pakua" iloko o ke Awawa; alaila iloko o ia Awawa, o ka palena no ia.
Akau 75½° Komohana 24.00 kaulahao;
Akau 32° 00' Komohana 28.00 kaulahao i ka aoao mauka o Pakua kokoke i ke kihi Akau o ka puu, maluna pono, alaila e iho ana ma ka "holo."
Akau - - - 12.00 kaulahao a hiki ilalo o ka puu ma kahi i kapa ia "Oanui."
Akau 40½° Komohana 34.90 kaulahao a hiki i ke kualapa i kapa ia "Kawahine"
Akau 8½° Komohana 13.60 kaulahao ma ke kualapa, o ka palena no ia, i kahi kumu ohia; i hoailona ia X, alaila ma ke kualapa no.
Akau 17½° Komohana 32.00 kaulahao;
Akau 37 1/4° Hikina 1.55 kaulahao i kahi kumu ohia i hoai loaa ia X maloko o ka [page 261] "Mawae" e pili ana me Ninole, alaila e holo i kai e pili ana me ka aina Aupuni o Ninole, penei;
Hema 28° 00' Hikina 14.35 kaulahao maloko o ka Mawae, o ka palena no ia.
Hema 7° 00' Hikina 9.20 kaulahao maloko o Mawae, o ka palena no ia
Hema 57° 0' Hikina 26.00 kaulahao maloko o Mawae, i kahi ahua i ka puka ana iwaho o ka ulu laau; alaila a haalele ana ka Mawae;
Hema 61° 00' Hikina 20.00 kaulahao i kahi ahu pohaku;
Hema 65 1/4° Hikina 25.80 kaulahao;
Hema 60 1/4° Hikina 19.85 kaulahao i ke kihi mauka o ko Kahuku Aina;

Hema 60 1/4° Hikina 99.50 kaulahao e pili ana me ka aina o Kahuku. Palapala Sila Nui Helu 2152 alaila e pili ana me ka Aina Aupuni a hiki i kahakai.
Hema 52° 00' Hikina 15.47 kaulahao i kahi ahu pohaku ma ka aoao Akau o kahi Awawa;
Hema 66° 00' Hikina 24.50 kaulahao 8 kahi ahu pohaku ma ka aoao Akau o kahi Awawa;
Hema 53° 00' Hikina 45.65 kaulahao i kahi ahu pohaku;
Hema 57° 00' Hikina 26.11 kaulahao i kahi ahu pohaku ma ka aoao Akau o "Puuwahaha."
Hema 55° 00' Hikina 28.90 kaulahao i kahi i kapa ia "Pohakuloa" ma ke aa;
Hema 55 1/4° Hikina 47.70 kaulahao i kahi ahu pohaku ma kai o ke Alanui Aupuni;
Hema 53° 00' Hikina 18.00 kaulahao i kahakai ma ka aoao Hema o kahi Mawae nui i kapa ia "Kokoaahu; alaila e pili ana me ka kai, aneane penei. [page 262]
Hema 30° 00 Komohana 69° 50 kaulahao a hiki i kahi i kahi i hoomaka ai
Maloko o keia aina he 2015 Eka - a oi iki aku a emi [?] mai paha.
(Inoa) F.S. Lyman
A.D. 1876
I hereby certify that the above is an accurate and true copy of the Certificate of boundaries of the land of Hilea iki. District of Kau, Island of Hawaii, issued on the [left blank] day of [left blank] A.D. 187[left blank]
Commissioner of Land Boundaries, Third Judicial Circuit.

It is therefore adjudged and I do hereby decide and certify that the boundaries of the said land are and hereafter shall be as hereinbefore set forth.
Given this 9th day of October A.D. 1877 at Hilo, Hawaii.
R.A. Lyman, Commissioner of Land Boundaries, Third Judicial Circuit

Judgement was given at Keaiwa, Kau, October 20th 1873 and survey has been made in accordance with the decision. Book A, Folio 434.
R.A. Lyman, Commissioner of Land Boundaries, 3d Judicial Circuit

In this case the expenses are
Costs including writing petition $50
Witnesses paid by applicants & owners of adjoining lands which are awarded to applicants $50
R.A. Lyman, Commissioner of Land Boundaries, Third Judicial Circuit

[No. 112, Hileaiki Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, 1877, 2015 Eka, Hawaiian transcribed by J. Quintero]

Hileanui Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, Hawaii, Volume A, No. 1, pps. 242-244

Honorable R.A. Lyman, Boundary Commissioner for Island of Hawaii
The undersigned would herewith make application for the settlement of the boundaries of the following Ahupuaas or lands belonging to Her Excellency, R. Keliikolani; viz.

Kikala, Hilo Hawaii, bounded by Maumau adjoining lands unknown
Haiku, Hilo Hawaii, bounding lands unknown

Kauniho, Hilo, Hawaii bounding lands unknown
Waikaumalo, Hilo Hawaii, bounding lands unknown
Lepoloa, Hilo, Hawaii, bounding lands unknown
Piha, Hilo, Hawaii, bounding lands unknown
Kaulakailio, Hilo, Hawaii, bounding lands unknown
Kaiwiki, Hamakua, Hawaii Humuula & other lands
Kalakalaula, Hamakua, Hawaii, bounds unknown
Kapoaula, Hamakua, Hawaii, adjoining lands unknown
Kemau, Hamakua, Hawaii, adjoining lands unknown
Pohakuhaku, Hamakua, Hawaii, adjoining lands unknown
Waikaloa, Hamakua, Hawaii, adjoining lands unknown
Paalaea, Hamakua, Hawaii, adjoining lands unknown
Kaala, Hamakua, Hawaii, adjoining lands unknown
Manowaialei, Hamakua, Hawaii, adjoining lands Humuula &c
Keahua, Hamakua, Hawaii, adjoining lands not known
Kana, Hamakua, Hawaii, adjoining lands not known
Kapaaula, Hamakua, Hawaii, adjoining lands not known
Waialeale, Hamakua, Hawaii, adjoining lands not known [page 243]
Niulii, Kohala, Hawaii, adjoining lands not known
Puanuipoepoe, Kohala, Hawaii
Puanui, Kohala, Hawaii
Hamanamana, Kona, Hawaii
Opea, Kona, Hawaii
Keopu 3rd, Kona, Hawaii
Kailua, Kona, Hawaii
Kulihee, Kona, Hawaii
Kaaipuhi, Kona, Hawaii
Niumalii, Kona, Hawaii [Niumalu?]
Naheana, Kona, Hawaii
Kalehanaole, Kona, Hawaii
Puuloa, Kona, Hawaii or Kohala
Kapaula, Kona, Hawaii or Kohala
Honokahauike, Kona, Honokahaunui & Kealakehe, Government lands adjoining
Moeauoa, Kona, Hawaii, Lanihaunui & Moeauoa, belonging to Government adjoining
Kaumalumalu, Kona, Hawaii, adjoining lands Holualoa 1 & Pahoehoe, Government
Laloa 1, Kona, Hawaii, adjoining lands Laaloa & Pahoehoe Government
Kealia 2d, Kona, Hawaii , adjoining lands Kealia & Hookena
Keokea, Kona, Hawaii, adjoining lands Hoonaunau, C.R. Bishop & KiilaeG. Hueu
Hookena, Kona, Hawaii, adjoining lands Kealia & Kauhako, Government
Ninole 2, Hilo, Hawaii [page 244]
Pahoehoe, Kona, Hawaii, adjoining lands Pahoehoe, Government
Haukalua, Kona, Hawaii, adjoining lands Haukalua & Alae Government
Kapualeiholaike, Kona, Hawaii, adjoining lands Okoe, Kaulanamauna, Government & Keauhou, Estate Kamehameha V.

Hinalole, Kona, Hawaii, adjoining lands Honuaula and Hinaloleliilii
Kahilipalinui, Kau, Hawaii, adjoining lands unknown
Hilea nui, Kau, Hawaii, adjoining lands unknown
Kawela, Kau, Hawaii, adjoining lands unknown
Hionomoa I, Kau, Hawaii, adjoining lands unknown
Hionomoa II, Kau, Hawaii, adjoining lands unknown
Mohokea, Kau, Hawaii, adjoining lands unknown
Kauhukuula, Kau, Hawaii, adjoining lands unknown
Paakaa, Puna, Hawaii, adjoining lands unknown [Pualaa?]
Keekee, Puna, Hawaii, adjoining lands unknown
Hulunanae, Puna, Hawaii, adjoining lands unknown
Mauluaiki, Hilo, Hawaii.

Your Honor will therefore please appoint a day for the hearing the above application & grant a Certificate in accordance therewith.
(Signed) R. Keliikolani by F.H. Harris, attorney at law
Hilo, August 16, 1873

Hileanui Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, Hawaii, Volume 1, No. A, pps 419-426

The Ahupuaa of Hileanui, District of Kau, Island of Hawaii, 3d Judicial Circuit

On this 15th day of October A.D. 1873 the Commission of Boundaries for the 3d Judicial circuit, Island of Hawaii met at Ninole, Kau on the application of J.O. Dominis, acting for Her Excellency, R. Keelikolani for the settlement of the boundaries of Hileanui, Kau.

Due notice personally served on owners or Agents of lands, adjoining, as far as known.

Present: J.G. Hoapili for applicant, J. Kauhane for Hawaiian Government, and Kahoomawanui for self and others.

For Petition see Folio 244

Kaele, kane, sworn, I was born at Hilea, Kau, at the time of building Kiholo. Have always lived there and know the boundaries. My Father, Kaawa (now dead), who was a bird catcher told me the boundaries and afterwards I went and saw them.

Kanikoaole (now dead) and myself pointed out the boundaries to Pele (F.S. Lyman) when he surveyed the land; and he surveyed as we pointed it out. We commenced at a large rock in the sea called Kapohakumoi; the boundary between Hilea and Kalaaiki, on the South side of Hilea; thence to Kahalehuki, an oioina, an ahua nui, mauka of Kauhale of Kaawaa; thence to Kihaopai, a kauhale kahiko at the foot of a pali; thence up said pali to a place called Malumaluakua; thence to Kipapaloa, a kauhale mauka of Puuike; thence along iwi aina, a line of caves; thence to Kaumukukui, a kauhale kahiko on the Kona side of a hill called Kaiholena; there is a kahawai

between kauhale and hill; thence to Kapapakonane, a kauhale; the boundary running to the Hilo side of it; thence the boundary runs in the gulch a short distance; thence the gulch running to the Kona side to a place called Kapaaneenee, a waterfall; thence along the gulch to Kapalimuku, a second large pali; then leave the gulch and the boundary runs to Waikoloa, a pond just mauka of the woods, [page 420] where Kahuku cuts Hileanui off on the mauka side; thence along the edge of the woods; the pahoehoe on the outside being the land of Kahuku, to A Poohina, where Ninole joins Hilea on the makai side of the aa.

I do not know about the boundaries of Punaluu. My Father said Punaluu extended to the aa. I cannot point out the spot where Hilea, Ninole and Punaluu join the aa.

Thence makai along Ninole to Naunuamalae, an oioina on a small pali; Anahua he ulu laaunae; thence makai to opposite Kukauakahi, a pali on Hilea, and mawae on Ninole; said mawae is a deep awaawa that runs makai. Kukanakahi is the Hilo end of Kaiholena; thence to Kaawahine, the mauka corner of Hileaike, a banana grove and pali at this place; thence makai along the iwi aina Ooanui on Papalanui Kihapai koele; thence makai to Makanau, a pali mahiai; thence down to Ahopae at the base of the hill and where there is a gate in the wall; thence to Ahupoho aa, a kihapai on Hileanui, aa on the Hilo side on Hileaike; thence makai to Puuainako, a point of rocks in the sea; sea on the makai side, and Ancient fishing rights extending out to Kai malolo, at Paneenee; we stopped surveying a Papaloa, Pele sighted to Paneenee you can see it distinctly from there; On the line between the two Hileas the chain was used as far as Makanau. I did not point out the boundary on this side of above there. The people of Hileaike claim that a part of Kaiholena belongs to them. Pakua is a pali on Makanau. Kaalaike is all sold from shore to Papaloa.
Cross-examined

Kapena and Kekapa also went with Pele surveying Hileanui.

Wapaa, kane, sworn, I was born at Puukoa, Kau, at the time of Peleleu. Lived at Kalaaike from the time I was small until four years ago when I moved to Hookukano. I know a part of the boundaries of Hileanui between the shore and the woods. Kuai and Kaawa, his son (both now dead) who were kamaaina and bird catchers showed me some of the boundaries when I went in the woods with them; they said Kahuku and Kaalaala took all the land above the woods. [page 421]

Papaloa is a puu pahoehoe at the mauka corner of my land, on Kaalaiki adjoining Hilea; Thence mauka along Hileaike to Kahoenakapuaa; a pali pali [sic]; thence to Kaumukukui pahoehoe; thence to Kapakonane where the boundary runs into a gulch; thence along the gulch to Paneenee, a waterfall; thence to Makaahi, a large pali; thence still along the gulch to Kapalimuku; this is as far as I know the boundaries; Have heard that it runs to Waikoloa above the woods. I have seen the pond and have heard that Kahuku cuts Hileanui off at that place.

The boundary between Hileanui and Hileaike being at two piles of stones on the aa, on each side of the Government road; thence it runs makai to Puuainako at the sea shore. From the road the boundary runs mauka to Ahupoho; thence to Puainako 2d, a cultivating ground; thence to a gate

in a wall at the foot of the pali; thence mauka to a kukui grove on the pali, called Wahawahaike; thence to Makanau; thence to Pakua a pali; thence to Papalanui, a pali; thence to Kukauakahi, Heard this from Makaha, now in Honolulu. He described it was on Hileanui. I have head that Hileaike ends at Ooanui; on Papalanui; Kawahine is on Hileanui; thence along Ninole, the mawae being the boundary between Ninole and Hileanui; thence along said mawae, through the woods to Waikoloa; the crack ends just makai of Waikaloa.
Cross-examined

Kahoomanawanui asks to have the case continued tomorrow the 16th instant at Keaiwa so as to give him an opportunity to get his witness.

Case adjourned to Keaiwa, October 16th 1873
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Keaiwa, Kau, October 16th 1873
The Boundary Commission and according to adjournment from the 15th instant.

Present: J.G. Hoapili for applicant; J. Kauhane for Hawaiian Government and Kahoomanawanui and others for Hileaike.

C.K. Apili states that Kalili is his step father [page 422]

Kapapa, sworn, I was born at Ninole at the time of Ulukaa. Have always lived there; know the lands of Hilea. I went with Nailieha, when he pointed out the boundaries to Pele (F.S. Lyman); many others went along, but he was an old kamaaina and I heard him tell the boundaries.

We commenced to survey at the sea shore at a place called Puainako; thence up the boundary between Hileanui and Hileaike; thence to Ahupoho, a place where the water stands in wet weather; thence to pali puukoheo; thence up the middle of the pali to the end; thence mauka to Wahawahahaiki, a kukui tree at pali above that place; said place being on Hilea 2d. It is an awaawa and the boundary is on the Kona side of it; thence to a hill called Makanau; up said hill across the top and down on the mauka slope to a short distance on the Hilo side of a heiau called by the same name (contradictory); said heiau is on top of the hill; thence down the hill and to the Kona side of a water hole called Punahae. This is as far as I know the boundaries, and it is as far as the land was surveyed.

I have heard Makaha say that the Kapae Loulu kuakahi was planted by his Kupuna kane, and that it was where Ninole and Hileanui join. He also told us when we came back from the woods, that the Hileaike people said their land went to the kuahiwi, but he said the Palm trees were on the boundary between Hileanui and Ninole, and that Ninole and Kaalaiki joined at A Poohina. Punahae is a water hole by Pakua, the large hill mauka. I did not see the side nest to Kaalaiki surveyed and do not know the boundaries.
Cross-examined.

Kalili, kane, sworn, I was born on Hileaike at the time of Kaumoalii coming from Hilo to Kau. I

went to Ohaikea with my parents after sandalwood before I was old enough to carry bundles of any weight. I lived at Ohaikea till I was married; then moved to Olaa, in Puna; lived there five or six years, and then came to Hileaike. My Kupuna kane (Kama kane) came from Kohala to Hilea [page 423] to live and had care of the lands. He and my Father (Pakuholu kane) told me a part of the boundaries and I went with them and saw said boundaries. We could not go onto Kaalaike and Ninole, as those lands had different konohiki from Hilea; know a place called Kapunahae, a water hole in an awaawa; it is in Wahawahaike, the water hole is on Hileaike near a hill called Pakua. The boundary line between Hileanui and Hileaike is a short distance on the kona side of the water; thence the boundary runs to the top of the ridge (up Pakua) then to the end of the ridge. Thence down into the awaawa where it reaches an old aa bed. Follow up the Kona side of the aa to the Hilo side of Kaiholena, a hill. This is as far as I know the boundaries; but my Kupuna and parents said it followed the aa to the upper edge of the woods.

I have heard that Hileaike joins Kaalaiki & a pali Puuike stands on [it?], and from thence the two run side and side to above the woods where Hileaike is cut off by Kahuku.

I do not know the boundaries between Hileanui and Kaalaiki.
Cross-examined.

Makaha and others had a dispute about the boundaries of Hilea. I have heard that Makaha said that the palm trees are on the boundary between Hileanui and Hileaike; others said that Kanukahikane lived at the palm trees without reference to boundaries. I have heard that this place is in the middle of an aa flow, but I have never seen it. Kaawahine is a kauhale on the Hilo side of Kaiholena; the awaawa on the Hilo side of the Kauhale is the boundary between Hileanui and Hileaike. Said place is near to the aa. I was disputing with Kaele; he said that Hilea ended at Pakua; and that I was not a kamaaina; I said if that is so and the lands are surveyed according to that statement, then Heleaike will take off a part of Kaiholena, and that he was not a kamaaina. In olden times people went from Ninole to Kaawahine and took the mamake, as I have heard; Kaawahine is on Hileanui and olona, mamake &c grow there.

I do not know what land Kanukahi lived on.
[page 424]
Hilea Nui, Kau, Hawaii

Note: Kauhane states that Makaha is at Honolulu and that he has not witnesses for the boundaries of Ninole.

Case continued till further notice to all interested parties.
R.A. Lyman, Commissioner of boundaries, 3d Judicial Circuit

Waiohinu, Kau, April 15, 1875
After due notice to interested parties, the Commission of Boundaries met at house of Junes & Richardson at Waiohinu, Kau, Hawaii.

Present: J.G. Hopaili on part of applicant, J. Kauhane for Hawaiian Government, G.W.C. Jones

and C.E. Richardson for owners of Kahuku.

Kaele kane, came forward and asked to be allowed to correct the testimony given by him October 15, 1873. Granted.

I stated before that Hilea Nui was bounded by Kaalaiki from Kapalimuku to Waikoloa. this is not true. I was induced by others to make the statement. The truth is that Hilea Nui ends at place called Palahalaha, a pali above Kapalimuku. This place is in the woods some distance makai of the mauka edge. Hilea Nui is cut off here by Kaalaiki to place called Naumamalae, a pali in the woods where Kaalaiki and Ninole join and cut this land off. This is the truth and I make this statement of my own free will, as I want to correct the wrong testimony I have given and to give the true boundaries of the land. The other boundaries of the land from the shore to these corners, I testified to correctly before. I never knew of Hilea Nui reaching further mauka than the points I have given today. I went with F.S. Lyman when he surveyed the land, and pointed out these boundaries to him.
Cross-examined

Mr. Kauhane says that he has no evidence to offer. Case continued to Hilo until F.S. Lyman files his notes of survey, when his evidence will be taken and decision given.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

No.113. For decision see Folio 263, Liber I or No. 3.

On filing survey by F.S. Lyman, it appears not to be receptive to take his evidence.
For costs see Folio 268, Liber I
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Costs paid May 28, 1874
2 day hearing 20.-; recording 19 folio 4.75, advertisement 4.-; $28.75

Hileanui Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission, Hawaii, Volume 1, No. 3, pps 263-267

See 420 &c. Book A

No. 113

Certificate of the Boundaries of the land of Hilea nui, District of Kau, Island of Hawaii, Commission of Boundaries, 3d Judicial Circuit, R.A. Lyman, Esquire, Commissioner

In the Matter of the boundaries of the land of Hilea nui, District of Kau, Island of Hawaii

Judgement

An application to decide and certify the boundaries of the land of Hilea nui, district of Kau,

Island of Hawaii having been filed with me on the 16th day of August 1873 by R. Keelikolani, per F.H. Harris, Attorney at Law, in accordance with the provisions of an Act to facilitate the settlement of boundaries &c, approved on the 22d day of June A.D. 1868, now therefore having duly received and heard all the testimony offered in reference to the said boundaries and having gone on the said land, at the request of the applicant, and having endeavored otherwise to obtain all information possible to enable me to arrive at a just decision which will more fully appear by reference to the records of this matter by me kept in Book No. 1. A., page 420, and it appearing to my satisfaction that the time, lawful and equitable boundaries are as follows, viz.:

Commence at a rock in the sea, on the Southwest side of Kawaa Bay, which rock is the boundary of Hilea and Kaalaiki, and run

1. South 43 3/4° West 2.80 chains to east corner of T. Keawe's Royal Patent No. [left blank] [page 264]
2 North 59½° West 11.26 chains along Royal Patent No. 993;
3. North 60½° West 18.00 chains along Royal Patent No. 993;
4. North 38 3/4° West 17.35 chains along Royal Patent No. 2648;
5. North 30½° West 28.00 chains along Royal Patent No. 2648;
6. North 47° 00' West 4.00[?] chains along Royal Patent 2646;
7. North 62° 00' West 55.50 chains along Royal Patent 2646, 2651 & 2647;
8. North 82½° West 12.00 chains along Royal Patent No. 2645 to top of pali;
9. North 77½° West 4.25 chains along Royal Patent No. 2645;
10. North 58° 00' West 12.00 chains along Royal Patent No. 2645;
11. North 54° 00' West 24.80 chains along Royal Patent No. 2943;
12. North 49 1/4° West 19.75 chains along Royal Patent No. 2948 to Papaloa;
13. North 63° 00' West 55.00 chains along Kaalaiki Government land to kukui tree marked Z;
14. North 67° 00' West 30.50 chains along Kaalaiki Government landto a pile of stones;
15. North 53° 00' West 11.36 chains along Kaalaiki to pile of stones at edge of the woods;
16. North 50 1/4° West 32.92 chains along Kaalaiki to Ohia tree marked H;
17. North 49° 00' West 21.00 chains along Kaalaiki to X cut in bedrock at angle of the ravine at place called "Kapuna,"
18. North 65 1/4° West 18.33 chains along Kaalaiki;
19. North 53° 00' West 24.70 chains along Kaalaiki to ohia tree marked I;
20. North 57° 00' West 17.30 chains along Kaalaiki to A, cut in the bedrock of the ravine;
21. North 76 34° West 27.00 chains along the old bed of the stream to [backwards P] cut in the bedrock;
22. North 24° 00' West 3.18 chains along bed of the ravine to [page 265] T cut in the bedrock of the ravine near the foot of "Panunu" pali;
23. North 62° 00' West 218.00 chains along west branch of the ravine up the pali;
24. North 50½° west 13.40 chains along west branch of the ravine to top of "Panunu" pali; thence the boundary follows up the bed of the ravine in bent lines to "Palahalaha", about the following courses;
25. North 29½° West 28.15 chains;
26. North 66½° West 27.00 chains to the top of a small pali;
27. North 33 3/4° West 7.30 chains;

28. North 79½° West 40.15 chains to the top of "Palimuku"
29. North 54 1/4° West 7.45 chains to a rock marked X in ravine, near foot of "Palahalaha'"
30. North16 3/4° West 6.50 chains up Palahalaha pali to where the ravine branches; thence the boundary leaves the ravine & follows up the ridge, high ridge;
31. North 22° 00' East 50.00 chains;
32. North 35 3/4° West 28.00 chains to ohia tree marked N.A. on top of the ridge at pace called "Naunuamania," the boundary of Ninole, thence following down the boundary of Ninole, Government land;
33. South 88½° East 23.10 chains to ohia tree marked X.
34. South 83 3/4° east 77.75 chains to ohia tree marked [bar with point of upside-down V meeting bar]
35. South 63 1/4° East 97.50 chains to ohia tree marked T at "Mawae", the boundary;
36. South 83½° East 6.75 chains along "Mawae," a volcanic chasm to top of "Kukauakahi" pali; [page 266]
37. South 60 1/4° East 180.30 chains along "mawae" to ohia tree marked X;
38. South 57½° East 12.10 chains along mawae;
39. South 25½° East 11.20 chains along mawae
40. South 37 1/4° West 1.55 chains;
41. South 17½° East 32.00 chains along "Kawahina" ridge to ohia tree marked X;
42. South 8½° East 13.69 chains along "Kawahine" ridge to ohia tree marked A;
43. South 40½° East 34.90 chains to place called "Oanui" at foot of "Pakua" hill;
44. South -- -- 12.00 chains up an old land slide to top of "Pakua" hill;
45. South 32° 00' East 28.00 chains along a ravine which is the boundary on top of "Pakua"
46. South 75½° 00' [sic?] East 24.00 chains along a ravine to the brow of Pakua; then leave ravine;
47. South 45 1/4° East 5.00 chains to the foot of "Pakua;"
49. South 64 1/4° East 16.65 chains to the brow of "Makanu" hill;
50. South 59½° East 23.00 chains to a kukui tree by the mauka road, near the south bank of the ravine below "Makanau" hill;
51. South 58° 00' East 11.60 chains along near south bank of ravine;
52. South 61 3/4° East 39.90 chains along near south bank of ravine;
53. South 27° 00' East 22.20 chains to the stone wall at foot of pali by the pahoehoe; [page 267]
54. South 50 1/4° East 27.70 chains to a hill of stones on the pahoehoe;
55. South 55½° East 32.00 chains to a hill of stones on the pahoehoe;
56. South 40½° East 26.40 chains to a hill of stones on the aa ~~at south side of Government road~~;
57. South 33½° East 37.15 chains to a hill of stones on the aa at South side of Government road
58. South 66 1/4° East 28.00 chains to a place called "Puuainako" at the sea shore, thence along the sea shore about as follows:
59. South 68 3/4° East 42.50 chains to the point of commencement; containing an area of 4400 acres, more or less.
(Signed) F.S. Lyman, (November 1876)

~~Commissioner of Land Boundaries, Third Judicial Circuit, Hilea, Hawaii~~

It is therefore adjudged, and I do hereby decide and certify that the boundaries of the said land

are and shall be as hereafter shall be as hereinbefore set forth.
Given this 9th day of October, A.D. 18977 at Hilo, Hawaii.
R.A. Lyman, Commissioner of Land Boundaries, Third Judicial Circuit

In this case the expenses are:
Costs 58.75
Travel. Expenses, 5.-
Witnesses paid by applicant and Hawaiian Government
Which are awarded as follows:
R. Keelikolani, 58.75
Travel Expenses 5.-
62.75
$33.75 paid, balance due 25. Paid
R.A. Lyman, Commissioner of Land Boundaries, Third Judicial Circuit

[No. 113, Hileanui Ahupuaa, District of Kau, Island of Hawaii, Boundary Commission,2015 Eka, 1873, Edited by J. Quintero]

Appendix E: Place Names of Nīnole and Hīlea

Ka‘ū	Southern District on the Island of Hawai‘i. In ancient poetry, Ka‘ū is called Ka‘ū-loa, “long Ka‘ū” (Pukui, Elbert and Mookini) (Hawaiian Place Names on *ul*ukau.org. Ka‘u has four particular *heiau*, which according to interviewees, are energy points for the district: Makanau or Kohākalani *heiau,* Lanipao *heiau*, Punalu‘unui *heiau* and Kalalea *heiau* at South Point (Ka Lae).

Nīnole Place Names

Nīnole	*ahupua‘a* “ bending” (Pukui et al. 1974:165)
Ahunui	point, “The boundary at shore between Ninole and Hileaiki is at an ana kai between the point of Ahunui on Ninole and Kapukini a point on Hilea-iki [but Kapukini is on Ninole per USGS], BCT 1:432 (Soehren ulukau.org)
Hakaka	boundary point “…a pali that slopes toward Hilo” between Puu Kulua and Wanawana on Ninole/Punaluu boundary. BCT 1:417,419 (Soehren, ulukau.org).
Haukoi	‘ili ‘āina, Claim No. 88793:3 by Kalanawahine is for a “kihapai maia ma Haukoi. Apana 4. Kihapai kalo ma Haukoi.” Other claims also mention this ‘ili, 8790:3 is for “kihapai kalo ma Haukoi” 9167:1 is for “kihapai lauhala ma Haukoi” 10847:1and 9204 are for “moo aina o Haukoi” 10607:4 is for “”kahua hale me na moo kanu” ahukoi PE: floater, as on a fish net. NT 8:388,390,394,2395,397,398,405 and 430 (Soehren, ulukau.org), Perhaps TMK 9519: por. 6x)
Iloi	pond, “Pond at Ninole, Ka‘ū, Hawai‘I, fromed by Pūhau spring. A heiau [Ka‘ie‘ie] is still visible above the pond. Lexicology: Ī-lo‘i, Lit., supreme pond.” (PEM 56).
Ka‘ie‘ie heiau	heiau “Situated at the edge of the aa flow on the west side of Ninole Bay…All that was found was a cleared level stretch of aa paved with beach pebbles…” Lexicology ka ‘ie‘ie. PEM, the ‘ie‘ie [Freycinetia arborea] vine. Stokes 1991:131; USGS 1966, North 107,800, East 495,200 (Soehren, ulukau.org). in Nīnole *ahupua‘a* The Ka‘ie‘ie *Heiau* was noted to be situated at the edge of Pu‘u Ehu located on the west side of Nīnole Bay. Pu‘u Ehu bears 170° 50’ 5476 feet. Stokes notes that only the clearing paved with beach pebbles existed when he visited it (Stokes and Dye 1991:131).
Kalopalopa	‘ili ‘āina, claim 106078:2 “kihapai kalo ma Kalopalopa ili” Perhaps TMK 9519:por.6x, Perhaps a misprint for Ka-lapalapa? NT 8:430 (Soehren, ulukau.org).

Kapio	‘ili ‘āina, claim 8792:2 for Kapuuhonua a “kihapai wauke ma Kapio”, Perhaps TMK 9519:por.6x NT 8:374 (Soehren, ulukau.org).
Kapo	kāheka, Claim 8760E:2 “he kaheka ohua o Kapo” NT8:404 Lit. Pool, especially a rock basin and salt forms; salt pan PEM (Soehren, ulukau.org).
Kapukini	place, “The boundary at shore at an ana kai [shore cave or cavern] between Ahunui and Kapukini… USGS 1966; BCT 1:432. North 108,500; East 495,600 (Soehren, ulukau.org).
Keopuka	‘ili ‘āina, Claim 7721, “3 ili aina o Keopuka” Perhaps TMK 9519:por.11. Claim 8790 “kihapai kalo moo o Keopuka” Perhaps TMK 9519:6x; Claim 8853, a “moo aina o Keopuka” Perhaps TMK 9520:por.18; Lexicology Ke-ō-puka, PEM: the perforated sand. Source NR8 153; NT 8:394,395. (Soehren, ulukau.org)
Kilohana	boundary point, “The mauka corner of Mohokea-nui and Punaluu. Elev. About 4600 ft. In other testimony this corner was named Pohakau, but the location may not be identical. BC 95(3:218), North 142,800, East 469,800. Lexicology kilohana. PEM: lookout point. (Soehren, ulukau.org).
Kōloa Beach	Beach in Punalu‘u ahupua‘a. The Makanau Heiau in Hīlea is paved with the pebbles from this beach. Pukui describes this beach in Punalu‘u, Ka‘u where *‘ili‘ili hānau* (birth stones) were said to reproduce (Pukui et al. 1974:116). While on a tour of the Hawaiian Islands, Reverend William Ellis places Kōloa Beach in the *ahupua‘a* of Nīnole South of the mouth of Ninole Gulch, Lexicology kō-loa PEM not translated, perhaps long sugar cane, North 108,000, East 495,300 (Soehren, ulukau.org).
Kauhewa Springs	a pond bordering the Punalu‘u side of Nīnole, fed evidently by another set of springs named Kauhewa (Handy and Handy 1973:606).
Kauwā	a small town on the outskirts of Punalu‘u, near the old “alanui” government road. Perhaps the remains of the old reservation which was on the western half of Nīnolem reserved for outcasts. (Map coordinates?????)
Makenala	moò. Claim 8793:1 “kihapai wauke moo o Makenala” Perhaps TMK 9519:por.6x. Claims 9167:2,87942 and 10510:3 for “Kihapai ma Makenala.” 9204:2 “kihapai kalo ma Makenala…” Claim 10607 “4 kihapai kalo ma Nakenala…” other claims list just “Kihapai ma Makenala”; Source NT 8:388,392,397,399, 400,404,405 and 430 (Soehren, ulukau.org).
Mokini	heiau “Perhaps identical with Kaieie heiau. It was a name heard in Waiohinu and Honuapo, but the single resident of Ninole I met with knew only of Kaieie heiau.” Stokes 1991:131. (Soehren, ulukau.org).
Nīnole	ahupua‘a, “Retained by Lunalilo, surrendered to Government. Another MB entry (p.46) identified Ninole as returned b y A. Kaeo, retained by Crown (p. 188) but with annotations by G.P. J[udd] referring to p. 25 and Lunalilo’s

claim. The name is also appled to a Gulch, Cove, Springs, village. Lexicology: Nīnole. PEM: bending. Source: MB 25,46,188: IN 52,79. North 116,000, East 436,500 (Soehren, ulukau.org).

