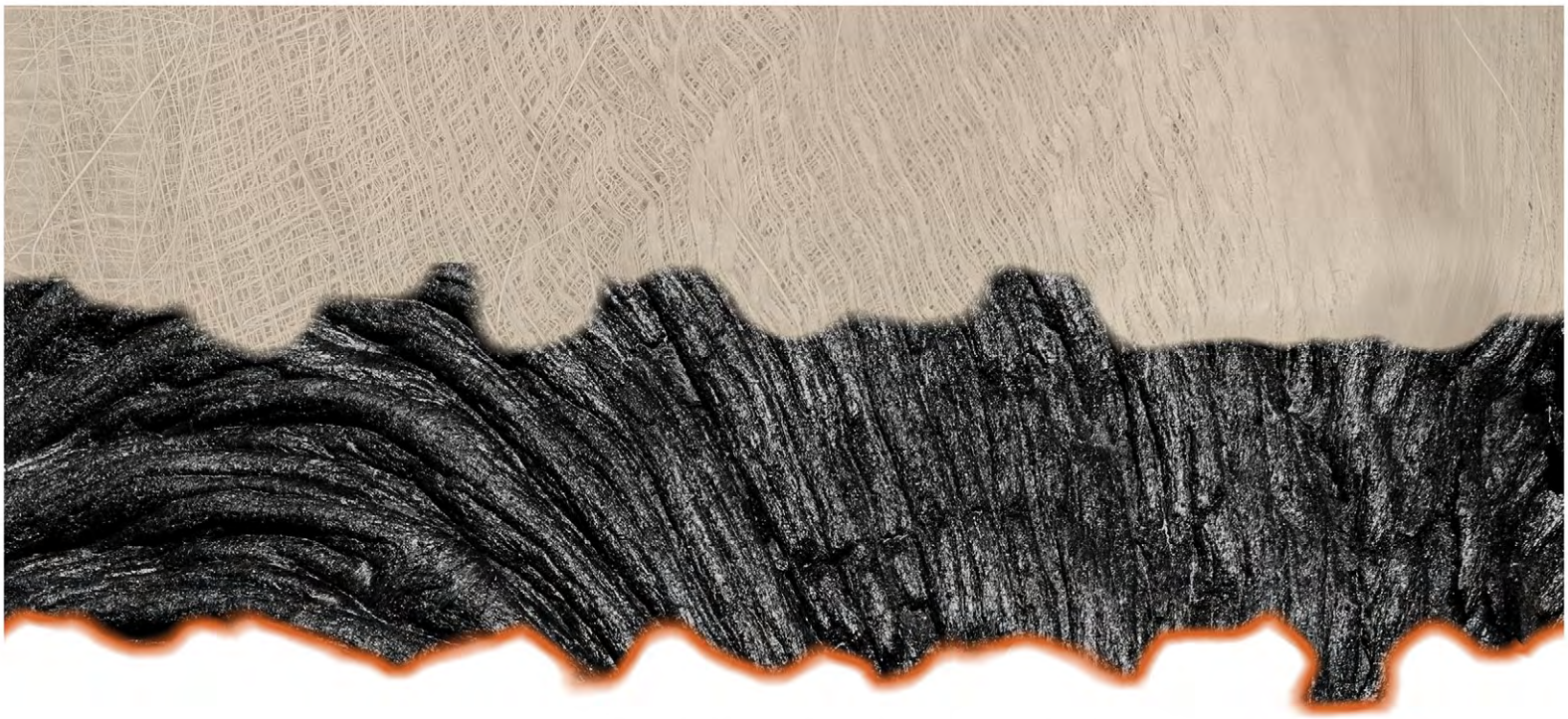

Makalei Fire Station

Kailua-Kona, Hawai'i

Final Environmental Assessment

April 2008

Prepared for

County of Hawai'i
Department of Public Works

Prepared by

PBR HAWAII
& ASSOCIATES, INC.

MAKALEI FIRE STATION

KAILUA-KONA, HAWAI'I

FINAL ENVIRONMENTAL ASSESSMENT

APRIL 2008

PREPARED FOR

COUNTY OF HAWAI'I
DEPARTMENT OF PUBLIC WORKS

PREPARED BY

PBR HAWAII
& ASSOCIATES, INC.

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1.0 INTRODUCTION

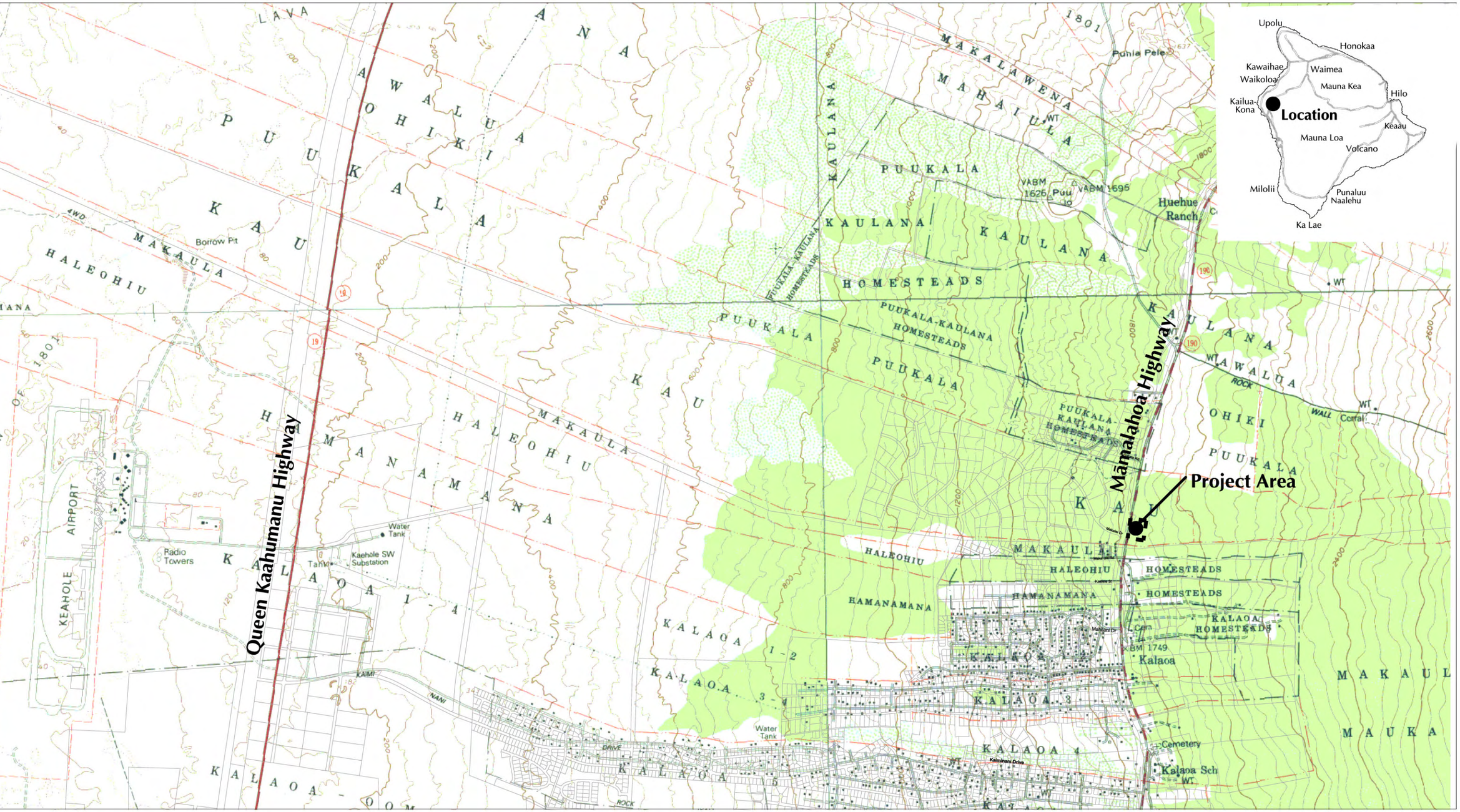
This Environmental Assessment (EA) is prepared in accordance with Chapter 343, Hawai'i Revised Statutes (HRS) for the proposed construction of the Makalei Fire Station in Makalei, North Kona, Island of Hawai'i, Hawai'i.

1.1 PROJECT SUMMARY

Project Name:	Makalei Fire Station
Location:	Makalei, North Kona, Island of Hawai'i, Hawai'i
Tax Map Key (TMK):	(3) 7-2-07:01 (por.)
Applicant:	County of Hawai'i Department of Public Works
Landowner:	GKK Makalei LLC
Existing use:	Vacant land
Proposed Action:	Construction of the Makalei Fire Station
Project Area:	Approximately 2 acres
Land Use Designations:	State Land Use: Agriculture County of Hawai'i General Plan: Extensive Agriculture County of Hawai'i Zoning: Agriculture (A-900a)
Special Management Area:	The project is not in the Special Management Area (SMA)
Permits/Approvals Requested:	Special Permit and Plan Approval Approval of Project Construction Plans Building and Grading Permits Underground Injection Control Highway Connection Subdivision Approval
Approving Agency:	County of Hawai'i Department of Public Works
Determination:	Finding of No Significant Impact (FONSI)

1.2 LOCATION

The proposed site for the Makalei Fire Station is in Makalei, North Kona, Island of Hawai'i, Hawai'i (Figure 1). The Makalei Fire Station proposed site is mauka of Makalei Drive and Māmalahoa Highway (Highway 190) and between mile marker 32 and 33.



LEGEND

Project Area

Source: U.S. Geological Survey

Disclaimer: This map is to be used for general planning purposes only.

Figure 1

Regional Location

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 1,000 2,000 4,000

PBR HAWAII & ASSOCIATES, INC.

1.3 LAND OWNERSHIP

GKK Makalei LLC owns the land for the proposed Makalei Fire Station identified as TMK (3) 7-2-07:01 (por.) (Figure 2).

Contact: GKK Makalei LLC
c/o Gramercy Capital Corp.
420 Lexington Avenue
New York, NY 10170
Attn: Robert Foley
Fax: (212) 297-1090

1.4 IDENTIFICATION OF APPLICANT

The County of Hawai'i Department of Public Works is the project applicant.

Contact: County of Hawai'i Department of Public Works
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, Hawai'i 96720-4224
Phone: (808) 961-8466
Fax: (808) 961-8630

1.5 IDENTIFICATION OF ENVIRONMENTAL CONSULTANT

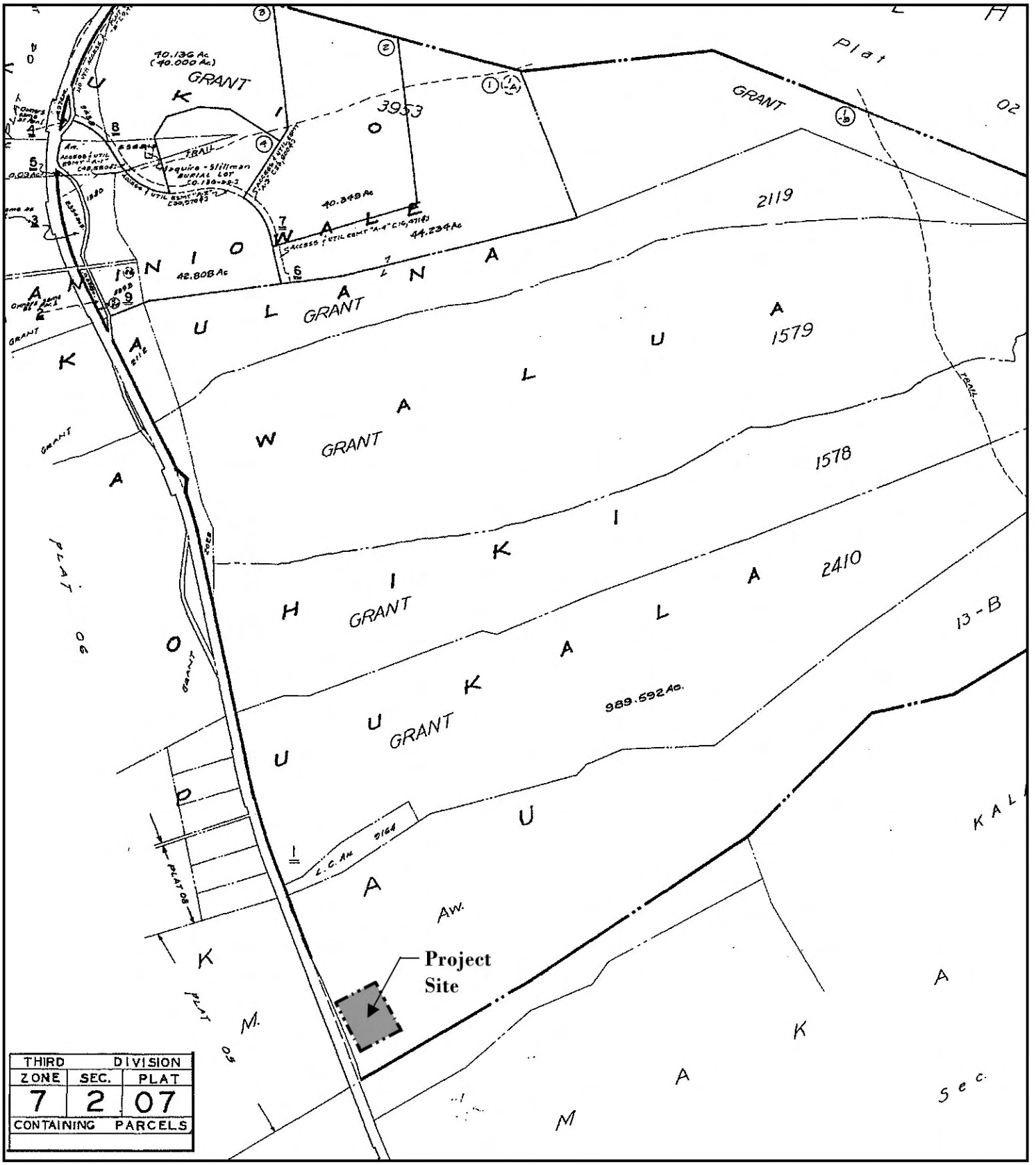
The environmental consultant is PBR HAWAI'I & Associates.

Contact: Vincent Shigekuni, Vice President
PBR HAWAI'I & Associates
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawai'i 96813
Phone: (808) 521-5631
Fax: (808) 523-1402

1.6 IDENTIFICATION OF APPROVING AGENCY

The County of Hawai'i Department of Public Works is the approving agency.

Contact: County of Hawai'i Department of Public Works
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, Hawai'i 96720-4224



LEGEND

Project Area

Figure 2

Tax Map Key

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

NOT TO SCALE

Source: City & County of Hawai'i

Disclaimer: This map is to be used for general planning purposes only.

PBR HAWAII & ASSOCIATES, INC.

Phone: (808) 961-8466
Fax: (808) 961-8630

1.7 COMPLIANCE WITH STATE OF HAWAI'I AND COUNTY OF HAWAI'I ENVIRONMENTAL LAWS

Preparation of this document falls in accordance with the provisions of Chapter 343, HRS (2007) and Title 11, Chapter 200, Hawai'i Administrative Rules (HAR) pertaining to Environmental Impact Statements. Section 343-5, HRS established nine "triggers" that require either an EA or an Environmental Impact Statement (EIS). The use of State or County lands or funds require the preparation of an Environmental Assessment.

1.8 IDENTIFICATION OF AGENCIES CONSULTED

Various agencies (or agency documents) were consulted in preparation of this EA. Such agencies include the following:

Federal
Army Corps of Engineers
Department of the Interior-Fish and Wildlife Service
Federal Emergency Management Agency
Department of Agriculture-Natural Resources Conservation Service

State of Hawai'i
Department of Business, Economic Development, and Tourism
Office of Planning
Land Use Commission
Department of Health
Department of Health-Environmental Planning Office
Department of Land and Natural Resources-State Historic Preservation Division
Department of Transportation
Office of Environmental Quality Control
Office of Hawaiian Affairs

County of Hawai'i
Mayor's Office
County Council
Department of Environmental Management
Department of Parks and Recreation
Department of Public Works
Department of Water Supply
Planning Department
Department of Research and Development
Police Department

Fire Department

Private
Hawai'i Electric Light Company, Inc.
Hawaiian Telcom
Oceanic Time Warner Cable

1.9 STUDIES CONTRIBUTING TO THIS ENVIRONMENTAL ASSESSMENT

The information contained in this report has been developed from site visits, generally available information regarding the characteristics of the site and surrounding areas, and technical studies. Technical studies are provided as appendices to this EA. These studies include:

- Flora
- Archaeology

2.0 PROJECT DESCRIPTION

This section provides background information and a general description of the Makalei Fire Station project site.

2.1 LOCATION

The proposed site for the Makalei Fire Station is in Makalei, North Kona, Island of Hawai'i, Hawai'i (Figure 1). The Makalei Fire Station proposed site is mauka of Māmalahoa Highway (Highway 190) and Makalei Drive. Photographs of the site are included as Figure 3.

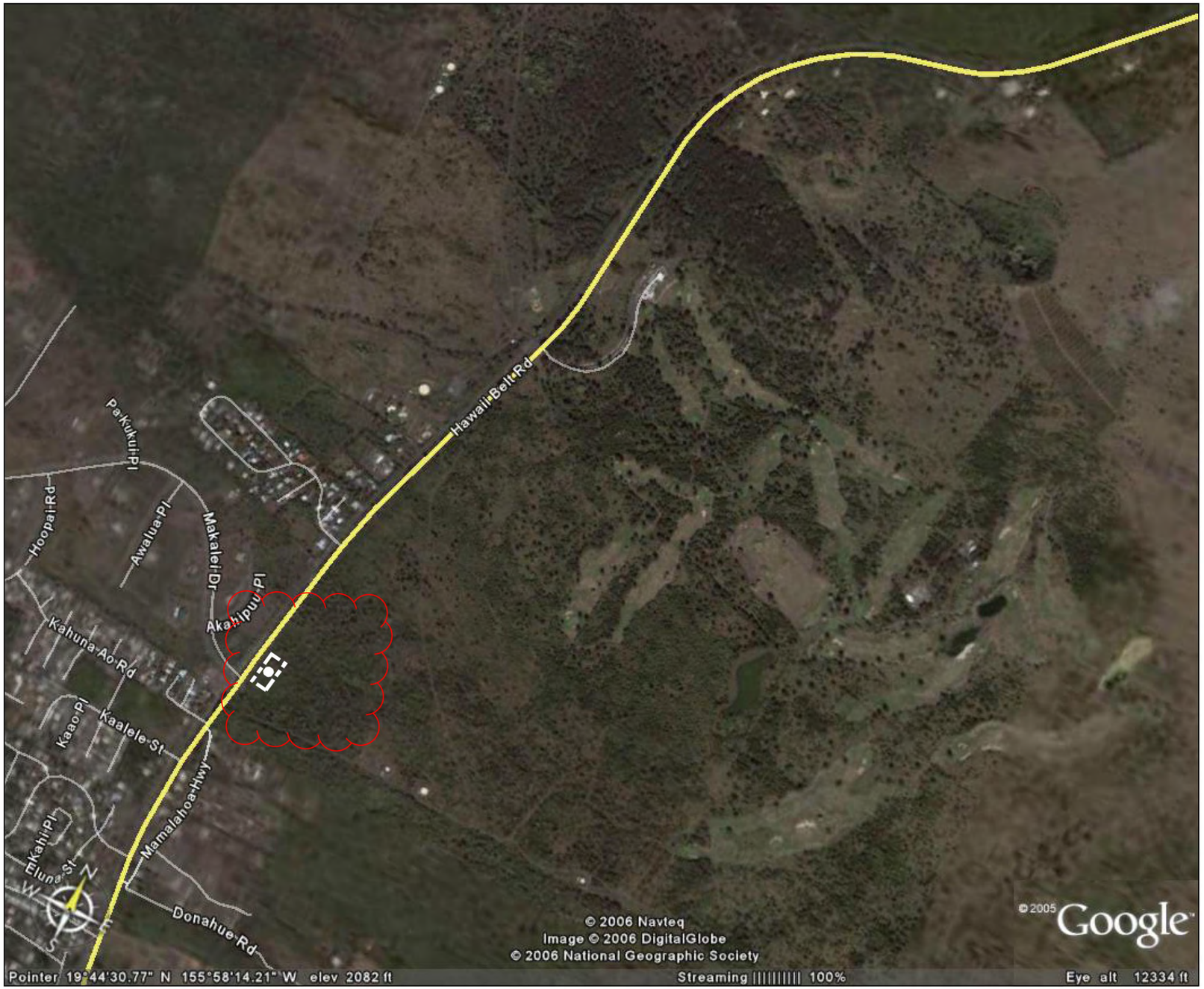
2.2 DESCRIPTION OF THE MAKALEI FIRE STATION

The project site is situated on a 2-acre site set back approximately 117 feet from Māmalahoa Highway (Highway 190). The fire station will include an apparatus bay with three bays, hose tower, pump house, grounds maintenance storage, office, kitchen/training room, dormitory, shower/restroom facilities, exercise/work rooms, laundry room, fuel tank, and parking areas for staff and guests. The station will also have a Hazmat Unit, an engine apparatus, and a ladder apparatus. The preliminary site plan for the Makalei Fire Station is included as Figure 4.

The proposed fire apparatus access road shall be designed in accordance with Uniform Fire Code (UFC) Sections 10.207(a-l). The proposed water system shall also be designed in accordance with Uniform Fire Code (UFC) Section 10.301(c).

2.3 PROJECT COST AND IMPLEMENTATION TIMEFRAME

The County hopes to commence construction in October 2008. Construction should run a duration of fourteen (14) months and placed into operation at the end of 2009. The budget for the fire station is $4.8 million dollars, with the necessary funds already appropriated to complete the project.



LEGEND

Project Area

Disclaimer: This map is to be used for general planning purposes only.

Figure 3
Site Photographs

Makalei Fire Station

County of Hawai'i — ISLAND OF HAWAI'I

PBR HAWAII & ASSOCIATES, INC.

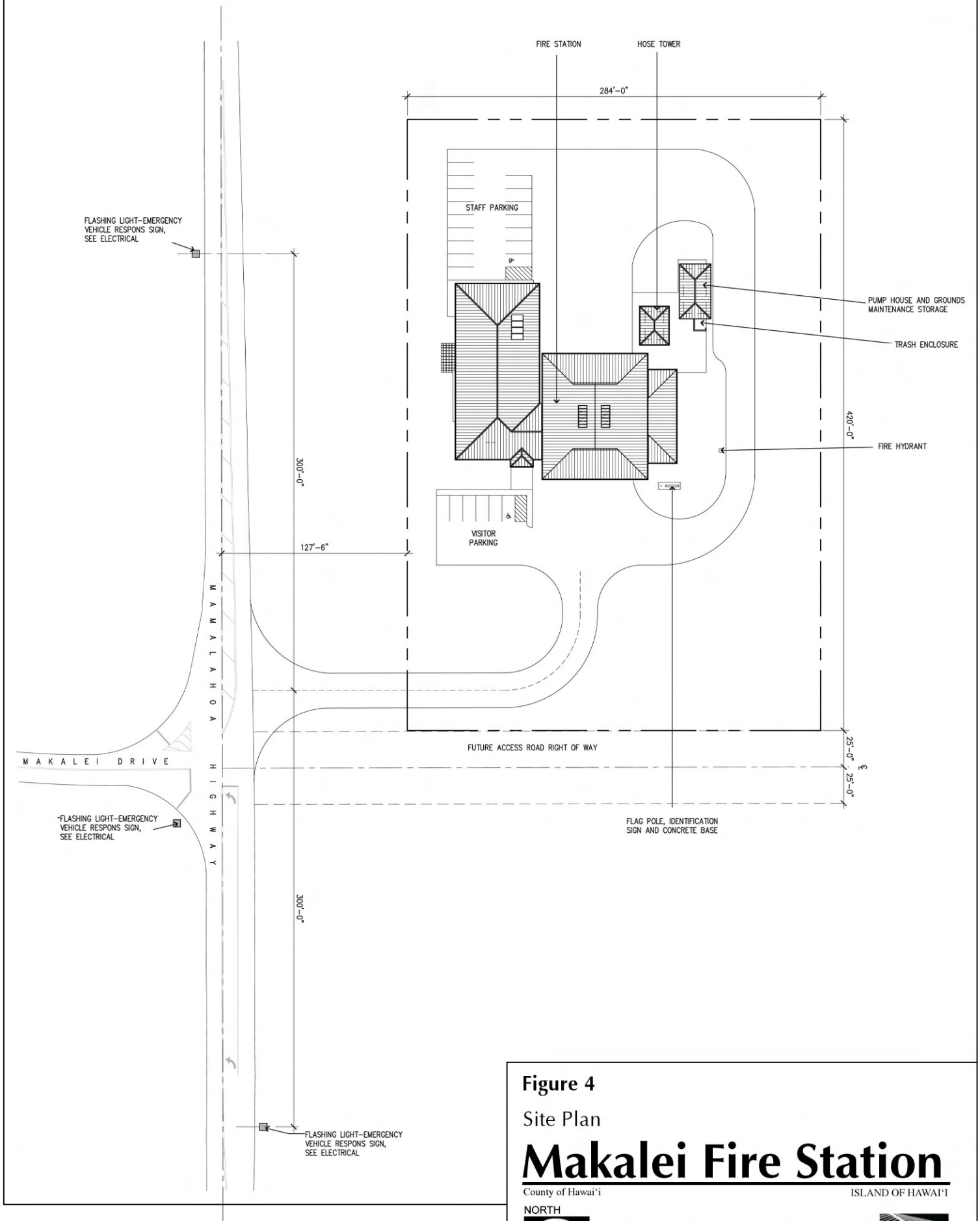


Figure 4

Site Plan

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

NOT TO SCALE

PBR HAWAII & ASSOCIATES, INC.

3.0 DESCRIPTION OF THE NATURAL ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

This section describes the existing conditions of the physical or natural environment, potential impacts of the Makalei Fire Station on the environment, and mitigation measures to minimize impacts.

3.1 CLIMATE

Hawai'i Island's geological features heavily influence its climate. Although the island consists of five volcanoes, the peaks of Mauna Loa (13,679 foot summit elevation) and Mauna Kea (13,796 foot summit elevation) dominate ground-based atmospheric influences. The region receives an annual rainfall of approximately 25 inches, with mauka areas typically experiencing larger amounts of rainfall than makai areas. Regional temperatures range from 72 to 77 degrees Fahrenheit (County of Hawai'i Department of Research and Development, 2005). Humidity ranges throughout the year between 68 percent in the morning to 80 percent in the afternoon (NOAA, no date).

Trade winds are typical of the Hawaiian Islands, blowing predominantly from a northeast direction, and averaging approximately 7 miles per hour (mph) (NOAA, no date). Hualālai and Mauna Loa, further influence the wind pattern for the Island of Hawai'i. In the early morning, the prevailing wind pushes out towards the ocean, and in the afternoon, the winds blow from the ocean towards the island (Juvick & Juvick, 1998).

Potential Impacts and Mitigation Measures

Construction of the Makalei Fire Station is not anticipated to have any impact on climatic conditions and no mitigative measures are planned.

3.2 GEOLOGY AND TOPOGRAPHY

Geology

Hualālai Volcano shaped the landscape of North Kona. Its most recent flow in 1800-1801, and including earlier flows, have created a harsh landscape that greatly slopes towards the sea. Multiple flows of differing ages overlap each other creating a layered landscape with lava colors reflecting differences in age, chemical composition, and state of weathering. Hualālai lay dormant since 1801, but a series of earthquakes in 1929 and other seismic activity indicate its most recent eruptive phase may not have concluded (Macdonald, Abbott & Peterson, 1983).

The site's geomorphology consists of multiple interbedded pāhoehoe and a'a flows. Pāhoehoe flows harden and form a smooth ropey surface while a'a flows harden as a rough jagged surface. Both lavas contain buried voids like pockets, blisters, and extensive lava tubes and tunnels that form as the molten rock cools and residual lava

drains beneath the solidified surface. Many of these lava tubes and voids have been found in the area. The thin roofs of lava tubes can collapse when placed under additional weight.

Topography

The project area slopes in an east to west (mauka to makai) direction, with a cross-slope of approximately one (1) percent. The mauka extent will be located at an elevation of approximately 1879 feet above mean sea level and the makai extent will be located at an elevation of approximately 1853 feet above mean sea level.

Potential Impacts and Mitigation Measures

Due to the gradual slope of the property, relatively minimal grading on the property will occur. The grading will not drastically change the topographic nature of the parcel relative to the surrounding lands.

3.3 SOILS

Three soil suitability studies prepared for lands in Hawai'i principally focus on the relative agricultural productivity of different land types. These studies are: 1) the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Survey; 2) the University of Hawai'i Land Study Bureau Detailed Land Classification; and 3) the State Department of Agriculture's Agricultural Lands of Importance to the State of Hawai'i (ALISH).

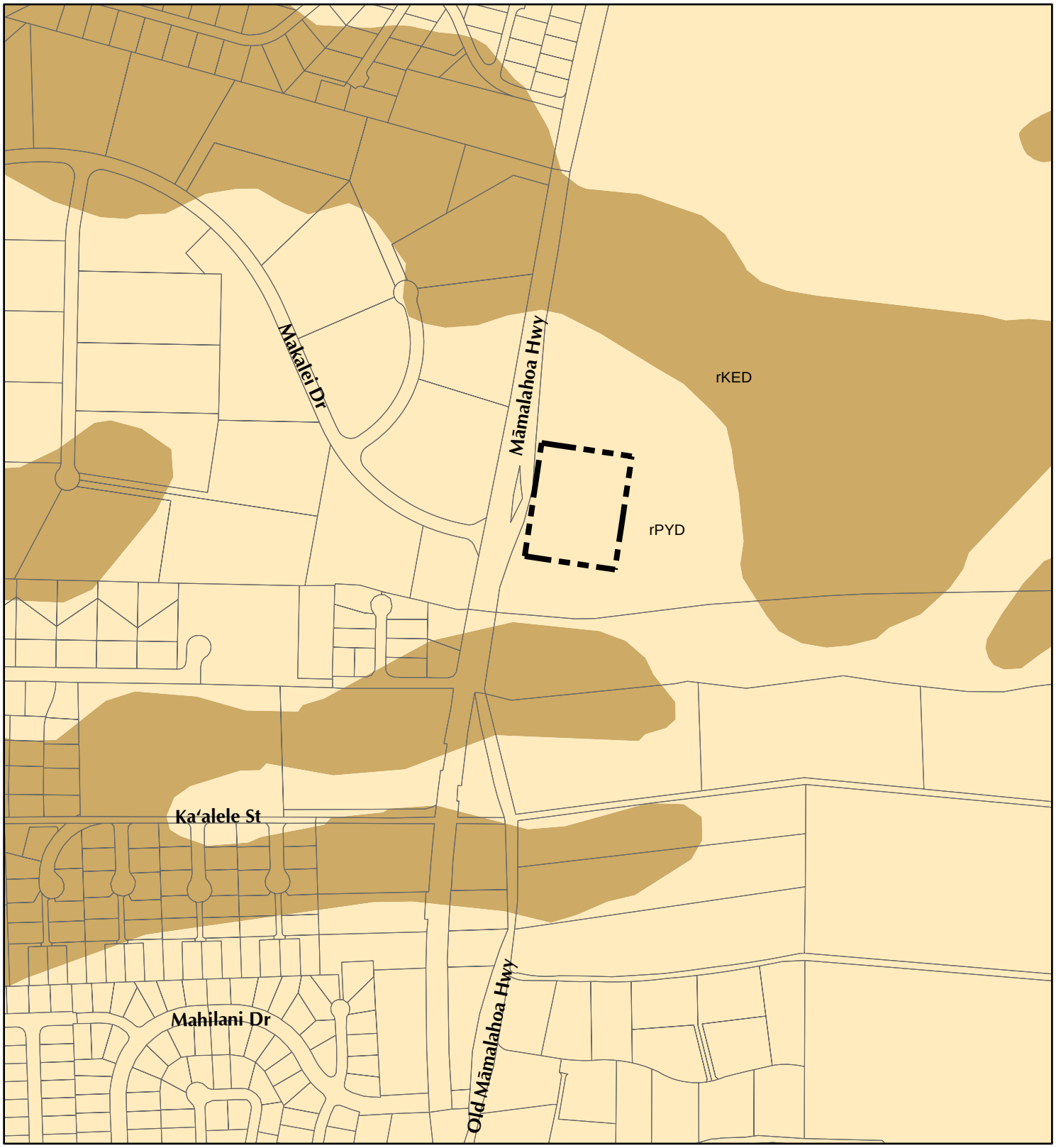
3.3.1 Natural Resources Conservation Service (NRCS)

The ***Natural Resource Conservation Service, Soil Survey for the Island of Hawai'i,*** classifies the soil of the Makalei Fire Station project site as: Punaluu Extremely Rocky Peat, 6-20% (rPYD) (Figure 5). This soil has a rapidly permeable black peat surface layer, about four inches thick. A permeable pāhoehoe lava bedrock underlies the soil. The peat has a weak, very fine, granular structure. It can characterized as very friable, non-sticky, non-plastic, and non-smeary. The soil also has very fine pores, few pebbles on the surface and many roots. The soil has a medium acidity.

Approximately 40 to 50 percent of the surface consists of rock outcrop. Runoff is slow and there is slight erosion hazard. Roots are matted over the pāhoehoe lava. Typically lands with this soil is primarily used for pasture.

3.3.2 Land Study Bureau Detailed Land Classification

The University of Hawai'i Land Study Bureau document, ***Detailed Land Classification, Island of Hawai'i***, classifies soils based on a productivity rating. Letters indicate class of productivity with A representing the highest class and E the lowest. The soils of the Makalei Fire Station project site are classified as C (Fair) and D (Poor) (Figure 6).



LEGEND

- Project Area
- rKED: Kaimu extremely stony peat, 7-25% slopes
- rPYD: Punaluu extremely rocky peat, 6-20% slopes

Source: Natural Resource Conservation Service (2007)
Disclaimer: This map is to be used for general planning purposes only.

Figure 5
Soil Survey

Makalei Fire Station

County of Hawai'i — ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)
0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

LEGEND

- Project Area
- C: Fair
- D: Poor
- E: Very Poor
- N: Unclassified Land

Source: Land Study Bureau

Disclaimer: This map is to be used for general planning purposes only.

Figure 6

Detailed Land Classification

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

3.3.3 Agricultural Lands of Importance to the State of Hawai'i (ALISH)

The Agricultural Lands of Importance to the State of Hawai'i (ALISH) system classify important agricultural lands as Prime, Unique, or Other Agricultural Land. The Makalei Fire Station project site lands are not classified (Figure 7).

Potential Impacts and Mitigation Measures

Construction of the Makalei Fire Station will not have a deleterious effect on the soil in the project site. Because soils at the project site are not well suited for crop cultivation, the proposed development should not impact the availability of agricultural land for cultivation.

3.4 NATURAL HAZARDS

Natural hazards like flooding, tsunami inundation, hurricanes, earthquakes, and volcanic eruptions have historically impacted Hawai'i Island.

Flooding

According to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program, the project site is located in "Zone X" -- out of the 500-year flood plain (Figure 8). The site sits in a dry and arid environment where the risks of flooding are low due to a combination of factors, including low rainfall, thin soil layer, slope, and the porosity of the bedrock. During periods of heavy rainfall, localized ponding and some scouring by flowing surface water may occur. However, those conditions typically dissipate as the water rapidly percolates through the substrate.

Tsunami

Since the early 1800s, approximately 50 tsunamis have inundated in Hawai'i's shores. Seven historical events have caused major damage. Two tsunami were generated locally. The proposed Makalei Fire Station is located well outside the defined tsunami inundation area.

Hurricanes

Since 1980, two hurricanes have had a devastating effect on Hawai'i: Hurricane 'Iwa in 1982 and Hurricane 'Iniki in 1992. Long-term prediction is virtually impossible. However, one should reasonably anticipate the onset of future incidents.

Earthquakes

In Hawai'i, volcanic activity produces most earthquakes in contrast to other areas sitting on tectonic plate margins. Thousands of earthquakes occur in Hawai'i each year. However, the vast majority of them are undetectable through normal human senses. A few historical earthquakes have reached moderate and even disastrous magnitudes.

LEGEND

- Project Area
- Unclassified Lands
- Prime ALISH Lands
- Other ALISH Lands
- Unique ALISH Lands

Source: U.S. Department of Agriculture

Disclaimer: This map is to be used for general planning purposes only.

Figure 7
Agricultural Lands of Importance to the State of Hawai'i

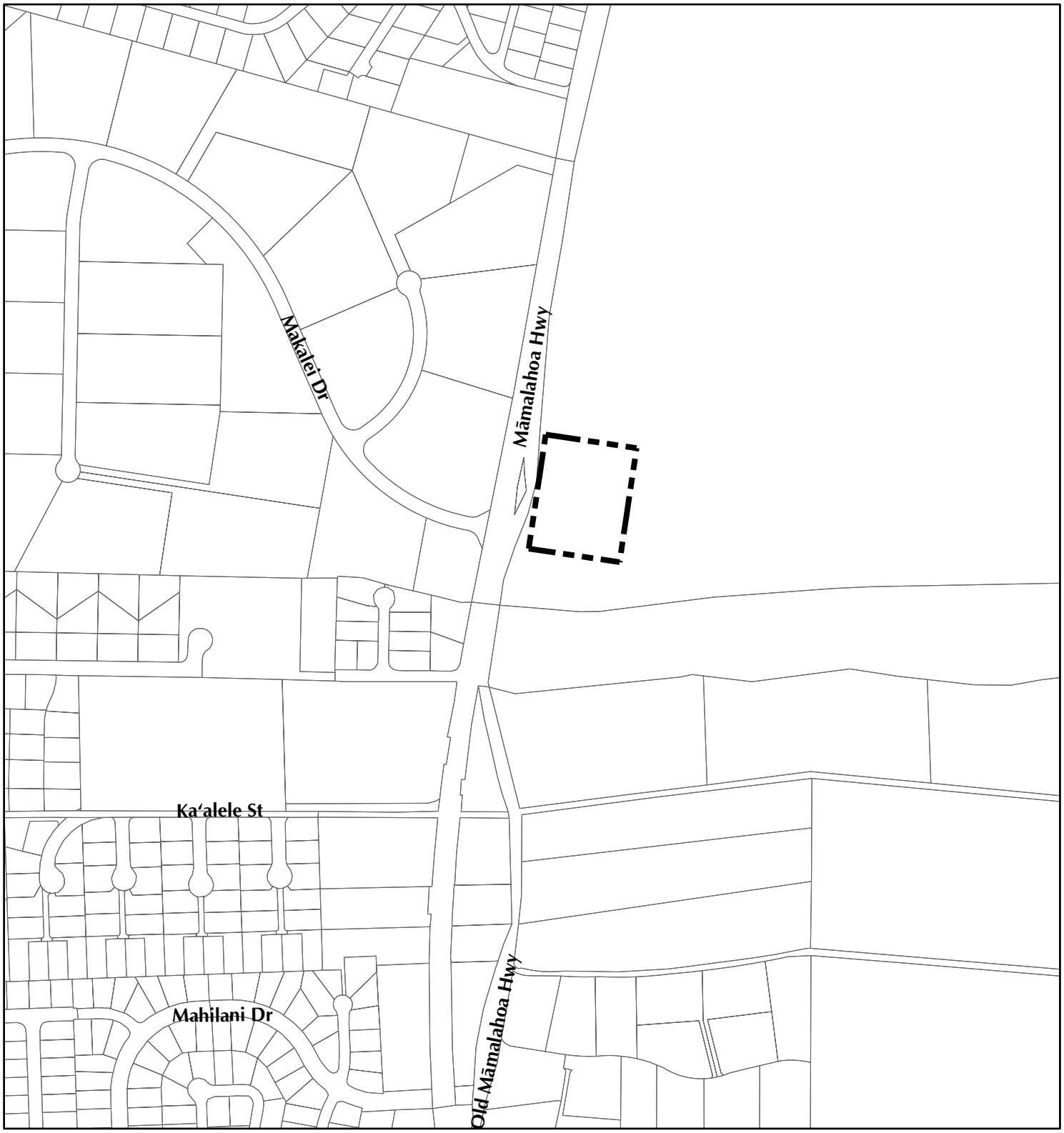
Makalei Fire Station

County of Hawai'i — ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)
0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.



LEGEND

- Project Area
- Outside Floodplain/Minimal Flooding Area
- 500-Year Floodplain
- 100-Year Floodplain
- Floodway

Source: Federal Emergency Management Agency

Disclaimer: This map is to be used for general planning purposes only.

Figure 8

Flood Insurance Rate Map

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

The last earthquake reported with an epicenter near the project area, in Hualālai, occurred in 1929 with a magnitude of 6.5. This earthquake caused extensive damage to the Kona area. The most recent series of earthquakes, with magnitudes of 6.7 and 6.0, occurred at Kīholo Bay on October 15, 2006. These earthquakes resulted in more than $100 million in damages to the northwest area of the island, and induced massive electrical blackouts statewide.

Volcanic Hazards

Volcanologists measure the level of eruption risk using a 1 to 9 scale, with 1 indicating an area of highest risk and 9 specifying lowest risk. Volcanologists have derived this scale using the historical probability of coverage by lava flows. According to this map, the project site sits within a Zone 4 area, indicative of its location on Hualālai.

About 5 percent of the shield volcano's surface area has been covered with lava since 1800. Over the past 750 years, lava has covered approximately 15 percent of Hualālai's surface area. Flows from Hualālai historically cover large areas but the frequency of eruptions is lower than other volcanoes, such as Kīlauea and Mauna Loa (USGS, 1997).

Potential Impacts and Mitigation Measures

The Makalei Fire Station should not have any impact or any deleterious effects on natural hazard conditions and no unique mitigative measures are planned, other than observing the Unifor Building Code in the design of the facility (to address the potential impacts from hurricanes and earthquakes).

The fire station could suffer irreparable damage as a result of its location near the base of Hualālai volcano, presently considered dormant by geologists. Should Hualālai erupt in the near future, the Makalei Fire Station along with the entire Kona coast could suffer from lava inundation. However, the fire station's location does not amplify risk to human life largely due to the high-degree of volcanologic monitoring on the mountain enabling advance warning of an impending eruption, and the slow-moving, fluid nature of mafic Hawaiian lavas.

3.5 FLORA & FAUNA

3.5.1 Flora

The United States Department of the Interior, Fish and Wildlife Service, through its rules and regulations, has designated two areas mauka of the project site as critical habitats for twelve plant species. These critical habitats are well outside a five-mile radius from the proposed site. The species of interest are: *Bonamia menziesii*, *Colubrina oppositifolia*, *Cyanea stictophylla*, *Delissea undulate*, *Flueggea neowawraea*, *Hibiscadelphus Hualālaiensis*, *Hibiscus brackenridgei*, *Nothocestrum breviflorum*,

Phyllostegia velutina, *Plantago hawaiensis*, *Pleomele Hawai'iensis* and *Zanthoxylum dipetalum*.

A preliminary study of a previous site which overlaps the current site conducted by Ron Terry, Ph.D. in 2007 describes the majority of the site studied as covered by mostly introduced species. Although some of the identified plants are endemic to Hawai'i, like the pakahakaha fern (*Lepisorus thunbergianus*) and the 'ohi'a (*Metrosideros polymorhia*), none are listed by the U.S. Fish and Wildlife Service as either endangered, threatened, or a "species of concern."

Dr. Terry's findings do reveal the nearby presence of the threatened 'Ohe makai (*Reynoldsia sandicensis*) outside the site boundary. This species is not listed but has received a "species of concern" designation from the service due to its dwindling population. The Department of Land and Natural Resources has also expressed interest in its protection. His findings encourage the preservation of this species if the landowner encounters it during construction. Overall, Dr. Terry identified fifty (50) different flora species on the proposed site. These species are listed on Table 3-1, below.

