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STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:MC

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JUN 0 8 2014

CDUA: OA-3712

Received
MAY 2 8 2014

MEMORANDUM

TO: Jessica Wooley, Director
Office of Environmental Quality Control

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

SUBJECT: Draft Environmental Assessment (DEA) for a Mauna Kapu Radio Facility Improvements

LOCATION: Hono`uli`uli, `Ewa District, O`ahu

TMK: (1) 9-2-005:024

The Department of Land and Natural Resources has reviewed the draft EA for the subject project, and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the June 8, 2014 issue of the *Environmental Notice*. We have sent OEQC one hard copy of the draft EA document, as well as a disc with the draft EA, Conservation District Use Application (CDUA), OEQC Bulletin Publication Form and Executive Summary.

Please contact Michael Cain of our Office of Conservation and Coastal Lands staff at 587-0048 should you have any questions.

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (FEBRUARY 2013 REVISION)

Received
MAY 28 2014

Project Name:	Information and Communication Services Division Radio Facility Upgrade at Mauna Kapu Communication Station
Island:	O'ahu
District :	'Ewa
TMK:	First division, 9-2-005: portion 024
Permits:	Conservation District Use Permit, Building, Grading, and Electrical Code Permits
Proposing/ Determination Agency:	State of Hawai'i, Department of Land and Natural Resources, Office of Conservation and Coastal Lands
Address	1151 Punchbowl Street, Room 131
City, State, Zip	Honolulu, Hawai'i 96813
Contact and Phone	Samuel Lemmo: 808-587-0377
Consultant:	Belt Collins Hawai'i
Address	2153 North King Street, Suite 200
City, State, Zip	Honolulu, Hawai'i 96819
Contact and Phone	Joanne Hiramatsu: 808-521-5361
Send Comments To:	
Consultant	Belt Collins Hawai'i
Address	2153 North King Street, Suite 200
City, State, Zip	Honolulu, Hawai'i 96819
Contact and Phone	Joanne Hiramatsu: 808-521-5361

Status (check one only):

√ DEA-AFNSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.
__FEA-FONSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__FEA-EISPN	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
__DEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__ Section 11-200-23 Determination	The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.
__Section 11-200-27 Determination	The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.
__Withdrawal (explain)	

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The State of Hawai'i, Department of Accounting and General Services, Information and Communication Services Division (ICSD), is proposing utility upgrades to the ICSD Radio Facility (IRF) at the Mauna Kapu Communication Station Site. The proposed action would: install underground electric, cable television, telephone, and communication conduits to service the existing U.S. Coast Guard, U.S. Army, and ICSD buildings; install minor utility upgrades to the three existing buildings; and, conduct maintenance and upgrade work to the ICSD building.

The overarching purpose for the proposed action is to support ICSD's efforts to provide effective and reliable telecommunication services to all agencies in the State of Hawai'i. The IRF at Mauna Kapu connects to the statewide Anuenue communications system that is shared by Federal, State, and County agencies for mission support, which includes emergency rescue, civil defense, and emergency medical services.

DRAFT ENVIRONMENTAL ASSESSMENT

ICSD RADIO FACILITY UPGRADE AT MAUNA KAPU

Mauna Kapu, ʻEwa District, Island of Oʻahu, Hawaiʻi

DRAFT ENVIRONMENTAL ASSESSMENT

ICSD RADIO FACILITY UPGRADE AT MAUNA KAPU

Mauna Kapu, ʻEwa District, Island of Oʻahu, Hawaiʻi
Tax Map Key: First Division, 9-2-005:024

Prepared for:
Department of Accounting and General Services, Information and Communication Services Division

Prepared by:
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, HI 96819

April 2014

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FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

AFONSI	Anticipated Finding of No Significant Impact
AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to the State of Hawaii
Anuenue	Anuenue Radio System
Army	U.S. Army
BMPs	Best Management Practices
CATV	Cable television
CDUP	Conservation District Use Permit
CIA	Cultural Impact Assessment
City	City and County of Honolulu
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DAGS	Department of Accounting and General Services (State)
DEA	Draft Environmental Assessment
DLNR	Department of Land and Natural Resources (State)
DOFAW	Division of Forestry and Wildlife, DLNR (State)
DOH	Department of Health (State)
DP	Development Plan
DPP	Department of Planning and Permitting (City)
EA	Environmental Assessment
EMR	Electromagnetic radiation
EMS	Emergency Medical Services Division, Department of Emergency Services (City)
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FIRM	Federal Insurance Rate Map
FONSI	Finding of No Significant Impact
GHz	Gigahertz
HAR	Hawaii Administrative Rules
HECO	Hawaiian Electric Company
HFD	Honolulu Fire Department (City)
HRHP	Hawai‘i Register of Historic Places
HRS	Hawaii Revised Statutes
ICSD	Information and Communication Services Division, DAGS (State)
IRF	ICSD Radio Facility
LMR	Land mobile radio
LUC	Land Use Commission

LUO	Land Use Ordinance (City)
Mauna Kapu	Mauna Kapu Communication Station
msl	Mean sea level
NEPA	National Environmental Policy Act of 1969
NRHP	National Register of Historic Places
OCCL	Office of Conservation and Coastal Lands, DLNR (State)
ROH	Revised Ordinance of Honolulu
SCP	Sustainable Communities Plan
SHPD	State Historic Preservation Division, DLNR (State)
SMA	Special Management Area
SOBA	Southern Oahu Basal Aquifer
State	State of Hawai‘i
State Plan	Hawai‘i State Planning Act
SWCA	SWCA Environmental Consultants
TMK	Tax map key
UIC	Underground Injection Control
U.S.	United States
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service

GENERAL INFORMATION

Project:	Information and Communication Services Division (ICSD) Radio Facility Upgrade at Mauna Kapu Communication Station (Mauna Kapu) Site
Location:	Mauna Kapu, ʻEwa District, Island of Oʻahu, Hawaiʻi
Proposed Action:	The proposed action calls for: the installation of underground electric, cable television, telephone, and communication conduits to service the existing U.S. Coast Guard, U.S. Army, and ICSD buildings; minor utility upgrades to the three existing buildings; and maintenance and upgrade work to the ICSD building.
Proposing Agency:	Department of Accounting and General Services, State of Hawaiʻi
Approving Agency:	Office of Conservation and Coastal Lands, Department of Land and Natural Resources (DLNR), State of Hawaiʻi
Recorded Fee Owner:	Gill Olson Joint Venture
Anticipated Determination:	Anticipated Finding of No Significant Impact (FONSI)
Property Profile:	
TMK	First Division, 9-2-005:024
Land Area	The proposed action would involve work in an area approximately 11,000 square feet
Existing Use:	Telecommunications, utilities, roadway
Proposed Use:	No change to existing use
Land Use Designations:	
State Land Use	Conservation District, Resource Subzone
County Zoning	P-1 Preservation Restricted
ʻEwa Development Plan (2013)	Agriculture and Preservation Area
Waiʻanae Sustainable Communities Plan	Preservation
Special Management Area (SMA)	Not within the SMA
Major Approvals Required:	Conservation District Use Permit (CDUP), Building, Grading, and Electrical Code Permits

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1 INTRODUCTION

Department of Accounting and General Services (DAGS) Information and Communication Services Division (ICSD) is proposing upgrades to the ICSD Radio Facility (IRF) at the Mauna Kapu Communication Station (Mauna Kapu) Site in the ʻEwa District, Island of Oʻahu. The proposed action would: install underground electric, cable television (CATV), telephone, and communication conduits to service the existing U.S. Coast Guard (USCG), U.S. Army (Army), and ICSD buildings; install minor utility upgrades to the three existing buildings; and, conduct maintenance and upgrade work to the ICSD building. The proposed action would occur on a portion of tax map key (TMK) 9-2-005:024, which is owned by the Gill-Olson Joint Venture and currently leased to the Army. The Army issued a permit to the USCG to use the Mauna Kapu site. Similarly, DAGS will request a permit from the Army for its IRF operations at the Mauna Kapu site. See Figure 1-1 Project Location Map.

This section provides background information, identifies the reasons for the proposed action, and describes the environmental review associated with this proposed action.

1.1 BACKGROUND

1.1.1 INFORMATION AND COMMUNICATION SERVICES DIVISION

ICSD is the lead State of Hawaiʻi (State) agency responsible for statewide information processing and telecommunication systems. As part of this role, ICSD is responsible for developing and maintaining the State's telecommunication system, which is composed of microwave radio systems, land mobile radio systems, antennas and towers, communication buildings, and supporting facilities. In the context of rapid technological advances and an increased reliance on telecommunications and computers, ICSD has been and continues to implement cost-effective and efficient information and communication services. Proper implementation of these systems is necessary for mission support in: emergency rescue, civil defense, emergency medical services, and critical government operations.[1]

The IRF at Mauna Kapu is a part of the State's telecommunication systems.

1.1.2 ANUENUE RADIO SYSTEM

The Anuenue Radio System (Anuenue) is a statewide microwave radio communication system that is shared by federal, State, and county agencies for mission support. Users of Anuenue include ICSD, USCG, State Department of Defense Civil Defense Division, State Department of Health Emergency Medical Services, DLNR, National Oceanic and Atmospheric Administration, Federal Aviation Administration, Army, and U.S. Postal Service. Anuenue is a partnership between the State and the USCG that replaced the Hawaii Rainbow Communications System (Rainbow) analog microwave radio system with a modern high-capacity digital microwave radio system. The need to replace Rainbow was due to: (1) increasing unreliability of Rainbow due to its antiquated analog radio

[1] State of Hawaiʻi, Department of Accounting and General Services. No date. *Information and Communication Services Division webpage*. Available as of 12/23/13 at http://ags.hawaii.gov/icsd/.

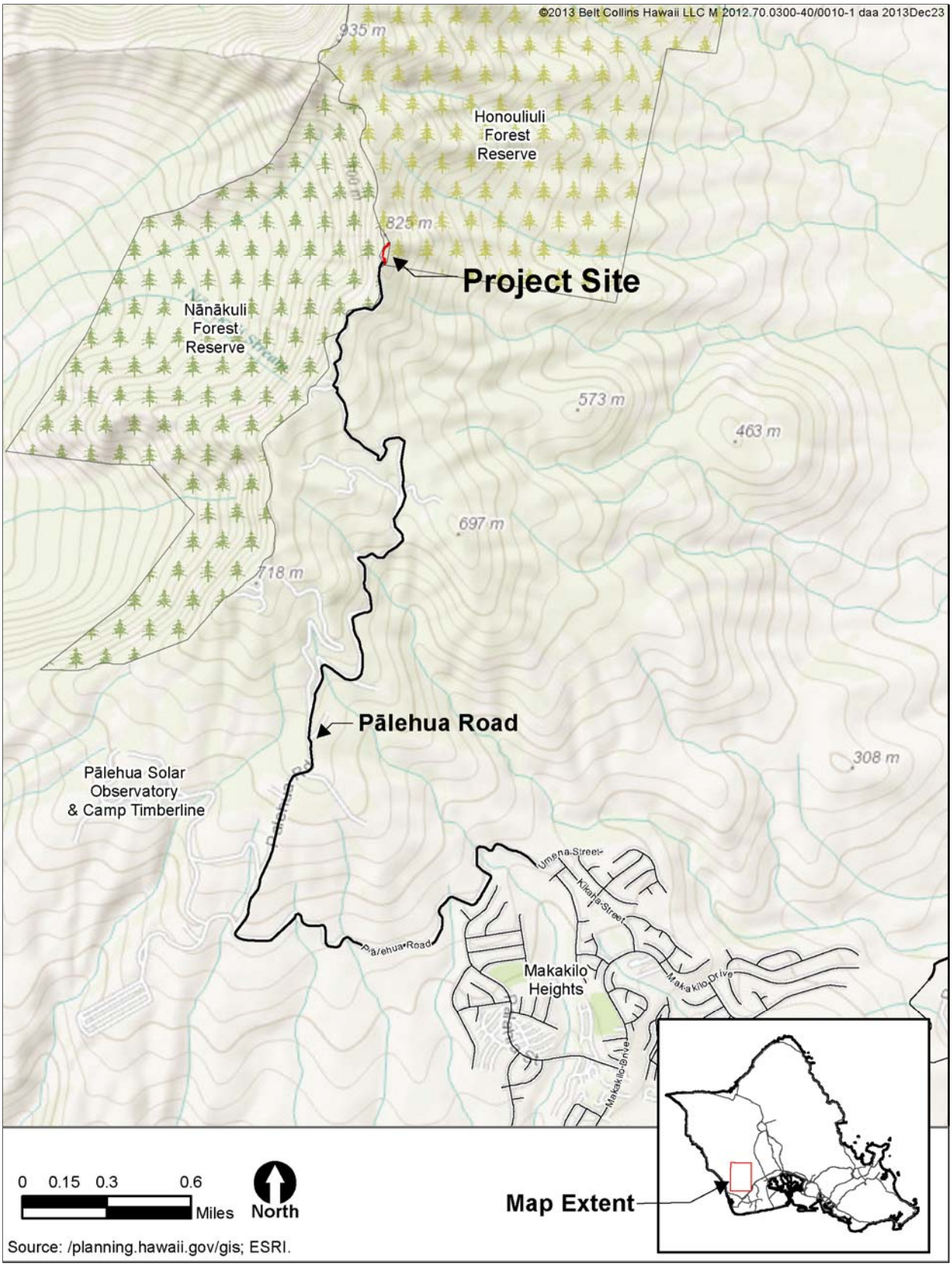

Figure 1-1. Project Location Map.

equipment; (2) State and federal user requirements for a statewide communications system that would survive wind speeds up to 155 miles per hour (mph) (highest winds in a Category 4 hurricane)[2]; (3) expanding voice and data communications requirements of federal and State users; and (4) federally-mandated auction of analog microwave frequencies from government to private users (such as cellular phone uses).[3][4]

Both ICSD and USCG have constructed or upgraded communication facilities around the State for Anuenue. The work by ICSD has included constructing radio facilities at: Humuʻula (Big Island)[5], Kahua Ranch (Big Island), Kamehame Ridge (Oʻahu), Kaʻūpūlehu (Big Island), Koko Head (Oʻahu), Puʻu Nana (Molokaʻi)[6], and Waiākea (Big Island).[7]

1.1.3 ANUENUE RADIO FACILITY AT MAUNA KAPU

As part of its efforts, the USCG completed upgrades at the Mauna Kapu site in 2009. The work included: the construction of a new 180-foot tower with 7-8 gigahertz (GHz) microwave dishes and multiple whip antennas; the demolition of two buildings; and an extensive renovation of a USCG building for use as a communications equipment building (Building C). The Mauna Kapu facility connects to other Anuenue facilities, including: to the USCG Communications Station in Wahiawa; and to the State Anuenue facility at Koko Head. In additional to the Anuenue system connections, the facility provides links to: USCG Air Station Barbers Point, National Oceanic and Atmospheric Administration at ʻEwa Beach, and USCG Integrated Support Center at Sand Island.

1.2 PURPOSE AND NEED

The purpose for the proposed action is to support ICSD's efforts to provide effective and reliable telecommunication services. The proposed utility upgrades and building improvements are needed to improve the reliability of the IRF at Mauna Kapu. The proposed work will address the following:

1) **Exposed existing electrical conduits.** The existing underground electrical conduits are exposed at various locations; thus making the electrical service vulnerable to outages due to hazards caused by severe weather as well as to acts of vandalism. Installing an underground electrical system will minimize the system's vulnerability.

2) **Increased electrical requirements.** As the technology/equipment has evolved, the equipment's electrical requirements have or are projected to increase. ICSD anticipates that the capacity of the existing metering equipment and/or cable will eventually be surpassed;

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2 D. Jandoc (DAGS), personal communication, March 4, 2014.

3 U.S. Coast Guard. 2009. *Final Environmental Assessment, Anuenue Radio Facility Upgrade, Mauna Kapu, Oahu, Hawaii.*

4 State of Hawaiʻi, Department of Accounting and General Services. 2012. *Final Environmental Assessment, ICSD Waiākea Radio Facility, Construction of a New Radio Facility.*

5 State of Hawaiʻi, Department of Accounting and General Services. 2012. *Final Environmental Assessment, ICSD Waiākea Radio Facility, Construction of a New Radio Facility.*

6 Unknown. Looking Back, and Forward: Department Accomplishments. No date. Available as of 12/23/12 at http://thelingleyears.wordpress.com/department-accomplishments/.

7 State of Hawaiʻi, Department of Accounting and General Services. 2012. *Final Environmental Assessment, ICSD Waiākea Radio Facility, Construction of a New Radio Facility.*

therefore, installing separate ICSD and USCG/Army electrical metering and service is prudent.

3) **No existing "land line" telephone, CATV, or communication connections.** There are no existing telephone or CATV services to any of the three existing buildings within the Mauna Kapu site. Installing empty telephone and CATV conduits from electrical pole #34 to USCG Building C will provide for future ICSD land line connection to off-site users/entities. Additionally, installing empty communications conduits from USCG Building C to the ICSD Building and the USCG/Army Shed will provide for land line connections between the equipment within these buildings. There is a need for telephone, CATV, and communication lines to enhance and improve reliability of the ICSD, Army, and USCG operations.

4) **Future ICSD equipment installation within USCG Building C.** With the rapidly developing communication technology and demands of users, future expansion of ICSD equipment is anticipated. A new electrical conduit and junction box will be installed within USCG Building C to facilitate future ICSD equipment installation.

5) **Aging ICSD building roof and on-going maintenance.** The aging ICSD building roof structure will remain in-place, to minimize facility downtime, while a new roof structure is constructed above it. The new roof will be designed to survive wind speeds up to 155 mph (highest winds in a Category 4 hurricane).[8] Maintenance work will include: door replacement, and painting of the building interior and exterior walls.

1.3 ENVIRONMENTAL REVIEW

This Environmental Assessment has been prepared because State funds and State designated Conservation lands (TMK 9-2-005:025) are being used for the proposed action. It has been prepared in accordance with Chapter 343, Hawai'i Revised Statutes, and Title 11, Chapter 200, Hawai'i Administrative Rules. DAGS anticipates a Finding of No Significant Impact (FONSI) for the proposed action.

The proposed action includes work on private land that is currently leased by the Army (TMK 9-2-005:024). After a review of the project and its potential impacts, the Army will determine the appropriate course of action that is in accordance with National Environmental Policy Act of 1969 (NEPA) and Army rules and regulations. It is anticipated that a Categorical Exclusion for utility upgrades will be determined. Additionally, DAGS intends to request a permit from the Army for its operations on the project site. The current intention is for the permit to be reviewed as part of the proposed action through the NEPA Categorical Exclusion process by the Army.

1.4 PROPOSED AGENCY ACTION AND ACCEPTING AGENCY

Hawaii Revised Statues Chapter 343, Environmental Impact Statement, establishes an environmental review process whereby a government agency or private entity proposing a project must prepare an environmental assessment that considers potential adverse impacts from the

8 D. Jandoc (DAGS), personal communication, March 4, 2014.

project. The requirement to prepare a Chapter 343 environmental assessment is triggered by, among other factors, the use of public funds, and the use of lands within the State Land Use Conservation District. The IRF at Mauna Kapu would be constructed with public funds on land that is within the State Land Use Conservation District.

For this proposed action, the DAGS is the proposing agency and the accepting agency is the DLNR, Office of Conservation and Coastal Lands (OCCL).

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2 PROPOSED ACTION AND ALTERNATIVES CONSIDERED

This section describes the proposed action, identifies the estimated cost, outlines the preliminary schedule, and briefly summarizes the alternatives considered.

2.1 PROPOSED ACTION

The proposed action calls for: installation of underground electric, cable television (CATV), telephone, and communication conduits to service the U.S. Coast Guard (USCG), U.S. Army (Army), and Information and Communication Services Division (ICSD) buildings; minor utility upgrades to the USCG, Army, and ICSD buildings; and maintenance and improvements to the ICSD building.

As shown in Figure 2-1, the proposed action would include the following:

1. Install underground electrical conduits to replace the exposed conduits and install new telephone, CATV, and communications conduits. See Figure 2-2 for typical sections of the four conduit designs that will be used. The conduits will be placed in a trench from the nearby existing electrical pole (EP 1/34) up to the ICSD and USCG/Army buildings. Along the stairway portion of the utility alignment, conduits will be installed on the uphill side of the stairs. Retaining walls up to 6 feet in height, to accommodate grade changes along an approximately 20-foot section, will be installed upslope of the underground utility alignment. See Figure 2-3 for section of typical retaining wall. Back slopes will be graded, as needed, to match the existing ground. Where practical, graded swales, landscaped drain inlets, subdrains, and PVC drain lines will be installed to divert storm water runoff away from the new retaining walls and existing buildings and walkways. The length of the utility system alignment is approximately 360 feet.

2. Install a new electrical meter box and equipment near the existing meter at EP 1/34.

3. Remove an unused water tank near the stairs to accommodate the conduit alignment.

4. Install minor utility upgrades to the three existing buildings include: new conduits to and within the buildings, new breaker boxes, and ancillary equipment, as needed.

5. Conduct maintenance and upgrade work to the ICSD building. The work includes: repainting the interior and exterior walls; replacing the door and hardware; and installing a new roof over the existing roof.

2.2 PROJECT SCHEDULE AND ESTIMATED COST

The source of funding for the project would be State of Hawai‘i (State) monies, through DAGS ICSD. The estimated cost of the proposed action is approximately $625,000. Prior to construction, project

design needs to be completed and permits need to be secured. Construction is anticipated to begin after permits are secured and would be completed in 4 to 6 months.

2.3 ALTERNATIVES CONSIDERED

A No Action Alternative, overhead alternative and downhill side of stairs alternatives were reviewed to meet the purpose and need of this infrastructure project. These alternatives were reviewed and evaluated in the following sections.

2.3.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the existing exposed electrical system would continue to serve ICSD, Army, and USCG buildings and the deficient building would continue to serve ICSD.

The No-Action Alternative would result in the following:

- The ICSD, Army, and USCG electrical system would continue to be vulnerable to damage from severe weather or acts of vandalism. The facilities serve as mission support for emergency rescue, civil defense, emergency medical services, and critical government operations. These important functions would be negatively impacted should these facilities experience an electrical outage.
- There would be no option to provide for future "land line" telephone, CATV, and communications connections between the Mauna Kapu facilities and the rest of the Anuenue and/or Anuenue users. The "land line" connection would provide a backup means of communication should there be a "line of sight" failure to or at the adjoining Anuenue Station(s). Without the option to establish these connections, improvements to the reliability at the Mauna Kapu facilities would be limited.
- The ICSD building would continue with the existing deficient roof. Under severe weather conditions, the roof could fail, which could negatively impact ICSD operations.
- ICSD would not be able to accommodate additional equipment to serve expanded and future needs. This would impede ICSD's ability to fulfill its responsibility of providing an efficient and effective statewide telecommunication system. This could negatively impact the numerous government agencies that rely on ICSD for communication services.
- No impact or change to the existing natural and man-made environment would occur and the existing environmental setting would be unchanged.

2.3.2 ALTERNATIVE 1 – OVERHEAD ALTERNATIVE

As an alternative to the proposed action an overhead utility system was considered. This alternative would install overhead electrical lines to replace the existing exposed lines. The overhead system would provide for future installation of telephone, CATV, and communication lines. This alternative would include the same building upgrades as the proposed action.

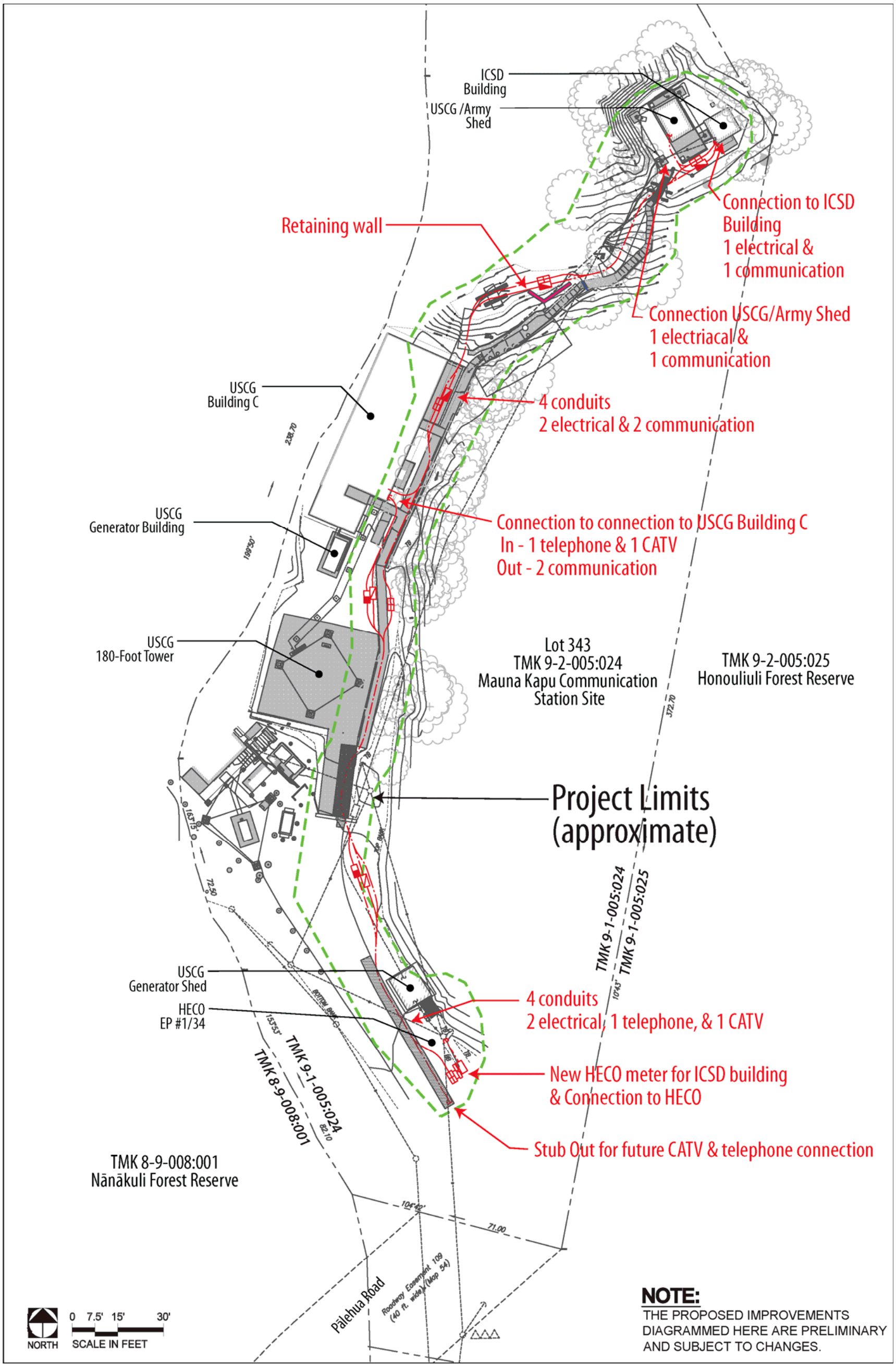

Figure 2-1. Utility System Improvements Site Plan.

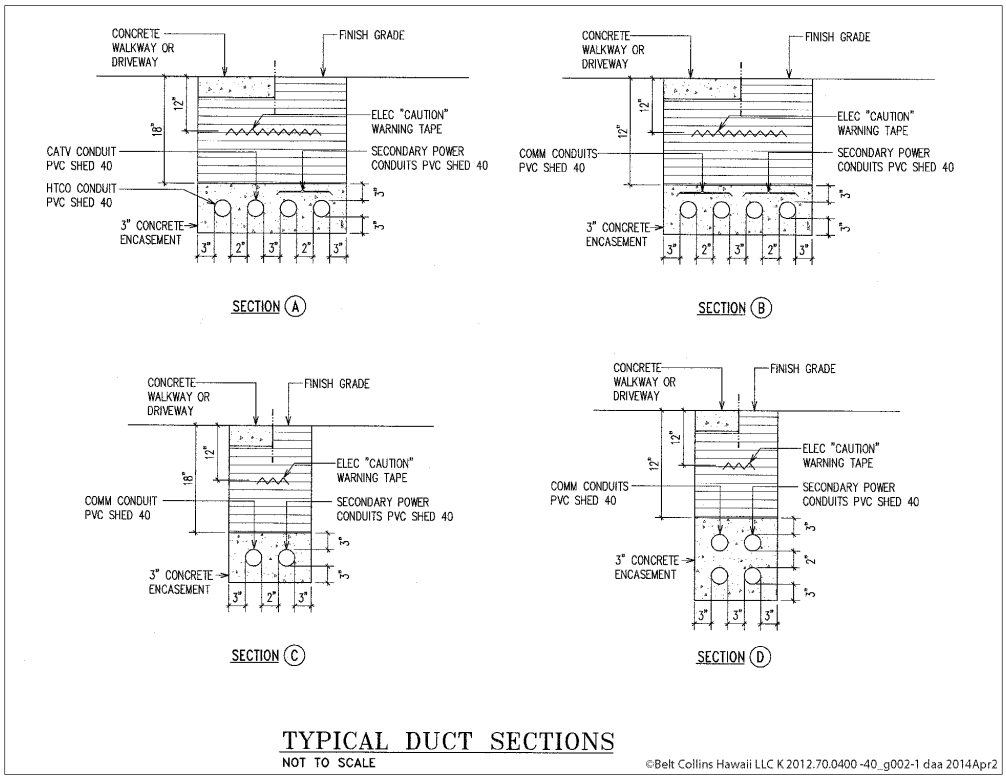

Figure 2-2. Typical Conduit Sections.

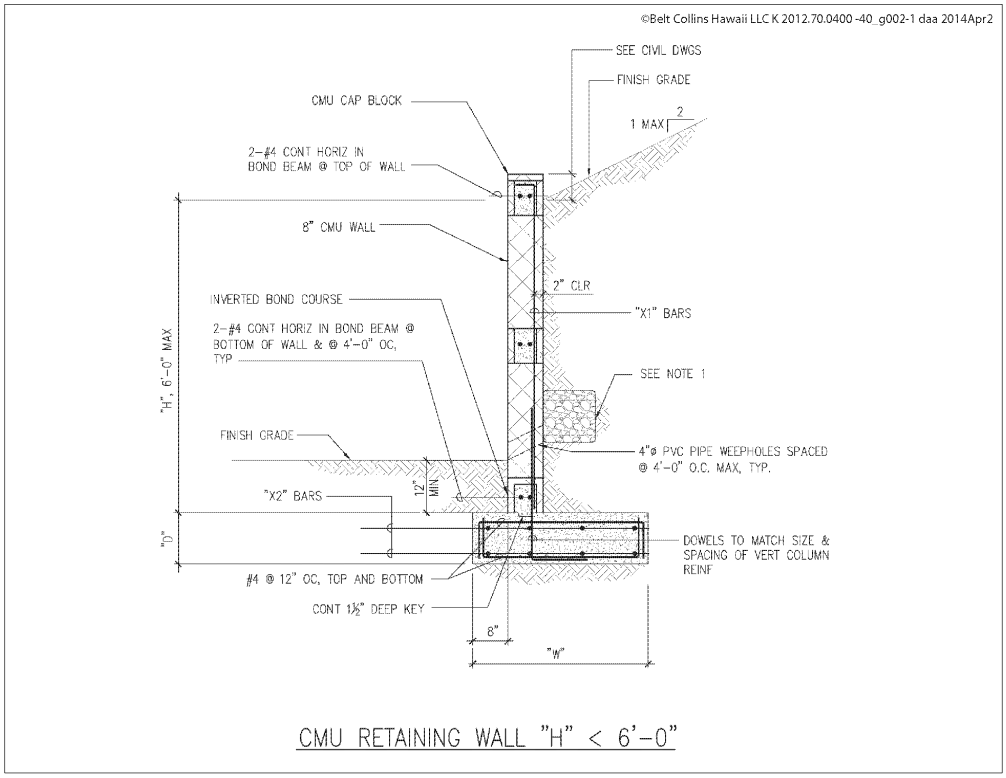

Figure 2-3. Typical Retaining Wall Section.

The Overhead Alternative would result in the following:

- Less initial construction cost than the preferred alternative. Overhead installation is typically five times less expensive than underground utility installation.
- Possibly less construction activity and habitat disturbance than the preferred alternative, including: no trenching, limited grading, and no retaining wall construction along the stairway. The reduced construction activities would result in fewer potential impacts ground disturbance and reduced potential erosion and runoff impacts. However, the overhead system would probably require the installation of utility poles and trimming of adjacent vegetation, which would offset some of the ground and habitat disturbance benefits.
- More maintenance cost than the preferred alternative. The overhead system may require on-going maintenance (tree trimming) to insure that adjacent vegetation does not become a hazard.
- The electrical system would remain vulnerable to severe weather and acts of vandalism. If installed, the telephone, CATV, and communication systems would be similarly vulnerable.

2.3.3 ALTERNATIVES FOR THE STAIRWAY SECTION

Connecting the utility system to the ICSD and Army/USCG buildings in the upper portion of the project site requires following an approximately 80 linear foot section of the stairway, which is surrounded by steep slopes. See Figure 2-4 for a photograph of a portion of the stair section. Two different alternatives were considered in this section; both of these alternatives would be identical to the proposed action in areas besides the stairway section and would therefore have the same advantages and disadvantages to the proposed action in these areas.

2.3.3.1 Alternative 2 – Underground on the Downhill Side Alternative

This alternative considers installing underground conduits on the downhill side of the stairway. Due to the following factors, this alternative was not chosen as the preferred alternative:

- The downhill side of the stairs is considerably steeper than the uphill side. Therefore, this alternative: may require greater excavation to install the conduits at an appropriate depth; and could increase erosion/sloughing impacts.
- The downhill side of the stairs has already experienced erosion/sloughing resulting in exposing of the stair's undersides and piling foundation. Therefore, conduit installation could affect the stair's stability/structural integrity.
- Design and construction to address the above two factors could result in increased and more complex construction activities that could result in increased construction cost and a similar amount of ground disturbance.

Figure 2-4. Stairway.

2.3.3.2 Alternative 3 – Suspended Alternative

This alternative considers attaching the conduits to the exposed downhill side of the stairs. This Alternative would result in the following:

- Minimized ground disturbance adjacent to the stairs, which would decrease erosion/sloughing impacts.
- Attaching would require drilling into the stairs for the fastening devices, which would still result in construction noise and air pollution from equipment.
- As erosion/sloughing has already resulted in portions of the stairs being undermined and exposed; attaching the conduits to the stairs may further negatively affect the stair's stability/structural integrity.
- Although the exposed conduit material would be metal pipe; the conduits would be visible and physically accessible from the stairs, which would make the conduits vulnerable to vandalism.

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3 AFFECTED ENVIRONMENT

This chapter reviews the affected environment and identifies potential impacts and mitigating measures.

Table 3-1. Summary of Environmental Impacts

Environment/ Resource	Discussion and Determination
Land Use and Land Tenure	The proposed action is an upgrade of existing communication facilities. The proposed action is on a parcel that contains other communication facilities. No adverse impacts are anticipated.
Geology, Soils, and Topography	The proposed action will trench to install underground conduits. Back slopes will be graded, where appropriate. Retaining walls will be installed along the stairway portion of utility system alignment. Best Management Practices (BMPs) will be employed during construction to control runoff, erosion, and dust. After the utility conduits are installed, affected areas would be re-vegetated. No adverse impacts are anticipated.
Hydrology	There are no streams or water bodies located near the project site and the proposed action would not lead to an increase in water runoff. BMPs will be employed during construction to control runoff. After the utility conduits are installed, affected areas would be re-vegetated. No adverse impacts are anticipated.
Archaeological and Cultural	There are no sensitive archaeological or cultural resources in the project site. The project will involve minor work on a historic building, but will not adversely impact its historical character No adverse impacts are anticipated.
Flora and Fauna	There are no sensitive flora or fauna resources in the project site. During construction, special vegetation trimming methods would be utilized to minimize impacts to native snails. No adverse impacts are anticipated.
Health and Safety	The proposed action does not pose any significant risk of generating health and safety impacts. The utility system and building upgrades will reduce the likelihood of damages to the project from severe weather events. No adverse impacts are anticipated.
Air Quality	Short-term air quality impacts would occur as part of construction activities. BMPs will be employed to minimize emissions from vehicles and dust during construction activities. After construction is the complete, the project would not increase pollutant generating activities on the site. No adverse impacts are anticipated.
Noise	Short-term noise impacts would occur as part of construction activities. BMPs, including the use of mufflers, will be employed during construction to minimize these impacts. After construction is the complete, the project would not add to noise levels on the site. No adverse impacts are anticipated.

Environment/ Resource	Discussion and Determination
Circulation and Traffic	The impacts from the traffic during construction are expected to be minor. Proper notification and coordination will be provided to limit impacts on other users of the private, one-lane Pālehua Road. After construction is the complete, traffic to the site would remain at current levels. No adverse impacts are anticipated.
Infrastructure	The proposed action is not anticipated to generate a significant increase in demand for the infrastructure that exists on the project site, which includes electricity and drainage. The underground conduits will allow for the installation of telephone and cable service, when available; this would generate minimal new demand for these services and is not anticipate to have any negative impacts on the systems or other users. The proposed action does not involve the construction of new infrastructure, such as water, sewer, and gas and fuel lines. The unmanned site would continue to be unmanned. No adverse impacts are anticipated.
Public Services and Facilities	The proposed action would not affect the capacity of public services and facilities such as police and fire protection, emergency services, and parks. No adverse impacts are anticipated.
Visual and Aesthetic	The proposed action involves the installation of an underground utility system and upgrades to an existing building. The proposed improvements will not be visible from developed areas. No adverse impacts are anticipated.
Socioeconomic	Proposed project will not affect population growth. The project will have a short-term economic benefit from costs associated with construction activities. No adverse impacts are anticipated.

3.1 LAND USE AND LAND TENURE

3.1.1 EXISTING CONDITIONS

Regional Context: The project is located at the Mauna Kapu Communication Station (Mauna Kapu) site in the Waiʻanae Mountain Range in the district of ʻEwa on the island of Oʻahu, Hawaiʻi. The Mauna Kapu site is located on the Palikea Ridge with the Honouliuli Forest Reserve directly to the east and the Nānākuli Forest Reserve directly to the west. The community of Makakilo Heights is the closest neighborhood located approximately 2.5 miles to the south of the project.

The Mauna Kapu site is accessed by Pālehua Road, a private, gate-secured, one-lane paved road. Pālehua Road is accessed via Kikaha Street to Umena Street in the Makakilo Heights neighborhood. Beyond the various public and private telecommunication users, Pālehua Road is used by several residents and Camp Timberline users.

Existing Use: The Mauna Kapu site is in use as a communication facility for various public users. The site includes a 180-foot tower, 70-foot tower, three U.S Coast Guard (USCG) buildings, a shared U.S. Army (Army)/USCG building, and an Information and Communication Services Division (ICSD) building. In addition to the public users, Verizon Wireless has a communication facility on the

Mauna Kapu parcel, which includes a 150-foot tower, a 130-foot tower, an equipment building, and a storage shelter. See Figure 3-1 for a map of existing uses on the Mauna Kapu site.

A paved driveway provides access from Pālehua Road up to the 180-foot tower. Paved walkways and stairs provide access to the USCG, Army, and ISCD buildings. Portions of the Mauna Kapu site are secured with perimeter fences.

The Pālehua-Palikea Trail, a hiking trail, crosses through the project site utilizing the paved walkway and stairs. Currently, access is limited to organized groups and requires obtaining special approvals.[1] See Section 3.11 for more discussion.

Surrounding Land Use: The land use in the surrounding area is primarily undeveloped forest reserve. Directly to the west of the Mauna Kapu site is the Nānākuli Forest Reserve and directly to the east is the Honouliuli Forest Reserve. To the south of the project site, along Pālehua Road, there are a number of governmental facilities, private telecommunication facilities, and a number of non-telecommunication private users. See Figure 3-2 for a map of surrounding telecommunication and residential uses. The uses in the surrounding area include:

- Federal Aviation Administration (FAA) Remote Transmitter/Receiver facility and an U.S. Navy facility on Pālehua Road, located approximately 600 feet south of the project site.
- Various private commercial telecommunications facilities located along Pālehua Road to Puʻu Manawahua.
- U.S. Air Force Pālehua Solar Observatory facility located approximately 1.5 miles southwest of the project site.
- Camp Timberline, a private camp facility offering cabins, camping, and recreational programs, located near the Pālehua Solar Observatory.
- A number of private residences located along Pālehua Road starting approximately 0.5 miles south of the project site.

[1] Exploration Hawaiʻi. March 4, 2013. Pālehua-Palikea: A Restricted Hike Featuring Native Hawaiian Plants, Snails, and Spiders. Available as of 12/26/13 at http://www.explorationhawaii.com/2013/03/04/palehua-palikea-a-restricted-hike-featuring-native-hawaiian-plants-snails-and-spiders/

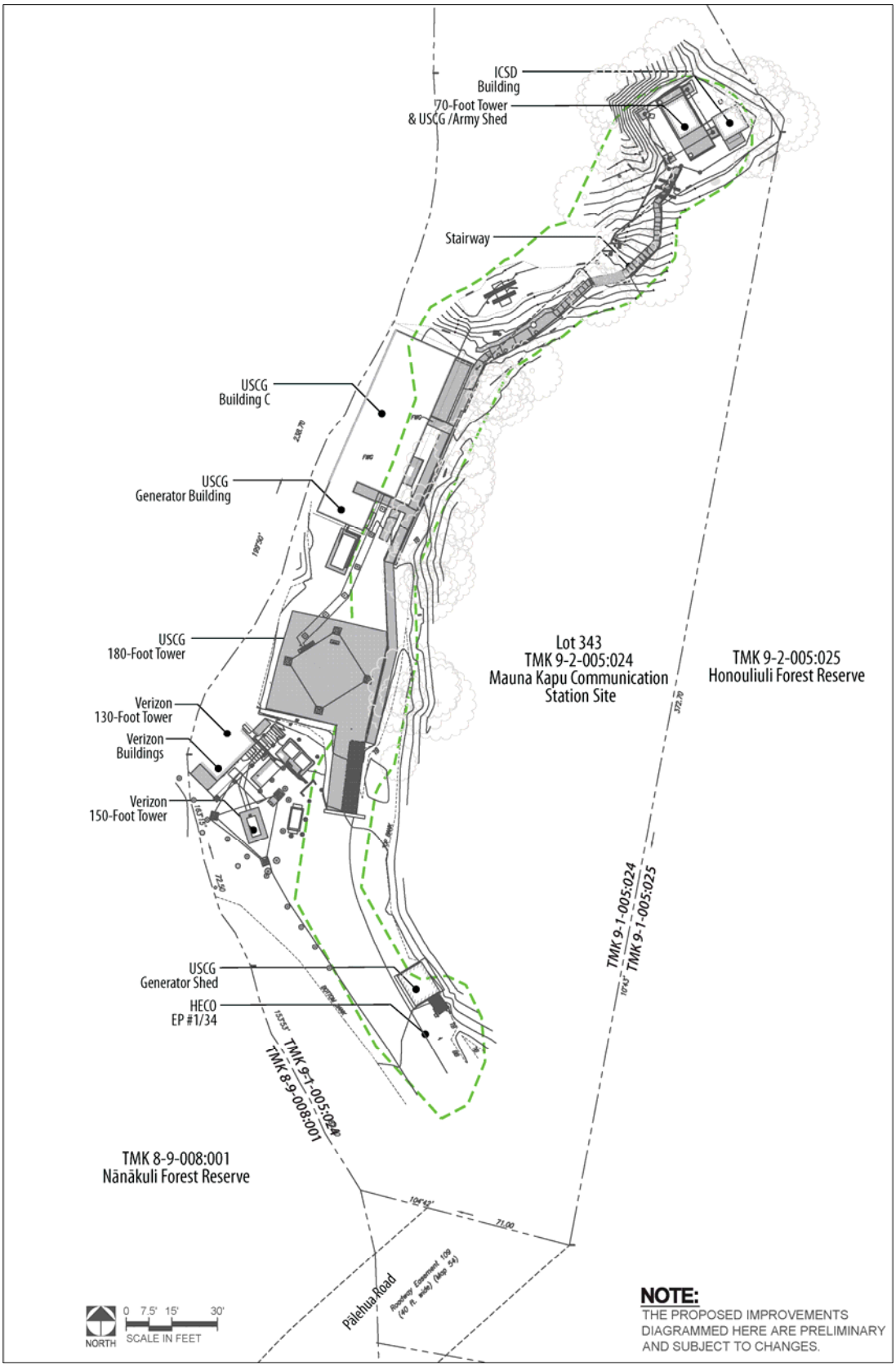

Figure 3-1. Mauna Kapu Site Existing Uses and Limits of Project Boundary.

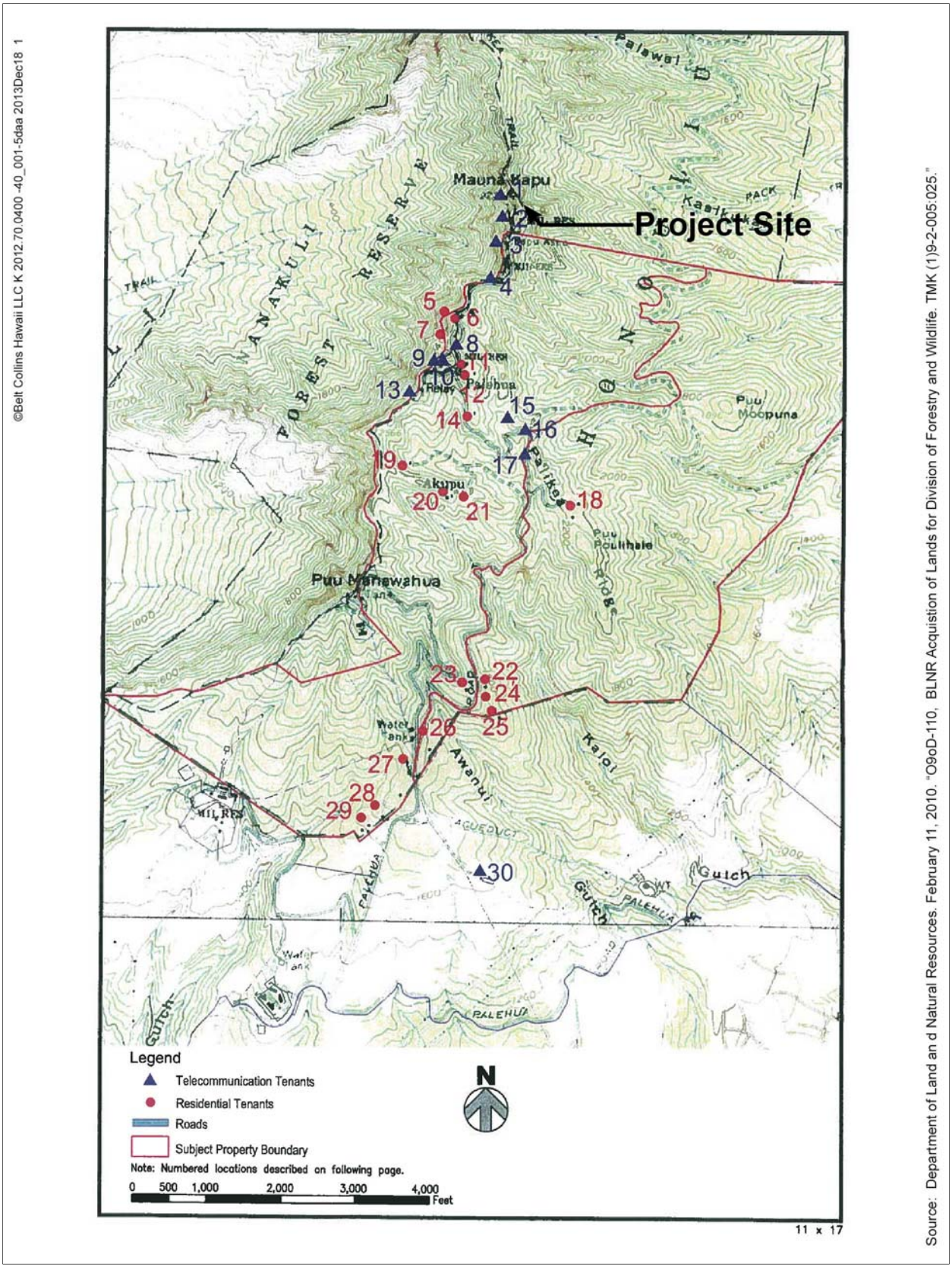

Figure 3-2. Mauna Kapu Surrounding Telecommunication and Residential Uses.

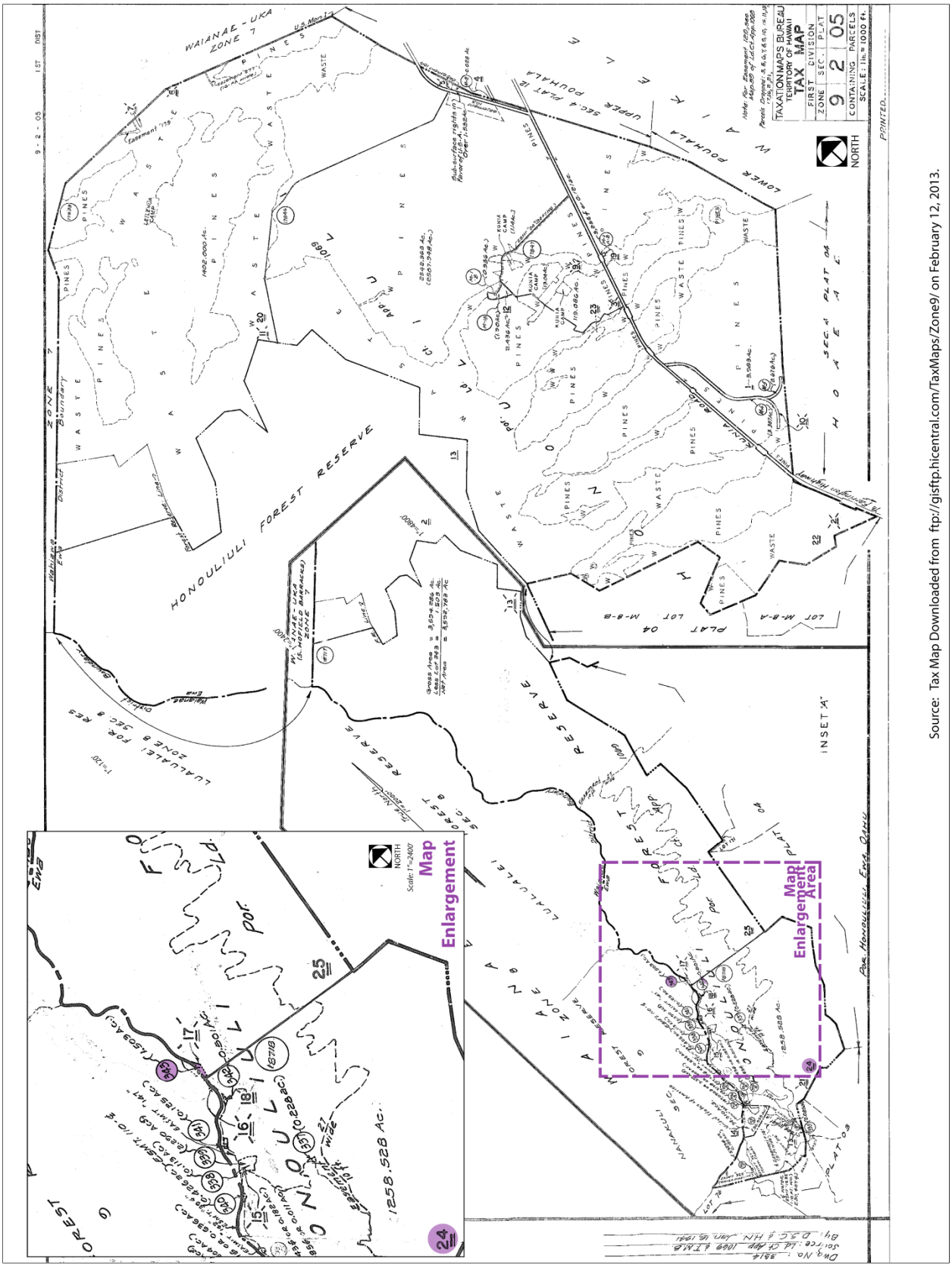

Figure 3-3. Tax Map Key.

Private Land Use Planning: From 1877 to 2010, the Mauna Kapu site and much of the surrounding area was owned by the Campbell Estate (previously James Campbell). Development of telecommunications facilities in the area was guided by the Campbell Estate's Pālehua Ridge Communication Facilities Master Plan. The master plan sought to minimize environmental impacts by directing development to areas where roads and utilities already existed.[2]

Land Ownership: The Mauna Kapu site is owned by the Gill-Olson Joint Venture. Until 2011, the site was part of TMK 9-2-005:013 when it was integrated as Lot 343 into TMK 9-2-005:024 as part of a resubdivision and consolidation by the Gill-Olson Joint Venture. The resubdivision and consolidation included the transfer of adjacent lands to the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife (DOFAW) to be incorporated into the Honouliuli Forest Reserve.[3] Since 1952, the Army has had a perpetual and exclusive lease to the land currently defined as Lot 343 of TMK 9-2-005:024. The Army has granted the USCG a permit for a perpetual and exclusive easement to portions of the site that include the 180-foot tower, USCG buildings, the 70-foot tower, the Army building, and the ICSD building. The ICSD facilities are covered under the USCG permit. The intention is for the State to obtain a similar permit from the Army to formalize ICSD's operations on the site.

3.1.2 POTENTIAL IMPACTS AND MITIGATION MEASURES

Land use and land tenure impacts are not anticipated. The proposed action is consistent with the existing use on the Mauna Kapu site. The proposed action is consistent with the intent of the Army lease and USCG permit for the land and would not represent a significant increase in activity or intensification of use on the site. Short-term impacts that are expected to occur during project construction would include traffic along the one-lane Pālehua Road, which would be coordinated with other roadway users to ensure minimal disruption. After construction is complete, activities associated with the project would be limited to periodic maintenance and emergency outage work.

Potential impacts to the adjacent Nānākuli and Honouliuli Forest Reserves and flora and fauna resources are discussed in Section 3.5 of this chapter. Potential impacts to the Pālehua-Palikea Trail are discussed in Section 3.11.4 of this chapter.

3.2 GEOLOGY, SOILS, AND TOPOGRAPHY

3.2.1 EXISTING CONDITIONS

The project is located in the Waiʻanae Mountain Range on the Palikea Ridge near the summit of Mauna Kapu, at an elevation ranging from approximately 2,720 feet above mean sea level (msl)near USCG Building C to 2,750 feet above msl near the ICSD and Army/USCG buildings. The Waiʻanae Mountain Range is the oldest portion of Oʻahu having been formed during the Pliocene period approximately 2.7-3.4 million years ago and Mauna Kapu is one of a series of (now extinct)

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2 Tyrone T. Kusao, Inc. 1991. *Environmental Assessment Report, Conservation District Use Application No. OA 7/22/91-2501, Proposed Telecommunications Facilities*.

3 State of Hawaiʻi, Department of Land and Natural Resources, Office of Conservation and Coastal Land. 11/24/11. *Conservation District Use Application for TMK (1) 9-01:24.*

volcanoes whose basalt and andesite flows formed the Wai‘anae Mountain Range.[4] Steep topography and incised valleys surround the project area. See U.S. Geological Survey Quadrangle Map in Figure 3-4.

The U.S. Department of Agriculture Soil Conservation Service’s “Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii,” dated August 1972, classifies the soil in the project area as Tropohumults-Dystrandepts association (rTP). These soils are found in the Wai‘anae Mountain Range at elevations from 1,000 to 4,000 feet, on slopes ranging from 30 to 90 percent, and in areas with 30 to 75 inches of annual rainfall. These soils mostly occur in very steep and inaccessible areas and generally the vegetation is ‘ōhi‘a, puakeawe, koa, ‘a‘ali‘i, and ferns.[5]

In 2003, as part of work undertaken at the Mauna Kapu site by USCG, Weidig Geoanalysts conducted a geotechnical investigation under the current location of the 180-foot tower. The boring revealed a dusky blue-gray and brown mottled, moist, medium-stiff clayey silt (Unified Soil Classification System: MH) from the ground level to approximately 9 feet.[6] Below the upper soils, a sequence of variably mottled purplish-brown, blue-violet and yellowish-orange to reddish-violet, blue-green and brown or gray-brown and reddish-brown, moist saprolite to a depth of 25 feet.[7] These soils are consistent with Tropohumults-Dystrandepts association.[8]

The Agricultural Lands of Importance to the State of Hawai‘i map indicates that the project area is not an important agricultural area and, therefore, its agricultural potential is low.[9] The nearest important agriculture lands are located in lower elevation, flatter lands at distances starting approximately one-mile away. See **Error! Reference source not found.**.

3.2.2 POTENTIAL IMPACTS AND MITIGATION MEASURES

The installation of underground conduits into the Tropohumults-Dystrandepts association soil types is not expected to be a problem since the trenching is relatively shallow. In November 2013, Geolabs Inc. conducted subsurface testing of geological conditions necessary for design.[10] Installation of the underground conduits will include excavation of asphalt and concrete surfaces up to the beginning of the existing stairs to the upper buildings. Thereafter, a trench upslope of the existing stairs will be excavated to the upper buildings. The excavated soil can be stockpiled and

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4 Stearns and Vaksvik. 1935. *Geology and Ground-Water Resources of the Island of Oahu, Hawaii*. Prepared for the U.S. Geological Survey. Reprinted in 2001.

5 U.S. Department of Agriculture, Soil Conservation Service. 1972. *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai.*

6 Weidig Geoanalysts. June 12, 2003. *Geotechnical Report, Anuenue Project – U.S.C.G. Mauna Kapu Palikea Trail, Makakilo, Honolulu, Hawaii.*

7 Weidig Geoanalysts. June 12, 2003. *Geotechnical Report, Anuenue Project – U.S.C.G. Mauna Kapu Palikea Trail, Makakilo, Honolulu, Hawaii.*

8 Weidig Geoanalysts. June 12, 2003. *Geotechnical Report, Anuenue Project – U.S.C.G. Mauna Kapu Palikea Trail, Makakilo, Honolulu, Hawaii.*

9 State of Hawai‘i, Department of Agriculture. 1977. *Agricultural Lands of Importance to the State of Hawai‘i*.

10 Geolabs, Inc. November 21, 2013. *Technical Memorandum, DAGS ICSD Mauna Kapu Preliminary Recommendations.*

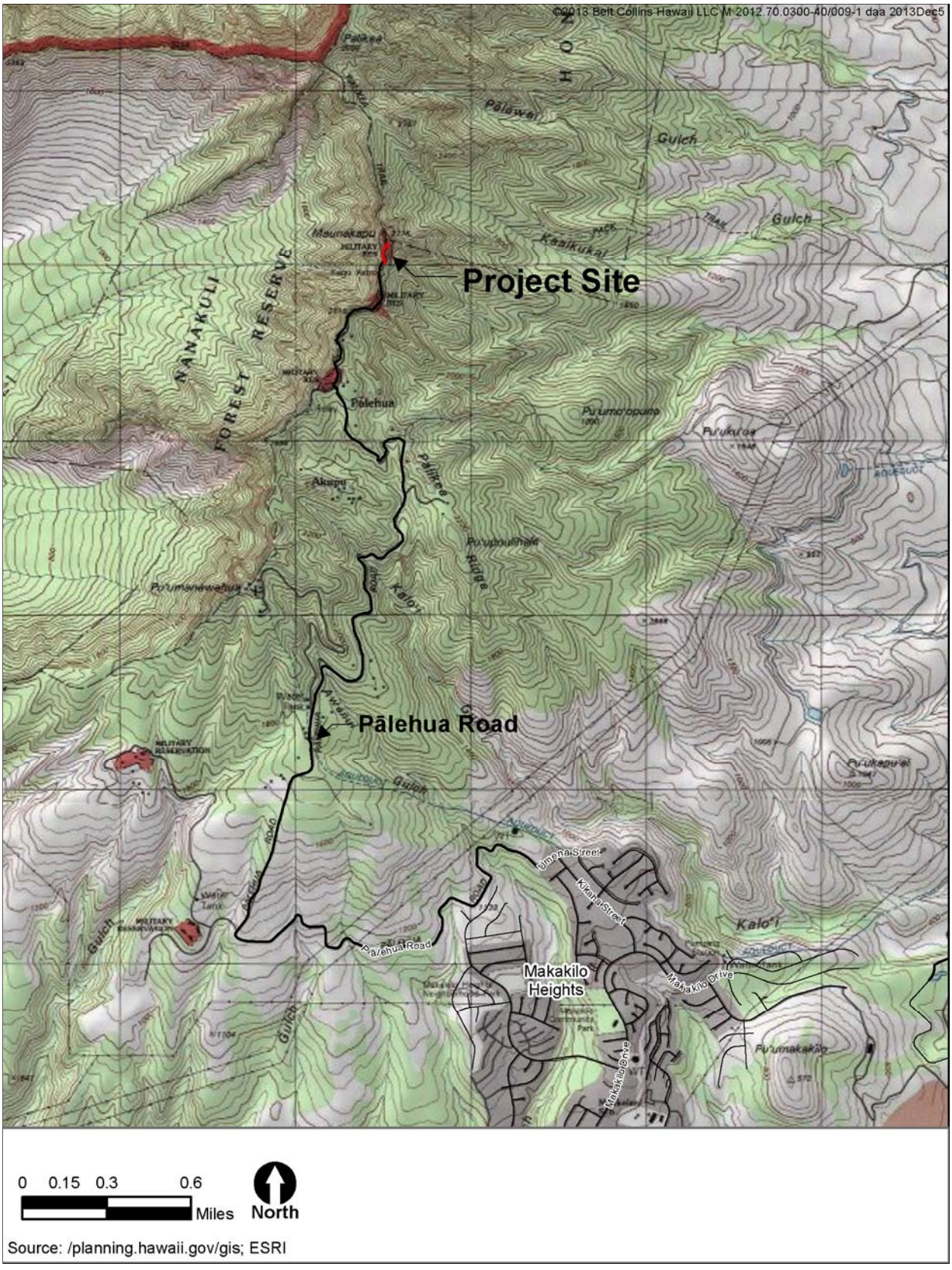

Figure 3-4. U.S. Geological Survey Quadrangle Map.

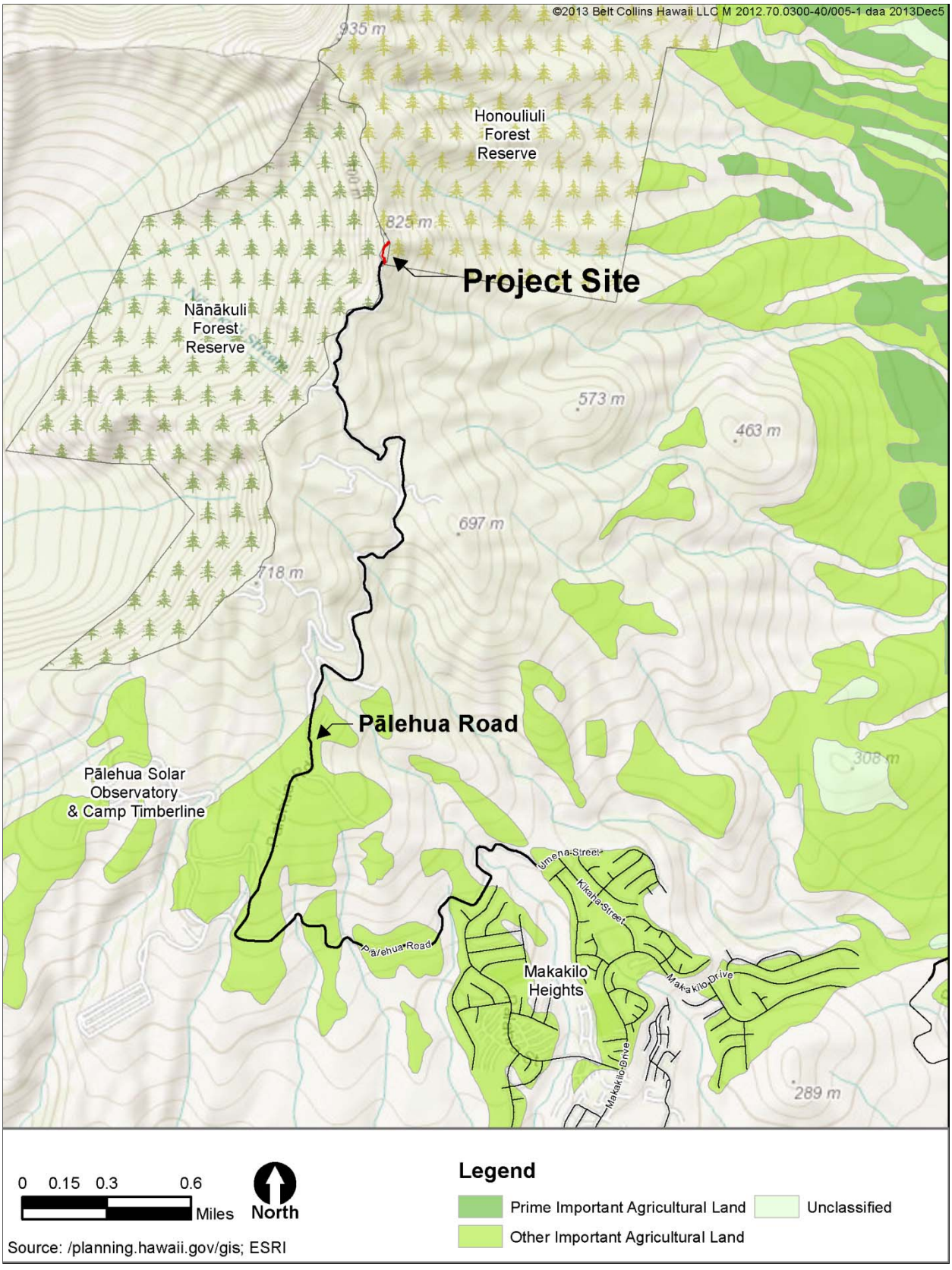

Figure 3-5. Agricultural Lands of Importance to the State of Hawai'i.

reused as fill after the conduits have been installed. Most of the proposed work is in previously disturbed areas. As noted in the project description, in the areas the conduits run along the uphill side of the stairs, approximately 20 feet of retaining walls will be installed to accommodate grade changes and prevent soil from sliding. Back slopes will be graded, as needed, to match the existing ground. BMPs, in accordance with current City and County of Honolulu (City) standards[11], will be implemented during construction to control soil erosion, surface runoff, and dust from the proposed action. In unpaved areas where ground disturbance occurs, the areas would be re-vegetated with appropriate vegetation.

3.3 HYDROLOGY

3.3.1 WATER RESOURCES

The annual average rainfall in the project area is about 42 inches.[12] Consistent with general weather patterns on Oʻahu, heavier rainfall months occur during November to March and the lowest rainfall months occur during June and July. [13]

3.3.2 GROUND WATER

According to the Hawaiʻi Water Resource Protection Plan, portions of the Mauna Kapu site are located in the ʻEwa-Kunia hydrological unit of the Pearl Harbor Aquifer Sector Area and portions of the site are in the Nānākuli hydrological unit of the Waiʻanae Aquifer Sector Area. The ʻEwa-Kunia and Nānākuli hydrological units are predominately basal groundwater sources.[14]

In November 2013, Geolabs, Inc. conducted subsurface investigations in areas where ground disturbance is proposed.[15] The tests included Dynamic Cone Penetrometer probes extending in depths ranging from about 3.5 to 7.8 feet below existing ground surface. The test did not encounter ground water. The geotechnical investigations conducted by Weidig Geoanalysts in 2003, which involved a single boring to a depth of approximately 31 feet at the site of 180-foot tower, similarly encountered no ground water.[16]

The underground injection control (UIC) line was established by the State Department of Health (DOH) as a boundary between potable and non-potable ground water sources. In general, areas upland of the UIC line are considered potable ground water sources and are subject to Environmental Protection Agency (EPA) water quality standards under the Clean Water Act. The areas below the UIC line are subject to EPA saltwater quality standards under the Clean Water Act. The Mauna Kapu site is located entirely within the UIC line.[17]

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11 City and County of Honolulu. 1999. *Rules Relating to Soil Erosion Standards and Guidelines.*

12 National Oceanic and Atmospheric Administration/National Weather Service. 2013. *Hydrology in Hawai'i*. Available at: http://www.prh.noaa.gov/hnl/hydro/pages/aug13sum.php

13 Juvik et al. 1998. *Atlas of Hawaii*.

14 State Commission on Water Resource Management. June 2008. *Hawaii Water Plan: Water Resource Protection Plan*.

15 Geolabs, Inc. November 21, 2013. *Technical Memorandum, DAGS ICSD Mauna Kapu Preliminary Recommendations*.

16 Weidig Geoanalysts. June 12, 2003. *Geotechnical Report, Anuenue Project – U.S.C.G. Mauna Kapu Palikea Trail, Makakilo, Honolulu, Hawaii.*

17 State Department of Health. July 6, 1984. *Underground Injection Control Program Quadrangle Maps*.

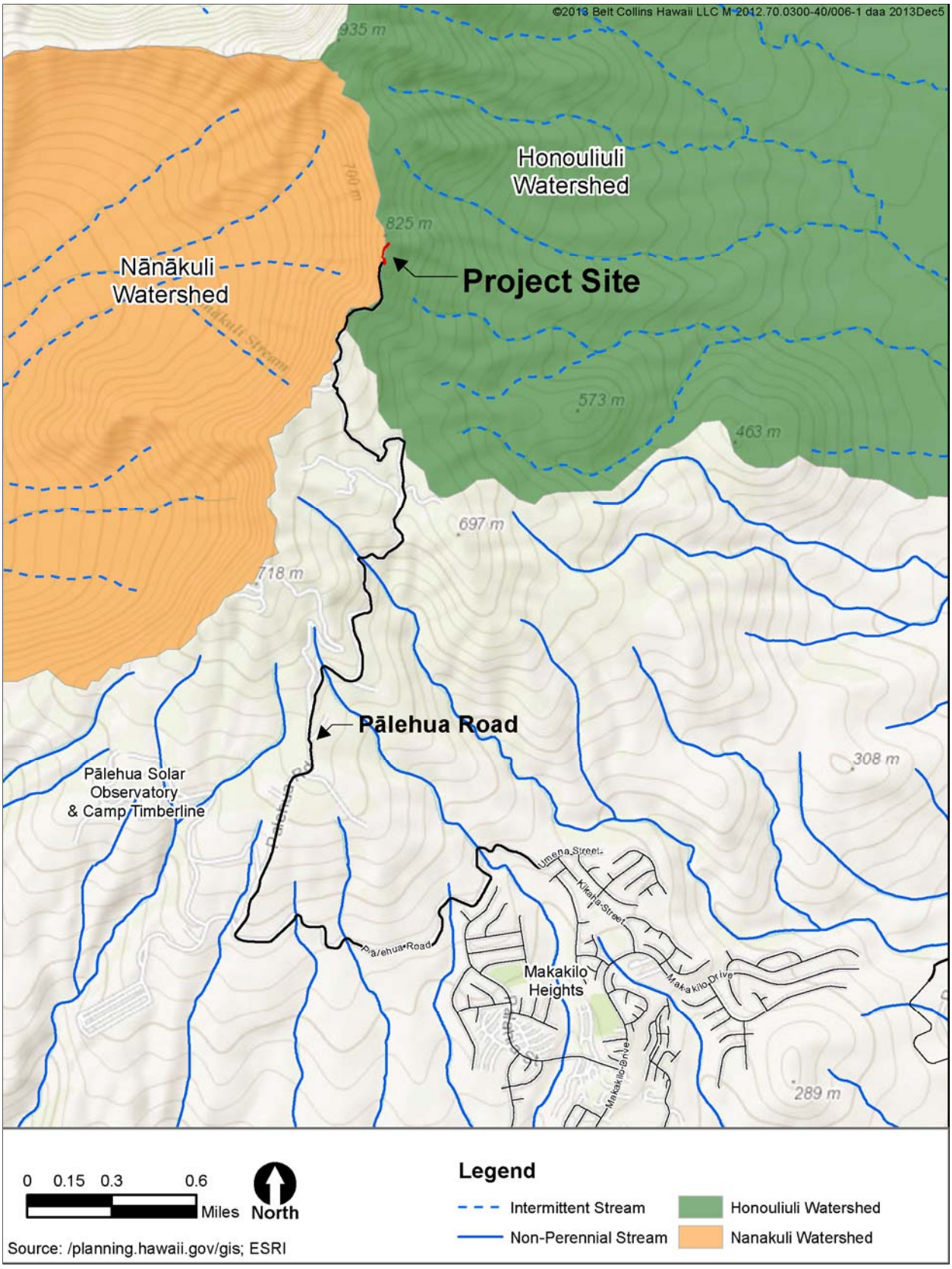

Figure 3-6. Streams and Watersheds.