Nīnole Gulch stream, Rises at 3880 ft. elev., ends about 1400 ft. from Ninole cdove. Lexicology: nīnole. PEM: bending. Source USGS 1966; North 111,900, East 443,100.

Nīnole Spring spring, “Its visible discharge is estimated to be 20 to 25 million gallons per day.” The traditional name is Puhau (q.v.), ISGS 1966; Stearns and Madconald 1946:262, North 108,000, East 494,800 (Soehren, ulukau.org).

Nīnole-Wailua Homesteads

Homestead, USGS 1966; North 123,000, East 480,000.

Paako ‘ili ‘ āina, Claim 8758:7K 9520:3x. Claim no. 8790:2 by Kahananui is for a "kihapai kalo moo o Paako". Perhaps TMK 9519:por.6x. Claim no. 10510:4 by Kawali is for "he kihapai ma Paako". Perhaps TMK 19519:por.10 or 9520:65. Claim no. 10607:3 by Piko is for a "kihapai ma Paako ili no Ninole". Perhaps TMK 9519:por.6x. Claim no. 8782:4 by Kalua for a "Pahale ma Paako" was not awarded. Claim no. 9167B:3 by Makuaole for a "moo kihapai o Paako ma Ninole" was not awarded. Claim no. 8760D:1 by Kahuakainui for a "moo aina o Paako ma Ninole" was not awarded. Lexicology: paʻakō. PE: dry lowland plain.:NT 8:375,395,399,400,404 and 430. (Soehren, ulukau.org)

Paepaenala place, A place in the southwest corner of RPG 2907, TMK 9520:12. Elev. About 1100 ft., Lexicology paepae-nala RM1455 (Soehren, ulukau.org) PEM platform ?,

Pakanaka moʻo, Claim no. 8793:2 by Kalanawahine is for a "kihapai mala ko moo o Pakanaka", TMK 9520:5x. Claim no. 10847:2 by Pulehu is for a "kihapai ma Pue me Pakanaka", TMK 9520:4x. Claim no. 8794:1 by Kahaku is for a "moo aina o Pakanaka ma Ninole", TMK 9520:por.78., Lexicology: pā-kanaka. PEM: touched [by] commoners (it could be used by commoners). NT 8:388,398, 399 (Soehren, ulukau.org).

Pia moʻo, Claim no. 8793:2 by Kalanawahine is for a "kihapai mala ko moo o Pakanaka", TMK 9520:5x. Claim no. 10847:2 by Pulehu is for a "kihapai ma Pue me Pakanaka", TMK 9520:4x. Claim no. 8794:1 by Kahaku is for a "moo aina o Pakanaka ma Ninole", TMK 9520:por.78**.,** NT 8:392,400,405.(Soehren, ulukau.org).

Pohakau boundary point. The mauka corner of Punaluu and Mohokeanui “where kauhale mamaki used to be, where Ninole cuts it [Punaluu] off…” This coerner is called Kilohana in Boundary certificate 95, but the location may not be identical. Lexicology: pōhākau. PE: stone that travelers rest on. BCT 1:417 (Soehren, ulukau.org).

Puakō ‘ili ‘āina, Claim no. 8758:5 by Kaiolani is "ma Puako ili no Ninole", TMK 9519:5 or 9520:3x. Claim no. 8853B:2 by Nawali is for a "kihapai kalo moo o Puako ma Ninole", TMK 9520:por.18. Lexicology: pua-kō. PEM: sugarcane blossom. NT 8:375,393 (Soehren, ulukau.org).

Pue ‘ili ‘āina, Claim no. 8758:6 by Kaiolani for his parcel "ma Pue ili aina". Perhaps TMK 9519:5. Claim no. 8853B by Nawali is for a "kihapai kalo moo o Pue ma Ninole". Perhaps TMK 8519:por.11. Claim no. 8790:1 by Kahananui is for his kihapai kalo 6 ma ka moo Pue". Perhaps TMK 8519:por.6x. Claim no. 10510:2 by Kawali is for "he kihapai ma ka moo o Pue". Perhaps TMK 9519:por.10. Claim no. 9204:4 by Kapaana is for a "kihapai ma Pue". Perhaps TMK 9520:por.18. Claim no. 10112:1 by Mauna is for a "kihapai kalo ma Pue ili no Ninole". Perhaps TMK 9520:por.78. Claim no. 8791:1 by Koapapaa is for "2 kihapai ma Pue ili ma Ninole" was denied. Claim no. 9167:1 by Komaia for his "pahale i ka moo aina o Pue" was not awarded. NT 8:375,390,391,395,397,404,405,430 and 501 (Soehren, ulukau.org).

Pūhau Spring spring, found near Kōloa Beach. Pūhau is the male counterpart and Kauale Spring is the female counterpart. Pūhau Springs feeds into Nīnole Fishpond, which is located *makai* (toward the ocean) and fronts Kōloa Beach (Clark 1985:62–63). Kauale is east of Pūhau. "Springs at Ninole, Kaʻū, and in [Hoʻokena] Kona, Hawaii. Lit., icy spring (pū is short for puna)." Called "Ninole Springs" on USGS 1966. Lexicology: pū-hau. PEM: icy spring (PEM 192), North 108,600, East 494,800 (Soehren, ulukau.org).

Puu Kulua puʻu, "...two large hills, the boundary [between Ninole and Punaluu] passes over the summit of both hills..." (p. 417). "...just makai of this hill is the mauka corner of Wailau..." (p.419) Elev. of upper Kulua is about 3480 ft., of lower Kulua about 3200 ft. Lexicology: kū-lua. PEM: two standing. RM 1455; USGS 1966; BC 95 (3:218); BCT 1:417,419, North 135,000, East 474,000 (Soehren, ulukau.org).

Waihī ‘ili ‘āina, Claim no. 8758:1 by Kaiolani is for his "pahale ili o Waihi ahupuaa Ninole", TMK 9519:23x. Claim no. 8758:8 by Kaiolani for his "pa kao ma ka ili o Waihi" was not awarded. Claim no. 8853:1 by Kanekoa is for his "moo aina a Waihi ma Ninole". Perhaps TMK 9520:por.18. Claim no. 7721 by Makaha is for "2 moo aina ma Waihi ma Ninole", TMK 9519:9x and 11. Claim no. 8760E by Kaui is for a "kihapai kalo & uala ma Waihi", TMK 9519:por.10, Lexicology: wai-hī. PEM: trickling water. NT 8:375,394,396,404 (Soehren, ulukau.org).

Wanawana boundary point. "...a puu on top of a big pali, where we used to catch uwaʻu." (p.417) The northwest corner of Punaluu. Elev. about 4760 ft. The upper boundary of Punaluu was disputed and said by some to extend to Ke A Pohina in Kahuku. Lexicology: wanawana. PE: spiny, thorny, as cactus; spiked, pointed; sharp, as jagged cliffs. BC 95(32:218); BCT 1:417,419), North 142,100, East 468,700 (Soehren, ulukau.org).

Hīleaiki Place Names

Hīlea iki/ike *ahupua‘a* “careless” and *iki* means smaller (Pukui et al. 1974:45). 2015 Acres (BC C3:265).

Hoopahulu boundary point. A hill or ridge between Kaniokamoa and Waihaka on Hileaiki/Ninole boundary. Lexicology: ho‘opahulu. BCT 1:432 (Soehren, ulukau.org).

Kaniakamoa ahu, "...an ahupuaa [makahiki altar] near a large rock at the mauka road" between Puu Ohi and Hoopahulu on Hileaiki/Ninole boundary. Elev. about 1200 ft. Lexicology: kani-o-ka-moa. PE: crowing of the rooster. RM 1455; BCT 1:432, North 116,600, East 485,100 (Soehren, ulukau.org).

Keahuokamalumalu

boundary point. "...a stone on the mauka side of the [lower] Gov. road" between Kokoaahu and Pohakuloa on Hileaiki/Ninole boundary. Also called Pohaku-o-Kamamalu (q.v.), "where Kamamalu slept." Elev. about 45 ft. Lexicology: ke-ahu-o-kamālumalu. The mound of Kamālumalu. BCT 1:432, North 107,650, East 494,800 (Soehren, ulukau.org).

Kohaahu boundary point. Misspelt. See Kokoaahu. USGS 1966, North 106,800, East 495,700 (Soehren, ulukau.org).

Kokoaahu boundary point. The boundary at shore between Hileaiki and Ninole. Misspelt "Kokaahu" on RM 1455; "Kohaahu" on USGS 1966. BC 112 (3:261); BCT 1:432, North 106,800, East 495,700 (Soehren, ulukau.org).

Kuhua Bay bay, Lexicology: kuhua. PEM: to thicken, USGS 1962, North 104,500, East 494,000 (Soehren, ulukau.org).

Kukauakahi boundary point. Located between Kawahine and Naunuamaia on Hileanui/Ninole boundary. Named after Kauakahi who lived there and planted loulu [Pritchardia sp.] palm trees. Also called Ka-pae-loulu Kauakahi [the loulu grove of Kauakahi]. Elev. about 240 ft. Lexicology: kū-kauakahi. RM 1455; BC 113 (3:265); BCT 1:422,433, North 127,200, East 473,900 (Soehren, ulukau.org).

Naunuamania boundary point, top of ridge boundary w3ith Nīnole (BC line No. 32)

Pohaku a Kamamalu/Pōhaku o Kamamalu

` This rock along the boundary of Hileaiki is a rock at the road where [Chiefess Victoria] Kamamalu slept (BC, Vol. A, 1:1853. 435). Between Kokoaahu and Pohakuloa on Hileaiki/Ninole boundary, at the mauka side of the lower Gov. road. Also called "Keahuokamalumalu (q.v.)". Elev. about 45 ft. Lexicology: pōhaku o Kaāmalu. Stone of [Queen] Kamāmalu. RM 1455. North 107,650, East 395,45.029 (Soehren, ulukau.org).

Pohakuloa boundary point and stone, "...a large high rock on aa" between Pohaku-o-Kamamalu and Puu Nahaha on Hileaiki/Ninole boundary. Elev. about 120

	ft. Lexicology: pōhaku-loa. PE: tall stone, RM 1455; BC 112 (3:261); BCT 1:432. North 109,800, East 492,600 (Soehren, ulukau.org).
Punahae	boundary point. "...a water hole" on the Hilo side of the Hileanui/Hileaiki boundary, between Makanau and Pakua BCT 1:422,431 (Soehren, ulukau.org).
Pu‘u Nahaha	boundary point. "...a hill of stones" between Pohakuloa and Puu Ohi on Hileaiki/Ninole boundary. Elev. about 230 ft. Lexicology: pu‘u nāhāhā. PEM: shattered hill. RM 1455; BCT 1:432, North 111,100, East 441,200 (Soehren, ulukau.org).
Pu‘u Ohi	boundary point between Pu‘u Nāhāhā and Kaniokamoa on Hileaiki/Ninole boundary. BCT 1:432 (Soehren, ulukau.org).
Waihaka	awāwa, "...an awaawa where people going after mamaki made a haka or bridge across the awaawa." Also called Alahaka. Lexicology: wai-haka. PE: water bridge.

Hīlea-Nui Place Names

Hīlea nui	*ahupua‘a* “careless” and *nui* means larger. Contains b4,400 acres (BC 1:264)
A Poohina	boundary point where Nīnole joins Hīlea on the Makai side of the aa (BCT 1: 420).
AhupaeAhopae	boundary point. "...at the base of the hill [Makanau] and where there is a gate in the wall." (p.420) Between Ahupoho and Wahawahaiki on Hileanui/Hileaiki boundary. BCT 1:420,431 (Soehren, ulukau.org).
Ahupoho	boundary point, "...a kihapai on Hileanui, aa on the Hilo side is on Hileaiki" (p.420) "...where water stands in wet weather." Between Keahupuaa and Ahupae on Hileanui/Hileaiki boundary. Quad uncertain. BCT 1:420,421, 422,431 (Soehren, ulukau.org).
Hīlea Gulch	gulch Hīlea Gulch and river system carries water from *mauka* (inland) to *makai* where it eventually empties into Kāwā Bay. Rises at 4600 ft. elevation, flows to Kāwā Bay. Lexicology: hīlea. PEM: careless. USGS 1962, 1966, North 107,000, East 490,800 (Soehren, ulukau.org).
‘ili‘ili hānau	the reproducing stones of Kōloa Beach in Punalu‘u. These pebbles were used in the paving at Kōhakalani or Makanau Heiau.
Kaawahine	boundary point, *mauka* corner of Hileaike with Hīleanui with a banana grove, mamake and pali (BCT 1:420, 423).
Kahalehuki	boundary point, an oioina (*o‘īo‘īna.* PEM: a resting place for travelers, such as a shady tree) and an ā*hua nui* (PEM: knoll) (BCT 1:419).
Kahoenakapuaa	boundary point and pali (BCT 1:421).

Kaiholena *pu‘u* and boundary point. The local rain god, Kū-mauna, had a field of iholena bananas here. (PEM 68). Lexicology Ka-iholena. PE: the iholena [banana]. RM 1455; USGS 1966, North 125,300, East 471,000 (Soehren, ulukau.org).

Kakainawana point, RM 1455, North 102,700, East 492,300 (Soehren, ulukau.org).

Kapaaneenee boundary point and waterfall BCT 1:419)(See also Paaneenee).

Kapalimuku boundary point, a second large *pali* from Kapaaneenee along a gulch. Here Kahuku cuts off Hileanui on the mauka side (BCT 1:419-420).

Kapohakumoi boundary point, a large rock in the sea (BCT 1:419).

Kapapakonane/Kapakonane boundary point, where there is *kauhale* (BCT 1:419), and where boundary tuns into the gulch (BCT 1:421).

Ka‘ulakalani hill back of Hīlea plantation, where Makanau/Kohāikalani temple is built (Puku and Green 1995:75).

Kaumukukui boundary point where there is a *kauhale kahiko* on the Kona side of a hill called Kaiholena (BCT 1:419). Pahoehoe (BCT1:421).

Kauale Spring spring found near Kōloa Beach. Kauale is the female counterpart, Pūhau is the male counterpart. (Clark 1985:62).

Kāwā Bay bay, The name is applied to the bay, surf and springs on neighboring Kaalaiki. Also written "Kawaa" with "aa" representing a long vowel "ā." Lexicology: kāwā. PEM: distance. USGS 1962; RM 1455; Ii 1963:134. North 102,500, East 490,500 (Soehren, ulukau.org).

Kāwā Beach beach in Hīlea *ahupua‘a*. The stones for Makanau heiau were reportedly brought from Kāwā beach (Pukui and Green 1995:78)

Kāwā Cave cave at shore in Hīlea. The story of Nānaele tells how the high chiefess of Kaalāiki was hidden in Kāwā (Cave) to protect her from her abusive husband (Pukui and Green 1995:

Kāwā Spring spring near Kāwā Beach in Hīlea nui, (See figure 7)

Kāwahine boundary point. "...the mauka corner of Hileaiki, a banana grove and pali at this place." (p.420) The boundary follows a ridge above Oanui to the corner where Hileanui joins Ninole and cuts off Hileaiki. Also spelt "Kaawahine." Called "Kawahine Ridge" on USGS but misplaced. Lexicology: kā-wahine. RM 1455; USGS 1966; BC 112 (3:260); BC 113 (3:266); BCT 1:420,433. North 123,000, Easwt 475,650 (Soehren, ulukau.org).

Keahupua‘a *ahu*. "...at the Gov. road" between Puuainako and Ahupoho on Hileanui/Hileaiki boundary. Elev. about 50 ft. Lexicology: ke-ahu-pua‘a. PE: the pig altar.: BCT 1:431. North 104,100, East 491,200 (Soehren, ulukau.org).

Ke‘eku Heiau *heiau* in Hīlea *ahupua‘a*. It is a heavy-walled enclosure on the northeastern side of Kāwā Bay, not to be confused with the one in Kahalu‘u. Pu‘u Enuhe bears 168° 47’ 30” 23,402 feet (Stokes and Dye 1991:128). "Located on the point at the northeast side of Kāwā Bay...This is a very heavy-walled enclosure with several platforms. It is bounded on the land side with a light wall..." Lexicology: ke‘e-kū. PEM: abrupt turn. North 102,750, East 490,900 (Soehren, ulukau.org).

Kihaopai boundary point with *kauhale kahiko* at foot of pali (BCT 1:419).

Kilohana awāwa, "...Hileanui ran to Kilohana with Ninole...Kilohana is an awaawa with olona etc. mauka of Kaiholena." Between Kukauakahi and Naunuamaia on Hileanui/Ninole boundary. Lexicology: kilohana. PEM: lookout point.: BCT 1:434 (Soehren, ulukau.org).

Kipapaloa boundary point after Malumaluakua. Witness says there is a *kauhale* mauka of Puuike, then going along “iwi ‘āina you come to a line of caves (BCT 1:419).

Kohākalani Heiau or Makanau Heiau
heiau in *mauka* region on Pu‘u Makanau The enclosure overlooks Hīlea Iki Ahupua‘a, also known as Makanau *heiau.* Pu‘u Enuhe benchmark bears 205° 56’ 11,448 feet (Stokes and Dye 1991:130). "Located on the southern brow of Makanau plateau...an enclosure with walls from 4.5 to 5.5 feet high inside...Kohāikalani...more commonly known as Koha...the Ka‘ū king who was killed at this heiau (which he is said to have been building) through a conspiracy of the common people in which the priest joined. It is a well-known story locally..." Lexicology: kohāikalani. [resounding-in-the-sky], North 114,600, East 482,100 (Soehren, ulukau.org).

Kohana boundary point. "Heleaiki people said it [Hileaiki] ended at Kohana makai of Kaiholena, a place where banana trees and olona are growing." The mauka boundary of both Hileanui and Hileaiki was much disputed before the Boundary Commission. Lexicology: kohana. PE: nude, naked, bare, alone. Cf. Kohana-iki 373.19.000. BCT 1:433 (Soehren, ulukau.org).

Kukauakahi *pali* and boundary point on Hīlea, It is the Hilo end of Kaiholena (BCT 1:420).

Kumauna, forest form of the god Kū, who stands as a great boulder in the forest above Hīlea, a stone potent as a rain maker. Ku-mauna might appear in the form of a dog to assist travelers or hunters lost in the uplands” (Handy and Handy 1973:591-592)

Today the huge boulder of lava which retains his shape in the bed of the valley is worshiped as a rain god. As late as 1914 a keeper escorted visitors to the sacred valley to see that the god was properly respected and his influence upon the weather restrained within bounds for the benefit of the district. The legend runs as follows: A tall foreigner comes from Kahiki and cultivates bananas of the iholena variety in a marshy spot of the valley. Pele

	comes to him in the shape of an old woman and he refuses to share his bananas with her. She first sends cold, then, as he sits doubled up with his hands pressed against his face trying to keep warm, she overwhelms him with a stream of molten lava. In this shape he is to be seen today encrusted in lava. [Internet Sacred Text Archive "Ku Gods," 18-19] http://www.sacred-texts.com/pac/hm/hm04.htm
Makaahi	Boundary point between waterfall and Kapalimuku (BCT 1:421).
Makaalia	place East of :alimuku. Elev. About 4200 ft. USGS 1966: North 129,700, East 465,000 (Soehren, ulukau.org).
Makanau	boundary point. A prominent hill, elev. 1843 ft. at a trig. station on the summit. Site of Kohaikalani heiau (q.v.), "the boundary passing some distance on the Hilo side of said heiau." (p.431) Lexicology: maka-nau. PEM: surly eyes. RM 1455; USGS 1966; BC 112 (3:260); BCT 1:420,421,431. North 115,300, East 481,400 (Soehren, ulukau.org), a "pali mahiai" (BCT 1:420).
Makanau Heiau	see Kohākalani Heiau
Malumaluakua	boundary point up the pali from Kihaopai (BCT 1:419)
Māmalahoa Highway or Belt Road	Main highway encircling the island, also the Ka‘ū section is known as The Belt Road or the Ka‘ū Belt Road by locals.
Naunuamalae	boundary point amd oioina, a resting place along Nīnole boundary with Hīlea, to pali Anahua he ulu laaunae (fragrant smelling twisted breadfruit trees??) (BCT 1:420).
Oanui	boundary point. "...a kihapai koele" (p.420) "I have heard ...Hileaiki ends at Ooanui [sic]" (p.433). Usuallly spelt "Oanui." RM 1455; BC 112 (3:260); BCT 1:420,433. North 120,000, East 476,850 (Soehren, ulukau.org), also an *iwi aina* (PEM: Stones or earth ridge marking land boundary) (BCT 1:420).
Old Plantation Spring	Spring. Elev. About 3440 ft. on a pali. USGS 1966, North 127,600, East 464,100 (Soehren, ulukau.org).
Pakua	boundary point. A prominent hill between Makanau and Kaiholena, elev. 2400 ft. Lexicology: pā-kua. PEM: back wall or enclosure. RM 1455; USGS 1966; BC 112 3:260); BCT 1:421,431. North 119,100, East 476,700 (Soehren, ulukau.org).
Palahahaha	boundary point and pali, where Hīleanui is cut off by Kahuku (BCT 1:424).
Paneenee	waterfall on boundary (BCT 1:421). Also called Kapaaneenee.
Panunu	pali, boundary point near foot of this pali.

Pāpalanui boundary point. “…a pali” between Pakua and Oanui on Hileanui/Hileaiki boundary, Lexicology: pāpala-nui, BCT 1:420,421, North 119,800, East 476,800 (Soehren, ulukau.org).

Pōhakuahalulu stone. Lexicology: pōhaku-a-halulu. PE: stone belonging to Halulu [the giant man-eating bird]. RM 1455; USGS 1962, North 102,600, East 491,200 (Soehren, ulukau.org).

Puainako 2/Puuainako 1
Puainako 2 is a boundary point. "...a cultivating ground" between Ahupoho and Ahupae on Hileanui/Hileaiki boundary. Lexicology: pu[‘u]-‘ainakō. PE: cane trash hill. BCT 1:421 North 103,000, East 493,000 (Soehren, ulukau.org). Puuainako 1, a point or rocks in the sea with ancient fishing rights out to Kai malolo (BCT 1:420], at the sea shore (BCT 1:421).

Pu‘u Iki pu‘u, A prominent hill west of Pakua. Elev. 2160 ft. Lexicology: pu‘u iki. PE: small hill. USGS 1966. North 118,500, East 474,700 (Soehren, ulukau.org).

Pu‘okoheo pali, boundary marker (BCT 1:422).

Pu‘u Oloea point. RM 1455, North 103,000, East 492,600 (Soehren, ulukau.org).

Pueo Point point, “Lae o Puuo” trig. Station is at Puu Ainako, RM 1455; USGS 1962, North 102,900, East 493,150 (Soehren, ulukau.org).

Wahawahaiki awāwa. "...a kukui grove, on the pali". (p.421) Between Ahupae and Makanau on Hileanui/Hileaiki boundary. Lexicology: wahāwahā-iki. PE: small Wahāwahā. BCT 1:421,431 (Soehren, ulukau.org).

Waikoloa boundary point and pond after Kapalimuku

Waiounahea point. RM 1455; North 102,200, East 490,200 (Soehren, ulukau.org).

Other place names mentioned in Hileaiki, Hileanui and Nīnole documents

Kapapala Ranch established in 1860, Kamehameha IV lease to William Reed and Charles Richardson, Willy Shopman becme a partner, sold to Charles Bishop in 1877, Charles Brewer became new owner in 1877 for 99 years. In 1975 Parker Ranch purchased all of the C. Brewwer holdings, sold to Gordon Cran in 1977. http://www.ctahr.hawaii.edu/sustainag/news/articles/V11-KapapalaRanch-FF.pdf

Lanipao heiau *heiau* in Punalu‘u *ahupua‘a* located near the southwest boundary of Punalu‘u, 1600 feet from the sea. Pu‘u Ehu benchmark bears 131° 56’ 2804 feet. This heiau is said to habve been built by Laka, of Kaua‘i (Stokes and Dye 1991:132). Today the Nechung Dorje Drayang Ling "Immutable Island of Melodious Sound," a Buddhist temple of Tibetan monks and retreat is located here on 25 acres in Wood Valley, the Ka'u District of the Island of Hawai'. (https://www.youtube.com/watch?v=T27ec1GHJWw)

Today the *heiau* there (Lanipao) has become a part of the Buddhist monastery. Interviewees regard it as part an integral complex of five Ka‘ū *heiau* which have special *mana* (divine power).

"Located near the southwest boundary of Punaluu, 1600 feet from the sea...This is a small, L-shaped enclosure with walls 6 feet high and from 6 to 7.5 feet thick...said to have been built by Laka, of Kauai." Two witnesses before the Boundary Commission gave the name "Punaluu" and "Punaluunui" to a heiau in this location. (BCT 1:418,419) Stokes 1991:132, North 111,600, East 496,400 (Soehren, ulukau.org).

Palehua, known today as Wood Valley

‘ili of Punalu‘u *ahupua‘a***.** Site of Lanipao *heiau*

Punalu‘unui heiau heiau at Punalu‘u. Same as Kaneeleele (Stokes); one of a pair with Halelau (Thrum). Two witnesses before the Boundary Commission gave this name to a heiau in the location of Lanipao heiau, on the Wailau/Punaluu bdry. (BCT 1:418,419) Lexicology: Puna-lu‘u nui. Big Punalu‘u. Stokes 1991:132; Thrum 1907a:47; BCT 1:418,419 (Soehren, ulukau.org).

Wood Valley see Palehua

Kalalea Heiau fishing *heiau* at Kamā‘oa, South Point, Ka‘ū. Ka Lae benchmark bears 191° 10’ 371.4 feet.(Stokes and Dye 1991:115)

Kōloa Beach. Beach in Punalu‘u. The Makanau Heiau in Hīlea is paved with the pebbles from this beach. Pukui describes this beach in Punalu‘u, Ka‘u where *‘ili‘ili hānau* (birth stones) were said to reproduce (Pukui et al. 1974:116). While on a tour of the Hawaiian Islands, Reverend William Ellis places Kōloa Beach in the *ahupua‘a* of Nīnole

Appendix F: Kawehi Ryder Transcription

Cultural Impact Assessment, CFL Bridge: Nīnole and Hīlea Bridges, Cultural Surveys Hawai‘i (CSH) interview with Kawehi Ryder (KR), at his home in Pāhala, Hawai‘i on 24 November 2015

CSH: Nicole Ishihara

K: Kalama

CSH: Okay, so we're here in your house in Pāhala, And your name is? [Laughing]

KW: Kawehi. Ryder.

CSH: And where were you born?

KW: I was born on O‘ahu in Kahalu‘u. Do you need the year?

CSH: If you feel like it.

KR: I was born on O‘ahu.

CSH: [Laughs] What did your parents do for a living?

KR: My parents worked for the--my mom worked for the State and my father worked for the Hawaiian Telephone Company.

CSH: Did you have any siblings?

KR: Five, besides me. So six all together.

CSH: How many brothers?

KR: Three boys, three girls.

CSH: Oh wow. So what was life like, living in Kahalu‘u growing up?

KR: It was beautiful! It was really, you know, a lot of the community should be today. But anyway, it was a good growing up environment and then in our community, because we had *kuleana* land, we were raised on the ocean by St. John's by the Sea, which is called Wailau, which is the Hawaiian name for that *wahi pana*. It was a very learning, growing-up environment. The culture was very alive and evolving. It was a living environment. So, it was good learning.

CSH: So describe like a day out in…

KR: A day?

CSH: Yeah, a day, what would you do? In a day…growing up there…

KR: Because my father was a fisherman, when he wasn't working, every weekend, we'd be in the ocean. So our day would be getting up early, and going out. And depending on the tide, the phase of the moon, we would do different fishing. Normally, daytime, we'd go diving for *he‘e*, the octopus. Or, if the tide was right, we would surround fish. In the form of the tradition called "*hukilau*." But, because Kāne‘ohe Bay has all the reef, the topography…

CSH: Like, the poppers?

KR: So, the concept of the "*hukilau*" evolved differently, which is a bag net system and then leaves attached to the rope, and then you walk on top of the reef, as the tide is coming up. And then what you do is, you try to corral the fish as they were eating the coral. Mainly, the fish we were getting was the *uhu* that feeds on the coral and the algae on the coral. In one day that was that. Unless it was a *pa‘ina* that was being done, we would all partake in different chores. To put together all the food. For the gathering. Anything from *kalua*-ing the pig, to making the raw squid, to cleaning the *wana*, to cleaning the *loli* and mixing it with the *ina*.

CSH: Oh, nice.

KR: That's a condiment you don't hear, let alone see, and people don't even know what it is. It's a sea cucumber that attaches itself underneath the rock. And the brown sea urchin, not the black one, the brown one which is called the *ina*. The black one is called the *wana*. That's what we mix. We put the two together as a Hawaiian delicacy. So in one day in Kahalu‘u, growing up, as well as still today, we still do that. That's what my childhood was about. And embracing grandparents, parents and extended family.

CSH: Would you guys go up *mauka* and…?

KR: That we had our land, our *kuleana* up *mauka*. But that didn't evolve conscious-wise until I came out of school. The land was idle for a period about 30 years, until I came back home from the Big Island from Hawai‘i Island. After I finished college. Then I began to restore the family taro lands, up in Kahalu‘u area *mauka*.

CSH: Ok. So, after you left Kahalu‘u…or when did you leave Kahalu‘u?

KR: I was pretty much always living in Kahalu‘u until I moved here to Hawai‘i.

CSH: Ok, ok.

KR: But I worked there up until 2007. I was doing work partly in the school system as a counselor, partly doing contractual work that involved cultural enrichment, cultural restoration, and then

through the years, doing that I acquired two contractor licenses. One in landscape trees and tree work, and the other in general mason work, which is what took me to Lāna‘i in 2007. Stayed there six years. Did restoration work and then presently living in Pāhala, Ka‘ū from 2014.

CSH: So your connection to Pāhala is?

KR: This is my home now.

CSH: Yeah.

KR: But I was always... I had friends that I had here when I was going to school in Hilo. So I've been part of this community, coming in and going fishing and whatnot, with my friend from the 70s.

CSH: I know when we were out in the field, that after Lāna‘i, that contract you did. What brought you here?

KR: Completion of our work on Lāna‘i, which was 1,500 for drystack rock wall, and the possibility of being a homeowner. At a decent price.

CSH: Right.

KR: Fee-simple wise. At a decent price.

CSH: [Laughs]

KR: And the fact that this was a good community where we could continue our work.

CSH: So, how did you learn about the fishpond here? And that there was restoration?

KR: From where I grew up. We grew up in Kahalu‘u where there is a fishpond existing called Kahonua unfortunately it's been turned into kind of a wedding contraction with the pond as the backdrop.

CSH: Right.