Scientific Name	Family	Common Name	Life Form	Status*
Agave sp.	Agavaceae	Agave	Tree	A
Aleurites moluccana	Euphorbiaceae	Kukui	Tree	A
Chamaecrista nictitans	Fabaceae	Partridge Pea	Herb	A
Cocculus trilobus	Menispermaceae	Huehue	Vine	I
Coffea arabica	Rubiaceae	Coffee	Shrub	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Cordyline fruticosa	Agavaceae	Ki	Shrub	A
Desmodium sandwicense	Fabaceae	Spanish Clover	Herb	A
Desmodium sp.	Fabaceae	Desmodium	Herb	A
Diospyros sandwicensis	Ebenaceae	Lama	Tree	I
Eleusine indica	Poaceae	Wiregrass	Herb	A
Eragrostis sp.	Poaceae	Love Grass	Herb	A
Eriobotrya japonica	Rosaceae	Loquat	Tree	A
Glycine wightii	Fabaceae	Glycine	Vine	A
Grevillea robusta	Proteaceae	Silver Oak	Tree	A
Hyptis pectinata	Lamiaceae	Hyptis	Shrub	A
Indigofera suffruticosa	Fabaceae	Indigo	Shrub	A
Kalanchoe pinnata	Crassulaceae	Air Plant	Herb	A
Lantana camara	Verbenaceae	Lantana	Shrub	A
Lepisorus thunbergianus	Polypodiaceae	Pakahakaha	Fern	I
Leucaena leucocephala	Fabaceae	Haole Koa	Tree	A
Macroptilium sp.	Fabaceae	Macroptilium	Herb	A
Melinis minutiflora	Poaceae	Molasses Grass	Herb	A
Metrosideros polymorpha	Myrtaceae	'Ohi'a	Tree	I
Nephrolepis mutiflora	Nephrolepidaceae	Sword Fern	Fern	A
Oplismenus sp.	Poaceae	Basket Grass	Herb	A
Oxalis corniculata	Oxalidaceae	Yellow Wood Sorrel	Herb	A
Panicum maximum	Poaceae	Guinea Grass	Herb	A
Pennisetum clandestinum	Poaceae	Kikuyu Grass	Herb	A
Pennisetum setaceum	Poaceae	Fountain Grass	Herb	A

Persea americana	Lauraceae	Avocado	Tree	A
Phlebodium aureum	Polypodiaceae	Golden Polypody	Fern	A
Phyllanthus debilis	Euphorbiaceae	Phyllanthus	Herb	A
Phymatosorus scolopendria	Polypodiaceae	Maile-scented Fern	Fern	A
Plantago lanceolata	Plantaginaceae	Narrow-leaved Plantain	Herb	A
Pluchea symphytifolia	Asteraceae	Sourbush	Shrub	A
Psidium cattleianum	Myrtaceae	Waiawi	Tree	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Psilotum nudum	Psilotaceae	Moa	Fern Ally	I
Rhynchelytrum repens	Poacea	Natal Red Top	Herb	A
Rivina humilis	Phytolaccaceae	Coral Berry	Herb	A
Sacciolepis indica	Poaceae	Glenwood Grass	Herb	A
Schefflera actinophylla	Araliaceae	Octopus Tree	Tree	A
Schinus terebinthifolius	Anacardiaceae	Christmas Berry	Tree	A
Sida rhombifolia	Malvaceae	Sida	Herb	A
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A
Spermacoce sp.	Rubiaceae	Spermacoce	Herb	A
Sporobolus sp.	Poaceae	Smutgrass	Herb	A
Stachytarpheta sp.	Verbenaceae	Jamaican vervain	Shrub	A
Verbena litoralis	Verbenaceae	Owi	Herb	A

Table 3-1: Plants observed on the property by Dr. Ron Terry in 2007
Note: A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

Potential Impacts and Mitigation Measures

Although critical habitats for endangered species are well away from the actual project site, an awareness of their potential presence will be emphasized during construction. Project landscaping will attempt to utilize the maximum amount of native species feasible. Prior to construction, a botanist will be retained to identify any ʻOhe makai on the project site. If found, the plants will be flagged. Attempts will be made to either preserve in place or relocate any ʻOhe makai encountered during clearing and grading to a portion of the project site that will be undeveloped or as part of the project landscaping. Otherwise, the Makalei Fire Station is not anticipated to have any impact on endangered flora species, and no mitigative measures will be required.

3.5.2 Fauna

The project site is within proximity of known habitats for endemic species under protection by the U.S. Fish and Wildlife Service. A faunal study conducted in July 2003 was conducted by Dr. Patrick Hart, Ph.D., as part of the Environmental Impact Statement process for the Palamanui Development approximately one mile northwest of the project site. The study identified three species of native birds, and eleven species of introduced birds on or within proximity of the site (*See* Table 3-2, below).

Scientific Name	Common Name
Acridotheres tristis	Common Myna

Asio flammeus sandwichensis	**Hawaiian Short-eared Owl (Pueo)**
Buteo solarius	**ʻIo (Hawaiian Hawk)**
Cardinalis cardinalis	Northern Cardinal
Carpodacus mexicanus	House Finch
Francolinus francolinus	Black Francolin
Geopelia striata	Zebra Dove
Hemignathus virens virens	**Hawaiʻi ʻAmakihi**
Lonchura malabarica	Warbling silverbill
Nutmeg mannikin	Lonchura punctulata
Serinus mozambicus	Yellow-fronted canary
Streptopelia chinensis	Spotted Dove
Zenaida macroura	Morning Dove
Zosterops japonicus	Japanese White-Eye

Table 3-2: List of species identified in 2003 survey by Dr. Patrick Hart, Ph.D.
Note: Bolded names indicate threatened or endangered status.

The Hart study specifically identified the Federally endangered ʻIo (*Buteo solitarius*) in the mauka portion of the Palamanui property. The ʻIo, otherwise known as the Hawaiian Hawk, has been known to inhabit the lowland forests between sea level and 6,000 feet. The ʻIo commonly nests between March and September.

Beyond the species identified in the Hart study, the area is also within proximity of known habitats for the endangered ʻAlala and Palila birds.

The ʻAlala (Corvus Hawaiʻiensis), more commonly known as the Hawaiian Crow, typically makes its habitat in the upland forests between the 3,000 to 6,000 elevation level around the western slopes of Hualālai and Mauna Loa. Only two ʻAlala are known to exist in the wild, with their habitat largely contained to the Kona Forest Unit of the Hakalau National Forest Reserve. The Kona portion of this latter forest reserve is well outside and mauka of the project site.

The project site is not within the specifically identified habitat area for the endangered Palila (*Loxiodes bailleui*). The Palila can only be found in 6,000 to 9,000 feet elevations on the slopes of Mauna Kea. The project site sits at an elevation of approximately 1850 feet, outside and well below the Palila habitat at the 6,000 foot level (USFWS Website, 2008).

Potential Impacts and Mitigation Measures
The small scale of the Makalei Fire Station is not anticipated to have any large impact on endangered faunal species. For example, issues related to displacement of habitat are

virtually non existent due to the large amount of remaining and similar vegetation immediately adjacent to the project site. No other mitigative measures are planned.

4.0 DESCRIPTION OF THE HUMAN ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

This section describes the existing conditions of the human environment, potential impacts of the Makalei Fire Station, and mitigation measures to minimize any impacts.

4.1 ARCHAEOLOGICAL AND CULTURAL RESOURCES

4.1.1 Archaeological Resources

Tax Map Key parcel number (3) 7-2-07:001, of which a portion would be subdivided from to create the project site, was surveyed entirely by Haun & Associates in 2005. The survey did not identify any historic properties within the proposed fire station site. The inventory survey was approved by the State Historic Preservation Division (SHPD) on June 26, 2006 (Log No: 2006.2068, Doc No: 0606JT72).

A preservation site (Site 24573) is located 110 m north-northeast of the proposed fire station site. Provisions for the protection of this site, along with Sites 24593 and 24599 are detailed in a Preservation Plan that was approved by SHPD on January 8, 2007 (Log No: 2006.3466, Doc No: 0701MK10).

Physical evidence reveals a vibrant ancient Hawaiian life system, including enclosures, house platforms, petroglyphs, walls and mounds and numerous cave and lava tube systems. Archaeological finds reveal a diversity of human activity including a large amount of agricultural and aquacultural cultivation. Hala was abundantly present until recently, and the area still maintains large populations of other medicinal, craft and specialty lumber plants significant to native Hawaiians. Many of the medicinal plants found in the area are still used today by native healers engaging in the art of lāʻau lapaʻau.

Potential Impacts and Mitigation Measures

The County does not anticipate any adverse impact to archeological resources as a result of construction. No burials have been identified on the site. To ensure that any potential ancient burial sites discovered during construction are left undisturbed, the County of Hawaiʻi and its contractors will comply with all State and County laws regarding the preservation of archaeological and historic materials. Should any remains including burials, concentrations of shell or charcoal or artifacts be encountered during construction, work will cease immediately in the immediate vicinity of the find and protection measures will be initiated to prevent further damage. Pursuant to the law, the contractor will immediately contact SHPD for assistance in assessing the significance of the find, and receive recommendations on appropriate mitigation measures. A request for Determination of No Efffect was transmitted to SHPD on January 19, 2008 (attached as Appendix B). In a response letter dated March 17, 2008 (Log No. 2008.0737, Doc No.

0803TD03), SHPD concurred with Dr. Haun the construction of the fire station would have no effect on historic properties.

4.1.2 Cultural Resources

The proposed site is located within the ahupuaʻa of Kaʻu in North Kona. Kaʻu was an apana part of a larger area known as Kekaha. A report by Kepā Maly, conducted as part of the accepted Kaloko-Honokōhau Business Park Environmental Impact Statement in 2000, researched archival material and conducted oral history interviews of residents. Residents who participated in Maly's interviews lived in the lands of Honokōhau, but were familiar with the whole Kekaha region. Many interviewed descended from families residing in the area since the 1840's.

Konaʻakau, or North Kona, was divided into several kalana, or ancient regions. The northernmost of these regions was called Kekaha after the arid coastal environment of the area. Native residents fondly refer to this area as "Kekaha-wai-ʻole o nā Kona," waterless Kekaha of the Kona district. Most of the early accounts describe the area as Kekaha rather than the smaller apana.

According to a published account in 1924 by J.W.H.I. Kihe, who was born at Honokōhau in 1854, residents considered the apana of Kaʻu as part of the community encompassing the lands of Kekaha:

> "Of those things remembered and thought of by the people who yet remain from that time in 1870; those who are here 53 years later, we cannot forget the many families who lived in the various (apana) land sections of Kekaha. From the lands of Honokohau, Kaloko, Kohanaiki, the lands of Ooma, Kalaoa, Haleohiu, Makaula, *Kau*, Puukala-Ohiki, Awalua, the lands of Kaulana, Mahaiula, Makalawena, Awakee, the lands of Kukio, Kaupulehu, Kiholo, Keawaiki, Kapalaoa, Puuanahulu, and Puuwaawaa. These many lands were filled with people in those days." (emphasis added) (NPS website, 2007)

Maly's study on the Kaloko and Honokohau apana, and the larger Kekaha area revealed few written historical references. However, some narratives describe a way of life in this arid region:

> "A considerable trade is kept up between the south and north end of this district. The inhabitants of the barren portion of the latter are principally occupied in fishing and the manufacture of salt, which articles are bartered with those who live in the more fertile regions of the south, for food and clothing." (Wilkes,1845)

Maly reveals that the forests of Hualālai were carefully managed for resources. Springs were vital and protected resources. Environmental zones, or waʻo, extending from near

shore to the upland forests, provided the resources necessary to support agriculture, and support the larger region of Kona.

Much of the oral history uncovered by Maly reveals heavy historical utilization of the near shoreline areas, and sparing use of the upland forests.

Potential Impacts and Mitigation Measures

The project site is located within the forested area of Hualālai. As the forests were largely utilized by Native Hawaiians for resources, a large focus must be placed on the impact to flora species on the site. The County anticipates no significant effect to cultural resources as a result of construction. Although the site does contain plant species utilized in cultural practices, these plants (like tī and kukui) are prevalent throughout the island. The project's relatively small size also minimizes impacts to the forests.

4.2 ROADWAYS AND TRAFFIC

The Makalei Fire Station will be located directly off of Māmalahoa Highway, mauka of Makalei Drive. Māmalahoa Highway is a mountainous winding State-owned road, wide enough to accommodate two-way traffic with shoulders. The right-of-way is approximately 80 feet wide, more than adequate to support two additional lanes of traffic and one turning lane where required. Pavement widths and road shoulder widths vary, with some sections having no shoulder due to retaining walls or steep embankments.

Potential Impacts and Mitigation Measures

Access to the Makalei Fire Station is by a driveway off of Māmalahoa Highway. The Makalei Fire Station's setback location from Māmalahoa Highway accommodates possible future expansion of the road. Two flashing light-emergency vehicle response signals will be installed on both sides of Māmalahoa Highway to warn drivers of an emergency vehicle existing the facility.

The Makalei Fire Station is not anticipated to generate a significant traffic volume. However, traffic along Māmalahoa Highway will be interrupted when the fire trucks leave the station in times of emergencies.

4.3 NOISE

Existing noise levels at and immediately adjacent to the proposed site mimic those typical to rural residential communities fronting a major thoroughfare. The noise generated along Mamalahoa Highway typically comes from the vehicular traffic of commuters between the major population centers at Kona and Waimea. The noise level is considered a low to moderate exposure, and well within the guidelines for non-noise sensitive land uses.

Potential Impacts and Mitigation Measures

Construction activities for the development of the property will inevitably create temporary noise impacts. The developer may employ mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai'i Administrative Rules, all project activities must comply with all community noise controls.

Once in operation. The fire station will generate temporary noise impacts during the course of responding to fire alarms, including sirens from emergency response vehicles. These noise disturbances are an unavoidable element of emergency response equipment but will be intermittent and of short duration.

The proposed fire station is set back from Mamalahoa Highway over approximately 100 feet. Within this 100+ foot buffer will be the existing thick vegetation. It is unlikely normal day-to-day operations will be noticeable to nearby residents.

4.4 AIR QUALITY

The project site is located within an area that is exposed to natural pollution from volcanic out-gassing (volcanic haze or vog). The vog is vented on the other side of a mountain barrier more than 50 miles east of the site. However, the prevailing tradewind flow can carry the vog over and around the mountain barrier, leading to an increase in particulates and other air pollutants. Sulfur Dioxide from Kilauea is the primary pollutant monitored by the Environmental Protection Agency throughout Hawai'i County. Last year, the agency documented 304 days where SO_2 was detectable in the atmosphere.

A source of industrial air pollution is Hawai'i Electric Light Company's (HELCO) Keāhole Power Plant, which is approximately 1.5 miles south. Other sources of pollution are vehicular traffic on Queen Ka'ahumanu Highway and Māmalahoa Highway.

Potential Impacts and Mitigation Measures

The County anticipates that the only potential for impacts to air quality will be during construction. This could occur from additional traffic generated by construction vehicles, machinery, and dust generated during grading.

The soils on-site are described as having a slight erosion hazard and tradewinds averaging only seven (7) miles per hour. An effective dust control plan will be implemented as necessary. All construction activities will comply with the provisions of Section 11-60.1-33, HAR related to Fugitive Dust. Measures to control dust during various phases of construction include:

- Providing an adequate water source at the site prior to start-up construction activities;
- Irrigating the construction site during periods of drought or high winds;
- Landscaping and rapid covering of bare areas, including slopes, starting from the initial grading phase;
- Disturbing only the areas of construction that are in the immediate zone of construction to limit the amount of time that the areas will be subject to erosion;
- Providing adequate dust control measures during weekends, after hours, and before daily start-up of construction activities; and
- Installing silt screening in the areas of disturbance.

Long-term negative impacts related to air quality are not expected.

4.5 VISUAL RESOURCES

The drive along Mamalahoa Highway near the proposed site reveals mauka views of Hualālai, Mauna Kea and Kohala mountains. Where Mamalahoa Highway "fronts" the project site, the highway appears "cut" into the slope such that the makai side of the highway is lower than the mauka side. With existing vegetation, mauka views from drivers passing by are extremely limited. Makai views show the expanse of the Kohala Coast and the ocean. These views reflect elements of natural beauty incorporated into the Hawai'i County General Plan. The construction of a fire station will not adversely affect the these views due to the site's setback from Mamalahoa Highway, and the wide swath of existing vegetation remaining in the median buffer.

Potential Impacts and Mitigation Measures

Adverse affects to mauka views will not occur due to adequate setbacks compensated for and integrated into the development plans.

4.6 SOCIAL & ECONOMIC CHARACTERISTICS

According to the Census 2000, the population of Hawai'i County numbered 148,677 individuals. The most recent American Community Survey conducted for Hawai'i County in 2006 by the Census Bureau accounted for 171,191 residents, representing a 15% increase in population. Approximately 27% of County residents have obtained a bachelor's degree or higher. The County has 66.8% of its residents actively participating in the workforce, with each household earning a median income of $55,390 per year.

The proposed project site is located within the County district of North Kona. The most populated region on the west side of the island, North Kona stretches from Keāhole to Waikoloa, and includes major commercial and tourist centers. As of the last census, North Kona had a population of approximately 41,600 residents. That figure is expected to nearly double at the time of the next census in 2010. The North Kona region is in the

midst of a tight labor market, with approximately 1,000 vacancies reported at area resorts and hotels. The unemployment rate in West Hawai'i is lower than the rest of the State.

The primary industry in North Kona is tourism. Agriculture (coffee, ranching, etc.) also contributes to the regional economy. The Natural Energy Laboratory of Hawai'i Authority's facilities house biotechnology start-up corporations, creating a small industry in this field.

Potential Impacts and Mitigation Measures

The proposed project will enhance the level of public safety, addressing the rapid population growth in North Kona particularly near Makalei and Kealakehe. The nearest fire stations are at Waikoloa where a 24-hour volunteer station is located, and in South Kona.

4.7 INFRASTRUCTURE AND UTILITIES

4.7.1 Water System

Water for the proposed project will come from the existing County of Hawai'i service lines adjacent to Mamalahoa Highway.

Potential Impacts and Mitigation Measures

The proposed project will not have any significant adverse impact on the existing county water system.

4.7.2 Wastewater System

No County wastewater system currently services the area. Therefore, any wastewater generated by the fire station requires disposal via an underground septic system. Such a system must meet the regulatory requirements set forth by all pertinent agencies.

Potential Impacts and Mitigation Measures

The proposed project will not have any significant adverse impact. Any septic system would require environmental permitting and approvals from the Department of Health.

4.7.3 Drainage System

The hardening of surfaces within the project site will increase storm runoff.

Potential Impacts and Mitigation Measures

The increase in storm runoff from the project will be mitigated using drywells to absorb the excess water.

4.7.4 Electrical and Communications Systems

The proposed fire station project will require the installation of new conduits for primary power, telephone and CATV that will cross Mamalahoa Highway and stubbed to an existing utility pole. The primary power conduits will be routed to a new transformer pad on which a new HELCO transformer will be provided. The secondary of the transformer will be routed to new service and distribution equipment at the new facility. The telephone and CATV conduits will be routed to a communication room in the new facility. Low pressure sodium post lights on concrete bases will be provided along new driveways and roadways on the site. Traffic warning beacons will be provided along Mamalahoa Highway and the intersection of Mamalahoa Highway and Makalei drive will be provided. The beacons will be utilized to signal oncoming traffic that a fire emergency vehicle is exiting the facility.

Potential Impacts and Mitigation Measures

The proposed project will not have any significant adverse impact on existing electrical and communication systems.

4.7.5 Solid Waste

The proposed project will generate solid waste related to operations at the Fire Station. The waste generated will predominantly come from the firefighters living in the station 24 hours a day. The nearest transfer station is located at Pu'uanahulu, approximately 15 minutes away.

Potential Impacts and Mitigation Measures

The proposed project will generate green waste from grading, and solid waste during construction. The contractor will be required to dispose of all waste in compliance with Department of Environmental Management requirements.

The Fire Department will also develop a solid waste management plan addressing solid waste from day-to-day operations. The plan will fall in accordance with the guidelines set forth by the county's Department of Environmental Management.

4.8 PUBLIC SERVICES AND FACILITIES

Police Protection
The main police station is located in Kealakehe, with substations in Captain Cook, Kailua-Kona, and Keauhou.

Fire Protection

The Kailua-Kona Fire Station is located near the intersection of Palani Avenue and Queen Kaʻahumanu Highway. This station serves areas within a 30-mile radius, from Keauhou to the Kona Village Resort.

Health Care Services

The Kona Community Hospital is located on Haukapila Street in Kealakekua. The hospital has 49 acute beds, 11 psychiatric beds, and 34 long-term beds.

Recreational Facilities

Recreational facilities in the North Kona region include Kealakekua Bay Historic Park, Kekaha Kai State Park, Keolonāhihi State Historic Park, and Nāpoʻopoʻo Beach Park (Helber, Hastert & Fee, April 2003).

Schools

The Department of Education's Kealakehe High School complex consists of Hōlualoa Elementary School, Kahakai Elementary School, Kealakehe Elementary School, Kealakehe Intermediate School, and Kealakehe High School. The University of Hawaiʻi-Hawaiʻi Community College has a campus currently under construction adjacent to the Palamanui Development, and within close proximity to the subject project.

Potential Impacts and Mitigation Measures

The County does not anticipate the Makalei Fire Station to create an increased demand on existing public services. The proposed Makakei Fire Station will actually enhance first-responder protection in the North Kona. Plans for the Makalei Fire Station include a hazardous materials (Hazmat) Unit, an engine apparatus, and a ladder apparatus.

5.0 LAND USE CONFORMANCE

State and County of Hawai'i land use plans and policies and required permits and approvals relevant to the Makalei Fire Station are described below.

5.1 STATE OF HAWAI'I

5.1.1 State Land Use Law, Chapter 205, Hawai'i Revised Statutes

The State Land Use Law (Chapter 205, HRS), establishes the State Land Use Commission (LUC) and authorizes this body to designate all lands in the State into one of four districts: Urban, Rural, Agricultural, or Conservation. These districts are defined and mapped by the State Land Use Commission in order to ensure compatibility with neighboring land uses and protection of public health.

The Makalei Fire Station is located within the State Agricultural District (Figure 9), and will require a Special Permit from the County of Hawai'i.

5.1.2 Coastal Zone Management Act, Chapter 205A, Hawai'i Revised Statutes

The Coastal Zone Management Area, as defined in Chapter 205A, HRS, includes all the lands of the State. Therefore, the proposed Makalei Fire Station lies within the Coastal Zone Management Area.

The Coastal Zone Management (CZM) Program aims to provide recreational opportunities, protect historic resources, protect scenic and open space resources, protect coastal ecosystems, provide facilities for economic development, reduce hazards, and manage development. Program objectives and applicability to the proposed Makalei Fire Station are discussed below:

RECREATIONAL RESOURCES

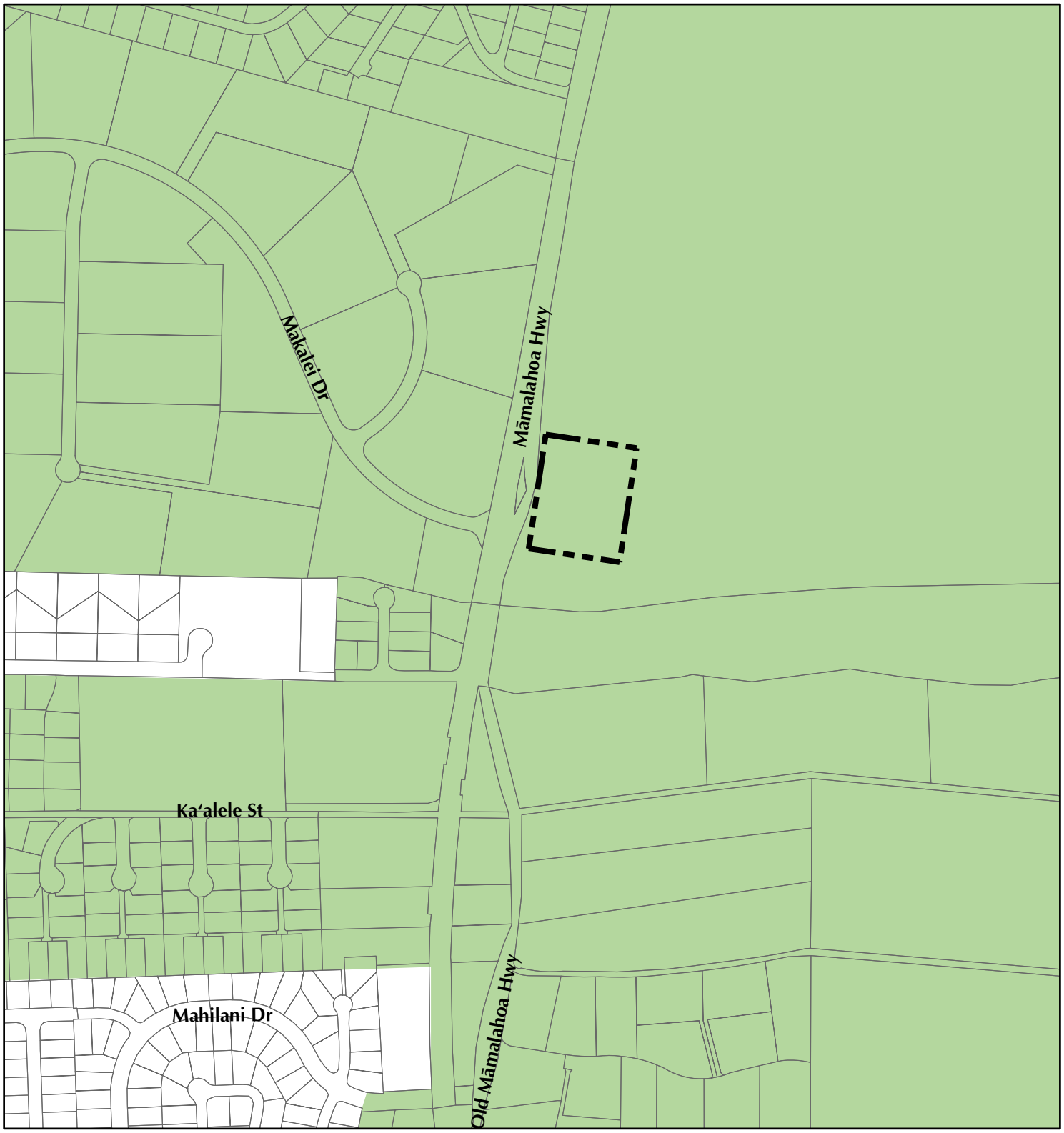
Objective: Provide coastal recreational opportunities accessible to the public.

Policy A: Improve coordination and funding of coastal recreational planning and management; and

Policy B: Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;



LEGEND

- Project Area
- Urban
- Agricultural
- Rural
- Conservation

Source: State Land Use Commisson (2006)

Disclaimer: This map is to be used for general planning purposes only.

Figure 9

State Land Use Districts

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
(v) Ensuring public recreational uses of County, State, and Federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and County authorities; and crediting such dedication against the requirements of section 46-6.

Discussion: The proposed Makalei Fire Station will be located inland, away from the shoreline (over 4.5 miles from the nearest coastline; refer to Figure 1); therefore, it is anticipated that there will be no effect on existing coastal or inland recreational resources.

HISTORIC RESOURCES

Objective: Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policy A: Identify and analyze significant archaeological resources;

Policy B: Maximize information retention through preservation of remains and artifacts or salvage operations; and

Policy C: Support State goals for protection, restoration, interpretation, and display of historic resources.

Discussion: An archaeological survey conducted in 2007 did not identify any historic properties within the proposed fire station site. Should any archaeological or cultural remains be encountered during construction, all work in the immediate vicinity of the find will cease and the State Historic Preservation Division will be contacted for establishment of appropriate mitigation in accordance with Chapter 6E, Hawai'i Revised Statutes.

SCENIC AND OPEN SPACE RESOURCES

Objective: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policy A: Identify valued scenic resources in the coastal zone management area;

Policy B: Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

Policy C: Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

Policy D: Encourage those developments which are not coastal dependent to locate in inland areas.

Discussion: The proposed Makalei Fire Station will be located inland, away from the shoreline; therefore, it is anticipated that there will be no effect on the quality of the coastal scenic resources.

COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policy A: Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

Policy B: Improve the technical basis for natural resource management;

Policy C: Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

Policy D: Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

Policy E: Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: The proposed Makalei Fire Station will be located nearly five miles from the ocean; therefore, it is anticipated that there will be no effect on the quality of the coastal ecosystems.

ECONOMIC USES

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policy A: Concentrate coastal dependent development in appropriate areas;

Policy B: Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

Policy C: Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;
(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

Discussion: The Makalei Fire Station will provide first-responders to emergencies in North Kona area communities, including those related to coastal hazards and recreation. The project site's relatively far distance from the shoreline will minimize adverse visual and environmental impacts in areas critical toward maintaining the health of coastal areas. This project provides a service critical toward maintaining a healthy tourism industry in the area by enhancing emergency response coverage.

COASTAL HAZARDS

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policy A: Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and non-point source pollution hazards;

Policy B: Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and non-point source pollution hazards;

Policy C: Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

Policy D: Prevent coastal flooding from inland projects.

Discussion: The proposed Makalei Fire Station's location nearly five miles inland from the coastline virtually negates any potential detriment to the quality of coastal ecosystems as a result of construction.

MANAGING DEVELOPMENT

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policy A: Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

Policy B: Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

Policy C: Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion: Due to the Makalei Fire Station's far inland location from the shoreline, it should not be considered a "significant coastal development." Its benign location relative to the coastline should not require an involved public participation process concerning coastal effects, although this EA provides an opportunity for input.

PUBLIC PARTICIPATION

Objective: Stimulate public awareness, education, and participation in coastal management.

Policy A: Promote public involvement in coastal zone management processes;

Policy B: Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

Policy C: Organize workshops, policy dialogues, and site- specific mediations to respond to coastal issues and conflicts.

Discussion: The project's mauka location, and far distance from the shoreline provides a difficult segue toward relevant discussions on coastal zone management. This EA provides a means for public input.

BEACH PROTECTION

Objective: Protect beaches for public use and recreation.

Policy A: Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

Policy B: Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

Policy C: Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The proposed Makalei Fire Station will be located nearly five miles from the ocean. Due to the project site's relatively far distance from the shoreline, no adverse impact to area beaches is anticipated.

MARINE RESOURCES

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policy A: Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

Policy B: Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

Policy C: Assert and articulate the interests of the State as a partner with Federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

Policy D: Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

> Policy E: Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: The proposed Makalei Fire Station will be located nearly five miles from the ocean. Due to the project site's relatively far distance from the shoreline, no adverse impact to area marine resources is anticipated.

5.1.3 Coastal Zone Management Act, Chapter 205A, Hawai'i Revised Statutes

The Hawai'i State Plan, Chapter 226 HRS (2007) provides guidelines for the future growth of the State of Hawai'i. The Hawai'i State Plan identifies goals, objectives, policies, and priorities for allocating the State's resources, including public funds, services, human resources, land, energy, and water. The plan was enacted to achieve "a desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people." Chapter 226 HRS (2007).

Discussion: Planning objectives outlined in Chapter 226 support the construction of a fire station in North Kona. Section 226-26 clearly identifies enhanced public safety as an element critical towards the State's socio-cultural advancement. The plan seeks an "[a]ssurance of public safety and adequate protection of life and property for all people." Section 226-26(a)(1), HRS. The plan hopes to achieve this objective through:

> Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters and other major disturbances.

Section 226-26(a)(2), HRS. The addition of a fire station in North Kona expands first-responder coverage previously absent in this community, and is therefore consistent with the spirit of the statute.

5.2 COUNTY OF HAWAI'I PLANS AND CONTROLS

5.2.1 County of Hawai'i General Plan

The General Plan—Hawai'i County (General Plan), adopted by ordinance in February 2005, is the policy document for the long-range development of the Island of Hawai'i. **The General Plan** provides direction for the future growth of the County of Hawai'i and contains a series of land use maps referred to as the Land Use Pattern Allocation Guide (LUPAG) maps. The Makalei Fire Station site is designated as Extensive Agriculture by the LUPAG maps (Figure 10).

Specific General Plan goals and policies applicable to the proposed Makalei Fire Station project are discussed below.

LEGEND

- Project Area
- Low Density Urban
- Extensive Agriculture

Figure 10

County of Hawai'i General Plan

Makalei Fire Station

County of Hawai'i — ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: City & County of Hawai'i

Disclaimer: This map is to be used for general planning purposes only.

Public Facilities

Protective Services

Policies

(a) Development of police and fire facilities should entail joint use structures whenever feasible.

(b) The establishment of a fire/police facility shall consider site size and locations that permit quick and efficient vehicular access.

(m) Consider the proximity to fire stations in approving any rezoning to permit urban development.

Discussion: The Makalei Fire Station is located along Māmalahoa Highway, which is one of the main roadway arteries between the Waimea region of the island and Kailua-Kona. Because the station is adjacent to the highway, first-responders have the capability to easily travel to an emergency scene in a timely manner.

5.2.2 Keāhole to Kailua Development Plan

The County of Hawai'i established an overall goal related to objectives for the Keāhole to Kailua Development Plan: "To develop during the next 10 years an efficient safe, and pleasing road network which operates at level of service C over the next 20 years, and which interconnects the various land uses within the planning area and accommodates various modes of travel". The County of Hawai'i General Plan incorporated reference to the plan in February 2005 stating, "The overall goal of the plan was to develop a mixed residential, commercial, industrial, resort and recreational community to meet the growing needs of the Kona Region."

5.2.3 West Hawai'i Regional Plan

The West Hawai'i Regional Plan was developed by the Office of State Planning in 1989. It was intended to complement the County of Hawai'i's General Plan and Community Development Plan to address the regional issues arising from rapid development in the West Hawai'i area. The primary objective of the plan focused on coordinating capital improvements within a regional planning context, and provide guidance in State land use decision-making. The plan strategically steers urban development away from areas where critical natural resources such as native forests, important agricultural lands and sensitive shorelines would be adversely impacted.

Discussion: The proposed action is consistent with the West Hawai'i Regional Plan. The location of the Makalei Fire Station steers clear of any native forests, important agricultural lands and sensitive shorelines.

5.2.4 County of Hawai'i Zoning

The proposed Makalei Fire Station will be located land designated as Agricultural (A-900a) (Figure 11).

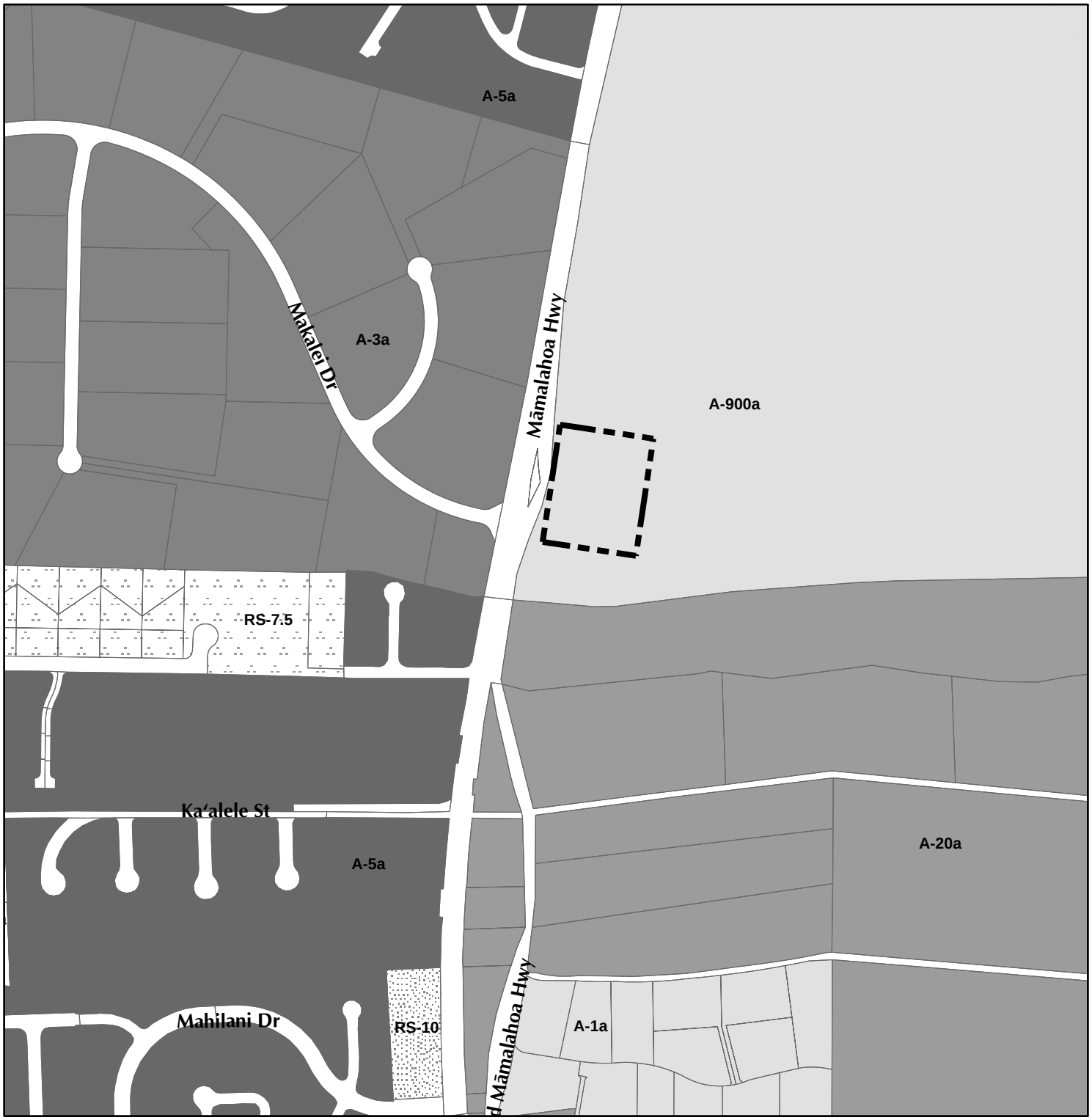
Discussion:
Because the Fire Station is sited on land designated by the County as Agricultural, and lies within the boundary of a State land use Agricultural district, the fire station will require both a Plan Use approval and a special permit from the County of Hawai'i Planning Commission. Pursuant to Section 25-5-72(c)(13), Hawai'i County Code (HCC), "[p]ublic structures, other than those necessary for agricultural practices," are allowed in County Agricultural districts provided further that the project complies with Section 25-4-11, HCC, obtaining a plan approval by the County Planning Director.

Discussion: The construction of an additional fire station in North Kona area is consistent with the goals of the Keāhole to Kailua Development Plan. Expanded first- responder coverage will encourage the development of a residential, commercial, resort and recreational community where the populace feels safe.

5.2.5 Kona Community Development Plan

The proposed Makalei Fire Station falls under the jurisdiction of the Kona Community Development Plan (KCDP). The plan is part of the overall County of Hawaii General Plan. These CDPs help the county determine how the County distributes funds, passes laws, governs development, provides roads and public facilities, and generally makes decisions in the area until the year 2015. CDPs essentially translate the broad goals outlined in the County General Plan, into opportunities for implementation. The CDPs also serve as a forum for community input. Once drafted, the CDP will be adopted by the County Council as an ordinance, giving it the force of law.

Discussion: The proposed Makalei Fire Station is consistent with the current pre-final draft of the Kona Community Development Plan released on April 17, 2008. The facility is included as a "Proposed Fire Station" in Figure 4-10(a) of the report, and is included on the Capital Improvements Funding List in Section 5.1.2.



LEGEND

Project Area

Residential Zones

RS-10

RS-7.5

Agricultural Zones

A-900a

A-20a

A-3a

A-5a

Source: City & County of Hawai'i

Disclaimer: This map is to be used for general planning purposes only.

Figure 11

County of Hawai'i Zoning

Makalei Fire Station

County of Hawai'i

ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

5.3 LIST OF REQUIRED PERMITS AND APPROVALS

Required permits and approvals are outlined in Table 5-1, below.

Agency	Permit/Approval
State of Hawai'i	
Department of Health	• Underground Injection Control Approval of Drywells • Approval of Septic Systems
Department of Transportation	• Approval of Driveway Connection
County of Hawai'i	
Planning Commission	• Approval of Special Permit Application • Subdivision Approval
Department of Public Works	• Approval of Construction Plans
Department of Water Supply	• Approval of Construction Plans
Planning Department	• Plan Approval • Approval of Construction Plans

Table 5-1: Required Permits and Approvals

6.0 ALTERNATIVES

In compliance with the provisions of Section 11-200-17(f), HAR relating to Environmental Impact Statements, an environmental assessment must discuss potential alternatives to the proposed action.

The alternatives considered include:

6.1 NO ACTION

The no-action alternative is just that: no action, or no change to the status quo. The proposed Makalei Fire Station will not be constructed. The site will be donated specifically for the purpose of a fire station, and failing to construct a station would deny the County an economic opportunity to obtain land at no cost.

6.2 ALTERNATIVES

The Hawai'i County Fire Department has spent years seeking a suitable site for a new fire station in North Kona. Although several were initially evaluated, none of the alternative sites considered provided the economic and locational benefit as the subject property. The site will be donated specifically for the purpose of a fire station, and switching to an alternative site would deny the County an economic opportunity to obtain land at no cost, unless another parcel was donated.

7.0 FINDINGS, SUPPORTING REASONS, AND ANTICIPATED DETERMINATION

To determine whether the Makalei Fire Station may have a significant impact on the physical and human environment, all phases and expected consequences of the proposed project have been evaluated, including potential primary, secondary, short-range, long-range, and cumulative impacts. Based on this evaluation, the Approving Agency (County of Hawai'i) is expected to issue a Finding of No Significant Impact (FONSI) for the Makalei Fire Station. The supporting rationale for this anticipated finding is presented in this chapter.

7.1 PROBABLE IMPACT, INCLUDING CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment that result from the action when added to other past, present, and foreseeable future actions by other agencies or persons. These cumulative long-term impacts are the need for potable water, more electricity, and regional infrastructure. However, these properties have had or will have an EIS prepared and the development of the projects includes appropriate mitigation measures to address any impacts. The following projects are planned for the immediate vicinity of the Makalei Fire Station Extension (*see* Figure 12):

University of Hawai'i Center at West Hawai'i (UHCWH)
The UHCWH plans a future expansion. This will be beneficial to the entire region by providing educational and employment opportunities. The 2000 EIS for the UHCWH addressed the cumulative impacts in the area (Wil Chee - Planning & Environmental, Inc., 2000).

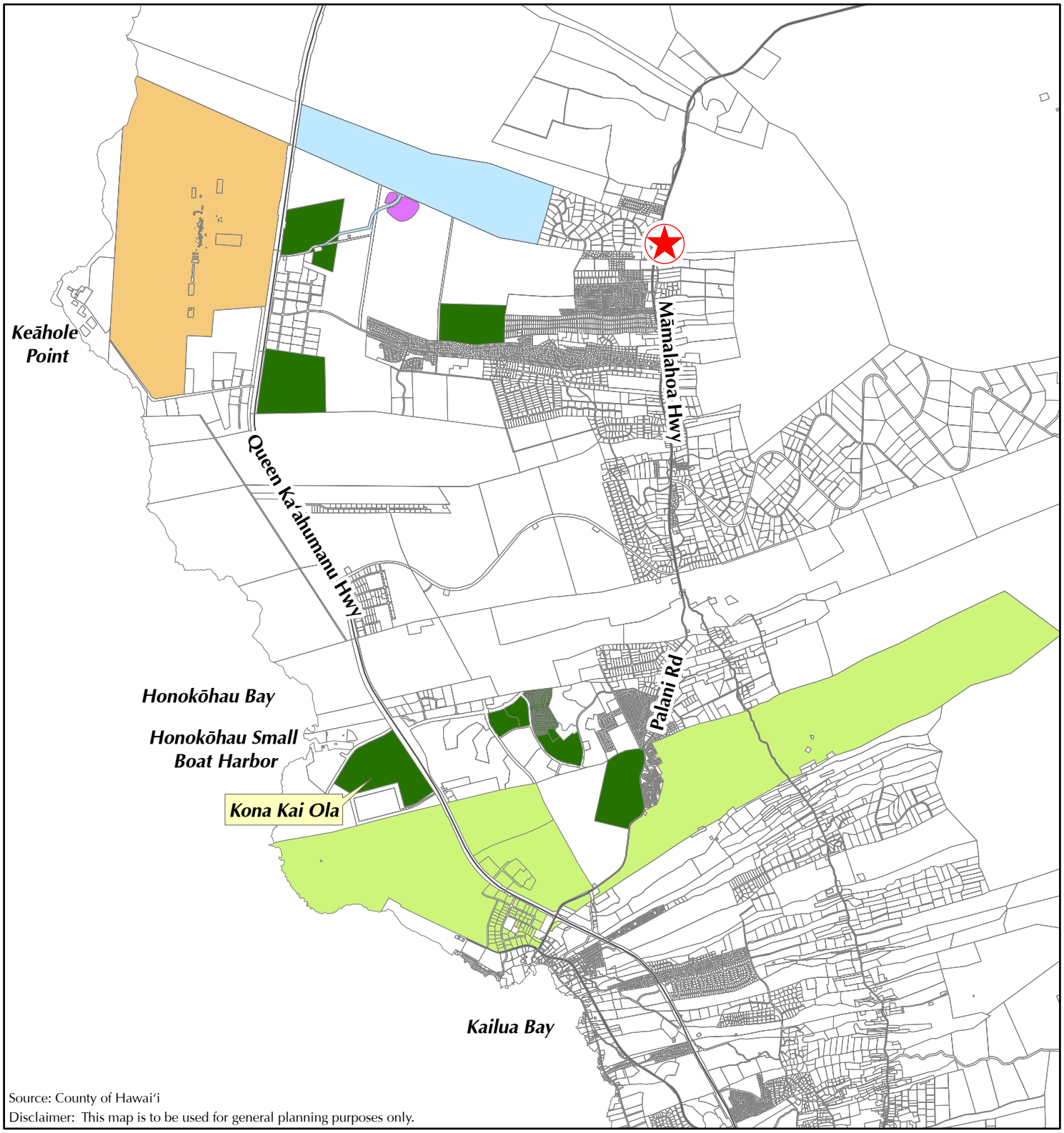
Palamanui—A Hiluhilu Development Project
The Palamanui Development (near the Kona International Airport at Keāhole) includes residential uses, mixed uses, an 18-hole golf course, and in conjunction with UHCWH, a University Village Center. A 2004 EIS was prepared that addresses cumulative growth in the area (Group 70 International, Inc., 2004).

Kona International Airport at Keāhole
The Kona International Airport has a list of long range improvements that are scheduled in phases to be completed by 2015. These projects include expansion of infrastructure to accommodate the growing needs of the airport as well as adding commercial and industrial uses that support airport activities.

