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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

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

REF: OCCL: AJR

CDUA: HA-3705
Acceptance Date: March 7, 2014
180 Day Expiration Date: September 3, 2014
SUSPENSE DATE: 21 Days from stamped date

FILE COPY

MAR 23 2014

MAR 12 2014

MEMORANDUM

TO: Director
Office of Environmental Quality Control

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: **DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR CONSERVATION DISTRICT USE APPLICATION (CDUA) HA-3705** for the Carlson Single Family Residence (SFR) Project located in the Puna District, Island of Hawaii, *TMK: (3) 1-5-010:028*

The Department of Land and Natural Resources has reviewed the Draft Environmental Assessment (DEA) for the proposed project and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the **March 23, 2014** issue of the *Environmental Notice*. We have enclosed the applicants OEQC Bulletin publication form, a CD with a copy of the DEA and Publication Form and a hardcopy of the DEA.

Should you wish to provide comments regarding this project please respond by the suspense date noted above. If no response is received by the suspense date, we will assume there are no comments. Please contact Alex J. Roy of our Office of Conservation and Coastal Lands staff at (808) 587-0316 should you have any questions.

Enclosures: *One (1) CD with a copy of OEQC publication form, HA-3705 DEA*
OCCL Acceptance letter (hard copy)
OEQC Bulletin Publication Form (hard copy)
DEA (Hard Copy)

APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JANURARY 2013 REVISION)

Project Name: Draft Environmental Assessment for the Proposed Carlson Single Family Residence (SFR) project

Island: Hawaii

District: Puna

TMK: (3) 1-5-010:028

Permits: State of Hawaii, Conservation District Use Permit, County of Hawaii, Grading Permit, County of Hawaii, Special Management Area Permit

Approving Agency: Office of Conservation and Coastal Lands, Department of Land and Natural Resources, Kalanimoku Building, 1151 Punchbowl Street, Room 131, Honolulu, Hawaii 96813; Contact: Samuel J. Lemmo, Administrator; Telephone: (808) 587-0377

Applicant: Darrin Nael & Debra Louise Carlson, 26 11th Street, Cayucos, CA 93430; Telephone: (805) 995-2298

Consultant: Native Technologies, LLC, 3449 Kaimuki Ave, Honolulu, HI 96816; Telephone: (808) 620-6332

Status (check one only):

_X_DEA-AFNSI	Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.
__FEA-FONSI	Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.
__FEA-EISPN	Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
__DEIS	The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
__FEIS	The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__ Section 11-200-23 Determination	The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin.

__Statutory hammer Acceptance

The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.

__Section 11-200-27 Determination

The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary:

The applicants propose to construct a single-story Single Family Residence (SFR) on a 3.5-acre shoreline property located at 15-2225 Government Beach Road in the Puna District of the Island of Hawai'i. The SFR will consist of a 3,371 square-foot house with an attached garage and wrap-around lanai, the SFR wil include: 4 bedrooms; 3 bathrooms; a subsurface septic system with 1000-gallon septic tank and 12-foot by 24-foot absorption bed, and a 10,000-gallon capacity water catchment tank, standing 4 feet high and 20 feet in diameter. The SFR will be placed on 7-foot post & pier to elevate the main residence, additionally a 15-foot wide compacted gravel driveway with a turnaround, and overall approximate length of 375 feet will be constructed on site.

DRAFT
Environmental Assessment
Carlson Single-Family Residence in the Conservation District at Pōpōkī

TMK (3) 1-5-010:028

Pōpōkī, Puna, County of Hawai‘i, State of Hawai‘i

January 2014

Submitted to:

State of Hawai‘i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

On behalf of applicants:

Mr. Darrin Neal Carlson & Mrs. Debra Louise Carlson
P.O. Box 251
Cayucos, CA 93430

Submitted by:

Native Technologies, LLC
P.O. Box 2998
Honolulu, Hawai‘i 96822
(808) 620-6332

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DRAFT ENVIRONMENTAL ASSESSMENT
CARLSON SINGLE-FAMILY RESIDENCE

TMK (3) 1-5-010:028
Pōpōkī, Puna, County of Hawai‘i, State of Hawai‘i

APPLICANTS:
Mr. Darrin Neal Carlson & Mrs. Debra Louise Carlson
P.O. Box 251
Cayucos, CA 93430

ACCEPTING AUTHORITY:
State of Hawai‘i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

CONSULTANT:
Native Technologies, LLC
P.O. Box 2998
Honolulu, Hawai‘i 96822
(808) 620-6332

CLASS OF ACTION:
Use of Land in Conservation District

This document is prepared pursuant to:

The Hawai‘i Environmental Protection Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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Acronyms and Abbreviations

BLNR	Board of Land and Natural Resources
BMPs	Best Management Practices
CDP	Community Development Plan
CDUP	Conservation District Use Permit
CZM	Coastal Zone Management
CZMP	Coastal Zone Management Program
DLNR	Department of Land and Natural Resources
DOFAW	Division of Forestry and Wildlife
DOH	Department of Health
EPA	U.S. Environmental Protection Agency
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HAR	Hawai‘i Administrative Rules
HELCO	Hawai‘i Electric Light Company
HEPA	Hawai‘i Environmental Policy Act
HRS	Hawai‘i Revised Statutes
MSL	Mean Sea Level
OCCL	Office of Conservation and Coastal Lands
OEQC	Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs
SFR	Single-Family Residence
SHPD	State Historic Preservation Division
SMA	Special Management Area
TMK	Tax Map Key
UBC	Uniform Building Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WSS	Web Soil Survey
§	Section

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Summary of Project, Environmental Impacts, and Mitigation

Native Technologies has prepared this Environment Assessment (EA) on behalf of applicants Darrin and Debra Carlson, who seek a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements (Figures 1 and 2). The proposed project site is a 3.5-acre parcel identified as Tax Map Key (3) 1-5-010:028. The parcel is located on the island of Hawai‘i, in the Puna District, along the shore, at 15-2225 Government Beach Road, southeast of the Hawaiian Paradise Park Subdivision. The proposed residence will be a single-story, 3371 square-foot home with attached garage, and will utilize a water catchment tank and septic system. The home will be set back approximately 110 to 120 feet from the parcel's sea cliffs and shoreline at an elevation approximately 30 feet above mean sea level.

A previous CDUP was granted in November 1989 for the construction of a single-family residence on Parcel 28 which was never built. An archaeological field inspection conducted at the time revealed no culturally or historically significant findings at the property. On October 11, 2013, Native Technologies personnel conducted a site reconnaissance survey and biological investigation of the parcel; in October 2013, a cultural impact assessment of the property by ASM Affiliates commenced; and on November 6 and December 13, 2013, ASM Affiliates conducted an archaeological inventory of the parcel. The biological investigation of the parcel found no state or federally-listed endangered or threatened floral or faunal species present at the proposed project site. The cultural impact assessment of the parcel and surrounding area, primarily the *ahupua‘a* of Maku‘u, Pōpōkī, and Hālona, has determined the general shoreline to be of cultural significance because of its use for recreation and subsistence, dating from the Pre-contact era, with respect to the proximity of Opunaha, reported to have been a canoe landing, Kula Bay, reported to have been a *ko‘a* (fishing ground) for *āholehole*, and an ancient coastal trail, believed to have been used for shoreline access and travel across a significant portion of coastal Puna. The archaeological inventory of the parcel revealed evidence of the coastal trail's path across Parcel 28, which had hitherto been obscured by soil and dense vegetation. Additionally, the historic rock wall boundary to the southeast, which was formerly documented as a feature of Parcel 29, was determined to be a feature of Parcel 28 instead. A preservation plan was deemed necessary for the trail remnant and will be submitted to the Department of Land and Natural Resources State Historic Preservation Division (DLNR-SHPD) by ASM Affiliates.

Survey of the proposed project site and further review of environmental conditions and resources indicate that no significant adverse effects would result from the construction of the Carlson single-family residence, due to implementation of archaeological preservation techniques for the coastal trail; adherence to Special Management Area (SMA) shoreline setback and other requirements; observance of Best

Management Practices for control of erosion, sediment, and storm-water runoff; and implementation of various other mitigation measures as detailed in this report. Pending the result of the solicitation for comments and concerns, and the approval of the archaeological preservation plan by DLNR-SHPD, a Finding of No Significant Action is anticipated.

Section 1. Project Description and EA Process

This report summarizes the findings of an Environmental Assessment (EA) of the land parcel identified as Tax Map Key (TMK) (3) 1-5-010:028, located at 15-2225 Government Beach Road, Puna, Island of Hawai‘i (Figure 1). Native Technologies has prepared this EA report on behalf of Darrin and Debra Carlson, applicants for a Conservation District Use Permit (CDUP) to build a single-family residence (SFR) on the parcel. The intent of this EA report is to provide the State Board of Land and Natural Resources (BLNR) with the information necessary to review the CDUP application request of Mr. and Mrs. Carlson.

1.1. PROJECT LOCATION AND DESCRIPTION

Darrin and Debra Carlson seek a Conservation District Use Permit (CDUP) to build a single-family residence (SFR) on a 3.5-acre parcel located at 15-2225 Government Beach Road, in the Puna District of the island of Hawai‘i, identified by the Hawai‘i County Real Property Tax Office as Tax Map Key (TMK) (3) 1-5-010:028 (Figure 2). The property fronts approximately 221.72 feet of Government Beach Road on the *makai* side of the unpaved road, in the Conservation District at Pōpōkī, within a shoreline Special Management Area (SMA) of Hawai‘i County (Figure 3).

The proposed SFR will be a single-story house with attached garage, a septic system, and water catchment tank. The structure will be set back greater than 110 feet from the cliff-line and greater than 120 feet from the shoreline. The proposed residence would therefore sit at an elevation of approximately 30 feet above mean sea level (MSL).

The parcel is currently unoccupied. It is bounded by an historic rock wall along Government Beach Road and the south/southeastern property border, and pahoehoe lava rock cliff and ocean shoreline along east/northeast. It is bounded to the north/northwest by Lot 3 (Parcel 27) of the subdivision, along the edge of a forested area dominated by autograph trees (*Clusia rosea)* moving westward. It contains predominantly non-indigenous vegetation, with the exception of hala trees located near the main road, in the east corner of the parcel, and in spots along the southeastern border; patches of mau‘u aki‘aki sedge; and naupaka grass and shrubs. The site also contains 2 existing concrete slabs, one of which formerly provided the base for a shed that has since been removed.

1.2. ENVIRONMENTAL ASSESSMENT PROCESS AND SCOPE

This Environmental Assessment (EA) is conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS) and its implementing regulations delineated in Title 11, Chapter 200, of the

Hawai‘i Administrative Rules (HAR). According to Chapter 343 of the HRS, an EA is used for the determination of impacts associated with an action and the development of mitigation measures for adverse impacts, as well as the determination of significant impacts as outlined by HAR.

The scope of this EA, in accordance with State of Hawai‘i content requirements, is as follows:

- Identification of the applicant(s);
- Identification of the approving agency;
- Identification of the agencies consulted in preparing the assessment;
- General description of the proposed project's technical, economic, social, and environmental characteristics;
- Summary description of the affected environment;
- Identification of impacts and alternatives considered, if any;
- Proposed mitigation measures;
- Anticipated determination or determination of approving agency, as applicable;
- Supporting reasons for anticipated determination;
- Identification of agencies for further consultation if it is determined that an Environmental Impact Statement (EIS) is required;
- List of all required permits and approvals; and
- Written comments and responses under early consultation and public review periods.

1.3. REPORT ORGANIZATION

This environmental assessment document is organized as follows:

SECTION 1
Purpose of the EA, the review process, and general content requirements for environmental assessments, along with the consultation efforts made during the preparation of this assessment.

SECTION 2
Details of the applicant's proposed project and alternatives considered.

SECTION 3
Significant characteristics of the project site's physical environment, culturally and historically significant findings relative to the project site, and socioeconomic development of the site and adjacent lands;

consequences of the proposed project which pose a significant impact on any of the aforementioned; proposed mitigation measures to be undertaken for any adverse impacts; and government permits, plans, and policies relevant to the project site.

SECTION 4
Determination of approving agency with respect to the applicants' request for a CDUP along with reasons supporting the determination.

1.4. METHODOLOGY

The preparation of this environmental assessment entailed a combination of quantitative and qualitative analyses, the evaluation of which relies, in part, upon available information provided by the present landowner(s) and selected public agencies with pertinent interest in the project site. Available information is comprised primarily of existing technical reports and maps describing the physical characteristics and designated land use of the project site and relevant adjacent and nearby properties.

An onsite reconnaissance survey of the land parcel was conducted by Native Technologies personnel on Friday, October 11, 2013. Field notes and digital photographs were taken to document existing physical characteristics of the parcel, the shoreline, road access, and adjoining parcels, as sources of supplemental information for the evaluation of current environmental conditions at the site.

1.5. PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

The early consultation process utilized in the preparation of this draft environmental assessment relied primarily upon inquiries made to the following agencies:

State of Hawai'i

Department of Land and Natural Resources (DLNR)

Division of Forestry and Wildlife (DOFAW)

Office of Conservation and Coastal Lands (OCCL)

State Historic Preservation Division (SHPD)

County of Hawai'i

County Fire Department

County Planning Department, Special Management Area (SMA)

Section 2. Alternatives

The applicants Darrin and Debra Carlson desire to use the land parcel identified as TMK (3) 1-5-010:028 for the construction and use of a single-family residence (SFR). Its location and general description is described in Section 1.1. The SFR will be set back greater than 120 feet from the shoreline, between two existing concrete slabs. The proposed project is detailed below, in Section 2.1.

2.1. PROPOSED PROJECT

The applicants propose to construct a single-story family dwelling on a 3.5-acre shoreline property located at 15-2225 Government Beach Road in the Puna District of the island of Hawai‘i (Figure 4). The development (Figure 5) is intended to have the following features:

- 3371 square-foot house with attached garage and wrap-around deck (Figure 6)
- 4 bedrooms
- 3 bathrooms
- subsurface septic system with 1000-gallon septic tank and 12-foot by 24-foot absorption bed (Figure 7)
- 10,000-gallon capacity water catchment tank, standing 4 feet high and 20 feet in diameter
- 7-foot post & pier elevation of main residence
- 15-foot wide compacted gravel driveway with turnaround, overall approximate length of 375 feet.

The structure will be set back greater than 110 feet from the cliff-line and greater than 120 feet from the shoreline, approximately 30 feet above mean sea level (MSL). The architectural elevation of the proposed structure from ground level is 23 feet at its highest point (Figures 8 & 9). The project site currently contains 2 existing concrete slabs; the slab situated on the southeast side of the proposed residence will be used for the setup of the water catchment tank (Figure 10) and the slab situated on the north side of the property will be used as a picnic area (Figure 11). The residence will be connected to power poles located on Government Beach Road for electricity. Availability of electrical power has been confirmed by Hawai‘i Electric Light Company at pole numbers 31 and 32, which are located nearest to the lot.

The parcel is currently unoccupied. It is bounded by an historic rock wall along Government Beach Road and the south/southeastern property border (Figure 12), and pahoehoe lava rock sea cliffs and ocean shoreline along north/northeast. It is bounded to the west/northwest by Lot 3 (Parcel 27) of the subdivision, along the edge of a forested area dominated by autograph trees moving westward (Figure

13). A predominant portion of the parcel was cleared in the past and used as grazing pasture. This large open area is covered by various grasses, with occasional scrub guava. The majority of the site's trees and shrubs are found along its perimeter. Indigenous hala trees are located near the main road, in the east corner of the parcel, and along the southeastern border. Indigenous naupaka shrubs were observed near the shore. The proposed residence will therefore be situated in an area which would lie primarily in the open pasture.

Landscaping of the lot would be minimal, confined to maintenance of the grassy open area surrounding the house and necessary clearing associated with driveway maintenance and power-line safety (Figure 14). Vegetation along the cliff-line would be left intact, as well as the various trees and shrubs around the perimeter in order to preserve as much of the current natural habitat as possible.

2.2. NO ACTION

Under the No Action Alternative, the SFR would not be built and the lot would remain unused. Persistent trash dumping, which has been a problem on vacant land in the area, would leave the property and its scenic shoreline vulnerable to potentially toxic materials that could adversely affect the ecosystem. This EA uses the No Action Alternative as a baseline of comparison for evaluating the environmental effects of the proposed project. No other alternative uses are currently desired by the applicants with respect to the project site.

Section 3. Environmental Setting, Impacts, and Mitigation

The project site is a 3.5-acre shoreline parcel, situated on Hawai‘i Island’s Puna District coast. Its physical environment and its biological, cultural, and socioeconomic resources are described below. Any anticipated environmental and cultural impacts along with corresponding mitigation measures will also be discussed in this section.

3.1. PHYSICAL ENVIRONMENT

The physical environment of the proposed project site is described in terms of its location, geology, topography, climate, flood zone and shoreline, air and water quality, noise, and hazardous waste contamination, if any.

3.1.1. Location

The project site is a shoreline land parcel identified as TMK (3) 1-5-10:028, located between the old, unpaved Government Beach Road and the rocky shoreline in a Special Management Area (SMA), approximately 1.35 miles southeast of Maku‘u Drive. The parcel is situated within the *ahupua‘a* known as Pōpōkī.

3.1.2. Geology, Soils, and Geologic Hazards

The project site is located on the flank of Kilauea in the District of Puna. The rocky shoreline bench formed as a result of prehistoric pahoehoe lava flows (Figure 15). Northwest of the shoreline bench, according to the United States Department of Agriculture’s Web Soil Survey, the pahoehoe lava rock is overlain by soils from the Opihikao series (USDA WSS, 2013). These soils represent a surface layer which is approximately 2 to 10 inches thick, over the pahoehoe lava bedrock, comprised of highly decomposed plant material and small amounts of volcanic ash (National Cooperative Soil Survey, 2012). It is highly permeable above the underlying bedrock, and very acidic.

Because Kilauea is an active volcano, the United States Geological Survey (USGS) has ranked the volcanic hazard in this area of Puna as Zone 3 (USGS, 1997). Zone 3 areas are gradationally less hazardous than Zone 2 areas (which are adjacent to and down-slope of active rift zones) because of increased distance from rifts which have been recently active and/or because their topography is less likely to be covered by lava flow. More than 75 percent of the land area has been inundated by lava flow in the last 750 years, but only 1 to 5 percent since the year 1800. Therefore, a modest risk of lava inundation over short time scales exists for the project site. Hawai‘i County is rated Zone 4 for Seismic Hazard (USGS, 2001), which indicates a 10 percent chance of severe ground shaking in a 50-year

interval. Zone 4 is the highest of the Uniform Building Code's (UBC) six seismic zones, and is considered at risk from major earthquake damage.

Impacts and Mitigation:

With respect to geologic hazards, the entire population of the Puna District shares a comparable level of risk. The applicants are aware of and accept the risk of geologic hazard which accompanies residence within the Conservation District and Hawai'i County in general. The risk of lava flow inundation is believed to be minimal because the parcel lies outside the Lava Flow Hazard Zone (Figure 16). The risk of seismic hazard is the same for all residents on the island of Hawai'i and damage can be minimized to the same degree as other well-built, code-compliant structures.

3.1.3. Topography

The topography of the project site ranges from approximately 50 feet above MSL near Government Beach Road to an average of approximately 20 feet above MSL along the cliff line, with a gentle 5 to 6 percent slope to the northeast (Figure 4). The cliff line itself ranges from approximately 15 to nearly 25 feet above MSL, whereat the property drops abruptly to the shore below, thus inhibiting access to the shore from the upper portion of the parcel. A previous parcel survey indicates that the cliff edge and shoreline below is composed of pahoehoe lava rock, and that the upper portion of the property is approximately 31 feet above MSL overall. Recent survey data indicates that the elevation of the upper portion is more likely an approximate 32.5 feet above MSL overall.

Impacts and Mitigation:

The topography of the parcel provides a natural means of protection for the shoreline and its marine ecology. The shore is not readily accessible from the upper portion of the lot and is therefore unlikely to be adversely impacted by the proposed residence.

During the construction phase, site-specific erosion and sediment control Best Management Practices (BMPs) will be implemented whenever necessary, to prevent sediment migration to the shoreline. Disturbed areas, storm water runoff controls, and sediment controls will be inspected by the contractor within 24 hours after any rainfall of 0.5 inches or greater during a 24-hour period, to ensure that appropriate controls are in place and functioning properly. Controls found to be damaged or ineffective will be replaced or modified promptly. Adherence to the minimum shoreline setback will further ensure that there is no disturbance to the cliff-line.

3.1.4. Climate

The coastal climate in the vicinity of the project site is primarily influenced by north to northeasterly trade winds and a mean annual rainfall of approximately 122 inches (Giambelluca, 2013). There is limited seasonal variation in local weather: a dry season from April to October and a wet season occurring between November and March, with greater rainfall, cooler temperatures, and more frequent winds from the south during the wet season. Monthly rainfall totals recorded in 2011 range from approximately 8 inches in the driest month to approximately 14 inches in the wettest month.

Impacts and Mitigation:

The climate is not anticipated to bear significant impact derived from the proposed project. It should be noted, however, that heavy rainfall in the area does present certain considerations for the applicants. The 7-foot post and pier elevation of the proposed SFR would provide reasonable protection for the property in the event of site inundation due to heavy rainfall.

3.1.5. Flood Zones, Shoreline Setting, and Storm Wave Exposure

Floodplain Status

Federal Emergency Management Agency (FEMA), which produces the National Flood Insurance Program's Flood Insurance Rate Maps (FIRM), does not print the flood plain map for the project area, No. 1551661150C. The FIRM Index Map for the Island of Hawai'i, No. 155166INDOA, indicates the following with respect to Panel No. 1551661150C: "Panel Not Printed – Minimal Tsunami Inundation (FIRM, 2004). The State of Hawai'i Flood Hazard Assessment Report classifies the area in which the project site lies as Special Flood Hazard Area Zone AO (Figure 17). This indicates that the area is subject to flooding by the 1% annual chance flood, wherein the flood has a 1 percent chance of being equaled or exceeded in any given year. Zone AO would usually be subject to 1 to 3 feet of sheet-flow flooding on sloping terrain.

Shoreline Setting

The shoreline of the project site, dominated by its rocky *pahoehoe* cliff and shelf, is subject to natural coastal processes, including erosion and accretion. These natural processes can be affected by human actions such as sand removal and shoreline hardening, but because of the shoreline setback ordinance, the proposed project is highly unlikely to pose any risk to the shoreline setting.

Storm Wave & Tsunami Exposure

The project site is directly exposed to northerly and easterly swells. According to the International Tsunami Information Center, tsunami wave runups of 24 feet above MSL for 1946 (Aleutian Islands

source location), 8 feet for 1957 (Aleutian Islands), and 12 feet for 1960 (Chile) have been estimated near Kea'au, approximately 5 miles northwest of the project site (Walker, 2013). Tsunami wave runups of 18 feet for 1946 and 14 feet for 1960 have been estimated for Honolulu Landing, approximately 2 miles southeast of the project site. Because the project site's vertical cliffs are approximately 20 feet above MSL, they would potentially provide significant protection from occasional storm and tsunami-generated waves.

Impacts and Mitigation:

The shoreline is not anticipated to bear significant impact derived from construction of the proposed project because the proposed setback of the residence is 120 feet. Site inundation from heavy rainfall or storm wave exposure is not believed to be high, but the topography of the parcel does afford reasonable protection from damage incurred from storm and tsunami-generated waves. Additionally, the 7-foot post and pier elevation of the proposed residence would provide additional protection for the residence should site inundation occur.

Prior to construction, storm water runoff controls and soil erosion and sediment BMPs (e.g., silt fencing, composite filter socks, sidewall sloping, dust control, etc.) which would prove most effective in stabilizing erosion will be determined through careful evaluation of the project site's physical environment and its specific preservation needs as delineated by DLNR. During the construction phase of the residence and continuing until vegetation cover has been reestablished, soil erosion and sediment control BMPs will continually be implemented to mitigate undue soil migration from disturbed areas in the event of flooding or storm/tsunami-generated waves. Disturbed areas and controls will be inspected by the contractor within 24 hours after any rainfall of 0.5 inches or greater during a 24-hour period, to ensure that appropriate controls are in place and functioning properly. In the event of flooding due to storm/tsunami-generated waves, disturbed areas and controls will be inspected by the contractor within 24 hours after subsidence, and replaced or modified as needed before construction resumes. After project completion, the owner will be responsible for inspecting and replacing controls until vegetation cover has been firmly reestablished.

3.1.6. Air Quality & Water Quality

Air

Air quality at the project site is generally excellent because of its coastal location, rural surroundings, and minimal degree of human activity. The air quality is adversely affected on occasion by vog, sulfur dioxide, and airborne particulate matter from Kilauea volcano.

Water

No streams, springs, or anchialine ponds exist on the project site.

Impacts and Mitigation:

No significant impacts are anticipated to the air quality in the area. No significant impacts are anticipated to the nearest body of water, the ocean, due to the shoreline setback of 120 feet. During the construction phase, site-specific erosion and sediment control Best Management Practices (BMPs) will be implemented whenever necessary, to prevent sediment migration to the shoreline and coastal waters, and to control dust generated by construction. Disturbed areas and sediment controls will be inspected by the contractor as discussed above, in sections 3.1.4 and 3.1.5, to ensure that appropriate controls are in place and functioning properly, and will be replaced or modified promptly when damaged or upon proving ineffective.

3.1.7. Noise

Noise on the project site is low, derived primarily from natural sources, such as the wind, surf, local fauna, and the occasional transit of vehicles.

Impacts and Mitigation:

During the construction phase of the proposed SFR, temporary increases in noise level will occur at the project site and along Government Beach Road due to mobilization of construction materials. Equipment use at the project site will also increase noise levels somewhat. The main area of construction will be set back approximately 350 feet from the main road and approximately 100 feet from both the northwestern and southeastern parcel boundaries, and the trees and shrubbery along these boundaries would aid in dampening the noise of construction. Minimal earthwork is anticipated as the site is relatively flat; therefore, minimal use of heavy equipment will be required. Noise increase during construction would be temporary and intermittent; therefore mitigation measures would likely not be needed beyond limiting construction to daytime hours.

3.1.8. Hazardous Substances, Toxic Waste, and Hazardous Conditions

An onsite reconnaissance visit was conducted on October 11, 2013 by Native Technologies personnel. Waste and rubbish observed on the property was primarily limited to demolished building materials from a shed that formerly stood on the parcel, occasional aluminum beverage cans and plastic bottles, and disposable drinking cups.

Hazardous Substances & Toxic Waste

Based on prior onsite inspections, and a recent onsite reconnaissance visit, no hazardous substances or toxic waste are believed to exist at the project site. While some trash dumping appears to have occurred at the site, observations were limited to various beverage containers and food wrappers, as well as the boards which remained from the demolition of a shed that once stood on the property. There is no documented use of the property that would indicate the presence of hazardous substances. While no hazardous substances were identified on the proposed project site, use and storage of certain hazardous substances and materials for the construction of the residence may be temporarily necessary.

Hazardous Conditions

No hazardous conditions were observed on the parcel. Furthermore, there is no documented use of the property that would indicate the presence of a hazardous condition.

Impacts and Mitigation:

Debris from the demolished shed, currently found next to the parcel's existing northwestern concrete slab will be removed by the owner and disposed of at the municipal landfill prior to construction. During the construction phase of the proposed residence, all necessary measures will be taken to minimize the possibility for spills or combustion of hazardous substances and/or materials. Manufacturers' instructions for proper storage and use will be strictly followed, and all waste, unused materials, and excess fill will be removed and disposed of at an authorized waste disposal site according to manufacturer recommendation. Emergency spill treatment, storage, and disposal of all hazardous materials will strictly adhere to State and County requirements. Onsite storage of hazardous materials and substances will be limited to the minimum practical quantity needed for project completion. Onsite vehicles and machinery will be properly maintained and monitored for leaks. Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean.

3.2. BIOLOGICAL RESOURCES

A biological resource site reconnaissance survey was conducted by a biologist on October 11, 2013. Survey methodology included a pedestrian survey of the property and visual reconnaissance of adjacent properties. It was found that the site consists of thick exotic grassland habitat bordered by herbaceous plants, ornamental trees, and shrubs (Figure 18). The terrain is predominantly level with a precipitous drop at the cliff-line to the rocky shoreline boundary of the parcel, 15 to 25 feet below the parcel's sea cliffs.

3.2.1. Flora

Federally-listed as an endangered plant species, *Ischaemum byrone*, generally grows in cracks of *pahoehoe* from sea level to an elevation of 250 feet, on low cliffs along coastal strands (Mueller, 2007). This perennial grass often occurs with naupaka (*Scaevola sericea*) (UH, 2009). Because of this, the parcel can be considered a potential habitat for *Ischaemum byrone.* None, however, was found on the parcel, nor was any other federally-listed endangered plant species observed onsite. The site location lies within an area designated by the Division of Forestry and Wildlife as having a low concentration of threatened and endangered plant species (Figure 19). Indigenous plant species, those native to Hawai'i and occurring naturally in other regions of the Pacific, were observed along the property borders and near the cliff line. These include naupaka bushes and hala trees (*Pandanus tectorius*), as well as mau'u aki'aki sedge (*Fimbristylis cymosa*) in the grass stands approaching the sea cliffs (Figures 20-21).

Vegetation at the site is dominated by dense stands of grasses such as California grass (*Brachiaria mutica*), molasses grass (*Melinus minutiflora*) and Bermuda grass (*Cynodon dactylon*). Interspersed throughout the grasslands, other invasive species such as Indian pluchea (*Pluchea indica*), bingabing (*Macaranga mappa*), and strawberry guava (*Psidium cattleianum*) were observed. Tall ironwoods (*Casuarina sp.*) are among the prominent non-native trees found on the parcel (Figure 22). Naturalized ornamental plant species bordering the site include autograph trees (*Clusia rosea*), coconut trees (*Cocos nucifera*), and ti (*Cordyline fruticosa*) (Figures 23). A list of plant species observed is presented in Table 1 below.

Impacts and Mitigation:

While indigenous vegetation was observed onsite, no federally-listed or state-listed endangered plant species such as *Ischaemum byrone* were observed onsite. No sensitive habitats such as wetlands are within the property boundary as well. The construction activities within the boundaries of the site should pose no risk to any endangered or sensitive plant species, and construction and residential use is unlikely to cause adverse biological impacts with respect to the property's flora. The

indigenous naupaka, *Scaevola sericea*, along the cliff-line will remain undisturbed, along with the rest of the vegetation in that area of the parcel. The indigenous hala, *Pandanus tectorius*, and the naturalized ornamental plant species bordering the site will also remain intact. The planned residence would be situated in the grassland area of the parcel with the intention of preserving as much of the current natural habitat as possible.

During the construction phase, site-specific erosion and sediment control (BMPs) will be implemented as needed, to preserve the environmental habitat. Disturbed areas, storm water runoff controls, and sediment controls will be inspected as described in sections 3.1.5 and 3.1.6 above.

Table 1 Plant Species Observed at the Carlson Property

Plant Species	Common Names	Family	Status
Cordyline fruticosa	ti	Agavaceae	non-native
Araucaria columnaris	Cook Island pine	Araucariaceae	non-native
Cocos nucifera	coconut	Arecaceae	non-native
Crassocephalum crepidiodes	crassocephalum	Asteraceae	non-native
Emilia fosbergii	Flora's paintbrush	Asteraceae	non-native
Pluchea indica	Indian pluchea; Indian fleabane	Asteraceae	non-native
Pluchea symphytifolia	sourbush	Asteraceae	non-native
Sonchus oleraceus	sow thistle	Asteraceae	non-native
Wedelia trilobata	wedelia	Asteraceae	non-native
Casuarina sp.	ironwood	Casuarinaceae	non-native
Clusia rosea	autograph tree	Clusiaceae	non-native
Commelina diffusa	honohono	Commelinaceae	non-native
Cyperus compressus	--	Cyperaceae	non-native
Fimbristylis cymosa	mau'u aki'aki	Cyperaceae	indigenous
Macaranga mappa	bingabing	Euphorbiaceae	non-native
Ricinus communis	castor bean; koli	Euphorbiaceae	non-native
Desmanthus virgatus	slender mimosa; virgate mimosa	Fabaceae	non-native
Desmodium incanum	Spanish clover	Fabaceae	non-native
Mimosa pudica	sensitive plant	Fabaceae	non-native
Scaevola sericea	naupaka kahakai, naupaka kai	Goodenaceae	indigenous
Musa sp.	banana	Musaceae	non-native
Psidium cattleianum	strawberry guava	Myrtaceae	non-native
Nephrolepis multiflora	sword fern	Nephrolepidaceae	non-native
Spathoglottis plicata	Philippine ground orchid	Orchidaceae	non-native
Pandanus tectorius	hala	Pandanaceae	indigenous
Brachiaria mutica	California grass	Poaceae	non-native
Cynodon dactylon	Bermuda grass; manienie	Poaceae	non-native
Digitaria ciliaris	Henry's crabgrass	Poaceae	non-native
Digitaria insularis	sourgrass	Poaceae	non-native
Melinus minutiflora	molasses grass	Poaceae	non-native

Paspalum conjugatum	Hilo grass	Poaceae	non-native
Polygala paniculata	milkwort	Polygalaceae	non-native
Phymatosorus grossus	laua'e	Polypodiaceae	non-native
Pilea microphylla	rockweed	Urticacaea	non-native
Lantana camara	lantana	Verbenaceae	non-native
Stachytarpheta urticafolia	blue rat's tail	Verbenaceae	non-native

3.2.2. Fauna

Avifauna

No federally-listed endangered Hawaiian hawks (*Buteo solitarius*) or Hawaiian petrels (*Pterodroma sandwichensis*) were observed during the October 2013 biological survey. The Newell's shearwater (*Puffinus newelli*), federally-listed as a threatened species, was not observed during the survey nor was the state-listed endangered Hawaiian short-eared owl (*Asio flammeus sandwichensis*) observed during the survey. The habitat onsite is not favorable to supporting an individual or population of these sensitive species; however these animal species could potentially utilize onsite sources for foraging or nesting. These species are known to exist in the Puna region.

The Hawaiian hawk, also known in Hawai'i as the 'io, occur at elevations from sea level to 5,600 feet. They have been observed in a variety of habitats: lowland and high-elevation forests, agricultural and pasture lands, and even urban areas. They nest in both native and non-native trees, such as 'ōhi'a, coconut palm, and Eucalyptus. The Hawaiian short-eared owl, also known as the pueo, are found from sea-level to an elevation of 8,000 feet. They are active during the day and found in a variety of habitats, wet and dry forests included, but most often in open lands, such as mountain parklands, grasslands, shrublands, and urban areas. Their nests are found throughout the year, at ground-level, lined with grasses and down. Their young hatch asynchronously and fledge from the nest on foot, dependent on their parents for approximately 2 months (Mitchell, 2005). The project site, therefore, cannot be ruled out as a potential foraging or nesting habitat for the 'io or the pueo.

Bird species known to forage and nest in the adjacent areas include: zebra doves (*Geopelia striata*), spotted doves (*Streptopelia chinensis*), mynah birds (*Acridotheres tristis*), feral chickens (*Gallus gallus*), red vented bulbuls (*Pycnonotus cafer*), common waxbills (*Estrilda astrild*), and cattle egrets (*Bubulcus ibis*). These animal species are likely to be transient foragers over the site. Additionally, the onsite vegetation may serve as nesting sites for various bird species.