3.3.3 SURFACE WATER

There are no streams or surface water bodies within the project site. Due to the Mauna Kapu site's ridgeline location, portions of the site on the western side of the ridgeline are defined as part of the Nānākuli watershed and portions on the eastern side are in the Honouliuli watershed.[18] The nearest streams to the project area are an intermittent stream flowing into the Nānākuli watershed located approximately 800 feet southwest and an intermittent stream flowing into the Honouliuli watershed located approximately 900 feet southeast of the project area.[19] See Figure 3-6 for a map of streams and watersheds.

3.3.4 POTENTIAL IMPACT AND MITIGATION MEASURES

Based on current and previous geotechnical analysis, the installation of underground conduits is not anticipated to encounter groundwater. Due to the absence of surface water sources near the project area, it is not anticipated that the proposed work would lead to any discharges into waters of the U.S. or waters of the State. Installation of conduits along the stairs will require the installation of retaining walls to accommodate grade changes. Back slopes will be graded, as needed, to match the existing ground. As described in Section 3.2.2, BMPs will be implemented during construction to control surface runoff and soil erosion; and, disturbed areas would be re-vegetated with appropriate vegetation. After construction is complete, no adverse impacts to water resources are anticipated.

3.4 ARCHAEOLOGICAL AND CULTURAL RESOURCES

3.4.1 ARCHAEOLOGICAL RESOURCES

This section summarizes the archaeological inventory survey report prepared by International Archaeological Research Institute, Inc. for the project site. The report is based on field surveys conducted during September 2013 and March 2014 and a review of relevant documents and databases.[20] The report is included as Appendix A.

Historical activity in the Mauna Kapu area is largely explained by its mountain location above Honouliuli and Nānākuli *ahupua'as* (traditional sub-district land unit). While much is known about the traditional Hawaiian histories of the lower areas of Honouliuli and Nānākuli, which were the focus of food production and settlement activities, there is little recorded about the mountain areas that encompass the project area. In the post-Contact period, the development of plantation agriculture and ranching reshaped the 'Ewa Plain, but did not directly affect the uplands, including the Mauna Kapu area.

The relative absence of historical activities in the area around Mauna Kapu is documented in the findings from previous archaeological investigations. The only archaeological inventory survey in

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18 Geographic Decision Systems International Hawaii. 1995. *Watershed Unit Boundary shapefile*. Available as 11/18/13 at http://planning.hawaii.gov/gis/

19 Department of Land and Natural Resources Division of Aquatic Resources. 2004. *DAR Streams shapefile*. Available as 11/18/13 at http://planning.hawaii.gov/gis/

20 International Archaeological Research Institute, Inc. April 2014. *Archaeological Inventory Survey for Reconditioning of the ICSD Mauna Kapu Radio Facility, Honouliuli Ahupua'a, 'Ewa, O'ahu, Hawai'i.* Prepared for Belt Collins Hawaii LLC.

the nearby mountains was conducted in 1992 by Hammatt for the proposed K-A-I-M radio tower, approximately 1 kilometer (0.62 miles) from the Mauna Kapu site, and recorded no historic properties. A number of historical sites have been documenting in the lower areas, at distances 3-8 kilometers (1.86-4.97 miles) from the project site; information on these sites is in Table 1 of Appendix A.

Starting in the 1930s, the Army began developing communication facilities on the Pālehua Ridge. In 1936, the U.S. government was granted a perpetual easement for a road and communication lines for military purposes along lower portions of the Pālehua Ridge. The easement was extended to the summit of Mauna Kapu in 1952 and was followed by increased telecommunications in the area. The exact date of the first development on the Mauna Kapu site is unknown, though records indicate that USCG Building C, which still exists, was built in 1943. Over the following years, USCG Building C has been renovated and modified to suit new equipment and changing activities, the most recent change occurred in 2009 when the USCG completed an extensive renovation of the building as part of the Anuenue system upgrades.

Field work conducted for the report involved a 100% pedestrian surface survey of the project area and a limited subsurface survey involving shovel test pits taken at three locations. The shovel test pits were conducted at one location above the stone retaining wall associated with the concrete steps linking the upper and lower areas and at two locations that will be subject to trenching. Analysis of the excavated materials revealed no cultural materials at two of the locations and a piece of plastic film at the retaining wall location, which suggests the origin of the retaining wall as modern. Findings from the surface survey identified a single significant site, Building C and associated retaining wall. Building C was built in 1943 as an Army receiver and transmitter station. The concrete retaining wall adjacent to the building was built in 1945. The report evaluated the significance of Building C and the retaining wall, as outlined in Hawai‘i Administrative Rules 13-284-6, and found the site to be significant under Criteria a and d: the site is associated with an event of national importance (World War II) and the site provides information on historical activities (military communication and communication infrastructure during World War II). None of the other structures in the project area were determined to be historically significant.

3.4.2 CULTURAL RESOURCES

This section summarizes the Cultural Impact Assessment (CIA) prepared by Kaimipono Consulting Services for the project site.[21] The CIA is based on ethnographic research (one oral history interview) and a review of relevant cultural literature research. The CIA was conducted in accordance with State Environmental Council *Guidelines for Assessing Cultural Impacts*.[22] The report is included as Appendix B.

Following the Environmental Council Guidelines, the geographic extent of the CIA extended well beyond the project area to include the *ahupua‘a* (traditional sub-district land unit) of Honouliuli and the *moku* (traditional district land unit) of ‘Ewa.

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21 Kaimipono Consulting Services LLC. December 2013. *Cultural Impact Assessment for ICSD Mauna Kapu Radio Facility Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, Hawai‘i, TMK (1)9-2-05:021 portion.* Prepared for Belt Collins Hawai‘i LLC.

22 State of Hawai‘i. 1997. *Guidelines for Assessing Cultural Impacts*. Adopted by the Environmental Council, November 11, 1997.

Cultural literature research included traditional Hawaiian literature in the form *mo'olelo* (legends), *oli* (chants), and *mele* (songs). The ethnographic research included an interview with a cultural consultant familiar with the area: "Uncle" Shad Kane a cultural practitioner whose work includes serving on the 'Ewa Moku O'ahu Island Burial Council and as the Cultural Representative on the Clean Water, Natural Lands Commission to the City Council. The consultant provided information on the history, presence, cultural importance, and use of land, water, and marine resources in the area.

The Hawaiian cultural importance of Mauna Kapu (the peak) is largely attributed to its mountain location and relationship to the surrounding areas. Due to the mountain location of Mauna Kapu, it and other mountain areas would have been part of the *wao akua* (zone of spirits), which are reserved for *ali'i nui* (high chiefs) or gathering specialists for the *ali'i nui*. Mauna Kapu's prominent position and relationship to surrounding natural features gave the area a unique cultural importance. Historical records documented an *ahu* (alter) on Mauna Kapu that was constructed from basalt and coral. An *ahu* in the Kō 'Olina area was similarly constructed of basalt and coral. The orientation of the two *ahus* forms a lineal relationship between the mountain and the sea. It is believed that the basalt at the Kō 'Olina *ahu* was brought from Mauna Kapu and that the coral at the Mauna Kapu *ahu* was brought from Kō 'Olina, which formed the relationship between the mountain to sea and made the two points and the land in between *kapu* (sacred). Local fishermen indicated that the *kapu* extended into the waters off of Kō 'Olina, where fishing was prohibited. The Mauna Kapu *ahu* is no longer intact, but the cultural importance of the peak continues today.

3.4.3 POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed action would involve work within existing disturbed areas and ground disturbance would be limited to trenching along approximately 360 linear feet, installation of retaining walls ranging from 0 to 6 feet in height along the approximately 20 linear-foot section of the alignment along the stairs, and grading of the areas adjacent to the trenching, where necessary. Additionally, the project will involve minor modifications to existing buildings to accommodate the utility system improvements. There are no archaeological sites or features identified within the project site. The archaeological inventory survey report identified a single significant site, Building C and associated concrete retaining wall. The report recommends Building C and the retaining wall as being eligible for listing on the Hawai'i Register of Historic Places under Criteria a and d. The project will involve the installation of four conduits along the exterior wall of Building C, with penetration of the conduits through the building's wall at approximately 10 feet above the exterior grade. See Figure 3-7 for a photo of Building C; the conduits will be installed near where the fence meets the building. The conduits will be placed side-by-side and will be suspended from the building with support hangers. Initially, two of the conduits will be fully installed, with the remaining two conduits capped at approximately 6 inches above grade; the latter conduits would be extended and enter the building at a later date, as needed, but are considered part of the proposed action. Any damage to the building's paint during construction will be repaired and the surface will be returned to the prior existing conditions. Modifications to the building will be no different than what currently exists with cables penetrating the structure to service the telecommunications needs within the building. Based on the above information, it is unlikely that the project will significantly impact the historical character of Building C. Consultation is currently underway with the State Historic Preservation Division (SHPD) Architecture Branch to determine what additional work, if any, needs

Figure 3-7. Building C.

to be done for a determination on possible impacts to Building C. The archaeological inventory survey report concluded that based on archaeological records, modern development on the site, and field investigations it is not anticipated that the project would adversely impact any archaeological or historic resources. If any unexpected find is uncovered during construction, work will be halted in the immediate area of the find and the SHPD would be notified.

While the CIA identified sites of cultural importance on the nearby Mauna Kapu peak, no sites of cultural importance were identified on the project site. Construction of the proposed project would require some temporary restrictions on access to the Pālehua-Palikea Trail and, in turn, access to

cultural sites and gathering areas. In order to mitigate these impacts, access to the Pālehua-Palikea Trail during construction activities will be mitigated by: traffic control plans designed to provide access across the site during construction activities, as appropriate; providing early notice of any closures to the party responsible for approving access requests to the trail; and minimizing the duration of any closures. The CIA concluded that after construction was complete there would be no cultural impacts.

No adverse archaeological or cultural impacts are anticipated from the proposed action after construction.

3.5 FLORA AND FAUNA

This section summarizes the biological report prepared by SWCA Environmental Consultants (SWCA) for the project site. The report is based on field surveys conducted during September 2013 and a review of relevant documents and databases.[23] The report is included in Appendix C.

3.5.1 FLORA

The report notes 37 plant species within the project site, only one of these species, pōpolo *(Solanum Americanum)*, is indigenous to Hawai'i and it is common. A complete list is included as part of the attached report (Appendix C). No State or federally-listed threatened, endangered, or candidate plant species, or rare native Hawaiian plant species were observed on the project site.

The project site is dominated by non-native species, with large swamp mahogany trees (*Eucalyptus robusta*) as the primary vegetation in much of the site. In the northern portion of the site, the vegetation is dominated by a large bamboo grove (*Phyllostachys nigra*). In the southern portion of the site, ironwood trees (*Casuarina equisetifolia*) and palmgrass (*Setaria palmifolia*) are locally abundant. Taro vine (Epipremnum pinnatum) is found throughout the site, particularly climbing up trees and structures. Other plant species found on the site in smaller numbers include Christmas Berry tree (*Schinus terebinthifolius raddi*), *Ruellia prostrata*, *Cyclosorus x intermedius*, thimbleberry (*Rubus rosifolius*), Hilo grass (*Paspalum conjugatum*), ti (*Cordyline fruticosa*), and African tulip tree (*Spathodea campanulata*). Just outside of the Mauna Kapu site at the south entrance is a single pāpala (*Charpentiera obovata*), which is indigenous to Hawai'i and common.

The report notes that designated critical habitat areas for plants exist in areas near the project site. The nearest critical habitat is for *Lobelia niihauensis* and is located approximately 450 feet from the project site. Approximately 900 feet north of the site is a critical habitat area (O'ahu 17) for several federally-listed plant species. Lowland Mesic Unit 3 is approximately 900 feet north of the site and is known to be occupied by 15 federally-listed plant species. Dry Cliff Unit 8 is approximately 2,100 feet southwest of the site and is known to be occupied by 8 federally-listed plant species. See Figure 3-8.

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[23] SWCA Environmental Consultants. November 2013. *Biological Resource Assessment for Mauna Kapu Communication Station Upgrades.* Prepared for Belt Collins Hawaii LLC.

3.5.2 FAUNA

Avifauna: During two surveys eight bird species were observed or heard in the project site. No State or federally-listed threatened, endangered, or candidate bird species, or native Hawaiian bird species were observed on the project site. Birds protected under the Migratory Bird Treaty Act of 1918 that were observed include the Northern cardinal (*Cardinalis cardinalis*) and House finch (*Carpodactus mexicanus*).

One native Oʻahu ʻamakihi (*Hemignathus flavus*) was observed approximately 650 feet away from the project site. The Oʻahu ʻamakihi had been previously documented to be prevalent in the area from Pālehua Road to Kaaikukui Gulch[24], so it is likely they occur occasionally on the site.

In 2001, the U.S. Fish and Wildlife Service (USFWS) designated critical habitat for the indigenous and State and federally-listed endangered Oʻahu ʻelepaio (*Chasiempis ibidis*). See Figure 3-8. USFWS considered including the Mauna Kapu site in the critical habitat area, but withdrew the Mauna Kapu site and portions of Pālehua Road from designation due to the existing extensive development and presence of vegetation that was not favored by the Oʻahu ʻelepaio including swamp mahogany trees and ironwood trees.[25] The Oʻahu ʻelepaio is territorial and as part of survey, playbacks consisting of ʻelepaio songs were broadcast at three locations for one minute followed by a listening period of two minutes, but no Oʻahu ʻelepaio were detected. While no Oʻahu ʻelepaio were detected the report notes that a study in 2009 documented the presence of several Oʻahu ʻelepaio in the nearby Kaaikukui Gulch (an area that is included in the Oʻahu ʻelepaio critical habitat).

An acoustic survey was conducted at the project site for 11 nights with a bat detector and did not record any bats. The report notes that the State and federally-listed endangered Hawaiian hoary bats or ʻōpeʻapeʻa (*Lasiurus cinereus semotus*) may occasionally be present on the site and there is a possibility that they could roost in the large swamp mahogany trees on the site.

Land Mammals. During the survey no land mammals were observed in the project site. The report notes that feral dogs (*Canis familiaris*), feral cats (*Felis catus*), mice (*Mus musculus*), rats (*Rattus spp*.), and mongoose (*Herpestes javanicus*) likely occur on the site.

Amphibians or Reptiles. During the surveys the only amphibian or reptile observed on the site was a single copper tailed skink (*Emoia cyanura*). The report notes that cane toads (*Bufo marinus*) are likely present on the site due to the ideal habitat.

Invertebrates. Four species of native snail species were identified at the project site including two species of *Tornatellides*, one species of *Elasmias*, and the *Auriculella ambusta*. None of the species are State or federally-listed threatened or endangered, but the *Auriculella ambusta* is considered to be rare and is endemic to the Waiʻanae Mountain Range. The observations are the result of a survey conducted by SWCA and a follow-up comprehensive snail survey conducted by SWCA with the

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24 VanderWerf, E. 2006. *Census of Oahu Elepaio in Honouliuli preserve – final report. Prepared for The Nature Conservancy of Hawaii, Oahu Program.*

25 U.S. Fish and Wildlife Service. 2001. *Determination of Critical Habitat for the Oahu Elepaio (Chasiempis sandwichensis ibidis): Final Rule.*

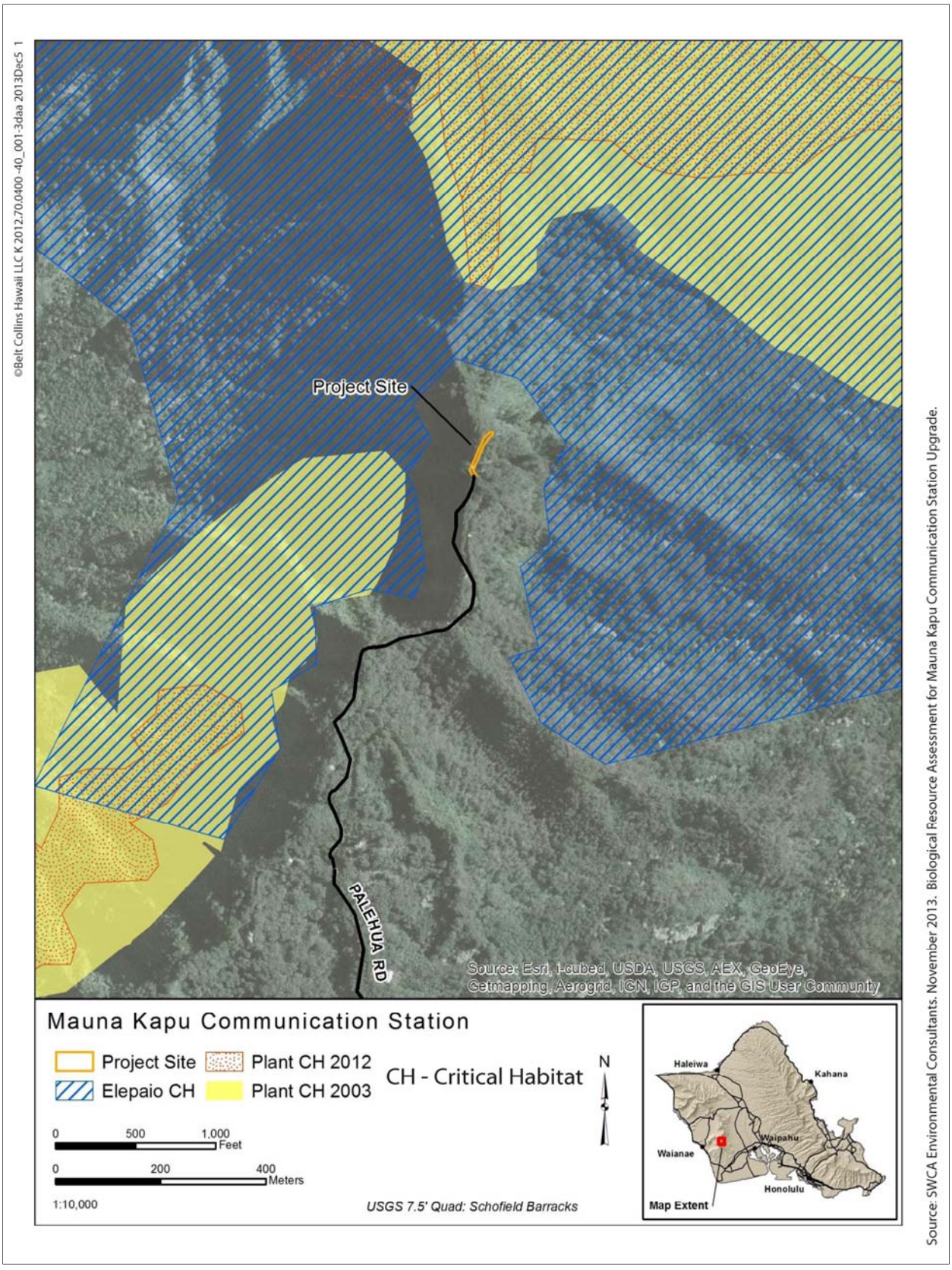

Figure 3-8. Critical Habitat Areas.

assistance of malacologist Dr. Brenden Holland. All four species of native snails were most prevalent in the southern portion of the project site, particularly on the taro vine plants (*Epipremnum pinnatum*).

The report notes that there is a known small population of a State and federally-listed endangered tree snail, *Achatinella*, located approximately 650 feet from the project site. None of these snails were observed on the project site.

Non-native invertebrates observed on the site include the invasive and predatory New Guinea flatworm (*Platydemus manokwari*), the predatory garlic snail (*Oxychilus alliarius*), Sonoran carpenter bee (*Xylocopa sonorina*), the honey bee (*Apis mellifera*), and the gulf fritillary (*Agraulis vanillae*).

3.5.3 PROBABLE IMPACTS AND MITIGATION MEASURES

While the plant and wildlife habitats on the project site have been highly modified by humans and are now largely occupied by alien flora and fauna, several species of concern exist in the area. Of concern are: four native snail species which were observed on the project site; the native Oʻahu ʻamakihi which was observed near the site; the State and federally-listed endangered Oʻahu ʻelepaio which may occur on the project site; and, the State and federally-listed Hawaiian hoary bat which is likely to occasionally occur on the project site.

No State or federally-listed threatened, endangered, or candidate plant or animal species were observed on the project site.

Tree cutting for the proposed action would be limited to several Christmas Berry trees, which are not consider suitable habitat for to the Oʻahu ʻamakihi, Oʻahu ʻelepaio, or Hawaiian hoary bat, therefore no adverse impacts to these species are anticipated. The SWCA report states the earthwork and clearing of understory vegetation associated with the proposed action is unlikely to impact the three noted species of concern.

In order to mitigate impacts to the four native snails from the proposed action, the following measures recommended by Dr. Brenden Holland will be followed:

- **Translocation:** Based on consultation between Dr. Holland and the Oʻahu Army Natural Resource Program staff and the DLNR's Snail Extinction Prevention Program staff, all parties agreed that translocation of the native snails on the project site to a nearby predator-proof snail enclosure at Palikea was in the best interest in the conservation of the four species.

  On October 5, 2013, a group of volunteers led by Dr. Holland collected 338 native snails present at the site and translocated them to the Palikea snail enclosure.

- **Hand clearing vegetation:** Vegetation clearing would occur by hand and plant cuttings shall be placed near adjacent vegetation of similar species. This would limit the likelihood of injury to snails during clearing and enable snails in the cleared vegetation to relocate to new host plants.

3.6 HEALTH AND SAFETY

3.6.1 FLOOD HAZARD

The Flood insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency does not show floodways or riverine flood zones in or near the project site. [26] The FIRM indicates that the project is located in an area where flood hazards have not been determined, but where flooding is possible.

3.6.2 TSUNAMI EVACUATION ZONE

The Tsunami Evacuation Zone Maps were prepared by the City's Department of Emergency Management and other agencies in 2010. The maps were based upon updated scientific techniques and technology that were not available when the previous maps were prepared. The project is located a large distance inland from the tsunami evacuation zone.

3.6.3 EARTHQUAKE

Most earthquakes in Hawai'i are directly linked to volcanic activities and the islands' volcanic structure. The movement of magma from active volcanoes on the island of Hawai'i causes many small earthquakes every year. Larger tectonic quakes are caused by structural weakness at the volcano's base or movement deep within the earth's crust.[27]

In 2006, the State experienced the strongest recorded earthquake in 23 years. The 6.7-magnitude earthquake from west of the island of Hawai'i caused island-wide blackouts on Oahu and Maui. On O'ahu, the earthquake caused automatic switches and operators to shut down the Kahe and Waiau power plants to protect the equipment.[28]

3.6.4 HURRICANE

Hurricane season in Hawai'i begins in July and lasts through November. Hurricanes in the Central Pacific generally originate in the areas off the coasts of southern Mexico and Central America. Few of these hurricanes make it near the Hawaiian Islands region, as most die off as they move northeasterly over cooler waters and less favorable atmospheric conditions. In the past 50 years, three hurricanes have made landfall in Hawai'i, all on the island of Kaua'i. Hurricane Iniki in 1992 was the most destructive of these storms, the Category 4 hurricane (recorded wind speeds of 145 mph) directly hit Kaua'i causing 6 deaths and $2.2 billion in damages. Other hurricanes and tropical storms have caused damage through flooding, high winds, and high waves. [29]

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26 Federal Emergency Management Agency. 2011. *Flood Hazard Areas shapefile and metadata*. Obtained from http://planning.hawaii.gov/gis/download-gis-data/

27 U.S. Geological Survey. No date. *Earthquake Hazards*. Obtained from http://pubs.usgs.gov/gip/hazards/earthquakes.html

28 Hawaiian Electric Company. December 28, 2006. *Investigation of 2006 Oahu Island-Wide Power Outage, PUC Docket Number 2006-0431.*

29 City and County of Honolulu, Department of Emergency Management. No date. *Hurricanes in Hawaii*. Available at http://www1.honolulu.gov/dem/hurr1.htm as of 11/6/13.

3.6.5 NAVIGABLE AIRSPACE

The Mauna Kapu site has four existing towers, a 180-foot tower and 70-foot tower in use by public agencies, and a 150-foot tower and 130-foot tower owned by Verizon Wireless. The 180-foot tower was granted a Determination of No Hazard to Air Navigation by the FAA.[30] The proposed action does not involve the installation or mounting of any items that would require review for possible impacts to navigable airspace.

3.6.6 ELECTROMAGNETIC RADIATION

Electromagnetic radiation (EMR) consists of waves of electric and magnetic energy moving together, The EMR emitted by radio waves and microwaves is referred to as radio frequency radiation and occurs at frequencies between 3 kilohertz and 300 gigahertz (GHz).[31]

Existing sources of EMR on the Mauna Kapu site include dish antennas and whip antennas. The EMR generating equipment that is in use as part of Anuenue system includes multiple radio transmitters that operate in two broad categories: point-to-point microwave and land mobile radio (LMR). When in operation, the point-to-point microwave transmitters operate in the 7-8 GHz bands and transmit continuous frequency energy concentrated in a narrow beam that stays in a consistent direction. When in use the LMR systems operate at fixed frequencies in 100-900 megahertz bands and transmit intermittently, dependent of system traffic, in an omni-directional pattern with energy concentrated towards the horizon.

As part of the Environmental Assessment (EA) the USCG completed for Anuenue improvements at the Mauna Kapu site[32] that included the construction of the 180-foot tower and installation of multiple new antennas, potential EMR impacts were considered. The analysis determined that EMR levels from the USCG Anuenue upgrades were within maximum permissible limits established by the U.S. Federal Communications Commission. The EA noted that safety precautions were necessary for tower maintenance personnel to prevent exposure to potentially unsafe levels of EMR.

3.6.7 HAZARDOUS AND REGULATED MATERIALS

As part of the 2009 renovation of Building C in 2009, the USCG conducted asbestos and lead abatement. In November 2013, Myounghee Noh and Associates, LLC conducted a targeted hazardous material survey of the project area.[33] Asbestos-containing material was not identified. Lead-containing and lead-based paints (exceeding 5,000 milligrams of per kilogram of lead) were found in USCG Building C and USCG Generator Building.

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30 Federal Aviation Administration. September 15, 2013. *Determination of No Hazard to Air Navigation, Antenna Tower – Mauna Kapu – NI-606.*

31 U.S. Federal Communications Commission, Office of Engineering and Technology. No date. *Radio Frequency Safety.* Available at http://transition.fcc.gov/oet/rfsafety/rf-faqs.html#Q1 as of 11/6/13.

32 U.S. Coast Guard. 2009. Final Environmental Assessment, Anuenue Radio Facility Upgrade, Mauna Kapu, Oahu, Hawaii.

33 Myounghee Noh and Associates, LLC. November 13, 2013. *Targeted Hazardous Material Survey for Mauna Kapu Radio Site Improvements and Building Renovation.*

3.6.8 PROBABLE IMPACTS AND MITIGATION MEASURES

Flooding is expected to have minimal or no adverse impact due to the project area's location away from flood hazard areas. Due to the project area's high elevation, tsunamis pose no risk to the project. The installation of the underground utility system and improvements to buildings would reduce the risk of adverse impacts to the ICSD communications and Anuenue operations from earthquakes and hurricanes. In cases of natural disasters and extreme weather events, the proposed action would improve the reliability of the IRF, which emergency response, disaster management, and civil defense utilize for their communication needs during these events.

The proposed action does not include the installation new antennas or towers; therefore no impacts to navigable airspace or from EMR are anticipated. The contractor will prepare a lead hazard control plan in accordance with all federal and State regulations to address potential impacts from the proposed work on USCG Building C and USCG Generator Building, where lead-based and lead-containing paint materials were found. Appropriate measures will be taken to recycle or dispose of any lead-containing waste in accordance with federal and State regulations.

3.7 AIR QUALITY

3.7.1 EXISTING CONDITIONS

The Clean Air Branch of the DOH, as part of its statewide pollution control responsibilities, monitors ambient levels of Carbon Monoxide (CO), Sulfur Dioxide (SO_2), and Particulate Matter (M10 and 2.5), Ozone (O_3).[34] The nearest monitoring station to the Mauna Kapu site is located approximately 6 miles south in the Kapolei Business Park, where between 2007 to 2011 readings did not exceed Federal and State standards for CO, SO_2, PM10 and, PM 2.5.[35]

In the vicinity of the project there are no major air pollution generators. Air pollution generated by existing uses at the Mauna Kapu site is limited to infrequent vehicles accessing the site and on-site back-up generators.

3.7.2 PROBABLE IMPACTS AND MITIGATION MEASURES

During construction, an increase in emissions would occur as a result of construction vehicles and equipment accessing and working on the site. Short-term impact associated with installation of the underground conduits would include dust created by the excavation, stockpiling, and hauling of soil. BMPs will be employed during construction to minimize air quality impacts. These measures would likely include periodically wetting down of excavated material and unpaved construction areas, use of dust screens, and managing the amount of areas uncovered.

No adverse air quality impacts are anticipated from the proposed action after construction.

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34 State of Hawai'i Department of Health. 2012. *Annual Summary 2011 Air Quality*.

35 State of Hawai'i Department of Health. 2012. *Annual Summary 2011 Air Quality*.

3.8 NOISE

3.8.1 EXISTING CONDITIONS

Ambient noise at the project site is normally limited to natural sounds from wildlife and weather. Maintenance vehicles and on-site back-up generators are occasional noise sources. The nearest noise sensitive receptors to the project site are residences located approximately 0.5 miles south of the site on Pālehua Road.

3.8.2 PROBABLE IMPACTS AND MITIGATION MEASURES

During construction, short-term, temporary noise is expected to occur. Some of the noisy equipment that may be used includes backhoes, compaction equipment, flatbed trucks, and diesel powered generators. Noise suppressant devices, such as mufflers, will to be used to help reduce objectionable noise levels. Due to the distance of approximately 0.5 miles to the nearest noise sensitive receptors, noise impacts during construction are unlikely to be significant. Construction would occur over a 4 to 6 month period. Construction activities would comply with the State DOH, Chapter 11-46, Community Noise Control regulations. Compliance with these regulations will be part of the project's construction contract and responsibility of the selected contractor.

No adverse noise quality impacts are anticipated from the proposed action.

3.9 CIRCULATION AND TRAFFIC

3.9.1 EXISTING CONDITIONS

The project is accessed by the paved, one-lane, private Pālehua Road. Pālehua Road connects to an access road within the Mauna Kapu site that ends near the 180-foot tower. Access to the USCG, Army, and ICSD buildings is via concrete walkways and a concrete stairway.

Access to Pālehua Road is restricted by a secured gate near where the road splits off from Umena Street near the Makakilo Heights neighborhood. Traffic on Pālehua Road is limited to those accessing the various public and private communication facilities, landowners, and those accessing Camp Timberline. The main access road to the Makakilo Heights neighborhood is Makakilo Drive, which is a four-lane arterial roadway. The residential streets of Kikaha Street and Umena Street provide access to Pālehua Road from Makakilo Drive.

The 'Ewa Development Plan proposes an eastern extension of Makakilo Drive to H-1; the extension would result in Makakilo Drive forming a loop starting from H-1 in the west at the Makakilo Drive/Fort Barrette Road exit and ending at H-1 in the east at the existing Kualakai Parkway exit.[36]

3.9.2 PROBABLE IMPACTS AND MITIGATION MEASURES

The proposed action is expected to generate minimal short-term impacts during construction associated with vehicles traveling to and from the project site. Before construction activities begin, notice of the upcoming construction activities will be made available to other users of Pālehua

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36 City and County of Honolulu. 2013. *'Ewa Development Plan*.

Road. After construction is complete, traffic related to the IRF would be limited to periodic maintenance and emergency outage trips.

3.10 INFRASTRUCTURE

3.10.1 WATER AND SEWER

The project site does not have water or wastewater systems. The Mauna Kapu site is unmanned and personnel are present only for routine maintenance and emergency repairs. Drinking water needs for personnel during routine maintenance and emergency repairs are provided by bottled water. The site has no irrigation and no toilet facilities.

3.10.2 ELECTRICITY, TELEPHONE, AND CABLE

Electrical service is provided to the Mauna Kapu site by Hawaiian Electric Company, Inc. (HECO). The HECO lines connecting to the site are located within the easement with Pālehua Road. The HECO lines end at a meter at the south end of the Mauna Kapu site. Within the Mauna Kapu site, exposed lines connect the communication facilities. The USCG has a generator, located within a protective building, which provides back-up power to the USCG and Anuenue operations.

The ICSD, USCG, and Army buildings on the site do not have existing telephone or CATV service.

3.10.3 FUEL AND GAS LINES

The only fuel lines on the project site connect an above-ground fuel storage tank and USCG Generator Building, covering a distance of less than five feet.

3.10.4 DRAINAGE

In the south portion of the project site, storm water runoff on the access road flows into a drainage ditch and catch basin system that discharges off-site to the southeast. The remaining portions of the site do not have a developed drainage system and storm water runoff follows the natural contours. Throughout the project area, storm water runoff sheet flows in a southeasterly direction; the runoff flows in the direction of an intermittent stream located approximately 900 feet to the east. See Figure 3-6 for a map of streams and watersheds in the vicinity of the project area.

3.10.5 PROBABLE IMPACTS AND MITIGATION MEASURES

The proposed action does not involve the construction of a water or sewer system. Water and wastewater needs during construction would be handled by the contractor and would likely involve the provision of bottled water and portable toilets. After construction is complete, activity at the site would be limited to periodic maintenance and emergency outage trips.

The proposed action does not involve any changes to the electrical, telephone, and cable systems that would impact users off-site. Replacing the exposed electrical system with an underground electrical system would decrease the vulnerability of the lines to severe weather events and acts of vandalism. Electrical connections would be coordinated with HECO. The proposed action includes the installation of conduits to facilitate future installation on telephone and CATV lines, when available. The telephone and CATV conduits will be inspected to certify compliance with relevant standards by Hawaiian Telcom and Oceanic Time Warner Cable, respectively. Where practical, the proposed action will divert storm water runoff away from the new retaining walls and existing

buildings and walkways with the use of graded swales, landscaped drain inlets, subdrains, and PVC drain lines. BMPs will be implemented during construction to control surface runoff and soil erosion from the proposed action.

3.11 PUBLIC SERVICES AND FACILITIES

3.11.1 POLICE, FIRE, AND EMERGENCY SERVICES

The Honolulu Police Department's Patrol District No. 8 provides police services to the ʻEwa and Waiʻanae area. The district is divided into Sector 1 (Mākua, Mākaha, Waiʻanae, and Maʻili), Sector 2 (Nānākuli, Kō ʻOlina, Campbell Industrial Park, Makakilo) and Sector 3 (Kapolei, ʻEwa, ʻEwa Beach, Kalaeloa). The district station is on Kamokila Boulevard in Kapolei and a sub-station is located in Waiʻanae.[37] DLNR Division of Conservation and Resource Enforcement provides police service within Conservation districts and in forest reserves, which includes the project site and surrounding areas.[38]

Fire service to the project area is provided by Honolulu Fire Department (HFD) and DOFAW, as seen in Figure 3-9. The HFD Battalion No. 9 provides fire protection services to the ʻEwa and Waianae areas. The nearest fire station to the project area is Makakilo Fire Station No. 35 on Makakilo Drive. DOFAW provides fire protection services in the cooperation with HFD to the project site and primary protection to adjacent lands in the Honouliuli and Nānākuli Forest Reserves.[39]

The City Department of Emergency Services provides ambulance services throughout Oʻahu through its Emergency Medical Services Division (EMS). The project site is within the EMS Makakilo Emergency Services Response Area. HFD also co-responds with first responder emergency services.[40]

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37 Honolulu Police Department. No date. *Patrol Districts.* Available as 12/26/13 at http://www.honolulupd.org/department/index.php?page=patrol_districts

38 State of Hawaiʻi. Department of Land and Natural Resources. No date. *Division of Conservation and Resource Enforcement, Strategic Plan 2009-2014*.

39 State of Hawaiʻi, Department of Land and Natural Resources, Division of Forestry and Wildlife. No date. *Fire Response Maps*. Available as of 11/20/13 at http://dlnr.hawaii.gov/forestry/fire/response-maps/

40 City and County of Honolulu, Department of Emergency Services. 2013. *Honolulu Emergency Services Department Unit Locations and Response Areas.* Available as of 12/26/13 at http://www1.honolulu.gov/esd/ems/redicustomerservicenumber.pdf

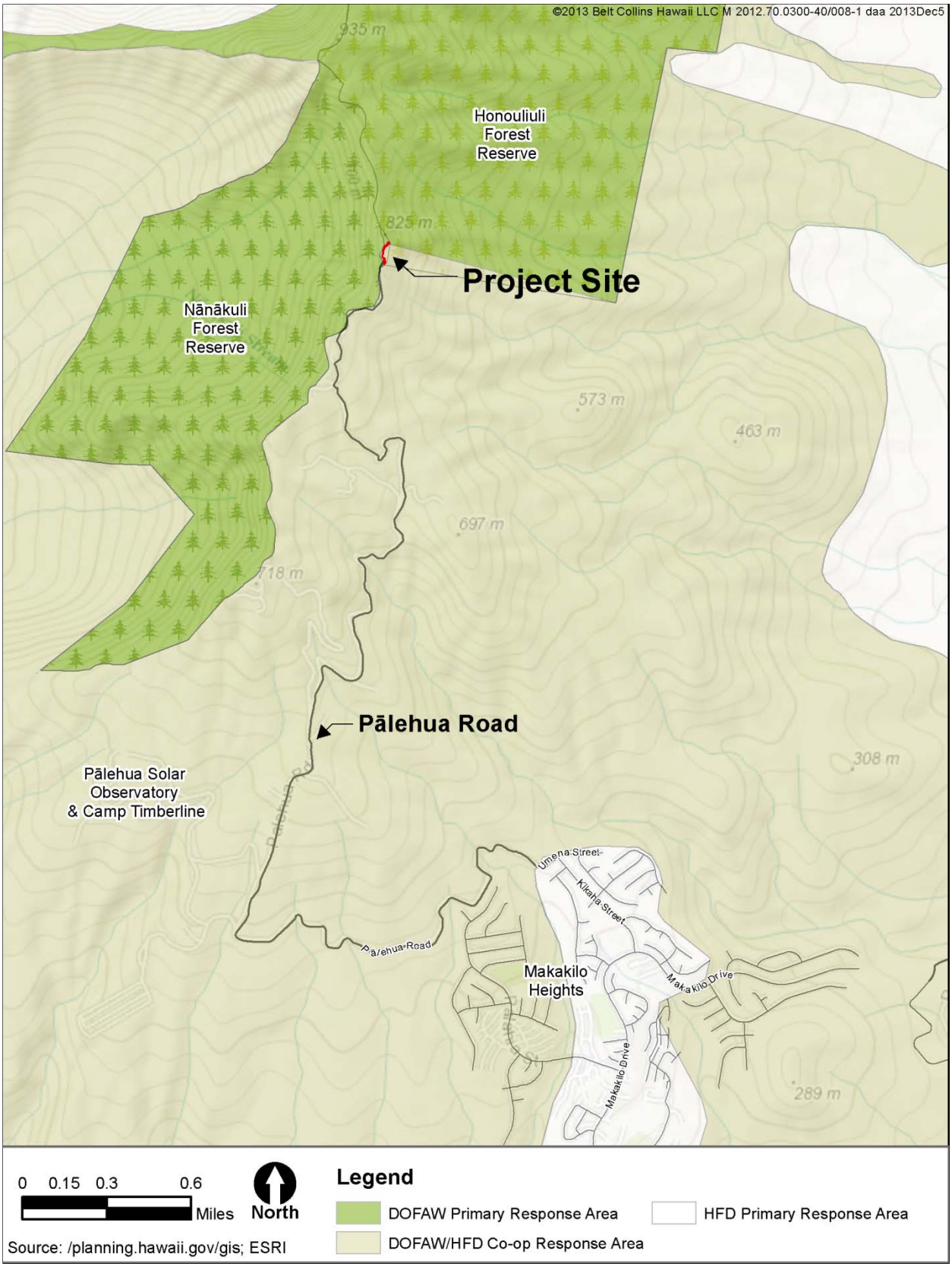

Figure 3-9. Fire Response Areas.

3.11.2 PARKS AND RECREATION AREAS

Parks and recreation areas in the vicinity of project include Camp Timberline and the Pālehua-Palikea Trail. The privately-run Camp Timberline, located off of Pālehua Road approximately two miles from the project site, offers overnight accommodations and a variety of facilities, activities, and programs including hiking trails, biking trails, basketball courts, and a swimming pool.[41] The Pālehua-Palikea Trail crosses by the project site. Though the trail passes largely through State forest reserve lands, it is not listed as part of the DLNR's Nā Ala Hele trail program.[42] Currently access is limited to organized groups and requires obtaining special approvals.[43]

3.11.3 SOLID WASTE

Within 5 miles of the project site, the City has the Waimanalo Gulch Landfill and H-POWER refuse to energy plant in the Campbell Industrial Park to accommodate solid waste disposal. Solid waste generated on the Mauna Kapu site is limited to materials replaced during maintenance/repair activities and personal waste from personnel performing maintenance or emergency repair activities. This waste is disposed of off-site at appropriate waste disposal facilities.

3.11.4 PROBABLE IMPACTS AND MITIGATION MEASURES

The proposed action would not significantly increase activity at the project site; therefore it is not expected to generate an increase in demand for police, fire, emergency response, parks, and recreation areas. Impacts to access to the Pālehua-Palikea Trail during construction activities will be mitigated by: traffic control plans designed to provide access across the site during construction activities, as appropriate; providing early notice of any closures to the party responsible for approving access requests to the trail; and minimizing the duration of any closures. Demolition and construction debris from the trenching, grading, and building improvements would be disposed of in accordance with State and City requirements. Soils excavated during trenching and grading would be used for fill where possible, to minimize waste. The main sources of debris would include the excavated material from trenching and material removed as part of building upgrades. The impact on the area's solid waste facilities is anticipated to be minor. Measures will be taken to recycle waste, if possible. After construction is complete, the proposed action is not expected to generate an increase in solid waste.

3.12 VISUAL AND AESTHETIC RESOURCES

3.12.1 EXISTING CONDITIONS

Mauna Kapu, the peak, occupies a high point in the southern Waiʻanae Mountain Range, perched above Nānākuli Valley and with Pearl Harbor visible to the southeast. The highest developed portions of the project site, which includes the ICSD building and USCG/Army shed, are approximately 30 feet in elevation below the Mauna Kapu summit. The highest and most visible structures on the project site are the towers, which are by design above the tree-level. Due to the

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41 Kamaʻāina Kids. No date. *Facilities and Accommodations.* Available as of 12/26/13 at http://www.kamaainakids.com/environmental-community/facilities-accomodations

42 Nā Ala Hele. No date. *Nā Ala Hele Trail Access System*. Available as of 12/26/13 at https://hawaiitrails.ehawaii.gov/home.php

43 T. Auhealii (employee of Gil-Olson Joint Venture), personal communication. March 13, 2014.

relative isolation of the site, the towers are only readily visible from Pālehua Road. In terms of views from public facilities, the structures on the site have the strongest visual and aesthetic impact on the Pālehua-Palikea Trail. Beyond this, the towers are faintly visible from portions of Nānākuli Valley including Nānākuli Community Park, residential areas, and portions of Farrington Highway. The *Waiʻanae Sustainable Communities Plan* also identifies mauka views of the Waiʻanae Mountains as important.[44] The ʻ*Ewa Development Plan* identifies general mauka views as important.[45] Due to the topography to the south and east of the site, which includes Puʻu Poulihale, Puʻu Manawahua, and Puʻu Moʻopuna, and the distance from the nearest development, views of the project site from the ʻEwa and Central Oʻahu areas are seldom visible.

3.12.2 PROBABLE IMPACTS AND MITIGATION MEASURES

The proposed action involves the installation of underground utility conduits and upgrades to existing buildings. The proposed action does not involve the erection or mounting on any new antennas or towers.

3.13 SOCIO-ECONOMIC SETTING

3.13.1 EXISTING AND ANTICIPATED CONDITIONS

The project site is located in an unpopulated area within the Waiʻanae mountains with development in the vicinity limited to various public and private communication facilities. The Mauna Kapu site is bounded on the north, south, west, and east by the Honouliuli and the Nānākuli Forest Reserves. The nearest residences are a small number of scattered houses located off of Pālehua Road starting approximately 0.5 miles south of the project site. At the south end of Pālehua Road is the Makakilo Heights neighborhood, a residential subdivision area with a population of 18,249 people, according to the 2010 census. Given the project site's remote location, the natural resource importance of the areas surrounding the site, and the area's importance for communication facilities, the communities potentially affected by the project are the public and private communication users and the natural resources.

3.13.2 PROBABLE IMPACTS AND MITIGTION MEASURES

The proposed action is not expected to impact the regional population, housing, or economic conditions. Construction and operations can be accommodated within the Mauna Kapu site with minimal or no disruption of its ongoing activity. No adverse social impact is anticipated. Positive impacts will occur because the communications facility will be upgraded to better serve the community in the event of an emergency.

During construction, work would be created in the construction trades, material and supply vendors, and related fields. Induced effects would occur as firms and workers in these industries spend income gained from work on the project. The impact on employment and wages is expected to be a small increase in direct jobs and economic activity. These economic impacts are small, short-lived, and beneficial. The project would cost an estimated $625,000 in 2014 dollars. By supporting

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44 City and County of Honolulu, Department of Planning and Permitting. 2010. *Waiʻanae Sustainable Communities Plan*. Prepared by Townscape, Inc.

45 City and County of Honolulu. 2013. ʻ*Ewa Development Plan.*

reliable information systems for agencies of the State, the project helps the State and its people. Improved communications will affect State, county, and federal agencies' operations in both normal and emergency conditions. After construction, the project would not involve a significant increase in personnel activities at the site.

4 LAWS, PLANS, POLICIES, AND CONTROLS

4.1 FEDERAL LAWS

The proposed action involves the use of lands under an easement to the U.S. Army (Army). The Information and Communication Services Division (ICSD) Radio Facility (IRF) at the Mauna Kapu Communication Station (Mauna Kapu) site is currently operated under a permit to the U.S. Coast Guard (USCG) from the Army for the Anuenue Radio System (Anuenue), which includes the IRF. ICSD intends to get a permit from the Army for its operations at the project site. The following is a review of the project's consistency with federal environmental policies and objectives.

4.1.1 COASTAL ZONE MANAGEMENT ACT OF 1972

The federal Coastal Zone Management Act of 1972 (CZMA) establishes a program for management, development, and protection of the nation's coastal zone. The states are authorized to develop and implement their own Coastal Zone Management (CZM) program, hence the Hawai'i CZM Program. Hawai'i Revised Statutes (HRS) 205A-1 establishes that all lands within the State are within the CZM area. The Office of Planning under the State Department of Business, Economic Development and Tourism is designated as the lead agency to administer this program in Hawai'i. The individual counties of the State are responsible for identifying and establishing the Special Management Areas (SMA) and shoreline setback areas of their jurisdiction.

Discussions of the project's relationship to the Hawai'i CZM Program and City and County of Honolulu's (City's) SMA are provided respectively, in Sections 4.2.5 and 4.3.4 of this chapter.

4.1.2 RIVERS AND HARBORS ACT OF 1899

The Rivers and Harbors Act is the oldest federal environmental law in the U.S. This Act makes it illegal to discharge refuse matter of any kind into the navigable waters of the U.S. without a permit. The Rivers and Harbors Act also makes it illegal to excavate, fill, or alter the course, condition, or capacity of any port, harbor, channel, or other navigable waters and their tributaries without a permit. Although many activities covered by the Rivers and Harbor Act are regulated under the Clean Water Act, the Rivers and Harbors Act retains independent vitality. The Act is administered by the U.S. Army Corps of Engineers.

The proposed action does not involve activities near any streams, water bodies or other waters of the U.S. Section 3.3 describes the water resources on the project site and Section 3.10 describes drainage on the site.

4.1.3 SECTION 1424(E) OF THE SAFE DRINKING WATER ACT OF 1974

A portion of proposed project is located in the Southern O'ahu Basal Aquifer (SOBA). According to the Safe Drinking Water Act of 1974 (amended in 1986 and 1996), Section 1424(e), the Environmental Protection Agency (EPA) can prohibit federal funding for projects located in areas that overlie a sole source aquifer, if such projects threaten that aquifer. For federal-aid projects that could affect the SOBA, a water quality assessment must be prepared and submitted to EPA for review. The current project is not receiving federal funding so this condition does not apply.

4.1.4 ENDANGERED SPECIES ACT OF 1973

The purpose of the Endangered Species Act (ESA) is to protect critically imperiled species and to conserve the ecosystems upon which they depend. ESA's provisions encompass plants and invertebrates as well as vertebrates. The U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration, which includes the National Marine Fisheries Service, administer the Act.

Section 7 of the ESA requires that federally-funded projects not jeopardize species listed as threatened or endangered or adversely modify designated critical habitats. A biological assessment survey conducted for this environmental assessment (EA) (described in Section 3.5) did not observe any federally-listed threatened, endangered, or candidate species on the project site and found that most flora and fauna on the site were introduced species. Critical habitat for several endangered plant species exists near the project area, though none of the subject species were identified in the project site. Critical habitat for the listed endangered O'ahu 'elepaio (*Chasiempis ibidis*) is located near the project site and there is a possibility the birds occur in the project area, though none were observed during surveys or recorded during playbacks. Additionally, the listed endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) may occur in the project area. Based on the proposed activities, which include building improvements, earthwork, and clearing of understory vegetation, the biological assessment concluded that the project is unlikely to have any adverse impact on the listed species. See Section 3.5 of this document for more discussion.

4.1.5 MIGRATORY BIRD TREATY ACT OF 1918

The purpose of the Migratory Bird Treaty Act is to protect migratory birds and birds native to the U.S. The Act prohibits the unregulated "taking" of covered species, which is defined as "hunting, pursuing, killing, possessing or transporting any migratory bird, nest, egg or part thereof." The Act extends to all bird species native to the U.S., even those that are not migratory. The Act is administered by the USFWS.

The biological assessment survey conducted for this EA identified two species in the project area that are covered under the Migratory Bird Treaty Act (described in Section 3.5). The project is unlikely to have any adverse impact on the covered species.

4.1.6 NATIONAL HISTORIC PRESERVATION ACT OF 1966

The National Historic Preservation Act of 1966 is legislation intended to preserve historical and archaeological sites in the U.S. The Act created the National Register of Historic Places (NRHP), the list of National Historic Landmarks, and in Hawai'i, the State Historic Preservation Division (SHPD). The Act requires actions that are federally funded, authorized, or implemented take into account the effect a proposed project will have on any district, site, building, structure, or object that is included in or eligible for inclusion on the NRHP. Section 106 of the Act sets up a process involving coordination and consultation with the local SHPD. Chapter 6E-8 of the HRS establishes similar responsibilities for State projects to be reviewed by SHPD (described in Section 4.2.4).

Section 3.4 of this document, entitled "Archaeological and Cultural Resources," describes the archaeological and cultural studies prepared for the project site. There are no sensitive archaeological sites or features within the project site. The project will involve minor work on a historic building, but will not adversely impact its historical character. Consultation with SHPD will

be conducted in accordance with HRS Chapter 6E-8, which is described further in Section 4.2.4 of this chapter. The Army will complete Section 106 consultation, if deemed necessary.

4.1.7 ENVIRONMENTAL JUSTICE

Executive Order 12898 regarding Environmental Justice requires each federal agency and federal aid recipients to take appropriate steps to identify and address "disproportionately high and adverse human health or environmental effects" of federal projects on minority or low income populations. Similar non-discrimination protection is provided by Title VI of the Civil Rights Act of 1964, as amended.

The proposed action does not discriminate against any particular group. The proposed project is not near any residential areas. The improved State and federal communication systems will not disproportionally impact any particular group. No land takings or condemnations will be performed for the proposed action.

4.1.8 PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH AND SAFETY RISKS

Executive Order 13045 calls on federal agencies to ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. The proposed project is located in an isolated and secured area, away from any areas where children would normally be present. The proposed action is not anticipated to pose any disproportionate risks to children.

4.2 STATE POLICIES AND STATUTES

4.2.1 HAWAIʻI STATE PLAN

The Legislature in 1978 adopted the Hawaiʻi State Planning Act (State Plan), HRS, to establish direction and provide long-range planning for the State. The State Plan consists of a series of broad goals, objectives, and policies that serve as guidelines for future long-term growth and development. It further (1) provides a basis for determining priorities and allocating limited resources; (2) seeks to improve coordination of federal, State, and county plans, policies, programs, projects, and regulatory activities; and, (3) establishes a system for plan formulation and program coordination to provide for an integration of all major State and county activities.

The proposed action supports and is consistent with the following State Plan objectives and policies:

> ***226-9 Objectives and Policies for the Economy – Federal Expenditures.***
>
> *(b)(3) Promote the development of federally supported activities in Hawaiʻi that respect state-wide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaiʻi's environment.*

The IRF at Mauna Kapu connects to Anuenue, which is a partnership between the USCG and the State. Anuenue is essential for providing communication services to State, county, and federal agencies for mission support, which benefits communities across the State. The USCG has used

federal funds to construct and upgrade Anuenue facilities around the State, including the Mauna Kapu site.

226-10.5 Objectives and Policies for the Economy – Information Industry

(b)(1) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawaii to accommodate future growth in the information industry.

The proposed action would improve the State's telecommunication system and would provide for the future needs of State agencies and other public partners.

226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources.

(b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

The proposed action would upgrade existing facilities on a site that has been used for communication purposes dating back to the 1940s. The proposed improvements, particularly the installation of the underground conduits, have been designed to minimize work in undisturbed areas and to minimize runoff and erosion impacts.

226-13 Objectives and policies for the physical environment--land, air, and water quality.

(b)(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.

The IRF at Mauna Kapu is part of the State's telecommunication system, which services federal, State, and county natural disaster efforts. The proposed action would increase the reliability of the IRF at Mauna Kapu and the State's telecommunication system.

226-14 Objectives and policies for facility systems--in general.

(b)(1) Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

The proposed action is part of ICSD's plans for fulfilling their responsibilities to provide and maintain a statewide telecommunication system for all State agencies.

226-18.5 Objectives and policies for facility systems--telecommunications.

(c)(3)Promote efficient management and use of existing telecommunications systems and services;

The proposed action would upgrade existing facilities to better meet the telecommunication needs of public agencies. The upgrades would increase the functionality and reliability of the IRF at Mauna Kapu and the State's telecommunication system.

> ***226-26 Objectives and policies for socio-cultural advancement--public safety.***
>
> *(a)(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic wellbeing of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.*

The proposed action would improve the functionality and reliability of the telecommunication system that serves State, federal, and county emergency management agencies.

> ***226-26 Objectives and policies for socio-cultural advancement--public safety.***
>
> *(d)(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.*

The proposed action would improve the functionality and reliability of the telecommunication system that serves the State, federal, and county agencies responsible for civil defense, police, security, and other critical services.

4.2.2 STATE LAND USE LAW

The Hawai'i State Legislature adopted the State Land Use Law in 1961 to protect Hawai'i's valuable lands from development that resulted in short-term gains for a few and long-term losses to the income and growth potential of the State's economy. Accordingly, the Legislature established an overall framework of land use management. HRS Chapter 205 placed all lands within the State in one of four land use districts: Urban, Agricultural, Conservation, or Rural (the Rural District was added in 1963), and established the State Land Use Commission to administer the designated land use districts. The project site is located in the Conservation District. See Figure 4-1.

Conservation District lands are administrated by the State Board of Land and Natural Resources and uses within the Conservation District are governed by rules established by the DLNR. Hawai'i Administrative Rules (HAR) 13-5 establishes regulations for Conservation District lands for the "purpose of conserving, protecting, and preserving the important natural and cultural resources through appropriate management and use to promote their long-term sustainability, and the public health safety and welfare".[1] Conservation District lands are further classified into one of five subzones: Protective, Limited, Resource, General, and Special. The subzones form a hierarchy of lands containing the most sensitive resources and having the greatest restrictions on use to the least sensitive and fewest restrictions, with Protective being the most sensitive and General the least sensitive. The Special subzone is used for areas with unique development qualities that complement the area's natural resources. The project site is located in the Resource subzone. The objective of this subzone is to ensure the sustainable use of the natural resources of those areas.

[1] State of Hawai'i, Department of Land and Natural Resources. 2011. *Hawai'i Administrative Rules 13-5*.

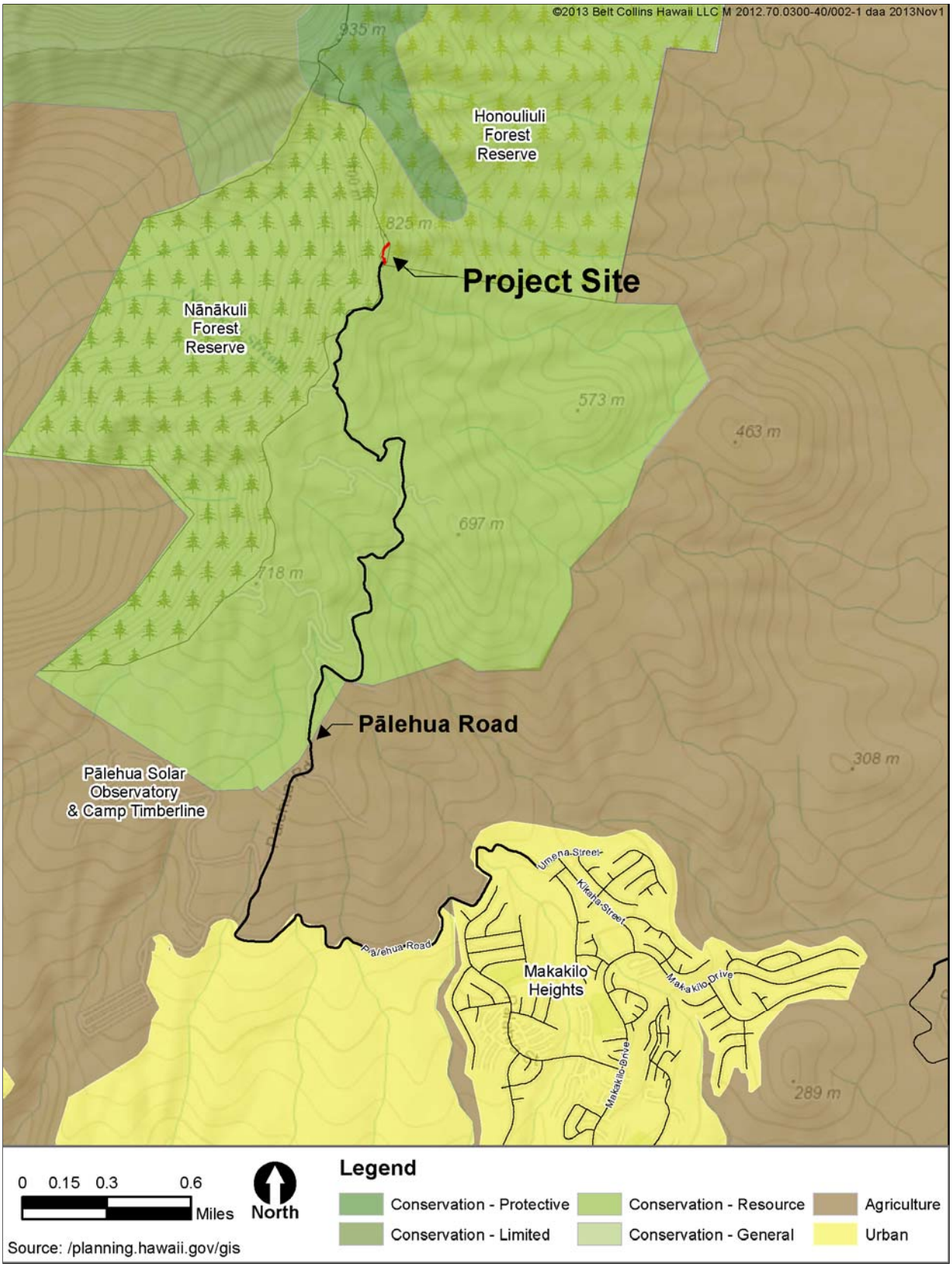

Figure 4-1. State Land Use Districts.

In a letter dated October 21, 2013, the DLNR, Office of Conservation and Coastal Lands (OCCL) provided guidance that the proposed action is categorized as identified land use HAR 13-5-22, P-8 *Structures and Land Uses, Existing (C-1) Moderate alteration of existing structures, uses, and equipment*. Per HAR 13-5-33, the identified use requires a Conservation District Use Permit (CDUP) with department approval.

4.2.3 STATE ENVIRONMENTAL POLICY

HRS Chapter 344 establishes an environmental policy that (1) encourages productive and enjoyable harmony between people and their environment, (2) promotes efforts that will prevent or eliminate damage to the environment and biosphere, (3) stimulates the health and welfare of humanity, and (4) enriches the understanding of the ecological systems and natural resources important to the people of Hawai‘i.

The proposed project is consistent with the following section of the State Environmental Policy as follows:

> *HRS 344-3(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.*

The proposed action calls for improvements to State communication facilities that provide statewide communications services. The project would benefit the general welfare through improving critical and general governmental services in the State. The proposed action involves improvements to existing facilities, thereby limiting the need for construction of new communication facilities in other, potentially undeveloped areas.

4.2.4 STATE HISTORIC PRESERVATION PROGRAM

The State Historic Preservation Program, HRS 6E, is intended to conserve and develop the historic and cultural property within the State for the public good. The legislation declares that it shall be the public policy of the State to provide leadership in preserving, restoring, and maintaining historic and cultural property, and to conduct activities, plans, and programs in a manner consistent with the preservation and enhancement of historic and cultural property. Chapter 6E-8 requires that a proposed State project which may affect historic property or a burial site conduct consultation with the SHPD and that the project shall not commence until the SHPD has given written concurrence.

Section 3.4 of this document, entitled "Archaeological and Cultural Resources," describes the archaeological and cultural studies that have been conducted for the project site. There are no sensitive archaeological sites within the project site. The project will involve minor work to a building that is eligible for inclusion on the Hawai‘i Registers of Historic Places (HRHP), but will not impact the historical character of the building. Consultation with SHPD is being conducted in accordance with Chapter 6E-8, which includes consultation with SHPD Architecture Branch to

determine what additional work, if any, needs to be done for a determination on possible effects to HRHP-eligible building.

4.2.5 HAWAIʻI COASTAL ZONE MANAGEMENT PROGRAM

The Hawaiʻi CZM Program was promulgated in 1977 in response to the federal CZMA. Per HRS 205A-1, the areas encompassed by the CZM are all the lands and waters of the State. The next sections assess the project in relation to the objectives and policies of the CZM Program.

4.2.5.1 Recreational Resources

The proposed project will not interfere with, nor obstruct public efforts to meet the CZM objective and policies relating to providing coastal recreational opportunities accessible to the public.

4.2.5.2 Historic Resources

Studies have been conducted to investigate and identify archaeological and cultural resources that might be impacted by the proposed project. Results of the studies are described in Section 3.4 of this document and no adverse impacts on archaeological or cultural resources are anticipated.

4.2.5.3 Scenic and Open Space Resources

The proposed action involves improvements to existing facilities and structures. The project will not interfere with nor obstruct public efforts to meet the CZM objective and policies relating to the protection, preservation, and restoration or improvement of the quality of coastal scenic and open space resources. Section 3.12 of this document discusses visual and aesthetic resources.

4.2.5.4 Coastal Ecosystems

The proposed project is located a long distance inland from the shoreline and would not adversely impact valuable coastal ecosystems, including offshore reefs.

4.2.5.5 Economic Uses

The CZM objective and policies pertaining to economic uses is to provide for public or private facilities and improvements important to the State's economy in suitable locations. The proposed action involves improvements to communication facilities that already exist in a suitable location.

4.2.5.6 Coastal Hazards

Due to the proposed project's mountain location, there is no risk to the proposed project from coastal hazards.

4.2.5.7 Managing Development

The proposed project will not interfere with public efforts to improve the development review process, communication, and public participation in the management of coastal resources and hazards.

4.2.5.8 Public Participation

The proposed project is engaged in public participation by virtue of this EA preparation and public comment/response process. Through this State environmental review process, information and public awareness are generated on the project and its affected environment.

4.2.5.9 Beach Protection

Due to the proposed project's mountain location, there is no risk of adverse impacts to beaches for public use and recreation.

4.2.5.10 Marine Resources

The proposed project site is located several miles from the ocean and contains no streams or other surface water bodies that connect to the ocean. Best Management Practices would be employed during construction to control runoff and erosion.

The proposed project would not obstruct public efforts to implement the State's ocean resources management plan.

4.3 CITY AND COUNTY OF HONOLULU

4.3.1 GENERAL PLAN

The City's General Plan (last amended in 2002) is comprised of 11 sections: Population; Economic Activity; Natural Environment; Housing; Transportation and Utilities; Energy; Physical Development and Urban Design; Public Safety; Health and Education; Culture and Recreation; and Government Operations and Fiscal Management.

The sections on Natural Environment and Public Safety are relevant to this EA and are presented and discussed in Table 4-1.

Table 4-1. Applicable Sections of the General Plan

NATURAL ENVIRONMENT
OBJECTIVE B: To preserve and enhance the natural monuments and scenic views of O'ahu for the benefit of both residents and visitors.
Policy 1: Locate roads, highways, and other public facilities and utilities in areas where they will least obstruct important views of the mountains and the sea.
COMMENT: Radio communication systems require line-of-sight between facilities; therefore locations above surrounding topography are necessary, which are often prominent mountain locations. Through improving an existing facility, the proposed action would limit the potential need to utilize an undeveloped site, which would likely need to be sited on a visible mountain location.
PUBLIC SAFETY
OBJECTIVE B: To protect the people of O'ahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.
Policy 4: Cooperate with State and federal agencies to provide tsunami warning and protection for O'ahu.
Policy 5: Cooperate with State and federal agencies to provide protection from war, civil disruptions, and other major disturbances.

Table 4-1. Applicable Sections of the General Plan

Policy 8: Provide adequate search and rescue and disaster response services.
Policy 11: Develop civil defense plans and programs to protect and promote public health, safety, and welfare of the people.
COMMENT: The proposed action would improve the functionality and reliability of the State, county, and federal communication systems. These communication systems provide mission support for emergency rescue, civil defense, emergency medical services, police, fire, and critical government operations.

4.3.2 CITY DEVELOPMENT PLANS

The City Charter requires the establishment of development plans with conceptual schemes for accomplishing the objectives and policies of the City's General Plan. The City has created eight development plans that include land use maps, statements establishing land use standards and principles, statements establishing urban design principles and controls, and statements establishing priorities necessary to guide major development activities. Based on the City's policy to guide development to specific regions, the plans for 'Ewa and the Primary Urban Center, to which most development is to be directed, are titled "Development Plans," and the plans for the remaining six communities, where growth is to remain relatively stable, are titled "Sustainable Communities Plans."

The project site is on the border of the 'Ewa Development Plan and Wai'anae Sustainable Communities Plan areas. The sections of these plans relevant to the proposed project are discussed in the sections below.

4.3.2.1 'Ewa Development Plan

The 'Ewa Development Plan (DP) provides a conceptual, long-range vision and policies on land use and infrastructure development in the 'Ewa Plain (see Figure 4-2). The 'Ewa DP provisions related to the open space preservation and development, natural resources, and public safety facilities are relevant to the proposed project and are presented and discussed in Table 4-2.

Table 4-2. Applicable Sections of 'Ewa Development Plan

Open Space Preservation and Development
Policy: Regarding mountain areas, "maintain the forest at higher elevations, in the State Conservation District. Plan utility corridors and other uses to avoid disturbance to areas with high concentrations of native species." (Section 3.1.3.1 of 'Ewa DP)
COMMENT: The proposed action involves improvements to existing communications facilities. In 2001, critical habitat for the State and federally-listed endangered O'ahu 'elepaio (*Chasiempis ibidis*) was designated near the project area, but due to extensive development and the presence of vegetation that was not favored by the O'ahu 'elepaio, the project site was not included as part of the critical habitat. Critical habitat for State and federally-listed endangered plant species in the surrounding areas, similarly excluded the project site and other developed areas along Pālehua Road. See Section 3.5 of this document for more discussion.
Natural Resources

Table 4-2. Applicable Sections of 'Ewa Development Plan

Policy: Regarding general natural resources, "require surveys for proposed new development areas to identify endangered species habitat, and require appropriate mitigations for adverse impacts on endangered species due to new development. (Section 3.5.1 of 'Ewa DP)
COMMENT: While the proposed project is in an existing developed area, a biological assessment was completed for this EA. As described in Section 3.5, no endangered, threatened, or candidate species were identified on the project site.
Public Safety Facilities
Policy: Regarding general public safety, "provide adequate staffing and facilities to ensure public safety." (Section 4.8.1 of 'Ewa DP)
COMMENT: The proposed action would improve the communication systems that serve State, county and federal agencies that provide public safety services.

4.3.2.2 Wai'anae Sustainable Communities Plan

The Wai'anae Sustainable Communities Plan (SCP) provides a conceptual, long-range vision, and policies on land use and infrastructure development in the Wai'anae area (see Figure 4-3). The Wai'anae SCP sections pertaining to open space, important views, and mountain forest land are relevant to the proposed project. The open space and important views section identifies general mauka views of the Wai'anae Mountains as important. The mountain forest land section recommends policies to preserve and enhance the natural ecology, rare and endangered species, scenic beauty, and cultural resources of the Wai'anae area's mountain forest lands.

The proposed action involves improvements to existing communication facilities on a developed site. The project would not erect any new structures and therefore it is not anticipated to impact views from the Wai'anae area. See Section 3.12 of this document for more discussion. The biological survey conducted for this EA identified no endangered, threatened, candidate, or rare species. As described in Section 3.5.2 of this document, mitigation measures would be taken to minimize potential impacts to native snail species that were identified in the project site and a native plant species near the project site,

4.3.3 CITY LAND USE ORDINANCE

The project site is within the State Conservation District, which is administrated by the State Board of Land and Natural Resources, as described in Section 4.2.2. The City's Land Use Ordinance map designation of P-1, Preservation Restricted, reflects the City's zoning designation for State Conservation District lands. See Figure 4-4**.**

4.3.4 SPECIAL MANAGEMENT AREA

The Special Management Area (SMA) on O'ahu is administered by the City. The SMA map shows the project site is located approximately 3 miles inland from the SMA and, therefore, would not be subject to Chapter 25, Revised Ordinances of Honolulu (ROH), governing SMAs.

