
**Historic Preservation Plan
for the Kahuku Training Area, O`ahu, Hawai`i**

Prepared for:

U.S. Army Engineer District, Honolulu
Corps of Engineers, Bldg. 223
Fort Shafter, Hawai`i 96858-5440

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Legacy Resource Management Program

Final Report

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8. Objectives: Perform cultural resources survey (selected sample) and assess historic properties for the purpose of developing predictive site models and a Historic Preservation Plan for Kahuku Training Area.
9. Summary of any final changes to project funding, schedule, or scope: The project has encountered numerous delays. Final draft reports are being provided in anticipation that they will be accepted as final with very few changes.
10. Final deliverables/products: Historic Preservation Plan (HPP) and Archaeological Inventory Survey reports.
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12. List of non-Legacy sources of funds that contributed to completion of the project: None.

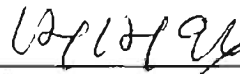
13. Project documentation and final product (enclosed).

Project Compliance Certification

I affirm that, to the best of my knowledge and belief, the requirements of the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), other advisory, compliance, and coordination requirements have been met.



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93-0539

Historic Preservation Plan
for the Kahuku Training Area,
O'ahu, Hawaii

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EXECUTIVE SUMMARY

In 1966, the Congress of the United States passed the National Historic Preservation Act (NHPA). This act recognized that the spirit and direction of the United States are founded upon and reflected in its historic heritage, and that the historical and cultural foundations of the nation should be preserved whenever possible as a living part of community life and development, in order to give a sense of orientation to the American people. The NHPA made it Federal policy to administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations. The United States Army, as a Federal agency, is charged with ensuring that the intent and purpose of the NHPA is maintained on Army controlled installations, such as the Kahuku Training Area (KTA). This Historic Preservation Plan (HPP) has been prepared for use by the Commanding Officer and staff of KTA to help guide and advise them on their responsibilities and duties under the mandate of the NHPA, and to assist them with the protection, preservation, and enhancement of the prehistoric and historic resources under their jurisdiction.

This HPP is divided into six sections plus appendices. The Section 1.0 discusses the goals, policies, and priorities of the installation Commander and staff to ensure that the mandates of the NHPA are met. It includes legislation concerning historic preservation and outlines the assigned historic preservation responsibilities of KTA personnel. Section 2.0 provides a geographic and historical overview of KTA to help users of KTA understand the historical and cultural importance of the area. Section 3.0 provides the archaeological site inventory and evaluation for KTA. It includes a discussion of all archaeological investigations conducted at the installation including all recorded archaeological and historical sites, and significance assessments of each. A model of probability for unidentified archaeological resources is also presented. Section 4.0 outlines the land uses, potential and identified threats to archaeological and historical resources, and regulated activities at KTA. Section 5.0 consists of historic preservation activities necessary at KTA including Section 106 and 110 compliance procedures, periodic reporting to SHPD and ACHP, standards for archaeology and historic preservation activities, and Native Hawaiian coordination, NAGPRA, and burial treatment policies. Section 6.0 consists of recommendations and implementation plans, as well as Standard Operating Procedures for users of KTA regarding historic preservation.

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1.0 SCOPE AND OBJECTIVES

The United States Army Kahuku Training Area (KTA) contains numerous recorded significant archaeological and historical resources. In addition to the known archaeological and historical resources existing at KTA, there is a probability that undiscovered archaeological and historical resources also exist within the training area. These resources are important to the study of Hawaiian history, and therefore, steps must be taken to ensure their protection. It is the responsibility of the United States Army to protect and manage all such archaeological sites that are either eligible or potentially eligible for inclusion in the National Register of Historic Places. Implementation of the Standard Operating Procedures (SOP) outlined in this Historic Preservation Plan (HPP) will comply with federal laws and assist in the preservation and management of significant archaeological and historical resources located at KTA.

1.1 GOALS AND OBJECTIVES

This HPP is designed for use by the staff and user groups of KTA with the primary goal of promoting the military mission of the installation while ensuring compliance with historic preservation legislation, regulations, standards, and guidelines established to facilitate the preservation and management of historic properties under Federal jurisdiction. The HPP provides guidelines and Standard Operating Procedures (SOPs) necessary to preserve, maintain, and protect archaeologically and historically significant resources. These procedures must be followed in order for the United States Army to meet its legal responsibilities for the management of these resources. Another goal of this Historic Preservation Plan is to promote increased awareness of the archaeological and historical resources of the installation.

This plan also sets forth historic preservation priorities with respect for predicted future projects, tasks, and actions scheduled to be undertaken at KTA. It is important to note that this plan is intended to be used as a guideline, and that future unpredicted projects, tasks, and actions not identified in this document may address historic preservation management concerns through consultation with the designated KTA historic preservation personnel.

1.1.2 Promoting The Military Mission Of The Installation

The primary military mission of KTA is to provide training support to USARPAC units, the USN, the USMC, the USCG, the Reserve components, the National Guard and, when directed, to those countries in the Pacific Rim Allied to the United States. This is accomplished by scheduling,

managing, controlling, and maintaining ranges, maneuver areas, airspace, and training facilities, to include upgrading and construction of new facilities. Part of this mission includes compliance with federal legislation and regulations regarding historic preservation and environmental laws. By establishing and maintaining historic preservation programs, the military mission of KTA succeeds in preserving aspects of local cultural and historical heritage, and promotes opportunities for a better understanding of how and why the past is important today.

1.2 APPLICABLE FEDERAL LAWS AND U.S. ARMY POLICIES

Federal legislative and regulatory mandates define the historic preservation planning, development, and management processes with which the Army must comply when planning and undertaking projects, tasks, and actions on lands under Army jurisdiction. All personnel and user groups at KTA should be aware of the laws, regulations, standards, and guidelines established to assure the archaeology, history, and cultural heritage of all American citizens are protected. These laws, regulations, standards and guidelines set forth the historic preservation development review process and procedures that apply to all projects, tasks, and actions under Army jurisdiction. Applicable Federal laws include:

- The Antiquities Act of 1906
- The Historic Sites Act of 1935
- The National Historic Preservation Act (NHPA) of 1966, as amended
- The National Environmental Policy Act (NEPA) of 1969, as amended
- The Archaeological and Historic Preservation Act (AHPA) of 1974, as amended
- The Public Buildings Cooperative Use Act (PBCUA) of 1976
- The American Indian Religious Freedom Act (AIRFA) of 1978
- The Archaeological Resources Protection Act (ARPA) of 1979
- The Native American Graves Protection and Repatriation Act (NAGPRA) of 1989
- The Programmatic Memorandum of Agreement (PMOA) of 1986
- The Archaeological and Historic Data Preservation Act (AHDPA), as amended

- The Defense Environmental Restoration Program Act (DERPA; Public Law 91-190)

In addition to the above laws, Presidential Executive Order No. 11593 for the Protection and Enhancement of the Cultural Environment (issued in 1971) applies to historic resources. Applicable Army policy and regulations include: Department of Defense Directives 4710.1, Archaeological and Historic Resources Management; Directive 6050.1, Environmental Effects in the United States of DoD Actions; Army Regulation 200-2-2, Environmental Effects of Army Actions; Army Regulation 420-40, Historic Preservation; and Engineering Regulation 1105-2-50, Historic Preservation.

Additional applicable federal regulations include: 36 CFR 79, Curation of Federally-Owned and Administered Archaeological Collections (issued 12 September 1990); 41 CFR 101, Federal Property and Administrative Services; National Register Bulletin No. 16, Guidelines for Completing National Register of Historic Places Forms (issued 30 September 1986); National Register Bulletin No. 19 National Park Service Procedures and Policies for Processing National Register Nominations (issued July 1986), and National Register Bulletin No. 16A, How to Complete the National Register Registration Form (issued 1991). These legislative and regulatory mandates are briefly explained below.

1.2.1 Antiquities Act of 1906

This act authorizes the President to designate as National monuments historic sites and natural resources of national significance located on federally owned or controlled lands as National Monuments. The act further provides for the protection of all historic and prehistoric ruins and objects of antiquity located on Federal lands by providing criminal sanctions against excavation, injury, or destruction of such antiquities without the permission of the Secretary of the Interior having jurisdiction over such resources.

1.2.2 Historic Sites Act of 1935

This act allows for the designation of national historical sites and landmarks, encourages interagency efforts to preserve historic resources, and established fines for violations of the act. This act establishes as national policy the preservation for public use of historic resources by giving the Secretary of Interior the power to make historic surveys and to document, evaluate, acquire, and preserve archaeological and historic sites across the country. This act led to the

establishment within the National Park Service of the Historic Sites Survey, the Historic American Buildings Survey, and the Historic American Engineering Record.

1.2.3 National Historic Preservation Act (NHPA) of 1966, As Amended

The NHPA establishes policies that support and encourage the preservation of historic and prehistoric resources for present and future generations. These policies are accomplished by several means:

1. The act authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places and it establishes procedures for nomination of properties to the Register.
2. The act directs the Secretary of the Interior to approve State preservation programs that provide for the designation of a State Historic Preservation Officer (SHPO) to administer State preservation efforts, a State preservation review board, and adequate public participation in the State program.
3. The act authorizes a grant program that provides funds to the States for historic preservation projects and to individuals for the preservation of properties listed in the National Register.
4. The act establishes the Advisory Council on Historic Preservation as an independent Federal agency. The act also directs the Advisory Council to advise the President, Congress, and other Federal agencies on historic preservation matters. The Advisory Council is responsible for implementation of Section 106 of the NHPA. Section 106 requires that Federal agencies take into account the effect of their undertakings on historic properties and to afford the Advisory Council an opportunity to comment on an undertaking.
5. The act establishes procedures that Federal agencies must follow in managing federally owned or controlled property. The act requires that Federal agencies must undertake such planning as necessary to minimize harm to National Historic Landmarks and must obtain the comments of the Advisory Council.
6. The act establishes a National Historic Preservation Fund.

Amendments of 1992 made several notable changes to the NHPA. These amendments clarify and expand the leadership role of the Federal Government in historic preservation administration and Native Americans and Native Hawaiians in the historic preservation process. Prior to these amendments, the term "State" referred to any State of the United States, the District of Columbia, the commonwealth of Puerto Rico, Guam, the Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, and the Trust Territories of the Pacific Islands. With the 1992 amendments, the Trust Territories of the Pacific Islands were deleted and replaced by the Trust Territory of the Pacific Islands, and, upon termination of the Trusteeship Agreement for the Trust Territory of the Pacific Islands, the Republic of Palau. The term "State" also includes the Republic of the Marshall Islands and the Federated States of Micronesia.

The definition of the term "Tribe" was revised to include "...an Indian tribe, band, nation, or other organized group or community..." The definition was expanded to include any "...Native village, Regional Corporation, or Village Corporation," as defined in section 3 of the Alaska Native Claims Settlement Act. The terms "Native Hawaiian" and "Native Hawaiian organization" were also defined in the 1992 amendments. The Office of Hawaiian Affairs of the State of Hawaii and Hui Malama I Na Kapuna O Hawai'i Nei were recognized as "Native Hawaiian organizations."

The 1992 amendments recognize the traditional religious and cultural importance of properties Native Americans or Native Hawaiian organizations, and, in the case of the State of Hawaii, provides for consultation between the State Historic Preservation Officer and Native Hawaiian organizations.

1.2.4 National Environmental Policy Act (NEPA) of 1969, as amended

The National Environmental Policy Act (NEPA) directs agencies to administer Federal programs and resources to foster environmental quality and preservation. For major Federal actions significantly affecting the quality of the human environment, Federal agencies must prepare and make available for public comment an environmental impact statement. Compliance with NEPA may be done in coordination with compliance with the National Historic Preservation Act under the regulations of the Advisory Council on Historic Preservation, 36 CFR 800.

1.2.5 Archaeological and Historic Preservation Act (AHPA) of 1974

This act requires Federal agencies to notify the Secretary of the Interior when a proposed undertaking may pose a threat of irreparable loss or destruction of significant scientific,

prehistoric, historical, or archaeological data. This act also authorizes appropriations for preservation of data, surveys, and investigations of such projects.

1.2.6 Public Buildings Cooperative Use Act (PBCUA) of 1976

This act encourages the Federal agencies to reuse historic buildings for administrative facilities or activities, while maintaining their historical integrity.

1.2.7 American Indian Religious Freedom Act (AIRFA) of 1978

This act protects the inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians. These rights include freedom of worship through ceremonies and traditional rites, possession of sacred objects, and access to religious or sacred sites. This act also requires consultation with tribal leaders prior to the disturbance of human burial sites.

1.2.8 Archaeological Resource Protection Act (ARPA) of 1979

The Archaeological Resources Protection Act requires a permit for any excavation or removal of archaeological resources from public lands or Indian lands. Excavations must be undertaken for the purpose of furthering archaeological knowledge in the public interest, and resources removed remain the property of the United States. The act provides both civil and criminal penalties for violation of the permit requirements. The act also allows for confidentiality of information regarding the nature and location of archaeological resources. ARPA also requires that federal land managers establish programs to increase public awareness of the significance of archaeological resources and the need to protect them.

1.2.9 Native American Graves Protection and Repatriation Act (NAGPRA) of 1989

This act was established to set procedures to determine the ownership and disposition of Native American and Native Hawaiian human remains, funerary objects, sacred objects, or objects of cultural patrimony that are discovered on Federal property or are possessed by Federal agencies or federally supported institutions. NAGPRA also requires these entities to inventory their collections of human remains, funerary objects, sacred objects, and objects of cultural patrimony to determine ownership, and thereafter to repatriate them to the appropriate Native American organization in accordance to the law. The act also establishes penalties for those convicted of trafficking in Native American remains and cultural items.

1.2.10 Programmatic Memorandum of Agreement (PMOA) of 1986

All Department of Defense (DoD) World War II temporary buildings are covered by a Programmatic Memorandum of Agreement (PMOA) signed in July 1986. After Congress directed the DoD to demolish World War II temporary buildings as part of the Military Construction Authorization Bill of 1983, the PMOA instigated a nationwide research and documentation program intended to mitigate the impact of the demolition. Documentation must be in accordance with Historic American Building Surveys (HABS) standards as administered by the National Park Service. Some of the PMOA requirements have been completed, including the publication of *World War II Temporary Military Buildings: A Brief History of the Architecture and Planning of Cantonments and Training Stations in the United States* (Garner 1993). The U.S. Army Corps of Engineers' Construction Engineering Research Laboratories (CERL) has also documented or kept track of others' documentation of 113 World War II temporary building types, including the standard 16-foot-wide and a 40-foot-wide Quonset huts. Actions concerning unique temporary buildings must be reviewed on an individual basis by the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources (DLNR).

1.2.11 Executive Order No. 11593 for the Protection and Enhancement of the Cultural Environment

This Presidential mandate was issued in 1971 and directs federal agencies to preserve, restore, and maintain cultural properties under their control, and establish implementation procedures to undertake the order. Importantly, the order specified that Federal agencies must

...with the advice of the Secretary of the Interior, and in cooperation with the liaison officer for historic preservation for the state or territory involved, locate, inventory, and nominate to the Secretary of the Interior all sites, buildings, districts and objects under their jurisdiction or control that appear to qualify for listing on the National Register of Historic Places.

1.2.12 Department of Defense (DoD) Directive 4710.1 Archaeological and Historic Resources Management

This DoD Directive, issued June 21, 1984, provides DoD policy, prescribes procedures, and assigns responsibilities for the management of archaeological and historic resources located in and on waters and lands under DoD control. This Directive orders, and assigns responsibilities to, the heads of the DoD components (e.g., Commanding General U.S. Army) to comply, and establishes procedures for compliance, with the National Historic Preservation Act, the Archaeological and

Historic Data Preservation Act, the Archaeological Resources Protection Act, Executive Order 11593, and DoD Directive 6050.1 (Environmental Effects in the United States of DoD Actions).

1.2.13 Defense Environmental Restoration Program Act (DERPA; Public Law 91-190)

This law orders all Department of Defense components (e.g., U.S. Army) to comply with the National Environmental Protection Act.

1.2.14 Army Regulation 200-2-2, Environmental Effects of Army Actions

This Army regulation, issued 23 December 1988, provides Army policy, prescribes procedures, and assigns responsibilities for the environmental management of waters and lands, projects, tasks, and actions under Army control in compliance with Department of Defense Directive 6050.1.

1.2.15 Army Regulation 420-40 Historic Preservation

This Army regulation, issued 15 April 1984, provides policy, prescribes procedures, and assigns responsibilities for the management of archaeological and historic resources located in and on waters and lands, projects, tasks, and actions under Army control in compliance with Department of Defense Directive 4710.1.

1.2.16 National Register Bulletin No. 16, Guidelines for Completing National Register of Historic Places Forms (issued 30 September 1986)

This document presents the standards and guidelines for completing National Register of Historic Places Forms in greater detail than the Secretary's guidelines.

1.2.17 National Register Bulletin No. 19 National Park Service Procedures and Policies For Processing National Register Nominations (issued July 1986)

This document presents the specific standards and guidelines for completing National Register of Historic Places Nomination Forms.

1.2.18 National Register Bulletin No. 16A, How to Complete the National Register Registration Form (issued 1991)

This document presents a step by step procedure for completing an National Register Registration Form.

1.3 ARMY POLICY

The Army policy for protecting and managing historic resources is defined by Regulation 420-40. Army policy for historic preservation can be summarized as:

- a) To inventory, evaluate, and protect historic resources located on lands controlled by the Army.
- b) To identify and nominate to the National Register all eligible historic resources on Army lands.
- c) To cooperate with Federal, state, and local agencies, Indian tribes, and the public in managing historic resources.
- d) To integrate historic preservation requirements with planning and management of other activities, and to consider historic resources during the earliest stages of project planning to reduce conflicts with the military mission and other management objectives.
- e) To maintain historic resources and promote their rehabilitation and adaptive reuse when feasible.
- f) To recognize the rights of American Indians to have access to certain religious sites and objects on lands under Army control within the limitations of the military mission.

1.4 ASSIGNED RESPONSIBILITIES

The Department of the Army has assigned responsibilities regarding historic preservation in Army Regulation 420-40. These responsibilities are outlined to ensure that historic preservation activities are conducted and are as follows:

1.4.1 The Assistant Secretary of the Army

The Assistant Secretary of the Army will direct and supervise matters pertaining to the formulation, execution, and review of policies, plans, and programs for historic preservation. This includes establishing objectives and approving performance (AR 420-40 1984:1-4).

1.4.2 The Chief of Engineers (COE)

The Chief of Engineers (COE) has primary staff responsibility for conducting and monitoring the Department of the Army's (DA) historic preservation program and for compliance with the NHPA and provisions of Federal laws and regulations listed in appendix B. The COE will--

1. Issue policy and furnish regulations and technical guidance to guarantee protection and proper treatment of historic properties.
2. Set standards for historic preservation programs, plans, and projects.
3. Obtain signature of the Army's Federal representative on applications for nomination of properties to the national Register of Historic Places (RCS DOI-1005) that have been sent through channels.
4. Keep a list of all Army-controlled properties listed on the National Register and publish it periodically.
5. Approve all Memorandums of Agreement (MOA) or other compliance documents requiring development of a historic preservation plan.
6. Keep a list of all MOA and ACHP comments.
7. Identify Army-wide historic preservation priorities for staffing and funding needed to develop and carry out historic preservation programs and plans.
8. Define qualifications for Army personnel and contractors engaged in Army historic preservation programs, plans, and projects.
9. Review the choice of non-Army laboratories, museums, archives, and other public buildings and institutions for long-term curation of historic and archeological materials.
10. Attend and organize conferences, programs, meetings, and staff visits to gather information and to provide policy guidance on historic preservation activities.
11. Provide information on the DA historic preservation program and Federal historic preservation laws and regulations to MACOMs and installations (AR 420-40 1984:1-4).

1.4.3 The Chief, National Guard Bureau

The Chief National Guard Bureau will--

1. Assist the State and Territory adjutants general (AG) (when the ARNG is a tenant) to cooperate with the host or support active component installation staff to conduct historic preservation activities on federally owned and/or controlled lands leased or licensed to the State or Territory Military Departments for Army National Guard (ARNG) use. This includes the

following ARNG facilities (referred to as installations in this regulation unless otherwise noted)–

- a. Training sites with permanent facilities.
 - b. Mobilization and Training Equipment Sites (MATES).
 - c. Unit Training and Equipment Sites (UTES).
 - d. Combined Support Maintenance Shop (CSMS).
 - e. Army Aviation Support Facility (AASF).
 - f. Army Aviation Flight Activity (AAFA)
 - g. Aviation Classification Repair Activity Depot (AVCRAD).
 - h. Organizational Maintenance Shop (OMS).
 - i. Armory.
2. Assist the AG to evaluate and protect significant historic properties on federally funded ARNG facilities and training sites according to the NHPA and applicable Federal laws and regulations listed in appendix B.
 3. Provide technical assistance to the AG, on request, for--
 - a. Preparing and carrying out an ARNG HPP.
 - b. Locating, inventorying, evaluating, and nominating federally funded ARNG properties meeting National Register criteria.
 - c. Reviewing the requirements for and the technical adequacy of ARNG HPP, projects, protection strategies, reports, National Environmental Protection Act (NEPA) compliance, National Register nominations, requests for Determinations of Eligibility, and MOA with the ACHP.
 - d. Maintaining a record of all ARNG federally funded or owned properties listed in the Federal Register.
 - e. Maintaining a record of all ARNG MOA and other compliance documents applicable to federally funded or owned ARNG properties.
 - f. Coordinating ARNG historic preservation and related plans through the ARNG Operating Activity Center (NGB-ARI-E), Aberdeen Proving Ground, MD 21010, with the Office Chief of Engineers, HQDA (DAEN-ZCF-B), as appropriate (AR 420-40 1984:1-4).

1.4.4 MACOM Commanders and State and Territory AGs

MACOM commanders and State and Territory AGs will assist their installations to locate, identify, evaluate, and protect significant historic properties. Each

MACOM commander and AG (via State Historic Preservation Officer (SHPO) or NGB-ARI-E) will provide technical assistance to installations, as requested, for--

1. Preparing and carrying out an HPP.
2. Locating, inventorying, evaluating, and nominating properties meeting National Register criteria.
3. Selecting and carrying out the proper treatment, such as maintenance, repair, adaptive use, or preservation of historic buildings, structures and districts. (See TM 5-801-1 and TM 5-801-2 for recommended procedures and techniques).
4. Choosing appropriate research designs, sampling methods, analytical techniques, and protection strategies for archaeological properties.
5. Documenting and categorizing historic buildings and structures.
6. Reviewing the requirements for and the technical adequacy of the installation HPPs, projects, reports environmental impact analyses. National Register nominations, requests for Determinations of Eligibility, and MOA with ACHP (AR 420-40 1984:1-4).

1.4.5 Installations Commanders and AGs

Installations commanders and AGs (referred to as installation commanders, except where noted) will--

1. Develop a historic preservation plan to locate, inventory, evaluate, and protect historic properties.
2. Provide qualified historic preservation expertise, facilities, and resources necessary to carry out the HPP, (in accordance with paragraphs 4-2, 4-3, 4-4, and 4-7).
3. Budget or program for resource requirements sufficient to carry out the HPP.
4. Afford the ACHP an opportunity to comment on the HPP and on any undertakings that may have an adverse effect on a historic property.
5. Consult or coordinate, as necessary, with the following on historic preservation activities, plans, and projects--
 - a) State Historic Preservation Officer (SHPO).
 - b) Other Federal, State and local agencies.
 - c) Local universities and colleges.
 - d) Federal, professional, and avocational organizations.
 - e) Museums.

- f) Interested persons.
- 6. See that the HPP and projects are coordinated with mater planning (AR 210-20 and NGR 415-5), environmental analysis (AR 200-2), and natural resources management plans and programs (AR 420-74).
- 7. Plan military training, construction, and undertakings to avoid or minimize adverse effects on historic properties.
- 8. Request, through command channels (AGs request through NGB-ARI-E), a Determination of Eligibility by the Secretary of the Interior (36 CFR 64) when the SHPO and the installation do not agree as to whether a property is eligible for listing on the National Register.
- 9. Nominate, through command channels (AGs nominate through NGB-ARI-E) to the National Register (in accordance with paragraph 1-5), all Army controlled properties that meet the criteria of the National Register (36 CFR 60).
- 10. Review Antiquities Permit applications and route them through command channels (AGs route through NGB-ARI-E) for processing.
- 11. Be sure that military police and other security personnel are trained to enforce
 - a) laws that protect historic and archaeological properties, including but not limited to the Archaeological Resources Protection Act of 1979 (ARPA).
 - b) measures to be taken to reduce and eliminate illegal activities affecting such properties, per AR 190-31.
 - c) procedures for prosecuting violators (AR 420-40 1984:1-4).