Other Fauna

No federally-listed endangered Hawaiian hoary bats (*Lasiurus cinereus semotus*) or other terrestrial vertebrate animal species were observed onsite during the October 2013 survey. A mongoose (*Herpestes javanicus*) was observed adjacent to the site. Other animals likely to forage in the adjacent areas include

feral cats, mice, and rats. A large nest of yellow jacket wasps was encountered in the dense grasses in the central portion of the property.

While the Hawaiian hoary bat, the state's only native terrestrial mammal, was not observed at the project site, it has been found to roost in native and non-native vegetation from approximately 3 to 29 feet above the ground, such as ʻōhiʻa, hala, coconut palm, kukui, kiawe, pūkiawe, Eucalyptus, Sugi pine, avocado, shower trees, and even in fern clumps. Coastlines and forest/pasture boundaries are important foraging grounds, and lower elevations with warmer temperatures are believed to be key breeding habitats. Hawaiian hoary bats, also known as ʻōpeʻapeʻa, are solitary for the most part, although mothers roost with their pups (Mitchell, 2005). The project site, therefore, should be considered a potential roosting and foraging site for this species.

Marine Species

The property's shoreline consists of a very narrow margin of basalt that provides minimal habitat for terrestrial or marine species. During the October 2013 survey, a federally endangered green sea turtle (*Chelonia mydas*) was observed feeding in the ocean offshore from the property. No other marine animals were observed during the survey. Due to rough ocean conditions, the narrowness of the exposed basalt, and lack of a substantial sand beach, it is unlikely that marine animals such as sea turtles and Hawaiian monk seals (*Monachus schauinslandi*) would come ashore near the property boundary.

Impacts and Mitigation:

Taking into account that a certain species may or may not be observed during a particular survey timeframe, an evaluation of habitat quality is therefore used to determine the probability of whether or not a species could be found onsite. This would be especially true for Hawaiian hoary bats, which begin foraging around sunset. The following precautionary measures will be taken to minimize potential impacts to endangered animal species:

- Existing trees and shrubs, which occur primarily along the property's perimeter, will remain intact, and will also be inspected for the presence of nests or roosts by a biologist prior to commencement of construction; if nests or roosts are found, the biologist will evaluate whether it is safe to proceed with construction, or if a delay will be necessary to protect the breeding of an endangered species.

- Grass stands, scrub guava, and other vegetation to be removed from the pasture area for construction and landscaping will be carefully

inspected for the presence of fauna before removal; if nests or burrows are found, consultation with a biologist will be conducted before proceeding.

- All exterior lighting will be shielded to prevent upwardly directed light from possibly disorienting seabirds.

Although federally-listed endangered species such as the green sea turtle and Hawaiian monk seal are known to frequent the coast of Puna, all construction activity will be set back 120 feet from the shoreline, and is therefore not anticipated to pose significant impact to the near-shore marine environment. The beach area is characterized by basalt, cobbles, and very little sand in a narrow area between the vertical drop of approximately 20 feet from the property's cliff edge and the open ocean. It is unlikely that turtles or seals would utilize this area to rest or nest since ocean wave intensity is high. Disturbance from human contact or interaction is also unlikely because the beach area is not accessible from the property other than by scaling a cliff. Construction workers will be cautioned not to approach or disturb any sea turtles or Hawaiian monk seals observed from the cliff.

3.3. CULTURAL, ARCHAEOLOGICAL AND HISTORIC RESOURCES

Cultural, archaeological, and historic resources of significance found at the proposed project site must be documented and preserved.

3.3.1. Cultural Resources

A Cultural Impact Assessment was prepared by Dr. Robert B. Rechtman and Lauren Kepa'a of ASM Affiliates, Inc., for the proposed development of the parcel TMK (3) 1-5-010:028 (Appendix C). The following discussion is based upon their findings and detailed in the attached cultural impact assessment:

The parcel identified as TMK (3) 1-5-010:028 is located in the Puna District of the island of Hawai'i. Historically speaking, Puna overall did not have political significance in the development of Hawai'i, but the region is well-known for its legendary associations with Pele and Kāne. Puna had also long been known for its growth of fragrant *Pandanus*, and its inhabitants long known for skillfulness in *lauhala* weaving.

Parcel 28 is situated within the *ahupua'a* known as Pōpōkī. The *ahupua'a* land management system was established in the 16th century as a socioeconomic unit. *Ahupua'a* were divided as

wedge-shaped sections of land extending from the island's center to the ocean, to include fisheries along the shoreline. Their boundaries were defined by topographical and geographical features, such as gullies, hills, particular types of vegetation, etc. Each *ahupua'a* was further divided into parcels. Although Pōpōkī is often grouped together with Maku'u and Hālona, review of information on former Land Grant 1537, in which the parcel lies, suggests that the Parcel 28 is most likely located in Pōpōkī, near the Hālona boundary. Beginning in 1848, the *Māhele* determined land ownership under the classifications of Crown Lands, Government Lands, and *Konohiki* (low-ranking chiefs) Lands, and in 1862, the Commission of Boundaries was established to legally set *ahupua'a* boundaries. The boundaries of Pōpōkī, however, were never certified, hence its typical grouping with Maku'u to the northwest and Hālona to the southeast. The *ahupua'a* were divided and sold as fee simple land grants to native tenants who desired to own and/or cultivate the land on which they lived, and thus Land Grant 1537, in which the parcel lies, was sold to Kapohano in 1855.

Several archaeological, cultural, biological, and environmental studies have been conducted in Maku'u, Pōpōkī, and Hālona *ahupua'a* since 1932. The most significant of these with respect to Parcel 28 was a field inspection of the parcel, conducted in 1989 by Paul H. Rosendahl, Ph.D., Inc., an archaeological inventory survey conducted by Rosendahl and Ann Charvet-Pond of adjacent Parcel 29 in 1993, and, most recently, an inventory conducted by Ashton Dircks Ah Sam and Dr. Robert B. Rechtman (Appendix D) in 2013. The 1989 Rosendahl inspection found no surface structural or portable remains aside from the stone wall along the property's western and southeast perimeter. The 1993 archaeological inventory survey of Rosendahl and Charvet-Pond revealed 5 archaeological sites consisting of 12 features on neighboring Parcel 29. Among these are SIHP Site 18418A, an ancient coastal trail remnant extending in the direction of Parcel 28, and SIHP Site 18419A, a historic cattle wall, extending along the northwestern boundary of Parcel 29. The trail remnant stops at the cattle wall. The archaeological inventory conducted in 2013 by Dircks Ah Sam and Rechtman identified a remnant of the coastal trail within the proposed project site, Parcel 28. They further identified the historic cattle wall along Parcel 28's southeastern boundary, previously thought to lie within the boundary of Parcel 29, as lying within the boundary of Parcel 28. The coastal trail is of significance because it is likely to have extended along a significant length of the Puna coast, as various segments have been described in several other studies. It is believed that it was originally built during Precontact times, and continued to be in use to the early Historic era. It was most likely used for distance travel and shoreline access.

While no specific Hawaiian traditions or legendary accounts were discovered by ASM field investigators concerning the *ahupua'a* of Pōpōkī during their survey in late 2013, survey notes of archaeological reconnaissance conducted in 1974 along the proposed Kapoho-Keaukaha

Highway route recount a 1956 interview of Mrs. Mary Ann Kamahele. Kamehele, who was 70 at the time of the interview, attested that Opunaha, to the northeast of Parcel 28, was at one time a canoe landing spot, and that Kula Bay, *makai* of the parcel, was a *koʻa* (fishing ground) for *āholehole*.

Cultural practices and beliefs are assessed with respect to various aspects: religious, spiritual, agricultural, residential, commercial, and subsistence-related. Natural features of the landscape, historic sites, and sites considered to be traditional cultural properties are considered potential cultural resources. A traditional cultural property must be associated with historically-founded traditional practices of an ethnic community (or members thereof) for 50+ years, which are currently still in practice, historically documented, or both. Determination of cultural significance is made with the understanding that said significance of a landscape feature may be connected to the significance of the landscape itself as well as to other distinct landscape features. Information gathered by Dircks Ah Sam and Rechtman indicate that the general shoreline area is and has been used for subsistence and recreation—Opunaha as a canoe landing, Kula Bay as *koʻa*, and the coastal trail from Precontact to historic times.

Impacts and Mitigation:

Although no specific shoreline activities were identified for the parcel, Dircks Ah Sam and Rechtman assert that strict adherence to the shoreline setback will ensure that shoreline access and any potential shoreline or immediate offshore traditional practices will not be adversely impacted by the proposed residence. Additionally, a preservation plan has been prepared for submittal to the Department of Land and Natural Resources State Historic Preservation Division (DLNR-SHPD) for approval, and would be implemented prior to construction on the site.

3.3.2. Archaeological and Historic Resources

As mentioned above in section 3.3.1, a previous archaeological field inspection of the project site was conducted by archaeologists Alan T. Walker and Kala Mossman of Paul H. Rosendahl, Ph.D., Inc., in 1989, and, with the exception of the stone wall along the south and east property boundaries, no surface or portable remains of archaeological or historic significance were identified during the survey. An archaeological inventory survey conducted by Rosendahl and Ann Charvet-Pond of adjacent parcel TMK (3) 1-5-010:029 in 1993 revealed five archaeological sites consisting of twelve features on Parcel 29. Among these are SIHP Site 18418A, a remnant of an ancient coastal trail extending in the direction of Parcel 28, and SIHP Site 18419A, the historic cattle wall, which extends along the southeastern boundary of Parcel 28, attributed as an archaeological figure of Parcel 29. The trail remnant stops at the cattle wall. Most recently, an archaeological inventory conducted by Ashton Dircks Ah Sam and Dr. Robert B.

Rechtman in 2013 (Appendix D), in conjunction with the preparation of this EA, has determined that a remnant of the coastal trail lies within the proposed project site. A surveyor was brought in to precisely determine Parcel 28's true boundaries. Subsequently, Dircks Ah Sam and Rechtman have been able to determine that the historic cattle wall along the southeastern boundary should be attributed as an archaeological feature of Parcel 28 rather than 29. The following discussion is based upon their findings and detailed in the attached Archaeological Inventory Survey:

Aerial photos of Parcel 28 from 1954 and 1977 reveal that the parcel was covered with low vegetation. It is believed to have been used as a pasture for the grazing of animals. It was previously bulldozed, sometime prior to 1989, which most probably accounts for the lack of archaeological portable remains and features at the site. A gap was bulldozed through the portion of historic cattle wall which bounds the property to the west, along Government Beach Road. Only the western corner of the property appears to have not been bulldozed.

The coastal trail remnant, identified as SIHP Site No. 18418A, is believed to have been, at one time, an elevated trail of water-worn boulders and cobbles. It runs fairly parallel to the coast at a distance approximately 65 feet (20 meters) inland from the sea cliffs, which is roughly the same distance inland as recorded for the trail remnant in neighboring Parcel 29. The trail is traceable for a distance of about 32 to 33 feet (10 meters). The remainder of the trail has either been destroyed by bulldozing or obscured by soil and dense vegetation. Water-worn basalt boulders and cobbles appear to have been placed along the edge of the level surface, presumably to define the trail's alignment, while others were embedded in the surface as stepping stones. The elevated coast trail is believed to have been used during Precontact times up until early Historic times for access to shoreline resources and for travelling along the Puna coast.

The core-filled rock wall, identified as SIHP Site No. 18419, runs along the southeastern boundary and the western boundary along Government Beach Road. There is a gap in the wall along the western boundary, the wall having been bulldozed where the driveway meets the road. It is believed that the wall was constructed for ranching purposes, and its method of construction would indicate that it was built during the historic era. The wall appears to have been built after 1903, based on its absence from Register Map No 2258, drawn in that year, depicting Land Grant boundaries, roads, and distinctive topography and features.

The archaeological sites identified on Parcel 28 are considered of significance under Criteria D and E as established by DLNR-SHPD. Under Criterion D, a resource of significance is considered to "have yielded, or likely to yield, information important for research on prehistory or history." Both sites meet Criterion D in that the elevated coastal trail was used for Precontact and Historic distance travel and shoreline access, and the historic cattle wall for cattle ranching

activities from the early to mid twentieth century. Under Criterion E, a resource should "have an important traditional cultural 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" which are "important to the group's history and cultural identity." The coastal trail meets Criterion E, particularly because of its cultural significance and value to native Hawaiians today, as well as the District of Puna overall.

Impacts and Mitigation:

SIHP Site No. 18419A was previously accepted by DLNR-SHPD as a "no further work" treatment, and the same recommendation has been proposed with respect to Parcel 28. A preservation plan will be submitted to DLNR-SHPD for SIHP Site No. 18418A. It will be implemented upon approval, before construction commences on the property.

3.4. SOCIOECONOMIC RESOURCES

The socioeconomic resources relevant to the proposed project site are identified as those associated with on-site and adjacent land use, recreational and scenic resources, roadways and access, and public utilities. Puna is generally considered to be an agricultural district with strong industry production of flowers and nursery products, papaya, bananas, macadamia nuts, and other agricultural produce, for not only Hawai'i County, but the state overall. The county zoning designation for the site location is A-1a: Agricultural District, minimum building site of 1 acre (Figure 24).

3.4.1. On-site and Adjacent Land Use

On-site

The subject property is recorded to have been cleared and used in the past for the grazing of horses. On November 17, 1989, a CDUP was granted for a prior owner to construct a single-family residence, but its construction was never completed. The land remains vacant, with two concrete slabs, set back approximately 120 to 130 feet from the shoreline.

Adjacent Land

The adjoining parcel to the southeast of the project site includes a two-story single-family residence (Figure 25); the adjoining parcel to the northwest remains vacant. Other nearby parcels along Government Beach Road include residences and/or pasture areas. Future development of the shoreline area between Hawaiian Paradise Park (northwest of the project site) and Hawaiian Beaches Subdivisions (spanning south of the project site) remains limited due to land-use regulations and lack of public utilities.

Impacts and Mitigation:

Socioeconomic impacts are anticipated to be comparable to those imposed by typical SFR construction in the Conservation District, and readily mitigated by adherence to State and County codes governing the SMA and Conservation lands.

3.4.2. Scenic and Recreational Resources

The natural beauty of the Puna Coastline provides scenic views from both the ocean and the shoreline. Hawai‘i County’s General Plan with respect to the preservation of natural beauty discusses primarily Puna’s black sand beaches, tidal pools, and inland lava land. The project site does not contain any of these as a significant feature. The low sea cliffs and rocky shoreline of the project site will, nevertheless, be preserved because of the SFR’s shoreline setback of 120 feet. Although the shoreline at the project site is not a designated scenic vista, the limited scenic view from the road will, for the most part, remain intact. The view of the ocean from the main road is partially obstructed by trees and shrubbery along Government Beach Road. The scenic view from a gap in the vegetation would not be significantly impacted because the single-story residence is set back approximately 350 feet from Government Beach Road, with a length of only 58 feet facing the main road. A broad view of the coastline from this vantage point would still be possible, but the coastline is generally not visible from Government Beach Road itself to passersby in vehicles traveling the unpaved road.

Shoreline recreation, such as fishing, swimming or kayaking, was not observed along the shoreline from the project site. The area does not afford safe access from the sea cliffs to the rocky shore below, nor are conditions along the shoreline conducive to the above-mentioned recreational activities.

Impacts and Mitigation:

Minor adverse impact to scenic resources may occur during the construction of the proposed SFR. Obstruction of the scenic vista by the completed SFR will be mitigated by the 120-foot setback from the shore, the approximate 350-foot setback from Government Beach Road, and the limited square footage of the residence with respect to the parcel size overall, which is subject to regulation of the maximum allowance of developable square footage.

3.4.3. Roads and Access

The 10-to-12-foot wide, predominantly unpaved, old Government Beach Road provides access to the parcel at its southwestern end (Figure 26). This road provides vehicle access to land situated between

Hawaiian Paradise Park and the Hawaiian Beaches/Hawaiian Shores subdivision. The old Government Beach Road allows the only access to the proposed project site from a public thoroughfare.

3.4.4. Public Utilities

The project site is not served by any public water distribution or wastewater collection utility, but is served by an electrical power distribution system. Existing shoreline residences in the area are equipped with private onsite wastewater treatment systems which conform to State wastewater disposal regulations. Existing shoreline SFRs which formally used their own generator-driven power for electricity now have access to electrical power supplied by power poles installed along Government Beach Road.

Water Supply and Wastewater

A 10,000-gallon catchment water tank will be used at the proposed residence to provide water supply for both the home and fire flow in accordance with standards of the Hawai‘i Fire Code. When water variances allow the use of a water catchment system, the County of Hawai‘i Planning Department requires a minimum 9000-gallon water storage system, 6000 gallons of which would be for potable purposes and the remaining 3000 for firefighting and emergency purposes. The location and capacity of the emergency water system, including the necessary compatible connector system, must meet the approval of the Hawai‘i County Fire Department. Wastewater must be treated with a septic system in conformance with State Department of Health requirements.

Electricity

Hawai‘i Electric Light Company (HELCO) has confirmed the availability of electrical power at the lot corresponding to TMK (3) 1-5-010:028, from Pole Nos. 31 and 32, nearest the lot. A valid building permit is required by HELCO in order to bring power to the property. Additional poles will likely be required to bring power to the actual residence.

Impacts and Mitigation:

No adverse impact is anticipated in relation to the installation of water and electrical systems. The addition of one SFR is unlikely to have any adverse impact on public facilities such as schools and police or fire services.

3.5. SECONDARY AND CUMULATIVE IMPACTS

No major secondary impacts, such as population changes or adverse effects on public facilities in the area are anticipated, since the proposed project is a relatively small-scale development. Additionally, no cumulative impacts resulting from the combined impacts and/or conflicting mitigation measures of several individual projects are anticipated. There may occasionally be two or more homes under

construction along the unpaved Government Beach Road, but multiple construction sites would generate temporary disturbances to noise, traffic and scenic enjoyment. The adverse effects would be minor overall because of the general isolation and sparse population of the area, and no accumulation of adverse impacts would be expected. No special mitigation measures would be required beyond those mentioned above.

3.6. REQUIRED PERMITS AND APPROVALS

The following permits and approvals are required for the construction of the proposed single-family residence:

State of Hawai'i:
Conservation District Use Permit

County of Hawai'i:
Special Management Area Permit or Exemption
Plan Approval and Grubbing, Grading, and Building Permits

3.7. CONSISTENCY WITH GOVERNMENT PLANS AND POLICIES

Proposed construction and development should demonstrate consistency with government plans and policies. The proposed single-family residence demonstrates consistency with pertinent goals, plans, and policies as delineated in the County's General Plan, the District of Puna's Community Development Plan, and Special Management Area and Conservation District goals and guidelines.

3.7.1. Hawai'i County General Plan

The General Plan for the County of Hawai'i expresses the broad goals and policies for the long-range development of the island. It is organized into fourteen elements, with goals, policies, and standards for each. Included below are sections pertinent to the proposed project, as well as relevant discussion of the project's conformity to stated goals, policies, and standards.

Economic Goals

- §2.2 (a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
- §2.2 (b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.
- §2.2 (d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.

The proposed construction of the Carlson SFR would create temporary construction jobs for local residents, and would indirectly boost the economy through construction industry purchases from local suppliers. The SFR and its construction is designed to be in balance with the natural, cultural and social environment of the County, and such activities which would be generated primarily and cumulatively are in keeping with the overall economic development of the island.

Environmental Quality Goals

- §4.2 (a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
- §4.2 (b) Maintain and, if feasible, improve the existing environmental quality of the island.
- §4.2 (c) Control pollution.

Environmental Quality Policies

- §4.3 (a) Take positive action to further maintain the quality of the environment.

Environmental Quality Standards

- §4.4 (a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
- §4.4 (b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
- §4.4 (c) Federal and State environmental regulations shall be adhered to.

The proposed project would respect the natural resources of the land, in conformity with State and County regulations, and would not have substantial adverse effect on the environment. The structure and associated improvements would be compatible with existing rural SFRs in the SMA. The SFR would further allow direct and continual environmental stewardship of the project site and its biological and scenic resources, which might otherwise be threatened by illegal refuse dumping or disposal of hazardous substances and materials.

Flooding and Other Natural Hazards Goals

- §5.2 (a) Protect human life.
- §5.2 (b) Prevent damage to man-made improvements.
- §5.2 (c) Control pollution.
- §5.2 (d) Prevent damage from inundation.
- §5.2 (e) Reduce surface water and sediment runoff.
- §5.2 (f) Maximize soil and water conservation.

Flooding and Other Natural Hazards Policies

- §5.3 (a) Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
- §5.3 (g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

Flooding and Other Natural Hazards Standards

- §5.4 (a) "Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
- §5.4 (b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
- §5.4 (c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
- §5.4 (d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.
- §5.4 (e) Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

The project site lies within an area that FEMA has designated at minimal risk from tsunami inundation. However, the State of Hawai'i Flood Hazard Assessment Report classifies the area in which the project site lies as Special Flood Hazard Area Zone AO, because of its susceptibility to sheet-flow flooding. Flood hazard areas have been difficult to delineate in the Puna District because of a lack of defined drainage ways, due to the island's young geologic age, but systems have been proposed by the County to incorporate diversion channels to intercept and transport sheet-flow flooding in some communities. The project from its construction to its completion as a permanent residence will conform to applicable drainage regulations and policies determined for the County of Hawai'i. The property owners further understand the risk of lava flow and volcanic emission, and will proactively undertake all reasonable measures to minimize threat to human life and property damage, as advised in the County General Plan with respect to the education of home and real property owners, as well as the general public.

Historic Sites Goals

- §6.2 (a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.
- § 6.2 (b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

Historic Sites Policies

- §6.3 (a) Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.

- §6.3 (b) Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.
- §6.3 (c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
- § 6.3 (d) Public access to significant historic sites and objects shall be acquired, where appropriate.

There are no historic sites listed in the Hawai‘i County General Plan that are associated with the project site. An archaeological inventory survey conducted in late 2013 has confirmed evidence of an elevated coastal trail which is believed to have been built during Precontact times for shoreline access and distance travelling. A preservation plan will be submitted to DLNR-SHPD, and its implementation prior to construction of the proposed SFR along with adherence to the shoreline setback will ensure appropriate and responsible stewardship of this archaeologically and historically significant feature.

Natural Beauty Goals

- §7.2 (a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
- §7.2 (b) Protect scenic vistas and view planes from becoming obstructed.
- §7.2 (c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

Natural Beauty Policies

- §7.3 (a) Increase public pedestrian access opportunities to scenic places and vistas.
- §7.3 (b) Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.
- §7.3 (f) Consider structural setback from major thoroughfares and highways and establish development and design guidelines to protect important viewplanes.

The project site is not associated with any sites listed as examples of Natural Beauty Sites in the Puna District in Hawai‘i County’s General Plan nor with any Exceptional Tree. The improvements are consistent with traditional land use and will neither obstruct nor impede access to scenic vistas and places of public interest.

Natural Resources and Shorelines Goals

- §8.2 (a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.

- §8.2 (b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
- §8.2 (c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.
- §8.2 (d) Protect rare or endangered species and habitats native to Hawaii.
- §8.2 (e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.
- §8.2 (f) Ensure that alteration to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

Natural Resources and Shorelines Policies

- §8.3 (a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
- §8.3 (c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.
- §8.3 (d) Protect the shoreline from the encroachment of man-made improvements and structures.
- §8.3 (h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
- §8.3 (p) Encourage the use of native plants for screening and landscaping.
- §8.3 (r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
- §8.3 (u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Natural Resources and Shoreline Standards

- §8.4 (f) The Coastal Zone and Special Management Area as defined by statute and in accordance with the adopted objectives and guidelines.

The SFR would be set back approximately 120 feet from the shoreline, at an elevation of about 30 feet above MSL, and would not affect shoreline resources or likely be damaged by waves or tides. No rare or endangered plant or animal species has been identified on the parcel, however landscaping associated with the construction of the residence will give due consideration to native plants identified on the parcel, as well as the incorporation of additional native botanical species, if deemed viable and beneficial to the current ecosystem. The shoreline itself is not feasibly accessible from the cliff line of the property, and it is unlikely that the parcel would be considered a point of access for shoreline recreation or shoreline cultural practices. Nevertheless, access to the shoreline for any potential traditional and/or cultural practices will not be adversely impacted by the residence because it will be set back greater than 120 feet from the shoreline.

Housing Standards

- §9.4 (a) Building Code
- §9.4 (b) Electrical Code
- §9.4 (c) Plumbing Code
- §9.4 (d) Zoning Code
- §9.4 (f) Standards of the single-family and multiple residential land use.

The construction of the single-family residence at the project site will conform to all applicable codes.

Public Utilities Standards: Water & Sewer

- §11.2.3 (a) Public and private water systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.
- §11.6.3 (i) All wastewater disposal systems shall conform to the applicable provisions of Chapter 11-62, Hawaii Administrative Rules for the Department of Health to ensure proper treatment and disposal of wastewater and to prevent further contamination of waterways, underground water sources, and the coastal waters.

The water catchment tank, septic system, and wastewater system for the proposed residence will conform to all State and County requirements.

3.7.2. Puna Community Development Plan

A Community Development Plan (CDP) translates broad General Plan Goals, Policies, and Standards into implementation actions as they apply to a specific geographical region within the County. The following are goals for the preservation of Puna's natural, cultural, historic features and Puna's growth management as delineated in the Puna CDP which are pertinent to the proposed project.

Goals, Mālama I Ka ʻĀina

- §2.3.1 (b) Maintain and increase the quality of coastal waters.
- §2.4.1 (a) Shoreline biological, historical and cultural resources are adequately protected.

The 120-foot shoreline setback of the proposed project would ensure that shoreline resources and coastal waters would not be adversely impacted.

Goals, Managing Growth

- §3.1.1 (a) Puna retains a rural character while it protects its native natural and cultural resources.

- §3.1.1 (b) The quality of life improves and economic opportunity expands for Puna's residents.
- §3.1.1 (d) Exposure to high risk from natural hazards situations is reduced.
- §3.1.1 (f) Native vegetation, coastal and historic resources are provided new forms of protection.

The architectural design of the SFR gives full consideration to the area's rural character. The construction of the SFR would provide economic opportunity and improve quality of life for area residents by creating a market for services and discouraging illegal refuse dumping. Although the parcel is subject to the same volcanic and seismic hazard as the rest of the District, the SFR's proposed location on the parcel and architectural design minimizes risk from coastal hazard. The 120-foot shoreline setback will preserve coastal resources and native vegetation along the cliff-line. The historic wall and native vegetation along portions of the parcel's perimeter will also remain intact.

3.7.3. Hawai'i County Zoning and Special Management

The project site lies in a County Special Management Area (SMA) and would, therefore be subject to the regulatory authority of the Coastal Zone Management Program (CZMP). Single-family residences may be determined to be an exempt action under SMA guidelines. The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled *Coastal Zone Management*, because it would not affect public access to recreational areas, historic resources, scenic and open space resources, coastal ecosystems, or economic uses, and demonstrates reduced risk of major damage from coastal hazards. The proposed improvements are not likely to result in any substantial adverse impact on the surrounding environment. The SFR will be set back from the shoreline and will not adversely impact scenic resources in any substantial way.

The project is not anticipated to adversely impact the biological or economic aspects of the coastal ecosystem, nor is it expected to adversely affect any natural drainage to the nearby coastal system. Therefore, no adverse impacts on marine resources are likely to occur. The property contains mostly non-native vegetation and a few common native plants.

The parcel lies in an area which is susceptible to 1-to-3-foot sheet-flow flooding, but, as discussed in section 3.7.1 above, the project from its construction to its completion as a permanent residence will conform to applicable drainage regulations and policies determined for the County of Hawai'i.

A Cultural Impact Assessment has found no known cultural practices associated specifically with the parcel; however the cultural significance of the shoreline cannot be discounted. Strict observance to the shoreline setback will ensure that access to the shoreline for any potential traditional practices will not be adversely impacted by the presence of the proposed single-family residence. An archeological inventory survey conducted in late 2013 has confirmed evidence of an elevated coastal trail which is believed to have been built during Precontact times for shoreline access and distance travelling. A preservation plan

will be submitted to DLNR-SHPD, and its implementation prior to construction of the proposed SFR, along with adherence to the shoreline setback, will ensure appropriate and responsible stewardship of this archaeologically and historically significant feature.

The Planning Director will be requested, by means of SMA application, to make the determination that the proposed development of a single-family residence is not considered a "development" under Special Management Area Rules and Regulations of the County of Hawai'i, Section 9-4 (10) (B) and thereby not subject to an SMA Major Permit.

3.7.4. Conservation District

The State Land Use District for the project site is Conservation. Its subzone is Resource, for which, according to Hawai'i Administrative Rules (HAR) §13-5-15, a single-family residence is an identified use. Any proposed use must undergo an examination for its consistency with the goals and rules of this particular district and subzone. The applicant has concurrently prepared a Conservation District Use Application (CDUA), to which this EA is an appendix. The CDUA includes a detailed evaluation of the consistency of the project with the criteria of the Conservation District permit process. The following individual consistency criteria applies:

1. *The proposed land use is consistent with the purpose of the Conservation District:*

The development of the single-family residence (SFR) is in conformance with the purpose of the Conservation District. The proposed use of the subject property for a SFR is an identified use within the Conservation District, requiring a Board Permit for such use. A commitment by the applicants to the management of the site will conserve, protect and preserve the natural features on the subject property. The proposed use will not impact the public's ability to utilize the coastal resources in the vicinity of this property. Additionally, due to the careful and limited nature of the proposed development, there would be no significant impacts to natural or cultural resources in the general area of the property.

2. *The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur:*

The objective of the Resource subzone "*…is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas."* This identified use, which conforms to the design standards in 13-5-41, will ensure the sustained use of the natural resources in the project site by mitigating potential impacts as outlined in this document. SFRs are an identified use in the Resource subzone under HAR 13-5-24, R-8.

3. *The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawaii Revised Statutes (HRS), entitled "Coastal Zone Management," where applicable:*

The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawai‘i Revised Statutes (HRS), entitled *Coastal Zone Management*, as discussed in Section 3.7.3 above.

4. *The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region:*

The proposed land use is not likely to cause adverse biological impacts because of the relatively minor nature of the project and lack of endangered plant species on the project site. Although the endangered Hawaiian hoary bat and Hawaiian Hawk have not been observed on the project site, negative impact to these species will be avoided through limited, appropriate and careful vegetation removal. The construction of the proposed SFR will ensure management of the property and prevent illegal refuse dumping.

5. *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel:*

The proposed use is consistent with single-family residential use in the area. The SFR is designed as a one-story dwelling with a total of 3371 square feet, and will be set back 120 feet from the shoreline. All lighting will be shielded in conformity with County and State guidelines for the safety, welfare, and preservation of native birds, bats, and insects. The identified use conforms to design standards set forth in HAR 13-5-41, and mitigation measures will be implemented to ensure sustained use of the natural resources in the general area of the project site. The use will not adversely affect the surrounding properties or how these properties are utilized.

6. *The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved:*

The proposed use of the subject property and management of the site will help conserve, protect and preserve the natural features of the area. The physical beauty of the existing parcel will be preserved by leaving substantial portions of vegetation in place and promoting the growth of native plant species.

7. *Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District:*

The proposed land use does not involve subdivision of land and will not lead to any increase in intensity of use beyond the requested SFR.

8. The proposed land use will not be materially detrimental to the public health, safety and welfare:

The proposed land use for a SFR on the subject property is consistent with land use on other parcels in the Conservation district, and will not be detrimental to the public health, safety, and welfare.

Section 4. Determination, Findings, and Reasons

4.1. DETERMINATION

The applicants expect that the State of Hawai‘i Board of Land and Natural Resources will determine that the proposed action will not significantly alter the environment, as impacts will be minimal, and request that this agency will accordingly issue a Finding of No Significant Impact (FONSI). This determination will be reviewed based on comments to the Draft EA, and the Final EA will present the final determination.

4.2. FINDINGS AND SUPPORTING REASONS

1. *The proposed project will not involve an irrevocable commitment to loss or destruction of any natural or cultural resource:*

No valuable natural or cultural resource would be irrevocably lost or destroyed. No rare or endangered species are present and native species would be fostered. A preservation plan has been submitted to DLNR-SHPD for archaeological sites which exist on the property; strict adherence to the preservation plan as approved by DLNR-SHPD would ensure that these features, which are not found in the developable portion of the parcel, will not be adversely impacted. No valuable cultural resources and practices such as coastal access, fishing, gathering, hunting, or access to ceremonial sites would be affected in any way, but, rather, adherence to the shoreline setback will ensure continued access to coastal cultural resources.

2. *The proposed project will not curtail the range of beneficial uses of the environment:*

No restriction of beneficial uses would occur by residential use on this lot.

3. *The proposed project will not conflict with the State's long-term environmental policies or goals and guidelines:*

The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is minor and is consistent with all elements of the State's long-term environmental policies.

4. *The proposed project will not substantially affect the economic or social welfare of the community or State:*

The project would not have any substantial effect on the economic or social welfare of the Puna community, the County of Hawai‘i or the State of Hawai‘i.

5. *The proposed project does not substantially affect public health in any detrimental way:*

The project would not affect public health and safety in any way. Disposal of wastewater and municipal refuse will conform to State Department of Health (DOH) regulations.

6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*:

The proposed project is minor in scale and would therefore not produce any major secondary impacts, such as population changes or effects on public facilities.

7. *The proposed project will not involve a substantial degradation of environmental quality*:

The project is minor—a 3371-square-foot residence on an approximately 152,460-square-foot parcel—and would not likely contribute to environmental degradation.

8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat:*

A thorough biological survey has determined that no endangered plant species are present. No rare, threatened or endangered species of fauna were observed on the project site and none have been documented to exist in population on or near the project site. However, mitigation measures for the removal of vegetation will be observed in order to avoid adverse impact on bats, hawks, and other creatures should evidence of nests, roosts, or burrows be found on the project site prior to or during the construction phase.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions:*

The adverse effects of building a SFR are minor and the disturbance to traffic, noise, and scenic vistas during construction would be temporary. The isolation of the area and infrequent use of the unpaved Government Beach Road by the general public would avert accumulation of adverse construction effects. No special mitigation measures should be required to counteract the minor adverse cumulative effect, other than those already indicated in 3.1.7 above.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels:*

No substantial effects to air, water, or ambient noise would occur. Intermittent and temporary effects would occur during construction and would be mitigated.

11. *The project does not affect nor would it likely be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area:*

The proposed home will have a seven-foot post and pier elevation, which is anticipated to substantially reduce damage from sheet-flow inundation. The proposed location of the residence on the parcel is approximately 30 feet above MSL and approximately 120 feet from the shoreline, located above historically-recorded tsunami wave heights along the coast in the vicinity of the parcel. Geologic hazards exist for all areas of Hawai‘i County, but the project site does not lie within the Lava Flow Hazard Zone at greatest risk.

12. *The project will not substantially affect scenic vistas and view planes identified in county or state plans or studies.*

No scenic views would be affected, due to adherence to shoreline setback of the SFR.