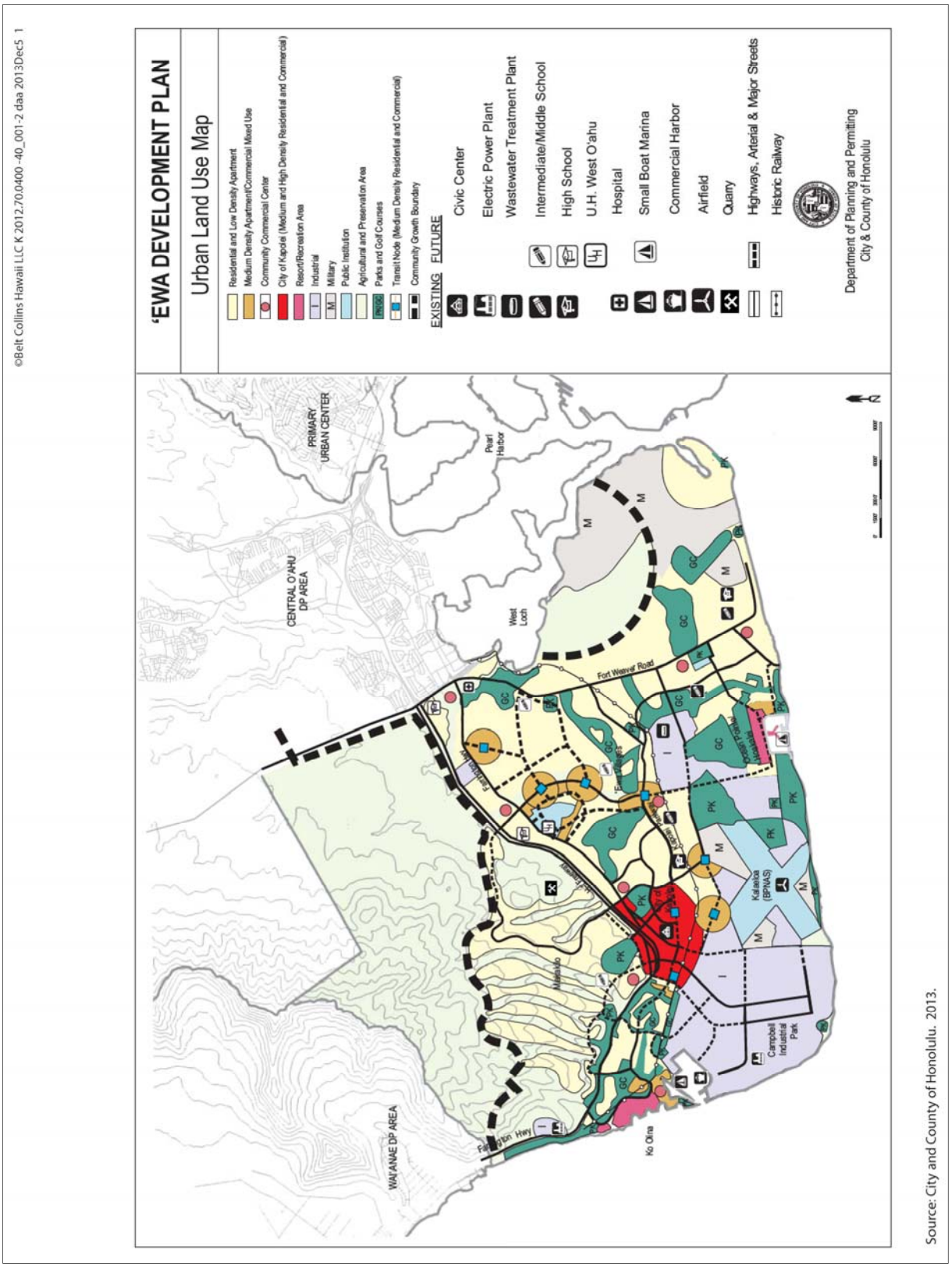

Figure 4-2. 'Ewa Development Plan

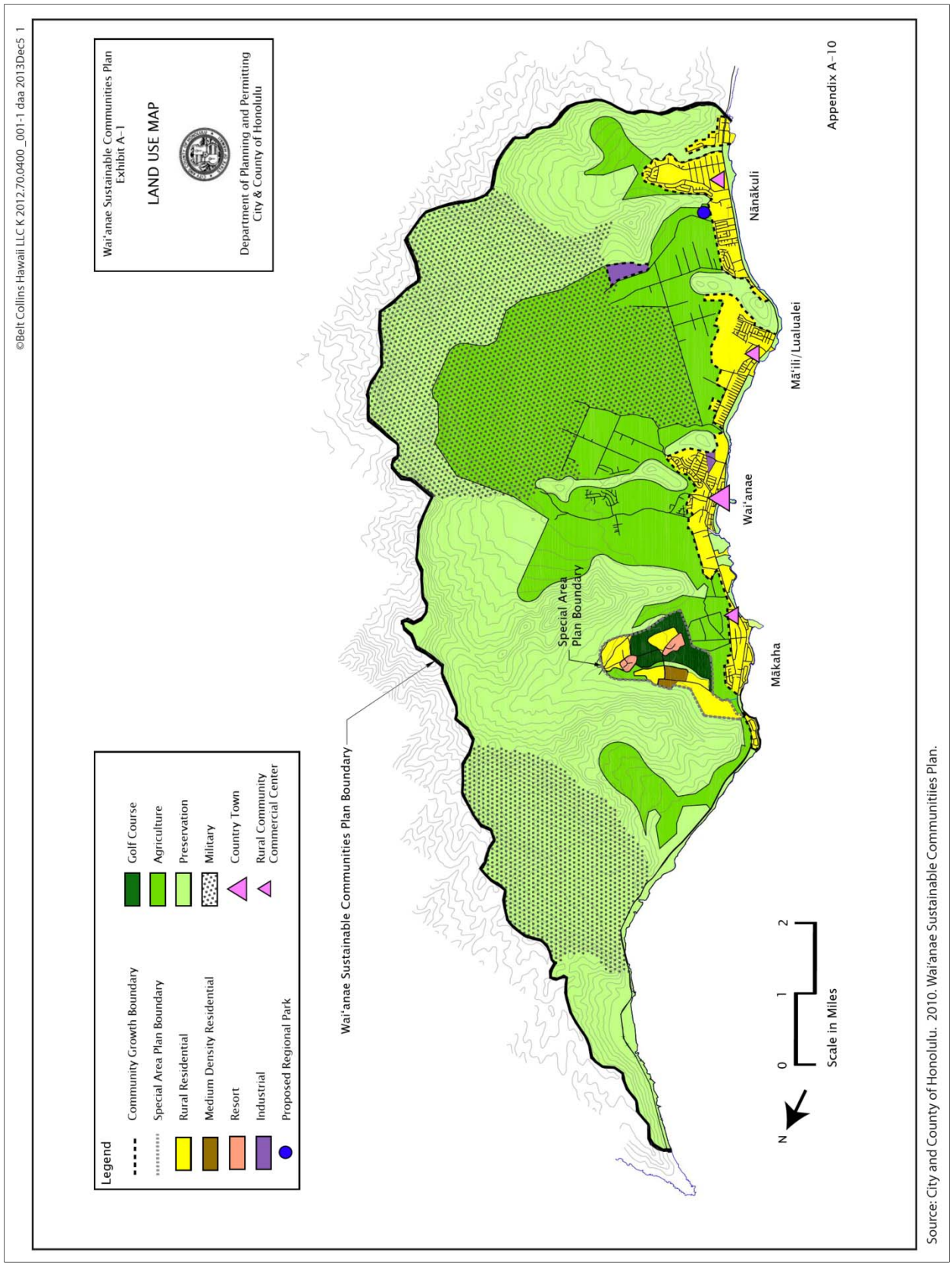

Figure 4-3. Waiʻanae Sustainable Communities Plan.

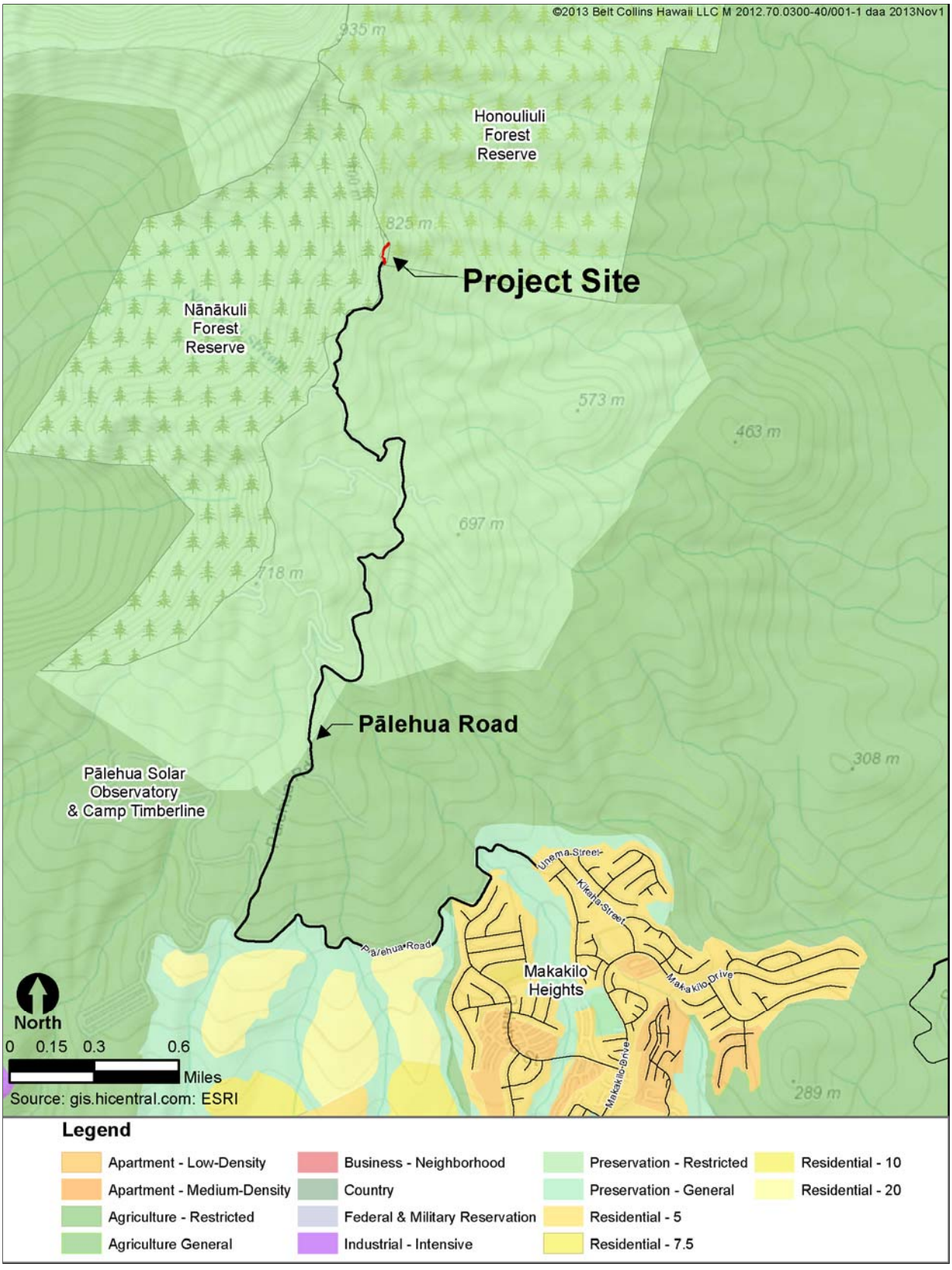

Figure 4-4. City Land Use Ordinance Zoning.

4.3.5 SUMMARY OF REQUIRED PERMITS AND APPROVALS

Per Chapter 18, ROH, the proposed action by a State government agency is exempt from building, electrical, plumbing, and sidewalk permits, except when permits are specifically requested by the State agency. Chapter 14, ROH, which covers grading, grubbing, and stockpiling, does not provide State agency work a similar exemption. In addition to the required City permits and approvals, DAGS intends to acquire all permits that would otherwise be required if the action where not undertaken by a State agency. Table 4-3 provides a summary of the permits and approvals applicable for the proposed underground utility conduits and improvements to the three buildings.

Table 4-3. Summary of Required Permits and Approvals

Construction Activity	Required Permit/ Approvals	Approving Agency
Earthwork and installation of underground lines.	Grading permit; electrical code review	City Department of Planning and Permitting (DPP)
Retaining walls	Building permit	DPP
Building upgrades	Building permit	DPP
Installation of new meter and connection HECO power.	Electrical code review	DPP
Building and utility improvements	CDUP	OCCL

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5 ANTICIPATED DETERMINATION

This Draft Environmental Assessment demonstrates that the proposed action will have no significant adverse impact on the environment and that an Environmental Impact Statement is not warranted. A Finding of No Significant Impact (FONSI) is, therefore, anticipated for this proposed action.

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6 FINDINGS AND REASONS SUPPORTING ANTICIPATED DETERMINATION

The following findings and reasons indicate that the proposed action will have no significant adverse impact on the environment based on the 13 significance criteria provided in the Hawai‘i Administrative Rules 11-200-12, and as a result supports the anticipated Finding of No Significant Impact (FONSI) determination.

- *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*
  Response. The flora, fauna, archaeological, and cultural impact studies conducted for this proposed action indicate that with the implementation of identified mitigation measures there will be no significant adverse impacts on natural or cultural resources.

- *Curtails the range of beneficial uses of the environment.*
  Response. The proposed action involves upgrades to existing communication facilities, including the undergrounding of utility conduits and upgrades to existing buildings. No uses are being displaced or curtailed by the proposed action.

- *Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, Hawai‘i Revised Statutes (HRS).*
  Response. As demonstrated in this document, the proposed action is consistent with the State of Hawai‘i's long-term environmental policies and guidelines as expressed in Chapter 344, HRS.

- *Substantially affects the economic or social welfare of the community or state.*
  Response. The proposed action is expected to improve the reliability and functionality of the State's communication system, which will assist the State, county, and federal agencies in their delivery of public services to the community. Moreover, the construction activity associated with the proposed action will create jobs and infuse business and personal income into the local economy. No negative effects on the social welfare of the local community are anticipated.

- *Substantially affects public health*.
  Response. The proposed action will not utilize hazardous materials or construction methods that would affect public health. The noise, air, and water quality regulations of the State Department of Health (DOH) will be followed. The proposed action will be implemented in accordance with State and City and County of Honolulu (City) standards.

- *Involves substantial secondary impacts, such as population changes or effects on public facilities.*
  Response. The proposed action involves upgrades to existing facilities, and once complete, will not change the existing use of the project site or increase demand for public facilities. No increase in residential population or public facility demands are expected by this proposed action.

- *Involves a substantial degradation of environmental quality.*

  Response. The proposed action involves the installation of underground conduits primarily in areas that are disturbed. The proposed action was designed to minimize the footprint of construction activities. Best Management Practices (BMPs) will be employed during construction to control erosion and runoff. Therefore, no substantial degradation of environmental quality is expected.

- *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.*

  Response. The proposed action involves improvements to existing communication facilities and is needed to meet current State standards, public user demands, and technological changes. The proposed action will be designed to provide for future expansion of communication equipment within the existing buildings.

- *Substantially affects a rare, threatened, or endangered species, or its habitat.*

  Response. The flora and fauna survey found no rare, threatened, or endangered flora or fauna resources in the project site. During construction, special vegetation trimming methods will be utilized to minimize impacts to native snails.

- *Detrimentally affects air or water quality or ambient noise levels*.

  Response. During construction, the effects of dust and runoff will be mitigated by establishing and following BMPs. Construction noise will be mitigated by scheduling start and curfew times per DOH requirements. The nearest noise sensitive receptors are residences located approximately 0.5 miles from the project site. Once construction is completed, no detrimental effects are expected from the proposed action.

- *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.*

  Response. The proposed action is situated outside of the flood plain and is at a large distance from the shoreline and tsunami evacuation zone. There are no streams or other water bodies that will be impacted in or near the project site.

- *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies*.

  Response. The proposed action includes upgrades to existing facilities and does not involving erecting any new towers, antennas or other tall structures. The proposed action will not affect scenic vistas or viewplanes identified in City or State plans.

- *Requires substantial energy consumption.*

  Response. The proposed action involves upgrades to existing facilities. After construction is complete, activities at the project site will return to near existing levels.

7 COMMENTS

The agencies and interested parties contacted as part of the pre-consultation process are as follows:

Federal Agencies

- Environmental Protection Agency, Region IX, Pacific Islands Office
- U.S. Army Corps of Engineers, Pacific Ocean Division
- U.S. Department of Commerce, National Marine Fisheries Service, Pacific Islands Regional Office
- U.S. Department of Homeland Security, U.S. Coast Guard, 14th Coast Guard District
- U.S. Department of the Interior, U.S. Fish and Wildlife Service

State Legislature

- Senator Mike Gabbard, State Senate District 20
- Representative Sharon Har, State House District 42

State Agencies

- Department of Defense
- Department of Hawaiian Home Lands
- Department of Health
- Department of Land and Natural Resources (DLNR)
- Office of Conservation and Coastal Lands, DLNR
- Office of Hawaiian Affairs
- State Historic Preservation Division, DLNR

City Council

- Councilmember Kimberly Pine, Council District 1

City Agencies

- Department of Design and Construction
- Department of Emergency Management
- Department of Emergency Services
- Department of Environmental Services
- Department of Planning and Permitting

Other Interested Parties

- Makakilo/Kapolei/Honokai Hale Neighborhood Board

- The Nature Conservancy of Hawai‘i
- Hawai‘i Historic Foundation
- Kama‘aina Kids Corporate Office

The agencies and interested parties that provided comments as part of the pre-consultation process are listed below. Copies of the comment and the response letters are included in Appendix E of this document.

- City and County of Honolulu, Department of Design and Construction
- State of Hawai‘i, Department of Defense
- State of Hawai‘i, Department of Health, Environmental Planning Office

8 REFERENCES

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APPENDIX A

ARCHAEOLOGICAL ASSESSMENT

— DRAFT —

Archaeological Inventory Survey for Reconditioning of the ICSD Mauna Kapu Radio Facility, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, Hawai‘i

Tax Map Key (1) 9-2-005:021 portion

Prepared for:

Dept. of Accounting and General Services
Division of Public Works
State of Hawai‘i
Honolulu, Hawai‘i 96819

Under Contract to:

Belt Collins Hawaii LLC
2153 North King St., Suite 200
Honolulu, HI 96819-4554

INTERNATIONAL ARCHAEOLOGICAL RESEARCH INSTITUTE, INC.
APRIL 2014

— Draft —

ARCHAEOLOGICAL INVENTORY SURVEY FOR RECONDITIONING OF THE ICSD MAUNA KAPU RADIO FACILITY, HONOULIULI AHUPUA‘A, ‘EWA DISTRICT, O‘AHU, HAWAI‘I

TMK (1) 9-2-005:021 portion

by

Timothy M. Rieth, M.A.

Prepared for

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April 2014

ABSTRACT

At the request of the Department of Accounting and General Services – Information and Communication Services Division and under contract to Belt Collins Hawaii, International Archaeological Research Institute, Inc., completed an archaeological inventory survey of the 0.25 acre Mauna Kapu Radio Facility, Honouliuli, O‘ahu (TMK [1] 9-2-005:021). Fieldwork included a pedestrian survey of the project area and a limited number of shovel test pits. No archaeological sites were documented; however, a single historic building built by the U.S. Army in 1943 (with an associated concrete retaining wall built in 1945), currently designated U.S. Coast Guard Building C (formerly U.S. Army Building 30), was identified. In addition to Building C, concrete steps and an unmortared basalt retaining wall constructed between 1945-1974/1975 were recorded. Recovery of black plastic film from between the retaining wall stones indicates a modern age for the feature.

Building C is a brick structure that was a U.S. Army receiver and transmitter station, which handled inter-island communications connecting with telephone circuits and military teletype terminations at the height of World War II. In 2006, the building was refurbished by the U.S. Coast Guard, which included asbestos abatement and the construction of a new roof. The current project includes the installation of communication conduit along the exterior wall of Building C with penetration through the wall at one location. Modifications to the building will be no different than what currently exists with cables penetrating the structure to service the telecommunications needs within the building. Consultation is currently underway with the State Historic Preservation Division Architecture Branch to determine what additional work, if any, needs to be done for a determination on possible effects to Building C.

No additional historic preservation mitigation measures are recommended for this project and the current level of recording is recommended as adequate documentation.

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I. INTRODUCTION

At the request of the Department of Accounting and General Services (DAGS) – Information and Communication Services Division (ICSD) and under contract to Belt Collins Hawaii LLC, International Archaeological Research Institute, Inc., (IARII) completed an archaeological inventory survey of the Mauna Kapu Radio Facility, Honouliuli, O'ahu (TMK [1] 9-2-005:021[1]) (Figs. 1 and 2). The property is owned by the Gill-Olson Joint Venture and is leased to the U.S. Army. The research was carried out as an initial step for compliance with federal and state requirements to identify and evaluate possible impacts to significant archaeological and historic resources in advance of construction activities for DAGS ICSD improvements of the radio facility. Consultation with the State Historic Preservation Division (SHPD) follows Hawaii Revised Statues (HRS) Chapter 6E-8. The U.S. Army will complete National Historic Preservation Act Section 106 consultation, if deemed necessary.

PROJECT AREA

The Mauna Kapu Radio Facility is located along a ridgeline separating Honouliuli and Nānākuli, at approximately 850 meters (m; 2,800 feet [ft.]) above sea level (asl). The 0.25 acre (0.1 hectare) facility is accessed via Pālehua Road, and includes two towers, generator buildings, and associated structures (Photos 1-7). The facility is jointly used by the United States Coast Guard (USCG), United States Army Garrison-Hawaii (USAG-HI), and ICSD.

SCOPE OF WORK

The archaeological inventory survey included a review of the literature and records at the SHPD and other repositories to obtain information on known archaeological sites in the vicinity of the project area. A site visit was carried out on September 5, 2013, in order to examine the facility and the areas to be affected by ICSD improvements, and a 100-percent pedestrian survey with subsurface testing was completed on March 25, 2014.

This report concludes with historic preservation recommendations based on a synthesis of archaeological and historical findings as these relate to ICSD construction plans.

NATURE OF THE UNDERTAKING

Seven construction activities are associated with DAGS ICSD improvements at Mauna Kapu (Fig. 3). These are as follows:

1. Install approximately 122 m (400 ft.) of underground conduit for utilities. The conduit has termini at the ICSD and USCG/Army buildings at the northern end of the facility, USCG Building C towards the center of the facility, and a new Hawaiian Electric Company (HECO) meter at the southern end of the facility.

[1] Lot 343, which encompasses the project area, was formerly designated TMK (1) 9-2-005:017. The current TMK number was obtained from the State of Hawaii Office of Planning Statewide GIS Program (file: oahutmk.shp), which is based on the Honolulu Land Information System (HOLIS).

2. Install handholes.
3. Install a new Hawaiian Electric Company (HECO) meter.
4. Construct retaining walls along the slopes leading to the upper site.
5. Remove an unused water tank near the stairs to accommodate the conduit alignment.
6. Install minor utility upgrades to the three existing buildings, including new conduits to and within the buildings, new breaker boxes, and ancillary equipment, as needed.
7. Conduit maintenance and upgrade work to the ICSD building. The work includes: repainting the interior and exterior walls; replacing the door and hardware, and; installing a new roof over the existing roof.

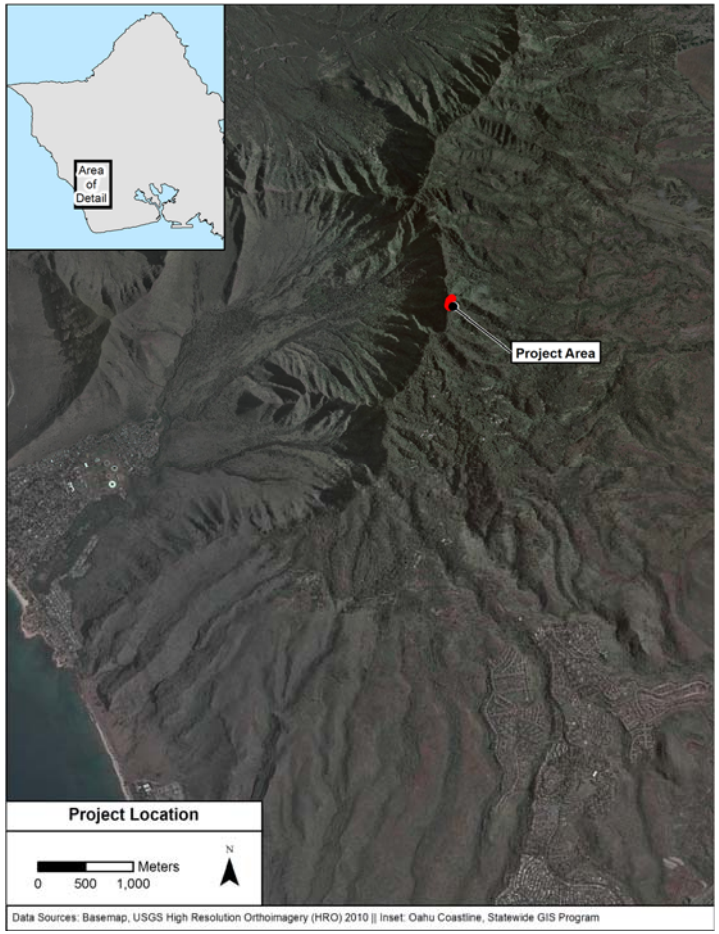

Figure 1. Mauna Kapu Radio Facility project area on the USGS High Resolution Orthoimagery (2010).

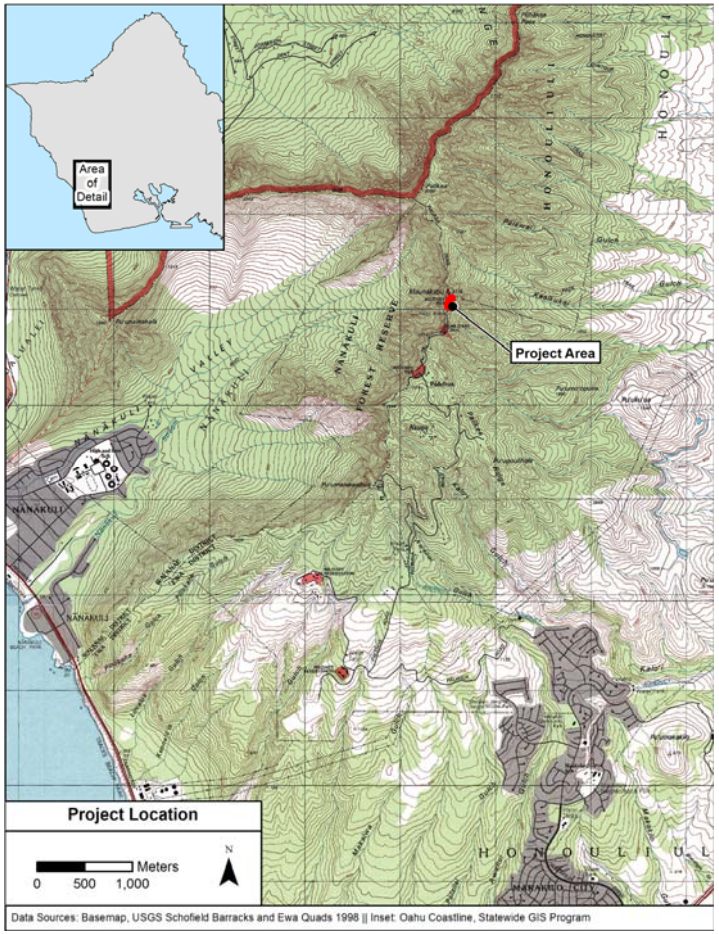

Figure 2. Mauna Kapu Radio Facility project area on the USGS 1998 Ewa and Schofield Barracks topographic quadrangle maps.

Photo 1. Representative photograph of the terrain at the Mauna Kapu Radio Facility. View south towards the USCG 180-foot tower and Building C.

Photo 2. View of the USCG 180-foot tower (right) and the Verizon tower (left, foreground) located southwest of the USCG Generator Building; view northwest.

Photo 3. Base of the USCG 180-foot tower (right), Verizon tower (left), generators, and associated infrastructure; view northwest. USCG Building C is located beyond the USCG 180-foot tower (building not visible); the building visible at the center of the photograph is a non-USCG structure.

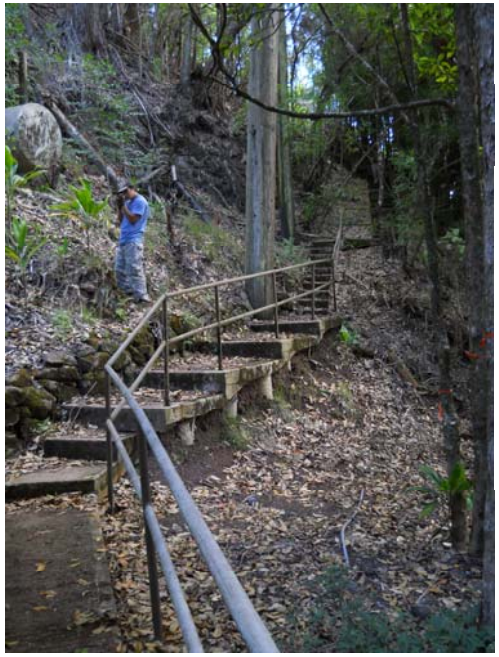

Photo 4. Stairway between USCG Building C (at the foot of the stairway; not depicted in the photograph) and the ICSD building, USCG/Army buildings, and 70-foot tower (at the top of the stairway; not depicted in the photograph). Orange flagging marks the boundaries of the project area; view northeast.

Photo 5. Views of USCG Building C.

Photo 6. Views of the USCG/Army building, 70-foot tower, and ICSD building (only visible in the right bottom of the right picture).

Photo 7. View of the ICSD building.

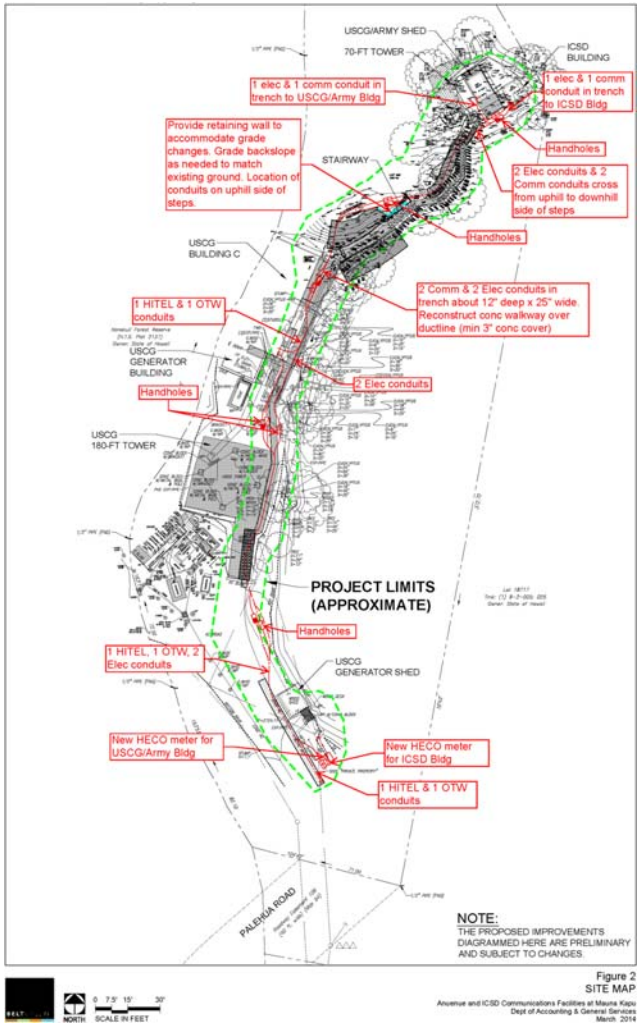

Figure 3. Mauna Kapu Radio Facilities site map (provided by Belt Collins Hawaii).

II. BACKGROUND

This section provides relevant background information on the physical environment, traditional history, post-Contact history, and previous archaeological investigations of the surrounding area.

PHYSICAL ENVIRONMENT

The Mauna Kapu Radio Facility is situated on an unnamed ridge, at approximately 850 m asl in the Waiʻanae Mountains, at the boundary of the Nānākuli and Honouliuli Forest Reserves. This mountain range is the oldest portion of Oʻahu having formed during the Pliocene approximately 2.5-3.3 million years ago (mya) (MacDonald and Abbott 1970). The underlying geology of the project area and environs is Palehua Member lava flow basalt. Soils overlying the basalt bedrock comprise the Tropohumults-Dystrandepts association (rTP). This soil association is found at the higher elevations of the Waiʻanae Range with slopes ranging from 30-90% and annual rainfall of 30-75 inches (Foote et al. 1972:122). The reddish-brown silty clay Tropohumults present at the elevation of the radio facility are "well-drained, strongly acid to extremely acid soils" (Foote et al. 1972:122).

The topography of the area consists of steep cliffs and incised valleys.

TRADITIONAL HISTORY

The Mauna Kapu Radio Facility is located within the *ahupuaʻa* (traditional subdistrict land division) of Honouliuli in the *moku* (island district) of ʻEwa. Little is recorded in traditional histories about the mountain areas of Honouliuli that encompass the radio facility. The focus of settlement and food production, and therefore much of the traditions that have been documented, was the lowland areas, particularly ʻEwa Plain and Pearl Harbor areas. Tuggle and Tomonari-Tuggle (1997) present a summary of the traditional and post-Contact history for these areas, which is briefly presented here as general context for the region.

Below Mauna Kapu to the south, the traditions of the ʻEwa Plain emphasize a strong ancestral connection with Kahiki—the traditional Polynesian homeland of Hawaiians. These connections are referenced in stories about the introduction of breadfruit and the activities of mythic figures such as Kamapuaʻa (Tuggle and Tomonari-Tuggle 1997:27). Traditions of Puʻukapolei, at the inland margin of the plain, provide further indications of Kahiki, as well as, the spiritual importance of this area that once supported a *heiau* (temple) (McAllister 1933:108).

Based on oral histories and genealogy, Cordy (1996:597) suggests that it was during the early 14th century that the Māweke lineage (eventually Māweke-Kumuhonua lineage) established control over an ʻEwa polity that included the late pre-Contact *moku* of Waiʻanae, ʻEwa, and Waialua. It is during this century that Cordy (1996-597-598) proposes significant changes began to occur within the social structure of Hawaiian society with increased distinctions between *aliʻi* (chiefs) and *makaʻāinana* (commoners). In Cordy's (1996:598) chronology, during the early 15th century Laʻakona of the ʻEwa Māweke-Kumuhonua lineage became the first ruler of a unified Oʻahu, and his family branch retained control for a century. Although control of the island eventually shifted to a junior Māweke line situated in the Kona district, the chiefly and religious importance of ʻEwa was maintained as evidenced by the birth of *aliʻi* and future rulers at Kūkaniloko in the district. The Maui chief Kahekili's successful conquest of Oʻahu in the late 18th century led to a failed rebellion by ʻEwa

chiefs that resulted in what Kamakau (1992:138) described as a massacre (Tuggle and Tomonari-Tuggle 1997:29-30).

Shortly after Kahekili's conquest, his son and successor, Kalanikūpule, was defeated in turn by Kamehameha, thus establishing Kamehameha's rule of O'ahu. Specific to Honouliuli, Kamehameha gave this *ahupua'a* to Kalanimoku as *panalā'au* (conquered lands, following Kame'eleihiwa 1992:58) with the ability to transfer the land to his heirs. As discussed below, this gift affected the subsequent land history of the area.

HISTORICAL BACKGROUND

Plantation agriculture and ranching during the 19th and 20th centuries did not directly affect the uplands, including the area of the Mauna Kapu radio facility (Fig. 4). Though one of the earliest commercial activities in the islands, sandalwood harvesting, did occur in these mountainous regions. Alongside this new commercial activities, it is unclear how long traditional forest activities, such as bird snaring, harvesting of timber, and the collection of other resources, continued into the post-Contact period. Presumably, many of these activities continued well into the 19th century (see Bayman 2007, 2009 for a discussion of the continuation of certain traditional activities into the post-Contact period).

The land tenure of Honouliuli Ahupua'a during the late 18th and 19th centuries is based on Kalanimoku's stewardship following Kamehameha's conquest of O'ahu. Upon Kalanimoku's death, his sister Wahinepio received the *ahupua'a*. Subsequently, through the 19th century Mahele (the institution of Western-style land ownership), Kekau'ōnohi was awarded the *ahupua'a*, excluding *kuleana* (*maka'āinana* parcels) lands. Kekau'ōnohi's claim was based on her mother, Wahinepio. Levi Ha'alelea, Kekau'ōnohi's husband, received Honouliuli after her death, and in turn, the *ahupua'a* passed to his second wife, Amoe Ululani Kapukalakala Ena, when he died. She transferred ownership to her sister's husband, John Coney, who leased the property to James Dowsett and John Meek for ranching. In 1877, Honouliuli was sold to James Campbell.

Campbell used the land for ranching and agriculture as Honouliuli Ranch. Artesian wells provided the water that allowed the development of extensive sugarcane cultivation, initially by the Ewa Plantation Company and later by the Oahu Sugar Company. Campbell leased Honouliuli to B.F. Dillingham in 1889, and Dillingham eventually added a line of his Oahu Railway and Land Company through the 'Ewa Plain. Sugar production remained a primary economic activity until the Oahu Sugar Company closed in 1995.

Throughout the better part of the 20th century, the military expanded its presence in Honouliuli. In 1936, the U.S. Government was granted perpetual easement to construct communication facilities along the lower portions of Palehua Ridge, with the perpetual easement extended to the Mauna Kapu peak in 1952 (Tyrone T. Kusao, Inc. 1991:7). The Mauna Kapu Radio Facility was originally a U.S. Army facility, and USCG Building C was originally U.S. Army Building 30, built in 1943 (Department of the Army 2008). The concrete retaining wall adjacent to (east-southeast) Building C was constructed in 1945 (U.S. Engineer Office 1945). Between 1945 and 1974, the concrete stairs and drylaid stone retaining wall providing access between the upper and lower areas of the facility were constructed. Construction of these features presumably coincided with the first construction activities and use of the upper area, which based on current evidence occurred prior to 1974 (U.S. Coast Guard 1976). Later, the upper area of the facility was graded further to accommodate the construction of the 70-foot tower and Army shed (referred to currently as USCS/Army Building) in 1975, with the ICSD building constructed in this area in 1988.

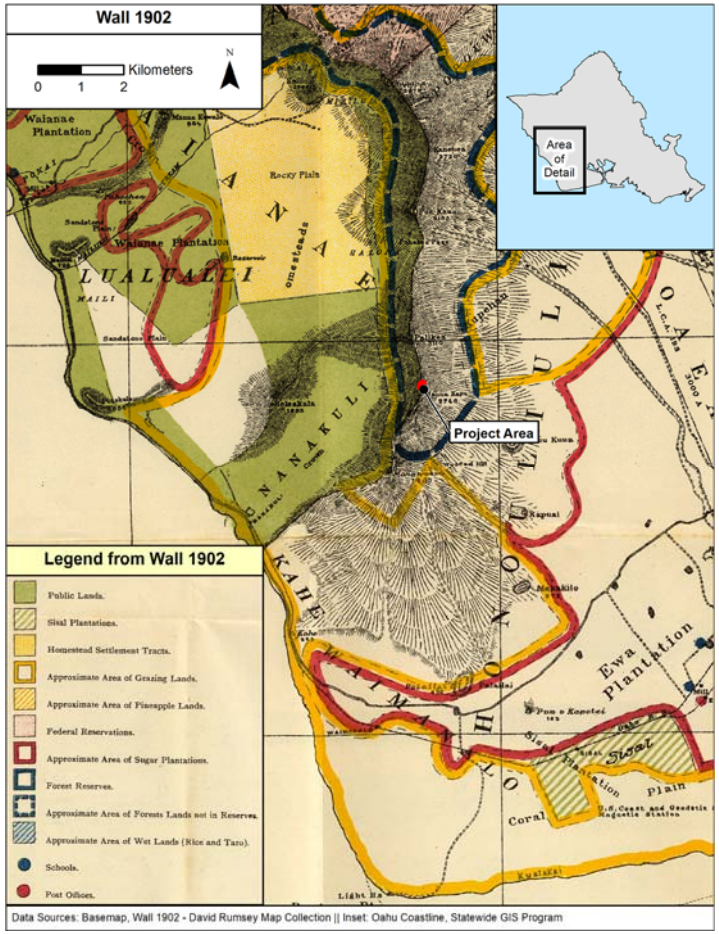

Figure 4. Overlay of the Mauna Kapu Radio Facility project area on Wall's 1902 (1906) map.

SUMMARY OF PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

No archaeological fieldwork has been conducted at the Mauna Kapu Radio Facility, although a historical properties assessment was recently completed, which did not identify any archaeological or historic resources (Sholin and Dye 2010). In contrast to the ‘Ewa Plain and lower slopes of the Wai‘anae Range, the surrounding uplands have received little archaeological investigation. Hammatt’s (1992) inventory survey of the proposed K-A-I-M radio tower, approximately 1 km south of the present project area is an exception. No historic properties were recorded during that survey. Therefore, the following discussion briefly considers the archaeology of the ‘Ewa Plain as part of the local context, but focuses on investigations within approximately 3-8 kilometers (km) of the Mauna Kapu Radio Facility, generally in lower slope and gulch areas (Table 1; Fig. 5).

Tuggle and Tomonari-Tuggle (1997) synthesized the prehistoric and historical archaeology of Naval Air Station (NAS) Barbers Point and the surrounding ‘Ewa Plain, and the reader is referred to that report for more detailed information. Of relevance for this project, is the documentation of substantial and extensive permanent occupation across this area. Enclosures, walls, and platforms attest to habitation with the many fishponds of West Loch and the greater Pearl Harbor area representing one significant aspect of food production. A major village, Honouliuli, was extant into the 19th century, with irrigated taro production in the better-watered areas to the east of the plain proper.

Investigations of the lower slopes of the Wai‘anae Range have recorded prehistoric, or possibly prehistoric features, typically walls and rockshelters, while the majority of archaeological features are plantation infrastructure (irrigation ditches, roads, etc.) (Fig. 6; see Table 1). Although historical sugarcane cultivation resulted in broad landscape modification across this area, the extant traditional structures do indicate at least temporary habitation, dryland cultivation, and religious activities.

Although a significant late pre-Contact and early post-Contact population is evident for the ‘Ewa Plain, and the lower slopes may have been lightly populated during these periods, geography and topography preclude any such habitation on the ridges and upper slopes of the Wai‘anae Range. Past activities likely included the procurement of logs, other plants, birds/feathers, and other natural resources, all of which would essentially be archaeologically invisible. McAllister (1933:107) does, however, note the presence of a *heiau* near Mauna Kapu, although these structures (McAllister Sites 134, 136, and 137) were never systematically recorded and are presumed to have been destroyed (Sterling and Summers 1978). He describes Site 136, which likely was closest to the Mauna Kapu facility, as follows:

> Small platform near Mauna Kapu, on the ridge dividing Ewa from Waianae.
>
> Dr. C.M. Cooke, Jr., reports that there was a small platform on this site, from 4 to 6 feet square, of coral and basalt stones. It is thought to have been built by the Hawaiians, who considered it sacred, and is believed to be an altar.

Site 134, Puu Kuina Heiau consisting of the “suggestion of a terrace,” was located in a gulch at the base of Mauna Kapu (McAllister 1933:107). Site 137, Puu Kuua Heiau, was located along Palikea Ridge at approximately 1,800 ft. asl, overlooking Nānākuli and Honouliuli (McAllister 1933:108). By the time McAllister recorded the feature it had been partially dismantled to construct cattle walls and had been planted in pineapple and ironwood.

Table 1. Previous Archaeological Investigations and Documented Sites Relevant to the Mauna Kapu Radio Facility.

Reference	Publication Title	Type of Investigation	Findings (Site Prefix 50-80-12-, unless noted)	Distance from Mauna Kapu Radio Facility
Bath (1989)	Waimanalo Gulch Petroglyphs 80-12-4110 Waimanalo Gulch, Honouliuli, Ewa, Oahu. Manuscript on file at the State Historic Preservation Division.	Inspection	4110 (petroglyphs)	6.7 km
Bordner (1977a)	*Archaeological Reconnaissance of the Proposed Kalo'i Gulch Landfill Site, Ewa, O'ahu.* Prepared for Environmental Impact Study Corporation. Archaeological Research Center Hawaii, Inc.	Reconnaissance survey	50-80-08-2600 (wall), 50-80-08-2601 (wall), 50-80-08-2602 (wall)	2.4-4.9 km
Bordner (1977b)	*Archaeological Reconnaissance of the Proposed Makaīwa Gulch Landfill Site, Ewa, O'ahu.* Prepared for Environmental Impact Study Corporation. Archaeological Research Center Hawaii, Inc.	Reconnaissance survey	No properties	4.4-6.7 km
Bordner and Silva (1983)	*Archaeological Reconnaissance and Historical Documentation: Waimanalo Gulch, Oahu, TMK: 9-2-03:2, 40, 13 (portion).* Prepared for Environmental Impact Study Corporation. Archaeological Research Center Hawaii, Inc.	Reconnaissance survey	No properties	6.5 km
Borthwick and Hammatt (1997)	*Archaeological Assessment for the Proposed Ministry of Transportation Satellite Multi-Ranging Station (MTSAT-MRS) Project Site, Palehua, Honouliuli, Ewa, Oahu Island, Hawaii (TMK 9-2-3:por 2).* Cultural Surveys Hawai‘i, Kailua. [cited in Dalton and Hammatt 2008, not seen]	Archaeological assessment	No properties	3.1 km
Dalton and Hammatt (2008)	*Archaeological Inventory Survey for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: [1] 9-2-003: por. 072 and 073).* Prepared for R.M. Towill Corporation. Cultural Surveys Hawai‘i, Inc., Kailua.	Archaeological inventory survey	6903 (rock uprights)	4.8-5.7 km

Table 1. Previous Archaeological Investigations and Documented Sites Relevant to the Mauna Kapu Radio Facility (continued).

Reference	Publication Title	Type of Investigation	Findings (Site Prefix 50-80-12-, unless noted)	Distance from Mauna Kapu Radio Facility
Hammatt (1992)	*Archaeological Inventory Survey of Proposed K-A-I-M Radio Tower, Palikea, Honouliuli, 'Ewa, O'ahu (TMK 9-2-005:013 Portion).* Prepared for KAIM. Cultural Surveys Hawai'i, Inc., Kailua.	Archaeological inventory survey	No properties	1.1 km
Hammatt and Shideler (1989)	*Archaeological Reconnaissance of the Six-Acre Proposed HECO Kahe Training Facility (T.M.K. 9-2-3:27), Honouliuli, 'Ewa, O'ahu.* Prepared for M and E Pacific, Inc. Cultural Surveys Hawaii, Inc., Kailua.	Reconnaissance survey	4221 (terrace; the site number is obtained from a hand-written notation on the SHPD copy of the report)	5.8 km
Hammatt and Shideler (1999)	*An Archaeological Inventory Survey and Assessment for the Waimanalo Gulch Sanitary Landfill Project Site, Honouliuli, 'Ewa, O'ahu.* Prepared for R.M. Towill Corporation. Cultural Surveys Hawai'i, Inc., Kailua.	Archaeological inventory survey	Battery Arizona	4.6-6.8 km
Hammatt et al. (1991)	*An Archaeological Inventory Survey for the Makaīwa Hills Project Site, Honouliuli, 'Ewa, O'ahu.* Prepared for William E. Wanket, Land Use Consultant. Cultural Surveys Hawaii, Inc., Kailua.	Archaeological inventory survey	2893 (petro., terrace, rockshelter), 4310 (enclosure), 4311 (wall), 4312 (wall), 4313 (terrace), 4314 (wall), 4315 (terrace), 4316 (wall), 4317 (terrace, platform), 4318 (enclosure), 4319 (rockshelter), 4320 (road), 4321 (rockshelter), 4322 (rockshelter), 4323 (*ahu*), 4324 (*ahu*), 4325 (C-shape), 4326 (wall), 4327 (*ahu*), 4328 (rockshelter complex), 4329 (enclosure), 4330 (platform), 4331 (L-shape), 4332 (enclosure), 4333 (wall), 4334 (enclosure), 4335 (mound), 4336 (enclosure), 4337 (enclosure), 4338 (rockshelter complex), 4339 (platform, wall), 4440 (concrete structure), 4341 (ditch), 4342 (reservoir)	3.8-7.3 km

Table 1. Previous Archaeological Investigations and Documented Sites Relevant to the Mauna Kapu Radio Facility (continued).

Reference	Publication Title	Type of Investigation	Findings (Site Prefix 50-80-12-, unless noted)	Distance from Mauna Kapu Radio Facility
Haun (1986a)	*Preliminary Archaeological Reconnaissance Survey for Environmental Assessment, Ewa Town Center/Secondary Urban Center. TMK: 9-1-15 and 16.* Prepared for Helber, Hastert, Van Horn, and Kimura. Paul H. Rosendahl, Ph.D., Inc., Hilo.	Reconnaissance survey	Ditch (later documented as Site 4341 by Hammatt et al. [1991]): eastern portion documented in Haun (1986b), and World War II structure (no site number)	6.5-7.9 km
Haun (1986b)	*Preliminary Archaeological Reconnaissance Survey for Environmental Assessment, Ewa Town Center/Secondary Urban Center. TMK: 9-1-15:4, 5, 17; 9-1-16:4, 6, 16, 18, 24, 30; 9-2-19:1.* Prepared for Helber, Hastert, Van Horn, and Kimura. Paul H. Rosendahl, Ph.D., Inc., Hilo.	Reconnaissance survey	Ditch (later documented as Site 4341 by Hammatt et al. [1991]): western portion documented in Haun (1986a)	6.9-7.8 km
Hoffman et al. (2004)	*Archaeological Assessment of an Approximately 30-Acre Parcel Adjacent to the Kahe Power Plant, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: 9-2-03:27).* Prepared for R.M. Towill Corporation. Cultural Surveys Hawai'i, Inc., Kailua.	Archaeological assessment	No properties	5.6 km
Kelly (n.d.)	Palehua Kuula Stone, Honouliuli, 'Ewa, Oahu. Manuscript on file at the State Historic Preservation Division.	Inspection	2316 (*kū'ula* stone [stone god to attract fish])	3.5 km
McAllister (1933)	*Archaeology of Oahu.* Bernice P. Bishop Museum Bulletin 104.	Reconnaissance survey	134 (*heiau*), 136 (*heiau*), 137 (*heiau*)	Unknown, presumably close
O'Leary et al. (2007)	*Archaeological Inventory Survey Addendum for the Makaīwa Hills Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu; TMK: (1) 9-1-015:005.* Prepared for Group 70 International. Cultural Surveys Hawai'i, Inc., Kailua.	Reconnaissance survey / Addendum to inventory survey	6870 (terrace, springs, rockshelter), 6871 (paving); plus re-location of 17 sites from Hammatt et al. (1991)	3.8-7.3

Table 1. Previous Archaeological Investigations and Documented Sites Relevant to the Mauna Kapu Radio Facility (continued).

Reference	Publication Title	Type of Investigation	Findings (Site Prefix 50-80-12-, unless noted)	Distance from Mauna Kapu Radio Facility
Rasmussen (2006)	*Archaeological Assessment for Makakilo, Honouliuli Ahupua'a, Island of O'ahu; TMK (portions) (1) 9-2-003:081, (1) 9-2-019:003, 072, 081, 084, 085*. Prepared for D.R. Horton-Schuler Division. International Archaeological Research Institute, Inc., Honolulu.	Archaeological assessment; survey	4664 (ditch)	4.6-6.8 km
Sholin and Dye (2010)	*Historic Properties Assessment for the Proposed Verizon Wireless HON Mauna Kapu Telecom Facility, Honouliuli, 'Ewa District, O'ahu Island, TMK (1) 9-2-005:021 por*. Prepared for Bureau Veritas North America Inc. T.S. Dye and Colleagues, Archaeologists, Inc., Honolulu.	Historical properties assessment	No properties	--
Soehren (1964)	Waimanalo Gulch House Site. Manuscript on file at the State Historic Preservation Division.	Inspection	2317 (bulldozed area presumed house site based on displaced shell midden and coral)	6.2 km
J. Tulchin and Hammatt (2004)	*Archaeological Field Inspection for the Proposed HECO Meteorological Observation Stations, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu*. Cultural Surveys Hawai'i, Inc., Kailua. [cited in O'Leary et al. 2007, not seen]	Reconnaissance survey	Mound, terrace, C-shape (no site numbers)	3.4-4.5 km
J. Tulchin and Hammatt (2007)	*Literature Review and Field Inspection of an Approximately 790-Acre Parcel at Pālehua, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu*. Cultural Surveys Hawai'i, Inc., Kailua. [cited by Dalton and Hammatt 2008, not seen]	Reconnaissance survey	26 historical and pre-Contact sites	2.3-4.6 km

Table 1. Previous Archaeological Investigations and Documented Sites Relevant to the Mauna Kapu Radio Facility (continued).

Reference	Publication Title	Type of Investigation	Findings (Site Prefix 50-80-12-, unless noted)	Distance from Mauna Kapu Radio Facility
J. Tulchin and Hammatt (2008)	*Archaeological Literature Review and Field Inspection of Approximately 809 Acres of Kahe Ranch Land, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu, TMK:[1] 9-2-003:002 por. and 005 por*. Cultural Surveys Hawaii, Inc., Kailua. [cited by Dalton and Hammatt 2008, not seen]	Reconnaissance survey	10 historical and pre-Contact sites	3-5.6 km
T. Tulchin and Hammatt (2004a)	*Archaeological Inventory Survey of the Approximately 86-Acre Proposed Pālehua Community Association (PCA) Common Areas Parcels, Makakilo, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: 9-2-03:78 por. and 79)*. Cultural Surveys Hawaii, Kailua. [cited by Hunkin and Hammatt 2009, not seen]	Archaeological inventory survey	6680 (quarry), 6681 (boulder mounds), 6682 (terrace)	3.4-4.6 km
T. Tulchin and Hammatt (2004b)	*Archaeological Inventory Survey of the Approximately 24-Acre Parcel Adjacent to the Kahe Power Plant, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: 9-2-03:27)*. Prepared for R.M. Towill Corporation. Cultural Surveys Hawaii, Inc., Kailua.	Archaeological inventory survey	6647 (wall, terraces), 6648 (mortared masonry foundations), 6649 (wall), 6650 (mounds, platforms, paving)	5.8 km
T. Tulchin and Hammatt (2005)	*Archaeological Inventory Survey of the Approximately 71-Acre Proposed Pālehua East B Project, Makakilo, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: 9-2-03:76 and 79)*. Cultural Surveys Hawaii, Inc., Kailua. [cited by Hunkin and Hammatt 2009, not seen]	Archaeological inventory survey	6666 (alignment, mound), 6667 (walls, ditch), 6668 (alignment, terrace)	4.5-4.8 km

Table 1. Previous Archaeological Investigations and Documented Sites Relevant to the Mauna Kapu Radio Facility (continued).

Reference	Publication Title	Type of Investigation	Findings (Site Prefix 50-80-12-, unless noted)	Distance from Mauna Kapu Radio Facility
Yucha and Hammatt (2012)	*Archaeological Inventory Survey Report for Portions of Kahe Valley, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island, TMK:[1] 9-2-003:027 por.* Prepared for Hawaiian Electric Company, Inc. Cultural Surveys Hawaii, Inc., Kailua.	Archaeological inventory survey	6647 (wall, terraces--re-documented), 6648 (mortared masonry foundations--re-documented), 6649 (wall--re-documented), 6650 (mounds, platforms, paving--re-documented), 7137 (World War II defensive structures), 7138 (mounds), 7139 (rockshelter, cultural deposit), 7140 (World War II defensive structures), 7141 (concrete foundation), 7142 (wall)	5.6 km

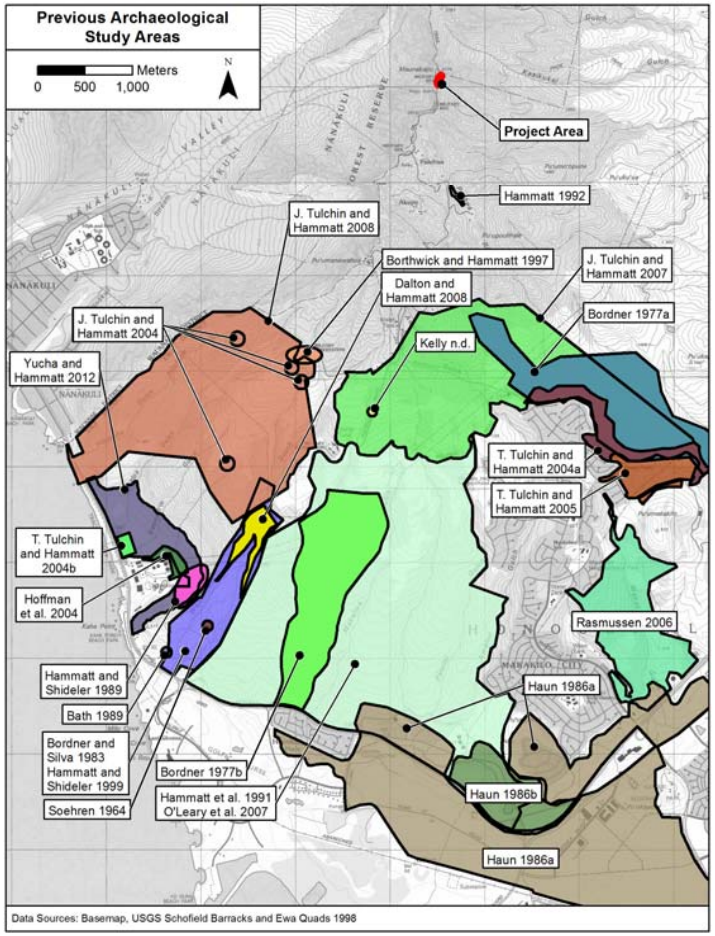

Figure 5. Previous archaeological project areas in relation to the Mauna Kapu Radio Facility. The closest project area is 1.1 km distant. See Figure 6 for the distribution of archaeological sites identified by the projects.

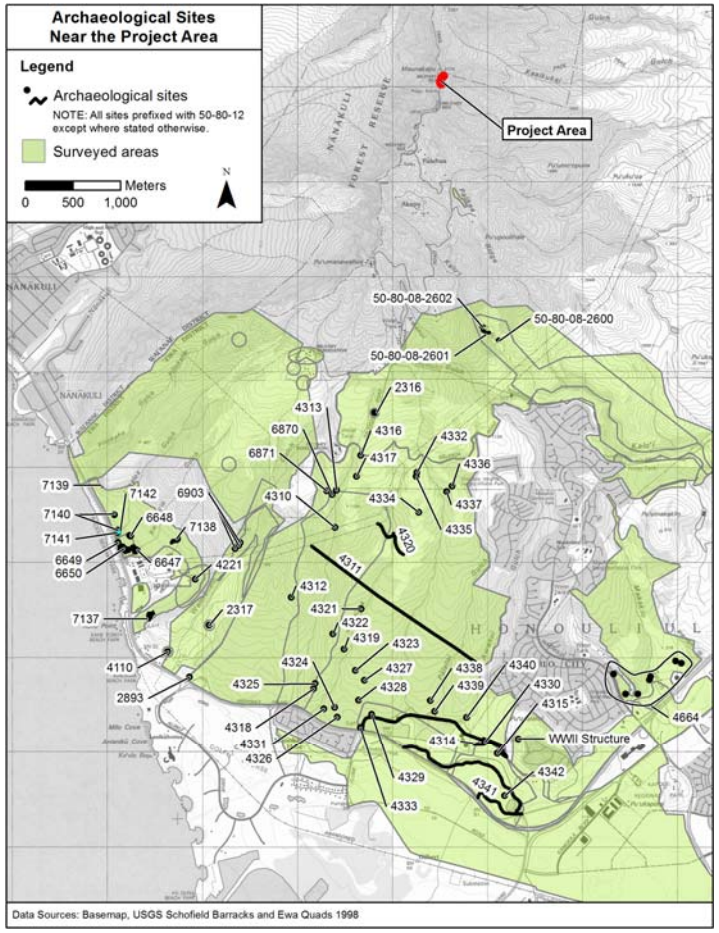

Figure 6. Archaeological sites previously documented in the general area.

III. RESEARCH METHODS

This section presents the research objectives guiding the project and the field methods that were employed.

RESEARCH QUESTIONS

Two basic research questions guided the field investigations.

1. Do any of the existing structures have historic significant, if so, are they eligible for listing on the Hawai‘i Register of Historic Places?

2. Is there evidence for traditional deposits? The likelihood of traditional deposits (or surface structures) being present is low due to the previous site development and the steep terrain. However, subsurface testing coupled with an evaluation and documentation of the present ground surface and any subsurface exposures will provide empirical data to assess this prediction. Shovel test pits will be placed at topographic locations that offer the most promise (e.g., level areas, areas that do not exhibit evidence for erosion).

FIELDWORK METHODS

A systematic pedestrian survey was conducted across the 0.25 acre project area, with parallel transect lines spaced between 2-4 m apart across the undeveloped portions of the parcel. Survey transect lines were roughly oriented northeast-southwest, parallel to the slope contours of the project area.

Feature text descriptions documented feature type, construction details, functional interpretations, and age estimates. Feature data points were recorded with a Trimble ProXH Global Positioning System (GPS) unit using the North American Datum of 1983 in Universal Transverse Mercator Zone 4 North. GPS data were differentially corrected for submeter accuracy. Digital photographs were obtained for features and the general project area setting.

Three shovel test pits (STP) were excavated. The STPs were placed above the stone retaining wall associated with the concrete steps and at two locations that will be subject to trenching for conduit installation. The primary aims of the STPs were documentation of the stratigraphic sequence and assessing the presence of buried cultural deposits. Excavated sediment was visually and manually inspected for cultural material. Stratigraphic profile drawings were completed along with soil descriptions. The soil characteristics recorded include: color, including moisture condition (wet, moist, dry) when color read; texture; structural grade, size, and form (or absence of structure); dry or moist consistence; wet consistence (stickiness, plasticity); root frequency and size; presence of charcoal or other cultural materials; and lower boundary distinctness and topography (Munsell Color 2000; U.S. Department of Agriculture Soil Survey Staff 1951, 1962). All excavation units were backfilled after the placement of flagging tape at the base of the excavation.

IV. SURVEY RESULTS

The results of the pedestrian survey and subsurface testing are presented in this section.

PEDESTRIAN SURVEY RESULTS

A single significant feature, Building C, was documented within the project area during the inventory survey (Fig. 7; Photos 8 and 9). This structure was built in 1943 as a U.S. Army receiver and transmitter station (Department of the Army 2008; Hull 1947). Hull (1947:32) states that the Mauna Kapu facility handled inter-island communications, connecting with telephone circuits and military teletype terminations at the height of WWII. The following equipment was installed at that time (Hull 1947:32-33): three Western Electric 430A-1 radio transmitters, three Western Electric 9-D-B antennas, three Western Electric 9-D-B radio receivers, six Western Electric X61882A voice frequency telegraphy terminals, three H-1 carrier equipment, and one Hallicrafter S-27 radio receiver. In 1945 a concrete retaining wall was built to the east-southeast of the building to stabilize the slope (U.S. Engineer Office 1945). In 2006, the building was refurbished including asbestos abatement and the construction of a new roof.

Photo 8. View of Building C; view southwest. The shed-roofed portion of the building is a later addition.

Photo 9. Composite photograph including Building C and the stairway, with stone retaining wall, leading to the upper facility area; view southwest.

In addition to Building C, a flight of modern concrete stairs with a drylaid stone retaining wall along the upslope side of the steps was documented (Photo 10; see Photo 9). The steps provide access between Building C and the upper portion of the facility (location of the 70-foot tower, USCG/Army building, and ICSD building). The exact construction date for these features is unknown, however, they were built between 1945 and 1974 based on engineering drawings; the stairs are absent from the U.S. Engineer Office (1945) drawing but are present on the U.S. Coast Guard (1976) revised as-built drawings for the facility (original plans dated 1974 with as-built revisions from 1975 and 1976 added). The latter plans indicate that structures were present in the upper area prior to 1974, but the date for the construction of these structures—and presumably the stairs and retaining wall—has not been determined. The documentation of a piece of black plastic film in STP 1, which originated between two of the retaining wall stones indicates a modern age for this structure. Based on this information, and per communication from the SHPD, these stairs and the retaining wall are not considered significant historic resources.

Photo 10. View of the southern portion of the concrete stairs and drylaid basalt retaining wall providing access between the upper and lower facility areas; view northeast.

SUBSURFACE TESTING RESULTS

Three STPs were excavated during the survey. The STPs were distributed across the project area (see Fig. 7). STP 1 was located above the basalt retaining wall associated with the concrete steps leading the upper facility area. The STP was placed 0.8 m south of the north end of the retaining wall, abutting the west side of the stacked stones. STP 1 was 50 cm in diameter and was excavated to 50 cm below surface (cm bs) (Photo 11). A cobbly dark brown (7.5YR 3/3) silty clay colluvial deposit was recorded. A piece of plastic film was encountered at 50 cm bs, extending from between the stacked stones of the retaining wall. No other cultural materials were documented. STP 2 was placed approximately 4 m east of the northeast corner of Building C in a level area. The STP was 40 cm by 40 cm, extending to 40 cm bs (Photo 12). The same cobbly dark brown (7.5YR 3/3) silty clay colluvium as STP 1 was identified, with saprolitic bedrock encountered at the base of excavation. No cultural material was encountered. STP 3 was located 1.5 m east of the fence surrounding Building C, near the path of the conduit that will connect the ICSD building with the new HECO building. STP 3 was 40 cm by 40 cm, extending to 60 cm bs (Photo 13). The excavation results are consistent with STP 2, including the lack of cultural material.

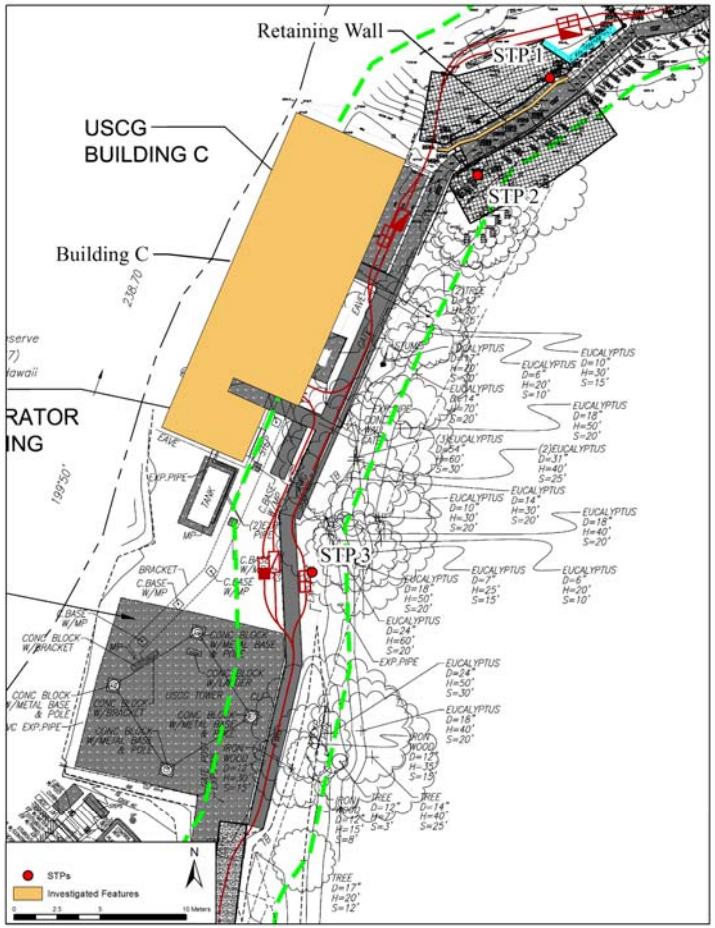

Figure 7. Location of the STPs, Building C, and stone retaining wall.

Photo 11. STP 1 at the completion of excavation; the arrow is pointing towards the black plastic that extends from the retaining wall.

Photo 12. STP 2 at the completion of excavation.

Photo 13. STP 3 at the completion of excavation; view northeast.

V. DISCUSSION AND RECOMMENDATIONS

The archaeological inventory survey of the 0.25 acre the Mauna Kapu Radio Facility resulted in the documentation of a single historic resource: Building C, a U.S. Army radio building built in 1943, and its associated concrete retaining wall built in 1945. Subsurface testing across the project area revealed culturally sterile cobbly silty clay colluvium overlying saprolitic bedrock. No subsurface cultural deposits were encountered and substantial grading and land alteration was observed across the project area.

The data generated by the field investigations informs on the project research questions.

Do any of the existing structures have historic significant, if so, are they eligible for listing on the Hawai'i Register of Historic Places? Building C, and its associated concrete retaining wall, is recommended as being eligible for listing on the State Register of Historic Places under Criteria a and d. Building C, originally U.S. Army Building 30, was built in 1943 as a receiver and transmitter station (Department of the Army 2008; Hull 1947). During WWII it handled inter-island communications connecting with telephone circuits and military teletype terminations. As such, it provides data relating to U.S. military communications during 1943-1945.

Is there evidence for traditional deposits? There is no evidence for traditional or early historical cultural deposits within the project area. The steeply-sloped landscape is not suitable for most habitation or agricultural activities, and the terrain has been heavily modified through grading and other land alterations to create level areas for building construction, beginning as early as 1943. Subsurface testing identified a culturally sterile cobbly silty clay colluvium overlying saprolitic bedrock.

SIGNIFICANCE EVALUATION

Building C and its concrete retaining wall are recommended as being eligible to be listed on the State Register of Historic Places under Hawaii HAR §13-284-6 Criteria a and d: the site relates to U.S. military activities during WWII, an event of national importance. The structure provides data on U.S. military communication and communication infrastructure during 1943-1945 and subsequent decades.

The retaining wall and concrete steps are modern constructions and are not significant historic structures.

PROJECT EFFECT

The project will involve the installation of four communication conduits along the exterior wall of Building C, with penetration of the conduit through the wall at approximately 10 ft above the exterior grade. The conduits will be placed side-by-side and will be suspended from the building with support hangers. Initially, two of the conduits will be fully installed, with the remaining two conduits capped at approximately 6 inches above grade; the latter conduit would be extended and enter the building at a later date, as needed, but are considered part of the present undertaking. Any damage to

the building's paint during construction will be repaired and the surface will be returned to the prior existing conditions.

Modifications to the building will be no different than what currently exists with cables penetrating the structure to service the telecommunications needs within the building. Consultation is currently underway with the SHPD Architecture Branch to determine what additional work, if any, needs to be done for a determination on possible effects to Building C.

RECOMMENDATIONS

No further mitigation is recommended for Building C or the remainder of the project area. The current recordation is recommended as adequate documentation.

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APPENDIX B

CULTURAL IMPACT ASSESSMENT

-FINAL-

Cultural Impact Assessment for ICSD Mauna Kapu Radio Facility Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, Hawai‘i

Tax Map Key (1) 9-2-05:021 portion

Prepared for:

Dept. of Accounting and General Services
Division of Public Works
State of Hawai‘i
Honolulu, Hawai‘i 96819

and

Belt Collins Hawaii LLC
2153 North King St., Suite 200
Honolulu, HI 96819-4554

Under Contract to:

International Archaeological Research Institute, Inc.
2081 Young Street
Honolulu, HI 96826

DECEMBER 2013

— Draft—

CULTURAL IMPACT ASSESSMENT FOR THE ICSD MAUNA KAPU RADIO FACILITY HONOULIULI AHUPUA‘A, ‘EWA DISTRICT, O‘AHU, HAWAI‘I

TMK (1) 9-2-005:021 portion

by

Maria E. “Kaimi” Orr, M.A.
Kaimipono Consulting Services, LLC

Prepared for

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December 2013

Cover
Photo 1. On peak of Mauna Kapu
(All photos were taken by author unless otherwise cited)

EXECUTIVE SUMMARY

This Cultural Impact Assessment (CIA) is in response to a request from International Archaeological Research Institute, Inc. (IARII) for ICSD Mauna Kapu Radio Facility, Honouliuli Ahupua‘a,‘Ewa District, O‘ahu. This study is part of a larger project that includes an Archaeological Assessment (AA) conducted by IARII. The AA and CIA will be incorporated into an Environmental Assessment (EA) prepared by Belt Collins Hawaii LLC in compliance with federal and state requirements to identify and evaluate possible cultural impacts to cultural resources, cultural practices and access to resources and/or practices in advance of construction activities for the ICSD Mauna Kapu Radio Facility project.

The ICSD Mauna Kapu Radio Facility project will include trenching; installing several electrical conduits starting from the existing utility pole on Pālehua Road extending up to the ICSD building and USCG/Army Shed; constructing retaining walls to accommodate grade changes; grading the backslope; installing handholes; extending concrete steps over the ductline; and installing a new HECO meter. The project will also include maintenance and upgrades to existing buildings.

The project area is on the slope of Mauna Kapu, a 2,776 foot summit on the northern section of Honouliuli Ahupua‘a. Its name is considered by some to mean ‘sacred mountain’ and would have been reserved for the gods and high chiefs.

This CIA is in accordance with the State of Hawaii Environmental Council *Guidelines for Assessing Cultural Impacts* [1997] and in compliance with Act 50 SLH 2000 (HB 28 H.D.1) as it amends the State of Hawai`i Environmental Impact Statement law [Chapter 343, HRS] to include “effects on the cultural practices of the community and State. [It] also amends the definition of ‘significant effect’ to include adverse effects on cultural practices.” The *level of effort* for this CIA included ethnographic research (one formal oral history interview) and analysis, a review of relevant reports, cultural literature research and a CIA report.

The project area has been heavily modified by the past construction of several buildings, towers for antenna arrays, walkways, concrete steps and chain-link fences. Therefore, the planned renovations would have no direct impact to cultural resources or cultural practices. Mitigation will not be necessary. However, there will likely be a temporary impact to accessing trails and cultural practices while construction activities are carried out.

ACKNOWLEDGEMENTS

Without the ethnographic consultants this Cultural Impact Assessment could not have been done, therefore **Mahalo Nui Loa** goes out to Uncle Shad Kane who is a very well-known cultural practitioner from this '*āina*, whose expertise and *mana'o* are always seeked out. Uncle Shad is the 'Ewa District representative for the State *Aha Moku* Council.

Big *mahalo* for the site visit opportunity.

Also mahalo to Se Ah Kee for transcribing in a timely manner; and J. Orr for her contributions.

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INTRODUCTION

This Cultural Impact Assessment (CIA) is in response to a request from International Archaeological Research Institute, Inc. (IARII) for the ICSD Mauna Kapu Radio Facility, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu (TMK: (1) 9-2-05:021 portion). This study is part of a larger project that includes an Archaeological Assessment (AA) conducted by IARII. The AA and CIA will be incorporated into an Environmental Assessment (EA) prepared by Belt Collins Hawaii LLC in compliance with federal and state requirements to identify and evaluate possible cultural impacts to cultural resources, cultural practices and access to resources and/or practices in advance of construction activities for the Mauna Kapu ICSD Radio Facility project.