Department of Hawaiian Home Lands (DHHL) Properties
DHHL has jurisdiction over a large amount of acreage in the surrounding area (but well makai of the project site) that they eventually plan to develop. Various types of uses are included that range from agricultural lots, industrial lots, commercial lots, a golf course, and residential units.

Honokohau Boat Harbor
DHHL has accepted the Kona Kai Ola EIS for expansion of Honokohau Boat Harbor and a mixed-use development at a site mauka of the Harbor.

Queen Lili'uokalani Trust (QLT)
QLT owns 3,500-acres in Kailua-Kona that includes developed and undeveloped land. Developed areas include shopping centers, light industrial, and residential low-rise condominiums. Undeveloped acreage is currently undergoing review for potential land uses and eventual development.



Source: County of Hawai'i
Disclaimer: This map is to be used for general planning purposes only.

LEGEND

- Project Location
- Department of Hawaiian Home Lands
- Queen Lili'uokalani Trust
- Kona International Airport at Keāhole
- Palamanui - A Hiluhilu Development Project
- University of Hawai'i Center at West Hawai'i

Figure 12

Surrounding Projects

Makalei Fire Station

County of Hawai'i — ISLAND OF HAWAI'I

NORTH

LINEAR SCALE (FEET)

0 — 3,250 — 6,500 — 13,000

PBR HAWAII & ASSOCIATES, INC.

Supporting Infrastructure

To accommodate all the proposed growth additional infrastructure is required. Included are the following projects:

Hawai'i Electric Light Company, Inc. (HELCO) plans for the expansion and improvements to Keāhole Generating Station and the Airport Substation in order to provide for future demands. The EIS for HELCO that addresses the expansion of the HELCO facilities was finalized in January 2005.

Keāhole Reservoir was completed on February 1, 2000 and will provide storage for water. The Hina Lani Drive Water Transmission line and Reservoir was completed in 2001.

Lokahi Subdivision proposes to provide an access road for the Lokahi Subdivision. The proposed road will intersect with Ka'iminani Drive near the Kona Palisades Subdivision providing a north-south segment of the proposed road that will become the new Main Street.

Cumulative Impacts

The previously mentioned projects will likely have an impact on the environment. However, established controls require developers to consider and manage or mitigate any negative long term impacts on the natural environment. Compliance and adherence with established controls are expected to decrease the impact on natural resources.

The man-made environment can also be stressed and severely impacted as all of the proposed projects in the region are implemented. Again, the developers must follow established controls and provide appropriate mitigation for project-generated impacts on infrastructure. Many of the proposed developments in the area have already submitted EISs that address the cumulative impacts in the region.

Social-economic impacts resulting from the proposed projects are anticipated to be beneficial. Construction generates employment and economic opportunities. Additional residential areas provide housing, commercial development provides long term employment, and the UHCWH provides a much needed higher education facility. All of the projects discussed will result in economic development that will expand employment opportunities for Kailua-Kona residents and provide additional tax revenue to the State and County governments to fund needed public services. Overall, the net cumulative impact is expected to have a positive effect on the Kailua-Kona community.

7.2 SIGNIFICANCE CRITERIA

Based upon the previous information presented in this document the proposed permitting and construction of the Makalei Fire Station will likely have no significant

environmental impacts. This determination is based upon the Significance Criteria outlined in Chapter 343, HRS, as amended and Title 11 Chapter 200 HAR 1996.

(1) ***Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;***

Environmental and cultural studies conducted in and around the project site reveal the absence of any resources potentially subject to irrevocable loss as a result of construction.

(2) ***Curtails the range of beneficial uses of the environment;***

The Makalei Fire Station will not curtail the range of beneficial uses of the environment. The site is primarily composed of alien species. Although designated for agriculture use, conversion of less than three acres of land for public safety use will not have an adverse impact on the environment as there remains more than sufficient surrounding acreage

(3) Conflicts with the State's long term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders;

The Environmental Policies enumerated in Chapter 344, HRS, and NEPA promote conservation of natural resources, and an enhanced quality of life for all citizens. The proposed Makalei Fire Station will not significantly impact natural resources due to the relatively small amount of land involved. The fire station will augment quality of life for citizens in the area as a result of increased first-responder coverage.

(4) ***Substantially affects the economic or social welfare of the community or State;***

The Makalei Fire Station will positively influence social welfare in the area as a result of increased first-responder coverage. Furthermore, as tourism highly influences the economic welfare of the North Kona region, increased first-responder coverage will promote greater safety leading to more appealing destination for potential visitors from abroad.

(5) ***Substantially affects public health;***

As public health highly depends on timely response in emergency situations, the construction of the Makalei Fire Station will subsequently decrease travel time for first-responders. Any noise, air, water and/or drainage impacts will be addressed through construction management practices in compliance with Federal, State and County requirements. Therefore, construction of the fire station will have a positive affect on public health resources in the region.

(6) ***Involves substantial secondary impacts, such as population changes or effects on public facilities;***

Construction of the Makalei Fire Station adds an additional public facility in the region, and will not create additional strain on other area facilities. Furthermore, the County anticipates no substantial increase in area population as a result of an additional fire station in the region.

(7) ***Involves a substantial degradation of environmental quality;***

Wherever possible, green materials like recycled flooring, paints with low volatile organic compounds, solar hot water panels and photovoltaic panels will be integrated into the ultimate design of the structure. A special coating will be applied to the roof to reduce heat gain. Otherwise, no substantial environmental degradation is anticipated as a result of this project. Also, as the project will fall under compliance with all pertinent statutes and regulations, no substantial environmental degradation is anticipated.

(8) ***Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;***

The proposed action will not have any substantial negative secondary impacts on the environment. Construction of an additional fire fighting facility is consistent with long-range County plans for North Kona. Construction of the fire station will not commit the County to any other larger actions, and will not generate any additional actions having a cumulative effect on the environment.

(9) ***Substantially affects a rare, threatened or endangered species or its habitat;***

The small scale of the Makalei Fire Station is not anticipated to have any large impact on endangered faunal species. For example, issues related to displacement of habitat are virtually non existent due to the large amount of remaining and similar vegetation immediately adjacent to the project site. No other mitigative measures are planned for faunal species.

Although critical habitats for endangered flora species are well away from the actual project site, an awareness of their potential presence will be emphasized during construction. Project landscaping will attempt to utilize the maximum amount of native species feasible. Attempts will be made to preserve and/or relocate any ‘Ohe makai encountered during clearing and grading. Otherwise, the Makalei Fire Station is not anticipated to have any impact on endangered flora species, and no mitigative measures are planned.

(10) Detrimentally affects air or water quality or ambient noise levels;

Air Quality: No State or Federal air quality standards will be violated during or after the construction of Makalei Fire Station. The only anticipated issues related to air quality would be during construction; however, construction activities would be temporary. Long-term negative impacts related to air quality are not expected.

Water Quality: No State or Federal water quality standards will be violated during or after the construction of Makalei Fire Station.

Ambient Noise Levels: Construction activities for the development of the property will inevitably create temporary noise impacts. The developer may employ mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai'i Administrative Rules, all project activities must comply with all community noise controls.

Temporary noise impacts will also be generated during the course of responding to fire alarms, including sirens from emergency response vehicles. These noise disturbances are an unavoidable element of emergency response equipment but nonetheless will be intermittent and of short duration.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The project site does not lie in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, estuary, freshwater or coastal waters. Likewise, the Makalei Fire Station is not anticipated to have any impact on any natural hazard conditions and no mitigative measures are planned.

However, the structure could suffer irreparable damage as a result of its location near the base of Hualālai volcano, presently considered dormant by geologists. Should Hualālai erupt in the near future, the Makalei Fire Station along with the entire Kona coast could suffer from lava inundation. However, the fire station's location does not amplify risk to human life largely due to the high-level of volcanologic monitoring on the mountain enabling advance warning of an impending eruption, and the slow-moving, fluid nature of mafic Hawaiian lavas.

(12) Substantially affects scenic vistas and view planes identified in County or State plans or studies; or,

Adverse affects to mauka views will not occur due to adequate setbacks compensated for and integrated into the development plans.

(13) Requires substantial energy consumption.

The proposed project will not require substantial energy consumption. As mentioned above, energy saving design elements will be integrated into building design.

7.3 DETERMINATION

Pursuant to Chapter 343, HRS, The County of Hawai'i Department of Public Works anticipates issuing a Finding of No Significant Impact (FONSI) as the accepting agency. This finding is founded on the basis of impacts and mitigation measures examined in this document, public comment received during the pre-consultation and public review phases, and analyzed under the above criteria,

8.0 REFERENCES CITED

County of Hawai'i Planning Department. 2005. *County of Hawai'i General Plan.* Available online at http://www.Hawai'i-County.com/la/gp/toc.html.

County of Hawai'i Department of Research and Development. 2005. *County of Hawai'i Data Book.* Available online at http://www.Hawai'i-County.com/databook_2004/dbooktoc.htm.

Fukunaga & Associates, Inc. 1994. *North Kona Water Master Plan (Draft Report).*

Garcia, Michael. 2004. *Volcanic Hazards at the HELCO Generating Station, North Kona, Hawai'i.* Geohazards Consultants International, Inc. Volcano, Hawai'i.

Group 70 International, Inc. 2004. *Final Environmental Impact Statement, Palamanui A Project by Hiluhilu Development, North Kona, Hawai'i.*

Hawai'i Health Systems Corporation. 2006. *Kona Community Hospital.* Available online at www.kch.hhsc.org/.

Helber, Hastert & Fee. 2003. *County Environmental Report in Support of Applications for a Project District and Special Management Area Use Permit.* Honolulu, Hawai'i.

Juvik & Juvik. 1998. *Atlas of Hawai'i. Third Edition.* University of Hawai'i Press, Honolulu, Hawai'i.

Macdonald, Abbott & Peterson. 1983. *Volcanoes in the Sea.* University of Hawai'i Press, Honolulu, Hawai'i.

Maly, K. 2000. *Nā Honokōhau: Nā Hono I Nā Hau 'Elua (Honokōhau: Bays of the Two Wind-born Dews)* 2 Vols. Hilo: Kumu Pono Associates.

National Oceanic & Atmospheric Administration (NOAA). no date. National Weather Service Forecast. Western Regional Climate Center. Hawai'i Climate Summaries. Available online at http://www.wrcc.dri.edu/summary/climsmhi.html.

R. M. Towill Corporation. 1989. *Keāhole to Kailua Development Plan.*

State of Hawai'i, Department of Business, Economic Development and Tourism (DEBDT). 1998. *The State of Hawai'i Data Book, 1997: A statistical Abstract.*

United States Department of Agriculture Soil Conservation Service. 1972. *Island of Hawai'i, State of Hawai'i.*

United States Geologic Survey (USGS). 1997. Lava Flow Hazard Zone Maps. Available online at http://pubs.usgs.gov/gip/hazards/maps.html.

United States Federal Register. 2003. United States Department of the Interior, Fish and Wildlife Service: Endangered and Threatened Wildlife and Plants; Final Designation and Nondesignation of Critical Habitat for 46 Plant Species From the Island of Hawai'i, HI; Final Rule. 68 FR 39624, 39655-39656.

United States Fish and Wildlife Service. 2008. List of Endangered Species in Hawai'i. Available online at http://www.fws.gov/pacificislands/wesa/endspindex.html.

Waimea Water Services, Inc. 2003. *Groundwater Resources of Kau, North Kona, Hawai'i, A Water Study for Hiluhilu Development, LLC.* Waimea Water Services, Inc. Kamuela, Hawai'i.

Wil Chee-Planning & Environmental, Inc. 2007. *Main Street Collector Road Final Environmental Assessment, North Kona, Hawai'i.*

Wil Chee - Planning & Environmental, Inc. 2000. *Final Environmental Impact Statement for University of Hawai'i Center at West Hawai'i.*

Wil Chee - Planning & Environmental, Inc. 1998. *Long Range Development Plan for University of Hawai'i Center at West Hawai'i.*

Wilkes, C. Narrative of the United States Exploring Expedition During the Years 1838-1842, Under the Command of C. Wilkes, U.S.N. Vol. 4. Philadelphia: Loa and Blanchard.

Yuen, Chris, Planning Director County of Hawai'i. 2004. *Kona Roads, West Hawai'i Traffic Problems.* Available online at http://www.Hawai'i-County.com/planning/konaroads.htm.

Appendix A

Botanical Survey

BOTANICAL SURVEY, MAKALEI LANDS, NORTH KONA, ISLAND OF HAWAI'I

By Ron Terry, Ph.D., Patrick J. Hart, Ph.D., and Layne Yoshida, B.A.
Geometrician Associates, LLC
August 2005

Introduction

This report describes the results of a botanical survey of part of an area referred to as the Makalei Lands. These lands comprise portions of nine properties (7-2-4-07; 7-2-5:08, 7-2-6:05, 08, 12, 13, 09, and 23; 7-2-7-:01) totaling about 1,100 acres, located mostly makai of Mamalahoa Highway. The properties are within the *ahupua'a* of Mahaiula, Kaulana, Awalua, Ohiki and Puukala, in the North Kona District of the island of Hawai'i (Fig. 1), and are owned by either Lynch Investments (Lynch) or the State of Hawai'i.

The report was commissioned by Lynch as part of planning for a potential land exchange and new road corridor. The principal purpose of the botanical survey was to determine whether State and/or federally listed threatened or endangered plant species were present, and if so, to register their locations with a Global Positioning System (GPS) unit. Another purpose was to determine whether valuable native ecosystems occurred in the area, and if so, to characterize the nature and extent of specific types.

The survey began in the most sensitive State land in the south and moved progressively northward (with the exception of one day early in the survey that concentrated on Mahaiula and the land just south of Pu'u Io). Results were shared on a weekly basis with planners for Lynch. After the survey had covered about 65% of the planned area, and about 85% of the area with valuable native habitat, Lynch requested Geometrician to terminate the survey, as the information they had gained required rethinking of their original proposal. This report reflects the findings to date of the survey. In Figure 2, the boundary of the planned makai survey area is shown in red (the mauka piece, 7-2-7:01, was not surveyed), and the area highlighted in yellow represents the area actually surveyed.

Background and Methodology

In order to better understand the area in preparation for survey, we investigated the background of the area. Given the rainfall, geologic substrate, and existing vegetation, the general area probably supported a Lowland Dry-Mesic Forest (Gagne and Cuddihy 1990) prior to human disturbance, with *lama* (*Diospyros sandwicensis*) and *alahe'e* (*Psydrax odoratum*) as co-dominants. A reconnaissance 4-wheel drive tour with Carl Carlson, formerly of Huehue Ranch, showed how extensively ranching and invasive species have transformed much of the vegetation. The degree of the change seems to depend largely on the history of land clearing and modification (e.g., chain dragging or bulldozing) and the intensity of grazing. It was clear that many areas had been drastically altered from

their original condition, and that others, particularly within the State lands, had seen relatively little disturbance and would still likely harbor native ecosystems and rare species.

Another survey of the nearby lands proposed for urbanization at slightly lower elevations in the ahupua'a of Kau (Hart 2003) had found three endangered species: *halepepe* (*Pleomele hawaiiensis*), *uhiuhi* (*Caesalpinia kavaiensis*), and *'aiea* (*Nothocestrum breviflorum*), as well as several rare species: *'ohe makai* (*Reynoldsia sandwicensis*) and *maua* (*Xylosma hawaiiense*).

The Makalei Lands were surveyed on foot by Ron Terry, Pat Hart, Layne Yoshida, and Graham Knopp over the course of six days spread out over four weekends in July of 2005. Most surveys began shortly after dawn and continued until near sunset. The botanists walked transects whose spacing was adjusted to suit the density and sensitivity of the vegetation cover. In order to fully examine the area within a transect, the botanists usually zig-zagged within a corridor defined by a central northing or easting, guided by GPS units. Some transects overlapped in order to test whether rare species would be detected twice. The area was also flown by helicopter. Species were identified in the field and, as necessary, collected and keyed out in the laboratory.

Results: Rare, Threatened or Endangered Species

Only one species listed as threatened or endangered by the State or federal government was located during the survey, *halapepe* (*Pleomele hawaiiensis*), but it was quite numerous. Figure 3 provides the locations of *halapepe*. It is important to note two limitations of the map: some of the symbols represent two or more individuals, and the tolerances of the mapping program restrict the close spacing of symbols so that not all sightings have a corresponding symbol. But the general pattern of *halapepe* being widely distributed on the State land, at elevations from 1,200 feet down to about 800 feet above sea level, is clear. Although present at lower elevations in Kau, neither *uhiuhi* nor *'aiea* were found during this survey.

For the purposes of the survey, rare plants were defined as those listed as Species of Concern by the U.S. Fish and Wildlife Service or those that in our experience were unusual to find in this area of Kona. Although these rare species have no legal status in the State of Hawai'i, they are worthy of preservation and of interest to land managers, particularly on State land. Figure 2 also shows the location of the two rare species that were found: *'ohe makai* (*Reynoldsia sandwicensis*), which was fairly numerous, and *hame* (*Antidesma pulvinatum*), which was represented by only two individuals. No *maua* was found.

It is important to point out that there *may be* additional individuals of rare, threatened or endangered species on the Makalei Lands that were present but not seen. Endangered plants may be difficult to detect when they are in a juvenile and/or sterile condition at the time of the survey. For example, when not in flower, the endangered *Abutilon menziesii* could easily be disguised among the many thousands of alien *Abutilon grandifolium* that

form much of the herb cover. Some endangered species such as ferns are cryptic and difficult to detect at any time. Even with more obvious species, the extremely dense underbrush that has flourished in Kona as a result of the last two years of rains sometimes make detection difficult. Thus, while the survey as a whole is reasonably accurate, the results must be interpreted with some caution.

Results: Native Ecosystems

Although there are many sub-varieties of vegetation and gradations between them, the vegetation on the property can be divided into four basic types:

1. Heavily grazed alien grassland/shrubland: much of Mahiula and parts of Ohiki and Awalua;
2. Secondary alien forest and shrubland: most of the land within about a half-mile of Mamalahoa Highway;
3. Fountain grass/native tree parkland: the makai half of Kaulana and the upper-middle and lower parts of Ohiki and Awalua; and
4. Native *lama/alahe'e* forest, with varying alien components: Puukala and the lower-middle parts of Ohiki and Awalua.

Type 1 is dominated by fountain grass (*Pennisetum setaceum*), *Senna* sp., *Grevillea robusta*, *Melia azadarach*, and *Abutilon grandifolium*. Very few native trees, shrubs or herbs are present.

Type 2 is dominated by silk oak (*Grevillea robusta*), Christmas berry (*Schinus terebinthifolius*), *kukui* (*Aleurites moluccana*), lantana (*Lantana camara*), comb hyptis (*Hyptis pectinata*), air plant (*Kalanchoe pinnata*), sourbush (*Pluchea symphitifolia*) and a large array of other alien species. *Lama* and *alahe'e* are occasionally present, and there are a very few *wiliwili* (*Erythrina sandwicensis*) as well.

Type 3 is also dominated by fountain grass, but instead of mostly invasives in the tree layer, a large proportion is either *lama* or *wilwili*. One of the largest *wiliwili* groves in Kona appears to be present on TMK 7-2-6:13. We also noted several individuals of the rare *'ohe makai* tree in this area.

Type 4 is basically native forest that varies from fairly intact to moderately invaded by aliens, particularly Christmas berry, silk oak, lantana, and comb hyptis. In addition to *lama* and *alahe'e*, there is a great diversity of fairly abundant natives, including: ferns (*Nephrolepis exaltata* and *Lepisorus thunbergianus*); herbs and vines such as *Peperomia* spp., *ilima* (*Sida fallax*), *ilie'e* (*Plumbago zeylanica*), morning glory (*Ipomoea indica*), and *huehue* (*Cocculus triloba*); shrubs or small trees such as *mamane* (*Sophora chrysophylla*), *'ulei* (*Osteomeles anthyllidifolia*), *olopua* (*Nestegis sandwicensis*), *'a'ali'i* (*Dodonea viscosa*); and trees such as *wiliwili*, *'ohe makai*, and *halapepe*. Considering the diversity, extent, and intactness of this type, it can be considered a major botanical resource for Kona.

Results: Species List

Table 1 below provides a full list of all species identified during the survey.

Table 1.
Plant Species Identified on Makalei Lands

Notes: Alien (A), Indigenous (I), and Endemic (E). Bold lettering indicates a federal/State listed threatened or endangered species.

Scientific Name	Family	Common Name	Life Form	Status
Abrus precatorius	Fabaceae	Rosary Pea	Vine	A
Abutilon grandifolium	Malvaceae	Hairy abutilon	Shrub	A
Agave sisalana	Agavaceae	Sisal	Shrub	A
Aleurites moluccana	Euphorbiaceae	Kukui	Tree	A
Amaranthus spinosus	Amaranthaceae	Spiny Amaranth	Shrub	A
Ambrosia sp.	Asteraceae	Ragweed	Herb	A
Antidesma pulvinatum	Euphorbiaceae	Hame	Tree	E
Argemone glauca	Papaveraceae	Pua kala	Herb	E
Asclepias physocarpa	Asclepiadaceae	Balloon Plant	Herb	A
Asplenium nidus	Aspleniaceae	Bird Nest Fern	Fern	A
Bidens pilosa	Asteraceae	Beggar's tick	Herb	A
Boerhavia coccinea	Nyctaginaceae	Boerhavia	Herb	A
Buddleia asiatica	Buddleiaceae	Buddleia	Shrub	A
Calotropis gigantea	Asclepiadaceae	Crown Flower	Shrub	A
Canavalia sp.	Fabaceae	Mauna Loa	Vine	A/I(?)
Capparis sandwichiana	Capparaceae	Maiapilo	Shrub	E
Carica papaya	Caricaceae	Papaya	Tree	A
Catharanthus roseus	Apocynaceae	Madagascar periwinkle	Shrub	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Herb	A
Chamaesyce hirta	Euphorbiaceae	Garden Spruge	Herb	A
Chamaesyce hypericifolia	Euphorbiaceae	Graceful Spurge	Herb	A
Chenopodium murale	Chenopodiaceae	Chenopodium	Shrub	A
Chenopodium oahuense	Chenopodiaceae	Chenopodium	Shrub	E
Chloris barbata	Poaceae	Swollen finger grass	Herb	A
Cirsium sp.	Asteraceae	Thistle	Herb	A
Citrus sp.	Rutaceae	Citrus	Tree	A
Clusia rosea	Clusiaceae	Autograph tree	Tree	A
Cocculus triloba	Menispermaceae	Huehue	Vine	I
Coffea arabica	Rubiaceae	Coffee	Shrub	A
Commelina benghalensis	Commelinaceae	Honohono	Herb	A
Conyza bonariensis	Asteraceae	Hairy horseweed	Herb	A
Cordyline fruticosa	Agavaceae	Ki	Shrub	A
Crotalaria incana	Fabaceae	Fuzzy rattlepod	Herb	A
Cucumis dipsaceus	Cucurbitaceae	Teasel gourd	Vine	A
Cuscuta sp.	Cuscutaceae	Dodder	Vine	E/A(/)
Cynodon dactylon	Poaceae	Bermuda Grass	Herb	A
Datura stramonium	Solanaceae	Datura	Shrub	A
Desmodium incanum	Fabaceae	Spanish Clover	Herb	A
Digitaria sp.	Poaceae	Digitaria	Herb	A
Diospyros sandwicensis	Ebenaceae	Lama	Tree	E
Dodonea viscosa	Sapindaceae	ʻAʻaliʻi	Shrub	I

TABLE 1, CONT'D				
Scientific Name	**Family**	**Common Name**	**Life Form**	**Status**
Eleusine indica	Poaceae	Wire grass	Herb	A
Emilia fosbergii	Astraceae	Pualele	Herb	A
Emilia sonchifolia	Asteraceae	Emilia	Herb	A
Eragrostis tenella	Poaceae	Eragrostis	Herb	A
Erechtites hieracifolia	Asteraceae	Erechtites	Herb	A
Eriobotrya japonica	Rosaceae	Loquat	Shrub	A
Erythrina sandwicensis	Fabaceae	Wiliwili	Tree	E
Galinsoga parviflora	Asteraceae	Galinsoga	Herb	A
Grevillea robusta	Proteaceae	Silk oak	Tree	A
Hyptis pectinata	Lamiaceae	Comb hyptis	Shrub	A
Indigofera suffruticosa	Fabaceae	Indigo	Shrub	A
Ipomoea indica	Convolvulaceae	Koali 'awa	Vine	I
Jacaranda mimosifolia	Bignoniaceae	Jacaranda	Tree	A
Kalanchoe pinnata	Crassulaceae	Air plant	Herb	A
Kyllinga brevifolius	Cyperaceae	Kyllinga	Herb	A
Lantana camara	Verbenaceae	Lantana	Shrub	A
Leonotis nepetifolia	Lamiaceae	Lion's ear	Shrub	A
Lepisorus thunbergianus	Polypodiaceae	Ekaha akolea	Fern	I
Leucaena leucocephala	Fabaceae	Haole koa	Tree	A
Macroptlium atropurpureum	Fabaceae	Phaseolus	Vine	A
Malvastrum coromandelianum	Malvaceae	False mallow	Herb	A
Momordica charantia	Cucurbitaceae	Momordica	Vine	A
Mangifera indica	Anacardiaceae	Mango	Tree	A
Melia azedarach	Meliaceae	Chinaberry	Tree	A
Metrosideros polymorpha	Myrtaceae	Ohia	Tree	E
Momordica charantia	Cucurbitaceae	Momordica	Vine	A
Morinda citrifolia	Rubiaceae	Noni	Shrub	A
Myoporum sandwicense	Myoporaceae	Naio	Tree	I
Nicotiana glauca	Solanaceae	Tree Tobacco	Shrub	A
Nephrolepis exaltata	Nephrolepidaceae	Sword Fern	Herb	I
Nephrolepis multiflora	Nephrolepidaceae	Sword Fern	Herb	A
Nestegis sandwicensis	Oleaceae	Olopua	Tree	E
Nototrichium sandwicense	Amaranthaceae	Kulu'i	Shrub	E
Olea sp.	Oleaceae	Olive	Shrub	A
Oplismenus compositus	Poaceae	Basket Grass	Herb	A
Opuntia ficus-indica	Cactaceae	Panini	Shrub	A
Osteomeles anthyllidifolia	Rosaceae	'Ulei	Shrub	I
Oxalis corniculata	Oxalidaceae	Wood Sorrel	Herb	A
Oxalis corymbosa	Oxalidaceae	Wood Sorrel	Herb	A
Panicum maximum	Poaceae	Guinea grass	Herb	A
Passiflora edulis	Passifloraceae	Lilikoi	Vine	A
Passiflora foetida	Passifloraceae	Love-in-a-mist	Vine	A
Passiflora suberosa	Passifloraceae	Wild passionfruit	Vine	A
Pennisetum setaceum	Poaceae	Fountain grass	Herb	A
Peperomia leptostachya	Piperaceae	'Ala 'ala wai nui	Herb	I
Peperomia af. membranacea	Piperaceae	Peperomia	Herb	E
Persea americana	Lauraceae	Avocado	Tree	A
Phlebodium aureum	Polypodiaceae	Hare's foot fern	Fern	A

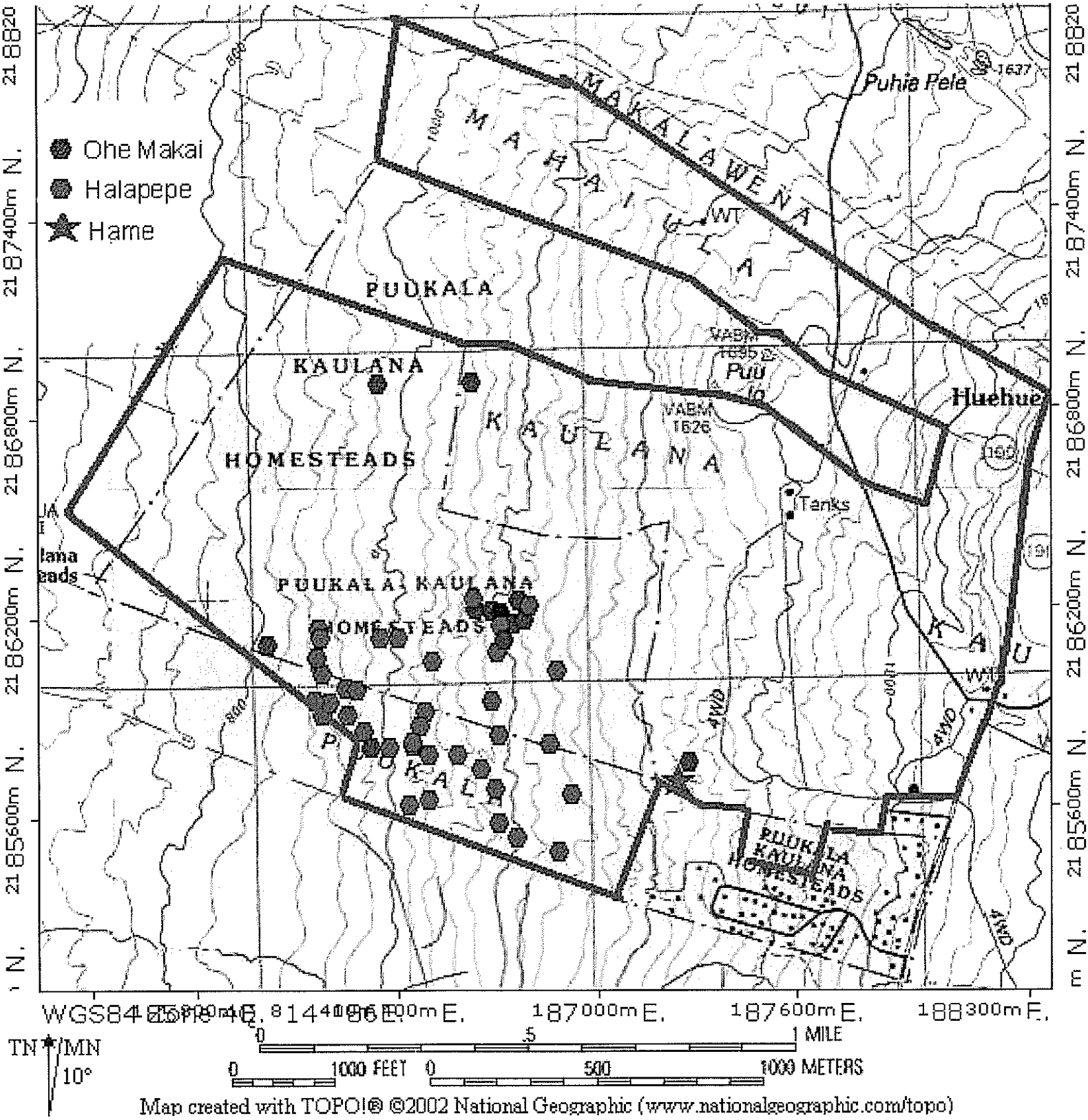
TABLE 1, CONT'D				
Scientific Name	**Family**	**Common Name**	**Life Form**	**Status**
Phymatosorus grossus	Polypodiaceae	Maile Scented fern	Fern	A
Pittosporum hawaiiense	Pittosporaceae	Hoawa	Tree	E
Pittosporum terminalioides	Pittosporaceae	Hoawa	Tree	E
Plantago lanceolata	Plantaginaceae	Narrow-Leafed Plantago	Herb	A
Plectranthus parviflorus	Lamiaceae	Spurflower	Herb	I
Pleomele hawaiiensis	**Agavaceae**	**Halapepe**	**Tree**	**E**
Pluchea symphytifolia	Asteraceae	Sourbush	Shrub	A
Plumbago zeylanica	Plumbaginaceae	'Ilie'e	Herb	I
Portulaca oleracea	Portulacaceae	Pigweed	Herb	A
Portulaca pilosa	Portulacaceae	'Akulikuli	Herb	A
Prosopis pallida	Fabaceae	Kiawe	Tree	A
Psidium cattleianum	Myrtaceae	Strawberry guava	Tree	A
Psidium guajava	Myrtaceae	Common guava	Tree	A
Psilotum nudum	Psilotaceae	Moa	Fern	I
Psydrax odoratum	Rubiaceae	Alahe'e	Tree	I
Reynoldsia sandwicensis	Araliaceae	'Ohe makai	Tree	E
Rhynchelytrum repens	Poaceae	Natal redtop	Grass	A
Rivina humilis	Phytolaccaceae	Coral berry	Shrub	A
Ricinus communis	Euphorbiaceae	Castor Bean	Shrub	A
Salvia coccinea	Lamiaceae	Texas sage	Herb	A
Samanea saman	Fabaceae	Monkeypod	Tree	A
Santalum paniculatum	Santalaceae	Sandalwood	Tree	E
Schinus terebinthifolius	Anacardiaceae	Christmasberry	Tree	A
Senecio madagascariensis	Astraceae	Senecio	Herb	A
Senicio mikanioides	Asteraceae	German Ivy	Vine	A
Senna gaudichaudii	Fabaceae	Kolomona	Tree	I
Senna occidentalis	Fabaceae	Coffee senna	Shrub	A
Sida fallax	Malvaceae	'Ilima	Shrub	I
Sida rhombifolia	Malvaceae	Cuba Jute	Herb	A
Sida spinosa	Malvaceae	Prickly Sida	Herb	A
Silene gallica	Caryophyllaceae	Catchfly	Herb	A
Solanum linnaeanum	Solanaceae	Sodom's apple	Herb	A
Sophora chrysophylla	Fabaceae	Mamane	Tree	E
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A
Spermacoce assurgens	Rubiaceae	Buttonweed	Herb	A
Spermacoce mauritiana	Rubiaceae	Borreeria	Herb	A
Sporobolus indicus	Poaceae	Smutgrass	Herb	A
Stachytarpheta jamaicensis	Verbenaceae	Jamaica vervain	Shrub	A
Tridax procumbens	Asteraceae	Coat buttons	Herb	A
Triumfetta sp.	Tiliaceae	Bur	Shrub	A
Verbascum sp.	Scrophulariaceae	Mullein	Herb	A
Verbena littoralis	Verbenaceae	Owi	Herb	A
Waltheria indica	Sterculiaceae	Uhaloa	Herb	I
Wikstroemia sandwicensis	Thymeliaceae	'Akia	Shrub	E

Literature Cited

Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai'i*. 2 vols. Honolulu: University of Hawai'i Press.

Hart, P.J. 2003. "Biological Reconnaissance, Lands of Kau, North Kona." Prep. for Hiluhilu Development.

U.S. Fish and Wildlife Service (USFWS). *Threatened and endangered plants in Hawai'i*. Washington: GPO.



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Appendix B

Request for Determination of No Archaeological Effect & Supporting Documents

490 Rcvd 3/22/08

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

March 17, 2008

Dr. Alan E. Haun
Haun & Associates
HRC 1, Box 4730
Kea'au, Hawai'i 96749

LOG NO: 2008.0737
DOC NO: 0803TD03
Archaeology

Dear Dr. Haun:

SUBJECT: **Chapter 6E-42 Historic Preservation Review of the Proposed Makalei Fire Station**
Kau Ahupua`a, North Kona District, Island of Hawai'i
TMK: (3) 7-2-07: 001

Thank you for the opportunity to comment on the proposed project, which involves construction of a new fire station along Mamalahoa Highway at Makalei Drive in North Kona . We apologize for the delay in responding to your request for a no effect determination, which was received in Kapolei January 23, 2008.

The two-acre fire station project area is situated entirely within a larger 989-acre parcel that was surveyed by Haun & Associates in 2005 (A.E. Haun, D. Henry and D. Berringer 2005). Thirty-four historic properties were identified within the larger survey area; however, no evidence of historic properties was identified within the area of the proposed fire station. The inventory survey report was reviewed in May 2006, and a revised final report was approved by our office in June 2006 (Log No. 2006.2068, Doc No. 0606JT72). As indicated in your letter dated January 19 2008, the nearest preservation site is over 100 meters from the proposed fire station area. Provisions for the protection of this site and others are detailed in a Preservation Plan that was approved by our office January 8, 2007 (Log No. 2006.3466, Doc No. 0701MK10).

Based on the previous documentation that there are no historic properties within the proposed project area, we believe that construction of the fire station will have no effect on historic properties. This determination is made with the understanding that material storage, machinery staging and earthmoving in association with this project will be confined to the two-acre area designated as the fire station parcel.

Please contact Theresa Donham at 987-5001 or Theresa.K.Donham@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Nancy McMahon, Acting Archaeology Branch Chief
State Historic Preservation Division

Haun & Associates

Archaeological, Cultural, and Historical Resource Management Services
HCR 1 Box 4730, Keaau, Hawaii 96749 Phone: 982-7755 Fax: 982-6343

January 19, 2008 Project 490

Administrator
State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Room 555
Kapolei, Hawaii 96707

Subject: Request for Determination of No Effect
Proposed Makalei Fire Station Site
Portion of TMK: (3) 7-2-07:001
Land of Kau, North Kona District
Island of Hawaii

Dear Administrator:

At the request of PBR Hawaii, we are requesting a determination of no effect on historic properties for the subject Makalei Fire Station site (*Figures 1* and *2*).

The site is situated within TMK: (3) 7-2-07:001 that was entirely surveyed by Haun & Associates in 2005. The survey did not identify any historic properties within the proposed fire station site. The inventory survey was approved by your office on June 26, 2006 (Log No: 2006.2068, Doc No: 0606JT72). A preservation site (Site 24573) is located c. 110 m north-northeast of the proposed fire station site. Provisions for the protection of this site, along with Sites 24593 and 24599 are detailed in a Preservation Plan that was approved by your office on January 8, 2007 (Log No: 2006.3466, Doc No: 0701MK10).

If you have any questions, please contact me at (808) 982-7755

Sincerely,

Alan E. Haun, Ph.D.
Principal Investigator

cc: Morgan Davis, SHPD Hawaii Island Archaeologist
Michael Dahilig, PBR Hawaii

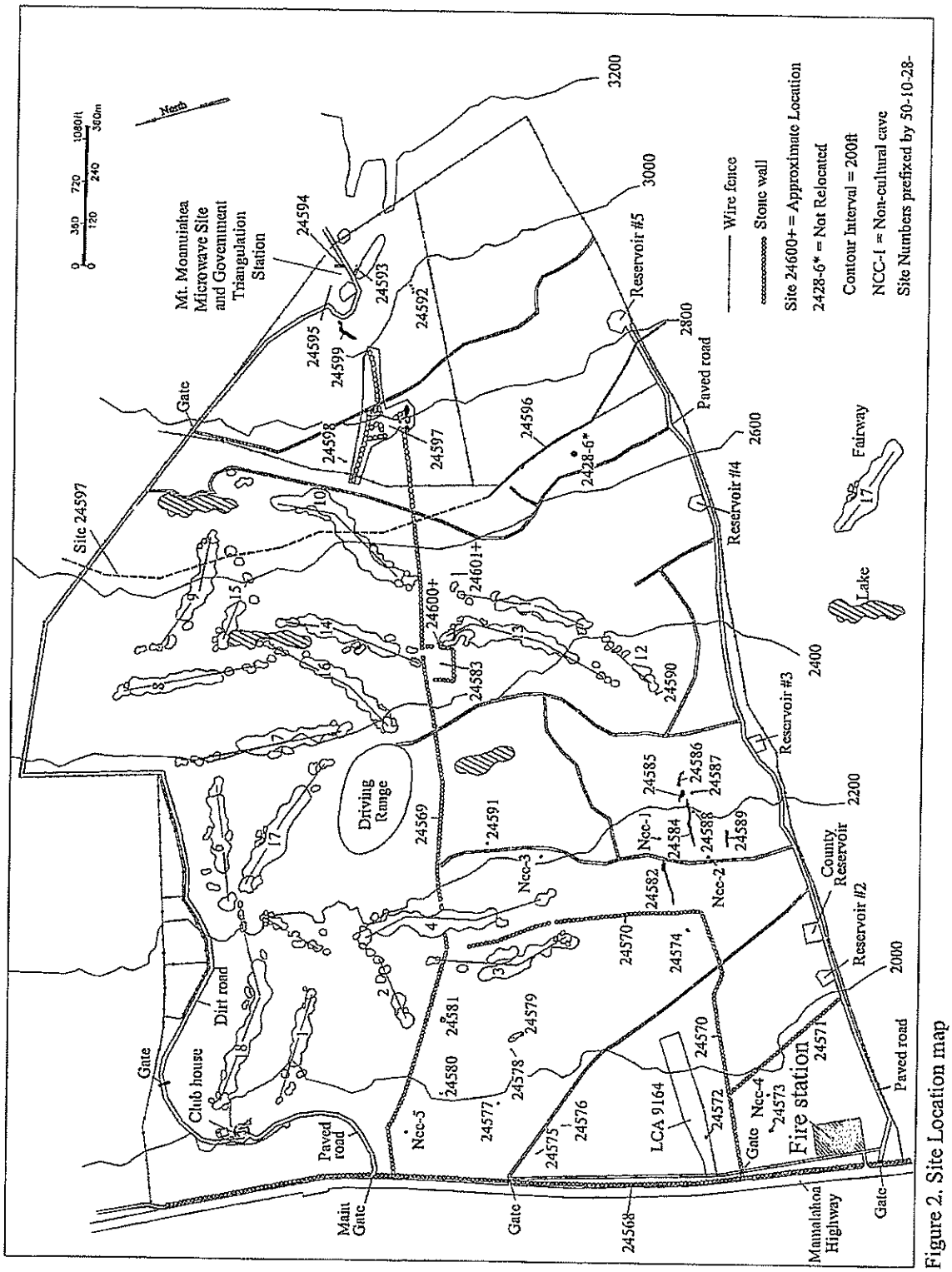

Figure 2. Site Location map

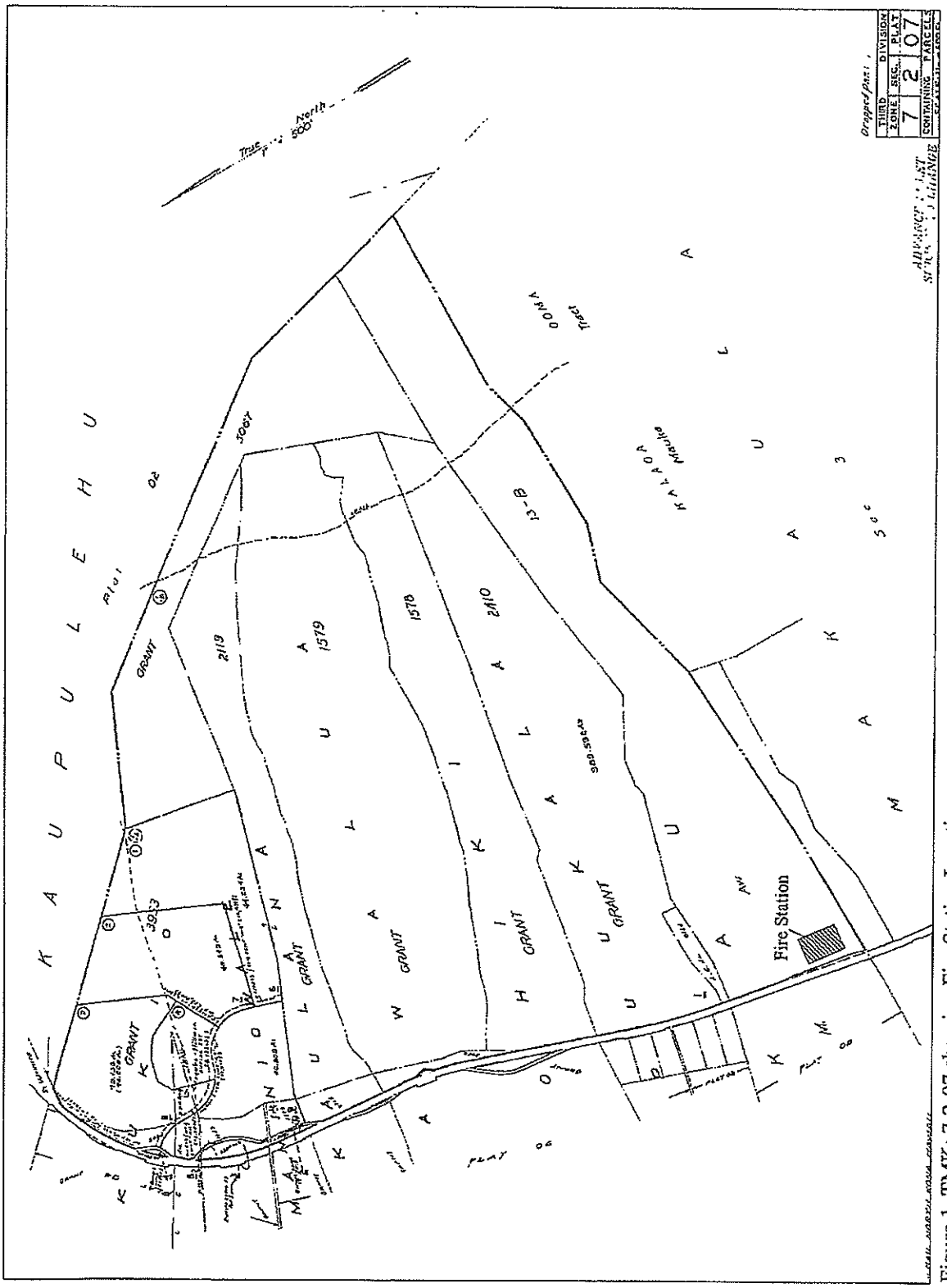

Figure 1. TMK: 7-2-07 showing Fire Station Location

SUMMARY

At the request of Lynch Hawaii Development, LLC, Haun & Associates conducted an archaeological inventory survey of TMK: (3) 7-2-007:001, a c. 989-acre parcel located in the Lands of Kaulana, Awahua, Ohiki, Pu'ukala and Kau, North Kona District, Island of Hawaii. The objective of the survey was to satisfy historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules.