1.4.6 Installation Director of Engineering and Housing

Installation Directors of Engineering and Housing, AGs, or other installation activity responsible for management of the historic preservation program (referred to as DEH, except where noted) will--

- 1. Develop and manage the HPP and all related staff activities and projects.
- 2. Provide the historic preservation staff with training, attendance at professional meetings, and other opportunities that assure that the HPP and related projects incorporate current methods, techniques, and information.
- 3. Coordinate HPP projects with Federal, State and local government and private preservation agencies, as appropriate.
- 4. Monitor all archaeological field investigations (AR 420-40 1984:1-4).

1.4.7 Installation Historic Preservation Officer

The Commander of Kahuku Training Area, or order to meet the responsibility for historic preservation compliance will designate an Installation Historic Preservation Officer (IHPO) who will be responsible for overseeing all cultural resources management actions for KTA. Major duties and responsibilities of the IHPO are as follows:

1. historic preservation law training for IHPO, plus law enforcement (ARPA) and cultural resources sensitivity training for KTA military law enforcement and other staff who regularly conduct field inspections or reconnaissance,
2. coordinating NHPA Section 106 compliance procedures,
3. managing and periodically updating a cultural resources database,
4. coordinating with other military personnel to ensure that historic preservation compliance objectives do not conflict with and are integrated into other land-use and resources management documents and programs, including the Master Plan, Ecosystems Management Plan, Fire Management Plan, Installation Restoration Program, NEPA documents, and the like,
5. monitoring archaeological site conditions and coordinating site protection activities;
6. scheduling site inventory, assessment, and treatment studies per the Training Area risk assessment, including development of scopes of work, contracts management, and/or supervision of in-house qualified archaeologists,
7. reviewing permit applications and monitoring work performance to ensure compliance with terms of Cultural Resources Use Permits issued by the U.S. Army Garrison, Hawaii for non-Army sponsored archaeological research projects,
8. assuring that regular ARPA/NAGPRA notification is provided to military and non-military users and visitors,
9. establishing the Historic Preservation Awareness Program to promote appreciation of the need to preserve the installations archaeological resources, including distribution of technical reports to interest professionals,
10. coordinating with Native Hawaiians, implementing burial protection measures, and completing NAGPRA inventory, consultation and repatriation requirements,
11. preparing the annual Historic Preservation Compliance Report to the State Historic Preservation Division and the Advisory Council on Historic Preservation, and
12. updating the Historic Preservation Plan every four years, or as appropriate [Eidsness et al. 1995:57]

2.0 CULTURAL CONTEXT

This section presents a brief overview of Hawaiian prehistory and history necessary to understand the significance of the archaeological and historical resources present at Kahuku Training Area.

2.1 GEOGRAPHIC AND ENVIRONMENTAL DESCRIPTION OF KAHUKU TRAINING AREA

A description of the geographic and environmental setting of the Kahuku Training Area is an important first step in understanding the cultural uses of the area. The environment of northern Ko`olau Loa is unique on O`ahu, in that the area is composed of a narrow coastal flat adjacent to upraised limestone cliffs and relatively short, narrow valleys which quickly become rugged and steep not too far inland. The area is also one of the windiest on O`ahu. These aspects of the environment, along with information on soils and vegetation, are discussed below.

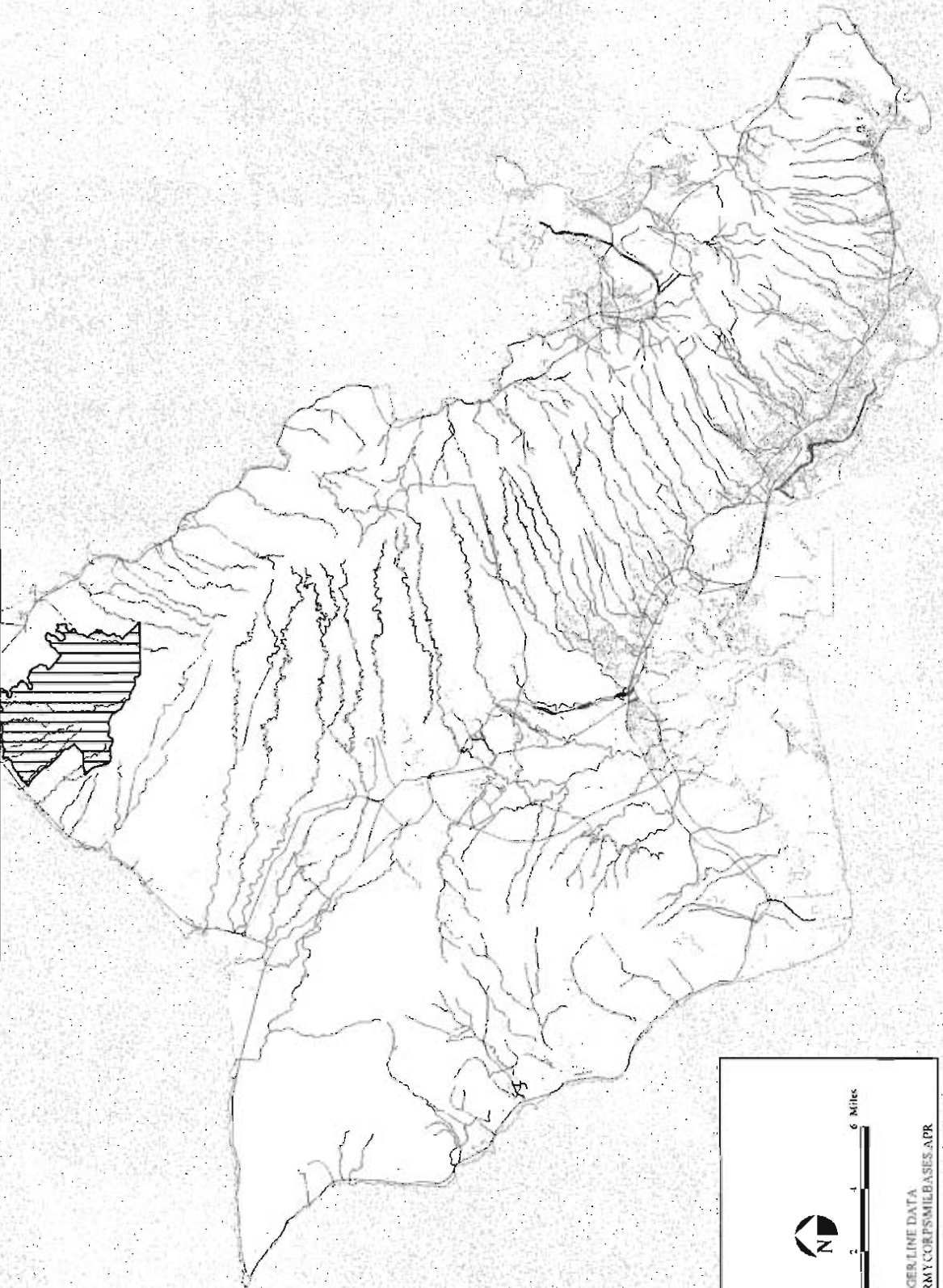
2.1.1 Location And Geographic Setting


The Kahuku Training Area is located on the northeastern flank of the Ko`olau mountain range on the island of O`ahu (Figure 1). The Ko`olau Range forms the eastern portion of the island, with the Wai`anae Range comprising the western portion. The Ko`olau and Wai`anae ranges are eroded Pleistocene shield volcanoes which joined to form the island of O`ahu circa 2 million years ago (Macdonald and Abbott 1970). The Kahuku Training Area is set on the northern and windward portion of the Ko`olau Range, in an upland area covering approximately 9,650 acres (3905 hectares). KTA ranges in elevation from near sea level along the inland portion of the coastal plain to 1860 ft (567 m) in the uplands along the crest of the Ko`olau range. KTA is within upland portions of 17 traditional Hawaiian land divisions (*ahupua`a*) of Ko`olau Loa District. These include, from north to south, portions of Waimea, Pūpūkea, Paumalu, Kaunala, Waiale`e, Pahipahi`ālua, `Ōpana, Kawela, Hanakoe, `Ō`io, Ulupehupehu, Punalau, Kahuku, Keana, Malaekahana, Lā`ie, and Kaipapa`u. In the 19th century, the land divisions of Kaunala, Waiale`e, Pahipahi`ālua, `Ōpana, Kawela, Hanakoe, `Ō`io, Ulupehupehu, and Punalau were subsumed under the redesignated land division of Hanakoe.

2.1.2 Climate and Rainfall

The climate of the northern Ko`olau Loa District is drier and windier than the southern portion. The northern portion receives less rainfall than other windward areas of the island, primarily due to

Kahuku Military Reservation





 0 1 2 3 4 5 6 Miles

SOURCES: 1990 TIGER LINE DATA
 FILE: WACHED-ARMY-CORP/SMILBASES.APR

**LOCATION OF KAHUKU MILITARY RESERVATION
O'AHU, HAWAII**

FIGURE

1

OGDEN

(*Psidium guajava*). Pineapple and sugarcane are still grown in coastal areas bordering KTA. Upland sections of KTA within the forest reserves still contain native vegetation, including `o`hia (*Metrosideros* sp.) and hapu`u tree fern (*Cybotium splendens*). Valleys and gulches are dominated by introduced species, although some native vegetation can be found in these areas as well.

2.1.5 Topography

Topography within KTA varies from nearly level coastal plains to nearly vertical bluffs along the Kahuku escarpment and within steeper portions of the many drainages. The upland areas consist of dissected drainages and moderate slope lands, with slopes ranging from 3 to 25 percent or more. There are 20 drainages in KTA including: Waimea, Kālunawaika`ala, Pakulena, Kaleleiki, Paumalū, Aimuu, Waiale`e, Pahipahi`ālua, Kawela, `Ō`io, East `Ō`io, `Ōhia`ai, Keaa`ulu, Mā laekahana, Kahawainui, Ihiihi, Wailele, Koloa, Kokololio, and Kaipapa`u Streams. Of these, only Waimea, Kahawainui, and Kaipapa`u flow to the sea year round; the others are intermittent drainages (Armstrong 1983; Foote et al. 1972).

2.1.6 Geology

KTA is located on the northeastern slopes of the Ko`olau Range, the remnant of a Pleistocene volcano that formed from 2.2 to 1.3 million years ago. The basaltic lavas are derived from the later stage Ko`olau volcanic series. These lavas are exposed along the Kahuku escarpment, the sides of drainages and in outcropped areas of the uplands. The coastal plain is comprised of uplifted Late-Pleistocene limestone reef which is overlain by calcareous beach sands, and terrigenous sediments and soils derived from the eroded Ko`olau volcano (Macdonald and Abbott 1970).

2.1.7 Soils

There are three major soils associations within KTA: Ka`ena-Waialua Association within the coastal plain; Lolekaa-Waikane Association within the inland portions of the coastal plain, within valley bottoms, along the Kahuku escarpment, and along the lower reaches of the upland slopes; and, Rough, mountainous land-Kapaa Association in the uplands. Ka`ena-Waialua Association soils are deep, nearly level and gently sloping, poorly drained to excessively drained soils that have a fine-textured to coarse-textured subsoil or underlying material and are found on coastal plains, talus slopes, and in drainage ways. Lolekaa-Waikane Association soils are deep, nearly level to very steep, well-drained soils that have a dominantly fine-textured subsoil and are found on alluvial

fans, terraces, and in the uplands. Rough, mountainous land-Kapaa Association soils are deep well-drained soils that have a fine-textured or moderately fine-textured subsoil and are found within very steep land broken by numerous drainageways, and in gulches and narrow ridges (Foote et al. 1972:37, 46, 47).

2.2 PREHISTORIC AND HISTORIC OVERVIEW

This information is presented to acquaint the user groups of KTA with the history of the area. This background information provides context for understanding the traditional and historic use of the area, and for assessing and evaluating historic properties at KTA.

2.2.1 Traditional Land Use and Settlement Patterns for Kahuku Training Area

The history of human occupation in the Hawaiian archipelago commenced around the sixth century A.D., and possibly earlier, with the arrival of Polynesians who had sailed northward, probably from the Marquesas Islands (Kirch 1985:1). Settlement was initially on the coasts; over time, as population and resource requirements increased, coastal population centers became more numerous, with an increase in the exploitation of outlying and more marginal areas, which the KTA area may have represented. Eventually, exploitation and population grew in the more resource-abundant areas, and expansion and settlement of inland and leeward areas intensified (e.g., Kirch 1985:298-306). The settlement pattern model presented by Kirch (1985:302-306), the Expansion Period began ca. A.D. 1100, with even the least exploitable zones settled before A.D. 1650.

Owing to the somewhat drier climate of the northern Ko`olau Loa area, it is possible that this area was permanently settled somewhat later than areas to the south. Given the abundant resources in the area, however, including permanent streams, wetlands, springs, and forested valley interiors, it is also possible that the area was settled relatively early. Regardless, it is reasonable to assume that the northern Ko`olau Loa area would have been exploited for the plant and animal resources available there both prior to and following the advent of permanent occupation. Also, the relatively level coastal lands formed a convenient route between the population centers of the Waialua District and the southern Ko`olau Loa and Ko`olau Poko Districts, part of a trail that circled the island (Ti 1983:98).

As population expansion and settlement throughout the islands occurred, complex trail systems and transportation networks developed. These trails probably initially developed along the coasts

between coastal settlements; later, trails crossed entire islands, connecting coastal and inland settlements for purposes of communication and transportation of goods for exchange and subsistence.

Among the best available sources for information regarding traditional Hawaiian lifeways is the ethnographic research of Handy (1940) and Handy and Handy (1972), who investigated traditional subsistence strategies and areas of cultivation and habitation. Their descriptions of Hawaiian communities have proven useful in the development of settlement models for particular localities, including the northern Ko'olau Loa area.

The typical homestead or *kauhale*...consisted of the sleeping or common house, the men's house, women's eating house, and storehouse, and generally stood in relative isolation in dispersed communities. It was only when topography or the physical character of an area required close proximity of homes that villages existed. There was no term for village. *Kauhale* meant homestead, and when there were a number of *kauhale* close together the same term was used. The old Hawaiians, in other words, had no conception of village or town as a corporate social entity. The terrain and the subsistence economy naturally created the dispersed community of scattered homesteads. Water supply was, however, a consideration which frequently led to grouping of homesteads close together. . . . Where conglomerations of homesteads existed, they were not communities held together either by bonds of kinship or economic interdependence. The grouping was fortuitous, and the ties of relationship of each household reached out to relatives living in other parts of the same or neighboring *ahupua`a*. [Handy and Handy 1972:284-285]

In general, then, *kauhale* were scattered over plains and broad slopes, unless water was a limiting factor; this was probably not the case for the majority of Kahuku Training Area.

This information is supplemented by Handy and Handy (1991) discussing various aspects of settlement and land use. According to Handy and Handy (1991), development of land was probably closely tied to areas with good fishing grounds:

One factor of prime importance affecting the development of [traditional Hawaiian] plantation areas was propinquity to good fishing grounds. Such land areas as were intensively developed were always in localities where good fishing grounds were easily accessible. It may be said therefore that as a general principle Hawaiians developed their land resources only where they lay not too far distant from good fishing grounds which would give them their needed protein food. Hogs and dogs were luxuries enjoyed by the *ali`i*, rarely by country folk. . . . On Kauai and Oahu sweet potatoes were planted only as a supplement to taro, along the coastal zone where there was sandy or rather dry soil not suitable for taro. Yet there were very extensive areas which, it would seem, might have been utilized for sweet potatoes if there had been sufficient pressure of population to demand it. . . .

Yet in old Hawaiian times this land was undeveloped (Handy and Handy 1991:282-283).

Handy and Handy (1991) also provide descriptions of the land use of each of the *ahupua`a* that Kahuku Training Area sits upon. These descriptions are as follows:

2.2.1.1 Kahuku

Handy and Handy discuss how there are conflicting descriptions regarding the land use of Kahuku in early days. According to Handy and Handy, there seems to be no evidence today of taro terraces along Kahuku Stream, although informants indicated that taro was cultivated in the area in early days. Early historic descriptions also present contradictions in this matter. In 1784 Cook wrote the following about the area around Kahuku: "Nothing can exceed the verdure of the hills, the variety of wood and lawn, and the rich cultivated valleys which the whole face of the country displayed (Cook as cited in Handy and Handy 1991:462). However, only thirteen years later Vancouver stated: "Our examination confirmed the remark of Capt. King excepting that in point of cultivation or fertility, the country did not appear in so flourishing a state..."(Vancouver, as cited in Handy and Handy 1991:462). And in 1833 Kahuku was described by Hall in the following manner: "much taro land now lies waste because the diminished population of the district does not require its cultivation." (Hall, as cited in Handy and Handy 1991:462). It would seem from these descriptions, that Kahuku was once highly cultivated, but that sharp declines in population in the early historic period resulted in the waste and abandonment of the area.

2.2.1.2 Hanako`ae

According to Handy and Handy, the *ahupua`a* of Hanako`ae did not have "sufficient flatlands for taro cultivation under the old system" (Handy and Handy 1991:462).

2.2.1.3 Kaipapa`u

Handy and Handy (1972) offer this description of Kaipapa`u Ahupua`a.

In Kaipapa`u (Shallow-sea) the *ahupua`a* adjacent to Hau`ula, the upper stream valley is steep and narrow, yet natives of the district say that, making the most of small opportunity, a few *lo`i* used to be worked there. The level land to seaward may once have supported a moderate amount of terracing, but as this was all under cane when the area was studied in 1953, the extent could not be determined (Handy and Handy 1991:460).

2.2.1.4 Lā`ie

According to Handy and Handy, Lā`ie was an area of intense taro cultivation:

The comparatively flat land between the rough hills and the bay (which is famous as a fishing area and for catching sea turtles even today) was anciently divided into numerous named districts and was thoroughly cultivated. In 1935 Kekūku, a 75-year-old *kama`aina* of the place, pointed out an area more than 60 acres in extent as having formerly been the largest single wet-taro area in La`ie *ahupua`a*, on land owned by his family for generations. It lies back of the present Mormon Temple, and was watered by springs, hence known as Ka-puna (The-spring).

Up Koloa (Wild-duck) Stream, which is toward Hau`ula from La`ie Stream, there are many groups of stone-faced terraces, formerly taro *lo`i*, now overrun with the spreading roots of great mango and breadfruit trees which marked old homesites along this twisting, rocky, and very beautiful watercourse. Other stream valleys show more scattered remains. We have the names of several large taro terraces that were famous anciently and have survived only in memory, such as Naue-loli (Move-[and]-change), Kuamo`o (Backbone), Mahanu (Rest-[and]-breathe), Makali`i (Pleiades), Po`o-haili (Head-recalls) (Handy and Handy 1991:461).

Handy and Handy note, however, that La`ie was an area subject to drought (Handy and Handy 1991:275).

2.2.1.5 Malaekahana

According to Handy and Handy, there were once some irrigated terraces in Malaekahana but do not elaborate further (Handy and Handy 1991:462).

2.2.1.6 `Ōpana

Handy and Handy (1991) indicate that `Ōpana maintained "a small spring-watered terrace area named Ka-wela (The heat), which is also the name of the bay below" (Handy and Handy 1991:462-463).

2.2.1.7 Waiale`e

According to Handy and Handy, Waiale`e was the location of a small group of irrigated terraces anciently known as Kane-ali`i (Handy and Handy 1991:463).

2.2.1.8 Paumalū and Pupukea

Handy and Handy (1991) suggest that Paumalū and Pupukea *Ahupua`a* were not cultivated in ancient times:

Two other *ahupua`a* situated between Kaunala and Waimea, namely Paumalu and Pupukea, are not of a topography to support wet-taro culture of the ancient type. High-level uplands are now given over to pineapple. The narrow seaward plain had no water. According *kama`aina* informants, the gulches or streams in these two localities never were terraced or planted (Handy and Handy 1991:463).

2.2.1.9 Kaunala, Keana, Pahipahi`alua

According to Handy and Handy, the *ahupua`a* of Kaunala, Keana, and Pahipahi`alua did not have "sufficient flatlands for taro cultivation under the old system" (Handy and Handy 1991:462).

By the A.D. 1600s, the Hawaiian sociopolitical system had evolved to an early State level. High chiefs (*ali`i nu`i*, or *mo`i*) were in control of individual islands (*moku*), or one or more districts on an island; lesser chiefs (*konoiki*) supervised *ahupua`a*. These *ahupua`a* were further broken down into parcels held by use-right by commoners (*maka`ainana*). Land divisions were assigned within *ahupua`a*. At least nine smaller divisions were recognized, the most common being *ili* (small divisions often used by extended families) and *kuleana*. Distribution of goods and services was controlled by the *ali`i nui*, with responsibilities of supervision delegated to the lesser chiefs, who further delegated responsibilities down the sociopolitical ladder.

This hierarchy was maintained by a religious system in which the high chiefs possessed great spiritual power (*mana*). The maintenance and garnering of *mana* was ever-present throughout the culture (Sahlins 1981). All aspects of traditional Hawaiian lifeways were affected by religion, and were accompanied by sacred rituals and ceremonies in place to assure the approval of the gods in each undertaking. Maintaining this spiritual power was a hierarchy of priests (*kahuna*), paralleling the sociopolitical hierarchy and supporting it. The *kapu* (proscription) system ensured social order; to disobey the *ali`i*, *kahuna*, or their delegates, or transgress against the gods or the practice of religion, was forbidden, or *kapu*.

Physical evidence of the value and role of religion within Hawaiian culture is exhibited in widespread archaeological sites and features. Stokes (Stokes and Dye 1991:24-25) identified nine principal classifications of *heiau* during his 1906-1907 research on Hawai`i Island:

According to information gathered in the field from modern natives, there were the following places of worship. Temples for human sacrifice were sometimes termed *po`o kanaka* but were generally described. The ancient term *luakini* now serves to designate the modern church and was not known to any native I met as the designation of a former temple.

I came across many foundations of temples with the name Hale o Lono, and when information was available, it was to the effect that temple was not for human sacrifice. Occasionally temples were found ascribed to the great gods Kane and Kanaaloa, to the lesser gods Pele and Hi`iaka of the volcano family, and to the shark gods.

A list of terms collected in the field includes:

1. *Heiau ho`omana*: temples of the priestly class.
2. *Heiau ho`ouluulu ua*: temples to induce rain.
3. *Heiau ho`ouluulu ai*: temples to cause good crops. Inquiry generally showed, however, that this and the preceding were for the same purpose. One of this form was termed *ko`a ho`ouluuluai*.
4. *Ko`a, heiau ku`ula, heiau ko`a, heiau ho`oulu i`a* and similar combinations: temples to secure good catches of fish.
5. *Heiau hana aloha*: temples to impel love.
6. Shrine for aid in childbirth.
7. *Pohaku o Kane*: a shrine.

Stokes went on to mention that there were many categories of lesser shrines, for smaller groups, families, and individuals, dedicated to various gods, *akua*, or *aumakua* (Stokes and Dye 1991:21-39). Within individual or extended-family habitation complexes, family shrines and alters were integral components of the structure and setting of the site (Kirch 1985). Shrines (*ko`a*) and temples (*heiau*) are found in association to fishing villages and prominent headlands along the coast, and are indicative of the role of religion in the maritime economy (Barrera 1971; Kirch 1979). A discussion of *heiau* types is important to the present undertaking, as several sacred or potentially sacred sites have been recorded in and around Kahuku Training Area (see Section 3.0).

By the time of the arrival of Captain James Cook in A.D. 1778, the Hawaiian culture was highly ordered under the sociopolitical and religious structures of the *kapu* system. All aspects of Hawaiian lifeways were affected by this system. Production and distribution of goods and services were under the control of the reigning *ali`i*, with subordinate, hierarchical, authority delegated through their affines and the priestly class of *kahuna*, downward to the commoner. The commoners were the labor force, overseen by *konoiki*, who administered the will of the *ali`i*.

The commoners, tied to the land as they were, would have been limited in the extent of their exploitation range. It has been postulated their range was, for the most part, confined to their home and neighboring *ahupua`a* within the resident district (Handy 1940; Kirch 1985). Yet the extensiveness of the trail systems suggests the commoners' ability to travel was not so greatly restricted, and this is somewhat supported by native accounts of travels to various localities throughout each island, and between islands. An example of this is the tale of the famous *kapa*

beater lost in Kahuku and found by its owner in Waipahu, `Ewa (McAllister 1933:106; Sterling and Summers 1978:25-26, 149).

2.2.2 Legendary History

The antiquity of the Ko`olau Loa District is reflected in the preserved legends and oral history of the area. An examination of these oral traditions are presented here to indicate the traditional uses and antiquity of the region. The legends of the more prominent *ahupua`a* that comprise Kahuku Training Area reflect the importance of both coastal and upland resources located there.

2.2.2.1 Kahuku Ahupua`a

Kahuku, which literally means "the projection," (Pukui et al., 1986:66) is remembered in a traditional proverb in the following manner:

Kahuku `aina lewa. Kahuku, an unstable land. O`ahu, according to legend, was once two islands that grew together. Kahuku is the part that bridges the gap (Pukui 1983:144).