13. *The project will not require substantial energy consumption.*

Energy consumption for construction of the project and to accommodate everyday living needs after completion would be typical for that of single-family residences of approximate size in the area, and substantial energy consumption would not be necessary to support the functionality of the residence.

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Appendix A. Comment Letters to Draft EA and Responses

(To be included in Final EA)

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Appendix B. Figures

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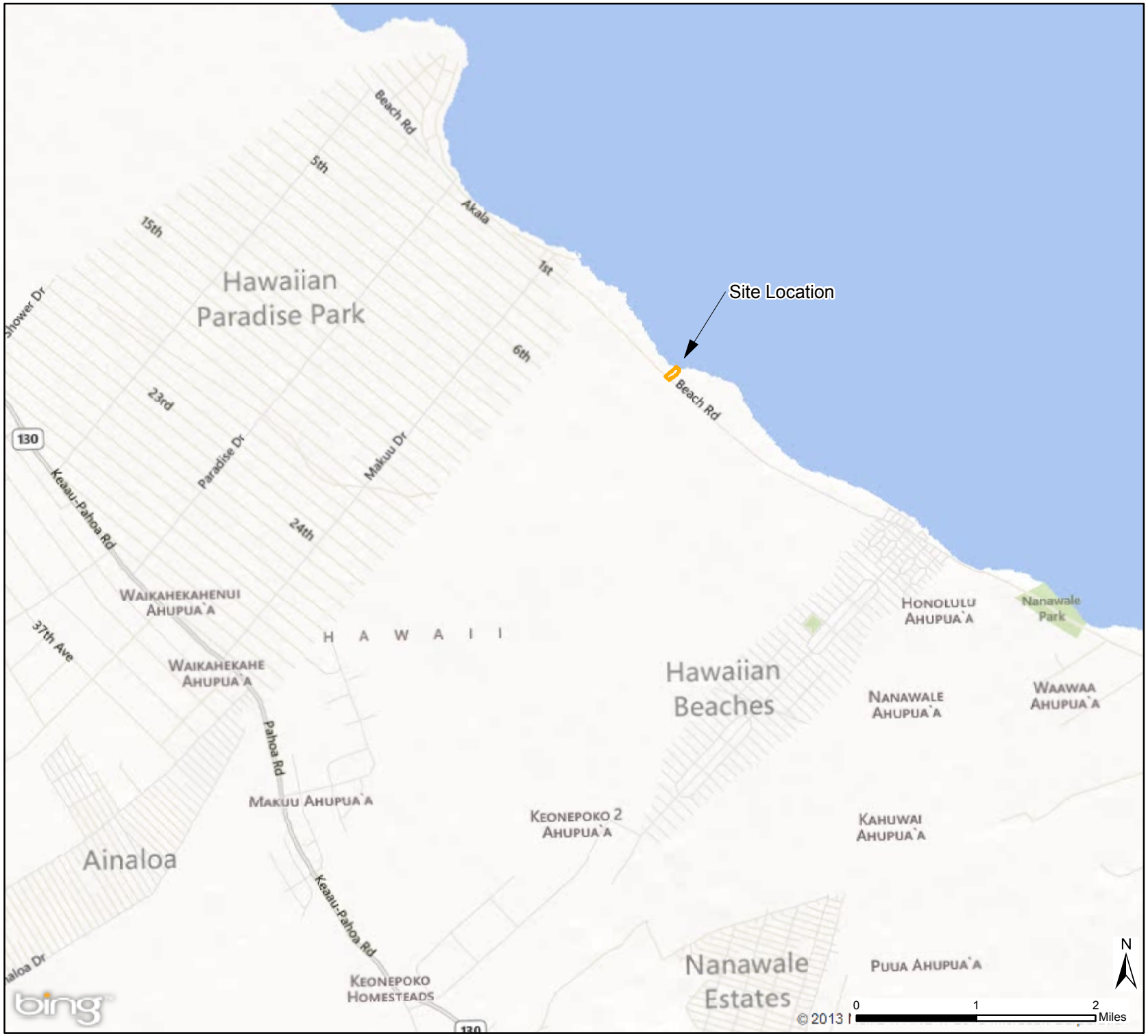

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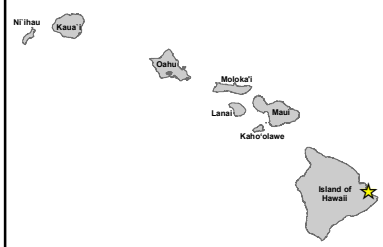

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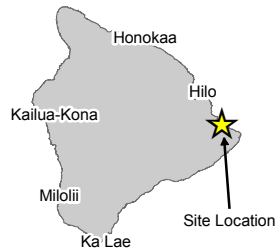

LEGEND

Approximate TMK Boundary

NOTES

1) Base Map: Bing, 2013
2) Vector Data: Hawaii Statewide GIS Program, 2013
3) Map Projection: UTM Zone 4 NAD83

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 1**
TITLE:	**SITE LOCATION**

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Construction Management - Environmental Consulting - Geomatics

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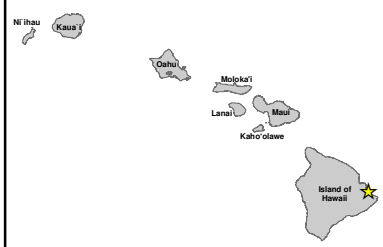

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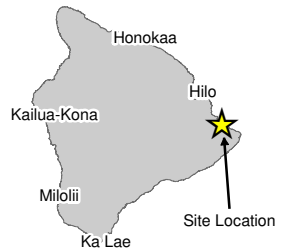

LEGEND

- Approximate TMK Boundary
- Neighboring TMK Boundaries

NOTES

1) Aerial Photo Source: As Shown
2) Vector Data: Hawaii Statewide GIS Program, 2013
3) Map Projection: UTM Zone 4 NAD83

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 2**
TITLE:	TAX MAP KEY LOCATION & SURROUNDING PARCELS

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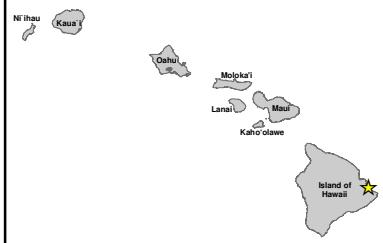

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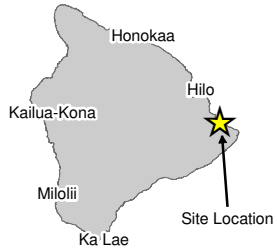

LEGEND

- Approximate TMK Boundary
- Neighboring TMK Boundaries
- Conservation District (Subzone: Restricted)
- Special Management Area

NOTES

1) Aerial Imagery Souce: As Shown
2) Vector Data: Hawaii Statewide GIS Program, 2013
3) Map Projection: UTM Zone 4 NAD83

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 3**
TITLE:	CONSERVATION DISRICT & SPECIAL MANAGEMENT AREA

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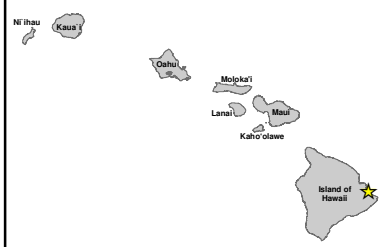

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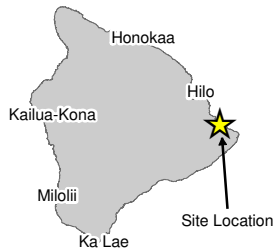

LEGEND

- Approximate TMK Boundary
- Neighboring TMK Boundaries
- Contour Line (20 ft)

NOTES

1) Base Map: Google Earth, 2013
2) Vector Data: Hawaii Statewide GIS Program, 2013
3) Map Projection: UTM Zone 4 NAD83

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 4**
TITLE:	**SITE LAYOUT**

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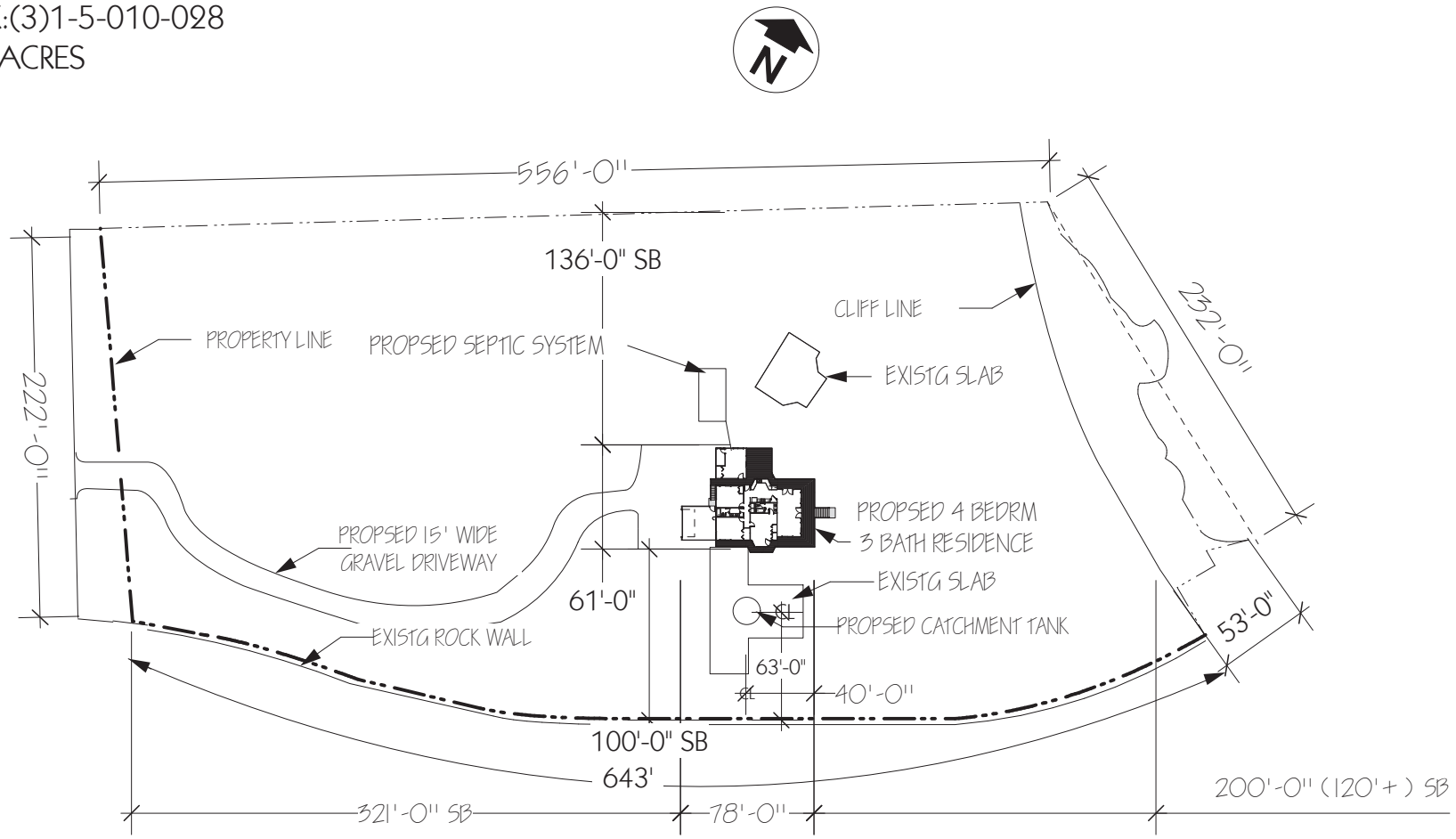
CARLSON,DARRIN NEAL & CARLSON,DEBRA LOUISE
15-2225 GOVERNMENT BEACH RD
ISLAND AND COUNTY OF HAWAII
STATE OF HAWAII
TMK:(3)1-5-010-028
3.5 ACRES



PLOT PLAN

Scale: 1" = 100 ft

1/25/2014 5:07:34 PM

Source: Big Island Package Homes

FIGURE 5
PLOT PLAN

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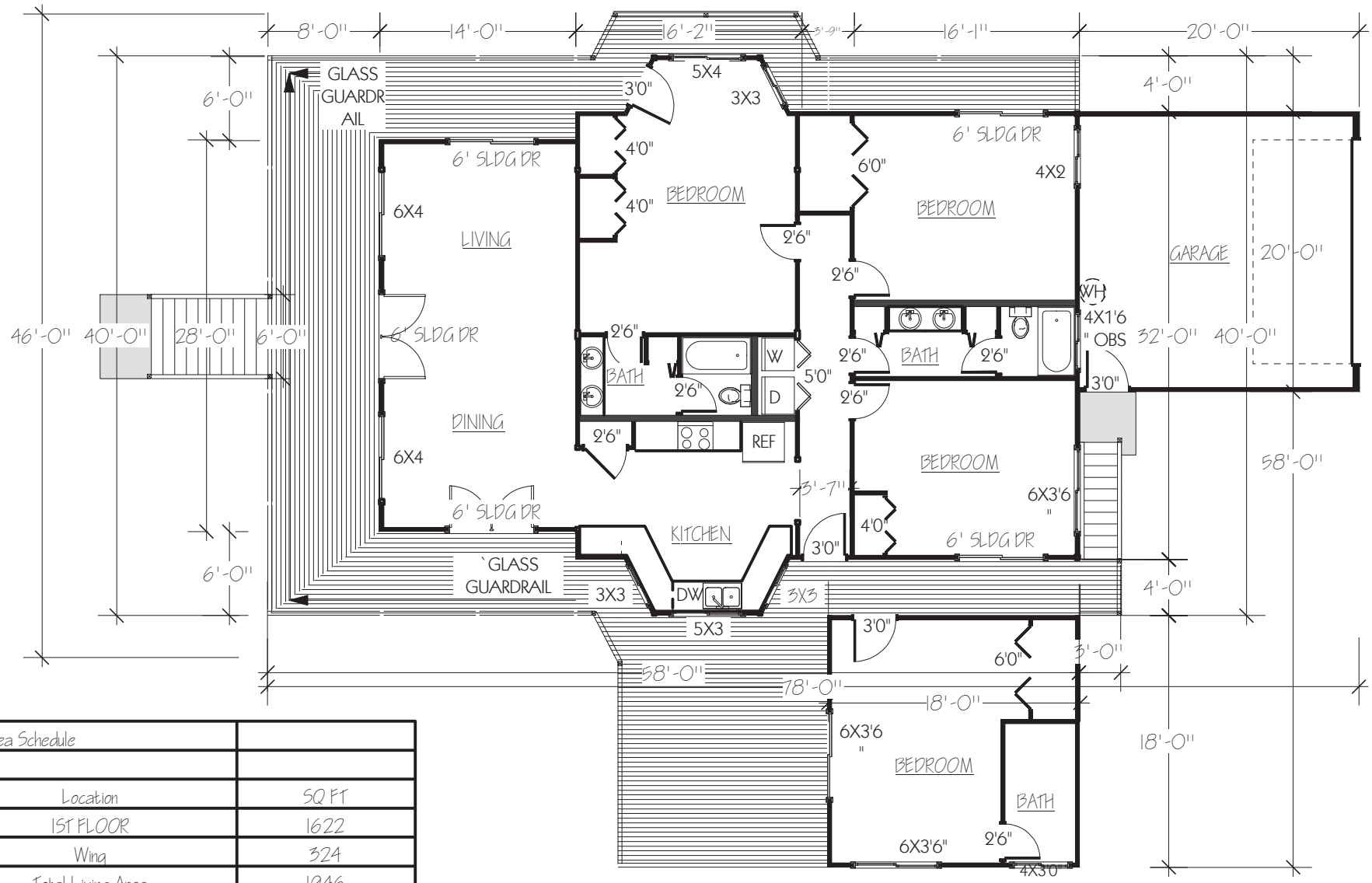

Floor Area Schedule	
Location	SQ FT
1ST FLOOR	1622
Wing	324
Total Living Area	1946
FRONT DECK	524
SIDE DECK 1	93
SIDE DECK 2	87
WING DECK	276
SIDE DECK 3	45
GARAGE	400
Total Accessory Area	1425

FLOOR PLAN

SCALE: 3/32"=1'

PROPOSED RESIDENCE FOR:
CARLSON, DARRIN NEAL &
CARLSON, DEBRA LOUISE

Source: Big Island Package Homes

FIGURE 6
FLOOR PLAN

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OWNER: DARRIN AND DEBRA CARLSON
TMK: (3) 1-5-010: 028
LOT SIZE: 3.5 ACRES
LOCATION: 15-2225 GOVERNMENT BEACH ROAD, PAHOA, PUNA
NO. BEDROOMS: FOUR

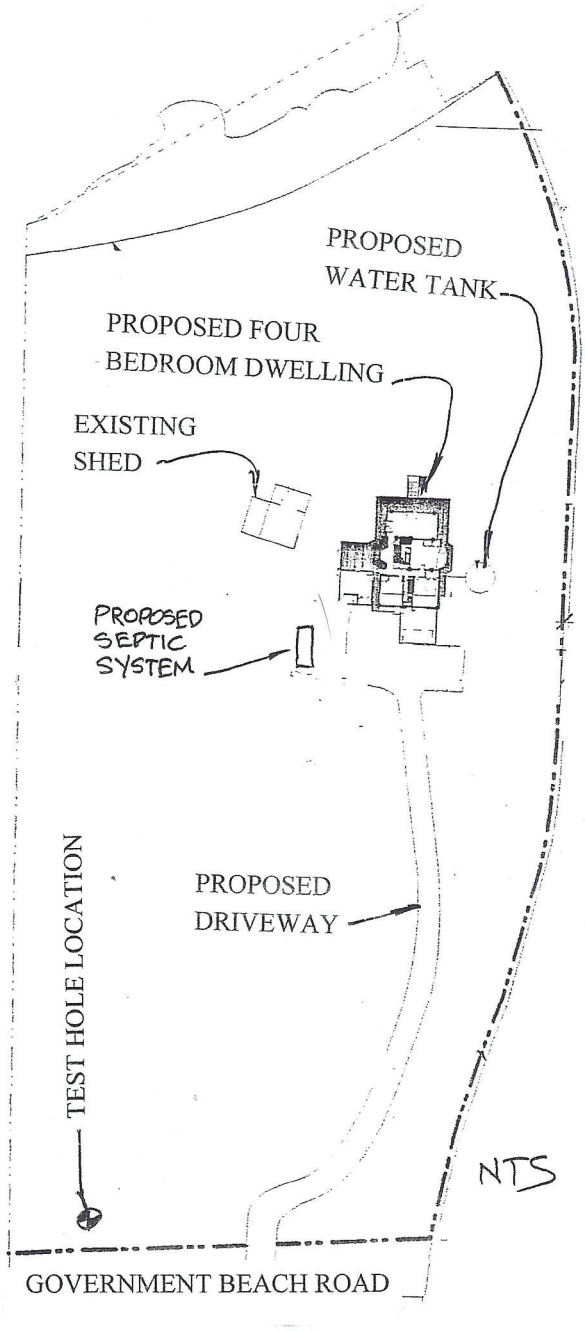
ONLY CONTRACTORS WITH THE FOLLOWING LICENSES ARE PERMITTED TO CONSTRUCT SEPTIC SYSTEMS: C-9 CESSPOOL, C-37 PLUMBING, C-37a SEWER AND DRAIN LINE, C-43 SEWER, SEWER DISPOSAL, DRAIN AND PIPE LAYING, AND "A" GENERAL.

CONTRACTOR CANNOT BEGIN CONSTRUCTION OF SEPTIC SYSTEM UNTIL AFTER APPROVAL OF BUILDING PERMIT.

NOTE: MINIMUM SEPARATIONS FOR SEPTIC TANK
PROPERTY LINE - 5'
BUILDING LINE - 5'
STREAM OR POND - 50'
LARGE TREES - 5'
SEEPAGE PIT - 5'

NOTE: MINIMUM SEPARATIONS FOR SOIL ABSORPTION SYSTEM
PROPERTY LINE - 5'
BUILDING LINE - 5'
STREAM OR POND - 50'
LARGE TREES - 10'
SEEPAGE PIT - 5'

OWNER SHALL PREVENT VEHICULAR TRAFFIC OVER SEPTIC SYSTEM



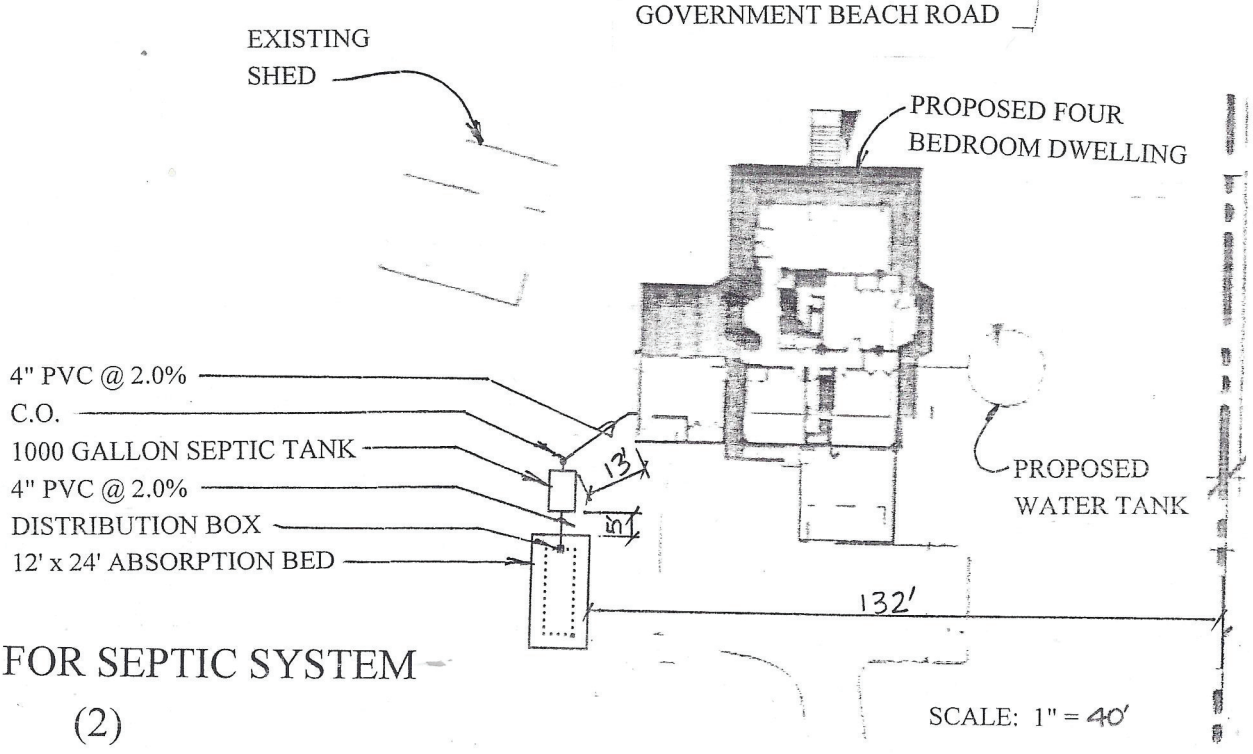


FIGURE 7
SITE PLAN FOR SEPTIC SYSTEM

SITE PLAN FOR SEPTIC SYSTEM

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RIGHT ELEVATION

SCALE: 3/32"=1'

LEFT ELEVATION

SCALE: 3/32"=1'

PROPOSED RESIDENCE FOR:
CARLSON, DARRIN NEAL &
CARLSON, DEBRA LOUISE

Source: Big Island Package Homes

FIGURE 8
RIGHT & LEFT ELEVATIONS

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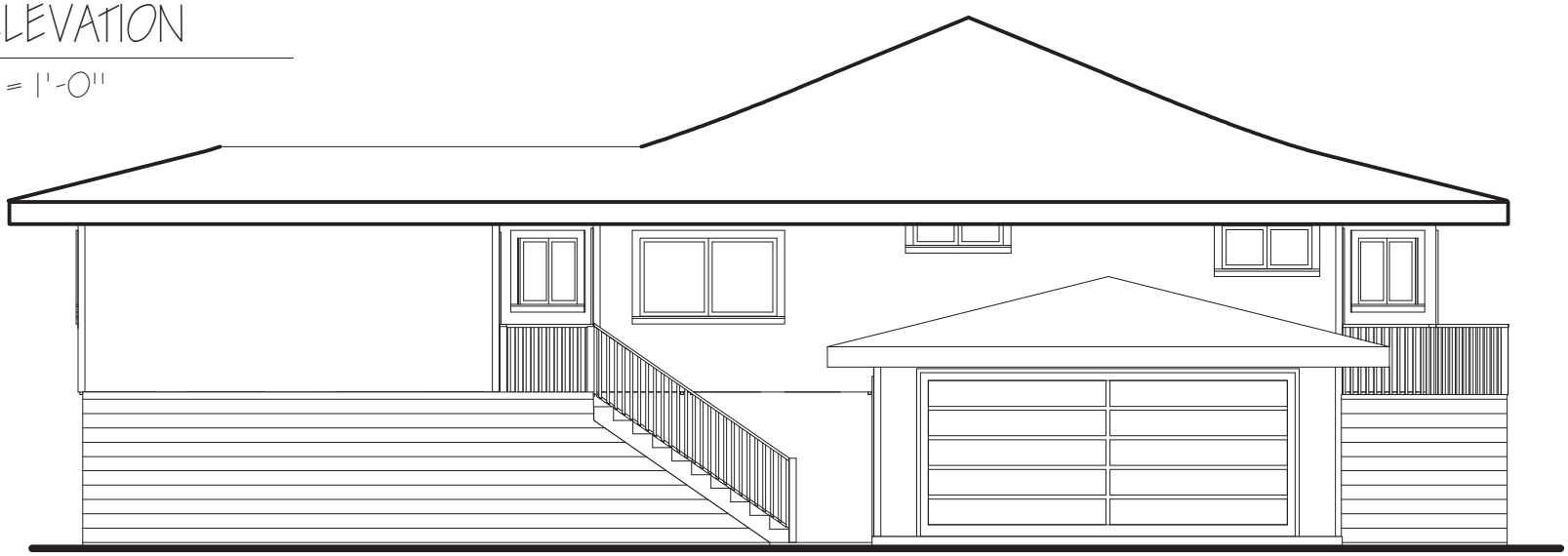
FRONT ELEVATION

Scale: 1/8" = 1'-0"



BACK ELEVATION

Scale: 1/8" = 1'-0"

PROPOSED RESIDENCE FOR:
CARLSON, DARRIN NEAL &
CARLSON, DEBRA LOUISE

Source: Big Island Package Homes

FIGURE 9
FRONT & BACK ELEVATIONS

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Figure 10: View to NE of existing concrete slab near SE parcel boundary at the end of existing driveway

Figure 11: View to N of existing concrete slab near NW parcel boundary with remains of torn-down shed in background

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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Figure 12: View of existing driveway & rock wall running S to Government Beach Road

Figure 13: View of parcel to the W, toward neighboring (vacant) parcel

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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NOTES:
1) Scale is approximate
2) No additional planting is planned. Vegetation depicted shows existing. Landscape changes limited to grass cutting.
3) Future landscaping will be limited to native species

LOT 3

EXISTING HISTORIC ROCK WALL (SIHP SITE 18419)

TRUE NORTH

APPROXIMATE LOT BOUNDARY

20' SETBACK

GOVERNMENT RD. (10' WIDE)

EXISTING HISTORIC ROCK WALL (SIHP SITE 18419)

PROPOSED SEPTIC SYSTEM

EXISTING CONCRETE PAD

LOT 4
3.50 ACRES±
TMK 1-5-010: 028

TRAIL REMNANT (SIHP SITE 18418)

APPROXIMATE LOCATION OF CLIFF LINE

APPROXIMATE LOCATION OF SHORELINE

PROPOSED RESIDENCE

PROPOSED DRIVEWAY

PROPOSED WATER CATCHMENT TANK

EXISTING CONCRETE PAD

20' SETBACK

HALA GROVE

APPROXIMATE LOT BOUNDARY

LOT 5

- Autograph
- Coconut
- Hala
- Ironwood
- Shrub
- Tree
- Naupaka

0' 50' 100'
SCALE IN FEET

Date: January 9, 2014

LANDSCAPE PLAN

of Lot 4, of the Subdivision of a Portion of Grant 1537 to Kapohano, at Halona and Popoki, Puna, Island and County of Hawaii, Hawaii

TMK(3)1-5-010: 028

Native Technologies
P.O. Box 2998
Honolulu, HI 96822
(808) 620-6332

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Figure 15: View to SE of sea cliff and rocky beach, toward neighboring parcel 29

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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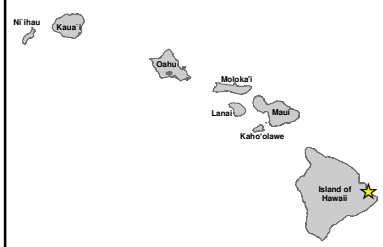
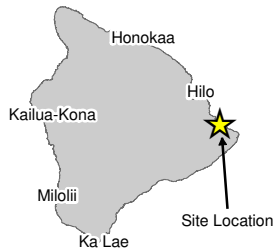
INSET 1



INSET 2



LEGEND

- Approximate TMK Boundary
- Neighboring TMK Boundaries
- Lava Flow Hazard Flow Zone

NOTES

1) Aerial Imagery Souce: As Shown
2) Map Projection: UTM Zone 4 NAD83
3) Lava Flow Hazard Zones:
Original: U.S. Department of the Interior / Geological Survey
Digitized by the Office of Planning for the USGS, Hawaii Volcanos Obervatory, 1991.
Retreived from Hawaii Statewide GIS Program, 2013

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 16**
TITLE:	**Lava Flow Hazard Zones**

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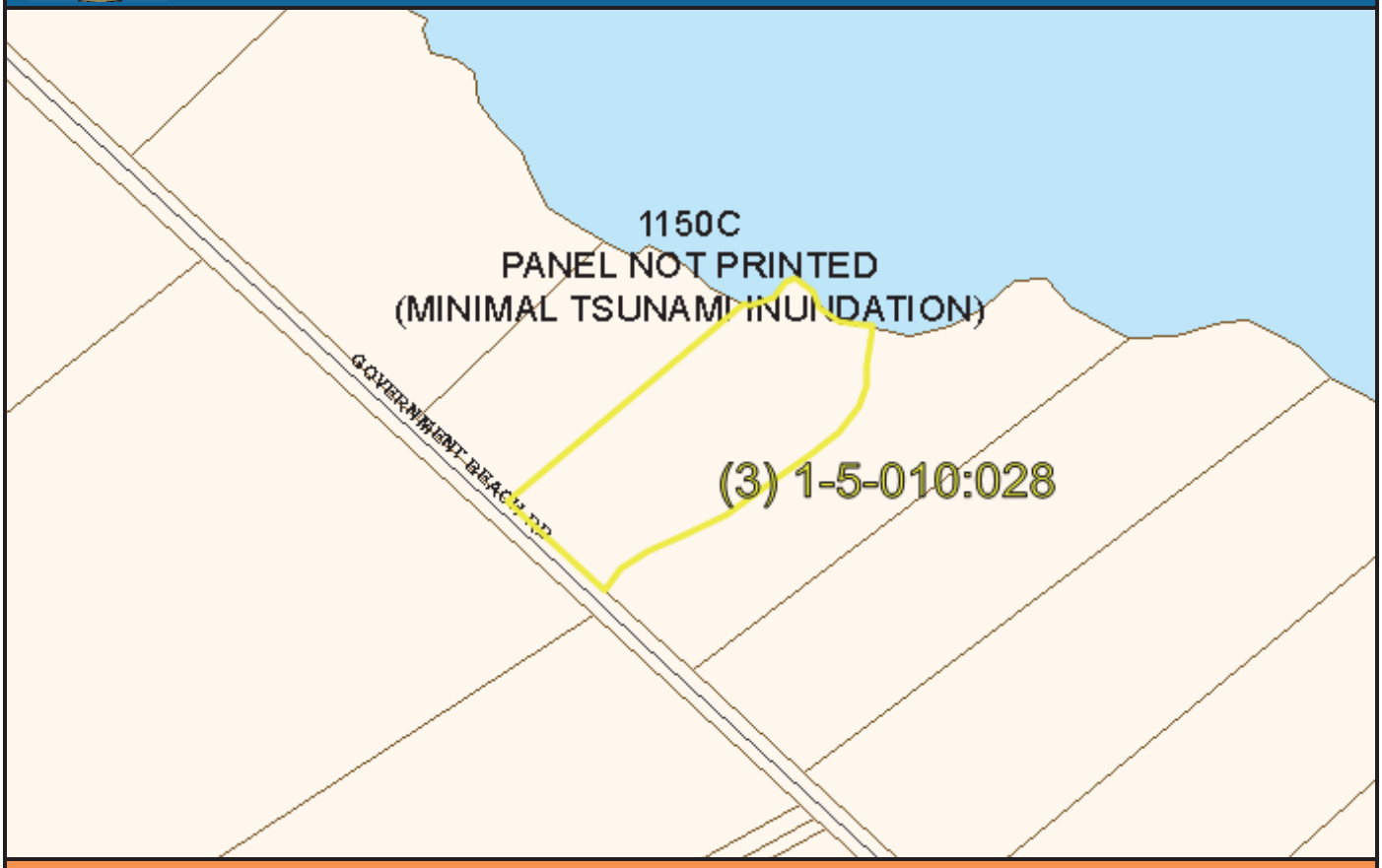
State of Hawaii

FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HAWAII
TMK NO:	(3) 1-5-010-028
PARCEL ADDRESS:	15-2225 GOVERNMENT BEACH ROAD KEAAU, HI 96749
FIRM INDEX DATE:	APRIL 02, 2004
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	1551661150C
PANEL EFFECTIVE DATE:	PANEL NOT PRINTED

PARCEL DATA FROM:	JUNE 2013
IMAGERY DATA FROM:	MAY 2005

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
County of Hawaii	
Frank DeMarco, CFM	(808) 961-8042
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

FIGURE 17

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Figure 18: View to NE across parcel, to the sea from existing driveway

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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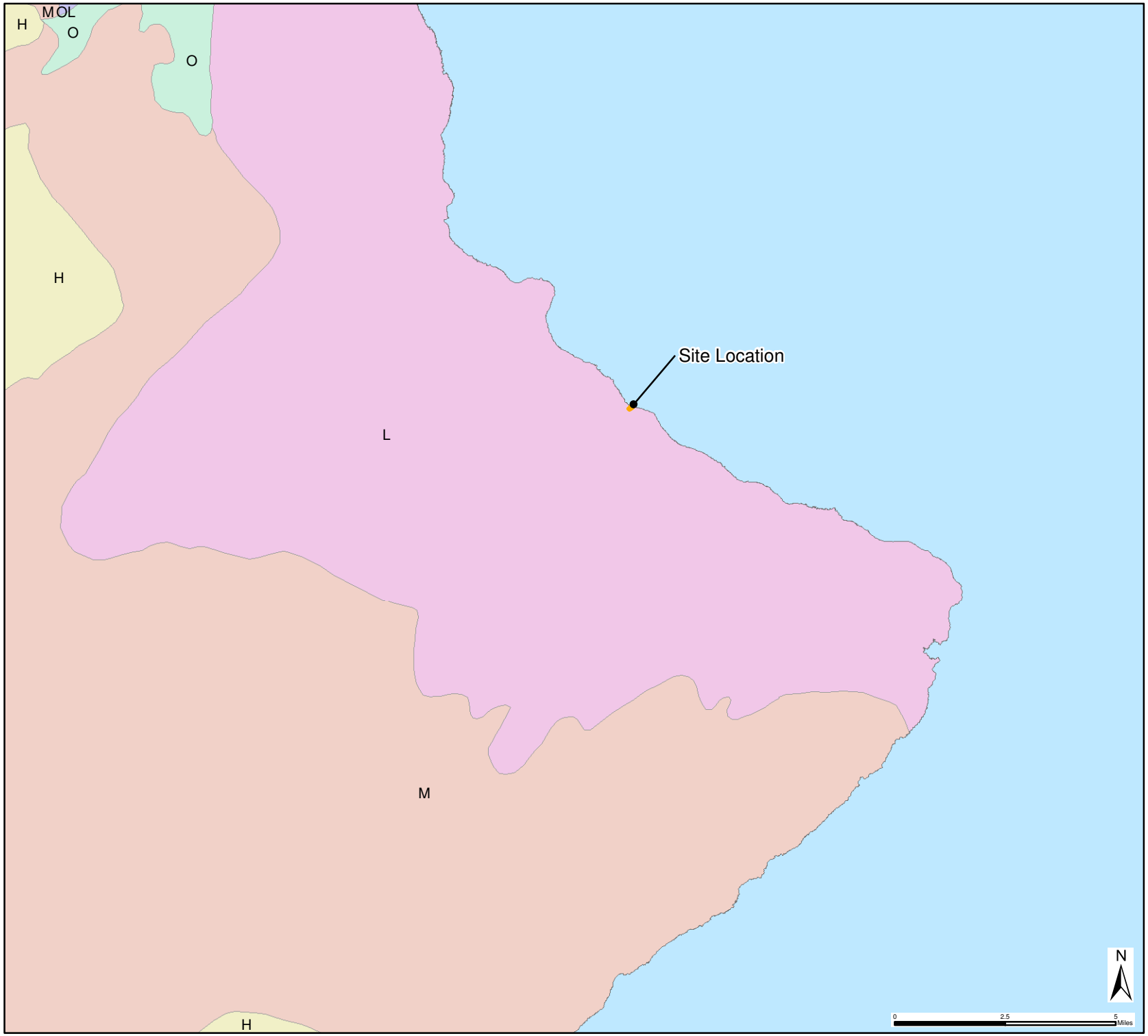

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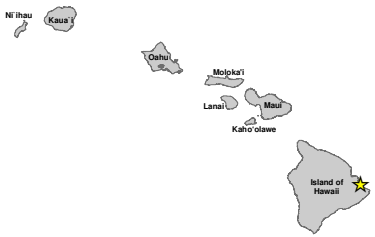

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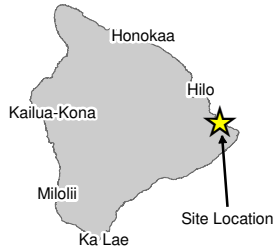

LEGEND

Approximate TMK Boundary

Threatened and Endangered Plants

(Density)

- H: High concentration of T&E species
- L: Low concentration of T&E species.
- M: Medium concentration of T&E species.
- O: Little or no T&E species.
- OL: O in cane fields, L in gullies and coastal areas.
- VH: Very high concentration of T&E species.