The archaeological inventory survey identified 34 sites with 56 features. The sites consist of 27 single feature sites and seven complexes of features that contain from two to ten component features. The identified features consist of enclosures, lava tubes, mounds, walls, cairns, lava blisters, modified outcrops, concrete slabs, alignments, and one each of the following: retaining wall, terrace, pipeline and water tank foundation. Functionally, features are interpreted as temporary habitation, temporary habitation/burial, burial, livestock control, agriculture, marker, foundation, historic habitation, ceremonial, permanent habitation, transportation, water storage, water transportation and indeterminate.

The identified sites and features conform to the traditional Hawaiian site/feature types expected in the Upland Forest Zone (Davis 1977, Cordy 1985) based on previous archaeological work and historic documentary research. As expected, agricultural features, temporary and permanent habitation sites, burials and a possible *heiau* or men's house were identified. Also, as expected, historic remains consist of historic habitation features, animal pens, and ranch walls. The massive prior disturbance associated with pasture improvement nearly eliminated traditional Hawaiian surface structural remains.

The best preserved evidence of traditional Hawaiian occupation is present in caves. The very limited amounts of portable remains indicate that habitation use probably was limited to periods of very short duration, potentially lasting hours or at most overnight. Five of the lava tubes contained evidence of use for collecting water from seeps in the cave ceilings. This evidence consists of oval to elliptical-shaped alignments of cobbles situated under seeps in the cave ceilings. These alignments functioned to support vessels used to collect water.

Historic sites consist of habitation features, several corrals and paddocks, three concrete foundations, walls, a water tank foundation, a camp fire ring, and two roads, one associated with a pipeline. The majority of these features were associated with Hu'ehu'e Ranch operations.

All thirty-four sites are assessed as significant for their information content. The sites have yielded information important for understanding prehistoric to historic land use in the project area. One site is assessed as significant as good site type example of a small *heiau* or men's house and for it cultural significance as a place for ritual. Three sites are additionally assessed as culturally significant because probable pre-contact burials are present. The mapping, written descriptions, photography, and test excavations at eighteen sites adequately documents them and no further work or preservation is recommended. Ten sites are recommended for mitigation through data recovery. The plans for data recovery would be detailed in a Data Recovery Plan prepared for DLNR-SHPD review and approval. Three sites are recommended for preservation in accordance with a Site Preservation Plan prepared for DLNR-SHPD review and approval. The specific plans for preservation and maintenance of the sites with burials would be detailed in a Burial Treatment Plan prepared for DLNR-SHPD and the Hawaii Island Burial Council (HIBC) review and approval.

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3) 7-2-007:001

LANDS OF KAULANA, AWALUA, OHIKI, PUA'UKALA AND KAU

NORTH KONA DISTRICT, ISLAND OF HAWAII

By:

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Prepared for:

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August 2005

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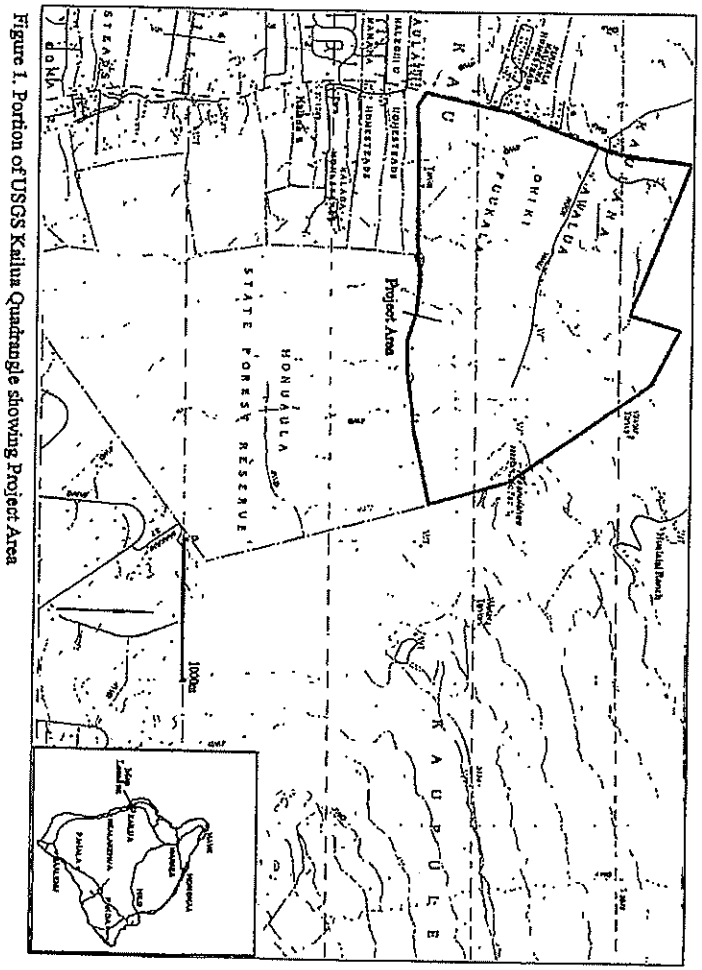

Figure 1. Portion of USGS Kailua Quadrangle showing Project Area

INTRODUCTION

At the request of Lynch Hawaii Development, LLC, Haun & Associates conducted an archaeological inventory survey of TMK: (3) 7-2-007:001, a c. 989-acre parcel located in the Lands of Kaulana, Awalua, Ohiki, Pu'uloia and Kau, North Kona District, Island of Hawaii (*Figure 1*). The objective of the survey was to satisfy historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (2003).

The survey fieldwork was conducted between June 29 and July 29, 2005 under the direction of Dr. Alan Haun. Approximately 41 person days of labor were required to complete the field work portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended further treatments.

Scope of Work

Based on DLNR-SHPD rules for inventory surveys, the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua'a* records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scaled plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct subsurface testing (manual excavation) at selected sites as necessary to determine site function;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The project area consists of an irregularly-shaped c. 989-acre parcel located on the inland side of the Mamalahoa Highway at elevations ranging from c. 1,800 to 3,220 ft. The parcel is bordered by a stone wall that parallels the highway along the western side and by wire fences along the north, east and south sides. Mount Moanuahea is situated in the inland portion of the project area. A microwave site and a government triangulation station are situated on the summit of the hill.

Large portions of the parcel have been impacted by the construction of the Makalei Country Club facilities and 18-hole golf course. The extent of the existing golf course and clubhouse is presented in *Figure 6*. Extensive disturbance to the parcel associated with 1960s-1970s pasture improvement activity was also noted throughout most of the area, evidenced by numerous piles of bulldozer pushed stones and trees, and secondary growth vegetation. According Mr. Clifford Medeiros, he cleared the majority of the project area systematically with heavy equipment to improve the land for pasture.

A series of paved and dirt roads bisect the project area and a paved access road parallels the southern boundary. There are five water reservoirs along this access road, consisting of Reservoirs #2 through #5

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area spans the inland portions of five *ahupua'a* consisting of Kaulana, Awalua, Ohiki, Pu'ukala, and Kau, from north to south (*Figure 2*). Pukui et al. (1976) provide literal translations of these names as follows:

Awalua	double harbor (p.15)
Kau	to place (p. 91)
Kaulana	[boat] landing (p. 93)
Ohiki	sand crab, or to pry (p. 168)
Pu'ukala	*kala* fish hill (p. 199)

The *ahupua'a* lie within the region north of Kailua called Kekaha, which "describes a dry, sun-baked land" (Kelly 1971:2). Early events documented in the Kona regional traditional history are associated with 'Umi-a-Liloa. Hawai'i was first unified under the rule of 'Umi-a-Liloa and Kona was selected as a dwelling place of chiefs (Kamakau 1961). The area lies within the realm of the traditional Hawaiian political authority that was centered in the Kailua-Keauhou area from at least the 15th century to the reign of Kamehameha I. The beaches of Kekaha were known as important fishing areas for *aku*, *ahi*, and *kala* since at least Umi-a-Liloa's time (Kamakau 1961:19-20). These fishing grounds were also a favorite of Kamehameha I during the last years of his life between 1812 and 1819 (Kamakau 1961:203).

One account about Umi by Kamakau (1961:215-216) mentions the coast between Ohiki and Ka'elehuluhulu in Kaulana before it was covered by lava in 1801. According to the account, Umi was fishing in the area with another chief, Pae, who died suddenly at sea. Umi instructed Pae's sons to bury their father. On the advice of one of Pae's attendants, the sons hid their father's bones. Umi subsequently used divination to locate the bones and used them to make fishhooks.

A vast fishpond known as Pa'alea once extended along the coast between Ka'elehuluhulu south to Kalaoa (Maly 1998). In about 1780, the lands of Kekaha were given to the twin chiefs Kame'elamoku and Kamanawa by Kalaniopu'u for their assistance in helping him defeat Alapa'i's son Keaweopala and secure his Hawaii Island rule (Kamakau 1961:310). In 1801, lava eruptions in Ka'upulehu and Puhi-a-Pele destroyed the vast Pa'alea fishpond and other ponds on the coast between Kukio and Ka'upulehu (Maly 1998). The eruption ceased shortly after Kamehameha personally made an offering to Pele.

Maly (1998) provides a detailed presentation of mythical and legendary references to Kekaha and the *ahupua'a* and places that comprise it. Ka'elehuluhulu in Kaulana was an important canoe landing (1998:47-48). The name Ka'elehuluhulu means "frayed canoe hull" and came to be used because at low tide canoes using the channel to the landing had to be dragged over the shallow pahoehoe. The legend of Makalei describes the water caves of Kekaha and many other facets of life in the region (1998:57-71). Makalei learned to fish at Ka'elehuluhulu and learned to farm in the uplands. The family's farm lands were on the south side of Akahipu'u, a small hill Mahai'ula immediately north of the project area. Makalei's father collected water in a secret cave discovered by his son using canoe-like troughs made of *ohia* and *wiliwili* wood. The water was used to irrigate crops at night. Mr. J.A. Maguire reportedly used a windmill to pump water from the cave to a reservoir at Hu'ehu'e Ranch, which he established in the late 1880s.

One of the first western accounts of the Kekaha region comes from Ellis (1963) who reported the observations of the Reverends Thurston and Bishop during a walk along the coast north from Kailua in 1823. They described houses along the coast built on lava and small gardens in the lava where sweet potatoes, watermelon, and tobacco were grown. The Rev. Thurston had a meeting house built at Ka'elehuluhulu, which also served as a school (Maly 1998:72-74). John Ka'elemakule, Sr. attended the school in the 1860s and attended services held by Rev. Thurston (Maly 1998:74). Mr. Ka'elemakule recalled that a remnant of the great Pa'alea fishpond was located at Ka'elehuluhulu. He built a house at the coast in Mahaiula in 1880 near where he was buried in 1936.

and one tank designated as "Country Reservoir" (see *Figure 6*). In addition to the wire fences that extend along the north, south and east sides of the parcel, a series of fences also bisect the parcel. One fence is located in the inland portion of the parcel at c. 2,700 ft elevation and extends through the project area in a roughly north-south direction. A second fence extends to the east from the first fence, terminating at the eastern project area fence. There are also four fences located in the northwestern portion of the parcel, south of the northern boundary fenceline, that form a series of three enclosed areas.

Two soil types are present within the parcel, with the majority of the area comprised of Punalu'u extremely rocky peat (6-20% slopes). This soil is comprised of well-drained, thin organic soils (c. 4" thick) over pahoehoe bedrock with a rapid permeability, a slow runoff and a slight erosional hazard (Sato et al. (1973:48). This soil type is classified as suitable for pasture. The second soil within the parcel consists of an inland-seaward band of Kainau extremely stony peat on 6-20% slopes situated along the northern portion of the project area. This soil is characterized by a c. 3" surface layer of extremely stony peat over an a'a substrate (1973:22). The permeability of this soil is rapid, the runoff is slow and there is a slight erosional hazard. Sato et al. (1973:22) indicates this soil is not suitable for cultivation with the majority of it in use as native woodland.

The underlying lava bedrock in the project area was deposited from Hualalai Volcano from between 3,000 and 5,000 years ago (Wolfe and Morris 2001:12). The rainfall in the vicinity of the project area varies from 40 to 60 inches per year (Juvik and Juvik 1998:57) and the mean annual temperature is approximately 72 degrees (Armstrong 1983: 63-64). The vegetation throughout the parcel consists of maintained grass fairways and greens associated with the golf course and a variety of introduced and native species. The latter consists of *ohia* (*Metrosideros collina*), kukui nut trees (*Aleurites moluccanna*), *koa haole* (*Leucaena leucocephala*), Christmas berry (*Schinus terebinthifolius*), mango *Mangifera indica*), guava *Psidium guajava*), silver oak (*Grevillea robusta*), *lantana* (*Lantana camara*), *kikuyu* grass (*Pennisetum clandestinum*) and various unidentified grasses, ferns and vines.

Field Methods

The project area was subjected a 100% surface examination with surveyors spaced at 10-15 m intervals depending on vegetation, with the ground surface visibility ranging from fair to good. The survey transects were oriented in a roughly north-south direction.

The identified sites were subjected to detailed recording including preparing scaled plan maps, completing standardized site/feature forms, and photographic documentation. A metal site tag was placed at each site and the tag's location was plotted on the site plan map. The location of all sites and features was determined by using a Garmin Global Positioning System (GPS) III+. The accuracy of the GPS device for a single point is +/- 15 m. This accuracy is increased to less than c. 3-5 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software.

Subsurface testing during the project consisted of the excavation of eight test units totaling 7.19 sq m of excavation. The tested features consist of an agricultural enclosure, a ceremonial enclosure, two temporary habitation lava blisters, a permanent habitation enclosure, an agricultural mound, an indeterminate modified outcrop and a temporary habitation terrace. The test units were excavated in arbitrary levels within stratigraphic layers and were terminated on bedrock. Standardized excavation records were prepared after the completion of each stratigraphic layer. The fill removed during excavation was screened through ¼" mesh. Following the excavations, a section drawing depicting the stratigraphy was prepared, post-excavation photographs were taken, and the units were backfilled. Recovered cultural remains were transported to Haun & Associates' office for analysis.

Schilt (1984) summarized Kailua's early historic period. In the late 1700s to early 1800s, Kamehameha monopolized foreign commerce including the provisioning of trading and whaling ships and beginning in 1811 the sandalwood trade. The first missionaries arrived in Kailua in 1820, but only stayed a few months. They returned in 1823 and were given land to establish missions and by 1825 schools. The gradual shift from subsistence farming to a market economy began with the introduction of coffee, corn, pumpkins, cotton, pineapple, and Irish potatoes in the 1820s to 1840s. Introduced early historic crops cultivated in the vicinity of Kailua below 500 ft elevation included melons, cabbage, onions, oranges, and tobacco. The introduction of cattle ranching and commercial coffee production in the mid-1800s caused further change to the traditional agricultural system.

During the *Mahele*, Paalua received all of Kau totaling 1560 acres (LCA 13-B). Paalua's claim to the land was based on her descent from her grandfather Hewahewa, who was a hereditary Pa'ao priest for Kamehameha I (Kamakau 1992:187). Kamehameha gave the land to Hewahewa's father Pu'ou, also a Pa'ao priest, whose father was Hoto'ae the leading *kahuna* (priest) for Kalaniopu'u (Kamakau 1992:85).

The Waihona 'Aina (2000) Mahele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.); lists nine Land Commission Award (LCA) claims for five parcels in Kaulana, one in Pu'ukala, and one for the entire *ahupua'a* of Kau. Only the latter two were awarded to Kuapuu (LCA 9164) and Paalua LCA 13-B, respectively (*Figure 2*).

Kuapuu's award is situated inland in the project area. According to the claim testimony (NR 424v4, NT 683v8), Kuapuu claimed a house lot in Ohiki Ahupua'a and 10 *kalo* (taro) *kihapai* in Pu'ukala Ahupua'a, but was only awarded the taro lands. He was the konohiki of Pu'ukala. The house lot was enclosed by a stone wall. The 4.4 acre awarded parcel is described in the claim testimony as bounded on the inland and seaward sides by lands of the *konohiki*, to the south by the Ahupua'a of Kau, and to the north by the Ahupua'a Ohiki. Kuapuu received the lands from Kakuhaupio in the days of Kamehameha I.

Most of the LCA claims in Kaulana were for house lots at the coast at Ka'elehuluhulu. B. Pookoai (LCA 7976) claimed an enclosed house lot with three houses for five individuals that Pookoai received from his parents (NR 520v8, NT 649v8). David Kealalki (LCA 8460) claimed a house lot with three houses (NT 531v8). LCA 8464B is another, probably duplicate claim by Kealalki for a house lot that he received from his parents in 1819 (NT 658v8). Kialoa (LCA 8467) claimed a house lot and a goat pen on land received from his parents in 1819 (NR 531v8, NT 658v8). Naia (LCA 9866) together with Kaneiakama (LCA 9867) claimed a house lot received from Naia's parents in 1819 (NR 557v8, NT 658v8). I. Malo's claim testimony (LCA 5975) does not provide any details about land use (NR 195v5).

Maly (1998) reproduced an extensive number of documents pertaining to lands occupied by Kalukai State Park including Kaulana. Interior ministry correspondence indicates that Kaulana was joined owned by the government and J. Malo in 1853 (1998:19). In 1855, 156 acres of Kaulana were sold to Hoopulaau (Grant 2112) and 75 acres (Grant 2119) were sold to Kaima (1998:20). In the early 1880s, Hoopulaau and Makahikuli are listed as goat ranchers in Kaulana (1998:31). In 1886, the government began leasing land in Kaulana for homesteads (1998:41). In 1903, John Ka'elemakule purchased a 40 acre beach lot in the lands of Kaulana and Mahalula and a one acre family burial plot in Kaulana that included a cave called Kolomikimiki where Ka'elemakule's foster parents and mother were buried (Grant 4723; 1998:42).

Other mid-1800s land sales in project area *ahupua'a* included three in Kau to Kaohimauna in 1855 (Grant 1580, 160 ac) and two 1856 grants to Hoopulaau (Grant 2112, 1561 ac) and to Puhilaolao (Grant 2022, 206 ac; Schilz et al. 1993:10-11). Other grants consists of Grant 1579 to Puhilaolao in Awaloa (1855, 212.5 ac), Grant 1578 to Kuapuu in Ohiki (1855, 124 ac), Grant 2410 to Kuapuu in Puukala (1857, 208.7 ac), and Grant 2022 to Puhilaolao in Ohiki and Awaloa.

Figure 3 is a portion of Emerson's 1891 map of Kona, which depicts the lower forest edge at approximately 1,200 ft elevation. *Figure 3* also shows that much of the area in the vicinity of the project area consisted of a series of land grants discussed above. The map shows the vent and upper portion of the 1801

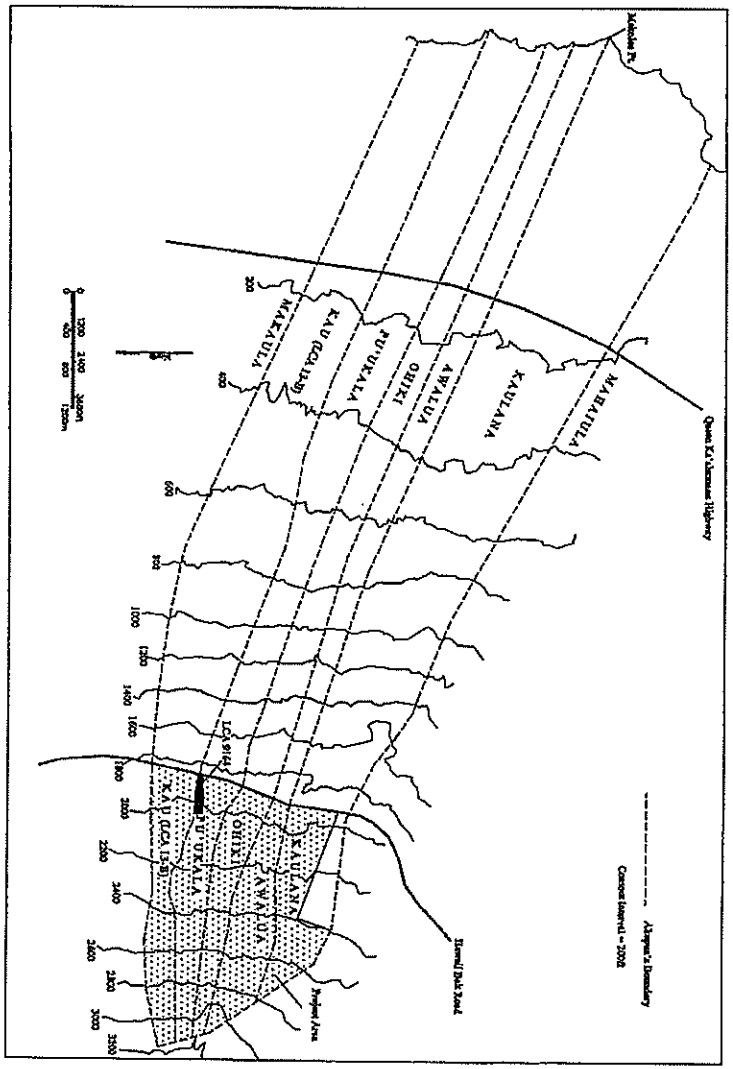

Figure 2. Ahupua'a Boundaries and Land Commission Awards

lava flow. Kahaunaele's house is depicted in Grant 2112 seaward of the inland road that generally follows the course of Mamalahoa Highway. A series of houses are shown along the seaward side of the road north of the hill labeled "Akahipuu". The Puukala school house is depicted on the inland side of the road on the boundary between Grants 1579 and 1578.

In the 1870s and 1880s, ranch operations were established on private land and land leased from the government (Maly 1998:31). John A. Maguire established Hu'ehu'e Ranch in 1886 on land in Kukio Ahupua'a. Portions of the area from Ka'upulehu to Kaulana were soon added to the ranch through lease and purchase. Kau Ahupua'a was purchased from Allen Wall in 1917 and added to the ranch holdings (Schilz et al. 1993:11). By the early 1920s, the ranch consisted of over 40,000 acres with 2,000 Hereford cattle (Maly 1998:31). Water for the stock came via a seven mile long pipeline from a spring.

Figure 4 is a portion of the 1928 USGS Kailua quadrangle map showing the project area. Awalua and Puukala Homesteads are shown seaward of the Mamalahoa Highway. A stone wall, which corresponds to Site 24569 documented during the survey in this report, extends inland from the highway on the boundary between Awalua and Ohiki. Two enclosures attached to the wall correspond to Sites 24583 (small enclosure) and 24597 (large enclosure) documented by the survey. The map also shows the Holualoa-Puuwaawaa Pipeline bisecting the large enclosure extending through the project area along the 2,800 ft elevation contour. This is probably the pipeline that brought water for Hu'ehu'e Ranch.

Maly (1998) conducted oral historical interviews in conjunction with the development of Kekaha State Park. One of his informants, Violet Lei Lincoln-Ka'elemakule, recalled Kaelehuluhulu at the coast in Kaulana in the 1920s. There was a house and canoe shed there that belonged to John Ka'elemakule (Maly 1998:125-126). Canoes were launched from the shoreline in front of the shed. There was a walled and terraced platform south of the house that was used for making salt by several families. In addition to domestic use, the salt was used on fish that were taken to market.

During the inventory survey Mr. Clifford Medeiros was consulted on several occasions concerning the project area. Mr. Medeiros was born in 1934. He worked for Hu'ehu'e Ranch from 1960 until 1990 when he began working for Makalei Golf Course, a job he retains today. He worked for the ranch and golf course as a mechanic and equipment operator. He used bulldozers and other equipment to clear vegetation throughout the project area during the 1960s-1970s. He recalled three locations where human skeletal material was encountered during clearing operations (Sites 24579, 24600 and 24601). The inland portion of the project area is still used for pasture today. The seaward portion of the area outside of the golf course and associated facilities is undeveloped.

Previous Archaeological Research

A search of DLNR-SHPD archaeological report database and other sources identified thirteen previous studies for project area *ahupua'a*. Stokes (Stokes 1991) and Reinecke (n.d.) conducted the first archaeological surveys along the coast. Stokes reported, but was not able to relocate, an unnamed shrine (*ko'a*) at Kaelehuluhulu. Reinecke (n.d.) described his survey of the coastal 1801 lava flow that covers the seaward portion of the project area *ahupua'a* as "cursory". He states:

> There are many walled sites on this coast, and it is very hard to tell whether they are the remains of old huts or more recent fishermen's shelters. It must be understood that there is much guesswork in naming them (n.d., no page no.).

He reported three sites situated south of the northern boundary of Kalana: a small recent shelter (Site 87), a shelter with a pavement and a second pavement marked by two cairns (Site 88), and a site consisting of "natural shelter caves" (Site 89). Reinecke's Site 90 was situated at the boundary of Kaulana and Mahaiula at the northern edge of the 1801 lava flow. The site consisted of seven house platforms, concrete slat pans, walled ponds, six or seven enclosures, four *papamu*, a dwelling site, and "various patches of walls". John Ka'elemakule, one of Reineke's informants, reported that there was a fishing *heiau* called Hale-o-Hiu on the beach at Ka'elehuluhulu. Reineke did not see the site, attributing this omission to his "hurried tour".

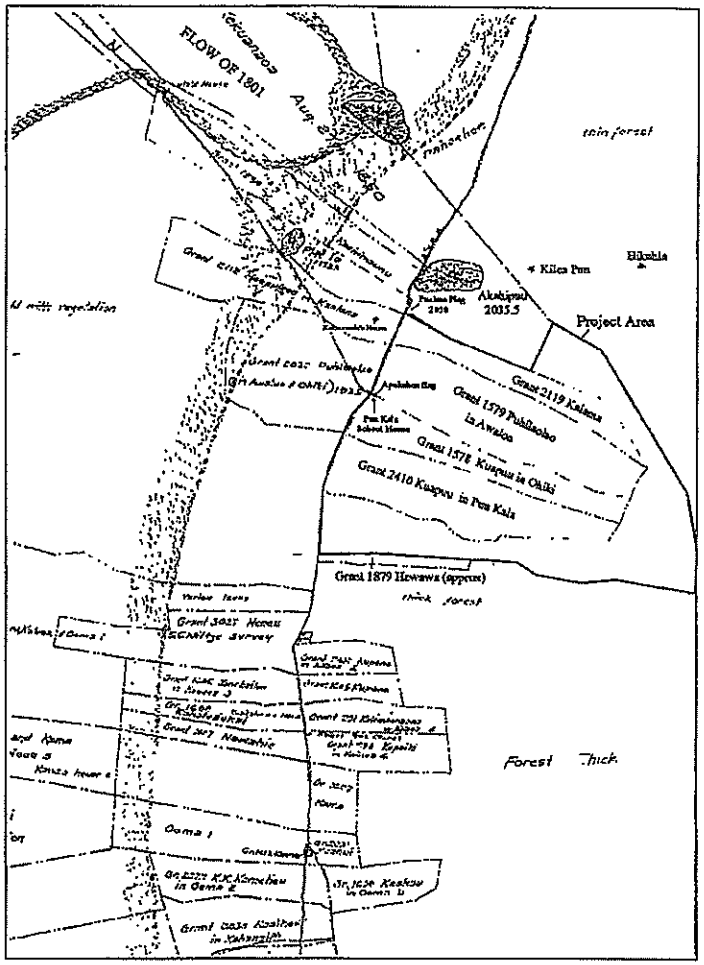

Figure 3. Portion of Emerson's 1880s Map of Kailua

Kikuchi (1973) inventoried fishponds along the coast. He documented the 0.28 acre Kaulana Fishpond that was mostly covered by the 1801 lava flow. He categorized the site as a Type II, *pu'uone*, pond. The pond is probably the remnant of Pa'aiea Pond first reported by John Ka'elemakule.

Table 1 summarizes nine surveys and data recovery projects conducted subsequent to Stokes, Reinecke, and Kikuchi. *Figure 5* shows the locations of the projects. The projects in *Table 1* cover 3,411 acres identifying 230 sites with 924 features. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as habitation, agricultural, burial (including possible burials), trail, *ahu*, rock art (petroglyphs), fishpond, and ritual. Features not assignable to these categories were categorized as miscellaneous/indeterminate and primary consist of pahoehoe excavations and *papamu*.

Density values are given for sites, features, and habitation and agricultural features. The data are crude primarily because of varying degrees of disturbance, variation in researchers' definitions of sites, and the extent to which agricultural features were documented. Comparison of feature densities reduces problems cause by variation in site definition. Overall, the studies have identified 154 habitation features, 471 agricultural features, 16 burials, 8 ritual features, 20 trails, 28 *ahu*, 153 petrogyphs, and two fishponds. Historic features were not segregated by function. The majority of the historic features are ranch walls. Overall feature density values range from 0.01 to 1.7 features per acre. Habitation feature density ranges from 0 to 0.12 features per acre with an average of 0.07. Agricultural feature density ranges from 0.2 to 0.85 features per acre with an average of 0.51.

Twenty-nine radiocarbon age determinations are reported in the studies by Schilz et al. (1993), Williams et al. (2002), and Clark et al. (2004). Six determinations yielded modern results. Several of the determinations produced multiple age ranges and several produced a single long range extending from the 1600s to 1950. When all potential age ranges are examined one spans the mid- to late A.D. 1200, two include the 1300s, 12 span the 1400s, 14 include the 1500s, 18 span the 1600s, and the rest include the 1700s to mid-1900s. The results indicate initial use of the area as early as the 1200s, sustained use beginning in the 1400-1500s, and the most intensive use during the 1600s.

Davis (1977) and Cordy (1985) utilized a three zone model to characterize settlement patterns in O'oma and the Kalaoas a short distance to the south of the project area. The model's environmentally-based zones are : (a) the Coastal Zone from sea level to 20 ft elevation within 150 ft of the shoreline, (b) the Barren or Transitional Zone from 20 ft to 430 ft elevation, and (c) the Upland Forest Zone from 430 ft to 3,400 ft elevation. Permanent and temporary habitation sites are present in the Coastal Zone along with burials, *holua* slides, petroglyphs, saltpans, fishponds, refuge caves, and ritual sites including *heiau* and shrines.

Sites in the Barren Zone primarily consist of trails linking the coast to the inland agricultural fields and temporary habitation sites. Upland Forest Zone sites include permanent and temporary habitations and agricultural features, primarily modified outcrops, mounds, and excavated depressions. Refuge caves are reported by Walker and Rosendahl (1990), and Head and Rosendahl (1993). Soehren (1982) identified a possible *heiau* and Head and Rosendahl (1993) assigned a ceremonial function to an enclosure in a lava tube. Petroglyphs and burials have also been identified at upland sites.

PROJECT EXPECTATIONS

The project area is situated in the Upland Forest Zone as defined by Davis (1977) and Cordy (1985). Prehistoric use of the project area is potentially represented by scattered temporary and permanent habitation sites associated with agricultural features. The agricultural features consist of informal fields with scattered modified outcrops, mounds, and depressions. Trails link the inland habitation and agricultural areas with the coast. Refuge caves, burials, and ritual sites are also potentially present. Chronologically, sites may have been used as early as the 1200s, sustained use is expected by the 1400-1500s, and the most extensive period of use occurring between the 1600s and early historic period.

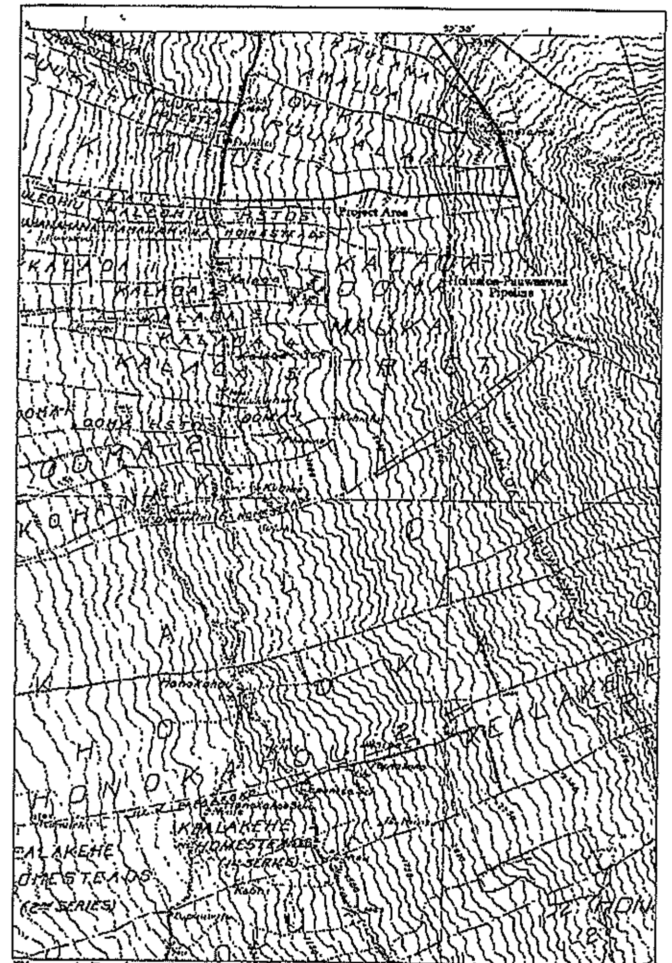
Figure 4. Portion of 1928 USGS Kailua Quadrangle

Table 1. Summary of Previous Archaeological Work

Study	Land	Study Type*	Elevation (ft)	Area (ac)	Total sites	Sites per acre	Total feas	Feas per acre	Hab Feas	Hab Feas per acre	Ag Feas	Ag Feas per acre	Burial Feas	Ritual Feas	Trail	Ahu	Livestock control	Rock art	Fish Pond	Historic Feas	Misc. Feas
Carpenter et al. (1998)	Kuelana and Mahaiula	RN	0-250	485	36	0.08	121	0.20	33	0.07			2		3		3	49	2		29
Ching (1971), Rosendahl (1973)	Kaulana-Kau	RN	150-240	466	12	0.03	111	0.24	3	0.01					2	6		100			
Rosendahl (1989, 1990), Schilz, Shun, Williams and Ness (1993), Williams et al. (2002), Clark et al. (2004)	Kau	RNDR	180-4840	1000	155	0.16	602	0.60	118	0.12	465	0.47	6	8	15	22	11	4		6	6
Corbin (2004)	Meiniowela-Kau	AS	720-3222	1454	13	0.01	15	0.01					5				5				1
Rosendahl (2001)	Pu'ukala	IN	1400-1600	11	0																
Corbin (2003)	Pu'ukala	IN	1480-1680	4.7	7	1.49	8	1.70			4	0.85					4				
Haun (2001)	Pu'ukala	AS	1630-1780	10	7	0.70	7	0.70			2	0.20	1				4				
			Total	3411	230	0.41	924	0.80	154	0.07	471	0.51	16	8	20	28	27	153	2	6	35

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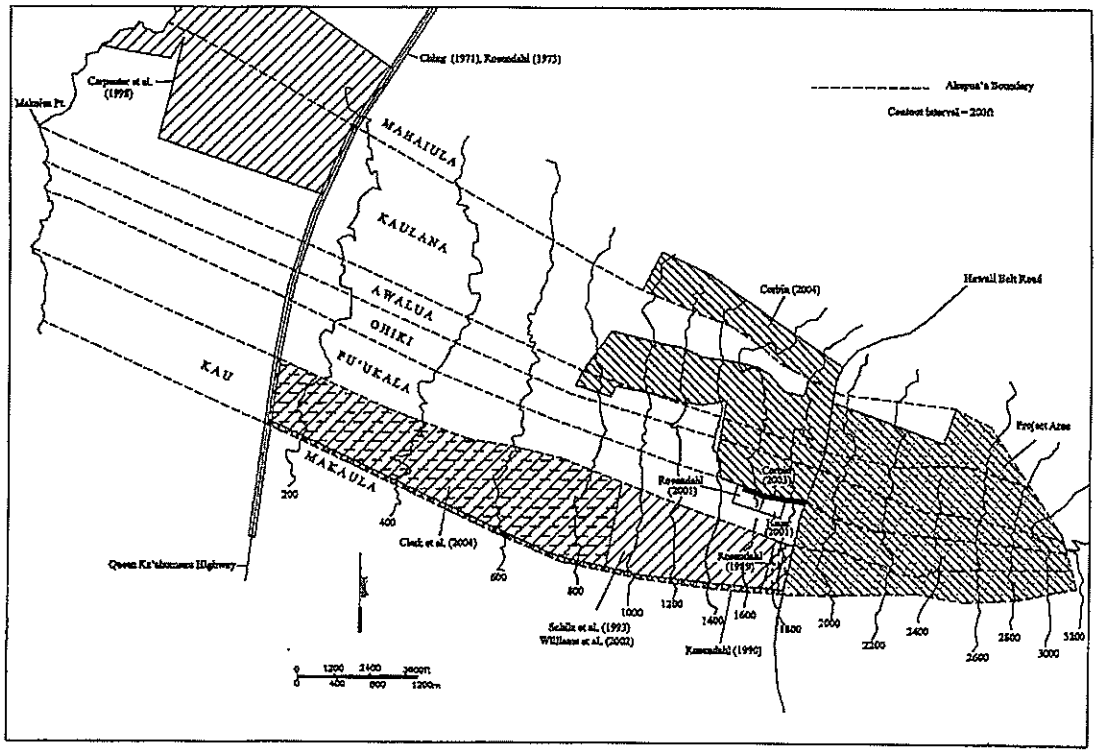

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Figure 5. Previous Archaeological Work

In the early to mid-1800s, LCA claims indicate settlement at the coast and one inland claim in the project area (LCA 9164) between 1,850 and 1,250 ft elevation. Taro is the only crop specifically mentioned in the LCA testimony. The lava flow of 1801 destroyed virtually all remains of coastal settlement and probably is one reason why none of the coastal LCA claims were awarded. By the mid-1800s to early 1900s, sites associated with ranching are expected. Ranching activity would be evidenced by stone walls, corrals, and scattered habitation sites. Historic maps indicate that a water pipe line traversed the project area and a school house was present on the inland side of the Mamalahoa Highway on the boundary between Grants 1579 and 1578. The 1928 USGS Kailua quadrangle map shows a wall bisecting the project area with two attached enclosures (Sites 24583 and 24597). The current tax map shows a trail traversing the inland portion of the project area (Site 24596).

FINDINGS

The archaeological inventory survey identified 34 sites with 56 features (*Figure 6*). The sites consist of 27 single feature sites and seven complexes of features that contain from two to ten component features. The 56 identified features consist of 13 enclosures, 11 lava tubes, 7 mounds, 5 walls, 4 cairns, 3 lava blisters, 3 modified outcrops, 3 concrete slabs, 3 alignments, and one each of the following; retaining wall, terrace, pipeline and water tank foundation. Functionally, features are interpreted as temporary habitation (n=14), temporary habitation/burial (1), burial (2), livestock control (13), agriculture (8), marker (4), foundation (3), historic habitation (3), ceremonial (1), permanent habitation (1), transportation (1), water storage (1), water transportation (1) and indeterminate (3). The 34 sites are summarized in *Table 2*.

Subsurface testing was undertaken in eight locations during the project. The tested features consist of an agricultural enclosure (Site 24572), a ceremonial enclosure (Site 24573), two temporary habitation lava blister (Site 24578 and Site 24579, Feature C), a permanent habitation enclosure (Site 24581), an agricultural mound (Site 24592, Feature A), an indeterminate modified outcrop (Site 24593, Feature A) and a temporary habitation terrace (Site 24598). A total of 7.19 sq m of excavation were undertaken during the study. The results of this testing is incorporated into the following site descriptions.

A previous archaeological assessment (Corbin 2004) was undertaken within the project area, although apparently the report was never submitted to SHPD. A total of 11 sites were identified during this prior examination. These sites were assigned temporary site designations 2428-1 through-6, -9 through -11, -13 and -14. Ten of these sites were relocated during the present and were assigned SIHP Site designations (see *Table 2*). The remaining site (Site 2428-6) consisted of a cairn reportedly located inland of a paved road in the eastern portion of the parcel at c. 2,650 ft elevation (see *Figure 6*). This area was carefully examined during the present project but the site was not relocated. According to Corbin (2004:12), the cairn marks the boundary between Pu'ukala and Kau Ahupua'a. No additional information concerning this site is available.

The survey of the project area also resulted in the identification of five lava blisters that contained no cultural remains or evidence of use. These blisters are all located in the southwestern quadrant of the parcel and each was typically small with bare lava floors. The distribution of these blisters, labeled Noe-1 through 6, is presented in *Figure 6*.

Site 24568

Site 24568 consists of a stone wall that forms the seaward project area boundary, extending along the inland side of the Mamalahoa Highway at elevations ranging from c. 1,800 to 1,950 ft. This wall was previously identified by Corbin (2004) and assigned Temporary Site No. 2428-11. The wall originates against the southern side of a dirt road in the northwest portion of the parcel and extends in a roughly southerly direction a distance of 1,918 m to the southwest corner of the parcel. The wall has been breached in three locations by gates leading into the parcel (see *Figure 6*). It extends outside the project area boundaries to the south an undetermined distance.

The wall is constructed of stacked and faced basalt cobbles, small boulders and slabs, with a core-filled cobble interior. The wall varies in width at the base from 0.9 to 1.2 m and at the top from 0.75 to 0.9 m (*Figure 7*). The majority of the wall is intact with only minor collapse noted. The height of the wall ranges from 1.0 to 1.25 m. No cultural remains were noted. Site 24568 is interpreted as a livestock control feature used to restrict the movement of cattle based on its formal type, height and method of construction.

Site 24569

Site 24569 is a stone wall that extends through the parcel in an inland-seaward direction, at elevations ranging from c. 1,900 to 2,780 ft. This site corresponds to Corbin (2004) Site 2428-9. The wall originates against the inland side of the Site 24568 wall and extends upslope for 646.0 m in a roughly easterly direction to where it has been truncated by the 14th Fairway. The wall continues on the inland side of the fair, continuing in an easterly direction for 1,275 m where it terminates at the seaward side of the Site

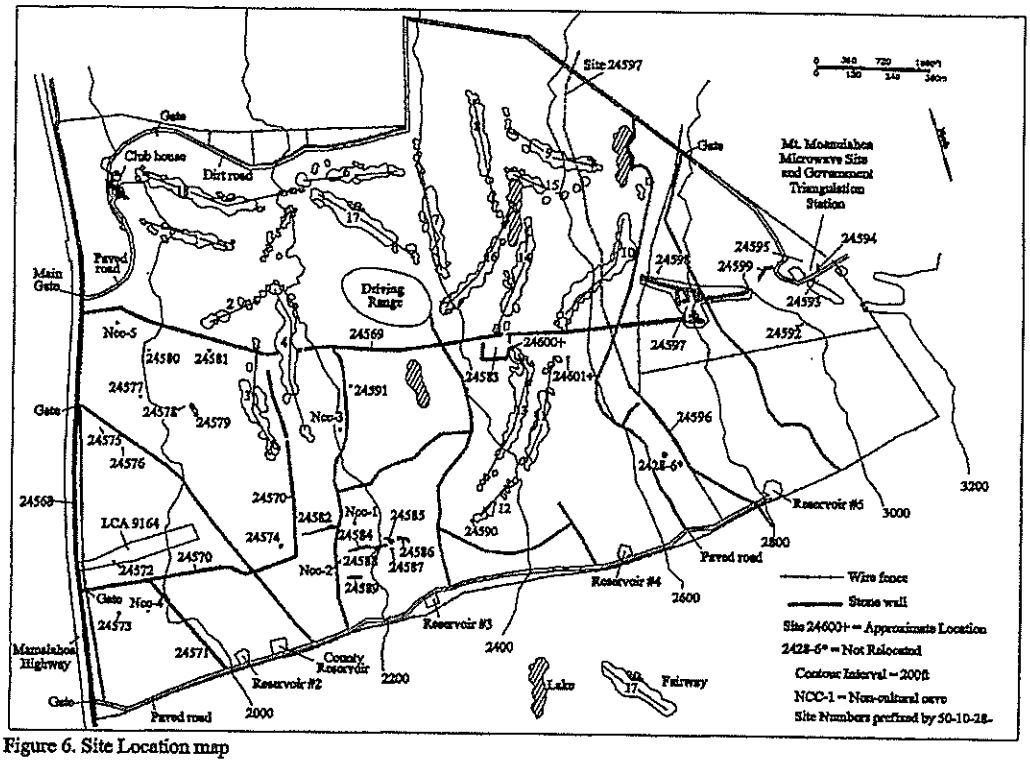

Figure 6. Site Location map

Table 1. Summary of Identified Sites

SIHP Site No.	Haun & Associates Field Number	Corbin (2004) Site No.	Type	Function	No. of Features	Formal Type														Function														
						Enclosure	Lava tube	Mound	Wall	Cairn	Lava blister	Modified Outcrop	Concrete slab	Alignment	Retaining wall	Terrace	Pipeline	Water tank foundation	Temporary Habitation	Temporary Habitation/Burial	Burial	Livestock control	Agriculture	Marker	Foundation	Historic Habitation	Ceremonial	Permanent Habitation	Transportation	Water storage	Water Transportation	Indeterminate
24568	26	2428-11	Wall	Livestock control	1			1													1											
24569	3/27	2428-9	Wall	Livestock control	1			1													1											
24570	17/31	2428-10	Enclosure	Livestock control	1	1															1											
24571	35		Enclosure	Livestock control	1	1															1											
24572	18		Enclosure	Agriculture	1	1															1											
24573	23		Enclosure	Ceremonial	1	1																1										
24574	34		Lava tube	Temporary Habitation	1		1													1						1						
24575	22		Wall	Indeterminate	1				1																							
24576	28		Mound	Agriculture	1			1														1										1
24577	29		Enclosure	Livestock control	1	1															1											
24578	57		Lava blister	Temporary Habitation	1						1								1													
24579	32	2428-3	Complex	Temporary Habitation/Burial	4						2		2					3	1													
24580	30		Enclosure	Historic Habitation	1	1																		1								
24581	33		Enclosure	Permanent Habitation	1	1																				1						
24582	39		Lava Tube	Temporary Habitation	1		1											1			1											
24583	55	2428-13	Enclosure	Livestock control	1	1															1											
24584	44		Complex	Temporary Habitation	2		2											2														
24585	46		Lava tube	Temporary Habitation	1		1											1														
24586	45		Complex	Temporary Habitation	2		2											2														
24587	43a	2428-5	Cairn	Marker	1					1													1									
24588	43b	2428-5	Cairn	Marker	1					1													1									
24589	38		Lava tube	Temporary Habitation	1		1											1														
24590	47	2428-4	Cairn	Marker	1					1													1									
24591	41		Modified outcrop	Agriculture	1						1											1										
24592	12		Complex	Agriculture	5			5														5										
24593	48		Complex	Indeterminate	2						2																					2
24594	49		Retaining wall	Transportation	1									1													1					
24595	50		Complex	Foundation	3							3												3								
24596	56	2428-14	Pipeline	Water transportation	1											1													1			
24597	1, 4, 5, 6, 8, 9, 10		Complex	Livestock control/ Water storage/ Historic Habitation	10	6	1		2				1				1			7				2				1				
24598	2		Terrace	Temporary Habitation	1										1			1														
24599	11		Lava Tube	Temporary Habitation	1		1											1														
24600	Location determined during project	2428-1	Lava tube	Burial	1		1													1												
24601	Location determined during project	2428-2	Mound	Burial	1			1												1												
	Not relocated	2428-6	Cairn	Marker	1					1													1									
				Total	56	13	11	7	5	4	3	3	3	3	1	1	1	1	14	1	2	13	9	4	3	3	1	1	1	1	1	3

24597 complex (discussed below). Sections of the wall have been breached by roads and golf course cart paths, although generally it is intact. The wall is constructed of stacked and faced cobbles and small boulders with a core-filled cobble interior (*Figure 8*). It varies in width at the base from 0.9 to 1.1 m and at the top from 0.75 to 0.9 m and ranges in height from 0.9 to 1.2 m. No cultural remains were found in association with the wall. Site 24569 is interpreted as a livestock control feature based on its formal type, method of construction and height. This wall also forms the north side of side of two large livestock enclosures (Sites 24570 and 24583) discussed below. The wall appears on the 1928 USGS Kailua quadrangle (see *Figure 4*) indicating that it is at least c. 80 years old. The wall is altered and in fair to good condition.