This proverb is explained in one of the earliest recorded Hawaiian legends. Levi Chamberlain, a missionary accountant, recorded the following legend in an 1828 report. The tradition, as recorded by Chamberlain, describes the creation of Kahuku.

The natives tell a marvelous story respecting the origin of this district which they say floated in from the sea, and attached itself to the ancient shore of the island, that there was a subterranean communication between the sea & the ancient shore, by which a shark used to pass, & make depredations up on land. The basis of the tract, which is 5-7 miles in length, & from 1 to 2 miles in breadth, appears to be of coral; and it was evidently redeemed from the sea.. [Chamberlain 1957:35-36]

Several variations of Chamberlain's translation of the tradition exist. A popular version is that the floating island of Kahuku banged against the island of O`ahu, creating so much noise that:

...the old women guarding Princess Laieikawai...grappled the island with fishhooks and attached it securely to Oahu. Polou Pool on the sea side of the Kahuku Mill is one spot where the hook was fastened. The other end was fastened at Kukio Pond, 300 feet inland at Kahuku Point. [Boswell 1958:68]

Another version of the legend about the formation of Kahuku maintains that Kahuku was once a separate island that was inhabited by Menehune. According to legend, Kahuku floated and was once situated a distance out to sea. The only problem with the island is that it did not have a natural source of fresh water. Because of this, the menehune were forced to paddle their island into the bays of O`ahu every night in order to collect water. One day, a man from Kahuku suggested

that everyone make hooks of whalebone and attach them to Olona ropes to capture the island. The people were successful in capturing the island as the Menehune were unable to free it from the whalebone hooks and the Olona ropes (Paki 1972:53).

Another proverb about Kahuku Ahupua`a describes the early environment of Kahuku, indicating that hala trees (pandanus) were abundant in the area:

Nani I ka hala ka `ōiwi o Kahuku. The body of Kahuku is beautified by hala trees. Refers to Kahuku, O`ahu (Pukui 1983:248).

The fact that Kahuku was known for its abundant hala trees is also a theme in many traditional legends of the *ahupua`a*.

In the Story of the Formation of these Islands and Origin of this Race, Fomander records a prayer of Kualii, who describes Kahuku as a pandanus (Fomander 1917:28).

Hala trees also play a major role in the legend of Kalelealuaka. According to this legend, Kalelealuaka was a strong, brave youth who disguised himself and fought many victorious battles for King Kakuhihewa against the forces of Kualii. Before one of these battles Kalelealuaka rushed to Kahuku and decorated himself with wreaths of pandanus fruit and flowers of sugarcane from Kahuku. Disguised this way, he came upon the lame Marshall of the King and offered to carry him to the battle. The Marshall asked Kalelealuaka where he was from and he answered Kahuku. Since Kalelealuaka was decorated with foliage from the Kahuku, the Marshall believed him and gave him the district of Koolau in reward for his service (Thrum 1976:100).

Another proverb about Kahuku also illustrates environmental conditions, this time referring to an underground stream:

Pukana wai o Kahuku. The water outlet of Kahuku. Refers to the outlet of an underground stream that once flowed from Kahuku to Waipahu, O`ahu (Pukui 1983:299).

This underground stream is the focus of another traditional legend of Kahuku, the story of the song of the kapa log. According to this legend a woman from Kahuku lost her kapa log in a stream one day. She had used the same kapa log for many years and was so fond of it that she referred to it as her grandchild. Thinking that the underground spring had to carry the log to some final destination, she set out to look for it. After several days, she heard its familiar ring up in a valley in Waipahu. The underground spring had carried her "grandchild" the entire distance to Waipahu (Pukui 1976:162-167).

Other legends of Kahuku provide insight into the traditional land use and activities of the *ahupua`a* including subsistence activities of fishing, and sociopolitical activities such as warfare and the *kapu* system.

The importance of fish and fishing activities in Kahuku is apparent in the following two legends. Kahuku is mentioned by Thrum in the legend of Kaneaukai. According to this legend, schools of the *anae-holo* and *kala* travel to Waimea from Maui, by way of Kahuku during the periods from April to July (Thrum 1976:254). Obviously, knowledge of fish migrations would be of utmost importance to a society that is dependent on marine resources.

The following legend not only emphasizes fishing as a subsistence strategy in Kahuku, but also deals with the sociopolitical aspects of warfare, and an apparent *kapu* placed on the eating of *hilu* (reef fish). Two fish from Tahiti is a legend where two canoes full of people (referred to as "fish") set sail for Hawai`i. Upon reaching O`ahu, the two boats went in separate directions one sailing north and the other sailing south in search of a good place to settle. One boat landed at Hauula where a battle took place between the men from Tahiti and the fishermen of Hauula. The fishermen were victorious, and the "fish" (men) from Tahiti were killed and eaten. The other boat of Tahitians continued to sail about the island. They became worried about their companions when they did not meet up, and landed at Kahuku to try to determine their whereabouts. The people of Kahuku were friendly and invited their new friends to feast with them. They explained to the Tahitians that a large battle had with a great fish had taken place at Hauula, and the fish had been divided up amongst all the people in the area. The Tahitians recognized that the feast was actually comprised of their companions, so they took portions of the flesh and threw it into the ocean, where it came to life as red *hilu*. The fish then swam to Hauula and dammed up the waters above the valley creating a great flood and taking vengeance upon the cannibals (Westervelt 1991:142-144).

Warfare in Kahuku is also the underlying theme of the Legend of Kamapua`a, a man of supernatural powers who could take either the form of a man or a hog. Kamapua`a, who was born in Ko`olau Loa, altered the land and created many of the landmarks and features on O`ahu through his mischievous deeds. According to one, legend Kamapua`a was fond of stealing the chickens of Olopana the king of O`ahu at the time. When Olopana found out that it was Kamapua`a who was responsible for the loss of his chickens he sent armies of men out to capture him. Every army that Olopana sent out against Kamapua`a was completely defeated including the men of Kahuku (Elbert 1982:200).

2.2.2.2 Kaipapa`u

Kaipapa`u which literally means "shallow sea" (Pukui et al., 1986:70) like that of Kahuku, also maintains proverbs and legends which describe the early environment and traditional activities of the area. One of the proverbs about Kaipapa`u illustrates once again the importance of fish migrations.

Ka i`a hali a ka makani. The fish fetched by the wind. The `anaeholo, a fish that travels from Honouliuli, where it breeds, to Kaipapa`u on the windward side of O`ahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong (Pukui 1983:145).

Another proverb about Kaipapa`u plays on the literal meaning of Kaipapa`u, which describes the early environment of the area.

No Kaipapa`u, paha? From Kaipapa`u, perhaps? A play on the name Kaipapa`u (Shallow-sea). He must be from Kaipapa`u, for he appears to be shallow-minded (Pukui 1983:254).

Kiapapa`u is recorded in legend as being the home of an old kahuna who worshipped the gods Kane and Kanaloa. The gods lived at Kiapapa`u where the old man constantly worshipped them but they traveled often. On one occasion the gods visited their sister who gave them dried fish. They threw the fish into the ocean where they became alive again and followed the gods along their journey. When the gods reached the river at Kiapapa`u they turned inland so the fish swam up the river to a pool where the gods had stopped. It is said, that whenever high waters make it possible the ulua come up the river to the place where the kahuna worshipped Kane and Kanaloa (Westervelt 1991:145).

2.2.2.3 Lā`ie and Malaekahana

Lā`ie which literally means `ie leaf (Pukui et al., 1986:128) is best known for its legends and proverbs about the beautiful princess Lā`iekawai. One traditional proverb has the following to say about Lā`ie:

Lā`ie I ka `ēheu o na manu. Lā`ie, borne on the wings of birds. Lā`ie is a gathering place for people. Twin girls were born at a place now bearing the name of Lā`ie, O`ahu. The older twin, Lā`iekawai, was reared by her grandmother, Waka, and was said to rest on the wings of birds. The younger Lā`ielohelohe, was taken by a kahuna to rear (Pukui 1983:209).

According to legend, Lā`iekawai and Lā`ielohelohe were the twin daughters of Malaekahana and Kahauokapaka who was chief of both Koolau districts. Kahauokapaka desired a son, so he made a

vow that any girl children bore to him by his wife Malaekahana would be put to death. Kahaukapaka made good on his vow, killing four daughters in a row. When Malaekahana was pregnant for the fifth time, she sent her husband away to gather some fish for her. In his absence she delivered the beautiful twin girls. Not wanting to see her daughters die like the others, Malaekahana sent La`iekawai to live with her grandmother Waka, and La`ielohelohe to be reared by a kahuna named Kapukaihaoa. When her husband returned, Malaekahana informed him that she had given birth, but that the child was born without life. Waka protected La`iekawai by taking her to live in a cavern that could only be entered by diving into the pool of Waiapuka (Kalākaua 1990:457).

The pool of Waiapuka, and the secret cavern said to protect La`iekawai from death was visited up until the early 1900s when it was said to have silted up, restricting entrance. The pool was visited and described by none other than King Kalākaua. His description of this event is interesting, as it connects traditional lore with actual physical manifestations in the environment. His description is as follows:

Early in the spring of 1885 a party of six or eight ladies and gentlemen--the writer being of the number--made a carriage circuit of the island of Oahu...Entering the district of Koolauloa the next day, and approaching the coast over a broad stretch of grassy meadow but slightly above the level of the ocean, our party was suddenly brought to a halt beside a pool of clear water, nearly round, and perhaps a hundred feet in diameter. The surface of the pool was ten or twelve feet below the level of the surrounding plain, and its even banks of solid rock dropped almost perpendicularly into water of unknown depth. The volume of the pool is affected neither by rain nor drought, and the native belief is that it is fed by springs at the bottom, and has a subterranean drainage to the ocean, some two or three miles distant.

This, we learned, was the celebrated pond of Waiapuka, around which so many strange legends have been woven. All of them speak of a cavern somewhere beyond the walls of the pool, and to be reached only by diving into the water and finding the narrow passage leading up into it.

While listening to fragments of the story of Laieikawai and of other legends connected with the mysterious cavern, and seriously doubting the existence of the secret chamber so prominently referred to in the early folk-lore of Oahu, an old native, who had joined the party at Kaneohe, quietly and without a word dismounted, divested himself of his upper garments and plunged into the pool. Swimming to the northern wall, he clung for a moment to a slight projection, and then disappeared. It was suggested for the first time that he was in search of the cavern of Laieikawai, and all eyes were turned toward the point where he was last seen above the water.

Three or four minutes elapsed, and fears for his safety began to be exchanged, when the salutation of "aloha!" greeted us from the opposite wall, and the next moment a pair of black eyes were seen glistening through a small opening into the cavern, not before observed...we were compelled to admit that the cavern of Laieikawai was a reality, however wild and visionary may have been the stories connected with it (Kalākaua 1990:455-456.)

Another legend surrounds the beautiful twin princesses. It was said that Laieikawai, was the element of water and dwelt in the sacred pools, and Laielohelohe, was the element of air and took the form of a beautiful dragon fly. Their grandmother often appeared in the form of a rainbow, and protected them from the air, and their grandfather Puhī, the eel-god protected them from the water. One day a great ali'i from Kaua'i, Hulumaniani was traveling about O'ahu and saw the rainbow of the twins and went to investigate. He took the form of the Koa'e bird and appeared to the twins inviting them to go for a flight with him. Laieikawai agreed, while Laielohelohe stayed behind. After a time Laieikawai discovered that she was far from home and called to her relatives for help, who enveloped her into the rainbow (Paki 1972:52).

Like other areas in Ko'olau Loa, Lā'ie also has legends indicating the importance of fishing as a subsistence strategy. One such legend is the legend of Maikohoa.

Maikohoa was a fearless man who angered his father by breaking the *kapu* staves at a sacred place of worship. Because of this, he was banished by his father and traveled to Maui where he turned into the *wauke* plant. His sisters went in search of him and during their journey settled in various places around O'ahu bringing certain fish from their home to the new places. One sister, Kahukuuna, settled in Lā'ie after marrying Laniloa. The fish that came with her were the mullet which remain there today (Fomander 1919:270, Laieikawai 1919:354).

The annual journey of mullet from 'Ewa to Waikīkī, around the end of O'ahu and ending in Lā'ie is explained in another legend. According to the story, a woman from 'Ewa married and built a home with her new husband at Lā'ie. They lived in comfort there, with banana and taro patches, sugar cane and sweet potatoes, and shellfish and seaweed which they collected from the reef. There was only one thing missing; fish. One day the wife asked her husband to go to 'Ewa where she had grown up and bring back fish. The husband questioned her. Fresh fish would spoil during the trip and dried fish would be too heavy to carry all that distance. The wife responded "bring fish in the sea," and told her husband to go ask her father who had power from the gods to "give him fish in the sea." The husband did not understand her strange request, but followed her instructions nevertheless. Upon hearing his son-in-law's request, the father prayed to his gods, and

then nothing else was said about the fish. When the husband was ready to return to La`ie, the father said, "you shall take fish in the sea." The husband did not understand this, but went on his way. He traveled to Nu`uanu, where the people were fishing because there was a run of mullet. He wished that there were fish at his home in La`ie. When he got to Waikīkī he saw people fishing and feasting on a run of mullet and again he wished that there were fish in La`ie. Finally, he reached home and discovered the next morning that the sea was full of mullet. They had followed him, in the sea, on his journey home (Pukui 1988:48-51, Thrum 1976:269-272). This particular legend also illustrates the importance of cultivation in addition to fishing in the Ko`olau Loa District.

Finally, the physical topography surrounding the area of La`ie and Malaekahana is explained in legend. The small islets which are present near La`ie, at Malaekahana Bay were formed according to legend from the pieces of the chopped up head of a giant *mo`o* (a great lizard). The monstrous *mo`o* killed all people who passed within it's reach. According to legend, Kana from the island of Hawai`i got a band of men together and they systematically killed all the *mo`o* that they could find in the islands. One of the *mo`o* that they killed was at La`ie where they chopped the head of the monster into five pieces and threw them into the ocean. The five pieces of the *mo`o* turned into the islets Maluawai, Keauakahepaaa, Pulemoku, Mokuaaniwa, and Kihewamoku (Armitage 1944:141).

2.2.3 The Early Post-Contact Period: A.D. 1778-1845

Following the explorations of Captain James Cook in 1778, European references to the Ko`olau Loa District appear in journals of early explorers. Equally brief and intermittent written records during the early post-Contact period are mentioned in the letters, reports, and journals of the missionaries who arrived in the Sandwich Islands in 1820, and in the published narratives of their native students. The majority of the early post-Contact period records of native land use and settlement patterns in Ko`olau Loa were found in the missionary letters and journals of Rev. John and Ursula Emerson assigned to the Ko`olau Loa-Waialua District mission in 1832.

The development of Hawaiian culture, and the history of traditional Hawaiian lifeways, was altered with the arrival of Captain Cook, followed shortly by other Westerners. Most changes were not immediately pervasive. Outlying areas, furthest from Western influence (possibly including the northern Ko`olau Loa area) would have been less affected by Western culture for some years afterward, until inland products such as sandalwood began to dominate foreign trade.

During the early nineteenth century, population declined rapidly throughout the Hawaiian Islands due to inter-island warfare and introduced diseases (Kelly 1991; Stannard 1989). Kelly (1991) references several accounts that detail the decimation of the population of the `Ewa District, south of the current project area. When Kahekili conquered O`ahu in 1783, "he is said to have been responsible for killing whole populations of villages in `Ewa" (Kamakau 1961:137, cited in Kelly 1991:157). Later, "when Kamehameha I came to [conquered] Oahu in 1795 the results were also devastating" (Kelly 1991:157). How often warfare-related deaths of non-combatants occurred before Contact is undetermined, but such actions could have affected population growth and settlement expansion.

Introduced diseases, including cholera, smallpox, bubonic plague, measles, and typhoid, as well as venereal diseases such as syphilis and gonorrhea, decimated the native population to an even greater degree as they had no natural resistance to these new illnesses. Epidemics destroyed whole populations of villages and districts, resulting in a decrease in population and equivalent shifts in lifeways and land use.

The rapid decline of population within the early post-Contact period precipitated the loss of a great resource: the oral histories and traditions of the residents of the island of O`ahu. Whole villages and groups of O`ahu residents died before early foreign arrivals had an opportunity to record their histories. The loss of this resource has made it difficult for modern researchers to effectively interpret traditional Hawaiian lifeways, settlement patterns, and land use. An influx of residents from Mau`i and Hawai`i followed the conquests of Kahekili and Kamehameha I, further compounding the problem as these individuals brought their own oral histories and traditions with them. Consequently, the extent to which these transported histories and traditions were altered to adapt to the new home on O`ahu is uncertain.

Nakamura (1981) and Silva (1984) summarize the known historical documentation of the Kahuku area in conjunction with archaeological surveys undertaken by Davis (1981), Bath (1984), Rosendahl (1985) and Walker et al. (1986). Nakamura and Silva agree there is little substantive historical documentation on the area. Both cite early mariners' descriptions of the Kahuku area that were previously reported by McAllister (1933). Subsequent studies (Stride, Craddock, and Hammatt 1993; Walker, Haun, and Rosendahl 1988) have not contributed additional historical information, but rather cite briefly the works of Nakamura and Silva.

The earliest description of the area was recorded 28 February 1779, in the log of Captain Charles Clerke, who had succeeded to command of the *H.M.S. Resolution* following the death of Captain Cook.

Run round the Noem [northern] Extreme of the Isle [O`ahu] which terminates in a low Point rather projecting [Kahuku Point]; off it lay a ledge of rocks extending a full Mile into the Sea, many of them above the surface of the Water, the country in this neighborhood is exceeding fine and fertile; here is a large Village, in the midst of it run up a large Pyramid doubtlessly part of a Morai. [Captain Charles Clerke's narrative cited in Beaglehole 1967:572, and recited by Nakamura 1981:1]

Lieutenant James King, also on board the *H.M.S. Resolution* at the time, made a similar entry about the windward side of O`ahu in general:

It (Oahu) is by far the finest island of the whole group. Nothing can exceed the verdure of the hills, the variety of wood and lawn, and the rich cultivated valleys, which the whole face of the country displayed. [McAllister 1933:153]

In contrast, Captain George Vancouver noted differences in the landscape 15 years later in 1794:

In every other respect our examination confirmed the remarks of Captain King; excepting, that in point of cultivation or fertility the country did not appear in so flourishing a state, nor to be so numerously inhabited, as he represented it to have been at that time, occasioned most probably by the constant hostilities that had existed since that period. [Vancouver 1798, Vol 3:71 cited in Nakamura 1981:2]

The possible decimation of the population and abandonment of the fields may have been due to multiple causes, such as warfare or epidemics, or may be related to seasonality. Clerke and King arrived during the wet season; Vancouver visited at the height of the dry season. Regardless of the cause, the population decline adversely affected the amount of land under cultivation. McAllister (1933:153) cites E.O. Hall's 1838 summary of conditions in the area: "Much taro land lies waste, because the diminished population of the district does not require its cultivation."

John Papa `Ti (1800-1870), a high chief and Hawaiian government official, visited relatives and friends living in *Waiale`e Ahupua`a* in about 1810, and provided a description of the area:

...a delightful land, well provisioned. There was a pond there, surrounded by taro patches, and there was good fishing places inside the reef...Chiefs and commoners crowded together at Puehuehue to go diving, or board surfing at Ulakua, just *makai* [towards the sea] of Kohalaloa, where the waves rolled and broke perfectly. [Ti 1983:24, 63]

Taro ponds along the beaches and shorelines were also used as holding ponds for mullet (Wilcox 1975:2), a fish generally reserved for the royalty. *Kapu* fish and fishing rights, until the division of Hawaiian lands in the 1840s, belonged to the King and were in charge of the chiefs (*konoiki*) of each *ahupua`a*. In Ko`olau Loa, *he`e* (octopus; *Polypus* sp.) was owned by and *kapu* for the king (Department of the Interior, Documents: 10:1852). Other fish and fishing rights were controlled by the chief, or headman of each *ahupua`a*, and were delegated to the commoners for harvesting.

Among other hardships the *konoikis* [sic] made exorbitant charges for fishing rights along the shore; certain fish were *tabu* and half the catch of other fish had to be shared with the chief. [Emerson 1928:138]

Following the division of lands after 1845, fishing rights were sold or leased by the owner of the *ahupua`a*.

In September of 1815, John B. Whitman made a visit to Pahipahi`ālua *Ahupua`a* with a friend to survey a plantation that had been granted by the high priest (Hewahewa) of Hawai`i Island. Whitman wrote in his journal that the point of Pahipahi`ālua *Ahupua`a* contained a hog pen (in addition to dogs and fleas) and was rocky and uncultivated; however, the "small valley" (Pahipahi`ālua Gulch) back from the point was stocked with taro. Preparations for collection of the king's taxes from Pahipahi`ālua, due at the time of the *makahiki* festival beginning in October, were being made at the time of Whitman's visit. The *konoiki* of Pahipahi`ālua enumerated salted fish, hogs, *tapa*, "5 pows" (*pa`u*; skirts worn by women), and "10 maros" (*malo*; men's loincloths) among the taxes being collected (Whitman 1979:78-82).

The Protestant missionaries sent to the Sandwich Islands by the American Board of Foreign Missions found the people of Hawai`i:

...dominated by the will of an autocratic and sometimes capricious chief or chief's headman...They had no incentive to improve their condition...and there were no laws to protect property and safeguard private ownership. A common man had to work for his chief whenever called upon; if he refused, he could be turned out of his home and whatever he had could be confiscated, his only recourse being to take French leave and... put himself under the rule of another chief. [Emerson 1928:137]

A heavy tax on the labor of natives of Ko`olau Loa (and other districts of Hawai`i) was the collection of sandalwood from the forests to pay for foreign sailing vessels purchased in trade by King Kamehameha I, and the high chiefs following his death in 1819. Trees felled and branched

by the men were carried along narrow foot paths to the collection station at Waialua, adjoining the Ko`olau Loa District on the north shore, for shipment to Honolulu.

Some records of sandalwood tax collection from the Ko`olau Loa and Waialua Districts to pay sandalwood debts during the 1820s were kept by Stephen Reynolds, a clerk of merchant William French in Honolulu, and by William French in the 1830s (French 1833). The heaviest traffic of schooners and brigs to Waialua, the collection station for the two districts, appears to have been between 1824 and 1829 (Reynolds 1989:28, 29-30, 181, 182, 185, 187, 193, 248, 249, 262, 272) in a effort to pay off accumulated sandalwood debts.

Levi Chamberlain made a tour of O`ahu during the sandalwood collecting period (1828) to examine the mission schools. South of the project area he examined a school of "sandal wood cutters from the mountains" before continuing on his tour to examine four schools in the Ko`olau Loa District. Being a guest of Peka, the Lā`ie *konohiki*, Mr. Chamberlain examined two schools in Lā`ie and Mā-laekahana the following day. After examining the schools, Mr. Chamberlain continued over "a level sandy country" to examine a large school at Kahuku, and a smaller one at Waiale`e (Chamberlain 1957:35, 36). Specific details giving precise locations of the schools, villages, and the population within the districts were not reported by Mr. Chamberlain.

On 24 July 1832, the missionaries Rev. John and Ursula Emerson were received at Waialua by Chief La`anui, and headman Kuakoa, to begin the second mission established on the island of O`ahu. The areas covered by the Emerson's mission were the Ko`olau Loa (generally referred to as "Kahuku"), Waialua, and later, the Wai`anae Districts. The native population was estimated at that time by Rev. Emerson as about 8,000 inhabitants in the three districts, with six settlements along the shoreline of Ko`olau Loa (Emerson 1928:55, 66, 103). Rev. Bingham gave the population about 7,300 (Bingham 1981:468).

My father's (John Emerson) charge included the district of Koolauloa (Long Koolau), the northern side of the island. Although this is only a strip of land from half a mile to a mile in width, running along the foot of cliffs, or bold precipices which terminate many mountain spurs, the soil is good and well watered by small mountain streams and the valleys between the spurs are rich and productive. There were six settlements along the shore with a population of about 2,700... [Emerson 1928:103]

The technology of grass hut construction, the purposes of enclosures, and available resources in these two districts are amply noted throughout the Emerson's letters and journals. Rev. Emerson described Kahuku in 1832 as:

...a populous district green with forests of *Lauhala* (pandanus) trees, nestled among which the homes of the natives were sheltered from the strong winds. They used the choice *luhala* [sic] leaves for lining their grass huts and for skillfully braided mats for their gravel floors, while the fruit also had its uses. [Emerson 1928:134]

Among the uses of the *lauhala* fruit was the identification of the district to whom a person belonged: "Men from Kahuku were identified by leis of the orange hala fruit which they wore by order of their chief when they left their *ahupua`a*." [Wilcox 1975:1]

House construction in Ko`olau Loa and Waialua, using natural resources growing in the districts, was described in detail by Rev. Emerson:

The frame of a native house is built by fitting and tying to a ridgepole other poles which slant from it to the ground, or to upright posts, which in that case frame perpendicular sides. Across the poles are placed horizontally other poles about an inch in diameter and two inches apart, the *aho* [cord], to which is fastened the thatch, which is made of bunches of *pili* grass lapped like shingles. The cords used for tying and fastening are prepared from the strong *ahu-awa* [sedge; *Cyperus javanicus*] reed...