KR: Really, superficial intention and improper use by the current owners. I did some work on the fishpond. My family's genealogy ties back to that pond as being the caretakers, because we're one of two families left in Kahalu‘u that has this *kuleana* identified land, which is *mauka* and *makai*. But in being here and settling here in Ka‘ū, I do what I normally do, which is look for land to grow food and taro because of my interest with taro. So, we acquired land up in Wood Valley, which is approximately about 20 acres and 4 miles from Pāhala Town. And then also, I'm looking at the possibility of this fishpond that has been completely changed by environmental disasters with the flooding, the tsunamis. Which has completely been sedimentized. Which is a Hilo fishpond, which is in the *ahupua‘a* of Nīnole, which is adjacent to the *ahupua‘a* of Wailau.

CSH: So do you know of any *mo‘olelo* surrounding the fishpond or that *makai* area?

KR: The only *mo‘olelo* I know is the fact that it sprang out for help.

CSH. Right [laughing].

KR: So, you know what it is, is what I was sharing with you folks as we were walking. Is looking at that as a learning tool. As well as a teaching tool with the work that we do, which is primarily under our non-profit, which is called "'Uhane pōhaku na moku o Hawai‘i." Where the embodiment of our ancestors is within the *pōhaku*. ‘*Uhane* is the spirit. And that embodies the stone, which represents our ancestors that lay, well, embraces the all the *moku*, islands. That make up Hawai‘i. So that literally, is the definition of our non-profit and we fortunate to operate, to be employed by it right now. Our focus is working with juveniles, females right now. We have developed a group home, a safe house, and we're working with girls first. So that is one of the antidotes or the ingredients of medicine that I kind of symbolize or use. That what we have on the land, that can come up with a good healing. That could be applied to the hurt that these kids have acquired through their life, which is just basically teenagers. So with that is how I began, I looked at acquiring the pond, which is going through the processes of permitting and whatnot. Which is where we're at now. We've acquired a two-year lease from the State in conjunction with talking to the other landowners. The County of Hawai‘i, and then the private landowner, which owns most of the Punalu‘u area, which is Roberts Hawaii.

CSH: Roberts Hawaii.

KR: So again, that's a two-year lease that we have.

CSH: Did it kick off already?

KR: What kicked off already was we got the paper work approved according to their format. And we're just waiting for the shadow division to sign their name, which would be under Historic the Preservation's monitoring.

CSH: Yeah.

KR: But again, these are the problems that we be dealing with. That's why so much of our natural sites are in dis-repair because of the slowness of the bureaucracy that is involved with the system. But anyway, we already have the approval, so probably next year--January. We're looking at maybe starting down there.

CSH: Yeah.

KR: But we're still yet finishing making our group home certified for our kids. That we serve.

CSH: So what is your--the work down there at the fishpond entail?

KR: The work, basically for two-year agreement is just to remove the—[pauses] look at the Christmas tree they going bring down here.

CSH: Is that going to go to the town?

KR: No, every year they set up a Christmas tree down here. Olsen does, they cut one and set it up right down by the entrance when you come up in to the town.

CSH: Oh, nice.

KR: But anyway, so what we're basically doing in the two-year contract with the State, is just remove the debris, the buffalo grass and all the other invasive grass types--to get it down to ground level. And then they identify the existing pond left, which is a Kuahiwa, which is the name of the springs. We'll clean all to the base of the *pāhoehoe* that makes up the stone area. So those are the things that we are allowed to do for the first phase. Get the grass down to the ground level and then Historic Preservation will come in and identify what would be [coughing], what is still there, in terms of the original fishpond. Which is Hilo‘e.

CSH: What about the *heiau*? Or the sites that are more…

KR: Oh, the adjacent sites?

CSH: Yeah.

KR: They are all factored into that. Because Nīnole, from the research that I did--and then some discussion with some of the community, you know. Mind you, we've been here shy of two years, but February we make two years here. It was an intensive fishing village, because of the fisheries out there [coughing]. But umm… I lost my train of thought. Rephrase the question.

CSH: The adjacent sites.

KR: Oh, the adjacent sites, OK! You have Ka‘ie‘ie, that is on the shoreline.

CSH: Right.

KR: If you're looking at the pond, facing the ocean, it would be on the right side. That would be in the direction of Honu‘apo. And then *mauka* of that, Ka‘ie‘ie Heiau, which I think because of the fishery there had to be attached to a fishing kind of site. Because of the abundance of the resource and the dependency of the fish. For the diet. And then you have another site that is on the backside. But again, they overlook the Hilo‘e Fishpond. Which was fed by Pu‘ihau Springs, which has been completely covered by the years of erosion coming down from Nīnole dry stream bed, which was probably caused by all the diversion over the years by the plantation. By [C.] Brewer. That diverted everything into the stream bed. Off of the sugarcane production that they were doing, which is where we end up with this problem today.

CSH: Right. So Ka‘ie‘ie Heiau, you feel like that’s like that’s a fishing shrine? Like a *ko‘a*?

KR: Well, there’s a *ko‘a* on the backside, right adjacent. I strongly feel that’s my own *mana‘o*, because of my background in fishing and whatnot, and then looking at that pond there, you know, I think to me, it has those qualities and probably mindset that I think was partly what that was intended for. For giving your gratitude, and giving your prayers, and just being in communion. With their ancestors.

CSH: Is that other site that we visited, you know…

KR: With all the stone area? The structure?

CSH: You think that’s part of the *ko‘a*?

KR: I think that might be applied to a learning site. But you know, the thing behind that one, looking eventually, between doing the pond cleaning and removing the debris there. That’s what I think would be good for us to do too.

CSH: Yeah.

KR: So we break up the monotony. You know, when you’re doing this kind of work, because it’s going to be hard work, because there is so much sediment, we cannot do that, but initially the idea is get the grass down and dig a canal, which would channel the water to and from the ocean. And have that set up until we can go to Phase 2.

CSH: Is Phase 2 still going to be part of this two-year lease? Or….

KR: No, Phase 2 will be the next phase, the actual-- next phase will be the cleaning or removing the sediment.

CSH: Mmmh.

KR: Through this water system, where we would connect it to the ocean from the existing Kuahiwa Pond. Which we’ll have to time when the rainy season comes, which normally opens up the dry stream bed all the way down to the ocean. So you have the mouth open at the Kaloa Beach and the high tide will bring the water in and out.

CSH: Yeah.

KR: So that is the process I’m going to use.

CSH: And you’re going to bring back fish in? Cause I know it’s dry.

KR: What normally happens when you open up an inland pond area like that, is the instinct of the fish will normally bring it back inside there. That’s what normally happens. Over time fish will come in.

CSH: Right, right.

KR: And then of course, over time we’ll look at netting and gathering. The wild mullet—the mullet and what not--and stocking. Once we get to that point of enclosure.

CSH. Yeah.

KR: Where we can keep them in. And not go out. Through a *makahā,* a gate system, of regulating the opening size, where the water goes in and out.

CSH: Is there any other sites that we didn’t visit in the area?

KR: No. Other than what connects that site to the next district, which is where the other proposed bridge is going to be.

CSH: Yeah.

KR: Hīleanui. The *alanui* that connects Nīnole to Kauwā, you have to pass between the two, Hīleaiki and Hīleanui. It’s about one mile and a half to two miles that connects you all the way to the next village which is Kauwā, and just before that you’re passing the district or the *ahupua‘a* of Hileanui, which is where the other bridge will be.

CSH: Mhmm.

KR: Redone. But that’s where the other sites are.

CSH: So that’s the original road, like….

KR: That was the original coastal road, which was the *alanui* that eventually became a carriage road. Which was widened to approximately six feet.

CSH: Do you know of any burials that are *makai*? Or even in the….

KR: Not to my knowledge I don’t. But what I do know is, that somewhere Ka‘ie‘ie Heiau is, when you begin to walk in the direction of Honu‘apo, on the *alanui*, that is now *aupuni*—widened road that was mandated by the Monarchy in the 1800s--you will traverse these small little fishing settlements, that maybe, that had maybe, twelve, maybe a population about twelve to a dozen people because of the harshness of the environment, the heat, the *‘a‘a*. But you see those sites all the way along the coastline. At least I’ve seen about three areas. Where I’ve seen these small little sites along that roadway that is in close proximity to where we’ve been looking at doing this pond

restoration. So that all factors in to the fishing, the focus. Because of the terrain, the topography of the land.

CSH: What kind of fish are usually found in this area?

KR: Wow! Okay, from the in-shore you still get a lot of *enenue*, you still have a lot, of *enenue,* a lot of *manini*, *āholehole*, *moi*, mullet, *pāpio*. Pretty much you have a mix, a variety, but you have the species that were intended for the ponds. Which was the mullet, the *moi*, the *āholehole*. So you have those species that have evolved further into the *moana*, the deeper part of the ocean, then you are dealing with the *ahi*, the *ono*, the pelagics. And then you would still have that abundant resource partly, because half the year the place is rough.

CSH: So is there plenty *‘opihi*?

KR: You still have *‘opihi.* Because I think what keeps that preserve is the roughness of the weather

CSH: The surf?

KR: …most of the year, or half of the year, and the accessibility. And then pretty much if you from this area. And those who do that. I pick *‘opihi* too.

CSH: Yeah.

KR: But that’s the things that preserve it. The unfortunate part of that is there are a lot of people picking more then what they should, because they use that to make money.

CSH: Over picking. Oh really?

KR: There is a lot of that. What you think….where do you think all the *‘opihi* coming from when you go to Tamashiro Market, Foodland on O‘ahu. All that ‘*opihi* comes from the Big Island.

CSH: Wow!

KR: And by looking at the shell, you can tell from what districts.

CSH: Yeah.

KR: So predominantly, a lot of the *‘opihi* is coming from any of three districts, so it can come from the Ka‘ū District, it can come from the Puna District, and it will come from the Hāmākua District. And those are the three major districts. That right now, I think, is sending a lot of the *‘opihi*, that you see in the seafood department at the major food stores, like Foodland, Tamashiro Market.

CSH: Is this locals picking? Over picking?

KR: Local, mixed. So, you know, that’s the kind of thing too, that you have that is of a concern. Because there have been studies done on the *‘opihi*. But in this area there is still that resource, like I say, because of the accessibility. The terrain, and getting to it, that prevents it from being over harvested. Lāna‘i, because I lived there and I did a lot of gathering of *‘opihi* for home consumption. You know, I came across people who were doing it for the money. And that island also has a lot of… well, in the areas that I went, there was still a lot of *‘opihi* because you literally had to walk far to get to it, unless you come by boat.

CSH: [Laughing] Is there *limu* out there too?

KR: You have a lot of the…you still have a lot of species of *limu* out here. The main one which is the more palatable, the palatable one, that everybody kinda thinks is the best one, is the *limu kohu*. So you have a good quantity of that still here, a good variety, very clean. Then you have the other species, like *limu kala, limu pahe‘e*.

CSH: Uh hmm.

KR: I haven’t come across the *huluhuluwaena* or the *manauea*, but in this area, because you get a lot of brackish water, so that’s what determines the *limu* varieties. And of course *lipoa*, we have that too. *Līpoa* is famous for Maui, but the *līpoa limu.*

CSH: How do you prepare all this stuff? Like your *‘opihi*. Like, do you make *poke* kine with it?

KR: *Poke*. And if you’re going to save it, you freeze ‘em, but you put a layer of water inside, salt water. You freeze it with a little salt water inside it, so you ziplock the bag, double bag it. What you’re doing is you’re making a kind of glacier like mold around it.

CSH: Yeah. Yeah.

KR: Basically what that does is preserves the quality, so you don’t just have the *‘opihi* in the bag, you freeze it. You notice frost will get into the bag and then it will break down the freshness so if you freeze it with a little glaze, basically that’s what you’re doing. When you defrost it, it’s just like when you shuck it off the rock. Fresh. That’s the trick.

CSH: Yeah.

KR: You go *holo ‘opihi*. Preferably not too long, and then when you prepare them, of course. Some like the guts behind, some like of off.

CSH: Yeah.

KR: And then that’s how you do it. And then the *limu* when you harvest it, you have to be careful, you snip. Not pull.

CSH: Right.

KR: Because you want to leave the root.

CSH: You want it to grow, to regenerate.

KR: Yeah.

CSH: Do you use some of the *limu* for when you make…

KR: Oh! When we make our condiments, when we make our fish, we use the *limu*, when we make our *lomi* salmon.

CSH: Ooooh!

KR: When I make *lomi* salmon, we put, I put the *limu kohu* inside. I put the *wakame*. We make ours a little different. And then we also have an *ahupua‘a* salad.

CSH: Oh!

KR: So that’s a combination fern shoots…

CSH: Ahh!

KR: The *hō‘io* [native Hawaiian fern shoots], the Hawaiians call it *warabi* [foreign fern shoots].

CSH: I was going to say.

KR: Mix that. Put tomato, put onion, put *limu*, put *limu kohu*, some people put *‘ōpae*, and then the *wakame*, so that’s the dry seaweed, the Japanese one, the one they put in *miso* soup.

CSH: Yeah, yeah.

KR: Put that inside too. Even with the *lomi* salmon, it makes a nice color contrast, when you make Hawaiian food.

CSH: I’m getting hungry again now!

KR: But, see these are all traditional stuff.

CSH: Yeah.

KR: It’s not the normal *lomi* salmon, like how everybody knows it. It’s a little bit creative.

CSH: Right. You don’t add *patis* or chili pepper water?

KR: You put that as a choice, for people when they come down the food line.

CSH: You better invite me to your next party then! Yeah. [Laughs] Nah!

KR: Patis. It’s a trick, it’s a good ingredient when you’re making the fern shoot salad. It’s a good additive to use.

CSH: What about *he‘e*? Is there *he‘e* out here? Or is it too rough little bit?

KR: There is *he‘e* outside here, but more towards the South side, where my grandfather’s from the Wai‘ōhinu side. The thing is, I haven’t really done diving down Wai’ōhinu side where there’s a place called Ka‘alu‘alu, which is where my grandfather’s family was from, which is a Kaikuana family. That is in the area, so now that we have our trucks, I’ll be going down there. This is the months that you go for, when the *he‘e* is big. And it normally starts in August, September, October, November, December. Because in the springtime that when the *he‘e* is young and growing.

CSH: Baby.

KR: But when you hit August, September, October, November, December, that’s when they’re going to be a fairly good weight. Four or five pounds, six pounds.

CSH: Legal.

KR: Like how they catch ‘em in Kāne‘ohe Bay now--one pound.

CSH: [Laughs]

KR: They should change that. It should be more than one pound.

CSH: I agree.

KR: It should be two pounds, at least.

CSH: And then how do you prepare your fish?

KR: Well, us….

CSH: It depends on what kind of fish?

KR: It depends on what kind fish. Like *‘ōpelu* we eat it raw, mainly raw. We use the insides, when you make it, the gills. Because you have all the blood. And the kidney and the heart. Then you squeeze all the blood that it holds. And then you put it all on the fish.

CSH: Like, do you sashimi it? And then you put that on top?

KR: No. You rub it all on top. So you put even more, if you like that blood taste, because that has a lot of the health benefits. It gives you a lot of the iron. That’s the true way like the old folks how they used to eat it. Then you dry it.

CSH: Right.

KR: Because everybody loves the dried *‘ōpelu*. Then the other kind fish we fry.

CSH: Yeah.

KR: You know, more *‘ono* to eat um fried. But the pond thing, getting back to the pond thing, like I say, with our walkabout, down there, the main concerns, and you folks will address that. What’s happening to the pond and why we have the two-year phase to clean the grass down. And then the next phase will begin to remove the sediment in an acre area, which is part of the four acre pond. And the importance of minimizing the erosion that would come down during the construction period. And then the usage, resource-wise, of the excess stone, the *pōhaku*, to be able to use, for help us out with what we’re going to do down there.

CSH: Yeah.

KR: Those are the two things that mainly concerns me. You know, hopefully I’ll get my…these people that can contribute through the information that you leave behind, that you folks going leave behind, that I can share with them.

CSH: Okay.

KR: And they can call in and then you could tape them maybe?

CSH: Yeah. Of course!

KR: By phone.

CSH: Yeah. Okay, so, that’s your main concerns though for the pond.

KR: Those are the main concerns.

CSH: All right. I was just curious too, like, about the *mauka* lands, like here. Is there any *kalo* up here?

KR: Well…

CSH: Do you still raise *kalo* here?

KR: Well, we’re growing *kalo*. We harvested our last batch when we had our festival, that we started from Lāna‘i. This has been the fifth one that we’ve started now. This is the second one for the community, since we’ve moved here. We did four community festivals on Lāna‘i, where we started the thing, which was you know, sharing of the *hula*, the crafts, built the whole Hawaiian Botanical Garden in Dole Park on Lāna‘i. So when we moved here to Pāhala, we continued the thing. Give something to the community, to engage the community. And then way back to the day,

to all this stuff we'll be doing so this idea about restoring and doing the fishpond is to empower and to get the community involved.

CSH: Yeah.

KR: Because it's not going to be about raising X amount of pounds of fish so you can make the money, it's about the learning process.

CSH: Yeah.

KR: And understanding that we have these resources, having the pond and the Ka‘ie‘ie Heiau having those important visual sites, to be able to *mālama* it, to take care, to heal them, to build them, to put them back in preservation, so it can be shared with the community, with visitors. And then getting back to the taro thing, you know, part of the pond down there, because of the fresh water, could be made, where you can raise by mounding, Hawaiian called that *pu‘u*, the *puipui* style, where you plant the taro around, so you can have the water level rise, where the fish can integrate in and around these mounds.

CSH: Yeah.

KR: So then you can plant the taro on the top of these mounds.

CSH: Yeah.

KR: So that was one way that they cultivated taro in harmony with the fish. The *kuapā* is generally just one pond enclosure that raises just fish alone. The *lo‘i kalo i‘a* is a combination fish with taro. On the *mauka* land that we lease, is where we're planting *taro* in a systematic way. We plant 100 feet by 30 feet rows, and we're going to start that sequence in December. Now that I was able to get the tractor, so. It's kind of hard with just a tiller. We harvested already and then when you're growing dryland, different from growing wetland. Like I grew wetland commercially, but dryland … so you identify, so we've identified. I think, four varieties that we're going to use. The *makokonaueia*, the *mana lauloa*, the *lehua*, and the *mana ulu*, so those taro seems to be compatible. Dryland wise. And then I got some *luau* leaf variety that I brought back from Moloka‘i.

CSH: Mmmm. Yummy!

KR: And then, again the whole thing behind this is to grow taro.

CSH: Yeah.

KR: To create babies, more *huli* plantings and then you share with the community who want to plant them. So we need to empower, to spread the food source.

CSH: Right.

KR: To people who want to do that and then the more area that is being planted you have the visual knowledge, by looking at it, by seeing your culture living.

CSH: Going back to traditional food system.

KR: So that’s part of what we’re looking at, to grow the taro, just enough to feed this community, and then by doing a sequence like that, we’ll have enough, and then we’ll sell it to the community for an affordable price, like $5 probably a pound for *pa‘i ‘ai*, which is about the cheapest.

CSH: That is really cheap!

KR: So you’ll end up with two pounds.

CSH: Right. When you stretch um!

KR: When you stretch them. And then we’ll also include a pounder, if you want to learn how to pound *poi*. Like I have all that, the boards, like when you guys walk in. When you guys walked in, I get the small board.

CSH: I know, I seen ‘em.

KR: So, you know, couldn’t find a better place, like I was sharing with you guys down there, to have a community all engaging and whatnot. There’s only about 1500 people--give or take over here in this community. And this is one of the last, diffused plantation communities, it’s still pretty much intact in terms of the family—everybody knows everybody. So you gotta be careful what you do.

CSH: Right, and say [laughing].

KR: Those are the three important things.

CSH: Right.

KR: …that should be taught to, especially young people today. Think. Be mindful of your thoughts. Think before you open your mouth. And be careful of what you do. What you do, what you say and what you think. People should be mindful.

CSH: So this is an old plantation town, and there’s still everybody who worked plantation. Pretty much still...lives here?

KR: Predominantly retirees, pretty much retirees now. All were ex-plantation workers, pretty much.

CSH: And they had their kids and their kids are still here?

KR: Well, a lot of these kids have moved away. Because of better opportunity. So, that's the scenario that's gone on with many plantations. They move away to get better opportunity, to find higher education, you know, and then I've run across some through my friends here that were classmates with these people from this community. This high school you got to remember, right now, presently, from K to 12 you only have about 400 students, all together.

CSH: Wow!

KR: Yeah?

CSH: That's like how many graduated in my class! [Laughing]

KR: So, they're very close. So, I met one recently, who came back, retired, he's about 64, but he worked all these years in Washington State.

CSH: Wow.

KR: So, you have this same scenario all over in all the small communities. Like in Lāna‘i, same thing, same thing has happened.

CSH: So mostly *kūpuna* here?

KR: Yes, but what is important is that these people need to come back and bring that kind of knowledge that they learn abroad. To help preserve the community, because we have few communities left like this, but we have the resources here, which is partly what I want to do, envision, it's because, I think that's part of the antidote we're going to use for help heal the kids, that we're going to work with. So it can be a community thing.

CSH: Yeah.

KR: Especially, because of the tourist flow that comes through this district. And down there I identified, we have a plan. Timeline wise, a sequence. If we start the pond, and at a certain point, we'll have a board walk. And then we can educate the visitor on what we are trying to do, along with the surrounding sites, which is the *heiau*. And then our fruit stand, you know, then these things and the community and those involved, you know, who have a part, there will be some economic activity, at least we are still somewhat in control of our own resources, by engaging them. And not reacting. That's the thing, to engage before we have to react, when you have all kinds of development coming. If you're involved with the doing part, then it's easier to react later. Because, what comes out of your mouth, when you're speaking for a real reason because you have a vested interest.

CSH: Right. Okay. Well, I think we kind of covered everything.

KR: Okay.

CSH: Oh. Do you have any referrals?

KR: Referrals? Oh, the ones that I'll probably have contact you guys is Alvin. He's retired. He's in his 70s. His name is Alvin Kailiawa. His family is one of the big families here that might have something. Another is my neighbor, Earl. I forget his last name….oh, Louis. He's an old time plantation family. But, he lived down along the Punalu‘u area for about ten years doing a cultural kind of program, teaching kids with his wife, who is from this area, which is part of the Hanoa family. And then the other would be Demetrius Oliveira, who is from this place also. I think they would be interesting people to give *mana‘o*. So I'll contact them.

CSH: You were saying there's a group too?

KR: The other group would be Ka‘ū Kākou their non-profit is called, and I guess the backbone behind that non-profit would be Wayne Kawachi, is his name. Debbie, do you have the phone number for Wayne?

CSH: Excellent! I think…

KR: And then I'll give them a copy of this

CSH: Of course.

KR: And you can share that. He can call you if he has any questions

CSH: Okay.

KR: Okay, that's about it.

[End 40:22.1]

Appendix G: Earl Louis and Demetrius Oliveira Transcription

Cultural Impact Assessment, CFL Bridge: Nīnole and Hīlea Bridges, Cultural Surveys Hawai‘i (CSH) interview with Earl Louis (EL) and Demetrius Oliveira (DO), at the Makanau/Kohāikalani Heiau in Pāhala, Hawai‘i, 16 December 2015 (CSH: Nicole Ishihara)

CSH: Okay, alright, so I'll put this over here.

EL: Alright. [Inaudible] [Laughing]

CSH: [Laughing] Alright so we're here with ….would you like to introduce yourselves?

EL: My name is Earl Louis. L-O-U-I-S. Louis.

DO: And Demetrius Oliveira.

CSH: Okay, so Earl -- you were born and raised here?

EL: Yeah, I was born in Pāhala.

CSH: And then, what about you?

DO: Born and raised here in Pāhala.

CSH: Okay. Uh, let's see – what is your guys' connection with this particular *heiau*? Like, how did you guys get to this point? Like, know about this site?

EL: It was in us from the day I saw. I was kind of hit. I was born already in Ka‘ū. Already we was here for a purpose. There was no coincidence why we were born in Ka‘ū. We would be the protectors of Ka‘ū. And to *malama* Ka‘ū, just like our ancestors did. So, that was already the first day, the first *hā* that we take. You know. The intuition of us start to grow, but as a child, who comes up, I always knew that I was connected to Ka‘ū, from the *‘āina* itself. So, by going through adolescence, as a child, and growing up until, I came older.

DO: We always knew this place was special.

EL: Yeah, we knew this place was special.

DO: Our *tutus* would talk to us about um.

EL: Right.

DO: Our *‘ohanas* would talk to us about um.

EL: That’s right.

DO: But we never received the *‘ike* concerning it until the last…

EL: Well, from maybe, maybe the last four years – four years ago.

DO: Yeah, four or five years ago.

EL: But we used to come do *hunamana* work with my wife.

DO: Yeah.

EL: Maybe, like 15 years ago. We did *hunamana* work up here. Rituals at the base of the mountain. And we did twenty-four vigils, so that was the connection already.

DO: But the actual call to come up here to clean and to restore…

EL: Right.

DO: From the *iwi kūpuna* was about four years ago.

EL: Right. Like, four years ago. That was our whole protocol just for come back and we reactivate…

DO: Reconsecrate…

EL: Reconsecrate, right, *mālama* the *heiau again*.

CSH: What kind of *hunamana* rituals would you guys do? Did you guys know each other before?

EL: Yeah, we know each other for a long time

DO: Yeah.

CSH: Okay. So, you guys participated in that together?

EL: Oh yeah, from way back.

DO: *Ho‘omana, ho‘oponopono,* do *lā‘au kahea,* healing, energy healing. We grew up in houses our parents did the same spiritual reference -- all our lives.

EL: Yeah, all our lives we’re connected.

CSH: Maybe, I should go back a little bit. So maybe you guys can both talk about your guys’ childhood, growing up in Pāhala. Or this area.

EL: I let you go first.

CSH: [Laughs]

DO: My dad’s side of the family…my dad is … My grandfather is Oliveira. Manuel Oliveira. And my grandma is Abigail Kanakaole. And they came from Kapāpala Ranch, which is a ranch that’s a couple miles up from here. And they have been there for many, many, many generations. On my mom’s side--my mom is from O‘ahu, Momi Oliveira, Momi Ahia actually. But her roots were … she found out when she moved here with my Dad that her grandparents were actually from Ka‘ū. That was kind of like a cool, happenstance. She found out she was coming back to her roots. So we grew up here. Yeah, like what we were talking earlier, we grew up doing healing work - spiritual. My mom used to do *opu ka huli, la‘au kahea*, all kinds of … [inaudible]

CSH: That was her job? She never worked plantation?

DO: She worked at Volcano House for a little while. But she was like a homemaker. But, people would constantly come to the house. Like, we’re talking about every other day, we would have someone coming, if not from Ka‘ū, from some other island or someplace far away, come to be healed.

CSH: And she learned from?

DO: Her mom. Jennie. My grandma Jennie Kaehukaiopuaena Ahia. And my grandma, her father, my great grandfather, Sylvester Kamakaiwa Kepelino. He was gifted with *lā‘au kahea*, healing of the broken bones just using the *hā,* the breath. He would pass his hand over the person and he would just *hā* [makes *hā* noise] and their bones would fuse back together. So he was always in our family, doing that type of *hunamana* – healing.

CSH: Did you have siblings? Do you have siblings?

DO: I have four older sisters.

CSH: Wow!

DO: I’m the youngest out of five. I came 11 years after my last sister.

CSH: That’s a surprise. Yeah?

DO: You could say that I was the mistake. [Laughs]

EL: It was meant to be.

CSH: Surprise. Surprise. So did your sisters learn all that too?

DO: They’re coming into their *‘ike* now, in their older lives, cause they have families. They all have families. They got married younger and they never really pursued their spiritual path. But, I have never, never, I’ve always been the high priest of my family.

CSH: So when you were born or when you were younger, your mom just knew, “Like, He’s the one?”

DO: Yeah.

CSH: “He’s the one that will carry it on?”

DO: I was the designated one to carry on the *kuleana*.

CSH: Awesome. So. Uhhh…let’s see. What would your training entail? You don’t have to …not like *lā‘au lapa‘au*, so you didn’t have to gather plants? Or did you?

DO: We did some of that with my mom. We were taught the protocols with gathering *lā‘au*. You only gathered it earlier in the day, when the sun was coming up. And you gathered it from the side of the tree where the sun would hit it at first sun in the morning because it was *ola*. And by lunchtime, because the sun is over. You know, what was taught to us, was if you’re kind of tired by lunchtime, then the *ola* of the plant would be also be kind of waning. So you do your gathering early in the morning. And you always do *pule* and you’d ask. And even if you went up to the plant, you’d *pule* and you’d ask. You know, before gathering.

CSH: Yeah. So… wow that’s crazy! So you still do that today though?

DO: Mmhmm.

[CSH talking, lots of background crackling]

DO: I’m actually a musician. My band, Ka‘ū. We recorded back in 1998-99. And I am a recording artist, but of lately my music has kind of taken a back seat to my spiritual [inaudible].

CSH: Nice.

DO: This is my, what I live for now.

CSH: Awesome. Yeah. Okay. So Earl, do you want to tell me a little bit about your growing up, your childhood?

EL: My childhood was, I had four older brothers than me. So I was the youngest one of my parents. My dad was one plantation worker. You know, we lived off the land. My dad was the [inaudible] and you know he was working at the plantation. And on the weekends, we used to go up to the mountains at an early age. We used to go to the forest. So, I really when enjoy being in the mountains. You know, how it evolves [inaudible] we learned a lot of things, and that was part of living off the *‘āina*, so. Live sustainable, self-sufficient living. One of the purposes. Like some weekends we went to the ocean, to Kamehame to catch fish, throw *‘upena*. We lived off the ocean too. I remember doing that. My parents was always going outdoors and doing…taking us to sacred places. But, my mom came from Kona, so she was a Kalemakia. On the weekends, I used to go visit my grandparents in Kona too. So, on the weekdays I was going to school but on the weekends I would go to Kona a lot. So my grandfather, you know, was a very educated Hawaiian man. He was a principal at Honaunau School in South Kona. His name was Anon Kealamakia. So we used to go to his place. He used to talk about… my grandmother was a *lawai‘a*, an *‘opelu* fisher woman. She used to go in the canoe and catch *‘ōpelu*. That was her

whole practice of doing things. I remember going to her house and eating *‘ōpelu* when I was a small little boy. With *poi.* Kerosene stove they had at that time.

CSH: [Laughs]

EL: Yeah, my mom and my grandmother used to *‘ōlelo* Hawaiian.

DO: I used to speak the language.

CSH: Yeah.

EL: Beautiful. The old language. So that was all good when I was growing up. So, yeah, I kind of… my mom was into, she was raised in doing, helping different churches. She was doing in the Christian movement. But you know, she was in her higher self too, so. At a younger age, we used to get, you know, every night we did…

DO: It is so interesting that we were raised Christian.

EL: Right.

DO: And now we’re being called back.

CSH: Yeah.

DO: By our *tutu*s to do…

CSH: So you were raised like that too?

DO: Yeah. In a Christian home.

EL: [Inaudible] Our moms was really … we went to church on Sundays, and fellowship.

CSH: That’s funny, because your mom *‘ōlelo* Hawai‘i…and she was Christian [laughs].

EL: Well, that was the time. That was the moment of that time. That era, that was the time. It was what made them happy. So, that you know, whatever they did…

DO: But even though they were Christian, they would practice the *hunamana* side. So they kind of melded them together.

CSH: Yeah.

EL: Right.

CSH: So, your mom did that too then? She …

EL: Yeah, she did *huna*. She’d practice on that. She did it on me. She did it on my nephews. She did it for other people, so that… they knew how for do that. Not too much now.

DO: They didn’t see any conflict between being Christian and practicing the healing aspects of our culture.

EL: Right.

DO: Because it worked together.

CSH: Yeah.

EL: So it was very interesting. But…

DO: Of course, others in the community, you know, think that our family, they thought that my mom was a witch.

CSH: [Laughs]

DO: But you know what? It was those church-going people who would come to our house.

CSH: Ahhh…the very ones.

DO: At 3:00 o’clock in the morning and like say we need help. Somebody got [inaudible].

EL: They don’t know how funny it is that, see, his mom did it. Even when my brother got possessed.

CSH: What?!