NOTES

1) Endangered plant data from Hawaii Statewide GIS Program.
Original Data Source:
Digitized from Division of Forestry and Wildlife's
mylar threatened and endangered (T&E) plant species maps.
The maps were all at a scale of 1:62,500 except Hawaii,
which was at a scale of 1:250,000. DOFAW's maps were created using
The Nature Conservancy's Rare & Endangered Species maps.
Digitized by the Office of Planning from source describe above,
March, 1992.

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 19**
TITLE:	**Threatened and Endangered Plants**

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Figure 20: View to NW of cliff line

Figure 21: View to NE of hala grove, approaching cliff-line

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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Figure 22: View to NE of ironwood trees & grasssland, toward ocean

Figure 23: View to SE of various vegetation along southeastern border

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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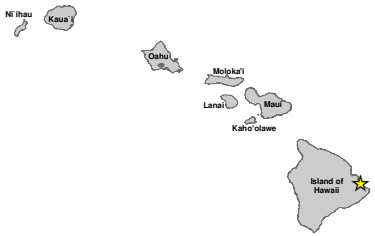
INSET 1



INSET 2

LEGEND

Approximate TMK Boundary

Neighboring TMK Boundaries

ZONING CODES
A-1a Agricultural District (minimum building site of 1 acre)
A-5a Agricultural District (minimum building site of 5 acres)
OPEN: Open District

NOTES

1) Zoning Data: County of Hawaii, Planning Dept, Sept. 2012
2) Map Projection: UTM Zone 4 NAD83

PROJ. NO.	13007001
PROJ. NAME:	CARLSON RESIDENCE EA
DRAWN BY:	L.KING
DATE:	10/20/2013
FIGURE:	**FIGURE 24**
TITLE:	**COUNTY ZONING**

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Figure 25: View to E of neighboring SFR on parcel 29

Figure 26: View to N of unpaved Government Beach Road

Project Information:	**Reconnaissance Information:**	
Project: Carlson EA	Taken By: L.KING Date: 10/13/2013	Native Technologies Native Technologies LLC P.O Box 2998, Honolulu, HI 96822 www.nativetechs.com

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Appendix C. Cultural Assessment

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Cultural Impact Assessment for Proposed Development Activities on TMK: (3) 1-5-10:028

Pōpōkī Ahupuaʻa
Puna District
Island of Hawaiʻi

Prepared by:

Robert B. Rechtman, Ph.D.
and
Lauren Kepaʻa

Prepared for:

Mr. Lincoln King
Native Technologies
3449 Kaimuki Ave.
Honolulu, Hawaiʻi 96816

January 2014

ASM Affiliates, Inc.
507 A East Lanikaula St.
Hilo, Hawaii 96720
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Archaeology • History • Ethnography • Architectural History
Office: (808) 969-6066 • Fax: (808) 443-0065

ASM Project No. 21370

Cultural Impact Assessment for Proposed Development Activities on TMK: (3) 1-5-10:028

Pōpōkī Ahupuaʻa
Puna District
Island of Hawaiʻi

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507 A East Lanikaula St.
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www.asmaffiliates.com
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Office: (808) 969-6066 • Fax: (808) 443-0065

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1. INTRODUCTION

At the request of Mr. Lincoln King of Native Technologies, Inc., on behalf of the landowner, ASM Affiliates, Inc. has prepared this Cultural Impact Assessment (CIA) to accompany an Environmental Assessment and a Conservation District Use Application associated with proposed development activities on TMK: (3) 1-5-10:028 located in Pōpōkī Ahupua‘a, Puna District, Island of Hawai‘i (Figures 1 and 2). This 3.5 acre parcel is a portion of a former land grant (Grant 1537) sold to Kapohana in 1855, and is currently situated within the State Conservation District. It is located southeast of the Hawaiian Paradise Park residential subdivision between the old Government Road (the Government Beach Road) and the coast at elevations ranging from 15 to 50 feet above sea level. The parcel is bounded along its *makai* edge (to the northeast) by sea cliffs (Figure 3), to the south-southeast by a privately owned, developed residential parcel (Parcel 29), to the north-northwest by a privately owned, undeveloped residential parcel (Parcel 27), and along its *mauka* edge by the old Government Road (Figure 4). A core-filled wall is present along the *mauka* and southeastern boundaries of the study parcel. Access to the parcel is through a gated driveway along the *makai* edge of the old Government Road (Figure 5). The driveway extends through a bulldozed gap in the wall across the southeastern portion of the project area towards the coast (Figure 6). Two modern concrete slabs are present in the *makai* portion of the study parcel; one near the southeastern boundary at the termination of the driveway (Figure 7), and another (once the location of a wooden structure that was recently torn down) near the northwestern boundary (Figure 8). A wire fence line extends from the coast at the study parcel’s northern corner to the wall at the old Government Road (Figure 9), but does not follow the project area boundary, which was recently marked with lathe and flagging tape by surveyors. Other fences enclose an area between the driveway and the fence line near the northwestern boundary, inland of the two concrete slabs (Figure 10).

Terrain within the project area slopes gently to the northeast and consists of mixed *‘a‘ā* and *pāhoehoe* lava flows (primarily *pāhoehoe*) that originated from Kilauea Volcano 450 to 700 years ago (Wolfe and Morris 1996). Soils in this area are classified as Opihikao extremely rocky muck (Sato et al. 1973). This soil typically consists of a thin layer of very dark brown muck about three inches thick that is generally underlain by *pāhoehoe* lava bedrock, and is strongly acidic. The muck is rapidly permeable, and the lava is very slowly permeable, but water moves rapidly through the cracks. Runoff is slow, and the erosion hazard is slight. Roots are matted over the *pāhoehoe* lava, but they can penetrate the cracks to a depth of two feet (Sato et al. 1973). This area typically receives 60 to 100 inches of rain per year (Jurvik and Jurvik 1998:57). Nearly the entire study parcel, with the exception of a small area in the west corner, has been previously bulldozed, and was once mowed lawn and pasture. Owing to this bulldozing, vegetation across much of the project area consists of a secondary growth of tall molasses grass (*Melinis minutiflora*), with stands of ironwood trees (*Casuarina equisetifolia*), *hala* (*Pandanus odoratissimus*), coconut palms (*Cocos nucifera*), guava (*Psidium guajava*), and autograph trees (*Clusia rosea*), along with various other non-native grasses, vines, weeds, and ferns, also present. The graded ground surface across the bulldozed portion of the project area consists of cobbles and thin soil, but in the western corner of the parcel, where a thick over story of vegetation shades out the ground cover, undisturbed *pāhoehoe* bedrock is present. Some *naupaka* (*Scaevola sericea*), *hala*, and coconut palms are also growing near the sea cliffs.

Aerial photographs from 1954 and 1977 show that the current project area was covered with low vegetation during the middle to late twentieth century (rather than *hala* forest) and was likely used as pasture land (Figures 11 and 12). Rosendahl (1989) indicates that the study parcel had been cleared with a bulldozer prior to the late 1980s. According to the neighbor living on the adjoining residential parcel to the southeast (Parcel 29) of the study parcel, a former owner of TMK:3-1-5-10:28 poured the two concrete slabs currently extant on the property, but passed away before building a house. At one point the entire parcel was mowed lawn. A 2012 aerial photograph shows the roof of the structure that was recently removed from the slab near the northwestern boundary of the study parcel and a mowed area surrounding it (Figures 13 and 14).

The current study parcel was subject to an archaeological inventory survey conducted by ASM Affiliates, Inc. (Dircks Ah Sam and Rechtman 2013), as a result of which, two previously recorded archaeological sites (SIHP Sites 18419 and 18418) were identified. These sites were originally identified on the neighboring parcel to the southeast by Charvet-Pond and Rosendahl (1993), and include a core-filled wall (Site 18419 Feature A) and a trail section (a portion of Site 18418 Feature A). Both sites were recommended for preservation. The bulk of the study area, with the exceptions of the locations of the two recorded sites and a small area in the parcel’s western corner had been previously bulldozed. There were no archaeological features observed on the unmodified *pāhoehoe* bedrock in the western corner of the study parcel, nor were any resources observed with the bulldozed portion of the parcel.

Figure 1. Project area location map.

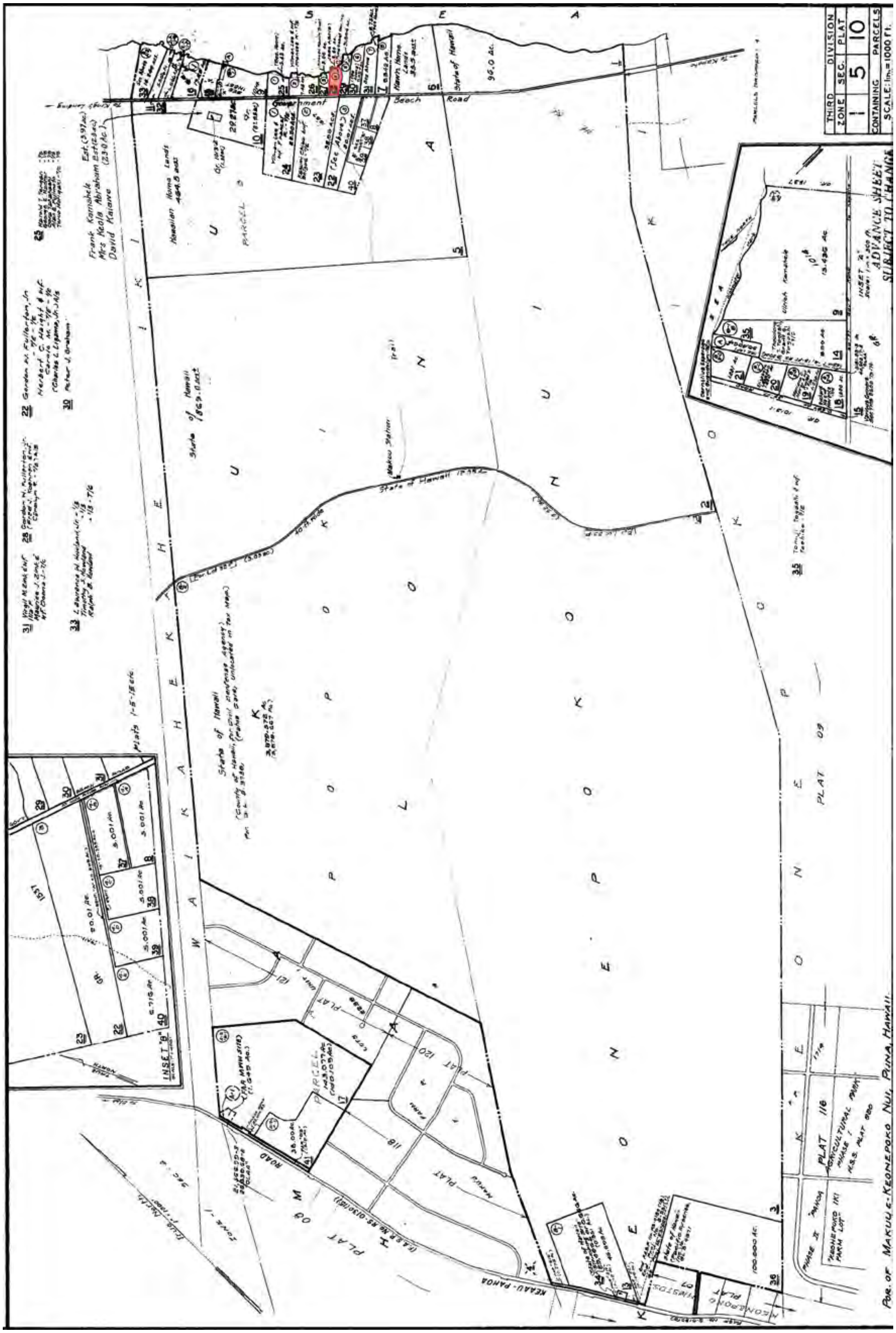

Figure 2. Tax Map Key (TMK):3-1-5-10 showing the current study parcel (Parcel 028) shaded red.

Figure 3. *Makai* boundary of the current study parcel at the coast, view to the northwest.

Figure 4. Old Government Road along the *mauka* edge of the current study parcel, view to the southeast.

Figure 5. Access road to the current study parcel extending *makai* from the old Government Road, view to the west.

Figure 6. Driveway extending across the southeastern portion of the study parcel, view to the west.

Figure 7. Concrete slab foundation near the southeast boundary of the study parcel, view to the north.

Figure 8. Concrete slab located near the northwestern boundary of the study parcel, view to the north.

Figure 9. Fence line that extends between the coast and the wall at the old Government Road near the northwestern boundary of the study parcel, view to the southwest.

Figure 10. Fence line crossing the central portion of the study parcel, view to the northwest.

Figure 11. 1954 aerial photograph showing the current study parcel outlined in red.

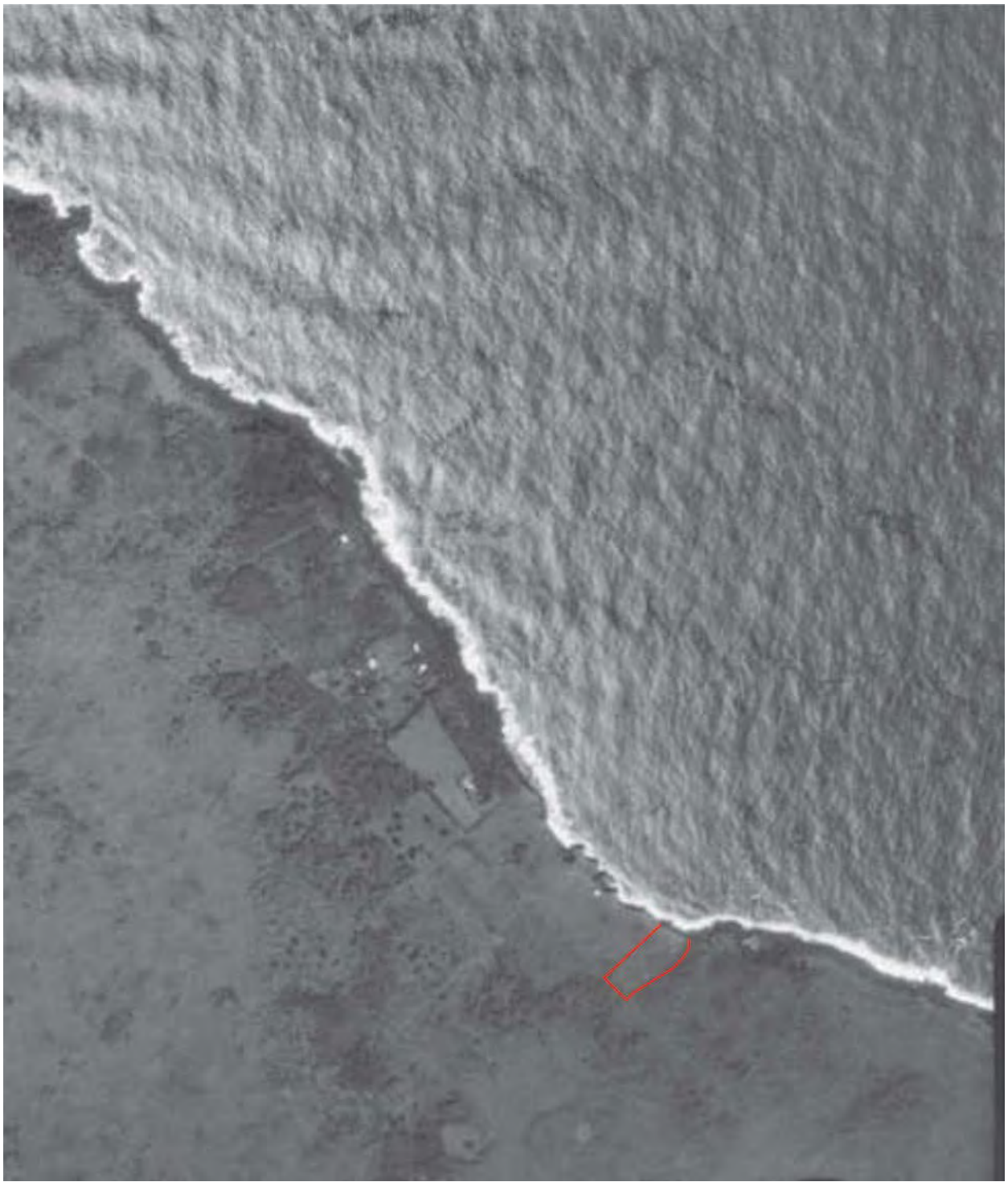

Figure 12. 1977 aerial photograph showing the current study parcel outlined in red.

Figure 13. Aerial photograph (from Google Earth) showing the current study parcel (outlined in red).

Figure 14. 2012 aerial photograph showing the current study parcel (outlined in red).

The current CIA has been prepared pursuant to Act 50, approved by the Governor on April 26, 2000; and in accordance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impact*, adopted by the Environmental Council, State of Hawai‘i, on November 19, 1997. Below is a description of the proposed development activities, a detailed cultural and historical background, and a presentation of prior studies; all of which combine to provide the physical and cultural setting and context. A summary of consultation is provided, followed by a discussion of potential cultural impacts and the appropriate actions and strategies to mitigate any potential impacts.

2. PROPOSED DEVELOPMENT ACTIVITIES

The landowner plans to develop the property as a single-family residence, which will include the construction of a 3,371 square foot 4 bedroom/3 bath post and pier house with attached garage, a 15 foot wide 375 feet long compacted gravel driveway leading from the Government Road to the residence, a 10,000 gallon capacity water catchment tank, and a subsurface 1,000 gallon septic system to be placed on the *mauka* side of the house (Figure 15). The residence will be set back approximately 110 feet from the coastal cliff placing it roughly 60 feet *mauka* of a former historic trail alignment. Landscaping of the lot will be minimal, confined to maintenance of the existing grassy open area surrounding the house and any necessary clearing associated with the driveway and utility service. Vegetation along the cliff-line would be left intact, as well as will various trees and shrubs around the perimeter of the parcel in order to preserve as much of the current natural habitat as possible.

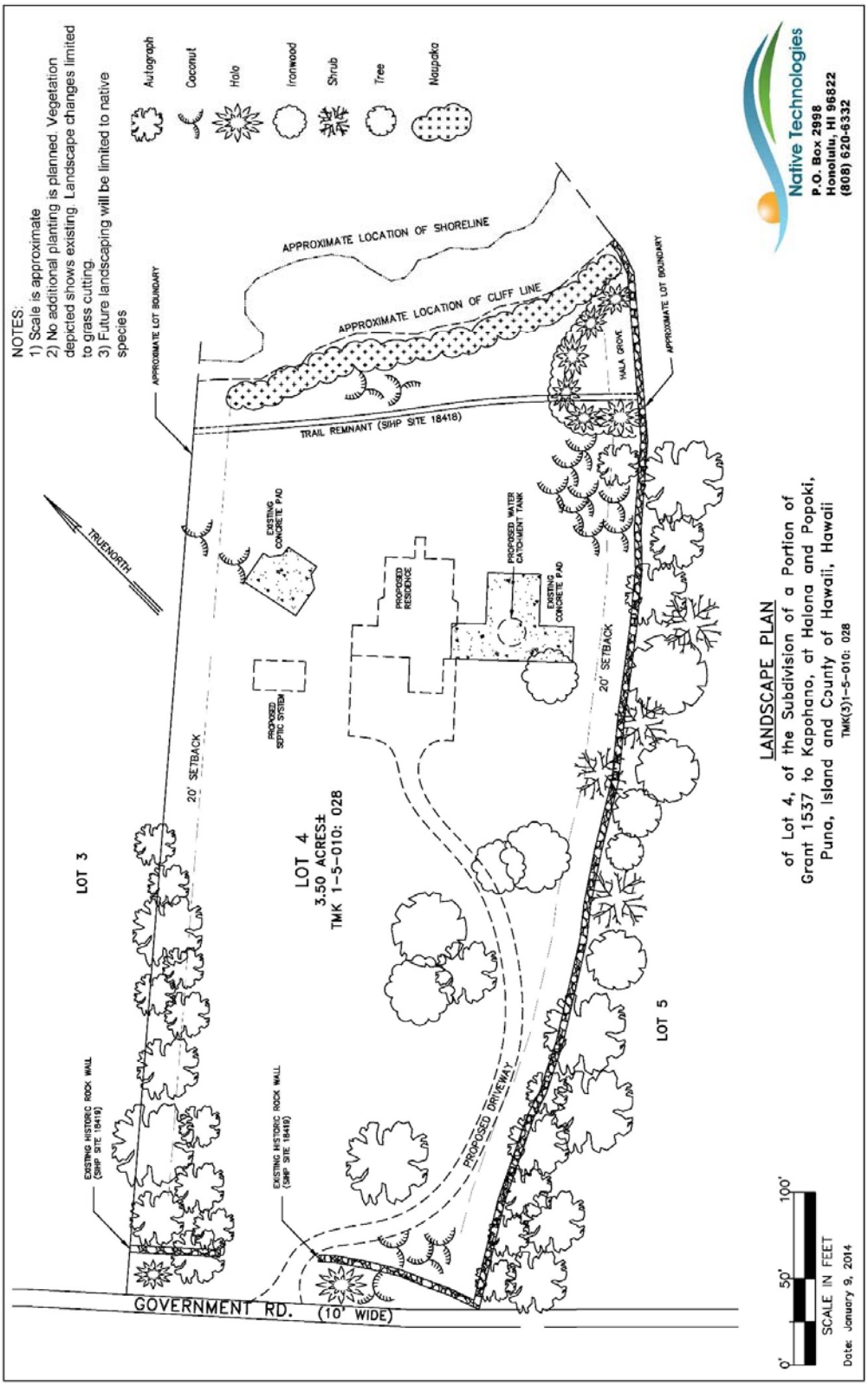

Figure 15. Proposed development plan.

3. CULTURE-HISTORICAL BACKGROUND

Archaeologists and historians describe the inhabiting of Hawai‘i in the context of settlement that resulted from voyages taken across the open ocean. For many years, researchers have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai‘i were underway by A.D. 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. However, as Kirch (2010) has recently argued, there is no archaeological evidence to support settlement of the Hawaiian Islands prior to about A.D. 1000. It has been generally reported that the sources of the early Hawaiian population—the Hawaiian Kahiki—were the Marquesas and Society Islands (Cordy 2000; Emory in Tatar 1982:16-18).

Whatever the timing, following initial settlement, communities were clustered along the watered, windward (*ko‘olau*) shores of the Hawaiian Islands. Along the *ko‘olau* shores, streams flowed and rainfall was abundant, and agricultural production became established. The *ko‘olau* region also offered sheltered bays from which deep sea fisheries could be easily accessed, and near shore fisheries, enriched by nutrients carried in the fresh water, could be maintained in fishponds and coastal waters. It was around these bays that clusters of houses where families lived could be found (McEldowney 1979:15). In these early times, Hawai‘i’s inhabitants were primarily engaged in subsistence level agriculture and fishing (Handy et al. 1972:287).

Within a few generations after initial settlement, (by about A.D. 1200) the population began expanding to the *kona* (leeward side) and more remote regions of the island (Cordy 2000:130). In Kona, communities were initially established along sheltered bays with access to fresh water and rich marine resources. The primary “chiefly” centers were established at several locations—the Kailua (Kaiakeakua) vicinity, Kahalu‘u-Keauhou, Ka‘awaloa-Kealakekua, and Hōnaunau. The communities shared extended familial relations, and there was an occupational focus on the collection of marine resources. By the fourteenth century, inland elevations to around the 3,000-foot level were being turned into a complex and rich system of dryland agricultural fields (today referred to as the Kona Field System). By the fifteenth century, residency in the uplands was becoming permanent, and there was an increasing separation of the chiefly class from the common people. In the sixteenth century the population stabilized and the *ahupua‘a* land management system was established as a socioeconomic unit (see Ellis 1963; Handy et al. 1972; Kamakau 1961; Kelly 1983; and Tomonari-Tuggle 1985).

Over the generations, the ancient Hawaiians developed a sophisticated system of land and resources management. By the time ‘Umi-a-Līloa rose to rule the island of Hawai‘i in ca. 1525, the island (*moku-puni*) was divided into six districts or *moku-o-loko* (cf. Fornander 1973–Vol. II:100-102). Puna was one of these districts, and like the other large districts on Hawai‘i, was subdivided into *‘okana* or *kalana*. The *moku-o-loko* and *‘okana* or *kalana* were further divided into manageable units of land that were tended to by the *maka‘āinana* (people of the land) (cf. Malo 1951:63-67). Of all the land divisions, perhaps the most significant management unit was the *ahupua‘a*. *Ahupua‘a* are subdivisions of land that were usually marked by an altar with an image or representation of a pig placed upon it (thus the name *ahu-pua‘a* or pig altar). In their configuration, the *ahupua‘a* may be compared to wedge-shaped pieces of land that radiate out from the center of the island, extending to the ocean fisheries fronting the land unit. Their boundaries are generally defined by topography and geological features such as *pu‘u* (hills), ridges, gullies, valleys, craters, or areas of a particular vegetation growth.

The *ahupua‘a* were also divided into smaller individual parcels of land (such as the *‘ili*, *kō‘ele*, *māla*, and *kīhāpai*, etc.), generally oriented in a *mauka-makai* direction, and often marked by stone alignments (*kuaiwi*). In these smaller land parcels the native tenants tended fields and cultivated crops necessary to sustain their families, and the chiefly communities with which they were associated. As long as sufficient tribute was offered and *kapu* (restrictions) were observed, the common people, who lived in a given *ahupua‘a* had access to most of the resources from mountain slopes to the ocean. These access rights were almost uniformly tied to residency on a particular land, and earned as a result of taking responsibility for stewardship of the natural environment, and supplying the needs of the *ali‘i* (see Kamakau 1961:372-377 and Malo 1951:63-67).

Entire *ahupua‘a*, or portions of the land were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *ali‘i-‘ai-ahupua‘a* (chief who controlled the *ahupua‘a* resources). The *ali‘i-‘ai-ahupua‘a* in turn answered to an *ali‘i ‘ai moku* (chief who claimed the abundance of the entire district). Thus, *ahupua‘a* resources supported not only the *maka‘āinana* and *‘ohana* who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided fruits and vegetables and some meat in the diet, and the ocean provided a wealth of protein resources.

The current project area is located within Pōpōkī Ahupuaʻa, a land unit of the District of Puna, one of six major districts on the island of Hawaiʻi. No specific Hawaiian traditions or legendary accounts concerning Pōpōkī Ahupuaʻa were located while conducting research for this report, but Barrère (1959) summarizes the Precontact geopolitics of the Puna District as follows:

> Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo (Barrère 1959:15).

Despite its perceived lack of importance with respect to the emerging political history of Hawaiian leadership, Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne (Maly 1998). Because of the relatively young geological history and persistent volcanic activity the region's association with Pele has been a strong one. However, the association with Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests (Pukui 1983). It is said that before Pele migrated to Hawaiʻi from Kahiki, there was "no place in the islands . . . more beautiful than Puna" (Pukui 1983:11). Contributing to that beauty were the groves of fragrant *hala* and forests of *ʻōhiʻa lehua* for which Puna was famous:

> *Puna pāia ʻala i ka hala* (Puna, with walls fragrant with pandanus blossoms)
> Puna, Hawaiʻi, is a place of *hala* and *lehua* forests. In olden days the people would stick the bracts of *hala* into the thatching of their houses to bring some of the fragrance indoors (Pukui 1983:301).

The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving. "To this day, Puna is known for its growth of *hala*, and the floors and furniture of some of the old households are still covered with fine woven mats and cushions. Weaving remains an important occupation of many native families of Puna." (Maly 1998:6).

Following the death of Kamehameha I in 1819, the Hawaiian religious and political systems underwent a radical transformation; Kaʻahumanu proclaimed herself "*Kuhina nui*" (Prime Minister), and within six months the ancient *kapu* system was overthrown. See Kameʻeleihiwa (1992) for an explanation suggesting an intentioned overthrow. Within a year, Protestant missionaries arrived from America (Fornander 1973; Iʻi 1959; Kamakau 1961). In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawaiʻi seeking out communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal (Ellis 1963). His writings contain descriptions of residences and practices that are applicable to the general study area:

> The population in this part of Puna, though somewhat numerous, did not appear to possess the means of subsistence in any great variety or abundance; and we have often been surprised to find desolate coasts more thickly inhabited than some of the fertile tracts in the interior; a circumstance we can only account for, by supposing that the facilities which the former afford for fishing, induce the natives to prefer them as places of abode; for they find that where the coast is low, the adjacent water is usually shallow.
>
> We saw several fowls and a few hogs here, but a tolerable number of dogs, and quantities of dried salt fish, principally albacores and bonitos. This latter article, with their *poë* [*poi*] and sweet potatoes, constitutes nearly the entire support of the inhabitants, not only in this vicinity, but on the sea coasts of the north and south parts of the island.
>
> Besides what is reserved for their own subsistence, they cure large quantities as an article of commerce, which they exchange for the vegetable productions of Hilo and Mamakua [Hāmākua], or the *mamake* and other tapas of Ora [ʻŌlaʻa] and the more fertile districts of Hawaii (Ellis 1963:190-191).

One year after Ellis' tour, the ABCFM established a base church in Hilo. From that church (Hāili), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman who came to Hawaiʻi in 1832, and Titus Coan who arrived in 1835 were two of the most influential Congregational missionaries in Puna and Hilo. As part of their duties they compiled census data for the areas within their missions. In 1835, 4,800 individuals

are recorded as residing in the district of Puna (Schmitt 1973); the smallest total district Population on the island of Hawai‘i. In 1841, Titus Coan recorded that most of the 4,371 recorded residents of Puna, lived near the shore, though there were hundreds of individuals who lived inland (Holmes 1985). One of the coastal settlement areas was Maku‘u in the immediate vicinity of the current project area (the, U.S.G.S. 7.5 min series quadrangle of Pahoa North, HI shows the approximate location of the village, labeled as MAKUU Site; see Figure 1).

In 1846, Chester S. Lyman, “a sometime professor” at Yale University visited Hilo, Hawai‘i, and stayed with Titus Coan (Maly 1998). Traveling the almost 100 mile long stretch of the “Diocese” of Mr. Coan, Lyman reported that the district of Puna had somewhere between 3000-4000 inhabitants (Maly 1998). Entering Puna from Hilo, and traveling southeast along the coast, Lyman described Maku‘u as a small scattered village, and offered the following observations of the Puna coast:

> …The groves of Pandanus were very beautiful, and are the principal tree of the region. There is some grass and ferns, and many shrubs; but the soil is very scanty. Potatoes are almost the only vegetable that can be raised, and these seem to flourish well amid heaps of stone where scarcely a particle of soil could be discovered. The natives pick out the stones to the depth often of from 2 to 4 feet, and in the bottom plant the potato–how it can expand in such a place is a wonder.
>
> Nearly all Puna is like this. The people are necessarily poor—a bare subsistence is all they can obtain, and scarcely that. Probably there are not $10 in money in all Puna, and it is thought that not over one in five hundred has a single cent. The sight of some of these potatoe patches would make a discontented N.E. farmer satisfied with his lot. Yet, I have nowhere seen the people apparently more contented & happy (Maly 1998:35).

By the mid-nineteenth century, the ever-growing population of Westerners had forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership. As Osorio explains, it was foreign economic interests originally promoted by the Hawaiian League and their “bayonet constitution” that ultimately infiltrated beliefs, ideas, and institutions; and as he put it, “literally and figuratively dismembered the lāhui (the people) from their traditions, their land and ultimately their government” (2002:5). Indeed, the Hawaiian culture was well on its way towards Western assimilation, although not without resistance (Silva 2004), as industry in Hawai‘i went from the sandalwood trade, to a short-lived whaling industry, to the more lucrative, but environmentally destructive sugar industry. Changes in land tenure were promoted primarily by the missionaries and Western businessmen in the island kingdom, claiming that they were hesitant to enter business deals on leasehold land.