The land on which our houses stand...is enclosed by a sort of palisade of small poles about six feet high so fastened together with the native cord as to make quite a strong fence. This is necessary to keep the horses and goats from carrying off the houses, in other words, from eating them up. [Emerson 1928:57, 58]

Later, stone walls were constructed, not as animal enclosures, but "to keep out roaming cattle, horses, and pigs from cultivated lots" (Emerson 1928:127).

In addition to plants and animals mentioned by Rev. Emerson, Ursula Emerson wrote in letters that taro was "found in abundance in the mountains," and recently introduced fruit available to them "from the uplands" were oranges, lemons, limes, and pineapples. Their firewood was gathered from the forests among the *kukui* (*Aleurites moluccana*), *koa* (*Acacia koa*) *ōhi`a ai* (mountain apple), and *kuawa* (guava; *Psidium guajava*) trees. Sweet potatoes, bananas, arrowroot, and a large variety of historically introduced fruits and vegetables (grapes, figs, corn, beans, cucumbers, squash, cabbage, melons, radishes, small onions) were mentioned by Mrs. Emerson as planted by Hawaiians in their scattered garden plots, and around their houses. Pigs, chickens, ducks, fish, and goat milk were also mentioned (Emerson 1928:66, 84, 96, 100, 151).

Gideon La`anui (1794-1849), the "Christian chief" (*konohiki*) of the Emerson's district, was baptized on 4 December 1825 in Honolulu by the first group of missionaries (Ōi 1983:145). Duties of tax collection from the residents in the district were directed to La`anui by way of written

messages. In 1834 a letter notified La`anui that a person was being sent to collect potatoes and *poi*, and that he was to get *puakai* (*pukai*; lime), medicinal herbs, ship some fish, and “hire” a man to get tapa material from the mountains. A message sent in 1837 stated that the king wanted hogs, fish and food. Other messages included the instructions “to go fishing” for fish and shrimp; “get some lime if matured,” ship wood, sandalwood, food, and potatoes. While in port, La`anui was to supply the sailors on the King’s vessel with food and fish (Department of the Interior: 1834, 1838a - 1838e).

2.2.4 Land Tenure Change: The Great Mahele

Until 1841, Hawaiian lands were owned by the King and administered by chiefs, with use rights assigned to them. Lands occupied by Hawaiians under a chief, or held by foreigners (in agreement with the king or various island chiefs), were subject to seizure and redistribution. The status of land tenure during the early post-Contact period was felt by foreigners to be a detriment to investment and the development of Western plantation agriculture, farming, and ranching. This resulted in the adoption of western judicial systems (e.g., trials) in 1832, codes of laws in 1833 and 1839 (superseded 1842), and the first Hawaiian Constitution in June 1840. The Hawaiian Constitution provided for the appointment of a legislature composed of the King, 16 chiefs, and 7 elected representatives (Department of the Interior 1840).

The first Hawaiian legislative meeting, held on 1 April 1841, authorized the governor of each island to lease tracts of lands for periods up to, but not exceeding, 50 years (Department of the Interior 1841). The most important change occurred during the period commonly referred to as the Great Mahele, the great division of lands signaling the transition from traditional Hawaiian concepts of land ownership to the Western concept of individual fee simple land ownership. The transition occurred in several stages between 1845 and 1854 (Chinen 1978:10). Initially, King Kamehameha III divided the lands into four categories: 1) the lands belonging to the King, 2) the government, 3) chiefs and *konohiki*, and 4) the commoners (Chinen 1978:15-16). Article 4, Chapter 7, of the Hawaiian Legislature, passed on 10 December 1845, provided for the Privy Council to appoint a Board of Commissioners to Quiet Land Titles. The Board reviewed claims by chiefs and commoners and made Land Claim Awards (LCA).

Two hundred sixty-nine land claim applications, indicating a minimum population of approximately 800 people, were applied for by residents of the Ko`olau Loa District. Hawai`i government survey maps detail coastal *kuleana* but the locations of upland *kuleana* are non-

existent. In 1873, the boundaries of the government land of Kahuku belonging to the Kahuku Ranch Company were still unsettled (Department of the Interior Letters: 1873). Some of the small *kuleana* land claim awards located along the lowlands of Ko`olau Loa appear on tax maps; others, as late as 1993, are listed in the tax records as "unlocated *kuleana*" (ten are currently designated as unlocated in TMK 5-5-07:3). The individual land claims are accompanied by testimonies which prove very useful in determining land use patterns during that time.

The Land Commission Award Testimonies for the *ahupua`a* that the Kahuku Training Area is located in have been completely recorded and are presented in Appendix A. Examination of these testimonies indicate that many of the inhabitants had lived in the Ko`olau Loa District since the time of King Kamehameha I or earlier. The testimonies also indicate that the Ko`olau Loa District was rich in resources of all sorts, providing it's inhabitants with all the necessary material needs to sustain life. The testimonies indicate not only an emphasis on coastal resources, but on inland resources as well. If the Kahuku Land Commission Award testimonies are used as an example for the broader Ko`olau Loa District then land use for the District could be described as follows. The coastal areas were utilized for habitation as well as exploitation of the coastal resources in a variety of ways including fish *lo`i*, fishponds (aquaculture), and fisheries. No doubt shell fish, and sea vegetation were also exploited, however, were not mentioned in the testimonies.

Habitation also occurred in the flatland areas and both irrigated agriculture (*lo`i*) and non-irrigated agriculture (*kula*) was practiced. The *lo`i* were cultivated in taro, whereas the *kula* contained a number of both traditional and non-traditional plants. These plants included; *wauke* (*Broussonetia papyrifera*, Paper Mulberry), coconuts, bananas, sweet potatoes, *hala* (*Pandanus tectorius*), sugarcane, `awa (*Piper Methysticum*, Kava), *ipu*, (gourd), *akaakai* (onions), watermelon, *alani* (oranges), `olena (*Curcuma domestica*, tumeric or ginger), *papapapa* (beans), `ulu (*Artocarpus communis*, breadfruit), and *ipu `awa`awa* (bitter gourd).

The upland areas were also described as being exploited for a number of resources, some of which required cultivation. These included; *hala* (*Pandanus tectorius*), banana, *noni* (*Morinda citrifolia*, Indian Mulberry), *pili* (*Heteropogon contortus*, Twisted Beardgrass), *koa* (*Acacia koa*), `awa (*Piper Methysticum*, Kava), sweet potatoes, *kukui* (*Aleurites moluccana*, Candlernut tree), *wauke* (*Broussonetia papyrifera*, Paper Mulberry), `ohi`a (*Metrosideros*), *ti* (*Cordyline terminalis*, Ki), *olona* (*Touchardia latifolia*).

In addition, the valleys were noted as places where *noni* (*Morinda citrifolia*, Indian Mulberry), banana, and sweet potato grew. Other resources mentioned in the Land Commission Award Testimonies without a location included salt, pigs, wiliwili trees, pasture land, watercourses, and a *holua* (slide).

Most of the Ko`olau Loa lands were then granted, leased, or sold to foreigners after 1850 for pasturing of cattle and sheep, developing most of the Ko`olau Loa District into ranches known as Mālaekahana and Kahuku Ranches.

Kahuku had passed from the control of its chief to that of an Englishman. The pastures of his big ranch extended along the shore for 12 miles, reaching inland to the mountain chain, and he was so autocratic that the natives could not own a dog, or pasture a cow or horse, without his consent. The depredations of herds and flocks on their small homesteads became unbearable, but they appealed in vain for their beloved *hala* trees and patches of vegetables... There was no redress, however, and with the fading of the forests the people also disappeared and the once populous district of Kahuku [Ko`olau Loa] became a lonely sheep and cattle ranch. [Emerson 1928:135-136]

2.2.5 Mālaekahana and Kahuku Ranches

Cattle and sheep were introduced to Hawai`i by Captain George Vancouver as a gift Kamehameha I in 1794, with a twenty-year *kapu* agreement to allow the cattle to multiply (Vancouver 1984:812). By the end of the *kapu* period, the cattle had become so troublesome that bullock hunters were engaged by Kamehameha I to hunt the cattle for their skins and tallow. The tenuous nature of foreign possession of lands for economic enterprises, prior to the Great Mahele, prohibited most foreign investments. Honolulu merchant, William French, however, acquired Hawai`i Island property for ranching in 1838, trading a "beautiful horse" to Governor Kuakini for use of the premises, beginning the first cattle ranch in the Hawaiian Islands (Board of Land Commissioners, Foreign Testimony 2:157-168, 171, 305).

The formation of Charles Hopkins' Mālaekahana Ranch appears to have begun with his purchase of livestock at Kahuku from Joseph Booth on 8 April 1850 (Bureau of Land Conveyances Liber 4:137). Robert Moffitt, owner of the Kahuku Ranch, began the ranch by acquiring large leases of Government lands in Ko`olau Loa in 1852. In land transactions between Hopkins and Moffitt in 1858, sheep, as well as cattle were apparently raised on the ranches (Bureau of Land Conveyances Liber 5:536).

A large number of deeds, grants, mortgages, and other land conveyances, from the formation of Mā-laekahana "Rancho" by Charles G. Hopkins, and Kahuku Ranch by Robert (Stoney) Moffitt from the early 1850s, until the charter of the Kahuku Plantation company in 1890, are filed with the Bureau of Land Conveyances. The major land transactions during the formation and ownership of Mālaekahana and Kahuku Ranches illustrates the change of land use in the Kahuku Training Area from pastures and ranching to a cultivated sugarcane plantation.

Combining the ranches, Malaekahana Ranch interest was purchased by Herman A. Widemann in 1867 and 1872 from Charles K. Hopkins, then residing in Montreal, Canada. Kahuku Ranch was purchased by Widemann from T.H. Stoney of Frankfort, Ireland, heir of Robert Stoney (alias Moffitt) in January 1873 (Bureau of Land Conveyances Libers 35:297-299; 39:1-5). Malaekahana and Kahuku Ranches were then sold by indenture of mortgage to Julius L. Richardson on 19 January 1874 (Bureau of Land Conveyances Liber 38:473-477).

James Campbell, a sugar planter in Lahaina, Maui purchased "Kahuku and Malekahana Ranch" from J.A. Richardson on 2 October 1876 for \$63,500.00. The ranches were comprised of the following land and properties in Ko`olau Loa on the date of sale to Campbell:

- I. 1) *ahupua`a* of Mālaekahana
 - 2) *ahupua`a* of Ke`ana
 - 3) *ahupua`a* of Kahuku
 - 4) *ahupua`a* of Ulupehupehu, Hanakaoe, `Ō`io and 1 and 2
 - 5) *ahupua`a* of Kawela
 - 6) *ahupua`a* of Opana 1 and 2
 - 7) *ahupua`a* of Pahipahi`ālua
 - 8) *ahupua`a* of Kaunala
 - 9) Leaseholds, ~3,000 branded cattle, 90 head horses, ~1700 sheep running or grazing on the ranch or adjacent lands, carts, yolks, harness, agricultural implements, tools, furniture, personal and mixed property.
- II. 1) *ahupua`a* of Pūpūkea
 - 2) *ahupua`a* of Paumalū
 - 3) *ahupua`a* of Wai`alee
 - 4) indentures and leases.

2.2.6 Kahuku Sugar Plantation

Early European visitors recognized the potential of Hawai'i developing sugarcane plantations. Captain Peter Puget observed in 1793 that "large and luxurious Growth [of sugarcane]... would abundantly repay in Quantity any Labor bestowed on it in Sugar and Rum" (Bradley 1968:24). Officer Menzies, with Vancouver's voyage in 1793 thought:

...that it would be profitable for the British government to encourage the settlement of a few West India planters at the Hawaiian Islands inasmuch as sugar could be cultivated there by cheap labor without the necessity of recourse to slavery... [Bradley 1968:24, 42]

Captain Iurii (Yuri) Fedorovich Lisianskii, with the Russian exploration voyages of the Pacific Ocean in 1804 wrote:

The sugar-cane also thrives here, the cultivation of which alone would yield a tolerable revenue, if sugar and rum were made of it; and the more so, as the use of these articles is already known to the savages of the north-west coast of America. [Barratt 1987:71]

The first sugar plantation in Hawai'i appears to have been initiated by a foreigner, John Wilkinson at Pu'u Pueo in Manoa Valley (behind Honolulu) about 1824. The mill and cane fields were taken over by Governor Boki and foreign partners following Wilkinsons' death in 1826. When the Pu'u Pueo plantation sugar was ground and distilled into rum, "a bad business" as described by one of the partners, Stephen Reynolds, the fields were destroyed by Queen Ka'ahumanu (Reynolds 1989:177, 254, 255, 263, 266, 267). Milled sugar in Ko'olau Loa and Waialua Districts was first ground on shares for Hawaiians by Rev. John Emerson in 1836 (Conde' and Best 1973:340). The crude sugar mill was used by the boys Boarding School at Waialua (1840-1843) through which the cultivation and sale of the sugar made the school self-supporting (Bradley 1968:351-354).

The Kahuku Plantation Company was chartered on 4 February 1890 (Department of the Interior, 43:54) by sugar planters James Campbell, James B. Castle, and Benjamin F. Dillingham (founder of the Oahu Railway and Land Company in 1888). In 1889, Dillingham's Oahu Railway and Land Company leased various pieces of land from Campbell to build a railroad from Honouliuli, 'Ewa, to the Kahuku Sugar Mill at Kahuku, Ko'olau Loa. Right to pasturage; working stock and animals; spring waters, running streams, artesian wells, and rights to "take deadwood from the mountains for fuel," to dig up, carry away, and use the soil and rock;" and use of the present ocean landing were subleased from Dillingham to Castle in December 1889 (Bureau of Conveyances 121:372; 128:143-155). The railroad reached "Waialua in 1898, and Kahuku in 1899...[in] the

early part of the twentieth century the Koolau Railroad was built along O`ahu's windward coast from Kahuku to Kahana Bay" (Mifflin 1983:64, 65). The Koolau Railway was purchased by the Kahuku Plantation Company in 1931 (Conde and Best 1973:308, 309).

Small-scale pineapple cultivation on Kahuku Plantation lands was begun about 1916 with additional leases of small parcels of land for pineapple leased to individual growers between 1921 and 1927 (Bureau of Land Conveyances 443:364-365; 832:267, 259; 885:105, 235). As the small leases expired, many of them mortgaged, the leases were acquired by the California Packing Company. Some portions of the Kahuku Training Area are former pineapple fields and contain plantation camp sites located in Kahuku, Keana/Mālaekahana, and Hanakoae/Kawela *ahupua`a*.

To clear titles to the Campbell Estate lands, survey maps of the plantation were submitted with Land Court Application 1095 in 1934 (Campbell Estate map 2736). The 1934 maps, showing the locations and boundaries of the pineapple fields and camp sites, have not yet been updated, and are currently used by the Hawaii State Tax Office as the standard base map of the area.

Dismantling of railroad tracks, and scrapping of railroad cars between 1948 and 1951, signaled the end of the O`ahu railroad era (Oahu Railway and Land Company 1946:11; 1948:8, 1951:4,7). Cane fields, serviced by portable cane trains at the Kahuku Plantation, were dispensed in 1954 (Conde and Best 1973:297-300), and 280 acres were initially leased to the U.S. Government in 1956 for the Kahuku Training Area. Additional leases at later dates expanded the facility to its present size of over 9,600 acres.

The Kahuku Training Area was used by divisions stationed at Schofield Barracks for war games, which contributed to serious topsoil erosion by the use of heavy army vehicles, and by jeeps crossing the ridges. "Heavy rains up in the mountains have stripped the grasses and low-lying vegetation from much of the [Kahuku] training area" (Honolulu Star-Bulletin, 4 May 1970:A2.2.4). In an effort to "halt wind and water erosion," the 29th Infantry Brigade of the Hawaii National Guard, with a motto to plant "a tree in every fox hole," planted 3,000 pine tree seedlings in the foxholes behind Kahuku in 1970 (Honolulu Star-Bulletin, 4 August 1970:A-11.4.1).

3.0 ARCHAEOLOGICAL SITE INVENTORY AND EVALUATION

This section is presented to inform military users of Kahuku Training Area about the known archaeological and historical resources at KTA. These resources are described, located, and

assessed for significance. In addition, a model of probability for archaeological and historical resources yet to be identified at KTA is presented.

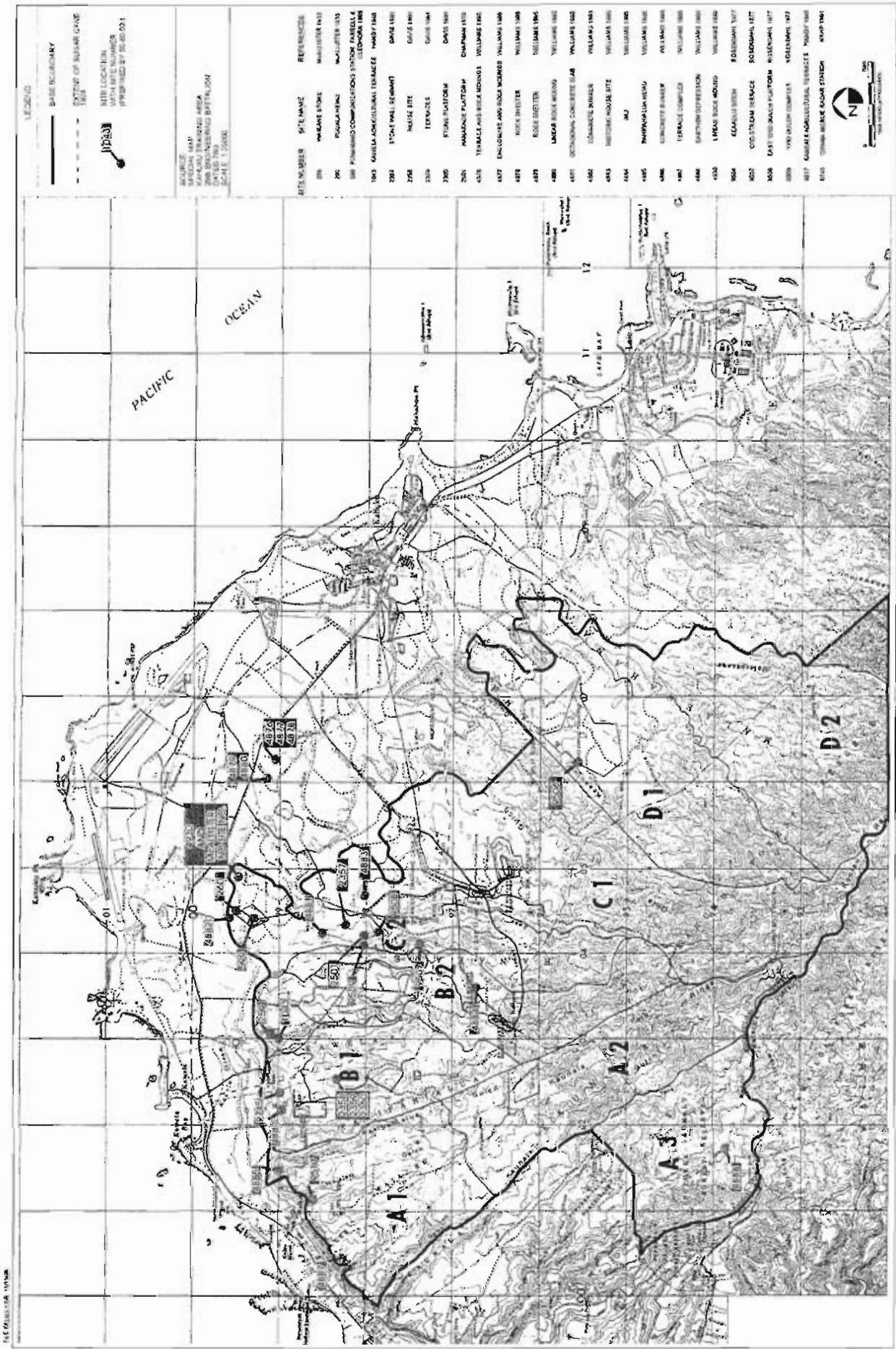
3.1 ARCHAEOLOGICAL INVESTIGATIONS WITHIN KAHUKU TRAINING AREA

Previous archaeological studies have identified 24 historic properties within KTA. These have been designated on the Statewide Inventory of Historic Places (SIHP) list. The SIHP site number (e.g., SIHP Site 50-80-02-2501) is a 10-digit geographic location code that has four groups of numbers; the first referring to the State of Hawaii (50), the second referring to the island of O`ahu (80), the third referring to the particular United States Geologic Survey (USGS) quadrangle map (02), and the fourth referring to the individual site number (2501). As a matter of convenience, these site numbers are often shortened to just the unique site number when discussed (e.g., Site 2501). Site locations are shown on Figure 2.

Numerous archaeological projects have been undertaken within the northern *ahupua`a* of the Ko`olau Loa District, including several projects within the 17 traditional *ahupua`a* that KTA incorporates. There are approximately 120 archaeological or related multidisciplinary reports within the SHPD library that focus on this area. With a few exceptions, most of these studies pertain to the coastal zone or portions of the coastal plain, and were undertaken in response to developmental actions, such as beach park improvements, resort expansion, flood control projects, agricultural park development, and residential complex developments. Only six studies have been undertaken within portions of the Kahuku Training Area (Figure 3): McAllister (1933), Chapman (1970), Rosendahl (1977), Davis (1981), and Williams et al. (1995), and Farrell and Cleghorn (1995). Review of these studies enables the formulation of predictive models for site and feature types to be found in the area, and development of a settlement pattern model for northern Ko`olau Loa.

McAllister (1933) recorded two sites, Sites 259 and 260, near the coast during his limited visit to the area. Site 259 was a legendary stone named Waikane, and Site 260 was a temple named Pu`uala Heiau. Both site areas were pointed out to him by local Hawaiian informants, but the stone features no longer existed at the time.