EL: Possessed. So my mom went call a *kahuna* to come help my brother. So from her Christian beliefs she went back [inaudible] to practice the *hunamana.*

DO: I mean, you can *oki* that.

EL: This was about when I was 15-16 years old. My brother got possessed. The negative got him.

CSH: Here?!

EL: No, in Pāhala. I live in Pāhala. So, you know…

CSH: From a Hawaiian standpoint? Or a Christian…

EL: I don’t know what happened to my brother. He went to O‘ahu and he got something. He was normal. He went to the associated and something happened there and he came back with this energy in him. So, my mom couldn’t handle it. So she had to call on a *kahuna* come.

CSH: So it was beyond her …

EL: Right. I remember I had to leave the home. She called this man and this Hawaiian man came. I couldn’t live there. I had to live with my older brother for two months and with his wife because my

mom was dealing with this problem. It was very sad, but my mom, she couldn't do it in the Christian way. So she went to one Hawaiian practitioner.

DO: I've performed a couple of exorcisms with my mom too.

CSH: Growing up or?

DO: Growing up. Out of all my sisters, even when I was small, I would be the one helping her. And still continue doing that, even now.

EL: So that's what I do now.

DO: Yeah.

CSH: Wow!

EL: Yeah. I do "blessings."

DO: But he call them on.

EL: Actually, I don't know if should, this is kind of…

CSH: We can take it out.

EL: Alright. Actually my name is Kū.

DO: Channels Kū.

CSH: Ok. Alright.

EL: [Inaudible]. My voice changed. I channel his energy.

DO: And he calls his brother Kanaloa.

EL: And Kanaloa comes. So Earl is just a losing name. My real name is Kū. The energy of Kū is me. And I do exorcisms. I move energy. And I call all my ancestors to come. And they come. It's like a general calling his army.

CSH: Yeah.

EL: So that's who I am.

CSH: So your mom?

EL: My mom didn't know. She knew I was a special boy. She always called me my Hawaiian son. I look more Hawaiian than my brothers. My brothers, my older brother looks Hawaiian too. Dark. My other brothers look more Portuguese. My mom used to call me her Hawaiian son.

CSH: So were you like, just like Demetrius, like you were the chosen one?

EL: They knew. But they all knew it. My mom…

DO: It was not something you spoke out loud.

CSH: Yeah, of course. You don’t say who your favorite is. You know what I mean?

DO & EL: [Laugh]

EL: But the connection is …

DO: But you do wash your clothes separate, though.

CSH: Ohhh?

EL: But growing up to that time, you know. See, I never really find myself. I was going *kolohe*. When I was young I was *kolohe*. But, you know, when I came, I had experience in my life that I had to experience. I had accidents. The negative couldn’t take me out from young. They knew, my energy already. They wanted me off. I had an accident that happened to me during my younger life, when I was in my early twenties…almost time for me to leave. You know, I had a major break in my femur bone. Guess who found me? One pure Hawaiian man found me. His name was Richard Kaukini. So you know, when I got accident, hurt on the job…

DO: They found him in the middle of this huge forest. That’s like looking for a needle in a haystack.

EL: Right. He said he wasn’t going to drive that way, but this *‘uhane* came to him, telling “Go that way, find this boy.” And he told me the story. He not going pass there, but this spirit told him “Go that way!” And when he found me, my leg was swelling. If he no find me, I no be here talking to you right now. But he found me and it was not my time to go yet. So my purpose, evolving from that purpose, going through my twenties, and reaching my thirties. You know, I lost my mom in the 90s--20 years ago. When she passed away that was one…da kine….

DO: Our moms are kind of our spiritual backbones.

CSH: Right.

DO: And when they are called upon to be with the ancestors. It’s kind of like they stepped out of their shoes and there is nobody else to do it, so we have to step in. That was an awakening.

EL: So funny, when I lost my mom my soothing place was to go to Black Sand Beach.

DO: The healing.

EL: So I went down there and…[asks Demetrius] You and Kila cousins?

DO: Yeah.

EL: I met his cousin [laughs] My wife! So, she came drove by me. I was going through…I didn’t go to my mom’s [inaudible].

DO: [inaudible].

EL: And this beautiful Hawaiian girl, came and swoop me with her big eyes. And she came to soothe me. And you know, we was friends for a whole year. She was, just like how we talking now [inaudible].

DO: She was, her *‘ike* was very [inaudible]…. She had so much [inaudible] that it will make you grow too.

EL: Right, right! So, when I fall in love with her. She won’t [inaudible]. Her mom was…my mother-in-law’s name was Pele. [Laughs]

CSH: Wow!

EL: Strong name, my mother-in-law. My wife’s name was Keolalani—“the pathway to the heavens.” “The life of the heavens,” sorry, was her name. *Ola* [laughing]. But I when get reconnected with my Hawaiian self.

CSH: So, it’s like your mom introduced it to you but it wasn’t until your twenties, when the man found you…

EL: Right.

CSH: And then your thirties, when you found your wife.

EL; Right.

CSH: And her healing powers as well, that it would really kind of….

EL: Open up my *‘ike*.

CSH: Yeah.

EL: Right, right.

CSH: You were gaining all this.

EL: So, when opened up my *‘ike,* when she came my wife, you know. I lived with her for 10 years down at Punalu‘u Black Sands.

DO: They lived down on the beach and they had this big property.

EL: Yeah, *kuleana*, so that was given to my wife’s family from the Great Māhele. From Kamehameha. You know the time he divided the land.

CSH: Right.

EL: So…that was very interesting, because my wife couldn't have children. All the kids love her. Because her heart was big.

DO: She had this summer program: *Kukulukumuhana.*

EL: Right. *Kukulukumuhana*. So we still have kids from 6 to 16 years old. And they still come as one [inaudible].

DO: To the summer program where they have…

EL: ‘Ōlelo Hawai‘i and that was the stepping stone.

DO: And they live right on the beach!

EL: And my wife was one of the founders of studying the Hawaiian language emerging program in the early 90s. Starting off…the emerging…the first beginning, the *piko*. That was the dawn [inaudible] went through. They went to Waipio Valley. They worked with Pua Kanahele.

CSH: Wow!

EL: That was the foundation to open, not only of Kamehameha Schools, but they was the first group organization that start one summer program and wen grow into one fully emerged program, now all over the State of Hawai‘i. So, she was one of the founders. So, I remember doing that program with her. And, you know, starting to do *hunamana* with her too...

CSH: Yeah…

EL: And it opened up lots of doors.

DO: A big part of the actual *hunamana* [inaudible]. There's lots of battling or binding of the dark forces in the dream world.

EL: Right.

DO: Well, the white man call ‘em the "red-eyed seers," where they go into the dream time, they battle the dark forces, bind them, and when they come out of the dream time, the physical person that the dark forces [inaudible] And that was the effects of the [inaudible]. So, that's like one example of doing *hunamana*. A lot of people down in the [inaudible].

EL: That's what I do now. I work in the dream. I fight.

DO: Like all the movements of TMT and all those different movements.

CSH: Yeah.

DO: They believe there’s energy or spirit behind them. So then, they have the physical warriors that stand on the front line--they fight. And the *kahuna* who stands behind and works with those energies, behind those movements. That is, that’s the dark forces. And it’s like the nightly ritual [inaudible]

EL: Yeah, I do it nightly, my dream time is my real time.

CSH: So, when you say dream, “dream time,” like when you’re sleeping?

DO: Right.

CSH: Like subconscious?

DO: Right.

CSH: Then, so you’re working in your subconscious?

DO: That’s right. When he’s in his Kū form.

EL: It’s when I battle the negative. [Inaudible] So that’s why one place like dis… [inaudible]….try come meditate. It’s peace.

DO: It’s peaceful here.

EL: Peace. When I come here, I work for an hour. Then I sit for a half an hour. Rejuvenate, mediate, Sometimes, only me, myself up here.

CSH: Yeah.

EL: So I just do work. Relax. And I stay all day. To [inaudible]. So that’s what rejuvenates me, because a special place, like this…

DO: It’s shielded from the dark side.

EL: It’s shielded.

DO: They cannot come in.

EL: They cannot come in.

DO: It’s too powerful for them.

EL: It’s so strong, the energy. Yeah?

DO: They’ve tried.

EL: Right, they cannot come in.

CSH: So like when you’re sleeping and in your subconscious…

DO: Right.

CSH: Like, I’m just trying to think about like when I sleep, when you’re actually doing…

DO: Right. You’re in control that’s why…

CSH: Yeah, you’re in control of your actions. Like instead, of it having a dream. Yeah…like letting it happen. You control it and you are doing spiritual work.

DO: Better.

EL: Better.

CSH: Right. Ok.

EL: And I put them down. Kū energy. Kū is a Kū.

CSH: How do you…

DO: Balance that.

CSH: Well, how do you train yourself to do that?

DO: The space…

CSH: Is this making sense? With the questions?

EL: No, no--it’s all good.

CSH: Ok.

DO: You have to believe in the possibility first of it being possible. That space that void, the universal law, all void shall be filled. And if you can even be open to the possibility that it’s possible--it’s a matter of time before an energy will come to fill that space. To manifest. It becomes real.

CSH: So, like, sometimes I’ll get dreams, like where my ancestors are talking to me.

EL: Right.

DO: Uh huh.

CSH: So, I feel like I don’t have control over that. It’s them telling me something. So, like, there’s other times when I just have dreams that stuff…weird things happen. And, I don’t know what it is. So, like, how do you control all that? Like, letting things happen to you and then….

EL: So you know what it is too? You know how you’re talking right now? No, no, it’s all good. Everybody get one beginning. Right now, how we’re talking right now.

DO: Is the catalyst.

EL: This is the….

DO: This is the start.

EL: The start. So this is uniting your little eternal being inside you. So, when you're home, you're meditating, when you think of your higher self…

DO: You ask for the guidance. You ask for the guidance. You let them know your intentions.

EL: That you claim your higher self, not an ego in love, but in love and aloha, that you say, "My family is everywhere."

DO: It cannot be for the pursuit, the sole purpose of gaining *mana*.

CSH & EL: Right.

DO: Because….it has to come in like this.

CSH: Right, right, right.

EL: So, You gotta find that inner self and you pray. We always say we pray to *Akua* and if you feel the *Akua* is there, and all your brothers and sisters is there too, in that realm… [Inaudible]

DO: What is interesting about the awakening that we went to, when we interact with the gods, it is not in a subservient servant serving the gods. We're talking about the oneness we're at the same level with them, we can kinda…

EL: Well, that talking…

DO: *'Ohana wale no*. Yeah.

EL: Pele, Ku, Kanaloa…

DO: Lono.

EL: Lono…is all my family.

CSH: Mmhhhmm.

E L: Kūmauna is my brother, [inaudible] We all one. So, when you look at them, your actions is part of them.

DO: And another thing that awakens you, is the synergy of being with others that are like-minded individuals.

CSH: Right.

EL: That’s right.

DO: When you’re in a group of people that nurture that same style, like the *kahuna,* they would have groups or colonies of *kahuna,* and they would live together and practice together, there is a synergism, there is a synergistic kind of energy that helps to nurture the development of the [inaudible].

CSH: Right.

EL: It’s not just looking at what the eyes, the mouth the taste, and hearing can see. It’s finding the connection with that higher self.

DO: That’s why she’s here.

EL: It’s finding yourself. Nobody can do it but you. Only you can love yourself. Sometimes we look for love from other people, it’s not that. It’s you, you need to aloha you. Center yourself. Because only you can please yourself.

DO: Yeah.

EL: No one else.

DO: If you keep going….

CSH: You guys are getting deep here.

EL: Right.

CSH: I don’t even know like why I’m tearing up.

EL: It’s the…that’s the truth of man need to know now, because we’re detached from that, from that.

CSH: Yeah.

EL: We look for love from someone else. We look for love….

DO: And that’s when we go from person to person…

EL: Person to person.

DO: And we hope it would reflect back to us.

EL: Right.

DO: But, the thing is, that we would hope it reflects back to us, what we know already.

EL: That’s right.

DO: But that’s not my question. Why do we need somebody else for tell us something we know already?

EL: That’s true.

DO: How do we know what we want from them? Because we know, we feel them, but we always look outside.

EL: Right.

DO: We are all reflections of each other.

EL: Right, right.

DO: We bounce ideas off each other

EL: It’s like what you said earlier. “Oh, look at my neighbor. He got one nice car, he got one better job, he got a nice house.” Is he really, is he happy with himself?

DO: You don’t know what goes on behind closed doors.

EL: Right.

CSH: Right, right.

EL: So, if you happy with you, it goes out, it radiates out, you are the reflection of that…

DO: You’re the source of that.

EL: It spreads out. That’s what the world needs now.

CSH: Yeah.

EL: It’s *aloha*. So, ‘nuff of the self [inaudible]

DO: *Alo* is the face or the presence of [inaudible] of *ha*, the living [inaudible] contained in the face of seeing the present [inaudible]

EL: So *Akua* is everything. *Akua* is the grass.

DO: Can you see in yourself in the grass? In this tree?

EL: Anything that is here. It’s all *Akua*. Everything.

CSH: Yeah. All encompassing.

EL: So, right now, you’re looking at this, it’s all *Akua’s* grace.

DO: When you get to the point…

EL: [Laughter]

DO: …where you feel you are a part of it, you actually feel you are it.

EL: You are it.

DO: You are a part of it.

EL: You are it.

DO: Then you are one with everything.

EL: Yeah, yeah, this is what you call…

DO: You're not going leave once you, you not going want to leave….

EL: [Laughing]

DO: But you gotta….

EL: It's part of living, losing, surviving, all that, losing the thing…this is what really centers yourself. That's why we're making this place….to heal yourself. I think you feel it. It's good for you. It's good for your baby.

DO: To be in this place.

CSH: Yeah.

EL: Right, right, right right. It's natural. Because, what you're feeling, the baby feeling.

CSH: Yeah, he just kicked.

EL: [Laughing] So it's all connected.

CSH: So you guys came up here or you guys had the calling three years ago. Right?

EL: Right. I was waiting for a long time.

DO: When we approached the landowner, Ed Olsen. And the *kūpunas* gave us the vision of what it would happen, how to do it, how to go about approaching these guys.

CSH: *Kūpunas* from another realm?

DO: From another realm, yes, the ancestors. And everything that they showed us… what we didn't get was the timing. Because that one thing about the vision that hard to judge, if's it near future or far in the future. But, three years ago, we approached him. It was the day before my birthday and then a year later on my birthday, a second time, and then we're now we're up here actually cleaning it. But

everything that the ancestors have shown us, that would happen, as we're doing it, is happening, from the help coming from nowhere, to the help with the fencing, and the cleaning.

EL: This is all reflection for all those people coming to find themselves. So, they're all coming….

DO: To be centered. There's no ego with this group. It's weird, it's like, the people who have knowledge in stone building -- when they come and they share their *mana‘o*, everybody else respect. It's kind of like the [inaudible]. Everybody's kind of … if you have knowledge in one area, there's no ego in the group at all,

CSH: That's wonderful.

DO: It's just like, a natural flow.

CSH: So, when you guys first came up here to the *heiau* it was all, was it all totally covered in grass? Like you couldn't even see this?

EL: Yeah. The rock wall was all vegetation on it.

DO: There were trees, you see how thick this brush is? This whole area was thick like this.

EL: It was all covered up. So, eventually that guava tree is going, because we gotta restore the wall. And part of that Christmas Berry tree, that gotta go too.

CSH: Yeah.

EL: But the rest, we'll keep it for canopy for now. For…

DO: ‘Cause it keep the rain too.

EL: Keep the rain. And we'll plant *kukui* trees and native trees around here. Yeah, so…

DO: When we did research on Makanau, Uncle Kawehi [Ryder] found out that they used to grow …

EL: ‘*Uala.*

DO: ‘*Uala.*

EL: Potato on top here.

DO: So we want to bring back those things. Things to grow…

CSH: Right.

DO: The [inaudible] is perfect right here.

EL: So right here on this hillside I'm going to plant potato and *kalo*, right here, into that brush, where all the dead brush is, so make a shelter.

DO: This is all the trees that we cut, you can see a line right there.

EL: It’s all mulch.

DO: Mulch.

EL: So I moved that from there and moved it down to there. But now I’d like to plant on this grass here, all potato and…

CSH: So how big was the *heiau*? Is this the back wall?

DO: Yeah, it is.

CSH: So it didn’t go down here.

DO: No.

CSH: So, that’s the back of it?

DO: Well, I think there was a second retaining wall.

EL: Right, right.

DO: ‘Cause, they are thinking there was actually another wall which all fell away. So this is a back but there was a second wall, outside wall, that runs to here.

CSH: Okay. And then it extended to the front?

EL: Right.

CSH: Where we were parked?

EL: Yeah, I think so.

CSH: Or beyond that?

EL: It think to that point over there.

CSH, EL, & DO: Yeah.

CSH: So, what about this? This is the wall?

EL: Right.

CSH: Oh wait. No, No. There’s another wall you said.

EL: Yeah.

CSH: Yeah, that’s right. What about this side?

EL: I don’t know how far it went out this way, but I think that it would damage….

DO: Marion Kelley, right? *Majestic Ka‘ū…*

CSH: Okay, yeah?

DO: Did a survey, a survey back in 1967.

CSH: 60s or 70s, yeah?

EL: Right, so you know what?

DO: So there’s actually a map of the height and width dimensions of the *heiau.* The only way she could have done that was if it was still semi-intact.

EL: Might have been. Maybe, still at that time. The plantation just came in and desecrated it.

[Lots of noise and talking all at once – unclear]

CSH: Like a USGS stop?

DO: A geodetic.

CSH: Okay, yeah, okay, okay. At the *heiau*?

DO: Right on the *heiau.* They cemented it in. Here, Let me show you.

EL: They’re trying to claim it.

DO: It looks like an elevation thing or something. It looks like…

CSH: Did you guys find any *iwi* here?

EL: No, not here.

CSH: Right because…

EL: I think they rebury them.

CSH: Like you guys were saying earlier …

EL: … around, along the side of the hill.

CSH: This was a *luakini heiau*, but then…

DO: It was designated.

CSH: But there was no blood?

DO: The chief who designated it a *luakini*… there was research that was done, saying that before Kohaikalani's time, that this was actually a war temple, a war *heiau*.

CSH: Oh!

DO: So.

CSH: So this is like beyond that *ali‘i.*

DO: Because Kohaikalani was a couple hundred years before Kamehameha.

EL: Before Kamehameha... so, this is before, before, maybe a thousand years. But if you go really back, oh, you go way, way back. So. It's very old. So, this is one of the strongest…. you know, people come to Ka‘ū, just like how you, how you, the first time you come to Punalu‘u. The first thing that draws your eyes is looking up here. A lot of people that goes to the Black Sand Beach even while driving on the highway, they couldn't just stop, they photograph all these hills. The energy, the strong *mana*.

CSH: Did you guys find any coral or anything up here?

EL: I found one piece coral.

DO: Right here.

EL: From the water. Found one old, found a couple of old bottles.

DO: But there is *‘ili‘ili* literally all over this mountain.

EL: This is a *‘ili‘ili* right here.

CSH: That's a pretty big *‘ili‘ili.*

EL: I found that right there in the dirt.

DO: And you only find that in the ocean, so you know that one of our ancestors…

CSH: Somebody had to bring it up here.

DO: …carried it up here.

EL: That is a big *‘ili‘ili*. This is another *‘ili‘ili* so all these rocks gotta go back in the wall.

CSH: So how many people have come up here?

EL: Well, twelve.

CSH: Less than a dozen?

DO: Less than a dozen.

EL: Less than a dozen. But…

DO: My family, my sisters, the kids come out.

EL: Yeah, one other Hawaiian family like come too.

DO: We try to give the families maps. I have this old map of the 1800s of the families and the names of the families that originally lived on the mountains.

EL: The *kuleana* lands.

DO: So we try to get those families involved with the restoration, the cleaning. But a lot of them are *maka‘u*. Afraid to come out.

CSH: Ohhh!

DO: But as they see us doing it, they say “Oh, they’re still around.”

CSH: So what’s the stigma attached? Why are they scared to come out? Is it because of the history?

EL: It’s not the history.

DO: People seeing things.

EL: People see things, but if you not *pono* with yourself…

DO: You no come up here.

CSH: [laugh]

EL: …not loving yourself, you get greed and ego. And selfishness, the mountain don’t want you here. It going kick you out.

CSH: Yeah.

EL: If you come up with *aloha* and you’re *pono* with yourself. It’s all good. It’s bringing that *lōkahi* back. The ones alright, the ones are *pono*, they don’t come to here.

DO: The ancestors that are here, that ones that have come to us, they are all in white and they have this huge white, pure white dog, that was seen. And there are also *mo‘olelo* that talk about this dog that was seen, seen running from the mountain, and it’s as big as a horse. It’s a gigantic dog. It runs from the mountains all the way down to Punalu‘u. I’ve seen the dog. And there was some when they purchased this place, they had a [inaudible]. And there was some *poe haole* that came up and I remember I came up with one of the groups because I wanted to monitor who was coming up. And this

one group of people I told them, “Do not walk into the *heiau,*” ‘cause I’ve lived here all my life and I’ve never been beyond this wall.

CSH: Yeah.

DO: And the people go, “Oh, don’t tell us, we know”… It’s kind of like…

CSH: Hawaiians?

DO: No *poe haole.* They just walked in. I was like… they stepped over the water and said, “Oh, See nothing, nothing.” They went home that night and all of them had dreams of seeing the dog, but it was pitch black.

CSH: Ohhhh!

DO: And snarling at them.

EL: [Laughs]

CSH: Ehhhh, chicken skin.

DO: So they call me up and said “Oh D, I think we offended someone.” I said, “No shit.”

CSH: [Laughs]

DO: I was like I told you guys, “I’ve lived here all my life and I’ve never been beyond this wall,” you know what I mean?

EL: Now one of them now your good friend, ah?

DO: So I told her what to do, what she needed to do, do this ancient ceremonial, finding this *Puolu*, a *pōhaku*, and asking for forgiveness and then taking it and bury um. Bury um. Because that way, any energy that gets sent to her, goes to the *pōhaku*. It’s like a decoy, don’t go to her. So she did that and everything kind of shift and now she comes up and she helps clean. But now she has great respect for this place.

EL: [Laughs]

CSH. Yeah.

DO: And I told her, “All my life I’ve seen that dog, he’s been pure white and beautiful.”

EL: [Laughs]

DO: She said she saw black and it was like pitch black and snarling at her.

CSH: They all had the same….

DO: Even like the guy that was filming, the camera guy, that was filming. I told him not to film. He was secretly running his film, and he's a Hawaiian, running his film up in the mountain acting as if he wasn't. "Oh no, I'm not filming with this camera." He said, when he got home, the camera only work up to the gate, coming up the backroad, up to the gate. As soon as they entered in, it was pitch black -- no audio and no video. Then he came up here and then he went back down and the audio and video worked at the gate. So I said, "I told you so a couple of times."

CSH: Hey, you guys, better make sure you guys tell them I'm not at work, otherwise I have to come back over here again.

EL, DO, and CSH: [Laughing]

EL: … Maybe it's all nice for you to hear.

EL & CSH: [Laughing]

DO: No, no. They knew you was coming.

CSH: [Laughs]

EL: We knew you was coming. We knew everything was okay.

CSH: [Laughs]

DO: They want you to help us.

CSH: Awwww!

EL: So you know what it is? You're moving to this island. You're going to see the rest of your [inaudible]?

CSH: I would like to.

EL: Right.

CSH: I definitely, I mean I love what I do. I love my job because I love learning about the history of places.

EL: Right.

CSH: And I love… and you know how everybody, all Hawaiians have their thing.

EL: Right.

CSH: I don't ʻŌlelo Hawaiʻi, cause I sound a little bit *haole* [laughs] that's why. I don't totally want to mess up my language.

EL: Right.

CSH: But I definitely love sites, like this, you know, like *wahi kūpuna*, because it’s just amazing. It’s amazing to see what our people did. It’s amazing to feel the energy. Every place is different. And the energy that each site has, is all different. Protocol is all different, you know. Everybody has feeling and connections with that *wahi*. That’s why I asked you, you know, it is okay come. You know, it’s okay sometimes on O‘ahu at places, but is it because there is no spiritual connection? Because it’s so inundated with that everyday rat race?

DO: It’s different, when you know, you’re connected.

CSH: Yeah, right.

DO: Because, it feels like a responsibility I guess.

CSH: Right. So I don’t know. That’s why I asked you guys. Is it okay if I take a picture?

EL: It’s all good.

CSH: You know? But I definitely, if we move here, I definitely, after I connected with Kawehi the first time. I thought I would make it a point to go down to the fishpond and check in and see how it’s going.

DO: It’s interesting the story of Uncle Kawehi, when they were still living on Lāna‘i, four years ago, and when the spirits, when the ancestors came to us, about restoring this place, we needed help. So I went… I played music on Lāna‘i in the the Lāna‘i Music Festival. When I went, I went to uncle’s *ahu*. He said, “Oh good.” I wanted to go and make one offering. So when I went and made an offering on the *ahu*, I asked the *kūpunas* of Lāna‘i, if they would allow uncle and aunty to come to help us, because we need help in Ka‘ū. And when we were leaving, they told me, “Take all the pictures you can, because you’re not ever coming back here again.” So, I called the group of *hula* girls, who had come from Ka‘ū, “Take all the pictures you guys can, because we’re not going to come back to Lāna‘i. I don’t know why.” As we were leaving, the dolphins were breaching and it was just a powerful experience. We came home, and it wasn’t about like about a week or two later, and we get a phone call. Uncle Kawehi is leaving Lāna‘i. They’re looking for one place to live, and they want to live here.

CSH: [Laughs]

DO: So I was just like, I just wanted to borrow them.

CSH: [Laughs]

DO: So I told Uncle, I just literally told Uncle maybe a couple weeks ago…

CSH: Yeah.

DO: What I actually did, by asking the ancestors to bring them here. And he was like, “You was the one!” No, but. And then, Uncle guys is so well versed and educated in doing this type of restoration project, that I believe, ‘cause I actually saw visions [inaudible], before I even went, they showed me how he was.

CSH: So when was the first time you met him?

DO: At the Lāna‘i Music Festival.

CSH: Three…

DO: About three years ago.

CSH: Yeah. And [to Earl] you just knew him, because he’s your neighbor now.

EL: I met him over a year ago.

DO: Yeah.

CSH: Wow.

EL: Sorry, maybe two years.

CSH: [Laughs]

EL: Yeah, about two years.

DO: You know how the ancestors picked him?

EL: Right.

DO: Five to six years before that he came here. He went up behind here and he wen pick Kūmauna’s bananas. And before, that’s the only place…

CSH: I feel like he told me that.

DO: …where Kumauna’s bananas grow and he was never meant to leave that place. But they allowed him to bring them down …and he planted them in Pāhala.

CSH: At his house!

EL: Right.

CSH: That’s right! It’s the ones in the front yard, right? He has four or five different varieties.

EL: And in the backyard too.

DO: So I was like, “That’s when they picked him!” ‘Cause if they didn’t allow him, he would never have left the mountain.

CSH: Purple. Right?

DO: Right.

CSH: He did tell me about those bananas. Now, that you're telling me this, it makes sense.

DO: When did the *tutu*s pick him? 'Cause it was when he went up. 'Cause if they didn't pick him he wouldn't have been allowed to come down from the mountain. 'Cause that was a sacred banana patch. He brought it down. And I was like "My God, they allowed you to bring it down?" I said, "That's when they picked you." And then four years ago, that's when he e-mailed me. So it would seem like a coincidence, but it's not.

EL: It's not a coincidence. It just happens. It's happening.

DO: So in a series of those coincidences happen, one right after the other, it's kind of like….

EL: It's like meeting you, it's all meant to be.

CSH: Yeah. I seem to think that too, it's not a coincidence.

EL: For you, to come in Ka'ū, in what, less than a month?

CSH: Yeah.

EL: Two trips in Ka'ū?

CSH: Mmmhmm.

DO: Oh, you were here a month ago?

CSH: Oh, less…

DO: Oh, that's right, we came up here.

EL: She was with Kawehi [inaudible].

CSH: I came, like, two days, no, a day before Thanksgiving, two days before Thanksgiving. Yeah, So less than a month. So, can you tell me about the *makai* area over here? I know you were talking about, we talked about all this earlier, but…

EL: Right.

CSH: Right. So, I'm kind of curious. Where is? How far is? What's on the other side of the island. How far is Kona from here?

EL: The west.

CSH: So where is the dividing line of the west?

DO: Well.

EL: Oh, well, it's South Point. The salt is thick, Ka Lae, that's southest point. Have you been there?

CSH: I don’t think so.

EL: You need to go there too. So you can see the [inaudible] There’s another *heiau* there. At the tip, tip point, they call it Kalahea. It’s a fishing *heiau*. It’s another east and west pair of things.

CSH: But it’s still all intact?

EL: Oh, yeah. It’s all intact.

DO: When you are looking out, at where the two currents meet, you’ll see a line in the water.

CSH: Wow!

DO: [inaudible]

EL: Ka‘ū’s got a lot of history.

CSH: Is that still considered Ka‘ū?

EL. That’s Ka‘ū.

CSH: Okay, okay.

DO: You catch one current, at a certain time of the year, and just ride without anything. Straight to…

EL: New Zealand

DO: New Zealand.

CSH: Get out of here!

DO: Two weeks.

EL: You go straight to the Southern Cross.

DO: Without paddling, nothing, it will carry you straight the current….

CSH: So I don’t need to pay $1800 on Hawaiian Air? I’ll just get a little…

EL and DO: [Laughing]

EL: You ever been to?

CSH: I’d like to. Yeah, I know.

EL: I been there about ten years ago.

DO: That’s where he got his [inaudible]

EL: I did that [inaudible]

CSH: I’d love to go to New Zealand.

EL: My nephew lives down there. He married to a Maori girl.

CSH: Nice.

EL: Yeah, we all [inaudible]. Ponoumu—yeah, the green stone!

DO: This was made by [inaudible]. Kinitapu [inaudible].

EL: When I went to New Zealand, I got mines.

CSH: I have mine at home.

EL: And this is from Tahiti. My wife went and she got this for me. It’s a bone… [inaudible], but it’s all connected. So the story of Ka Lae, it’s a powerful place. It’s one of the oldest spots of Hawai‘i. A lot of the ancestors arrived there. With *nā wa‘a*. Even Nainoa Thompson came there with his Hōkūle‘a, so that place is really respected, the southern point of this island. There you get a lot of burial sites.

CSH: Oh okay.

EL: You do archaeological work. You got a lot of *heiau* that is in Kamehameha lands. It’s a powerful place. It’s all connected.

DO: Isn’t it called Pu‘u?

EL: Pu‘u Ali‘i.

DO: Pu‘u Ali‘i.

EL: We got *iwi kūpuna* there. And then we have a hole in the ground that we call Palahemo.

CSH: Is it like a bottomless hole?

EL: Funny you should say that, it is. I never said that.

DO: They all say the *kūpuna* always used to say, “You’ve never seen Ka‘ū, if you’ve never been to Ka Lae.” You need to actually swim in the water, to say that you’ve been to Ka‘ū. It’s like this old saying. And the water will turn red when

CSH: Ohhhh!

DO:…the ‘*ōpae* comes up. The whole water will turn red. [Laughs] There’s a *mo‘o*…

EL: It’s kind of greenish. It’s kind of greenish, but beautiful. You jump in.

CSH: Oh, wait, I know which one you’re talking about.

EL: You been there?

CSH: Green water. Just a pool.

EL: Saw pictures of it? Yeah, that’s the one.

CSH: Yeah, I saw pictures of it. I thought maybe it was some kind of Sulphur, like…

DO: It connects to the…

EL: …the bottomless…and you go down there and you get olivine, Green Sand Beach, Mahana Bay. Tourists. A lot of tourists go there. It’s special down there too. It’s all part of Ka‘ū.

CSH: So the dividing line though, between Kona and Ka‘ū District…

EL: It’s at Manukā. It’s past the town of Ocean View, Ka‘ū.

CSH: Okay. But like that ridgeline is not…

DO: No.

CSH: It’s beyond that.

EL: It’s far beyond that.

CSH: Oh, Wow!

EL: It’s all Ka‘ū, this. The District of Ka‘ū is bigger than your Island of O‘ahu.