In 1848 the *Māhele* became the vehicle for determining ownership of native lands. During the *Māhele* all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and *Konohiki* Lands. All three types of land were subject to the rights of the native tenants therein. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded as a part of the *Māhele*. Subsequently, in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents of the lands, many of which had also been claimants for *kuleana* during the *Māhele*. This information was collected primarily between A.D. 1873 and 1885 and was usually given in Hawaiian and transcribed in English as they occurred. Boundary descriptions were not collected for all *ahupua‘a*.

Pōpōkī Ahupua‘a is a small *ahupua‘a* sandwiched between the larger *ahupua‘a* of Maku‘u to the northwest, and the small *ahupua‘a* of Hālona to the southeast. The boundaries of Pōpōkī were never certified, which is why it is so often grouped with Maku‘u and Hālona Ahupua‘a. These three *ahupua‘a* were not depicted on any of the cartographic resources reviewed for this study, and in literature, and as previously mentioned, all three are often referenced together as a single unit (Maku‘u is often the general term used to mean the entire area; Charvet-Pond and Rosendahl 1993:C-1). The placement of the current project area within Pōpōkī Ahupua‘a was determined through a reckoning of the parcel’s location within the *ahupua‘a*, combined with a review of information contained in the records for former Grant 1537, which includes the current project area. Based on this information, it is very likely that the current study parcel is located within Pōpōkī Ahupua‘a near its boundary with Hālona Ahupua‘a.

As a result of the *Māhele* of 1848, the *ahupua‘a* of Maku‘u, Pōpōkī, and Hālona were retained as Government Lands, and no *kuleana* parcels were awarded in the *ahupua‘a* (Charvet-Pond and Rosendahl 1993:C-2). Between 1852 and 1855 portions of all three *ahupua‘a* were divided and sold as fee simple Land Grants. The Land Grants were sold to Native tenants who were interested in acquiring the land upon which they lived, or land that they felt

they could cultivate (Maly 1999:64). Three Land Grants were sold in the coastal portions of Makuʻu, Pōpōkī, and Hālona; Grant No. 1013 to Maiau in 1852 (Figure 16), Grant No. 1014 to Kea in 1852 (Figure 17), and Grant No. 1537 to Kapohano(a) in 1855 (Figure 18). The current project area is a portion of Grant No. 1537 to Kapohano (sometimes spelled Kapohana) (Figure 19). Kepā Maly translates the boundary description of Grant No. 1537 as follows:

> This parcel begins at the shore on the Northern corner of this lot, adjoining the land of Kea, and proceeding along this land South 39 1/2 West 24.48 chains to a coconut tree, then proceeding along this land South 37 West 9.30 chains to a breadfruit tree; then proceeding South 41 1/4 East 32.24 chains to a stone cairn; then North 56 1/2 East 35.29 chains to the government road; then North 37 1/2 East 20.00 chains to the shore; then proceeding along the shore to the place of commencement. There are 171 acres within this lot (1999: 67; Appendix A).

Register Map No. 2258 shows a single house within the boundaries of Grant No. 1537 (see Figure 19). The house is located near the coast (to the northeast of the current study area) next to what appears to be a small hill and survey station labeled Opunaha. The small bay located directly *makai* of the current study area is labeled Kula. The map also shows the old Government Road alignment, a trail that runs *mauka* from the edge of the Government Road to the west of the current project area, and another trail the runs inland from the coast to the east of the current project area. A grove of coconuts is depicted south of the current project area. Ewart and Luscomb (1974) included in their report, notes of a July 4, 1956 interview conducted by Mrs. Violet Hansen with Mrs. Mary Ann Kamahele (age 70), who was described as being of a Hawaiian family that were the only residents of Makuʻu at that time (living on Grant No. 1013, see Figure 19). Mrs. Kamahele related that Opunaha was a canoe landing spot, and that Kula was a *koʻa* (a fishing ground) where *āholehole* were caught (Ewart and Luscomb 1974:50).

During the latter part of the nineteenth century and into the twentieth century land use within the District of Puna began to change. The native agricultural system was largely abandoned as the population declined (Yent and Ota 1982), and ranching, sugar cane, coffee, and lumber became the dominant industries. The Keaʻau Ranch began grazing cattle on nearby lands as early as the 1850s (Maly 1999:42), and the ʻŌlaʻa and Puna Sugar Companies operated in Puna from 1900 until the 1980s (Dorrance and Morgan 2000). Beginning in 1900, railroad tracks for hauling the unprocessed cane and passenger travel were laid by the Hawaiʻi Railway Company from the sugarcane fields in lower Puna to the mills in Pahoa and Keaʻau, and then continuing on to Hilo (Clark et al. 2001). The railroad ceased operations in 1946. When operating, the railroad passed through the *ahupuaʻa* of Makuʻu, Holana, and Pōpōkī *mauka* of the current project area, where the Makuʻu Station house was located.

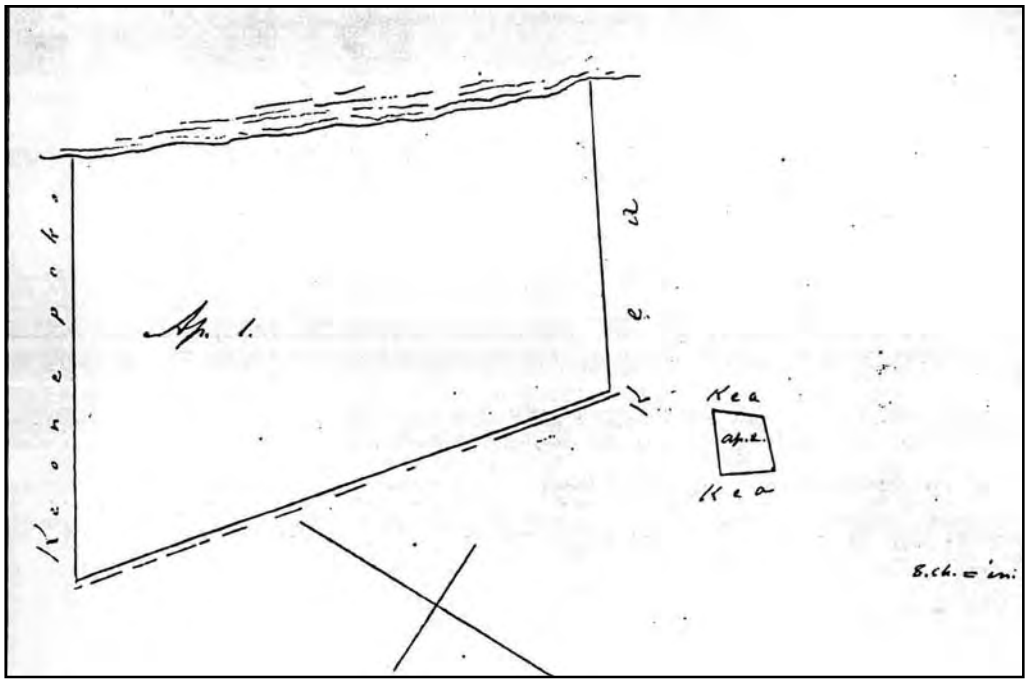

Figure 16. Map of Grant No. 1013 to Maiau (from Maly 1999:67).

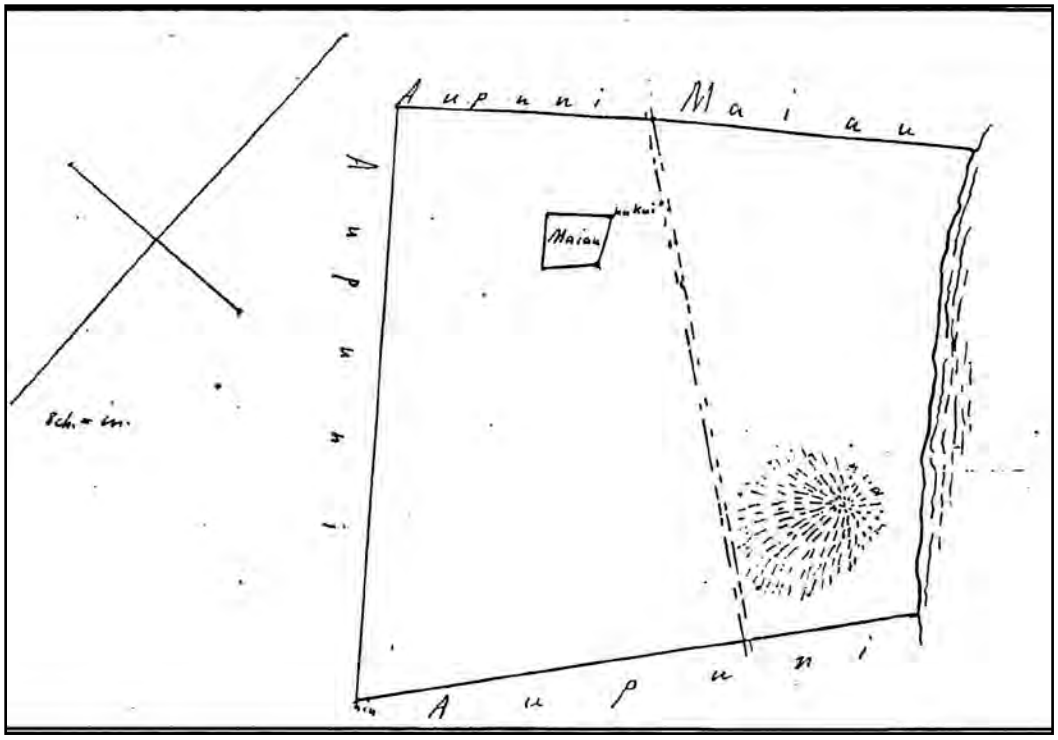

Figure 17. Map of Grant No. 1014 to Kea (from Maly1999:68).

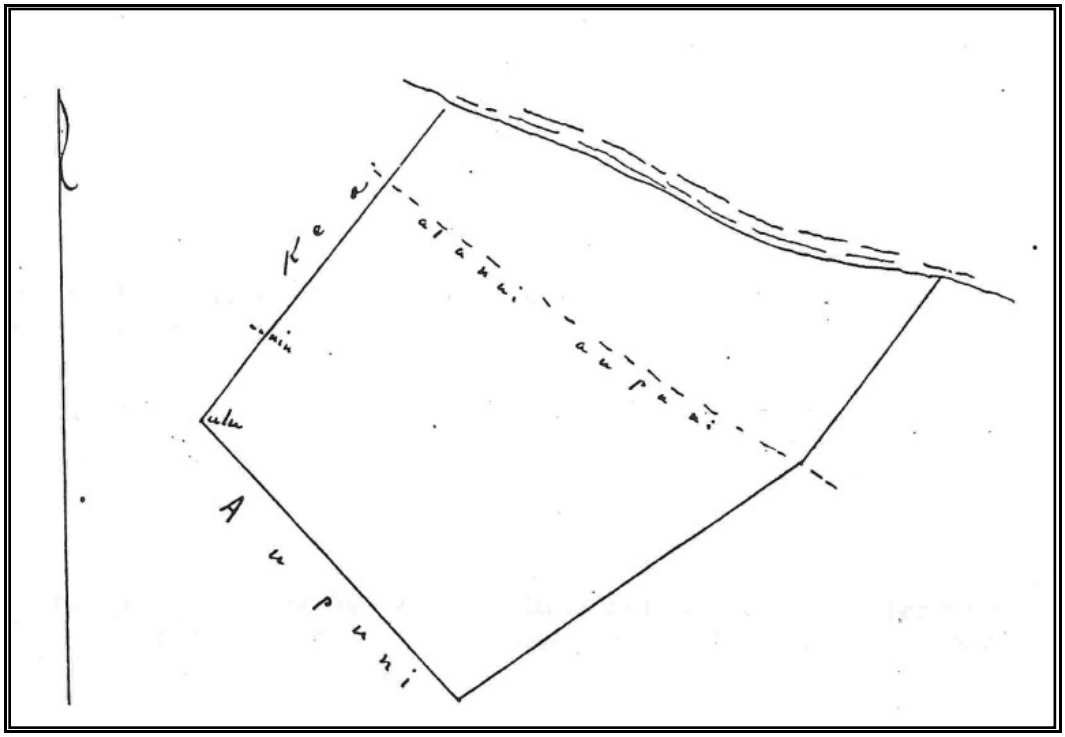

Figure 18. Map of Grant No. 1537 sold to Kapohana in 1855.

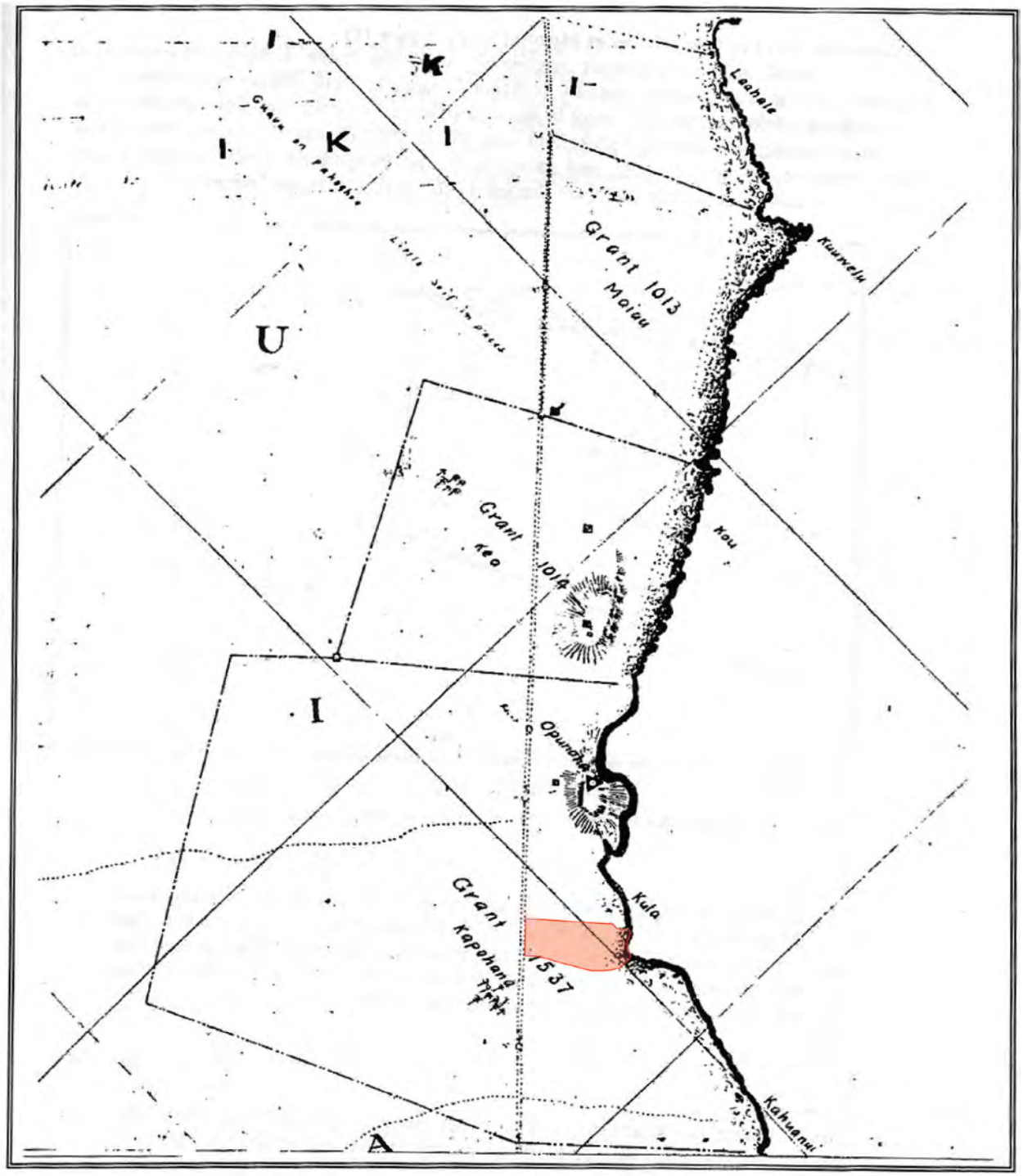

Figure 19. Portion of Register map No. 2258 showing land grant parcels (current project area in red).

4. PRIOR STUDIES

Several previous archaeological and cultural studies have been conducted within the *ahupua‘a* of Maku‘u, Pōpōkī, and Hālona (Table 1 and Figure 20). The most recent of these investigations to take place on the subject parcel was an archaeological inventory survey that was completed by ASM Affiliates, Inc. (Dircks Ah Sam and Rechtman 2013). Prior to that, the current project area was the subject of an archaeological field inspection conducted by Rosendahl (1989). Twelve other studies were conducted in the coastal portions of the *ahupua‘a* in the immediate vicinity of the current project area (Barrera and Lerer 1990; Chaffee and Spear 1993; Charvet-Pond and Rosendahl 1993; Clark et al. 2008; Ewart and Luscomb 1974; Hudson 1932; Ketner and Rechtman 2011; Komori and Peterson 1987; Pestana et al. 2009a; Pestana et al. 2009b; Spear et al. 1995; Terry 2000). A brief discussion of the findings of each of these previous studies, arranged in chronological order, follows below.

Table 1. Prior studies conducted in the *ahupua‘a* of Maku‘u, Pōpōkī, and Hālona.

Author/Date	Type of Study	Ahupua‘a
Hudson 1932	Archaeological Survey	Various
Ewart and Luscomb 1974	Reconnaissance Survey	Various
Bordner 1977	Reconnaissance Survey	Maku‘u
Yent 1983	Archaeological Survey	Maku‘u
Komori and Peterson 1987	Cultural and Biological Resource Survey	Various
Rosendahl 1989	Field Inspection	Maku‘u, Hālona, Pōpōkī
Barrera and Lerer 1990	Inventory Survey	Maku‘u
McEldowney and Stone 1991	Archaeological/Environmental Survey	Various
Chaffee and Spear 1993	Burial Testing	Maku‘u
Charvet-Pond and Rosendahl 1993	Inventory Survey	Maku‘u, Hālona, Pōpōkī
Conte et al. 1994	Inventory Survey	Maku‘u, Hālona, Pōpōkī
Spear et al. 1995	Data Recovery	Maku‘u
Terry 2000	Environmental Assessment	Maku‘u
Rechtman 2003	Archaeological Assessment	Maku‘u, Hālona
Desilets and Rechtman 2004	Inventory Survey	Maku‘u, Hālona, Pōpōkī
Clark et al. 2007	Inventory Survey	Pōpōkī
Clark et al. 2008	Inventory Survey	Maku‘u
Pestana et al. 2009a	Preservation Plan	Maku‘u
Pestana et al. 2009b	Burial Treatment Plan	Maku‘u
Ketner and Rechtman 2011	Cultural Impact Assessment	Maku‘u
Dircks Ah Sam and Rechtman 2013	Inventory Survey	Pōpōkī

In addition to the coastal studies, seven other studies have been conducted at more inland locations within the *ahupua‘a* (Bordner 1977; Conte et al. 1994; Desilets and Rechtman 2004; McEldowney and Stone 1991; Rechtman 2003; Yent 1983, Clark et al. 2007) (see Table 1 and Figure 20). These studies are not discussed in detail below, but are briefly mentioned and referenced because of what they tell us about land use and subsistence within the *ahupua‘a* as a whole. McEldowney and Stone (1991) and Yent (1983) documented extensive lava tube systems containing cultural material related to Precontact habitation and burial in the extreme upland portions of the *ahupua‘a*. As a result of the remaining four upland studies which included over 2,000 acres of total survey area, only three other features were recorded. One of these features was a cairn (Bordner 1977), another was a small terrace interpreted as a possible agricultural planting area (Desilets and Rechtman 2004), and the third was a complex of surface features that included a large enclosure, a constructed mound, a wall, and a platform that was interpreted as the location of unspecified Native Hawaiian ceremonial activities (Desilets and Rechtman 2004). The relative lack of archaeological features in the upland area of the *ahupua‘a* is understandable, considering that most of the area consists of relatively young lava flows covered by dense (primarily native) vegetation.

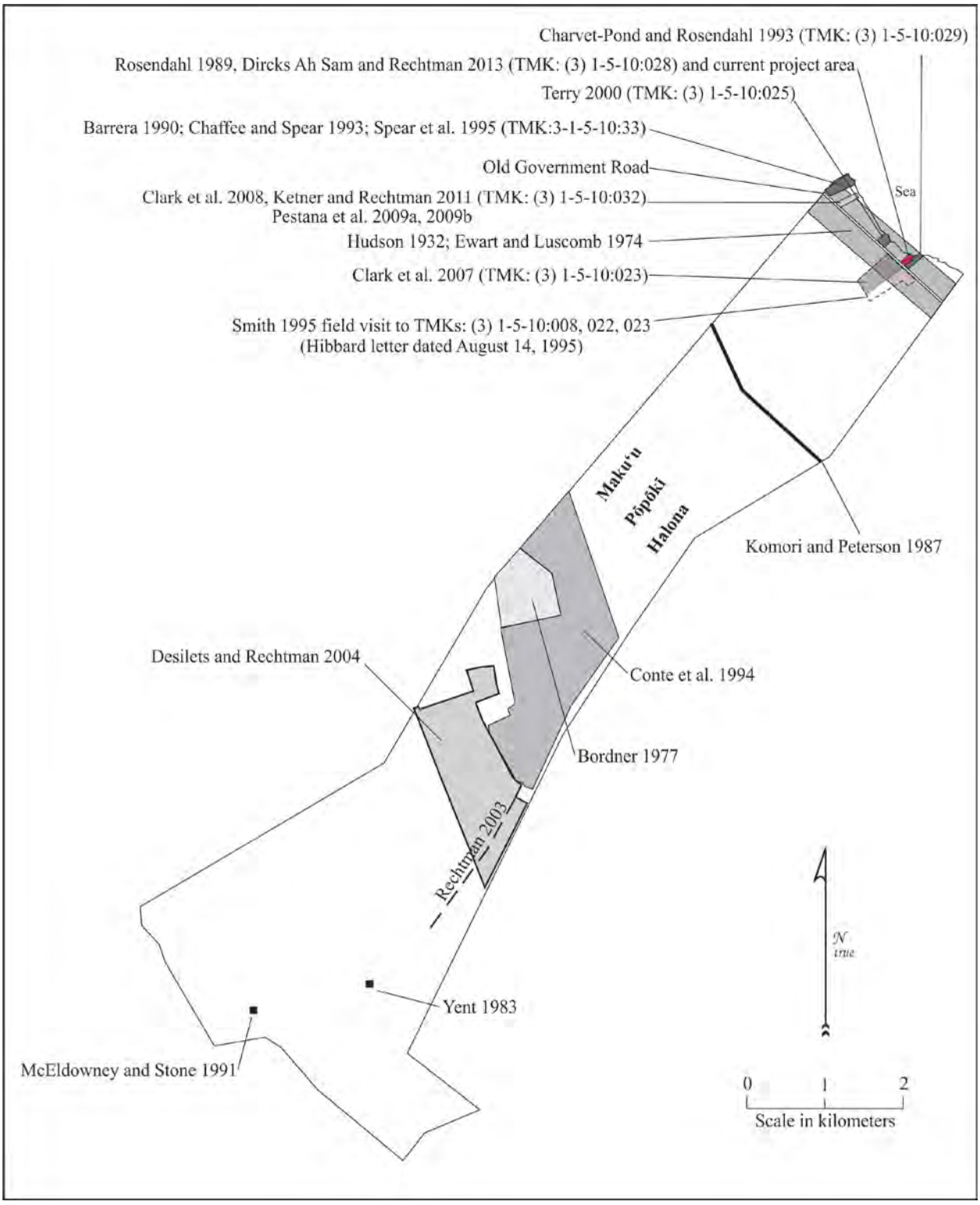

Figure 20. Distribution of prior archaeological studies conducted in the vicinity of the current study parcel.

The earliest coastal survey of archaeological resources in the vicinity of the current project area was conducted by Hudson (1932). Hudson attempted to inventory the sites of East Hawai‘i Island from Waipi‘o Valley to the Ka‘ū District for the B. P. Bishop Museum. He recorded a wide range of archaeological features including *heiau*, burials, caves, habitations, trails, and agricultural features during his survey. The route of the survey took him through the coastal portion of Maku‘u, Pōpōkī, and Hālona Ahupua‘a. It does not appear, however, that Hudson (1932) recorded any features in the immediate vicinity of the current project area. Hudson noted that it was difficult to obtain information about sites in Puna because "most of them are located along the coast between Keaau and Kopoho where no one now lives, and it is difficult to locate descendants of the former Hawaiian population of the area who might be able to shed light on the nature and function of certain sites," and that, "back from the sea the land is under cultivation in cane, used for pasture, or covered with dense vegetation which can be penetrated only with difficulty" (Hudson 1932:304).

Forty-two years later, Ewart and Luscomb (1974) of the B. P. Bishop Museum conducted a six-mile long archaeological reconnaissance survey of a proposed Kapoho-Keaukaha Highway route through the District of Puna from Waiakahiula Ahupua‘a to Kea‘au Ahupua‘a. The survey area consisted of a 2,000-foot wide corridor that generally followed the route of the old Government Road that passes *mauka* of the current project area (see Figure 20). Ewart and Luscomb (1974) recorded numerous archaeological features and feature complexes in the vicinity of the current project area including walls, mounds, petroglyphs, trails, platforms, enclosures, and modified depressions. These features were variously interpreted as being associated with habitation, burial, agriculture, and ranching. . Eight sites were located in the immediate vicinity of the current study parcel including: a large feature complex (Ha-A3-10) that is partially within the current project area; two other feature complexes (Ha-A3-7 and Ha-A3-19) located to the southeast; two burial platforms (Ha-A3-17) also located to the southeast, that are discussed as the final resting place of the original recipients of Grant No. 1013; a large feature complex located across the Government Road (Ha-A3-18); two petroglyph fields (Ha-A3-24 [SIHP Site 4222] and Ha-A3-25) located at the coast near the current project area; and a wall (A3-14) located along the old Government Road southeast of the current project area.

Komori and Peterson (1987) conducted a pedestrian survey of a proposed Pohoiki-Keaau transmission line corridor that passed roughly 1.5 miles inland (southwest) of the current project area (see Figure 20). Komori and Peterson recorded five agricultural site complexes, habitation and burial platforms, burial and refuge caves, and petroglyphs. According to Komori and Peterson (1987), the agricultural complexes were all located on or adjacent to *‘a‘ā* lava flows or ash deposits that were more than 1,500 years old. Feature types observed at these agricultural complexes included walls, terraces, clearings, ditches, and modified outcrops. The other sites recorded by Komori and Peterson (1987) were all located on *pāhoehoe* lava flows that originated from Kīlauea Volcano between 300 and 500 years ago. Komori and Peterson (1987) suggests that the construction and use of these sites likely dates to between A.D. 1450 and the present, and that the development of the inland agricultural complexes likely followed the establishment of permanent settlements at the coast sometime after A.D. 1450.

Rosendahl (1989) conducted a field inspection of the current study parcel (see Figure 20). With the exception of a stone wall along the south and east boundaries of the parcel, no surface structural or portable remains of any kind were identified on the property. Rosendahl (1989) relates that the lack of findings was due to widespread bulldozing that had occurred on the parcel at some point prior to the field inspection. Rosendahl concluded:

> As a result of the negative findings of the field inspection, no further archaeological field work is necessary within the present project area. The evaluation and recommendation presented within this report are made solely on the basis of the field inspection survey work. There is always the possibility, however remote, that potentially significant, unidentified subsurface cultural remains and/or surface structural features will be encountered in the course of future archaeological investigations or subsequent development activities. In such situations, archaeological consultation should be sought immediately (1989:2).

Beginning in 1990, three phases of archaeological study were conducted at TMK: (3) 1-5-10:033, a 14-acre parcel located along the coast to the northwest of the current project area (see Figure 20). Barrera and Lerer (1990) first conducted an Archaeological Inventory Survey of the parcel. As a result of that study, six archaeological site complexes, each with multiple features, were recorded (SIHP Sites 14675, 14981, 14982, 14983, 14984, and 14985). These sites included a wide range of feature types such as modified outcrops, depressions, and lava blisters, walls, mounds, platforms, enclosures, and terraces, which were interpreted as being used for habitation, agriculture, and possible burial during Precontact and Historic times. Only two of the sites, Sites 14675 and 14985, were recommended for further study.

Chaffee and Spear (1993) followed up on Barrera and Lerer's (1990) work by conducting burial testing at Feature J of Site 14675 (a mound) and Features C, L, and M of Site 14985 (two platforms and a mound). Three of these features (Features J, L, and M) were found to contain subsurface vaults interpreted as burial chambers. Two of the vaults (at Features L and M of Site 14985, a mound and a platform) contained human skeletal remains, while Feature J of Site 14675 lacked human skeletal remains, but was nonetheless interpreted as a burial feature based upon its formal attributes. The lack of human skeletal remains at Feature J was explained by the presence of a wetter micro-environment at that feature, as compared to the other two, which had accelerated the rate of decomposition of the skeletal material (Chaffee and Spear 1993:20). Two of the features (Features J and M) contained associated grave goods that dated to the Historic Period, suggesting a post-contact time frame for the interment of those individuals. With a surface pavement of *'ili'ili* and lacking a subsurface vault, Feature C was dissimilar in construction technique to the other three features; and based on the results of the Chaffee and Spear (1993) burial testing, Feature C of Site 14985 was determined to be a habitation platform.

Spear et al. (1995) conducted additional data recovery excavations at some of the remaining features of Sites 14675 and 14985 located northwest of the current project area (see Figure 20). Five features—Feature B (an enclosure), Feature C (a terrace), Feature R (a sealed lava blister), Feature Y (a faced mound), and Feature AP (an enclosure)—were tested at Site 14675, and Feature J (a terrace) of Site 14985 was also tested. Artifacts recovered during the excavations were limited to two types of material; (1) basalt (flakes, manuports, an abrader, and a hammerstone/anvil), and (2) volcanic glass (flakes, debitage, and cores). Most of this material was recovered from Feature J of Site 14985. That feature also yielded a radiocarbon date with a 2 sigma calibrated result of A.D. 1660 to 1950. Based on the data recovery findings Spear et al. (1995) conclude that the large size of most of the tested features suggested that they were used for permanent habitation purposes during the late Precontact Period until perhaps the late nineteenth century. One feature (Feature Y of Site 14675), based on its construction and lack of cultural debris, was interpreted as being used for agricultural purposes.

Charvet-Pond and Rosendahl (1993) conducted an Archaeological Inventory Survey of TMK: (3) 1-5-10:029, a 3.6-acre coastal parcel located adjacent to the southeast edge of the current study parcel (see Figure 20). As a result of the survey, five archaeological sites consisting of twelve features were recorded on the subject parcel. The sites included a Precontact coastal trail (Site 18418 Feature A), two Historic cattle walls (Site 18419), a coastal terrace complex interpreted as a possible agricultural shrine or *heiau* (Site 18420), two "bait cups" located within the coastal basalt bench (Site 18421), and an agricultural complex containing twenty-six individual features (Site 18422). One of the Site 18419 cattle walls extends along the southeastern boundary of the current study parcel, and Feature A of Site 18418, a coastal trail, extends in the general direction of the current project area, but stops at the Site 18419 cattle wall. The features of Site 18422 included modified outcrops, modified depressions, terraces, walls, and mounds. Nine of these agricultural features were subject to subsurface testing, which yielded fifty-nine volcanic glass cores and flakes. Subsurface testing was also conducted at Sites 18418, 18420, and 18421, which revealed a complete lack of cultural material at those sites. Based on the predominance of agricultural features and relative lack of cultural debris within their project area, Charvet-Pond and Rosendahl (1993) suggest that many of the activities formerly conducted there were likely related to Precontact agricultural pursuits. It is for this reason that they interpreted Site 18420, a five-feature complex, as a possible agricultural shrine or *heiau*. Three of the terraces of the complex were located on an adjacent parcel to the southeast (TMK: (3) 1-5-10:030), and were therefore not tested, but Charvet-Pond and Rosendahl (1993) suspected that based on their formal attributes, it was possible that one or all of them contained burials. The main feature of Site 18420 is a 1.0+ meter high, two-tiered terrace with a water-worn cobble surface. Although several possible functional interpretations are discussed for this feature (e.g. fishing shrine, burial, Precontact or Historic habitation), all were discarded in favor of the agricultural *heiau* interpretation. This interpretation was arrived at based on the feature's formal attributes, the lack of cultural debris, and its proximity to the agricultural features of Site 18422 Charvet-Pond and Rosendahl (1993).

In 1995, former State Historic Preservation Division (SHPD) staff archaeologist Marc Smith conducted a site inspection of TMKs: (3) 1-5-10:008, 022, and 023, located to the southwest of the current project area, *mauka* of the old Government Road (see Figure 20) at the request of a Mr. Tom Brennen (Don Hibbard letter dated August 14, 1995; on file at DLNR-SHPD). Don Hibbard, former SHPD administrator, describes the archaeological features that were observed during that visit:

> Stone structures were observed in Parcel 23. These consisted of a single platform, stacked stone walls, mounds, and modified outcrops. It appears that these structures may be associated with early agricultural practices and may be significant as they reflect past land use patterns, and for their information content. Also on historic maps a mauka-makai trail cuts across all three parcels. Where this trail was visible in the field it appears as a jeep road, with very few modifications. It is

> unclear who owns the trail easement, but it may be significant in that it reflects past land use practices. Because of the proximity to historic Maku‘u, unmarked grave sites could be expected, however, during this site inspection no burials were observed.

Hibbard goes on to recommend that the features be recorded prior to any modifications to the parcel, and that the information should be submitted to DLNR-SHPD for their review and comment. Also, that if any significant historic sites are encountered, that as part of any permit action, a mitigation plan detailing a data recovery and/or preservation commitment should also be submitted.

Geometrician Associates, LLC (Terry 2000) conducted an Environmental Assessment (EA) of a 5.43 acre parcel (TMK: (3) 1-5-01:025) located along the coast to the northwest of the current project area. As part of the EA process, Marc Smith of DLNR-SHPD inspected the parcel in October of 2000, as a result of which, historic-era cattle walls and the possible remnants of a former house site were noted in the southeastern corner of the project area. The proposed activities associated with the construction of the single family home on the property were not projected to impact any structures on that portion of the property, and noted features were to be marked with fencing buffers as a precautionary mitigation measure. Through Smith, DLNR-SHPD determined that an archaeological inventory survey would not be necessary and that should any previously unidentified sites, remains, human burials, rock or coral alignments, pavings, or walls be encountered, work would immediately cease and DLNR-SHPD would be consulted in order to determine appropriate mitigation.