Chapman (1970) limited his work to recording a single site, Site 2501, reported by some hikers. After clearing the Christmas berry overgrowth, Chapman was able to make a sketch and record a brief description. His field notes state:



DATE: 10/15/80

LEGEND

- BASE BOUNDARY
- - - - - EXTENT OF SUGAR CANE
- SITE LOCATION
- SITE LOCATION (PREVIOUS EDITION)

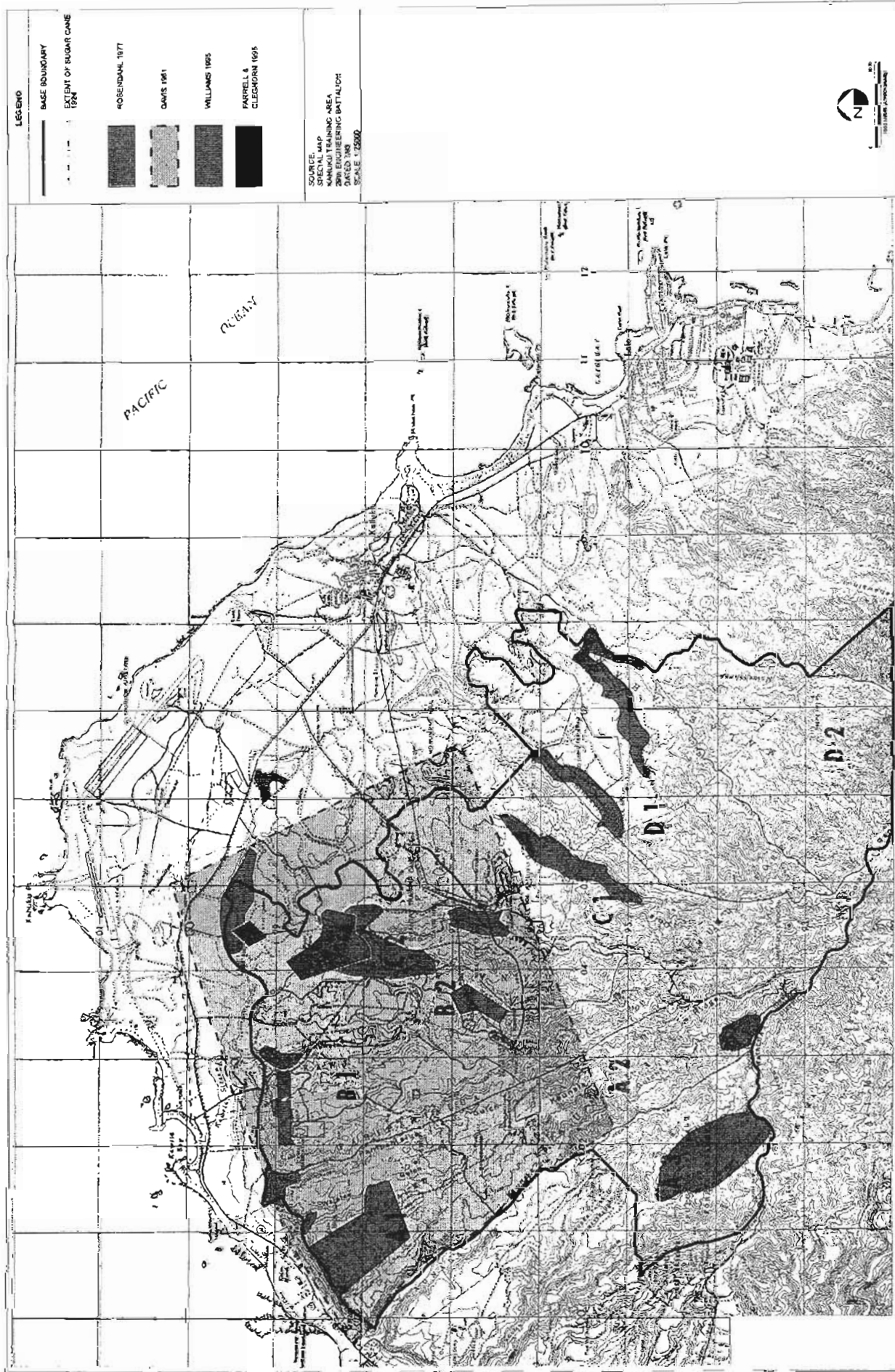
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SOURCE: 1967
 MAP: 1967
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SITE NUMBER	SITE NAME	REFERENCE
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200	POKAIKAI	WILLIAMS 1963
201	POKAIKAI	WILLIAMS 1963
202	POKAIKAI	WILLIAMS 1963
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300	POKAIKAI	WILLIAMS 1963

LOCATION OF RECORDED ARCHAEOLOGICAL SITES IN KAHUKU
 KAHUKU TRAINING AREA
 ISLAND OF O'AHU, HAWAII



LOCATION OF ARCHAEOLOGICAL SURVEY AREAS IN KAHUKU
 KAHUKU TRAINING AREA
 ISLAND OF O'AHU, HAWAII

Flat deck revealed, about 4 by 7 m, upslope about a meter off the ground, and downslope about 2.5 m above the surface. Farther down slope, possibly two earlier levels of construction remain beneath the rubble collapse. Firm clean and slightly bulging wall on up valley, south side; heavy well-made wall or facing on north side about 2.5 to 3 m high. Quite massive. No other structure reported nearby, about 3000 ft from stream bed. Suggest burial from massive quality and isolation, but could be agricultural heiau. [Chapman field notes 1970]

Subsequently, the State Historic Preservation Office conducted a statewide archaeological inventory and nominated the site to the National Register of Historic Places (NRHP). The site was accepted and listed on the NRHP on August 14, 1973.

Rosendahl's (1977) study was a sample survey of selected portions of KTA and was limited in areal extent, covering 1,044 acres (approximately 10%) of the 9,646 acre installation. In addition to the three sites noted above, the study identified six additional archaeological sites. These sites include: Site 1043, Kawela Agricultural Terraces; Site 9506, Kea`aalu Ditch; Site 9507, `O`io Stream Terrace; Site 9508; East `O`io Gulch Platform; Site 9509, `O`io Gulch Complex; and Site 9517, Kanealii Agricultural Structures. Two of these sites (1043 and 9517) are reported by Rosendahl to have been destroyed or not located, as were Sites 259 and 260. Four (Sites 9506-9509) were new site designations.

Of the four new sites recorded during Rosendahl's survey, Site 9506 is a historic period stone-faced irrigation ditch in Kea`aalu Gulch; Site 9507 is a stone-faced terrace located in East `O`io Gulch; Site 9508 is a stone platform located in East `O`io Gulch; and site 9509 is a complex of small stone-faced agricultural terraces located in `O`io Gulch. All of these sites are in poor condition and the ages of the latter three are undetermined.

Subsequent to Rosendahl's (1977) survey, Davis (1981) conducted an archaeological reconnaissance-level survey of proposed windmill sites within selected areas of KTA. His survey resulted in the identification of four additional sites. Site 2357 (Davis 1981:11) was a discontinuous wall remnant of roughly piled stones, which supported a barbed-wire fence on milled wooden posts. The wall marked the boundary of a small pineapple farm dating to 1930, and Davis interpreted the wall as a 20th century feature.

The other three sites identified by Davis, Sites 2358, 2359, and 2360, form a discrete complex set within a small swale in upland `Opana, approximately 250 meters inland and southeast of the Naval Computer and Telecommunications Area Master Station (NCTAMS) Satellite Communications (SATCOM) facility. Together the three sites, set within a 120 sq. m area

adjacent to the eastern edge of a jeep road, comprise a small traditional Hawaiian residential complex, including a house site, two habitation terraces and a terrace with possible religious function. Davis attributed the placement of the site within the swale to the strong winds in the area. He suggests that the site was chosen as a habitation and agricultural area because the swale affords protection from the wind (Davis 1981:19). This complex was located within the proposed boundary of the Kahuku Windfarm Turbine Site 10 construction impact area, and was recommended to be either avoided, monitored during construction, or salvaged (Davis 1981:20). Since there are no subsequent reports available on these sites at the Bishop Museum or at the SHPD, and the wind turbine is in place, it is assumed that construction proceeded without further work undertaken and the sites are destroyed.

During preparation for the 50th anniversary of the Japanese attack of O`ahu, the National Park Service, in conjunction with the Department of Defense Legacy Resources Program, determined that Site 9745, `Ōpana Mobile Radar Station, was eligible for inclusion on the NRHP and was nominated as a National Historic Landmark. It is the location of a World War II mobile radar station, located on the ridge near the current NCTAMS SATCOM facility. This site is within KTA and is under U.S. Army jurisdiction.

The `Ōpana Mobile Radar Station played a critical role at the outbreak of the war. Located near Kahuku Point at 230 feet above sea level, the `Ōpana site was one of six Army radar stations established along O`ahu's coastline in November 1941. At the `Ōpana site on 7 December 1941, Privates Joseph L. Lockard and George E. Elliott observed more than fifty planes bearing down on the island from approximately 130 miles to the north. Within the hour, Japanese planes attacked Pearl Harbor, an event which brought the United States into World War II. Site 9745 was officially listed in the HRHP on 2 June 1990, on the NRHP on 19 September 1991, and as a National Historic Landmark on 19 April 1994.

In 1992, archaeological reconnaissance and historical investigations were conducted in a portion of Kahuku Training Area known as Punamano Communication Station (Farrell and Cleghorn 1995). Cultural remains within this project area had been assigned State Site number 0599, and included structures, features, and artifacts mainly dating to the post World War II era. However, three bunkers dating to World War II are considered potentially eligible for inclusion in the National Register of Historic Places (Farrell and Cleghorn 1995:i).

In early 1994, Williams et al. (1995) (Appendix B of this HHP) conducted a limited archaeological inventory of selected areas within KTA. That study reviewed the previous archaeological research, and included inspection of some of the previously surveyed site areas to determine current site conditions and status. The study resulted in the identification of nine new sites. Three are military features: Site 4881, an octagonal concrete slab; Site 4882, a bunker; and Site 4886, another bunker. Sites 4882 and 4886 are World War II era coastal defenses, and Site 4881 is thought to be the remains of a military observation post. Site 4883 is a plantation-era house site with early to mid-20th century refuse. Sites 4884, 4885, 4887, and 4888 are traditional Hawaiian in origin. Site 4884 is an isolated upland *imu* (cooking hearth); Site 4885 is a *heiau*, an ancient temple; Site 4887 is a probable habitation complex containing 11 features; and Site 4888 is a probable planting/garden area.

3.1.1 Summary of Known Cultural Resources at KTA

Twenty-four cultural resources have been identified within KTA (Table 1). Eight of these sites (Sites 259,260, 1043, 2357-2360, and 9517) are presumed to have been destroyed, but have not undergone systematic archaeological inventory survey and subsurface testing, and therefore have potential to contain either undisturbed surface or subsurface resources. Fifteen cultural resources still exist at KTA (Sites 2501, 9506-9509, 4881-4888, 4930, 0599, and 9745). Twelve of these sites (Sites 9506-9509, 4882-4888, 4930, 0599) are eligible or potentially eligible for nomination to the HRHP and NRHP. Sites 2501 Hanakoa Platform, 4884 *imu* (cooking hearth), 4885 Pahipahialua *Heiau*, 4887 habitation and agricultural complex, and 4888 upland garden area, have confirmed Pre-Contact Traditional Hawaiian origins. Site 2501 Hanakoa Platform is listed on the NRHP. Sites 4881 Octagonal Concrete Slab/observation post, 4882 World War II era bunker, 4886 World War II era Pentagonal Bunker, Site 0599 World War II era bunkers associated with Punamano Communication Station, and 9745 Opana Mobile Radar Station have military origins. Importantly, Site 9745 Opana Mobile Radar Station, is a commemorative National Historic Landmark and is listed on the NRHP and HRHP. Sites 4882 and 4886 are potentially eligible for inclusion on the HRHP and NRHP as World War II era historic properties. Site 4881 does not have confirmed origin or association to World War II, and is therefore not presently eligible for nomination to the HRHP or NRHP. Site 9506 is a Post-Contact plantation era irrigation ditch, and Site 4883 is Post-Contact plantation era residential complex. Sites 9507-9509, and 4930 have unconfirmed temporal origins, being either Pre-Contact traditional Hawaiian agricultural features or Post-Contact plantation era features. Further research is necessary to confirm the origin of these sites, and to evaluate eligibility for NRHP.

Table 1. Summary of Known Cultural Resources at Kahuku Training Area

Site Number and Name	Site Type	Temporal Origin	NRHP Eligibility	Applicable NRHP Criteria
50-80-02-259 Waikane Stone	Cultural site associated to legends about Hawaiian demigods	Pre-Contact	No- Destroyed or unlocated	Not Applicable
50-80-02-260 Pu`ula Heiau	Religious and Ceremonial Site	Pre-Contact	No- Destroyed, unlocated, or mislocated	Not Applicable
50-80-02-1043 Kawela Terraces	Agricultural Terraces	Pre-Contact	Undetermined**Surface area reported destroyed	Undetermined***
50-80-02-2357	Pineapple Plantation Boundary Wall	Post-Contact 20th Century	No- Presumed Destroyed by Kahuku Windfarm Development	Not Applicable
50-80-02--2358	Habitation Complex	Pre-Contact	No- Presumed Destroyed by Kahuku Windfarm Development	Not Applicable
50-80-02-2359	Habitation Terraces	Pre-Contact	No- Presumed Destroyed by Kahuku Windfarm Development	Not Applicable
50-80-02-2360	Possible Ceremonial Terrace/Platform	Pre-Contact	No- Presumed Destroyed by Kahuku Windfarm Development	Not Applicable
50-80-02-2501 Hanakoae Platform	<i>Heiau</i> ; Religious and Ceremonial, and Possible Burial Site	Pre-Contact	Yes NRHP Listed 8/14/73	a, c, d
50-80-02-9506 Keaaulu Ditch	Plantation irrigation ditch	Post-Contact	Yes	a, d
50-80-02-9507 `O`io Stream Terrace	Agricultural terrace	Undetermined* (Pre- or Post-Contact)	Undetermined**	Undetermined***
50-80-02-9508 East `O`io Gulch Platform	Stepped Stone Platform	Undetermined* (Pre- or Post-Contact)	Undetermined**	Undetermined***
50-80-02-9509 `O`io Gulch Complex	Agricultural Terraces with Possible Associated Habitation Features	Undetermined* (Pre- or Post-Contact)	Undetermined**	Undetermined***

Table 1 (continued). Summary of Known Cultural Resources at Kahuku Training Area

Site Number and Name	Site Type	Temporal Origin	NRHP Eligibility	Applicable NRHP Criteria
50-80-02-9517 Kaneali'i Structures	Irrigated Agricultural Terraces	Undetermined* (Pre- or Post- Contact); surface destroyed	Undetermined** Presumed Destroyed by Plantation Agriculture	Undetermined***
50-80-02-4881	Octagonal Concrete Slab; probable training maneuver observation post	Military Era probable post- WWII construction	Undetermined**	Undetermined***
50-80-02-4882	Bunker	Military Era World War II	Yes	a, c, d
50-80-02-4883	Residential Complex	Post-Contact Plantation era; Early to Middle 20th Century	Yes	d
50-80-02-4884	<i>Imu</i> (Cooking Hearth)	Pre-Contact	Yes	d
50-80-02-4885 Pahipahialua <i>Heiau</i>	Religious and Ceremonial Site	Pre-Contact	Yes	a, c, d
50-80-02-4886	Pentagonal Bunker Coastal Defense	Military Era World War II	Yes	a, c, d
50-80-02-4887	Habitation and Agricultural Complex	Pre-Contact	Yes	a, c, d
50-80-02-4888	Agricultural Site	Pre-Contact	Yes	d
50-80-02-4930	Linear rock mound	Undetermined* (Pre- or Post- Contact)	Undetermined**	Undetermined***
50-80-02-0599	Military Bunkers	World War II	Yes	a, c
50-80-02-9745 'Opana Mobile Radar Station	National Historic Landmark Listed 4/19/94	Military Era World War II	Yes NRHP Listed 9/19/91 HRHP Listed 6/2/90	a, c, d
<p>* Further research is necessary to determine temporal origin. ** Further research is necessary to determine NRHP eligibility. *** Insufficient data available at present to evaluate the resource; further research and data collection is necessary. Shaded sites are reported/presumed destroyed but have not undergone systematic archaeological survey since original site description was reported, and therefore have potential to contain undisturbed, associated surface or subsurface resources. "Pre-Contact" refers to the Traditional Hawaiian cultural period prior to arrival of Captain James Cook in Hawai'i in A.D. 1778. "Post-Contact" refers to Historical Period after A.D. 1778. NRHP = National Register of Historic Places. HRHP = Hawaii Register of Historic Places. [Data Sources: McAllister 1933; Chapman 1970; Rosendahl 1977; Davis 1981, 1982; Williams and Patolo 1995]</p>				

SECTION 3.2 SIGNIFICANCE ASSESSMENTS

The recognition that historic and prehistoric sites (i.e., cultural resources) are valuable to society is reflected in the federal laws and regulations designed for their protection. Based on existing legislation, cultural resources are those historic and prehistoric sites, artifacts, features, and other humanly produced elements that represent or reflect the heritage of the people within an area of affected environment. Prehistoric resources may vary from individual isolated features to site complexes that may include midden deposits, fish ponds, and any number of related features. Historic resources may vary from an individual structure, or remains of a structure, to a complex of structures encompassing an entire community. Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665), as amended, is designed to ensure that historic properties (i.e., significant cultural resources) are considered during Federal project planning and execution.

3.2.1 Significance Evaluation Criteria

The National Register of Historic Places (NRHP), title 36 CFR 60.4, defines the criteria for legally evaluating the significance of cultural resources.

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method or construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded, or may be likely to yield, information important in prehistory or history.

In addition, amendments to the National Historic Preservation Act include a provision stating that "Properties of traditional religious and cultural importance to an Indian Tribe or Native Hawaiian organization may be determined to be eligible for inclusion on the National Register" (§101(d)(6)(A)).

3.2.2 Significant Historic Properties At Kahuku Training Area

Two of the 24 sites, Site 2501, Hanakoae Platform, and Site 9745, Opana Mobile Radar Site, are listed on the National Register of Historic Places (NRHP), and Site 9745 is also a National Historic Landmark (NHL). Fifteen sites are of traditional Hawaiian origin: Sites 259, 260, 1043, 2358, 2359, 2360, 2501, 9507 through 9509, 9517, 4884, 4885, 4887, and 4888; seven of these (Sites 259, 260, 1043, 2358, 2359, 2360, and 9517) are presumed to have been destroyed since their original reporting, but are included because the site areas have not undergone systematic subsurface archaeological testing and there is potential for subsurface resources to be present in these site locations. Five sites are World War II era military sites: Sites 0599, 4881, 4882, 4886, and 9745. Two sites have post-Contact plantation-era origins: Sites 4883, and 9506. Site 4930 appears to be a traditional Hawaiian site, but more detailed, systematic archaeological study is required to determine its origin. Each site is briefly described below with its significance assessed.

3.2.2.1 Site 50-80-02-259 Waikane Stone

McAllister (1933:152) described Site 259 as:

Site 259. Large stone, known as Waikane, beside the stream bed on the mountain side of Kawela Bay, and at the foot of the palis in the land of Hanakoae. "Long ago the Hawaiians had to go far up the valley in order to get fresh water, but when Kane struck the stone water flowed from it and continued to flow up to the time the plantation built a pump just below the rock." [McAllister 1933:152]

Handy (1940:88) describes the spring-watered terrace areas of Opana and Hanakoae and reprises McAllister's description of the Waikane stone.

In reviewing Rosendahl's 1977 report, including appendices, it is not clear whether the site was not located or simply not found. The report suggests the site may actually be outside the boundary for the Kahuku Training Area, further suggesting it is not at the previously designated location, or that the site is indeed destroyed, or altered so as to be unrecognizable. McAllister (1933) indicates a plantation well was established just below the rock, suggesting the former spring is capped or that a well head is located in the vicinity. Neither the 1939 Campbell Estate maps, or the 1887 Kahuku Ranch maps, or the Kahuku Plantation map show the location of either a well or terraces in the area. No maps or illustrations of this site are available.

3.2.2.2 Site 50-80-02-260 Pu`u`ala Heiau

Site 260, Pu`u`ala Heiau, was apparently destroyed prior to McAllister's survey, or existed as a location rather than a structure. The *heiau* is neither described by class (e.g., sacrificial,

agricultural, or other type), nor are any dimensions offered in McAllister's brief description, which reads, "Site 260. Puu'ala heiau, said to have been located on the ridge overlooking Kahuku ranch. There is now no evidence of any type of a structure on this bare hill." (McAllister 1933:152).

Inspection of Thrum's various lists of O'ahu *heiau* (1921, 1917, 1909, 1907, 1901) indicates Thrum was not informed of its existence. Moreover, J.F.G. Stokes (n.d.) notes and site card files do not contain any references to this *heiau*, suggesting it may have been destroyed prior to their research, or that information as to its existence was lacking. Sterling and Summers (1978:149) reprise McAllister's description, cite a reference to the area in a Hawaiian newspaper, and plot the location according to McAllister's notes. The news article states "When Keaua'ula reached Pu'u'ala [sic] in Kahuku, he met some people who were indulging in sports there. They were spear throwing and *moa* sliding and they urged him to stop and play" (Sterling and Summers 1978:149). Rosendahl's (1977) survey apparently included inspection of this area, but did not identify any surface remains. A brief search of additional records (e.g. State Archives, SHPD files; Bishop Museum records) failed to reveal any other reference to this site. No maps or illustrations of this site are available.

The name Pu'u'ala may be interpreted at least two ways; 1) hill path or hill trail (*pu'u + ala*), which may be appropriate since the subject of the above tale was traveling, and perhaps this site was near the juncture of major trails, or 2) sweet potato hill (*pu'u + 'u'ala*) which could be appropriate as the area was known to be the focus of sweet potato gardening, especially on the *kula*. In either case, the *heiau* has apparently been destroyed, or was never located, and there is very sketchy information about this structure. Review of McAllister's notes (O'ahu field notes, books I, II, III 1929-1930) revealed no additional information. Without structural or subsurface remains, the site is not eligible for the NRHP, although the hill itself can be considered to hold traditional value to modern Hawaiians as a former *heiau* site.

Williams et al. (1995) conducted a survey of the hilltop that the *heiau* was reported to be located on, and did not find any surface indications of its existence. The hilltop has been heavily modified by modern construction, and there is little or no potential for intact subsurface deposits. On the hill adjacent to the plotted location, however, they did find the remnant of a stone terrace facing (Site 4930), although the relationship of this, if any, to the *heiau* is unknown. It is possible, though, that McAllister plotted his site location on the wrong hill, and that Site 4930 is the remains of the *heiau* foundation.

3.2.2.3 Site 50-80-02-1043 Kawela Agriculture Terraces

Site 50-80-02-1043, the Kawela Agricultural Terraces, was apparently destroyed by Kahuku Plantation development (Rosendahl 1977), yet Rosendahl's reference is to Handy's (1940) description of Opana wherein he includes reference to McAllister's (1933:152) Sites 258 and 259. Site 258 is a fishpond located at Kawela Bay, while Site 259 is Waikane Stone and was not relocated. Apparently, the spring which sprang from Waikane Stone watered a group terraces at the base of the *pali* there. This land was apparently converted to sugarcane lands by Kahuku Plantation, and therefore, the terraces may in fact have been destroyed. No maps or illustrations of this site are available. Further inventory level survey is warranted, as subsurface resources may yet exist within the area, and the lower *pali* slopes (*kula*) may contain other features, such as habitation sites or sweet potato gardens (Handy 1940; Handy and Handy 1972). If other surface features or subsurface remains exist, they would be significant under NRHP criterion D for their information content.

3.2.2.4 Site 50-80-02-2358 Habitation Complex

Davis (1981) identified and described this site, which was found in a small swale on the slope within Opana approximately 250 m east-southeast of the U.S. Navy Satellite Communications (SATCOM) Facility (Figure 4). The site is part of a cluster of three sites (including Sites 2358, 2359, and 2360), which conform to traditional Hawaiian residential complexes, although Site 2358 may also have been occupied during the ranch or plantation era:

This is one of three sites located in a protected upland swale between turbine sites 10 and 11 in Opana. the swale trends generally from north to south (downhill), with the main ridge overlooking Kawela Gulch to the east and a hillock of lava outcropping on the west. The swale is about 45 m (130 ft) wide at the uphill end and opens onto a broad flat about 100 m (330 ft) downhill. The bottom of the swale is characterized by sheet-washed alluviums eroded from the surrounding higher ground.

The house site is built against the hill on the west side of the swale. Overall, it measures about 13 m north-south by 10 m east-west (43 by 33 ft) For the most part, the walls are mere low rubble facings along natural contours, dividing the site into four relatively distinct floor areas. The best of these unpaved floor areas, in the southeast quarter of the site, is roughly 4 by 5 m (13 by 16 ft) and stands about 60 cm (24 in) high at the downhill facing. From this level the other three floors step up and back 25 to 55 cm (10 to 20 in) high and blend into the natural slope behind the main floor.

No hearths or other non-portable features were observed on the surface, nor were prehistoric-type artifacts or other cultural refuse in evidence. Not including the

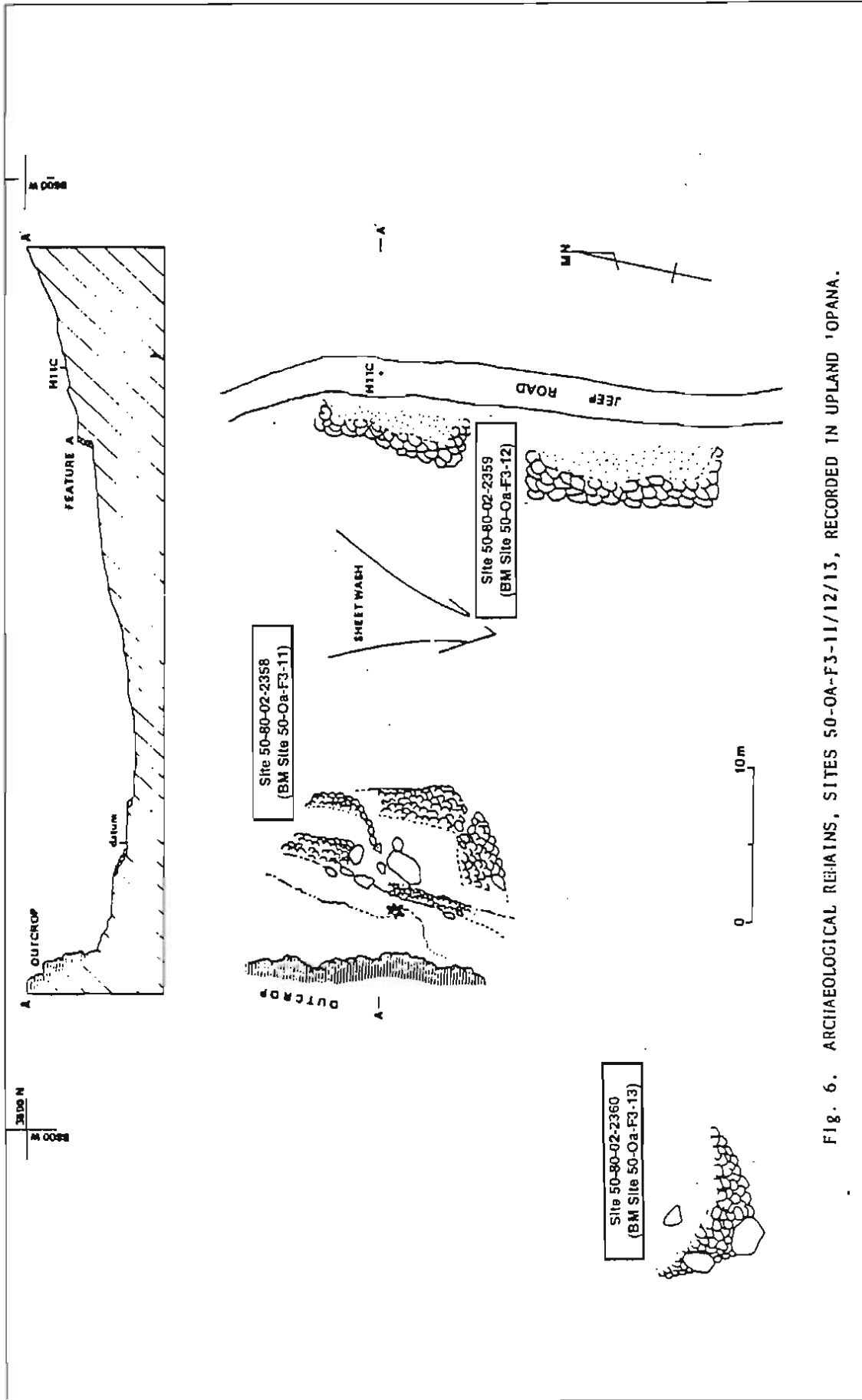


Fig. 6. ARCHAEOLOGICAL REMAINS, SITES 50-OA-F3-11/12/13, RECORDED IN UPLAND 'OPANA.