CSH: I know, I’m over here like, thinking it’s like the Ko‘olau Mountain Range. Oh, it’s just like that mountain right there, right? No, sister, it is not.

DO: You could drive out there [pointing] and never reach it.

EL: I think we have the biggest forest reserve in the whole State of Hawai‘i.

CSH: Yeah.

EL: You walk in the forest for thousands and thousands of years.

DO: If you ever get lost though, you just look for the ocean.

EL: It’s so beautiful and pristine. It’s untouchable. Some places so beautiful.

DO: And there are caves everywhere.

CSH: In here?

DO: Everywhere. Everywhere you go there are caves.

CSH: Like burial caves?

DO: Lot of the caves. Bottomless caves.

EL: A lot of [inaudible].

DO: You can literally drop a car into it and [inaudible]

EL: Koa trees… [Inaudible] trees. Very old.

CSH: Do people like live back here?

EL: No, never live in the forest. Always belongs to the gods.

CSH: Ahh.

EL: The *ahupua‘a* system of [inaudible].

DO: Maybe, up to the edge of it.

CSH: But, no trails going in?

EL: Oh, yeah. Got trails, get hiking trails. You can hike in. You can visit, you can walk in and see the beauty of it. You can stay up for a whole month and still not going to find all of Ka‘ū.

DO: Oh yeah.

EL: It’s just so big and pristine and beautiful. Where I went two weeks ago, I went to Kūmauna help the Nature Conservancy, rents a place up there. We went on a [inaudible] in the back of this. You can see it right here.

CSH: On this ridgeline?

EL: Yeah. Yeah, in the back, another *pu‘u.* It’s connected, it’s right behind Kaiholena, the bigger *pu‘u* there.

CSH: Okay.

EL: We was on the *pu‘u* and we just saw forests in abundance. Of course, the gulch of spring water, cold ice water.

DO: There’s a whole lot of water, especially where you get the quick sand…

EL: They get quick sand and you get one falls back in there that’s a thousand feet high and it’s just beautiful, beautiful.

CSH: Do the people of Pāhala or of Ka‘ū District, do they like gather back here?

EL: Well…

CSH: Like for *hula* or…

EL: Well…

CSH: You guys hunt were saying ah?

EL: …say when the plantation, I don’t know back in the past where the *ahupua‘a* was. The people just stay in their *ahupua‘a*, but when the plantation days came, this side was considered Nā‘ālehu people side. From the Pu‘uenuhe that way back to Kāpapala, that was for Pāhala. So Pāhala them never come this side.

CSH: Oh.

EL: So, it was kind of like, a little bit military like

DO: It was kind of territorial.

EL: It was a territorial thing. So this was belonged to the town of Nā‘ālehu. People that lived in the town of Nā‘ālehu, this was their mountains.

CSH: Ok. I got it.

EL: But before that was the *ahupua‘a*, before all the plantation days.

DO: The hunters would always go up hunting…

CSH: For pig?

DO: Yeah.

CSH: And deer? Do you have deer here?

DO: No.

CSH: No deer?

EL: No deer here, just pigs.

CSH: No goats either?

EL: Get goats.

CSH: Okay, get goats.

EL: But not in the forest, but in the *makai* area.

CSH: Yeah. On the cliffs, yeah?

EL: All that dry desert area.

CSH: Do you guys have pheasants or wild turkey?

DO: Oh, yeah.

EL: We got turkeys. But pheasants, I no see em. I no see em. I no see em like before.

CSH: People when shoot them and eat them?

EL: Oh yeah. They hunt them. They mount them.

CSH: Did you guys used to eat that when you were little?

DO: Ate doves. I ate doves.

EL: The doves was good, but I know pheasant was good I think I ate it one time.

DO: I never ate pheasant though. My dad [inaudible].

EL: We used to eat turtle.

DO & EL: [laugh]

CSH: You guys wen harvest it, yourself?

DO: It’s really good.

CSH: I heard it’s really good.

DO: It’s really good [laughing].

EL: Before the laws came in.

CSH: Right, that was like the 70s.

EL: Right, so we don’t eat turtles.

CSH: So, do you guys when net it?

EL: No, there was the kind. There was this long bamboo, with a long big hook with the *lei* and a nylon rope. When the turtle used to come up right here, we’d gaff him.

CSH: Oh, you guys gaffed it?!

EL: Yeah. In those days, they never come on the beach and lay on the sand.

DO: Now, they are so protected they…

EL: Now, what they doing now, before these peoples, grabbing them off the sand, those days, but now…

CSH: But those buggas fight. No?

EL: Well, they fight. And you know they’re strong. When I was living Punalu‘u, had a “turtle weed out.” Big hook in [inaudible]. My wife was with the university and we used to [inaudible], one marine biologist in O‘ahu, he’s an older guy. We would call the University of Hawai‘i in Hilo. He said, “Go get the turtle and we’ll go come and pick it up.” And help him, so, when I used to drive my truck on the beach, it was like a couple hundred pound turtle. You know, people was taking pictures of me, people telling me, “We going to call the cops on you, because you’re illegal.” I said, “I have permission.” You can do whatever, you can help this turtle. So I bear bugged this turtle…

CSH: Uh huh….

EL: He start to flap, pah, pah, and I throw him right in my truck box, and he still like that, pah pah. The lady taking pictures, said “Later, I get one picture I’m going to call the cops.” I said “Go ahead, call the cops. I’m a resident there,” and so I took it back in our yard

CSH: Yeah…

EL: …And I took if off the truck, I laid it on the ground, and put a wet towel over it to keep it wet.

CSH: Mmmhmm.

EL: The University came and caught him and put it in dog kennel and took him and bring him back.

DO: Did it survive?

EL: Yeah. It survived, and then they brought him back. Mind you, he had a cancer, he was dying of a tumor.

DO: They have a lot of tumors.

EL: I help a lot of turtles at Punalu‘u Black Sand Beach, but…

CSH: So, how you guys used to prepare the turtle?

DO & EL: [laughing]

CSH: ‘Cause I wasn’t, like, even born yet. Not to make everyone feel old…

EL: [laughs] Well, what year was you born?

CSH, EL, DO: [laughing]

EL: What year you was born?

CSH: ’82, ’82.

EL: So same year as my nephew.

CSH: So ‘78 was when you couldn’t—da kine---eat turtle no more.

EL: They um, um…

CSH: So, you wen gaff em…

EL: No. No. I no like tell you because you might cry.

CSH: My family all… [laughing]

EL: Actually they tear.

CSH: They cry yeah?

DO: They get tears.

EL: And then they, my dad and his friend would cut the head and take out the veins and…

DO: Animals too….

EL: And they cut off the back feet out and then they would just take the meat from the top, but in the middle, where the shell was, no had meat.

CSH: Really?

EL: Yeah, it was kind of all intestinal things, whateva. Was fat. Mostly it was the veins and the…

CSH: I always thought it was here that there was plenty of meat?

EL: Get little bit, but not that much. On the shell got mostly…

CSH: Oh!

EL: Because of the blubber, but I remember because it was green meat.

CSH: Green meat?

DO: Yeah, it was kind of green.

EL: Limu yeah? It was very good, you barbecue them and make stew. Yeah, yeah. Soft like a barbecue.

DO: So you eat this…

CSH: Yeah.

EL: So it’s pretty *ono*. But now you cannot do that. So…

CSH: So you would make in stew?

DO: I had it, when I could have it, as stew.

CSH: Like beef stew? Like with carrots and potatoes and all that? The red kind, like tomato beef?

EL: You make ‘em from the Hawaiian way.

DO: No, it was more the Hawaiian way.

EL: Make them like the *luau* and throw the *kalo* leaf inside.

CSH: Mmmm. Ohhhhh!

EL: You never eat beef *luau?*

CSH: Yeah.

EL: That’s good. That’s the Hawaiian stew. That’s the Hawaiian potato. Nothing. Just the *kalo* leaf inside.

CSH: Yeah, oh like that.

EL: Or squid *luau.*

CSH: So like *honu luau?*

EL: Yeah.

CSH: Got it.

EL: So everything was green.

DO: Simple, with salt, *pa‘akai*.

EL: Salt water, and *pa‘akai* and the leaf, and that’s it.

CSH: Oh, you guys, no more coconut milk?

EL: Well, you could have. Or you could have the squid *luau*. That’s how they make squid *luau* with coconut milk. You can make all different flavors or whatever.

CSH: What else did you guys get from *makai?*

EL: *‘Opihi*, *opena* [?], *‘a‘ama*, *limu kohu*--all different kind *limu*, you get *‘upena*--throw net. *Holo* [?] *maninis*, [inaudible], *aholehole*.

CSH: Is it still really abundant?

EL: It’s not entirely abundant like in the past. Because get the turtle are eating the *limu*, the fish resources.

DO: They’re throwing off the balance.

EL: They’re throwing off the balance—the turtle.

CSH: Really?

DO: There’s too much of them.

EL: Too much. They’re eating the *limu* so the fish cannot eat. So, they’re throwing off the balance of the resources.

CSH: I know, like O‘ahu, we have an issue of over fishing, like, taking more than they need. Do you guys have that issue here?

EL: Well, you’re right. Get people that…

DO: Get outsiders that come in. They’ve been coming in on jet skis along the coast, and they pick *‘opihi*.

CSH: From another island? Or like…

DO: From outside, like Hilo or Kona side. You don’t even see them…

EL: People come.

DO: You don’t even see them come down to the beach. They come in along the shore on jet skis. They just rape the land.

EL: That’s it. It’s all money and profit. Before times we used to take just for *luau*s or your own consume, right?

CSH: Consumption.

EL: It changed a lot. For people to forget…

DO: They should lift the ban for just one week.

EL: You know for the turtles. But, you know what it is too?

DO: A couple of hours.

DO, CSH: [laughing]

DO: You could see how much they could load up, you know what I mean.

EL: People need to go back to *kapu* times, when the fish spawn and you cannot hunt the fish.

CSH: Right.

EL: Go back into that system.

DO: When you *paepae*.

EL: Yeah, yeah, at a certain time of the year…

DO: Our ancestors, they was smart. They never worked hard. I mean, they were hard-working, but, came time, they go to one spot, and *paepae* the water and every time and the fish would come. It was like you would domesticate, I guess.

CSH: Like right now, they wouldn't be working, when there's a hot sun.

EL: Well, they never work at noon. But remember, now is *Makahiki* season, so they never work for…

CSH: Yeah, that's right.

EL: So they never work for a couple of months. You know, waiting for the brand new year come in, so,

CSH: Yeah.

EL: So it's all what we need to be doing, but you know, this *Makahiki* season, I been working. [DO & EL laughing] So, but it's all good, but we're going to do our ceremony and it's coming up in a week, and we're going to do our *kahiko*, do our protocol and we're going to re-consecrate this *heiau* back to them, to our *kūpunas*…so that's what…

CSH: Nice….

DO: Back to ‘I.

EL: Back to ‘I, the first.

DO: Before all the other guys it was ‘I.

EL: *Akua…makua.* ‘I. Right.

CSH: ‘I, like ‘I?

EL: ‘I, ‘I…Hawai‘i.

CSH: Yup.

EL: The *hā*, the breath, the *wai*….

DO: The waters of life.

EL: The waters of life, of ‘I. That’s a powerful name.

DO: Hawai‘i. He get his name on all the islands, well, across the islands.

EL: Maui.

DO: Kaua‘i, Moloka‘i…

EL: Only O‘ahu.

CSH: Yeah, I know.

DO, EL, & CSH: [laughing]

DO: All the other islands with “i”.

EL: The gathering place. Maybe they when gather too much.

CSH: I think so! [laughing]

EL: Too much gathering, but lot of people from O‘ahu…

DO: ‘I was the name of our god, during the time of Mū and we never did, the ancestors before our ancestors never did sacrifice.

EL: Right.

CSH: Do you guys have any *mo‘olelo* of Hīlea or Nīnole?

EL: Yeah, I’ll tell you one *mo‘olelo* of Hīlea.

CSH: Okay.

EL: This is talking about Kūmauna. Maybe you want to tell um [talking to DO]?

DO: No. Go…

CSH: Okay.

EL: So [clears throat]. One time Pele and Kūmauna came here in the beginning. And he said, “You know, I reside in Ka‘ū, and then Pele said, “Yeah,” to Kūmauna, “You can reside here. So, what you picking? What you going get?”

DO: He’s from Kahiki.

EL: Kahiki. Right. Yeah, yeah. So, Pele told him, “If you bring your bananas, I’ll let you go up in the back of these *pu‘us* here and reside here, Kūmauna. So he when plant his bananas, and, you know, he didn’t give her…

DO: At least that’s the cover story…

EL: Yeah, yeah. You can say the cover story.

DO: There’s always a cover story.

E: Right, right. Let me… This is the story that I heard from my mother-in-law and my father-in law. This is what… I’m just telling the story what they told me. I’m repeating their story. They’re *kūpuna*s. They told me that, you know, Pele never … you know, that Kūmauna didn’t give her the first bunch of bananas.

DO: She wanted the first harvest.

EL: The first bunch of bananas. So she when turn him into one *pu‘uula*, one rock.

DO: They when battle.

EL: They when battle, when battle eh and she turned him into a rock, so. His rock was right there by the water pool in back of this *pu‘u.* So, in that time, when the Hawaiians came up, when Ka‘ū became dry and windy. At certain times they didn’t get rain. So the people in the *kuaiwi*, yeah, in the inner lands, the ones who live there, come up to the *pu‘u*, they still go up, to Kūmauna and give him offering of *‘opelu*, from the ocean you get this special *‘opelu* grass.

DO: *‘Opelu* grass.

EL: It’s a silver grass that Kūmauna liked for offering. So they would *oli* and chant and ask him for *ua*, rain. So when they gave him that, the rain would come. Oh, it would come, and they were grateful and thankful. And those Hawaiians that live in that area they could levitate, they could float, they could do *hunamana*, because they were magical.

DO: They also used that rock for healing.

EL: Right.

DO: If someone was sick, or didn’t know what it was, they would take an offering of *‘opelu* or the grass and lay it by the rock and go to sleep by the rock, and the next morning they would wake up and be cured.

EL: Okay and so when the plantation came, the Western Society came, so one of the first plantation manager’s name was Sherf [?]. So, he was with a Hawaiian man and the Hawaiian man came up and show him Kūmauna rock. And so, that arrogance, or the ego in the Western belief, “Why don’t we break those stones?” “Who are you guys are [inaudible]”

DO: He was one of the first plantation…

EL: Owners. When the white man came here to plant sugar cane in Ka‘ū. So, so when he did that…

DO: He was drunk. He was drunk…

EL: Right, right.

DO: Drinking.

EL: Drinking. So he went up…

DO: These stupid people praying to these rocks….

EL: So he went up and desecrated the rock.

DO: He set dynamite in the rock.

EL: He blew it up.

DO: He blew it up.

EL: So the town of Hīlea, with the bridge, where they're going to repair, had a great flood.

DO: A massive flood.

EL: So the gulch here, on the left hand side of us, get one gulch. Above Hīlea, right here, Hīlea Gulch. It stay right here.

CSH: Yeah.

EL: Stay right on the side of this mountain, so this river that's running down here, is going to…

CSH: To the bridge.

EL: To the bridge. So the gulch is right here.

DO: We're talking one tidal wave of water.

EL: So, a flood of water came down and when flood out the town of Hīlea. So, I don't know where that man was, he was living on the side of this gulch. His home when get destroyed.

DO: By stones.

EL: Yep, stones and the flood came through.

DO: His house was pelted by stones.

EL: Right.

DO: They found him dead.

EL: They found him dead and the pigs was eating him.

DO: And the pigs was eating him.

EL: That is the *mo‘olelo* of Kūmauna. The wrath of him…

DO: He was the first plantation manager.

CSH: So what year was this?

EL: Maybe 100 years ago, I don’t really know.

CSH: Wow!

DO: When you Google Kūmauna, there is a story about Cyril, the plantation manger.

CSH: Oh, Cyril. That’s the one.

EL: So I don’t know, a hundred years or so, I really don’t know.

CSH: So that *pōhaku* doesn’t exist anymore?

DO: When he when dynamite em, he blew up a chunk of it.

CSH: But he didn’t obliterate the entire…

DO: Not the whole thing.

EL: But, you went there two years ago.

DO: John Rapogo, who’s with Nature Conservancy said an *‘ohia,* an *‘ohia* tree had grown through the rock and split the rock open, so it’s believed that him and Pele is now at peace.

EL: Right.

DO: She released him. But the *kaona* behind the story is that –this is what the *tūtūs* revealed to us in the dream time.

CSH: Hmm. Okay, yeah, you guys have to like, tell me, ‘cause I’m, seeing, literally the *tūtūs*, like in the *lauhala* hats…not like…

EL: Not the physical ones.

EL, DO, & CSH: [laughing]

CSH: Okay.

DO: But they are very real to us.

EL: Our ancestors if you like go back.

DO: Kūmauna, when he came, he came with, he set up his, his banana patch was actually a sacred community of *kahuna*s. And the story was that he didn't want to give a banana to Pele, it was actually, Pele had an eye for one of his *kahunas*. She wanted him. Pele gets what Pele wants.

CSH: Right.

DO: She wanted one of his *kāne*, it was this very powerful *kahuna*, and he said, "No, that's mine." It wasn't a community of *kahuna* tucked away from everybody, it was a training area. But the cover story, there's always a cover story, so it's about the sacred banana patch and he never like give it to her. It was actually one of his own *haumana*. That's the *kaona* behind the story.

EL: So, that's one of the first *hunamauna*.

DO: Yes. Of *kahuna*s. She wanted him, right? He didn't want to give it to her, so they battle [it] out. When John Rapogo guys, of the Nature Conservancy, and we saw that *'ohia lehua* breaking through the stone in that crack, he said, "Ah, they're at peace now." That was Pele's way of releasing him.

CSH: Mmm.

EL: That's a pretty good *mo'olelo.*

CSH: Yeah, a really good *mo'olelo*!

EL: [laughs]

DO: You know, Kūmauna is Kū, is different aspects of the god.

EL: Right.

DO: Like Kūkailimoku, you had Kūmauna.

EL: It's all the Kū energy.

DO: It's like every one of the gods had their different, I guess you would say, personalities.

EL: Right.

DO: And you would approach them in a certain way, with protocols for approaching them, certain ways to get them to help you with certain things. There's war and sorcery, there was healing. 'Cause Kū is also one powerful healer. Kūmauna.

EL: So it's just bringing that essence back. So what had happened then…

DO: What aspect of the *akua* will we appeal to?

EL: Right, so what happened then…

DO: Of course we’re not going to appeal to Kūkailimoku for restoring this…

EL: No, we’re not calling the war part, we’re calling the healing part. So actually….

DO: There is a time for that too.

EL: Right, right. What happened when what happen. But. The *mo‘olelo* is connected [inaudible]…reconnect.

DO: Because, about five years ago, when I was working with Hui Mālama Ola Nā ‘Ōiwi, I was the secretary for the Native Hawaiian Health Care program at Na‘ālehu…Kūmauna’s energy first came to me and told me, the *akua* told me “I need you to go and speak to my people and remind them about the *‘aumakua.”* He said, “Remind my *poe kānaka* that without the *akua,* the *‘aumakua* and the *kapua,* there is no *poe kānaka.* And without the *poe kanaka* there’s no *aumakua*. We one and the same. So you cannot be *kānaka* , ‘*ōlelo,* and not recognize the ancestral deities It’s all one. You know what I mean? So that’s what causes a lot of the *hewa* within the Hawaiian community, because we’re hand choosing, to pick what aspects of our culture we want to immerse ourselves into, and then we’re denying other aspects.

CSH: Yeah.

DO: So there will always be a *hewa*, that’s split, because no more the continuity that once was. Yeah? In the culture? Yeah?

CSH: Guilty.

DO: So he tells me, and I’m like telling the Tūtūs, “Oh Tūtū, I’m not good at speaking.” And he said, “You go, and you remind them, my people, of the *‘aumakua.* So, a week later, the Mayor’s office shows up at the Hui Mālama. Secretary, the liaison for the Mayor. She tells me, “Hey D, we heard you were a *kahu*.” I said, “Yeah.” She said, “Would you do the opening *pule* for us at the Kauwā meeting?” I said, “Oh Lord, that’s when they’re going to give me the message.” And I could feel the energy, because when he comes into me, I was kind of shake. So, I said, “Okay I’ll do it, but on one condition,” And she said, “What?” And I said, “If you allow me to share some *mana‘o* beforehand the opening *pule*.” She said, “Okay.” It was the first that I was sent to do something for the *Akua*s. So it came that day, I wen kind of blessed the area before anybody came. And when Kūmauna came into me, I was literally shaking, my body was like, I felt like I was going into like…one seizure. Almost.

CSH: Mmmhmm.

DO: I was shaking and saying “Oh Tūtū, you have to pull back the energy. It’s too much.” And when they came in, ‘cause the Ka‘ū people, they tend to fight a lot at the public meetings.

CSH: Really?

DO: It’s just…they’re warriors, [EL laughs] because they’ll fight with each other like cats and dogs. But when an outsider come in they all unite. They attack the person and then they go back fighting with each other. So, I told them, “A week ago, Tūtū Kūmauna came to me a week ago, when I was in the shower and he appeared on my wall, he told me to remind my *‘ohana,* that we are all ‘*ohana wale no*. We are all family here. And that you guys need to recognize the *‘aumakua*, and that because the issue was that about they’re wanting to get one of the families off from the land. And what Kumauna said, when he said, “You tell them, if my *mo‘opuna* do not occupy the land, I will flood all of Ka‘ū.” And, so I had to. I had to give the message, so I went down to the meeting, and I told them “Please, Kumauna, Tūtū Kūmauna wants you guys to remember that we are all *‘ohana* and that the *Akua* stand behind of us. But, the only way for us to have the proper *hunamana* is move anything, is that we need to recognize them, we need to go back and start doing ceremony, start to recognize them, to call upon them in the things we do, as we move forward.” We cannot go, we’re going kind of half-assed pursuing a certain aspect of the culture and then denying the other part. Because a lot of them today is Christian, yeah? So, the Christians speak the *‘ōlelo Hawai‘i*, but then they’ll do, at most, maybe do *ho‘oponopono, ho‘omana*. We talk about *hunamana*, like going into the deepness… *kahuna* nobody like.

CSH: The people in this area are definitely culturally vibrant though like or, because they grew up on the plantation they’re Western, right?

DO: Yeah, they’re westernized. I would say, I would say, like there’s only literally less than a handful of us that actually do *hunamana*.

CSH: Right. But even beyond *hunamana*, like this, like the restoration of this.

DO: Oh yeah, Oh No. A lot of people are coming out.

CSH: Okay, okay. [Inaudible] …I know we talked about it earlier, *heiau* [inaudible] but, like how does it interact with the other *pu‘u*? And with sites on the beach, along this side, or even back here?

DO: We know there is four energy points in Ka‘ū, and this is the main one, and it connects to Punalu‘unui, which is the *heiau* at Punalu‘u and the other *heiau* down at Ka Lae. So that’s the three points. Then the fourth point is the Buddhist temples, Wood Valley [inaudible] Tibetan temple ….. Wood Valley,

CSH: Wood Valley?

DO: Yeah, you know the road where you turn coming up the [inaudible]…

CSH: Yeah, yeah.

DO: You go straight and you end up going up towards Wood Valley, there’s this huge Tibetan Buddhist temple.

CSH: Oh, that’s why I see all the monks in town.

DO: Yeah. They actually chose that site to put their temple because they felt the energy of that area. Behind of the temple is this energy vortex that connects to these three points.

CSH: When you say energy vortex, are you talking about like holes? Or are you talking about…

DO: Actual, actual energy. Like the Earth’s magnetic field.

CSH: Okay.

DO: Where they interact.

CSH: Got it.

DO: And where they interact, is really important, where really important vortexes open up. And there are some places where there is entrances into Pō.

CSH: Ah. Okay.

DO: Where it’s *kapu*, you know at Waipi‘o Valley, have one, where the river comes down….. There’s so much drownings that happen there, in that area that area where the entrance is to Pō. A lot of people have died and drowned there. So, we consider it as a kind of like a negative, I like only say negative because like I think of a positive negative. But some places are *kapu* that you wouldn’t want to go.

CSH: Yeah.

DO: But this is more of like one healing…

CSH: Okay.

DO: Vortex. Healing…

CSH: Healing vortex.

DO: Energy. But Punalu‘u, the Punalu‘u . I was telling her about the four points, the Punalu‘unui, Makanau and what’s the name of the one down in Ka Lae?

EL: Ka Lae? Man, I don’t know. Okay.

CSH: I can look it up.

DO: And the one that the Buddhists got…

EL: Lanipau?

DO: Yeah, Lanipau, up there

EL: Punalu‘u got three *heiau*s.

DO: But Punalu‘unui actually is there for perform sacrifices.

CSH: I think that’s kind of *pau.*

EL: [Laughs] We when answer all your questions?

CSH: Yeah, yeah. So do you guys have any concerns about the bridge project?

EL: Well, the bridge. Only two questions I gonna ask.

CSH: Okay. Okay.

EL: So where’s the outlet for the [inaudible] gonna be? When they take out the bridge.

CSH: I…

EL: Gonna be on the *mauka* side of the, gonna be *mauka* of the …

CSH: I’m actually not sure. I’ll have to check. I might have to go back and ask her, the client. Trash [inaudible].

DO: [Noise] Punalu‘u one right here, so, that’s right, the second one, right?

EL: [Inaudible] for the plants, for the lava, tear the roof off of here, da kine…Tūtū da kine [inaudible]

DO: So there’s a temporary bypass, go around the thing.

EL: Around the thing. They’re not even going to repair the two bridges. [Inaudible] They not gonna [inaudible]…

CSH: I don’t know. It’s hard to tell. It might go *mauka* for Hīlea.

EL: Right.

CSH: I can double check with the client.

EL: I think the Nīnole one already get the golf course from before. So possibly go right through the golf course.

CSH: No wait. Hello.

EL: I got that paper too right there.

CSH: It looks like they’re both going to go in from… *mauka.*

EL: Okay.

CSH: The bypass, yeah, the temporary…

EL: Yeah, the temporary bypass. So when this project going to start? The repairs, you don't really know? [Laughs] You're just doing the [inaudible], right [laughing]. But all good, but I have no concern, because I think built the bridges in 1940 and time to repair it.

DO: Oh, yeah.

EL: You gotta repair it, it's very old. It's over 75 years old.

DO: Yep. There is a….anytime we experience stuff by the Hīlea Bridge that nobody [inaudible].

EL: Well people lost their lives too there, car accidents.

DO: In the stretch.

CSH: Oh, there's some car accidents there?

DO: Lots.

EL: At the Hīlea one.

CSH: Do you know if there's *iwi*, that's why, over there? Or a site?

DO: It's all [inaudible] over there.

EL: You know, I think there's no more *iwi*s because the whole Hīlea thing come into one flood zone, so already the *iwi* would be flooded out.

DO: Because of the years of constant flooding, massive flooding…

EL: The water…

DO: If there was, there would have washed the bones out.

CSH: Coming from Kūmauna?

EL: Yeah, coming from here. Kūmauna, So Kūmauna is connected to the Hīlea Bridge.

DO: And we know when the flooding going be massive, because when you see the white wash coming off the mountain. You'll see it way before it gets down here.

EL: Right.

DO: You know as the rule: You better get home, because, if the bridges broke you going be stuck in town. One time we was stuck two weeks in town. On both sides of Pāhala.

EL: The year 2000, the great flood.

DO: The National Guard flew in supplies and…yup.

EL: We’re real isolated here.

CSH: Crazy. So, I’m not moving here for that reason come summer time. Okay?

DO: Oh! Oh no!

CSH: [Laughs]

EL: You know what it is? No, No, No.

DO: There’s back roads!

EL: You know what it is? Eh? Okay, the reason why you drawn to Ka‘ū is, you finding yourself. You finding your higher self. But the fear of losing it [inaudible] is just fear. but when it really comes down to it, the illusion is just going dissolve one day.

CSH: Yeah.

EL: To believe in [inaudible].

DO: You’ll come back one day.

CSH: [Inaudible].

EL: So that’s why I’m here! So why I’m here? To go back to rework the land, to…

DO: To get it ready for everybody.

EL: To get it ready for *kalo*, to plant taro, and live off the *‘āina* like our ancestors did.

DO: And Uncle Kawehi has this amazing, amazing vision of doing this *ahupua‘a*, of this living *ahupua‘a* system where we grow things here. Even starting with these fishponds and this organization that wants to fund that, and take that plan, concept and take it around the world and [inaudible] like get the people back on the *‘āina*.

CSH: Wow!

EL: Right.

DO: I think it’s coming back.

EL: We cannot be living on import foods from the mainland and all that. And that’s not good for…

DO: It’s just a matter of time before the bottom when drop out of the [inaudible]…

EL: You know that, the past history--great civilizations when fall.

DO: Rise and fall.

EL: Empire Rome, Egypt when fall. [Inaudible] going fall.

DO: We know the financial system of the world is hanging on by threads.

EL: It’s all what happened. We gonna go back to *mahi‘ai* on the *‘āina.*

DO: And the fishermen, the *lawai‘a*. They going be the heroes.

EL: Then we’ll be bartering again, trading.

CSH: Yeah.

EL: So that’s the whole system. You going to be telling …

DO: We can start that now.

EL: You’re going to be saying…

CSH: [laughing]

EL: “Why am I living in the city, when I could be living in…?”

DO: Should something of that magnitude happen, a financial collapse, you wouldn’t want to be in the city.

CSH: Oh yeah, No. I don’t want to be there either.

DO: Yeah, you could actually go up to the mountain get pig, go to the ocean, you know get fish. How would you do that in the city? It’s like…

EL: Right.

CSH: You go to the Ala Wai…

EL & DO: [laughing]

CSH: …and get the tilapia!

DO: And kill our neighbor for that food?

CSH: [laughing]

EL: I hate to say, but I don’t like to bring up. But where mass people live…cannibalism. [Inaudible] people be eating eachother.

DO: And the resources dwindle.

EL: Yeah. We’d rather be in an open place like this, be protected from [inaudible].

DO: We’re already talking with ‘*ohana*s that [inaudible]. Nothing but Doomsday scenarios [inaudible, wind blowing] back to the *‘āina*. Now [inaudible].

EL: And now, before the thing really happens. Because we got to be prepared.

DO: How…

EL: We cannot survive by individuals, by ourself. We need to be as one *‘ohana*, community to survive. So, we need to change the babies coming in the future. That they need to do that.

DO: To give them the survival skills. Right?

EL: Right.

EL: You cannot handicap them more. He’s got to learn to live on the land, I guess. We need to teach them. I don’t know how we got so handicapped.

DO: But if he grew up in it, it would be natural.

CSH: Right.

DO: Farms.

EL: Just like…

CSH: Like how you guys grew up.

EL: Right.

DO: Somewhat. But, we were raised in the western way.

EL: But it’s just bringing that mentality to the kids now because [inaudible] I don’t know what happened… Bringing that energy back. What happened? This is what started it off. Planting the seed and moving forward in our *ahupua‘a* system.

DO: And I know that we can do it with [inaudible].

EL: It’s coming. So, you’re welcome to come here and live.

CSH: Well, thank you.

EL: Well, you find your place and where ever you going to be. Just like what happened to the Mauna Kea people, they old friends [inaudible]

DO: What’s amazing we get, is that the Supreme Court passed several precedents concerning the religious practices. That helps us here. Even if Olsen owns this place, he cannot deny our right to practice our religion.

EL: Cannot.

DO: Which means, if you’re the temple priest, of this temple, and you’re doing ceremonies from it, seven days a week…

EL: Right.

DO: You can actually live here on the temple site.

EL: That’s what happens.

DO: That’s how we get our [inaudible]. That was the first thing we did [inaudible]... as the temple *kahu*.

EL: Right.

DO: We put on a *kapu* [inaudible]. We lost our *mana.* That was our [inaudible]. All the stones went down. Domino effect, it was inevitable.

EL: Right.

DO: The Kingdom when collapse.

EL: True.

DO: But now we begin our *mana* spots, we rebuild our temples, we gain back our *hunamana.*

EL: That’s right.

DO: From there everything start to build up.

EL: That’s true.