Clark et al. (2007) conducted an Archaeological Inventory Survey of a 38-acre parcel (TMK: (3) 1-5-10:023; one of the parcels inspected by Marc Smith in 1995) located to the southwest of the current project area, *mauka* of the old Government Road (see Figure 20). As a result of that study, five archaeological sites were recorded, including a Precontact agricultural shrine or small *heiau* (Site 26165), a Historic trail/roadway (Site 26166), a habitation complex (Site 26167), and two agricultural complexes (Sites 26168 and 26169). These sites were interpreted as being variously related to Precontact and continued early Historic Hawaiian use of the area for habitation, ceremonial, and agricultural purposes. Primary habitation occurred at Site 26167, an enclosed complex where a subsurface deposit of marine shell, fish bone, and pig bone found within a terrace indicated that the nearby coastal marine resources and terrestrial resources were exploited for subsistence purposes. Agriculture was practiced at Sites 26168 and 26169 where soil-filled depressions in a *pāhoehoe* lava flow could have been mulched and planted in diverse crops. The shrine recorded by Clark et al. (2007) (Site 26165) occupied a prominent location on an *‘a‘ā* slope overlooking a low-lying *pāhoehoe* area that contained numerous agricultural features of Site 26169. The shrine consisted of a terrace constructed in three levels, that had a ramped entrance paved with water-worn cobbles leading to a square, water-worn cobble paving on the second level, and a slab lined pit on the third level. Clark et al. (2007) suggest that the cobble paving may have been intended as a spot for leaving offerings, and the slab lined pit could have supported a wooden *ki‘i* (idol). A Historic trail/roadway dating to the early part of the 20th century was also recorded. The roadway formerly ran from the old Government Road inland to Maku‘u Station along the old railroad line.

Clark et al. (2008) conducted an Archaeological Inventory Survey of a 5.586-acre parcel (TMK: (3) 1-5-10:032) located northwest of the current project area, between the old Government Road and the coast (see Figure 20). As a result of that study, nine archaeological sites containing a total of 67 features were recorded within that project area. The sites included a core-filled wall along the old Government Road (Site 26658), an enclosure/pavement used for Historic habitation purposes (Site 26659), a Historic habitation complex (Site 26660), a modified bedrock hole used for water collection and storage (Site 26661), three concealed bedrock overhangs interpreted as Historic burial features (Sites 26662, 26663, and 26664), a platform interpreted as a Precontact burial feature (Site 26665), and a large agricultural complex (Site 26666) containing 55 features that spanned the entire project area. Six test units were excavated at five of the recorded sites. In addition to the recorded archaeological sites, the presence of a petroglyph field was noted on the coastal shelf *makai* of their project area. Of the 67 features that were documented during this study, two habitation sites and four burial sites were recommended for preservation, and were grouped into four preservation areas: two in the Agricultural District portion, one in the Conservation District, and one spanning both Districts. Scientific Consultant Services, Inc. prepared the follow-up archaeological preservation and burial treatment plans (Pestana et al. 2009a, 2009b, respectively).

Ketner and Rechtman (2011) conducted a Cultural Impact Assessment for the same parcel as the Clark et al. (2008) inventory survey. Community consultation was initiated by Ketner and Rechtman (2011) with descendants Nicole Lui, Jimmy Medeiros, and also with Richard Ha, and Melani Dominguez, both of whom are genealogically connected to the area.

Dircks Ah Sam and Rechtman (2013) conducted an Archaeological Inventory Survey of the current project area (TMK: (3) 1-5-10:028) (see Figure 20). As a result of that study, features of two previously recorded archaeological sites (SIHP Sites 18419 and 18418) were identified within the current study parcel. The two sites, both of which were originally recorded by PHRI in 1993 on the neighboring parcel to the southeast (Charvet-Pond and Rosendahl 1993), include a core-filled wall (Site 18419 Feature A) that extends along the southeast and *mauka* edges of the current study parcel and a trail section (a portion of Site 18418 Feature A) that extends parallel to the coast in the *makai* portion of the study parcel. Across the rest of the study area, with the exceptions of the locations of the two recorded sites and a small area in the western corner of the parcel, the remaining acreage had been previously bulldozed (sometime prior to 1989). No additional features were observed on the unmodified *pāhoehoe* bedrock in the western corner of the study parcel, but a rectangular stone and concrete feature (1.3 meters long by 1.0 meter wide and 35 centimeters tall), built of stacked small to medium cobbles held together with concrete, was noted adjacent to the northwest edge of the existing driveway within a previously bulldozed area. According to a neighbor (the owner of Parcel 029), this feature was built at the request of the former landowner as the base for a BBQ (the same landowner that poured the concrete house slab near the southeastern boundary of the study parcel), but was never completed. The stone and concrete BBQ foundation, which is located adjacent to two large ironwood trees in an area where push material was deposited during the grubbing and grading of the property, was created as the rocks from the push pile were moved and the area was landscaped. The descriptions of each of these sites follow below; their locations within the current study parcel can be seen in Figure 21.

Site 18418 Feature A is a trail remnant located in the *makai* portion of the study parcel that parallels the coast (Figure 22). This trail was first recorded by Charvet-Pond and Rosendahl (1993) on Parcel 029, which is adjacent to the current study parcel. On Parcel 029 they identified an elevated trail alignment that "paralleled the coastline and extended across the property onto the neighboring parcels on both sides." (Charvet-Pond and Rosendahl 1993:15). This trail likely extended along this entire portion of coastal Puna, and various segments of it have been described in several archaeological studies (see Charvet-Pond and Rosendahl 1993). Given the physical characteristics of this site (elevated with water-worn steppingstones) it appears to have been originally built and used during Precontact times, and may have seen continued local use into the early Historic Period during which time most distance travelers used the Government/Beach Road (Maly 1999) that is situated along the *mauka* side of the current study parcel. The feature is described as being "a linear mound of variable construction." (ibid.). Charvet-Pond and Rosendahl further describe that:

> The elevated trail varies in construction materials, styles and techniques. In some sections the primary building material is subangular basalt cobbles, while in other segments area largely waterworn cobbles. On one eastern segment, two parallel alignments of flat waterworn basalt boulders have been placed on the surface at about one meter intervals near the edges, these appear to be steppingstones. There are occasional small rounded basalt pebbles (ʻiliʻili) between them, suggesting that the interstices between the steppingstones were at one time rock-filled. The trail is moderately elevated, and is generally lower (0.3 m) on the mauka side and higher (0.6 m) on the makai side; in width it ranges from one to two meters (Charvet-Pond and Rosendahl 1993:A-1).

They go on to suggest that "this feature is very similar to inferred prehistoric coastal-trail segments in the vicinity described by Hudson (1932) and Ewart and Luscomb (1974)." (Charvet-Pond and Rosendahl 1993:15).

Within the current study parcel, a slightly elevated earthen alignment with placed water-worn boulders and cobbles (Figure 23) was observed approximately 20 meters *mauka* of the sea cliffs; at roughly the same distance inland that Site 18418 Feature A was recorded on the adjacent parcel. This alignment is interpreted to be a segment of this same trail. Within the current project area the trail alignment is traceable for only a 10 meter distance in the southeast portion of the parcel, the remainder either having previously bulldozed away or covered and obscured by soil and vegetation. The trail remnant within the study parcel was first visually identified as a humped area covered with a dense growth of grasses and vines. The vegetation was then removed exposing a 10 meter long section of the elevated trail. This feature consists of an approximately 1.8 meter wide level surface with 60 centimeter sloped margins. On its upslope edge, the trail rises 12 centimeters above the surrounding ground surface and on its downslope edge it is 32 centimeters above the surrounding ground surface. Several water-worn basalt boulders and cobbles have been placed along the edge of the level surface, while others have been embedded within the surface; the former rocks seem to define the trail alignment, and the latter appear to have been used as steppingstones. A large *pāhoehoe* slab sits on the slope adjacent to the trail's *mauka* edge, likely indicating the extent of former bulldozing in this area.

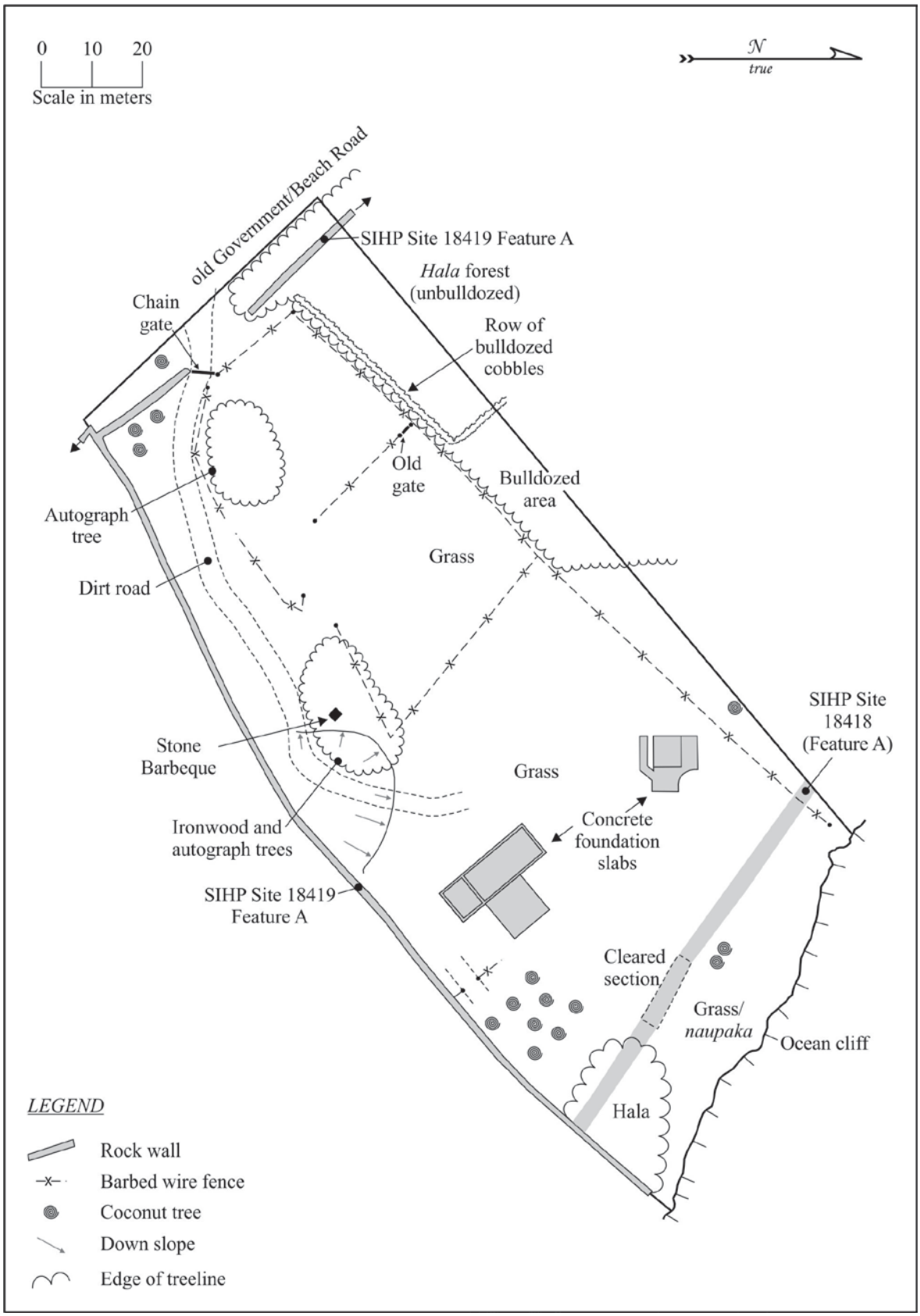

Figure 21. Project area plan view.

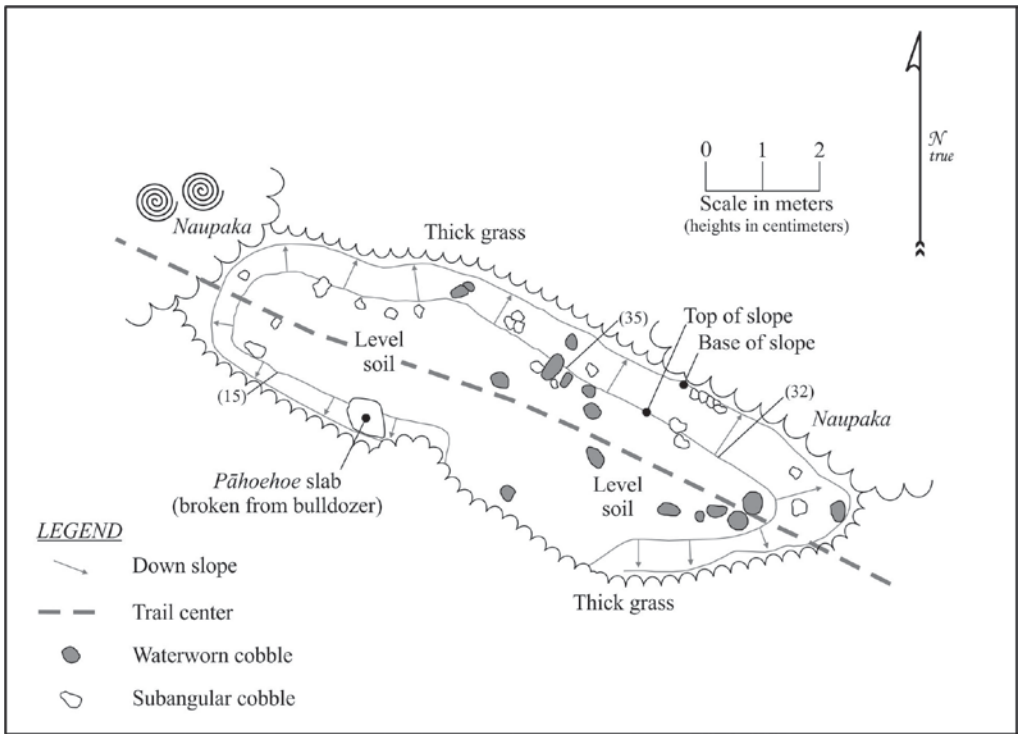

Figure 22. SIHP Site 18418 Feature A plan view.

Figure 23. SIHP Site 18418 Feature A water-worn boulders and cobbles along edge of trail, view to the northwest.

Site 18419 is a core-filled wall (Figure 24) located along the southeastern and *mauka* boundaries of the current study parcel (see Figure 21). The portion of the wall along the southeastern boundary of the study parcel was re-documented as part of Dircks Ah Sam and Rechtman's (2013) study, but was originally recorded and assigned its SIHP number as a result of the Charvet-Pond and Rosendahl (1993), who described the feature thusly:

> This feature is a double-faced core-filled rock wall with approximately seven courses of stacked subangular basalt cobbles, small boulders, and occasional waterworn basalt cobbles; the height and thickness of the wall are variable. The sides are vertical, but the rocks are not tightly fitted or smoothly faced, and the top of the wall is eroded and somewhat irregular. The wall runs from a boundary-line fencepost near the Government/Beach Road to the seaward cliff-face, and forms the west boundary of the property (Charvet-Pond and Rosendahl 1993:A-2).

Dircks Ah Sam and Rechtman (2013) explain that:

> The previously recorded portion of Site 18419 begins at the coast near the sea cliffs and extends along the boundary between the current study parcel and Parcel 029 nearly to the old Government Road. At intact sections the wall stands 4 to 7 cobbles tall (up to 148 centimeters) averaging 1 meter in width. The wall follows the meandering southeastern boundary of the current study parcel for 185 meters toward its southern corner near the *makai* edge of the old Government Road. The wall then turns ninety degrees and continues in a northwesterly direction adjacent to the *mauka* boundary of the study parcel, paralleling the old Government Road for 24 meters to a bulldozed break where a driveway from the old Government Road enters the property. This section of wall appears recently restacked, but its dimensions are similar to those previously recorded by Charvet-Pond and Rosendahl (1993) along the southeastern property boundary. At the bulldozed break, where the wall terminates along the southeastern edge of the driveway, a large slab has been recently set on edge. A 5.5 inch diameter pipe protrudes up from the wall's surface at this location. A chain, used to block access to the parcel, extends from the pipe to a fence line on the opposite side of the driveway. From the pipe, extending northwest, the wall is absent for a distance of 17 meters. On the northwestern side of the break, the wall continues the 27 meters to the western corner of the study parcel and beyond for an undetermined distance outside of the current study area in a northwesterly direction paralleling the old Government Road (Dircks Ah Sam and Rechtman 2013:26).

Figure 24. SIHP Site 18419 Feature A intact section along boundary with Parcel 029, view to the south.

5. CONSULTATION

When assessing potential cultural impacts to resources, practices, and beliefs; input gathered from community members with genealogical ties and/or long-standing residency relationships to the study area is vital. It is precisely to these individuals for whom meaning and value are ascribed to traditional resources and practices. Community members may also retain traditional knowledge and beliefs unavailable elsewhere in the historical or cultural record of a place. As part of earlier studies (Ewart and Luscomb 1974; Rechtman 2009; Terry 2000) several individuals with ties to the Makuʻu, Hālona, Pōpōkī area were consulted. The information obtained from these earlier consultation interviews that is applicable to the current assessment study is presented below. In addition representatives from the Makuʻu Farmers Association were contacted. This latter organization is made up of Department of Hawaiian Home Lands (DHHL) beneficiaries living and farming on tracts of land in the portions of Makuʻu, Halona, and Pōpōkī that lie inland from the current study area. The Association president Paula Kekahuna was contacted by telephone and the proposed development was discussed and she explained that the coastal area is of enough distance from the DHHL farm lots that the development of a single-family residence has no direct effect on their activities. She also indicated that she would check with other association and community member to see if they had any further information or input concerning the current proposed project. At the time of this writing no additional responses were received.

In the study prepared by Ewart and Luscomb (1974), they cite notes from a July 4, 1956 interview conducted by Mrs. Violet Hansen with Mary Ann Kamahele (who was 70 years old at the time). Mary Ann Kamahele was described as a member of the only Hawaiian family resident at Makuʻu at that time; she was living on Grant No. 1013 (see Figure 19). Mrs. Kamahele provided the following information about two place names in the vicinity of the current study area (see Figure 19): Opunaha was a canoe landing, and Kula was a *koʻa* (a fishing ground) for *āholehole*.

During the EA process conducted for the development of a single-family residence on TMK: (3) 1-5-01:025, located three parcels to the northwest of the current study parcel and similarly situated between the old Government Road and the coastal cliffs (see Figure 20), two native Hawaiian individuals with direct ties to the area were interviewed, Ms. Puanani Mukai and Mr. Frank Kamahele (nephew of Ulrich "Sonny" Kamahele). Ms. Mukai was described as the guardian of an adjacent parcel; and Frank Kamahele spent much of his childhood in the area, beginning in 1938. Frank Kamahele described that the use of the area duirng the early and middle twentieth century centered on farming, ranching, and fishing. Access to the ocean was much easier at that time because the Makuʻu cinder cone sloped gently to the rocky beach and was covered with grass. Wave action has since created a steep cliff above the beach, and most fishing is now done from the cliffs. He indicated that landowners in the area have always allowed fishermen access to the cliffs, but did not recall any particular trails or access routes. With respect to other residents in the area, Mr. Kamahele recalled that the coastal area was sparsely populated, partly because the nearest train station was more than a two-mile walk away. The development of the Hawaiian Paradise Park subdivision in the early 1960s connected the Old Government Road (Beach Road) to the current Keaʻau-Pāhoa Highway and made access to the area much easier. Terry (2000) reported that neither Mr. Kamahele nor Ms. Mukai identified any specific sites with traditional cultural significance in the area; and with respect to the then proposed and now constructed single-family home on TMK: (3) 1-5-01:025, neither could think of any possible adverse cultural impacts to the area.

As part of the assessment of cultural impacts for the proposed development of TMK: (3) 1-5-10:032 located to the northwest of the current project area, and also situated between the old Government Road and the coast (see Figure 20), additional extended members of the Kamahele Family were consulted, Richard Ha and Melani Dominguez. Mr. Ha's grandmother's brother was Ulrich Kamahele; and as Mr. Ha relates in his online blog, "Everyone knew him (Ulrich) as Uncle Sonny, as if there was only one 'Uncle Sonny' in all of Hawaiʻi." In this same online blog, Mr. Ha prepared a four-part story about his life experiences at Makuʻu. Excerpts from these stories are presented to highlight life in the general project area during the middle twentieth century.

> My extended Kamahele family came from Makuʻu. When we were small kids, Pop would take us in his '51 Chevy to visit.
>
> He would turn left just past the heart of Pahoa town, where the barbershop is today. We drove down that road until he hit the railroad tracks, and then turned left on the old railroad grade back toward Hilo. A few miles down the railroad grading was the old Makuʻu station. It was an old wooden shack with bench seats, as I recall. That is where the train stopped in the old days. A road

> wound around the pahoehoe lava flow all the way down the beach to Maku‘u. That was before there were the Paradise Park or Hawaiian Beaches subdivisions.
>
> We did not know there was a district called Maku‘u; we thought the family compound was named Maku‘u. Of the 20-acre property, maybe 10 acres consisted of a kipuka where the soil was ten feet deep. The 10 acres on the Hilo side were typical pahoehoe lava. The property had a long oceanfront with a coconut grove running the length of the oceanfront. It was maybe 30 trees deep and 50 feet tall.
>
> The old-style, two-story house sat on the edge of a slope just behind the coconut grove. If I recall correctly, it had a red roof and green walls. Instead of concrete blocks as supports for the posts, they used big rocks from down the beach.
>
> There was no telephone, no electricity and no running water. So when we arrived it was a special occasion. We kids never, ever got as welcome a reception as we got whenever we went to Maku‘u.
>
> And the person happiest to see us small kids was tutu lady Meleana. She was my grandma Leihulu’s mom. She was a tiny, gentle woman, maybe 100 pounds, but very much the matriarch of the family. She spoke very little English but it was never an issue. We communicated just fine.
>
> We could not wait to go down the beach. Once she took us kids to catch ‘ohua—baby manini. She used a net with coconut leaves as handles that she used to herd the fish into the net. I don’t recall how she dried it, but I remember how we used to stick our hands in a jar to eat one at a time. They were good.
>
> She would get a few ‘opihi and a few haukeuke and we spent a lot of time poking around looking at this sea creature and that.
>
> Between the ocean in the front and the taro patch, ulu trees, bananas and pig pen in the back, there was no problem about food. I know how Hawaiians could be self-sufficient because I saw it in action.
>
> The house was full of rolls of stripped lauhala leaves. There were several lauhala trees and one was a variegated type. I don’t recall if it was used for lauhala mats but it dominated the road to the house.
>
> There were lauhala mats all over the place, four and five thick. There was a redwood water tank, and the kitchen water pipe had a Bull Durham bag on the spout as a water filter.

When asked about the proposed development of TMK: (3) 1-5-10:032, Mr. Ha indicated that if the landowner adhered to the Conservation District rules and the treatment plans for the archaeological sites that development of a proposed single-family residence would be fine.

As reported by Ketner and Rechtman (2011), Melani Dominguez has strong genealogical ties to the area having descended from Hawaiians residing in Maku‘u dating from *Māhele* times, and likely Precontact times. Melani‘s personal recollections of the current study area extend back to the late 1970s, when she was a small girl. Melani recalled picking *limu* and fishing with her grandmother Theresa Kamahele down at their property on TMKs: (3) 1-5-10:009 and 010; Grant 1014. She also remembered hearing about a *menehune* trail that meandered through their property *mauka*/*makai*. When asked the construction of the single-family dwelling on TMK: (3) 1-5-10:032, Melani indicated that she would feel alright about it as long as no cultural sites were impacted.

6. POTENTIAL CULTURAL IMPACTS

The Office of Environmental Quality Control (OEQC) guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The guidelines also identify the types of potential cultural resources, associated with cultural practices and beliefs that are subject to assessment. Essentially these are natural features of the landscape and historic sites, including traditional cultural properties. A working definition of traditional cultural property is:

> "Traditional cultural property" means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community's history and contribute to maintaining the ethnic community's cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

The origin of the concept of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service. "Traditional" as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. "Cultural" refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term "Property" defines this category of resource as an identifiable place. Traditional cultural properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them.

It is however with the definition of "Property" wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often times cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa'akai O Ka'āina* v. Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical, or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights will be affected or impaired; and third, specify any mitigation actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

Based on the archival research and collected oral information it is recognized that the general shoreline area is and has been used for both recreational and subsistence purposes (see consultation section above), and that the immediate off-shore area (at a place identified as Kula) was considered to be a *ko'a āholehole*. This location could be considered a traditional cultural property and the shoreline practices could be considered to be of a traditional cultural nature. While no specific activities were identified for the shoreline fronting the study parcel, strict adherence to shoreline setbacks will ensure that the proposed development of the parcel will not affect existing shoreline access, and thus there will be no impact on any potential shoreline-related and immediate off-shore traditional practices or places. Although not specifically identified in either the archival materials or consultation information, there is one site of an archaeological nature that was recorded (Dircks Ah Sam and Rechtman 2013) on the study parcel that could have been related to the traditional use of the shoreline area, SIHP Site 18418 Feature A is a remnant of a coastal trail. During Precontact and early Historic times this trail likely extended along a significant portion of the Puna coastline providing for both distance travel and localized shoreline access.

To mitigate any potential impacts to SIHP Site 18418 Feature A within the current study parcel, a preservation plan will be prepared and submitted to DLNR-SHPD for approval. Protection measures described in the plan will be implemented prior to the commencement of any development activities. Execution of mitigation measures specified in that plan along with adherence to the shoreline building setbacks will help to ensure that no cultural practices and beliefs or associated cultural resources will be adversely affected by the proposed development of a single-family residence on TMK: (3) 1-5-10:028.

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APPENDIX A – Grant No. 1537 to Kapohana(o)

Original
No. 1537, Kapohano, Halona & Popoki Ahupuaa, District of Puna, Island of Hawaii, Vol. 8, pps. 237-238</B> [LG Reel 3, 00580-00581tif]

Helu 1537
Palapala Sila Nui

Ma keia palapala sila nui ke hoike 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 Kapohano i kona wahi kanaka i manao pono ia ia i kela apana aina a pau e waiho la, ma Halona a me Popoki, Puna ma ka Mokupuni o Hawaii, a penei hoi ka waiho ana o na Mokuna,

E hoomaka ana keia ma kahakai ma ke kihi Akau o keia e pili ana me ka aina o Kea, a e holo ana ma ia aina
Hema 39 1/2° Komohana 24.48 Kaulahao a hiki ma kahi kumu niu, alaila
Hema 37° Komohana 9.40 Kaulahao a hiki ma kahi kumu ulu, alaila
Hema 41 1/2° Hikina 32.24 Kaulahao a hiki ma kahi ahupohaku, alaila
Akau 56 1/2° Hikina 35.20 Kaulahao a hiki ma ke alanui Aupuni, alaila
Akau 37 1/2° Hikina 20.00 Kaulahao a hiki ma kahakai alaila ma kahakai a hiki ma kahi i hoomaka'i.

[page 238]

A maloko o ia Apana 171.00 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 $52.75. Aka, ua koe i ke Aupuni na mine minerale a me na mine metala a pau.

No Kapohano, ua aina la i haawiia, nona mau loa aku no, ma ke ano alodio, a me kona mau hooilina, a me kona 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 i ko'u inoa, a me ka sila nui o ko Hawaii Pae Aina ma Honolulu i keia la 20 o Ianuali, 1855.

Inoa}
Kamehameha IV
V.K. Kaahumanu
Keoni Ana

[Land Patent Grant No. 1537, Kapohano, Halona & Popoki Ahupuaa, District of Puna, Island of Hawaii, 171 Acres, 1855]

Translation
No. 1537, Kapohano, Hālona & Pōpoki Ahupua‘a, District of Puna, Island of Hawai‘i, Vol. 8, pps. 237-238</B>
[LG Reel 3, 00580-00581 tif]

Number 1537
Great Seal Document

In this Great Seal Document, Kamehameha III, the High Chief of God whose blessings are upon the Hawaiian Island Chain, is showing to all people today, for himself and for his lesser chiefs, that he has given an Alodial title to Kapohano his settlement that he rightly thinks to leave in the land section's entirety, in Hālona and Pōpoki, Puna on the island of Hawai‘i, and this is how the boundaries are being put down,

It is starting at the shore at the North extremity adjoining the land of Kea, and it is proceeding along this land
South 39 ½ degrees West 24.48 chains to a coconut tree, then
South 37 degrees West 9.40 chains to a breadfruit tree, then
South 41 ½ degrees East 32.24 chains to a rock mound, then
North 56 ½ degrees East 35.20 chains to the government road, then
North 37 ½ degrees East 20.00 chains to the shore and along the shore to the place of commencement.

[page 238]

This land parcel contains 171.00 acres, give or take.
This is the source of its accruement; he gave $52.75 to the Government Treasury, but, in addition, the Government received all the mineral and metal mines.

This land was given to Kapohano, his forever, as an alodium, and to his recipients as well as his savings, and taxes were placed on all Alodial titles by those of the Legislature from that time until now.

And for reasons of presentation I have placed my name as well as the seal of the Hawaiian Island Chain in Honolulu on this day, the 20th of January, 1855.

Name}
Kamehameha IV
V.K. Ka‘ahumanu
Keoni Ana

[Land Patent Grant No. 1537, Kapohano, Hālona & Pōpoki Ahupua‘a, District of Puna, Island of Hawai‘i, 171 Acres, 1855].

Appendix D. Archaeological Assessment

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An Archaeological Inventory Survey of TMK: (3) 1-5-10:028

Pōpōkī Ahupua‘a
Puna District
Island of Hawai‘i

Draft Version

Prepared by:

Ashton Dircks Ah Sam, B.A.,
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Prepared for:

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December 2013

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An Archaeological Inventory Survey of TMK: (3) 1-5-10:028

Pōpōkī Ahupuaʻa
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EXECUTIVE SUMMARY

At the request of Mr. Lincoln King of Native Technologies, Inc., on behalf of the landowner, ASM Affiliates, Inc. conducted an Archaeological Inventory Survey of a 3.5-acre parcel (TMK: (3) 1-5-10:028) located in Pōpōkī Ahupuaʻa, Puna District, Island of Hawaiʻi. This parcel is a portion of a former land grant (Grant 1537) sold to Kapohana in 1855, and is currently situated within the State Conservation District. The landowner plans to develop a single-family residence on the property, which given the Conservation District zoning requires the preparation of an Environmental Assessment (EA) and Conservation District Use Application (CDUA) pursuant to Hawaiʻi Revised Statutes (HRS) Chapter 343. The current study is being prepared in support of the EA and CDUA, and was undertaken in accordance with Hawaiʻi Administrative Rules (HAR) 13§13-284.

The current study area (TMK:3-1-5-10:28) consists of 3.5 acres located in Pōpōkī Ahupuaʻa, Puna District, Island of Hawaiʻi (see Figures 1 and 2). The parcel is located southeast of the Hawaiian Paradise Park residential subdivision between the old Government Road (the Government Beach Road) and the coast at elevations ranging from 15 to 50 feet above sea level.

As a result of the current inventory survey features of two previously recorded archaeological sites (SIHP Sites 18419 and 18418) were identified within the current study parcel. These sites were originally recorded on the neighboring parcel to the southeast by Charvet-Pond and Rosendahl (1993) and include a core-filled wall (Site 18419 Feature A) and a trail section (a portion of Site 18418 Feature A). The bulk of the study area, with the exceptions of the locations of the two recorded sites and a small area in the parcel's western corner had been previously bulldozed. There were no archaeological features observed on the unmodified *pāhoehoe* bedrock in the western corner of the study parcel, nor were any resources observed with the bulldozed portion of the parcel.

Both of the archaeological sites recorded during the current inventory survey are considered significant under Criterion D for information they have yielded relative to the past use of the study area. Site 18419 Feature A is a Historic Period (likely post-1903) wall that defined pasture space and was associated with cattle-ranching activities that took place in the general study area during the early and middle twentieth century. Site 18418 Feature A is a segment of an elevated coast trail that was used during the Precontact Period (and likely also during early historic times) by the area's inhabitants for both distance travel and to access shoreline resources. This site (Site 18418 Feature A) is considered additionally significant under Criterion E for the important traditional cultural value that such sites hold for native Hawaiians of today. DLNR-SHPD previously accepted a "no further work" treatment for Site 18419 Feature A and nothing was found during the current study to recommendation otherwise. Site 18418 Feature A was previously approved for preservation, a treatment that is supported by the current study. A preservation plan for this site, relative to the current study area, should be prepared and submitted to DLNR-SHPD for review and approval.

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1. INTRODUCTION

At the request of Mr. Lincoln King of Native Technologies, Inc., on behalf of the landowner, ASM Affiliates, Inc. conducted an Archaeological Inventory Survey of a 3.5-acre parcel (TMK: (3) 1-5-10:028) located in Pōpōkī Ahupua'a, Puna District, Island of Hawai'i (Figures 1 and 2). This parcel is a portion of a former land grant (Grant 1537) sold to Kapohana in 1855, and is currently situated within the State Conservation District. The landowner plans to develop a single-family residence on the property, which given the Conservation District zoning requires the preparation of an Environmental Assessment (EA) and Conservation District Use Application (CDUA) pursuant to Hawai'i Revised Statutes (HRS) Chapter 343. The current study is being prepared in support of the EA and CDUA, and was undertaken in accordance with Hawai'i Administrative Rules (HAR) 13§13-284. In order to satisfy the Historic Preservation review process requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) as well as the County of Hawai'i Planning Department rules and guidelines, the structure and contents of the current report adhere to the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in HAR 13§13-276

This report contains background information outlining the project area's physical and cultural contexts, a presentation of previous archaeological work in the vicinity of the parcel, and current survey expectations based on that previous work. Also presented is an explanation of the project's methods, a detailed description of the archaeological sites encountered, interpretation and evaluation of those resources, and treatment recommendations for the documented sites.

PROJECT AREA DESCRIPTION

The current study area (TMK:3-1-5-10:28) consists of 3.5 acres located in Pōpōkī Ahupua'a, Puna District, Island of Hawai'i (see Figures 1 and 2). The parcel is located southeast of the Hawaiian Paradise Park residential subdivision between the old Government Road (the Government Beach Road) and the coast at elevations ranging from 15 to 50 feet above sea level. The parcel is bounded along its *makai* edge (to the northeast) by sea cliffs (Figure 3), to the south-southeast by a privately owned, developed residential parcel (Parcel 29), to the north-northwest by a privately owned, undeveloped residential parcel (Parcel 27), and along its *mauka* edge by the old Government Road (Figure 4). A core-filled wall is present along the *mauka* and southeastern boundaries of the study parcel. Access to the parcel is through a gated driveway along the *makai* edge of the old Government Road (Figure 5). The driveway extends through a bulldozed gap in the wall across the southeastern portion of the project area towards the coast (Figure 6). Two modern concrete slabs are present in the *makai* portion of the study parcel; one near the southeastern boundary at the termination of the driveway (Figure 7), and another (once the location of a wooden structure that was recently torn down) near the northwestern boundary (Figure 8). A wire fence line extends from the coast at the study parcel's northern corner to the wall at the old Government Road (Figure 9), but does not follow the project area boundary, which was recently marked with lathe and flagging tape by surveyors. Other fences enclose an area between the driveway and the fence line near the northwestern boundary, inland of the two concrete slabs (Figure 10).

Terrain within the project area slopes gently to the northeast and consists of mixed *'a'ā* and *pāhoehoe* lava flows (primarily *pāhoehoe*) that originated from Kilauea Volcano 450 to 700 years ago (Wolfe and Morris 1996). Soils in this area are classified as Opihikao extremely rocky muck (Sato et al. 1973). This soil typically consists of a thin layer of very dark brown muck about three inches thick that is generally underlain by *pāhoehoe* lava bedrock, and is strongly acidic. The muck is rapidly permeable, and the lava is very slowly permeable, but water moves rapidly through the cracks. Runoff is slow, and the erosion hazard is slight. Roots are matted over the *pāhoehoe* lava, but they can penetrate the cracks to a depth of two feet (Sato et al. 1973). This area typically receives 60 to 100 inches of rain per year (Jurvik and Jurvik 1998:57).