Sites 50-80-02-2358, 50-80-02-2359, and 50-80-02-2360 as Recorded by Davis in 1981
 (Source: Davis 1981:13; 85% Reduction of Figure 6)

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ubiquitous presence of military trash, however, a number of historic items were recorded. These items are as follows: one horse shoe, one sherd of recent Japanese or Chinese commercial ceramic ware, and four metal enamelware pots—one of which was stamped “Made in Germany”. [Davis 1981: 11-15]

This site was not relocated during the Williams et al. (1995) survey and apparently was destroyed during the Kahuku Windfarm development. No records of archaeological mitigation have been found. If surface features or subsurface remains exist, they would be significant under NRHP criterion D for their information content.

3.2.2.5 Site 50-80-02-2359 Two Habitation Terraces

Davis (1981) identified and described this site, which was found in a small swale on the slope within `Opana approximately 250 m east-southeast of the U.S. Navy SATCOM Facility (Figure 4). The site is part of a cluster of three sites (including Sites 50-80-02-2358, -2359, and -2360), which conform to traditional Hawaiian residential complexes:

This site has two adjacent features. Both are stone-faced terraces built against the east slope of the swale, opposite the house site. In contrast to the house site, these features were rather well constructed, with lave boulders and cobbles stacked to form relatively high straight facings along the downhill side. Feature A, on the north, is about 10.5 m (34 ft) long across the face and stands approximately 1.2 m (4 ft) high. Feature B is about 5 m (16 ft) to the south and measures 12 m (ft) long across the face by 1.4 m (4.5 ft) high. Both features have been partially buried by eroded materials from the slope behind and are cut across by a jeep trail. It is therefore difficult to determine the original width of the platforms, although 5 to 6 m (16 to 19 ft) seems a reasonable estimate. No other surface evidence was observed at this site. [Davis 1981:15]

This site was not relocated during the Williams et al. (1995) survey and apparently was destroyed during the Kahuku Windfarm development. No records of archaeological mitigation have been found. If surface features or subsurface remains exist, they would be significant under NRHP criterion D for their information content.

3.2.2.6 Site 50-80-02-2360 Terrace/Platform (Possible Ceremonial Structure)

Davis (1981) identified and described this site, which was found in a small swale on the slope within `Opana approximately 250 m east-southeast of the U.S. Navy SATCOM Facility (Figure 4). The site is part of a cluster of three sites (including Sites 50-80-02-2358, -2359, and -2360), which conform to traditional Hawaiian residential complex patterns:

This structure is a narrow stone-faced terrace built up on the hillside to the west of the swale and about 20 m (65 ft) to the south of the house site. Its elevated position affords an excellent view of the swale opening onto the broad lower flat.

This terrace is not as well constructed as Site F3-12 [Site 50-80-02-2359]. The high facing is of roughly stacked lava boulders, but the floor is paved with angular cobbles, 50 to 10 cm (2 to 4 inches) in diameter. Overall, the structure measures approximately 20 m long across the face, 10 m wide from the rear of the floor to the foot of the facing, and 3.5 m high at the center (965 by 33 by 11 ft). The paved floor area measures 20 by 4 m (65 by 13 ft). No other surface evidence was observed at this site. [Davis 1981:15]

This site was not relocated during the Williams et al. (1995) survey and apparently was destroyed during the Kahuku Windfarm development. No records of archaeological mitigation have been found. If surface features or subsurface remains exist, they would be significant under NRHP criterion D for their information content, and the terrace structure could be of religious significance to modern Hawaiians.

3.2.2.7 Site 50-80-02-2501 Hanakoa Platform

Site 50-80-02-2501, Hanakoa Platform, was first identified by Airman Richard R. Skelaney and two companions, while hiking. He reported the find to the Bishop Museum, and on February 3, 1970, Bishop Museum Archaeologist Peter Chapman inspected the site. After clearing the Christmas-berry (*Schinus terebinthefolius*) overgrowth, Chapman was able to make a sketch and record a brief description. His field notes state:

Flat deck revealed, about 4 by 7 m, upslope about a meter off the ground, and downslope about 2.5 m above the surface. Farther down slope, possibly two earlier levels of construction remain beneath the rubble collapse. Firm clean and slightly bulging wall on up valley, south side; heavy well-made wall or facing on north side about 2.5 to 3 m high. Quite massive. No other structure reported nearby, about 3000 ft from stream bed. Suggest burial from massive quality and isolation, but could be agricultural heiau. [Chapman February 3, 1970, site notes]

Subsequently, the State Historic Preservation Office conducted a statewide archaeological inventory and nominated the site to the National Register of Historic Places (NRHP), and the site was accepted and listed on the NRHP on August 14, 1973. On the NRHP nomination form the site was described as a burial platform, with no reference to Chapman's notes that state that his functional interpretations were just suggestions. The structural form, location, and setting of this platform are consistent with other sites determined to be agricultural heiau. This, coupled with Chapman's indication that "further downslope, possibly two earlier levels of construction remain beneath the rubble collapse" (Chapman 1970) suggests this intact platform is but a portion of a larger site that is in deteriorated condition. The present functional designation for this platform is unconfirmed; further research at this site may help determine its actual function. This site is of traditional religious significance to modern Hawaiians. The detail of recording on the 1973 NRHP

Form is not consistent with today's standards and minimum requirements for site recording. This NRHP site should undergo archaeological inventory survey and recording.

3.2.2.8 Site 50-80-02-9506 Kea`aalu Ditch

Rosendahl (1977) identified and briefly recorded this site information:

Site 50-80-02-9506, Kea`aalu Ditch, Located in Kea`aalu Gulch, UTM coordinate FJ06069544, Stone-faced Irrigation Ditch, Historic Period origin [plantation irrigation?], poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Data recording was limited to the above description and a photograph. More detailed and complete recording of this site should be undertaken. Based on the recorded data, the site may be eligible for the NRHP under criterion D.

3.2.2.9 Site 50-80-02-9507 `O`io Stream Terrace (Agricultural Terrace?)

Rosendahl (1977) identified and briefly recorded the following site information:

Site 50-80-02-9507, Oio Stream Terrace, located in East Oio Gulch, UTM coordinate FJ04209788, Agricultural? terrace, Prehistoric or Historic Period origin undetermined, poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Data recording was limited to the above description and a photograph. More detailed and complete recording of this site should be undertaken. Based on the recorded data, the site is eligible for the NRHP under criterion D.

3.2.2.10 Site 50-80-02-9508 East `O`io Gulch Platform (Stepped Stone Platform)

During his survey, Rosendahl (1977) identified and briefly recorded this site information:

Site 50-80-02-9508, East Oio Gulch Platform, located in East Oio Gulch, UTM coordinate FJ04209788, Stepped Stone Platform, Prehistoric or Historic Period origin undetermined, poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Data recording was limited to the above description and a photograph. More detailed and complete recording of this site should be undertaken. Based on the recorded data, the site is eligible for the NRHP under criterion D.

3.2.2.11 Site 50-80-02-9509 `O`io Gulch Complex (Agricultural Terraces)

Rosendahl (1977) identified and briefly recorded this site information for `O`io Gulch Complex:

Site 50-80-02-9509, Oio Gulch Complex, located in Oio Gulch, UTM coordinate FJ04049802, agricultural terraces, Prehistoric or Historic origin undetermined, Poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Data recording was limited to the above description and a photograph. More detailed and complete recording of this site should be undertaken. Based on the recorded data, the site is eligible for the NRHP under criterion D.

3.2.2.12 Site 50-80-02-9517 Kanealii Agricultural Structures (Irrigated Agricultural Terraces)

Site 50-80-02-9517, Kanealii agricultural terraces, were described by Handy (1940:88) and assigned a State Site number by Rosendahl (1977:Table 5):

Waialea. There is a small group of terraces formerly known as Kanealii, now abandoned for lack of water, around the house of Mrs. John Baker, just east of the Boy's Industrial School and inland of Kamehameha Highway. The large terraces now cultivated seaward of the Industrial School are of recent construction. [Handy 1940:88]

Rosendahl (1977:Table 5) indicates the temporal origin of these terraces is in question, and further indicates the site is destroyed. No maps or illustrations of this site are available. Further archaeological investigation in this area is warranted as remains of the site may still exist. If any remains of the site do exist, they may be eligible for the NRHP.

3.2.2.13 Site 50-80-02-4881 Octagonal Concrete Slab (Military)

Williams et al. (1995:57-58) identified and described this site (Figure 5) in the following manner:

This site is an octagonal concrete slab located on the lower Oio Gulch eastern ridge top. This site is located on a narrow ridge approximately 2.0 m from the edge of the gulch's eastern wall. The site is under a growth of ironwood, which is the dominant vegetation in the area. The vegetation in the immediate site area is comprised of predominantly vines and some isolated young Christmas berry. A north-south foot trail, about 2.0 m east of the feature, extends to the north edge of the ridge. Several rectangular-shaped fox-holes excavated for Army training are located in the surrounding area.

The concrete slab is octagonal in shape, and measures 4.15 m in diameter, and 0.17 m thick. There are eight small square holes corresponding to each of the eight corners to be post holes. Based on the size of these cavities, the structural posts were of 4"x 4" square wooden posts. A set of concrete stairs, two steps high, is located on the west side of the slab indicates that the structure was oriented at a westerly direction with its entrance towards the gulch. A concrete pedestal, measuring 0.37 m high and 0.40 m wide, is located in the middle of the feature. This site appears to have been the foundation for a ranging or targeting station.



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Site 50-80-02-4881 Octagonal Concrete Slab

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The octagonal concrete slab is likely to be a military observation post, although its association with World War II is not known. This site is not considered eligible for listing on the NRHP.

3.2.2.14 Site 50-80-02-4882 Military Bunker

This site was identified and described by Williams et al. (1995:58):

Site 4882 is a concrete bunker located on the slope below the radio towers on the east side of `Ō`io Gulch. This site is located upslope from the Kahuku cattle farm, and is about 300 feet above sea level. This single feature is surrounded by a dense growth of *koa haole*, Christmas berry, with an undergrowth of dense grass and vines. The surrounding topography is very rugged and extremely rocky. A rock quarry on the slope, west of the bunker, was used in quarrying materials for the feature's floor.

The bunker is a concrete rectangular structure with cemented rock walls along the front (seaward side). These walls are mostly of cobbles with small boulders, a single rock wide and several courses high, with highest portion at the northwest corner. A wall similar to this forms the west wall of the bunker. A second sloping rock wall below the bunker serves as a supporting foundation for the upper wall.

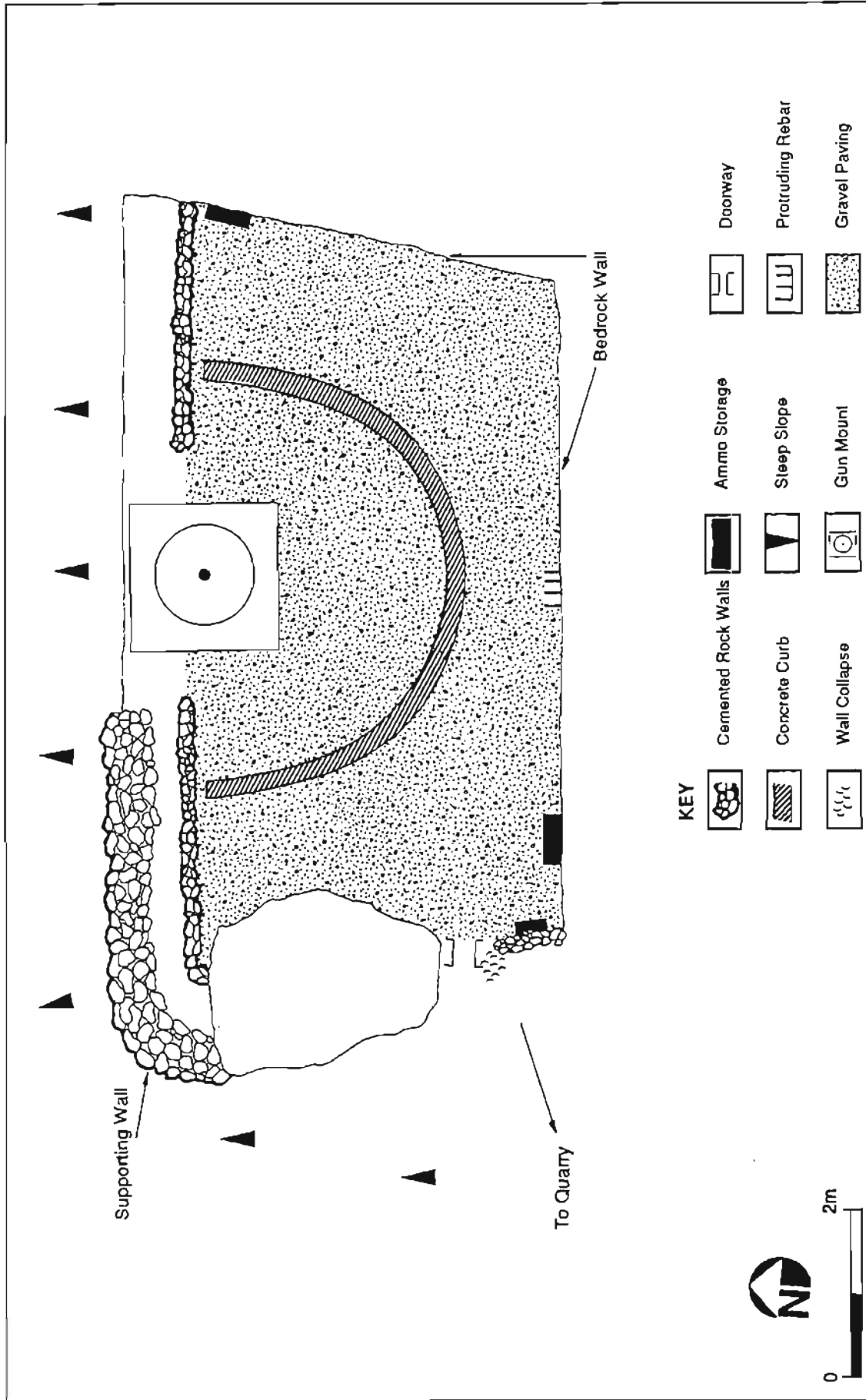
The bunker measures 8.7 m by 4.5 m and is widest on the *makai* side. The floor is of quarried gravel. A semi-circular concrete curb is directly behind the doorway and a gun mounting platform is directly in front of it. The curb measures 0.15 m high and it extends the length of the feature's *makai* opening. There are three intact metal built-in ammo storage cabinets in the bunker. One of these is located near the northeast corner, and two are side-by-side near the southwest corner. These ammo cabinets are now rusting. Several metal rebars protrude out of the south wall directly behind the main opening. With the exception of some collapsed portions on west and the northwest walls, the feature is in very good condition.

The bunker is associated with World War II era coastal defenses, and is significant under criteria A and D of the NRHP. This bunker is depicted in Figure 6.

3.2.2.15 Site 50-80-02-4883 Plantation-Era House Site

Williams et al. (1995:60-67) identified and described this Plantation-Era House Site in the following manner:

Site 4883 is a post-Contact residential site located on the east side of the KTA Access Road. The site is adjacent to the Department of Energy (DOE) and National Atmospheric and Space Administration (NASA) Experimental Wind Turbine. Most of the features observed are still intact, although some have minor damage due to erosion. The site is currently under dense hau (*Hibiscus tiliaceus*) and Christmas berry.



FIGURE

Plan Map of Site 50-80-02-4882

6



There are fourteen features at the site. These include two walls, two small paved terraces, one small platform, two earthen depressions, one concrete paved terrace, two stone faced terraces, one U-shaped feature, two rock alignments, and one rock linear mound.

Site 4883 appears to be a plantation-era homestead, based on the architectural characteristics and surface artifacts present (Figure 7). It is significant under NRHP criterion D, as it is likely to yield information on the history of the area.

3.2.2.16 Site 50-80-02-4884 Imu (Cooking Hearth) Site

Williams et al. (1995:67-71) recorded this site, located in the upper portion of `Ōio Gulch below the Kahuku Range Control facility (Figures 8-9). The site is about half-way up on the gulch's north wall, on a steep slope dominated by ironwood, Christmas berry, strawberry guava, common guava, octopus trees, `ohia lehua, ferns, and other species.

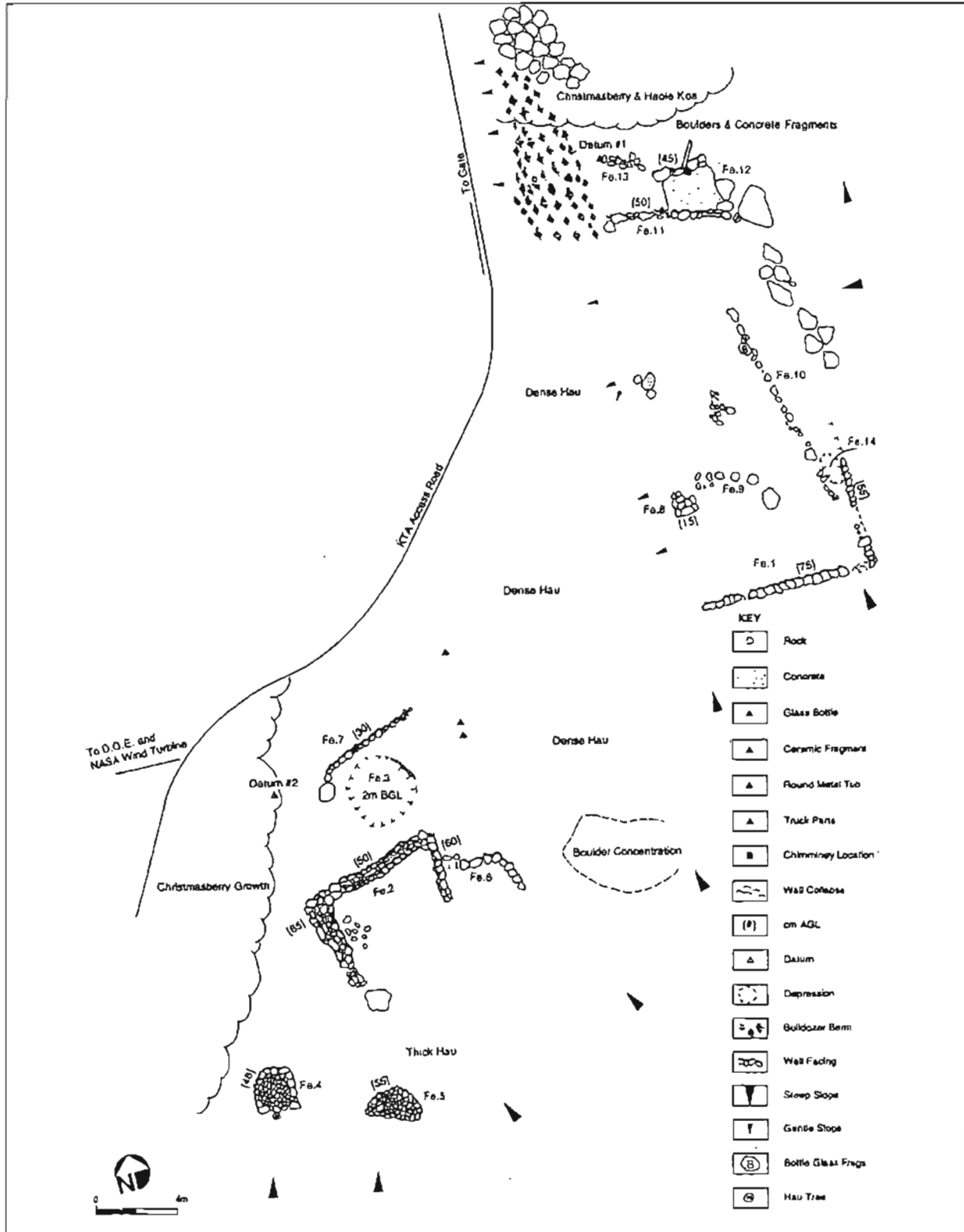
The site consists of a single *imu* (earth oven) on a small, circular man-made level area measuring 3.0 m in diameter. A single 0.5 m by 0.5 m was excavated at the site. It was estimated that only about a third of the feature was exposed. The *imu* is estimated to be about 1.0 m in diameter, based on the portion excavated.

This site has been recorded, excavated, and radiocarbon and soils samples have been collected and analyzed, generating baseline site information. It should be noted, however, that this is one of the few sites found and studied in the upland area, and the extent of excavation was minimal. Additional subsurface resources may be present in the area. This site is significant under NRHP criterion D, because it has yielded and is likely to yield additional information about traditional Hawaiian activities in the area.

3.2.2.17 Site 50-80-02-4885 Pahipahialua Heiau

Williams et al. (1995:71-77) identified and described Pahipahialua Heiau in the following manner:

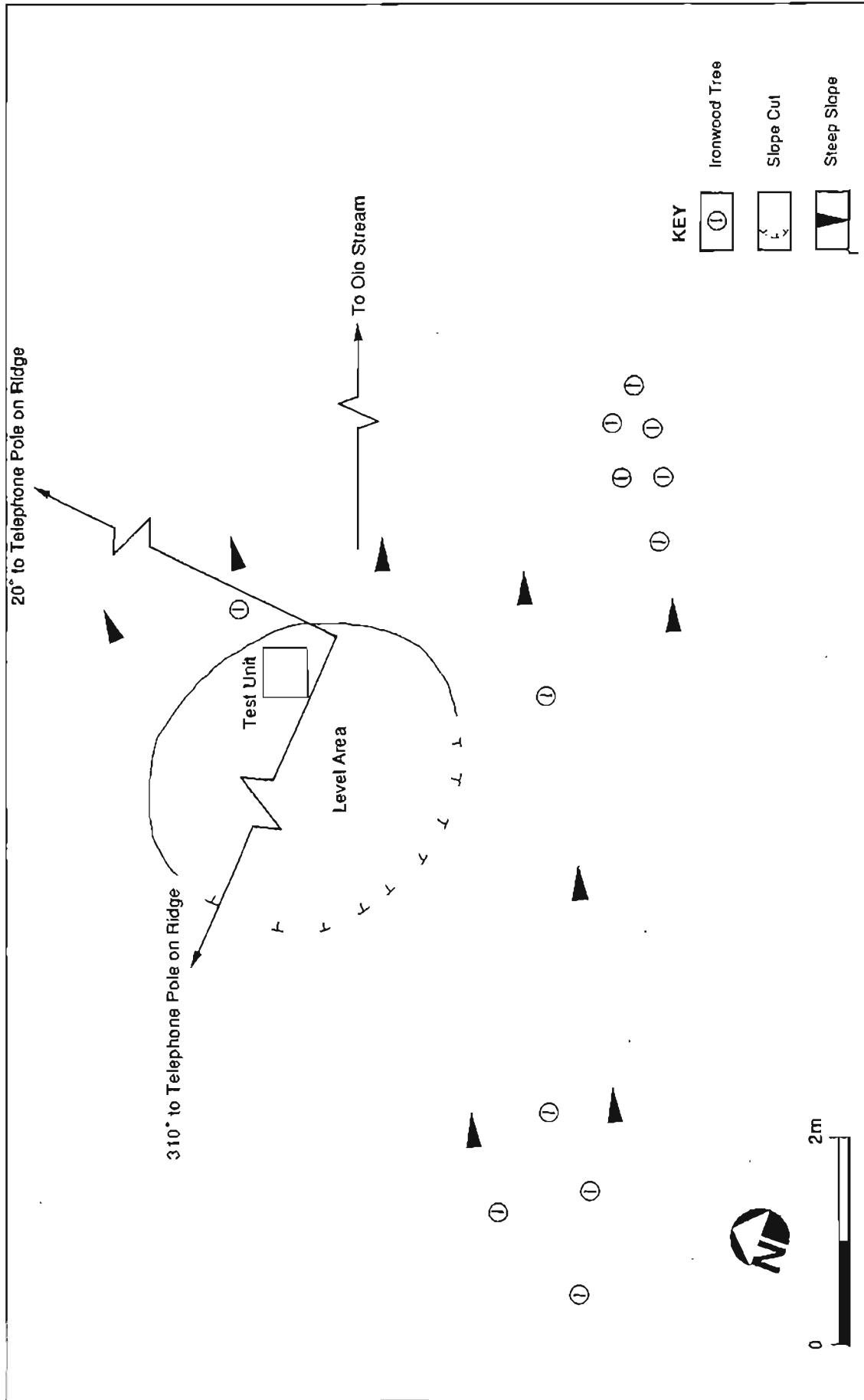
Site 4885 is a religious structure (*heiau*) located at the mouth of Pahipahi`ālua Gulch just inside of the KTA north boundary fence line. The site is at the edge of agricultural land adjacent to Kukaimanini Beach Park. The site consists of a rock platform and several terraces on the upslope side of the platform (Figures 10-11). Several post-Contact features, including a concrete trough and a stone-lined ditch are located just *makai* (seaside) of the project boundary. These features are probably remnants from the plantation era, and were not recorded since they are outside the project area.