This CIA is in accordance with the State of Hawaii Environmental Council *Guidelines for Assessing Cultural Impacts* (1997) and in compliance with Act 50 SLH 2000 (HB 28 H.D.1) (Appendix A) as it amends the State of Hawai‘i Environmental Impact Statement law [Chapter 343, HRS] to include “effects on the cultural practices of the community and State. [It] also amends the definition of ‘significant effect’ to include adverse effects on cultural practices.” The following is from its Introduction*:*

> It is the policy of the State of Hawaii under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.
>
> Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

A Cultural Impact Assessment comprises gathering information about the project lands through interviews with knowledgeable individuals, and a study of applicable historical and cultural documents. The *Guidelines for Assessing Cultural Impacts* (Appendix B) recommend the following:

> The geographical extent of the inquiry should be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An *ahupua`a* is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the *ahupua`a* and the geographical extent of the study area should take into account those cultural practices.
>
> The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.
>
> The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man-made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

This report is organized into five parts or chapters. Chapter 1 describes the project area in terms of location, in the context of *ahupua'a* (traditional sub-district land unit), district and island, as well as a generalized description of the natural environment (e.g., geology, flora and fauna) and built environment (e.g., any current features). Chapter 2 explains the methods and constraints of this study. Chapter 3 summarizes a review of the historical and traditional (cultural) literature in the context of the general history of Hawai'i, the island of O'ahu, the traditional district or *moku* of 'Ewa and local histories of Honouliuli Ahupua'a. Chapter 4 presents the ethnographic analysis based on the supporting raw data (oral history transcripts) as it pertains to land and cultural resources and use in the project area and vicinity. It also includes background data of the ethnographic consultants. Chapter 5 summarizes the findings of this cultural impact study based on supporting data from Chapters 1 through 4 and presents a cultural impact assessment and recommendations.

The CIA scope-of-work (SOW) (Appendix C) was based on the Environmental Council *Guidelines for Assessing Cultural Impacts* (1997) and focuses on three cultural resource areas (traditional, historical and ethnographic), conducted on two levels: archival research (literature/document review) and ethnographic data (oral history). The tasks of the CIA include the flowing:

1. conduct historical and other culturally related documentary research;
2. identify individuals with knowledge of the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or *ahupua'a*; or with knowledge of the area potentially affected by the proposed action [e.g. past/current oral histories];
3. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
4. assess the impact of the proposed action on the cultural resources, practices and beliefs identified.

Traditional resources research entailed a review of Hawaiian *mo'olelo* (stories, legends or oral histories) of late 19th and early 20th century ethnographic works. Historic research focused on the literature compiled and included two past oral histories conducted in the 1970s. Ethnographic research focused on current interviews with individuals knowledgeable of the project area.

Construction activities associated with this project as stated in the project map (Figure 1) are as follows:

- trenching for conduits;
- installing several electrical conduits starting from the existing utility pole on Pālehua Road extending up to ICSD building and USCG/Army Shed;
- construct retaining walls to accommodate grade changes;
- grade the backslope;
- installing handholes;
- extending concrete steps over ductline; and
- installing a new HECO meter.

Project Location

The project area (Figure 2) is on the slope of Mauna Kapu (21.4039°N, 158.0976°W), a 2,776 foot peak of the Wai'anae Range, in the northern section of Honouliuli Ahupua'a (Figure 3), district or *moku* of 'Ewa. To the west of the Pu'u Mauna Kapu is the Nanakuli Forest Reserve, to the north is Pu'u Palikea (3,098′), to the northeast is Pālāwai Gulch, to the east Ka'aikukui Gulch and Royal Kunia complex off Kunia Road, and to the south is Pu'u Pālehua (Figure 4) and Makakilo. Sources differ on the exact elevations of the various peaks. Access to Mauna Kapu is from Makakilo Drive and Umena Street to a locked gate at Pālehua Road; the project site is at the end of Pālehua Road.

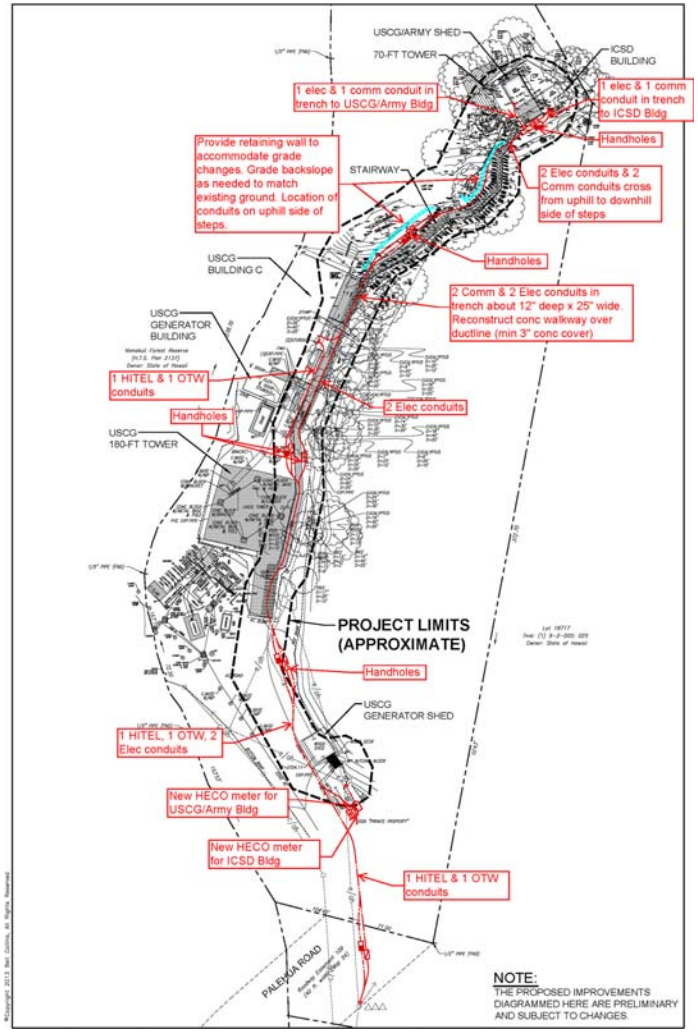


Figure 1. Mauna Kapu ICSD Radio Facility Site Map (from BCH 2013).

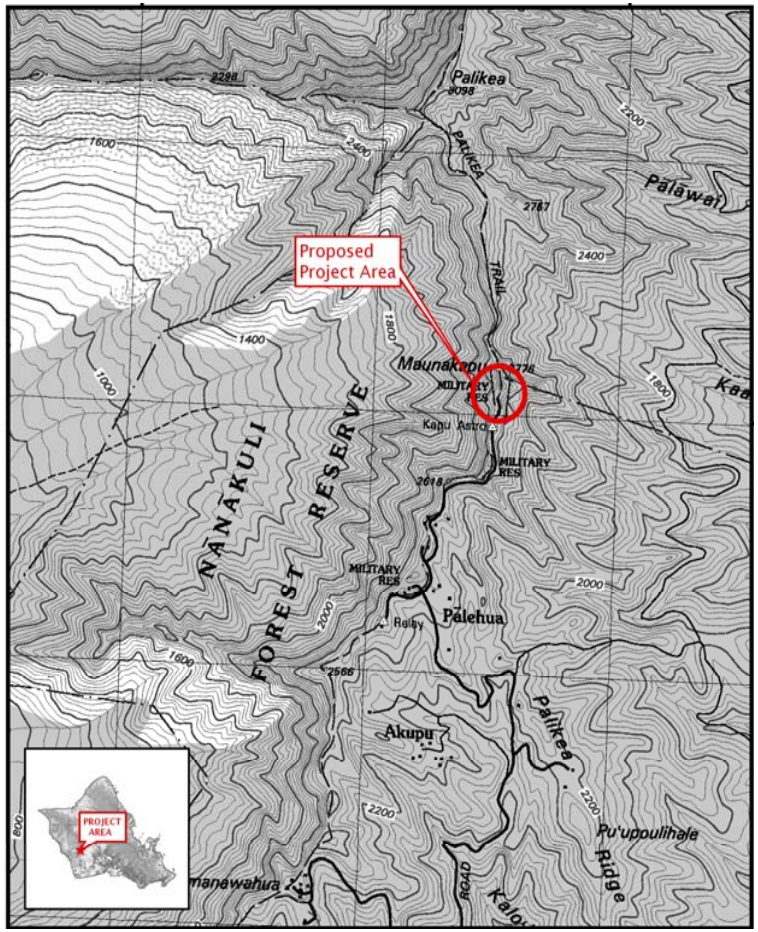


Figure 2. Mauna Kapu ICSD Radio Facility Project Area (from Sholin et al. 2010-Fig 1).

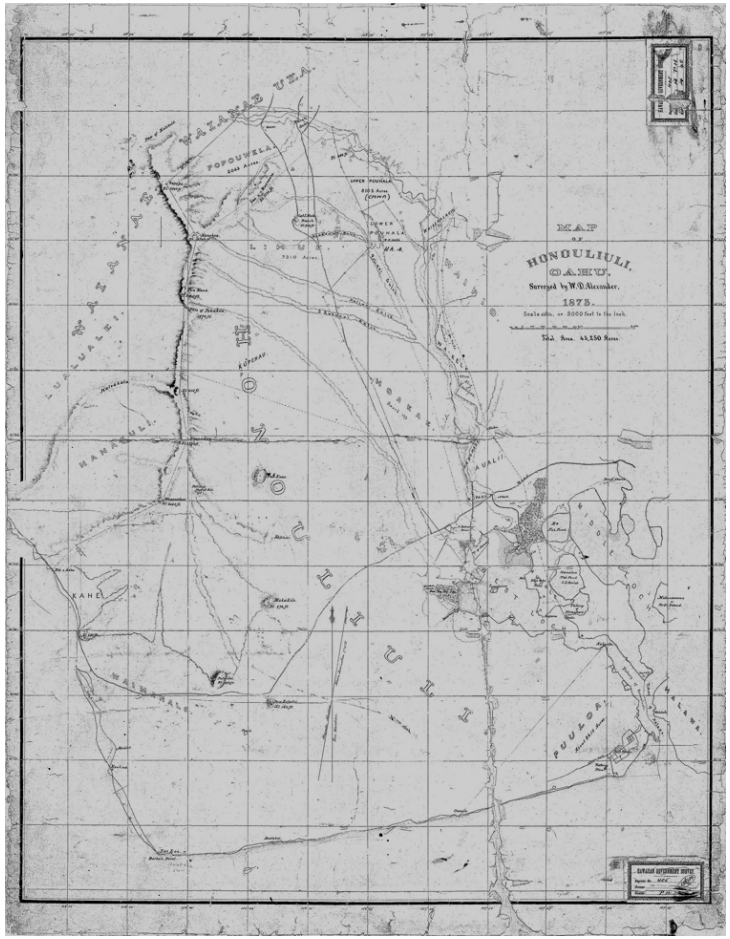


Figure 3. 1873 map of Honouliuli Ahupua‘a by W.D. Alexander No. 405 (from Maly and Maly 2012).

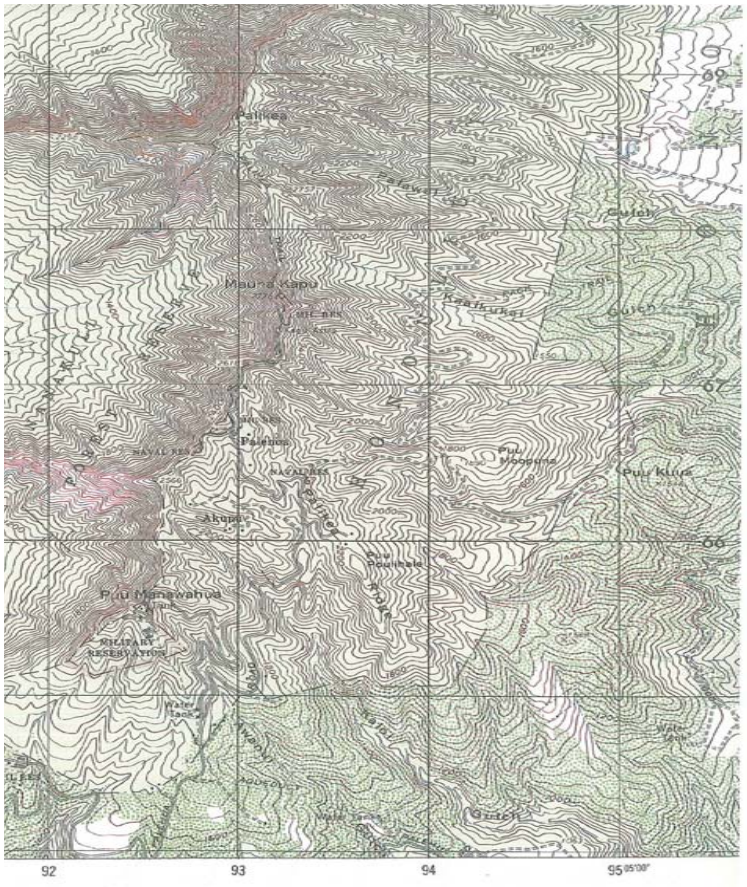


Figure 4. Location of Mauna Kapu in relation to nearby land features (USGS Topo Map/Schofield Quad 2013).

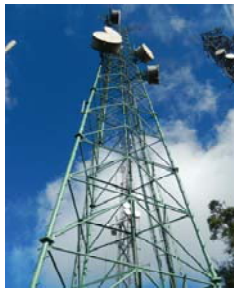
The following photographs are of the project area and vicinity.

Photo 2. Gate at beginning of Pālehua Road.

Photo 3. Pālehua Road to right.

Photo 4. End of Pālehua Road.

Photo 5. West direction.



Photos 6-8. First tower/antenna array at end of Pālehua Road.

Photos 9-11. Second tower/antenna array at end of Pālehua Road.

Photo 12. 1st and 2nd towers; Verizon building.

Photo 13. Third tower.

Photo 14. Structures, beginning of walkway.

Photo 15. Walkway to steps adjacent to USCG building.

Photo 16. Diesel fuel tank between structures.

Photo 17. End of walkway, beginning of steps.

Photos 18-20. Variety of steps up to Army and ICSD buildings.

Photo 21. Army and ICSD structures.

Photo 22. Army building.

Photo 23. Tower in rear.

Photo 24. Steps to left of ICSD.

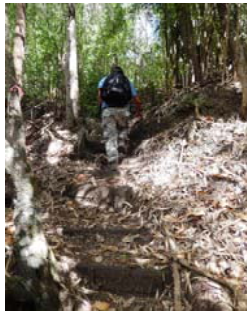


Photo 25. Steps above ICSD.

Physical Setting: Natural and Built Environment

The physical setting of the immediate project area is primarily exotic shrubs and trees (see tower photos above), although there are a few Polynesian-introduced plants such as ti (*Cordyline terminalis*), *'ohe* or bamboo and *maia* or banana. It is likely that the ti and banana were planted within the last fifty years. According to the on-site biologist, the bamboo and ferns are not endemic or indigenous varieties. However, there was one native plant at the entrance to the project area according to the biologist and one at the peak, above the project site according to the placard on the fence surrounding it.

Photo 26. Ti plants throughout project area.

Photo 27. Non-native bamboo in project area.

Photo 28. Banana at project site.

Photo 29. Non-native fern.

Photo 30. Unknown species.

Photo 31. Native plant at project site entrance.

Photo 32. Native plant above project boundary.

The project area is slightly lower than the peak of Mauna Kapu. Several structures including towers were constructed within the last 50-plus years, modifying the natural environment by leveling/grading and carving into the slope of the mountain.

Photo 33. Lower structures tucked into hillside.

Photo 34. Leveled lower section of project area.

The natural environment of the surrounding area includes sections of the Palikea Trail and the peak of Mauna Kapu and its incredible views. After ascending the steps beyond the ICSD structures and tower, there is a pathway that forks into two trails. The right trail leads down and up to the peak, while the left merges with the Palikea Trail.

Photo 35. Peak trail to right of tree trunk.

Photo 36. Downslope east of trail to peak.

Photo 37. View north of Palikea from Mauna Kapu.

Photo 38. View of Kawailoa windmills from Mauna Kapu.

Photo 39. North-easterly view of Kunia farms from Mauna Kapu.

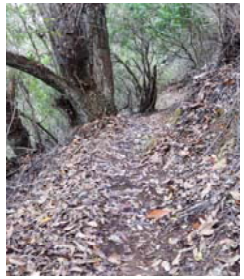
Photo 40. East view from Mauna Kapu.

Photo 41. North west view from Mauna Kapu.

Photo 42. West view from Mauna Kapu.

Photo 43. West view from Mauna Kapu.

Photo 44. West view from Mauna Kapu.



Photos 45-47. Sections of Palikea Trail on west slope of Pu‘u Mauna Kapu.

A summary of the Mauna Kapu soils from Sholin and Dye (2010:4) follows:

> The project location receives between 30 and 40 in. of rainfall per year [6]. The geology and soil composition consists of Pālehua lava flow basalt, overlain by a Tropohumults-Dystrandepts soil association on 30 to 90 percent slopes. This mixed soil association of three fully-formed soil classes: tropohumults, dystrandepts, and histosols. Tropohumults are well-drained, strongly acidic soils composed of reddish brown silty clay. It has strong structure through all *horizons,* terminating with ironstone pan or saprolitic bedrock. Dystrandepts are well-drained, acidic, dark-colored soils. Formed from volcanic ash and colluvium, dystrandepts have a high mineral content making it friable in the upper horizons and *massive* in lower horizons. Histosols are composed of accumulations of organic matter in small, wet positions in higher elevations.

The built environment of Mauna Kapu includes at least four towers, several wooden structures, two fuel tanks, other related paraphernalia, a walkway, several sets of steps, handrail, basalt retaining wall, chain-link fence, and meter boxes. The built environment of the vicinity (a significant distance from the project area) includes several radio and television masts, and (FCC registered) microwave, paging, and maritime coast and aviation ground towers installed along lower Pālehua, as well as several private residences and the Pālehua Ranch owned by Olson Trust.

Photo 48. Radio masts.

Photos 49 and 50. Towers along lower Pālehua Road.

Photo 51. Fenced-in cattle off lower Pālehua Road.

METHODS

This Cultural Impact Assessment was conducted October 2013 to November 2013. The study consisted of three phases: (1) cultural and historical archival literature review; (2) ethnographic survey (oral history interview - October), analysis of ethnographic data and (3) report writing. The personnel consisted of the principal investigator (ethnographer) who has a master's degree in Anthropology, with a graduate curriculum background in the archaeology track as well as anthropology theory, cultural resource management, ethnographic research methods, and public archaeology; an undergraduate curriculum background that included Hawaiian History, Hawaiian Language, Hawaiian Archaeology, Pacific Islands Religion, Pacific Islands Archaeology, Cultural Anthropology, as well as a core archaeology track, Geology, and Tropical Plant Botany; and ethnographic field experience that includes over 400 interviews to date.

This CIA is loosely based on *Grounded Theory,* a qualitative research approach in which "raw data" (transcripts and literature) are analyzed for concepts, categories and propositions. Categories were pre-selected as part of the overall research design. However, it is not always the case that these research categories are supported in the data. Categories were generated by forming general groupings such as "Land Resources and Use," "Water Resources and Use," and "Cultural Resources and Use." Conceptual labels or codes are generated by topic indicators (i.e., trails, cultural resources). In the *Grounded Theory* approach, theories about the social process are developed from the data analysis and interpretation process (Haig 1995; Pandit 1995). This step was not part of this cultural impact assessment as the research sample was too small.

The level of effort for this study included an archival research literature review and an ethnographic review and analysis (one formal oral history). Primary source material included genealogies, oral history and other studies and reports. Secondary source material included translations of 19th century ethnographic works, historical texts, indexes, various reports and Hawaiian language resources (i.e., proverbs, place names and dictionary).

The selection of the ethnographic consultant is based on the following criteria:

- Had/has Ties to Project Location
- Known Hawaiian Cultural Resource Person
- Known Hawaiian Traditional Practitioner
- Referred By Another Cultural Practitioner

The formal interview process included a brief verbal overview of the study. Then the ethnographic consultant was provided with a consent or 'agreement to participate' form to review and sign (Appendix D). An ethnographic research instrument (see Appendix E) was designed to facilitate the interview; a semi-structured and open-ended method of questioning based on the person's response ('talk-story' style). The interview was conducted at the convenience (date, place and time) of the consultant. The interview was conducted using a cassette tape recorder. The interviewee was allowed to choose where he wanted to have his interview conducted. Notes were also taken, but more attention was given to listening intently to the consultant. A *makana* or gift was given to the ethnographic consultant in keeping with traditional reciprocal protocol.

In the transcribing-editing process the taped interview was transcribed by a hired transcriber and edited by the ethnographic investigator. The consultant was emailed an explanation of the transcript review process, along with the interview transcript, and a 'release of information' form. This process allows for corrections (i.e., spelling of names, places), as well as a chance to delete any part of the information if so desired or to make any stipulations if desired. The consultant was also informed of the two-week time limit for their review after which it will be assumed that the raw data can be selectively used.

The ethnographic analysis process followed a more traditional method, as a qualitative analysis software program was not necessary. The interview was manually coded for research thematic indicators or categories (i.e., personal information; land resources and uses; site information-traditional and/or historical; and anecdotal stories). For the purpose of this CIA, it was also not necessary to go beyond the first level of content and thematic analysis. However, sub-themes or sub-categories were developed from the content or threads of each interview (e.g., land resources; cultural resources).

The Summary of Findings section is based on both archival and ethnographic data: Summary of Significant People and Events (e.g., Legendary Entities, *Ali'i Nui* or high chiefs), Summary of Historic People and Events, and Significant Practices Pre-Contact and Post-Contact. This section also includes 'Environmental Council Guidelines Criteria in Relation to Project Lands' and the Cultural Impact Assessment and recommendations or mitigation if any are made.

The interview was conducted at the Kalaeloa Heritage Park off of Coral Sea Road at request and convenience of the Interviewee. Due to a previous commitment, the ethnographic consultant was not able to participate in the September 5, 2013 site visit.

Project Research Constraints included the following:

- A staff person from Nature Conservancy suggested a member of the Campbell family who is an expert of the area. However, no contact information was provided and time constraints did not allow for more aggressive follow-up;
- Only one previous study has been done specifically for Mauna Kapu – none prior to tower construction activities; several studies were done for near-by areas (e.g. Palikea, Pālehua and Makaīwa);
- McAllister (1933) did a study of O'ahu sites; one site was said to be on Mauna Kapu, but was already destroyed and could not be relocated with any certainty.

CULTURAL AND HISTORICAL BACKGROUND REVIEW

The Cultural and Historical Background Review entailed a review of previous reports that included primary and secondary source literature. Examples of primary source material include maps, newspaper articles, genealogies, oral histories and other studies. Secondary source material includes translations of 19th century ethnographic works, historical texts, indexes, archaeological reports, internet research and Hawaiian language resources (i.e., proverbs, place names and Hawaiian language dictionary). A review of selected archival material is presented in this section.

The ethnographic works of the late 19th and early 20th centuries contribute a wealth of information that comprise the traditional literature - the *mo'olelo, oli,* and *mele* - as well as glimpses into snippets of time, and a part of the Hawaiian culture relatively forgotten. The genealogies handed down by oral tradition and later recorded for posterity, not only give a glimpse into the depth of the Hawaiian culture of old, they provide a permanent record of the links of notable Hawaiian family lines and ties to various lands. The *mo'olelo* or legends allow *ka po'e kahiko*, the people of old, the *kupuna* or ancestor*,* to come alive, as their personalities, loves, and struggles are revealed. The *oli* (chants) and the *mele* (songs) not only give clues about the past, special people and *wahi pana* or legendary places, they substantiate the magnitude of the language skills of *na kupuna kahiko*.

Po'e ku'auhau or genealogy *kahuna* (masters) were very important people in the days of old. They not only kept the genealogical histories of chiefs "but of *kahuna*, seers, land experts, diviners, and the ancestry of commoners and slaves…an expert genealogist was a favorite with a chief" (Kamakau 1992:242). During the time of 'Umi-a-Līloa, genealogies became *kapu* (restricted) to commoners, which is why there "were few who understood the art; but some genealogists survived to the time of Kamehameha I and even down to the arrival of the missionaries" (Kamakau 1992:242).

There are several chants from Hawai'i and other Polynesian islands referred to as migration chants that expand on the travels of ancient Polynesians and not only explain why they traveled from place to place, and where the traveled, they also give their genealogy illustrating how families are connected from one Polynesian island-nation to another. Examples are the chants and stories by Kamakau and Kepelino about Hawaii-loa a famous ancient navigator and discoverer of the islands named after him (PVS 2013).

Ruling chiefs of the various islands came from combinations of genealogies or branches from all the major islands. Malo (1971) wrote about the connection between the *maka'āinana* and the chiefs. "Commoners and *ali'i* were all descended from the same ancestor, Wākea and Papa" (Malo 1971:52). Surviving genealogies illustrate that the ruling families of each island were interrelated quite extensively. The chiefs of O'ahu, Kaua'i, Hawai'i, Maui and Moloka'i had one common ancestry. Families branched out, but conjoined several times in succeeding generations (Kamakau in McKinzie 1983: xxv). Not only were the chiefs or *ali'i* related to each other, they were also related to the commoners. In *Ruling Chiefs of Hawaii,* Kamakau (1992a:4) states that "there is no country person who did not have a chiefly ancestor." Genealogies were very important to the chiefs, because ranking was very important.

One could defend and/or prove their rank by knowing or having one's genealogist recite one's genealogy. "To the Hawaiians, genealogies were the indispensable proof of personal status. Chiefs traced their genealogies through the main lines of 'Ulu, Nana'ulu, and Pili, which all converged at Wākea and Papa (Barrère 1969:24). Two well-known genealogy chants are the *Kumuhonua* and the *Kumulipo,* but other genealogy chants have survived as well.

The *Kumuhonua* first published by Fornander in 1878 in *The Polynesian Race* Vol. I was based on information from Kamakau and Kepelino. Kumuhonua, the man, was of the Nana'ulu line, and the older

brother of Olopana and Mo‘ikeha (McKinzie 1986:14-15 Vol. I). Barrère (1969) explains that some of the *Kumuhonua* legends were recorded by Kamakau and Kepelino between the years 1865 and 1869, however, the ‘genealogy’ of the *Kumuhonua*, published by Fornander, was given to him “to provide credibility to the legends…this ‘genealogy’ (was) constructed from previously existing genealogies--the *Ololo* (*Kumuhonua*) and the *Paliku* (*Hulihonua*), which are found in the *Kumulipo* chant (see Beckwith 1951:230-234) and interpolations of their own invention” (Barrère 1969:1).

Feher (1969) asked several notable Hawaiian scholars to write passages in his *Kumulipo: Hawaiian Hymn of Creation-Visual Perspectives.* In the Introduction Momi Naughton states “The *Kumulipo* belongs to a category of sacred chants known as *pule ho'ola'a ali‘i,* or ‘prayer to sanctify the chief,’ which was recited to honor a new-born chief (Feher 1969:1). In her passage (Feher 1969:1), Edith McKinzie states:

> “The *Kumulipo* is a historical genealogical chant that was composed by the court historians of King Keaweikekahiali‘iokamoku of the island of Hawai‘i about 1700 AD in honor of his first born son Ka-lani-nui-‘I-a-mamao. This important chant honors his birth and shows the genealogical descent of both the *ali‘i* (chiefs) and the *maka'ainana* (commoners) from the gods, in particular Wakea.”

In a passage by Roger T. Ames, he corroborates this idea and states that “what is of particular humanistic interest is the way in which the *Kumulipo* as a repository of cultural authority served Hawaiian society in transmitting its cultural legacy and organizing its community. In doing so, it combines both a linear sense of temporal development and the richness of one particular moment in time” (Feher 1969:3).

Edith McKinzie (1983) completed the first volume of *Hawaiian Genealogies,* which were based on genealogy articles translated from 19th century Hawaiian newspapers such as *Ka Nonanona* and *Ka Nupepa Kuokoa* in the late 19th century and early 20th century. These articles were in response to a call to preserve the Hawaiian heritage. Some of the information came from Malo’s (1838) *Mo‘olelo Hawaii* (Hawaiian History), and in Fornander’s (1880), *The Polynesian Race* (Book I) (McKinzie 1983:1).

Youngblood (1992) found that he could draw on both Fornander and Beckwith’s translations of ‘The Kumulipo’ to sketch a socio-political history of Hawai`i (Youngblood, 1992:34). In his re-creation he found that stemming from Wākea and Papa are two major Hawaiian genealogies: the *Nana‘ulu* and the ‘*Ulu* [brothers]. The *Nana‘ulu* was the wellspring for the *ali‘i* of O‘ahu and Kaua‘i, while the *‘Ulu* line supplied the chiefs of Maui and Hawai‘i Island.

Using thirty years to account for one generation, McKinzie determined that Wākea was born ca AD 190; Umi-a-Līloa ca 1450; Keawekehahialiiokamoku ca 1650, Kalanihuiikupuapaikalanui Keoua ca 1710; and Kamehameha I ca 1740” (McKinzie 1983:12). Volume One of *Hawaiian Genealogies* was published in 1983 and Volume Two of *Hawaiian Genealogies* was published in 1984 (reprinted in 1986 and 1997) with information extracted from genealogical lists published in thirteen newspapers from 1858 to 1920. It complements genealogies found in other works, such as Fornander’s (1880) *An Account of the Polynesian Race* and David Malo’s (1903) *Hawaiian Antiquities* (McKinzie 1986: v).

The following excerpt is from Kamakau’s article in *Ka Nupepa Kuokoa* October 7, 1865, and was translated by McKinzie (1986:18-19). It illustrates some of the mid-19th century sentiment regarding genealogies:

> *I na maka'ainana, he mea wai wai ole, no ka mea ua papa ko lakou mau makua o hoohalikelike, a hoohanau keiki o ke kuaaina a pii aku i na li`i. Nolaila ia ao ole ia ai na keili a na makaainana, ma kahi makuakane a makuahine, a kupuna aku no…. Ia kakou i ka poe o keia wa, aole waiwai o keia mea he mooalii aole a kakou mau kuleana nui iloko. Aka, ma ko kakou noonoo iho he waiwai nui. Ua komo kakaou iloko, ua waiwai na li`i na kupuna; a ua waiwai pu kakou i koo kakou ike ana. No ka mea, ua kapu i ka makaainana aole e ike i keai mea. Aka, no ka pii ana i ka naauao a me ke akamai o na keiki a na makaainana; nolali, ua noa na wahi kapu, ua pii waleia. O ke koeana mai o na kupuna oia kahi waiwai.*
>
> To the commoners, a genealogy was of no value because their parents forbad (sic) it lest comparisons should occur and country children be born and rise up as chiefs. Therefore, the children of the commoners were not taught beyond father, mother, and perhaps grandparents…. To us, the people of this time, there is no value of this thing of a chiefly lineage; we have no great interest in it. But in our thoughts it is of great value. We have entered into discussion of it; the chiefs valued the chiefs and ancestors; and we also value our knowledge of it. Because it was forbidden to the commoners, they were not to know this. However, due to the rise of wisdom and skill of the children of the commoners, therefore, all of the ranking privileges were no longer restricted; it was only lifted. What remains of the ancestors is something of value.

Kamakau (in McKinzie 1983: xxv) also stated the following:

> In the genealogical line of *Nana`ulu*, it is believed that he is an ancestor of Tahiti and Borabora because in this genealogy down to Mo`ikeha [it is said he is from Tahiti] and married Hooipo (Hinauulua) in Kauai who bore their three children: Hookamalii, Haulanuiaiakea, and Kila. And Hookamalii became the chiefly ancestor for O‘ahu, Haulanuiaiakea for Kauai, and Kila for Hawaii.

According to genealogist Kekoolani (2010), his great-grandfather Solomon Lehuanui Kalaniomaiheuila Peleioholani (1844-1916) was a well-known genealogist and noted Hawaiian authority of the late 1800s to early 1900s. He was famous for his creation chant called *Hookumu-ka-lani Hookumu-ka-honua* which he wrote in longhand Hawaiian. His friend, newspaper editor Joseph Mokuohai Poepoe (1852-1913) translated it into English. Part of the chant includes a thanksgiving prayer first offered by the earliest “Hawaiians” who came from Alaska; and part of it names and describes the Arctic Ocean. In the typed English copy the various creation chants are first explained (Peleioholani/Poepoe 18_ _):

> There are many genealogies and traditions relating to the creation of the heavens and earth, and most important are: Kumulipo, Paliku, Lolo or Ololo, Puanue, and Kapohihi. But all of these genealogies and traditions are, more or less, contained in the Hookumu-ka-Honua or Kumuhonua Genealogy and Tradition.
>
> It has been known of late that David Malo’s genealogical work commences with Kumulipo as the source and foundation of his genealogy; but instead of his following up the generations following Lailai (w) in a straight line to Puanue, he left all that out, and then commences from Puanue, about 637 generations from Lailai: and in his later work, known as the *Hawaiian Antiquities* he chopped off all the generations from Puanue to Wakea, and established the Royal genealogy of Hawaii nei from Wakea, about ____ generations from Lailai.
>
> (1) Kumulipo – Kumu, origin, foundation, source: the trunk of a tree: lipo, blue, black, dark; hence the night, the darkness, the chaos. Some suppose it to be the nebular hypothesis of Creation. (2) Pali-ku – Pali, mountain, precipice: ku, vertical, standing upright. It is perhaps the cataclysmal theory of cosmogony. (3) Lolo (Ololo), brains; the oily meat of the coconut. This bears out the idea that matter in its primordial condition was a state of vapor. (4) Puanue – the rainbow. (5) Kapohihi – branching out of night or chaos.

The following tables start with the genealogical line called *Kumu-Honua* which descends to the *Nanaulu* line - the ancestral chiefs of O‘ahu and Kaua‘i - from Nana‘ulu down to Lā‘ielohelohe (McKinzie 1983:13). Kamakau (1991) says that Nana‘ulu to ‘Olopana are the ancestors of Kahiki (Tahiti) and Nu‘uhiwa (Marquesas) (Kamakau 1991:79). (Note: macrons may not be used because McKinzie did not use them.) The majority of the sources come from McKinzie (1983 and 1986); Kamakau (1991); Peleioholani (2011) and Kekoolani (2010).

Table 1a. Annotated Genealogy of O‘ahu Chiefs

Kāne (male)	**Wahine (Female)**	**Keiki (offspring)**
Kumu-Honua	Haloiho	Ahukai (k)
"	"	Kane-a-Kumuhonua
"	"	Kanaloa-a-Kumuhonua
Ahukai	Holehana	Kapili
Kapili	Alonainai	Kawakupua
Kawakupua	Heleaeiluna	Kawakahiko
Kawakahiko	Kahohaia	Kahikolupa
Kahikolupa	Lukaua	Kahikoleikau
Kahikoleikau	Kupomakaikaelene	Kahikoleiulu
Kahikoleiulu	Kanemakaikaelene	Kahikoleihonua
Kahikoleihonua	Haakookeau	Haakoakoalaulani
Haakoakoalaulani	Kaneiakoakanioe	Kupo
Kupo	Lanikupo	Nahaeikekua
Nahaekekua	Hanailuna	Keakenui
Keakenui	Laheamanu	Kahianahinakii-Akea
Kahianahinakii-Akea	Luanahinakiipapa	Koluanahinakii
Koluanahinakii	Hanahina	Limanahinakii
Limanahinakii	Onohinakii	Hikiuanahina
Hikiuanahina	Waluanahina	Iwahinakiiakea
Iwahinakiiakea	Lohanakiipapa	Welaahilaninui
Welaahilaninui	Owe	Kahiko Laumea (I) (Kahiko)
Kahiko Laumea (I) (Kahiko)	Kupulanakehau	Wākea (Nu‘uanu, O‘ahu)
Kukalaniehu	Kahaukauakoko	Papa (w) Nu‘uanu, O‘ahu
"	"	Kauakahi
"	"	Kainohiula
Wākea [lived in Waolani, Nu`uanu]	Papa (Papahanaumoku) (Haumea)	Kaalewalewa
"	"	Hoohokukalani (w)
"	"	Laukapalili
"	"	Haloa I (k) [stillborn]
Wākea	Hoohokukalani (daughter)	Haloa II (k)
Haloa II	Hinaaihoouluae (Hinamanoluae)	Waia (k)
"	"	Huhune (w)
Waia (sibs)	Huhune	Hananaloa (Hinanalo) (k)
"	"	Hauiki (Haunu'u) (w)
Hananaloa/Hinanalo (sibs)	Hauiki/Haunu`u	Haulani (w)
"	"	Nanakehili (k)
Nanakehili	Haulani	Waia-loa (Wailea, Manaku) (k)
"	"	Hikawaakaunu (Hikawaopuaianea)
Waialoa (sibs)	Hikawaakaunu	Kio (k)
"	"	Kamuoleilani (Kamole) (w)
Kio (sibs)	Kamuoleilani	Ole (k)
"	"	Haihailauahea (w)
Ole (sibs)	Haihailauahea	Kahiko Luamea (II) (k)
"	"	Pupue (w)
[Wikipedia has it slightly different from McKinzie who has Pupue m Kamahele – they have Manuka (k), then Manuka m Hikohaale and they have Kahiko (k) who m Kaea and they have Luanuu…the rest is same]	[Wikipedia has another Kahiko son of Manuka & Hikohaale who m Kaea and has Lukahakona (k)] who m Ko`ulamaikalani and they have Kaealuanui (Lu`anu`u) (k)]	Wikipedia’s information comes from various genealogies…most prolific is from well-known genealogist S. K. Peleioholani.

Kahiko Luamea (II) (sibs)	Pupue	Kawaamaukele (w)
Kaealuanui (Lu'anu'u)	Kawaamaukele	Hinakoula (w)
"	"	Kukū (Kū) (k)
Kū (sibs)	Hinakoula	Nanaulu (Nana‘ulu) (k) [O‘ahu lines]
"	"	Ulu ('Ulu) (k) [c. 415AD]
"	"	Kapumaleolani(Kapomaleolani) w
Ulu (‘Ulu)	Kapunuu	Kapulani (Kapulani-a-Ulu) (w)
"	"	Nana (k)
Ulu (‘Ulu)	Kaulani I	Nanaele (Nanaie) (k) [c. 440AD]
Nanaulu (sibs)	Kapumaleolani (Kapomaleolani)	Kahauomokuleia (w) [c. 444AD]
Nanaulu	Ulukou	Nana-mea (k) [13 gen→Maweke]
Nanamea	Puia	Pehekeula (k)
Pehekeula	Uluae	Pehekenana (k)
Pehekenana	Nanahapa	Nanamua (k)
Nanamua	Nanahope	Nanakeauhaku (k)
Nanakeauhaku	Elehu	Keaoa (k)
Keaoa	Waohala	Hekumu (k)
Hekumu	Kumukoa	Umalei (k)
Umalei	Umaumanana	Kalai (k)
Kalai	Laikapa	Malelewaa (k)
Malelewaa	Pililohai	Hopoe (k)
Hopoe	Hauananaia	Makalawena (k)
Makalaawena	Koihouhoua	Lelehooma (k)
Lelehooma	Hapuu	Kekupahaikala (k)
Kekupahaikala	Maihikea	Maweke → O‘ahu /Kaua‘i/Ni‘ihau
Maweke (Ruling Chief-O‘ahu)	Naiolaukea	Mulielealii (Kona, O‘ahu residence)
"	"	Keaunui (‘Ewa, Wai‘anae, Wai‘alua)
"	"	Kalehenui (Ko‘olau)
Mulielealii (O‘ahu Ruling Chief)	Wehelani	Kumuhonua II (k) [O‘ahu chiefs]
"	"	Olopana (k) (Waipio Valley)
"	"	Moikeha (k) (Kaua‘i)
"	"	Hainakolo (w) (Kuaihelani)
	KUMUHONUA II RULING CHIEFS Term Ali‘i Aimoku first used:	
Kumuhonua II - 1st Ali‘i Aimoku of O‘ahu; 1s[t] cousin to Laakona of ‘Ewa, Nuakea-queen consort of Moloka‘i; Moi, kaula/Moloka‘i; and high chiefess of Ko‘olau, Hinakaimauliawa	unkn	Elepuukahonua (k)
"	"	Molohaia (k)
"	"	Kahakuokane (k)
"	"	Kukawaieakane (k)
Elepuukahonua (k) - 2nd Ali‘i Aimoku [Cousin Haulanuiaiakea, Kauai king]	?	?
Hikilena	Olepuukahonua	Kahokupohakano
Kahokupohakano - 3rd Ali‘i Aimoku	Kumana	Nawele
Nawele - 4th Ali‘i Aimoku of O‘ahu	Kalanimoeikawaikai	Lakona (‘Ewa, Wai‘anae, Waialua)
Lakona - 5th Ali‘i Aimoku of O‘ahu [Ruled ‘Ewa/Waianae/Waialua moku; his cousins Maelo ruled Kona, O‘ahu and Kaulaulaokalani ruled Ko‘olau]	Alaikauakoko (also wf of Kanipau) [Kanipau-4th Ali‘i Aimoku of Hawai‘i Is-Pili line-usurped…he went to Moloka‘i-his gds Kalapana later Mo‘i of HI Is]	Kapae-a-Lakona (k)
Kapae-a-Lakona (6th Ali‘i Aimoku)	Wehina	Haka (k) (resided Lihue/Ewa)

Haka-a-Kapae -7th Ali'i Aimoku [O'ahu chiefs revolted and killed Haka at his fortress near Waewae, near Līhu'e; they then elected Mā'ilikūkahi to rule O'ahu.]	Kapunawahine	Kapiko-a-Haka (k)
	END of Kumuhonua II Ruling Chiefs as Mā'ilikūkahi descended from Moikeha, brother of Kumuhonua II.	However… Haka's granddaughters connected the O'ahu - Kaua'i ohana. See below
Kapioko-a-Haka (son of Haka)	Ulakiokalani	Kaulala(w)→ Kanekapuakakuhihewa
"	"	Kauoi (w)
"	"	Kamiliahonui (w) →Kaumualii
Kalaniuli (Koolau chief)	Kaulala (granddaughter of Haka)	[started Kualii line of O'ahu chiefs]
Ilihiwalani [son of Kalanikuma-13th Ali'i Aimoku of Kaua'i and Kapoleikauila, descendant of Maweke/Kumuhonua line]	Kamiliahonui (gdau of Haka) [They are ancestors of Kaumuali'i, last king of Kaua'i]	Kukawaieakane (k) ('Ewa/Līhu'e)
	MOIKEHA LINE	
Moikeha (1st Ali'i Aimoku of Kaua'i) [Brother of Kumuhonua]	Hanauula	Hookamalii (k) Kona/'Ewa→Kahai →Mailikukahi→Kalona
"	"	Haulanuiakea (k) [He and brothers sailed to Kahiki to fetch La'a (McKinzie 1991:15)]
"	"	Kila (k)
Hookamalii	Keahiula	Kahai (k)
Kahai (grandson of Moikeha) [He sailed to Kahiki, Wawae, Upolu and Sawaii and brought back *'ulu* that was planted at Pu'uloa (McKinzie 1991:15)]	Kehenu/Keheau	Kuolono (k)
Kuolono	Kaneakaleleoi	Maelo (w)
Lauli-a-Laa	Maelo	Laulihewa (k)
Laulihewa	Akepamaikalani	Kahuoi (k)
Kahuoi	Pelea	Puaakahuoi (k)
Puaakahuoi	Nononui	Kukahiaililani (k)
Kukahiaililani (This contradicts Kamakau 1991)	Kokalola	Mā`ilikūkahi (k) [8th O'ahu Ali'i Nui] resided in Līhu'e, O'ahu
	NEW O'AHU REIGN MOIKEHA LINE (from Kauai)	
Mā`ilikūkahi - 8th Alii Aimoku Līhu'e, O'ahu, Born at Kūkaniloko birthstones and coronated at Kapukapuakea Heiau; from Maweke & Paumakua lines; raised at Wahiawā, Kanewai and Wai'alua, but later made Waikīkī his permanent residence; ended human sacrifices; Hilo and Maui chiefs raided O'ahu ('Ewa) during his time & were defeated in Kīpapa Gulch	Kanepukaea	Kalona-nui (k) [Līhu'e, O'ahu] [Born at Kūkaniloko]
"	"	Kalona-iki (k) [b/Kūkaniloko and considered to be a Lō-Ali'i chief, who were guardians of Kūkaniloko and lived at Līhu'e, now Schofield Barracks]
Kalona-nui	Kahalakaihuholua/Kaihuholua	Kalamakua [→ I ohana of Hilo; and Pi'ilani Ohana of Maui]
Kalona-iki - 9th Ali'i Aimoku-O'ahu	Kikenui-a-Ewa [←Lakona←Maweke]	Kamaleamaka (w)
"	"	Piliwale (k) O'ahu Mo'i-Waikīkī
"	"	Lali/Lō-Lale-o-Halona [Lō-Alii] (k)

	O'AHU - MAUI LINES CONNECT	
Lōlale-o-Halona (Ali'i-Līhu'e, O'ahu)	Keleanuinohoanaapiapi (Maui chiefess) Aunt of Pi'ilani, Mo'i of Maui	Kaholialale-o-Halona/Līhu'e
"	"	Luliwahine-a-lale-o-Halona/Līhu'e
"	"	Luli-kane (Halona/Līhu'e)
	[Kelea is sister of Kawaokaohele, Maui Mo`i - father of Pi`ilani]	[All three children were born at Kūkaniloko and were Lō-Alii]
Kalamakua (Waikīkī/Hālawa) [Son of Kalona-nui, nephew of Kalona-iki, cousin of Piliwale and LōLale. developed the extensive irrigation system that supported several hundred acres of taro fields and fishing at Waikīkī. This irrigation system changed the formerly wet-taro cultivating area of Waikīkī, Kapahulu, Mō'ili'ili & Mānoa. The increase of fishing was due to the development of fishponds, which along with the taro pondfields were irrigated by water drawn from the Mānoa and Palolo Valley streams and large springs in the area. He was also known to enjoy surfing, especially at Kahaloa near the mouth of the 'Apuakeahau Stream; high chief of Hālawa]	Keleanuinohoanaapiapi (niaupio) [former wife of LōLale-o-Halona, who was son of Kalona-iki. She was also noted for her surfing prowess.]	Laielohelohe (w) [wf of Pi'ilani/Maui] [Bethrothed to cousin Pi'ilani in her youth; they became the progenitors of the famous Maui line of ruling chiefs. She was half-sib of Kaholialale & Luliwahinealale keiki of Lō-Ali'i of Līhu'e, O'ahu] MORE O'AHU - MAUI CONNECTIONS
Kawaokaohele (Maui Mo'i)	Kepalaoa (O'ahu Chiefess)	Pi'ilani
Pi'ilani (Maui Mo'i)	Laielohelohe (O'ahu Chiefess)	Lono-a-Piilani [Maui Mo'i]
"	"	Piikea [m/Umi-a-Liloa-Hawaii Mo'i]
"	"	Kala'aiheana [given the title of Kihawahine, mo'o goddess of Maui]
"	"	Kiha-a-Piilani [O'ahu -Maui Alii]
Piliwale - 10th Ali'i Aimoku-O'ahu son of Kalona-iki of Līhu'e; brother of LōLale 1st husband of Kelea and uncle of their children	Paakanilea	Kūkaniloko (w) b/Kūkaniloko Sister of Kohipalaoa; cousin of Kaholialale-o-Halona, Luli-kāne and Luli-wahine
"	"	Kohepalaoa/Kohipalaoa (w)
Kaholialale-o-Halona [1st cousins] [s/Lō-Lale & Kelea of Maui]	Kohipalaoa	Kānehoalani (k) grandson of Kelea; grdf of Kākūihewa;
Luaia [Maui chief-gs/Kaka`alaneo; son of Kahekiliahumano; cousin of Pi'ilani]	Kūkaniloko - 11th Ali'i Aimoku-O'ahu 1st female Ali'i Aimoku of O'ahu; her daughter ruled after her	Kalai-Manuia (w) b/Kūkaniloko [childhood in Wahiawa mtns and youth/adult in Kalauao-res at Kukiiahu & Paaiau; She built many fish shrines and fish ponds of Kapaakea, Opu & Paaiau; She died at 91yrs; ruled 65 yrs]
"	"	Kauwahimakaweo (k)
Lupekapukeahomalii	Kalai-Manuia - 12th Ali'i Aimoku She ruled for a long time; built several fishponds especially in the Pearl Harbor area.	Ku-a-Manuia (k) (b/lived Waikīkī)
"	"	Kaihikapu-a-Manuia (k) (Waimanalo) [given Kalauao/Aiea/Hālawa/Moanalua]
"	"	Ha'o (k) (lived in Waikele/'Ewa) [given 'Ewa Beach/Waianae]
"	"	Kekela (w) lived Kalauao, given Wai'alua/Ko'olauloa; married nephew - son of Ha'o - ruled Wai'anae, Wai'alua, and Ko'olauloa

Ku-a-Manuia - 13th Aliʻi Aimoku [given Kona and Koolaupoko; greed and assault got him killed]	?	?
Kaihikapu-a-Manuia - 14th Aliʻi Ai Grew up in Waimanalo/Koʻolaupoko; built *loko* Kaihikapu & Lelepaua in Keʻehi; was jealous of bro Haʻo's wealth and killed him]	Kaʻūnuiakanehoalani (Koʻolau) [Grt-grd dau of Lō-Lale & Kelea; daughter of Lō-alii Kānehoalani]	Kākuhihewa (k) -b Kūkaniloko [He grew up in Waipiʻo, Waiʻawa & Mānana; royal res ʻEwa, Waikīkī & ʻAlele, Kailua]
Haʻo-killed by bro Kahikapu-a-Manuia	?	Kahaiaonuiakahuailana/Kaea-a-Kalona
Nā-pū-lānahu-mahiki	Kekela (aunt)	?
Kākūihewa* (15th Aliʻi Aimoku) [He was born at Kūkaniloko; taken to Hoʻolonopahu by gf Kānehoalani; & 48 chiefs e.g., Makohau, Ihukolo, Kaaumakua, Pakapakauana & sacred drums Opuku & Hawea; he grew up at Waipio, Waiawa & Mānana]	Kahaiaonuiakahuailana (Waiʻanae) aka Kaea-a-Kalona [She was dau of Napulanahumahiki, son of Haʻo and Aunt Kekela; with this union Koolauloa united with Waianae and Waialua]	Kanekapu-a-Kakuhihewa [when his father died Oʻahu was divided between the 3 eldest brothers]
"	"	Kaihikapu-a-Kakuihewa (k) [2nd son]
"	"	Makakailiilani (w)
"	Kaakaualani (dau of Laninui-a-Kaihupee, a descendant of the Kalehenui-a-Maweke branch and his wife Kauhiiliula-a-Piilani, a daughter of Piʻilani, the King of Maui.)	Kauakahinui-a-Kakuihewa (k)
"	Koaekea (unkn)	Kalehuapaikua (k)
"	Kahamaluihi (dau of Kaioe, a descendant of the Kumuhonua-a-Mulielealii branch of the Maweke line and Kawelo-Ehu, of the Kauaʻi branch descending from Ahukini-a-Laa, 4th Aliʻi Aimoku of Kauaʻi. Said to have become the wife of her stepson, Kakuhihewa's son, Kanekapu-a-Kākuhihewa)	Kumuhonua-a-Mulieleali
Kaihikapu-a-Kakuihewa Ruled Waikīkī & ʻEwa; during this time Kauhi-a-Kama Mauiʻ Moʻi invaded Waikīkī and was killed; he was offered at heiau Apuakehau	Ipuwaiaholani [Oʻahu /Hawaii] [Dau of Hoalani, brother of Kākuhihewa's wife and Kaua Kamakaohua, dau of Kohala chief]	Kauakahikuaanaauakane/kama (w)
"	Kapunawahine	Kauaupena (w)
Kawelo-kalanikala	Kauapena	Kuihewa-kauaupena (w)
Kauloaiwi	Kuihewa-kauaupena	Kuihewa-makawelo
Umi-a-Liloa	Kuihewa-makawelo	Papaikaniau (w) mother of Kekaulike
"	"	Kuimehewa
"	"	Uluehu (ancestor of Molokai and Lanai)
Iwikauikaua (Oʻahu /Hawaii Chief) (son of Makakaualii (k) & Kapukamola & grdson of Kukailani who was nephew of Keawenui Moi of Hawaii Island and father of Kaikilani (w) 17th aliʻi Aimoku of Hawaiʻi Island	Kauakahikuaanaauakane/kama (Oʻahu Chiefess - descendant of Kākūihewa of Oʻahu)	Kaneikauaiwilani (k) Kaneikaiwilani
" (cousins) [ancestor of Kalākaua & Liliʻuokalani]	Keakamahana (19th Hawaii Moʻi)	Keakealaniwahine (20th Hawaii Moʻi)
Kaneikauaiwilani (1/2 sibs)	Keakealaniwahine (Hawaii Island Moʻi)	Kalanikauleleaiwi (w) [She married several ruling chiefs and became progenitor of several ruling families on Hawaiʻi and Maui islands e.g., wife of Hawaiʻi Island Moʻi and ½ sib Keaweikekahialiiokamoku; grt-grdmf of Kamehameha I; she married Kaulahea II moʻi of Maui and had

		Kekuipoiwanui wife of Kekaulike-Maui Moʻi;
	SEE MIXED LINES BELOW	
Kanaloakaiwilewa	Keakealaniwahine (29th Hawaii Moi)	Keaweikekahialiiokamoku (21st Hawaiʻi Moʻi; ggf of Kamehameha I)
Kaneikauaiwilani (Oʻahu Aliʻi) (½ sibs)	"	Kalanikauleleiaiwi (w) (ggm of K-I)
Kaulaheanuiokamoku [Maui Moʻi]	Papaikaniau	Kekaulike (k) → Maui Moʻi
Kaulaheanuiokamoku [Maui Moʻi]	Kalanikauleleiaiwi	Kekuipoiwanui I (w) m ½ sib Kekaulike → Maui Dynasty
Keawe II [21st Hawaii Moʻi] (½ sibs) [progenitor of the House of Keawe]	"	Keʻeaumoku Nui (k) (Kona ch) → grdf of Kamehameha I
"	"	Kekelaokalani (w) →Kekuipoiwa II, mother of Kamehameha I
Kauauanui-a-Mahi (Kohala chief)	"	Alapai-nui (k) [22nd Hawaiʻi Moʻi]
"	"	Haae-a-Mahi (k) (Kohala Chief)
Lonoikahaupu	"	Keawepoepoe (k) [father of royal twins Kameeiamoku/.Kamanawa]
Keʻeaumoku Nui	Kamakaimoku	Keōua (k) → Kamehameha I
"	Kailakanoa	Kanekoa (k) → Kawananakoa
Haae-a-Mahi (k) (Kohala Chief) ½ sibs	Kekelaokalani	Kekuipoiwa II mother of Kamehameha I
	[After death of Kakuhihewa the Kingdom was divided into 3 districts and ruled by 3 eldest brothers; since Kanekapu, Oʻahu Aliʻi Aimoku ruled from Kailua, the ʻEwa & Waialua chiefs ruled West Oʻahu]	
Kanekapu-a-Kuhihewa - 16th Aliʻi Aimoku; ruled from Kailua; he is ancestor of Papaikaniau, mother of Kekaulike, Maui Moʻi]	Kalua-o-Hoohila (descendant of Haka's gd)	Kahoowahaokalani (k)
"	Kahamaluihi (step-mother)	NI
Kahoowahaokalani - 17th Aliʻi Aimoku. [Koolaupoko Chf, ruled from Kailua; mother descended from Haka of Oʻahu & Ilihiwalani of Kauaʻi; Maweke line]	Kawelolauhuki (Kauai chiefess)	Kauakahi-a-Kahoowaha (k)
Kauakahi-a-Kahoowaha - 18th Aliʻi Aimoku; he ruled from Kailua; introduced the *kapu-moe* to Oʻahu from his ohana on Kauaʻi-from Oʻahu it went to Maui-Kekaulike]	Mahulua	Kualiilanipipililanioakaiakunuiakealuan uuokuiialiikahalau (k) [born at Kalapawai, Kailua; raised in Kailua & Kualoa; sacred drums Opuku & Hawea used at birth ceremony]
Kūaliʻi - 19th Moi Oʻahu; (Kauaʻi) [Famous for his Law of Niaupio Kolowalu; Kualii defeated ohana Waialua army at Kalena on plains of Heleauau (Haleauau) and later defeated ohana army of Ewa at Malamanui and Paupauwela uniting Oʻahu again]	Kalanikahimakeialii (w) (Maui) [dau of sibs Kaulahea II & Kalaniomaiheuila, who connect to Kauai and Oʻahu lines; father of Kekuiapoiwanui I and Kekaulike who were parents of Kamehamehanui, Kahekili & Kalola and gp of Kalanikupule, Kiwalaʻō, and Liliha Kekuiapoiwanui]	Kapiohookalani (k) (Oʻahu Moʻi)
"	"aka" Kalanikahemakoalii	Peleioholani I (k) (b 1735) [He was given Kauai to rule while older brother ruled Oʻahu, but later ruled Oʻahu as well following death of nephew Kapio]
"	"	Kukuiaimakalani (w)

"	"	Kaionuilanilalahai (w)(Maui)(b 1733) [mother of Kahahana, last O'ahu Mo'i]
Kapiohookalani - 20thAlii Aimoku (son/mom) [after Kekaulike's death, Kapio invaded Moloka'i; he was defeated and slain by Alapa'inui, uncle of Maui Mo'i Kamehamehanui and Kahekili at Kawelo]	Kalanikahimakaialii (w) (Maui)	Kanahaokalani (k) (O'ahu Mo'i) [six when father died so Uncle Peleioholani took over and went to Maui to assist nephew Kauhiaimokuakama, Kekaulike's oldest son who waged war on younger brother Kamehamehanui]
Kanahaokalani - 21st Ali'i Aimoku aka Kahahaokalani [regent ruled - he was six years old; died at 7; he was descendant of Kaihikapu-a-Manuia]	NA	NA
Peleioholani I (21st Alii) (sibs) [Kualii made him *ali'i nui* of Kauai; co-ruled O'ahu as regent for nephew]	Halakii (Kauai Chiefess)	Kūmahana (k)
" (Uncle of Kauhiaimokuakama eldest son of Kekaulike, Mō'ī of Maui)	"	Keelaniihonuaiakama (w) [She was murdered on Moloka'i and avenged by her father who spared Kaiakea, his son-in-law of other dau]
"	"	Kaapuwai (w)
" (dau)	Kukuiaimakalani	Kalanipoo-a-Peleioholani (w)
" (sibs)	Lonokahikini	Keeaumoku-a-Peleioholani (k)
"	"	Kuwalu (w) m I (Ali'i of Hilo) wf of I
"	"	Kapueohoanoano (w)
Kumahana -22nd Mo'i (neph/aunt) [Just a youth as Mo'i; deposed 1773]	Lonokahikini [one version] Unknown [another version]	Kaneoneo-a-Peleioholani (k)
Kaiakea (Molokai Ali'i-Nui)	Kalanipoo-a-Peleioholani (w)	Kaakaupalalaka (w)
"	"	Kuluehu (k)
"	"	Kolokoli (k)
Kaneoneo (O'ahu Ali'i)	Kamakahelei [Kauai chiefess; dau of Kaapuwai-sister of Kumuhana]	Lelemahoalani (w)
" [died in an insurgency]	Kalanikauiokikilo (daughter of Maui Ali'i Aimoku Kamehameha-Nui & sib Kalolo…very, very high rank)	[She had four children]
'Elani ('Ewa Chief; Maweke-Lakona)	Kaionuilalahai (daughter of Kualii & related to Kahekili II)	Kahahana (k) O'ahu/Moloka'i; b Kukaniloko [nephew of Peleioholani; cousin of Kumahana; great-grandson of Kaulahea II; grandson of Kekaulike; nephew of Kehekili and raised in Kahekili's court]
Kahahana - 23rd Ali'i Aimoku-O'ahu [15 when voted in by O'ahu Council after Kumuhana; later tricked/slain by Uncle Kahekili; he "was killed at Maunakapu, as one descends to Moanalua" - last of Kuali'i line]	Kekuapo'iula (Maui) [Very beautiful] daughter of Kekaulike-Maui Moi; niece of Kehekili II; she and Kahahana were betrayed to Kahekili II by her brother Kekuamanoha, son of Kekaulike; nephew of Kahekili II]	?
	END OF O'AHU -MAUI RULE	
	BEGINNING OF RULE BY MAUI ALI'I	
Kahekili II – 24th Moi; 25th Mo'i of Maui (1/2 sibs)	Kauwahine (dau of Kekaulike)	Kalanikupule (k) Maui/O'ahu
Kaeokulani (26th Maui Mo'i) Kaua'i Mo'i (son of Kekaulike; 1/2 sib of Kahekili)	Kamakahelei (Queen of Kaua'i; granddaughter of Peleioholani)	Kaumuali`i (k) last Kaua'i Mo'i
Kalanikupule - 25th O'ahu Mo'i; (27th Maui Mo'i)	[Defeated/slain by Kamehameha I - possibly ½ sibs]	

Legends: k/*kāne*-male; w/*wahine*-female; wf/wife; dau/daughter; gd/granddaughter; gs/grandson; gf/grandfather; gm/grandmother; ggf/great-grandfather; ggd/great-granddaughter; sibs/siblings; gp/grandparents; OT/Over Thrown

*At the time Kākūihewa was the ruling chief of O'ahu, Kihapi'i and his son Kamalalawalu were chiefs of Maui; Keli'iokaloa (later killed by Kona's people), Keawenuiaumi, Kanaloakuaana (Kona, Kohala and Hamakua), and Umiokalani were ruling chiefs of Hawai'i Island (Kamakau in McKinzie 1986:13, 14). However, the families from each main island were all related as the genealogy of Kawaookekahuli illustrates, as written by her husband Samuel R. Keli'ihahaimoku. "The birth of the ancestors occurred through those of Molokai, Hawaii, and of Maui. The great-great-grandparents join together with those of O'ahu nui; and the great-great-grandparents were related to Kūhihewa" (McKinzie 1986:75). Keli'ihahaimoku continues (McKinzie 1986:75):

> We have partially withdrawn through a straight line in the history of the genealogical line, unbranched; and because the history of Kawaookekahuli (w) is extensive, what the researcher has partially presented are the individual alignments and O'ahu nui's great-great-grandparents on the side of Kawaookekahuli's father. This is what we now present; that there are those from Waianae, those from Oki Kupee, those from Wahiawā, of Kūkaniloko, and those of Mokuleia. The desire of the ancient period has passed away.

Table 1b. Annotated Genealogy of O'ahu Chiefs – House of Pili

	END OF RULE by MAUI ALI'I	
	RULE BY HAWAII-MAUI LINE	
	HOUSE OF PILI (KAMEHAMEHA)	
Keoua-kalani-kupua-i-kalani-nui (bro of Kalani'opu'u Hawai'i Is Mo'i)	Kekuiapoiwa II [dau of Kekelaokalani & Haae (k); niece of Alapa'inui Hawai'i Is Mo'i; niece of Kekaulike's ½ sib wife]	Kamehameha I
Kahekili (Maui Mo'i) [said to be biological father of K-I]	Kekuiapoiwa II (Hawaii Is chiefess)	Kamehameha I
Kalei'o-u'u/Kalani'opu'u (Hawai'i Is Moi; mom from O'ahu ; Brother of Keoua; uncle of Kamehameha I)	Kalola (Maui Chiefess) [dau of Kekaulike and Kekuiapoiwa I; sib of Kamehamehanui and Kahekili II]	Kiwala'ō (Hawai'i ruling chief) [cousin of Kamehameha I; grandson of Kekaulike; father of Keopuolani]
Keoua-kalani-kupua-i-kalani-nui (bro of Kalani'opu'u; father of Kamehameha I)	Kalola (Maui Chiefess) [younger sister of Kamehamehanui; older sister of Kahekili and Namahana; aunt of Ka'ahumanu and grandmother of Ke'ōpuolani]	Liliha Kekuiapoiwa III [gdau of Kekaulike; mother of Ke'ōpuolani]
Kiwala'ō (half sibs) [cousin of Kamehameha I]	Liliha Kekuiapoiwa III (Maui chiefess) [½ sib of Kamehameha I- they shared the same father]	Kalani-kau-i-Ka'alaneo/Ke'ōpu-o-lani
Ke'eaumoku Pāpa'iahiahi (Hawai'i chief)	Namahana Kaleleonalani (Maui Chfs) [widow of ½ sib Kamehamehanui-Maui)	John Adams Kuakini (k) (Hawai'i chief) Governor of Hawaii Island
"	"	Ka'ahumanu (fav wf of Kamehameha I)
"	"	George Cox Kahekili Ke'eaumoku II Governor of Maui
"	"	Kalākua (w) (Maui chiefess)
		Lydia Namahana Pai'ia
Paiea Kamehameha (nephew/aunt) [warrior youth]	Kānekapolei (wife of Kalaniopu'u – they were parents of twins Keoua Kuahuula and Keoua Peeale)	Pauli Ka'ōleiokū
Pauli Ka'ōleiokū [son of Kamehameha I]	Keouawahine	Kalani Pauahi ('fire out'…gunpowder explosion she narrowly escaped)
"	Kahailiopua Luahine	Laura Konia
Kala'imamalu (bro of Kamehameha I)	Kalākua Kaheiheimālie (Maui chiefess; sister of Ka'ahumanu and Namahana)	Miriam Auhea Kekāuluohi →mom of Lunalilo
Paiea Kamehameha	Kalola-a-Kumuko`a	NI
Kamehameha I (Hawaii Is chief-King of all islands except Kaua'i)	Ka`ahumanu (Maui/Hawai'i chiefess) [favorite wife]	NI
"	Keōpūolani (Maui chiefess-niaupio) descendant of Pi'ilani through mother	Liholiho (Kamehameha II)

	and father who had same mother-Kalola	
"	" (grdau of Kekaulike-Maui Moi)	Kauikeaouli (Kamehameha III)
"	"	Nahi'ena'ena
"	Peleuli-i-Kekela [dau of Kamanawa; gm of Kekauōnohi]	Kahoanoku Kina'u (k) father of Kekauōnohi wf of Liholiho)
"	Kalākua Kaheiheimālie (dau of Namahana Kaleleokalani; Maui chiefess; gd of Kekaulike; descendant of Pi'ilani)	Kamāmalu (later wf of Kamehameha II) (two sons died as infants)
"	"	Elizabeth Kina'u (hanai to Peleuli; wf of Kamehameha II)
"	Lydia Namahana Pi'ia (dau of Namahana Kaleleokalani; Gov of O'ahu)	NI
"	Kahakuha'akoi Wahinepio (Maui cfs; her father was son of Kekaulike; her mother Kamakahukilani was daughter of Kauhiaimokuakama-eldest son of Kekaulike; sister of Kalanimoku, Boki and Manono II and cousin of Keōpūolani; buried at Moku'ula)	NI
" (uncle/niece)	Miriam Auhea Kekāuluohi (dau of Kalākua & Kala'imamalu; Kuhina Nui; wf of K-II and Charles Kana'ina; mom of Lunalilo)	NI
"	Kekipipa'a (dau of Kame'eiamoku cousin of Kiwala'o; she was mother of High Chiefess Kapiolani)	
"	Manono II (sister of Kalanimoku, Boki & Kahakuha'akoi; gd of Kekaulike; wf of Keaoua Kekua-o-kalani-both died in Battle of Kuamo'o in favor of the *kapu* system)	NI
Liholiho (Kamehameha II) (1/2 sibs) descendant of Pi'ilani through mother	Kamāmalu (fav wife; dau of Kalākua/Kamehameha I)	NI
" (uncle/niece)	Kalani Pauahi [dau of Pauli; gd of K-I; mom of Princess Ruth Ke'elikōlani]	NI
" (1/2 sibs)	Elizabeth Kina'u (dau of Kalākua and Kamehameha I; Kuhina Nui after Ka'ahumanu; mother of two kings with another *kāne*)	NI
" (step-sister/cousin)	Miriam Auhea Kekāuluohi [dau of Kalākua; ½ sib of Kamāmalu and Kina'u; Gov of Kaua'i]	NI
″ (cousins)	Anna/Miriam Kekau'ōnohi (dau of Kahakuha'akoi & Kahō'anokū Kīna'u-the eldest son of Kamehameha I and wife Peleuli; Boki niece; ggd of Kekaulike; ggd of Kauhiaimokuakama)	NI
Charles Kana'ina (b/Napo'opo'o; descendant of Pi'ilani – Maui Mō'ī; House of Nobles-Privy Council; friend of Kamehameha III)	Miriam Auhea Kekāuluohi (dau of Kalākua & brother of Kamehameha I)	William Charles Lunalilo(k)
Kauikeaouli (sibs)	Nāhi'ena'ena	Infant died
Kauikeaouli	Kalama (mom sister of C. Kana'ina)	Two infants died/hanai several
" descendant of Pi'ilani through mother's line	Jane Lahilahi Young Ka'eo [dau John Young; grand niece of Kamehameha I; companion of Nahi'ena'ena]	Albert Kuka'ilimoku Kunuiakea; twin Keoua died as infant; hanai by Queen Kalama
Mataio Kekūanāo'a (punahele of Liholiho; Gov of O'ahu; Kuhina Nui after Kamāmalu - dau of Kalākua & Kamehameha I)	Kalehua	Pa'alua (k)

"	Kalani Pauahi (gd of Kamehameha I; wf of Liholiho)	Princess Ruth Ke'elikōlani
"	Elizabeth Kīna'u (dau of Kamehameha; wf of Liholiho; Kuhina Nui/K-III)	David Kamehameha
"	"	Moses Kukūāiwa
"	"	Lot Kapuāiwa (Kamehameha V)
"	"	Alexander Liholiho (Kamehameha IV)
"	"	Victoria Kamāmalu (Kuhina Nui)
Abner Pāki (Molokai/Maui ali'i; gs of Kamehamehanui Ailuau-Maui Moi - descendant of Pi'ilani)	Laura Konia (gd Kamehameha I)	Bernice Pauahi Bishop (named for aunt Queen Kalani Pauahi)
Alexander Liholiho (Kamehameha IV)	Emma Na'ea (dau of Fanny Young; gd of John Young; ggn of Kamehameha I; she and husband established Queen's Hospital)	Albert Edward Kauikeaouli (died at 4 years old)
Lot Kapuāiwa (Kamehameha V)	NA	NA (No heir)
William Charles Lunalilo [thru his father descendant of Pi'ilani & Kumunuiakapokii union]	NA	NA (No heir)
	END OF PILI/KAMEHAMEHA PI'ILANI LINE	
	HOUSE OF KALĀKAUA	
Caesar Kaluaiku Kapa'akea (Hana)	Analea Keohokālole (Hana/Hawaii lines)	Moses Kapa'akea
"	"	James Kaliokalani
"	"	David La'amea Kalākaua
"	"	Lydia Kamakeha (Lili'uokalani)
"	"	Kaiminaauao
"	"	Anna Ka'iulani
"	"	Kinini
"	"	Miriam Kekāuluohi Likelike
"	"	William Pitt Leleiohoku II
David Kalākaua	Esther Kapiolani (dau of Kuhio Kalanianaole and Kinoiki Kekaulike - niaupio dau of King Kaumualii of Kauai)	NI (Kapiolani later hanai sister Victoria Kekaulike's sons David Kawānanakoa and Jonah Kuhio Kalanianaole – heirs; she estb Kapiolani Maternity Home now Kapiolani Medical Center)
Liliu'okalani	John Owen Dominis	NI
Archibald Scott Cleghorn	Miriam Kekāuluohi Likelike	Victoria Ka'iulani Cleghorn (heir)
	GOVERNMENT OVERTHROWN 1893	

Legends: k/*kāne*-male; w/*wahine*-female; wf/wife; dau/daughter; gd/granddaughter; gs/grandson; gf/grandfather; gm/grandmother; ggf/great-grandfather; ggd/great-granddaughter; sibs/siblings; gp/grandparents; OT/Over Thrown

Table 2. Houses of Ali'i Nui of O'ahu

HOUSE	ALI'I NUI OF O`AHU
Maweke	Maweke · Mulielealii · Kumuhonua · Elepuukahonua · ? · Nawele · Lakona · Kapae · Haka (OT)
Paumakua-O'ahu	Mailikukahi · Kalonaiki · Piliwale · Kūkaniloko
Paumakua (Maui)	Kalaimanuia
Lupe-Kalehenui-Maweke	Kumanuia · Kaihikapuamanuia · Kakuhihewa · Kanekapukakuhihewa · Kahoowahaokalani · Kauakahikahoowaha · Kualii · Kapiohookalani · Kanahaokalani · Peleioholani · Kumahana (OT)
Laakona-Keaunui-Maweke	Kahahana (Last independent monarch)
Paumakua (Maui)	Kahekili II · Kalanikupule (sacrificed)
Pili	Kamehameha I · Kamehameha II · Kamehameha III · Kamehameha IV · Kamehameha V
Kanaina-Eia	Lunalilo
Paumakua-O'ahu	Kalākaua · Liliuokalani (OT)

Table 3. Lineage of Mikahela Kekauonohi - Ahupua'a of Honouliuli (Konohiki lands)

Kane (male)	**Wahine (female)**	**Keiki (offspring)**
Kaulaheanuiokamoku II (Maui Mō'ī)	Papaikaniau II (Hawaii Chfs)	Kekaulikeokalanikuihonoikamoku
"	"	Kaleiamaoli-o-Kalani (w)
"	Kalani-kau-lele-i-a-iwi (Hawaii Chfs)	Keku'iapoiwa Nui (I)
Kekaulike (cousins) (Maui Mō'ī, descendant of Pi'ilani and La'ielohelohe - O'ahu cfs)	Kahawalu (sis of Peleioholani *ali'i nui* of Kauai and O'ahu after death of his father Kuali'i)	Kauhiaimokuakama (at advise of kahuna challenged Kamehamehanui - younger brother - for ruling chief. After loss of thousands of lives on both sides a truce was called at Pu'unēnē, Maui)
"	Holau (dau of high chief Kawelo-a-Aila and chiefess Kauakahialii-a-Kaiwi, descendant of Lono-I-Kamakahiki)	Manuha'aipo (Queen of 'Ī'ao)
" (½ sibs)	Keku'iapoiwa Nui (royal wife)	Kamehameha Nui (Ruling Chief of Maui)
"	"	Kalola Pupuka-o-Honokawailani (w) (aka Kalola I/Kalola Kekuipoiwa)
"	"	Kahekilinui'ahuamanu II (Maui Mō'ī)
"	"	Ku-ho'oheihei-pahu
Kekaulike (uncle/niece) Kekuapo'iula	Ha'alo'u (Hawai'i/Maui - dau of Hawai'i Is *ali'i* Haae-a-Mahi - son of ali'i Kauauanui-a-Mahi and Kalani Kalele-a-Iwi - and Maui chiefess Kaleiamaoli-o-Kalani, full-sibling of Kekaulike; Ha'alo'u had two half sisters – Kamakaeheukuli and Kekuiapoiwa II – same father; Haae was the younger half-brother of Alapainui, who was Hawai'i Is king when Kamehameha I was born)	Na-mahana-i-kaleo-nalani
"	"	Kaeokulani
Kekaulike (Maui Mō'ī)	"	Ke-kua-manoha (father of Boki)
"	"	Kekuapo'iula (married Kahahana; betrayed by brother Kekuamanoha to uncle Kahekili II and killed)
"	"	Ahia
"	"	Nahulanui
"	"	Naaiakalani
"	"	Manuailehua
"(another genealogy has Keaweikekahialiiokamoku as the father of Kumukoa)	Kane-a-Lae/Hoakalani (Molokai - last independent Ruling Chiefess of Moloka'i/she was also wife of King Keawe II/Keawe Nui-a-Umi of Hawai'i Island: Fornander says she is from Kalona-iki family of O'ahu)	Kumuko'a (Moloka'i Chief) married Kahawalu, first wife and cousin of Kekaulike, ruling chief of Maui and had Kaikilani III)
Kekaulike (Fornander says Keawe was the father, not Kekaulike)	Kane-a-Lae/Hoakalani (Fornander says Kanaalae was the mother)	Ha'o (Moloka'i Chief)
" (Fornander says Keawe was the father, not Kekaulike)	" (Fornander says Kanaalae was the mother, not Hoakalani)	Awili (Moloka'i Chief)
" (Fornander says Keawe was the father, not Kekaulike)	" Fornander says Kanaalae was the mother, not Hoakalani)	Kaliloamoku (w) (Molokai Chiefess)
" (½ sibs)	Kahilipoilani	?
"	Kaupekamoku	Kaiana (famous Maui chief-went to China, died in Battle of Nu'uanu 1795)
"	?	Kauwahine
Kaulahea II (Maui Mō'ī, father of	Kalanikauleleiaiwi	Kekuiapoiwa Nui (w)

Kekaulike)		
Keaweikekahialiikamoku (½ sibs)	"	Kekelaokekeaokalani (w)
"	"	Kalanikeeaumoku (Alii-o-Kona)
Kauauanuiamahioloili, (Kauaua-a-Mahi) (Ali'i-o-Kohala)	"	Alapainui
Kauauanuiamahioloili, (Kauaua-a-Mahi) (Ali'i-o-Kohala)	"	Haaeokalani
Lonoikahaupu (Kauai mō'ī)	Kalanikauleleiaiwi	Keawepoepoe
Kauakahiakua-o-Lono (Maui)	Kekuiapoiwa Nui	Kekelaokalani
Keawepoepoe	Kanoena	Kamanawa (twins-uncles of K-I; said to be ½ brothers of Kahekili and hid his bones at Kaloko after his death in 1794)
"	"	Kameeiamoku (same as above; grandson Kamanawa II was the grandfather of Kalākaua and Lili'uokalani)
"	Kumaaiku	Ke'eaumoku Pāpa'iahiahi
Kamanawa (cousins) (½ cousin and uncle and step-father of Kamehameha I)	Kekelaokalani (dau of Kekuiapoiwa Nui and Kauakahiakua-o-Lono of Maui; aunt of Kamanawa)	Kaahou
"	"	Noukana
"	"	Amamalua
"	"	Peleuli (w)
"	Kekuiapoiwa II mom of Kamehameha I	Pi'ipi'i Kalanikaulihiwakama
Ke'eaumoku Pāpa'iahiahi (Hawai'i chief; son of Keawepoepoe and Kumaaiku; younger ½ brother of famous twins Kamanawa and Kameeiamoku, uncles of Kamehameha I; killed Keoua Kuahuula at Kawaihae in 1791; died of plague on O'ahu in 1804)	Namahana Kaleleonalani (Maui Chfs) [widow of ½ sib Kamehamehanui-Maui)	John Adams Kuakini (k) (Hawai'i chief) Governor of Hawai'i Island
"	"	Ka'ahumanu (fav wf of Kamehameha I)
"	"	George Cox Kahekili Ke'eaumoku II - Governor of Maui (aka Kahekili II)
"	"	Kalākua Kaheiheimaile (w)
"	"	Lydia Namahana Pai'ia
Kalaninu-I-amamao	Kamakaimoku (father from Waianae)	Kalaniopuu (also said to be fathered by Peleioholani, O'ahu ruling chief)
"	"	Keaouakalanikupuapaikalaninui
Keaoua-kalani-kupua-i-kalani-nui (Kohala high chief; bro of Kalani'opu'u Hawai'i Is Mo'i) (aka Keoua)	Kekuiapoiwa II [dau of Kekelaokalani & Haae (k); niece of Alapa'inui Hawai'i Is Mo'i; niece of Kekaulike's ½ sib wife]	Kamehameha I
"	"	Keliimaikai
Kahekili (Maui Mo'i) (said to be biological father of K-I)	Kekuiapoiwa II (Hawai'i Is chiefess)	Kamehameha I
"	Kauwahine (dau of Kekaulike)	Kalanikūpule (killed 1795 and sacrificed to Kamehameha I war god Kūkailimoku)
Kamehameha I (Hawai'i ali'i)	Peleuli-i-Kekela [dau of Kamanawa; gm of Kekauōnohi]	Kahoanuku Kina'u (aka Abner) father of Kekauōnohi wf of K-I and Liholiho)
"	Ka'ahumanu (Maui/Hawaii Chiefess)	NI
"	Kalākua Kaheiheimālie (dau of Namahana; Maui chiefess; gd of Kekaulike; descendant of Pi'ilani)	Elizabeth Kina'u (hanai to Peleuli; wf of Kamehameha II)

"	Keōpūolani (Maui/Hawaii Chiefess)	Liholiho
"	"	Kauikeaouli
"	"	Nahiʻenaʻena
Kekuamanoha (son of Kekaulike)	?	Kahakuhaʻakoi Wahine-pio
Kahoanuku Kinaʻu	Kahakuhaʻakoi Wahine-pio (daughter of Kekuamanoha of Maui)	Mikahela Kekauonohi (aka Anna M. Kekauonohi and Keahikuni-i-Kekauonohi)
Hoapili (Ulumaheihei; Kameeiamoku, the twin uncle was his father)	Kalākua (Maui Chiefess)	Kamamalu (fav wife of Liholiho – Kamehameha II – died in London)
Kalaʻimamalu	"	Miriam Auhea Kekāuluohi (wife of K–I, Kamehameha II and Charles Kanaʻina
Liholiho-Kamehameha II	Kamamalu	?
"	Kekauluohi (5th wife; later wife of Charles Kanaina; mom of Lunalilo)	NI
Mataio Kekuanaoʻa	Kinaʻu	Moses Kukuaiwa
"	"	Lot Kamehameha (K-V)
"	"	Alexander Liholiho (K-IV)
"	"	Victoria Kamamalu
Alexander Liholiho (K-IV)	Emma Naʻea	Albert Edward Kauikeaouli
Lot Kamehameha (K-V)	------	

Legends: k/kāne-male; w/wahine-female; wf/wife; dau/daughter; gd/granddaughter; gs/grandson; gf/grandfather; gm/grandmother; ggf/great-grandfather; ggd/great-granddaughter; sibs/siblings; gp/grandparents; OT/Over Thrown; fav/favorite.