Site 24570

Site 24570 is a large roughly rectangular-shaped enclosure situated in the southwestern portion of the parcel, at elevations that vary from c. 1,900 to 2,150 ft. This enclosure was previously identified by Corbin (2004) and designated as Site 2428-10. The enclosure ranges in length from 655.0 to 921.0 m (north-south) and from 605.0 to 710.0 m (see *Figure 6*). The western wall of the enclosure is formed by the Site 24568 wall, with the north wall formed by the Site 24569 wall. The south and east sides are delineated by stone walls built of stacked and faced cobbles and small boulders with a core-filled cobble interior (*Figure 9*). These walls vary in width at the base from 1.0 to 1.3 m, at the top from 0.75 to 0.9 m and in height from 0.85 to 1.0 m.

LCA 9164 and nine sites are present within the enclosure. A dirt road extends diagonally through the interior of the enclosure, exiting through a breach in the southern wall. A second dirt road parallels the inland side of the western wall (Site 24568). Portions of the eastern wall have been truncated by golf course cart paths and the 13th fairway, greens and tees are located within the enclosure. No cultural remains were present. Site 24570 is interpreted as a large livestock control enclosure, used to restrict the movement of cattle, based on its formal type, method of construction and the height of the walls. It is altered and in fair to good condition.

Site 24571

Site 24571 consists of an irregularly-shaped enclosure located in the southwestern corner of the project area between of c. 1,800 and 1,195 ft elevation. The enclosure is 383.0 m long (north-northwest by south-southeast) and from 225.0 to 451.0 m wide. The northern side of the enclosure is formed by the south wall of Site 24570 and the western side is formed by the Site 24568 wall. The south side is bordered by a paved road and a wire fence that extends along the southern project area boundary. The eastern, inland side of the enclosure consists of a stone wall that extends between the paved road and the south wall of Site 24570. This eastern wall is built of stacked cobbles and small boulders, ranging in width from 0.9 to 1.2 m at the base and from 0.65 to 0.8 m at the top (*Figure 10*). The wall is relatively intact with only minor collapse noted. It ranges in height from 0.9 to 1.2 m. No cultural remains were present. Site 24571 is also interpreted as a livestock control enclosure, used to restrict the movement of cattle, based on its formal type, method of construction and the height of the walls. It is altered and in fair to good condition.

Site 24572

Site 24572 is a small oval enclosure and lava blister located in the southwestern portion of the project area at c. 1,900 ft elevation. The site is situated within the Site 24570 enclosure and is located within the boundaries of LCA 9164. The enclosure is formed by walls along the northwest, west, south and southeast sides, and a bedrock outcrop along the northeastern side (*Figure 11*). The enclosure is 2.0 to 2.55 m long (north-south) and from 1.0 m wide, with walls built of crudely piled cobble and small boulders, one to three courses high. The walls are from 0.3 to 0.85 m wide and from 0.35 to 0.6 m in height. The enclosure interior is level soil with no cultural remains.

Figure 7. Site 24568 Wall, view to west

Figure 8. Site 24569 Wall, view to west

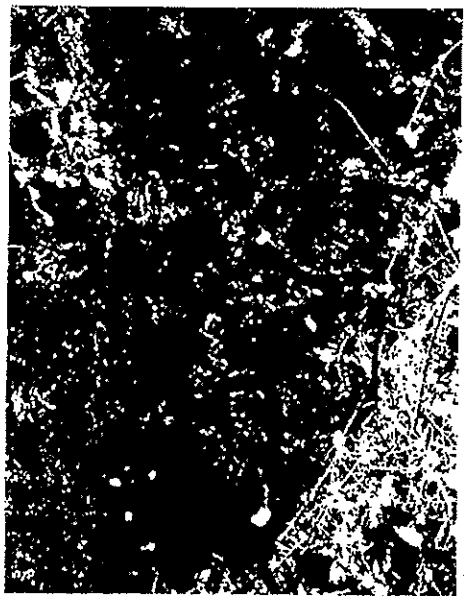

Figure 9. Site 24570 Wall, view to northwest

Figure 10. Site 24571 Wall, view to west

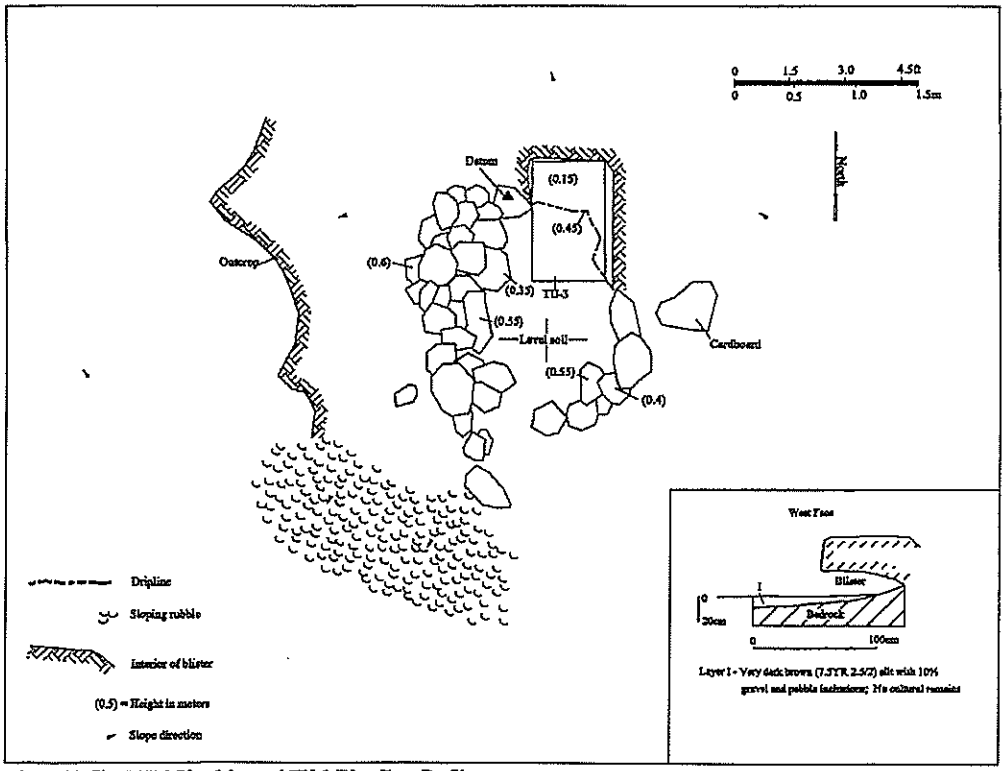

Figure 11. Site 24572 Plan Map and TU-3 West Face Profile

A small lava blister is present within the outcrop at the northeastern end of the enclosure. The entrance is 0.85 m wide and 0.45 m in height, with the interior comprised of an irregularly-shaped blister that is 0.85 m long (northwest by southeast), from 0.25 to 0.45 m wide and 0.15 m in height. The interior is comprised of soil with no cultural remains present.

A 1.0 m by 0.6 m test unit (TU-3) was excavated into soil interior of the enclosure adjacent to the entrance to the lava blister. The excavation revealed a single deposit overlying bedrock (see *Figure 11*). Layer I consists of 0.05 to 0.1 m of very dark brown (7.5YR 2.5/2) silt containing 10% subangular gravel and pebble inclusions. No cultural material was recovered from Layer I. Site 24572 is interpreted as an agricultural feature based on the crude method of construction of the enclosure and the absence of cultural material. The site is unaltered and in fair to good condition.

Site 24573

Site 24573 is a roughly D-shaped enclosure located on a gentle slope in the southwestern corner of the project area c. 1,910 ft elevation. The enclosure is an 8.9 to 11.1 m long (north-south) and from 6.5 to 7.0 m wide with a gap in the west wall that probably functioned as an entrance (*Figure 12*). The north wall is oriented obliquely to the east and west walls, and the south wall is perpendicular to the parallel east and west walls. Portions of the enclosure walls have collapsed. The walls appear to have originally measured 0.95 to 1.35 m in thickness and from 0.65 to 1.05 m in height. The exterior of the north, southeast, and south walls have collapsed but faced sections are preserved on the interior sides. A vertical slab is present on the north side of the gap in the west wall. The gap is 0.6 m wide. The floor of the enclosure consists of soil and scattered cobbles. A vertical slab is located in the middle of the floor 2.25 m east of the entrance. Vertical and horizontal slabs are present in the northwest interior corner of the enclosure creating a small bench that is 1.4 m long by 1.01 m wide and 0.27 m high. The north and west sides of the bench are bordered by the interior enclosure walls.

A 1.0 m by 1.0 m test unit (TU-2) was excavated in the bench. A horizontal capstone was encountered beneath wall collapse stones. The slab was removed revealing cobbles, small boulders and three pieces of branch coral. The excavation within the feature revealed two layers over bedrock (see *Figure 12*). Layer I consisted of 0.18 to 0.24 m of tightly packed cobbles and pebbles with no cultural remains. Layer II consisted of 0.07 to 0.16 m of very dark brown (10YR 2/2) silt with 15-25 waterworn coral gravel inclusions. Cultural material recovered from Layer I is restricted to 40 fragments of charcoal (6.3 g).

Site 24573 is interpreted as a possible ceremonial feature, potentially representing a men's house. This is based on the substantially constructed nature of the enclosure (faced sides), its large area (73.5 sq m), and the presence of the internal bench feature that probably served as an altar based on the presence of branch coral. Alternatively, the site may be a small *heiau*. The site is unaltered and in fair to good condition.

Site 24574

Site 24574 is a lava blister located in the southwestern portion of the project area at c. 2,110 ft elevation. The blister covers an area 11.5 m long by 6.0 m wide (*Figure 13*). Access to the tube is from a vertical rubble-filled sinkhole that is 2.9 m long (east-west) by 1.5 m wide and 2.4 m deep. Bulldozing activity has nearly filled the chamber with rubble and logs. The sinkhole provides a vertical opening over the west-central part of the blister. Access to the blister is from the east side of the sinkhole because the west side is completely blocked with rubble. The ceiling height varies from 1.2 m to 1.55 m and rubble covers the floor except for restricted areas around the chamber perimeter.

A small subchamber underlies the main chamber. Access to the subchamber is located on the west wall of the blister through a low overhang. The subchamber is 1.8 m long by 0.75 m wide by 0.5 m high and the floor is covered by rubble. A shelf is present along the east half of the blister, along the north, south and east walls. The shelf surface is 1.2 m above the rubble on the blister floor. A disarticulated pig skeleton is exposed on the shelf along the north wall and a partially articulated dog skeleton is exposed on the shelf along the east wall. Fragments of charcoal are present on the floor of the blister below the shelf.

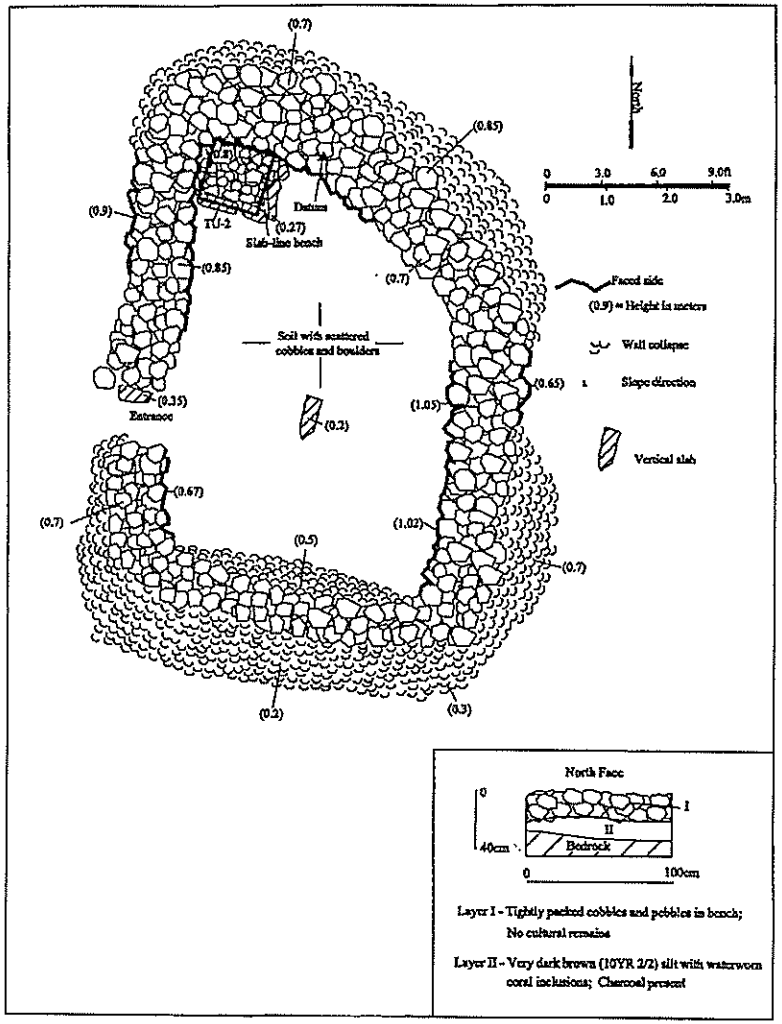

Figure 12. Site 24573 Plan Map and TU-2 North Face Profile

Pieces of a green glass jug are exposed along the south wall of the blister. Scattered pig bones are exposed on the blister floor in a small cavity that intersects the southwest wall of the blister. Site 24574 is interpreted as a temporary habitation shelter based on its formal type and the presence of cultural material. The site is unaltered and in fair to good condition.

Site 24575

Site 24575 consists of the remnant of a wall located in the western portion of the project area at c. 1,920 ft elevation. The site is situated adjacent to a sloping bulldozed rubble pile and a large mango tree. The wall is comprised of two linear alignments of a single course of cobbles and small boulders that are spaced 1.0 to 1.3 m apart and varying in length from 3.75 to 6.25 m long (north-south; *Figure 14*). The area between the alignments is sparsely filled with cobbles. The height of the stones ranges from 0.15 to 0.47 m. No cultural remains were found in association with the site. The linear alignments of stones likely represent the basal course of a wall, although the disturbance to the site, likely the result of bulldozer activity, precludes functional interpretation. The site is altered and in poor condition.

Site 24576

Site 24576 consists of a crude mound located in the western portion of the project area at c. 1,930 ft elevation, 95.0 m southeast of Site 24575. The mound is situated on a slight soil slope angling to the west and is 1.9 m long (east-west), 1.0 to 1.3 m wide and from 0.25 to 0.4 m in height. It is constructed of piled cobbles and small boulders with no cultural remains present. Site 24576 is interpreted as an agricultural clearing pile based on its formal type, informal construction and absence of cultural remains. It is unaltered and in fair condition.

Site 24577

Site 24577 is a roughly triangular-shaped enclosure located in the western portion of the project area at c. 1,995 ft elevation. The enclosure measures from 2.7 to 5.75 m long (east-west) and 4.1 m wide (*Figure 15*). The enclosure is formed by walls along the north, east and west sides, and a 1.5 m tall bedrock outcrop along the southern side. The walls are constructed of stacked cobbles and small boulders, ranging in width from 0.5 to 0.95 m and in height from 0.5 to 1.84 m. Portions of the interior and exterior walls are faced, except along the northwest exterior corner and the west exterior side, which have collapsed.

A portal extends through the base of the western wall measuring 0.36 m wide and 0.55 m high. This portal utilizes a pahoehoe slab as a lintel on the exterior side of the wall and 1.26 m long, horizontal 5" by 6" wooden post as a lintel on the interior side. The floor of the enclosure is level soil. No cultural material was observed in association with the enclosure. Site 24577 is interpreted as a pig trap based on formal feature type, the presence of a low portal in the wall and the absence of cultural material. The use of a post as a lintel and the use of substantial construction techniques might indicate that the feature is historic. The site is unaltered and in fair to good condition.

Site 24578

Site 24578 is a lava blister located in the western portion of the project area at c. 2,025 ft elevation. The entrance to the blister is through an oval-shaped, rubble filled sinkhole that is 1.5 m long (east-west), 1.1 m wide and is 1.0 m deep (*Figure 16*). A mango tree is growing at the northwestern side of the sink. Access to the blister is along the east and northeast side of the sink, averaging 0.95 m in height. The interior of the blister is roughly oval-shaped and is 3.6 m long (northwest by southeast) and from 1.8 to 2.75 m wide. The blister ceiling varies in height from 0.15 m to 0.95 m. The floor is covered with soil and scattered cobles and small boulders. Pig bones and numerous *kukui* nuts are scattered on the floor near the eastern wall of the blister.

A 0.5 m by 0.5 m test unit (TU-7) was excavated into the soil deposit 0.30 m east of the blister entrance. Four *kukui* nuts were exposed on the surface of the unit. The excavation revealed a single deposit overlying bedrock (see *Figure 16*). Layer I consists of 0.14 to 0.21 m of very dark brown (7.5YR 2.5/2) silt

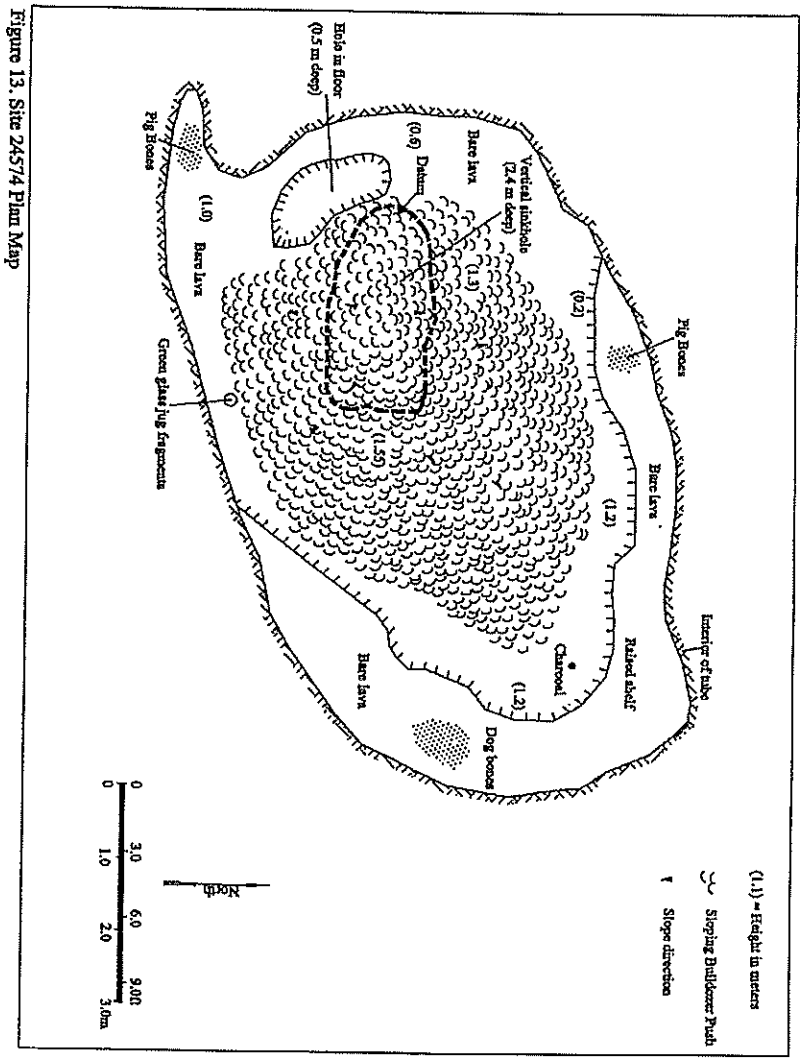

Figure 13. Site 24574 Plan Map

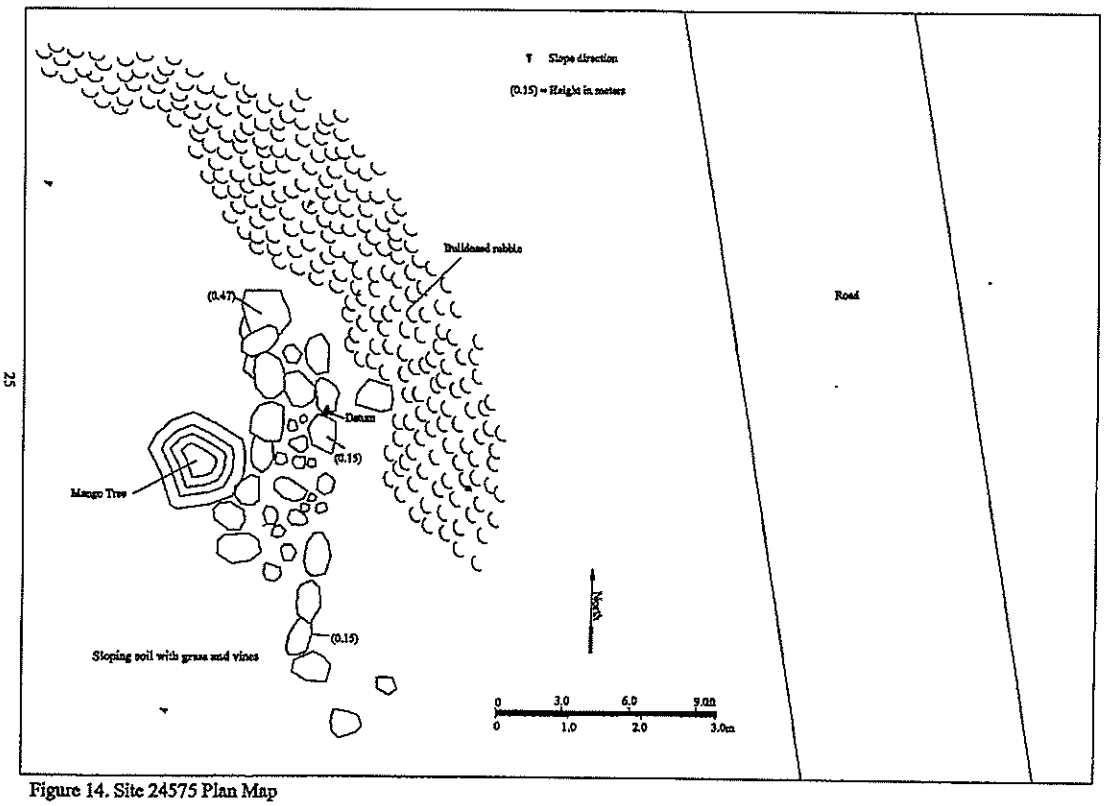

Figure 14. Site 24575 Plan Map

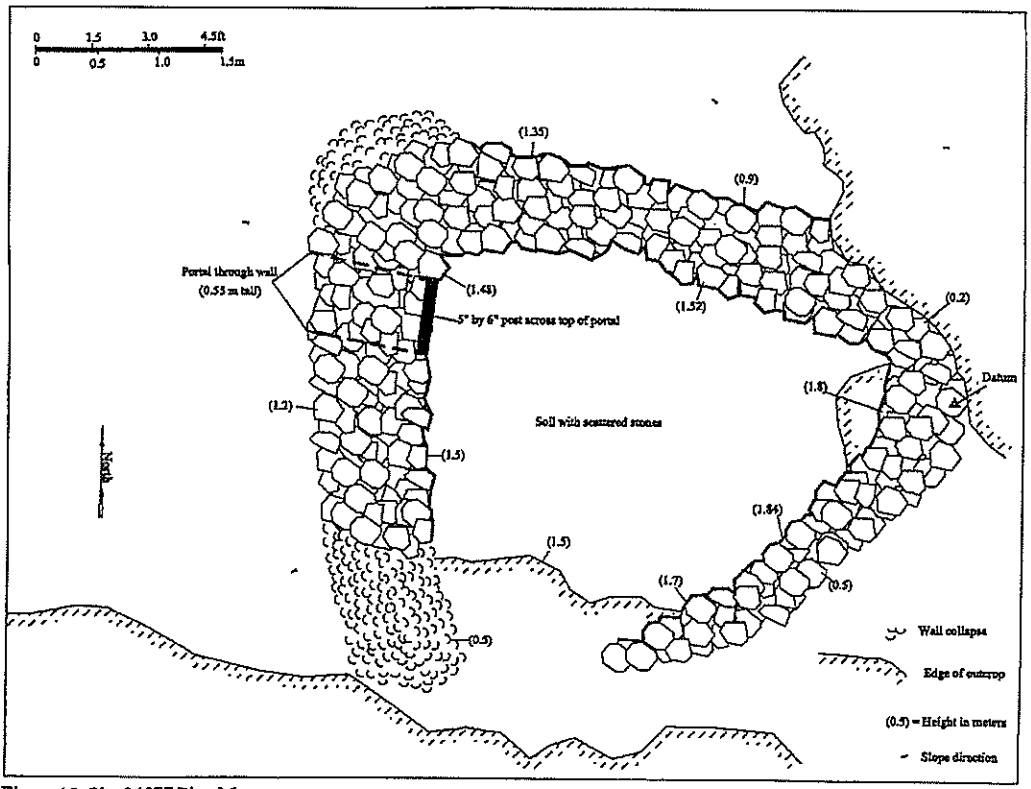

Figure 15. Site 24577 Plan Map

containing 5-10% subangular cobble inclusions. Cultural material recovered from Layer I consisted of two pig bones (5.0 g) and 0.8 grams of charcoal. Site 24578 is interpreted as a temporary habitation based on its formal type and the presence of cultural material. The site is unaltered and in fair to good condition.

Site 24579

Site 24579 is a complex of four features located in the western portion of the project area at c. 2,040 ft elevation situated 30.0 m east of Site 24578. This site corresponds to Corbin (2004) Site 2428-3. The sites is comprised of two linear alignments (Features A and B) and two lava blisters (Features C and D; *Figure 17*). The area surrounding the site has been impacted by bulldozer activity and encompasses an area 28.0 m long (north-south) by 7.0 m wide.

Feature A consists of two parallel linear alignments, each constructed of four to five cobbles and small boulders. The alignments are 1.0 m to 1.5 m long and spaced 0.4 m apart. The height of the stones vary from 0.1 to 0.42 m. The aligned rocks might represent the disturbed remnants of a bulldozed wall. No cultural remains were present.

Feature B is a linear alignment located 6.2 m north of Feature A. This feature is comprised of a single alignment of 12 cobbles and small boulders that measure 4.5 m long. The height of the stones range from 0.15 to 0.2 m. No cultural remains were present.

Feature C is a small lava blister located 7.0 m northwest of Feature B. The entrance to the blister is filled with cobbles and small boulders, likely the result of bulldozer activity in the area. A 1.0 m by 1.0 m test unit (TU-6) was placed over the blister entrance, revealing two layers overlying the bedrock floor of the blister (see *Figure 17*). Layer I consists of 0.3 to 0.39 m of subangular basalt cobbles and small boulders with voids up to 0.2 m. No cultural material was recovered from Layer I. Layer II overlies Layer I and consists of 0.29 to 0.34 m of very dark brown (10YR 2/2) silt with 10-15% subangular basalt gravel, pebble and cobble inclusions. Cultural material recovered from Layer I is restricted to two fragments of charcoal (0.7 g). Seven *kukui* nuts associated with the upper 0.2 m of Layer II were not collected. The excavation of TU-6 allowed examination of the interior of the blister, indicating it measures 1.2 m long (east-west), 0.62 m wide and 0.35 m in height.

Feature D is a small lava blister located in a bedrock outcrop 11.5 m southeast of Feature A. Piled small boulders block the low overhanging entrance on the north side of the outcrop. The stones blocking the entrance were removed, revealing a 1.0 m long by 0.6 m wide opening that leads to an oval-shaped chamber that is 4.75 m long (north-south) and 3.5 m wide. The floor of the chamber is overlain by rubble at the entry, with an area of soil to the south of the rubble. The ceiling height varies from 0.8 m to 1.35 m. Fragmentary and disarticulated human skeletal remains are exposed on the floor on the east side of the blister. Two femurs, a mandible and innominate are located 1.5 m southeast of the entrance. A tibia and talus are located 2.5 m southeast of the entry and a cranium is located 3.0 m south of the entry. A *Cypraea sp.* shell and a volcanic glass flake are exposed on the blister floor 2.5 m south of the entrance. No cultural material was collected from Feature D. After the examination of the interior, the entrance was carefully re-sealed.

Site 24579 is interpreted as a possible temporary habitation complex with a burial component. The Features A and B alignments may represent structural remnants, and the Feature C blister may have served as a storage feature. The cultural remains within Feature D suggest it was utilized as a shelter with the human remains indicating a subsequent burial function. The site is altered and in poor to fair condition.

Site 24580

Site 24580 is an irregularly shaped enclosure located on the crest of an outcrop in the western portion of the project area at c. 2,005 ft elevation. The enclosure is constructed against the northern side of an exposed outcrop, with walls built of roughly stacked and piled cobbles and small boulders (*Figure 18*). It measures 3.5 to 6.8 m long (northwest by southeast) and 6.4 m wide. The walls range in width from 0.35 to

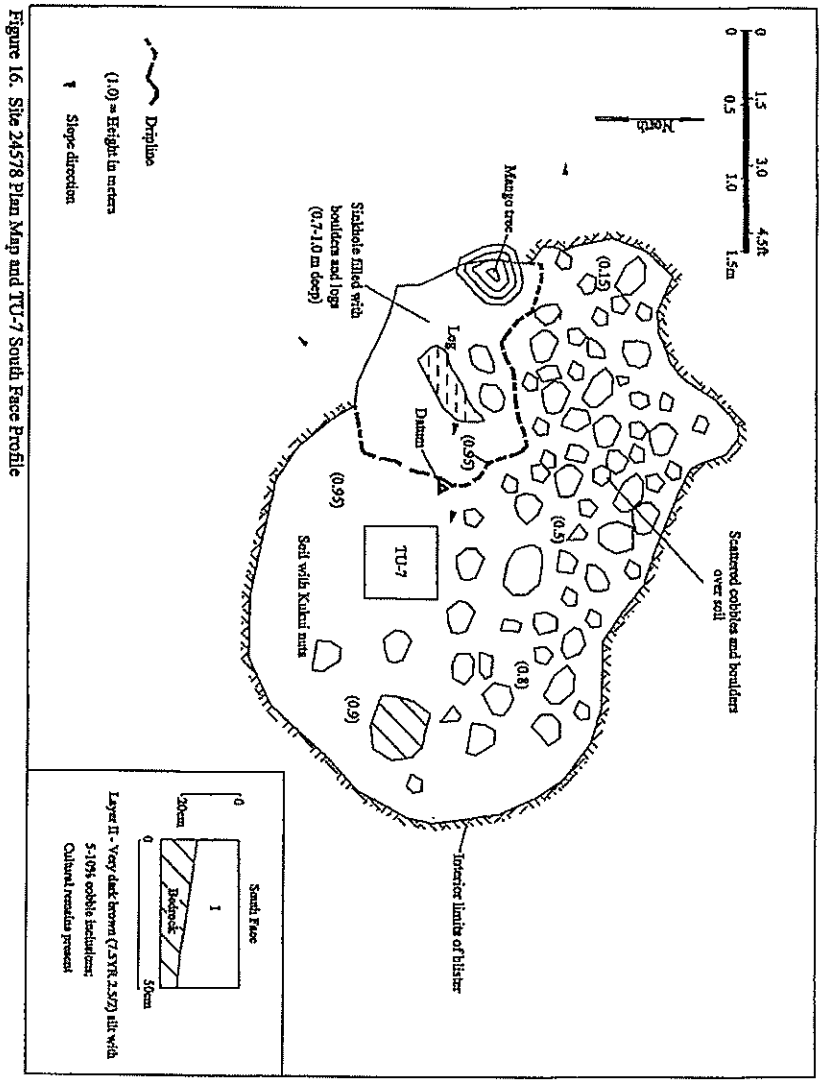

Figure 16. Site 24578 Plan Map and TU-7 South Face Profile

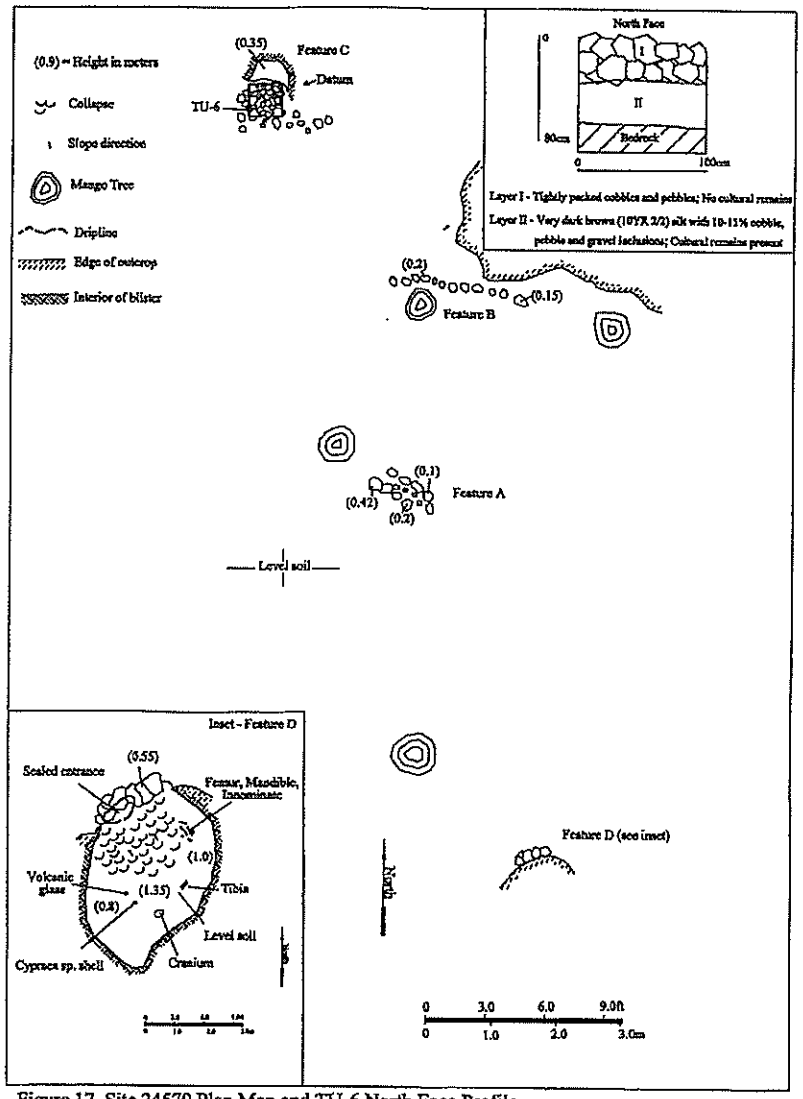

Figure 17. Site 24579 Plan Map and TU-6 North Face Profile

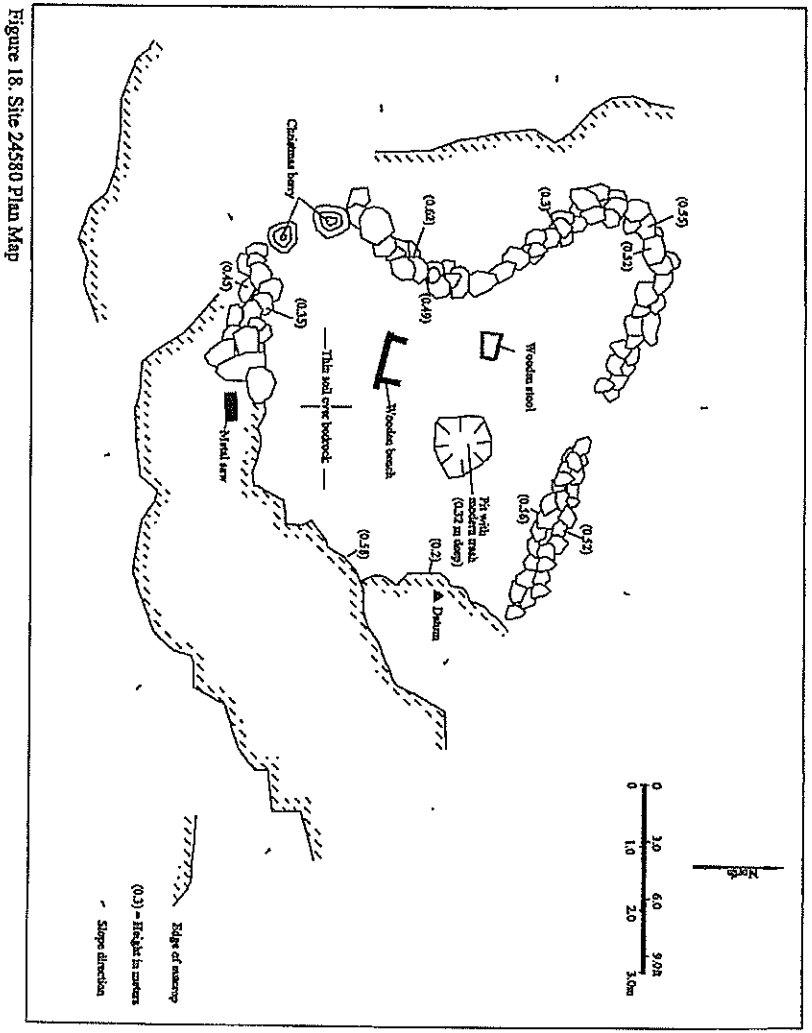

Figure 18. Site 24580 Plan Map

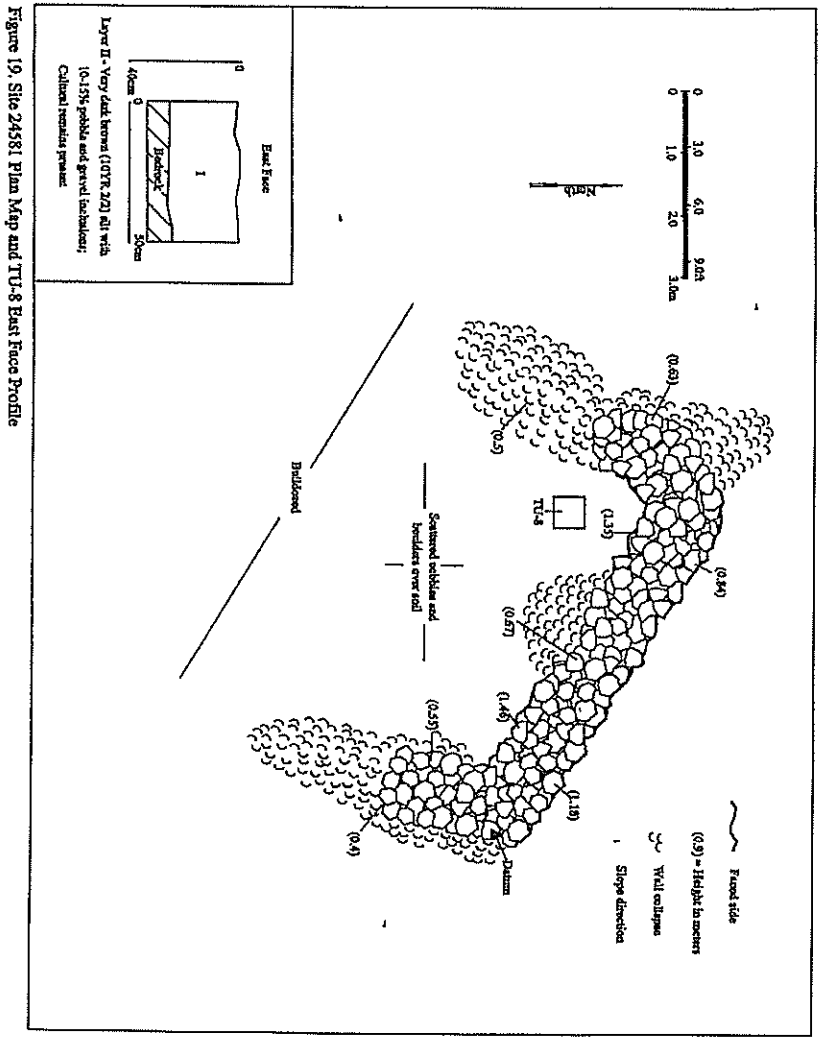

Figure 19. Site 24581 Plan Map and TU-8 East Face Profile

0.95 m and in height from 0.3 to 0.56 m. There are gaps in the enclosure walls on the northeast and southwest sides, which likely allowed access into the interior.

The floor of the enclosure consists of patchy soil and exposed bedrock. A wooden stool and a 2 ft by 1 ft wooden bench are located inside the enclosure. A 0.7 m diameter depression (0.35 m deep) is located in the approximate center of the enclosure, filled with recent refuse including a 5-gallon bucket, a KTA plastic grocery bag, a Tostitos cellophane bag and a Menehune water bottle. The depression might have functioned as a hearth. An old saw is exposed on the bedrock outcrop on the southern exterior of the enclosure. Site 24580 is interpreted as a temporary habitation based on formal type and the nature of the cultural remains observed. The modern remains indicate that the site has been recently utilized. The site is unaltered and in fair to good condition.

Site 24581

Site 24581 consists of the disturbed remnant of an enclosure located in the western portion of the project area at c. 2,080 ft elevation. The enclosure remnant is rectangular in shape and is 7.3 m long (northwest by southeast) and 4.6 m wide (*Figure 19*). The northern wall is generally intact, ranging in width from 1.2 to 1.4 m and in height from 0.84 to 1.46 m. The exterior and portions of the interior sides of the north wall are faced. Short segments of the west and east walls are preserved, but bulldozing activity has extensively damaged both walls. Cobbles from the impacted walls are scattered on the ground surface in the enclosure interior.

A 0.5 m by 0.5 m test unit (TU-8) was placed in the northwest interior corner of the enclosure, revealing a single soil deposit overlying bedrock (see *Figure 19*). Layer I consists of 0.23 to 0.26 m of very dark brown (10YR 2/2) silt with 10-15% subangular basalt gravel and pebble inclusions. Cultural material recovered from Layer I consisted of charcoal (0.2 g) and numerous *kukui* nuts (80-100) which were not collected. Site 24581 is interpreted as a permanent habitation structure using Cordy's (1981) model based on its formal type and substantial construction (faced sides). Although disturbed, the enclosure is interpreted as measuring at least 33.5 sq m in area. The site is altered and in poor to fair condition.