Figure 1. Project area location map.

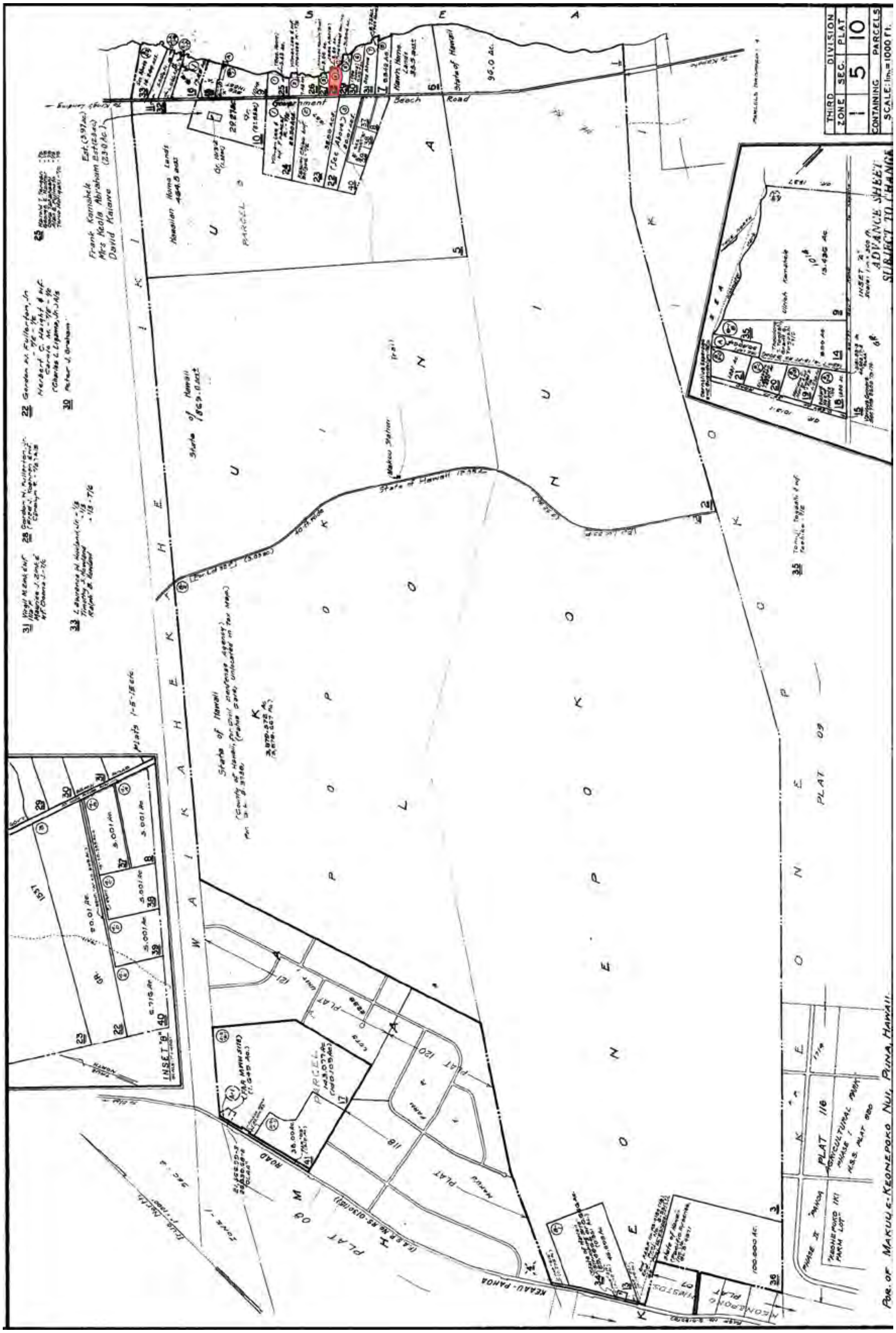

Figure 2. Tax Map Key (TMK):3-1-5-10 showing the current study parcel (Parcel 028) shaded red.

Figure 3. *Makai* boundary of the current study parcel at the coast, view to the northwest.

Figure 4. Old Government Road along the *mauka* edge of the current study parcel, view to the southeast.

Figure 5. Access road to the current study parcel extending *makai* from the old Government Road, view to the west.

Figure 6. Driveway extending across the southeastern portion of the study parcel, view to the west.

Figure 7. Concrete slab foundation near the southeast boundary of the study parcel, view to the north.

Figure 8. Concrete slab located near the northwestern boundary of the study parcel, view to the north.

Figure 9. Fence line that extends between the coast and the wall at the old Government Road near the northwestern boundary of the study parcel, view to the southwest.

Figure 10. Fence line crossing the central portion of the study parcel, view to the northwest.

Nearly the entire study parcel, with the exception of a small area in the west corner, has been previously bulldozed, and was once mowed lawn and pasture (Figure 11). Owing to this bulldozing, vegetation across much of the project area consists of a secondary growth of tall molasses grass (*Melinis minutiflora*), with stands of ironwood trees (*Casuarina equisetifolia*), *hala* (*Pandanus odoratissimus*), coconut palms (*Cocos nucifera*), guava (*Psidium guajava*), and autograph trees (*Clusia rosea*), along with various other non-native grasses, vines, weeds, and ferns, also present. The graded ground surface across the bulldozed portion of the project area consists of cobbles and thin soil, but in the western corner of the parcel, where a thick over story of vegetation shades out the ground cover, undisturbed *pāheohe* bedrock is present. Some *naupaka* (*Scaevola sericea*), *hala*, and coconut palms are also growing near the sea cliffs.

Figure 11. Aerial photograph (from Google Earth) showing the current study parcel (outlined in red).

2. BACKGROUND

In order to generate a set of expectations regarding the nature of archaeological resources that might be encountered on the study parcel, and to establish an environment within which to assess the significance of any such resources, previous archaeological studies relative to the project area and a general historical context for the region are presented. It should be noted that Pōpōkī Ahupuaʻa is a small *ahupuaʻa* sandwiched between the larger *ahupuaʻa* of Makuʻu to the northwest, and the small *ahupuaʻa* of Hālona to the southeast. The boundaries between these three *ahupuaʻa* are not depicted on any of the cartographic resources reviewed for this study, and in the literature all three are often referenced together as a single unit (Makuʻu is often the general term used to mean the entire area; Charvet-Pond and Rosendahl 1993:C-1). The placement of the current project area within Pōpōkī Ahupuaʻa was determined through a reckoning of the parcel's location within the *ahupuaʻa*, combined with a review of information contained in the records for former Grant 1537, which includes the current project area. Based on this information, it is very likely that the current study parcel is located within Pōpōkī Ahupuaʻa near its boundary with Hālona Ahupuaʻa.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Several previous archaeological studies have been conducted within Makuʻu, Pōpōkī, and Hālona *ahupuaʻa* (Table 1 and Figure 12), and the current project area was previously the subject of an archaeological field inspection conducted by Rosendahl (1989). Nine other studies were conducted in the coastal portions of the *ahupuaʻa* in the immediate vicinity of the current project area (Barrera and Lerer 1990; Chaffee and Spear 1993; Chavert-Pond and Rosendahl 1993; Ewart and Luscomb 1974; Hudson 1932; Komori and Peterson 1987; Rosendahl 1989; Spear et al. 1995, Clark et al. 2008). A brief discussion of the findings of each of these previous studies, arranged in chronological order, follows below.

Table 1. Previous archaeological studies in Makuʻu, Pōpōkī, and Hālona *ahupuaʻa*

Author/Date	Type of Study	Ahupuaʻa
Barrera and Lerer 1990	Inventory Survey	Makuʻu
Bordner 1977	Reconnaissance Survey	Makuʻu
Chaffee and Spear 1993	Burial Testing	Makuʻu
Spear et al. 1995	Data Recovery	Makuʻu
Clark et al. 2008	Inventory Survey	Makuʻu
Charvet-Pond and Rosendahl 1993	Inventory Survey	Makuʻu, Hālona, Pōpōkī
Conte et al. 1994	Inventory Survey	Makuʻu, Hālona, Pōpōkī
Desilets and Rechtman 2004	Inventory Survey	Makuʻu, Hālona, Pōpōkī
Clark et al. 2007	Inventory Survey	Pōpōkī
Hudson 1932	Archaeological Survey	Various
Ewart and Luscomb 1974	Reconnaissance Survey	Various
Komori and Peterson 1987	Cultural and Biological Resource Survey	Various
McEldowney and Stone 1991	Archaeological/Environmental Survey	Various
Yent 1983	Archaeological Survey	Makuʻu
Rechtman 2003	Archaeological Assessment	Makuʻu, Hālona
Rosendahl 1989	Field Inspection	Makuʻu, Hālona, Pōpōkī

In addition to the coastal studies, seven other studies have been conducted at more inland locations within the *ahupuaʻa* (Bordner 1977; Conte et al. 1994; Desilets and Rechtman 2004; McEldowney and Stone 1991; Rechtman 2003; Yent 1983, Clark et al. 2007) (see Table 1). These studies are not discussed in detail below, but are briefly discussed and referenced because of what they tell us about land use and subsistence within the *ahupuaʻa* as a whole. McEldowney and Stone (1991) and Yent (1983) documented extensive lava tube systems containing cultural material related to Precontact habitation and burial in the extreme upland portions of the *ahupuaʻa*. As a result of the remaining four upland studies, which included over 2,000 acres of total survey area, only three other features were recorded. One of these features was a cairn (Bordner 1977), another was a small terrace interpreted as a possible agricultural planting area (Desilets and Rechtman 2004), and the third was a complex of surface features that included a large enclosure, a constructed mound, a wall, and a platform that was interpreted as the location of

unspecified Native Hawaiian ceremonial activities (Desilets and Rechtman 2004). The relative lack of archaeological features in the upland area of the *ahupua'a* is understandable considering that most of the area consists of relatively young lava flows covered by dense (primarily native) vegetation.

The earliest coastal survey of archaeological resources in the vicinity of the current project area was conducted by Hudson (1932). Hudson attempted to inventory the sites of East Hawai'i Island from Waipio Valley to the Ka'ū District for the B. P. Bishop Museum. He recorded a wide range of archaeological features including *heiau*, burials, caves, habitations, trails, and agricultural features during his survey. The route of the survey took him through the coastal portion of Maku'u, Pōpōkī, and Hālona *ahupua'*a. It does not appear, however, that Hudson (1932) recorded any features in the immediate vicinity of the current project area. Hudson noted that it was difficult to obtain information about sites in Puna because "most of them are located along the coast between Keaau and Kopoho where no one now lives, and it is difficult to locate descendants of the former Hawaiian population of the area who might be able to shed light on the nature and function of certain sites", and that, "back from the sea the land is under cultivation in cane, used for pasture, or covered with dense vegetation which can be penetrated only with difficulty" (1932:304).

Forty-two years later, Ewart and Luscomb (1974) of the B. P. Bishop Museum conducted a six-mile long archaeological reconnaissance survey of a proposed Kapoho-Keaukaha Highway route through the District of Puna from Waiakahiula Ahupua'a to Kea'au Ahupua'a. The survey area consisted of a 2,000-foot wide corridor that generally followed the route of the old Government Road that passes *mauka* of the current project area (see Figure 12). Ewart and Luscomb (1974) recorded numerous archaeological features and feature complexes in the vicinity of the current project area including walls, mounds, petroglyphs, trails, platforms, enclosures, and modified depressions. These features were variously interpreted as being associated with habitation, burial, agriculture, and ranching.

Komori and Peterson (1987) conducted a pedestrian survey of a proposed Pohoiki-Keaau transmission line corridor that passed roughly 1.5 miles inland (southwest) of the current project area (see Figure 12). Komori and Peterson recorded five agricultural site complexes, habitation and burial platforms, burial and refuge caves, and petroglyphs. According to Komori and Peterson (1987), the agricultural complexes were all located on or adjacent to *'a'ā* lava flows or ash deposits that were more than 1,500 years old. Feature types observed at these agricultural complexes included walls, terraces, clearings, ditches, and modified outcrops. The other sites recorded by Komori and Peterson (1987) were all located on *pāhoehoe* lava flows that originated from Kīlauea Volcano between 300 and 500 years ago. Komori Peterson (1987) suggests that the construction and use of these sites likely dates to between A.D. 1450 and the present, and that the development of the inland agricultural complexes likely followed the establishment of permanent settlements at the coast sometime after A.D. 1450.

Rosendahl (1989) conducted a field inspection of the current study parcel (see Figure 12). With the exception of a stone wall along the south and east boundaries of the parcel, no surface structural or portable remains of any kind were identified on the property. Rosendahl (1989) relates that the lack of findings was due to widespread bulldozing that had occurred on the parcel at some point prior to the field inspection. Rosendahl concludes:

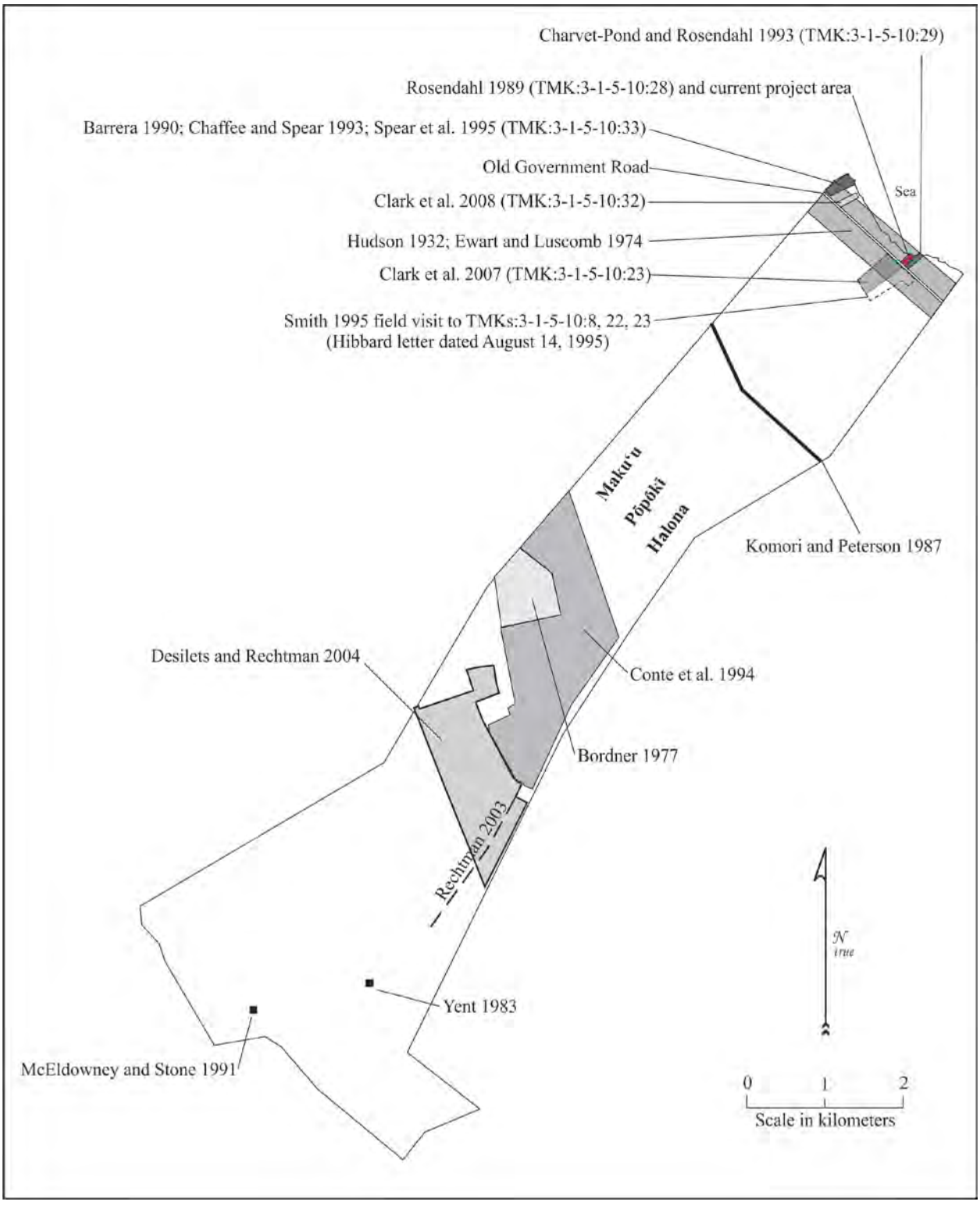

Figure 12. Location of previous archaeological studies conducted in the vicinity of the current study parcel.

> As a result of the negative findings of the field inspection, no further archaeological field work is necessary within the present project area. The evaluation and recommendation presented within this report are made solely on the basis of the field inspection survey work. There is always the possibility, however remote, that potentially significant, unidentified subsurface cultural remains and/or surface structural features will be encountered in the course of future archaeological investigations or subsequent development activities. In such situations, archaeological consultation should be sought immediately. (1989:2)

Beginning in 1990, three phases of archaeological study were conducted at TMK:3-1-5-10:33, a 14-acre parcel located along the coast to the northwest of the current project area (see Figure 12). Barrera and Lerer (1990) first conducted an Archaeological Inventory Survey of the parcel. As a result of that study, six archaeological site complexes, each with multiple features, were recorded on the parcel (SIHP Sites 14675, 14981, 14982, 14983, 14984, and 14985). These sites included a wide range of feature types such as modified outcrops, depressions, and lava blisters, walls, mounds, platforms, enclosures, and terraces, which were interpreted as being used for habitation, agriculture, and possible burial during Precontact and Historic times. Only two of the sites, Sites 14675 and 14985, were recommended for further study.

Chaffee and Spear (1993) followed up on Barrera and Lerer's (1990) work by conducting burial testing at Feature J of Site 14675 (a mound) and Features C, L, and M of Site 14985 (two platforms and a mound). Three of these features (Features J, L, and M) were found to contain subsurface vaults interpreted as burial chambers. Two of the vaults (at Features L and M of Site 14985, a mound and a platform) contained human skeletal remains, while Feature J of Site 14675 lacked human skeletal remains, but was interpreted as a burial feature anyway based on its formal attributes. The lack of human skeletal remains at Feature J was explained by the presence of a wetter micro-environment at that feature, as compared to the other two, which had accelerated the rate of decomposition of the skeletal material (Chaffee and Spear 1993:20). Two of the features (Features J and M) contained associated grave goods that dated to the Historic Period, suggesting a post-contact time frame for the interment of those individuals. With a surface pavement of *ʻiliʻili* and lacking a subsurface vault, Feature C was dissimilar in construction technique to the other three features; and based on the results of the Chaffee and Spear (1993) burial testing, Feature C of Site 14985 was determined to be a habitation platform.

Spear et al. (1995) conducted additional data recovery excavations at some of the remaining features of Sites 14675 and 14985 located northwest of the current project area (see Figure 12). Five features—Feature B (an enclosure), Feature C (a terrace), Feature R (a sealed lava blister), Feature Y (a faced mound), and Feature AP (an enclosure)—were tested at Site 14675, and Feature J (a terrace) of Site 14985 was also tested. Artifacts recovered during the excavations were limited to two types of material; (1) basalt (flakes, manuports, an abrader, and a hammerstone/anvil), and (2) volcanic glass (flakes, debitage, and cores). Most of this material was recovered from Feature J of Site 14985. That feature also yielded a radiocarbon date with a 2 sigma calibrated result of A.D. 1660 to 1950. Based on the data recovery findings Spear et al. (1995) conclude that the large size of most of the tested features suggested that they were used for permanent habitation purposes during the late Precontact Period until perhaps the late nineteenth century. One feature (Feature Y of Site 14675), based on its construction and lack of cultural debris, was interpreted as being used for agricultural purposes

Charvet-Pond and Rosendahl (1993) conducted an Archaeological Inventory Survey of TMK:3-1-5-10:29, a 3.6-acre coastal parcel located adjacent to the southeast edge of the current study parcel (see Figure 12). As a result of the survey five archaeological sites consisting of twelve features were recorded on the subject parcel. The sites included a Precontact coastal trail (Site 18418 Feature A), two Historic cattle walls (Site 18419), a coastal terrace complex interpreted as a possible agricultural shrine or *heiau* (Site 18420), two "bait cups" located within the coastal basalt bench (Site 18421), and an agricultural complex containing twenty-six individual features (Site 18422). One of the Site 18419 cattle walls extends along the southeastern boundary of the current study parcel, and Feature A of Site 18418, a coastal trail, extends in the general direction of the current project area, but stops at the Site 18419 cattle wall. The features of Site 18422 included modified outcrops, modified depressions, terraces, walls, and mounds. Nine of these agricultural features were subject to subsurface testing, which yielded fifty-nine volcanic glass cores and flakes. Subsurface testing was also conducted at Sites 18418, 18420, and 18421, which revealed a complete lack of cultural material at those sites. Based on the predominance of agricultural features and relative lack of cultural debris within their project area, Charvet-Pond and Rosendahl (1993) suggest that many of the activities formerly conducted there were likely related to Precontact agricultural pursuits. It is for this reason that they interpreted Site 18420, a five-feature complex, as a possible agricultural shrine or *heiau*. Three of the terraces of the complex were located on an adjacent parcel to the southeast (TMK:3-1-5-10:30), and were therefore not tested, but Charvet-Pond and Rosendahl (1993) suspect that based on their formal attributes, it is possible that one or all of

them may also contain burials. The main feature of Site 18420 is a 1.0+ meter high, two-tiered terrace with a water-worn cobble surface. Although several possible functional interpretations are discussed for this feature (e.g. fishing shrine, burial, Precontact or Historic habitation), all are discarded in favor of the agricultural *heiau* interpretation. This interpretation was arrived at based on the feature's formal attributes, the lack of cultural debris, and its proximity to the agricultural features of Site 18422.

In 1995, former State Historic Preservation Division (SHPD) staff archaeologist Marc Smith conducted a site inspection of TMKs:3-1-5-10:8, 22, and 23, located to the southwest of the current project area, *mauka* of the old Government Road (see Figure 12) at the request of a Mr. Tom Brennen (Don Hibbard letter dated August 14, 1995; on file at DLNR-SHPD). Don Hibbard, former SHPD administrator, describes the archaeological features that were observed during that visit:

> Stone structures were observed in Parcel 23. These consisted of a single platform, stacked stone walls, mounds, and modified outcrops. It appears that these structures may be associated with early agricultural practices and may be significant as they reflect past land use patterns, and for their information content. Also on historic maps a mauka-makai trail cuts across all three parcels. Where this trail was visible in the field it appears as a jeep road, with very few modifications. It is unclear who owns the trail easement, but it may be significant in that it reflects past land use practices. Because of the proximity to historic Maku'u, unmarked grave sites could be expected, however, during this site inspection no burials were observed.

Hibbard goes on to recommend that the features be recorded prior to any modifications to the parcel, and that the information should be submitted to DLNR-SHPD for their review and comment. Also, that if any significant historic sites are encountered, that as part of any permit action, a mitigation plan detailing a data recovery and/or preservation commitment should also be submitted.

Clark et al. (2007) conducted an Archaeological Inventory Survey of a 38-acre parcel (TMK:3-1-5-10:23; one of the parcels inspected by Marc Smith in 1995) located to the southwest of the current project area, *mauka* of the old Government Road (see Figure 12). As a result of that study, five archaeological sites were recorded, including a Precontact agricultural shrine or small *heiau* (Site 26165), a Historic trail/roadway (Site 26166), a habitation complex (Site 26167), and two agricultural complexes (Sites 26168 and 26169). These sites were interpreted as being variously related to Precontact and continued early Historic Hawaiian use of the area for habitation, ceremonial, and agricultural purposes. Primary habitation occurred at Site 26167, an enclosed complex where a subsurface deposit of marine shell, fish bone, and pig bone found within a terrace indicated that the nearby coastal marine resources and terrestrial resources were exploited for subsistence purposes. Agriculture was practiced at Sites 26168 and 26169 where soil-filled depressions in a *pāhoehoe* lava flow could have been mulched and planted in diverse crops. The shrine recorded by Clark et al. (2007) (Site 26165) occupied a prominent location on an *'a'ā* slope overlooking a low-lying *pāhoehoe* area that contained numerous agricultural features of Site 26169. The shrine consisted of a terrace constructed in three levels, that had a ramped entrance paved with water-worn cobbles leading to a square, water-worn cobble paving on the second level, and a slab lined pit on the third level. Clark et al. (2007) suggest that the cobble paving may have been intended as a spot for leaving offerings, and the slab lined pit could have supported a wooden *ki'i* (idol). A Historic trail/roadway dating to the early part of the 20th century was also recorded. The roadway formerly ran from the old Government Road inland to Maku'u Station along the old railroad line.

Clark et al. (2008) conducted an Archaeological Inventory Survey of a 5.586-acre parcel (TMK:3-1-5-10:32) located northwest of the current project area, between the old Government Road and the coast (see Figure 12). As a result of that study, nine archaeological sites containing a total of 67 features were recorded within their project area. The sites included a core-filled wall along the old Government Road (Site 26658), an enclosure/pavement used for Historic habitation purposes (Site 26659), a Historic habitation complex (Site 26660), a modified bedrock hole used for water collection and storage (Site 26661), three concealed bedrock overhangs interpreted as Historic burial features (Sites 26662, 26663, and 26664), a platform interpreted as a Precontact burial feature (Site 26665), and a large agricultural complex (Site 26666) containing 55 features that spanned the entire project area. Six test units were excavated at five of the recorded sites. In addition to the recorded archaeological sites, the presence of a petroglyph field was noted on the coastal shelf *makai* of their project area.

CULTURE-HISTORICAL CONTEXT

The current project area is located within Pōpōkī Ahupuaʻa, a land unit of the District of Puna, one of six major districts on the island of Hawaiʻi. No specific Hawaiian traditions or legendary accounts concerning Pōpōkī Ahupuaʻa were located while conducting research for this report, but Barrère (1959) summarizes the Precontact geopolitics of the Puna District as follows:

> Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo. (Barrère 1959:15)

Despite its perceived lack of importance with respect to the emerging political history of Hawaiian leadership, Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne (Maly 1998). Because of the relatively young geological history and persistent volcanic activity the region's association with Pele has been a strong one. However, the association with Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests (Pukui 1983). It is said that before Pele migrated to Hawaiʻi from Kahiki, there was "no place in the islands . . . more beautiful than Puna" (Pukui 1983:11). Contributing to that beauty were the groves of fragrant *hala* and forests of *ʻōhiʻa lehua* for which Puna was famous:

> *Puna pāia ʻala i ka hala* (Puna, with walls fragrant with pandanus blossoms)
> Puna, Hawaiʻi, is a place of *hala* and *lehua* forests. In olden days the people would stick the bracts of *hala* into the thatching of their houses to bring some of the fragrance indoors. (Pukui 1983:301)

The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving. "To this day, Puna is known for its growth of *hala*, and the floors and furniture of some of the old households are still covered with fine woven mats and cushions. Weaving remains an important occupation of many native families of Puna" (Maly 1998:6).

Following the death of Kamehameha I in 1819, the Hawaiian religious and political systems underwent a radical transformation; Kaʻahumanu proclaimed herself "*Kuhina nui*" (Prime Minister), and within six months the ancient *kapu* system was overthrown. Within a year, Protestant missionaries arrived from America (Fornander 1973; Iʻi 1959; Kamakau 1961). In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawaiʻi seeking out communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal (Ellis 1963). His writings contain descriptions of residences and practices that are applicable to the general study area:

> The population in this part of Puna, though somewhat numerous, did not appear to possess the means of subsistence in any great variety or abundance; and we have often been surprised to find desolate coasts more thickly inhabited than some of the fertile tracts in the interior; a circumstance we can only account for, by supposing that the facilities which the former afford for fishing, induce the natives to prefer them as places of abode; for they find that where the coast is low, the adjacent water is usually shallow.
>
> We saw several fowls and a few hogs here, but a tolerable number of dogs, and quantities of dried salt fish, principally albacores and bonitos. This latter article, with their *poë* [*poi*] and sweet potatoes, constitutes nearly the entire support of the inhabitants, not only in this vicinity, but on the sea coasts of the north and south parts of the island.
>
> Besides what is reserved for their own subsistence, they cure large quantities as an article of commerce, which they exchange for the vegetable productions of Hilo and Mamakua [Hāmākua], or the *mamake* and other tapas of Ora [ʻŌlaʻa] and the more fertile districts of Hawaii. (Ellis 1963:190-191)

One year after Ellis' tour, the ABCFM established a base church in Hilo. From that church (Hāili), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman who came to Hawaiʻi in 1832, and Titus Coan who arrived in 1835 were two of the most influential Congregational missionaries in Puna and Hilo. As part of their duties they compiled census data for the areas within their missions. In 1835, 4,800 individuals

are recorded as residing in the district of Puna (Schmitt 1973); the smallest total district Population on the island of Hawai‘i. In 1841, Titus Coan recorded that most of the 4,371 recorded residents of Puna, lived near the shore, though there were hundreds of individuals who lived inland (Holmes 1985). One of the coastal settlement areas was Maku‘u in the immediate vicinity of the current project area (the, U.S.G.S. 7.5 min series quadrangle of Pahoa North, HI shows the approximate location of the village, labeled as MAKUU Site; see Figure 1).

In 1846, Chester S. Lyman, “a sometime professor” at Yale University visited Hilo, Hawai‘i, and stayed with Titus Coan (Maly 1998). Traveling the almost 100 mile long stretch of the “Diocese” of Mr. Coan, Lyman reported that the district of Puna had somewhere between 3000-4000 inhabitants (Maly 1998). Entering Puna from Hilo, and traveling southeast along the coast, Lyman described Maku‘u as a small scattered village, and offered the following observations of the Puna coast:

> …The groves of Pandanus were very beautiful, and are the principal tree of the region. There is some grass and ferns, and many shrubs; but the soil is very scanty. Potatoes are almost the only vegetable that can be raised, and these seem to flourish well amid heaps of stone where scarcely a particle of soil could be discovered. The natives pick out the stones to the depth often of from 2 to 4 feet, and in the bottom plant the potato–how it can expand in such a place is a wonder.
>
> Nearly all Puna is like this. The people are necessarily poor—a bare subsistence is all they can obtain, and scarcely that. Probably there are not $10 in money in all Puna, and it is thought that not over one in five hundred has a single cent. The sight of some of these potatoe patches would make a discontented N.E. farmer satisfied with his lot. Yet, I have nowhere seen the people apparently more contented & happy. (Maly 1998:35)

By the middle of the nineteenth century the ever-growing population of Westerners forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership in Hawai‘i, and the *Māhele* became the vehicle for determining ownership of native lands. During the *Māhele*, land interests of the King (Kamehameha III), the high-ranking chiefs, and the low-ranking chiefs, the *konohiki,* were defined. The chiefs and *konohiki* were required to present their claims to the Land Commission to receive awards for lands provided to them by Kamehameha III. They were also required to provide commutations to the government in order to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission (Chinen 1961:13).

During the *Māhele* all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and *Konohiki* Lands. All three types of land were subject to the rights of the native tenants therein. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded as a part of the *Māhele*. Subsequently, in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents of the lands, many of which had also been claimants for *kuleana* during the *Māhele*. This information was collected primarily between A.D. 1873 and 1885 and was usually given in Hawaiian and transcribed in English as they occurred. Boundary descriptions were not collected for all *ahupua‘a*. The boundaries of Pōpōkī were never certified, which is why it is so often grouped with Maku‘u and Hālona *ahupua‘a*.

As a result of the *Māhele* of 1848, the *ahupua‘a* of Maku‘u, Pōpōkī, and Hālona were retained as Government Lands, and no *kuleana* parcels were awarded in the *ahupua‘a* (Charvet-Pond and Rosendahl 1993:C-2). Between 1852 and 1855 portions of all three *ahupua‘a* were divided and sold as fee simple Land Grants. The Land Grants were sold to Native tenants who were interested in acquiring the land upon which they lived, or land that they felt they could cultivate (Maly 1999:64). Three Land Grants were sold in the coastal portion of Maku‘u, Pōpōkī, and Hālona *ahupua‘a*; Grant No. 1013 to Maiau in 1852, Grant No. 1014 to Kea in 1852, and Grant No. 1537 to Kapohano(a) in 1855 (Figure 13). The current project area is a portion of Grant No. 1537 to Kapohano (sometimes spelled Kapohana). Kepā Maly translates the boundary description of Grant No. 1537 as follows:

> This parcel begins at the shore on the Northern corner of this lot, adjoining the land of Kea, and proceeding along this land South 39 1/2 West 24.48 chains to a coconut tree, then proceeding along this land South 37 West 9.30 chains to a breadfruit tree; then proceeding South 41 1/4 East 32.24 chains to a stone cairn; then North 56 1/2 East 35.29 chains to the government road; then North 37 1/2 East 20.00 chains to the shore; then proceeding along the shore to the place of commencement. There are 171 acres within this lot. (1999: 67; Appendix A)

Register Map No. 2258 shows a single house within the boundaries of Grant No. 1537 (see Figure 13). The house is located near the coast (to the northeast of the current study area) next to what appears to be a small hill and survey station labeled Opunaha. The small bay located directly *makai* of the current study area is labeled Kula. The map also shows the old Government Road alignment, a trail that runs *mauka* from the edge of the Government Road to the west of the current project area, and another trail the runs inland from the coast to the east of the current project area. A grove of coconuts is depicted south of the current project area. Ewart and Luscomb (1974) include, in their report, notes of a July 4, 1956 interview conducted by Mrs. Violet Hansen with Mrs. Mary Ann Kamahele (age 70), who was described as being of a Hawaiian family that were the only residents of Makuʻu at that time (living on Grant No. 1013; see Figure 13). Mrs. Kamahele related that Opunaha was a canoe landing spot, and that Kula was a *koʻa* (a fishing ground) where *āholehole* were caught (Ewart and Luscomb 1974:50).

During the latter part of the nineteenth century and into the twentieth century land use within the District of Puna began to change. The native agricultural system was largely abandoned as the population declined (Yent and Ota 1982), and ranching, sugar cane, coffee, and lumber became the dominant industries. The Keaʻau Ranch began grazing cattle on nearby lands as early as the 1850s (Maly 1999:42), and the Olaa and Puna Sugar Companies operated in Puna from 1900 until the 1980s (Dorrance and Morgan 2000). Beginning in 1900, railroad tracks for hauling the unprocessed cane and passenger travel were laid by the Hawaiʻi Railway Company from the sugarcane fields in lower Puna to the mills in Pahoa and Keaʻau, and then continuing on to Hilo (Clark et al. 2001). The railroad ceased operations in 1946. When operating, the railroad passed through Makuʻu, Holana, and Pōpōkī *ahupuaʻa mauka* of the current project area, where the Makuʻu Station house was located.