Oʻahu Chiefs and Lineages

About the 12th century, Kapawa, the son of *aliʻi nui* Nanakaoko and his wife Kahihiokalani, was the first high *aliʻi* to be born at Kūkaniloko, located on the Waialua side of Kaukōnāhua Gulch in central Oʻahu. It was one of two sacred places in Hawaiʻi where *kapu* chiefesses went to give birth (McAllister 1933:134-135; Handy & Handy 1978:465; see also Fornander 1969 (1880): 20; Kamakau 1991 (1869): 136; Cordy 1996:596). *Mele* or *oli* informed about and honored the chiefs. The following *oli* from Kamakau (1991:136-137), is about Kapawa, the first child born at Kūkaniloko, the sacred birthing site of *aliʻi nui* on Oʻahu.

ʻ*O Kapawa, ʻke aliʻi o Waiʻalua*,	Kapawa, the chief of Waiʻalua,
I hanau i Kūkaniloko;	Was born at Kūkaniloko;
ʻ*O Wahiawā ke kahua*;	Wahiawā the site;
ʻ*O Līhuʻe ke ēwe*,	At Līhu`e the placenta,
ʻ*O Ka`ala ka piko*,	At Kaʻala the navel cord,
ʻ*O Kapukapuāea ka aʻa*,	At Kapukapuākea [heiau] the caul,
ʻ*O Kaiaka i Māeaea*;	[Heiau] of Kaiaka at Māeaea
Haʻule i Nukea i Wainakia.	He died at Nukea at Wainakia.
I ʻAʻaka Haleu,	Through [the surf of] ʻAʻaka at Haleu,
I ka laʻi malino o Hauola,	Through the calm stillness of Hauola,
Ke ʻliʻi o Kapawa ho ʻi no,	The chief Kapawa was taken,
Hoʻino i uka ka waihona,	Taken upland [in ʻIao] for laying away,
Hoʻino i ka pali kapu o nā ʻliʻi…	Taken to the sacred *pali* of the chiefs…
He kiaʻi Kalāhiki no Kakaʻe.	Kalāhiki is the "watchman" of [the burial Cave called Ka-pela-kapu-o-] Kakaʻe.
ʻ*O Heleipawa ke keiki a Kapawa*,	Heleipawa was the son of Kapawa,
He keiki aliʻi no Waiʻalua Oʻahu….	A chiefly child of Waiʻalua, Oʻahu…

Cordy (1998:9-10) explains the "rise of complex societies and settlement inland" that occurs in the 1300s with reference to ʻEwa:

> By the 1300s, the oral histories tell of the formation of district (*moku*) sized countries (Cordy 1996:597-598). The accounts are brief, but they suggest these were much larger countries. Around A. D. 1320-1340, the sons of the chief Maweke were in charge over three noted countries on Oʻahu. These were ʻEwa, Kona and Koʻolaupoko. Importantly for the history of Waiʻanae, the ʻEwa country included not only ʻEwa, but also Waiʻanae and Waiʻalua (Fornander 1960 (1880): 48-49, 68, 88 56). The senior line of Maweke, the Maweke-Kumuhonua line, controlled ʻEwa in these times. Some accounts suggested that Kumuhonua (Maweke's grandson) was the nominal ruler of all Oʻahu about 1340-1360. This ʻEwa country included Kūkaniloko (the sacred birthing area), and Līhuʻe became the country's important ruling center. Līhuʻe was located on the central plateau, roughly in the Schofield Barracks area. It is vital to realize that the ʻEwa country may not have been divided into districts at that time. This might account for the fact that Kūkaniloko is in Waiʻalua today and that Līhuʻe was mostly in today's Waiʻanae-uka and perhaps once lapped over into parts of Waiʻalua and ʻEwa. The borders may have come later.
>
> Another important point related to the rise of these larger countries is that more administrative levels of chiefs probably formed -- with a ruler and with local chiefs over the many communities of these district-based countries. More chiefs were present. In the Līhuʻe area the early famed ruling line belonged to the Lō Aliʻi chiefs. Anthropologists also believe that the political structure was still kin-based. The ruler would be the senior man in the dominant kin group of the country, and the local chiefs would be his kinsmen or the senior men in the dominant kin groups of their communities. The land-holding system is also still likely to have remained kin-based, with local groups controlling land. Countries may have had populations of 1,000-3,000 based on similar types of countries in Polynesia at European contact and other estimates.
>
> The oral histories also show that the chiefs began to be behaviorally isolated from commoners to a greater degree in the 1300s (Cordy 1996:597-598 56). The Aha Aliʻi council was established and restricted access to chiefly status. Certain types of temple worship supposedly became more restricted, with rulers and chiefs becoming the main participants. One would expect different levels of temples to develop in these years -- with local community temples and larger temples at the ruling centers (national temples).... However, temple sizes were certainly still much smaller that the sizes seen at European contact. No temples dated to this period have yet been documented for Oʻahu…. Construction of large national temples may have begun in the 1300s.

In Cordy's next period (AD 1400s-1500s) he summarizes the "Rise of the Oʻahu Kingdom" in the following (Cordy 1998:10-11):

> The oral histories indicate that Oʻahu was unified into one kingdom during the 1400s -- the Oʻahu Kingdom. Laʻakona, who was the ruler of ʻEwa, Waiʻanae, and Waiʻalua about 1420-1440, was apparently recognized as the overall ruler of Oʻahu by the other district based countries. In his line "descended the dignity of *Mōʻī* of Oʻahu" (Fornander 1969:89(1880); Cordy 1996:598 56). Laʻakona was the senior Maweke-Kumuhonua line. This line held power until the reign of Haka, 1520-1540. Haka portrayed as an evil ruler in the accounts -- "a stingy, rapacious, and ill-natured chief, who paid no regard to either his chiefs or his commoners" (Fornander 1969:88(1880); Kamakau 1991:53-54) -- was deposed by the Oʻahu chiefs. He retreated to the fortress of Waewae on the Kawiwi ridge between Wahiawā and Waiʻanae valleys, where he was captured and slain. Māʻilikūkahi of the junior Maweke-Moʻikeha line was made ruler in 1520-1540, and this line held power until the late 1700s.
>
> Up to the time of Haka, rulers of Oʻahu seem to have retained Līhuʻe as their royal center, and Kūkaniloko remained an important birthing site throughout Oʻahu's history. When Haka was removed, the ruling center was moved to Waikīkī in Kona district as this was the district long controlled by the Maweke-Moʻikeha line (Fornander 1969: 89; Kamakau 1991: 54, 56). But, Māʻilikūkahi still seems to have traveled to the Līhuʻe area and perhaps periodically resided there, for he was there when raiders from Hawaiʻi Island arrived (Kamakau 1991: 55-56). Māʻilikūkahi had been raised partly at Wahiawā (Kamakau 1991: 53 56). These raiders proceeded up from Pearl

> Harbor and were met by Māʻilikūkahi and defeated in battles running from the gulches to Waikakalaua to Kīpapa, just below Waiʻanae uka.
>
> With island unification, at least three administrative levels of chiefs should have been formed -- the ruler, high chiefs over one or more districts (or over multiple communities), and local chiefs over one or two communities. Social stratification, thus, became more complex. Each strata of chiefs would have been set off from the commoners and amongst themselves.

The Proto-Historic Period, A.D. 1650-1795, appears to be marked with both intensification and stress. Many wars and intermittent periods of peace took place during this period between intra-island chiefdoms and inter-island kingdoms; cousins challenged cousins, nephews rebelled against uncles, fathers battled sons - all living on various islands and some losing track that they were related (see Kamakau 1992a; 66-174).

In Cordy's (2000:31) reconstruction of Oʻahu Kingdoms, this was also a time of continued population growth: "these are the years when the Oʻahu Kingdom grew to the pinnacle of its power. Population grew, fields expanded, and more houses were built. These were the times of famed Oʻahu rulers: Kalaiʻmanuia (1600-1620), Kākūhihewa (1640-1660), Kūaliʻi (1720-1740), and Peleiʻōhōlani (1740-1779)." [Their *moʻolelo* follows below.]

Cordy (2000:37) explains what happened after Pele-iʻō-hōlani died on Oʻahu.

> Peleiʻōhōlani's son, Kumuhana, was not a capable ruler, and he was soon removed by the Oʻahu chiefs. Kumuhana returned to his family's lands on Kauai. Kahahana was chosen to be ruler. The son of a sister of Peleiʻōhōlani (Kaionuilalahai) and of a powerful ʻEwa high chief (ʻElani), Kahahana had been raised on Maui in the court of the Maui ruler, Kahekili [his uncle]. Kahekili rapidly outmaneuvered Kahahana. He tricked Kahahana into slaying his high priest, Kaʻopulupulu.

Kahekili's army invaded Oʻahu in 1783 and defeated Kahahana and his warriors. Kahahana and his wife fled and hid in the mountains for about two years, then were found and slain. This led to a revolt by ʻElani, his father and other Oʻahu chiefs. After several battles in ʻEwa, the rebels were defeated. Most of the remaining Oʻahu's high chiefs were slain in subsequent battles. Oʻahu was ruled by Maui for the next ten years (Cordy 2000: 38).

In 1795 Kamehameha and his Hawaiʻi Island warriors defeated the Maui rulers and their army in Nuʻuanu. Kalanikūpule, son of Kahekili and ruler of Oʻahu at the time, hid for over year, but was captured in ʻEwa and killed. Kamehameha offered his body in sacrifice to his god Kū-kaʻili-moku (Kamakau 1961:173). In 1803 Kamehameha settled on Oʻahu where he placed his chiefs over all the lands (Cordy 1998:17). He put the chiefs and their men from Hawaiʻi to work farming the lands of Oʻahu (Silverman 1987:41-47).

Moʻolelo

Legends, stories or moʻolelo are a great cultural resource as well as entertaining. Leib and Day (1979) state in their annotated bibliography of Hawaiian legends, that legends "are a kind of rough history." They noted Luomala's idea of the value of legend and myth in the serious study of a culture and her following quote. "To a specialist in mythology, a myth incident or episode is as objective a unit as an axe, and the differences and similarities of these units can be observed equally clearly and scientifically." Leib and Day also expressed concern about authenticity, and sometimes found it difficult to determine if a legend was a primary or secondary source. The following definitions of terminology, including the Hawaiian classification of prose tales--moʻolelo or kaʻao, come from their work (Leib and Day 1977: xii, 1):

Tradition	used to refer to that which is handed down orally in the way of folklore
Folklore	a rather inclusive term, covering the beliefs, proverbs, customs, and literature (both prose and poetry) of a people
Myth	a story of the doings of godlike beings
Legend	deals with human beings and used interchangeably with 'myth'… because the collectors and translators of the tales often failed to make the strict distinction
Kaʻao	"pure fiction"
Moʻolelo	deals with historical matters and somewhat didactic in purpose… included tales of the gods, as well as tales of historical personages… many have recurring patterns, plots, and types of characters.

The following excerpts are *moʻolelo* of chiefs and chiefesses who had connections to the ʻEwa *moku*. Kamakau (1991:53-56) provides the following:

> Moʻolelo of Māʻili-kūkahi. Puaʻa-a-Kahuoi was the father and Nononui the mother of Māʻili-kūkahi. He was born at Kūkaniloko and was named the *aliʻi kapu* for the land because of his dedication by the chiefs and priests and people; he had been vowed as such before the gods and had been anointed by the *kāhuna*. Chiefs born at Kūkaniloko were the *akua* of the land and were *aliʻi kapu* as well.
>
> Māʻili-kūkahi was raised at Wahiawā and at Kānewai and at Waiʻalua. When he was a little over twenty years of age, he was chosen by the chiefs to be the administrator of the government, the *mōʻī hoʻoponopono o ke aupuni*. Māʻili-kūkahi did not refuse them. Haka, a descendant of Kumuhonua, was the *aliʻi mōʻī* at the time.
>
> Haka was a bad chief and a stingy one. He did not take care of the chiefs and people. Because of this, the chiefs rebelled against him and fought with him. Haka took refuge in the *puʻu kaua* Waewae, the fortified hill at Kawiwi there in Līhuʻe…. The rebelling chiefs and warriors came up, crowding thickly in the stronghold. Haka was the only person killed….
>
> [Māʻili-kūkahi] was taken to the *heiau* of Kapukapu-ākea at Paʻalaʻa-kai in Waiʻalua and consecrated by the *kahuna* to rule as *mōʻī*. At the end of this ceremony, he was taken inside the *heiau* for the ceremony of the cutting of the navel cord, just as at the birth of a chief. After that another important ceremony, that of circumcision, *ʻoki poepoe* was reenacted. This was to cleanse and purify him; ʻUlonokū was the prayer. When this ceremony was over, he was installed as ruler of the island, *ke aliʻi o ka moku.* This chiefly ritual pertained to high chiefs from remote time – *mai ka pō mai.* It was not performed for rebellious chiefs, however, nor for warrior chiefs who took the kingdom by force, but for "chiefs of Pōkano" [chiefs of unblemished bloodlines from remote times (MKP)]. That is the manner in which Māʻili-kūkahi became ruler of the kingdom, and he ruled as *mōʻī* over the land.
>
> Soon after he became *mōʻi* the chiefs took Māʻili-kūkahi to Waikīkī to live; he was perhaps the first of the ruling chiefs to live there. Until then the chiefs had lived in Waiʻalua and ʻEwa. When the

kingdom passed to Mā‘ili-kūkahi, the land divisions were in a state of confusion; the *ahupua‘a,* the *kū* – [*‘ili kūpono*], the ‘*ili ‘āina*, the *mo‘o* ‘āina, the *pauku ‘āina,* and the *kīhāpai* were not clearly defined. Therefore Mā‘ili-kūkahi ordered the chiefs, *ali‘i,* the lesser chiefs, *kaukau ali‘i,* the warrior chiefs, *pu‘ali‘i,* and the overseers*, luna* to divide all of O‘ahu into *moku* and *ahupua‘a, ‘ili kūpono, ‘ili ‘āina,* and *mo‘o ‘āina.* There were six districts, *moku,* and six district chiefs, *ali‘i nui ‘ai moku*. Chiefs were assigned to the *ahupua‘a* – if it was a large *ahupua‘a,* a high chief, an *ali‘inui*, was assigned to it. Lesser chiefs, *kaukau ali‘i,* were placed over the *kūpono* lands, and warrior chiefs over *‘ili ‘āina.* Lands were given to the *maka‘āinana* all over O‘ahu.

Mā‘ili-kūkahi commanded the chiefs, *kahuna,* lesser chiefs, warrior chiefs, and people: “Cultivate the land, raise pigs and dogs and fowl, and take the produce for food. And you, chiefs of the land, do not steal from others or death will be the penalty. The chiefs are not to take from the *maka`āinana.* To plunder is to rebel; death will be the penalty. This is my command to the chiefs, the lesser chiefs, the warrior chiefs, the warriors, and the people; all the first-born sons, the *keiki makahiapo,* are to be mine to raise; they will be my sons, *ka‘u keiki,* and mine to take care of.”

The chiefs and people agreed with pleasure. Because of his exceedingly great concern for the prosperity of the kingdom, the chiefs and people never rebelled during his reign….

In the time of Mā‘ili-kūkahi, the land was full of people. From the brow, *lae,* of Kulihemo to the brow of Maunauna in ‘Ewa, from the brow of Maunauna to the brow of Pu‘ukua (Pu‘u Ku‘ua) the land was full of chiefs and people. From Kānewai to Halemano in Wai‘alua, from Halemano to Paupali, from Paupali to Hālawa in ‘Ewa the land was filled with chiefs and people. The chiefs kept themselves apart, *‘oko‘a,* and the commoners kept to the *makai* side of the land. From Halahape to O‘ahu-nui in Wai‘alua was the *kūlanakauhale* of Mā‘ili-kūkahi. There he raised the first-born sons of the *maka‘āinana* and of the chiefs. The chiefs and commoners loved him for his great *aloha* for their children…. Mā‘ili-kūkahi’s name became famous from the skies to the earth and from Hawai‘i to Kauai.

The chiefs of Hawai‘i and Maui heard of Mā‘ili-kūkahi and of the high state of his kingdom. Hilo, the son of Hilo-kapuhi, Hilo-a-Lu‘ukapu, and Punalu‘u, chiefs of Hawai‘i, and Luako‘a, a chief of Maui, decided to go and make war on Mā‘ili-kūkahi. They sailed and landed in Waikīkī, then went to Kapua‘ikāula in ‘Ewa with their canoes full of men. *Mauka* of Wai-kakala-ua gulch the battle was to begin. While they were going inland, they were cut off in the rear by the foster children of Mā‘ili-kūkahi. Of the chiefs of Hawai‘i and Maui, Punalu‘u was killed on the plain now called Punalu`u. Corpses that “paved” a gulch gave the name Kīpapa to that place. Some of the invaders reached as far as the sea at ‘Ewa and Waimano – the gulches were filled with their corpses. The heads of Hilo *ma* were cut off and taken to Honouliuli to a place now called Po‘o-hilo….

There was peace again on O‘ahu, with fear of the kingdom of Mā‘ili-kūkahi. It is said of this chief that he was a religious chief. The people all over O‘ahu lived religiously and in peace. It is said of Mā‘ili-kūkahi that he did not sacrifice men in the *heiau* and *luakini*. That was the way of Kūkaniloko chiefs. There were no sacrificial *heiau, po‘okanaka*, there.

Kamakau (1991:40) gives the following explanation about the Lō Ali‘i:

Lō Ali‘i. The chiefs of Līhu`e [uplands of ‘Ewa], Wahiawā, and Halemano [also Helemano] on O‘ahu were called *Lō ali‘i*. Because the chiefs at these places lived there continually and guarded their *kapu,* they were called *Lō ali`i* (from whom a “guaranteed” chief might be obtained, *loa‘a*). They were like gods, unseen, resembling men.

High Chief Kalamakua is described by Kamakau (1991:45):

Mo‘olelo of Kalamakua. Kalamakua-a-Kaipūhōlua was a good chief. He was noted for cultivating, and it was he who constructed the large pond fields Ke‘okea, Kūalulua, Kalāmanamana, and other

lo‘i of Waikīkī. He traveled about his chiefdom with his chiefs and household companions to cultivate the land and gave the produce to the commoners, the *maka‘āinana*. They loved him. Kelea-nui-noho-‘ana-‘api‘api became his wife when he was a mature man.

There are several legends of Keleanuinoho‘ana‘api‘api (Kelea), the sister of Kawaokaohele, aunt of Pi‘ilani, and mother of La‘ielohelohe, Pi‘ilani’s wife. Her story is one of intrigue, and romance, but also allegorizes the life and privileges of *ali‘i nui* women. It further illustrates the interrelationships between the *ali‘i nui* of the various islands. The following *mo‘olelo* is extracted from Fornander’s (1880:83-87, 90-91) “Story of Keleanui-Nohoanaapiapi.”

The Story of Kelea. The Story of Keleanui Nohoanaapiapi, sister of Kawaokaohele, begins in Hāna. The men of Chief LōLale of Līhu‘e, O‘ahu were searching for a wife for him…. They went first to Moloka`i, then to Lāna‘i, then sailed for Hāna intending to go to Hawai‘i. While at Hāna they heard that Kawaokaohele, the Moi of Maui was stopping with his court and his chiefs at Hamakuapoko, regulating the affairs of the country, and enjoying the cool breezes of that district, and the pleasures of surf-bathing, and that with him was his sister Kelea, the most beautiful woman on Maui, and the most accomplished surf-swimmer.

They thought of a plan to win her confidence by going surfing with her, and challenging her to a race. On her third time out, they captured her, and took her into a waiting canoe to O‘ahu. They took her to Chief LōLale of Līhu‘e, O‘ahu, son of O‘ahu Moi Kalona-iki, and brother of heir-apparent Piliwale. “And as she did not commit suicide, it may be inferred that she became reconciled to her lot and accepted him as her husband. And as no invasion of O‘ahu was ever attempted by Kawaokaohele, or vengeance exacted for the abduction of his sister, it is probable, though the legend says nothing about it, that the affair was diplomatically settled to the satisfaction of all parties.” [Lō-Lale was a Lō Ali‘i, who were guardians of the sacred birthing place of Kūkaniloko; chiefs born there were given first consideration if a new chief was needed to be replaced anywhere in the islands.]

Kelea and Lō-Lale had three children: Kaholi-a-Lale, who later married Kohipalaoa [Kohepalaoa], sister of Kūkaniloko, Mō‘ī of O‘ahu after her father Piliwale’s death; Luliwahine, and Lulikane. After several years and three children she informed Lo-Lale that she was leaving him, as was her privilege due to her high rank. He reluctantly gave his consent, but his grief was preserved in a chant. While traveling around O‘ahu, Kelea met Kalamakua, chief of Hālawa [and Waikīkī], son of Kalona-nui and cousin of Lō-Lale. They marry and have a daughter La‘ielohelohe, who in her youth was betrothed to her cousin Pi‘ilani, son of Kelea’s brother Kawaokaohele.

There are other versions of this *mo‘olelo*. The following is from Kamakau (1991:45-49) and corroborates Fornander’s (1880) “Story of Kelea.”

The Mo‘olelo of Kelea-nui-noho-‘ana-‘api‘api. Kelea was a beautiful chiefess with clear skin and sparkling eyes. Her hair fluttered like the wings of the *ka‘upu* bird, and so she was called Kelea-nui-noho-‘ana-‘api‘api, Great-Kelea-Who-Flutters. She was the sister of Kawaukaohele (Kawaokaohele), the *mō‘ī* of Maui. Surfing was her greatest pleasure. She lived at Hamakuapoko and Kekaha and at Wailuku, surf riding with all the chiefs.

When Lō Lale was the chief of Līhu‘e on O‘ahu, he sent some chiefs on a search for a wife for himself. The canoe expedition in search of a wife set out from Wai‘alua, circled Moloka‘i without finding a wife, circled Lāna‘i without finding a wife, and set out to circle Maui in search of a wife. When the chiefs reached Hāna, they heard of Kelea, the beautiful chiefess who was the sister of Kawaokaohele. She was living at Hamakuapoko because of the surf was riding there, reveling in the curling breakers of the midmorning when the sea was smooth and even. She enjoyed surfing so much she dwelt upon the morrow’s surfing and awakened to the murmuring of the sea to take up her board. The early morning, too, was delightful because of its coolness, and so she might go at dawn.

When the wife seekers heard these words about Kelea, they decided to obtain her as a wife for their master and quickly got ready to leave Hāna. The *kama'āina* residents tried to make them stay a little longer, but they would not listen. When they drew close to Hamakuapoko, they saw many people ashore, and saw the chiefess surf riding. They floated out where the waves broke, and when Kelea saw them her countenance faded at being seen by these strangers, and her heart throbbed. But she heeded their voices inviting her to board the canoe and showed herself to be the unsurpassed one of east Maui. The men said, "O chiefess, ride ashore on the canoe." She agreed – perhaps because of the glance of one of them. They were all "soaring '*iwa* birds," constantly moving on the shifting billows of the ocean, bronzed and reddened of check by the high seas. The chiefess did not know that this was a "wife-searching" canoe, *he wa'a kā'ili wahine.*

The first time, they rode a wave ashore, and the second time, they rode a wave ashore, but the third time, there was a dashing away to vanish at sea, "*ua hiki mai o Pupuhi ma"* ("blown away" has arrived). Those who searched for them found nothing; they searched Hawai'i, O'ahu, and Kaua'i without finding a thing.

When Kelea was landed at Wai'alua, she was quickly taken up to Līhu'e and became the wife of the Lō chief of Līhu'e, Lō Lale. They had three children, Kaholi-a-Lale, Luli-wahine, and Luli-kāne. They were among the ancestral chiefs of O'ahu as you shall see later. After living with her husband in the uplands of Līhu'e for ten years, Kelea asked him to let her go down to the seashore of 'Ewa to go sightseeing. He agreed to her request and said "You may go. Living on our inland land is dejecting – there is only the scent of *kupukupu* ferns and *nēnē* plants here."

Kelea went down to the plain of Ke-ahu-moa ['Ewa], to the rushing waters of Waipahu, to the "hand-holding" sands of 'Ewa-uli. Beautiful was the view of the channels of Pu'uloa. When she and her traveling companions reached Hālawa, she inquired of them, "What is the place before us like? Is it as nice as the places we have passed through in coming this far?" Her companions answered, "Yes, even more so. It is dense with *kou* and coconut trees, and it I also a place where one may watch the chiefs enjoying surfing." When Kelea heard the wording "surfing," desire rose in her, for surfing had been her favorite pastime. She said to her companions, "Let us continue our sightseeing and go to see the place you two speak of." They answered, "If it is your wish that we go, then that is what we shall do. You are the one whose sightseeing journey this is, and we two are merely to accompany you. That was the command of your husband to us."

They went along until they entered the coconut grove of Kawehewehe in Waikīkī. The *kama'āina* of the place saw this beautiful woman and welcomed her and shook down coconuts for the three to eat. They asked, "Where are you from? And where are you going?" "We have come from 'Ewa from the upland of Līhu'e because we wanted to go sightseeing. This is the most pleasant place we have seen." The *kama'āina* said. "This is a place for enjoyment. Over there is the *kou* grove of Kahaloa where one may view the surfing of the chiefs and of the *ali'i nui* Kalamakua."

Joyful at the thought of surfing, Kelea said o her companions, "Let us go on." They entered the *kou* grove of Kahaloa and watched the chiefs surfing in. Kelea inquired of the *kama'āina*, Is it possible to obtain a surfboard for the asking?" "*Ka!* Are you skilled at surfing?" "Who would not be if one had a board?" retorted Kelea. When the *kama'āina* heard these words, they were astonished; those of Līhu'e were accustomed to slicing *mo'okīlau* ferns and *pūpolo* stalks, but of surf riding these people knew nothing. The *kama'āina* thought that Kelea had been born at Līhu'e; they did not know she came from Maui.

The *kama'āina* said that a surfboard could readily be obtained. So she asked them for a board, and perhaps because she was so beautiful a woman, someone gave her one. When she received it, she went to the edge of the sea and rubbed off the red dirt of 'Ewa from her feet so as to look fresh. When she had finished, she dipped into the sea, then jumped upon her board and paddled off like an expert. Those who were watching saw that she managed her board like one trained, moving along easily and noiselessly without the least heeling over.

> When Kelea reached the place where the surf broke, she left that place to the *kama'āina* and paddled on out to wait for a wave to rise. As she floated there, the first wave rose up but she did not take it, nor did she take the second or third wave, but when the fourth wave swelled up, she caught it and rode it to shore. As she caught the wave, she showed herself unsurpassed in skill and grace. The chiefs and people who were watching burst out in cheering – the cheering rising and falling, rising and falling.
>
> While Kelea was surfing, the chief Kalamakua was working in his fields. When he heard those shouts he was startled and asked his men, "What is that shouting reverberating from the seashore?" "It is probably because of a skilled woman surfer." They answered. The chief remembered the chiefess of Maui, Kelea. He left off his work and went to stand on the shore to watch. As Kelea rode in on a wave, the *mō'ī* ran to the edge of the sea and stood there. When the chiefess reached the sand, he took hold of her board and asked, "Are you Kelea?" "Yes," she answered. She stood up, naked. The *mō'ī* removed his *kihei* shoulder covering and wrapped it around her as a *pā'ū* and took her to a *kapu* place. That was the beginning of her life as the *ali'i wahine mō'ī* and she married (*ho'āo mare*) the *mō'ī* Kalamakua.

The genealogies indicate how *ali'i nui* from all the islands were related, and the *mo'olelo* also confirm this as indicated in the following story of La'ielohelohe in Kamakau (1991: 49-50).

> The Mo'olelo of La'ielohelohe. Kalamakua was a good chief who cultivated large pond fields of Waikīkī. He married [Kelea] Keleanuinoho'ana'api'api, a beautiful chiefess and sister of Kawaukaohele [children of Kahekili I], [Pi'ilani's father, also spelled Kawaokaohele] the *ali'i nui* of Maui. She loved to surf at Hamakuapoko, Kekaha, and Wailuku…. The chiefs of O'ahu, searching for a wife for Chief Lōlale, ruling chief of Līhu'e, Oahu, when reaching Hāna heard about the beautiful Kelea, they wanted to obtain her for their chief. They found her at Hamakuapoko, and she proved to be an unsurpassed surfer of East Maui. They tricked her and kidnapped her to Wai'alua, O'ahu, where she was taken to Chief Lōlale at Līhu'e. They had three children: Kaholialale, Luliwahine, and Lulikane, ancestral chiefs of Oahu. After ten years she asked her husband if she could go to 'Ewa to go sightseeing and he agreed. On her travels she heard about the surfing of Waikīkī and asked her companions if she could go there and they agreed. She asked the *kama'aina* for a board and she proved to be a very skilled surfer. The people cheered and cheered her. Chief Kalamakua was working in his fields and heard the shouts. He went to check and watched her from the shore. When he saw her skill and beauty he asked if she was Kelea. She said yes. He wrapped his *kihei* around her naked body and took her to a *kapu* place. She married Kalamakua. They had La'ielohelohe, born at Helumoa and raised in Waikīkī. She was betrothed to Pi'ilani, the son of the *ali'i nui* of Maui [Kawaokaohele]. Her *akua* grandmothers Hapu'u and Kalaiohauola took care of her. Later she voyaged to Maui to marry Pi'ilani. They lived at Halehuki and had four children: Lono-a-Pi'ilani, Pi'ikea, Kala'aiheana, and Kihapi'ilani. La'ielohelohe returned to O'ahu for Kiha's birth. He was born at 'Apuakehau in Waikīkī—there is a rock there to mark the place.

Kamakau (1991:50-51) shares the story of Lō Kaholi-a-Lale, son of Kelea and LōLale in the following:

> Mo'olelo of Lō Kaholi-a-Lale. Lō Lale was the father and Kelea-nui-noho-'ana-'api'api [sister of Kawaokaohele, Pi`ilani's father] was the mother of Lō Kaholi-a-Lale. He was born in the uplands of Līhu`e and raised there until manhood. This youth was an exceedingly handsome man with features like his mother's. Lō Kaholi-a-Lale was taught club wielding, *ke ka`ala`au,* and spear throwing, *ka lono-maka-ihe,* and he became highly skilled in striking, thrusting, and parrying. In striking, no creeping or flying thing did he miss.
>
> The main occupation of the Līhu`e chiefs in olden times was to learn the art of spear throwing, and from there came the most skilled teachers. Spear throwing was also the main occupation of Piliwale,

the *mōʻī* of ʻEwa. He belonged to the chiefly family, *ʻohana aliʻi,* of Kumuhonua [Nanaʻula genealogy according to editors notes] of Kūkaniloko, and he had two daughters, Kūkaniloko, the older, and Kohe-palaoa, the younger. The older was betrothed to the son of the *mōʻī* of Maui; Luaia was the name of this youth.

Piliwale said that if a man were found who was skillful in hurling spears and whose skill was as great as that of his own teacher the reward would be his daughter Kohe-palaoa. The name of the chief's teacher of spear throwing was ʻAwa. We could grasp ten spears in his right hand and ten in his left. He was a "triple threat" in throwing; he could throw ten spears from the shoulder, two backwards, and two directly to the navel….

There were two days of sham battles on the plain of Pueohulunui, but no one challenged ʻAwa. However, Lō Kaholi-a-Lale studied the stances and thrusts of this teacher who was so skilled in *kākā lāʻau,* the striking, thrusting, and parrying with the spear-club *lāʻau pālau*. He himself already knew the thrusts and the stances of his own teacher, whose name was Ake-pao-a-nā-ihe. On the third day, the sham battles were resumed to seaward at Hālaulani. From there word came to the chief Piliwale that a young chief from upland Līhuʻe had challenged ʻAwa-hāuna-laʻau-nui in *kākā lāʻau*. Here the youth exerted himself to the limit and was beyond compare in wielding the spear-club. The strokes by which he won were the *pane oluna* and the *huʻalepo*…. This incident gave names to places that remain to this day: Kūpahu, "to hurl," and Hanapouli, "make dark." These places are in Waipiʻo in ʻEwa.

Kohe-palaoa became the wife of Lō Kaholi-a-Lale. That was the beginning of the combining of the *lō* and the *wohi,* the ranks of Kaholi-a-Lale. As for Kohe-palaoa, her rank was that of a Kumuhonua chief of Kūkaniloko; she was a *nīʻaupiʻo.* They had a son named Kānehōalani who became the *aliʻi* of Koʻolau.

There are no *moʻolelo* or stories of Piliwale (of ʻEwa) a ruling chief of Oʻahu or his eldest daughter Kūkaniloko in Kamakau (1991); however there are several references to them in the other *moʻolelo* of this section. Piliwale was the 10th Aliʻi Aimoku of Oʻahu and the son of Kalona-iki, who was a son of Māʻili-kūkahi. Like his father and grandfather before him and his two daughters, Piliwale was born at the royal birthing site of Kūkaniloko. His eldest daughter Kūkaniloko was the first female ruling cheifess of Oʻahu and the 11th Aliʻi Aimoku. Her daughter, Kalani-Manuia was also born at Kūkaniloko and followed her mother as ruling chiefess of Oʻahu and was the 12th Aliʻi Aimoku of Oʻahu. Kamakau (1991: 57-61) shares the following in the Moʻolelo of Kalani-Manuia.

Luaia was the father and Kūkaniloko, the daughter of Piliwale, the mother of Kalani-manuia (Kalai-manuia). Luaia was an *aliʻi kapu* of Maui; his father was Kaʻihiwālu and his mother was Kaualua; Ka-lei-iki-o-Kakaʻe was his grandfather. Malena was the place where Luaia's navel cord was cut; at Olopio the placenta (as deposited); at Kaukūloa, the caul.

Kalani-manuia was a famous chiefess, an *aliʻi kapu;* she lived *mauka* of Wahiawā, Kalani-manuia was born at Kūkaniloko, at Kapuʻahuʻawa, in A.D. 1100, and at Hoʻolono-pahu *heiau* her naval was cut. When this chiefess was a grown woman, she was taken to Kalauao [ʻEwa]; her home as at Kūkiʻiahu, with a second residence at Pāʻaiau. She remained in Kalauao when she became ruler of the kingdom. She was a good chiefess, and the chiefs and commoners lived in comfort all over the land. No taxes were laid upon the chiefs and their men, *kānaka,* and no war was known in her kingdom. She ordered the chiefs and commoners to erect *heiau* to the gods, and also *mua,* men's "chapels," a places for the chiefs and their men to pray to the gods. She had Pāʻaiau, Opu, and Kapaʻakea fishponds made for herself. The island of Oʻahu was made productive through cultivation.

Kalai-manuia married (*hoʻaō*) Lupe-kapu-ke-aho-makaliʻi, an *aliʻi kapu* and an *aliʻi piʻō*. He was the son of Kalaniuli. Kalaniuli was the father (and Kalaniuli's full sister) Nalu-e-hilo-i-ke-aho-makaliʻi, the mother. It is said of Lupe that he was skilled and wise and did many things. His main

occupation was fishing. Because of his skills in handling fine fishlines and the snells of tiny fishhooks, and all other tiny things, his men called him Lupe-kapu-ke-aho-makaliʻi, Sacred Lupe of fine fishlines. He was a chief benevolent toward the commoners. However, the kingdom belonged to his wife Kalani-manuia, and he acted as the administrator for their government.

Kalai-manuia and Lupe had four children: Kū-a-Manuia first, Kaʻihikapu-a-Manuia second, Haʻo third, and Kekela, a female, fourth. Kū-a-Manuia was raised in Waikīkī to be the overlord, *haku aliʻi,* there; Kaʻihikapu-a-Manuia was raised at Wai-mānalo in Honouliuli, ʻEwa, to be the chief there, and Haʻo at Waikele [ʻEwa] to be the chief there. The daughter Kekela was raised at Mauna-kuʻaha; her bathing place was Kahuawai in Kalauao. She was raised by her mother and father. The main occupation of Kekela during the time she lived with her mother were playing *kōnane* ʻand drinking ʻ*awa*. Her *kōnane* board and her ʻ*awa* straining bowl still exist.

The reign of Kalai-Manuia and her husband Lupe lasted a long time…. The chief Lupe became a parent to the children of the commoners, as in the days of Māʻili-kūkahi. He was beloved by commoners. His occupations as he traveled about Oʻahu were cultivation and fishing, the main one being fishing with long lines….

Shortly before she died at her residence at Kūkiʻiahu in Kalauao [ʻEwa], Kalai-manuia gave her commands her children, She ordered that her first-born, Kū-a-Manuia, be at the head of the kingdom; Kaʻihikapu-a-Manuia was given charge of her gods Kūkalani and Kū-hoʻoneʻe-nuʻu. To Haʻo she gave charge of ʻEwa and Waiʻanae under his older brother Kū-a-Manuia. To the sister Kekela were given the lands of Waiʻalua and Koʻolauloa; to Kū-a-Manuia were given Koʻolaupoko and Kona. All the chiefs and commoners were to be under him. The lands given to Kaʻihikapu-a-Manuia were Kalauao, Aiea, Hālawa, and Moanalua, under his older brother. Also the gods. After she had given these orders, Kalai-manuia did in the ninety-first year of her life and sixty-fifth of her reign.

The following *moʻolelo* is about the three sons of Kalani-Manuia based on Kamakau (1991: 61-67):

Kū-a-Manuia was forty years old when he became the ruling chief. It was said that he disregarded the rules set forth by his parents and was greedy and jealous of any honors given to anyone else. He wanted everything that was left by his parents, not wanting his brothers to have any lands. Because his behavior towards his chiefs, kahuna, and the people was malicious, they all supported his younger brother Kaʻihikapu-a-Manuia. Kaʻihikapu-a-Manuia constructed the large fishponds of Kaʻihikapu and Lelepaua
(where the Honolulu International Airport and Hickam are today). One day when Lelepaua was almost finished Kū-a-Manuia came prepared to battle Kaʻihikapu-a-Manuia. Their youngest brother Haʻo, joined forces with Kaʻihikapu-a-Manuia because so many others supported him as well. In the ensuing battle Kū-a-Manuia was killed; he had only reigned for six years.

Kaʻihikapu-a-Manuia was forty-one when he became the ruling chief; he was of the Kumuhonua line and nīʻaupiʻo and piʻo rank. His wife Kaʻū-nui-a-Kānehoalani was also of the Kumuhonua line, of wohi rank, and a lō aliʻi of Līhue; she was the daughter of kapu chiefs Kānehoalani and Kualoa-ka-laʻilaʻi. They had a son Kākuihewa. Kaʻihikapu-a-Manuia was considered to be a good and benevolent chief to all. He made visits around the island restoring heiau and building houses for the gods Lono, Kāne, and Kanaloa. However, on one of his trips around the island he stopped to visit his brother Haʻo who lived in Waikele, ʻEwa. He noticed that Haʻo's people were cultivating and raising animals and his lands from Honouliuli to Waipiʻo were full of men. This made him anxious and afraid that Haʻo would challenge him for the chiefdom or that if he Kaʻihikapu died Haʻo would rule and not his son. So when Kaʻihikapu went back to Waikīkī, he conducted several rituals and imposed various kapu. He told his kahuna nui Laumea that he should go to war against his brother.

> The *kahuna* Luamea said not to kill his brother in war, instead to shower him with gifts of pigs, taro, bananas, sugarcane and fish. So for five years Ka‘ihikapu did this, but with hypocrisy because he still wanted the death of his brother. So he planned on a unique way to kill his brother. He went shark fishing and snared a nine and a half meter long shark which took two days and nights to die. They towed the shark to Waikīkī. When the *kahuna* heard of this and learned that Ka‘ihikapu still felt his brother was raising up an army to defeat him, he had a plan. Ka‘ihikapu was told to send someone to tell his brother Ha‘o that Ka‘ihikapu had a shark offering for him for the *kapu Kū* coming up.
>
> Laumea then told Ka‘ihikapu to remove the flesh from the shark and fill it with spears for he and his men who would be hiding inside the shark. Ha‘o was told that Ka‘ihikapu would not be coming when the shark was delivered so they were relaxed. The shark was delivered to Ha‘o in Waikele, ‘Ewa accompanied by “countless” men and placed on the *lele.* When Ha‘o was about to offer his prayer and ‘*amama* for this *kapu* ritual, Ka‘ihikapu opened the mouth of the shark and said “You are bitten by the mouth of the shark!”

The slaughter took place in Paumakua, Waikele and stopped with the deaths of Ha‘o, his *kahuna*, and his chiefs. Their bodies were stuffed into the shark and offered in sacrifice at one time. Ha‘o’s son Nā-pū-lānahu-mahiki-a-Ha‘o, escaped and became the chief of Wai‘anae. He was strong and became an enemy of Ka‘ihikapu-a-Manuia, engaging him in battles and dividing the kingdom of O‘ahu into two parts. Wai‘alua, Wai‘anae, and Ko‘olauloa ruled by Nā-pū-lānahu-mahiki-a-Ha‘o and ‘Ewa, Kona, and Ko‘olaupoko ruled by Ka‘ihikapu-a-Manuia. The O‘ahu chiefs supported the two rulers equally.

The story of Kākuhihewa, son of Ka‘ihikapu-a-Manuia and grandson of Kalani-Manuia is based on Kamakau’s (1991:68-70) *Kākuhihewa*:

Kākuhihewa was born at Kūkaniloko and all the high rituals and ceremonies of the time were performed. After the birthing rituals, his maternal grandfather Kānehoalani took him to Ho‘olono-pahu *heiau* for the cutting of the navel cord that was observed by forty-eight chiefs, including Mākō-kā‘au, Ihu-kolu, Kā‘aumaku‘a, and Pakapaka-kūaua. The drums ‘Opuku and Hāwea were sounded to announce his birth (Kamakau 1991:68). “While the navel cord was being cut and the foreskin cut off the *pahu* drum was sounded and rain fell and lightening flashed; then the child was established as a *hoali‘i,* a royal offspring” (Kamakau 1991:118). The *kahuna* performed the rites of purification (*huikala, ka‘iōlena, lele uli,* and *lele wai*), clearing away all defilements.

Kākuhihewa was raised in ‘Ewa (Waipi‘o, Waiawa, and Mānana) “on the fat *awa* fish of Kuhia and the sweet mullet of Pauhala.” His parents were high ranking chiefs (*ali‘i kapu, ali‘i nī‘aupi‘o, pi‘o, wohi* and *lō ali‘i*) so he inherited their multitude of *kapu* (*kapu a mano a lehu*) (Kamakau 1991:68). Kākuhihewa had many teachers and learned the many arts of warfare, including spear throwing, club wielding, sling stones, but his favorite pastime was the shooting with bows and arrows; Kamakau (1991:69) continues:

> The shooting of rats and mice, *pana ‘iole,* was one of Kākuhihewa’s principal pastimes during his reign. From the open country of Hālawa to Līhu‘e, he would go with food and fish and his household and his wives, and babies would be born in the open country. The bones of birds or human beings were used for the points of the arrows. This was one of the worthless occupations of the chiefs in olden times….
>
> During the reign of Kākuhihewa, O‘ahu became known for its productiveness; its smell reached Kaua‘i there was so much cultivation. Kākuhihewa maintained residences in ‘Ewa, at Waikīkī, and at Kailua in Ko‘olaupoko. At ‘Alele in Kailua he built his “government house,” *Hale Aupuni*.... Kākuhihewa became a famous chief from Hawai‘i to Kaua‘i. In the *mele* of the chiefs of Hawai‘i,

> Maui and Kaua‘i, Kākuhihewa and the chiefs of O‘ahu are included. Because of the benevolence of this ruler and because of his many works, O‘ahu was called “the sands of Kākuhihewa,” *ke one o Kākuhihewa.* He was a chief without anger or resentment.

Kākuhihewa was so loved and respected that “Lānahu-‘imi-haku, an elderly *kahuna* and advisor to Lono-i-ka-makahiki of Hawai‘i, came to O‘ahu to live with” him. Many other “chiefs of Hawai‘i and Maui also came to live on O‘ahu because of the abundance of food and fish and fresh water and the productiveness of the land” and became related through intermarriage (Kamakau 1991:70). Kākuhihewa ruled for fifty years (Kamakau 1991:68).

This last *mo‘olelo* is about *Nā Haole* (white foreigners) – *Neleiki Mā,* some ended up living in Honouliuli, O‘ahu (Kamakau 1991:113-114). These foreigners were always assimilated into royal families.

> Here are some of the first *haole* to come to *Hawai‘i nei.* They arrived during the time of Wakalana the chief of Maui and his wife Kaua‘i. Some people say that it was during the time of Kaka‘alaneo [great-grand uncle of Pi‘ilani] that these people arrived, while others say that it was Kukanaloa who arrived during the time of Kaka‘alaneo. The ship came to Wailuku, Maui: it was the *Mamala*; the captain was Kuluikia-aManu, and on board were Masawell, Neleiki, Malaea, Ha‘akoa, and Hīkā – some were men and some were women. It is said by some that Neleiki mated with Wakalana and that their child was Alo‘oia, who became the chief after Wakalana; others say that Alo‘oia was Kauai‘i’s child. This was before the year A.D. 900. They were perhaps the ancestors of the albino people, *ka po‘e kekea.* There are many of these people at Wai-mānalo in Honouliuli, O‘ahu. Their features are different from other Hawaiians.

The following is a list of additional *mo‘olelo* sources from the *Hawaiian Legends Index* Vol I & II by the Hawaii State Public Library System (HSPLS) (1989) that mention ‘Ewa or Honouliuli. Since there are several stories they will not be summarized or included in this report.

‘Ewa:

‘Kaihi-kapu or the attack of the king shark.’	In Armitage, *Ghost Dog and other Hawaiian Legends* Pp 148-151
Pele and Hi‘iaka	Emerson, Nathaniel Bright
‘Story of Lonoikamakahiki’	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 1* pp 256-363
‘History of Kuali‘i’	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 1* pp 364-434
‘Legend of Kelelealuaka and Keinohoomanawanui’	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 1* pp 464-471
‘Legend of Kewalo’	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 2-71
‘Legend of Palila’	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2*pp 136-153
‘Legend of Opelemoemoe’	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 168-171

'Legend of Kahalaopuna'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 188-193
'Legend of Halemano'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 228-263
'Legend of Maikoha'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 270-273
'Legend of Namakaokapaoo'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 274-283
'Tradition of Kamapuaa'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 314-363
'Story of Palila'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 372-375
'Brief stories of ghosts and cunning'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 418-435
'Famous men in early days'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 486-503
'A story of Makahi'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 564-569
'History of the awa'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2* pp 606-611
'The kukui tree'	In Fornander, *Fornander Collection of Hawaiian Antiquities and Folk-lore, v 2*pp 670-677
'The slandered priest of Oahu'	In Gowen, *Hawaiian Idylls of Love and Death* pp 34-42
'The city of refuge: A tale of Oahu'	In Gowen, *Hawaiian Idylls of Love and Death* pp 59-66
'The triple marriage of Laamaikahiki'	In Kalakaua, *The Legends and Myths of Hawaii* pp 117-135
'The apotheosis of Pele'	In Kalakaua, *The Legends and Myths of Hawaii* pp 139-154
'Hua, king of Hana'	In Kalakaua, *The Legends and Myths of Hawaii* pp 157-173
'The sacred spear-point'	In Kalakaua, *The Legends and Myths of Hawaii* pp 209-225
'Kelea, the surf-rider of Maui'	In Kalakaua, *The Legends and Myths of Hawaii* pp 229-246
'The adventures of Iwikauikaua'	In Kalakaua, *The Legends and Myths of Hawaii* pp 335-349
'The modest warrior'	In Knudsen, *Teller of Hawaiian Tales* pp 125-128
'Laie i ka wai'	*The Hawaiian Romance of Laieikawai*
'Why the mullet swim around Oahu'	In Pukui, *Tales of the Menehune* pp 51-54
'Oahunui'	In Thrum, *Hawaiian Folk Tales* pp 139-146

'The ivory of Oahu'	In Westervelt, *Hawaiian Historical Legends* pp 114-124
'The legend of the breadfruit tree'	In Westervelt, *Legends of Old Honolulu* pp 23-31
'Kalelea and his wish'	In Wheeler, *Hawaiian Wonder Tales* pp 143-163
Honouliuli	
'Lepe the bird-maiden…'	In Colum, *The Bright Islands* pp 187-196
'Lepeamoa'	In Thrum, *More Hawaiian Folk Tales* pp164-184
Kalaeloa/Barbers Point	
'Aiai, son of Kuula'	In Thrum, *Hawaiian Folk Tales* pp 230-249

'*Ōlelo no'eau* (Pukui 1983) or proverbial/traditional sayings usually had several layers of meanings. They reflected the wisdom, observations, poetry and humor of old Hawai'i. Some of them referenced people, events and/or places. The following '*olelo no'eau* that make references to 'Ewa were compiled by Mary Kawena Pukui between 1910 and 1960 with both translations and an explanation of their meaning, which are often more *kaona* (hidden or double meaning) than obvious. Most references were to 'Ewa; none specifically for Honouliuli and one for Pālāwai.

'Ōlelo no'eau	*'Āina koi 'ula i ka lepo.*
Translation:	Land reddened by the rising dust.
Meaning:	Said of 'Ewa, O'ahu (p 11 #80)
'Ōlelo no'eau	*Anu o 'Ewa i ka i'a hāmau leo e. E hāmau!*
Translation:	'Ewa is made cold by the fish that silences the voice. Hush!
Meaning:	A warning to keep still First uttered by Hi'iaka to her friend Wahine'oma'o to warn her not to speak to Lohi'au while they were in a canoe near 'Ewa (p 16 #123).
'Ōlelo no'eau	*'Ewa kai lumaluma'i.*
Translation:	'Ewa of the drowning sea.
Meaning:	An epithet applied to 'Ewa, where *kauwā* were drowned prior to offering their bodies in sacrifice (p 47 #385)
'Ōlelo no'eau	*'Ewa nui a La'akona.*
Translation:	Great 'Ewa of La'akona.
Meaning:	La'akona was a chief of 'Ewa, which was prosperous in his day (p 47 #386)
'Ōlelo no'eau	*He kai puhi nehu, puhi lala ke kai o 'Ewa.*
Translation:	A sea that blows up *nehu* fish, blows up a quantity of them, is the sea of 'Ewa.
Meaning:	[No meaning provided] (p 75 #661)
'Ōlelo no'eau	*Ku a'e 'Ewa; noho iho 'Ewa*
Translation:	Stand up 'Ewa; Sit down 'Ewa.
Meaning:	The names of two stones, now destroyed, that once marked the boundary between the chiefs' land (*Kua'e 'Ewa, O'ahu* (p 200 #1855)
'Ōlelo no'eau	*O 'Ewa, 'āina kai 'ula i ka lepo.*

Translation:	‘Ewa, land of the sea reddened by earth [dirt].
Meaning:	‘Ewa was once noted for being dusty, and its sea was reddened by mud in time of rain (p 257 #2357)
‘Ōlelo no‘eau	*Ua ‘ai i ke kāi-koi o ‘Ewa.*
Translation:	*Kāi* is O‘ahu’s best eating taro; one who has eaten it will always like it. Said of the youth or a maiden of ‘Ewa, who, like the *kāi* taro, is not easily forgotten (p 306 #2770)
‘Ōlelo no‘eau	*Ka ua kapua‘i kanaka o Pālāwai.*
Translation:	The rain of Pālāwai [which sounds like] human footsteps (p 169 #1564)

Place Names. Hawaiians of old generally named everything; from winds and mountains, to rocks, canoes, taro patches, fishing stations, and “the tiniest spots where miraculous or interesting events are believed to have taken place” (Williamson et al. in Pukui, 1983: x). They all represented a story; some known only locally, while others became legendary. Unfortunately, the stories and meanings of many of the traditional place names today have been forgotten.

Table 4. Place Names and *mo‘olelo* in vicinity of Mauna Kapu

Name	Location/Description/Reference
Akupu	A small hill near Pālehua, southwest of Mauna Kapu
‘Ewa	District, plantation, quadrangle, west of Pearl Harbor, O‘ahu. *Lit.* ‘crooked.’ The gods Kāne and Kanaloa threw a stone to determine the district boundaries. The stone was lost but later found at Pili-o-Kahe. Beach between Pu‘uloa and One‘ula beaches (Pukui et al. 1974:28).
Honouliuli	*Ahupua‘a* or land division, village, forest reserve and gulch. Waipahu quad, O‘ahu. *Lit.* ‘dark bay’ (Pukui et al. 1974:51); may be literally translated as meaning, “dark-bay,” and is descriptive of the lochs (Awalau o Puuloa) that make up what is now called Pearl Harbor. Honouliuli includes lands extending from the verdant mountains, to the watered plains where *loi kalo* (taro pond fields) and *loko ia* (fishponds) were developed, to the arid plains and rich fisheries on the ocean. Along the ocean-fronted coast of Honouliuli are noted places in lore and ancient life, such as Keahi, Kupaka, Keoneula (Oneula), Kualakai, Kalaeloa and Koolina. It was at places like these along shore that early residents lived, and that are described in native traditions (Maly and Maly 2012); location of project area.
Ka‘aikukui	Gulch, Honouliuli, *Lit.* ‘candlenut food’ (Pukui et al. 1974:59); east of Mauna Kapu.
Kō ‘Olina	A small coastal village within Waimānalo (west), where Kakuhihewa was known to stopover, and where James Campbell had a residence (Sholin and Dye 2010:6); cultural sites starting from Kō ‘Olina shores align all the way to Mauna Kapu (Kane 2013).
Kunia	Land division, *Lit.* ‘burned’ (Pukui et al. 1994:125); northeast/east of Mauna Kapuauhi
Mauna Kapu	Mountain in the Wai‘anae range separating Nanakuli and forest reserves, *Lit.* ‘sacred mountain’ (Pukui et al. 1974:149).
Nānākuli	Land division, forest reserve, stream, valley, Wai‘anae qd. (Ii 29) *Lit.* ‘look at knee’ (said to be named in honor of the tattooed knee of Ka‘ōpulupulu, a priest whose chief, Ka-hahana, turned a deaf [*kuli*] ear to his advice, and, when asked about his knee, told of his relationship with the chief, thus rebuking him); or ‘look deaf’ (said because people in the area had not enough food to offer passerby, hence they looked at them and pretended to be deaf) (Pukui et al. 1994:162); west of Mauna Kapu.

Pālāwai	Gulch, Wai‘anae qd. (Pukui et al. 1994:176); northeast of Mauna Kapu.
Pālehua	Land division, hill (2,566 feet elevation), and road, Wai‘anae qd. *Lit.* ‘*lehua* flower enclosure’ (Pukui et al. 1974:177); south of Mauna Kapu.
Palikea	Peak (3,098 feet high) above Lualualei in the Wai‘anae mountains. *Lit.* ‘white cliff’ (Pukui et al. 1974:177); north of Mauna Kapu.
Pu‘u-o-Kapolei	One of the most important of the *wahi pana* (special places), important cultural locales of the ‘Ewa Plain (Tuggle et al. 1997:20). Pu‘u Kapolei was the home of Kamaunuaniho, the grandmother of demi-god Kamapua‘a; where a *heiau* was located and a place to observe the movement of the sun (Sholin and Dye 2010:6).
Pu‘u-kapua‘i	Hill (1,047 feet high) Wai‘anae qd. *Lit.* ‘foot-print hill’ (Pukui et al. 1974:199); southeast of Mauna Kapu.
Pu‘u-makakilo	Hill near Honouliuli, *Lit.* ‘observing eyes hill’ (Pukui et al. 1974:201); south of Mauna Kapu.
Pu‘u-mo‘opuna	Peak (1,548 feet high), Honouliuli. *Lit.* ‘grandchild hill’ (Pukui et al. 1974:202); southeast of Mauna Kapu and Pālehua.
Pu‘u-poulihale	Hill near Honouliuli, *Lit.* ‘dark house hill’ (Pukui et al. 1974:201); south of Mauna Kapu and Pālehua.

Early Historic References

By and large “Historic References” pertain to notable historic events and overviews of important places and land tenure within the project area and district. One of the most significant practices in the history of the Hawaiian people was their concept of the stewardship of the land. However, over time, these practices were replaced by more Western methods of land tenure and use, as the lands of ‘Ewa and Honouliuli went from the domain of the *ali‘i nui* to the monarchy, to various individuals and entities. The history of land use in this area went from traditional *ahupua‘a* land management and use to sugarcane and ranching related activities to military and multi-uses today (e.g., military reservation, residences, ranching, telecommunications facilities).

It was during the time of Kahaukapu of Hawai‘i and Kaka‘alaneo of Maui (also said to be the time the Spanish first came with Ku-kanaloa [Kamakau 1991:324]) that the division of lands is said to have taken place under a *kahuna* named Kalaihaohi‘a. He portioned out the lands into districts, sub-districts, and smaller divisions, each ruled over by an agent appointed by the landlord of the next larger division, and the whole under control of the ruling chief over the whole island or whatever part of it was his to govern (Handy and Handy 1978:491; Beckwith 1970:383). Each island was divided into *moku* or districts that were controlled by an *ali‘i ‘ai moku.* Within each of the *moku* on each island, the land was further divided into *ahupua‘a* and controlled by land managers or *konohiki*. The boundaries of the *ahupua‘a* were delineated by natural features such as shoreline, ridges, streams and peaks, usually from the mountain to the sea, and ranged in size from less than ten acres to 180,000 acres (Moffat and Fitzpatrick 1995:24-29, see also Chinen 1958:3). According to Kamakau (1991) it was during the time of Mā‘ili-kūkahi that O‘ahu was divided.

Each *ahupua‘a* was often divided and sub-divided several times over (i.e., ‘*ili, kuleana, mo‘o, pauka, kōele, kiha pai*), answerable to *ali‘i* where the lesser division was located. However the ‘*ili kūpono* or the *ili kū* was “completely independent of the *ahupua‘a* in which it was situated…tributes were paid directly to the king himself” (Chinen 1958:4). Rights to lands were mutable or revocable; a ruling chief or any

"distributor" of lands could change these rights if displeased, or as favors--usually after a victorious battle, and after the death of the *ali'i nui* or ruling chief (Chinen 1958:5).

'Ewa is one of the largest districts in O'ahu. The northern boundary begins from the top of Ka'ala mountain and runs towards the Ko'olau mountain range, passing Wahiawa and Halemano, along the mountain to Moanalua, to Ke'ehi Lagoon, passing Kapukaki (Red Hill). From the west of Honolulu Airport near Kapuaikaula (Fort Kamehameha), to Barbers Point, to Piliokahe, along the Wai'anae mountain range. It comprises the following *ahupua'a*: Hālawa, 'Āiea, Kalauao, Waimalu, Waiau, Waimano, Manana, Wai'awa, Waikele (Waipahu was a spring in Waikele), Hoaeae, Honouliuli and including Waikakalaua, Līhu'e, Wahiawa, and Halemano (Sterling and Summers 1978:1). The following *mo'olelo* explains how the 'Ewa boundaries were created (Sterling and Summers 1978:1):

> When Kane and Kanaloa were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now Ewa. To mark boundaries of land they would throw a stone and where the stone fell would be the boundary line. When they saw the beautiful lad lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as far as the Waianae range and it landed somewhere in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So Ewa (strayed) became known by that name. The stone that strayed. Eventually the stone was found at Pili o Kahe. This is a spot where two small hills of the Waianae range come parallel on the boundary between Honouliuli and Nanakuli.

'Ewa is as diverse as it is large. On the one hand it was well-known for its famous taro lands, countless springs, streams and river, as well as hundreds of fishponds of east 'Ewa. On the other hand, 'Ewa was also referred to as hot and arid. The hot and arid plains of 'Ewa were most likely referring to Honouliuli, its westernmost *ahupua'a* as described in the following excerpt (Magnuson and Welch 2003:1).

> The 'Ewa Plain is a dry, hot, low-lying, and relatively flat expanse of emerged reef limestone with the northern part being partly covered by alluvium from the Wai'anae Mountains. Geologists have long suggested that most of the emerged reef formed during the plus-7.6 m (25 ft) Waimanalo sea stand (Macdonald and Abbott 1970:355), and recent radioactive isotope dating confirms an interglacial age of about 114,000 to 131,000 years ago (Szabo et al. 1994). At elevations above 12.2 m (40 ft) above sea level (asl), there may be an older reef, as indicated by the presence of a fossil soil (Fletcher, pers. comm., 1996 in Athens et al. 1999:3).

Based on the previous *mo'olelo*, 'Ewa was significant in the ancient socio-political world where ruling chiefs lived and/or set up court in the lands of 'Ewa from Kalauao to Waikele. Also according to the *mo'olelo* and history, many of the O'ahu and 'Ewa ruling chiefs and their families were killed by Kahekili, ruling chief of Maui, who was likely related to most of them. By the time Kamehameha I defeated the Maui chiefs and warriors in the battle of Nu'uanu in 1795, 'Ewa had lost its political power, but not its appeal. Unfortunately, it was ravaged during the sandalwood era (Kamehameha I – III), then changed as sugarcane became the dominant industry in the islands. However, several *ali'i nui* still frequented its lands during the monarchy period, such as Kamehameha III and Queen Lili'uokalani. But, the 'Ewa lands continued to change radically with the Overthrow of the Kingdom government to the military occupation of its lands from Pearl Harbor to Fort Shafter, to Schofield (Līhue), Halemano and Wheeler; to its modern developments from Hālawa to Honouliuli.

During the period 1839 to 1855, several legislative acts transformed the centuries-old Hawaiian traditions of *ali'i nui* land stewardship to the western practice of private land ownership. In the first stage, King Kamehameha III (Kauikeaouli) divided up his lands among the highest-ranking *ali'i* (chiefs), *konohiki* (land managers), and favored *haole* (foreigners) (Chinen 1958:7-14; Moffat and Fitzpatrick, 1995:11, 17). This historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. Kamehameha III, in his mid-

thirties, was persuaded by his *kuhina nui* and other advisors to take a course that would assure individual personal rights to land.

One-third of all lands in the kingdom would be retained by the king; another one-third would go to *ali`i* or chiefs as designated by the king. In 1846 he appointed a Board of Commissioners, commonly known as the Land Commissioners, to confirm or reject all claims to land arising previously to the 10th day of December, AD 1845. Notices were frequently posted in *The Polynesian* (Moffat and Fitzpatrick, 1995). However, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Fitzpatrick, 1995:48-49), known today as *The Great Mahele*. The *mahele* did not actually convey title to the *ali'i* and *konohiki*, but it essentially gave them the right to claim the lands assigned to them. These lands became known as the *konohiki* lands. The *konohiki* chiefs were required to present formal claims to the Land Commission and pay a commutation fee, which could be accomplished by surrendering a portion of their land to the government. The government could later sell these lands to the public in the form of Grants. Upon payment of the commutation fee, the Minister of Interior issued a Royal Patent to the chief or *konohiki.* The last one-third was originally designated to the *maka'ainana*, but not acted on - instead it was set aside to the government, "subject always to the rights of the tenants" (Moffat and Fitzpatrick, 1995:41-43; see also Chinen 1958:15-21).

'Ili kūpono were the only '*ili* (parcel) recognized in this process, all the '*ili* and lesser divisions were absorbed into the *ahupua'a* claim (Chinen 1958:20). In 1892 the legislature authorized the Minister of Interior to issue Royal Patents to all *konohiki* or to their heirs or assignees where the *konohiki* had failed to receive awards for their lands from the Land Commission. The Act further stipulated "that these Royal Patents were to be issued on surveys approved by the Surveyor General of the kingdom" (Chinen 1958:24; Moffat and Fitzpatrick 1995:41-43). Kamehameha III formalized the division of lands among himself (one-third) and 245 of the highest-ranking *ali'i* and *konohiki* (one-third) between January 27 to March 7, 1848. He acknowledged the rights of these individuals to various land divisions in what came to be known as the *Buke Mahele* ('sharing book') or *The Great Mahele.* According to Baker and Baker (1989) the Honouliuli *ahupua'a* was given to Mikahela Kekauonohi as *konohiki* lands during the time of the Great Mahele.

Mikahela Kekauonohi also known as Anna M. Kekauonohi and Keahikini-i-Kekauonohi comes from a very long line of intermixed royal families from all the main Hawaiian Islands. She was born in Lahaina, Maui in 1805 and died in Honolulu, O'ahu in 1851. She was the only daughter of Kahoanuku Kinau and Kahakuha'akoi Wahinie-pio, daughter of Maui chief Kekuamanoha, younger son of Maui ruling chief Kekaulike, and brother of many older siblings including Kamehamehanui, Kalola, Kahekili and Ka'eokulani. On Kekauonohi's father's side, Kahoanuku Kinau was the son of Kamehameha I and Peleuli, daughter of Kamanawa, one of the famous twin uncles of Kamehameha I.