Site 24582

Site 24582 is a lava tube located in the southwestern portion of the project area at c. 2,160 ft elevation. The tube is accessed through a rubble-filled sinkhole that is 12.5 m long (east-west), 9.5 m wide and 3.4 m in depth (*Figure 20*). The entrance is located on the east side of the sinkhole, measuring 8.6 m wide and 2.1 m in height. This opens onto an irregularly-shaped chamber that is 16.0 m long (west-northwest by east-southeast) and from 2.5 m to 8.5 m wide. The ceiling heights within this chamber range from 0.7 to 1.8 m and the floor is comprised of bare lava with scattered roof fall. A cat skeleton is located on the floor near the eastern end of the chamber and dog bones are located at the entrance below the dripline.

There is a hole in the floor along the north wall of the chamber, 4.0 m east of the sinkhole entrance that provides entry into a lower chamber. This hole is 1.5 m long by 1.2 m wide and 2.2 m above the floor of the lower chamber. This lower chamber consists of a linear tube that is 104.0 m long (east-west) and from 2.0 m to 4.0 m in width. The ceiling height varies from 0.5 m to 2.25 m and the floor is bare lava. Eleven cobble alignments are located on the tube floor in the eastern half of Feature B, all within 52.0 m of the entry. These alignments range in length from 1.2 to 1.5 m and in width from 0.5 to 0.7 and were created as supports for vessels used to collect drip water. Charcoal fragments are scattered the entire length of the tube. Scattered avifauna bones, marine shell and a crab claw were also present. A small cobble pedestal is located near the north wall in the approximate center of the lower chamber, measuring 0.6 m long by 0.4 m wide. Charcoal is concentrated on the chamber floor around the pedestal. Collapsed rubble blocks the west end of the tube.

Site 24582 is interpreted as a temporary habitation shelter and water catchment locale based on its formal type, the presence of the stone rings and associated cultural materials. The site is unaltered and in fair to good condition.

Site 24583

Site 24583 is a rectangular enclosure located in central portion of the parcel at c. 2,420 to 2,440 ft. The north side of the enclosure is formed by the Site 24569 wall. This site was previously identified by Corbin (2004) and designated as Site 2428-13. The enclosure is rectangular in shape and is 88.2 m long (west-northwest by east-southeast) and from 66.3 to 71.0 m in width (see *Figure 6*). The walls of the enclosure are built of stacked and faced cobbles and small boulders with a core-filled cobble interior. The walls range in width at the base from 0.9 to 1.0 m and at the top from 0.7 to 0.8 m. The majority of the walls are intact and range in height from 0.8 to 1.1 m. The northern ends of the east and west walls have been destroyed by bulldozer activity and the construction of a cart path associated with the 14th Tee has truncated the north wall at the northeast corner of the enclosure and in the center of the eastern wall. Site 24583 is interpreted as a cattle pen based on its formal type, the height and method of construction of the walls. Corbin (2004:14) states that Mr. Medeiros indicated that the enclosure was utilized as corral for trapping and branding cattle. The site is altered and in fair to good condition.

Site 24584

Site 24584 is a lava tube with two chambers located in the southwestern portion of the project area at c. 2,200 ft elevation. The entrance to the site is through a sinkhole located near the east end of the tube (*Figure 21*). The oval rubble-filled sinkhole is 5.9 m long (east-west) by 3.9 m wide and is 3.3 m deep. The entrance to the Feature A chamber is on the western side of the sinkhole and the entrance to Feature B is on the east side.

The Feature A chamber is 101.5 m long (east-west) and varies in width from 3.0 m to 6.3 m. The entry is 3.4 m wide and the dripline is 1.4 m above the sinkhole floor. The ceiling height of the chamber varies from 0.6 m to 6.0 m. The chamber floor is bare lava, overlain by collapsed roof fall rubble. A series of horizontal slabs are present on the chamber floor 10.0 m to 24.0 m west of the entry, potentially representing a steppingstone path. The floor in the vicinity of the slabs has been cleared of roof fall forming a linear path. Traces of charcoal are visible on the floor at the west end of the path trail and in discrete areas throughout the chamber.

There are nine stone water catchment rings present in the western two-thirds of the chamber. These rings vary in length from 0.55 to 1.6 m and in width from 0.4 to 0.9 m, and are comprised of single course alignments. No cultural remains were present. A small crude pile of stacked cobbles is located against the south tube wall in the western portion of the chamber. This pile is 0.6 m long, 0.5 m wide and 0.5 m in height.

The entrance to the Feature B chamber is 4.0 m wide and 1.6 m in height above the sinkhole floor. The chamber is 6.4 m long (east-west) by 5.4 m wide with a ceiling height of 2.55 m. The floor is covered by collapsed rubble. A piece of charcoal is located 2.5 m southeast of the entrance, representing the only cultural material noted within the chamber. Site 24584 is interpreted as a temporary habitation and water catchment locale based on formal feature type and structural modifications and cultural material. The site is unaltered and in fair to good condition.

Site 24585

Site 24585 is a lava tube located in the southwestern portion of the project area at c. 2,210 ft elevation, to the east of Site 24584. Access to the tube is from the western side of a large rubble-filled sinkhole that is 12.95 m long (northwest by southeast), 8.9 m wide and 2.75 m deep (*Figure 22*). The main entrance to the tube is 8.0 m wide and the dripline is 2.0 m above the sinkhole floor. A small passage on the south wall of the tube intersects the south wall of the sinkhole and provides a narrow secondary entrance. The interior of the tube irregularly-shaped and is 16.0 m long (northwest by southeast) and from 1.5 to 9.2 m wide. The chamber ceiling varies in height from 0.8 m to 3.0 m. The floor is bare lava overlain in the east half by collapsed rubble around the entrance. The chamber floor slopes steeply to the west. Charcoal and a juvenile pig skeleton are exposed on the floor 9.5 m west of the entrance. A pig bone is exposed near the

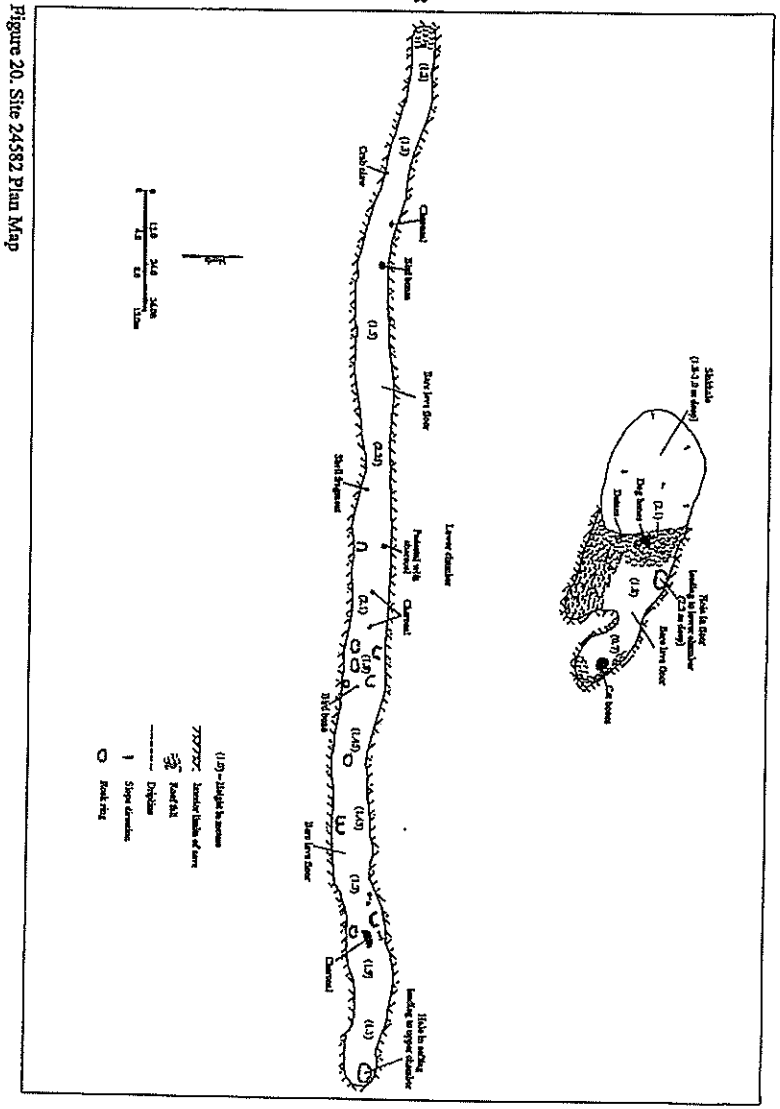

Figure 20. Site 24582 Plan Map

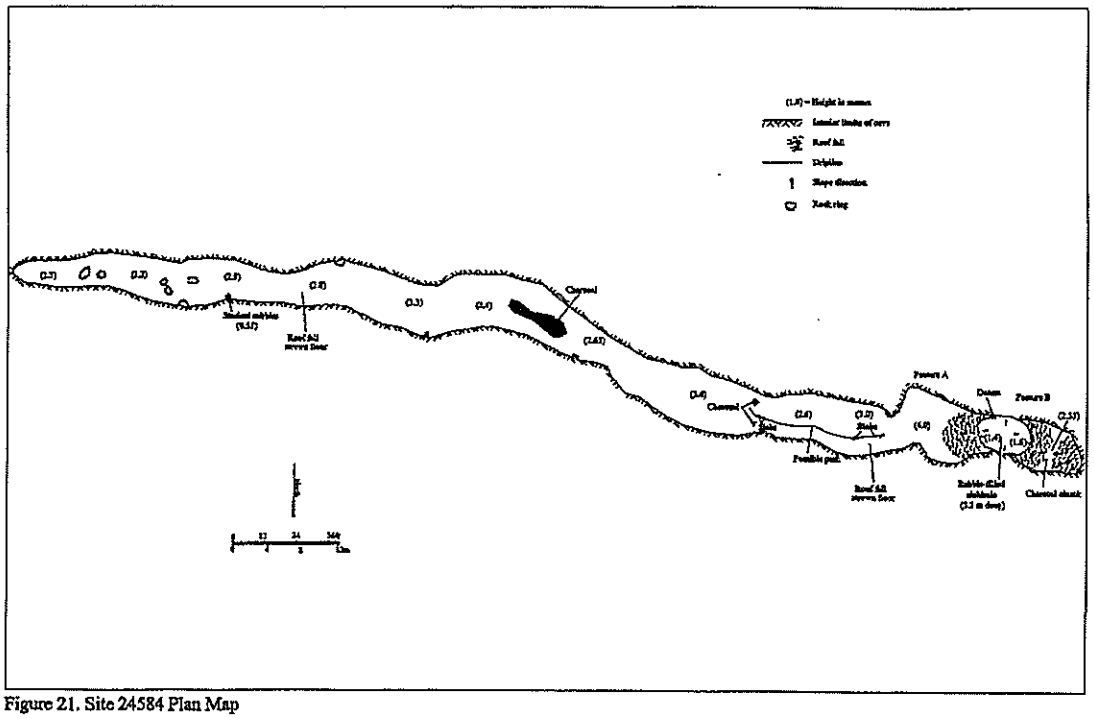

Figure 21. Site 24584 Plan Map

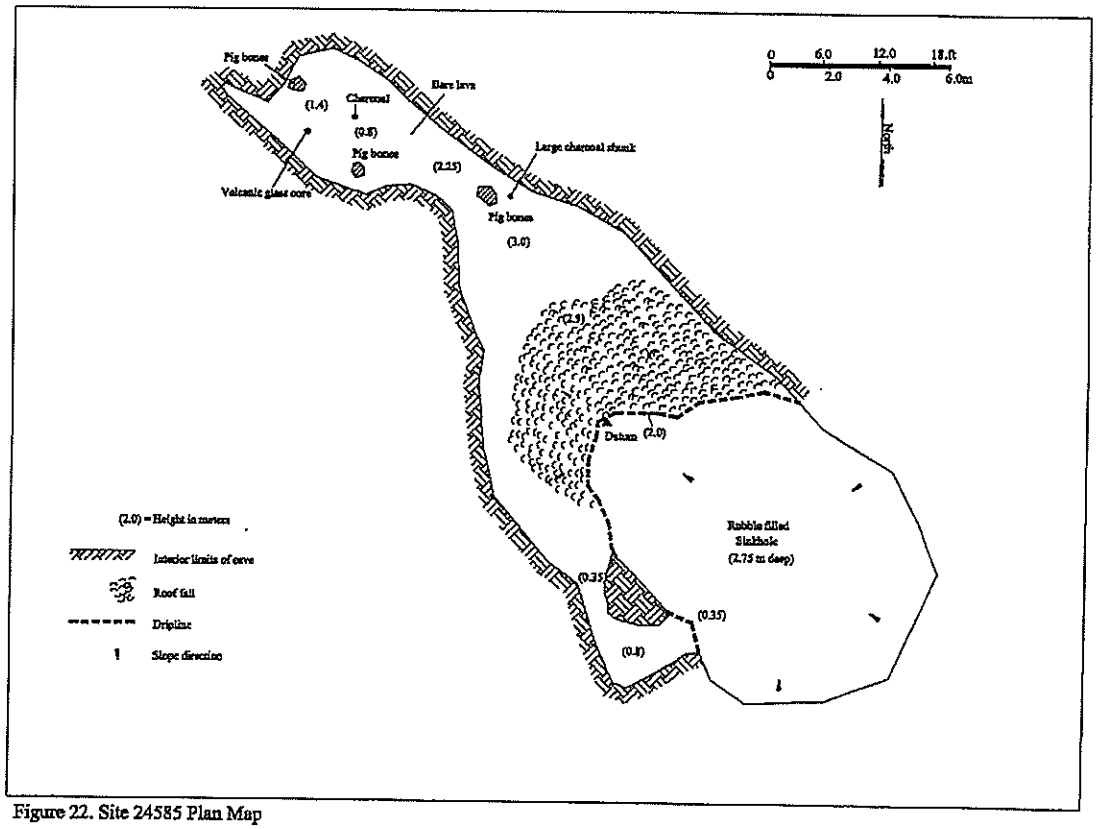

Figure 22. Site 24585 Plan Map

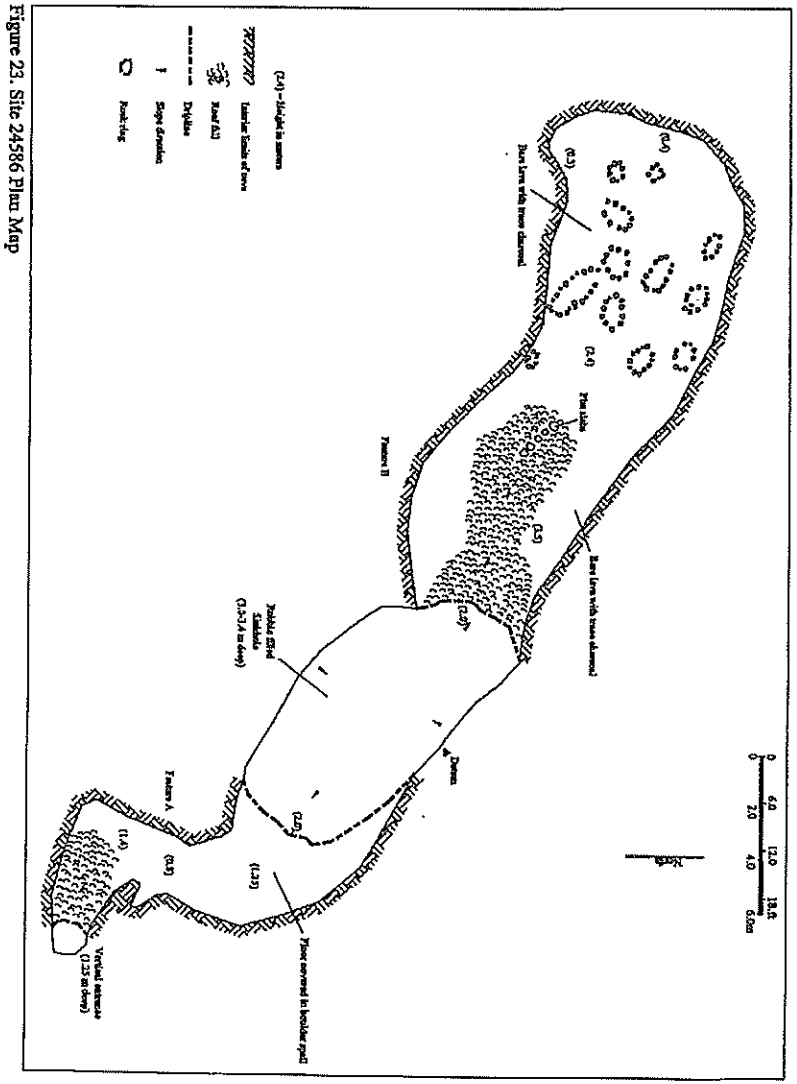

Figure 23. Site 24586 Plan Map

south wall of the chamber 11.75 m west of the entrance and a volcanic glass core is exposed on the floor 2.0 m west of the pig bone. Charcoal is present on the floor 15.0 m west of the entry and a pig bone is exposed on the floor against the west wall of the chamber. A piglet cranium and mandible are exposed in a crevice at the western terminus of the tube. Site 24585 is interpreted as a temporary habitation based on its formal type and the presence of cultural material. The site is unaltered and in fair to good condition.

Site 24586

Site 24586 is a lava tube located in the southwestern portion of the project area at c. 2,225 ft elevation, to the east of Site 24585. The lava tube covers an area 39.0 m long by 12.5 m wide and is divided into two chambers (Features A and B) by a large sinkhole (*Figure 23*). The oval rubble-filled sinkhole is 11.2 m long (northwest-southeast) by 6.5 m wide and is 3.4 m deep. The Feature A chamber is entered from the east side of the sinkhole and Feature B is entered from the west side.

The **Feature A** chamber is irregularly-shaped and is 12.5 m long (northwest by southeast) and from 1.5 m to 5.0 m in width. The entry is 4.4 m wide and the dripline is 2.0 m above the sinkhole floor. The ceiling height of the chamber varies from 0.8 m to 2.0 m. The chamber floor is overlain by collapsed rubble. A small vertical entrance is present in the ceiling at the eastern end of the chamber. The vertical entry is 1.2 m in diameter and is 1.25 m above the chamber floor. No cultural material was observed in Feature A.

The **Feature B** chamber is 19.6 m long (northwest by southeast) and varies in width from 4.75 m to 8.2 m. The entry is 4.5 m wide and the dripline is 2.7 m above the sinkhole floor. The chamber's ceiling height varies from 0.3 m to 3.5 m. The floor descends from the entrance to the west and is bare lava overlain by collapsed rubble in the eastern half of the chamber. A linear alignment of five horizontal slabs at the western end of the rubble appears to represent a stepping stone path over the uneven sloping floor.

There are twelve cobble rings present in the western half of the chamber where the floor is flat bare pahoehoe lava. The alignments are comprised of single courses of cobbles that range in length from 0.9 to 2.1 m and in width from 0.5 to 1.05 m. Traces of charcoal were observed on the floor in the west half of the chamber. No other cultural remains were present. Site 24586 is interpreted as a temporary habitation and water catchment locale based on formal feature type and the presence of stone rings and charcoal. The site is unaltered and in fair to good condition.

Site 24587

Site 24587 is a stone cairn located in the southwestern portion of the parcel at c. 2,215 ft elevation, south of the Site 24586 lava tube. This cairn, along with Site 24588 (discussed below) were previously identified by Corbin (2004) and designated as Site 2428-5. The cairn is constructed of stacked pahoehoe cobbles, small boulders and slabs placed eight to eleven courses high. The cairn is 1.65 m long (north-south), 1.55 m wide and 1.2 m in height, with sloping sides and a domed surface (*Figure 24*). No cultural remains were found in association with the site. The site is interpreted as a marker based on its formal type. This cairn, along with Sites 24588 and 24589 are located along the approximate boundary between the Lands of Pu'ukala and Kau and were likely built to delineate this land division. An additional cairn noted by Corbin (2004) and designated Site 2428-6 was reportedly located further inland but was not relocated during the present project. This cairn also likely served as a land division marker.

Site 24588

Site 24588 is a stone cairn located in the southwestern portion of the parcel at c. 2,195 ft elevation 50.0 m west of Site 24587. The cairn is built of stacked pahoehoe cobble, small boulder and slabs placed seven to nine courses high. The cairn is 2.0 m long (north-south) and 1.9 m wide, and ranges in height from 0.45 to 0.83 m. The sides are near vertical and the surface is irregular (*Figure 25*). No cultural remains were found in association with the site. The site is interpreted as a marker based on its formal type.

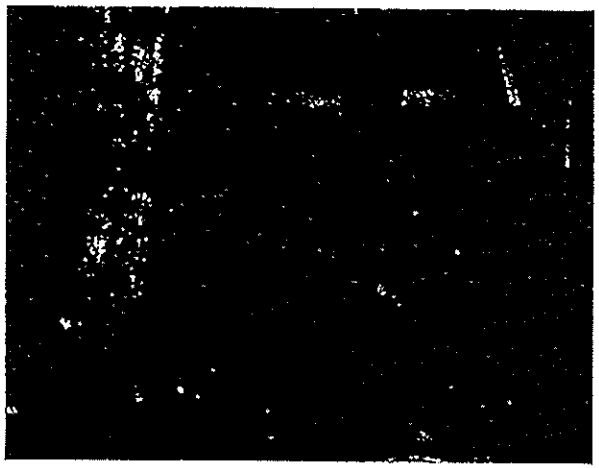

Figure 24. Site 24587 Cairn, view to east

Figure 25. Site 24588 Cairn, view to northwest

Site 24589

Site 24589 is a lava tube located in the southwestern portion of the project area at c. 2,175 ft elevation. Access to the tube is from a large rubble-filled sinkhole that is 8.5 m long (east-west), 5.75 m wide and 3.5 m deep (*Figure 26*). The lava tube is entered from the western side of the sinkhole, through an opening that is 5.5 m wide and 1.2 m in height. The interior of the lava tube extends 35.0 m to the northwest from the entrance, ranging in width from 4.0 to 5.9 m and in height from 0.62 to 3.5 m. A skylight is present in the ceiling 1.4 m west of the entrance, measuring 1.6 m long by 1.5 m wide. A second skylight is located 14.0 m west of the entry and is 1.5 m in diameter. A pile of logs and soil, resulting from bulldozer activity on the surface, is exposed on the south side of the collapsed rubble beneath the second skylight. A concentration of fish bones and a rat skeleton is exposed on the chamber floor 2.5 m west of the second skylight.

Scattered cobbles and small boulders are exposed on the chamber floor in the west half of the chamber. A concentration of charcoal 2.5 m long by 1.5 m wide is exposed along the south wall of the chamber 23.0 m west of the entrance. A semicircular cobble alignment 1.80 m long by 1.0 m wide is located 2.0 m west of the charcoal concentration. Additional charcoal is scattered and clustered on the floor between the stone ring and the western end of the chamber. Site 24589 is interpreted as a temporary habitation and water catchment locale based on formal feature type, the presence of a stone ring and associated cultural material. The site is unaltered and in fair to good condition.

Site 24590

Site 24590 is a cairn located in the south-central portion of the parcel at c. 2,350 ft elevation, near the southern end of the 12th Green. This site was previously identified by Corbin (2004) and designated as 2428-4. The cairn is constructed of stacked pahoehoe cobbles, small boulders and slabs placed five to seven courses high. The cairn is 2.50 m long (north-south) by 2.35 m wide and 0.89 m high. The cairn's irregular shape is a result of collapse. The site is interpreted as a marker based on its formal type and appearance. The site is altered and in poor to fair.

Site 24591

Site 24591 a modified outcrop located in the central portion of the project area at c. 2,320 ft elevation. The site is comprised of an irregular-shaped pile of cobbles and small to medium-sized boulders situated on an exposed bedrock outcrop, encompassing an area 8.5 m long (north-northeast by south-southwest) and 2.0 to 2.9 m wide. The surface is uneven and irregular and varies in height from 0.25 to 1.35 m. The area surrounding the site has been impacted by bulldozer activity. A small lava blister is located 3.0 m east of the modified outcrop. Articulated cow bones are visible in the stone rubble filling blister, apparently the result of bulldozing activity. No cultural material was observed in association with the site. Site 24591 is interpreted as an agricultural feature based on formal type and the absence of associated cultural material. The site is unaltered and in fair to good condition.

Site 24592

Site 24592 is a complex of five mounds located in the eastern portion of the project area, on the southwestern flank of Mount Moanuiahea at elevations ranging from c. 2,990 to 3,000 ft. The features encompass an area 44.0 m long (east-west) by 13.0 m wide (*Figure 27*). No cultural material was noted on the surface of the mounds.

Feature A is an oval mound located at the western end of the site. The mound is constructed of stacked pahoehoe cobbles and small boulders crudely faced on the south and west sides. The mound is 3.95 long (east-west) by 3.5 m wide and varies in height from 0.55 m to 1.15 m. The surface is domed. A 1.5 m by 1.5 m test unit (TU-1) was placed in the center of the mound, revealing three layers overlying bedrock (see *Figure 27*). Layer I consists of 0.55 to 0.63 m of subangular basalt pebbles, cobbles and small boulders with voids up to 0.10 m. No cultural material was recovered from Layer I. Layer II underlies

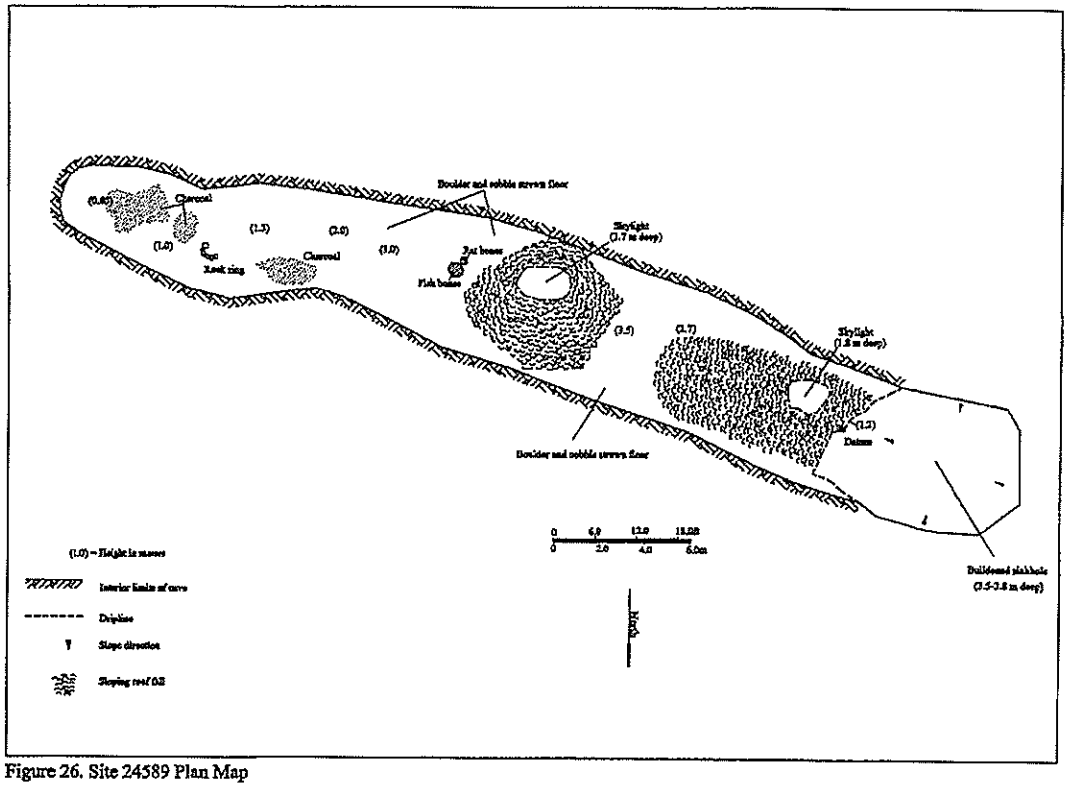

Figure 26. Site 24589 Plan Map

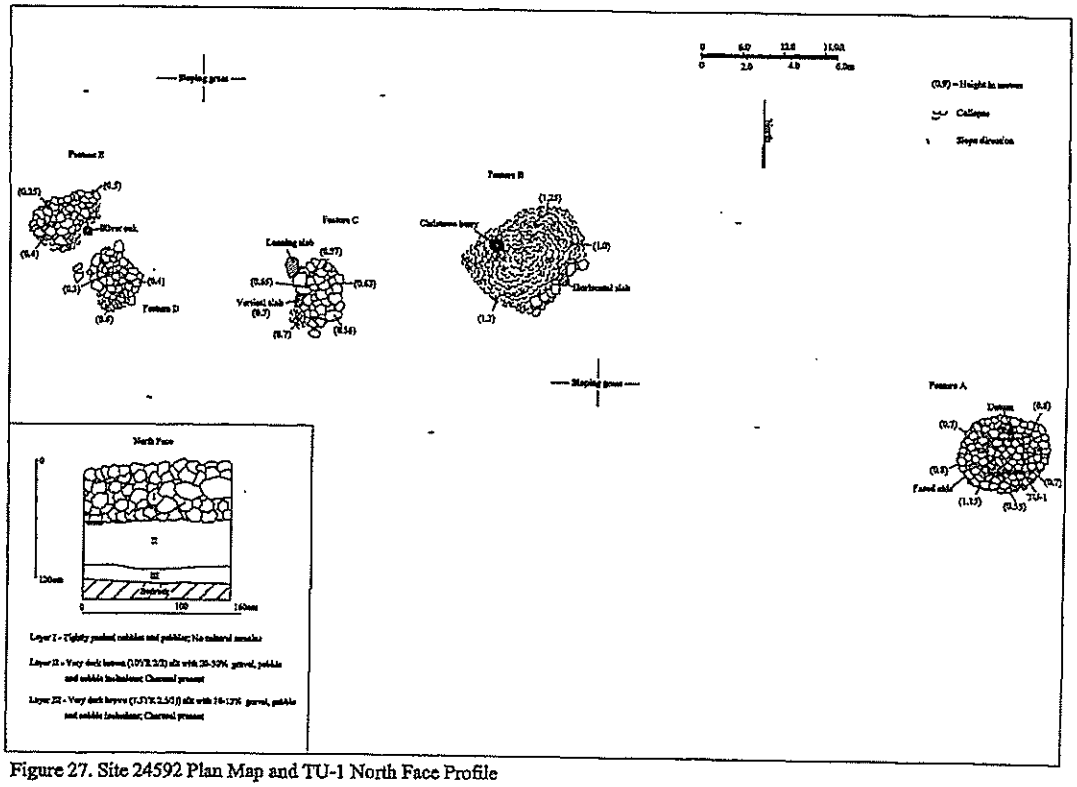

Figure 27. Site 24592 Plan Map and TU-1 North Face Profile

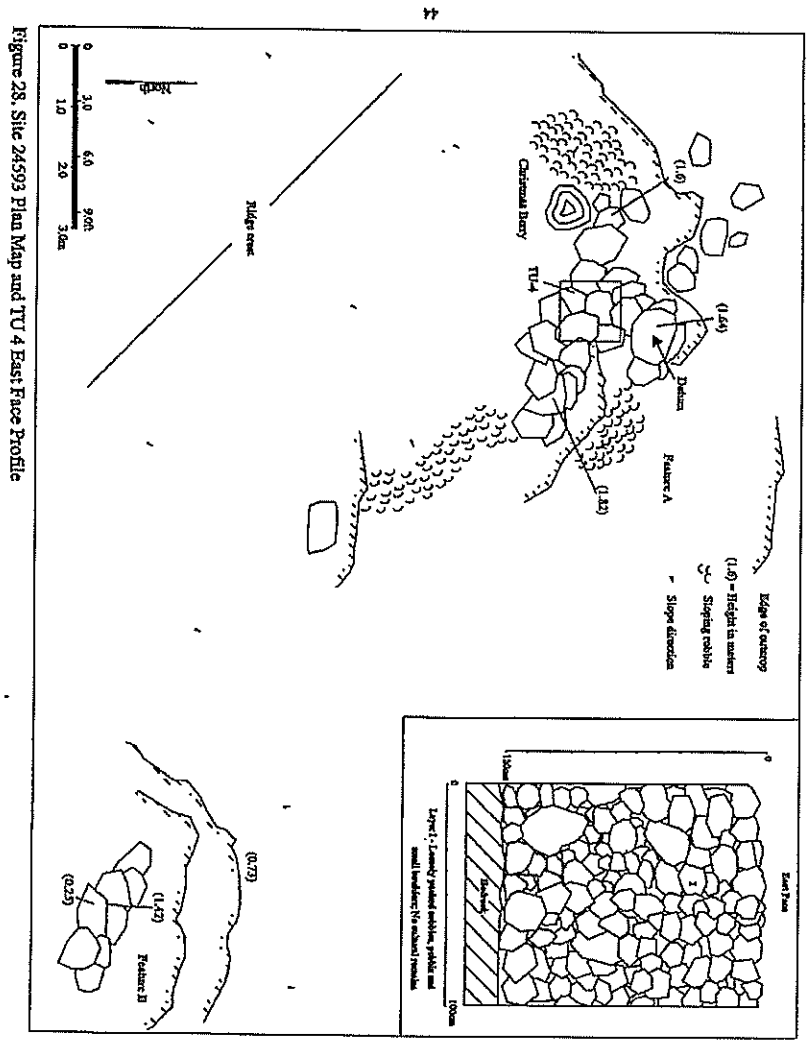

Figure 28. Site 24593 Plan Map and TU 4 East Face Profile

Layer I and consists of 0.42 to 0.51 m of very dark brown (10YR 2/2) silt containing 20-30% subangular gravel, pebble and cobble inclusions. Cultural material recovered from Layer II consisted of 31.0 grams of charcoal. Layer III consists of 0.13 to 0.18 m of very dark brown (7.5YR 2.5/3) silt with 10-15% subangular basalt gravel, pebble and cobble inclusions. Cultural material recovered from Layer III consisted of charcoal (0.1 g).

The **Feature B** is located 18.0 m northwest of Feature A. This feature is oval-shaped and is built predominately of piled pahoehoe cobbles and small boulders. The western side is roughly stacked and incorporates a horizontal basalt slab along the edge. The mound is 5.5 m long (northeast by southwest) by 4.2 m wide and varies in height from 1.25 m to 1.3 m. The surface is domed.

Feature C is a small oval mound located 6.3 m west of Feature B. The mound is constructed of crudely stacked pahoehoe cobbles and small boulders two to three courses high. The mound is 2.8 m long (north-south) by 2.2 m wide and the height varies from 0.5 m to 0.7 m. A vertical slab is incorporated on the west side and a leaning slab is present at the northwestern end. The surface is domed.

Feature D is a small oval mound constructed of crudely stacked pahoehoe cobbles and small boulders one to two courses high, located 8.7 m west of Feature C. The mound is 2.75 m long (northwest by southeast) by 2.2 m wide and varies in height from 0.3 m to 0.6 m. The surface is uneven and irregular.

Feature E is a disorganized mounded pile of pahoehoe cobbles and small boulders located 1.0 m northwest of Feature D. The feature is 3.25 m long (northeast by southwest) by 2.5 m wide and varies in height from 0.25 m to 0.75 m. The surface is domed.

Site 24592 is interpreted as an agricultural complex. This is based primarily on the nature of the features. The presence of the charcoal noted in TU-1 suggests that the site area has been burned. The site is unaltered and in fair to good condition.

Site 24593

Site 24593 consists of two modified outcrops located on top of Mount Moanuiahea at c. 3,180 ft elevation. The site encompasses an area 17.0 m long (northwest by southeast) and 4.7 m wide (*Figure 28*). **Feature A** consists of an irregularly-shaped pile of cobbles and small boulders situated on a weathered bedrock outcrop at the northwestern end of the site. Overall the feature is 6.9 m long (northwest by southeast) and 4.3 m wide. The central portion is comprised of roughly stacked stones, with crudely piled areas along eh south, west and eastern sides. The surface is uneven and irregular. A 1.0 by 1.0 m test unit (TU-4) was placed in the approximate center of the feature, revealing a single deposit overlying bedrock (see *Figure 28*). Layer I consists of 1.19 to 1.21 m of pebbles, cobbles and boulders overlying bedrock. No cultural material was recovered from Layer I.

Feature B is a linear pile of cobbles and small boulders on a bedrock outcrop, 9.0 m southeast of Feature A. The feature is irregularly-shaped and is 2.65 m long (northwest by southeast) and 0.85 m wide. The surface is uneven and irregular and ranges in height from 0.25 to 1.42 m. No cultural remains were present.

Site 24593 is assigned an indeterminate function. Although the formal type of the features, the crude method of construction and the lack of cultural remains suggests an agricultural function, the sites location on top of Mount Moanuiahea suggest they may have served a different, undetermined function. The site is unaltered and in fair to good condition.

Site 24594

Site 24594 is a retaining wall located on the northeastern side of the summit of Mount Moanuiahea at c. 3,100 ft elevation. The retaining wall is linear, 18.0 m long (north-northeast by south-southwest)

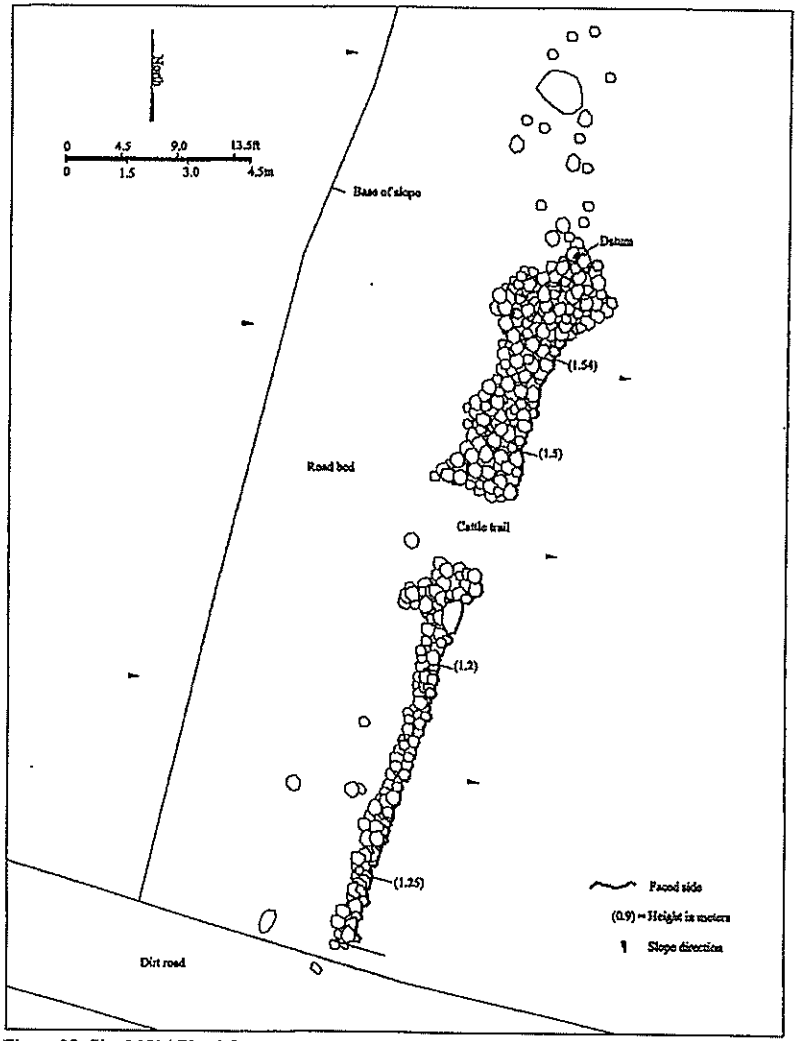

Figure 29. Site 24594 Plan Map

and from 0.6 to 2.5 m in width (*Figure 29*). The retaining wall is built of stacked cobbles and small boulders and ranges in height from 1.25 to 1.54 m. The eastern downslope side of the wall is faced. Cattle have breached the wall creating a gap in the approximate center. The north end of the retaining wall is poorly defined and consists of disorganized rubble. The southern end terminates against the side of a dirt access road. The retaining wall borders a broad flat terrace 4.0 m to 5.0 m wide that functioned as a roadway. No cultural material was observed in association with the feature. Site 24594 is interpreted as an historic roadway feature with the retaining wall functioning to support the road as it traversed the side of the slope. The site is unaltered and in fair to good condition.

Site 24595

Site 24595 consists of three concrete slab foundations and scattered concrete fragments located on top of Mt. Moanuiahea at c. 3,100 ft elevation. The features cover an area 11.5 m long by 10.0 m wide (*Figure 30*). The **Feature A** slab is located at the south end of the site. It is 5.0 ft (1.52 m) square and ranges in height from 4" (10.2 cm) to 5" (12.8 cm) in height above the ground surface. Two threaded foundation bolts are set in the slab along the west side.

Feature B is located 18" (0.45 m) north of Feature A. This slab is rectangular-shaped and is 15 ft (4.57 m) by 9 ft (2.74 m) wide and varies in height from 7" (17.9 cm) to 11" (28.9 cm) above the ground surface. Six threaded foundation bolts are set in the slab along both the north and south sides and two threaded foundation bolts are aligned on the east and west sides. Pieces of rebar are exposed on the ground surface at the northeast and southwest corners. A ½" diameter metal pipe is exposed on the east side of the foundation.

Feature C is located 2 ft north of Feature B. It is 6' 5" (2.05 m) square and rises 9" (23.9 cm) to 10" (25.8 cm) above the ground surface. Three clusters of four bolts are set in the concrete in the center of the square foundation. Site 24595 is interpreted as the foundations for an antenna facility based on the appearance of the slabs and the sites location on top of Mt. Moanuiahea. The site is unaltered and in fair to good condition.

Site 24596

Site 24596 consists of a pipeline and road that extends through the inland portion of the project area. The southern portion of pipeline is referenced as the Holualoa-Pu'uwaawaa Pipeline on the 1928 USGS Kailua Quadrangle (see *Figure 4*). This site was previously identified by Corbin as Site 2428-14, which they interpreted as a historic or prehistoric trail or road that is depicted on the USGS quadrangle map of the area (2004:14). Apparently all that was recorded during this prior project was a barbed wire fence located in the approximate location of the road.

Mr. Clifford Medeiros indicated that that the road follows a galvanized metal pipeline that originates in upland Holualoa and extends to the north to a reservoir on the neighboring ranch land. All that was observed of this site during the present project is the pipeline and barely visible maintenance roadway that parallels a wire fence, then diverges to the southeast away from the fence, extending out of the parcel. The portion of the site within the project area is located at elevations of 2,650 to 2,780 ft and measures 580.0 m long. The northern extent of the site within the parcel has apparently been destroyed by the golf course, although its approximate original extent (as depicted in *Figure 6*) was established with the assistance of Mr. Medeiros. The site is altered and in poor to fair condition.

Site 24597

Site 24597 is a complex of ten features located in the inland portion of the project area at elevations ranging from 2,700 to 3,000 ft. The features are comprised of five enclosures (Features A, D, F, I and J), two walls (Features G and H), a lava tube (Feature B), a rock ring (Feature C), and the foundation for a water tank. The site is situated in an area of sloping soil with level areas, in a grassy area with numerous Christmas berry and silk oak trees. The distribution of the ten features is illustrated in *Figure 31*. The site is altered and in fair to good condition.