FIGURE

OGDEN Plan Map of Site 50-80-02-4883 Plantation Era Residence

7

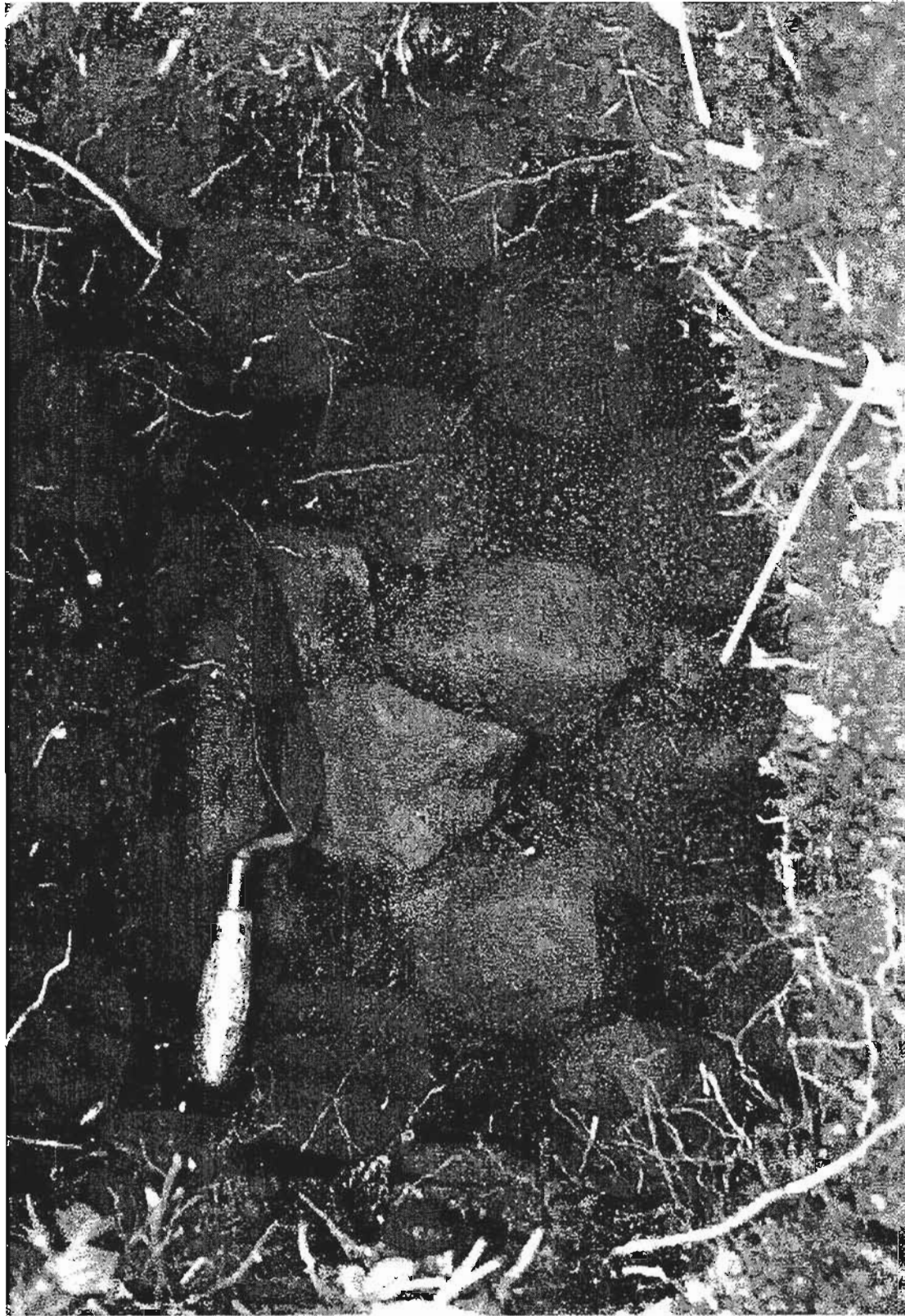


FIGURE

Plan Map of Site 50-80-02-4884 Imu

8





FIGURE

9

Site 50-80-02-4884 Top of Imu

OGDEN
■■■■



FIGURE

10

Plan Map and Profile of Site 50-80-02-4885 Phipahialua Heiau





FIGURE

11

Site 50-80-02-4885 Pahi-pahialua Heiau

OGDEN
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The recording of the site focused primarily on the *heiau* platform. This feature measures 17.0 m long by 12.0 m wide, and is 1.4 m at its highest point. The feature is composed of subangular and subrounded large and small boulders, cobbles and some pebbles. Although the original architecture of the feature is difficult to discern, portions along north and the south sides show stacking. The rest of the feature has tumbled, probably due to disturbance by cattle and vegetation. An earthen pathway in the middle of the feature extends from the southeast end to approximately 2.5 m from the west end. There are two rock-lined depressions on north side of the pathway, in the central area of the *heiau*. A small platform, roughly 2.0 m on each side, is located at the northeast corner of the platform and is faced with subangular small boulders, with a pavement of waterworn gravels and pebbles. Branch coral fragments are scattered throughout the *heiau* platform, but more so along the north and southwest sides.

The *heiau* and associated terraces at Pahipahialua Gulch is the most prominent pre-Contact site encountered during the Williams et al. (1995) reconnaissance survey. The unexpected discovery of the *heiau* at Pahipahialua Gulch demonstrates better archaeological site preservation in the shoreward periphery of KTA than thought previously, especially along the foothills of the bluff. Most of this area, however, is located outside of the KTA. This site is significant under NRHP criteria A, C, and D. It is exemplary of traditional Hawaiian cultural occupation and architecture, and has yielded and is likely to yield information important to our understanding of traditional Hawaiian culture and prehistory. In addition, this site is a type that maintains strong traditional cultural value to modern Hawaiians.

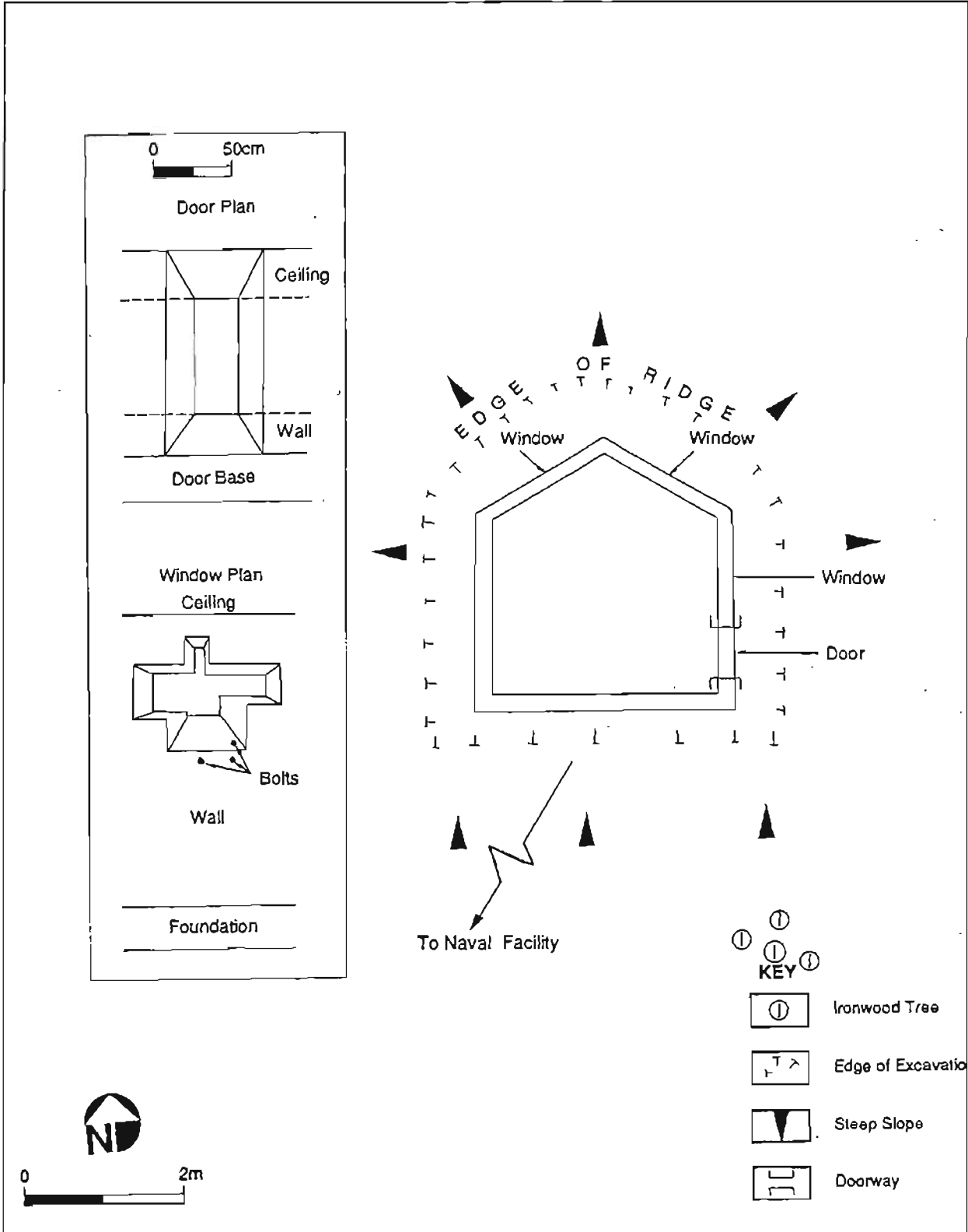
3.2.2.18 Site 50-80-02-4886 Pentagonal Military Bunker

A Pentagonal Military Bunker was identified by Williams et al. (1995:77) and described below:

Site 4886 is a small (3.5 m by 3.0 m) five-sided World War II bunker located at the edge of the ridge between Kawela and Pahipahi`ālua Gulches. It is directly north of the Naval Facility above Kawela Bay. The bunker is in a circular pit that was excavated into the natural bedrock on top of the bluff. It is barricaded by the unexcavated bedrock. The roof of this feature is elevated just above the lowest portion of the pit.

The bunker has a single entry-way, and three windows. The door and one window are on the east side, and the other two windows are on either side of the V-shaped wall at the *makai* end. The door measures 1.23 m tall and 0.61 m wide. The interior measures 3.25 m by 2.45 m, and is 1.23 m high. The walls are 0.3 m thick. All the windows are cross-like in shape, and measure 0.91 m by 0.35 m at the widest points..

The bunker (Figures 12-13) is associated with World War II era coastal defenses, and is significant under NRHP criterion A and D for its association with the war and informational content.



FIGURE

OGDEN
■■■■■

Plan Map of Site 50-80-02-4886

12



F I G U R E

13

Site 50-80-02-4886 Pentagonal Military Bunker

OGDEN
■■■■

3.2.2.19 Site 50-80-02-4887 Habitation Complex With Related Agricultural Features

Williams et al. (1995:77, 80-84)) identified and described this Habitation Complex (Figure 14) as follows:

Site 4887 is located between Kaunala and Waiale'e Gulches. The site is approximately 150-200 m southeast of the Alpha Gate (A1), and is about 70-80 m east of the access road.

The site is a complex of terraces and associated features located on the northeastern side of a shallow gully, one ridge over on the eastern side of A1 Gate. It is on the talus slope near the edge of the bluff, northwest of an Army staging area located approximately 400 m to the southeast. The site is on a rugged talus slope that consistently slopes towards the northwest. A narrow intermittent stream is located west of the terraces, and may have been the water source for these terraces.

A total of eleven features were recorded during the reconnaissance survey in the area. These include five terraces, one rock alignment, two circular alignment, one depression, one enclosure, and one boxed C-shape structure.

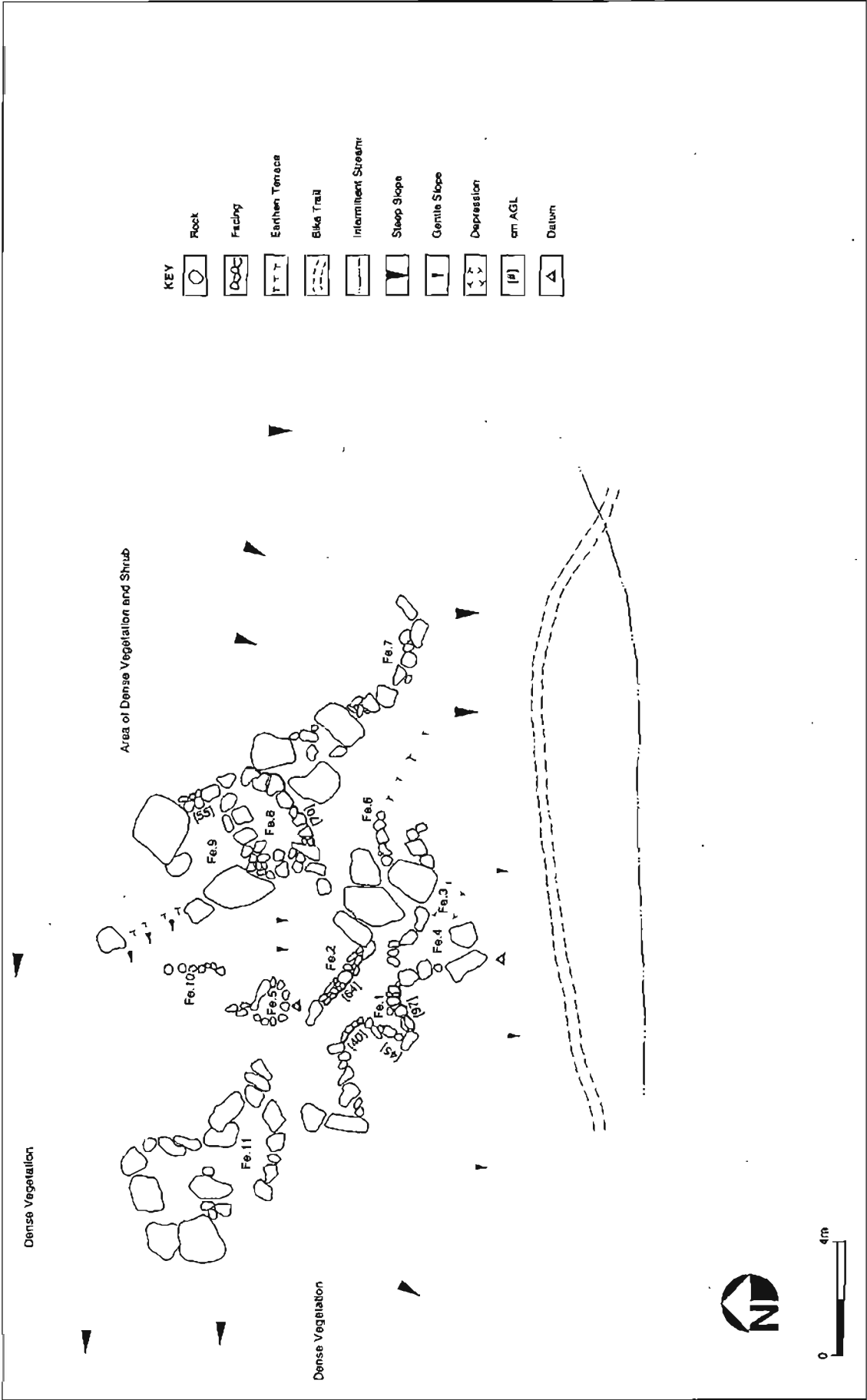
Site 4887 is interpreted to be a residential site, based on the features encountered, and probably dates to the pre-Contact or early post-Contact period. Concentrations of boulders are modified and are incorporated in the construction of most features. Feature 9 is thought to have been a house location. Feature 1 appears to be a ramp leading up to Feature 2, and eventually into Feature 9. Feature 8 is a possible animal pen based on its size and shape.

This site is significant under NRHP criterion D, because it has yielded and is likely to yield additional information about traditional Hawaiian activities in the area.

3.2.2.20 Site 50-80-02-4888 Earthen Depressions, Rock Alignment (Agricultural)

Williams et al. (1995:85) identified and described this site:

Several small depressions are present along the northwest slope, and a larger depression is located at the northeast end of the knoll. The smaller depressions measure 0.7 to 1.0 m in diameter, and 0.05 m or less deep. The larger depression measures 4.2 m long by 3.2 m wide, and it is about 0.5 m at its deepest point. A sizable charcoal scatter is present at the northeast side of the pit. This feature is thought to be an *imu*, but was not tested. The smaller depressions are suspected to have resulted from agricultural activities, most likely bananas. This assumption is based on the presence of banana trees nearby, and their similarity to features elsewhere in the island (Williams et al. 1995). A short boulder alignment (2.0 m long) at the edge of the false staghorn fern growth on the southwest slope is a possible slope retention.



FIGURE

14

Plan Map of Site 50-80-02-4887

OGDEN

Two 0.5 m by 0.5 m shovel probes were excavated in two of the smaller depressions to determine the presence or absence of cultural remains. The excavation was done following the natural stratigraphy and the excavated matrix was not screened. Both of the excavations revealed sparse charcoal flecking; none of the material was collected, and the units were terminated at 30 cmbs.

This site is significant under NRHP criterion D, as it is likely to yield information important to the history and prehistory of the area.

3.2.2.21 Site 50-80-02-4930 Linear Rock Mound (Undetermined Origin Or Function)

A Linear Rock Mound (Figure 15) of undetermined origin or function was identified by Williams et al. (1995:86, 87) and is described as follows:

Site 4930 is a linear rock mound or facing located on the east side of the hill that is of the hill containing the Army Radio Communication Towers. A small building bearing a sign "COMMON BUILDING" currently occupies the summit of the ridge. The portion of the ridge north of the building has been leveled in the past off and is currently under gravel paving.

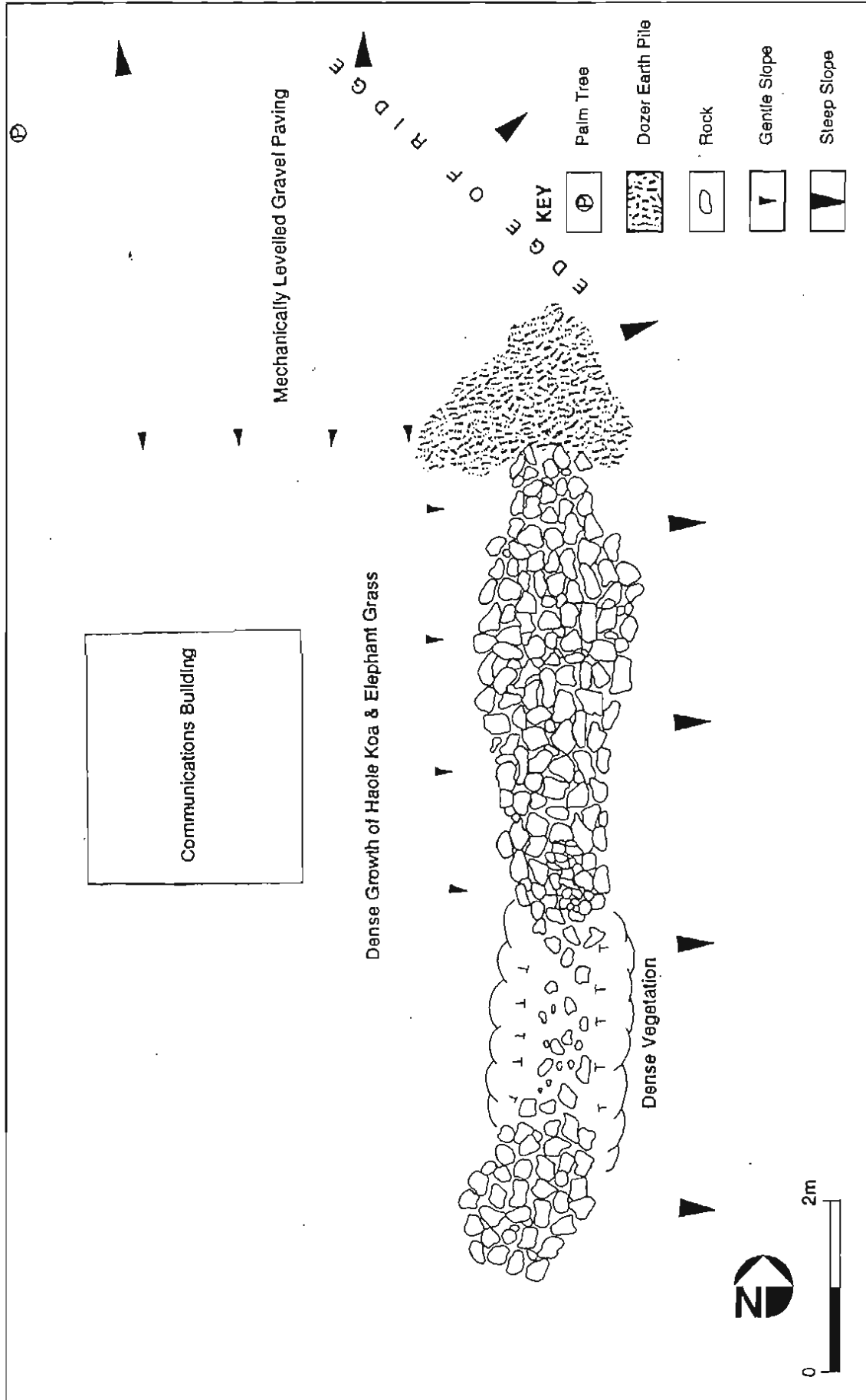
This single feature site is located directly east of the building and is covered with dense elephant grass (*Pennisetum purpureum*), *koa haole*, vines, and other weeds. The feature consists of roughly stacked, small, rounded to subrounded boulders and cobbles extending into a large dirt mound at the north end. This mound covers the north end of the feature. This feature measures 7.0 m long and 2.0 m at the widest point.

Given that the area has been greatly disturbed, it is impossible to ascertain site boundaries, functions, or site age. However, given its proximity to the area marked by McAllister (1933) as the location of Puu'ala Heiau, this site can be considered as possible remains of this site. Further work is necessary to determine this feature's function.

The function and temporal origin of this feature are currently unknown; further recording and testing would be required to determine these. Due to the potential the site has to be a pre-Contact feature, possibly associated with Pu'u'ala Heiau. The site is significant under criterion D of the NRHP.

3.2.2.22 Site 50-80-02-0599 Punamano Communication Station

Site 50-80-02-0599 is the location of the former Punamano Communication Station. During archaeological reconnaissance of the area three World War II era bunkers in "excellent condition" were recorded by Farrell and Cleghorn (1995). Farrell and Cleghorn concluded that these bunkers are potentially eligible for inclusion in the National Register of Historic Places under Criteria A and C.