Kekauonohi was married to Kamehameha II (Liholiho), her half-brother, but when he died she married Kaua'i *ali'i* Abner Keli'ihanoui (1832). Keli'ihanoui was once married to Deborah Kapule, former wife of Kaumuali'i, the last king of Kaua'i, and Ka'ahumanu. Keli'ihanoui died in 1849 and was buried in Pu'uloa. She was the Governess of Kaua'i from 1842-1844 (Kekoolani 2013). Kekauonohi then married Levi Ha'alelea in 1850. She died in 1851 and her lands were passed on to Ha'alelea. There were 96 LCA Claims made including that of Mikahela Kekauonohi (#11216*O) in Honouliuli; 73 were awarded. There were 73 Royal Patents awarded in Honouliuli including one to M. Kekauonohi (RP# 6971) for TMK 1-9-1 (Waihona 'Āina 2013). [See Appendix G for Waihona 'Āina lists of awardees]

The following is from Towill (2010:11):

> Following the Māhele of 1848, 99 individual land claims in the *ahupua'a* of Honouliuli were registered and awarded by King Kamehameha III. The present study area appears to have been included in the largest award (Royal Patent 6071, LCA 11216, *'Āpana* 8) granted in Honouliuli

> Ahupua‘a to Miriam Ke‘ahi-Kuni Kekau‘ōnohi on January 1848 (Native Register). Kekau‘ōnohi acquired a deed to all unclaimed land within the *ahupua‘a*, totaling 43,250 acres. Kekau‘ōnohi was one of Liholiho’s (Kamehameha II’s) wives, and after his death, she lived with her half-brother, Luanu‘u Kahala‘i‘a, who was governor of Kaua‘i. Subsequently, Kekau‘ōnohi ran away with Queen Ka‘ahumanu’s stepson, Keli‘i-ahonui, and then became the wife of Chief Levi Ha‘alelea. Upon her death on June 2, 1851, all her property was passed on to her husband and his heirs. When Levi Ha‘alelea died, the property went to his surviving wife, who in turn leased it to James Dowsett and John Meek in 1871 for stock running and grazing. In 1877, James Campbell purchased most of Honouliuli Ahupua‘a… for a total of $95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek, and James Robinson and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). By 1881, the Campbell property of Honouliuli prospered as a cattle ranch with “abundant pasturage of various kinds” (Briggs in Haun and Kelly 1984:45).

James Robinson was a carpenter on the whaling ship *Hermes* which landed in Hawai‘i (1820) just before the first missionaries on the ship *Thaddeus*. He left with the *Hermes* in 1822 to Japan, but the ship wrecked on a reef, on what is now called Pearl and Hermes. They were castaways for months while Robinson built a schooner, the *Deliverance*, from the wreckage. They sailed back to Honolulu where they took up residence. He was befriended by Kamehameha II and John Young and was employed by them repairing schooners owned by the king. In 1827 he established a shipyard at Honolulu Harbor on land owned by Kalanimoku. He and partner Robert Lawrence were joined by James Holt; they were very successful and became involved in other businesses as well (Young 2012). Robinson married B. Kaikilani “Bebe” Previere, daughter of A. Previere and Kamakana – Kamakana’s paternal grandfather Kaneiahualaahilani was the eldest son of Kahekili, *ali‘i nui* of Maui. Robinson and Bebe had seven children (Kekoolani 2010). Robinson died in 1876. Their daughter Lucy Hannah Robinson married Albert McWayne in 1878 (HSA 2013). According to the 1890 Honolulu Directory Albert was a physician and surgeon. Robinson’s company later became McWayne Marine Supply (Young 2012). McWayne Marine Supply was run by their son Charles Andrew McWayne, Sr. and later by his son C.A. McWayne, Jr. (Blakeman 2001; Morse 2001).

Captain Samuel James Dowsett and Mary Bishop Dowsett arrived in Hawai‘i in 1822 accompanying the ship Captain George Vancouver gave to Kamehameha I (Castro 2000). Their son James Isaac Dowsett was the first non-missionary Anglo-Saxon child born (1828) in Hawai‘i. As a youth he was a playmate of Kamehameha IV, Kamehameha V and Lunalilo. At fourteen he became the family breadwinner working for the Hudson Bay Company after his father never returned from a voyage. He became a successful businessman; he owned a fleet of whaling ships, was in the lumber business, cattle ranching, active in politics, and founded the Pu‘uloa Salt Works in Honouliuli. He married Annie Green Ragsdale and they had thirteen children (Nellist 1925b). Annie was the daughter of Alexander Ragsdale and Hawaii chiefess Kahawalu (Castro 2000). Their daughter Victoria married Curtis Perry Ward – their home the *Old Plantation* is now the site of the Blaisdell Center; after her husband’s death Victoria established Victoria Ward Ltd. (Kekoolani 2010c; HSB 2002). Another daughter Mary Elizabeth Mikahala married Thomas R. Foster also a ship builder; Mary’s legacy is the Foster Botanical Garden (Wiki-Foster 2013).

The following is a more detailed summary about Meek (EPP 2010):

> Captain John Meek was born in Marblehead, Massachusetts on Nov. 24, 1791. Meek was one of five sons of a seafaring father. Meek followed in his father’s footsteps and became a sea captain in the early 1800s. He sailed on voyages all over the world and eventually landed in Hawaii and came ashore to live on Oahu. Once Meek set up his residence on the island he began to lease property for his cattle operation in Waimanalo and the Ewa Plains area from J.H.L. Ha‘alelea. Meek’s ranch in the Ewa Plains was at Honouliuli. Meek leased the land for around 25 years before James Campbell bought it.

Captain Meek was associated with the Honouliuli lands prior to 1871, as early as 1846, according to a Supreme Court case in which he was a defendant. The Mahele and associated Legislation had a negative impact to some people as seen from the perspective of this case. Prior to the Mahele there were certain relationships between a *konohiki* and native tenants or *hoaaina.* In exchange for working a few days a month (*koele*) for the *konohiki*, the *hoaaina* could pasture his animals on the *kula* lands or any unused lands, but this changed after the Mahele. In 1858 a case came before the Supreme Court (*Oni v. John Meek* - 2Haw.87, 1858 WL 4829 (Hawai‘i Kingdom)) which challenged the traditional *hoaaina* rights involving lands in Honouliuli and set a precedent. Native tenant Oni (plaintiff) challenged John Meek (defendant) for the costs of his horses and for the pasture use of the *ili* of Līhue and the *ili* of Waimanalo (Kō ‘Olina) in the *ahupua‘a* of Honouliuli. What the Court determined was that once *kuleana* land had been claimed by a native tenant and processed via the Land Commission Awards his lands were now owned in fee simple and he was subject to new terms in regard to rights to usage of *konohiki* lands.

> A hoaaina, holding his land by virtue of a fee simple title, is forever freed from the labor formerly due (under the ancient system) to the Government and the konohiki. If he performs such labor, it is neither by force of law or custom, but in fulfillment of a private contract. At the passage of the Act of the 6th of August, 1850, the former rights of the hoaaina to pasture his animals on the lands of the konohiki, ceased to exist. The term people, as used in the seventh section of the Act of 1850 held to be synonymous with the term tenants, as used in the law relating to private fisheries. Whatever private agreement, as to pasturage, that may have been made between the tenant and the konohiki can not affect the rights of the konohiki’s lessee of land, unless he had special notice of such agreement and bound himself to respect its terms (1)….
>
> Hoaaina of Honouliuli residing on part of ahupuaa of Honouliuli, either upon land awarded to him as kuleana, by the Land Commission, or otherwise was not entitled to right of pasturage upon kula land by custom, since custom contended for was so unreasonable, so uncertain, and so repugnant to the spirit of laws in force that it should not be sustained by judicial authority (3)….
>
> It appears, by the evidence submitted to us, that the defendant [Meek] holds, under three several leases, the entire kula land of the ahupuaa of Honouliuli, with the exception of certain portions expressly reserved by the terms of the latest lease, made on the 16th day of February, 1853; that the plaintiff [Oni] is a hoaaina of Honouliuli, residing on some part of that ahupuaa, either upon land awarded to him as a kuleana, by the Land Commission, or otherwise; and that two horses belonging to him were seized as estrays by the defendant’s order, on some part of the land leased to him, and carried to the Government pound, where they were subsequently sold under the estray law.
>
> During the argument of the case, great stress was laid by the plaintiff's counsel upon the clause in the lease of the 16th of February, 1853, which reads as follows, viz: “Aole e hiki i keia hoolimalima ke kue aku i ka pono o na kanaka e noho ana malalo o ka malu o ka aoao mua.” That is to say: “This lease shall not be construed as conflicting (or interfering) with the rights of the people living under the shade of the party of the first part (the konohiki).” He argued that by this clause the rights of the plaintiff [Oni], and all others living under the shade of the konohiki [Haalelea], were expressly reserved by the grantor, Mr. Haalelea; and that those rights included the right of pasturage for their animals. Neither the lease of the 3d of March, 1846, which covers the Ili of Lihue, nor that of the 15th of July, 1851, which covers the Ili of Waimanalo, contain any clause parallel to the clause we have just quoted from the lease of the 16th of February, 1853. So that before the plaintiff could claim to recover, by force of the reservation in favor of the rights of the people living under the konohiki, made in the lease of 1853, he must first prove that his horses were seized on the land covered by that lease, because it is expressly declared in that lease that neither the Ili of Lihue nor the Ili of Waimanalo are included in it, and that the terms and conditions of the several leases made in 1846 and in 1851, are not affected in any way whatever by the lease of 1853. No evidence having been introduced by the plaintiff, to prove that his horses were seized for trespass upon any part of the land covered by the latter lease, we are of the opinion that, so far as his claim depends upon the reservation referred to, in said lease, it must fall to the ground (3).

The Court decision explains that the decision of this particular case has far-reaching implications throughout the Kingdom affecting thousands of common people and carefully illustrates the differences in land-use rights before and after fee-simple designation. It also gives a glimpse of what was happening on the lands of Honouliuli from 1833 to 1858.

> But the claim of a right of pasturage, put forward by the plaintiff, is made to rest upon far broader grounds than that just mentioned, which fact renders this case one of great importance, not only to the large landed proprietors throughout the Kingdom, but to thousands of the common people. It is contended on behalf of the plaintiff that he, as a hoaaina of Honouliuli, has a right to pasture his animals on the kula land of that Ahupuaa, upon one or both of two grounds; first, by custom; or secondly, by statute law.
>
> It appears by the evidence that horses were first introduced on the Ahupuaa of Honouliuli about the year 1833; that within ten years afterwards they had become numerous; and that the horses belonging to the hoaainas were allowed to pasture upon the kula land, in common with those of the konohiki. It appears further that, about the year 1851, after the enactment of the new laws, relating to the tenure of land, a large number of the hoaainas of Honouliuli, including, as we understand Mr. Haalelea's testimony, some who had obtained awards for their kuleanas, and others who had not, came to Mr. Haalelea, the konohiki, and expressing their understanding and belief that under the new order of things they would be cut off from the enjoyment of some of their accustomed rights and privileges, including the right or privilege of pasturage they offered to continue to labor for him, as formerly, upon the konohiki's labor days, in consideration of his allowing them to enjoy all their accustomed rights and privileges, to which proposition he agreed; that since that time all the hoaainas who have duly performed their labor on the konohiki's days, have been permitted to pasture their horses on the kula land as formerly; and that the plaintiff is one of those who have continued to labor according to that agreement. It appears, also, that within the three years last past the defendant has repeatedly notified the hoaainas to remove their horses from the kula lands leased by him.
>
> Upon this state of facts, it is argued by the learned counsel for the plaintiff, that he, in common with the other hoaainas of Honouliuli, is entitled to the right of pasturage, by custom. On the other hand, it is contended, on the part of the defendant, that before the Court can sustain this claim on the ground of custom, the custom attempted to be set up must appear to have existed from time immemorial; to be reasonable, to be certain, and not inconsistent with the laws of the land.
>
> While we are of the opinion that the objection urged by the counsel for the defendant against the custom sought to be set up by the plaintiff, that it is not shown to have obtained from time immemorial, is entitled to great weight, we do not think it necessary to express a conclusive opinion upon that point at present. For it is obvious to us that the custom contended for is so unreasonable, so uncertain, and so repugnant to the spirit of the present laws, that it ought not to be sustained by judicial authority. Further, it is perfectly clear that, if the plaintiff is a hoaaina, holding his land by virtue of a fee simple award from the Land Commission, he has no pretense for claiming a right of pasturage by custom, for so far as that right ever was customary, it was annexed to the holding of land by a far different tenure from that by which he now holds—a tenure by which the hoaaina was bound to labor a certain number of days in each month, for the immediate lord of the land, and a like number of days for the King or Government, as payment or rent, both for the use of the land and for the enjoyment of the other rights and privileges appurtenant thereto, whereas the very fact that the plaintiff holds his land by virtue of a fee simple title, frees him forever from the labor formerly due to the Government and to the konohiki; he no longer owes, nor can he be called upon to perform such labor, by law, as payment for the use of his land, or for the enjoyment of any right or privilege, and if he performs such labor it is neither by force of law or custom, but in fulfillment of a private contract.
>
> Again, if the plaintiff claims to be a hoaaina of Honouliuli, holding his land, not independently, upon an award from the Land Commission, but according to ancient tenure, in dependence upon the konohiki, and that, therefore he is entitled to the right of pasturage, by custom, he is met by the testimony of the principal witnesses introduced by himself, to the effect that, in the year 1851, he, in common with the other hoaainas of Honouliuli, admitted that his former right or privilege of pasturage was determined, by the operation of the new laws affecting the tenure of land, and that he has since been permitted to enjoy the right of pasturage for his horses, not by force of law or custom, but in consideration of certain labor which he has performed, in accordance with a special contract with the konohiki to that effect, made at a time when the right of pasturage could not have been said, with any show of reason, to have become established by ancient custom. And whatever private agreement as to pasturage may have existed between the plaintiff and the konohiki, that, of course, cannot affect the defendant's rights under his leases, unless he had special notice of such agreement, and bound himself to respect its terms (5)….

The plaintiff's counsel tried to use the Joint Resolutions of November 1846 to claim rights of pasturage, but the Court declared:

> So far as these resolutions provided for a division of land, their provisions have been entirely superseded by other and more expeditious arrangements; for, while the great division of 1848 separated and defined the land of the King and Government, and that of each konohiki, the action of the Land Commission separated and defined the land of every hoaaina who succeeded in sustaining a claim before the Board. It was evidently the intention of the Legislature that whenever, in any case, a tract of land was divided between the several parties in interest, those rights which they had previously held in common, while their interests in the land were undivided, should cease to be so held (6)….

The Court continued to explain how and why the Act of August 1850 supersedes the Joint Resolutions of November 1846 and ruled in favor of the defendant (Meek):

> "Whereas, many difficulties and complaints have arisen from the bad feeling existing on account of the konohikis forbidding the tenants on the lands enjoying the benefits that have been by law given them: Therefore," etc. It was evidently the intention of the Legislature at the time of the passage of the Act of 1850 that the former right of the hoaaina to "pasture his horse and cow, and other animals, on the land, but not in such numbers as to prevent the konohiki from pasturing his," should cease to exist. It was inconsistent with the new system, and therefore was not reserved on the change of the law. That such was the general understanding throughout the country, after the passage of the Act of 1850, clearly appears from the evidence given in this case; and it is matter of history that during several subsequent sessions of the Legislature, petitions were presented for the enactment of a law granting to the common people the right of pasturage on the lands of the konohikis, but without success, on the ground that it would interfere with vested rights…. Let judgment be entered for the defendant, with costs (7).
>
> Hawaii 1858.
> Oni v. Meek
> 2 Haw. 87, 1858 WL 4829 (Hawai'i King.)

One of the most influential people in early historic Honouliuli was James Campbell (1826-1900), a Scotch-Irish born in Ireland. He became a carpenter like his father, but at the age of fifteen joined a whaling ship crew headed to the South Pacific. He eventually ended up in Lahaina, Maui in early 1850s where he took up carpentry once again. He married, but after a few years his young wife died. In 1860 James Campbell, James Dunbar and Henry Turton formed a partnership called Campbell & Turton and entered the sugar industry. The partners purchased their sugar cane from native growers and other independent planters that included Henry and Dwight Baldwin, L.C. Torbet, Captain McKee and J.M. Horner (Tester 1966). In 1863 Campbell & Turton's competitor, the Lahaina Sugar Co. went bankrupt and sold their holdings to the

partnership. By 1865 Dunbar left the partnership and the company became known as Pioneer Mill Company (Tester 1966). In 1870 Kamehameha V and his partners founded the West Maui Sugar Association however this company also folded and was sold to Pioneer Mill. In 1876 partners Campbell and Turton won an award for their sugar exhibition at the Philadelphia World's Fair. The following year Campbell sold his interest in the company to Turton (Tester 1966). A few years later (1885) Turton went bankrupt and the company's agents, H. Hackfeld & Co. submitted a bid to James Campbell and Paul Isenberg (Tester 1966), and H. Hackfeld & Company bought controlling interest in Pioneer Mill Company (Dorrance 2000:63). In 1889 Campbell once again sold his interest; this time to C. F. Horner who succeeded him as manager (Tester 1966).

Campbell married Abigail Kuaihelani Maipinepine Bright (1859-1908) of Maui in 1877. Her parents were Mary Kamai Hanaike and Isaac Maipinepine Bright said to be descendants of Maui royalty. She was a friend and staunch supporter of Queen Lili'uokalani and became president of the Hawaiian Women's Patriotic League (Silva 2004:130). They moved to O'ahu and Campbell began purchasing more land. One of his purchases in 1877 was 41,000 acres of Honouliuli lands (HA 2005). Campbell constructed fences, drove in about 32,000 head of cattle, and developed a prosperous cattle ranch with pastureland and approximately 4,047 ha (10,000 ac.) of agricultural land. In 1879, he also had the first well in the Islands drilled behind his ranch house. "After drilling several hundred feet down, they discovered a vast underground source of pure, fresh water" (BOWS 2004; HBM 2013). The ranch incorporated 'Ewa lands from Pearl Harbor to Barbers and Kahe Points west and north to Wahiawa (Day 1984:17-18; Yardley 1981:81, 100-102 referenced in Pacheco and Allen 2013:7). In 1889 Campbell leased Honouliuli and Kahuku lands to Benjamin F. Dillingham for fifty years; Dillingham built a railroad from Honolulu to Kahuku (HA 2005).

Campbell also delved in politics and was a friend of royalty. His daughter Alice told her granddaughter "that King Kalakaua would play 'poka' with her father at his Honouliuli ranch" (Goring 2012). In 1900 after a lengthy illness James Campbell died in his Emma Street residence (HH 2013); he was 74. He was survived by his widow, his four surviving daughters, Abigail Wahiikaahuula Campbell Kawānanakoa, Alice Kamokilaikawai Campbell Macfarlane, Beatrice Campbell Wrigley (last child of James Campbell to die in 1987 ending the Campbell Estate Trust twenty years later) and Ethel Muriel Kuaihelaniahumanu Campbell Shingle and their children. He left a trust, the Campbell Estate for his heirs; the trust terminated in 2007, but the Estate's business is continued by a new company, James Campbell Co. LLC, founded in 2004 (HA 2005).

In 1939 one of James Campbell's daughters, Alice Kamokila Campbell (1884-1971) Macfarlane [F. Walter], leased a beachfront portion of Kō 'Olina, Honouliuli, for her private residence, which she named Lanikuhonua (where heaven meets the earth). It was a very special place – known to be a retreat of the *ali'i* such as Kakuhihewa, and where Ka'ahumanu bathed in the sacred pools. Alice used her home at Lanikuhonua to preserve and promote the Hawaiian culture. Today Lanikuhonua Cultural Institute, a non-profit charitable organization affiliated with the James Campbell Company LLC, operates and maintains Lanikuhonua with Alice's mission in mind (PCH 2013; LCI 2013 and HBM 2013).

Kō 'Olina is mentioned here because of its significance in relation to Mauna Kapu, which will be discussed further in the ethnographic section. The master plan for Kō 'Olina Resort was created by Alice's son-in-law, Walter E. Flanders, Jr. who married her daughter Muriel Macfarlane (they are parents of Alice Flanders Guild, former executive director of 'Iolani Palace; Judith Flanders Staub [Puna of Pālehua]; and Mary Flanders Philpotts McGrath [mother of McDonald Philpotts] (Blakeman and Harada 2003).

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Photo 52. Alice Kamokila on the left with mom and sisters (Shingle Family, JCE 2003)

ETHNOGRAPHIC DATA AND ANALYSIS

The Ethnographic Survey (oral history interview) is an essential part of the Cultural Impact Assessment (CIA) because the ethnographic data helps in the process of determining if an undertaking or development project will have an adverse impact on cultural properties and practices or access to cultural properties and practices. The following are initial selection criteria:

- Had/has Ties to Project Location(s)
- Known Hawaiian Cultural Resource Person
- Known Hawaiian Traditional Practitioner
- Referred By Other People

The consultant for this Cultural Impact Assessment was selected because he met the following criteria: (1) consultant grew up, lives or lived in Honouliuli Ahupua'a, 'Ewa and vicinity (Makakilo, Pālehua); (2) consultant is familiar with the history and *mo'olelo* of 'Ewa and vicinity; and (3) consultant is a cultural practitioner of the area. Copies of signed "Consent" forms are provided in (Appendix H).

In order to comply with the scope of work for this cultural impact assessment (CIA), the ethnographic survey was designed so that information from the ethnographic consultant would facilitate in determining if any cultural resources or practices or access to them would be impacted by the implementation of the Mauna Kapu ICSD Radio Facilities project. To this end the following basic research categories or themes were incorporated into the ethnographic instrument: Consultant Background, Land Resources and Use, Water Resources and Use, Cultural Resources and Use; Anecdotal Stories and Project Concerns. Except for the 'Consultant Background' category, all the other research categories have sub-categories or sub-themes that were developed based on the ethnographic raw data (oral histories) or responses of the ethnographic consultants. These responses or clusters of information then become supporting evidence for any determinations made regarding impacts on cultural resources and/or practices including access.

The interviewee was asked to talk about his background; where he was born and raised, where he went to school and worked, and a little about his parents and grandparents. This category helps to establish his connection to the project area, his area and extent of expertise, and how he acquired his proficiency. In other words, how he meet the selection criteria. Ethnographic consultants either have family or personal ties to a project area/vicinity and/or are familiar with the history of the area.

Two cultural practitioners from the area were identified; only one, Uncle Shad Kane was formerly interviewed. The second person, Mr. McDonald Philpotts, (great-grandson of Alice Kamokila Campbell Macfarlane) was identified by three people; by Uncle Shad Kane, by staff of Nature Conservancy, and by a friend of his. However, no one had his current contact information (or would give it to me without his consent), and time constraints did not allow for more aggressive pursuits.

There is always a danger of not allowing the consultant's "voice" to be heard; of making interpretations that are not theirs; and of asking leading questions. To remedy this, the "talk story" method is used and allows for a dialogue to take place, thereby allowing the consultant to talk about a general topic in their own specific way, with their own specific words. All of the excerpts used are in the exact words of the consultant or paraphrased to insert words that are "understood" or to link sentences that were brought up as connected afterthoughts or related additions spoken elsewhere in the interview. The following "Consultant Background" provides an overview of the consultant, as well as information about his connection to the project area. Names will not be used because all statements are from Uncle Shad Kane, who he part Hawaiian and lives nearby in the Pālehua Subdivision of Makakilo Heights.

Consultant Background.

Shad Kane. My name is Shad Kane, born 1945 … raised on O'ahu. Time of birth we lived in the Pearl City land peninsula, at that time it was still owned by civilians. Subsequent to my birth date, the Navy proceeded to buy all the lands of the Pearl City land peninsula and make it Navy lands. *We moved to Wahiawa, later on to Kalihi, Kamehameha Schools, went to college in the mainland, spent some time in the Navy, and finished school at UH. Made a career as a police officer, retired in 2000 and since then have become much more involved in our Hawaiian Culture primarily through the civic clubs. Today, I am a Commissioner of the O'ahu Island Burial Council representing 'Ewa Moku and I'm also the Cultural Representative of the Clean Water, Natural Lands Commission to the City Council. The bulk of the money comes from property taxes and the City coffers for Clean Water, Natural Lands project. Also the State Aha Moku Council, representing 'Ewa Moku and a Board Member of the Kalaeloa Heritage and Legacy Foundation, a 501(3) nonprofit. We have a close relationship to the Navy Region; as a result [inaudible] Navy Region Historic Partners with respect to Section 106 and Federal projects, primarily Navy and Air Force properties, to reorganize Pearl Harbor into a joint base; Pearl Harbor, Hickam.

* [From a previous interview: *My mom wanted me to go to a Catholic school, so I ended up moving in with my grandfather in Kalihi and went to school at Saint Anthony's Elementary School. My seventh and eighth grade we moved to Chicago and spent two years living in Chicago where my dad went to school. We came back and I went to Kamehameha School and graduated in 1964. I spent two years at Utah State University, then spent four years in the Navy, and then went back to school and graduated from University of Hawai'i in 1976, and got a Master's degree subsequent to 1976 from Central Michigan University. At that time, I was in the Police Department, and in order to get promoted into administrative positions, you're in a better position if you had more than a high school diploma and more than a college* [*degree*]. *I think I just made sergeant at that time, so I found out that Central Michigan had an extension program, where you can work and also get a Master's degree. So I got a Master's degree in Public Administration. I became a policeman in 1971. I got three years credit for my military service – I spent four years in the Navy. So actual years spent* [*in police force*] *was 31 years. I retired as a lieutenant in November, 2000.*

My mom was Hattie Pavao Kane Gushikuma. My stepdad's name is Henry Gushikuma. My father's name is Tazoni Crowningburg Kane. My mom grew up in Honolulu; however, she spent time in Hālawa Valley, where her mother was from. My grandmother on my mom's side was from Hālawa Valley, Moloka'i. But she grew up in Honolulu. My dad's parents and my father grew up in Kohala, in the area of Hāwī. My dad's parents were sugar workers for the sugar industry of Kohala. My dad and his parents moved to Honolulu during his high school years, where they lived in Kalihi and he graduated from Farrington High School. That's my stepdad. My father Tazoni is also from Honolulu. He grew up for the most part at a place called Waiale'e. Waiale'e is between Sunset Beach and Kahuku. Most people are not aware of Waiale'e by name. I think most people refer to that as Vellzyland, because it's right on the beach. It's a surfing spot, the ancient Hawaiian name for where my father grew up, right on the beach. They had a house right there and there's burials right there on the beach in the sand dunes. Tazoni Kane's father Albert Kane worked at the Boy's Home, but it's referred to as the Waiale'e Boys' Industrial School. And so his early years were spent there, subsequent to that, they moved to town, Honolulu and spent many years working at the Pearl Harbor Naval Shipyard.]

So we are here today to talk about Mauna Kapu. My relationship with Mauna Kapu is actually the result of my participation in the civil clubs and tours, subsequent to that, establishing my relationship through the Hawaiian Civic Clubs with Campbell Estate Heir, Judith Flanders [Puna]. Who at that time owned the house, I shouldn't say that, the house belonged to Campbell Estate and she was leasing a house from the Campbell Estate although she was a Campbell Estate Heir. Judith Flanders was a member of the Kapolei Hawaiian Civic Club and as a result of that relationship; we participated with Judith Flanders in a restoration of a cultural landscape and *heiau* on her property up in Pālehua. That *kuleana* extended through Miss Flanders through the surrounding areas of her home to include other cultural structures both *mauka* and *makai* of her property, which led to access of Mauna Kapu and the Palikea Trail and also establishing a relationship between the civic club and Nature Conservancy of Hawaii. The result of these relationships I was able to acquire a certain level of cultural knowledge with the respect to cultural resources and biological resources in the area of Mauna Kapu.

# # #

Land Resources and Use.

Land resources and use changes over time. Evidence of these changes is often documented in archival records. Cultural remains are also often evident on the landscape and/or beneath the surface and provide information regarding land resources and use. However, oral histories can give personal glimpses of how the land was utilized over time and where the resources are or may have been. The specific place names are often forgotten over time or in this case can get lumped into one name as in ‘Ewa, which is the district but sometimes used as a reference to the project’s general area. Honouliuli, is the name of the *ahupua‘a* in the district of ‘Ewa, where the project is located. Mauna Kapu is the name of a mountain peak on the Wai‘anae range where the project is located. The cultural consultant knows the places names of the project area vicinity and is also familiar with the natural land resources and use of the project area and vicinity.

Project Area Vegetation

> There is [ti] and I don’t know if that’s old growth ti leaves and the problem is it’s hard to tell where the old growth is and it may have been planted recently. You find a lot of ti leaves all around Mauna Kapu even in the area that the *ahu* [altar] once was. They are struggling ti leaves, at that time. When Jan [pronounced Yahn] and I went up in that period [1995-96] there were a lot of ti leaves. But what is most obvious is all the *ohe*, all the bamboo.
>
> Nature Conservancy did a lot of reforestation up there and they planted a lot of plants, they did an awesome job but hard to tell if those are old growth plants or more recent. In the area of the trail, what most visible, is all the bamboo, all the *ohe*, that immediate area is all bamboo, *ohe*, and there’s ti leaves. It’s [bamboo] been there for as long as I can remember, the first time I went up there was actually back in the 80’s the first time I ever went. It was a tour, a Hawaiian Civic Club tour. Nature Conservancy was conducting tours and that’s how we heard about it. It was Barry Fox Morgan, before Pauline Sato, quite a while ago. Part of that was to get us interested in out-planting, that was part of that whole project, it was to get people interested in assisting them in hiking and planting native plants, reintroducing native plants onto the Preserve. Today, I think, I don’t know if Nature Conservancy is there but what I think is that Gary Gill and Ben Olson, they have taken on that responsibility of maintaining stuff up there.
>
> And Anu, I don’t know if you’ve met Anu, they hired him to be their Forest Ranger. He [Anu] takes care of that whole road, Pālehua Road and I think he maintains it all the way up to Mauna Kapu. I don’t know what he does beyond that, but as far as I know even the area up there was purchased by, I’m not sure so I shouldn’t say, but he maintains the area on both sides of the roads by keeping it accessible; all the way up to Mauna Kapu. We [Pālehua Nakoa and McD Philpotts] used to do that with the Campbell Estate before Campbell Estate folded over.

Area Trails

> For a while no one was able to go up there because some of that trail was washed away because of storm that they had, I’m sure they’ve fixed it by now…. We went until you could not go any further, so we beyond the trail, Jan and I and a bunch of our guys. To the point where you it got so narrow and you couldn’t go any further. You can’t even get that far [to Schofield]; you gotta pass through Pōhākea Pass. Pukaua is on the Wahiawa side of the trail, we were able to, if you are looking on the mountain range on the *makai* side of Pōhākea we were able to get as far as two peaks *makai* of Pōhākea, beyond that was way too dangerous.

Place Names in Vicinity

> Palikea - the name comes from [white] lichen - moss [on the cliffs].

Given the exact location of Pu’u Pālehua is hard you know. I asked people the exact location. Pu’umanawahua is easy because you can see it really clear, but Pālehua and Akupu because it’s referenced in tradition and referenced in *Sites of O‘ahu* but when you actually try to find it, I can’t tell where our Akupu is. Everybody that I talk to have different opinions, some people I talk to refer to Pālehua as, if you are looking at Pu’umanawahua there are actually three pu’u next to each other and the *maika* most *pu‘u* some people say is actually Pālehua. You cannot tell until you actually look at it, *mauka* looking down. The third one is actually offset but when you are looking at it from Makakilo it looks like three right next to each other.

All the maps identify, Pu’umanawahua is easy, but to find Pālehua and Akupu, Akupu is extremely important because tradition doesn’t make reference to Pu’umanawahua, don’t say a whole lot of reference to Pālehua, the only place you find only reference to Pālehua is from Kenneth Emory. So I went to Bishop Museum archives and tried finding specifically Pālehua and the reason I was doing that is to find significance to the stone structures on Puna’s property. Everybody says she lives at Pālehua so you say Pālehua Heiau but the reality is, our thinking was the name would have to be associated with the Pu’u, and if she’s correct and she lives on Pālehua, than that would mean Pu’umanawahua, the Pu’u I’m talking about is Pālehua. That’s why we were getting into that whole discussion about which pu’u up here is Pālehua. Because when you go beyond Puna’s property to look for what you have here, Akupu and Pālehua, I cannot find them. I didn’t tell Puna this, but I don’t think it is correct to refer to her property as Pālehua. To me Pālehua has gotta be more *mauka*, higher. This is Kumu John’s thinking; it’s associated with a ridge, a valley or a pu’u for that name. If you going to call something outside of that it is probably not correct, if it sits within that alignment, it’s probably correct. For Puna’s property to be sitting in Pālehua, one of the ridges that we refer to as Pu’umanawahua has gotta be the ridge referred to as Pālehua. Because if this is correct, what you have here, then Puna’s property is not in Pālehua. This is way *mauka*, its way above her property.

I talked to Bob Thorn. Bob Thorn worked for Finance Realty, and Finance Realty hired the construction company. I talked to Bob and asked them why they named the different projects the way they did, Makakilo, Pālehua, and he couldn’t give me a straight answer. Where I live is called Pālehua subdivision, if you look at a map we are so far removed from Pālehua it doesn’t make sense.

Our ahupua‘a [Honouliuli], our Moku [‘Ewa], it’s the highest point. From Mauna Kapu, on a clear day, you can see Kaua’i, you can Moloka’i, and you can see Lana’i, Kaho’olawe, and you can see Maui and Hualalai. Hualalai - it appears as a shadow, so the best time to make that observation is first thing in the morning. The biggest obstruction is the Kaiwi Channel; if you are looking through the Kaiwi Channel in the morning than you have an unobstructed view of the other islands. As a shadow, however, as the day passes you have a lot of weather in the Kaiwi and lose sight of it. It’s all in reference to Diamond Head, so if you are looking at Diamond Head, from Mauna Kapu, just to left of Diamond Head you can see a low shadow and you see a tall mountain, which is Haleakala, sitting on top of Moloka’i, the bottom shadow. If you looking to the right of that you see two fingers, the first finger is Lana’i, the second figure is Kaho’olawe. From the elevation is a clear division, you cannot see it from Pālailai, from Pālailai you can see everything except the division between Lana’i and Kaho’olawe because they are sitting right behind that shadow. But from Mauna Kapu it separates Lana’i and Kaho’olawe so you can see a very clear distinction between those two islands as a shadow and what you see is Hualalai as a pu’u. Hualalai is sitting on top the tip of Kahoolawe and I don’t think, I don’t know of anywhere else on O’ahu where you can make that observation. You can see it from Pu’u Makakilo too, we’ve got photographs from Mauna Kapu, I’ve got photographs, not from Pu’u Makakilo but from a house at the same elevation in Makakilo looking Diamond Head. That elevation you cannot see the distinction between Lana’i and Kaho’olawe. You have to make that observation over a period of days, the reason why is the first time you see it, the first thought in your mind is that it looks like weather. You gotta look at it several days in a row and it’s identical, that’s the only way because it looks like clouds but if you do it every day for several days in a row, same cloud, same place.

Honouliuli Internment Camp - it's in Honouliuli Gulch, I've been there several times, even with the Japanese Chamber of Commerce. From Mauna Kapu, I don't know if you can see it. You cannot, it's hard to make an observation from anywhere besides where I told you because how thickly forested it is, you cannot see through all that bamboo. The only place you can see through is at that northern most where that *ahu* used to be. From that point on, the bamboo is all behind you so you are looking out over Kunia and Wahiawa but as you walk back and you stay on that side, can't it's just too think.

Cultural Resources and Use

This category represents traditional Hawaiian cultural resources and practices and other ethnic resources and practices. The traditional Hawaiian cultural resources and practices, includes the pre-Contact era, as well as cultural practices after Contact. Cultural Resources can be the traditional *wahi pana* or sacred places, any cultural gathering place, or the tangible remains of the ancient past. One of the most significant traditional Hawaiian cultural resources is the *heiau* or place of worship. Other places of great significance for all cultures are the burial places of loved ones.

Uncle Shad has made several trips to Mauna Kapu and vicinity, primarily to learn about and *malama* or care for the cultural sites located there or in the vicinity or associated with it. He learned through other cultural practitioners that Mauna Kapu was associated with cultural practices and sites from Kō 'Olina, Paradise Cove and Makaiwa Valley/Gulch.

Mauna Kapu – Identifying Sites

After having acquired information regarding Judith Flander's property and the cultural landscape surrounding that, it led to Kapolei Hawaiian Civic Club and O'ahu Council to research the cultural landscape to include, not only the area of Judith Flander's property and surrounding property, but to research the *mauka* area of Mauna Kapu, all the way up to Schofield Barracks, Pu'u Hapāpā, which is the most Northern boundary of 'Ewa Moku that passes through the Waianae Mountains, down into the Kunia. So we became involved in researching all of that, with the assistance and cooperation of Campbell Estate, Nature Conservancy, Natural Area Reserve, Army environmental people. Much of the research work had to do with hiking, walking into the brush, and identifying cultural sites, primarily identified in *Sites of O'ahu,* so our efforts was to identify those sites references in *Site of O'ahu*, look for them and identify the level of disturbance within those respective properties of cultural landscapes to see the level of disturbance since the book was written and up until that period, which was back in the 1990s [Published June 1978].

So the immediate area of Mauna Kapu, the only cultural structure that Jan Becket and I was reasonably able to identify was an *ahu* that's referenced in *Sites of O'ahu* [on peak outside of project boundary]. What made this *ahu* extremely interesting to Jan Becket was the fact that it was built of both basalt and coral, which in the *mana'o* of Kumu Hula John Ka'imikaua, who was our person who assisted us in cultural protocols as a result of us walking up to cultural properties and the discovering and touching of cultural structures, he assisted us in those protocols necessary to keep us safe.

Mauna Kapu Association with Kō 'Olina

His [Kumu Ka'imikaua] *mana'o* [thoughts/knowledge] regarding the construction of that *ahu* and the name associated with the name of Mauna Kapu had to do with the linear relationship with Mauna Kapu and the area we identify today as Kō 'Olina. In his *mana'o* and his studies, the coral and basalt solidified the *mana* associated with that lineal relationship between the mountain and the sea. He identified the coral and coral and that had been carried from the area of Kō 'Olina to Mauna Kapu and structures, similar structures that still exists today at Kō 'Olina. His feelings were

that the basalt located at this cultural structure by Kō 'Olina, the basalt was carried from Mauna Kapu, and comprised of coral and basalt at this *makai* structure. So he identifies this relationship between this *makai* structure and Mauna Kapu and everything in between associated with this cultural landscape.

Lei Fernandez who was the first employee of Campbell Estate, mother of Maddie Tiffany, makes reference to the same *kapu* associated between Kō 'Olina and Mauna Kapu and the cultural landscape in between.

The *makai* structure, most people refer to it as a fishing shrine, its right on the bend of Farrington Hwy as Farrington Hwy bends in the Waianae direction. As soon as Farrington Hwy passes all the exits to Kō 'Olina, on the left hand side, is the ocean, within Farrington Hwy and the ocean is a site that is also identified in *Sites of O'ahu*, referenced as a fishing shrine. There is a consistency of the construction of the fishing shrine and the remnants, and the narratives associated with the construction in *Sites of O'ahu* with the *ahu* in Mauna Kapu, both being built of basalt and coral. Jan Becket and I, back in the 1990s attempted to find that particular *ahu*, both sites, we were able to go to the *makai* site and identify it as a fishing shrine, we were able to identify the fact that that structure, although badly eroded, we were able to identify both platform made out of both coral and basalt. Hiking up to Mauna Kapu, we were not able to find a structure on the same level as disturbance, what appeared to be more eroded, because that structure was actually built just off the slope on the North West corner of Mauna Kapu. So in that area you see scattered basalt and scattered coral slabs, so in the *mana'o* for both Jan Becket and Shad Kane, we believe that was the remnants of what once was the cultural structure *ahu* identified in the *Sites of O'ahu*. To that date the only cultural structure we could find in that immediate area, and again, that structure was an eroded portion of Mauna Kapu.

You go into the bamboo, before you come down you make an immediate right turn. You walk through the forest, all the way to the extreme North East corner looking to Wahiawa, looking to the North Shore. So right in that immediate area, where you have a visual of Wahiawa and Mililani, and Kunia, when you looking in that area, you have to walk down the slope because it's badly eroded. So our thinking that it may have been higher up on the slope at one time but because of the level of erosion, the scattered *pohaku* is of the basalt and the coral. The reason why we can connect it with the *Sites of O'ahu* is because of the coral, the coral is so out of place. The coral slabs on the side of the hillside that has slipped down and it's on that face looking, you can actually see Wahiawa, see Mililani, see the North Shore, see Kunia. So that is the area, my best judgment is looking directly north.

Mauna Kapu Linear Relationships

I don't want it to seem like I'm an expert in Hawaiian language but much of what I share, actually comes from other people. My Hawaiian language is very limited, I took Hawaiian but I don't tell people I'm a Hawaiian speaker, but with respect to this specific area and the place name, my information that all comes from Kumu Hula John Ka'imikaua. Kumu John, much like Rubellite [Kawena] Johnson, speaks about linear relationships and that relationship is always *mauka* and *makai* and he speaks in terms of a subsistence lifestyle - that *mauka* and *makai* subsistence lifestyle, which is the same thing Rubellite Johnson talks about basically formed our thinking of our *ahupua'a* boundaries. But Kumu John speaks of it more in terms of a spiritual religious relationship between the mountain and the sea and the *wai-a*-Kane and the flow of water. He also speaks of it in terms of connecting burials within that region, in the burials, his *mana'o*, was that coral and basalt was a part of burials in this area. He's not talking about other places; he's just speaking about that very strong relationship between Mauna Kapu and the area down below, Kō'Olina. I'm just sharing a little bit and I'll try to share a little bit more so that you understand because there are large numbers of mounds within that relationship. They are actually below Judith Flanders' home, in that alignment between Mauna Kapu and Kō 'Olina; substantial numbers of mounds, seemingly no real reason to be out in the open and different area on and most of them appear to be on more of the

western facing slope. The thing you have to understand of Kumu John, the *mana'o* he shares is associated more with the Moloka'i tradition, so he takes Moloka'i traditions and tries to make sense of the things on O'ahu. With respect to that alignment with Kō 'Olina and Mauna Kapu with the main construct, Mauna Kapu, it partially comes from the burials associated, all facing in the westerly direction and he talks about the West, the night and Pō and the Leina and Ka'ena. So they all kind of associated in that direction and there is also a mound in the same area with substantial amount of burials and he refers to it as a hula mound and it's all on this western facing slope.

[The hula mound] is in Pālehua. When you look at it it's a platform and you can't miss it when you see it. It's a broad pile of stones, flat for the most part, but sloping down where it connects to the sloping part of the hillside. It juts out to the hillside, and it falls down and tapers into the natural landscape of the gully as you are going down. It appears to be, from a distance, a long wall but in fact it is not a wall but a platform that is supported by a lot of stone beneath the platform and it's still there. I would hope it's still there, you access it through the Pālehua Road, pass the intersection going to Timberline and you take the left-right fork as you go straight up, there's a ranch gate on the left where Buddy Gipson was leasing. As you are going through the corals, it's right on the *makai* side of the road, its' very obvious and in that immediate area there is substantial number of mounds.

There is also a stone that Marion Kelly refers to as Ku-ula Walking Stone and that stone was there the last time I was there and that stone has a human shape, maybe about two and a half feet tall, has a shape of a head and the shape of a torso, it's all in the immediate area.

Linear - straight line. It actually passes, if you draw a line the fishing shrine, right at the border where Kō'Olina begins and the road bends towards Waianae, that fishing shrine should still be there. I went about a few years ago and you walk through the grass you see all the coral and all the basalt still there and at that time there was an upright stone and Jan Becket got photographs. *Pana O'ahu: Sacred Stones, Sacred Lands*, [Jan Becket and Joseph Singer] is images of a lot of cultural structures on the island of O'ahu, he took photographs of the upright stone, that stone was in there when Jan Becket went to take photographs and it was in there five or six years ago when I went, in the California grass, couldn't see it because the grass is so tall so you gotta walk in there but that structure is still there. Take a look at it - it actually passes right through Makaiwa Gulch.

When Campbell Estate was going through their plans to build Makaiwa Hills, they hired Cultural Surveys Hawaii, and Cultural Surveys did an archaeological survey and even much of the area I'm familiar is actually up above the Makaiwa property but the interesting thing, the survey done by Cultural Surveys, they found substantial numbers of cultural structures within Makahiwa Hills, to include caves that had rock walls inside. One particular cave had what appeared to be elevated platform that was used as a bed because of olona fragments that was on this platform within this cave, a lot of fractured basalt, so it looks like someone was making tools with basalt. There are actually several caves with walls but the most interesting one is the one with the *olona* and basalt shavings. It's all within the natural alignment. At the very top of Makaiwa Hill, within this alignment, is another platform.

The fishing shrine, cultural surveys work at the lower elevations, the Ku'ula Walking Stone identified by Marion Kelly, the hula mound identified by Kumu Hula Ka'iimikaua, all the mounds in this area. It's all within Makaiwa Gulch, Makaiwa Gulch actually stops at Judith Flanders property and right where it stops is an undocumented platform. It's a terraced platform, gotta still be there because of the amount of stones that were there, I can't imagine anyone walking in there and moving them.

Kō 'Olina Spirit Connection

With respect to Mauna Kapu and the coral and the basalt and the names, much of it, much of the understanding comes from Lei Fernandez, whose daughter is Maddie Tiffany.

Kamokila [Alice Campbell Macfarlane] is also one of the Campbell heirs - during the latter part of the early 1900s, Kamokila moved to San Francisco, lived there for a while and returned to Hawaii and she wanted to live in the ways of the old people, so she convinced the estate to allow her to lease and live on the property, today it's Paradise Cove, and she established a relationship with Lei Fernandez. Kamokila and Lei Fernandez talk often about people walking from the sea, passing through their property, walking mauka to the area where today is known as Honokai Hale, walking into the valley as Kumu John refers to with all these mounds as burials, they make reference to these spirits walking through that area up into that area with all these mounds. Kamokila took that serious - when she planted the *naupaka*, in the latter part of the late 40s and early 50s, she made sure that her gardener left an opening in the naupaka bush on the ocean side and the mauka side to allow these people to pass through her property. Now all of this was a result of her conversation with Lei Fernandez. Lei Fernandez was able to convince her about the sacredness between the relationship between the ocean and the upper regions of Mauna Kapu, that particular area. It was to allow those people to walk through this area.

I have somewhat of a personal experience with the numbers of accidents associated with the Honokai Hale area. As a retired lieutenant one of my last jobs was to read police reports for grammar, for content, making sure they had all the elements for a case and amongst those reports we had frequent cases, reports that I read, with respect to this immediate area between Kō 'Olina and Makaiwa Gulch. Makaiwa Gulch is where much of this cultural landscape resides in this particular area but many police reports were statements in the reports was the driver or the passenger saw somebody on the road crossing where they swerved off the road hit a pole or media or oncoming car. A lot of those had to do with seeing something on the road and often times in the report they mention seeing one lady.

All of this with respect to the *mana'o* that was shared by Kumu John Ka'imikaua and also having an understanding in *Sites of O'ahu,* they identify Kō 'Olina as the favorite vacation place of Kakuhiewa. Kakuhiewa was also referenced as the person responsible for the building of several *heiau* in the Waianae and Nanakuli area.

Meaning of Mauna Kapu

The name comes from all of these that I shared with you, the *kapu* that are associated it extended from the beach to the mountain, people living a subsistence lifestyle anciently, probably prior to Kakuhiewa and maintaining that *kapu* out into the ocean. Back in the 1990s I talked to a number of fishermen who lived, one of them was one of our Nakoa, who told me that the waters of Kō 'Olina was also *kapu* water and it was their understanding that no one was allowed to fish in the area around Paradise Cove. At that time, where we were doing all this research, Jan Becket and I, Kumu Hula Ka'imikaua, associated the name Mauna Kapu, associated the name with the linear relationship between Kō'Olina all the way to Mauna Kapu and these bits and pieces of information lend support to all of this, what I just shared.

It's aligned, if you draw a straight line. I never had an opportunity to walk, above that is private property, above that is homes so I would think the level of disturbance. Puna's property is the most *makai* residence; the undisturbed portion is up to Puna's property, once you get above Puna's property there is a higher level of disturbance because from that area all the way up to Mauna Kapu there are homes and there are driveways. To get a real good idea of the cultural landscape it's up to Puna's property, so between Puna's property and Mauna Kapu it has been severed much, then the cultural land begins again at Mauna Kapu, if you follow that natural ridge line. That place is a very interesting place and it's sad that we don't go up there anymore and I don't know if anyone is taking care of it.

Well, I would say based on my conversation with Kumu John, based on my respect for him as the traditional cultural person. His feelings were that it [the name Mauna Kapu] is very old; we never talked about how old but he makes reference to Kakuhihewa, in the 1500s or around that period of time.

> The only thing I can say is that [places] such as Mauna Kapu; all that in the mountain area, is considered sacred places and reserved for only certain people. Even that **heiau*, that coral and basalt was not made for everybody; it was probably just made to serve certain individuals. [*There were several types of *heiau* or 'places of worship' ranging from very small to very large; an *ahu* or "altar" was a part of the *heiau* and sometimes all that remained. However, some '*ahu*' were also stand alone structures like those at *ahupua'a* boundaries; or used by fishermen and bird feather gatherers as *ku'ula* or shrines.]

# # #

Water Resources and Use.

The Hawaiian word for fresh water is *wai;* the Hawaiian word for wealth is *wai wai.* This is because of the value the ancient Hawaiians placed on fresh water, which was crucial for growing taro, the staple of the Hawaiian people using the '*auwai* or irrigation system. Fresh water was also crucial in the lifecycle of stream inhabitants such as the *'o'opu* and '*opae*, as well as some of the marine life that depended on the benefits of brackish water areas. Fresh water was valuable in other ways such as natural springs or ponds.

No mention of fresh water was made by Uncle Shad in specific reference to Mauna Kapu. However, as part of the Wai'anae range, was part of the watershed crucial to Honouliuli.

# # #

Marine Resources and Uses.

The sea can be a great resource to people with access to its bounty. Honouliuli Ahupua'a was part of a coastal environment settlement, the former inhabitants fished and gathered there, but they were also connected to the *mauka* lands. This is explained in the previous section on Cultural Resources and Use – the connection between Kō 'Olina/Paradise Cove and Mauna Kapu; the similar coral and basalt at both places, and the alignment of cultural sites from Kō 'Olina to Makaiwa Gulch/Hills, Pālehua and Mauna Kapu.

# # #

Anecdotal Stories.

Consultants usually have many stories to share. Some of these stories are not always germane to the research categories. However, they are too precious not to share as they give a broader view of the life in 'Ewa. The following story from Uncle Shad expands on Kalaeloa as an example of connecting *mo'olelo* and cultural remains. The area now called Kalaeloa is south of Mauna Kapu.

Kalaeloa Heritage Park: Evidence of Migration, Ancient Place Names and Water Sources

> It's interesting when you talk about names and their relationship with different geographical areas and what they are today and what they may have once been. Finding a level of consistency, the interesting thing is if you want to compare what we are talking about to our studies here, our work here. The common Carbon-14 date is 1450, and that's from Dave Tuggle. 1450 is common, plus or minus 1600 or as old as 1300 so you how broad that is, but the reality is that it could be as recent as the 1600s. To me that is amazing, it's not that old but what makes it extremely interesting is, we are talking about names and place. The name of this place is Kanehili. Kanehili is associated with migration, that period of time, and it makes reference - this place is referenced in the story of the travels, in the story of Kane and Kanaloa, by the very nature it's referenced in that tradition. So it's

a period of migration and Kane and Kanaloa the migration we think occurred over 1,000 or maybe before that, but we don't really know how old that chant is, that story is, we know it's old. So this place is called Kanehili, the structures are not Hawaiian, the structures here are not built in the Hawaiian fashion, it's built in the Tahitian fashion, coupled with the fact that Carbon-14 is 1450, could be as recent as 1600. It tells me the people that lived here during this period of 1450 and 1600 still identified themselves as their place of origin if in fact they came from Tahiti. In my mind, how long, in fact, does it take a migrating people to see themselves other than their place of origin? We are talking about names, we are talking about Kane migration, either these people were traveling back and forth much more recent than most of us think, if not. What is it about their lifestyle that makes them still build in the old way, of the place of their origin? It raises so many questions, at least in our minds. The question that always comes up is that people have a hard time understanding the manner in which these things were built over here. That is the question that comes up over here. 1450 – 1600, I thought Tahitians were here back in the early 1,000 AD. They only speak of a few migrations.

Everybody is stuck in the idea that the migration and travel took place only in that period and what this does here is raise a question on that they were traveling back and forth much more recent. Even the story associated with this place is associated with a guy named Kaha'i. Kaha'i was the grandson of Moikeha. That's not that long ago, my understanding of the genealogy is that Moikeha came around 1200-1300.

It's really a struggle when you are talking about time and you are talking about architecture and names, it raises a whole bunch of interesting questions. The story of Kane and Kanaloa, it's my understanding; it's one of the oldest stories. The story of Pele and her travels, what I was told, it was a very old story but they make reference to Kanehili.

Our understanding is because this place is so hot and void of water, because most places, water travels from the mountain to the sea…just before the water that's your traditional river system. Over here it's different, there are no rivers. So over here what happens, what was abundant was coral because they say it was much more eroded than Hawai'i Island. Hawai'i Island is a younger island so you have basalt on top of coral so cultural structure are made out of basalt but on O'ahu and Kaua'i, in areas such as Kapolei, most of the structures are built out of coral because coral was abundant, it's a much more eroded area. You pass fresh water over coral and we all know it dissolves the limestone so it creates a whole series of caves. Water travels the same manner, but you cannot see it, as the water hits the flat land the water slows down, it deposits all the soil. So although the soil is not on the surface all the soil underground so they use sink holes to grow stuff, to grow their plants and grow their food. We are still experimenting with this; we are planting plants inside of sink holes and trying to see how well they do with minimal irrigation.

We just had UH West O'ahu here Saturday and we've been conducting experiments with the same plants, some no water, some water once a week, some once a month. We are doing this to experiment, to try to determine the level of water as it once was and what we found is that we were able to identify where the rivers once ran. So we have a pretty good idea where the rivers ran by identifying agricultural sinks. Agricultural sinks actually in areas of organic material so that's identifying the underground banks of the rivers. So they built water sink holes, this is all from Dave Tuggle; they built water sink holes where water is moving the fastest. So that's the water that we are drinking, right in this particular property we have two sink holes almost adjacent to each other. One is a water sink hole and one is an agricultural sink, the agricultural sink identifies the underground banks of the underground river. But with respect to time, the interesting thing is, that the name of this place is in an ancient story, yet the Carbon-14 date that all other aspects with respect to the archeological structures seem to lend support that this place is much more recent than 1,000 AD. It's gotta be much more recent than that and the names, we hope, are accurate. Like we are talking about Mauna Pālehua, we make decisions or interpretations based on a name with respect to a geographical area so if that name is not correct we are making a wrong interpretations for the kind of things that we do, maybe to others it's not a big deal but for us we interpret things

and we use resources as a means to make those interpret so names become critical in respect to a geographic location.

# # #

Project Recommendations/Comments.

This special section is included when ethnographic consultants make any recommendation and/or comments about the project in general. Uncle Shad did not feel the project would impact any cultural sites.

> From what I understand where the work is going to be done, in that immediate area there has been substantial disturbance in the construction of the stairs. So you can actually take a good look at the stairs and the actually cut away portions of Mauna Kapu in the construction of the stairs. I would say in the foot print of the stairs and two to three feet on both sides of the stairs, substantial disturbance…. The amount of disturbances up there is a lot, people might say not, but the amount is considerable.
>
> I participated with the Army; I forget what branch of the service. The antenna [towers], there's the antennae…. The level of disturbance is so great I wouldn't be worried about it…. In the area of the stairs, it has been altered a whole lot.

CIA SUMMARIES and ASSESSMENT

This cultural impact assessment (CIA) is based on two guiding documents: Act 50 and Environmental Council Guidelines (1997) [see Appendices A & C]. H.B. NO. 2895 H.D.1 was passed by the 20th Legislature and approved by the Governor on April 26, 2000 as *Act 50* (see Appendix A). The following excerpts illustrate the intent and mandates of this Act:

> The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit' in Hawai`i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.
>
> Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.
>
> The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

Summary of Findings

The following summaries are based on the information presented in the previous sections: the traditional (cultural) and historical literature background review and the ethnographic data and analyses. References are not cited unless it is new information and not already cited in the text above. These summaries condense the information above, but also serve to focus on a few significant individuals and events in history in relation to the project lands in the *ahupua'a* of Honouliuli, 'Ewa District, O'ahu Island, as well as give a broad overview of land, water and cultural resources and uses in the general area, as they reflect cultural resources (properties) and practices and access to them.

Summary of Significant People and Events. According to traditional and historical material, most of the land in Hawai'i has gone through land modifications over time, including the lands of Honouliuli Ahupua'a, and have witnessed the comings and goings of many significant people. Some of these people may have contributed substantially not only to the history of this area, but of O'ahu Island and the rest of the Hawaiian Islands as well. There were several people and events noted in the oral histories. Some of these significant entities traversed these lands or vicinity.

Legendary Entities. There are several *mo'olelo* about legendary entities connected to the 'Ewa district. One of the earliest *mo'olelo* is about the gods Kāne and Kanaloa throwing a stone to mark the boundaries of the 'Ewa district. Another *mo'olelo* is about Hi'iaka, sister of volcano goddess Pele who while traveling with her companions through 'Ewa, stopped at the spring Hoakalei to pick *lehua* flowers to make a *lei* and saw her reflection in the water. Other stories involve another sister of Pele, Kapo, whom Pu'u Kapolei is named after. In another *mo'olelo* the hill at Ft. Barrett is connected to the deity Kamapua'a.

Pre-Contact *Ali'i Nui.* The *ali'i nui* or *ali'i 'ai moku* would have jurisdiction over all of O'ahu's lands, assigning lesser chiefs or *konohiki* to oversee each *moku* or *ahupua'a.* Most of the O'ahu chiefs are descendants of the Nana'ulu line. Nana'ulu married his sacred sister Kapumaleolani and they had a daughter named *Kahauomokuleia*. But it was through his union with another wife Ulukou that the line was passed down through their son Nanamea**,** to fourteen generations later to Maweke who became a ruling

chief of Oʻahu. His great-grandson Mulielealii who with his wife Wehelani had three famous sons: Kumuhonua II (who became the 1st *Aliʻi Aimoku* of Oʻahu), Olopana and Moikeha, and a daughter Hainakolo. Mulielealii's brother Keaunui was a chief of ʻEwa, Waiʻanae and Waiʻalua. Two of Kalai-Manuia's (12th *Aliʻi Ai Moku*) sons were raised in west ʻEwa; Kaihikapu-a-Manuia (14th *Aliʻi Ai Moku*) in Waimanalo, the western end of Honouliuli and Haʻo lived in Waipiʻo, but his followers lived in Honouliuli to Waipiʻo. Kākūihewa (15th *Aliʻi Ai Moku*), son of Kaihikapu-a-Manuia was a very famous and well-loved ruling chief of Oʻahu; one of his royal residences was in ʻEwa.

Oʻahu *Aliʻi Ai Moku*:

1st Kumuhonua II

2nd Eleluukahonua

3rd Kahokupohakano

4th Nawele

5th Lakona (ruled ʻEwa/Waianae/Waialua; his cousins Maelo ruled Kona, Oʻahu and Kaulaulaokalano ruled Koʻolau; Lakona's wife Alaikauakoko was once the wife of Kanipau 4th Aliʻi Ai Moku of Hawaiʻi Island who was usurped by the Pili line – Kanipau exiled himself to Molokaʻi, but his grandson Kalapana later became a Mōʻī of Hawaiʻi Island)

6th Kapae-a-Lakona

7th Haka-a-Kapae (Oʻahu chiefs revolted and killed Haka at his fortress near Waewae, Līhuʻe, then 'elected' Māʻilikūkahi who was a descendant of Moikeha - 1st Aliʻi Ai Moku of Kauaʻi and brother of Kumuhonua II; Moikeha's grandson Kahaʻi was a famous voyager who sailed to Kahiki, Wawae, Upolu and Sawaii and brought back *ulu* that was planted at Puʻuloa, ʻEwa; Haka's granddaughter would later start the Kualiʻi line of Oʻahu chiefs)

8th Māʻilikūkahi (11 generations from Moikeha, brother of Kumuhonua II; born at Kūkaniloko birthstones and 'coronated' at Kapukapuakea Heiau in Waialua; from Maweke & Paumakua lines; raised at Wahiawa, Kanewai and Waialua, but later made Waikīkī his permanent residence; ended human sacrifices; Hilo and Maui chiefs raided Oʻahu (ʻEwa) during his time & were defeated in Kipapa Gulch)

9th Kalona-iki (born at Kūkaniloko; second son of Lōlae-o-Halona married Keleanuinohoanaapiapi - sister of Kawaokauhele, father of Piʻilani – their children were all born at Kūkaniloko; his brother Kalona-nui was the father of Kalamakua who also married Keleanuinohoanaapiapi and had Laʻielohelohe who was bethrothed to Piʻilani – together they were progenitors of the very famous Piʻilani line of Maui ruling chiefs)

10th Piliwale (oldest son of Kalona-iki; his daughter and granddaughter became 1st and 2nd female ruling chiefs of Oʻahu – all were born at Kūkaniloko; another daughter Kohepalaoa married her famous spear-throwing cousin Kaholialale, son of Piliwale's brother Lō-Lale and Keleanuinohoanaapiapi of Maui)

11th Kūkaniloko (w) (1st female ruling chief of Oʻahu; born at Kūkaniloko and carried the sacred name; married Luaia, grandson of Maui co-ruling chief Kakaʻalaneo - with brother Kakae; and cousin of Piʻilani, Maui Ruling Chief)

12th Kalai-Manuia (w) (born at Kūkaniloko – daughter of Kūkaniloko, ruled for 65 years, famous for building fishponds at what is now Pearl Harbor and various ahupuaʻa surrounding those waters; her son Kaihikapu was also famous for building fish ponds)

13th Ku-a-Manuia (given lands of Kona and Koʻolaupoko, greed got him killed)

14th Kaihikapu-a-Manuia (grew up in Waimanalo/Koʻolaupoko; married Kaunuiakanehoalani, chiefess of Koʻolau, great granddaughter of LōLae and Kelea and daughter of Kanehoalani; their son Kākūihewa grew up in Waipio, Waiawa, Manana, and royal residences in ʻEwa, Waikiki and Kailua - a very famous Oʻahu ruling chief.)

15th Kākūihewa (born at Kūkaniloko; taken to Hoʻolonopahu by grandfather Kanehoalani; 48 chiefs present at birth - e.g., Makohau, Ihukolo, Kaaumakua, Pakapakauana; sacred drums Opuku & Hawea sounded at his birth; he married Kahaiaonuiakahuailana or Kaea-a-Kalona, daughter of Napulanahumahiki, son of Hao and Aunt Kekela - with this union Koʻolauloa united with Waianae and Waialua; he had several other very well connected

wives of the various Oʻahu, Maui and Kauaʻi branches; when Kākūihewa died Oʻahu was divided between his three eldest sons: Kanekapu-a-Kuhihewa (ruled from Kailua); Kaihikapu-a-Kakuihewa (2nd son ruled Waikīkī and ʻEwa); and Kauakahinui-a-Kakuihewa.

16th Kanekapu-a-Kuhihewa (set up court and ruled from Kailua; he is the ancestor of Papaikaniau, mother of Maui Moʻi Kekaulike; his wife Kalua-o-Hoohila was a descendant of Haka's granddaughter)

17th Kahoowahaokalani (Koʻolaupoko chief, Maweke line; ruled from Kailua; his mother descended from Haka of Oʻahu & Ilihiwalani of Kauaʻi; he married Kawelolauhuki a Kauaʻi chiefess)

18th Kauakahi-a-Kahoowaha (he also ruled from Kailua; introduced the *kapu-moe* to Oʻahu from his *ohana* on Kauaʻi, from Oʻahu it went to Maui to Kekaulike; he married Mahulua and they had Kualiilanipipililanioakaiakunuiakealuanuuokuiialiikahalau - Kualiʻi)

19th Kualiʻi (born in Kailua - raised in Kailua and Kualoa, the sacred drums Opuku and Hawea were sounded at his birth; famous for his *Law of Niaupio Kolowalu*; Kualii defeated ohana Waialua army at Kalena on plains of Heleauau [Haleʻauʻau, Līhuʻe] and later defeated ohana army of ʻEwa at Malamanui and Paupauwela uniting Oʻahu again; he was one of Oʻahu's most famous rulers; he was married to Maui chiefess Kalanikahimakeialii, daughter of siblings Kaulahea II and Kalaniomaiheuila - Kaulahea II was also the father of Maui *aliʻi nui* sibs Kekaulike and Kekuiapoiwanui I who were parents of Kamehamehanui, Kahekili & Kalola and grandparents of cousins Kalanikupule, Kiwalaʻo and Liliha Kekuiapoiwanui; half-sibs Kiwalaʻo and Liliha Kekuiapoiwanui were parents of Keʻōpuolani, sacred wife of Kamehameha I; the sons of Kualiʻi and Kalanikahimakeialii - Kapiohoʻokalani and Peleioholani – were cousins of both Maui and Hawaiʻi Island ruling chiefs, as well as Kauaʻi Island *aliʻi nui*)

20th Kapiohookalani (after Kekaulike's death, Kapiohookalani invaded Molokaʻi; he was defeated and slain by Alapaʻinui [half sib of Kekuiapoiwanui I and uncle of Maui Mōʻī Kamehamehanui and Kahekili] at Kawelo)

21st Kanahaokalani (was six years old when his father was slain at Kawelo, so his uncle Peleiohōlani, who was ruling Kauaʻi at the time, was brought back to be regent ruler of Oʻahu; Kanahaokalani died the following year at seven years old)

22nd Peleioholani I (several battles were avoided because he was first cousin of Alapaʻinui, ruling chief of Hawaiʻi Island; however when half-sibling brothers Kauhiaimokuakama and Kamehameha nui went into battle with each other over the domain of Maui after the death of their father Kekaulike, they asked their uncles Peleiohōlani and Alapaʻinui to help them with warriors and weapons, the first cousin uncles went into battle from Honolua Bay to Puʻunēnē where they once again called a truce, but this time after tens of thousands of their warriors died. This was Maui's biggest civil war)

23rd Kumahana (he was just a youth when he became ruling chief and was deposed in 1773)

24th Kahahana (born at Kūkaniloko to ʻEwa chief Elani and Kaionuilalahai daughter of Kualiʻi, making him grandson of Kualiʻi, nephew of Peleioholani, cousin of Kumahana and great-grandson of Kaulahea II; grandson of Kekaulike; and nephew of Kahekili II and raised in Kahekili's Maui court; Kahahana was voted to be ruling chief by the Oʻahu Council of Chiefs; he was later tricked by his uncle Kahekili and when he did not give Kahekili control of Kualoa; he was later killed at Maunakapu, near Moanalua – he was the last of the Kualiʻi ruling line)

Contact/Post-Contact/Historic *Aliʻi nui*

[The next two *Aliʻi Ai Moku* were not Oʻahu-born chiefs although they were related many times over; this was also in a period referred to as Contact (1778)/Post-Contact and Historic when Oʻahu was conquered by Maui.]

25th Kahekili II (also 25th Maui Mōʻī; son of Kekaulike, ruling chief of Maui; fanatical warrior and well-known athlete; said to be the biological father of Kamehameha I; with half-sister Kauwahine they had Kalanikūpule)

26th Kalanikūpu**le** (also 27th Maui Mōʻī, after killing his uncle Kaʻeokūlani who was half-brother of his father Kahekili II and father of Kauai ruling chief Kaumualiʻi, last king of Kauaʻi; Kalanikūpule was later slain by Kamehameha I who was possibly his half-brother)

Kingdom of Hawai‘i Era

Kamehameha I conquered O‘ahu in 1795. In 1803 he settled on O‘ahu where he placed his chiefs over all the lands and put the chiefs and their men from Hawaii Island to work farming the lands of O‘ahu. Kamehameha I essentially became the king of all the islands except for Kauai. When Kamehameha I died, his successor was his son Liholiho (Kamehameha II) with Ka‘ahumanu as the Kuhina Nui or regent. They successfully “kidnapped” their cousin Kaumuali‘i who under duress turned Kauai over to the Kamehameha rulers.

Kamehameha II was the eldest son of Kamehameha I and Keōpūolani; he had a place in Pu‘uloa, ‘Ewa.

Kamehameha III was known to visit and carouse in ‘Ewa; he was involved with the sandalwood trade in ‘Ewa.

Two sons of Kina‘u, daughter of Kamehameha I became kings after the death of Kamehameha III - Alexander Liholiho or Kamehameha IV and Lot Kapuāiwa Kamehameha V; they were followed by William Charles Lunalilo, nephew of Kamehameha I and descendant of Pi‘ilani through both of his parents – he was the last of the royal Kamehameha line.

David La`amea Kalākaua and later his sister Lydia Kamakeha/Lili`uokalani descendants of Maui and Hawai‘i Island chiefly lines were the last rulers of the Kingdom of Hawai‘i.

Historic People and Events. The *ahupua‘a* of Honouliuli was awarded to Mikahela Kekauonohi also known as Anna M. Kekauonohi and Keahikini-i-Kekauonohi. She comes from a very long line of intermixed royal families from all the main Hawaiian Islands. She was born in Lahaina, Maui in 1805 and died in Honolulu, O‘ahu in 1851. She was the only daughter of Kahoanuku Kinau and Kahakuha'akoi Wahinie-pio. Her father Kahoanuku Kinau was the son of Kamehameha I and Peleuli, daughter of Kamanawa, half-brother of Kahekili and one of the famous twin uncles of Kamehameha I. Her mother Kahakuha‘akoi Wahinie-pio was the daughter of Maui chief Kekuamanoha, younger son of Maui ruling chief Kekaulike, and brother of many older siblings including Kamehamehanui, Kalola, Kahekili and Kaeokulani. This union made Kekauonohi the granddaughter of both Kamehameha I and Kekaulike. Kekauonohi was married to Kamehameha II (Liholiho), her uncle, but when he died she married Kauai *ali‘i* Abner Keli‘ihanoui (1832) and was the Governess of Kauai from 1842-1844. Keli‘ihanoui was once married to Deborah Kapule, former wife of Kaumuali‘i, the last king of Kauai, and Ka‘ahumanu. Keli‘ihanoui died in 1849 and was buried in Pu‘uloa, ‘Ewa. Kekauonohi then married Levi Ha‘alelea in 1850.

Levi Ha‘alelea was the *konohiki* of Honouliuli during the mid-1800s and leased lands to Captain John Meek, James Isaac Dowsett, and James Robinson for ranching and other pursuits. The most significant historic person of Honouliuli, was James Campbell (originally from Ireland) who purchased the lands where he had a ranch, a sisal plantation and a sugar plantation. He was married to Abigail Kuaihelani Maipinepine Bright Campbell who was born in Lahaina, Maui and the daughter of Mary Kamai Hanaike and John Maipinepine Bright. Abigail was a staunch friend of Queen Liliu‘okalani. Campbell leased and sold lands to Benjamin F. Dillingham who was contracted to build a railroad that went from Honolulu through ‘Ewa to Kahuku.

Significant Practices Pre-Contact and Post-Contact. The project area would have been part of the *wao akua* or zone of the spirits. It would have been a place reserved for *ali‘i nui* or high chiefs or specialists gathering for the *ali‘i.* According to the oral history, Mauna Kapu did have an *ahu* or altar on the peak, but now destroyed. It also has a linear relationship with sites at Kō ‘Olina; they align from

Kō ‘Olina and Paradise Cove to Makaīwa Gulch and above. Many of these sites are still relatively intact; however sites above Pālehua may have been destroyed or compromised.

Cultural Impact Assessment

According to the Environmental Council Guidelines, the types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, religious and spiritual customs. The following actions were taken to meet the EC Guidelines Criteria for conducting this cultural impact assessment based on the SOW:

1) conduct historical and other culturally related documentary research;

Documentary research, particularly on identifying traditional and cultural uses of the area, was completed. Much of what is known about the traditional and cultural uses of the area comes from written records that tell of its prehistory (e.g., *mo‘olelo;* 19th century ethnographic works); the stories associated with early coastal and upland area uses by early Hawaiians; and scientific studies (i.e., archaeological, botanical, geological, biological).

2) identify individuals with knowledge of the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or *ahupua‘a*; or with knowledge of the area potentially affected by the proposed action (e.g., past/current oral histories);

The project lands have been in semi-restricted use (military and civilian communication towers and antenna), and not very well documented. Two individuals who have expertise concerning the types of cultural resources, practices and beliefs found within the vicinity of the Project Site were identified. Only one was formally interviewed and his *mana‘o* (thoughts and knowledge) has been incorporated into this report.

3) identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

Archival research in Chapter 3 (Cultural and Historical Background Review) and ethnographic research in Chapter 4 (Ethnographic Data Review and Analysis) identified potential cultural resources, practices and beliefs within the project lands.

4) assess the impact of the proposed action on the cultural resources, practices and beliefs identified.

There are no direct impacts on any cultural resources, practices or beliefs in the immediate area of the proposed ICSD Radio Facilities project. The locations of both the trail and the destroyed *ahu* (McAllister site#139) are far enough away from the locations of the project activities. The project site is an area that has been heavily modified by historic military and civilian communication construction activities spanning over 50 years and currently is in use by military and civilian entities. Therefore no mitigation is needed. However, there will likely be a temporary impact to accessing trails and cultural practices while construction activities are carried out.