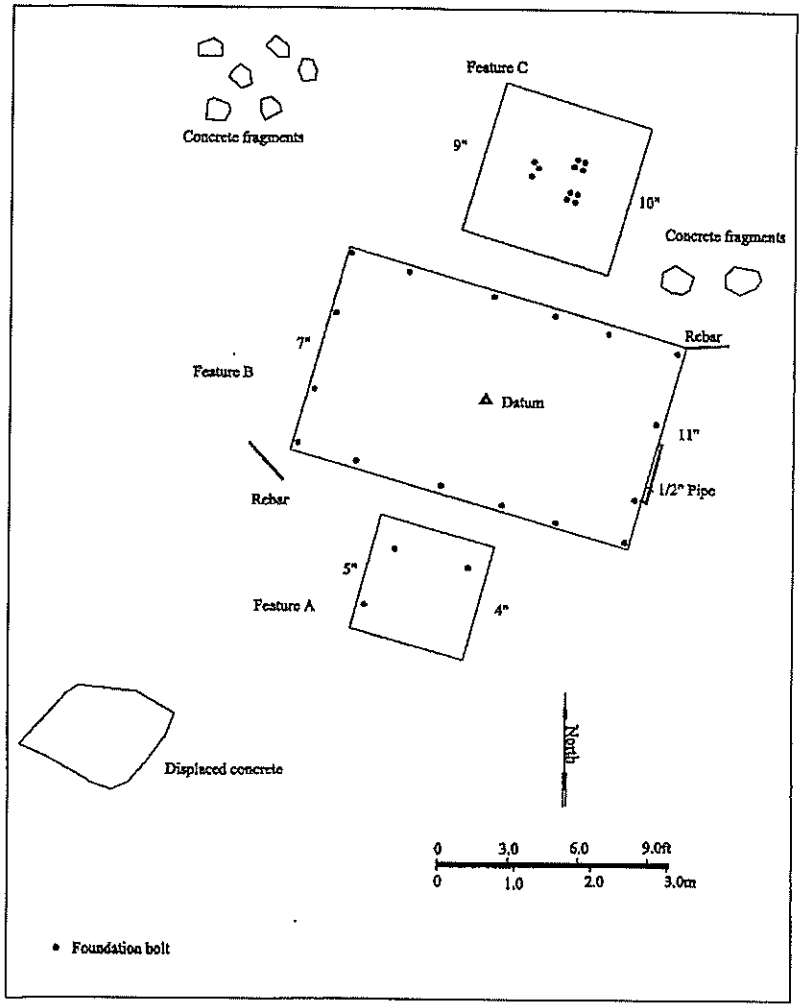

Figure 30. Site 24595 Plan Map

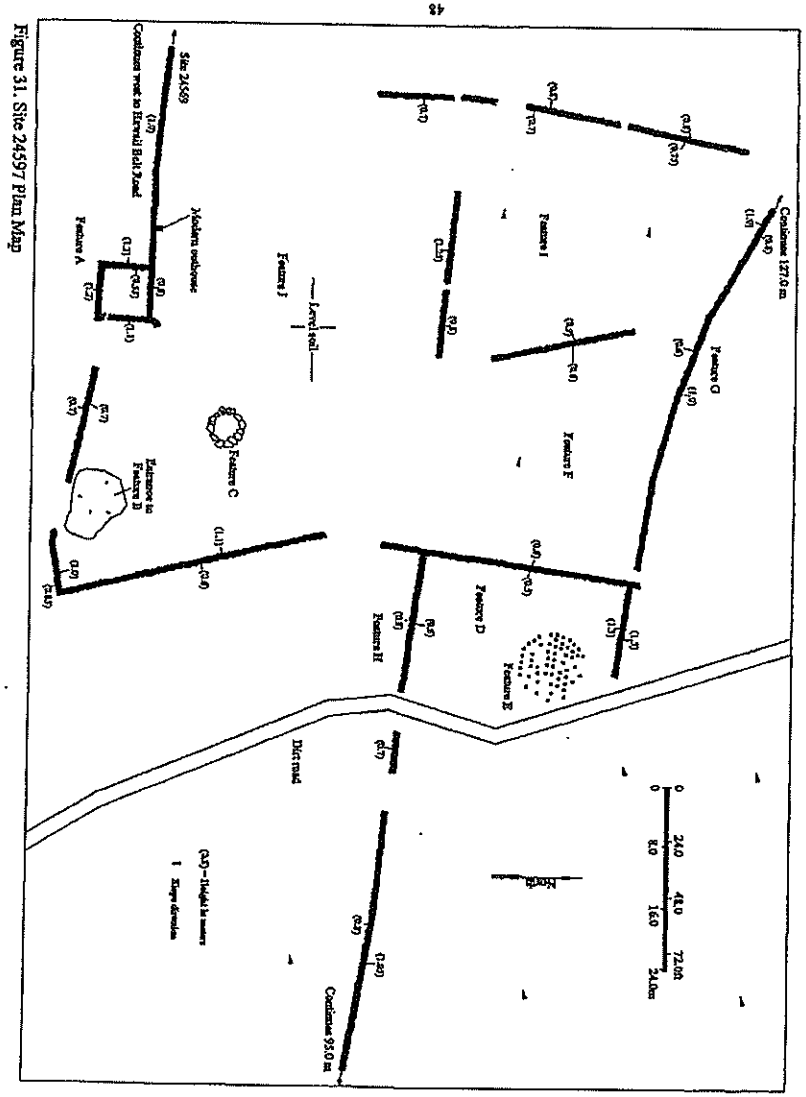

Figure 31. Site 24597 Plan Map

Feature A is a 7.0 m square-shaped enclosure that is located at the southwestern end of the site at the inland end of the Site 24569 wall. The north wall of the enclosure is formed by Site 24569, with free-standing, stacked and faced cobble and small boulder walls extending along the east-west and south sides. The walls range in width from 0.9 to 1.0 m at the base and 0.8 to 0.9 m at the top, and vary in height from 0.55 to 1.3 m. Portions of each wall have collapsed though the majority of the enclosure is intact. There is a 0.8 m wide gap in the eastern wall at the southern end which appears to have functioned as an entrance into the interior. The floor of the enclosure is comprised of a level soil deposit. An *ohia* post is incorporated into the western wall and a galvanized metal pipe extends under the west wall at the northern end. A brown glass Dianippon bottle is present on top of the west wall. A modern outhouse is located against the north side of the Site 24569 wall to the west of the enclosure.

Feature B is a lava tube located within the Feature J enclosure (discussed below). The entrance to the tube is through an oval-shaped sinkhole that is 11.6 m long (northwest by southeast), 5.8 to 9.5 m wide and 4.0 m in depth (*Figure 32*). The entrance is 5.7 m wide and 2.35 m in height and opens onto an irregularly-shaped chamber that is 31.6 m long (northwest by southeast) and from 9.5 to 15.2 m wide. The ceiling height varies from 1.3 m to 4.0 m and the floor is largely covered by collapsed rubble.

Three horizontal slab steps are present in the sloping rubble 2.0 m east of the entrance, leading down into the chamber. A terrace constructed of boulders is located at the base of the sloping rubble slope, 6.0 m east of the entrance. The terrace is 7.25 m long (north-south) by 3.7 m wide and evidences a stacked pahoehoe boulders and cobble retaining wall along the north and east sides that ranges in height from 0.6 to 0.9 m. The surface is comprised of a level slab pavement.

There is a concentration of pig and cow bones located along the north wall of the chamber, with a concentration of charcoal situated to the west. A second pig skeleton is situated at the eastern end of the chamber, with two charcoal concentrations located against the eastern wall of the chamber.

A small chamber extends to the northwest, north of the terrace. This chamber is 5.5 m long (northwest by southeast) and from 1.4 to 2.3 m wide. The ceiling height averages 1.3 m and the floor is bare lava. Several metal barrel hoops and a concentration of charcoal are present in the chamber. A second small chamber underlies the floor of the main chamber and is accessed from a low overhang along the north wall. This chamber is 3.5 m long (northwest by southeast) by 2.0 m wide and the ceiling height is 0.75 m. No cultural remains were present.

Feature C is an oval-shaped alignment of boulders and large cobbles located 15.0 m north-northwest of the entrance to the Feature B lava tube (see *Figure 32*) in an area of level soil. The alignment is 6.4 m long (north-south) and 5.9 m wide, with the stones varying in height from 0.4 to 0.8 m. Charcoal and burnt wood are present inside the feature. No other cultural remains were observed.

Feature D is a rectangular-shaped enclosure located in the northern portion of the site. The enclosure is 28.5 m long (north-northeast by south-southwest) and 18.4 m wide. The north side of the enclosure is formed by the Feature G wall and the south side is formed by the Feature H wall (discussed below). The western side is delineated by a stone wall and the eastern side is bordered by a dirt road. The Feature E water tank foundation (discussed below) is present within the Feature D enclosure.

The walls of the enclosure are built of stacked and faced cobbles and small boulders, ranging in width at the base from 0.85 to 1.1 m, at the top from 0.75 to 0.9 m and in height from 0.5 to 1.5 m. Portions of the walls have collapsed although the majority of the feature is intact. A clear glass jug is present on top of the western wall (*Figure 33*). The interior consists of a level soil deposit.

Feature E consists of a roughly circular-shaped configuration of pier blocks situated within the Feature D enclosure. The configuration is c. 9.0 m in diameter and is comprised 54 small concrete pier blocks (*Figure 34*). Roughly half of the piers are concrete formed block piers 0.25 m square and 0.20 m tall. The rest are small concrete pads poured crudely over boulders, each with the impression of the base of a 4-in square post. Bar strapping for tank planks are exposed on the ground surface in the southeast quad-

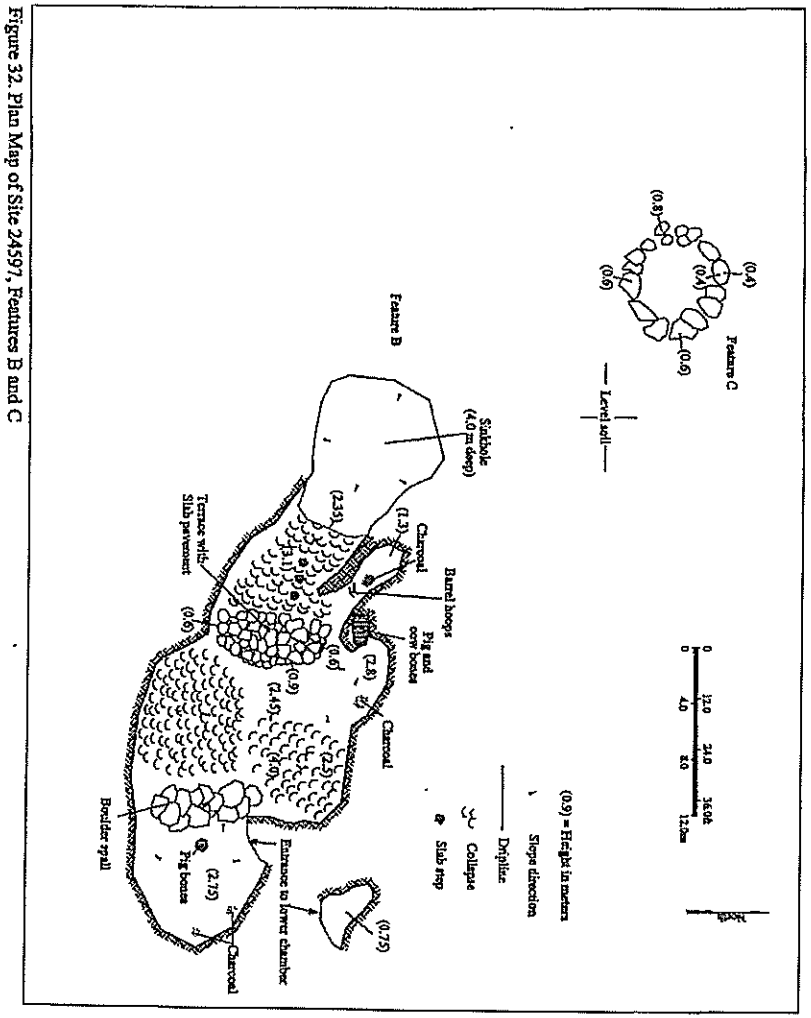

Figure 32. Plan Map of Site 24597, Features B and C

Figure 33. Site 24597, Feature D Enclosure Wall, view to north

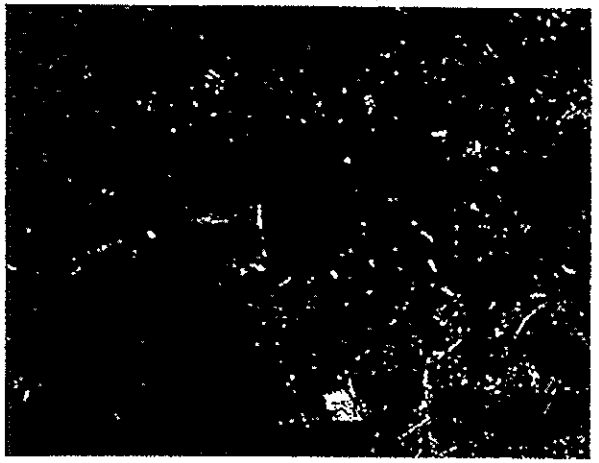

Figure 34. Site 24597, Feature E Tank Fondation, view to north

rant of the foundation and a 2 ½ -in elbow pipe fragment is exposed on the eastern perimeter of the foundation.

Feature F is a trapezoidal-shaped enclosure located to the west of Feature D. The east wall is formed by the western wall of Feature D, the north wall is formed by the Feature G wall and the west side is delineated by the eastern wall of the Feature I enclosure. The enclosure is open to the south. The feature is 34.6 m long (north-south), and from 25.0 to 3.4 m wide. As the walls of this enclosure are formed by elements of other features, the description of the enclosure walls are discussed elsewhere. The interior is comprised of a sloping soil deposit with no cultural remains.

Feature G is a stone wall that forms the northern side of the site complex. This wall forms the northern side of the Feature D, F and I enclosures. It originates on the western side of a dirt access road and extends to the west-northwest for 29.5 m. It then angles to the northwest for 164.5 m where it terminates. There is 1.8 m wide gap in the wall on the eastern side of the Feature D enclosure. The wall is built of stacked and faced cobbles and small boulders, ranging in width at the base from 0.85 to 1.1 m, at the top from 0.8 to 1.0 m and in height from 0.6 to 1.5 m (*Figure 35*). The majority of the wall is intact with minor collapse noted. No cultural remains were noted.

Feature H is a stone wall located in eastern portion of the site. The wall originates at the southwestern corner of Feature D (forming the south wall of this enclosure). It extends upslope to the east-southeast for 164.0 m where it terminates. This wall is also built of stacked and faced cobbles and small boulders, varying in width at the base from 0.9 to 1.0 m, at the top from 0.9 to 1.0 m and in height from 0.6 to 1.05 m (*Figure 36*). The wall has been truncated by a dirt road along the east side of the Feature D enclosure and there is 5.0 m wide gap in the wall to the east of the road, which may have been created by bulldozer activity in the area.

Feature I is a trapezoidal-shaped enclosure located adjacent to the Feature F enclosure to the west. The west side of the enclosure is formed by Feature F, the north side is formed by Feature G and the west and south sides are formed by discontinuous stone walls. The enclosure is 40.0 m long (north-south) and from 24.0 to 35.0 m wide. The walls are built of stacked and faced cobbles and small boulders, ranging in width at the base from 0.85 to 1.0 m, at the top from 0.75 to 0.9 m and in height from 0.6 to 1.25 m. The interior consists of sloping soil. No cultural remains were noted.

Feature J is a large roughly rectangular-shaped enclosure located in the southwestern portion of the site. The enclosure is formed by the Site 24569 wall at the southwest end, by the south side of Features F and I to the north and by stone walls at the southeast and east end. The Feature B lava tube and the Feature C alignment are present within the enclosure. The enclosure is 59.0 m long (east-west) and from 40.0 to 47.0 m wide. The walls are built of stacked and faced cobbles and small boulders, ranging in width at the base from 0.8 to 1.0 m, at the top from 0.8 to 0.9 m and in height from 0.6 to 1.0 m. Portions of each side of the enclosure have been destroyed, likely the result of bulldozer activity. The interior of the enclosure is comprised of relatively level soil with no cultural remains present.

Site 24597 is interpreted as an historic livestock control/habitation complex. The walls and enclosures within the site likely functioned as cattle pens due to their height and method of construction. The Feature B lava tube evidences historic debris and potentially served as a shelter with the slab terrace likely functioning as a work area. The Feature C oval alignment contains burnt wood and charcoal and appears to have served as a camp fire ring with the boulders serving as seats. The Feature E configuration of pier blocks likely served as the foundation for a water tank. The Site 24596 pipeline located to the west of the site probably once fed the water tank. This water line is depicted on a 1928 map (see *Figure 4*). The site is altered and in fair to good condition.

Site 24598

Site 24598 is a terrace remnant located in the inland portion of the project area at c. 2,720 ft elevation. The terrace consists of a retaining wall constructed on the north side of a bedrock outcrop (*Figure 37*). The retaining wall is built of crudely stacked cobbles and small boulders one to two courses high. The

Figure 35. Site 24597, Feature G Wall, view to west

Figure 36. Site 24597, Feature H Wall, view to northwest

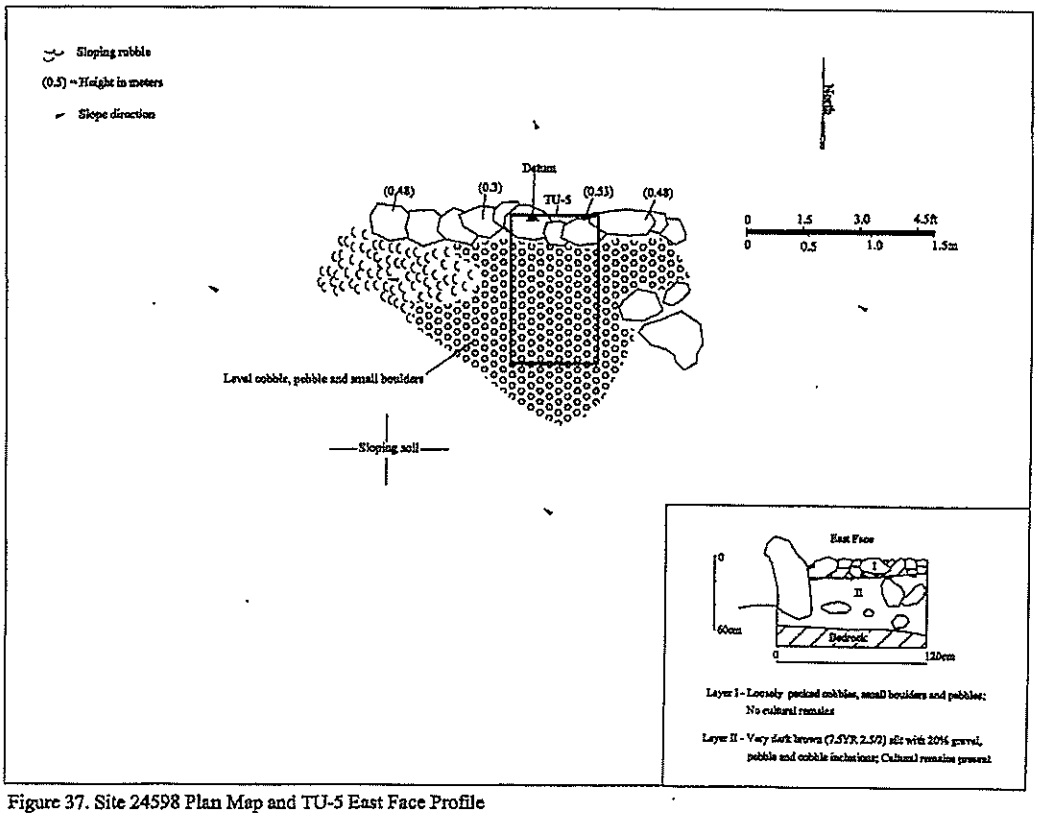

Figure 37. Site 24598 Plan Map and TU-5 East Face Profile

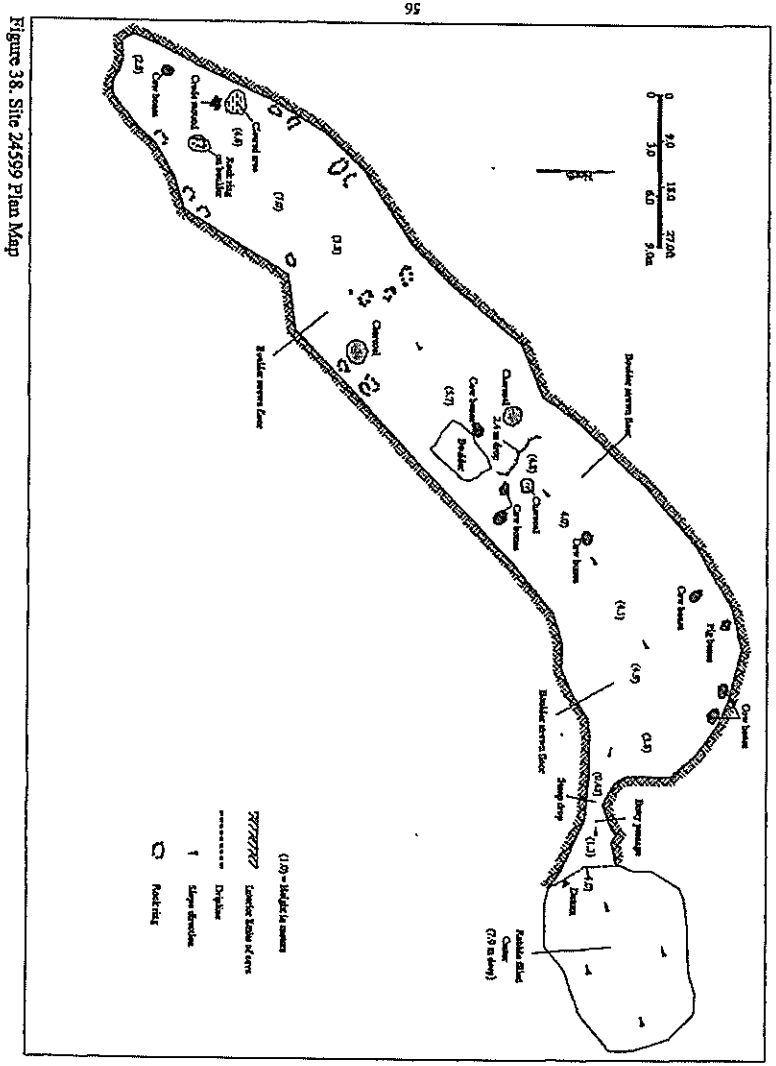

Figure 38. Site 24599 Plan Map

terrace measures 2.65 m long (east-west) by 1.75 m wide. The height of the retaining wall varies from 0.3 to 0.53 m. The terrace surface is comprised of relatively level pebbles, cobbles and small boulders with no cultural remains present. The upper surface appears to have been truncated on the southeast and southwest sides by bulldozing.

A 1.2 m by 0.7 m test unit (TU-5) was excavated into the surface of the terrace on the south side of the retaining wall. The excavation revealed two layers overlying bedrock (see *Figure 32*). Layer I consists of 0.12 to 0.53 m of subangular basalt pebbles, cobbles and small boulders representing pavement fill. No cultural material was recovered from Layer I. Layer II underlies Layer I and consists of 0.4 to 0.51 m of very dark brown (7.5YR 2.5/2) silt containing 20% angular gravel, pebble and cobble inclusions. A basalt tertiary flake fragment (18.5 g), 11 unidentifiable fish bones (5.0 g), a piece of waterworn coral (5.6 g), and 68 fragments of charcoal (13.9 g) were recovered from Layer II. Site 24598 is interpreted as a temporary habitation site based on its formal type, its small area (5.25 sq m), and its informal construction. The site is altered and in fair to good condition.

Site 24599

Site 24599 is a lava tube located in the inland portion of the project area, seaward of the access road leading to Mt. Moanuiabea at c. 3,025 ft elevation. Access to the tube is through a large rubble-filled crater 10.8 m long (east-west) by 8.2 m wide and 7.0 m deep (*Figure 38*). The lava tube is entered from the west side of the crater, through an opening that is 3.75 m wide and the dripline is 4.0 m in height. This entry passage consists of a narrow chamber that angles down steeply to the east, with a floor comprised of loose boulder and cobble roof fall. This entry passage is 5.4 m long (east-west), but which drops approximately 7.0 m. The width of this passage is 1.0 to 2.7 m wide and from 0.45 to 1.3 m in height.

The entry passage opens onto a large oval-shaped chamber that is 53.0 m long (northeast by southwest) and from 2.5 to 11.0 m wide. The ceiling heights range from 2.0 to 7.0 m and the floor is comprised of boulder and cobble roof fall that angles down to the southeast. There is a 2.4 m drop in the center of the chamber. Seven cow skeletons and a pig skeleton are present amidst the roof fall; representing obvious casualties resulting from livestock becoming trapped by the steep crater walls. Concentrations of charcoal are exposed on the floor at the southwestern end of the collapsed debris. The floor of the western half of the chamber is relatively level but uneven and copious charcoal is scattered among collapsed rubble on the floor. Fifteen rock alignments are constructed on the floor in the western half of the lava tube. Most are clustered along the chamber walls, although one is situated on top of a large boulder. These alignments range in length from 0.7 to 1.5 m and in width from 0.4 to 0.9 m, and functioned to support water catchment gourds.

Site 24599 is interpreted as a temporary habitation and water catchment locale based on its formal, the presence of the water catchment supports and cultural material. The site is unaltered and in fair to good condition.

Site 24600

Site 24600 consists of a lava tube that has been buried by bulldozer activity prior to the current project. Although the site not examined by Corbin (2004) it was designated as Site 2428-1. According to Corbin (2004:11), the site was identified by Mr. Medeiros during bulldozing activity decades ago when the tube was mechanically breached and exposed human remains. Mr. Medeiros recalled that there was an eight to nine foot drop into the tube and that it is oriented in an east-west direction. The tube reportedly extended c. 20.0 m upslope and also downslope, although the downslope side was not explored. Mr. Medeiros indicated that the rebar was placed over the burial and the entrance was re-sealed with boulders, stones and soil.

A bulldozed area representing the sealed entrance to the tube was pointed out by Mr. Medeiros during the present project. This area is located at the northern side of the 13th green, east of the Site 24583 enclosure at the c. 2,480 ft elevation.

Site 24601

Site 24601 is a burial mound that was disturbed prior to the present project. The location of the mound was reported to Corbin (2004) by Mr. Medeiros, who stated that it was noted during previous bulldozer activity in the area and measured 2.0 feet across and 1.0 ft in height (2004:12). Human remains were reportedly located beneath the stones. Corbin (2004) examined the area in which the mound was reportedly situated but were unable to locate it. No other information concerning this site is available.

The area in which the site was located was carefully examined during the present study. A bulldozed area possibly representing the remnants of this mound was noted to the east of the 11th green at c. 2,520 ft elevation.

CONCLUSION

Discussion

The identified sites and features conform to the traditional Hawaiian site/feature types expected in the Upland Forest Zone (Davis 1977, Cordy 1985) based on previous archaeological work and historic documentary research. As expected, agricultural features, temporary and permanent habitation sites, burials and a possible *heiau* or men's house were identified. Also, as expected, historic remains consist of historic habitation features, animal pens, and ranch walls. The massive prior disturbance associated with pasture improvement nearly eliminated traditional Hawaiian surface structural remains. Agricultural features that probably once dominated the landscape are only represented by seven features consisting of five mounds, a modified outcrop, and a small enclosure.

Aside from the large enclosure at Site 24573, which probably escaped destruction because of its proximity to several large trees, the only other surface evidence of probable traditional Hawaiian occupation consists of a terrace remnant (Site 24598), a burial mound (Site 24601), and wall remnants at Sites 24575, 24579 and 24581. The wall remnants at Site 24579 were interpreted as possible temporary habitation features. The wall remnant at Site 24575 was assigned an indeterminate function based on the absence of cultural remains. These wall remnants consist of the basal portion of walls. The walls at Sites 24575 and Feature A at Site 24579 were bi-faced; 1.0 to 1.3 m thick at Site 24575 and 0.4 m thick at Site 24579. The wall remnant at Site 24581 apparently represent one intact side of an enclosure that was interpreted to be a permanent habitation site based on the wall's faced sides and estimated minimum area of the structure using Cordy's (1981) definition for permanent housing.

The best preserved evidence of traditional Hawaiian occupation is present in caves. The ten temporary habitation sites consist of seven lava tubes, a lava blister, and the terrace remnant and two wall remnants mentioned above. The amount of cultural material in the caves is very minimal consisting of a single artifact, a volcanic glass core at Site 24585, and sparse amounts of food remains including marine shell (Site 24582), fish bone (Site 24589), a crab claw (Site 24582), and bird bone (24582). Pig bone was present in three caves (Sites 24574, 24584, 24585), and dog bone is present at one cave (Site 24582), but these remains potentially were deposited naturally because the bone lacks evidence of butchering or cooking. Charcoal is present in all of the caves. The very limited amounts of portable remains indicate that habitation use probably was limited to periods of very short duration, potentially lasting hours or at most overnight. Two caves (Sites 24584 and 24586) had short segments of steppingstone paths that apparently facilitated passage through areas of floor strewn with roof fall.

Five of the lava tubes contained evidence of use for collecting water from seeps in the cave ceilings. This evidence consists of 48 oval to elliptical-shaped alignments of cobbles situated under seeps in the cave ceilings. These were concentrated in four caves: Site 24582 had 11 alignments, Site 24584 had nine, Site 24586 had 12, and Site 24599 had 15. Site 21 only had one. In several cases, the alignments utilize irregularities in the cave floor or the cave wall as part of the support structure. These alignments functioned to support vessels used to collect water.

Elsewhere such alignments frequently are circular. These features are interpreted as supports for gourds used to collect water based on the presence of gourd fragments and circular shape. The alignments in the project area differ in that most are oval to elliptical. This is reflected in the dimensions of the features which average 0.84 to 1.7 m in length and 0.45 to 0.91 m in width. This shape would be better suited to support the canoe-like troughs made of wood described in the story of Makalei for a water collecting cave on the southern slope of Akahipu'u (Maly 1998:57-71), which is situated immediately north of the project area. According to the story, the water was used to irrigate crops at night. The large number of alignments in these caves potentially supports use for irrigation because the potential volume of collected water would probably exceed the amount necessary for drinking and cooking.

The Site 24573 enclosure is interpreted as a possible ceremonial feature, potentially representing a men's house. This is based on the substantially constructed nature of the enclosure (faced sides), its large area (73.5 sq m), and the presence of the internal bench feature that probably served as an altar based on the presence of branch coral that probably represent offerings. Cordy (1981:82) reported a range of 42-144 sq m with an average of 94 sq m for structures interpreted to be men's houses. Typically, a men's house is associated with a number of other residential structures, but these are lacking for Site 24573, potentially the result of mechanical disturbance. Alternatively, the site may be a small *heiau*.

Burials are present at three sites. At Site 24579, human skeletal remains are present in a lava blister covered with a slab. Site 24600 is the reported location of a lava tube containing human remains revealing during earthmoving with heavy equipment that subsequently was sealed and buried. Site 24601 is a mound of stones where human remains were discovered during grubbing.

Historic sites consist of habitation features, several corrals and paddocks, three concrete foundations, walls, a water tank foundation, a camp fire ring, and two roads, one associated with a pipeline. The habitation features consist of an enclosure (Site 24580), a lava tube (Site 24597, Feature B) and a camp fire ring (Site 24597, Feature C). The majority of these features were associated with Hu'ehu'e Ranch operations. The route of the Site 24596 road and pipeline apparent has shifted over time. The 1928 quadrangle map (see *Figure 4*) shows the pipeline extending through the Site 24597 ranch complex where it probably fed the Feature E reservoir. Subsequently the route within the project area apparently shifted seaward as depicted in *Figure 6*. The shifted route corresponds to the trail alignment shown on the current tax map.

Significance Assessments

Pursuant to DLNR (1998) Chapter 275-6 (d), the initial significance assessments provided herein are not final until concurrence from the DLNR has been obtained. Sites identified and relocated during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 1998:Chap. 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

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

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

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

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

5. Criterion "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.

Based on the above criteria, all thirty-four sites are assessed as significant under Criterion "d" (*Table 3*). The sites have yielded information important for understanding prehistoric to historic land use in the project area. Site 24573 also is assessed as significant under Criterion "c" as good site type example of small *heiau* or men's house. As a ritual feature Site 24573 have associations with traditional Hawaiian beliefs important to Hawaiian history and cultural identity and is additionally assessed as significant under Criterion "e". Sites 24579, 24600 and 24601 are additionally assessed as culturally significant because probable pre-contact burials are present.

Table 3. Site Significance and Recommended Treatment

SIHP Site No.	Type	Function	Significance Criteria*	Recommended Treatment**
24568	Wall	Livestock control	D	NFW
24569	Wall	Livestock control	D	NFW
24570	Enclosure	Livestock control	D	NFW
24571	Enclosure	Livestock control	D	NFW
24572	Enclosure	Agriculture	D	NFW
24573	Enclosure	Ceremonial	C, D, E	PR
24574	Lava Tube	Temporary Habitation	D	DR
24575	Wall	Indeterminate	D	DR
24576	Mound	Agriculture	D	NFW
24577	Enclosure	Livestock control	D	NFW
24578	Lava Blister	Temporary Habitation	D	DR
24579	Complex	Temporary Habitation/Burial	D, E	PR
24580	Enclosure	Historic Habitation	D	NFW
24581	Enclosure	Permanent Habitation	D	DR
24582	Lava Tube	Temporary Habitation	D	DR
24583	Enclosure	Livestock control	D	NFW
24584	Complex	Temporary Habitation	D	DR
24585	Lava Tube	Temporary Habitation	D	DR
24586	Complex	Temporary Habitation	D	DR
24587	Cairn	Marker	D	NFW
24588	Cairn	Marker	D	NFW
24589	Lava Tube	Temporary Habitation	D	DR
24590	Cairn	Marker	D	NFW
24591	Modified Outcrop	Agriculture	D	NFW
24592	Complex	Agriculture	D	NFW
24593	Complex	Indeterminate	D	PR
24594	Retaining wall	Transportation	D	NFW
24595	Complex	Foundation	D	NFW
24596	Pipeline	Water transportation	D	NFW
24597	Complex	Livestock control/ Water storage/ Historic Habitation	D	NFW
24598	Terrace	Temporary Habitation	D	DR
24599	Lava tube	Temporary Habitation	D	PR
24600	Lava tube	Burial	D, E	PR
24601	Mound	Burial	D, E	PR

*C-Site Type Example
D - Important for Information Content
E - Cultural Value

**NFW - No further work
DR - Data Recovery
PR - Preservation

REFERENCES

Armstrong, R.W. (editor)
1983 *Atlas of Hawai'i*. Honolulu: University of Hawai'i Press. (Second edition)

Carpenter, A., M. Major and M. Yent
1998 Archaeological Reconnaissance Survey, Kekaha Kai State Park, Mahai'ula Section, Kaulana and Mahai'ula Ahupua'a, North Kona, Island of Hawaii. State of Hawaii, Department of Land and Natural Resources Report.

Ching, F.
1971 The Archaeology of South Kohala & North Kona: From the Ahupua'a of Lalamilo to the Ahupua'a of Hamanamana, Surface Survey Kailua-Kawaihae Road Corridor (Section III). Hawaii State Archaeological Journal 71-1. State of Hawaii, Department of Land and Natural Resources, Division of State Parks, Honolulu.

Clark, M., D. Amerine, J. Nelson, C. Hand, M. Winburn, K. McCune and R. Rechtman
2004 Addendum: Archaeological Inventory Survey of the Kau Development Area (TMK: 3-7-205:por. 1). Rechtman Consulting, LLC Report prepared for Hiluhilu Development, LLC, Kamuela, Hi.

Corbin, A.
2003 Archaeological Inventory Survey, Proposed Access Road Easement, Pu'ukala-Kalana Homesteads Parcels, Land of Pu'ukala, North Kona District, Island of Hawaii (TMK: 3-7-2-06:4, 5, 6, 27). PHRI Report 2311-041503 prepared for Pacific Rim Education Foundation.

2004 Archaeological Assessment Survey for Due Diligence, Makalei Country Club and Adjacent Lands, Maniniowale, Makalawena, Mahai'ula, Kaulana, Awalua, Ohiki, Pu'ukala and Kau, North Kona District, Island of Hawaii (TMK: (3) 7-2-4:7; 7-2-5:5; 7-2-6:por. 9, 13, 23, 26; 7-2-7:1). PHRI Report 2428-070104 prepared for Scott Bates, LGB, Inc.

Cordy, R.
1981 *A Study of Prehistoric Social Change: The Development of Complex Societies in the Hawaiian Islands*. Academic Press. New York.

1985 Working Paper 1. Hawaii Island Archaeology, 'O'oma & Kalaoa Ahupua'a, Kekaha, North Kona. Historic Sites Section, Department of Land and Natural Resources, State of Hawaii.

Davis, B.
1977 Archaeological Survey of the Proposed Agricultural Park at Ke-ahole, North Kona, Hawaii Island. Archaeological Research Center Hawaii, Inc. Prepared for Department of Agriculture.

DLNR (Department of Land and Natural Resources)
2003 Hawai'i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules.

Ellis, W.
1963 *Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee*. Honolulu: Advertiser Publishing Co.

FR
n.d. Foreign Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

Recommended Treatments

The mapping, written descriptions, photography, and test excavations at eighteen sites adequately documents them and no further work or preservation is recommended (see *Table 3*). Ten sites are recommended for mitigation through data recovery. The plans for data recovery would be detailed in a Data Recovery Plan prepared for DLNR-SHPD review and approval. Sites 24573, 24593, and 24599 are recommended for preservation in accordance with a Site Preservation Plan prepared for DLNR-SHPD review and approval. The specific plans for preservation and maintenance of the burials at Sites 24579, 24600, and 24601 would be detailed in a Burial Treatment Plan prepared for DLNR-SHPD and the Hawaii Island Burial Council (HIBC) review and approval.

1989 Archaeological Inventory Survey, Phase I – Site Identification, Kau Well Filed Site Project Area, Land of Kau, North Kona, Hawaii (TMK: 7-2-05:por 1). PHRI Report 760-121289 prepared for Nansay Hawaii, Inc.

1990 Archaeological Inventory Survey, Phase I Site Identification, Kau Waterline/Roadway Project (TMK:7-2-05:por 1.). PHRI Report 760-022290 prepared for Nansay Hawaii, Inc.

2001 Request to State Historic Preservation Division for Determination of "No Historic Properties Affected" Puukala Mauka Parcel, Land of Puukala, North Kona District, Island of Hawaii (TMK: 3-7-2-06:4).

Sato, H.H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro, Jr.
1973 *Soil Survey of the Island of Hawai'i, State of Hawai'i.* U.S. Department of Agriculture, Soil Conservation Service and University of Hawai'i Agricultural Experiment Station. Washington, D.C.: Government Printing Office.

Schilz, A., K. Shun, S. Williams and R. Nees
1993 Archaeological Survey and Evaluation, Lands of Kau, North Kona, Hawaii Island. Ogden Environmental and Energy Services Co., Inc. Report prepared for Nansay Hawaii, Inc.

Schilt, A.R.
1984 Subsistence and Conflict in Kona, Hawai'i. An Archaeological Study of the Kuakini Highway Realignment Corridor. *Departmental Report Series* 84-1. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for Department of Transportation, State of Hawai'i.

Soehren, L.
1982 Letter Report of an Archaeological and Historical Reconnaissance Survey of TMK: 7-3-05:13, Kalaoa 4, North Kona, Hawaii. Historic Sites Section (H-282), Division of State Parks, department of Land and Natural Resources, State of Hawaii

Stokes, J.F.G.
1991 Heiau of the Island of Hawai'i. *Bishop Museum Bulletin in Anthropology* 2. Bishop Museum Press, Honolulu.

Waihona 'Aina Corporation
1998 The Mahele Database, waihona.com.

Walker, A., and P. Rosendahl
1990 Archaeological Inventory Survey, Kona Palisades Development Parcel, Land of Kalaoa 4th, North Kona District, Island of Hawaii (TMK: 3-7-3-05:86). PHRI Report 806. Prepared for Ken World, Inc.

Williams, S., F. Elbe, C. O'Hare, T. Moorman, and R. Nees
2002 Archaeological Data Recovery of Selected Sites above 950-Feet Elevation in Makalei Estates Subdivision, Kau Ahupua'a, North Kona District, Island of Hawaii (TMK: 07-02-05:01). AMEC Earth and Environmental, Inc. Report prepared for Island Advisors, Inc.

Wolfe, E., and J. Morris
2001 Geological Map of the Island of Hawaii. U.S. Department of the Interior. U.S Geological Survey

FT
n.d. Foreign Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

Haun, A.
2001 Archaeological Assessment, TMK: 7-2-06:27, Land of Puukala, North Kona District, Island of Hawaii. Haun & Associates Report 124-082301 prepared for Mr. Ran Tully.

Head, J., and P. Rosendahl
1993 Archaeological Inventory Survey, Kailua to Keahole Region State Lands LUC Project – 500-acre University Site, Lands of Makaula, Halaohiu, Hamanamana and Kalaoa 1-4, North Kona District, Island of Hawaii. PHRI Report 1298. Prepared for Helber, Hastert & Fee.

Indices
1929 *Indices of Awards Made by the Board of Land Commissioners to Quiet Land Titles in the Hawaiian Islands.* Territory of Hawai'i, Honolulu.

Juvik, S.P. and J.O. Juvik (editors)
1998 *Atlas of Hawaii,* Third Edition. University of Hawaii Press. Honolulu.

Kamakau, S.M.
1961 *Ruling Chiefs of Hawaii.* Honolulu: The Kamehameha Schools Press.

Kelly, M.
1971 *Kekaha: 'Aina Malo'o. A Survey of the Background and History of Koloko and Kukio, North Kona, Hawaii.* Departmental Report Series 71-2. Department of Anthropology, B.P. Bishop Museum, Honolulu.

Kikuchi, J.
1973 *Hawaiian Agricultural Systems".* Ph.D Dissertation, University of Arizona.

Maly, K.
1998 Ali'i Highway Phased Mitigation Program, Phase I - Archaeological Intensive Survey, North Kona District, Island of Hawai'i. Volumes IVa and IVb-Informant Interviews. PHRI Project 1320-040197. Prepared for the County of Hawai'i.

NR
n.d. Native Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

NT
n.d. Native Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaii State Archives.

Pukui, M., S. Elbert and E. Mo'okini
1976 *Place Names of Hawai'i.* University of Hawai'i Press, Honolulu

Reinecke, J.E.
n.d. Survey of Sites on West Hawai'i. Ms. In Bishop Museum (1930).

Rosendahl, P.
1973 Archaeological Salvage of the Kea-hole to 'Anaeho'omalu Section of the Kailua-Kawaihae Road (Queen Ka'ahumanu Highway), Island of Hawaii. Dept. of Anthropology, B.P. Bishop Museum.

Appendix C

Pre-consultation Comments Received & Written Responses

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Glen P.I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT

25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 981-8394 • Fax (808) 981-2037

May 10, 2007

Mr. Vincent Shigekumi
PBR Hawaii
101 Aupuni Street
Suite 310
Hilo, Hawaii 96720

RE: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION
MAKALEI, NORTH KONA, ISLAND OF HAWAI'I
DRAFT ENVIRONMENTAL ASSESSMENT

In reference to the above property, our office has no records of any environmentally-related activities, incidents, permits or issues.

DARRYL OLIVEIRA
Fire Chief

PBW:lpc

Hawai'i County is an Equal Opportunity Provider and Employer.

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& ASSOCIATES, INC.

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Tel: (808) 242-2878

May 16, 2007

Mr. Darryl J. Oliveira, Fire Chief
County of Hawai'i
Hawai'i Fire Department
25 Aupuni Street, Room 103
Hilo, Hawai'i 96720

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Chief Oliveira,

Thank you for your letter dated May 10, 2007. We acknowledge that the Fire Department has no records of any environmentally-related activities, incidents, permits or issues related to the Makalei Fire Station site.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

O:\JOB09\920.11 Makalei Fire Station EA\Pre-Consultation\Acknowledgement Letters\Fire 5-16-2007.doc

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

March 29, 2007

Regulatory Branch

File Number POH-2007-121

Mr. Vincent Shigekuni
Vice-President
PBR Hawaii & Associates, Inc.
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, HI 96858

Dear Mr. Shigekuni:

This responds to your request for written comments for a draft Environmental Assessment (dEA) which will address activities and impacts of the proposed Makalei Fires Station Project at Kailua-Kona, Hawaii Island (TMK (3) 7-2-007: por. 01).

The dEA should indicate whether waters of the United States, as represented by perennial, intermittent and ephemeral streams to include special aquatic sites such as wetlands and anchialine ponds, are in, adjacent to, or absent from, the proposed project area. The dEA should include site-specific floral, faunal and cultural investigation reports and state in appropriate sections that there is, or there is no potential for waters of the U.S. to be impacted by construction of project structures and associated ground disturbing activities within the proposed improvement area. The dEA document should also specifically include information on the location and capacity of drainage ways which convey waters from the project site to the Pacific Ocean, and where they occur, specific information should be presented in descriptive and photographic form regarding the existing bed and bank structure and the presence or absence of Ordinary High Water Mark (OHWM) indicators. Upon our receipt of the dEA, it may be determined whether a Department of Army (DA) permit for Section 404 activities of the Clean Water Act may, or may not be, required for the proposed Makalei Fire Station Project.

Thank you for your consideration of potential impacts to the aquatic environment of the West Hawaii watershed system. Please contact Mr. Farley Watanabe of my staff at 438-7701, or facsimile 438-4060, if you have any questions or need additional information. Please refer to the file number above in any written correspondence with us.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

PBR HAWAII
& ASSOCIATES, INC.

April 26, 2007

W. FRANK BRANDT, FASLA
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SCOTT MURAKAMI, ASLA
Associate

Mr. George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawai'i 96858

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Young,

Thank you for your letter dated March 29, 2007 (File Number POH-2007-121). We offer the following response to your comments:

There appears to be no waters of the United States, as represented by perennial, intermittent and ephemeral streams, including special aquatic sites such as wetlands and anchialine ponds in the proposed project area. Enclosed is the USGS map which does not delineate any streams located nearby or in the proposed project area (Figure 1). This map will also be included in the DEA. Also, note that the project area is approximately 4.8 miles from the Pacific Ocean.

Please be assured that you will be sent a copy of the DEA and we look forward to your determination whether or not a Department of Army (DA) permit for Section 404 activities of the Clean Water Act will be required for the Makalei Fire Station.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD06/2977

April 23, 2007

Vincent Shigekuni
PBR Hawaii
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, HI 96813

RE: Pre-Consultation for the Proposed Makalei Fire Station, North Kona, Hawai'i Island, TMK (3) 7-2-07: 01 (por.).

Dear Mr. Shigekuni,

The Office of Hawaiian Affairs (OHA) is in receipt of your March 30, 2007 submission and offers the following comments:

Our staff has no comment specific to the above-listed consultation request at this time. We do however look forward to reviewing the Draft Environmental Assessment upon completion.