Aerial photographs from 1954 and 1977 show that the current project area was covered with low vegetation during the middle to late twentieth century (rather than *hala* forest) and was likely used as pasture land (Figures 14 and 15). Rosendahl (1989) indicates that the study parcel had been cleared with a bulldozer prior to the late 1980s. According to the neighbor living on the adjoining residential parcel to the southeast (Parcel 29) of the study parcel, a former owner of TMK:3-1-5-10:28 poured the two concrete slabs currently extant on the property, but passed away before building a house. At one point the entire parcel was mowed lawn. A 2012 aerial photograph shows the roof of the structure that was recently removed from the slab near the northwestern boundary of the study parcel and a mowed area surrounding it (Figure 16).

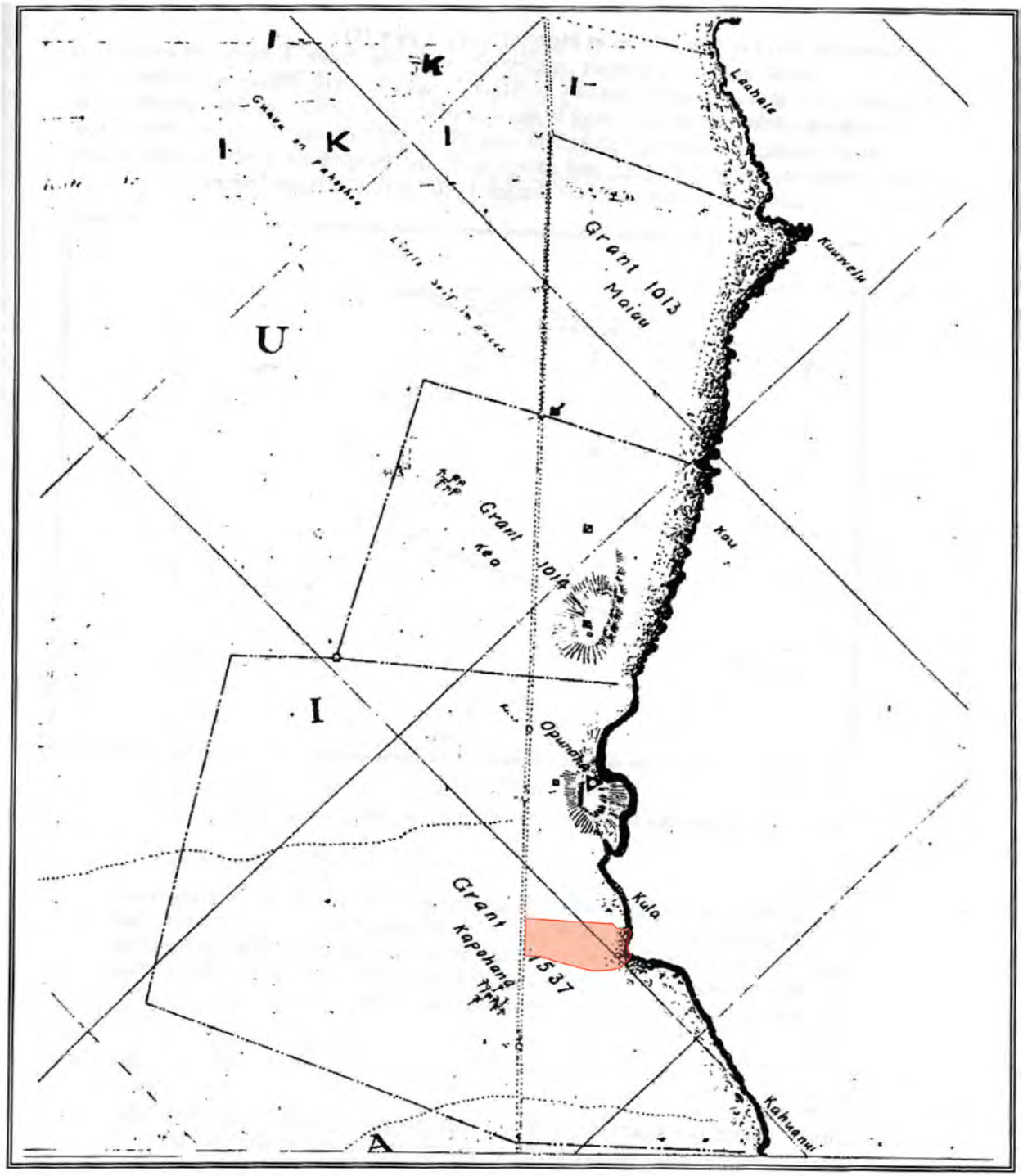

Figure 13. Portion of Register map No. 2258 (prepared by J. H. Morgane in 1903) showing land grant parcels and the historic trail (current project area in red).

Figure 14. 1954 aerial photograph showing the current study parcel outlined in red.

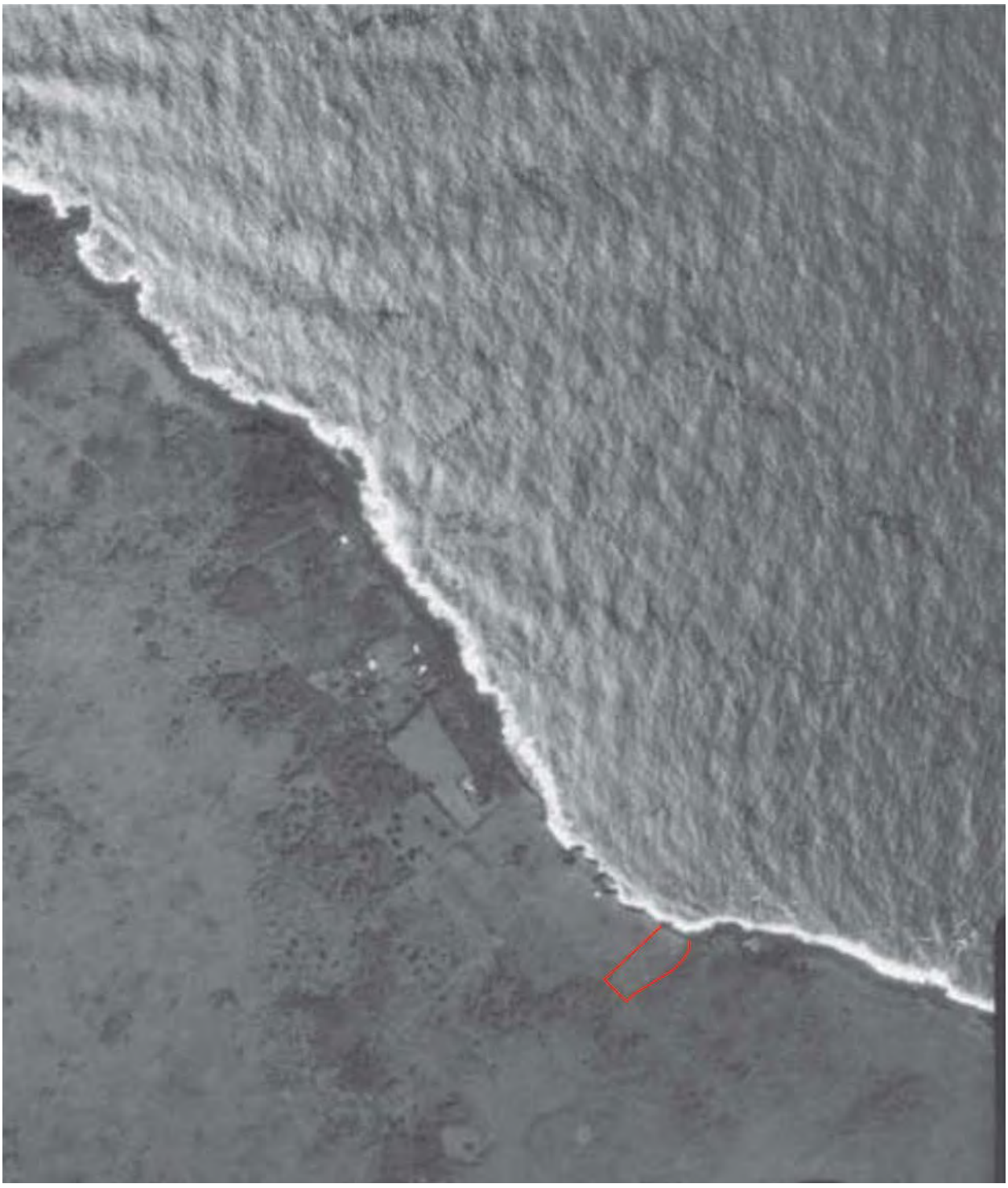

Figure 15. 1977 aerial photograph showing the current study parcel outlined in red.

Figure 16. 2012 aerial photograph showing the current study parcel (outlined in red).

3. *AHUPUA'A* SETTLEMENT PATTERNS AND CURRENT SURVEY EXPECTATIONS

A general model of Precontact settlement patterns for the Puna coastline includes both habitation sites and agricultural complexes along with ceremonial and burial areas, all associated with a fairly dense population. Inland areas were exploited for agricultural purposes and the collection of forest resources, but not generally for habitation. Maku'u was likely a regional population center during Precontact times. By early Historic times, as drastic population reduction occurred throughout Hawai'i and traditional sites were abandoned, Maku'u became a small scattered village (Maly 1998). The later Historic Period saw a minor expansion of settlement in this area of both transplanted Hawaiians and non-Hawaiians alike. This was primarily due to Government grant programs. Grantees often modified their lands obscuring if not obliterating prior residential and agricultural sites. The influx of people during this period waned by the early twentieth century as a result of commercial economic failures, and the population once again dipped.

Keeping in mind the above discussed settlement patterns, but based on the results of the prior archaeological study (Rosendahl 1989) conducted on the current study parcel and the archaeological studies conducted on properties adjacent (Charvet-Pond and Rosendahl 1993) and across from (Clark et al 2007) the current study parcel, a project area specific set of expectations can be devised. It is expected that as the bulk of the parcel has been previously bulldozed any evidence of Precontact or early Historic use of the project area would have been removed. Such evidence likely in the form of agricultural features (modified depressions, modified outcrops, alignments, and/or mounds) intermixed with scattered habitation features (platforms, terraces, pavements, walls, and/or enclosures) might be present in the unmodified western corner of the parcel. The prior studies also indicate that dry-stacked core-filled rock walls may exist along at least two of the parcel boundaries. Lastly, it is possible that physical evidence of the former coastal trail (SIHP Site 18418 Feature A known to exist on the adjacent parcel) survived the earlier bulldozing and this site may be present in the *makai* portion of the current study parcel.

4. FIELDWORK

Fieldwork for the current project was conducted on November 6, 2013 and December 13, 2013 by J. David Nelson, B.A., Matthew R. Clark, B.A., and Ashton Dircks Ah Sam, B.A., under the direction of Robert B. Rechtman, Ph. D.

METHODS

During the intensive inventory survey of the study area the entire parcel was subject to southeast/northwest pedestrian transects with fieldworkers spaced at 10-meter intervals. When archaeological features (or landforms, fence lines, disturbances, etc.) were encountered, they were plotted on a map of the study parcel using a Garmin Vista Hcx handheld GPS device (set to the WGS 84 datum). Features were then cleared of vegetation, mapped in detail using tape and compass, photographed, and described using standardized site record forms. No subsurface testing was conducted during the inventory survey fieldwork.

FINDINGS

As a result of the current inventory survey features of two previously recorded archaeological sites (SIHP Sites 18419 and 18418) were identified within the current study parcel (Table 2). The two sites, both of which were originally recorded by PHRI in 1993 on the neighboring parcel to the southeast (Charvet-Pond and Rosendahl 1993), include a core-filled wall (Site 18419 Feature A) that extends along the southeast and *mauka* edges of the current study parcel and a trail section (a portion of Site 18418 Feature A) that extends parallel to the coast in the *makai* portion of the study parcel. Across the rest of the study area, with the exceptions of the locations of the two recorded sites and a small area in the western corner of the parcel, the remaining acreage had been previously bulldozed (sometime prior to 1989). No additional features were observed on the unmodified *pāhoehoe* bedrock in the western corner of the study parcel, but a rectangular stone and concrete feature (1.3 meters long by 1.0 meter wide and 35 centimeters tall), built of stacked small to medium cobbles held together with concrete, was noted adjacent to the northwest edge of the existing driveway within a previously bulldozed area (Figure 17). According to a neighbor (the owner of Parcel 29), this feature was built at the request of the former landowner as the base for a BBQ (the same landowner that poured the concrete house slab near the southeastern boundary of the study parcel), but was never completed. The stone and concrete BBQ foundation, which is located adjacent to two large ironwood trees in an area where push material was deposited during the grubbing and grading of the property, was created as the rocks from the push pile were moved and the area was landscaped.

Table 2. Sites identified during the current study

SIHP Site No.	Formal Type	Functional Type	Age
18418A	Elevated trail remnant	Transportation	Precontact
18419A	Core-filled rock wall	Ranching/Boundary	Historic

Descriptions of the two previously recorded sites within the current study area (Site 18418 Feature A and Site 18419 Feature A) are presented below, and their locations relative to one another, the BBQ foundation, the existing fence lines, concrete slabs, coastline, and the parcel boundaries are shown in Figure 18.

SIHP Site 18418 Feature A

Site 18418 Feature A is a trail remnant located in the *makai* portion of the study parcel that parallels the coast (see Figure 18). This trail was first recorded by Charvet-Pond and Rosendahl (1993) on Parcel 29, which is adjacent to the current study parcel. On Parcel 29 they identified an elevated trail alignment that "paralleled the coastline and extended across the property onto the neighboring parcels on both sides." (Charvet-Pond and Rosendahl 1993:15). They describe the feature as "a linear mound of variable construction." (ibid.). Charvet-Pond and Rosendahl further describe that:

> The elevated trail varies in construction materials, styles and techniques. In some sections the primary building material is subangular basalt cobbles, while in other segments area largely waterworn cobbles. On one eastern segment, two parallel alignments of flat waterworn basalt boulders have been placed on the surface at about one meter intervals near the edges, these appear

> to be steppingstones. There are occasional small rounded basalt pebbles (*ʻiliʻili*) between them, suggesting that the interstices between the steppingstones were at one time rock-filled. The trail is moderately elevated, and is generally lower (0.3 m) on the *mauka* side and higher (0.6 m) on the *makai* side; in width it ranges from one to two meters. (Charvet-Pond and Rosendahl 1993:A-1)

Figure 17. Modern stone and concrete BBQ foundation located in in the southeast portion of the current study parcel, view to the southwest.

They go on to suggest that "this feature is very similar to inferred prehistoric coastal-trail segments in the vicinity described by Hudson (1932) and Ewart and Luscomb (1974)." (Charvet-Pond and Rosendahl 1993:15).

Within the current study parcel, a slightly elevated earthen alignment with placed water-worn boulders and cobbles was observed approximately 20 meters *mauka* of the sea cliffs; at roughly the same distance inland that Site 18418 Feature A was recorded on the adjacent parcel. This alignment is interpreted to be a segment of this same trail. Within the current project area the trail alignment is traceable for only a 10 meter distance in the southeast portion of the parcel (see Figure 18), the remainder either having previously bulldozed away or covered and obscured by soil and vegetation. The trail remnant within the study parcel was first visually identified as a humped area covered with a dense growth of grasses and vines. The vegetation was then removed exposing a 10 meter long section of the elevated trail (Figure 19). This feature consists of an approximately 1.8 meters wide level surface with 60 centimeter sloped margins (Figure 20). On its upslope edge, the trail rises 12 centimeters above the surrounding ground surface and on its downslope edge it is 32 centimeters above the surrounding ground surface. Several water-worn basalt boulders and cobbles have been placed along the edge of the level surface (Figure 21) while others have been embedded within the surface (Figure 22); the former rocks seem to define the trail alignment and the latter appear to have been used as steppingstone. A large *pāhoehoe* slab sits on the slope adjacent to the trail's *mauka* edge (Figure 23), likely indicating the extent of former bulldozing in this area.

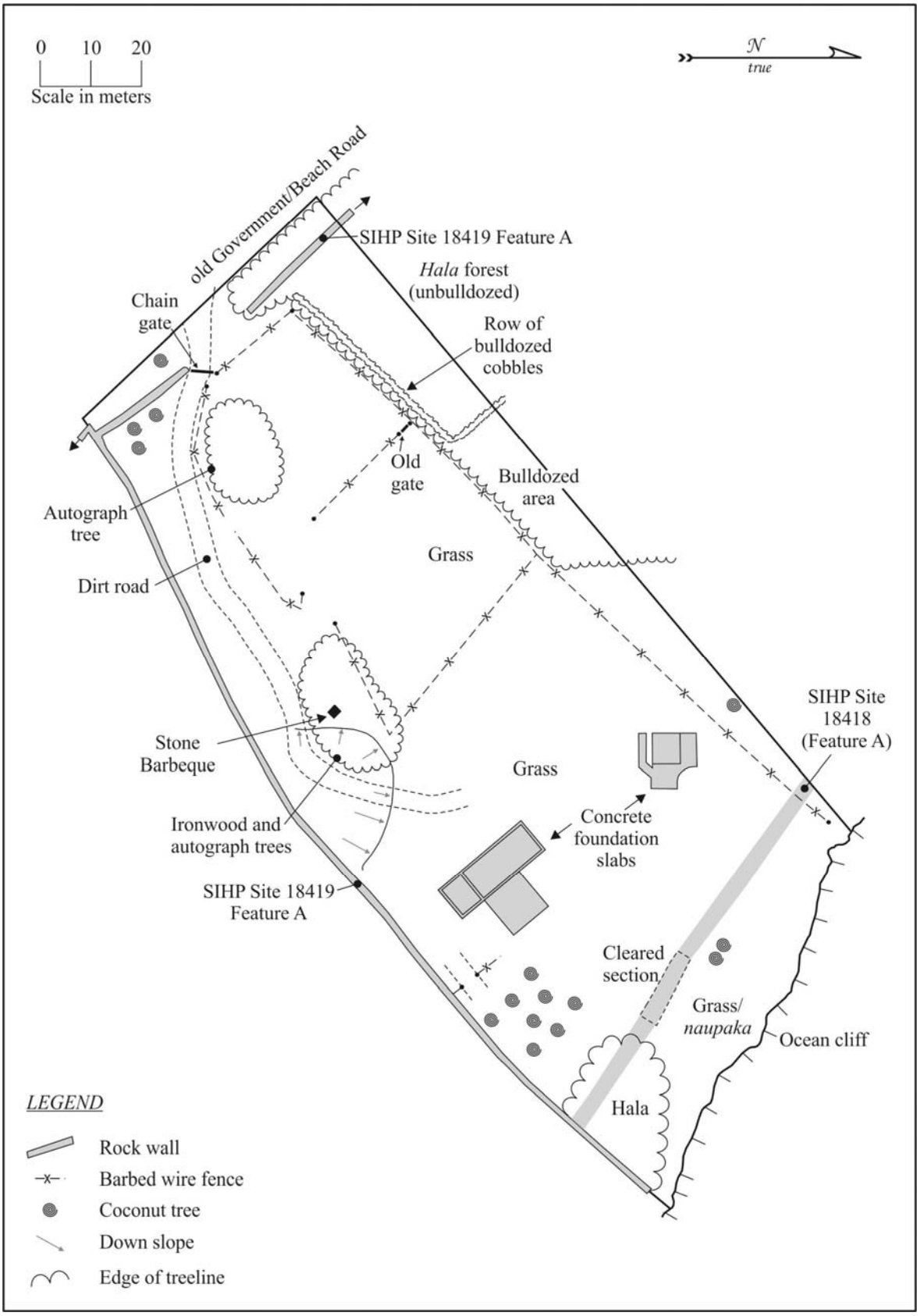

Figure 18. Project area plan view.

Figure 19. SIHP Site 18418 Feature A, showing the elevated nature of the trail alignment, view to the southeast.

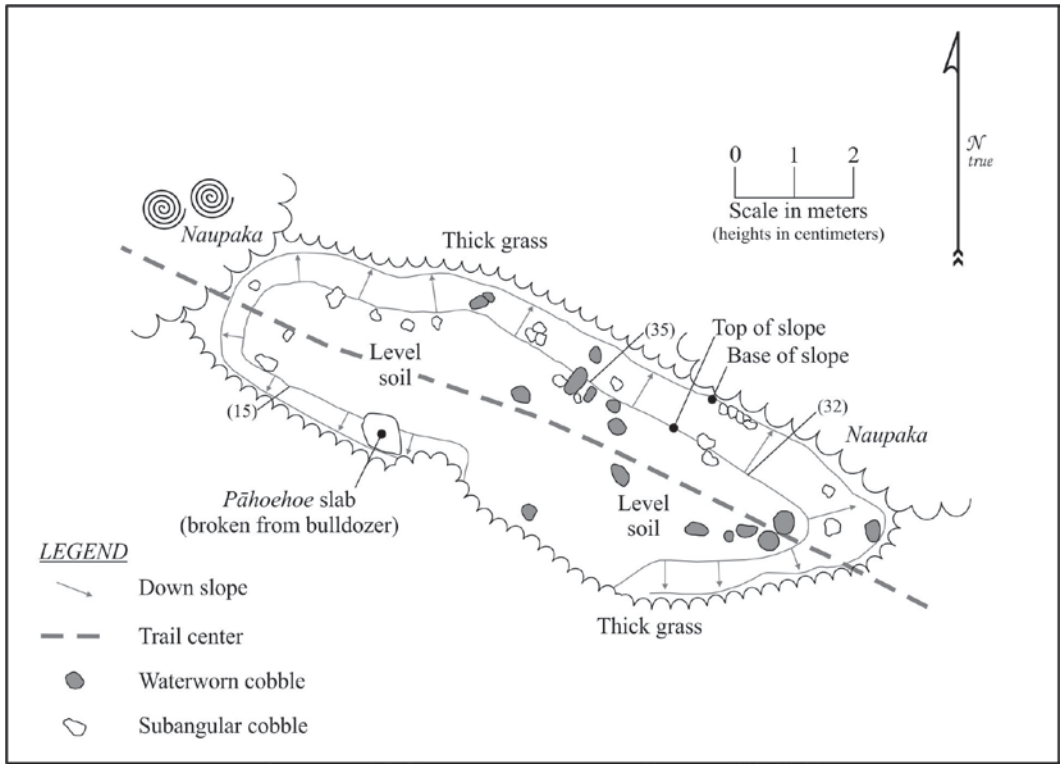

Figure 20. SIHP Site 18418 Feature A plan view.

Figure 21. SIHP Site 18418 Feature A water-worn boulders and cobbles along edge of trail, view to the northwest.

Figure 22. SIHP Site 18418 Feature A, showing embedded steppingstones in trail surface, view to the northwest.

Figure 23. SIHP Site 18418, large *pāhoehoe* slab on the slope adjacent to the trail's *makai* edge, view to the west.

SIHP Site 18419 Feature A

Site 18419 is a core-filled wall located along the southeastern and *mauka* boundaries of the current study parcel (see Figure 18). The portion of the wall along the southeastern boundary of the study parcel was originally recorded and assigned its SIHP number by Charvet-Pond and Rosendahl (1993). Their description of Feature A of Site 18419 is as follows:

> This feature is a double-faced core-filled rock wall with approximately seven courses of stacked subangular basalt cobbles, small boulders, and occasional waterworn basalt cobbles; the height and thickness of the wall are variable. The sides are vertical, but the rocks are not tightly fitted or smoothly faced, and the top of the wall is eroded and somewhat irregular. The wall runs from a boundary-line fencepost near the Government/Beach Road to the seaward cliff-face, and forms the west boundary of the property (Charvet-Pond and Rosendahl 1993:A-2).

Site 18419 Feature A has been re-documented as part of the current study. The previously recorded portion of Site 18419 begins at the coast near the sea cliffs (Figure 24) and extends along the boundary between the current study parcel and Parcel 29 nearly to the old Government Road. At intact sections the wall stands 4 to 7 cobbles tall (up to 148 centimeters) averaging 1 meter in width. The wall follows the meandering southeastern boundary of the current study parcel for 185 meters toward its southern corner near the *makai* edge of the old Government Road (Figures 25 and 26). The wall then turns ninety degrees and continues in a northwesterly direction adjacent to the *mauka* boundary of the study parcel, paralleling the old Government Road for 24 meters to a bulldozed break where a driveway from the old Government Road enters the property. This section of wall appears recently restacked, but its dimensions are similar to those previously recorded by Charvet-Pond and Rosendahl (1993) along the southeastern property boundary. At the bulldozed break, where the wall terminates along the southeastern edge of the driveway, a large slab has been recently set on edge (Figure 27). A 5.5 inch diameter pipe protrudes up from the wall's surface at this location. A chain, used to block access to the parcel, extends from the pipe to a fence line on the opposite side of the driveway. From the pipe, extending northwest, the wall is absent for a distance of 17 meters. On the northwestern side of the break, the wall continues the 27 meters to the western corner of the study parcel

(Figure 28) and beyond for an undetermined distance outside of the current study area in a northwesterly direction paralleling the old Government Road.

SUMMARY

Features of two previously identified archaeological sites were documented during the current inventory survey. SIHP Site 18418 Feature A is a remnant portion of a coastal trail. This trail likely extended along this entire portion of coastal Puna, and various segments of it have been described in several archaeological studies (see Charvet-Pond and Rosendahl 1993). Given the physical characteristics of this site (elevated with water-worn steppingstones) it appears to have been originally built and used during Precontact times, and may have seen continued local use into the early Historic Period during which time most distance travelers used the Government/Beach Road (Maly 1999) that is situated along the *mauka* side of the current study parcel.

SIHP Site 18419 Feature A is a rock wall that may have functioned as a pasture boundary wall to control the movement of cattle. Throughout the late nineteenth and early twentieth centuries this general area was used as pasture lands by the local ranches. The wall's core-filled construction technique indicates that it was constructed during the historic era, and an inspection of Hawai'i Registered Map No. 2258 (see Figure 13) suggests that perhaps the wall was not present in 1903, but rather was built subsequent to that date.

Figure 24. SIHP Site 18419 Feature A *makai* end of wall near the sea cliffs, view to the east.

Figure 25. SIHP Site 18419 Feature A intact section along boundary with Parcel 29, view to the south.

Figure 26. SHIP Site 18419 Feature A near the parcel's south corner at the old Government Road, view to the east.

Figure 27. SIHP Site 18419, large slab set on edge at the end of the wall near the access, view to the east.

Figure 28. SIHP Site 18419, portion of the wall extending northwest beyond the current study parcel, view to the southwest.

5. SIGNIFICANCE EVALUATION AND TREATMENT RECOMMENDATIONS

The above-described archaeological sites are assessed for their significance based on criteria established and promoted by the DLNR-SHPD and contained in the Hawai‘i Administrative Rules 13§13-284-6. This significance evaluation should be considered as preliminary until DLNR-SHPD provides concurrence. For a resource to be considered significant it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

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;

E Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional 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.

Table 3 presents a summary of the significance and treatment for the two recorded sites, the descriptions of which are found below.

Table 3. Site significance and treatment recommendations

SIHP Site No.	Function	Age	Significance	Recommended Treatment*
18419A	Boundary wall	Historic	D	No further work
18418A	Trail	Precontact	D,E	Preservation

*Treatment recommendations for these sites were approved by SHPD as a result of the Charvet-Pond and Rosendahl (1993) study.

Both of the archaeological sites recorded during the current inventory survey are considered significant under Criterion D for information they have yielded relative to the past use of the study area. Site 18419 Feature A is a Historic Period (likely post-1903) wall that defined pasture space and was associated with cattle-ranching activities that took place in the general study area during the early and middle twentieth century. Site 18418 Feature A is a segment of an elevated coast trail that was used during the Precontact Period (and likely also during early historic times) by the area’s inhabitants for both distance travel and to access shoreline resources. This site (Site 18418 Feature A) is considered additionally significant under Criterion E for the important traditional cultural value that such sites hold for native Hawaiians of today. DLNR-SHPD previously accepted a “no further work” treatment for Site 18419 Feature A and nothing was found during the current study to recommendation otherwise. Site 18418 Feature A was previously approved for preservation, a treatment that is supported by the current study. A preservation plan for this site, relative to the current study area, should be prepared and submitted to DLNR-SHPD for review and approval.

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APPENDIX A

Grant No. 1537 to Kapohana(o)

APPENDIX A – Grant No. 1537 to Kapohana(o)

Original
No. 1537, Kapohano, Halona & Popoki Ahupuaa, District of Puna, Island of Hawaii, Vol. 8, pps. 237-238</B> [LG Reel 3, 00580-00581tif]

Helu 1537
Palapala Sila Nui

Ma keia palapala sila nui ke hoike 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 Kapohano i kona wahi kanaka i manao pono ia ia i kela apana aina a pau e waiho la, ma Halona a me Popoki, Puna ma ka Mokupuni o Hawaii, a penei hoi ka waiho ana o na Mokuna,

E hoomaka ana keia ma kahakai ma ke kihi Akau o keia e pili ana me ka aina o Kea, a e holo ana ma ia aina
Hema 39 1/2° Komohana 24.48 Kaulahao a hiki ma kahi kumu niu, alaila
Hema 37° Komohana 9.40 Kaulahao a hiki ma kahi kumu ulu, alaila
Hema 41 1/2° Hikina 32.24 Kaulahao a hiki ma kahi ahupohaku, alaila
Akau 56 1/2° Hikina 35.20 Kaulahao a hiki ma ke alanui Aupuni, alaila
Akau 37 1/2° Hikina 20.00 Kaulahao a hiki ma kahakai alaila ma kahakai a hiki ma kahi i hoomaka'i.

[page 238]

A maloko o ia Apana 171.00 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 $52.75. Aka, ua koe i ke Aupuni na mine minerale a me na mine metala a pau.

No Kapohano, ua aina la i haawiia, nona mau loa aku no, ma ke ano alodio, a me kona mau hooilina, a me kona 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 i ko'u inoa, a me ka sila nui o ko Hawaii Pae Aina ma Honolulu i keia la 20 o Ianuali, 1855.

Inoa}
Kamehameha IV
V.K. Kaahumanu
Keoni Ana

[Land Patent Grant No. 1537, Kapohano, Halona & Popoki Ahupuaa, District of Puna, Island of Hawaii, 171 Acres, 1855]

Translation
No. 1537, Kapohano, Hālona & Pōpoki Ahupua‘a, District of Puna, Island of Hawai‘i, Vol. 8, pps. 237-238</B> [LG Reel 3, 00580-00581 tif]

Number 1537
Great Seal Document

In this Great Seal Document, Kamehameha III, the High Chief of God whose blessings are upon the Hawaiian Island Chain, is showing to all people today, for himself and for his lesser chiefs, that he has given an Alodial title to Kapohano his settlement that he rightly thinks to leave in the land section’s entirety, in Hālona and Pōpoki, Puna on the island of Hawai‘i, and this is how the boundaries are being put down,

It is starting at the shore at the North extremity adjoining the land of Kea, and it is proceeding along this land
South 39 ½ degrees West 24.48 chains to a coconut tree, then
South 37 degrees West 9.40 chains to a breadfruit tree, then
South 41 ½ degrees East 32.24 chains to a rock mound, then
North 56 ½ degrees East 35.20 chains to the government road, then
North 37 ½ degrees East 20.00 chains to the shore and along the shore to the place of commencement.

[page 238]

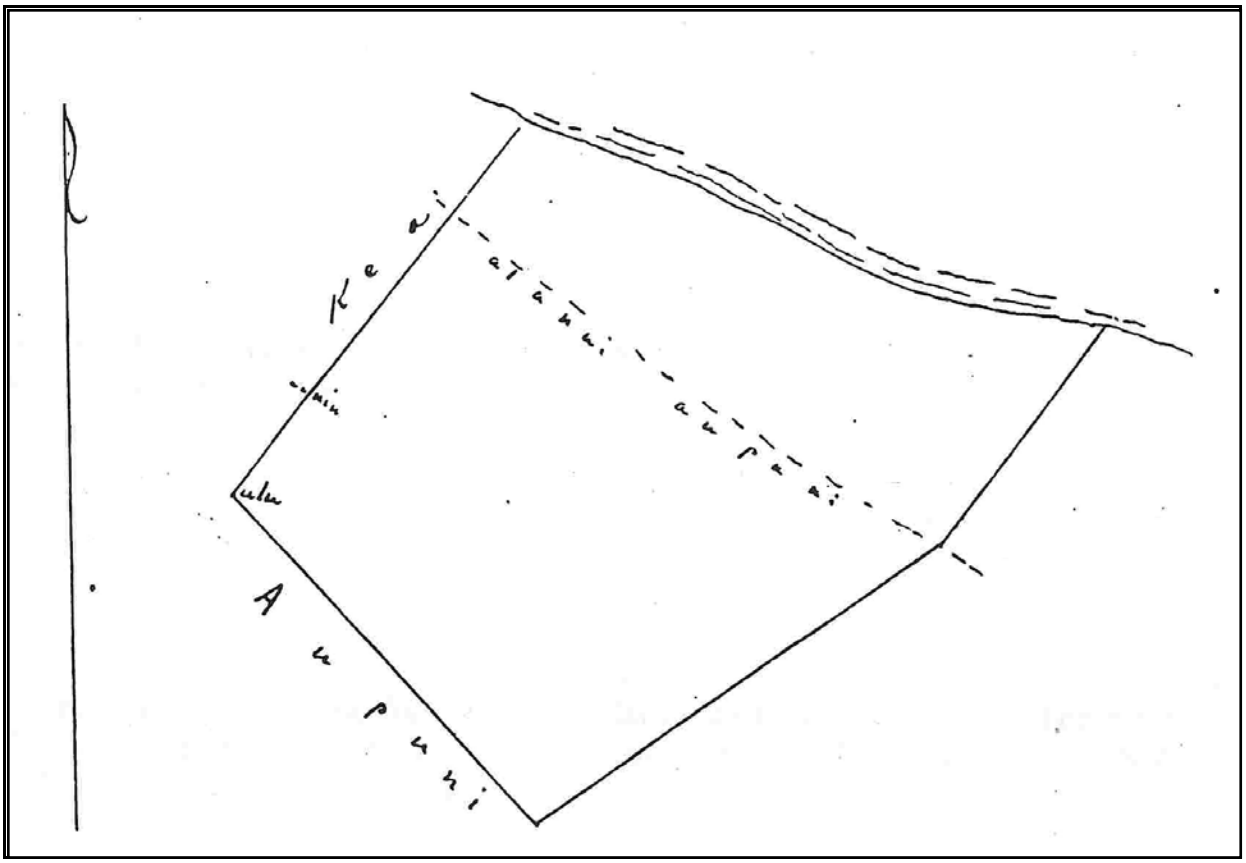
This land parcel contains 171.00 acres, give or take.
This is the source of its accruement; he gave $52.75 to the Government Treasury, but, in addition, the Government received all the mineral and metal mines.

This land was given to Kapohano, his forever, as an alodium, and to his recipients as well as his savings, and taxes were placed on all Alodial titles by those of the Legislature from that time until now.

And for reasons of presentation I have placed my name as well as the seal of the Hawaiian Island Chain in Honolulu on this day, the 20th of January, 1855.

Name}
Kamehameha IV
V.K. Ka‘ahumanu
Keoni Ana

[Land Patent Grant No. 1537, Kapohano, Hālona & Pōpoki Ahupua‘a, District of Puna, Island of Hawai‘i, 171 Acres, 1855]



MAP OF GRANT NO. 1537