DO: Move up and we’ll rise again. We’ve seen this happen. We gotta get this done before the great quaking and shaking.

EL: That’s right. Because Mother Earth will start shaking the ground

DO: But she recesses. But she will recess.

EL: She will recess herself, so she relieves the duties before all that happen.

CSH: That’s soon?

EL: It’s gonna happen. Because man wen get too arrogant to not take care of it

DO: The only reason we can’t believe that Atlantis existed was because there is no remnant of it now.

EL: Right.

DO: When you look at the Atlantic Ocean [inaudible].

EL: That’s right.

DO: [inaudible, wind blowing].

Appendix H: Kawehi Ryder Authorization Form

Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai‘i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: NINOLE 2 nishihara@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai‘i (CSH) appreciates the generosity of the *kūpuna* and *kama‘āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Nīnole Stream Bridge and Hīlea Stream Bridge Projects. Nīnole Stream Bridge is located in Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, Tax Map Keys (TMKs): [3] 9-5-019:011, 016, 024, and 035 por., and 9-5-019, 9-5-027, Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way. Hīlea Stream Bridge is located in Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way.

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

I, Kawehi Ryder, agree to the procedures outlined above and, by my signature, give my consent and release for this interview to be used as specified.

(Please print your name here)

Frank Ryder (Kawehi)
(Signature)

Nov. 24, 2015.
(Date)

Appendix I: Earl Louis Authorization

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: NINOLE 2 nishihara@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Nīnole Stream Bridge and Hīlea Stream Bridge Projects. Nīnole Stream Bridge is located in Nīnole Ahupua'a, Ka'ū District, Hawai'i Island, Tax Map Keys (TMKs): [3] 9-5-019:011, 016, 024, and 035 por., and 9-5-019, 9-5-027, Hawai'i Belt Road/Māmalahoa Highway Right-of-Way. Hīlea Stream Bridge is located in Hīlea Ahupua'a, Ka'ū District, Hawai'i Island, TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai'i Belt Road/Māmalahoa Highway Right-of-Way.

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

I, Earl Louis, agree to the procedures outlined above and, by my
(Please print your name here)
signature, give my consent and release for this interview to be used as specified.

Earl Louis
(Signature)

12-16-15
(Date)

Appendix J: Demetrius Oliveira Authorization

Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai‘i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: NINOLE 2 nishihara@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai‘i (CSH) appreciates the generosity of the *kūpuna* and *kama‘āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Nīnole Stream Bridge and Hīlea Stream Bridge Projects. Nīnole Stream Bridge is located in Nīnole Ahupua‘a, Ka‘ū District, Hawai‘i Island, Tax Map Keys (TMKs): [3] 9-5-019:011, 016, 024, and 035 por., and 9-5-019, 9-5-027, Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way. Hīlea Stream Bridge is located in Hīlea Ahupua‘a, Ka‘ū District, Hawai‘i Island, TMKs: [3] 9-5-017:007 por., 008 por., and 9-5-017 Hawai‘i Belt Road/Māmalahoa Highway Right-of-Way.

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

I, Demetrius K. Oliveira, agree to the procedures outlined above and, by my
(Please print your name here)
signature, give my consent and release for this interview to be used as specified.

(Signature)

12/16/2015
(Date)

Appendix G
National Historic Preservation Act Section 106 and Hawaii Revised Statutes Chapter 6E Consultation Documentation

AFFIDAVIT OF PUBLICATION

IN THE MATTER OF
NOTICE OF CONSULTATION

STATE OF HAWAII }
} SS.
City and County of Honolulu }

Doc. Date: AUG 27 2015 **# Pages:** 1

Notary Name: Patricia K. Reese First Judicial **Circuit**

Doc. Description: Affidavit of Publication

Notary Signature — AUG 27 2015 Date

PATRICIA K. REESE NOTARY PUBLIC Comm. No 86-467 STATE OF HAWAII

Lisa Kaukani being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser, MidWeek, The Garden Island, West Hawaii Today, and Hawaii Tribune-Herald, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 0 times on:

MidWeek 0 times on:

The Garden Island 0 times on:

Hawaii Tribune-Herald 1 times on:
08/27/2015

West Hawaii Today 0 times on:

Other Publications: 0 times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Lisa Kaukani

Subscribed to and sworn before me this 27th day of August A.D. 2015

Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii

My commission expires: Oct 07, 2018

Ad # 0000791053

PATRICIA K. REESE NOTARY PUBLIC Comm. No 86-467 STATE OF HAWAII

SP.NO.: _____ L.N.

NOTICE OF CONSULTATION

SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT OF 1966 AS AMENDED (2006) AND CHAPTER 6E OF THE HAWAII REVISED STATUTES

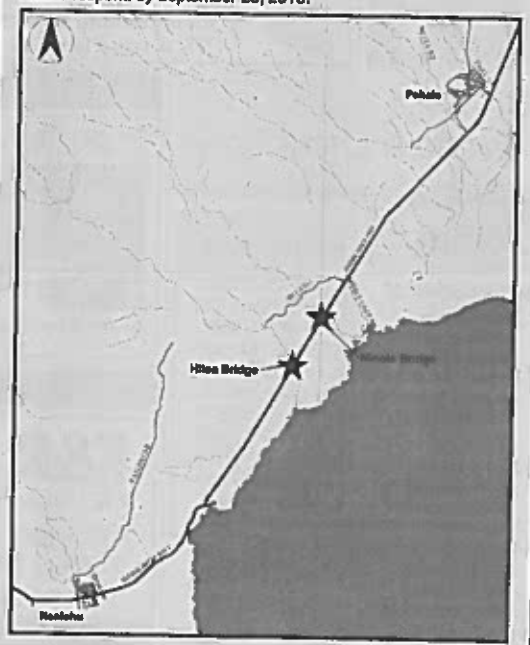
HILEA AND NINOLE BRIDGE REPLACEMENT PROJECT
KAU DISTRICT, HAWAII ISLAND, HILEA AHUPUAA AND NINOLE AHUPUAA
FEDERAL-AID PROJECT NUMBER: HI STP SR11(1) AND HI STP SR11(2)
TAX MAP KEYS: (3)9-5-017:007, (3)9-5-017:008, (3)9-5-017 (Hawaii Belt Road / Mamalahoa Highway Right-of-Way), (3)9-5-019:011, (3)9-5-019:016, (3)9-5-019:024, (3)9-5-019:035, (3)9-5-027:020, (3)9-5-019, and (3)9-5-027 (Hawaii Belt Road / Mamalahoa Highway Right-of-Way)

Notice is hereby given that the Federal Highway Administration, Central Federal Lands Highway Division and State of Hawaii Department of Transportation, Highways Division propose to replace the Hilea Stream and Ninole Stream bridges on Mamalahoa State Highway 11 (HI-11). The Hilea Bridge is located at Mile Post (MP) 57.7 and the Ninole Bridge is located at MP 56.7, in Hilea Ahupuaa and Ninole Ahupuaa in Kau District on Hawaii.

The proposed project would replace the existing Hilea and Ninole bridges and their approaches to maintain the stream crossings on HI-11 as safe and functional components of the regional transportation system for highway users. A seismic event could significantly damage the existing bridges. Reinforcing the existing wooden bridge structures and rock foundations would not be feasible for both the Ninole and Hilea Bridges. In addition, storm water overtops Hilea Bridge and its approaches, so the existing stream channel must be realigned and widened, resulting in the need for a longer bridge. The new replacement bridges would be modern and match other new bridges along this state highway route. The replacement bridges would be single-span bridges that are wide enough to accommodate two 11-foot travel lanes with 9-foot shoulders on each side. The potential area of disturbance, including temporary construction areas, is 3.3 acres for Hilea Bridge and 2.1 acres for Ninole Bridge.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (2006), and Chapter 6E of the Hawaii Revised Statutes, Native Hawaiian organizations and Native Hawaiian descendants with ancestral, lineal or cultural ties to, cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area are requested to contact Mr. Michael Will via email at Michael.will@dot.gov or by US Postal Service to 12300 West Dakota Avenue, Suite 380, Lakewood, CO 80228-2583.

Please respond by September 28, 2015.



AFFIDAVIT OF PUBLICATION

IN THE MATTER OF
NOTICE OF CONSULTATION

STATE OF HAWAII }
} SS.
City and County of Honolulu }

Doc. Date: AUG 27 2015 **# Pages:** 1

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Patricia K. Reese AUG 27 2015
Notary Signature Date

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Honolulu Star-Advertiser 0 times on:

MidWeek 0 times on:

The Garden Island 0 times on:

Hawaii Tribune-Herald 0 times on:

West Hawaii Today 1 times on:
08/27/2015

Other Publications: 0 times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Lisa Kaukani

Subscribed to and sworn before me this 27th day of August A.D. 2015

Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii

My commission expires: Oct 07, 2018

Ad # 0000791054

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

SP.NO.: _____ L.N.

NOTICE OF CONSULTATION

SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT OF 1966 AS AMENDED (2006) AND CHAPTER 6E OF THE HAWAII REVISED STATUTES

HILEA AND NINOLE BRIDGE REPLACEMENT PROJECT
KAU DISTRICT, HAWAII ISLAND, HILEA AHUPUAA AND NINOLE AHUPUAA
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TAX MAP KEYS: (3)9-5-017:007, (3)9-5-017:008, (3)9-5-017 (Hawaii Belt Road / Mamalahoa Highway Right-of-Way), (3)9-5-019:011, (3)9-5-019:016, (3)9-5-019:024, (3)9-5-019:035, (3)9-5-027:020, (3)9-5-019, and (3)9-5-027 (Hawaii Belt Road / Mamalahoa Highway Right-of-Way)

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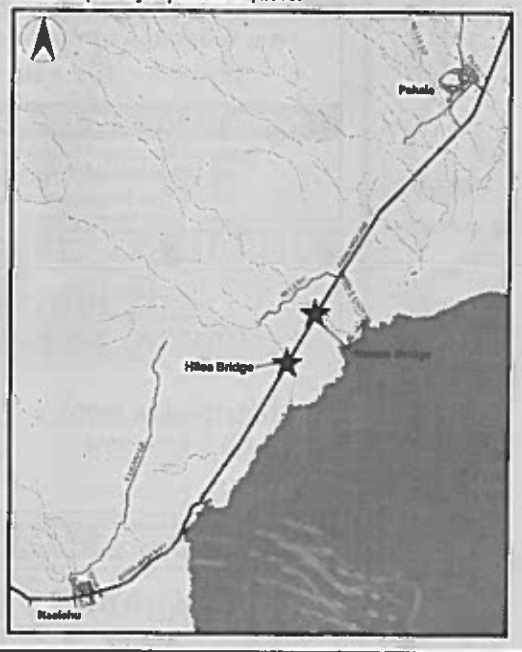
The proposed project would replace the existing Hilea and Ninole bridges and their approaches to maintain the stream crossings on HI-11 as safe and functional components of the regional transportation system for highway users. A seismic event could significantly damage the existing bridges. Reinforcing the existing wooden bridge structures and rock foundations would not be feasible for both the Ninole and Hilea Bridges. In addition, storm water overtops Hilea Bridge and its approaches, so the existing stream channel must be realigned and widened, resulting in the need for a longer bridge. The new replacement bridges would be modern and match other new bridges along this state highway route. The replacement bridges would be single-span bridges that are wide enough to accommodate two 11-foot travel lanes with 9-foot shoulders on each side. The potential area of disturbance, including temporary construction areas, is 3.3 acres for Hilea Bridge and 2.1 acres for Ninole Bridge.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (2006), and Chapter 6E of the Hawaii Revised Statutes, Native Hawaiian organizations and Native Hawaiian descendants with ancestral, lineal or cultural ties to, cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area are requested to contact Mr. Michael Will via email at Michael.will@dot.gov or by US Postal Service to 12300 West Dakota Avenue, Suite 380, Lakewood, CO 80228-2583.

Please respond by September 28, 2015.



U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

In Reply Refer To:
HFPM-16

TO:

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 AND HAWAII REVISED STATUTES, CHAPTER 6E CONSULTATION
HILEA AND NINOLE BRIDGE REPLACEMENT PROJECT
KAU DISTRICT, HAWAII ISLAND, HILEA AHUPUAA AND NINOLE AHUPUAA
PROJECT NO. HI STP SR11(1) AND HI STP SR11(2)
TAX MAP KEY: (3)9-5-017:007 POR., (3)9-5-017:008 POR., (3)9-5-017 HAWAII BELT ROAD / MAMALAHOA HIGHWAY RIGHT-OF-WAY (3)9-5-019:011, (3)9-5-019:016, (3)9-5-019:024, (3)9-5-019:035 POR., (3)9-5-027:020 POR., AND (3)9-5-019, (3)9-5-027 HAWAII BELT ROAD / MAMALAHOA HIGHWAY RIGHT-OF-WAY

Dear :

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace the Hilea and Ninole Bridges on Mamalahoa State Highway 11 (HI-11). The Hilea Bridge is located at Mile Post (MP) 57.7, and the Ninole Bridge is located at MP 56.7 (see attached Area of Potential Effects USGS Maps for project locations). The proposed project is considered a federal action and undertaking, and will comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (2006), as well as Hawaii Revised Statutes (HRS) Chapter 6E. We would like to invite you to participate in the Section 106 consultation for the proposed project in accordance with Title 36 of the *Code of Federal Regulations*, Section 800.3, by providing information and/or by requesting to be a consulting party. This letter also initiates consultations in accordance with HRS Chapter 6E.

Overview of the Undertaking

The proposed project would replace the existing Hilea and Ninole Bridges and their approaches to maintain the Hilea Stream and Ninole Stream crossings on HI-11 as safe and functional components of the regional transportation system for highway users. Both bridges are eligible for listing on the National Register of Historic Places.

A seismic event could significantly damage the existing bridges. Reinforcing the existing wooden bridge structures and rock foundations would not be feasible for both the Ninole and Hilea

Bridges. In addition, stormwater overtops Hilea Bridge and its approaches, so the existing stream channel must be realigned and widened, resulting in the need for a longer bridge that would be a single-span 100-foot long bridge (approximately 60 feet longer than the existing bridge). The proposed Ninole Bridge would be a single-span 65-foot long bridge.

New replacement bridges will be modern and match other new bridges on the state highway. The replacement bridges would be wider than the existing bridges, to accommodate two 11-foot lanes with 9-foot shoulders on both sides. At Ninole, the existing center pier, with a lava-rock facing, will remain. Timbers and lava rock from the existing bridges will be offered to others for re-use.

On both bridges, concrete post and beam railings would be 2 feet 8 inches high, capped with a 10-inch high metal railing, for a total height of 3 feet 6 inches for bicycle safety. Concrete end posts with metal railings would be installed. These railings would be similar to the railings on the Keaiwa Stream Bridge, which is located on HI-11 approximately six miles north of Ninole Bridge, at MP 50.35.

The roadway approaches to the bridges would be widened, which would require extending embankment slopes or installing retaining walls to minimize right-of-way (ROW) and environmental impacts.

During construction, Hilea and Ninole Bridges would be closed to traffic, and bypass roads and temporary bypass bridges would be constructed to route traffic over Hilea and Ninole Streams upstream of the existing bridges.

The proposed improvements would occur within the existing HDOT right-of-way. However, construction parcels would be needed for the temporary bypass roads, construction zones, and staging areas during construction. No historic resources are located within the temporary construction parcels.

Area of Potential Effects

The archaeological and historic architectural Areas of Potential Effects (APE) are illustrated in the attached APE Aerial Imagery maps, and include both temporary and permanent impact areas.

Cultural, Archaeological, and Historical Studies

To provide you information on the cultural, archaeological, and historical settings of the project area, we are including four studies prepared for this project. Please note that the study areas indicated in the reports are larger than the attached APE maps. At the start of the project, we assumed a large study area so that field findings could inform the conceptual design process at an early stage to help avoid or minimize effects to potentially sensitive sites.

1. Draft Archaeological Inventory Survey Report for the Hilea Bridge Replacement Project, Hilea Ahupuaa, Kau District, Hawaii
2. Draft Archaeological Inventory Survey Report for the Ninole Bridge Replacement Project, Ninole Ahupuaa, Kau District, Hawaii
3. Hawaii State Historic Preservation Division (SHPD) Historic Resource Inventory Form (Reconnaissance Level) for Hilea Bridge
4. Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Ninole Bridge

Consultations

Section 106 notice/advertisement will be included in the Hawaii Tribune Herald and West Hawaii Today. Native Hawaiian organizations and Native Hawaiian descendants with ancestral, lineal, or cultural ties to, cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area are asked to provide a response within 30 days of notification.

Letters for this project are being sent to the following NHOs as well as other organizations with knowledge of cultural, archaeological, and historical resources:

- Office of Hawaiian Affairs
- Hawaiian Civic Club of Kau
- Kau Preservation
- O Kau Kakou
- Hawaii Island Burial Council
- Kamehameha Schools
- Cultural Resources Commission, County of Hawaii
- Historic Hawaii Foundation

We welcome any comments you have on this project's proposed improvements or APE. We are particularly interested in any information you may have on the historic and cultural sites that have been recorded in the area, or other historic or cultural sites about which you may have knowledge. In addition, if you are acquainted with any person or organization that is knowledgeable about the proposed project area, or any descendants with ancestral, lineal, or cultural ties to or cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area, we would appreciate receiving their names and contact information.

If you have information and/or would like to be a Consulting Party, we would appreciate a written response within 30 days from date of receipt, by email at Michael.will@dot.gov or by US Postal Service to 12300 West Dakota Avenue, Suite 380, Lakewood, CO 80228.

Please feel free to contact Nicole Winterton, Environmental Protection Specialist, by telephone at (720) 963-3689, or email Nicole.Winterton@dot.gov, if you have any questions.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Enclosures:

- Hilea Bridge Area of Potential Effects (USGS Map)
- Ninole Bridge Area of Potential Effects (USGS Map)
- Hilea Bridge Area of Potential Effects (Aerial Imagery)
- Ninole Bridge Area of Potential Effects (Aerial Imagery)

- On CD: Draft Archaeological Inventory Survey Report for the Hilea Bridge Replacement Project, Hilea Ahupuaa, Kau District, Hawaii
- On CD: Draft Archaeological Inventory Survey Report for the Ninole Bridge Replacement Project, Ninole Ahupuaa, Kau District, Hawaii
- On CD: Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Hilea Bridge
- On CD: Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Ninole Bridge

cc (with enclosures on CD):

Kevin Ito, HDOT
Todd Nishioka, HDOT
Jessica Puff, SHPD
Dr. Susan Lebo, SHPD
Mike Vitousek, SHPD Hawaii-Lead Archaeologist

DISTRIBUTION LIST FOR
NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 AND HAWAII REVISED STATUTES, CHAPTER 6E CONSULTATION LETTER
HILEA AND NINOLE BRIDGE REPLACEMENT PROJECT

AUGUST AKIU

ADRIENNE KEKOA

DARLYNE AKIU

CULTURAL RESOURCES COMISSION (c/o HAWAII COUNTY PLANNING DEPARTMENT)

JOHN CROSS

LEIMANA DAMATE

MELVIN DAVIS

BLOSSOM DE SILVA, HAWAIIAN CIVIC CLUB OF KA'U

EDWIN MIRANDA, HAWAII ISLAND BURIAL COUNCIL

JACKIE KALUA'U

DEAN KANIHO

KANAKA COUNSEL MOKU O KEAWE

JEFFRY KEKOA

KA'U PRESERVATION

KAMA DANCIL AND MILILANI BROWNING, KAMEHAMEHA SCHOOLS

PAUL MAKUAKANE

OFFICE OF HAWAIIAN AFFAIRS

O KA'U KAKOU

KAWEHI RYDER

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
Deputy Director

West Hawai'i Office
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Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

County of Hawai'i

PLANNING DEPARTMENT
CULTURAL RESOURCES COMMISSION

September 21, 2015

Mr. J. Michael Will, P.E.
Project Manager, Federal Highways Administration
123000 West Dakota Avenue, Suite 380
Lakewood, CO 80228-2693

Dear Mr. Will:

SUBJECT: Request for Comments Pursuant to Section 106, National Historic Preservation Act
Project: Hīlea and Nīnole Bridge Replacement Project, Ka'ū, Hawai'i [HFPM-16]
TMKs: (3) 9-5-017:007 por, 008 por, (3) 9-5-017 Hawai'i Belt Road/Māmalahoa Highway Right-of-Way, (3) 9-5-019:011, 016, 024, 035 por, (3) 9-5-027:020 por, (3) 9-5-019 & (3) 9-5-027
Hawai'i Belt Road/Māmalahoa Highway Right-of-Way, Ka'ū, Hawai'i

Thank you for taking the time to consult with the Hawai'i County Cultural Resources Commission (CRC) at their September 9, 2015, meeting regarding the subject bridge replacement project. The proposed project is considered a federal action and undertaking, and information was solicited from the CRC pursuant to Section 106 of the National Historic Preservation Act.

The subject Section 106 consult specifically requested information regarding the historic and cultural sites that have been recorded in the area, or other historic or cultural sites that the CRC has knowledge of. Additionally, the CRC was asked for names of any people or organizations knowledgeable about or with ties to the proposed project area whom should be consulted. The below information was generated at the CRC's meeting and is presented for your consideration.

Project / Site Considerations:

1. Install protective fencing around any historic sites close to or within the identified areas of potential effect.
2. Include drainage name on concrete of new bridges.
3. Correct the draft archaeological inventory survey report for the Hīlea Bridge to remove reference to Hanapēpē River on pg. iii under "consultation".

Organizations to Consider / Contact:

1. Aha Moku Advisory Committee – contact Leimana DaMate <Leimana.K.DaMate@hawaii.gov>
2. Kānaka Counsel Moku o Keawe – HC 2 Box 9607, Kea'au Hawai'i 96749

Additionally, a list of individuals whom you may consider contacting for the subject Section 106 consult was identified at the meeting; for a copy of the list please contact Lucas Mead of this office at (808) 961-8140 or at Lucas.Mead@hawaiicounty.gov. Mahalo for allowing us to comment.

Me ka pono,

Deborah L Chang

DEBORAH CHANG, Chairperson
Hawai'i County Cultural Resources Commission

LM:klt
\\coh33\planning\public\wpwin60\Cultural Resources Commission\Projects\Section 106 for Hilea and Ninole Bridges\Section 106 Letter - CRC to DOT.doc

cc via email: Mr. Jason Y. Kage, P.E., CH2M <jason.kage@ch2m.com>
Ms. Barbara Shideler, AIA, <bss@masonarch.com>
Hawai'i County Cultural Resources Commission

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380A
Lakewood, CO 80228-2583
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

January 26, 2016

In Reply Refer To:
HFPM-16

TO: THE HONORABLE SUZANNE CASE, CHAIRPERSON
DEPARTMENT OF LAND AND NATURAL RESOURCES

ATTN: SUZANNE CASE
STATE HISTORIC PRESERVATION OFFICER

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 AND HAWAII REVISED STATUTES, CHAPTER 6E CONSULTATION
HILEA AND NINOLE BRIDGE REPLACEMENT PROJECT
KAU DISTRICT, HAWAII ISLAND, HILEA AHUPUAA AND NINOLE AHUPUAA
PROJECT NO. HI STP SR11(1) AND HI STP SR11(2)
TAX MAP KEY: (3)9-5-017:007 POR., (3)9-5-017:008 POR., (3)9-5-017 HAWAII BELT ROAD / MAMALAHOA HIGHWAY RIGHT-OF-WAY; (3)9-5-019:011, (3)9-5-019:016, (3)9-5-019:024, (3)9-5-019:035 POR., (3)9-5-027:020 POR., AND (3)9-5-019, (3)9-5-027 HAWAII BELT ROAD / MAMALAHOA HIGHWAY RIGHT-OF-WAY

Dear Ms. Case:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace the Hilea and Ninole Bridges on Mamalahoa State Highway 11 (HI-11). The Hilea Bridge is located at Mile Post (MP) 57.7, and the Ninole Bridge is located at MP 56.7 (see attached Area of Potential Effects USGS Maps for project locations). The proposed project is considered a federal action and undertaking, and will comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (2006), as well as Hawaii Revised Statutes (HRS) Chapter 6E. This letter is to initiate consultation with the State Historic Preservation Division (SHPD) under Section 106 in accordance with Title 36 of the *Code of Federal Regulations* (CFR), Section 800.3, and in accordance with HRS Chapter 6E.

Overview of the Undertaking

The proposed project would replace the existing Hilea and Ninole Bridges and their approaches to maintain the Hilea Stream and Ninole Stream crossings on HI-11 as safe and functional components of the regional transportation system for highway users. The existing Hilea and Ninole Bridges are in need of upgrade to meet current live load and seismic requirements and

roadway design standards, and in the case of Hilea Bridge, to address the inability to sufficiently pass flows. Rehabilitation was considered for both of these historic bridges and determined to not be practicable because the existing Ninole Bridge has numerous splits and checks in the timber columns and beams, there is decay in the timber deck, and the bridge needs to be widened approximately 17 feet to meet roadway design requirements. In addition, stormwater overtops the existing Hilea Bridge and its approaches, so to address flooding the existing stream channel must be realigned and widened, resulting in the need for a longer bridge which cannot be accomplished through rehabilitation.

The replacement Hilea Bridge is proposed to be a single-span 100-foot long bridge (approximately 60 feet longer than the existing bridge). The proposed Ninole Bridge would be a single-span 65-foot long bridge.

New replacement bridges would be modern and match other new bridges on the state highway. The replacement bridges would be wider than the existing bridges, to accommodate two 11-foot lanes with 9-foot shoulders on both sides. At Ninole, the existing center pier, with a lava-rock facing, would remain. The entire structure, as well as the lava rock from the existing bridges would be offered to others for re-use.

On both bridges, concrete post and beam railings are anticipated to be 2 feet 8 inches high, capped with a 10-inch high metal railing, for a total height of 3 feet 6 inches for bicycle safety. Concrete end posts with metal railings would be installed. These railings would be similar to the railings on the Keaiwa Stream Bridge, which is located on HI-11 approximately six miles north of Ninole Bridge, at MP 50.35.

The roadway approaches to the bridges would be widened, which would require extending embankment slopes or installing retaining walls to minimize right-of-way (ROW) and environmental impacts.

During construction, Hilea and Ninole Bridges would be closed to traffic, and bypass roads and temporary bypass bridges would be constructed to route traffic over Hilea and Ninole Streams upstream of the existing bridges.

The proposed improvements would occur within the existing HDOT right-of-way. However, construction parcels would be needed for the temporary bypass roads, construction zones, and staging areas during construction. Permanent easements would be required for riprap and maintenance access. No historic resources are located within the temporary construction parcels or permanent easements.

Area of Potential Effects

The archaeological and historic architectural Areas of Potential Effects (APE) are illustrated in the attached APE Aerial Imagery maps, and include both temporary and permanent impact areas. The APE comprises 5.4 acres and includes the following TMKs:

- Hilea Bridge: (3)9-5-017:007 por., (3)9-5-017:008 por., (3)9-5-017 Hawaii Belt Road / Mamalahoa Highway Right-of-Way

- Ninole Bridge: (3)9-5-019:011, (3)9-5-019:016, (3)9-5-019:024, (3)9-5-019:035 por., (3)9-5-027:020 por., and (3)9-5-019, (3)9-5-027 Hawaii Belt Road / Mamalahoa Highway Right-of-Way.

Determination of Eligibility

Pursuant to NHPA Section 106 and HRS Chapter 6E, cultural resources investigations were performed within a field survey area that included the project's APE. The cultural resources investigation comprised an archival literature review, an architectural reconnaissance survey, and an archaeological inventory survey. The surveys confirmed the presence of two previously documented resources within the APE. The confirmed cultural resources include SIHP #50-10-74-30298, Hilea Bridge, and SIHP #50-10-68-30299, Ninole Bridge. The surveys did not identify any new archaeological or architectural resources within the APE. FHWA believes all historic properties with potential to be affected by the undertaking have been identified.

Both bridges were included in the 2013 Hawaii Historic Bridge Inventory and Evaluation prepared by MKE Associates, LLC and Fung Associates, Inc. as eligible for the National Register of Historic Places (NRHP) and the Hawai'i Register of Historic Places (HRHP) under Criterion C. Mason Architects has updated the site record as part of this undertaking's inventory efforts and confirmed the eligibility under Criterion C.

FHWA is in agreement with the recommendations of Mason Architects and has therefore determined that SIHP #50-10-74-30298, Hilea Bridge, and SIHP #50-10-68-30299, Ninole Bridge are ***eligible*** for the NRHP and HRHP under Criterion C for their association with wood bridge construction in Hawaii and as the work of master engineer William R. Bartels.

Detailed information on the cultural, archaeological, and historical settings of the project area and the evaluation of eligibility are provided in four studies prepared for this project, included on the enclosed CD:

1. Draft Archaeological Inventory Survey Report for the Hilea Bridge Replacement Project, Hilea Ahupuaa, Kau District, Hawaii
2. Draft Archaeological Inventory Survey Report for the Ninole Bridge Replacement Project, Ninole Ahupuaa, Kau District, Hawaii
3. Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Hilea Bridge
4. Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Ninole Bridge

Determination of Effects

Because the undertaking would demolish the existing bridges and replace with new modern bridges, FHWA has determined that the undertaking will result in an ***Adverse Effect*** finding for both the Hilea Bridge (SIHP #50-10-74-30298) and the Ninole Bridge (SIHP #50-10-68-30299) in accordance with Federal regulations (36 CFR 800.5) and an Effect, With Agreed Upon Mitigation Commitments in accordance with HAR §13-13-275-7.

A detailed Determination of Effects memorandum is attached to this letter.

Consultations

Section 106 notice/advertisement was published in the Hawaii Tribune Herald and West Hawaii Today on August 28, 2015. Native Hawaiian organizations and Native Hawaiian descendants with ancestral, lineal, or cultural ties to, cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area were asked to provide a response within 30 days of notification.

Section 106 consultation letters were sent to the following organizations as potential consulting parties:

- Office of Hawaiian Affairs
- Hawaiian Civic Club of Kau
- Kau Preservation
- O Kau Kakou
- Hawaii Island Burial Council
- Kamehameha Schools
- Hawaii County Cultural Resources Commission
- Historic Hawaii Foundation

FHWA-CFLHD attended the Hawaii County Cultural Resources Commission September 9, 2015 meeting and received a formal response letter from the commission dated September 21, 2015. In the letter, the commission requested that protective fencing be installed around historic sites near or within the APE and the drainage names be included on the concrete of the new bridges. Drainage names will be included on the concrete of the new bridges as requested, however fencing has not been included because the only historic sites within the APE are the bridges themselves. The commission also recommended that the following organizations be contacted:

- Aha Moku Advisory Committee: FHWA-CFLHD initiated contact on October 12, 2015
- Kanaka Counsel Moku o Keawe: FHWA-CFLHD initiated contact on November 11, 2015

The commission also requested that FHWA-CFLHD contact Lucas Mead at the commission office for an additional list of individuals to consider contacting as potential Section 106 consulting parties. FHWA-CFLHD initiated contact on October 12, 2015 with the individuals provided by Mr. Mead.

Request for Concurrence

We request your concurrence with the Area of Potential Effects and Determinations of Eligibility and Effects. We would appreciate a written response within 30 days from date of receipt, by email at Michael.will@dot.gov or by US Postal Service to 12300 West Dakota Avenue, Suite 380A, Lakewood, CO 80228-2583.