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APPENDIX A

Act 50 — 2000
A BILL FOR AN ACT RELATING TO
ENVIRONMENTAL IMPACT STATEMENTS
[UNOFFICIAL VERSION]

HOUSE OF REPRESENTATIVES H.B. NO, 2895 H.D.1
TWENTIETH LEGISLATURE, 2000
STATE OF HAWAI`I

A BILL FOR AN ACT
RELATING TO ENVIRONMENTAL IMPACT STATEMENTS.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAI`I:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai'i's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit' in Hawai`i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawai'i Revised Statutes, is amended by amending the definitions of "environmental impact statement' or "statement"

and "significant effect", to read as follows:

"'Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be distinguished from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

"Significant effect" means the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] welfare, social welfare [.], or cultural practices of the community and State."

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval.

Approved by the Governor as Act 50 on April 26, 2000

APPENDIX B
Guidelines for Assessing Cultural Impacts
Adopted by the Environmental Council, State of Hawai`i

November 19, 1997

INTRODUCTION

It is the policy of the State of Hawai'i under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

II. CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants [consultants], including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The types of cultural resources the historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, including submerged cultural resources, which support such cultural practices and beliefs.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

1. identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua`a;

2. identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

3. receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

4. conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;

5. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

6. assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials is likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant [consultant] may provide information only on the condition that it remains in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Mahele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

III. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.

2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.

3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.

4. Biographical information concerning the individuals and organizations consulted their particular expertise and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.

5. A discussion concerning historical and cultural source materials consulted the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.

7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

8. An explanation of confidential information that has been withheld from public disclosure in the assessment.

9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.

10. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.

11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call 586-4185.

APPENDIX C
Scope of Work (SOW)

Cultural Impact Assessment [in accordance with OEQC Guidelines]

1. identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua`a;

2. identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

3. receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

4. conduct ethnographic, historical, and other culturally related documentary research;

5. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

6. assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Methods

The specific tasks listed below expand on the above scope of work:

- Conduct historical and cultural background research (i.e., business records, land records; archival documents, literature, reports, letters, photographs, journals, or newspaper files) to locate material that will provide broad patterns of the history of the project area such as subsistence, religious, recreational, and commercial uses of the land; as well as settlement and residential patterns of the area and region; major family groups that inhabited, used or controlled lands within the project area and region; documented legends, myths, or traditional histories associated with the area; and descriptions of traditional practices, customs and beliefs associated with identified traditional cultural practices;

- Prepare a semi-structured ethnographic research instrument that will include questions that will generate general biographical information, association with and knowledge of the project area, its history and use;

- Prepare a consent form to be used as written agreement with any individual interviewed concerning the review of content and use of information recorded during the interview

- Identify individuals knowledgeable with the project area.

- Conduct and record ethnographic interviews with knowledgeable individuals. If feasible individuals shall participate in field inspections (Makana to be given)

- Transcribe recorded interviews (Approximate time, 6-8 hrs/per hr of recording)

- Prepare a report that will include an overview of the archival material, and an analysis of the ethnographic data.

APPENDIX D
Agreement to Participate in Ethnographic Survey

Project Title: Mauna Kapu ICSD Radio Facility CIA
Honouliuli Ahupua‘a, Ewa District, O‘ahu

Interviewer: Maria “Kaimi” Orr, M.A.
Kaimipono Consulting Services, LLC
(808) 375-3317 kaimi@lava.net

You are being asked to participate in an ethnographic survey conducted by an independent interviewer from *Kaimipono Consulting Services* LLC (KCS) contracted by *International Archaeological Research Institute, Inc.* (IARII) to prepare a Cultural Impact Assessment (CIA) as part of an environmental compliance document prepared by *Belt Collins Hawaii* (BCH). The interviewer will explain the purpose of this survey/CIA project, the procedures to be used, the potential benefits and possible risks of participating. You may ask the interviewer any question(s) in order to help you to understand the process. If you then decide to participate, please sign on the second page of this form. You will be given a copy of this form.

I. Nature and Purpose of the Study

The purpose of this ethnographic survey is to gather information about the project lands through interviews with individuals who are knowledgeable about the area and/or about the history of these lands. The objective of this survey is to provide ethnographic data for the CIA report.

II. Explanation of Procedures

After you have voluntarily agreed to participate and have signed the consent page, the interviewer will tape record your interview and have it transcribed later. The interviewer may also need to take notes and/or ask you to spell or clarify terms or names that are unclear.

III. Discomforts and Risks

Foreseeable discomforts and/or risks may include, but are not limited to the following: having to talk loudly for the recorder and video; being recorded and/or interviewed; providing information that may be used in a report; knowing that the information you give may conflict with information from others; your uncompensated dedication of time; possible miscommunication or misunderstanding in the transcribing of information; loss of privacy; and worry that your comment(s) may not be understood in the same way you understand them. It is not possible to identify all potential risks.

IV. Benefits

This survey will give you the opportunity to express your thoughts/knowledge (*mana`o*), which will be listened to and shared; your knowledge may be instrumental in the preservation of significant historic information.

V. Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected **if you so desire**. You may request, for example, that your name and/or sex not be mentioned in write-ups, such as field notes, on tape, on files (disk or folders), drafts, reports, and future works; or you may request that some of the information you provide remain “off-the-record.” In order to ensure protection of your privacy, confidentiality and/or anonymity, you should immediately advise the interviewer of your desires. The interviewer will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, chose to not participate any further and ask the interviewer for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I, _____, understand that Maria "Kaimi" Orr, an independent interviewer contracted by *International Archaeological Research Institute, Inc.* will be conducting oral history interviews with individuals knowledgeable about the project lands in Mauna Kapu. The oral history interviews are being conducted in order to collect information of the area.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say. **I also understand that if I don't return the revised transcripts after two weeks from date of receipt, my signature below will indicate my release of information for the CIA report. I also understand that I will still have the opportunity to make revisions during the draft review process.**

_____ I am willing to participate.

_____

Signature **Date**

_____

Print Name **Phone**

_____

Address **Zip Code**

_____

Email Address

MAHALO NUI LOA!

Part II: Personal Release of Interview Records

I, _____, have been interviewed by Maria "Kaimi" Orr of Kaimipono Consulting Services LLC, an independent interviewer contracted by International Archaeological Research Institute, *Inc.* I have reviewed the transcripts of tape recordings of the interview and agree that said documentation is complete and accurate except for those matters specifically set forth below the heading "CLARIFICATION OR CORRECTIONS" below.

CLARIFICATION OR CORRECTIONS:

I further agree that KCS, IARII *and/or* Belt Collins Hawaii *may use and release my identity and other interview information, both oral and written, for the purpose of using such information in a report to be made public, subject to my specific objections, to release as set forth below:*

SPECIFIC CONDITIONS TO RELEASE OF INTERVIEW TRANSCRIPT:

_____

Signature **Date**

_____

Print Name **Phone**

_____

Address

_____

Zip code

_____

Email address

MAHALO NUI LOA!

APPENDIX E

Ethnographic Survey

Basic Research Instrument for Oral History Interviews

This research instrument includes basic information as well as research categories which will be asked in the form of open primary questions which allow the individual interviewed (Ethnographic Consultant) to answer in the manner he/she is most comfortable. Secondary or follow-up questions are asked based on what the Consultant has said and/or to clarify what was said. The idea is to have an interview based on a "talk-story" form of sharing information. Questions will NOT be asked in an interrogation style/method, NOR will they necessarily be asked in the order presented below. This research instrument is merely a *guide* for the interviewer and simply reflects general categories of information sought in a semi-structured format. Questions will be asked more directly when necessary.

The Consultants were selected because they met one or more of the following criteria:

- Had/has Ties to Project Area/Vicinity
- Known Hawaiian Cultural Resource Person
- Referred By Other Cultural Resource People
- Referred By Other People

[NOTE: Introduction of ICSD Mauna Kapu Radio Facility CIA Project is done before the Ethnographic Consultant signs the Consent Form, usually during the initial phone call to make interview appointments.]

[NOTE: This part of the interview, #1-4 is mutual sharing and rapport building. Most of the information for research categories "Consultant Background" and "Consultant Demographics" come from this section, but not exclusively.]

1. *To start please tell me about yourself…Name? Where/When you were born?*

   [This information can be addressed in a couple of ways. After the interviewer first turns on the tape recorder, the following information will be recorded: Day/Date/Time/Place of Interview; Name of Consultant (if authorized by Consultant); Name of Interviewer; Initial Questions: Have you read the Agreement to Participate? Do you have any questions before we begin? Will you please sign the Consent Form? The interviewer will explain again the purpose of the interview.

   The interviewer will then ask the Consultant to "Please tell me about yourself—when/where were you born? Where did you grow up? Where did you go to school?" This general compound question allows the Consultant to share as much or as little as he/she wants without any pressure. Some of the information for #1 may already be known to the interviewer.]

2. *History: Your `ohana/family background; Hawaiian connection (if any)?*

   [Much of the information for questions #2, 3, and 4 usually comes from the "monologue" answer to Question #1. If it does not, then these questions will be asked. The answers in this section usually establish how the Consultant meets the criteria; how the Consultant developed his/her information base, etc.]

3. *Youth: Where lived? Grew up?* [This may have been answered in #1]

4. *Schooling*? *Where? When?* [This may have been answered in #1]

[NOTE: The next part of the interview, #5-7 reflects information sought for the following research categories: Land, Water, Cultural Resources and Use as well as Significant People and Events. The questions are open-ended so as NOT to "put words in the mouths" of the Consultants. The answers will help in assessing if any cultural properties or practices (or access to them) will be impacted by the proposed project.]

5. *Please tell me what you know about the lands of the Project Area?*

   [NOTE: Generally when people share information about a specific topic/place, they usually state where their information came from. If it isn't volunteered, it is asked as a follow-up question(s). A map of the project area should be available to confirm that interviewer and consultant are talking about the same place. Photos would also help if a field trip is not possible. The best scenario would be to be "on-site" at some part of the interview…although this is not always practical.]

6. *What are your recollections and/or personal experiences of this area?*

7. *Do you know any stories/legends/songs/chants associated with these areas?*

   [NOTE: Possible follow-up questions if information not in their answers:

   - How are you or your family connected to the Project lands?
   - What year(s) were you and/or your family associated with these lands?
   - What was this place called when you were growing up or working here?
   - Can you describe what the area looked like—natural and/or man made things?
   - To your knowledge what kind of activities took place in this location?
   - Do you know of any traditional gathering of plants, etc in the area?
   - Please describe any other land/water use? Resources?
   - What was the historic land use? Sugar? Ranching? Agriculture?
   - [Have map ready for marking.]
   - Do you know about any burials in the project area? [last resort question]
   - Do you know of any cultural sites in the project area or vicinity? [last resort question]

8 *Is there anyone you know who can also tell me about the project area?*

   [NOTE: Usually in the course of the interview, Consultants suggest other people to interview.]

9. *As soon as the tape of this interview is transcribed I will send you two sets. Please review your transcript and make any corrections and/or additions, then sign both copies of the Release Forms thereby allowing the information to be used by the interviewer, and other Project Partners. Then mail one set back in the enclosed stamped-addressed envelope* (*or email corrected version*).

10. *If your revised transcript is not returned within* ***two weeks*** *of date of receipt, it will be assumed that you are in concurrence with the transcript material and your information will then be incorporated into any draft reports. However, you can still make changes during the draft review process.*

MAHALO NUI LOA

APPENDIX F
LCA & Royal Patent Claims
Waihona 2013

HONOULIULI

LCA	Claimant	Island	District	Ahupuaa	Ili	Awarded
00000O03	Poina	Oahu	Ewa	Honouliuli		1
00745!	Mahina	Oahu	Ewa	Honouliuli		x
00746	Naholowaa	Oahu	Kona, Ewa	Honolulu, Honouliuli		0
00747	Nakai	Oahu	Ewa	Honouliuli	Kailikahi, Nukee	0
00748	Kalauhala	Oahu	Ewa	Honouliuli	Panahaha, Kaaumakua	1
00749	Mahina	Oahu	Ewa	Honouliuli	Kaulaula	1
00751	Kalauli	Oahu	Ewa	Honouliuli	Kamoku, Polapola, Kalihikahi	1
00752	Haae	Oahu	Ewa	Honouliuli	Kailikahi, Kailihai	1
00753	Manuwa	Oahu	Ewa	Honouliuli	Kamoku	1
00754	Kaunahi	Oahu	Ewa	Honouliuli	Niukee	1
00755	Keinohananui	Oahu	Ewa	Honouliuli	Niukee, Kailikahi, Kaakau	1
00756	Kauouo	Oahu	Ewa	Honouliuli	Kaaumakua	1
00757	Kaniau	Oahu	Ewa	Honouliuli	Kuwiliwili	0
00758	Nihua	Oahu	Ewa	Honouliuli	Niukee	1

00759	Liliu	Oahu	Ewa	Honouliuli	Loloulu	0
00760	Kuhemu	Oahu	Ewa	Honouliuli	Kamaipipipi, Niukee, Naopala, Kailikahi	1
00761	Kinolua	Oahu	Ewa	Honouliuli	Niukee, Kailikahi, Ilikahi, Palahemo	1
00762	Kalama	Oahu	Ewa	Honouliuli	Kaaumakua	1
00763	Keliiaa, Solomona	Oahu	Ewa	Honouliuli	Hiwa, Poohilo, Mauakapuoa, Uani / Maui, Polapola	1
00764	Maeaea	Oahu	Ewa	Honouliuli	Lihue	0
00765	Kamalae	Oahu	Ewa	Honouliuli	Niukee, Kailikahi, Palahemo	1
00766	Paele	Oahu	Ewa	Honouliuli	Niukee, Kaluamooiki, Kailikahi	1
00767	Hapauea	Oahu	Ewa	Honouliuli	Niukee, Kapapahi	1
00768	Pio	Oahu	Ewa	Honouliuli	Kahaumakua, Niukee, Waioha	1
00769	Pekane	Oahu	Ewa	Honouliuli	Kaaumakua	0
00831	Kaekuna	Oahu	Ewa	Honouliuli	Poohilo	1
00832	Opiopio	Oahu	Ewa	Honouliuli	Poohilo	1
00834	Oni	Oahu	Ewa	Honouliuli	Poohilo, Kailikahi	1

00839	Kaaiawaawa	Oahu	Ewa	Honouliuli	Kamilomilo, Kailikahi, Haole, Poohilo	1
00844	Kuailau	Oahu	Ewa	Honouliuli	Puehuehu, Poohilo	0
00845	Kekukahiko	Oahu	Ewa	Honouliuli	Kapapahi, Niukee	1
00847	Hinaa	Oahu	Ewa	Honouliuli	Poohilo	1
00848	Kapule	Oahu	Ewa	Honouliuli	Poohilo	1
00869	Pue	Oahu	Ewa	Honouliuli	Maui	1
00872	Kahakuliilii	Oahu	Ewa	Honouliuli	Loloulu, Paakai, Papaioua	1
00874	Laamaikahiki	Oahu	Ewa	Honouliuli	Polapola, Hiwa	1
00876	Nohunohu, Iopa	Oahu	Ewa	Honouliuli	Niukee, Nukee	1
00881	Kikala	Oahu	Ewa	Honouliuli	Polapola	1
00883	Kumupopo, Iona	Oahu	Ewa	Honouliuli	Poohilo, Puaaluu, Kaaumakua, Loloulu	0
00886	Kahalewai	Oahu	Ewa	Honouliuli	Kamoku, Manuwa	1
00887	Kaihikapu	Oahu	Ewa	Hoaeae, Honouliuli	Kalaikea, Kapapapuhi, Kuainihi, Kalokoeli, Pakai	1
00892	Aoao, Samuela	Oahu	Ewa	Honouliuli	Kapapahi, Niukee	1

00895	Kekuahiko	Oahu	Ewa	Honouliuli	Nukee, Niukee	0
00898	Kaneaola	Oahu	Ewa	Honouliuli, Waikele	Polapola, Kahawai, Hiwa	1
00901	Kuahine	Oahu	Ewa	Honouliuli	Nukee / Niukee,	1
00902	Haakue, wahine	Oahu	Ewa	Honouliuli	Waimanalo	0
00905	Kaimuena	Oahu	Ewa	Honouliuli	Kaaumakua	1
00906	Kanoho	Oahu	Ewa	Honouliuli	Kamoku	1
00907	Luana	Oahu	Ewa	Honouliuli	Kamaipipipi, Niukee	1
00910	Nunu	Oahu	Ewa	Honouliuli	Kaaumakua	1
00911	Kauhailepa	Oahu	Ewa	Honouliuli	Poohilo	1
00914	Kamaala	Oahu	Ewa	Honouliuli	Niukee, Kapapahi	1
00916	Kama	Oahu	Ewa	Honouliuli	Loloulu, Makau	1
00917	Kaulu	Oahu	Ewa	Honouliuli	Kamilomilo, Kaaumakua	1
00946	Kauinui	Oahu	Ewa	Honouliuli	Poohilo	0
00947	Kaopala	Oahu	Ewa	Honouliuli	Loloulu, Kaulaula	1
00960	Poopuu	Oahu	Ewa	Honouliuli	Loloulu	1
01019	Kukuiaina	Oahu	Ewa	Honouliuli		0
01565	Kaalauahi	Oahu	Ewa	Honouliuli	Niukee, Kapapahi	1

01566	Kaheananui	Oahu	Ewa	Honouliuli	Loloulu	0
01570	Kekua	Oahu	Ewa	Honouliuli	Poohilo	1
01570B	Paekane	Oahu	Ewa	Honouliuli	Kaaumakua	1
01570C	Naholowaa	Oahu	Ewa	Honouliuli	Kaaumakua	1
01573	Kawahamana	Oahu	Ewa	Honouliuli	Niukee, Kapapapuhi	1
01580	Kanahuna	Oahu	Ewa	Honouliuli	Kamilomilo	1
01580B	Kapioho/Kapiioho	Oahu	Ewa	Honouliuli	Polapola, Kahiwapalaai	1
01596	Kahawai	Oahu	Ewa	Honouliuli	Poohilo	0
01598	Kekua	Oahu	Ewa	Honouliuli	Loloulu, Kapapahi	1
01605B	Nakai	Oahu	Ewa	Honouliuli	Mahuna, Niukee	1
01666	Mauwele	Oahu	Ewa	Honouliuli	Poohilo	1
01666B	Kuahilo	Oahu	Ewa	Honouliuli	Poohilo	1
01670	Moano	Oahu	Ewa	Honouliuli	Loloulu, Kaaumakua	1
01672	Makue	Oahu	Ewa	Honouliuli	Kamoku, Kapapapuhi	1
01688	Poopuu	Oahu	Ewa	Honouliuli	Loloulu	0
01699	Leleiaupa	Oahu	Ewa	Honouliuli	Maui, Poaiwaikele	1
01701	Alaluka	Oahu	Ewa	Honouliuli	Poohilo	1
01703	Aimaikai	Oahu	Ewa	Honouliuli	Kamilomilo	1

01713	Healani	Oahu	Ewa	Honouliuli	Niukee, Kapapuhi	1
01719	Hilea	Oahu	Ewa	Honouliuli	Kaaumakua	1
01720	Hilinae	Oahu	Ewa	Honouliuli	Polapola	1
03857	Puaa	Oahu	Ewa	Honouliuli	Kalahaka, Lahueiki	0
05204	Kalama 2	Oahu	Ewa	Honouliuli	Bolabola, Polapola	1
05653	Kua	Oahu	Ewa	Honouliuli	Maui, Polapola, Kahui	1
05653B	Kanehikili	Oahu	Ewa	Honouliuli	Poohilo	1
05653C	Kalaulii	Oahu	Ewa	Honouliuli	Polapola	0
05654	Kuhiena	Oahu	Ewa	Honouliuli	Maui, Poohilo	1
05670	Kawaokele	Oahu	Ewa	Honouliuli	Polapola	0
05670B	Kaohai	Oahu	Ewa	Honouliuli	Kaihuopalaai, Polapola	1
05670C	Kumupopo	Oahu	Ewa	Honouliuli	Poohili, Kepoe, Loloulu, Puaaluu	1
05950	Pihana	Oahu	Ewa	Honouliuli	Kamoku	1
08658	Kapoli	Oahu	Ewa	Honouliuli	Loloulu	0
08878	Kou, S.	Oahu	Ewa	Honouliuli		0
09037	Kahakai, H.	Oahu	Ewa	Honouliuli	Waimanalo	0
09351	Kauakahilau	Oahu	Ewa	Honouliuli	Poohilo	0

10933	Uia	Oahu	Ewa	Honouliuli	Niukee	1
11216*O	Kekauonohi, Mikahela	Oahu	Ewa,Koolauloa	Honouliuli, Waimalu, Makao		1

Honouliuli RP (73)

RP Number	Patentee	Island	District	Ahupuaa	TMK
0869	Kinolua	Oahu	Ewa	Honouliuli	
1082	Pue	Oahu	Ewa	Honouliuli	
1083	Kaihekapu	Oahu	Ewa	Honouliuli	1-9-4-001, 049
1084	Kauakahilau	Oahu	Ewa	Honouliuli	
1085	Opiopio	Oahu	Ewa	Honouliuli	
1086	Paele	Oahu	Ewa	Honouliuli	
1277	Keinohananui no Kaope	Oahu	Ewa	Honouliuli	1-9-1-22
1278	Kahakuliilii	Oahu	Ewa	Honouliuli	
1493	Kaihekapu, see 1083	Oahu	Ewa	Honouliuli	1-9-4-001, 049
2337	Pio no Wahinenui	Oahu	Ewa	Honouliuli	
2865	Kalama 2	Oahu	Ewa	Honouliuli	
2866	Kaulu no Kaoliko	Oahu	Ewa	Honouliuli	
2867	Mahina	Oahu	Ewa	Honouliuli	
2868	Kapiioho/Kapioho	Oahu	Ewa	Honouliuli	
2869	Haae	Oahu	Ewa	Honouliuli	1-9-1-20

2870	Hiilea	Oahu	Ewa	Honouliuli	
2871	Kikala	Oahu	Ewa	Honouliuli	1-9-1-21
3078	Kua	Oahu	Ewa	Honouliuli	
3084	Alauka	Oahu	Ewa	Honouliuli	
3085	Kaohai	Oahu	Ewa	Honouliuli	
3086	Kapule	Oahu	Ewa	Honouliuli	
3087	Kekua	Oahu	Ewa	Honouliuli	
3088	Kuhiena	Oahu	Ewa	Honouliuli	
3089	Laamaikahiki	Oahu	Ewa	Honouliuli	
3090	Kaopala	Oahu	Ewa	Honouliuli	1-9-1-19, 21
3091	Kaopala	Oahu	Ewa	Honouliuli	
3092	Hinaa	Oahu	Ewa	Honouliuli	1-9-1-19
3287	Hilinae	Oahu	Ewa	Honouliuli	
3384	Keliiaa, Solomona	Oahu	Ewa	Honouliuli	1-9-1-21
3386	Kaneaola	Oahu	Ewa	Honouliuli	
3415	Oni	Oahu	Ewa	Honouliuli	1-9-1-19
3518	Kekua	Oahu	Ewa	Honouliuli	1-9-1-19
3548	Moano	Oahu	Ewa	Honouliuli	
3717	Kanoho no	Oahu	Ewa	Honouliuli	1-9-1-20

	Abrahamson				
3718	Kawahaea	Oahu	Ewa	Honouliuli	
3803	Kuhemu	Oahu	Ewa	Honouliuli	1-9-1-22
3856	Kaunahi	Oahu	Ewa	Honouliuli	1-9-1-22
3857	Kaalauahi	Oahu	Ewa	Honouliuli	
4157	Kukahiko	Oahu	Ewa	Honouliuli	
4162	Luana	Oahu	Ewa	Honouliuli	
4163	Kamaala	Oahu	Ewa	Honouliuli	
4179	Nakai	Oahu	Ewa	Honouliuli	1-9-1-22
4244	Kawahamana	Oahu	Ewa	Honouliuli	
4309	Nihua	Oahu	Ewa	Honouliuli	
4584	Kaekuna	Oahu	Ewa	Honouliuli	
4585	Kaaiawawa	Oahu	Ewa	Honouliuli	1-9-1-19
4700	Nohunohu, Iopa	Oahu	Ewa	Honouliuli	
5018	Kanahuna	Oahu	Ewa	Honouliuli	
5036	Nunu	Oahu	Ewa	Honouliuli	
5134	Pekane	Oahu	Ewa	Honouliuli	
5141	Kalama	Oahu	Ewa	Honouliuli	2-4-6-16, 19, 26, 27
5142	Manua	Oahu	Ewa	Honouliuli	1-9-1-20

5457	Makue	Oahu	Ewa	Honouliuli	1-9-1-20
5483	Kauhailepa	Oahu	Ewa	Honouliuli	
5521	Healani	Oahu	Ewa	Honouliuli	
6261	Kama	Oahu	Ewa	Honouliuli	1-9-1-22
6509	Kamalae	Oahu	Ewa	Honouliuli	
6641	Poopuu	Oahu	Ewa	Honouliuli	1-1-8-05, 1-2-2-20
6767	Aoao, Samuela	Oahu	Ewa	Honouliuli	
6768	Naholowaa	Oahu	Ewa	Honouliuli	
6771	Aemaikai	Oahu	Ewa	Honouliuli	
6806	Kumupopo	Oahu	Ewa	Honouliuli	
6820	Kaimuena	Oahu	Ewa	Honouliuli	
6825	Kalauhala	Oahu	Ewa	Honouliuli	
6826	Pio	Oahu	Ewa	Honouliuli	
6827	Kanehekili	Oahu	Ewa	Honouliuli	1-9-1-20
6828	Uia or Uwia	Oahu	Ewa	Honouliuli	
6829	Leleiupa	Oahu	Ewa	Honouliuli	1-9-1-21
6878	Kalauli	Oahu	Ewa	Honouliuli	1-9-1-20, &
6934	Kauouo	Oahu	Ewa	Honouliuli	
6935	Puuiawa	Oahu	Ewa	Honouliuli	1-9-1-20

6971	Kekauonohi, M.	Oahu	Ewa	Honouliuli	1-9-1
7356	Mauwele	Oahu	Ewa	Honouliuli	

APPENDIX G

Signed Consent Forms

privacy, confidentiality and/or anonymity, you should immediately advise the interviewer of your desires. The interviewer will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, chose to not participate any further and ask the interviewer for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I, SHAD KANE *understand that Maria "Kaimi" Orr, an independent interviewer contracted by* International Archaeological Research Institute, Inc. *will be conducting oral history interviews with individuals knowledgeable about the* Mauna Kapu ICSD Antenna *project lands. The oral history interviews are being conducted in order to collect information of the area.*

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say. ***I also understand that if I don't return the revised transcripts after two weeks from date of receipt, my signature below will indicate my release of information for the CIA report. I also understand that I will still have the opportunity to make revisions during the draft review process.***

✓ *I am willing to participate.*

Signature — 10-28-13 — Date

SHAD S. KANE — 672-4765

Print Name — Phone

92-1309 KAHANAI ST 96707

Address — ZipCode

– SHAD SKANE@GMAIL.COM

Email Address

MAHALO NUI LOA!

APPENDIX H

Release

Shad Kane

Nov 8, 2013

Aloha Maria,

Kala mai ia'u. Yes the transcript ok. There is one place where I don't think I meant what I said however I expanded on the explanation and made it correct. It was on page 4 and the question was where the hula mound is. My response was I did not know however I corrected that as I continued speaking. I do know and I explained it.

I am still looking for that photo. If you interview McD he also as a photo of all the islands east of Pu‘u Makakilo.

Mahalo,
shad

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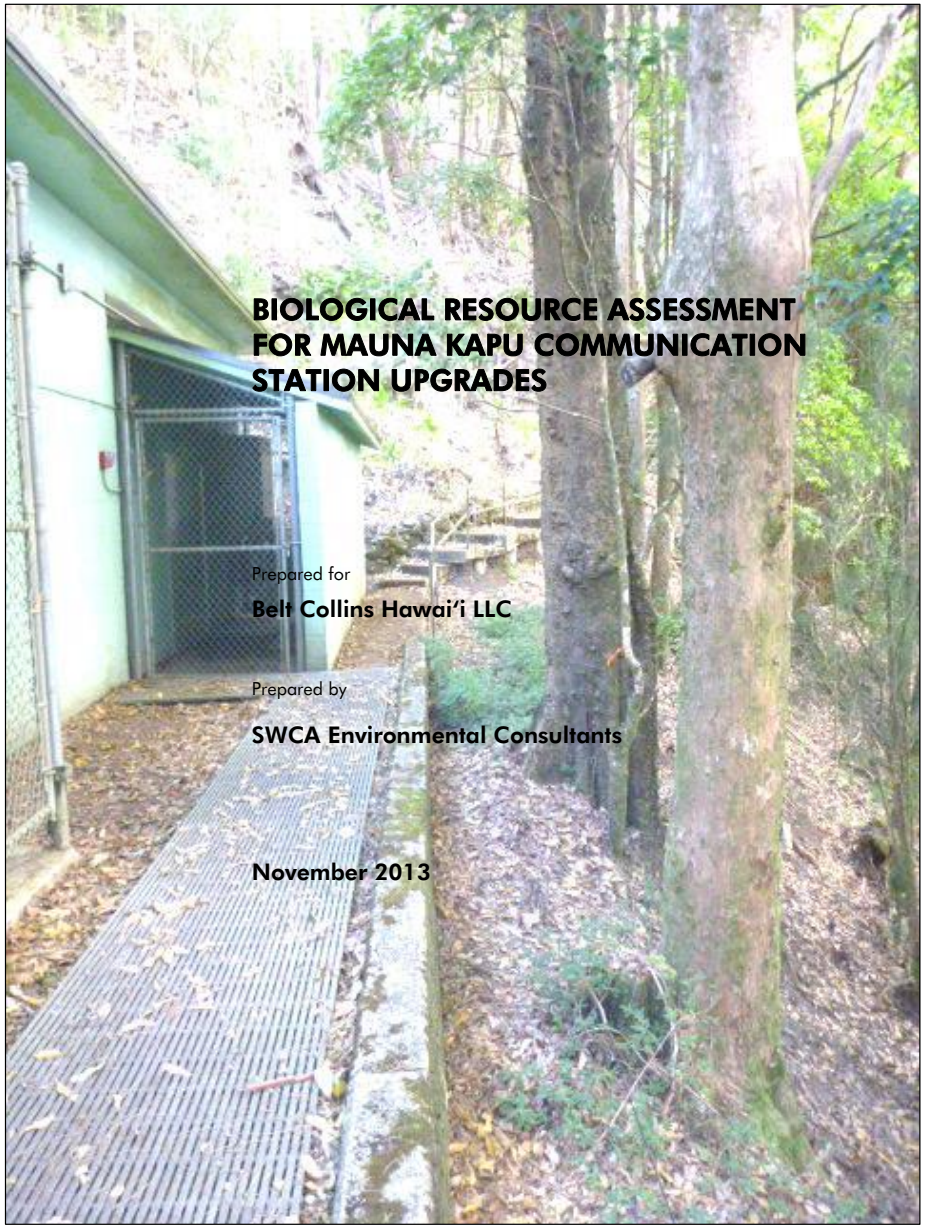
APPENDIX C

BIOLOGICAL RESOURCE ASSESSMENT



BIOLOGICAL RESOURCE ASSESSMENT FOR MAUNA KAPU COMMUNICATION STATION UPGRADES

Prepared for

Belt Collins Hawai'i LLC

Prepared by

SWCA Environmental Consultants

November 2013

BIOLOGICAL RESOURCE ASSESSMENT
FOR MAUNA KAPU COMMUNICATION STATION UPGRADES

Prepared for

Belt Collins Hawai'i LLC
2153 North King Street, Suite 200
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(808) 521-5361

Prepared by

SWCA Environmental Consultants
Bishop Square ASB Tower
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www.swca.com

SWCA Project No. 23461.00, Phase 4

November 2013

CONTENTS

APPENDICES

FIGURES

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1. INTRODUCTION

Belt Collins Hawai‘i LLC (Belt Collins) is preparing an environmental assessment (EA) for the State Department of Accounting and General Services (DAGS), Information and Communication Services Division (ICSD) to implement improvements at six radio facility sites on the Island of O‘ahu. SWCA Environmental Consultants (SWCA) was tasked by Belt Collins to conduct a biological resource assessment at one of these sites, referred to as the Mauna Kapu Communication Station, in August 2013, in support of the EA for the project. Proposed work at the Mauna Kapu Communication Station site involves installing underground conduits, handholes, a new Hawaiian Electric Company (HECO) meter, and retaining walls along the slope next to the existing stairs leading up to the upper portion of the site.

This report summarizes the findings of the assessment conducted by SWCA Biologists Tiffany Thair (botanist), Ling Ong (zoologist), and Bryson Luke (field technician) on September 5, 2013, as well as University of Hawai‘i Professor Brenden Holland (malocologist) on September 16, 2013. The objectives of the natural resource assessment are as follows:

1. Identify and document the presence and relative abundance of plant species and vegetation communities in the project site.
2. Identify and document the presence and relative abundance of bird, mammal, amphibian, reptile, and invertebrate macrofauna that occur in the project site.
3. Identify any state or federally listed candidate, threatened, or endangered species; species of concern; and/ or rare (either locally or statewide) species found or known to occur at the project site.
4. Describe any known resource issues and conflicts unique to the project site.

2. DESCRIPTION OF THE PROJECT SITE

2.1. Location and Vicinity

The Mauna Kapu Communication Station is north of Makakilo in the Wai‘anae Mountain Range. It is along Palikea Ridge east of the Nānākuli Forest Reserve and west of the Honouliuli Forest Reserve. The station is at the terminus of Pālehua Road (Figure 1). The project site extends from the existing HECO meter at approximately 2,728 feet (831 meters [m]) above mean sea level to the ICSD building at roughly 2,750 feet (838 m) above mean sea level (Figure 2). A number of federal, state, and city communications equipment exists in the area, including lattice towers, buildings, generators, and conduit. The Palikea Trail begins north of the site. The land immediately surrounding the project site is undeveloped.

Mean annual rainfall for this area is approximately 44.9 inches (1,141 millimeters [mm]). Rainfall is typically highest in January and lowest in June and July (Giambelluca et al. 2013). The Pālehua rainfall gage near the site has recorded nearly average rainfall for 2013 through the end of August (National Oceanic and Atmospheric Administration/National Weather Service, Weather Forecast Office Honolulu 2013).

The geology at the site consists of Pālehua lava flow basalt (Sherrod et al. 2007). The Natural Resources Conservation Service (NRCS) identifies the soil at the site as Tropohumults-Dystrandepts association (Foote et al. 1972).

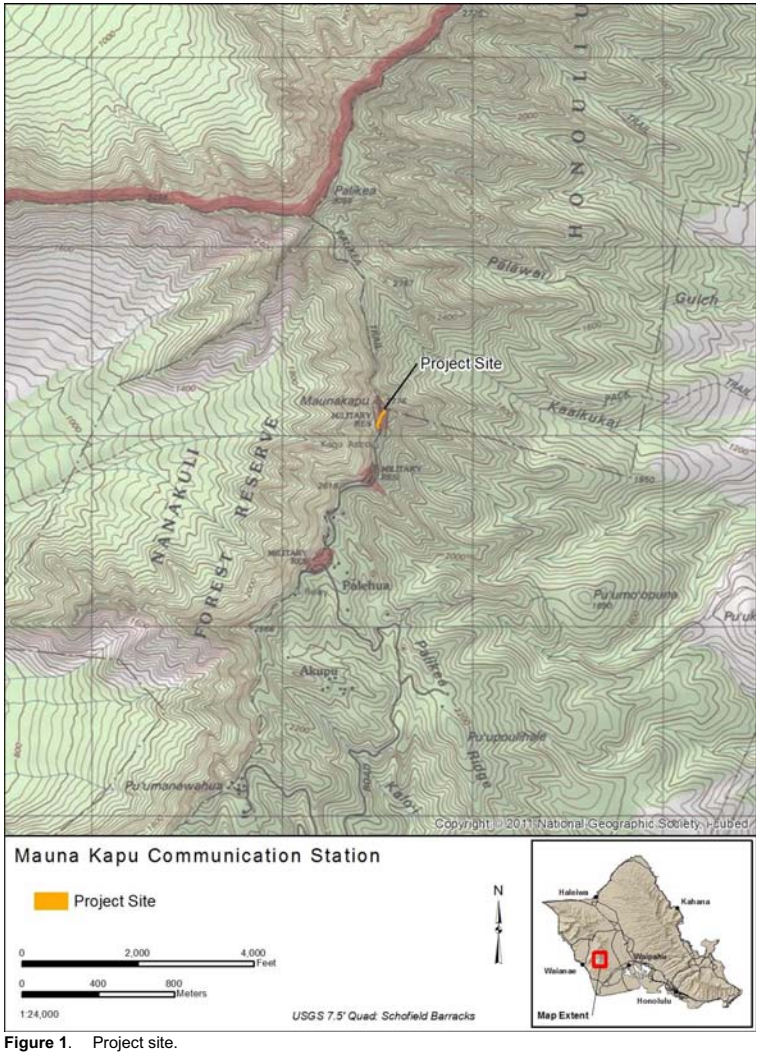

Figure 1. Project site.

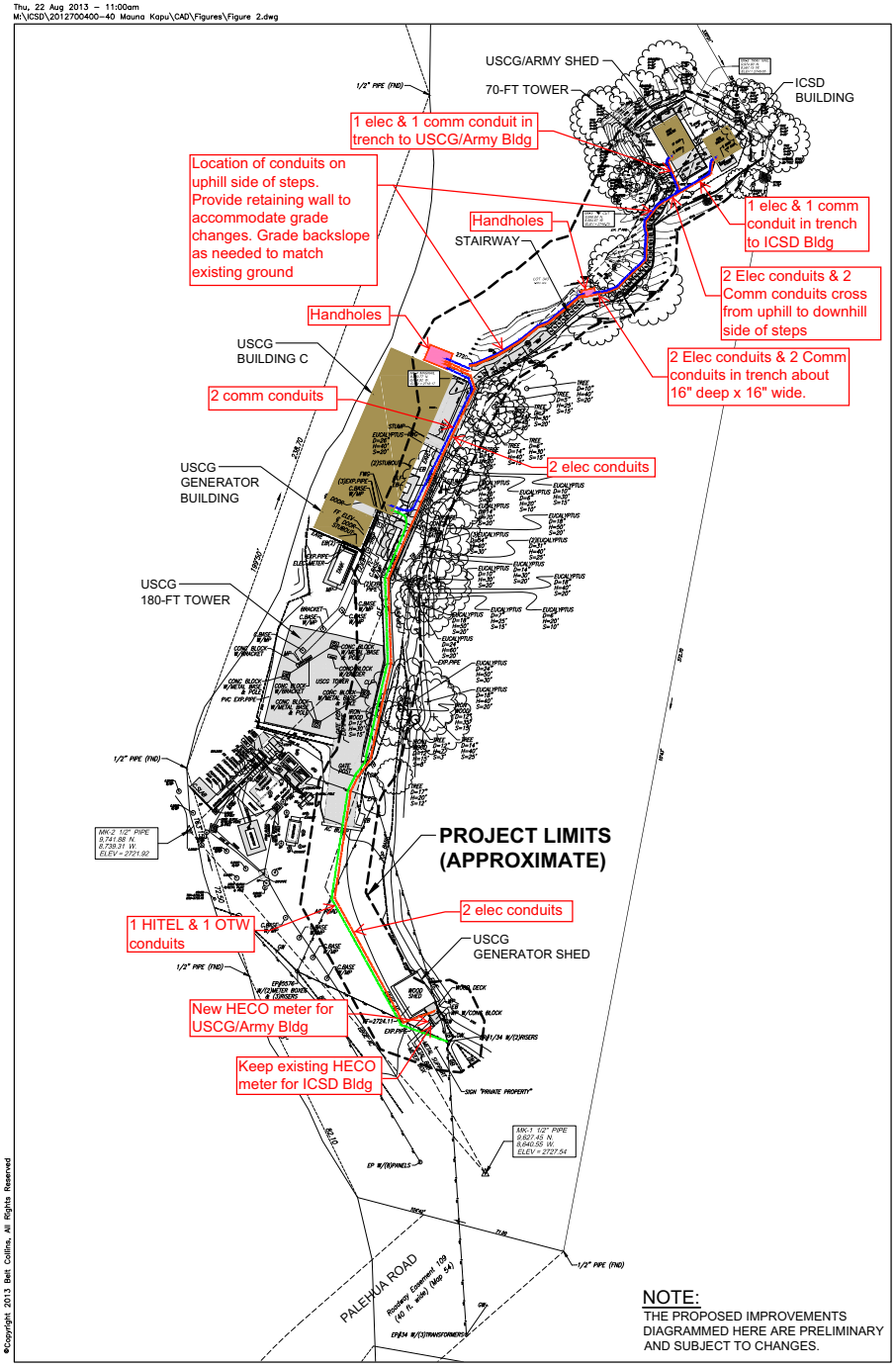

Figure 2
SITE MAP
ARF at Mauna Kapu
Dept of Accounting & General Services
August 2013

3. METHODS

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

A field reconnaissance of the site was conducted by three SWCA biologists on September 5, 2013. A supplement site visit to survey for native mollusks was conducted by SWCA in partnership with a University of Hawai‘i Professor on September 16, 2013.

3.1. Flora

One SWCA botanist conducted a pedestrian survey of the project site. All vascular plant species observed in the project site were documented, and notes were made on relative abundances (e.g., abundant, common, uncommon, and rare), communities, and disturbances. Areas more likely to support native plants were more intensively examined.

Plants recorded during the survey are indicative of the season (“rainy” vs. “dry”) and the environmental conditions at the time of the survey. It is likely that additional surveys conducted at a different time of the year would result in minor variations in the species and abundances of plants observed.

3.2. Fauna

Fauna surveys consisted of pedestrian surveys of the project site. All birds, mammals, reptiles, amphibians, and invertebrate species seen or heard were noted. Because the project site is close to the O‘ahu ‘elepaio (*Chasiempis ibidis*) critical habitat (listed as endangered), playbacks consisting of O‘ahu ‘elepaio songs were conducted at three locations at the project site, separated by 66–164 feet (20–50 m). Songs were broadcast for 1 minute, followed by a listening period of 2 minutes, as recommended by VanderWerf et al. (2011).

The first survey for native molluscs was conducted by SWCA biologists on September 5, 2013. A follow-up survey with Dr. Brenden Holland, a malacologist from the University of Hawai‘i at Mānoa, was conducted on September 16, 2013. During both surveys, the leaf litter and leaves of low shrubs within the project site were examined for native and introduced snails and other invertebrates. The leaves of low-hanging branches of trees were also examined for snails during the September 16 survey.

One bat detector (Wildlife Acoustics Songmeter SM2BAT) was deployed to record from 1800 to 0700 hours for 11 nights from September 5 through the morning of September 16, 2013.

3.3. Wetlands and Streams

Before the survey, National Wetlands Inventory (NWI) Program data and aerial imagery were review for the presence of wetlands or other waters of the U.S. During the reconnaissance survey, the project site was scanned for wetlands or other waters using the presence of obligate or facultative wetland plants, surface water, and other hydrology indicators.

4. RESULTS

The project site is disturbed from various activities that have occurred in the area over several decades. No state or federally listed threatened, endangered, or candidate species were observed at the project site during the survey. However, one rare native snail, *Auriculella ambusta*, restricted to the Waiʻanae Mountains and two other native snails of the genera *Elasmias* and *Tornatellides* were found in the understory plants on the slopes alongside the access road.

The project site does not contain critical habitat for threatened or endangered plants as designated by the U.S. Fish and Wildlife Service (USFWS). However, the USFWS has designated critical habitat for various listed species near the project site (Figure 3). Designated Oʻahu ʻelepaio critical habitat is present roughly 328 feet (100 m) from the project site (see Figure 3). The project site and areas along Pālehua Road were excluded from Oʻahu ʻelepaio critical habitat designation because the areas are dominated by non-native species and do not contain the primary constituent elements required by Oʻahu ʻelepaio (USFWS 2001).

Additionally, critical habitat for numerous plant species occurs nearby. In 2003, critical habitat was designated for four listed plant species (Oʻahu 17) to the southwest of the project site on the leeward side of the Waiʻanae Mountains. The nearest critical habitat is for *Lobelia niihauensis*, roughly 450 feet (137 m) from the project site. Almost 900 feet (274 m) to the north of the site on the windward side of the Waiʻanae Mountains, additional critical habitat was designed for several other listed plants (see Figure 3).

In 2012, USFWS designated two additional critical habitat units near the project site. Lowland Mesic Unit 3 encompasses 353 acres (143 hectares) and is roughly 905 feet (275 m) north of the project site from Pōhākea Pass to Kaiakuakai Gulch (see Figure 3). It is known to be occupied by 15 listed plants and contains unoccupied habitat for an additional 49 lowland mesic plant taxa (USFWS 2012). Dry Cliff Unit 08 is roughly 2,117 feet (650 m) southwest of the project site. This unit encompasses 259 acres (105 hectares) of state land from Pālehua to Puʻumanawahua. It is occupied by eight listed plant species and contains the primary constituent elements for an additional 38 plant taxa (USFWS 2012).

4.1. Flora

No state or federally listed threatened, endangered, or candidate plant species, or rare native Hawaiian plant species were observed at the project site. Thirty-eight plant species were recorded at the site during the survey. Of these, only one species—pōpolo (*Solanum americanum*)—is native to the Hawaiian Islands. This indigenous species is common throughout the Hawaiian Islands (Wagner et al. 1999). A single pāpala (*Charpentiera obovata*) individual was observed immediately southeast of the project site on a steep slope. Appendix A provides a list of all plant species observed by SWCA biologists in the project site during the survey.

The vegetation in the project site is primarily dominated by large swamp mahogany (*Eucalyptus robusta*) trees (Figure 4). In the north portion of the site, the vegetation is characterized by a bamboo groove (*Phyllostachys nigra*) (Figure 5). Many areas are devoid of understory vegetation and covered with a layer of leaf litter.

Ironwood trees (*Casuarina equisetifolia*) and palmgrass (*Setaria palmifolia*) are locally abundant in the south portion of the project site. Taro vine (*Epipremnum pinnatum*) is also common, found climbing up trees and structures. Other plants found scattered sparsely throughout the area or occurring in a few small patches include *Ruellia prostrata*, *Cyclosorus x intermedius*, thimbleberry (*Rubus rosifolius*), Hilo grass (*Paspalum conjugatum*), ti (*Cordyline fruticosa*), and African tulip tree (*Spathodea campanulata*).

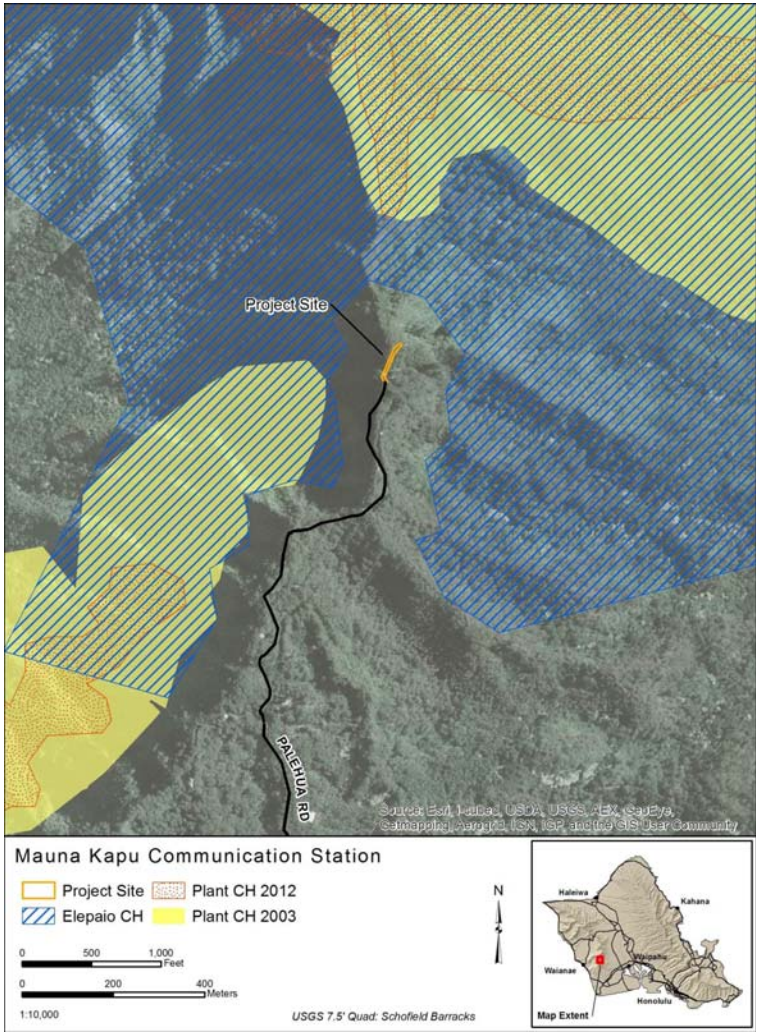

Figure 3. Designated critical habitat near the project site.

Figure 4. Communication station facilities and swamp mahogany and leaf litter within the site.

Figure 5. Bamboo groove in the northeast portion of the site.

4.2. Fauna

4.2.1. Avifauna

The bird species observed at the project site are species typically found in rural disturbed habitat. Species diversity at the site is low, with only eight species encountered during the two surveys (Appendix B). No native birds were seen or heard at the project site, but one native species—the O‘ahu ‘amakihi (*Hemignathus flavus*)—was observed feeding in an ‘ōhi‘a tree (*Metrosideros polymorpha*) approximately 656 feet (200 m) downslope from the site; this is the location where the endangered O‘ahu tree snail (*Achatinella mustelina*) snail is present (see Section 4.2.5.1 below). O‘ahu ‘amakihi have been reported to be abundant in the area from the Pālehua Road to Kaaikukui Gulch (VanderWerf 2006) and can be expected to be present at the project site some of the time.

No O‘ahu ‘elepaio were detected during the playbacks, which were conducted at three locations at the project site. One pair of O‘ahu ‘elepaio and several single males were reported in Kaaikukui Gulch in 2009 (VanderWerf et al. 2011). O‘ahu ‘elepaio are territorial, and no territories were identified during the playback surveys at the site; however, it is possible that ‘elepaio may occasionally transit the project site.

4.2.2. Hawaiian Hoary Bat

No Hawaiian hoary bat (*Lasiurus cinereus semotus*) calls were detected during the 11 nights of acoustic survey. It is expected that Hawaiian hoary bats may very occasionally fly through the project site or could roost in the large swamp mahogany trees present.

4.2.3. Other Mammals

No mammals were seen during the survey, though it is possible for feral dogs (*Canis familiaris*) and cats (*Felis catus*) to enter the project site. Other mammals that can be expected on-site include mice (*Mus musculus*), rats (*Rattus* spp.) and mongoose (*Herpestes javanicus*).

4.2.4. Reptiles and Amphibians

No amphibians were observed or heard during the survey. Based on habitat, cane toads (*Bufo marinus*) are likely to be present. One copper tailed skink (*Emoia cyanura*) was observed on-site. None of the terrestrial reptiles or amphibians in Hawai‘i are native to the islands, so these are not species of interest.

4.2.5. Invertebrates

4.2.5.1. Native molluscs

Two genera of native snails were found on ti plants during the September 5, 2013, survey. Photographs of these snails were sent to malacologist Dr. Brenden Holland who identified them as native snails belonging the family Achatinellidae of the genus *Elasmias* (Subfamily: Tornatellininae) and *Tornatellides* (Subfamily: Tornatellidinae) (Figure 6).

Figure 6. The native snails *Elasmias* (left) and *Tornatellides* (right) (Subfamily: Tornatellininae).

A subsequent survey specifically for native snails was conducted by Dr. Brenden Holland and an SWCA biologist on September 16, 2013. A full report of this survey is in Appendix C. Two species of *Tornatellides* and one species of *Elasmias* were identified at this time, and an additional species, *Auriculella ambusta* (Figure 7), was also found. *Auriculella ambusta* is an endemic snail and geographically restricted to the Wai‘anae Mountain range on O‘ahu. This species was found on the taro vine at the south end of the project site. *Auriculella ambusta* was also found in small numbers on the ironwood trees and bamboo (see Figure 5) on the site. These snails have a full-grown shell length of approximately 0.2 inches (6 mm). All three genera of native snails were most common at the south end of the project site, particularly on the taro vine. No native snails were found in the leaf litter.

A small population of the endangered O‘ahu tree snails is present approximately 656 feet (200 m) from the project site. No endangered *Achatinella* were found at the project site.

Figure 7. O‘ahu endemic snail *Auriculella ambusta*, with an egg visible along the side of an adult snail. Photo by Dr. Brenden Holland.

4.2.5.2. Non-Native invertebrates

The most notable non-native invertebrate noted on-site was the invasive, predatory New Guinea flatworm (*Platydemus manokwari*), which is likely a predator of the native snails at the project site. A non-native snail species, the garlic snail (*Oxychilus alliarius*), which can be predatory on small native snails was also found in the leaf litter.

Other invertebrates seen in the project site include the Sonoran carpenter bee (*Xylocopa sonorina*), the honey bee (*Apis mellifera*), and the gulf fritillary (*Agraulis vanillae*).

4.3. Wetlands and Streams

No wetlands or streams were identified on the project site during the survey.

5. DISCUSSION AND RECOMMENDATIONS

5.1. Flora

The vegetation in the project site is disturbed from previously land-use activities. The vegetation types and species identified are not considered unique. Over 97% of the plant species seen are not native and pōpolo, the only native species, is common throughout the Hawaiian Islands. No threatened or endangered plants (USFWS 2013) were found during the reconnaissance, and the designated plant critical habitat near the site is not likely to be impacted. Therefore, the proposed project is not expected to have a significant, adverse impact on botanical resources.

SWCA recommends that native Hawaiian plants be used for landscaping around the project to the maximum extent possible. Potential native species that may be appropriate for landscaping at the proposed project site include: pāpala and ‘a‘ali‘i (*Dodonaea viscosa*). Both pāpala and the Polynesian introduced ti plant are also host plants to native snail species. Additional information on selecting appropriate plants for landscaping can be obtained from the following websites:

- http://www.nativeplants.Hawaii.edu/
- http://www.plantpono.org/non-invasive-plants.php
- http://www.hear.org/alternativestoinvasives/pdfs/mcaac_hpwra_a2i_list.pdf
- http://www.hear.org/oisc/oahuearlydetectionproject/pdfs/oedposterwhatnottoplant.pdf

Furthermore, SWCA recommends that the one pāpala, which is just outside the project site, be flagged and avoided during construction.

5.2. Fauna

No state or federally listed threatened or endangered species, or candidates for listing, were observed at the project site during the survey.

The endangered O‘ahu ‘elepaio and the native O‘ahu ‘amakihi may occasionally be present at the site; however, they are not expected to be affected by the proposed activities at the project site because the activities mainly involve earthwork and disturbance of the understory shrubs. The cutting of two isolated Christmas berry trees (*Schinus terebinthifolius*) trees at the project site is also not expected to impact the behavior of either species.

Hawaiian hoary bat roosts are typically in trees with dense canopy foliage, or in the subcanopy when the canopy is sparse, with open access for launching into flight (U.S. Department of Agriculture 2009). Based on these criteria, the Christmas berry trees that will be cut as a result of the project do not fit the profile of typical bat roost trees, and to date have not been documented as roost trees. Therefore, no impacts to the roosting or foraging activities of endangered Hawaiian hoary bat are expected.

Native snails will likely be impacted by the proposed trenching because low-lying vegetation will be cut and removed. All four species of native snails documented at the project site, particularly the rare Wai‘anae endemic *A. ambusta*, were the most abundant in the taro vine at the south end of the project site. The one pāpala individual, which is just outside the project site, is also a species identified as a potential host to native snails and *Achatinella* (USFWS 1993); however, no snails were noted on the pāpala at the time of the surveys, and the pāpala is outside of the project site.

Malacologist Dr. Brenden Holland provided the following recommendations to minimize impacts to native snails present at the project site. Details of all the recommended measures are provided in Appendix C.

1) **Translocation:** Collect and move all native snails (*Tornatellides*, *Elasmias,* and *Auriculella*) from the project site to a recently completed predator-proof snail enclosure at Palikea (north of the Mauna Kapu site). Dr. Holland has consulted with O‘ahu Army Natural Resource Program staff, as well as Department of Land and Natural Resources’ Snail Extinction Prevention Program (the agencies charged with managing the site), and both entities agree that translocation of these native snails from the project site into the safety of the enclosure is prudent and in the best interest in the conservation of native snail species. The translocation was conducted on October 5, 2013 and 268 *Auriculella ambusta*, 45 *Tornatellides* spp., *Elasmias* sp., and *Lamellidea* sp. and 25 *Philonesia* sp. were successfully translocated to the predator-proof snail enclosure. *Lamellidea* sp. and *Philonesia* sp. were two additional native snail genera found during the translocation effort.

2) **Minimizing on-site impacts**: Because the collection of all native snail individuals in the work area is not possible, some individuals are expected to remain in the project site after the translocation effort. Therefore, the following on-site measures are recommended:

    a. The footprint of any construction at the site should be minimized wherever possible.

    b. If vegetation clearing is required, hand clearing of vegetation is recommended, and cut plants should be placed near adjacent vegetation of similar species (such as the taro vine which is expected to be undisturbed in the south portion of the project site) to enable the snails to move onto new host plants. Currently, most of the snails are found in the south portion of the site on the taro vine.

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Appendix A.

CHECKLIST OF PLANTS OBSERVED AT MAUNA KAPU COMMUNICATION STATION ON SEPTEMBER 5, 2013

The following checklist is an inventory of plant species observed by SWCA biologists on September 5, 2013 during the survey of the Mauna Kapu Communication Station project site. The plant names are arranged alphabetically by family and then by species into three groups: Ferns & Lycophytes, Monocots and Dicots. The taxonomy and nomenclature of the ferns and lycophytes is in accordance with Palmer (2003) and Evenhuis and Eldredge (2011). The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999) and Wagner and Herbst (2003). Recent name changes are those recorded in Wagner et al. (2012).

Status:

E = endemic = native only to the Hawaiian Islands.
I = indigenous = native to the Hawaiian Islands and elsewhere.
P = Polynesian = introduced by Polynesians.
X = introduced/ alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778).

Relative Site Abundance:

A = Abundant = forming a major part of the vegetation within the survey area.
C = Common = widely scattered throughout the area or locally abundant within a portion of it.
U = Uncommon = scattered sparsely throughout the area or occurring in a few small patches.
R = Rare = only a few isolated individuals within the survey area.

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
FERNS AND LYCOPHYTES			
BLECHNACEAE			
Blechnum appendiculatum Willd.	----	X	R
POLYPODIACEAE			
Phymatosorus grossus (Langsd. & Fisch.) Brownlie	laua'e, maile-scented fern	X	R
THELYPTERIDACEAE			
Cyclosorus x intermedius W.c. shieh & J.l. tsai	----	X	U

MONOCOTS			
AGAVACEAE			
Cordyline fruticosa (L.) A.Chev.	ti, kī	P	U
ARACEAE			
Epipremnum pinnatum (L.) Engl.	taro vine, pothos, golden pothos	X	C
BIGNONIACEAE			
Spathodea campanulata P.Beauv.	African tulip tree	X	U
COMMELINACEAE			
Commelina diffusa Burm.f.	honohono	X	R
CYPERACEAE			
Cyperus sp.		?	R
Cyperus gracilis R.Br.	McCoy grass, mau'u hunehune	X	R
Kyllinga brevifolia Rottb.	kili'o'opu, kaluhā	X	R
POACEAE			
Bromus catharticus Vahl	rescue grass	X	U
Eleusine indica (L.) Gaertn.	wiregrass	X	R
Melinis minutiflora P.Beauv.	molasses grass	X	R
Paspalum conjugatum Bergius	Hilo grass, mau'u Hilo	X	U
Phyllostachys nigra (Lodd. ex Lindl.) Munro	black bamboo	X	C
Setaria palmifolia (J.König) Stapf	palmgrass	X	C
DICOTS			
ACANTHACEAE			
Ruellia prostrata Poir.	----	X	U

ANACARDIACEAE			
Schinus terebinthifolius Raddi	Christmas berry	X	R
ASTERACEAE			
Ageratum conyzoides L.	maile hohono	X	R
Galinsoga parviflora Cav.	----	X	R
Pluchea carolinensis (Jacq.) G. Don	sourbush	X	R
BRASSICACEAE			
Lepidium virginicum L.	----	X	R
BUDDLEJACEAE			
Buddleja asiatica Lour.	huelo 'ilio, dog tail	X	R
CASUARINACEAE			
Casuarina equisetifolia L.	ironwood	X	A
FABACEAE			
Desmodium incanum DC.	Spanish clover, ka'imi	X	U
MALVACEAE			
Sida acuta Burm.f. ssp. *carpinifolia* (L.f.) Borss.Waalk.	----	X	R
Sida rhombifolia L.	----	X	R
MELASTOMATACEAE			
Clidemia hirta (L.) D. Don	Koster's curse	X	R
MYRTACEAE			
Eucalyptus robusta Sm.	swamp mahogany	X	A
Psidium cattleianum Sabine	strawberry guava	X	R

OXALIDACEAE			
Oxalis corniculata L.	wood sorrel	P?	R
PASSIFLORACEAE			
Passiflora suberosa L.	huehue haole	X	R
PHYTOLACCACEAE			
Phytolacca octandra L.	southern pokeberry	X	R
PLANTAGINACEAE			
Plantago lanceolata L.	narrow-leaved or English plantain	X	R
Plantago major L.	broad-leaved plantain, common plantain	X	R
ROSACEAE			
Rubus rosifolius Sm.	thimbleberry, ʻākala	X	U
SOLANACEAE			
Solanum americanum Mill.	pōpolu	I	R
VERBENACEAE			
Verbena litoralis Kunth	ōwī, oī	X	R

Appendix B.

CHECKLIST OF BIRDS OBSERVED AT MAUNA KAPU COMMUNICATION STATION ON SEPTEMBER 5 AND SEPTEMBER 16, 2013

The following checklist is an inventory of bird species observed by SWCA biologists on September 5 and 16, 2013, during the survey of the Mauna Kapu project site. The bird species names are arranged alphabetically.

E = endemic native, NN = non-native permanent resident; C= common, U = uncommon

Common Name	Scientific Name	Status	Relative Abundance on Site	Off-site incidental detection
Northern cardinal	*Cardinalis cardinalis*	NN	U	
House finch	*Haemorhous mexicanus*	NN	C	
Oʻahu ʻamakihi	*Hemignathus flavus*	E		X
Common waxbill	*Estrilda astrild*	NN	C	
Erckel's francolin	*Francolinus erckelii*	NN	U	
Red-billed leiothrix	*Leiothrix lutea*	NN	C	
Red-vented bulbul	*Pycnonotus cafer*	NN	C	
Red-whiskered bulbul	*Pycnonotus jocosus*	NN	C	
Japanese white-eye	*Zosterops japonicus*	NN	C	
	Total species		**8**	**1**

Appendix C.

ASSESSMENT OF LAND SNAIL FAUNA AT MAUNA KAPU, OʻAHU

Assessment of Land Snail Fauna at Mauna Kapu, Oahu

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Background

The Hawaiian land snail fauna has long been noted for its extraordinary species diversity, and in recent decades for devastating levels of extinction. With more than 750 valid native species in 10 families, some of the highlights of the assemblage include one endemic family with more than 300 described species (Amastridae) and a Pacific endemic family (Achatinellidae) with over 200 species. Species from these two families account for the bulk of the species diversity in Hawaii. The Hawaiian tree snails, achatinellid subfamily Achatinellinae, comprise 4 genera with about 100 species, and all species within one of these genera, the *Achatinella*, occur on Oahu and have been Federally listed as endangered since 1981. This was the first time an entire genus was listed as endangered by the USFWS. At present there are 9 extant species remaining in the genus.

Another important endemic Hawaiian subfamily within this family is the Auriculellinae, an assemblage of about 30 arboreal species that generally live in native habitat, all of which are classified in a single genus, *Auriculella*, about two thirds of which occur on Oahu. Two additional land snail families with relatively large conspicuous individuals that are occasionally encountered in native mid and upper elevation habitats are the Succineidae with 42 endemic species and the Helicarionidae, with about 60 endemic species. Neither of these groups is as host specific in terms of native plants, or as strictly arboreal as the achatinelline tree snails. Neither group has any Federally regulated taxa, but all endemic Hawaiian land snails are of conservation concern because all face similar threats from habitat loss and predation by introduced species such as rats, the rosy wolf snail, *Euglandina rosea*, the New Guinea flatworm *Platydemus manokwari*, and Jackson's chameleons. Unfortunately detailed distribution and abundance data for small difficult to detect lineages of native Hawaiian snails are not available, therefore I urge caution and care when wild populations of native snails are present within proposed work areas.

Survey Results

We arrived at the telecommunication facilities project site at Mauna Kapu (21°24'14.10"N, 158° 5'50.90"W) around 10:00 AM on 16 September, 2013, and began the survey near the parking area south of the USCG Generator Building, on the east side of the ridge along the upper edge of the slope. This is a mixed, low complexity nonnative forest, at an elevation of a little over 2,700 feet, dominated by ironwood trees *Casuarina*, plus *Eucalyptus*, *Spathodea campanulata, Psidium cattleianum, Clidemia hirta, Phytolacca octandra.* There is a single *Charpentiera obovata* immediately below the site on the steep slope, and a stand of bamboo begins a bit further northwards and upslope towards the ICSD and USCG/Army Buildings. We searched the understory along the southern end of the project site consisting of widely spaced ti plants *Cordyline fruticosa* (~1.5 m in height), thimbleberry *Rubus parvifloris* and the vine *Epipremnum pinnatum*. Right away I began seeing a white-shelled *Auriculella* (~ 6 mm shell length) on the waxy undersides of the leaves of the vine. This snail, *A. ambusta* (see Fig. 1), is distributed from this point in the southern Waianaes up to Pahole NAR in the northern part of the range. As we worked in a northerly direction along the edge of the ridge, I counted about a dozen adult *A. ambusta,* mainly on the vine, but also in *Casuarina* and bamboo. In addition we found three species of very small (~1 mm shell length) native snails, members of the subfamilies Tornatellidinae and Tornatellininae, in the genera *Tornatellides* (2 species) and *Elasmias* (1 species), respectively. These are native snails that prefer broad leafed native plants, and a number were found on the ti leaves and the vine *Epipremnum pinnatum*. Native snails of all three genera were most common at the southern end of the work area near the vine *Epipremnum pinnatum.*

Searches of the leaf litter revealed several adult individuals of the introduced European snail commonly known as the garlic snail, *Oxycheilus alliarius*. This species is omnivorous and has been shown to prey on minute native snails, the egg masses of native succineids, as well as plant material. Also found in the leaf litter were several specimens of the invasive predatory triclad flatworm *Platydemus manokwari*, including one worm feeding on a garlic snail.

The main conservation concern here is the presence of *Auriculella* in the understory, many of which occur in precisely the area where the trench will be placed. None of the plants which this snail was found on are likely to be ideal host species for native snails, but colonization has likely occurred out of necessity, given the lack of suitable host plant alternatives in this area. Because of the restricted range of *A. ambusta,* the restricted size of the patch of habitat at the site and given its location in the work area, very near to the ground where predators have access, the following measures are recommended.

1) **Translocation**- I would recommend collecting and moving all of the native snails (*Tornatellides*, *Elasmias* and *Auriculella*) from this area. There is a recently completed predator-proof snail enclosure at Palikea, just to the north of the Mauna Kapu site, and I have consulted with OANRP staff, as well as DLNR's Snail Exinction Prevention Program, the agencies charged with managing the site, and they agree that translocation of these native snails into the safety of the enclosure is a good idea. I would be happy to lead the translocation effort, assuming all interested parties agree on this course of action, to be conducted prior to breaking ground on the telecommunication cable and trench project. Translocation is expected to take less than one day (collection, transport and release) with the on-site collection estimated to take 2-3 man hours.

2) **Minimizing on-site impacts** - Since the collection of all native snail individuals within the work area is not possible, some individuals are expected to remain within the work area after the translocation effort. Therefore:

    a. The footprint of any construction at the site should be minimized wherever possible.

    b. If vegetation clearing is required, hand clearing of vegetation is recommended and cut plants should be placed near adjacent vegetation of similar species to enable the snails to move on to new host plants. The most sensitive area is the southern portion of the site with the vine *Epipremnum pinnatum.*

c. If a large amount of vegetation is cleared, it may be helpful to have a biologist on-site to monitor vegetation clearing and placement of cut material, in order to maximize chances for remaining native snails to move to suitable live habitat.

Figure 1. Oahu endemic snail *Auriculella ambusta*, with an egg visible along the side of an adult snail. These snails have a full-grown shell length of about 6 mm.

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APPENDIX D

TARGETED HAZARDOUS MATERIAL SURVEY

TARGETED HAZARDOUS MATERIAL SURVEY REPORT
FOR
MAUNA KAPU RADIO SITE IMPROVEMENTS AND
BUILDING RENOVATION
NANAKULI, OAHU, HAWAII

MNA PROJECT 01587_2

NOVEMBER 13, 2013

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TARGETED HAZARDOUS MATERIAL SURVEY REPORT FOR MAUNA KAPU RADIO SITE IMPROVEMENTS AND BUILDING RENOVATION NANAKULI, OAHU, HAWAII

MNA Project 01587_2

November 13, 2013

Adam Custer
Building Inspector (HIASB-3042, exp. Date 2/21/2014)

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EXECUTIVE SUMMARY

In October 2013, Myounghee Noh & Associates, L.L.C. (MNA), was retained by Richard Matsunaga & Associates Architects, Inc. (RMAIA), to conduct a targeted hazardous materials survey of the Mauna Kapu Radio Site, located in at the end of Palehua Road in Nanakuli, on the Island of Oahu, Hawaii. MNA's survey was conducted in support of the planned improvement and renovation of Building C, the Information and Communication Services Division Building (ICSD), and the United States Coast Guard (USCG) Hut.

The purpose of the survey was to identify the existence (if any), extent, and condition of asbestos-containing materials (ACM), and lead-containing paint (LCP) present on the interior and exterior of the buildings.

MNA conducted the survey on October 24, 2013, and identified 20 suspect building materials. Based on the survey and analysis of 27 asbestos samples and 26 lead samples, MNA provides the following summary:

- No ACM were identified on the exterior or within the interior of the buildings onsite.
- Four LCP were identified by paint chip sampling on the interior and exterior of the buildings (Table 2). The LCP included:
  - **Light green paint** in good condition **on brick walls on the exterior of Building C, 150 milligrams per kilograms (mg/kg) and 180 mg/kg,** totaling approximately 1,600 square feet.
  - **White paint** in good condition **on brick walls in the Equipment Room of Building C, 570 mg/kg and 3,500 mg/kg,** totaling approximately 1,800 square feet.
- Two of the four LCP were lead-based paints (LBP), exceeding 5,000 mg/kg. The LBP included:
  - **White paint** in good condition **on concrete ceiling in the Equipment Room of Building C, 2,500 mg/kg and 9,600 mg/kg,** totaling approximately 1,200 square feet.
  - **Gray paint** in fair condition **on metal walls on the exterior of the USCG Hut, 4,300 mg/kg and 8,900 mg/kg,** totaling approximately 350 square feet.

Based on the sampling and analysis of suspect paints and bulk materials, special hazard control measures are warranted for work involving LCP and LBP. These control measures are briefly

described in Section 7 Recommendations for Renovation and Construction Work. General dust and runoff controls are also warranted.

The contractor shall verify the location and volumes of hazardous materials and determine the appropriate dust and hazard control measures based on the area and material to be disturbed. The quantities of hazardous materials provided in this report are visual estimates only during and for the survey and should not be used for bidding purposes. Contractors are required to verify the location and quantities.

1.0 INTRODUCTION

Myounghee Noh & Associates, L.L.C. (MNA), under contract with Richard Matsunaga & Associates Architects, Inc. (RMAIA), conducted a targeted hazardous materials survey at the Mauna Kapu Radio Site, located at the end of Palehua Road in Nanakuli, Island of Oahu, Hawaii. Figure 1 presents a general vicinity map of the Mauna Kapu Radio Site.

MNA's survey was conducted in support of planned improvements and renovations of Building C, the Information and Communication Services Division Building (ICSD), and the United States Coast Guard (USCG) Hut. The survey targeted asbestos and lead on the exterior and within the interior of the buildings located onsite.

Mauna Kapu Radio Site
October, 2013

2.0 SAMPLING AND SURVEY METHODS

On October 24, 2013, State of Hawaii-certified building inspectors, Adam Custer and Danny Falanug, conducted the targeted hazardous material building survey. The inspectors performed a visual inspection of all interior and exterior areas to identify materials suspected of containing asbestos or lead and collected samples of these materials. Inspector certifications are presented in Appendix A.