OHA asks that, in accordance with Section 6E-46.6, Hawaii Revised Statutes and Chapter 13-300, Hawaii Administrative Rules, if the project moves forward, and if any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) shall be contacted.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck, Native Rights Policy Advocate, at (808) 594-0239 or jessey@oha.org.

Aloha,

Clyde W. Nāmu'o
Administrator

CC: Ruby McDonald
OHA Community Affairs Coordinator (Kailua-Kona)
75-5706 Hanama Pl., Suite 107
Kailua-Kona, HI 96740

PBR HAWAII
& ASSOCIATES, INC.

May 1, 2007

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Associate

SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA
Associate

Mr. Clyde W. Nāmu'o, Administrator
Office of Hawaiian Affairs
State of Hawai'i
711 Kapi'olani Blvd., Suite 500
Honolulu, Hawai'i 96813

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Nāmu'o,

Thank you for your letter dated April 23, 2007. We acknowledge that the Office of Hawaiian Affairs has no comments to offer at this time. Please be assured that all rules and regulations will be followed including Section 6E-46.6, Hawaii Revised Statutes and Chapter 13-300, Hawaii Administrative Rules. Should any significant cultural deposits or human skeletal remains are encountered, work shall stop in the immediate vicinity and the State Historic Preservation Division (SHPD/DLNR) will be contacted.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BARRY FUKUNAGA
INTERIM DIRECTOR

Deputy Directors
FRANCIS PAUL KEENO
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.2463

April 18, 2007

Mr. Vincent Shigekuni
Vice President
PBR Hawaii & Associates, Inc.
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813-3483

Dear Mr. Shigekuni:

Subject: Proposed Makalei Fire Station
Pre-Consultation, Draft Environmental Assessment

Thank you for your early notification and inquiry on the subject proposed fire station.

We anticipate the fire station, by itself, will not have an adverse traffic impact on our highway and, therefore, will not require a traffic impact analysis report at this time. However, we will require that the parties involved with planning and constructing the fire station contact and do advance coordination with our Highways Division, through the Highways Hawaii District Office. Discussions with our Highways staff can cover the approval and documentation of the permitted access to the fronting highway, related design and layout factors for the driveway, including any signs or signalization for emergency vehicle responses out from the fire station, and the review and approval of construction plans of the facility for impacts to and along the highway right-of-way.

Also, if other county agencies and/or services are to be housed at the new facility, now or in the future, we request that we be apprised of the County's decision in advance to allow our Highways staff time to review any new or additional effects to the highway. If our Highways staff determine that there can be further impacts to the highway, we will need to reserve the right to impose other conditions as may be needed.

When the Draft Environmental Assessment is completed, we request that four (4) copies be transmitted to our Highways Division (three (3) copies to our Highways Planning Branch and one copy to our Highways Hawaii District Office) for review. Our Highways staff will provide further comments on the proposed fire station after examining the environmental assessment report.

We appreciate the courtesy of your consultation and for the opportunity to provide our initial comments.

Very truly yours,

BARRY FUKUNAGA
Interim Director of Transportation

PBR HAWAII
& ASSOCIATES, INC.

April 26, 2007

Mr. Barry Fukunaga, Interim Director of Transportation
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Fukunaga,

Thank you for your letter dated April 18, 2007 (reference: STP 8.2463). We offer the following responses to your comments:

- We acknowledge that the Department of Transportation will not require a traffic impact analysis report at this time; however, coordination with the Highways Division, through the Highways Hawai'i District Office is required and has been initiated by the project civil engineer, Wilson Okamoto & Associates, Inc., and will continue during the design of the project.
- Please be assured that if other County agencies and/or services are to be housed at the new facility, now or in the future, the Department of Transportation requests to be apprised of the County's decision in advance to allow your Highways staff time to review any new or additional effects to the highway.
- Please also be assured that the Department of Transportation would like to receive at least four (4) copies of the draft environmental assessment (three copies to the Highways Planning Branch and one copy to the Highways Hawai'i District Office).

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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Harry Kim
Mayor

Jane H. Testa
Director

Diane L. Ley
Deputy Director

County of Hawaii

DEPARTMENT OF RESEARCH AND DEVELOPMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8366 • Fax (808) 935-1205
E-mail: chresdev@co.hawaii.hi.us

April 18, 2007

Vincent Shigekuni, Vice-President
PBR Hawaii & Associates, Inc.
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawai`i 96813-3484

RE: Pre-Consultation for the Proposed Makalei Fire Station
Makalei, North Kona, Island of Hawai`i
Draft Environmental Assessment

Dear Mr. Shigekuni:

Thank you for providing the County of Hawai`i's Department of Research and Development with an opportunity to provide pre-consultation comments on the Draft Environmental Assessment for the proposed Makalei Fire Station in North Kona, Island of Hawai`i.

The Department has the following suggestions to offer as they relate to our policies and goals for energy conservation and energy self-sufficiency. Additionally, the suggestions will afford the proposed project the ability to significantly offset its continuing electrical utility expenses.

- All facilities should meet the minimum standard of the United States Environmental Protection Agency's (EPA) Energy Star rating.
- All hot water requirements should be met with solar water heater units.
- All facilities should include radiative barriers or R-19 equivalent in roofs and R-11 in walls.
- Consideration should be given to third party contract for the installation of a net metered photovoltaic system.

If additional information is needed related to energy conservation systems or cost-benefit analyses of such applications, please feel free to contact the County of Hawai`i's Energy Specialist, Robert Arrigoni, at 808.327.3664.

Again, thank you for this opportunity to provide comments.

Sincerely,

Diane Ley
Deputy Director

Hawai`i County is an Equal Opportunity Provider and Employer

PBR HAWAII
& ASSOCIATES, INC.

April 26, 2007

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RUSSELL Y. J. CHUNG, FASLA
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SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA
Associate

Ms. Diane Ley, Deputy Director
Department of Research and Development
County of Hawai'i
25 Aupuni Street, Room 109
Hilo, Hawai'i 96720

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Ley,

Thank you for your letter dated April 18, 2007. We offer the following responses to your suggestions:

- The Makalei Fire Station will meet the minimum standard of the United States Environmental Protection Agency's (EPA) Energy Star rating.
- The Makalei Fire Station will use either a solar water heating system or a heat recovery unit that utilizes heat captured from the air conditioning system to heat the water. The method that is the most cost-effective and energy efficient will be utilized.
- The Makalei Fire Station will include radiative barriers or R-19 equivalent insulation in roofs and R-11 insulation in walls.
- The Makalei Fire Station will incorporate photovoltaics if feasible.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EPO-07-066

April 16, 2007

Mr. Vincent Shigekuni
PBR Hawaii
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Shigekuni:

SUBJECT: Pre-consultation for the Proposed Makalei Fire Station, Makalei, North Kona, Island of Hawaii, Hawaii
TMK: (3) 7-2-007: 001 (portion)

Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time. We strongly recommend that you review all of the Standard Comments on our website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
HEER
EH-Hawaii

Clean Air Branch
Standard Comments

Construction/Demolition Involving Asbestos:

If the proposed project includes renovation/demolition activities which may involve asbestos, the applicant should contact the Asbestos Abatement Office in the Noise, Radiation and Indoor Air Quality Branch at 586-5800.

Control of Fugitive Dust:

A significant potential for fugitive dust emissions exists during all phases of construction and operations. Proposed activities that occur in proximity to existing residences, businesses, public areas or thoroughfares, exacerbate potential dust problems. It is recommended that a dust control management plan be developed which identifies and addresses all activities that have a potential to generate fugitive dust. The plan, which does *not* require DOH approval, would help with recognizing and minimizing the dust problems from the proposed project.

Activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance problems.

The contractor should provide adequate measures to control the fugitive dust from the road areas and during the various phases of construction. Examples of measures that can be implemented to control dust include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing dust from shoulders and access roads;
e) Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling dust from debris being hauled away from the project site.

If you have any questions, please contact the Clean Air Branch at 586-4200.

(6/15/05)

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of the subject document on (insert received date). The CWB has reviewed the limited information contained in the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 for this project. Pursuant to Federal Water Pollution Control Act (commonly known as the AClean Water Act≅ (CWA)), Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for A[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...≅ (emphasis added). The term Adischarge≅ is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40, Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

2. In accordance with HAR, Sections 11-55-04 and 11-55-34.05, the Director of Health may require the submittal of an individual permit application or a Notice of Intent (NOI) for general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES).

    1. An application for an NPDES individual permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

    2. An NOI to be covered by an NPDES general permit is to be submitted at least 30 days before the commencement of the respective activity. A separate NOI is needed for coverage under each NPDES general permit. The NOI forms may be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

        1. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi). [HAR, Chapter 11-55, Appendix B]

        2. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. **An NPDES permit is required before the commencement of the construction activities.** [HAR, Chapter 11-55, Appendix C]

        3. Discharges of treated effluent from leaking underground storage tank remedial activities. [HAR, Chapter 11-55, Appendix D]

        4. Discharges of once through cooling water less than one (1) million gallons per day. [HAR, Chapter 11-55, Appendix E]

        5. Discharges of hydrotesting water. [HAR, Chapter 11-55, Appendix F]

        6. Discharges of construction dewatering effluent. [HAR, Chapter 11-55, Appendix G]

        7. Discharges of treated effluent from petroleum bulk stations and terminals. [HAR, Chapter 11-55, Appendix H]

        8. Discharges of treated effluent from well drilling activities. [HAR, Chapter 11-55, Appendix I]

        9. Discharges of treated effluent from recycled water distribution systems. [HAR, Chapter 11-55, Appendix J]

        10. Discharges of storm water from a small municipal separate storm sewer system. [HAR, Chapter 11-55, Appendix K]

        11. Discharges of circulation water from decorative ponds or tanks. [HAR, Chapter 11-55, Appendix L]

3. In accordance with HAR, Section 11-55-38, the applicant for an NPDES permit is required to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. If applicable, please submit a copy of the request for review by SHPD or SHPD=s determination letter for the project.

4. Any discharges related to project construction or operation activities, with or without a Section 401 WQC or NPDES permit coverage, shall comply with the applicable State Water Quality Standards as specified in HAR, Chapter 11-54.

Hawaii Revised Statutes, Subsection 342D-50(a) requires that A[n]o person, including any public body, shall discharge any water pollutants into state waters, or cause or allow any water pollutant

to enter state waters except in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director.≅

If you have any questions, please contact Mr. Alec Wong, Supervisor of the Engineering Section, CWB, at (808) 586-4309.

Updated 9/15/05

The Environmental Planning Office (EPO) is responsible for several surface water quality management programs mandated by the federal Clean Water Act or dictated by State policy. (http://www.state.hi.us/doh/eh/epo/wqm/wqm.htm). Among these responsibilities, EPO:

- maintains the *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* (http://www.state.hi.us/doh/eh/epo/wqm/303dpcfinal.pdf);
- develops and establishes Total Maximum Daily Loads (TMDLs) for listed waters (suggesting how much existing pollutant loads should be reduced in order to attain water quality standards, please see http://www.epa.gov/owow/tmdl/intro.html);
- writes TMDL Implementation Plans describing how suggested pollutant load reductions can be achieved; and
- conducts assessments of stream habitat quality and biological integrity.

Standard Comments / Areas of Concern

To facilitate TMDL development and implementation, and to assist with our assessment of the potential impact of proposed actions upon water quality, pollutant loading, and biological resources in receiving waters, we suggest that environmental review documents, permit applications, and related submittals include the following standard information and analyses:

Waterbody type and class

1. Identify the waterbody type and class, as defined in Hawaii Administrative Rules Chapter 11-54 (http://www.state.hi.us/health/about/rules/11-54.pdf), of all potentially affected water bodies[1].

Existing water quality management actions

2. Identify any existing National Pollutant Discharge Elimination System (NPDES) permits and related connection permits (issued by permittees) that will govern the management of water that runs off or is discharged from the proposed project site or facility. Please include NPDES and other permit numbers; names of permittees, permitted facilities, and receiving waters (including waterbody type and class as in 1. above); diagrams showing drainage/discharge pathways and outfall locations; and note any permit conditions that may specifically apply to the proposed project.

3. Identify any planning documents, groups, and projects that include specific prescriptions for water quality management at the proposed project site and in the potentially affected waterbodies. Please note those prescriptions that may specifically apply to the proposed project.

Pending water quality management actions

4. Identify all potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* including the listed waterbody, geographic scope of listing, and pollutant(s) (See Table 5 at http://www.hawaii.gov/health/environmental/env-planning/wqm/303dpcfinal.pdf).

5. If the proposed project involves potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*, identify and quantify expected changes in the following site and watershed conditions and characteristics:
   - surface permeability
   - hydrologic response of surface (timing, magnitude, and pathways)
   - receiving water hydrology
   - runoff and discharge constituents
   - pollutant concentrations and loads in receiving waters
   - aquatic habitat quality and the integrity of aquatic biota

Where TMDLs are already established they include pollutant load allocations for the surrounding lands and point source discharges. In these cases, we suggest that the submittal specify how the proposed project would contribute to achieving the applicable load reductions.

Where TMDLs are yet to be established and implemented, a first step in achieving TMDL objectives is to prevent any project-related increases in pollutant loads. This is generally accomplished through the proper application of suitable best management practices in all phases of the project and adherence to any applicable ordinances, standards, and permit conditions. In these cases we suggest that the submittal specify how the proposed project would contribute to reducing the polluted discharge and runoff entering the receiving waters, including plans for additional pollutant load reduction practices in future management of the surrounding lands and drainage/discharge systems.

Proposed Action and Alternatives Considered

We suggest that each submittal identify and analyze potential project impacts at a watershed scale by considering the potential contribution of the proposed project to cumulative, multi-project watershed effects on hydrology, water quality, and aquatic and riparian ecosystems.

We also suggest that each submittal broadly evaluate project alternatives by identifying more than one engineering solution for proposed projects. In particular, we suggest the consideration of "alternative," "soft," and "green" engineering solutions for channel modifications that would provide a more environmentally friendly and aesthetically pleasing channel environment and minimize the destruction of natural landscapes.

If you have any questions about these comments or EPO programs, please contact Jiacai Liu at 586-4346.

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[1]"Potentially affected waterbodies" means those in which proposed project activity would take place and any others that could receive water discharged by the proposed project activity or water flowing down from the proposed project site. These waterbodies can be presented as a chain of receiving waters whose top link is at the project site upslope and whose bottom link is in Pacific Ocean "oceanic waters," with all receiving waters named according to conventions established by Chapter 11-54 and the *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*. For example, a recent project proposed for Nuhelewai Stream, Oahu (a tributary of Kapalama Canal) might potentially affect Nuhelewai Stream, Kapalama Canal, Honolulu Harbor and Shore Areas, and the Pacific Ocean.

Hazard Evaluation & Emergency Response Office

1. A phase I Environmental Site Assessment (ESA) should be conducted for developments or redevelopments. If the investigation shows that a release of petroleum, hazardous substance, pollutants or contaminants occurred at the site, the site should be properly characterized through an approved Hawaii State Department of Health (DOH)/Hazard Evaluation and Emergency Response Office (HEER) soil and or groundwater sampling plan. If the site is found to be contaminated, then all removal and remedial actions to clean up hazardous substance or oil releases by past and present owners/tenants must comply with chapter 128D, Environmental Response Law, HRS, and Title 11, Chapter 451, HAR, State Contingency Plan.

2. All lands formerly in the production of sugarcane should be characterized for arsenic contamination, If arsenic is detected above the US EPA Region (preliminary remediation goal (PRG) for non-cancer effects, then a removal and or remedial plan must be submitted to the Hazard Evaluation and Emergency Response (HEER) Office of the State Department of Health for approval. The plan must comply with Chapter 128D, Environmental Response Law, HRS, and Title 11, Chapter 451, HAR, State Contingency Plan.

3. If the land has a history of previous releases of petroleum, hazardous substances, pollutants, or contaminants, we recommend that the applicant request a "no further action" (NFA) letter from the Hawaii State Department of Health (DOH)/ Hazard Evaluation and Emergency Response (HEER) Office prior to the approval of the land use change or permit approval.

Noise, Radiation & Indoor Air Quality Branch Standard Comments Dated 3/2/04

"Project activities shall comply with the Administrative Rules of the Department of Health:

- Chapter 11-39 Air Conditioning and Ventilating.
- Chapter 11-45 Radiation Control.
- Chapter 11-46 Community Noise Control.
- Chapter 11-501 Asbestos Requirements.
- Chapter 11-502 Asbestos-Containing Materials in Schools.
- Chapter 11-503 Fees for Asbestos Removal and Certification
- Chapter 11-504 Asbestos Abatement Certification Program

Should there be any questions, please contact Russell S. Takata, Environmental Health Program Manager, Noise, Radiation and Indoor Air Quality Branch, at 586-4701."

Safe Drinking Water Branch
Standard Comments

Safe Drinking Water Branch Dated 3/11/04

The Safe Drinking Water Branch administers programs in the areas of: 1) public water systems; 2) underground injection control; and 3) groundwater protection. Our general comments on projects are as follows.

Public Water Systems

- Federal and state regulations define a public water system as a system that serves 25 or more individuals at least 60 days per year or has at least 15 service connections. All public water system owners and operators are required to comply with Hawaii Administrative Rules, Title 11, Chapter 20, titled Rules Relating to Potable Water Systems.

- All new public water systems are required to demonstrate and meet minimum capacity requirements prior to their establishment. This requirement involves demonstration that the system will have satisfactory technical, managerial and financial capacity to enable the system to comply with safe drinking water standards and requirements.

- Projects that propose development of new sources of potable water serving or proposed to serve a public water system must comply with the terms of Section 11-20-29 of Chapter 20. This section requires that all new public water system sources be approved by the Director of Health prior to its use. Such approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.

- The engineering report must identify all potential sources of contamination and evaluate alternative control measures which could be implemented to reduce or eliminate the potential for contamination, including treatment of the water source. In addition, water quality analyses for all regulated contaminants, performed by a laboratory certified by the State Laboratories Division of the state of Hawaii, must be submitted as part of the report to demonstrate compliance with all drinking water standards. Additional parameters may be required by the Director for this submittal or additional tests required upon his or her review of the information submitted.

- All sources of public water system sources must undergo a source water assessment which will delineate a source water protection area. This process is preliminary to the creation of a source water protection plan for that source and activities which will take place to protect the source of drinking water.

- Projects proposing to develop new public water systems or proposing substantial modifications to existing public water systems must receive approval by the Director of Health prior to construction of the proposed system or modification. These projects include treatment, storage and distribution systems of public water systems. The approval authority for projects owned and operated by a County Board or Department of Water or Water Supply has been delegated to them.

- All public water systems must be operated by certified distribution system and water treatment plant operators as defined by Hawaii Administrative Rules, Title 11, Chapter 11-25 titled; Rules Pertaining to Certification of Public Water System Operators.

- All projects which propose the use of dual water systems or the use of a non-potable water system in proximity to an existing potable water system to meet irrigation or other needs must be carefully design and operate these systems to prevent the cross-connection of these systems and prevent the possibility of backflow of water from the non-potable system to the potable system. The two systems must be clearly labeled and physically separated by air gaps or reduced pressure principle backflow prevention devices to avoid contaminating the potable water supply. In addition backflow devices must be tested periodically to assure their proper operation. Further, all non-potable spigots and irrigated areas should be clearly labeled with warning signs to prevent the inadvertent consumption on non-potable water. Compliance with Hawaii Administrative Rules, Title 11, Chapter 11-21 titled; Cross-Connection and Backflow Control is also required.

- All projects which propose the establishment of a potentially contaminating activity (as identified in the Hawai`i Source Water Assessment Plan) within the source water protection area of an existing source of water for a public water supply should address this potential and activities that will be implemented to prevent or reduce the potential for contamination of the drinking water source.

- For further information concerning the application of capacity, new source approval, operator certification, source water assessment, backflow/cross-connection prevention or other public water system programs, please contact the Safe Drinking Water Branch at 586-4258.

Underground Injection Control (UIC)

- Injection wells used for the subsurface disposal of wastewater, sewage effluent, or surface runoff are subject to environmental regulation and permitting under Hawai`i Administrative Rules, Title 11, Chapter 11-23, titled Underground Injection Control (UIC). The Department of Health's approval must be first obtained before any injection well construction commences. A UIC permit must be issued before any injection well operation occurs.

- Authorization to use an injection well is granted when a UIC permit is issued to the

injection well facility. The UIC permit contains discharge and operation limitations, monitoring and reporting requirements, and other facility management and operational conditions. A complete UIC permit application form is needed to apply for a UIC permit.

- A UIC permit can have a valid duration of up to five years. Permit renewal is needed to keep an expiring permit valid for another term.

For further information about the UIC permit and the Underground Injection Control Program, please contact the UIC staff of the Safe Drinking Water Branch at 586-4258.

Groundwater Protection Program

- Projects that propose to develop a golf course are asked to use the Guidelines Applicable to Golf Courses in Hawai'i (Version 6) in order to address certain groundwater protection concerns, as well as other environmental concerns.

Solid and Hazardous Waste Branch - Standard Comments

1)
The OSWM recommends the development of a solid waste management plan that encompasses all project phases including demolition, construction, and occupation/operation of the completed project.

Specific examples of elements that the plan should address include:

- The recycling of green-waste during clear and grub activities;
- Recycling construction and demolition wastes, if appropriate;
- The use of locally produced compost in landscaping;
- The use of recycled content building materials;
- The provision of recycling facilities in the design of the project.

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2)
The developer shall ensure that all solid waste generated during project construction is directed to a Department of Health permitted solid waste disposal or recycling facility.

---

3)
The developer should consider providing space in the development for recycling activities. The provision of space for recycling bins for paper, glass, and food/wet waste would help to encourage the recycling of solid waste(s) generated by building occupants.

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4)
The discussion of solid waste issues contained in the document is restricted to activities within the completed project. The OSWM recommends the development of a solid waste management plan that encompasses all project phases, from construction (and or demolition) to occupation of the project.

Specific examples of plan elements include: the recycling of green-waste during clear and grub activities; maximizing the recycling of construction and demolition wastes; the use of locally produced compost in the landscaping of the project; and the provision of recycling facilities in the design of the project.

---

5)
Hawaii Revised Statutes Chapter 103D-407 stipulates that all highway and road construction and improvement projects funded by the State or a county or roadways that are to be accepted by the State or a county as public roads shall utilize a minimum of ten per cent crushed glass aggregate as specified by the department of transportation in all base-course (treated or untreated) and sub-base when the glass is available to the quarry or contractor at a price no greater than that of the equivalent aggregate.

If you have any questions, please contact the Solid and Hazardous Waste Branch at (808) 586-4240.

Wastewater Branch Standard Comments

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems". We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294.

PBR HAWAII
& ASSOCIATES, INC.

April 25, 2007

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RUSSELL Y. J. CHUNG, FASLA
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Mr. Kelvin H. Sunada, Manager
Environmental Planning Office
Department of Health
State of Hawai'i
919 Ala Moana Blvd., Room 312
Honolulu, Hawai'i 96814
Attn: Mr. Jiacai Liu

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Sunada,

Thank you for your letter dated April 16, 2007 (your reference number: EPO-07-066). We acknowledge that the Department of Health has no comments to offer at this time. As recommended, the Standard Comments on the Department of Health website (http://www.state.hi.us/health/environmental/env-planning/landuse/landuse.html) have been reviewed and will be adhered to as applicable.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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RECEIVED APR 0 4 2007

Harry Kim
Mayor

Barbara Bell
Director

Nelson Ho
Deputy Director

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DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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http://co.hawaii.hi.us/directory/dir_envmng.htm

April 3, 2007

Mr. Vincent Shigekuni
Vice President
PBR Hawaii
101 Aupuni Street, Suite 310
Hilo, HI 96720

Re: Pre-Consultation for the Proposed Makalei Fire Station,
Makalei, North Kona, Island of Hawai'i
Draft Environmental Assessment

Dear Mr. Shigekuni,

We offer the following comment on the subject Draft Environmental Assessment.

- A Solid Waste Management Plan should be incorporated into the Environmental Assessment. Guidelines have been enclosed for that purpose.

Thank you for allowing us the opportunity to offer input on this project. If you have further questions regarding the Solid Waste Management Plan, please contact Michael Dworsky, Solid Waste Division Chief, at 808-961-8515.

Barbara Bell
DIRECTOR

enclosure

Harry Kim
Mayor

Barbara Bell
Director

Michael Dworsky P.E.
Solid Waste Division Chief

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street, Room 210 • Hilo, Hawai'i 96720-4252
(808) 961-8083 • Fax (808) 961-8086

June 6, 2006

SOLID WASTE MANAGEMENT PLAN
Guidelines

INTENT AND PURPOSE

This is to establish guidelines for reviewing solid waste management plans, for which special conditions are placed on developments. The solid waste management plan will be used to: (1) encourage recycling and recycling programs, (2) predict the waste generated by the proposed development to anticipate the loading on County transfer stations, landfills and recycling facilities, and (3) predict the additional traffic being generated because of waste and recycling transfers.

REPORT

The consultant's report will contain the following:

1. Description of the project and the potential waste it may be generating: i.e. analysis of anticipated waste volume and composition. This includes waste generated during the construction and operational phases. Greenwastes will be included in this report for both construction grubbing and future operational landscape maintenance.

2. Description and location of the possible sites for waste disposal or recycling. We will not allow the use of the County transfer stations for any commercial development; commercial development as defined under the policies of the Department of Environmental Management, Solid Waste Division.

3. Since the Department of Environmental Management promotes recycling, indicate onsite source separation facilities by waste stream; i.e. source separation bins of glass, metal, plastic, cardboard, aluminum, etc. Provide ample and equal space for rubbish and recycling.

4. Identification of the proposed disposal site and transportation methods for the various components of the waste disposal and recycling system, including the number of truck traffic and the route that truck will be using to transport the waste and recycled materials.

5. The report will include any impacts to County waste and recycling facilities, and the appropriate mitigation measures. All recommendations and mitigation measures will be addressed.

6. Description of the waste reduction component that analyzes techniques to be employed to achieve a reduction goal.

7. Analysis will be based on the highest potential use or zoning of the development.

REQUIREMENTS AND CONDITIONS

1. A solid waste management plan will be done for all commercial developments, as defined under the policies of the Department of Environmental Management, Solid Waste Division.

2. We will require the developer to provide or resolve all recommendations and mitigation measures as outlined in the report; besides any conditions placed on the applicant by the Department of Environmental Management.

3. A licensed environmental or civil engineer will draft and certify the solid waste management plan.

CONCUR:

Barbara Bell

Barbara Bell
DIRECTOR

10/13/03
Revised 06/06/06

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PBR HAWAII
& ASSOCIATES, INC.

April 19, 2007

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Ms. Barbara Bell, Director
Department of Environmental Management
County of Hawai'i
25 Aupuni Street, Room 210
Hilo, Hawai'i 96720

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Bell,

Thank you for your letter dated April 3, 2007. We acknowledge that a Solid Waste Management Plan should be incorporated in the Environmental Assessment.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni

Vincent R. Shigekuni
Vice President

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cc: KYA Design Group

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Brad Kurokawa, ASLA
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April 16, 2007

Mr. Vincent Shigekuni, Vice President
PBR Hawaii
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, HI 96813-3484

Dear Mr. Shigekuni:

Pre-Consultation for Draft Environmental Assessment (EA)
Proposed Makalei Fire Station
Tax Map Key: 7-2-7:01 (Por.), Kau, North Kona, Hawai'i

This is in response to your letter dated March 22, 2007, requesting our comments as part of the pre-consultation process for the Draft EA for the proposed Makalei Fire Station and possible Police Substation. We provide you with the following comments:

1. The goals, policies, standards and courses of action of the General Plan and the applicability to the proposed project should be discussed in the Draft Environmental Assessment. The document should also include discussion on the project in relations to any regional and/or community plans for the Kona district.

2. The Draft EA should discuss the land use designations, including the General Plan, State Land Use District, and County Zoning District. For your information, the project site is designated as Extensive Agricultural by General Plan Land Use Pattern Allocation Guide (LUPAG) Map. It is situated within the State Land Use Agricultural District and County zoned Agricultural (A-900a). The Draft EA should also include discussions on the surrounding land use designations and uses.

3. The project site is not located within the County's Special Management Area (SMA).

4. The Draft EA should clearly discuss the proposed project, the needs for the project, project construction timeline and include detailed maps of the proposed structures and improvements of the proposed fire station.

5. You have stated that the project site may possibly include space for a proposed Police Substation. Discussion on the police substation should also be included in the Draft EA, unless you determine that said project is not part of this Draft EA.

6. Since the project site is located within the State Land Use Agricultural District, a Special Permit will be required from the Planning Commission for the proposed project.

7. According to the location map, the project site is across of Makalei Drive. The Draft EA should discuss traffic situation in the area and address traffic concerns, if any.

Thank you for the opportunity to provide comments for the Pre-Consultation. Should you have any questions, please feel free to contact Alice Kawaha of this department at 961-8288, Ext. 203.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

AK:cd
p:\wpwin60\alicewin\LPBRShigekuni MakaleiFireStation 7-2-7-1

xc: Mr. Bennett Mark, Planning Department – Kona Office

PBR HAWAII
& ASSOCIATES, INC.

April 19, 2007

Mr. Chris Yuen, Director
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Yuen,

Thank you for your letter dated April 16, 2007. We offer the following responses to your comments:

1. We acknowledge that the goals, policies, standards and course of action of the General Plan and the applicability to the Makalei Fire Station should be discussed in the Draft Environmental Assessment. Also, the Draft Environmental Assessment will discuss any regional and/or community plans for the Kona district.

2. We acknowledge that the Draft EA should discuss land use designations, including the General Plan, State Land Use District, and County Zoning District. The Draft EA will also include discussions on the surrounding land use designations and uses.

3. Thank you for the information that the Makalei Fire Station is not located within the County's Special Management Area.

4. We acknowledge that the Draft EA should clearly discuss the Makalei Fire Station, the needs for the Makalei Fire Station, construction timeline and include detailed maps of the proposed structures and improvements of the Makalei Fire Station.

5. We acknowledge that the Draft EA should include discussion on the police substation, unless it is determined that the police substation is not part of the Draft EA.

6. We acknowledge that a Special Permit will be required from the Planning Commission for the Makalei Fire Station.

7. We acknowledge that the Draft EA should discuss the traffic situation in the area and address any traffic concerns.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni, Vice President

cc: KYA Design Group

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Harry Kim
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Harry S. Kubojiri
Deputy Police Chief

County of Hawaii

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April 4, 2007

Mr. Vincent Shigekuni
Vice President
PBR Hawaii & Associates
101 Aupuni Street
Hilo Lagoon Center, Suite 310
Hilo, Hawaii 96720-4262

Dear Mr. Shigekuni:

This is in response to your letter dated March 22, 2007, seeking comments on the proposed Makalei Fire Station in North Kona, Hawaii.

After consideration, it was determined that your proposed project will not have a negative impact on any police projects, policies, or programs.

Should you have any questions, please contact Captain Randy Apele, Commander of the Kona Patrol Division, at 326-4646, ext. 249.

Sincerely,

LAWRENCE K. MAHUNA
POLICE CHIEF

DEREK D. PACHECO
ASSISTANT CHIEF
AREA II OPERATIONS

RKA:dmv

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SCOTT ALIKA ABRIGO
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SCOTT MURAKAMI, ASLA
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April 12, 2007

Mr. Lawrence Mahuna, Chief of Police
Police Department
County of Hawai'i
349 Kapiolani Street
Hilo, Hawai'i 96720

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Chief Mahuna,

Thank you for your letter dated April 4, 2007. We acknowledge that the Police Department determined the Makalei Fire Station will not have a negative impact on any police projects, policies, or programs.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

March 29, 2007

Mr. Vincent Shigekuni
PBR Hawaii & Associates, Inc.
1001 Bishop Street, ASB Tower, Suite 650
Honolulu, Hawaii 96815

Subject: Pre-Consultation for the Proposed Makalei Fire Station, Makalei, North Kona, Island of Hawaii

Dear Mr. Shigekuni,

We are in receipt of your letter dated March 22, 2007 in regards to the proposed Makalei Fire Station.

We have the following comments:

1. The building should follow the sustainable guidelines and use of energy effective devices.
2. Landscaping should be using native Hawaiian plants where possible.

The office encourages development of any infrastructure that will benefit the well being of the community. We reserve the right to further comments when the documents are reviewed in our office. If you have any questions, please feel free to contact us at 586-4185.

Sincerely,

Genevieve Salmonson

Genevieve Salmonson
Director

PBR HAWAII
& ASSOCIATES, INC.

April 12, 2007

W. FRANK BRANDT, FASLA
Chairman

THOMAS S. WITTEN, ASLA
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R. STAN DUNCAN, ASLA
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Associate

KIMI MIKAMI YUEN, LEED® AP
Associate

SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA
Associate

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawai'i 96813

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Salmonson,

Thank you for your letter dated March 29, 2007. We offer the following responses to your comments:

1. We acknowledge your statement that the building should follow the sustainable guidelines and use of energy effective devices. The Makalei Fire Station shall implement sustainable guidelines and use energy effective devices where feasible.

2. We acknowledge your statement that landscaping should be using native Hawaiian plants where possible. The Makalei Fire Station landscaping plan will include native Hawaiian plants where feasible.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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Harry Kim
Mayor

Patricia G. Engelhard
Director

Pamela N. Mizuno
Deputy Director

County of Hawai'i

DEPARTMENT OF PARKS AND RECREATION

101 Pauahi Street, Suite 6 • Hilo, Hawai'i 96720
(808) 961-8311 • Fax (808) 961-8411

April 3, 2007

Mr. Vincent Shigekuni
Vice President
PBR Hawaii & Associates, Inc.
1001 Bishop Street
ASB Tower, Suite 640
Honolulu, HI 96813-3484

Project: **Pre-Consultation for the Proposed Makalei Fire Station, Makalei, North Kona, Island of Hawaii**
Draft Environmental Assessment
TMK: (3rd) 7-2-07:01 (por. 1)

We have reviewed the map and information you provided for the proposed Makalei Fire Station in your letter dated March 22, 2007 and have no comments to offer.

Thank you for including the Department of Parks and Recreation as part of the review process.

Sincerely,

Pat Engelhard

Patricia G. Engelhard
Director

My Documents\Park Projects\PBR HAWAII - Makalei Fire Station - No Comments - 4-3-07.doc

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Executive Vice-President

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Principal

TOM SCHNELL, AICP
Senior Associate

RAYMOND T. HIGA, ASLA
Senior Associate

KEVIN K. NISHIKAWA, ASLA
Associate

KIMI MIKAMI YUEN, LEED® AP
Associate

SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA
Associate

April 9, 2007

Ms. Patricia Engelhard, Director
County of Hawai'i Department of Parks and Recreation
Aupuni Center, 101 Pauahi Street, Suite 6
Hilo, Hawai'i 96720

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED MAKALEI FIRE STATION, MAKALEI, NORTH KONA, ISLAND OF HAWAI'I DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Engelhard,

Thank you for your letter dated April 3, 2007. We acknowledge that the Department of Parks and Recreation has no comments to offer at this time.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

cc: KYA Design Group

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Appendix D

April 2008 Draft Environmental Assessment Public Review Comment Letters & Responses

Harry Kim
Mayor

Christopher J. Yuen
Director

Brad Kurokawa, ASLA
LEED® AP
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-4224
(808) 961-8288 • FAX (808) 961-8742

April 21, 2008

Mr. Vincent R. Shigekuni
PBR Hawaii
1001 Bishop Street, ASB Tower 650
Honolulu HI 96813

Dear Mr. Shigekuni:

SUBJECT: **Draft Environmental Assessment**
Project: Makalei Fire Station
Land Owner: GKK Makalei LLC
Applicant: County of Hawaii, Department of Public Works
TMK: 7-2-7:Por. of 1, Makalei, North Kona, Hawaii

In response to the above referenced document submitted for our review, we have the following to offer:

1. We concur with the Land Use Designations of the project site.

2. **County of Hawaii Plans and Controls:** The status of the Kona Community Development Plan (KCDP) should be included. For your information, it is still in progress and draft sections are currently being reviewed. The KCDP will be forwarded to the County Council as an ordinance for adoption to give it the force of law.

3. **Lists of Required Permits and Approvals:** The approximately 2-acre project area should be subdivided out of the larger parcel. Therefore, Subdivision Approval should be included on this list.

4. **Probable Impact, Including Cumulative Impacts:** A map denoting the project areas planned for the immediate vicinity of the Makalei Fire Extension should be included.

Thank you for allowing us the opportunity to comment on the Draft Environmental Assessment.

If you have questions, please contact Esther Imamura of this office at 961-8288, extension 257.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

ETI:pk
P:\wpwin60\ETI\EAdraftPre-consult\Shigekuni Makalei Fire Station 7-2-7-1.ltf

xc: Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Planning Department, Kona

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Tel: (808) 242-2878

April 28, 2008

Mr. Christopher J. Yuen
Director, Department of Planning
County of Hawai'i
25 Pauahi Street, Suite 3
Hilo, Hawai'i 96720

SUBJECT: MAKALEI FIRE STATION ENVIRONMENTAL ASSESSMENT

Dear Director Yuen,

Mahalo for your letter transmitted via facsimile on April 21, 2008. We offer the following responses to your comments:

Comment 1: **We concur with the Land Use Designations of the project site.**

Response: We acknowledge your affirmative response regarding Land Use Designations.

Comment 2: **County of Hawai'i Plans and Controls: The status of the Kona Community Development Plan (KCDP) should be included. For your information, it is still in progress and draft sections are currently being reviewed. The KCDP will be forwarded to the County Council as an ordinance for adoption to give it the force of law.**

Response: A new section will be added to Part 5.2 as follows:

5.2.5. Kona Community Development Plan

The proposed Makalei Fire Station falls under the jurisdiction of the Kona Community Development Plan (KCDP). The plan is part of the overall County of Hawaii General Plan. These CDPs help the county determine how the County distributes funds, passes laws, governs development, provides roads and public facilities, and generally makes decisions in the area until the year 2015. CDPs essentially translate the broad goals outlined in the County General Plan, into opportunities for implementation. The CDPs also serve as a forum for community input. Once drafted, the CDP will be adopted by the County Council as an ordinance, giving it the force of law.

Discussion: The proposed Makalei Fire Station is consistent with the current pre-final draft of the Kona Community Development Plan released on April 17, 2008. The facility is included as a "Proposed Fire Station" in Figure 4-10(a) of the report, and is included on the Capital Improvements Funding List in Section 5.1.2.

Comment 3: **Lists of Required Permits and Approvals: The approximately 2-acre project area should be subdivided out of the larger parcel. Therefore, Subdivision Approval should be included in the list.**

Response: Subdivision Approval will be added to Table 5-1 as one of the required approvals under the County of Hawai'i, Planning Commission section.

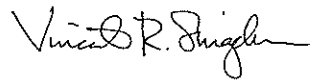
Comment 4: Probable Impact, Including Cumulative Impacts: A map denoting the project areas planned for the immediate vicinity of the Makalei Fire Extension should be included

Response: An additional map labeled "Figure 12: Projects within Vicinity of Makalei Fire Station" will be added to Chapter 7 depicting the location of the mentioned projects in the narrative.

We appreciate your participation in the preparation of the Environmental Assessment for Makalei Fire Station. If you have any further questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII



Vincent R. Shigekuni
Vice President

Cc: Mr. Bruce McClure, Director, County of Hawai'i DPW
Mr. Darryl Oliveria, Chief, County of Hawai'i Fire Department

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LINDA LINGLE
GOVERNOR OF HAWAII

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CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

April 1, 2008

Mr. Vincent Shigekuni, Vice President
PBR Hawaii
1001 Bishop Street, ASB Tower 650
Honolulu, Hawai'i 96813

LOG NO: 2008.0559
DOC NO: 0804TD02
Archaeology

Dear Mr. Shigekuni:

SUBJECT: **Chapter 6E-42 Historic Preservation Review -**
Draft Environmental Assessment for the Proposed Makalei Fire Station
Kau Ahupua`a, North Kona District, Island of Hawai'i
TMK: (3) 7-2-07: 001 (por.)

Thank you for the opportunity to comment on the proposed project, which involves construction of a new fire station on a 2-acre parcel along Mamalahoa Highway at Makalei Drive in North Kona. A Draft Environmental Assessment (DEA) for the project was received in our office February 27, 2008. We recently responded to a request from Dr. Alan Haun (letter dated January 19, 2008) for a no effect determination for this project (Log 2008.0737, Doc No. 0803TD03).

The fire station project area is situated entirely within a larger 989-acre parcel that was surveyed by Haun & Associates in 2005 (A.E. Haun, D. Henry and D. Berringer 2005). Thirty-four historic properties were identified within the larger survey area; however, no evidence of historic properties was identified within the area of the proposed fire station. The inventory survey report was reviewed in May 2006; and a revised final report was approved by our office in June 2006 (Log No. 2006.2068, Doc No. 0606JT72). The nearest preservation site is over 100 meters from the proposed fire station area. Provisions for the protection of this site and others are detailed in a Preservation Plan that was approved by our office January 8, 2007 (Log No. 2006.3466, Doc No. 0701MK10).

Based on the previous documentation that there are no historic properties within the proposed project area, we believe that construction of the fire station will have no effect on historic properties. This determination is made with the understanding that material storage, machinery staging and earthmoving in association with this project will be confined to the two-acre area designated as the fire station parcel.

Please contact Theresa Donham at (808) 987-5001 or Theresa.K.Donham@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Nancy McMahon, Acting Archaeology Branch Chief
State Historic Preservation Division

cc: Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 9683

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April 28, 2008

Administrator, State Historic Preservation Division
Department of Land & Natural Resources, State of Hawai'i
601 Kamokila Boulevard, Room 555
Kapolei, Hawai'i 96707

SUBJECT: MAKALEI FIRE STATION ENVIRONMENTAL ASSESSMENT

Dear Administrator,

Mahalo for the letter dated March 12, 2008 from the State Historic Preservation Division (SHPD) from then-Acting Administrator Nancy McMahon. We acknowledge SHPD has previously determined there are no historic properties within the proposed project area, and that construction of the fire station will have no effect on historic properties (Log No. 2008.0737, Doc No. 0803TD03).

We appreciate your participation in the preparation of the Environmental Assessment for Makalei Fire Station. If you have any further questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

Cc: Mr. Bruce McClure, Director, County of Hawai'i DPW
Mr. Darryl Oliveria, Chief, County of Hawai'i Fire Department

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Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

County of Hawai'i
FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 981-8394 • Fax (808) 981-2037

March 25, 2008

Mr. Vincent Shigekuni
PBR Hawaii
1001 Bishop Street, ASB Tower 650
Honolulu, HI 96813

RE: DRAFT ENVIRONMENTAL ASSESSMENT
MAKALEI FIRE STATION
NORTH KONA, HAWAII
TMK: (3) 7-2-07:01 (POR.)

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"**Fire Apparatus Access Roads**

"**Sec. 10.207.** (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"**EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

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"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301:

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207."

DARRYL OLIVEIRA
Fire Chief

JP:lk

cc: Office of Environmental Quality Control

PBR HAWAII
& ASSOCIATES, INC.

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April 28, 2008

Mr. Darryl Oliveria
Chief, County of Hawai'i Fire Department
25 Aupuni Street, Suite 103
Hilo, Hawai'i 96720

SUBJECT: MAKALEI FIRE STATION ENVIRONMENTAL ASSESSMENT

Dear Administrator Chinen,

Mahalo for your letter dated March 25, 2008. We offer the following responses to your comments:

1) The FEA will note that the proposed fire apparatus access road shall be in accordance with Uniform Fire Code (UFC) Sections 10.207(a-l).

2) The FEA will note that the proposed water system shall be in accordance with Uniform Fire Code (UFC) Section 10.301(c).

We appreciate your participation in the preparation of the Environmental Assessment for Makalei Fire Station. If you have any further questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

Cc: Mr. Bruce McClure, Director, County of Hawai'i DPW

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RECEIVED
MAR 18 2008
PBR HAWAII

Harry Kim
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Bobby Jean Leithead-Todd
Director

Nelson Ho
Deputy Director

County of Hawaii

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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March 12, 2008

Mr. Vincent Shigekuni
PBR Hawaii
1001 Bishop Street, ASB Tower 650
Honolulu, HI 96813

Subject: Draft Environmental Assessment
Makalei Fire Station
North Kona, Hawai'i
TMK: 7-2-07:01 (por.)

Dear Mr. Shigekuni,

We have no comments to offer on the subject project.

Thank you for allowing us the opportunity to review and comment on this project.

Sincerely,

Bobby Jean Leithead Todd
DIRECTOR

cc: OEQC
DPW

Hawai'i County is an equal opportunity provider and employer.

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& ASSOCIATES, INC.

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April 28, 2008

Ms. Bobby Jean Leithead Todd
Director, Department of Environmental Management
County of Hawai'i
25 Pauahi Street
Hilo, Hawai'i 96720-4252

SUBJECT: MAKALEI FIRE STATION ENVIRONMENTAL ASSESSMENT

Dear Director Leithead Todd,

Mahalo for your letter dated March 12, 2008. We acknowledge the Department of Environmental Management has no additional comments regarding the proposed project.

We appreciate your participation in the preparation of the Environmental Assessment for Makalei Fire Station. If you have any further questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

PBR HAWAII

Vincent R. Shigekuni
Vice President

Cc: Mr. Bruce McClure, Director, County of Hawai'i DPW
Mr. Darryl Oliveria, Chief, County of Hawai'i Fire Department

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