Please feel free to contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689, email: nicole.winterton@dot.gov, if you have any questions. We look forward to working with the SHPO on these needed improvements.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Enclosures:

- Area of Potential Effects (USGS Map)
- Area of Potential Effects (Aerial Imagery)
- Determination of Effects Memorandum
- Formal response letter from the Hawaii County Cultural Resources Commission, dated September 21, 2015
- On CD: Draft Archaeological Inventory Survey Report for the Hilea Bridge Replacement Project, Hilea Ahupuaa, Kau District, Hawaii
- On CD: Draft Archaeological Inventory Survey Report for the Ninole Bridge Replacement Project, Ninole Ahupuaa, Kau District, Hawaii
- On CD: Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Hilea Bridge
- On CD: Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Ninole Bridge

cc (with enclosures on CD):
Kevin Ito, HDOT
Todd Nishioka, HDOT
Jessica Puff, SHPD
Susan Lebo, SHPD

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380A
Lakewood, CO 80228-2583
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

April 25, 2016

In Reply Refer To:
HFPM-16

TO: THE HONORABLE SUZANNE CASE, CHAIRPERSON
DEPARTMENT OF LAND AND NATURAL RESOURCES

ATTN: SUZANNE CASE
STATE HISTORIC PRESERVATION OFFICER

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 AND HAWAII REVISED STATUTES, CHAPTER 6E CONSULTATION
HILEA AND NINOLE BRIDGE REPLACEMENT PROJECT, KAU DISTRICT, HAWAII ISLAND, HILEA AHUPUAA AND NINOLE AHUPUAA
PROJECT NO. HI STP SR11(1) AND HI STP SR11(2)
TAX MAP KEY: (3)9-5-017:007 POR., (3)9-5-017:008 POR., (3)9-5-017 HAWAII BELT ROAD / MAMALAHOA HIGHWAY RIGHT-OF-WAY; (3)9-5-019:011, (3)9-5-019:016, (3)9-5-019:024, (3)9-5-019:035 POR., (3)9-5-027:020 POR., AND (3)9-5-019, (3)9-5-027 HAWAII BELT ROAD / MAMALAHOA HIGHWAY RIGHT-OF-WAY

Dear Ms. Case:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace the Hilea and Ninole Bridges on Mamalahoa State Highway 11 (HI-11).

On January 26, 2016, we submitted documentation regarding this project to the State Historic Preservation Division (SHPD) initiating consultation in accordance with the requirements of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (2006), as well as Hawaii Revised Statutes (HRS) Chapter 6E. This documentation also included a description of the Area of Potential Effect (APE) and determination of eligibility and effects, as well as copies of the Draft Archaeological Inventory Survey (AIS) Reports and Historic Resource Inventory Forms.

Since the previous submittal, there has been a slight revision to the APE at both Hilea Bridge and Ninole Bridge. The APE at Hilea Bridge has increased from 3.3 acres to 3.5 acres; the APE at Ninole Bridge has increased from 2.1 acres to 2.5 acres. Analysis of the additional area included in the APE has been conducted by Cultural Surveys Hawaii and Mason Architects. The results of their analyses indicate that there are no cultural resources within this area, such that there would

be no additional impacts anticipated as a result of project implementation. Enclosed are copies of the APE maps, Draft AIS Reports and Historic Inventory Forms, revised to reflect the updated APE. As no additional cultural resources were identified within the APE, our original determination of eligibility and effects is still valid. We respectfully request that you continue your review in response to our correspondence dated January 26, 2016.

A copy of this correspondence will also be sent to the following organizations as potential consulting parties:

- Office of Hawaiian Affairs
- Hawaiian Civic Club of Kau
- Kau Preservation
- O Kau Kakou
- Hawaii Island Burial Council
- Kamehameha Schools
- Hawaii County Cultural Resources Commission
- Historic Hawaii Foundation

Please feel free to contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689, email: nicole.winterton@dot.gov, if you have any questions.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Enclosures:

- Revised Area of Potential Effects (USGS Map)
- Revised Area of Potential Effects (Aerial Imagery)
- On CD: Revised Draft Archaeological Inventory Survey Report for the Hilea Bridge Replacement Project, Hilea Ahupuaa, Kau District, Hawaii
- On CD: Revised Draft Archaeological Inventory Survey Report for the Ninole Bridge Replacement Project, Ninole Ahupuaa, Kau District, Hawaii
- On CD: Revised Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Hilea Bridge
- On CD: Revised Hawaii SHPD Historic Resource Inventory Form (Reconnaissance Level) for Ninole Bridge

cc:
Kevin Ito, HDOT
Todd Nishioka, HDOT
Jessica Puff, SHPD
Susan Lebo, SHPD

Hilea Bridge Project APE

Mamalahoa Highway

VICINITY MAP

LEGEND

Area of Potential Effects

N

0 2,000 4,000

Feet

Notes:
1. Imagery Source: ESRI USA Topographic Maps

Hilea Bridge Project
Area of Potential Effects (USGS Map)
Central Federal Lands - Kau, Hawaii

CH2MHILL

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VICINITY MAP

LEGEND

- Existing Bridge
- Area of Potential Effects
- TMK
- Detour Route

N

0 200 400

Feet

Notes:

1. High-Res Imagery Source: Google Earth 01/08/2013
2. Low-Res Imagery Source: Digital Globe 02/27/2010
3. Imagery base map is not orthorectified; therefore project features may not properly align with the imagery.

Hilea Bridge Project
Area of Potential Effects (Aerial Imagery)
Central Federal Lands - Kau, Hawaii

CH2MHILL

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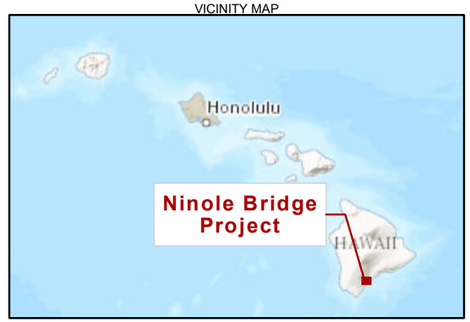
Ninole Bridge Project APE

VICINITY MAP



LEGEND

Area of Potential Effects

N

0 2,000 4,000

Feet

Notes:
1. Imagery Source: ESRI USA Topographic Maps

Ninole Bridge Project
Area of Potential Effects (USGS Map)
Central Federal Lands - Kau, Hawaii

CH2MHILL

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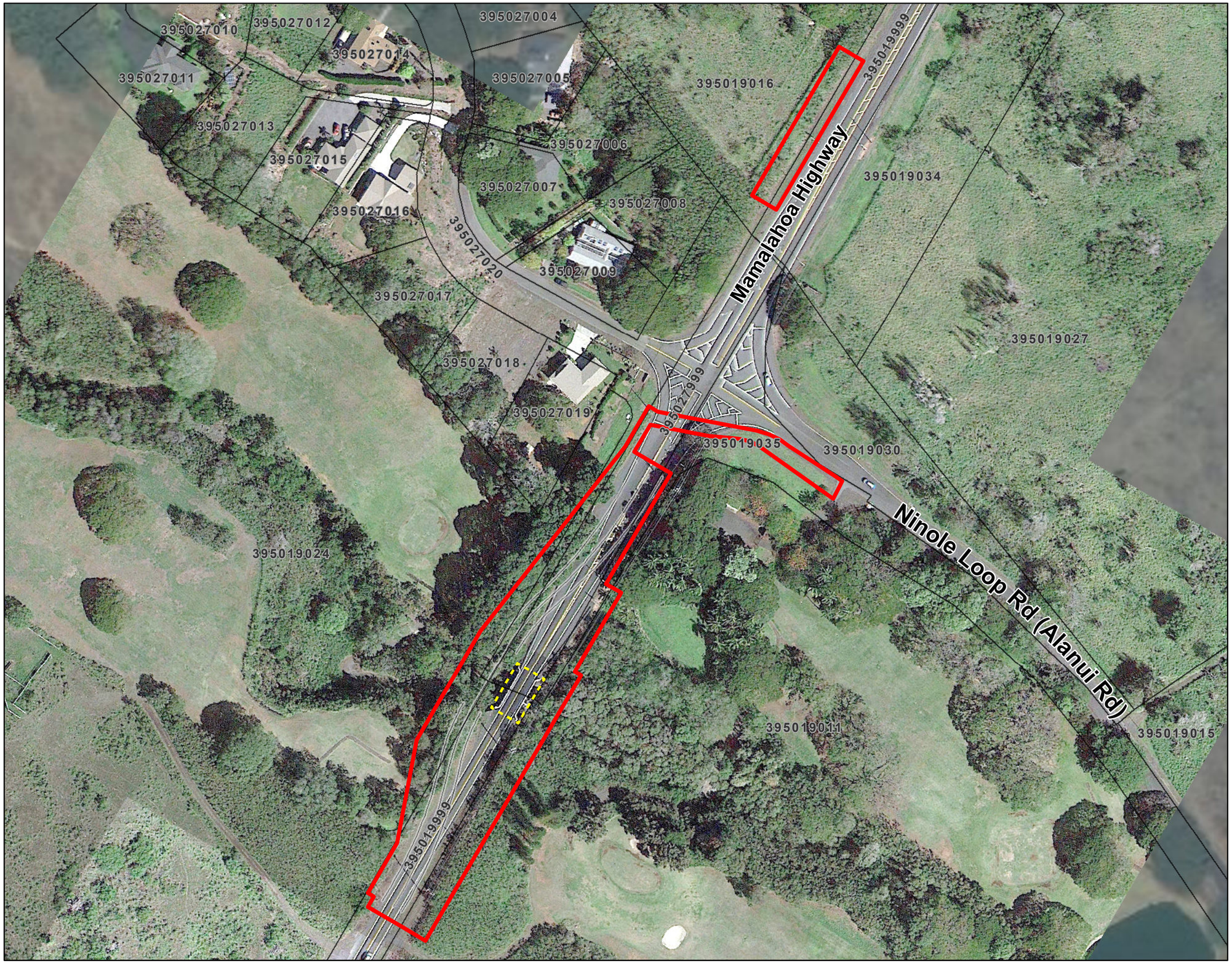

VICINITY MAP

LEGEND

- Existing Bridge
- Area of Potential Effects
- TMK
- Detour Route

N

0 200 400

Feet

Notes:

1. High-Res Imagery Source: Google Earth 01/08/2013
2. Low-Res Imagery Source: Digital Globe 02/27/2010
3. Imagery base map is not orthorectified; therefore project features may not properly align with the imagery.

Ninole Bridge Project
Area of Potential Effects (Aerial Imagery)
Central Federal Lands, Kaui, Hawaii

CH2MHILL

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DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

March 8, 2017

IN REPLY REFER TO:
Log No. 2016.00223
Doc. No. 1703JLP09
Architecture, Archaeology

J. Michael Will, P.E., Project Manager
U.S. Department of Transportation
Federal Highways Administration
Central Federal Lands Division
12300 West Dakota Avenue, Suite 380A
Lakewood, CO 80228-2583

Dear Mr. Will:

SUBJECT: **Chapter 6E-8 and National Historic Preservation Act (NHPA) Section 106 Review**
Request for Concurrence with Area of Potential Effects, Determinations of Eligibility, and Effects
Hīlea and Nīnole Bridge Replacement Project – Ref. No. HFPM-16
Project No. HI STP SR11(1) and HI STP SR11(2)
Hīlea and Nīnole Ahupuaʻa, Kāʻu District, Hawaiʻi Island
TMK: (3) 9-5-017:007 por. and 008 por.; 9-5-017 Hawaii Belt Road/Māmalahoa Highway Right-of-Way; (3) 9-5-019; 9-5-019:011, 016, 024, 035 por.; (3) 9-5-027:020; and (3) 9-5-027 Hawaii Belt Road/Māmalahoa Highway Right-of-Way

In a letter dated January 26, 2016, the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD) requested the State Historic Preservation Officer's (SHPO) concurrence with the Area of Potential Effects (APE), the agency's Determinations of Eligibility for historic properties within the APE, and the agency's determination of an Adverse Effect finding for the Hīlea and Ninole Bridge Replacement Project. The State Historic Preservation Division (SHPD) received this submittal on February 1, 2016. Subsequently, the SHPD reviewed the following associated documents:

(1) April 27, 2016 – FHWA CFLHD notified the SHPD in a letter dated April 25, 2016, that the APE for the Hilea Bridge portion was being increased from 3.3 acres to 3.5 acres and the APE for the Nīnole Bridge portion was being increased from 2.1 to 2.5 acres, and that the revised APE would be included in the archaeological inventory survey (AIS) reports prepared for the project.
(2) November 2, 2016 – Nīnole Bridge Reconnaissance Level Survey (RLS) received from FHWA. Nīnole Bridge determined eligible for National Register of Historic Places (NRHP). The RLS form documentation was accepted by the SHPD (November 6, 2016; Log No. 2016.02584, Doc. No. 1611JLP06).
(3) November 2, 2016 – Hīlea Bridge RLS received from FHWA. Hīlea Bridge determined eligible for NRHP. The RLS form documentation was accepted by the SHPD (November 6, 2016; Log No. 2016.02580, Doc. No. 1611JLP09).
(4) December 8, 2016 – Received HAER No. HI-131 documentation for Nīnole Bridge (Log No. 2016.02856) and the HAER No. HI-132 documentation for Hilea Bridge (Log No. 2016.02847) from the National Park Service.
(5) March 1, 2017 – Archaeological inventory survey (AIS) report for Nīnole Bridge replacement project was accepted by the SHPD (Log No. 2017.00388, Doc. No. 1703SL02).
(6) March 1, 2017 – AIS report for Hīlea Bridge replacement project was accepted by the SHPD (Log No. 2017.00225, Doc. No. 1703SL03).

The FHWA CFLHD, in partnership with the State of Hawaii Department of Transportation (HDOT), proposes to replace the Hīlea and Nīnole Bridges on Māmalahoa Highway (HI-11). Pursuant to 36 CFR 800.16(y), the project is determined to be a federal undertaking and is subject to review under the National Historic Preservation Act (NHPA) Section 106. In addition the proposed project is subject to review under Hawaii Revised Statutes §6E-8.

The proposed project would replace the existing bridges and their approaches to maintain the Hīlea Stream and Nīnole Stream crossing on HI-11 as safe and functional components of the regional transportation system. Rehabilitation was considered but was determined not practicable. The proposed improvements would occur within the existing HDOT right-of-way (ROW). However, construction parcels would be needed for the temporary bypass roads, construction zones, and staging areas. Permanent easements would be required for riprap and maintenance access.

The project documents reviewed by the SHPD (see above summary) support the following:

- The revised APE totals 3.5 acres for the Hīlea Bridge portion and 2.5 acres for the Nīnole Bridge portion.

- Three historic properties have been identified within the overall APE: Hīlea Bridge (Site 50-10-74-30298), Nīnole Bridge (Site 50-10-68-30299), and a 1940s by-pass portion of the Māmalahoa Highway (Site 50-10-47-30187).

- A determination of eligibility (DOE) for the three historic properties as eligible for inclusion in the National Register of Historic Places (NRHP) and the Hawaii Register of Historic Places (HRHP). Both bridges are eligible under Criterion C for their association with wood bridge construction in Hawaii and as the work of master engineer William R. Bartels. Māmalahoa Highway is eligible under Criteria and D for its association with important late nineteenth and early twentieth century events in establishing a regional transportation network that has roots in antiquity, and includes portions of an ancient trail (Site 50-10-27-00002), an "Old Government Road", and a "by-pass" to the "Old Government Road."

- Pursuant to 36 CFR 800.5, the effect determination is "Adverse Effect" for the Hīlea and Nīnole Bridge Replacement Project. The undertaking would result in the demolition of both bridges. The integrity and significance of the Māmalahoa Highway would not be diminished as the alignment would remain unchanged and the road surface would be replaced in-kind where impacted by project work.

- Pursuant to HAR §13-275-7, the effect determination is "Effect, with Proposed Mitigation Commitments."

- Based on the above information, the **SHPO concurs** with the revised APE; the DOE for Hīlea Bridge, Nīnole Bridge, and Māmalahoa Highway as eligible for listing in the NRHP; and the Undertaking (36 CFR 800.5) effect determination of **Adverse Effect**, and the Project (HAR §13-275-7) effect determination of **Effect, with Proposed Mitigation Commitments**.

FHWA CFLHD is the office of record for this undertaking. Please maintain a copy of this letter with your environmental review record for this undertaking. Please contact Susan Lebo, Archaeology Branch Chief, at (808) 692-8019 or at Susan.A.Lebo@hawaii.gov for any questions regarding this letter or if there are any changes to the APE or scope of work.

Mahalo,

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

Appendix H
Pre-Assessment Comments and Responses

PRE-ASSESSMENT COMMENTS

Template Letter with Project Sheet
Comments Received

- National Park Service
- State of Hawaii Department of Health, Clean Water Branch
- State of Hawaii Department of Health, Environmental Planning Office
- State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management
- Office of Planning, Department of Business Economic Development and Tourism
- Hawaii County Planning Department
- Hawaii County Fire Department

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
720-963-3647
michael.will@dot.gov

March 17, 2015

In Reply Refer To:
HFPM-16

Dear :

Subject: **Hawaii Bridge Program for Island of Hawaii**
Federal Highway Administration, Central Federal Lands Highway Division
Pre-Assessment Consultation
Chapter 343, Hawaii Revised Statutes and National Environmental Policy Act

The Federal Highway Administration, Central Federal Lands Highway Division (CFLHD), in partnership with the Hawaii Department of Transportation (HDOT), is conducting environmental studies to examine the impacts of a project to improve two bridges on the island of Hawaii. We are assisted in this effort by our consultant, CH2M HILL.

- Ninole Bridge on Mamalahoa Highway
  Kau District, TMK: [3] 9-5-19
- Hilea Bridge on Mamalahoa Highway
  Kau District, TMK: [3] 9-5-17

Attached to this letter are fact sheets for each of the bridge projects, including photos and maps. We are requesting comments and input regarding environmental concerns in all resource areas, and information that might help us to evaluate the projects.

The environmental review for this project is being conducted in accordance with the National Environmental Policy Act (NEPA) and Hawaii Revised Statutes (HRS), Chapter 343.

Please send preliminary comments to Kathleen Chu, CH2M HILL program manager or myself, by March 31, 2015. If you have questions, please contact Ms. Chu at Ph. 440-0283 or kathleen.chu@ch2m.com or Mr. Will at Ph. 720-963-3647 or Michael.will@dot.gov. Thank you.

Sincerely,

J. Michael Will, P.E.
Program Engineering Manager

Enclosure:

Fact Sheet for Hilea Bridge and Ninole Bridge

cc: Nicole Winterton/FHWA-CFLHD
Kathleen Chu/CH2M HILL
Paul Luersen/CH2M HILL
Elizabeth Cutler/CH2M HILL

Hilea Bridge

Hilea, Kau District, Hawaii
TMK: [4] 9-5-017

Photo 1: View of Hilea Bridge looking upstream

Location

The project area for the improvements includes Hilea Bridge and its immediate surroundings. The bridge is located at milepost 57.7 on Mamalahoa Highway (State Route 11) in Pahala on the southern side of Hawaii (see Project Location Map).

Existing Conditions

Hilea Bridge, built in 1940, is a wooden timber stringer bridge with 2 spans and a total length of about 41 feet. The bridge width is about 27.75 feet. The asphalt deck is supported by timber columns and concrete rubble masonry footings and abutment walls. There are two travel lanes with asphalt shoulders on each side. Mamalahoa Highway is two-lane undivided highway in the project area with a posted speed limit of 55 mph. It is classified as a Rural Minor Arterial. There is no plan to add travel lanes to increase the capacity of the bridge.

Purpose and Need

The purpose of this project is to improve Hilea Bridge and its approaches, by rehabilitation or replacement, to create a stream crossing of Mamalahoa Highway that remains a safe and functional component of the regional transportation system. Based on bridge inspections and studies, a number of conditions were identified that need to be remedied, including: substandard roadway widths, various substandard bridge elements (including substructure and bridge railings), and substandard roadside safety features.

Project Description

Bridge design alternatives are being developed in conjunction with ongoing studies. However, design options will include, but are not limited to, the following components:

- Restore structural integrity of the stream crossing via bridge rehabilitation or replacement
- Meet live load and seismic requirements
- Provide for adequate hydrological flow under flood conditions
- Mitigate scour at bridge foundations
- Widen bridge to include adequate shoulders and travel lane widths
- Replace/relocate existing utilities, as necessary
- Develop a traffic management plan with appropriate construction-period detours

This project is included in the Statewide Transportation Improvement Program (STIP) and will be funded, in part, with federal monies.

Project Location Map

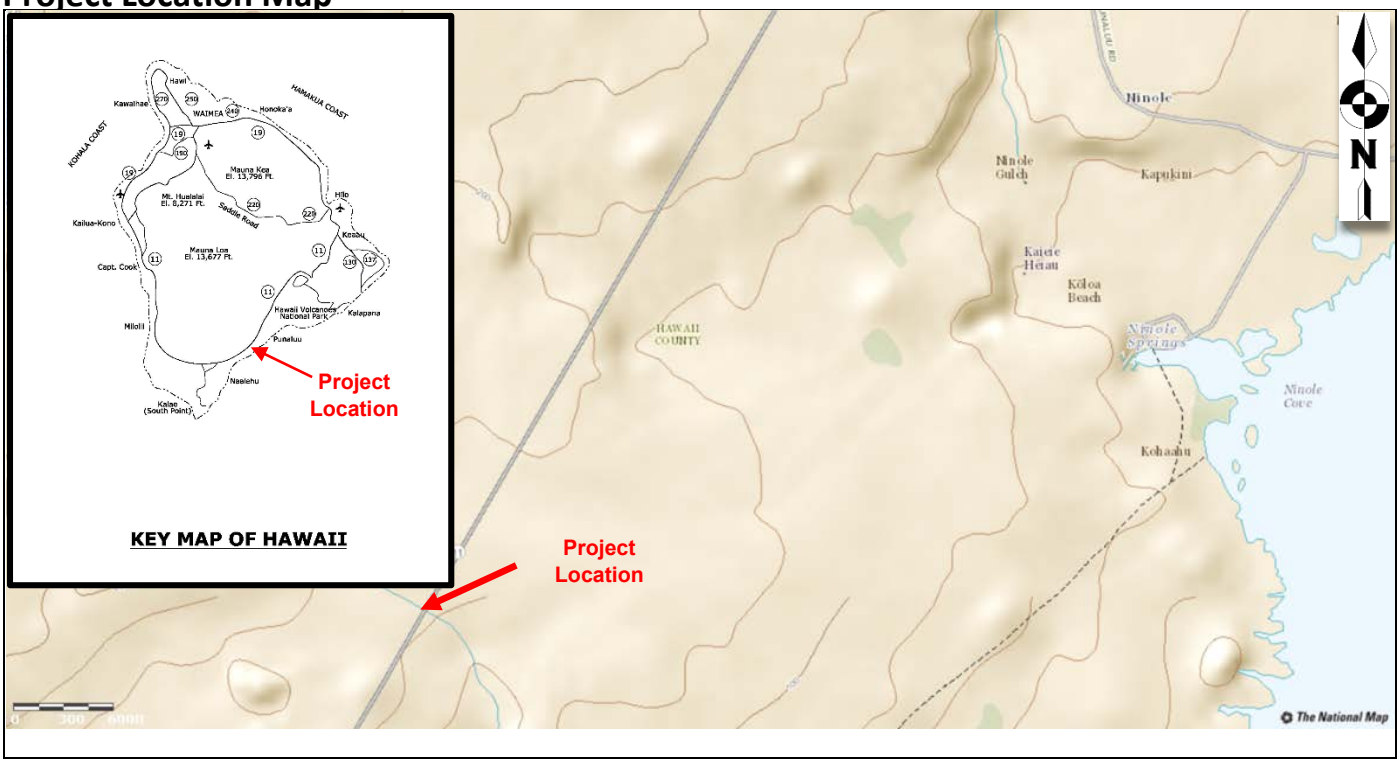
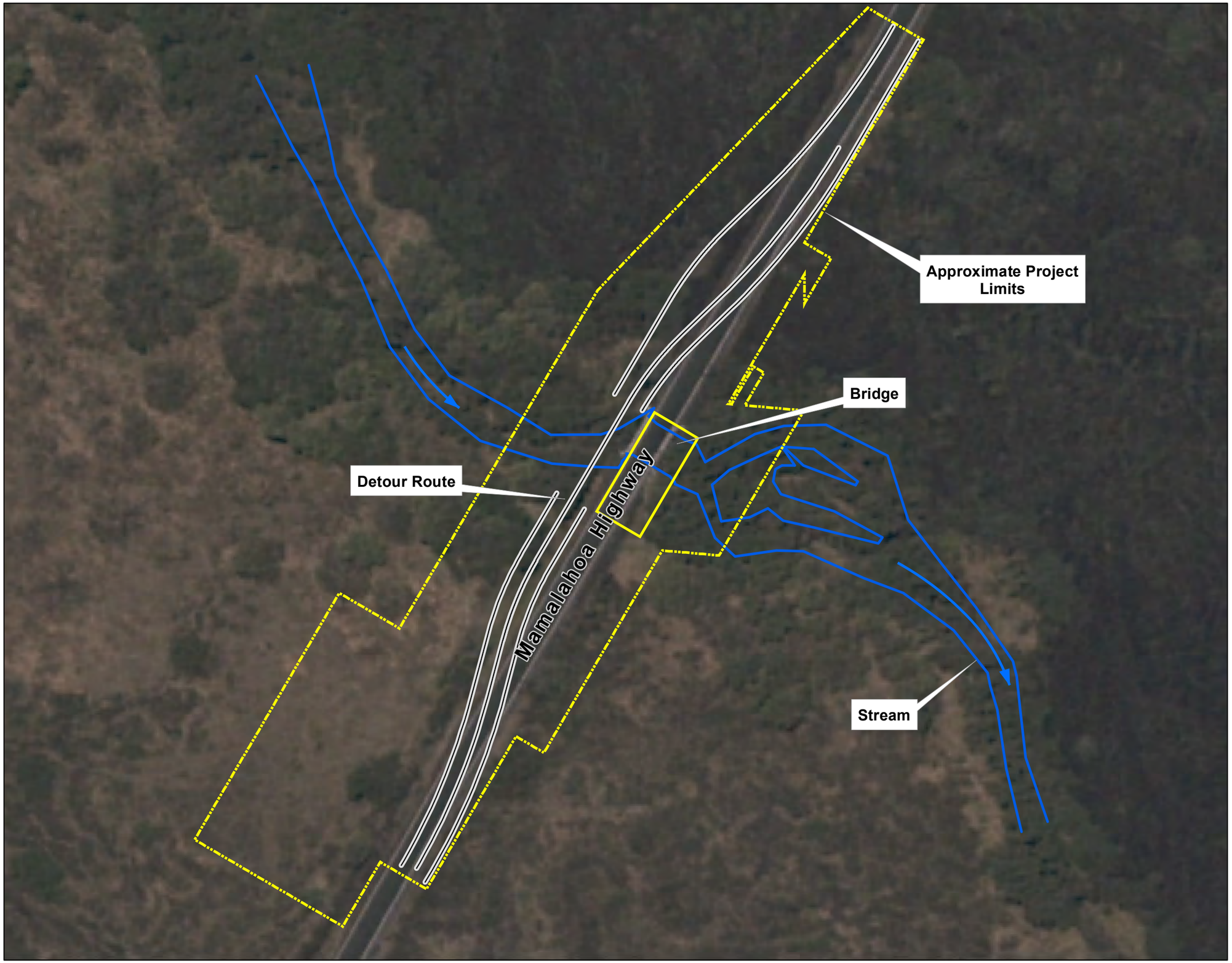


Photo 2: Bridge deck

Photo 3: Looking from above



VICINITY MAP

LEGEND

- Approximate Project Limits
- Stream
- Detour Route

Notes:
1. Imagery Source: ESRI World Imagery

N

0 100 200
Feet

Hilea Bridge Project
General Project Limits
Central Federal Lands - Kau, Hawaii

CH2MHILL

Ninole Bridge

Ninole, Kau District, Hawaii
TMK: [4] 9-5-019

Photo 1: View of Ninole Bridge looking northwest

Location

The project area for the improvements includes Ninole Bridge and its immediate surroundings. The bridge is located at milepost 56.7 on Mamalahoa Highway (State Route 11), approximately 480 feet south of the Punaluu Road/Mamalahoa Highway intersection, in Pahala on the southern side of Hawaii (see Project Location Map).

Existing Conditions

Ninole Bridge, built in 1950, is a wooden timber stringer bridge with 3 spans and a total length of about 60 feet. The bridge width is about 26.9 feet. The piers consist of a timber bent on CRM wall. Abutments are concrete seats on CRM walls. There is an existing golf cart path under one span and steep adjacent grades. Mamalahoa Highway is a two-lane undivided highway in the project area with a posted speed limit of 55 mph. It is classified as a Rural Minor Arterial. There is no plan to add travel lanes to increase the capacity of the bridge.

Purpose and Need

The purpose of this project is to improve Ninole Bridge and its approaches, by rehabilitation or replacement, to create a stream crossing of Mamalahoa Highway that remains a safe and functional component of the regional transportation system. Based on bridge inspections and studies, a number of conditions were identified that need to be remedied, including: substandard roadway widths, various substandard bridge elements (including substructure and bridge railings), and substandard roadside safety features.

Project Description

Bridge design alternatives are being developed in conjunction with ongoing studies. However, design options will include, but are not limited to, the following components:

- Restore structural integrity of the stream crossing via bridge rehabilitation or replacement
- Meet live load and seismic requirements
- Provide for adequate hydrological flow under flood conditions
- Widen bridge to include adequate shoulders and travel lane widths
- Replace/relocate existing utilities, as necessary
- Develop a traffic management plan with appropriate construction-period detours

This project is included in the Statewide Transportation Improvement Program (STIP) and will be funded, in part, with federal monies.

Project Location Map

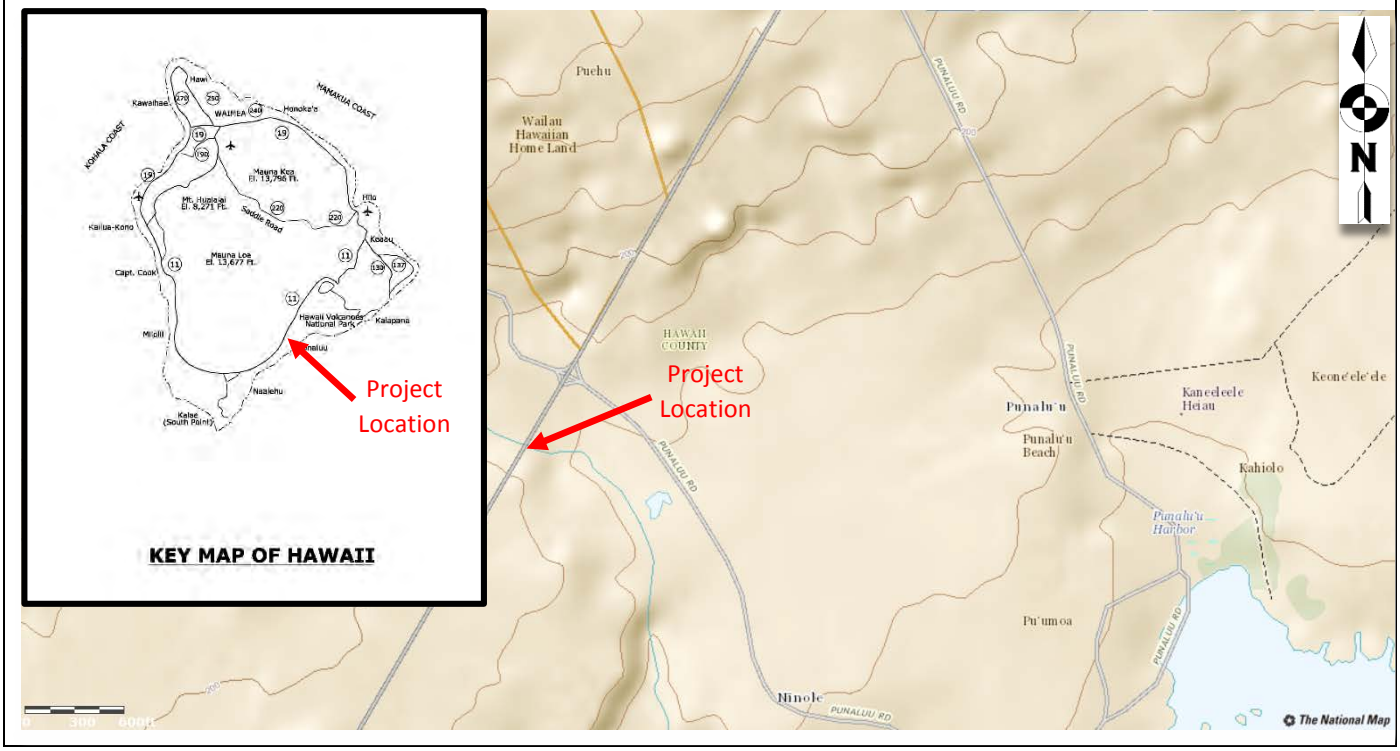


Photo 2: View of Ninole Bridge deck

Photo 3: View from under the bridge

Approximate Project Limits

Mamalahoa Highway

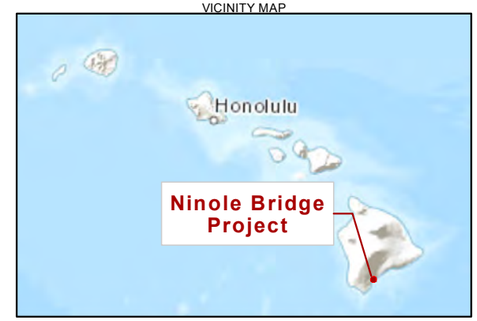
Ninole Loop Rd (Alanui Rd)

Detour Route

Stream

Bridge

VICINITY MAP



LEGEND

- Approximate Project Limits
- Detour Route
- Stream

Notes:
1. Imagery Source: ESRI World Imagery

N

0 150 300
Feet

Ninole Bridge Project
General Project Limits
Central Federal Lands - Kau, Hawaii

CH2MHILL

United States Department of the Interior

NATIONAL PARK SERVICE
Hawai'i Volcanoes National Park
Post Office Box 52
Hawaii National Park, Hawai'i 96718

IN REPLY REFER TO
HAVO I.D. (L7621)

April 27, 2015

Kathleen Chu
CH2M Hill, Inc.
1132 Bishop Street, Suite 1100
Honolulu, HI 96813

Subject: Mauna Kea Master Lease Environmental Impact Statement Preparation Notice (EISPN)

Thank you for the notice sent to the National Park Service (NPS) regarding two bridge replacements in the Ka'ū District, the Ninole Bridge and the Hilea Bridge on Mamalahoa Highway.