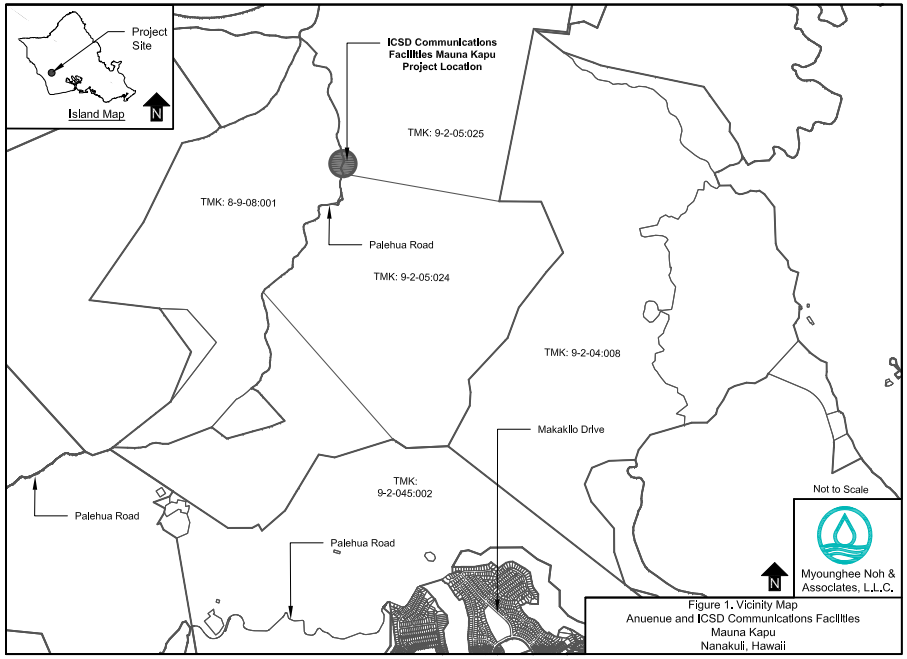


Figure 1. Vicinity Map
Anuenue and ICSD Communications Facilities
Mauna Kapu
Nanakuli, Hawaii

2.1 Identifying Homogeneous Materials

The survey identified building materials with the same appearance, color, and substrate as homogeneous materials. Interior homogeneous materials are considered unique per building and building floor, while exterior building materials are considered unique per building. Building materials with the same characteristics (appearance, color, and substrate) as an identified homogeneous material should be considered to possess the same hazardous characteristics unless specifically identified as a different material in the report. As an example, if white paint on concrete is identified as lead-based paint (LBP), then all similar white paint on concrete should be treated as LBP. Table 1 provides an overview of sampling and a summary of hazardous materials identified.

Table 1. Summary of Sampling and Results

Materials Sampled	Samples Submitted/ Inspected	Suspect Material Locations	Identified Hazardous Materials
Asbestos in bulk material and paint	27	Ceilings, door frames, floors, walls	None
Lead in paint	26	Beams, brackets, ceilings, conduit, doors, door frames, eaves, roof trim, walls	4 LCP (150 mg/kg – 9,600 mg/kg) including 2 LBP (8,900 mg/kg – 9,600 mg/kg)

LBP – Lead-Based Paint
LCP – Lead-Containing Paint
mg/kg – milligrams per kilogram (equivalent to parts per million)

2.2 Building Material Sampling

Bulk and paint samples were collected using a decontaminated chisel, razor, and hammer in a manner that minimized airborne dust. The inspectors collected triplicate samples for asbestos and duplicate samples for lead. Samples were placed in sealable plastic bags, labeled with a unique identification number, and recorded on a chain-of-custody. For each sample, the date, sample appearance, analyte, and sample location were recorded on a field data form. All samples were transported under chain-of-custody by FedEx to LA Testing in South Pasadena, California.

3.0 LABORATORY INFORMATION

LA Testing analyzed the samples as follows:

- Asbestos samples by polarized light microscopy using the Environmental Protection Agency (EPA) Method 600/R-93/116.
- Lead samples by flame atomic absorption spectroscopy using the EPA Method 7420.

LA Testing, South Pasadena, is certified by:

- National Voluntary Laboratory Accreditation Program (NVLAP), certification 200232-0.
- State of Hawaii Department of Health (HDOH), certification L-01-034.
- American Industrial Hygienist Association (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP), certification 102814.

4.0 ASBESTOS RESULTS

Materials determined to contain greater than, or equal to, 1% asbestos fibers are considered regulated ACM under the National Emission Standards for Hazardous Air Pollutants (NESHAP) as specified in 40 Code of Federal Regulations (CFR) Part 61 Subpart M. The U.S. Occupational Safety and Health Administration (OSHA) Asbestos General Industry and Construction Standards also define asbestos-containing materials (ACM) as 1% or more by volume under 29 CFR 1910.1001 and 29 CFR 1926.1101, respectively.

Nine suspect ACM was identified onsite, generating 27 samples for the analysis of asbestos. None of the suspect ACM were confirmed to be ACM through sampling and analysis.

The suspect ACM descriptions and identifiers are provided in Appendix B. Sample location drawings are provided in Appendix C. Photographs of the suspect materials are presented in Appendix D. Laboratory analytical reports, chain-of-custody, and field data forms are provided in Appendix E.

5.0 LEAD RESULTS

The U.S. Department of Housing and Urban Development (HUD) and the EPA define paint containing 5,000 milligrams per kilogram (mg/kg), or 0.5% by weight, or more of lead to be LBP. OSHA considers paint containing any measurable concentration of lead to be lead-

containing paint (LCP). When lead is detected in a multi-layer sample, it is assumed that all layers represented by the sample contain lead at the same concentration.

Thirteen paints suspected of containing lead were identified and sampled, generating 26 paint samples. Four LCP were identified in the survey area, with results ranging from 150 mg/kg to 9,600 mg/kg. Two of those LCP were identified as LBP, exceeding 5,000 mg/kg, the threshold for LBP.

The lead findings are summarized in Table 2. Suspect LCP descriptions and identifiers are provided in Appendix B. Lead sample and hazardous material location drawings are provided in Appendix C. Photographs of suspect materials are presented in Appendix D. Laboratory analytical reports, chain-of-custody, and field data forms are provided in Appendix E.

6.0 SUMMARY OF SURVEY RESULTS

In October 2013, MNA was retained by RMAIA, to conduct a hazardous materials survey of the Mauna Kapu Radio Site, located at the end of Palehua Road in Nanakuli, Island of Oahu, Hawaii. MNA's survey was conducted in support of the planned improvement and renovation of Building C, ICSD, and the USCG Hut.

The purpose of the survey was to identify the existence (if any), extent, and condition of ACM, and LCP present on the interior and exterior of the buildings.

MNA conducted the survey on October 24, 2013, and identified 20 suspect building materials. Based on the survey and analysis of 27 asbestos samples and 26 lead samples, MNA provides the following summary:

Table 2. Lead-Containing Paint Determination

Building	Rooms	Locations	HM ID	Material Color	Material	Substrate	Result	Condition	Estimated Quantity
C	**Exterior**	**Walls**	**1**	**Lt. green**	**Paint**	**Brick**	**LCP 150 - 180 mg/kg**	**Good**	**1,600 sq. ft.**
C	**Equipment Room**	**Walls**	**2**	**White**	**Paint**	**Brick**	**LCP 570 - 3,500 mg/kg**	**Good**	**1,500 sq. ft.**
C	**Equipment Room**	**Ceiling**	**3**	**White**	**Paint**	**Concrete**	**LBP 2,500 - 9,600 mg/kg**	**Good**	**1,200 sq. ft.**
ICSD	Exterior	Walls	5	Gray	Paint	Concrete block	<100 mg/kg	Poor	280 sq. ft.
ICSD	Exterior	Roof trim	6	Gray	Paint	Wood	<100 mg/kg	Fair	35 ln. ft.
ICSD	Exterior	Eave	8	Gray	Paint	Concrete	<100 mg/kg	Good	5 sq. ft.
ICSD	Exterior	Door, door frame	19	Gray	Paint	Metal	<100 mg/kg	Fair	25 sq. ft.
ICSD	Interior	Walls	9	Off-white	Paint	Concrete block	<100 mg/kg	Fair	280 sq. ft.
ICSD	Interior	Brackets, conduit	10	Off-white	Paint	Metal	<100 mg/kg	Good	15 ln. ft.
ICSD	Interior	Ceiling	11	Off-white	Paint	Drywall	<100 mg/kg	Good	65 sq. ft.
ICSD	Interior	Door, door frame	17	Beige	Paint	Metal	<100 mg/kg	Good	25 sq. ft.
ICSD	Interior	Beams	18	Off-white	Paint	Wood	<100 mg/kg	Good	15 sq. ft.
USCG Hut	**Exterior**	**Walls**	**4**	**Gray**	**Paint**	**Metal**	**LBP 4,300 - 8,900 mg/kg**	**Fair**	**350 sq. ft.**

Bold values indicate results above the detection limit.
Good – Building material is in an "as installed" condition. It is usable as is, may show cosmetic wear and tear or fading.
Fair – Building material is functional for its installed purpose but shows initial signs of deterioration beyond the cosmetic.
Poor – Material shows significant deterioration and may not be functional for its installed purpose. Paint is bubbling or peeling over 20% or more of surface area and no longer protects the substrate.

Acronyms and Abbreviations:
HM ID – Hazardous Material Identifier
LBP – Lead-Based Paint ≥5,000
LCP – Lead-Containing Material <5,000 mg/kg
ln. ft. – Linear Feet
mg/kg – milligrams per kilogram, equivalent to parts per million
sq. ft. – Square Feet

- No ACM were identified on the exterior or within the interior of the buildings onsite.
- Four LCP were identified on the interior and exterior of the buildings. The LCP included:
  - **Light green paint** in good condition **on brick walls on the exterior of Building C, 150 mg/kg and 180 mg/kg,** totaling approximately 1,600 square feet.
  - **White paint** in good condition **on brick walls in the Equipment Room of Building C, 570 mg/kg and 3,500 mg/kg,** totaling approximately 1,800 square feet.
- Two of the four LCP were LBP, exceeding 5,000 mg/kg. The LBP included:
  - **White paint** in good condition **on concrete ceilings in the Equipment Room of Building C, 2,500 mg/kg and 9,600 mg/kg,** totaling approximately 1,200 square feet.
  - **Gray paint** in fair condition **on metal walls on the exterior of the USCG Hut, 4,300 mg/kg and 8,900 mg/kg,** totaling approximately 350 square feet.

7.0 RECOMMENDATIONS FOR RENOVATION AND CONSTRUCTION WORK

OSHA requires that only properly trained employees perform construction work and demolition that disturbs hazardous materials. The following recommendations address OSHA and other applicable federal requirements. These recommendations provide guidance for the management of hazardous building materials and control of occupational and environmental hazards associated with operations, maintenance, renovation, and demolition. These recommendations are based on information gathered during the hazardous materials survey. These recommendations are not intended to constitute a formal work plan but are intended to provide a starting point for the development of a work plan.

7.1 Asbestos-Containing Materials

No ACM were identified in any of the three buildings within the project area. Therefore, no special control measures are warranted for the disturbance of ACM.

7.2 Lead-Containing Paints

Employees involved in renovation or construction activities that disturb LCP or LBP must conduct work in accordance with 29 CFR 1926.62, the OSHA Lead Construction Standard. Work practices that would trigger these requirements include, but are not limited to, sanding, blasting, welding, cutting, or scraping. For each project, the contractor shall determine the appropriate safety measures based on the area to be disturbed, the lead concentration, and the

paint condition. Applicable work practice guidelines involving the disturbance of LCP or LBP are summarized, but are not limited to:

- Employees must utilize appropriate engineering controls and personal protective equipment (PPE). The PPE includes disposable coveralls, gloves, eye protection, steel-toed boots, a hard hat, and a National Institute for Occupational Safety and Health (NIOSH)-approved appropriate respirator.
- Employees must utilize respiratory protection until the initial air monitoring assessment documents safe working levels of airborne lead (29 CFR 1926.62[d][1] and [2][i][A]).
- An exposure assessment should be carried out when employees are disturbing LCP or LBP to ensure that they are not exposed to airborne lead concentrations greater than the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu g/m^3$) averaged over an 8-hour period. Additional periodic exposure monitoring may be required if the lead OSHA Action Level of 30 $\mu g/m^3$ averaged over an 8-hour period is exceeded.
- Employees must implement stringent dust control procedures to minimize airborne lead concentrations.
- Employees must clean the work area thoroughly using wet methods and a high-efficiency particulate air (HEPA) vacuum. Dry sweeping or air blowing of lead debris and dust must be avoided.
- Lead-containing debris should be segregated from other wastes, collected, and containerized. Wastes should be fully characterized, including a determination of the waste as hazardous or non-hazardous. Lead-containing wastes should be disposed of in accordance with applicable requirements.
- Visually inspect the work area to ensure all lead-containing debris and dust has been properly removed.
- Conduct clearance in accordance with contract specifications.

8.0 LIMITATIONS

Every reasonable effort was made to identify suspect building materials during the survey. However, this does not imply a guarantee that all suspect building materials were identified by this assessment because certain building materials and/or surfaces may be hidden by walls,

flooring, partitions, or other building components. If suspect materials previously unknown become uncovered, additional survey work may be required prior to the planned renovation project.

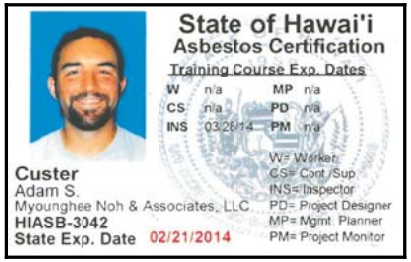
Estimated quantities of hazardous materials provided in this report are visual estimates during and for the survey and should not be used for bidding purposes. Contractors are required to verify the locations and quantities.

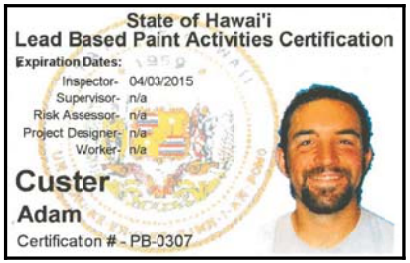
APPENDIX A

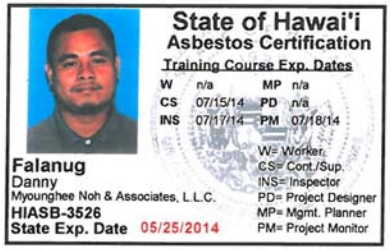
INSPECTOR CERTIFICATIONS

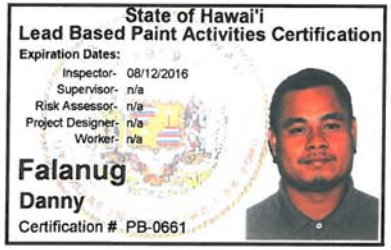
Adam Custer

Danny Falanug









APPENDIX B

HOMOGENEOUS MATERIALS IDENTIFIED AND SAMPLE TYPES COLLECTED

Homogeneous Materials Identified and Sample Types Collected

HM ID	Building	Rooms	Locations	Material Color	Material	Substrate	Asb	Pb	Result
1	**C**	**Exterior**	**Walls**	**Lt. green**	Skim coat **Paint**	**Brick**	X	**X**	ND **LCP 150 - 180 mg/kg**
2	**C**	**Equipment Room**	**Walls**	**White**	Skim coat **Paint**	**Brick**	X	**X**	ND **LCP 570 - 3,500 mg/kg**
3	**C**	**Equipment Room**	**Ceiling**	**White**	**Paint**	**Concrete**		**X**	**LBP 2,500 - 9,600 mg/kg**
4	**USCG Hut**	**Exterior**	**Walls**	**Gray**	**Paint**	**Metal**		**X**	**LBP 4,300 - 8,900 mg/kg**
5	ICSD	Exterior	Walls	Gray	Paint	Concrete block		X	<100 mg/kg
6	ICSD	Exterior	Roof trim	Gray	Paint	Wood		X	<100 mg/kg
7	ICSD	Exterior	Wall	Gray	Caulking	Concrete block	X		ND
8	ICSD	Exterior	Eave	Gray	Paint	Concrete		X	<100 mg/kg
9	ICSD	Interior	Walls	Off-white	Paint	Concrete block		X	<100 mg/kg
10	ICSD	Interior	Brackets, conduit	Off-white	Paint	Metal		X	<100 mg/kg
11	ICSD	Interior	Ceiling	Off-white	Paint	Drywall		X	<100 mg/kg
12	ICSD	Interior	Wall	Brown Yellow	Cove base Mastic	Concrete block	X		ND
13	ICSD	Interior	Floor	Off-white with brown specks Yellow	12" x 12" Vinyl tile Mastic	Concrete	X		ND
14	ICSD	Interior	Walls	White	Caulking	Wood	X		ND
15	ICSD	Interior	Ceiling	White Beige	Drywall Joint compound	None	X		ND

RMAIA Inc. - Hazardous Material Survey Report, Mauna Kapu,
Site Improvements and Building Renovation, Nanakuli, Oahu, Hawaii

Homogeneous Materials Identified and Sample Types Collected

HM ID	Building	Rooms	Locations	Material Color	Material	Substrate	Asb	Pb	Result
16	ICSD	Interior	Door frame	Off-white	Caulking	Metal	X		ND
17	ICSD	Interior	Door, door frame	Beige	Paint	Metal		X	<100 mg/kg
18	ICSD	Interior	Beams	Off-white	Paint	Wood		X	<100 mg/kg
19	ICSD	Exterior	Door, door frame	Gray	Paint	Metal		X	<100 mg/kg
20	ICSD	Exterior	Door frame	White	Caulking	Metal	X		ND

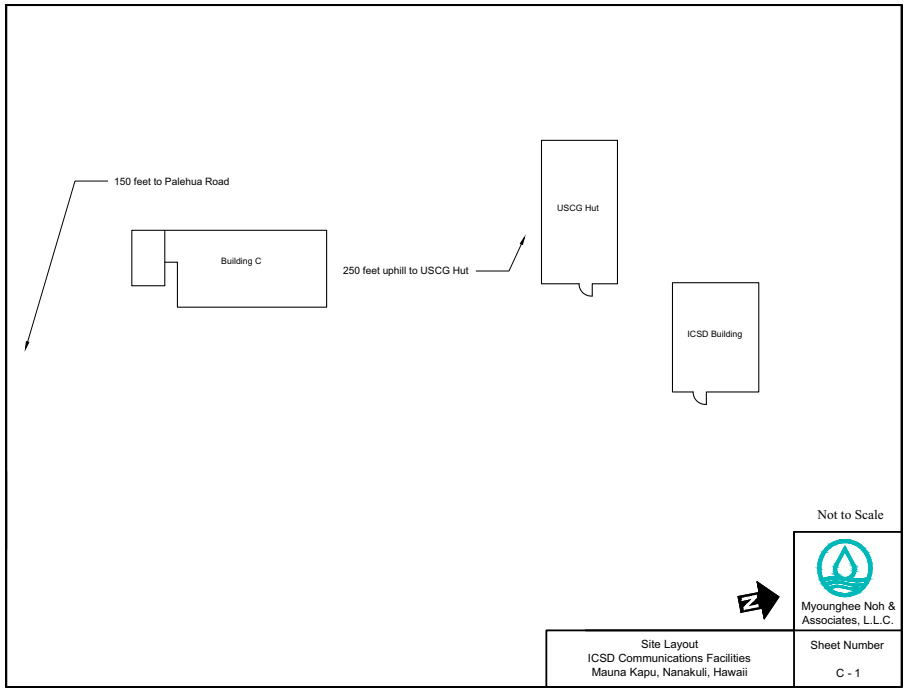
Bold values indicate results above the reporting limit.
All asbestos found to be chrysotile.

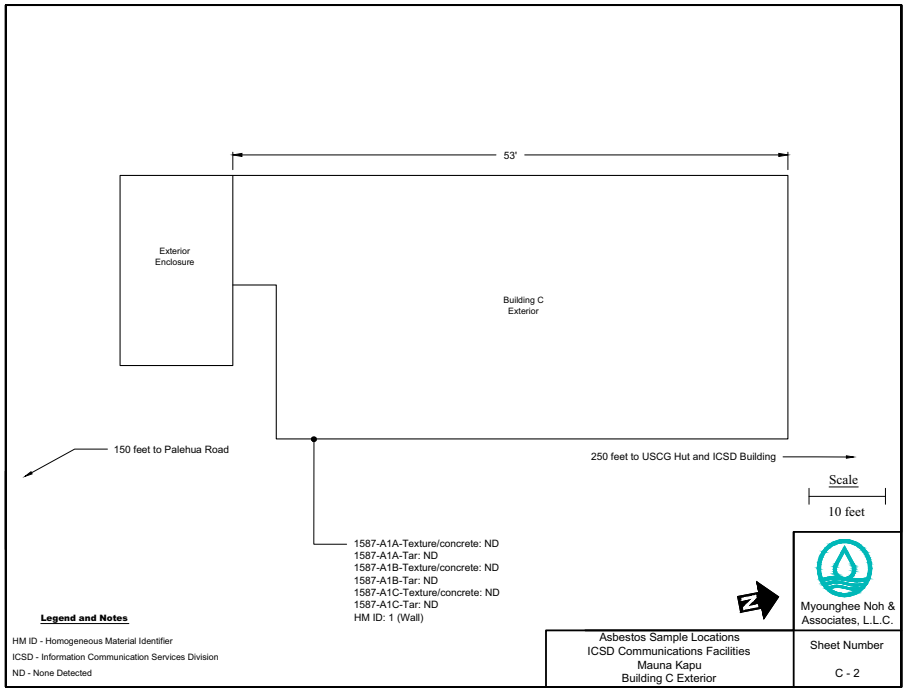
Abbreviations and Acronyms
Asb - Asbestos
HM ID - Homogeneous Material Identifier
LBP - Lead-Based Paint >5,000 mg/kg
LCP - Lead-Containing Material <5,000 mg/kg
mg/kg - milligrams per kilogram, equivalent to parts per million
ND - Not Detected

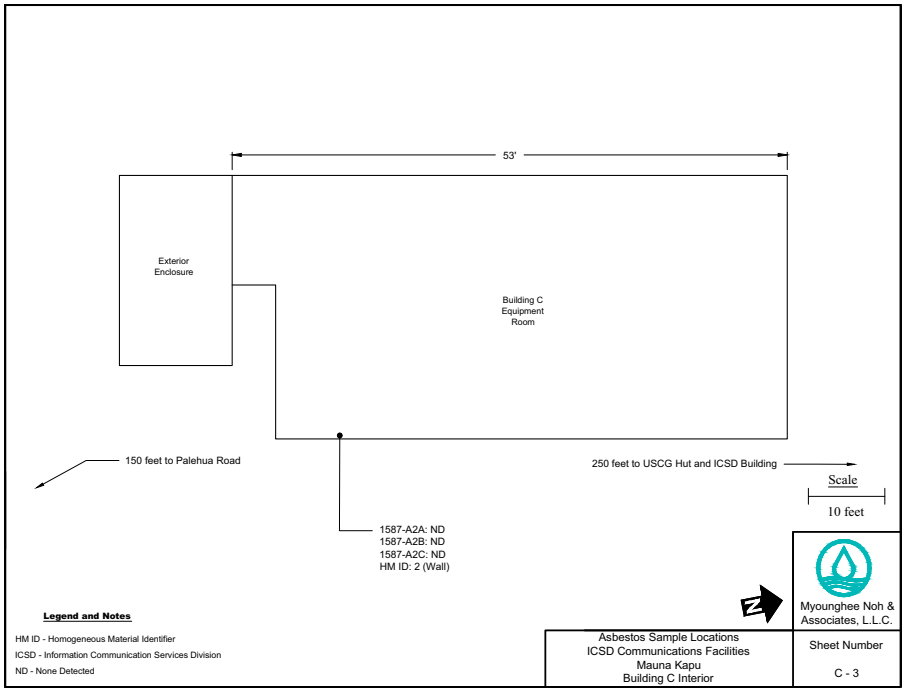
APPENDIX C

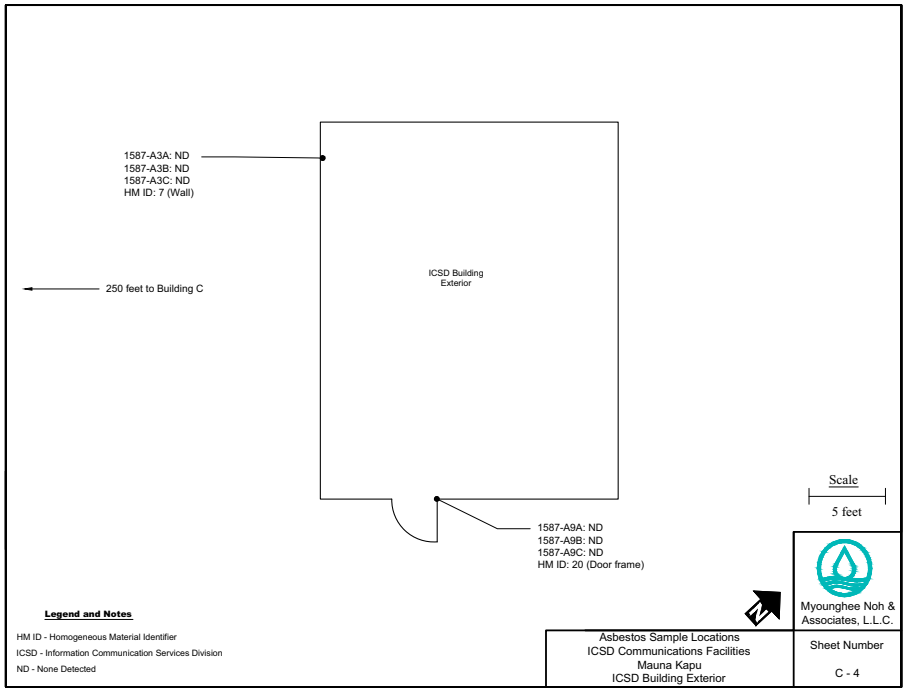
ASBESTOS AND LEAD SAMPLE LOCATION AND HAZARDOUS MATERIAL DRAWINGS

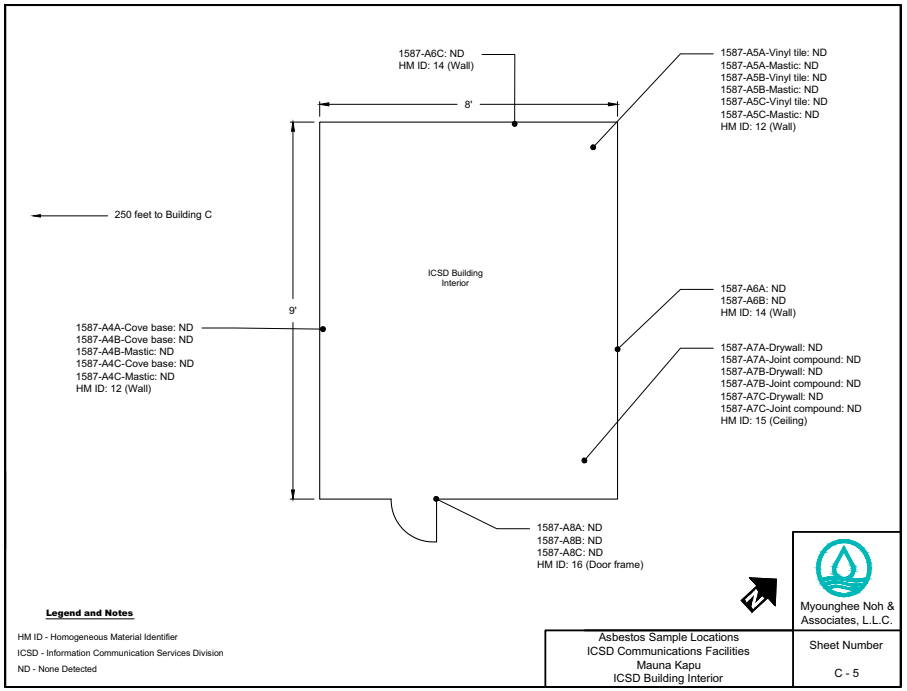
Table of Contents	
Site Layout	**C-1**
Asbestos Sample and Hazardous Material Locations	**C-2 – C-5**
Lead Paint Sample and Hazardous Material Locations	**C-6 to C-10**



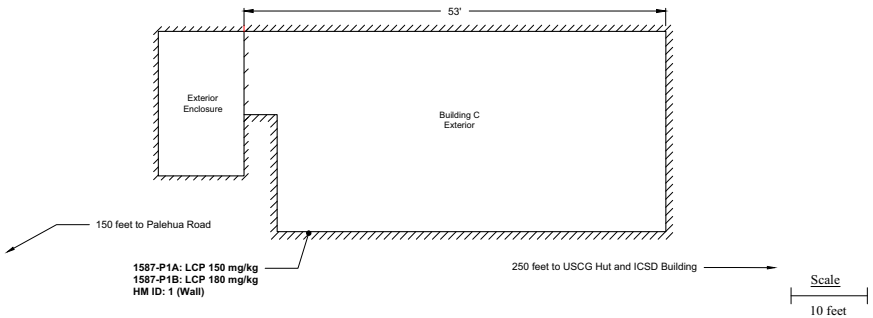

53'
Exterior Enclosure
Building C Exterior
150 feet to Palehua Road
250 feet to USCG Hut and ICSD Building
Scale
10 feet
1587-A1A-Texture/concrete: ND
1587-A1A-Tar: ND
1587-A1B-Texture/concrete: ND
1587-A1B-Tar: ND
1587-A1C-Texture/concrete: ND
1587-A1C-Tar: ND
HM ID: 1 (Wall)
Legend and Notes
HM ID - Homogeneous Material Identifier
ICSD - Information Communication Services Division
ND - None Detected
Asbestos Sample Locations
ICSD Communications Facilities
Mauna Kapu
Building C Exterior
Myounghee Noh & Associates, L.L.C.
Sheet Number
C - 2


53'
Exterior Enclosure
Building C Equipment Room
150 feet to Palehua Road
250 feet to USCG Hut and ICSD Building
Scale
10 feet
1587-A2A: ND
1587-A2B: ND
1587-A2C: ND
HM ID: 2 (Wall)
Legend and Notes
HM ID - Homogeneous Material Identifier
ICSD - Information Communication Services Division
ND - None Detected
Asbestos Sample Locations
ICSD Communications Facilities
Mauna Kapu
Building C Interior
Myounghee Noh & Associates, L.L.C.
Sheet Number
C - 3


1587-A3A: ND
1587-A3B: ND
1587-A3C: ND
HM ID: 7 (Wall)
250 feet to Building C
ICSD Building
Exterior
1587-A9A: ND
1587-A9B: ND
1587-A9C: ND
HM ID: 20 (Door frame)
Scale
5 feet
N
Legend and Notes
HM ID - Homogeneous Material Identifier
ICSD - Information Communication Services Division
ND - None Detected
Myounghee Noh &
Associates, L.L.C.
Asbestos Sample Locations
ICSD Communications Facilities
Mauna Kapu
ICSD Building Exterior
Sheet Number
C - 4


1587-A6C: ND
HM ID: 14 (Wall)
8'
1587-A5A-Vinyl tile: ND
1587-A5A-Mastic: ND
1587-A5B-Vinyl tile: ND
1587-A5B-Mastic: ND
1587-A5C-Vinyl tile: ND
1587-A5C-Mastic: ND
HM ID: 12 (Wall)
250 feet to Building C
ICSD Building
Interior
9'
1587-A6A: ND
1587-A6B: ND
HM ID: 14 (Wall)
1587-A4A-Cove base: ND
1587-A4B-Cove base: ND
1587-A4B-Mastic: ND
1587-A4C-Cove base: ND
1587-A4C-Mastic: ND
HM ID: 12 (Wall)
1587-A7A-Drywall: ND
1587-A7A-Joint compound: ND
1587-A7B-Drywall: ND
1587-A7B-Joint compound: ND
1587-A7C-Drywall: ND
1587-A7C-Joint compound: ND
HM ID: 15 (Ceiling)
1587-A8A: ND
1587-A8B: ND
1587-A8C: ND
HM ID: 16 (Door frame)
N
Legend and Notes
HM ID - Homogeneous Material Identifier
ICSD - Information Communication Services Division
ND - None Detected
Myounghee Noh &
Associates, L.L.C.
Asbestos Sample Locations
ICSD Communications Facilities
Mauna Kapu
ICSD Building Interior
Sheet Number
C - 5

HM ID	Locations	Material	Color	Substrate	Results (mg/kg)
1	Walls	Paint	Lt. green	Brick	**LCP 150 - 180**



Legend and Notes

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Homogeneous Material Identifier

ICSD - Information Communication Services Division

LCP - Lead-Containing Paint < 5,000 mg/kg

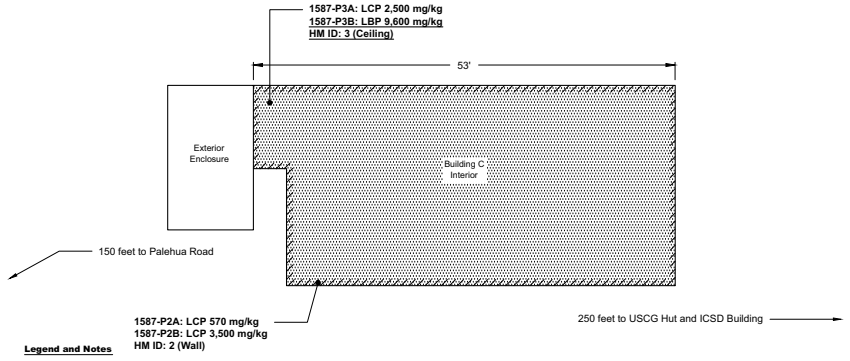
mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
ICSD Communications Facilities
Mauna Kapu Building C Exterior

Sheet Number
C - 6

HM ID	Locations	Material	Color	Substrate	Results (mg/kg)
2	Walls	Paint	White	Brick	**LCP 570 - 3,500**
3	Ceiling	Paint	White	Concrete	**LBP 2,500 - 6,900**



Legend and Notes

Visual Extent of Lead-Based Paint

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Homogeneous Material Identifier

ICSD - Information Communications Systems Division

LBP - Lead-Based Paint ≥ 5,000 mg/kg

LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

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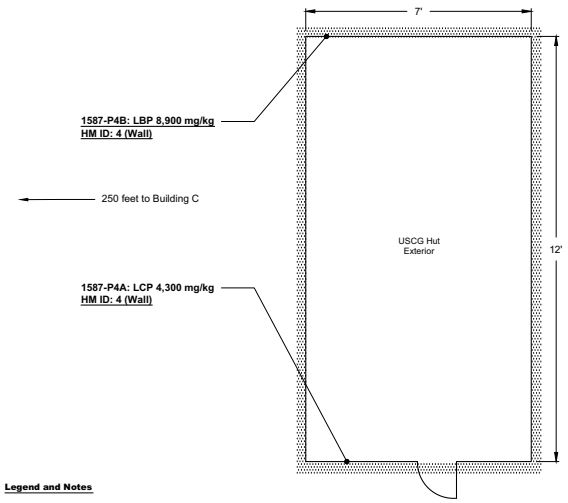
Lead Paint Sample and Hazardous Material Locations
ICSD Communications Facilities
Mauna Kapu Building C Interior

Sheet Number
C - 7

HM ID	Locations	Material	Color	Substrate	Results (mg/kg)
4	Walls	Paint	Gray	Metal	**LBP 4,300 - 8,900**



Scale
5 feet

Legend and Notes

Visual Extent of Lead-Based Paint

Bold values indicate results above the detection limit.

HM ID - Homogeneous Material Identifier

ICSD - Information Communications Systems Division

LBP - Lead-Based Paint ≥ 5,000 mg/kg

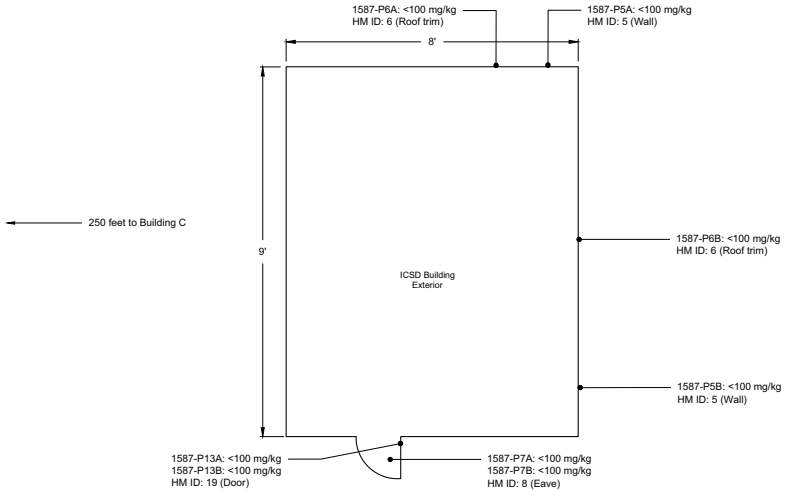
LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
ICSD Communications Facilities
Mauna Kapu USCG Hut Exterior

Sheet Number
C - 8



Scale
5 feet

Legend and Notes

HM ID - Homogeneous Material Identifier

ICSD - Information Communication Services Division

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

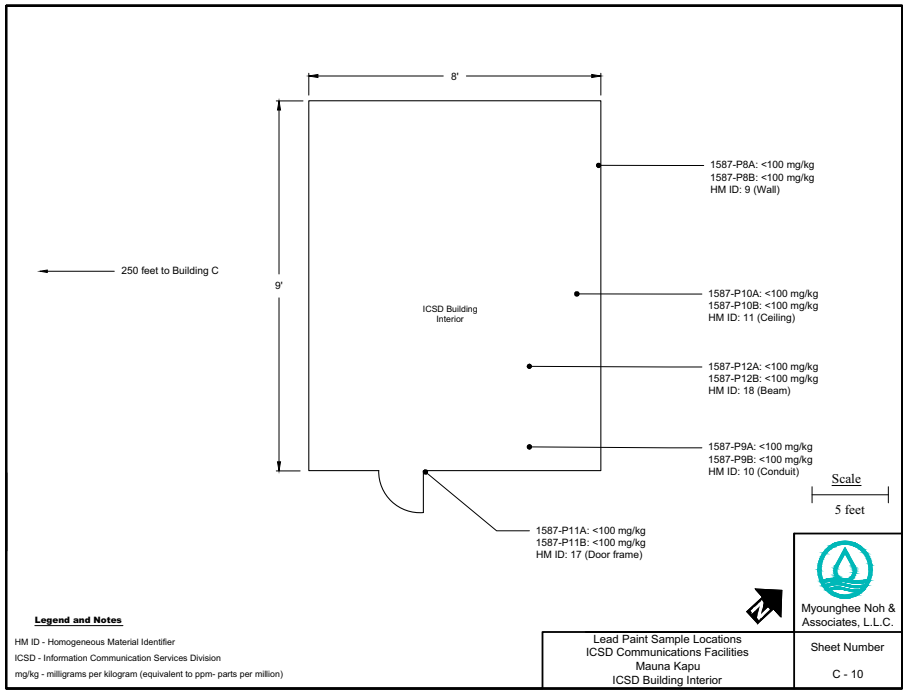
Myounghee Noh & Associates, L.L.C.

Lead Paint Sample Locations
ICSD Communications Facilities
Mauna Kapu
ICSD Building Exterior

Sheet Number
C - 9

APPENDIX D

PHOTOGRAPHS



HM ID 1
Building C

Exterior
Light green texture, concrete, tar, and paint on brick wall.

Non-ACM
1587-A1A-Texture/Concrete: ND
1587-A1A-Tar: ND
1587-A1B-Texture/Concrete: ND
1587-A1B-Tar: ND
1587-A1C-Texture/Concrete: ND
1587-A1C-Tar: ND

LCP
1587-P1A: 150 mg/kg
1587-P1B: 180 mg/kg

HM ID 2
Building C

Equipment Room
White skim coat and paint on brick wall.

Non-ACM
1587-A2A: ND
1587-A2B: ND
1587-A2C: ND

LCP
1587-P2A: 570 mg/kg
1587-P2B: 3,500 mg/kg

HM ID 3
Building C

Equipment Room
White paint on concrete ceiling.

LBP
1587-P3A: 2,500 mg/kg
1587-P3B: 9,600 mg/kg

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Site Improvements and Building Renovation, Nanakuli, Oahu, Hawaii

HM ID 4
USCG Hut

Exterior
Gray paint on metal wall.

LBP
1587-P4A: 4,300 mg/kg
1587-P4B: 8,900 mg/kg

HM ID 5
ICSD Building

Exterior
Gray paint on concrete block wall.

Non-LCP
1587-P5A: <100 mg/kg
1587-P5B: <100 mg/kg

HM ID 6
ICSD Building

Exterior
Gray paint on wood roof trim.

Non-LCP
1587-P6A: <100 mg/kg
1587-P6B: <100 mg/kg

HM ID 7
ICSD Building

Exterior
Gray caulking on concrete block wall.

Non-ACM
1587-A3A: ND
1587-A3B: ND
1587-A3C: ND

HM ID 8
ICSD Building

Exterior
Gray paint on concrete eave.

Non-LCP
1587-P7A: <100 mg/kg
1587-P7B: <100 mg/kg

HM ID 9
ICSD Building

Exterior
Off-white paint on concrete block wall.

Non-LCP
1587-P8A: <100 mg/kg
1587-P8B: <100 mg/kg

HM ID 10
ICSD Building

Interior
Off-white paint on metal conduit.

Non-LCP
1587-P9A: <100 mg/kg
1587-P9B: <100 mg/kg

HM ID 11
ICSD Building

Interior
Off-white paint on drywall ceiling.

Non-LCP
1587-P10A: <100 mg/kg
1587-P10B: <100 mg/kg

HM ID 12
ICSD Building

Interior
Brown cove base and mastic on concrete block wall.

Non-ACM
1587-A4A-Cove base: ND
1587-A4A-Mastic: ND
1587-A4B-Cove base: ND
1587-A4B-Mastic: ND
1587-A4C-Cove base: ND
1587-A4C-Mastic: ND

HM ID 13
ICSD Building

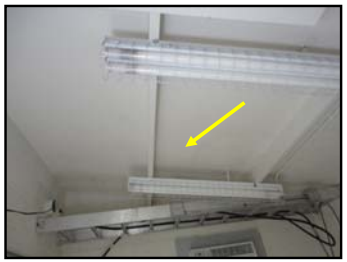
Interior
Off-white 12” x 12” vinyl tile with brown specks and mastic on concrete floor.

Non-ACM
1587-A5A-Vinyl tile: ND
1587-A5A-Mastic: ND
1587-A5B- Vinyl tile: ND
1587-A5B-Mastic: ND
1587-A5C- Vinyl tile: ND
1587-A5C-Mastic: ND

HM ID 14
ICSD Building

Interior
White caulking on wood wall.

Non-ACM
1587-A6A: ND
1587-A6B: ND
1587-A6C: ND



HM ID 15
ICSD Building

Interior
White drywall and joint compound on ceiling.

Non-ACM
1587-A7A-Drywall: ND
1587-A7A-Joint compound: ND
1587-A7B- Drywall: ND
1587-A7B-Joint compound: ND
1587-A7C- Drywall: ND
1587-A7C-Joint compound: ND

HM ID 16
ICSD Building

Interior
Off-white caulking on metal door frame.

Non-ACM
1587-A8A: ND
1587-A8B: ND
1587-A8C: ND

HM ID 17
ICSD Building

Interior
Beige paint on metal door.

Non-LCP
1587-P11A: <100 mg/kg
1587-P11B: <100 mg/kg

HM ID 18
ICSD Building

Off-white paint on wood beam.

Non-LCP
1587-P12A: <100 mg/kg
1587-P12B: <100 mg/kg

HM ID 19
ICSD Building

Exterior
Gray paint on metal door.

Non-LCP
1587-P13A: <100 mg/kg
1587-P13B: <100 mg/kg

HM ID 20
ICSD Building

Exterior
White caulking on metal door frame.

Non-ACM
1587-A9A: ND
1587-A9B: ND
1587-A9C: ND

APPENDIX E

LABORATORY ANALYTICAL REPORTS

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321319102
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Akari Ihara**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 10/28/13 9:00 AM
Analysis Date: 11/1/2013
Collected: 10/24/2013

Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1587-A 1 A-Texture/Concrete *321319102-0001*	1	Green/Beige Non-Fibrous Heterogeneous	Unable to separate	100% Non-fibrous (other)	**None Detected**
1587-A 1 A-Tar *321319102-0001A*	1	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 1 B-Texture/Concrete *321319102-0002*	1	Green/Beige Non-Fibrous Heterogeneous	Unable to separate	100% Non-fibrous (other)	**None Detected**
1587-A 1 B-Tar *321319102-0002A*	1	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 1 C-Texture/Concrete *321319102-0003*	1	Gray/Green/Beige Non-Fibrous Heterogeneous	Unable to separate	100% Non-fibrous (other)	**None Detected**
1587-A 1 C-Tar *321319102-0003A*	1	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 2 A *321319102-0004*	2	White/Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
Kieu-anh Pham Duong (25)
Rosa Mendoza (13)

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

Initial report from 11/01/2013 11:09:38

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321319102
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Akari Ihara**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 10/28/13 9:00 AM
Analysis Date: 11/1/2013
Collected: 10/24/2013

Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1587-A 2 B *321319102-0005*	2	White/Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 2 C *321319102-0006*	2	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 3 A *321319102-0007*	7	Gray/Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 3 B *321319102-0008*	7	Gray/Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 3 C *321319102-0009*	7	Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 4 A-Cove Base *321319102-0010*	12	Brown Non-Fibrous Homogeneous	No mastic present for analysis.	100% Non-fibrous (other)	**None Detected**
1587-A 4 B-Cove Base *321319102-0011*	12	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 4 B-Mastic *321319102-0011A*	12	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
Kieu-anh Pham Duong (25)
Rosa Mendoza (13)

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%

Samples analyzed by LA Testing South Pasadena, CA NVLAP Lab Code 200232-0, CA ELAP 2283

Initial report from 11/01/2013 11:09:38

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321319102
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Akari Ihara**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 10/28/13 9:00 AM
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Collected: 10/24/2013

Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1587-A 4 C-Cove Base *321319102-0012*	12	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 4 C-Mastic *321319102-0012A*	12	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 5 A-VFT *321319102-0013*	13	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 5 A-Mastic *321319102-0013A*	13	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 5 B-VFT *321319102-0014*	13	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 5 B-Mastic *321319102-0014A*	13	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 5 C-VFT *321319102-0015*	13	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 5 C-Mastic *321319102-0015A*	13	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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Rosa Mendoza (13)

Jerry Drapala Ph.D, Laboratory Manager
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Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1587-A 6 A *321319102-0016*	14	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 6 B *321319102-0017*	14	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 6 C *321319102-0018*	14	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 7 A-Drywall *321319102-0019*	15	White Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (other)	**None Detected**
1587-A 7 A-Joint Compound *321319102-0019A*	15	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 7 B-Drywall *321319102-0020*	15	Brown/White Fibrous Heterogeneous	30% Cellulose	70% Non-fibrous (other)	**None Detected**
1587-A 7 B-Joint Compound *321319102-0020A*	15	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 7 C-Drywall *321319102-0021*	15	Brown/White Fibrous Heterogeneous	15% Cellulose	85% Non-fibrous (other)	**None Detected**

Analyst(s)
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Rosa Mendoza (13)

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

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Samples analyzed by LA Testing South Pasadena, CA NVLAP Lab Code 200232-0, CA ELAP 2283

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Received: 10/28/13 9:00 AM
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Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1587-A 7 C-Joint Compound *321319102-0021A*	15	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 8 A *321319102-0022*	16	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 8 B *321319102-0023*	16	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 8 C *321319102-0024*	16	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 9 A *321319102-0025*	20	Gray/White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 9 B *321319102-0026*	20	Gray/White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
1587-A 9 C *321319102-0027*	20	Gray/White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
Kieu-anh Pham Duong (25)
Rosa Mendoza (13)

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

Initial report from 11/01/2013 11:09:38

THIS IS THE LAST PAGE OF THE REPORT.

321319102

321319102
Asbestos Testing Chain of Custody
LA Testing Order Number *(Lab Use Only):*

South Pasadena, CA - Los Angeles County
520 Mission Street
South Pasadena, CA 91030
PHONE: 1-800-303-0047
FAX: 323-254-9982

Company: Myounghee Noh & Associates L.L.C.
LA Testing-Bill to: ☑ Same ☐ Different
If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party

Street: 99-1046 Iwaena St.
City/State/Zip: Aiea, HI 96701
Report To (Name): Akari Ihara
Fax: 8084844660
Telephone: 8084849214
Email Address: akari@noh-associates.com
Project Name/Number: 015872 KAI RMAA DAGS MAUNA KAPU ICSD
Please Provide Results: email
Purchase Order:
State Samples Taken: HI

Turnaround Time (TAT) Options* - Please Check
☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 3 Day ☐ 4 Day ☑ 1 Week ☐ 2 Week
*For RUSH TAT's Please Call Ahead to Confirm Lab Hours and Availability
Materials Science and IAQ TATs are in Business Days rather than Hours (i.e. 24 Hour – End of Next Business Day)

Asbestos

PCM - Air
☐ NIOSH 7400
☐ w/ 8hr. TWA

TEM- Air ☐ 4-6 hr TAT (AHERA ONLY)
☐ AHERA 40 CFR, Part 763
☐ NIOSH 7402
☐ EPA Level II
☐ ISO 10312

TEM - Water
Fibers ≥10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

PLM - Bulk
☑ PLM EPA 600/R-93/116
☐ PLM EPA NOB (<1%)
☐ NYS 198.1 (friable-NY)
☐ NYS 198.6 (non-friable-NY)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/ Gravimetric
☐ 400 (<0.25%) ☐ 1000 (<0.1%)

TEM - Dust
☐ Microvac – ASTM D 5755
☐ Wipe-ASTM D6480

TEM - Bulk
☐ TEM EPA NOB
☐ NYS NOB 198.4 (non-friable-NY)
☐ Chatfield SOP

Soil/Rock/Vermiculite
☐ PLM CARB 435 – A (0.25% sensitivity)
☐ PLM CARB 435 – B (0.1% sensitivity)
☐ TEM CARB 435 – B (0.1% sensitivity)
☐ EPA Reg. 1 Screening Protocol (Qualitative)
Other:

Lead (Pb)

Flame Atomic Absorption
☐ Chips SW846-7000B or AOAC 974.02
☐ Soil SW846-7000B/7420
☐ Air NIOSH 7082
☐ Wastewater SM3111B or SW846-7000B/7420
☐ ASTM Wipe SW846-7000B/7420
☐ non ASTM Wipe SW846-7000B/7420
☐ TCLP SW846-1311/7420/SM 3111B

ICP
☐ Air NIOSH 7300 Modified
☐ non ASTM Wipe SW846-6010B or C
☐ ASTM Wipe SW846-6010B or C
☐ Soil SW846-6010 B or C
☐ Waste Water SW846-6010B or C
☐ TCLP SW846-6010B or C

Graphite Furnace Atomic Absorption
☐ Soil SW846-7421 ☐ Wastewater EPA 200.9
☐ Air NIOSH 7105 ☐ Drinking Water EPA 200.9
Other: ☐

Microbiology

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi Culture (Genus & Species)
☐ Bacterial Count & ID (Up to Three Types)
☐ Bacterial Count & ID (Up to Five Types)
☐ MRSA
☐ *Pseudomonas aeruginosa*

Water Samples
☐ Total Coliform & E.coli (P/A)
☐ Fecal Coliform (SM 9222D)
☐ Sewage Screen
☐ Heterotrophic Plate Count (SM 9215)

Air Samples
☐ Mold & Fungi (Spore Trap)
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi (Genus & Species)
☐ Bacterial Culture & ID (Up to Three Types)
☐ Bacterial Culture & ID (Up to Five Types)
☐ Endotoxin Testing

Real Time Q-PCR (See Analytical Guide for Code)
Code:

Legionella
☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4
Other: ☐

Materials Science

☐ Common Particle ID (large particles)
☐ Full Particle ID (environmental dust)
☐ Basic Material ID (solids)
☐ Advanced Material ID
☐ Physical Testing (Tensile, Compression)
☐ Combustion-by-products (soot, char, etc.)
☐ X-Ray Fluorescence (elem. analysis)
☐ X-Ray Diffraction (Crystalline Part.)
☐ MMVF's (Fibrous glass, RCF's)
☐ Particle Size (sieve/microscopy/laser)
☐ Combustible Dust
☐ Petrographic Examination
Other: ☐

IAQ

Nuisance Dust NIOSH ☐ 0500 ☐ 0600
Airborne Dust ☐ PM10 ☐ TSP
Silica Analysis: ☐ All Species
Silica Analysis – Single Species
☐ Alpha Quartz ☐ Cristobalite ☐ Tridymite
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
Other: ☐

Client Sample #'s 1587-A1A — A9C — **Total # of Samples:** 27
Relinquished (Client): [signature] **Date:** 10/25/13 **Time:** 0800
Received (Lab): [signature] **Date:** 10/28/13 **Time:** 9:00am

Comments/Special Instructions: See field forms
Positive stop

http://latesting.com/COC_Print.cfm

321319102

321319102

Asbestos Testing Chain of Custody

LA Testing Order Number *(Lab Use Only)*:

South Pasadena, CA - Los Angeles County
520 Mission Street
South Pasadena, CA 91030
PHONE: 1-800-303-0047
FAX: 323-254-9982

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
~~1587-P1A~~ DF			
1587-A1A			
-A1B	See field forms		
-A1C	Positive Stop		
1587-A9A			
-A9B			
-A9C			

Comments/Special Instructions: See field forms
Positive Stop

321319102

321319102

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 1587.2 KAI RMAA DAGs Mauna Kapu ICSD
Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge
Inspector Initials: ~~AC~~/DF
Date & Time: 10/24/13

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
1	C	1	Ext.	walls	Lt. gray	P/sc	Brick	G F P	Y (N) TSI S (M)	1,600	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 1 A	Ext.	wall		5634	
1587-A 1 B	↓	↓			
1587-A 1 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
2	C	1	Equipment Rm.	walls	white	P/sc	Brick	G F P	Y N TSI S M	1,500	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 2 A	Equipment Rm	wall		5635	
1587-A 2 B	↓	↓			
1587-A 2 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
(KCS)	C	1	Equipment Rm.	~~Walls~~ Ceiling	white	P	CC	G F P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A A				5640	wrap FF
1587-A B					
1587-A C					

Myounghee Noh & Associates, L.L.C.

321319102

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
7	ICSD	1	Ext.	wall	gray	Caulking	CC Block	G (F) P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 3 A	Ext.	Wall		5660	
1587-A 3 B	↓	↓			
1587-A 3 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
12	ICSD	1	INT	Wall	Brown	Cove base	CC Block	G (F) P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 4 A	Int.	Wall		5668	
1587-A 4 B	↓	↓			
1587-A 4 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
13	ICSD	1	INT	floor	O/W with brown spots	12"x12" VFT	CC	G F P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 5 A	Int.	floor		5665	
1587-A 5 B	↓	↓			
1587-A 5 C					

321319102

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
14	ICSD	1	INT	walls	W	Caulking	W	G F P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 6 A	Int.	Wall		5674	
1587-A 6 B	↓	↓			
1587-A 6 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
15	ICSD	1	INT	ceiling	W	DW	None	G F P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 7 A	Int.	ceiling		5669	
1587-A 7 B	↓	↓			
1587-A 7 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
16	ICSD	1	INT	Door frame	O/W	Caulking	M	G P	Y (N) TSI S (M)		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 8 A	Int.	Door frame		5676	
1587-A 8 B	↓	↓			
1587-A 8 C					

Myounghee Noh & Associates, L.L.C.

321319102

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AE/DE Date & Time: 10/24/13

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
20	ICSD	1	EXT.	Door frame	W	Caulky	M	G F P	Y N B TSI S M		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A 9 A	EXT.	Door frame	ICSD	5678,79	
1587-A 9 B	↓	↓			
1587-A 9 C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
								G F P	Y N TSI S M		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A A					
1587-A B					
1587-A C					

HM ID	Building	Flr.	Room	Locations	Material Color	Material	Substrate	Condition	Friable ACM Type	Area Sq. ft or L. ft	Hatch Color
								G F P	Y N TSI S M		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-A A					
1587-A B					
1587-A C					

Page 4 of 4

Myounghee Noh & Associates, L.L.C.

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321319096
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Akari Ihara**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 10/28/13 9:00 AM
Collected: 10/24/2013

Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/7000B)

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Lead Concentration*
1587-P 1 A	*0001*	10/24/2013	10/29/2013	150 ppm
Site: 1				
1587-P 1 B	*0002*	10/24/2013	10/29/2013	180 ppm
Site: 1				
1587-P 2 A	*0003*	10/24/2013	10/29/2013	570 ppm
Site: 2				
1587-P 2 B	*0004*	10/24/2013	10/29/2013	3500 ppm
Site: 2				
1587-P 3 A	*0005*	10/24/2013	10/29/2013	2500 ppm
Site: 3				
1587-P 3 B	*0006*	10/24/2013	10/29/2013	9600 ppm
Site: 3				
1587-P 4 A	*0007*	10/24/2013	10/29/2013	4300 ppm
Site: 4				
1587-P 4 B	*0008*	10/24/2013	10/29/2013	8900 ppm
Site: 4				
1587-P 5 A	*0009*	10/24/2013	10/29/2013	<100 ppm
Site: 5				
1587-P 5 B	*0010*	10/24/2013	10/29/2013	<100 ppm
Site: 5				
1587-P 6 A	*0011*	10/24/2013	10/29/2013	<100 ppm
Site: 6				
1587-P 6 B	*0012*	10/24/2013	10/29/2013	<100 ppm
Site: 6				
1587-P 7 A	*0013*	10/24/2013	10/29/2013	<100 ppm
Site: 8				
1587-P 7 B	*0014*	10/24/2013	10/29/2013	<100 ppm
Site: 8				
1587-P 8 A	*0015*	10/24/2013	10/29/2013	<100 ppm
Site: 9				

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by LA Testing South Pasadena, CA CA ELAP 2283, AIHA-LAP, LLC ELLAP 102814

Initial report from 10/29/2013 10:32:32

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321319096
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Akari Ihara**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 10/28/13 9:00 AM
Collected: 10/24/2013

Project: **015872 KAI RMAA DAGS MAUNA KAPU ICSD**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/7000B)

Client Sample Description	Lab ID	Collected	Analyzed	Lead Concentration
1587-P 8 B	0016	10/24/2013	10/29/2013	<100 ppm
Site: 9				
1587-P 9 A	0017	10/24/2013	10/29/2013	<100 ppm
Site: 10				
1587-P 9 B	0018	10/24/2013	10/29/2013	<100 ppm
Site: 10				
1587-P 10 A	0019	10/24/2013	10/29/2013	<100 ppm
Site: 11				
1587-P 10 B	0020	10/24/2013	10/29/2013	<100 ppm
Site: 11				
1587-P 11 A	0021	10/24/2013	10/28/2013	<100 ppm
Site: 17				
1587-P 11 B	0022	10/24/2013	10/28/2013	<100 ppm
Site: 17				
1587-P 12 A	0023	10/24/2013	10/28/2013	<100 ppm
Site: 18				
1587-P 12 B	0024	10/24/2013	10/28/2013	<100 ppm
Site: 18				
1587-P 13 A	0025	10/24/2013	10/28/2013	<100 ppm
Site: 19				
1587-P 13 A	0026	10/24/2013	10/28/2013	<100 ppm
Site: 19				

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by LA Testing South Pasadena, CA CA ELAP 2283, AIHA-LAP, LLC ELLAP 102814

Initial report from 10/29/2013 10:32:32

321319096

Asbestos Testing Chain of Custody

LA Testing Order Number *(Lab Use Only):* 321319096

South Pasadena, CA - Los Angeles County
520 Mission Street
South Pasadena, CA 91030
PHONE: 1-800-303-0047
FAX: 323-254-9982

Company: Myounghee Noh & Associates L.L.C.
Street: 99-1046 Iwaena St.
City/State/Zip: Aiea, HI 96701
Report To (Name): Akari Ihara
Telephone: 8084849214
Project Name/Number: 015872 KAI RMAA DAGS MAUNA KAPU ICSD
Please Provide Results: email
Purchase Order:
State Samples Taken: HI

LA Testing-Bill to: ☑ Same ☐ Different
If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party

Fax: 8084844660
Email Address: akari@noh-associates.com

Turnaround Time (TAT) Options* - Please Check
☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 3 Day ☐ 4 Day ☑ 1 Week ☐ 2 Week
*For RUSH TAT's Please Call Ahead to Confirm Lab Hours and Availability
Materials Science and IAQ TATs are in Business Days rather than Hours (i.e. 24 Hour – End of Next Business Day)

Asbestos

PCM - Air
☐ NIOSH 7400
☐ w/ 8hr. TWA
TEM- Air ☐ 4-4.5hr TAT (AHERA ONLY)
☐ AHERA 40 CFR, Part 763
☐ NIOSH 7402
☐ EPA Level II
☐ ISO 10312
TEM - Water
Fibers ≥10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

PLM - Bulk
☐ PLM EPA 600/R-93/116
☐ PLM EPA NOB (<1%)
☐ NYS 198.1 (friable-NY)
☐ NYS 198.6 (non-friable-NY)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/ Gravimetric
☐ 400 (<0.25%) ☐ 1000 (<0.1%)
TEM - Dust
☐ Microvac – ASTM D 5755
☐ Wipe-ASTM D6480

TEM - Bulk
☐ TEM EPA NOB
☐ NYS NOB 198.4 (non-friable-NY)
☐ Chatfield SOP
Soil/Rock/Vermiculite
☐ PLM CARB 435 – A (0.25% sensitivity)
☐ PLM CARB 435 – B (0.1% sensitivity)
☐ TEM CARB 435 – B (0.1% sensitivity)
☐ EPA Reg. 1 Screening Protocol (Qualitative)
Other:

Lead (Pb)

Flame Atomic Absorption
☑ Chips SW846-7000B or AOAC 974.02
☐ Soil SW846-7000B/7420
☐ Air NIOSH 7082
☐ Wastewater SM3111B or SW846-7000B/7420
☐ ASTM Wipe SW846-7000B/7420
☐ non ASTM Wipe SW846-7000B/7420
☐ TCLP SW846-1311/7420/SM 3111B

ICP
☐ Air NIOSH 7300 Modified
☐ non ASTM Wipe SW846-6010B or C
☐ ASTM Wipe SW846-6010B or C
☐ Soil SW846-6010 B or C
☐ Waste Water SW846-6010B or C
☐ TCLP SW846-6010B or C

Graphite Furnace Atomic Absorption
☐ Soil SW846-7421 ☐ Wastewater EPA 200.9
☐ Air NIOSH 7105 ☐ Drinking Water EPA 200.9
Other: ☐

Microbiology

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi Culture (Genus & Species)
☐ Bacterial Count & ID (Up to Three Types)
☐ Bacterial Count & ID (Up to Five Types)
☐ MRSA
☐ *Pseudomonas aeruginosa*

Air Samples
☐ Mold & Fungi (Spore Trap)
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi (Genus & Species)
☐ Bacterial Culture & ID (Up to Three Types)
☐ Bacterial Culture & ID (Up to Five Types)
☐ Endotoxin Testing

Water Samples
☐ Total Coliform & E.coli (P/A)
☐ Fecal Coliform (SM 9222D)
☐ Sewage Screen
☐ Heterotrophic Plate Count (SM 9215)

Real Time Q-PCR (See Analytical Guide for Code)
Code:
Legionella
☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4
Other: ☐

Materials Science

☐ Common Particle ID (large particles)
☐ Full Particle ID (environmental dust)
☐ Basic Material ID (solids)
☐ Advanced Material ID
☐ Physical Testing (Tensile, Compression)
☐ Combustion-by-products (soot, char, etc.)
☐ X-Ray Fluorescence (elem. analysis)
☐ X-Ray Diffraction (Crystalline Part.)
☐ MMVF's (Fibrous glass, RCF's)
☐ Particle Size (sieve/microscopy/laser)
☐ Combustible Dust
☐ Petrographic Examination
Other: ☐

IAQ

Nuisance Dust NIOSH ☐ 0500 ☐ 0600
Airborne Dust ☐ PM10 ☐ TSP
Silica Analysis: ☐ All Species
Silica Analysis – Single Species
☐ Alpha Quartz ☐ Cristobalite ☐ Tridymite
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
Other: ☐

Client Sample #'s: 1587 - P1A — P13B
Total # of Samples: 26
Relinquished (Client): [signature] **Date:** 10/25/13 **Time:** 0800
Received (Lab): [signature] **Date:** 10/28/13 **Time:** 9:00AM

Comments/Special Instructions: See field forms

http://latesting.com/COC_Print.cfm

321319096

Asbestos Testing Chain of Custody

LA Testing Order Number (Lab Use Only): 321319096

South Pasadena, CA - Los Angeles County
520 Mission Street
South Pasadena, CA 91030
PHONE: 1-800-303-0047
FAX: 323-254-9982

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
1587-P1A			
-P1B	See field forms		
1587-P13A			
-P13B			

Comments/Special Instructions: See field forms

321319096

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge
Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area (Sq. ft or L. ft)	Hatch Color
1	C	1	Ext	walls	Lt. green	P/sc	Brick	G F P	1,600	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 1 A	Ext	wall	C	5634	
1587-P 1 B					

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area (Sq. ft or L. ft)	Hatch Color
2	C	1	Equipment Room	walls	White	P/sc	Brick	G F P	1,500	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 2 A	Equipment Rm	wall	C	5635	
1587-P 2 B					

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area (Sq. ft or L. ft)	Hatch Color
3	C	1	Equipment Rm	ceiling	White	P	CC	G F P	1,200	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 3 A	Equipment Rm	ceiling	C	5640	
1587-P 3 B					

32131909 G

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
4	USCG Hut.	1	Ext.	wall	gray	P	M	G (F) P	350	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 4 A	Ext.	wall	USCG Hut	5649	P Violet
1587-P 4 B					

HM ID	Bldg	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
5	ICSD	1	Ext.	Walls	gray	P	CC Block	G F (P)	280	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 5 A	Ext.	wall	ICSD	5658	
1587-P 5 B					

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
6	ICSD	1	Ext.	Roof trim	gray	P	W	G (F) P	35	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 6 A	Ext.	Roof trim	ICSD	5659	Dell Gl.
1587-P 6 B					

Mayunahee Noh & Associates, LLC

32131909 G

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
8	ICSD	1	Ext.	eave	gray	P	CC	G F P	5	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 7 A	Ext.	eave	ICSD	5664	V blue
1587-P 7 B					

HM ID	Bldg	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
9	ICSD	1	INT.	Walls	O/W	P	CC Block	G (F) P	~~350~~ 280	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 8 A	INT.	wall	ICSD	5666	C Red
1587-P 8 B					

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
10	ICSD	1	INT	Conduit, brackets	O/W	P	M	G F P	15	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 9 A	INT.	conduit	ICSD	5671	
1587-P 9 B					

Mayunahee Noh & Associates, LLC

32131909C

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
11	ICSD	1	INT	Ceiling	O/W	P	DW	G F P	65	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 10 A	INT	ceiling	ICSD	5670	
1587-P 10 B					

HM ID	Bldg	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
17	ICSD	1	INT	Door, door frame	Beige	P	M	G F P	25	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 11 A	INT	Door frame	ICSD	5671	two Dad
1587-P 11 B					

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
18	ICSD	1	INT	beams	O/W	P	W	G F P	15	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 12 A	INT	beam	ICSD	5670	H. ogue
1587-P 12 B					

Mvounahee Noh & Associates, LLC

32131909C

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1587_2 KAI RMAA DAGs Mauna Kapu ICSD Location: Building C, ICSD Shed, & USCG Shed Waianae Ridge

Inspector Initials: AC/DF Date & Time: 10/24/13

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
19	ICSD	1	Ext.	Door, door frame	gray	P	M	G F P	25	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P 13 A	Ext.	Door		5662	RCS
1587-P 13 B		Door frame			

HM ID	Bldg	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
								G F P		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P A					
1587-P B					

HM ID	Bldg.	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
								G F P		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
1587-P A					
1587-P B					

Mvounahee Noh & Associates, LLC

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APPENDIX E

PRECONSULTATION LETTERS

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

CHRIS T. TAKASHIGE, P.E., CCM
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

October 23, 2013

Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Attn: Joanne Hiramatsu

Dear Ms. Hiramatsu:

Subject: Environmental Assessment Pre-Consultation Proposed Information And Communication Services Division Radio Facility Upgrade at Mauna Kapu Communication Station Site Tax Map Key: (9) 2-5-24 Ewa District, Oahu, Hawaii

The Department of Design and Construction does not have any comments to offer on the environmental assessment pre-consultation.

Thank you for the opportunity to review and comment. Should there be any questions, please contact me at 768-8480.

Sincerely,

Chris T. Takashige, P.E., CCM
Director

CTT: cf (534925)

December 17, 2013
2012.07.0400-40/13P-110

Mr. Chris T. Takashige, P.E., CCM
Director
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, HI 96813

Dear Mr. Takashige:

Environmental Assessment Preconsultation
Proposed Information and Communication Services Division (ICSD)
Radio Facility Upgrade at Mauna Kapu Communication Station Site

Thank you for your October 23, 2013 response stating that the Department of Design and Construction does not have any preconsultation comments to offer on the proposed ICSD Radio Facility Upgrade at Mauna Kapu Communication Station Site.

If you have any questions, please feel free to call me at 521-5361, ext. 309, or you can email me at jhiramatsu@beltcollins.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

DAA/JEH:jdk

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
Belt Collins Hawaii is an Equal Opportunity Employer

NEIL ABERCROMBIE
GOVERNOR

RECEIVED
2013 NOV -5 PM 12:55
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

DARRYLL D. M. WONG
MAJOR GENERAL
ADJUTANT GENERAL

JOSEPH K. KIM
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

November 4, 2013

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Subject: Environmental Assessment Preconsultation
Proposed Information and Communication Services Division Radio Facility Upgrade at
Mauna Kapu Communication Station Site
Tax Map Key: (9) 2-5-24
Ewa District, Oahu, Hawaii

Dear Ms. Hiramatsu:

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no comments to offer relative to the project at this time.

If you have any questions or concerns, please have your staff contact Mr. Lloyd Maki, our Acting Chief Engineering Officer at (808) 733-4250.

Sincerely,

DARRYLL D.M. WONG
Major General
Hawaii National Guard
Adjutant General

c: Mr. Ian Duncan/Mr. Albert Chong, State Civil Defense

BELT COLLINS

December 17, 2013
2012.07.0400-40/13P-112

Mr. Darryll D.M. Wong
Major General
Hawaii National Guard
Adjutant General
Department of Defense
3949 Diamond Head Road
Honolulu, HI 96816-4495

Dear Mr. Wong:

Environmental Assessment Preconsultation
Proposed Information and Communication Services Division (ICSD)
Radio Facility Upgrade at Mauna Kapu Communication Station Site

Thank you for your November 4, 2013 response stating that the State of Hawaii Department of Defense does not have any preconsultation comments to offer on the proposed ICSD Radio Facility Upgrade at Mauna Kapu Communication Station Site.

If you have any questions, please feel free to call me at 521-5361, ext. 309, or you can email me at jhiramatsu@beltcollins.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

DAA/JEH:jdk

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

RECEIVED
2013 OCT 30 PM 2:31
BELT COLLINS HAWAII

In reply, please refer to:
File:
13-202
Mauna Kapu
2012-70-0400/13P-082

October 21, 2013

Ms. Joanne E. Hiramatsu, Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Environmental Assessment Pre-Consultation, Proposed Information and Communication Services Division, Radio Facility Upgrade at Mauna Kapu Communication Station Site, TMK: 9-2-05: 024, Ewa District, Oahu, Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated October 15, 2013. Thank you for allowing us to review and comment on the subject document. EPO recommends that you review the standard comments at:
http://health.hawaii.gov/epo/home/landuse-planning-review-program/
You are required to adhere to all standard comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable design of communities, including the:
State of Hawaii, Office of Planning: www.planning.hawaii.gov and the new 2013 ORMP
U.H., School of Ocean and Earth Science and Technology: www.soest.hawaii.edu
U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability
U.S. Green Building Council's LEED program: www.new.usgbc.org/leed

The DOH encourages everyone, to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at www.cdc.gov/healthyplaces/hia.htm. We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We require a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to epo@doh.hawaii.gov. We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Manager, Environmental Planning Office

BELT COLLINS

December 17, 2013
2012.07.0400-40/13P-111

Ms. Laura Leialoha Phillips McIntyre, AICP
Manager, Environmental Planning Office
Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Ms. McIntyre:

Environmental Assessment Preconsultation
Proposed Information and Communication Services Division (ICSD)
Radio Facility Upgrade at Mauna Kapu Communication Station Site

Thank you for your October 21, 2013 preconsultation comments on the proposed ICSD Radio Facility Upgrade at Mauna Kapu Communication Station Site.

In regards to the Standard Comments, these will be reviewed and integrated into the Draft Environmental Assessment (DEA) where appropriate.

In regards to the sustainability strategies and Health Impact Assessment, these will be reviewed and integrated into the DEA where appropriate. The DEA will discuss public health and appropriate mitigation measures, if any are needed.

If you have any questions, please feel free to call me at 521-5361, ext. 309, or you can email me at jhiramatsu@beltcollins.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

DAA/JEH:jdk

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