We recommend that best management practices will be included in the project specifications to minimize the potential for introduction and spread of invasive species. We recommend that the best management practices include sanitation procedures for ensuring vehicles, equipment, and materials are free of invasive species, including invasive ants (such as, little fire ants and others), coqui frogs, and invasive plants. We are including standard operating procedures that we require of contractors working in and adjacent to the park, for your information.

If any lights are needed for safety or night work, we recommend that dark sky lighting protocols be followed. This will protect threatened and endangered nocturnal seabirds that may be transiting the area, such as the endangered Hawaiian petrel, the threatened Newell's shearwater, and the state-listed band-rumped storm-petrel. While these species may not occur on the project site, they do fly to and from nesting colonies after dark and could be disoriented by artificial lights that are not properly shielded. In order to protect night skies and night-flying birds, it is recommended that only full cut-off, amber (560 nm or longer wavelength), downward directional lighting be considered for this project.

An excellent resource for seabird friendly lighting can be found at the following website:
http://www.kauai-seabirdhcp.info/minimization/lights/index.html
We look forward to working with you in the future on jointly shared resources of concern.

Sincerely,

Cynthia L. Orlando
Superintendent

Enclosures

cc: J. Michael Will

04/09/2015
D. Benitez, B. Everett, R. Loh
Hawaii Volcanoes National Park
Division of Natural Resources Management

Ant Sanitation Standard Operating Procedures (SOPs) for Contractors in Hawaii Volcanoes National Park

Sanitation protocols address ways to minimize the introduction of new ant species within and from outside the park by individuals, vehicles, machinery, and construction materials.

Ants are not native to Hawaii, and many introduced species have had disastrous effects on Hawaiian ecosystems. The spread of Argentine ants on Maui threatens native insects and the Haleakala silversword, and the rapid spread of little fire ants (LFA) on Hawai'i Island threatens human health, agriculture, and native ecosystems. LFA are considered among the world's worst 100 invasive species.

To prevent introduction of ants into new areas of the park, vehicles, machinery, and construction materials must be carefully inspected and sanitized for ants prior to arriving to the work site. This includes vehicles (cars and trucks), and heavy machinery such as bulldozers, as well as construction materials such as lumber, gravel, and cinder. Potted plants and soil are another vector for invasive ants and these are prohibited from entry into the park except under special circumstances provided they are free of invasive ants and other pests.

In personal and commercial vehicles ants typically occupy the cab areas, persisting on food stuffs, in packs or other gear, and supplies. But they may also be found in wheel wells or in other portions of the vehicle body, such as in debris in the undercarriage, the beds of pickups, or in the engine compartment and under the battery. Ants may be found in these same areas on heavy machinery and construction vehicles, and the potential for ant dispersal by any vehicle is greater if the vehicles are parked in an area infested with ants for any length of time.

Additional considerations apply to high elevations in the park above 5,000' where the argentine and big headed ants are not established. Additional documentation is on file to describe sanitation measures for contractors to prevent the introduction of invasive plants, coqui frogs, and other pests into the park, as well as sanitation for imported firewood brought into the park by concessioners.

The procedures outlined below must be followed for all administrative, researcher, cooperator, and contractor vehicles in the park, to prevent the introduction or movement of LFA and other ants.

Keep vehicles and machinery clean by:

1. Using high pressure hoses to clean wheel wells, bumpers, grill, fenders, undercarriage, and side panels behind wheel. Remove any mud or debris.

2. Visually inspecting the engine compartment including the area under the battery.

3. Visually inspecting the interior of all vehicles, remove rubbish and vacuum. All foodstuffs shall be removed from the vehicles at the end of the workday

Test for invasive ants:

1. To check vehicles and equipment, deploy sticky traps or chopsticks, either should be baited with small amounts of peanut butter and jelly to attract LFA and other ants. Place these in the cab and engine compartment, as well as the truck bed, and re-check in 30 minutes to 1 hour. If ants are present, they should aggregate around the chopstick. **This method is only useful for detection and does not control ants,** and the bait should not be left in the vehicle for over 1 hour as this may attract ants from surrounding areas. Approximately 6 chopstick

baits are adequate to test most personal vehicles and trucks, larger vehicles and heavy machinery may require up to 10-20 baits.

2. Monitoring stations (baited sticky traps or baited chopsticks) also need to be deployed throughout the vehicle base yard, quarry, gravel, building materials, or other equipment (e.g., portable buildings) to test for invasive ants. Utilize the same method as above, but place baited chopsticks every 10-20 feet around the area. Ensure they are placed in the shade. When putting out stations, spend at least 2 minutes searching immediate vicinity (5 square meter area) for ants. At low densities they may not be on the bait even though they are there. Be prepared to collect any observed ants for identification – (e.g. aspirator). The monitoring stations must be left out for 1 hour for all sites other than actual vehicles.

3. When collecting deployed test sticks, bag and label each test stick separately to allow identification of specific species by location (for those sticks that are positive for ants). A magnifying glass is recommended to determine if test sticks are positive for ants. Send positive sticks to the Hawaii Ant Lab or other experts for species identification.

4. Previously clean or sanitized vehicles or equipment will require re-testing if parked in ant-infested areas and may not be driven into the park until they are free of ants.

If ants are found in vehicle or on materials:

1. If a vehicle, machine, or materials are found to have ants, they are not allowed into the park until free of ants. Infested vehicles will be sanitized following recommendations by the Hawaii Ant Lab http://www.littlefireants.com/ (see below) or other ant control expert and in accordance with all State and Federal laws. The owner of the vehicle/equipment is responsible for cleaning and/or sanitizing the infested object. The park should be provided the name of the ant control expert who confirmed species identification, treatment recommendations, and all treatment data. After treatment, retesting is required to ensure ants are no longer present and should follow the recommended retesting protocol prescribed by the expert. Please communicate daily with the dates of inspections, and the findings to the park contact for the project.

2. If gravel or material at the base yard or quarry, or the area itself is found to test positive for ants, the material needs to be quarantined and properly treated. It is important to make sure that no equipment comes in contact with the tainted material and that the material does not get moved around. A dual approach of baiting followed by barrier treatments is recommended. Treatment schedule and re-testing of materials, base yards, quarries, etc. (non-vehicles) needs to be approved by the NPS in advance (for materials or areas to be used as part of the NPS project).

Treatment options:

For bait treatments, Hawaii Ant Lab has recommended several products including: Siesta Fire Ant Bait, Amdro, and Probait.*

For barrier treatments, Hawaii Ant Lab has recommended several products including but not limited to: Ortho Home Defense Max granules, Ortho Home Defense ready to spray, Triazicide Once and Done Insect Killer Granules, and Triazicide Once and Done Insect Killer.*

*The use of trade names herein is for descriptive purposes only and does not imply endorsement by the National Park Service.

Sanitation Standard Operating Procedures (SOPs) for Contractors

Weed Sanitation Protocol for Hawaii Volcanoes National Park

Sanitation protocols address ways to minimize movement of weeds within and from outside the park by individuals, vehicles and equipment.

Bringing Vehicles, Equipment and Material from Outside the Park:

1. Inspect and clean all vehicles, equipment and material (including fill) before bringing to the park. Vehicles and equipment are sanitized using high pressure hoses to clean wheel wells, bumpers, grill, fenders, and side panels behind wheel. If a pressurized hose is not available, than a hose with spray nozzle attachment can be used. The interior of all vehicles will be inspected, cleared of rubbish, all food items removed and vacuumed.

2. During and following completion of project, work sites will be inspected and treated monthly for up to one year following completion of project. Treatment of weeds discovered at work sites will be done following consultation with vegetation staff (tel: 808-985-6085). Additional monitoring and treatment beyond one year may be necessary to eradicate some invasive species.

Alien plants have a devastating effect upon native ecosystems in Hawaii Volcanoes National Park. Invasion by alien plants reduces native biodiversity and abundance by displacing the native vegetation and impacting the insects and birds that depend on native plants. At their very worst, ecologically disruptive alien species (e.g., faya tree, fountain grass, strawberry guava, kahili ginger) are able to completely takeover native ecosystems by disrupting water and nutrient cycles, and disturbance regimes (e.g., increased fire frequency and forest gap creation) making restoration difficult if not impossible. The park devotes substantial efforts to eradicate or prevent the further spread of disruptive alien weeds in order to protect native ecosystems from their devastating effects.

New weeds threaten to invade the park from outside areas. For example, the first individuals of Australian tree fern were found in the Thurston rainforest in 2001. Individuals of miconia occur in housing developments near the park. Within the park, small localized weed populations have the potential to move to pristine or uninfested areas. Preventing the movement of disruptive weeds from infested to uninfested areas within the park and from outside areas into the park is a high priority. Many of these weeds are brought in inadvertently as seeds or plant parts that hitch hike on vehicles, equipment, persons, and animals.

Is Your Vehicle Coqui-Free?

Coqui tree frogs are new to Hawaii Volcanoes National Park. Aside from being a major noise nuisance, the frogs pose a threat to Hawaii's island ecosystem. A thousand frogs can live on less than one acre of thickly vegetated land and eat large numbers of native insects and spiders. These un-welcomed visitors enter the park primarily on vehicles, supplies and plant materials arriving from infested places.

Please Help Reduce the Number of Coqui Reaching Hawaii Volcanoes NP

Coqui frog numbers are greatest at lower elevations around the island, especially where it is humid, moist and thick with vegetation. When every tree is occupied by one or two calling male frogs, those left without a "home" will venture outwards. They will cross pavement in the evenings if they have to, looking for unoccupied trees. They often take refuge on parked vehicles. If the vehicle starts moving the frog often stays with it. Hundreds of coqui already made the journey of 25 to 30 miles, only to be discovered and recovered by park coqui patrols. In 2007 this happened roughly 75 times in Hawaii Volcanoes National Park. You can help reduce the spread of coqui into the park by taking the following measures:

Decontaminate or Isolate

DECONTAMINATE vehicles and equipment coming to park from infested areas by:

- Commercial car-wash prior to heading to park.
- Hose vehicle with pressurized water (hot water works even better).
  - Especially truck beds, car bumpers and wheel wells, also check under the hood.

ISOLATE vehicles and equipment from the infestation, while parked overnight or in storage, by:

- Park and store equipment in enclosed, coqui-free garage.
- Maintain a coqui-free buffer around carports, homes and other structures.

AVOID bringing contaminated material to the Park, by:

- Inspect plant material (including plant parts, potting soils, growing medium, pots) prior to coming to the park. If infestations are found do not bring the infested material to the park.

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: CYNTHIA L. ORLANDO
SUPERINTENDENT
NATIONAL PARK SERVICE
P.O. BOX 52
HAWAII NATIONAL PARK, HI 96718

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM, HAWAII ISLAND PROJECTS
HILEA BRIDGE AND NINOLE BRIDGE

Dear Ms. Orlando:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated April 27, 2015.

In particular, we acknowledge the information you provided on best management practices related to invasive species and night-time lighting. These issues will be addressed in the Draft Environmental Assessment (DEA).

We appreciate your participation in the environmental review process. A copy of the DEA will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

05028PNN.15

May 18, 2015

Mr. J. Michael Will, P.E.
Program Engineering Manager
Central Federal Lands Highway Division
U.S. Department of Transportation
12300 West Dakota Avenue, Suite 380
Lakewood, Colorado 80228

Dear Mr. Will:

SUBJECT: Comments on the Pre-Assessment Consultation for the Hawaii Bridge Program State of Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated March 24, 2015, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like

community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at:
http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

NN:ay

c: Ms. Kathleen Chu, CH2M Hill [via e-mail kathleen.chu@ch2m.com only]
DOH-EPO #15-094 [via e-mail only]
Mr. Gary Ueunten, CWB, Kauai District Health Office [via e-mail only]
Mr. Neil Mukai, CWB, Hawaii District Health Office [via e-mail only]

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: ALEC WONG, P.E.
CHIEF, CLEAN WATER BRANCH
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HI 96801

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM
KAUAI PROJECTS: BRIDGE 7E, HANAPEPE, KAPAA
OAHU PROJECTS: HALONA, ROOSEVELT, KAWELA, NANAHU
HAWAII ISLAND PROJECTS: HILEA, NINOLE

Dear Mr. Wong:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated May 18, 2015.

The project team is aware that certain projects may require certification or permits under the Clean Water Act. We have been engaged in early consultation with your staff and greatly appreciate their assistance.

We appreciate your participation in the environmental review process. A copy of the Draft Environmental Assessment will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Christine Yamasaki, HDOT
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:
HFPM-16

EPO 15-094

May 12, 2015

Mr. J. Michael Will, P.E.
Program Engineering Manager
Central Federal Lands Highway Division
U.S. Department of Transportation
12300 West Dakota Avenue, Suite 380
Lakewood, Colorado 80228
Via email: Michael.will@dot.gov

Dear Mr. Will:

SUBJECT: Pre- Assessment Consultation (PC) for Hawaii Bridge Program for State of Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your PC to our office on March 24, 2015. Thank you for allowing us to review and comment on the proposed project. The PC was routed to the Clean Water Branch, and the District Health Offices on Kauai and Hawaii. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: http://health.hawaii.gov/epo/home/landuse-planning-review-program. Projects are required to adhere to all applicable standard comments.

We encourage you to examine and utilize the Hawaii Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov

You may also wish to review the revised Water Quality Standards Maps that have been updated for all islands. The Water Quality Standards Maps can be found at: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/water-quality-standards

The University of Hawaii has examined potential sea level rise changes in Hawaii. You may find it useful to review their studies at: http://www.soest.hawaii.edu/coasts/sealevel

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

c: Kathleen Chu, CH2M Hill program manager – kahtleen.chu@ch2m.com {via email only}
CWB, DHO Kauai, DHO Hawaii {via email only}

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: LAURA LEIALOHA PHILLIPS McINTYRE, AICP
PROGRAM MANAGER, ENVIRONMENTAL PLANNING OFFICE
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HI 96801

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM
KAUAI PROJECTS: BRIDGE 7E, HANAPEPE, KAPAA
OAHU PROJECTS: HALONA, ROOSEVELT, KAWELA, NANAHU
HAWAII ISLAND PROJECTS: HILEA, NINOLE

Dear Ms. McIntyre:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated May 12, 2015.

We acknowledge the information provided on the Hawaii Environmental Health Portal, Water Quality Standard Maps, and University of Hawaii studies related to sea level rise.

We appreciate your participation in the environmental review process. A copy of the Draft Environmental Assessment will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Christine Yamasaki, HDOT
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
ACTING CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

FIRST DEPUTY

WILLIAM M. TAM
INTERIM DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 15, 2015

U. S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division
Attn: J. Michael Will, Program Engineering Manager
12300 West Dakota Avenue, Suite 330
Lakewood, CO 80228

via email: michael.will@dot.gov

Dear Mr. Will,

SUBJECT: Notification of Intent to Construct the Hawaii Bridge Program, Request for Information, HFPM-16

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments sent to you dated December 18, 2014, and January 9, 2015, enclosed are additional comments from the Commission on Water Resource Management on the subject matter. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
2015 JAN 14 PM 1:19
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 2, 2014

MEMORANDUM

TO: **DLNR Agency:**

X Div. of Aquatic Resources
__ Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands

X Land Division – Oahu District
X Land Division – Kauai District
__ Land Division – Maui District
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Notification of Intent to Construct the Hawaii Bridge Program, Request for Information
LOCATION: Various (see cover letter) including all Districts except Maui
APPLICANT: Federal Highway Administration, Central Federal Lands Highway Division, in cooperation with the Hawaii Department of Transportation

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by December 18, 2014. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed:
Print Name: WILLIAM M. TAM, Deputy Director
Date: January 7, 2015

FILE ID: RFO. 4095.0
DOC ID: 11897

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

January 7, 2015

REF: RFD.4095.0

TO: Russell Tsuji, Administrator
Land Division

FROM: William M. Tam, Deputy Director
Commission on Water Resource Management

SUBJECT: Notification of Intent to Construct Hawaii Bridge Program, Request for Information

FILE NO.: HFPM-16
TMK NO.: Various including all Districts except Maui

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

☐ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

☐ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/.

☐ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

☐ 6. We recommend the use of alternative water sources, wherever practicable.

☐ 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program

☐ 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf

☐ 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM:
Additional information and forms are available at http://hawaii.gov/dlnr/cwrm/info_permits.htm.

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

☐ 11. A Well Construction Permit(s) is (are) required before any well construction work begins.

☐ 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 14. Ground water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☒ 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration(s) can be made to the bed and/or banks of a stream channel.

☐ 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is (are) constructed or altered.

☐ 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☐ OTHER:

If there are any questions, please contact Dean Uyeno at 587-0234.

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: ROY HARDY
DEPUTY DIRECTOR
COMMISSION ON WATER RESOURCE MANAGEMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
P.O. BOX 621
HONOLULU, HI 96809

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM
KAUAI PROJECTS: BRIDGE 7E, HANAPEPE, KAPAA
OAHU PROJECTS: HALONA, ROOSEVELT, KAWELA, NANAHU
HAWAII ISLAND PROJECTS: HILEA, NINOLE

Dear Mr. Hardy:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated January 7, 2015.

We acknowledge that projects may require a Stream Channel Alteration Permit, and will initiate the application process as needed.

We appreciate your participation in the environmental review process. A copy of the Draft Environmental Assessment will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Christine Yamasaki, HDOT
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
ACTING DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

Ref. No. P-14732

RECEIVED
MAY 4 2015

May 1, 2015

Ms. Kathleen Chu
Program Manager
CH2M Hill, Inc.
1132 Bishop Street, Suite 1100
Honolulu, Hawaii 96813

Dear Ms. Chu:

Subject: Hawaii Bridge Program for the State of Hawaii
Federal Highway Administration, Central Federal Lands Highway Division,
Pre-Assessment Consultation
Chapter 343, Hawaii Revised Statutes and National Environmental Policy Act; TMK: Various

Thank you for the opportunity to provide comments on the pre-consultation request for a Draft Environmental Assessment (Draft EA) being developed for the Hawaii Bridge Program. The pre-consultation review material was transmitted to our office by letter dated March 24, 2015.

It is our understanding that the Federal Highway Administration, Central Federal Lands Highway Division, in partnership with the Hawaii Department of Transportation, is conducting this environmental study for nine bridges on the islands of Kauai, Oahu, and Hawaii. The purpose of this bridge improvement project is the rehabilitation or replacement of identified bridges to create a safer and more functional stream, river, and canal crossing network for roadway users. The bridge improvements will focus on getting these bridges up to current design standards, increase load capacity, allow for safer pedestrian traffic, and improve on railings, transitions, and bridge approaches.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. Some of the bridge sites listed in the Draft EA review material contain incorrect Tax Map Key (TMK) numbers. TMK's generally have a nine digit number and are listed by island designation, plat, and parcel locations. The island of Oahu is classified by the number (1), Maui County by (2), Hawaii County by (3), and Kauai County by (4). The review material, for example, lists the Hanapepe River Bridge with the correct TMK: (4) 1-9-007:001. The bridges on the island of Oahu have an insufficient

amount of TMK numerals. The East Hawaii County locations list the wrong island designation (it should be listed with island designation of (3), rather than the island designation of (4)). The Draft EA should correct these errors and provide TMK locations with a nine digit format.

2. OP provides technical assistance to state and county agencies in administering the statewide planning system in Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Plan. The Hawaii State Plan provides goals, objectives, priorities, and priority guidelines for growth, development, and the allocation of resources throughout the State. The Hawaii State Plan includes diverse policies and objectives of state interest including but not limited to the economy, agriculture, the visitor industry, federal expenditure, the physical environment, facility systems, socio-cultural advancement, climate change adaptation, and sustainability.

   The Draft EA should include an analysis that addresses whether the proposed project conforms or is in conflict with the objectives, policies, and priority guidelines listed in the Hawaii State Plan.

3. The coastal zone management area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" see HRS § 205A-1 (definition of "coastal zone management area").

   HRS Chapter 205A requires all State and county agencies to enforce the coastal zone management (CZM) objectives and policies. The Draft EA should include an assessment as to how the proposed project conforms to the CZM objectives and its supporting policies set forth in HRS § 205A-2. The assessment addressing compliance with HRS Chapter 205A is an important component for satisfying the requirements of HRS Chapter 343. These objectives and policies include: recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources.

4. Because of the proximity to the shoreline, some of the bridge sites may lie within areas designated as Special Management Areas (SMA). Please confirm with the City and County of Honolulu's Department of Planning and Permitting, the County of Kauai Planning Department, and the County of Hawaii Planning Department on the location of these bridges in relation with the SMA boundaries and whether SMA permits are required.

5. The national Coastal Zone Management Act requires direct federal activities and development projects to be consistent with approved state coastal programs to the maximum extent practicable. OP is the lead state agency to conduct this Federal Consistency evaluation.

   Because at least one of the proposing agencies for this Draft EA is a federal agency, and federal funding will be used to finance this endeavor, this project may require compliance with Federal Consistency requirements. The Draft EA should list all applicable permits needed for this project. Any federal permits required for this project may have implications on the federal consistency evaluation conducted by OP.

6. Our review indicates that these bridge improvement projects lie within proximity to perennial streams, canals, wetlands, and are within numerous watersheds. The project areas are adjacent to a range of human activities from agriculture, urban development, and activity along coastlines or upstream from the coastline. The Draft EA should consider inclusion of a section addressing watershed protection and management.

   OP has created the Hawaii Watershed Guidance to provide direction on methods to safeguard Hawaii's watersheds and implement watershed plans. This guidance provides a number of management measures that address polluted runoff. OP's watershed guidance provides a number of management measures that address polluted runoff from urban activities, and a summary and links to management measures that may be implemented to minimize coastal nonpoint pollution impact. Specifically please examine, Section B – Roads, Highways, and Bridges pages 132-135. The document can be viewed or downloaded from the Office of Planning website at http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed Guidance Final.pdf.

7. We have reviewed the location maps of the bridge improvement projects and compared them to known coastal resources in the area. Many of these parcels are located in flood hazard zones, tsunami evacuation areas, and as noted above, land zoned for agriculture or urban uses, or are located near perineal streams, canals, wetlands, seasonal river gulches, or pass close to coastal areas and beaches. Therefore, inclusion of a stormwater impact evaluation would be beneficial to the Draft EA. Development and land use activities can create erosion, increased stormwater runoff, and coastal pollution that cause direct, secondary, and cumulative impacts to Hawaii's resources.

Please consider OP's Stormwater Impact Assessment in your stormwater impact evaluation for this project. This document can be used to identify and evaluate information on hydrology, stressors, sensitivity of aquatic and riparian resources, and management measures to control runoff occurrences. Mitigation measures and best management practices (BMP) listed in this document can be applied to water runoff strategies to prevent damage to coastal ecosystems. This document will assist in integrating stormwater impact assessment within the planning and environmental review process of a project. The document can be found at http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_stormwater_impact_assessments_guidance.pdf.

8. Construction of widened roadways, new bridge approaches, increased support structures for bridge spans, and pedestrian crossing will introduce hardened impervious surfaces, secondary development, and may require additional drainage infrastructure to be built. Please consider Low-Impact Development (LID) design practices in the planning process for this project. LID techniques promote a range of structural BMP's for stormwater control management, roadway development, and urban layout that minimizes negative environmental impact.

   LID design concepts and BMP's that should be considered include: the preservation of natural features and conservation design; the reduction of impervious cover; and utilizing natural features and source control for stormwater management. These methods are listed in OP's Low Impact Development, A Practitioners Guide. For more information on LID – BMP's, please examine Section 1.7, pgs. 1-4 to 1-11. This guidance can be viewed or downloaded from the OP website at: http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Josh Hekekia of our office at 587-2845.

Sincerely,

Leo R. Asuncion
Acting Director

c: J. Michael Will, P.E., Program Engineering Manager

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING
235 SOUTH BERETANIA STREET, 6TH FLOOR
HONOLULU, HI 96813

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM
KAUAI PROJECTS: BRIDGE 7E, HANAPEPE, KAPAA
OAHU PROJECTS: HALONA, ROOSEVELT, KAWELA, NANAHU
HAWAII ISLAND PROJECTS: HILEA, NINOLE

Dear Mr. Asuncion:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated May 1, 2015. We offer the following responses in the order presented in your letter:

1. Tax Map Key numbers will be verified.

2. The Draft Environmental Assessment (DEA) will discuss consistency with the Hawaii State Plan.

3. The DEA will discuss consistency with Coastal Zone Management objectives.

4. Where relevant, the Special Management Area permit will be listed as a potential requirement.

5. Federal Consistency Review will be listed as a potential requirement.

6. The DEA will assess potential impacts on water resources.

7. We acknowledge the availability of the Office of Planning's Stormwater Impact Assessment as an environmental planning resource.

8. Stormwater management measures are being considered in project design and will be addressed in the DEA.

We appreciate your participation in the environmental review process. A copy of the DEA will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Christine Yamasaki, HDOT
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
Deputy Director

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

May 7, 2015

Ms. Kathleen Chu
CH2M Hill, Inc.
1132 Bishop Street, Suite 1100
Honolulu HI 96813

Dear Ms. Chu:

Subject: **Pre-Consultation on Draft Environmental Assessment**
Project: Nīnole Bridge and Hīlea Bridge on Māmalahoa Highway
Tax Map Key: (3) 9-5-019 and (3) 9-5-017, Ka'ū, Hawai'i

Thank you for your letter, which we received on April 10, 2015, requesting our comments on the preparation of a Draft Environmental Assessment for the subject project. Proposed are improvements to the Nīnole Bridge and the Hīlea Bridge by rehabilitation, widening or replacement.

The surrounding properties of the Nīnole Bridge are zoned Agricultural (A-20a) and Open (O) by the County and are situated within the State Land Use Urban district. According to the Hawai'i County General Plan, as amended, they are designated Open and Medium Density Urban.

Properties surrounding the Hīlea Bridge are zoned Agricultural (A-20a) and Open (O) by the County and are situated within the State Land Use Agricultural and Conservation Districts. According to the Hawai'i County General Plan, as amended, they are designated Extensive Agriculture and Conservation.

For both bridges, the Special Management Area (SMA) extends up to the makai (seaward) edge of the Māmalahoa Highway right-of-way. Therefore, an SMA review is not applicable. However, if any construction activity or a staging area is located makai of the right-of-way, SMA review will be required.

This project is consistent with the County of Hawai'i General Plan, as amended. Specifically *Policy 13.2.3(d)* supports the development of programs to identify and improve hazardous and substandard sections or roadways and drainage problems. Also, included with *Ka'ū Courses of Action 13.2.5.9.2(a)* is to continue to improve Māmalahoa Highway, realigning where necessary.

However, Table 7-14, Natural Beauty Sites, District of Ka'ū lists the site for Kawa (Kawaa Bay and Spring), which includes TMK: 9-5-017:007, an adjacent parcel on the makai side of the Hīlea Bridge. Therefore, please discuss the impacts that this project may have on this natural beauty site.

The project site is located in the Ka'ū Community Development Plan (CDP) planning area. Though the CDP has not yet been adopted, a draft is under consideration by the CDP Steering Committee. The Draft EA should include a discussion of the project in relationship to the following relevant Advocacy strategies in the Draft CDP:

- *Continue to improve Māmalahoa Highway, realigning where necessary and prioritizing shoulder safety (particularly for bicyclists), including on the stretch of highway between Honu'apo and the Ka'ū Police Station*
- *Implement Bike Plan Hawai'i.*

If you have questions, please contact Esther Imamura of this office at (808) 961-8139.

Sincerely,

DUANE KANUHA
Planning Department

ETI:cll
P:\Wpwin60\ETI\Eadraftpre-Consul\Chu Ninole & Hilea Bridge 9-5-19, 9-5-17.Rtf

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: DUANE KANUHA
PLANNING DEPARTMENT
101 PAUAHI STREET, SUITE 3
HILO, HI 96720

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM, HAWAII ISLAND PROJECTS
HILEA BRIDGE AND NINOLE BRIDGE

Dear Mr. Kanuha:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated May 7, 2015. We offer the following responses:

- Information on zoning, State land use district, and General Plan designation will be included in the Draft Environmental Assessment (DEA).
- The project team is aware that construction activity on the makai side of the highway right-of-way would trigger the requirement for a Special Management Area permit, and will initiate the application process.
- The DEA will address consistency with policies in the Hawaii County General Plan and Draft Ka'u Community Development Plan.

We appreciate your participation in the environmental review process. A copy of the DEA will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

April 21, 2015

Michael Will, P.E.
Program Engineering Manager
12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228

Dear Mr. Will:

SUBJECT: HFPM-16; Hawai'i Bridge Program for Island of Hawai'i
Federal Highway Administration – Pre-Assessment Consultation
Nīnole Bridge and Hilea Bridge on Māmalahoa Highway

We are in receipt of your letter dated March 24, 2015 in regards to an Environmental Studies Review for the above listed subject.

The Hawai'i Fire Department has no comments or concerns and there is currently no records on file indicating releases of hazardous materials or petroleum products as well as other environmental hazards at the address listed above.

If you should have any questions, please feel free to contact my office at (808)932-2900.

Mahalo,

DARREN J. ROSARIO
Fire Chief

nac

U.S. Department of Transportation
Federal Highway Administration

Central Federal Lands Highway Division

12300 West Dakota Avenue
Suite 380
Lakewood, CO 80228
Office: 720-963-3647
Fax: 720-963-3596
Michael.Will@dot.gov

December 7, 2015

In Reply Refer To:
HFPM-16

TO: DARREN J. ROSARIO
FIRE CHIEF
COUNTY OF HAWAII FIRE DEPARTMENT
25 AUPUNI STREET, SUITE 2501
HILO, HI 96720

FROM: J. MICHAEL WILL, P.E.
PROJECT MANAGER

SUBJECT: PRE-ASSESSMENT CONSULTATION
HAWAII BRIDGE PROGRAM, HAWAII ISLAND PROJECTS
HILEA BRIDGE AND NINOLE BRIDGE

Dear Chief Rosario:

Thank you for pre-assessment comments on the subject projects transmitted by letter dated April 21, 2015.

We acknowledge that you have no comments or concerns. Additionally, we note that there are no records of hazardous materials releases or known environmental hazards at the project locations. Thank you for this information.

We appreciate your participation in the environmental review process. A copy of the Draft Environmental Assessment will be sent to your office when available for public review and comment. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E.
Project Manager

Cc:
Kevin Ito, HDOT
Nicole Winterton, CFLHD
Kathleen Chu, CH2M HILL