FIGURE

15

Plan Map of Site 50-80-02-4930

OGDEN

3.2.2.23 Site 50-80-02-9745 `Ōpana Mobile Radar Site

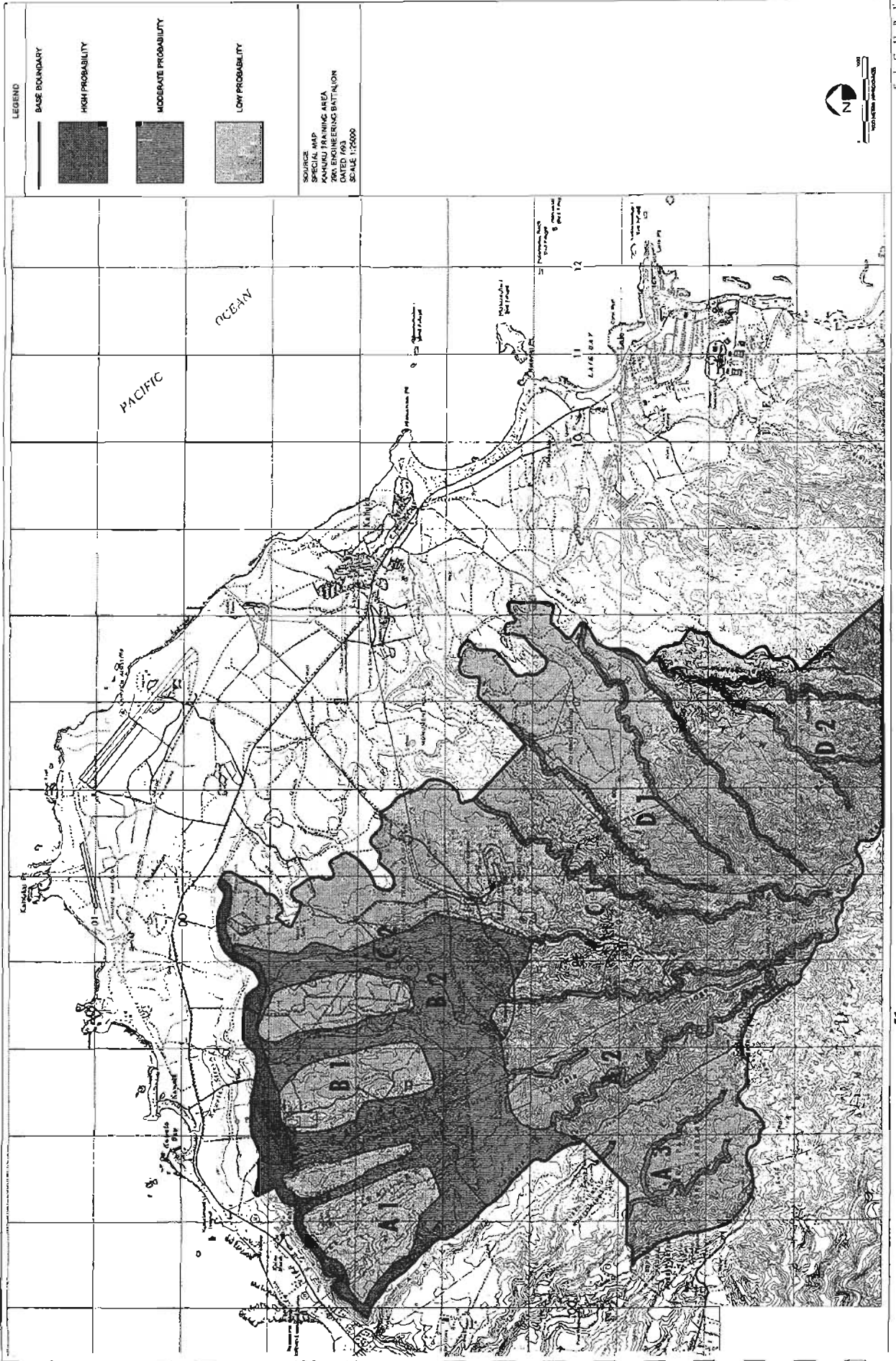
Site 50-80-02-9745, is the location of a former World War II era mobile radar station that was set on the ridge seaward of the current U.S. Navy SATCOM station. It is on the Hawaii Register of Historic Places (HRHP; 6/2/90), the NRHP (9/19/91), and is a NHL (4/19/94). This site is within the Kahuku Training grounds and is under U.S. Army jurisdiction. The `Ōpana Mobile Radar Station (Site 50-80-02-9745) played a critical role in the outbreak of the war. Located near Kahuku Point on the northern tip of O`ahu at 230 feet above sea level, the `Ōpana site was one of six Army radar stations established along O`ahu's coastline in the November 1941. While at the `Ōpana site on December 7, 1941 at 0702 hours, Privates Joseph L. Lockard and George E. Elliott observed more than fifty planes bearing down on the island from approximately 130 miles to the north. Within the hour, Japanese planes attacked Pearl Harbor, an event which plummeted the United States into war. `Ōpana is significant as the site where radar was utilized for the first time in a combat situation by the United States (U. S. Dept. of Interior 1991). The site is also significant because this tragic communication error prompted the development of more efficient early warning systems, including the eventual establishment of the U.S. Navy SATCOM Station near the former location of Site 50-80-02-9745.

It is important to note that Site 50-80-02-9745 is a landmark, and that there are no extant structural remains located there. This site is more or less a commemorative entity, designated because of the significance of events which occurred there and elsewhere on O`ahu on December 7th, 1941.

3.3 AREAS OF ARCHAEOLOGICAL PROBABILITY

Only a small percentage of Kahuku Training Area has undergone archaeological investigations to identify archaeological sites. Archaeological and historical resources may be present in areas that have not yet been surveyed. Based upon the results of previous archaeological investigations at Kahuku Training Area, settlement patterns, and historical references a model of probability for archaeological and historical resources is presented in Figure 16.

Areas which maintain a low probability for archaeological and historical resources at Kahuku Training Area would be portions of the training area which has been heavily impacted by either erosion or past destructive activities such as sugar cane cultivation. In such areas, it is unlikely that archaeological and historical resources exist.



Areas which maintain a moderate probability for archaeological and historical resources would be along the stream lined gulches and the lower cultivable flatlands. Archaeological sites expected in these areas would be associated with both irrigated and dryland agriculture, and either permanent or temporary habitation.

Areas which maintain a high probability for archaeological and historical resources would be those portions of Kahuku Training Area that are closest to the coast, and therefore, possibly contain permanent habitation deposits, and religious sites.

4.0 LAND USES, POTENTIAL THREATS, AND REGULATED ACTIVITIES

This section outlines how the land of KTA is utilized, and what activities pose potential and identified threats to archaeological and historical resources in the area.

4.1 LAND USES, USER GROUPS, AND AREAS

Of the 9,398 acres that comprise Kahuku Training Area, 25 acres are owned in fee, 18 acres in Easement, and the remainder of the area is leased. Two parcels of 7,850 and 355 acres are leased from the Campbell Estate. The remainder 1,150 acres are leased from the State of Hawaii.

4.1.1 Military Uses Of Kahuku Training Area

The Kahuku Training Area is used for tactical maneuver training, including mountain and jungle warfare with fixed and rotary wing aircraft. Of the 9,295 acres which comprise the Kahuku Training Area, only about 4,596 acres in the northern portion are considered suitable for maneuvers because of the rugged terrain in the southern areas. These areas are utilized for company sized units and smaller, but is considered marginal for battalion sized operations.

4.1.1.1 Restrictions in Kahuku Training Area

Restrictions to the training activities at Kahuku Training Area have been established by Range Control Hawaii. These restrictions are as follows:

- Only blank ammunition is allowed at KTA. Live fire, tracer ammunition, incendiaries, and explosives are prohibited.
- Pyrotechnics may be utilized if requested 30 days in advance of the training date, however aerial pyrotechnics are restricted.

- Excavation must be requested 30 days in advance of the training date.
- Portable latrines are required at a ratio of one latrine per 25 soldiers.
- Training activities are restricted within 150 meters of the wind turbines.

4.1.2 Non-Military Recreational Uses Of Kahuku Training Area

The Army has assigned alpha-numeric designations to all sections of KTA. These sections are indicated on Figures 2-3. Currently, sections of Area A1 and all of A3 are publicly utilized on holidays and weekends for recreational purposes. Pupukea Loop Trail in Section A3, and a motocross course at the *mauka* (toward the mountain) end of A1 are most commonly used.

4.2 IMPACTS AND POTENTIAL THREATS TO ARCHAEOLOGICAL AND HISTORICAL RESOURCES

This section provides information on the impacts, potential threats, and identified threats to archaeological and historical resources at Kahuku Training Area.

4.2.1 Potential Threats To Archaeological and Historical Resources

Potential threats to historic and cultural resources are generally characterized as any ground-disturbing or vegetation clearance activity such as the following:

1. Facilities development (site grading and improvements)
2. Underground utilities construction
3. Hazardous waste remediation
4. Insertion of utilities poles or posts
5. Vegetation grubbing
6. Landscaping
7. Unauthorized excavation of archaeological sites
8. Soil investigations
9. Operation of vehicles in unpaved areas (off-road vehicles)

10. Soil contamination
11. Recreational activities
12. Explosive detonation
13. Pedestrian human or animal activity

4.2.2 Identified Threats to Archaeological and Historical Resources

While all of the above activities pose potential threats to cultural resources at Kahuku Training Area, some specific threats to resources have been identified in the area.

The Kahuku Training Area has been subjected to various topographic alterations and modifications over the years. These included conversion of the traditional landscape (upland forest and dryland fields) to facilitate livestock pasturage, sugar, pineapple, and diversified plantation agriculture, and its current use as a training area by the U.S. Army.

4.2.2.1 Erosion

Numerous asphalt, gravel, and dirt roads traverse ridges and gulches throughout the project area. Foot trails, jeep trails, and fox holes are common features. Area A1 contains the most extensive road and trail system, as it is the focus of the most activity. Erosion in this part of KTA is very extensive. In addition to the issues under discussion, cattle are still roaming freely in the mid-section of Area C1. The ground cover in this area is depleted, thus opening it to erosion.

4.2.2.2 Off Road Vehicle Activity

The most destructive threat to archaeological and historical resources identified at Kahuku Training consisted of the use of motocross bikes and off road vehicles. During a brief site inspection evidence of off road vehicle usage was very apparent. This type of activity promotes erosion and damages both surface and subsurface archaeological deposits.

4.2.2.3 Unauthorized Excavation

The unauthorized excavation of archaeological sites is a serious problem. Once an archaeological site has been excavated, its potential to yield contextual information is destroyed. During a brief site visit, excavated (and unfilled) foxholes were observed. Some of these occurred in areas where there is a high probability for archaeological and historical resources to exist.

In addition to the excavation of numerous foxholes in Kahuku Training Area, excavated areas for latrine use were also observed during a brief site inspection. In these areas, holes had been excavated where human waste and toilet paper were deposited. The presence of human waste attracts feral animals, and evidence of further disturbance by such animal activity was apparent.

4.2.2.4 Removal of Basalt Stones

The utilization of basalt stones to create “hasty fortifications” was also observed. The removal of basalt stones from archaeological features is a very serious threat, may alter the site so completely that it will be unrecognizable. Some archaeological sites located at Kahuku Training Area (Pahipahialua Heiau) are comprised almost entirely of basalt. Removal of stones from such resources is extremely detrimental.

4.2.2.5 Litter Accumulation

Litter accumulation also presents a threat to archaeological and historical resources. The main source of litter observed at Kahuku Training Area consisted of MRE packaging. The mere presence litter serves to destroy the integrity of the site, but more destructive results are also possible. The presence of food packaging is attractive to feral animals especially to feral pigs whose rooting activities can be very destructive to archaeological sites.

4.2.2.6 Looting

During the Williams et al. study, evidence of looting in a rock shelter just outside the boundary of Kahuku Training Area was observed. While this particular incident did not occur within the Training Area boundaries, it is very likely that similar incidents have occurred within KTA itself. Looting is extremely detrimental to archaeological and historical resources, where archaeological context is destroyed and archaeological data are removed.

4.3 REGULATED ACTIVITIES AND EXEMPTIONS

4.3.1 Regulated Activities

As outlined in Sections 4.2.1 and 4.2.2, regulated activities at Kahuku Training area may pose a threat to archaeological and historical resources in the area. Actions that constitute these threats are as follows:

1. Military training activities including excavation (foxhole and latrine) in areas with known or potential archaeological resources.

2. Potential development of training facilities or infrastructure (including buildings, combat courses, roads, etc.) at Kahuku Training Area.
3. Recreational activities by non-military personnel granted weekend use of portions of Kahuku Training Area.

4.3.2 Routine Activities Exempted From Regulation

Certain routine activities do not pose potential threats to archaeological and historical resources at Kahuku Training area, and are therefore exempted from regulation. These routine activities include the following:

1. Any areas that have been previously landscaped may be maintained by basic landscaping maintenance such as tree trimming, grass mowing, etc.
2. Any areas that have been previously paved such as roads, parking areas, and paths may be repaved or resurfaced provided that heavy equipment is restricted to previously paved or disturbed areas.
3. Maintenance or repair to pre-existing military facilities, that are not historically significant, including buildings, water, sewer, telephone, gas, and electric utilities. These activities may be exempted providing that previously undisturbed areas are not disturbed in the process.

4.3.3 Waiver of Responsibilities Under Emergency Conditions

According to Department of Interior Regulations 36 CFR § 78, Federal Agency Responsibilities can be waived in whole or part in the event of a major natural disaster or an imminent threat to national security.

Major Natural Disaster means any hurricane, tornado, storm, flood, high water, tidal wave, earthquake, volcanic eruption, landslide, snowstorm, fire, explosion, or other catastrophe, in any part of the United States which, in the determination of a Federal Agency Head, causes damage of sufficient severity and magnitude such that an emergency action is necessary to the preservation of human life or property, and that such emergency action would be impeded if the Federal Agency were to concurrently meet its historic preservation responsibilities under section 110 of the National Historic Preservation Act, as amended.

Imminent Threat to the National Security means the imminence of any natural, technological, or other occurrence which, in determination of a Federal Agency

Head, because of its size or intent, seriously degrades or threatens the national security of the United States such that an emergency action would be impeded if the Federal Agency were to concurrently meet its historic preservation responsibilities under section 110 of the National Historic Preservation Act, as amended (36 CFR §78.2).

In the event of natural disaster or imminent threat to national security, the Commander of Kahuku Training Area shall forward information regarding the situation through Army Chain of Command to the Secretary of Defense:

1. The major natural disaster or imminent threat to the national security necessitating the waiver and the emergency action taken;
2. The period of effect of the waiver;
3. Which provisions of section 110 have been waived
4. The geographic area to which the waiver applies; and
5. The measures and procedures used to avoid or minimize harm to historic properties under the conditions necessitating the waiver (36 CFR §78.4)

Upon receiving the information, the Secretary of Defense must decide to waive Section 110 responsibilities as outlined in 36 CFR §78.3:

- (a) When a Federal Agency Head [Secretary of Defense] determines, under extraordinary circumstances, that there is an imminent threat of a major natural disaster or an imminent threat to the national security such that an emergency action is necessary to the preservation of human life or property, and that such emergency action would be impeded if the Federal Agency were to concurrently meet its historic preservation responsibilities under section 110 of the Act, that Federal Agency Head may immediately waive all or part of those responsibilities, subject to the procedures set forth herein and provided that the agency head implements such measures or procedures as are possible in the circumstances to avoid or minimize harm to historic properties.
- (b) Waiver under §78.3 (a) shall not exceed the period of time during which the emergency circumstances necessitating the waiver exist.
- (c) In no event shall a Federal Agency Head delay an emergency action necessary to the preservation of human life or property for the purpose of complying with the requirements in section 110 of the Act (36 CFR §78.3)

The Secretary of Defense shall then notify the Secretary of the Interior, within 12 days of the effective date of the waiver. The notification shall be in writing and should identify the following:

- 1) The major natural disaster or imminent threat to the national security necessitating the waiver and the emergency action taken;

- 2) The period of effect of the waiver;
- 3) Which provisions of section 110 have been waived
- 4) The geographic area to which the waiver applies; and
- 5) The measures and procedures used to avoid or minimize harm to historic properties under the conditions necessitating the waiver (36 CFR §78.4).

The Secretary of the Interior, will then review the waiver, as outlined in 36 CFR §78.5 below:

- (a) If the Secretary considers that all or part of the agency's decision as outlined under §78.4(a) is inconsistent with the intent of the Act or these regulations for use of the waiver under extraordinary circumstances, the Secretary shall notify the Agency Head and the Director of the office of Management and Budget within 5 days of receipt of the Federal Agency notice under §78.4(a) of termination of the waiver, or make appropriate recommendations for modifications of the waiver's use. Termination of a waiver by the Secretary is final.
- (b) If the waiver is still in effect at the time the Federal Agency Head receives recommendations from the Secretary, the Agency Head shall consider the recommendations and any comments received from the Advisory Council and the State Historic Preservation Officer before deciding whether to continue, withdraw, or modify the waiver. The Federal Agency Head shall respond to recommendations received from the Secretary either accepting or rejection those, recommendations, and where recommendations are rejected, explaining the reasons for such a decision. Information copies of such response shall be forwarded by the Federal Agency Head to the Advisory Council on Historic Preservation and the appropriate State Historic Preservation Officer.
- (c) If the waiver is no longer in effect at the time the Federal Agency Head receives recommendations from the Secretary or comments from the Advisory Council or the State Historic Preservation Officer, the Federal Agency Head should consider such recommendations and comments in similar future emergencies (36 CFR §78.5).

5.0 HISTORIC PRESERVATION ACTIVITIES

Historic preservation activities at Kahuku Training Area must include compliance with Section 106 and 110 procedures of the National Historic Preservation Act. This section outlines those procedures as well as the standards and qualifications for archaeological and architectural activities that must be adhered to.

5.1 SECTION 106 AND 110 COMPLIANCE PROCEDURES

The United States Army is responsible for initiation and completion of the Section 106 review process for a proposed undertaking. Section 106 and 110 compliance procedures follow five basic steps, including: identification and evaluation process, assessment of effects, consultation process, council comment, and procedure. Three alternative approaches also comply with Section 106 regulations.

5.1.1 Identification Process

The first step to Section 106 compliance is the identification process. Federal agencies are required by Section 106 of the National Historic Preservation Act to identify all historical properties that an undertaking may affect. This step requires consultation with the State Historic Preservation Officer and other sources that may be knowledgeable about the historical properties in the area, and a review of background information. This review will then determine what additional research or field work may be necessary, and proceeds to conduct such studies. Army Regulation 420-40 requires that:

Before planning any action or undertaking likely to have an effect on Army-controlled property, the DEH will determine whether any property listed, on the National Register exists within or near the area of the undertaking. If this information is not available, the DEH will locate, inventory, and evaluate all historic properties within the area of the undertaking, per paragraph 2-11 of this regulation, 36 CFR 60 and 63, and TM 5-801-1 (AR 420-40 1984:3-2)

5.1.2 Evaluation Process

The evaluation process involves the evaluation of districts, sites, buildings, structures, or objects that may be eligible for inclusion in the National Register of Historic Places but have not been included on the register, in reference to NRHP criteria for inclusion. This process must be carried out in consultation with the State Historic Preservation Officer (SHPO). If there are questions or disputes regarding the eligibility of a property, the agency can seek a formal determination of eligibility from the Secretary of the Interior. Army Regulation 420-40 outlines procedures for consultation with the SHPO. These are as follows:

The DEH will consult with the SHPO at the earliest stages of planning to coordinate all aspects of the review requirements, including the following:

- a. Methodology or research design of the projects to locate and inventory historic properties.

- b. Determining if recommendations of the SHPO can be accommodated in the project.
- c. Requesting the opinion of the Keeper of the National Register and the ACHP when the installation and the SHPO cannot agree on methods for locating, inventorying, and evaluating properties.
- d. Applying the criteria of the national Register to properties on the installation.
- e. Requesting a determination of eligibility from the Keeper of the National Register (per 36 CFR 63) when the installation and SHPO disagree on eligibility (AR 420-40 1984:3-3).

5.1.3 Assessment Of Effect Process

If properties that are included or eligible for inclusion in the National Register are discovered, the agency must then assess what potential effect the undertaking might have upon them. This process must be conducted under consultation with the State Historic Preservation Officer and other interested parties. The agency must utilize the criteria in the Council's regulations, in order to determine one of the following effects.

- (1) No effect: the undertaking will not affect historical properties;
- (2) No adverse effect: the undertaking will affect one or more historical properties, but will not be harmful;
- (3) Adverse effect: the undertaking will harm one or more historical properties.

Army Regulation 420-40 outlines the procedures to be followed for the Assessment of Effect. These are as follows:

5.1.3.1 Determination Of No Effect And No Adverse Effect

The DEH will apply the Criteria of Effect (36 CFR 800.3) to the proposed action or undertaking. If the installation finds that the undertaking will have no effect, it will send proof of this finding to the SHPO for comment. If the SHPO concurs, the installation will file the proof and the undertaking may proceed. In the case where there is an effect but it is not adverse, the DEH will forward a description of the proposed action and request the concurrence of the SHPO. If the SHPO concurs in the findings or if the SHPO fails to respond within 30 days, then the DEH will send a copy of this correspondence to the ACHP. The AG will send a copy of this correspondence through NGB-ARI-E to the ACHP. If the ACHP does not reply within 30 days, the action may proceed (AR 420-40 1984:3-4).

5.1.3.2 Objection

If the SHPO does not concur in the finding of no effect or of no adverse effect, the installation will consult again with the SHPO about conditions that may result in a

finding of no adverse effect before entering into the consultation process (AR 420-40 1984:3-5).

5.1.3.3 Determination Of Adverse Effect

If the installation finds that the proposed undertaking may have an adverse effect, or if the SHPO or ACHP does not concur in the determination of no adverse effect, the installation will do the following:

- a. Suspend any action that may result in an adverse effect on a National Register listed or eligible property.
- b. Suspend any action that prohibits looking at alternative ways to reduce adverse effects.
- c. Submit a preliminary case report or an acceptable mitigation plan to the ACHP for comment (AR 420-40 1984:3-6)

5.1.3.4 Preliminary Case Report

- a. The DEH will include the following in the preliminary case report:
 - (1) Documentation of the historic properties affected.
 - (2) An assessment of the effect of the action on those properties.
 - (3) A description of the measures considered to avoid or minimize the effect.
 - (4) A copy of the SHPO's comments on the effect.
- b. A draft EIS may contain the material of a preliminary case report when ACHP comments are requested per NHPA Sec 106 and 36 CFR 800 (AR 420-40 1984:3-7).

5.1.4 Consultation Process

A consultation process must be implemented if the undertaking has been determined to create an adverse effect. During the consultation process, the agency must consult the State Historic Preservation Officer and other interested parties in an effort to make the undertaking less detrimental to the historical property. Interested parties may include but are not limited to: local governments, Indian [Hawaiian] tribes, property owners, and other members of the public, and the Advisory Council. The goal of the consultation process in the creation of a Memorandum of Agreement (MOA), that will outline the agreed upon activities the agency will conduct in order to lessen, avoid, or mitigate the adverse effect the undertaking will have upon the resource. In certain cases the consulting parties may determine that the adverse effects are inevitable, but must be accepted in the public interest.

5.1.4.1 Avoiding Or Minimizing Adverse Effects

Army Regulation 420-40 has outlined options to avoid or minimize the potential adverse effect.

These are as follows:

- a. Alternative locations.
- b. Alternative undertakings.
- c. Limiting the size of the undertaking.
- d. Changing the proposed undertaking through redesign, redirection, or other similar changes.
- e. Improving the affected property through increased preservation and maintenance of the historic property during and after the undertaking.
- f. Documentation and recording of the historic property before the adverse effect occurs. This may be done by--
 - (1) Recovery and analysis of archaeological data.
 - (2) Photographic documentation, measured drawings, additional research.
 - (3) Preparation of a report for the public on the historic qualities of the property (AR 420-40 1984:3-9).

5.1.4.2 Documentation Standards

When an undertaking requires excessing, demolition, or substantial alteration of a historic property, documentation will be done in accordance with the standards and guidelines of the National Park Service for historic buildings and archaeological resources (AR 420-40 1984:3-10).

5.1.4.3 Memorandum Of Agreement (MOA)

- a. Consulting parties will prepare an MOA on how undertakings will be carried out if they agree on the following:
 - (1) Measures to avoid or mitigate the adverse effects.
 - (2) Acceptance of the adverse effect as being in the public interest.
- b. The MOA is signed by the ACHP executive director, the installation Commanding Officer, or AG, and the SHPO, and is forwarded through DA channels for ratification by HQDA (DAEN-ZCF-B).
- c. The DEH will make sure that any agreements that involve real estate used by the Reserve Components are staffed with the chief of the proper CONUS component.

- d. HQDA (DAEN-ZCF-B) will send approved agreements to the ACHP for final signature of the Chairman, ACHP, on behalf of the ACHP Council members (AR 420-40 1984:3-12).

If consultation does not result in a productive compromise, the agency, the State Historic Preservation Officer, or the Council may terminate the consultation. If this happens, the agency must submit the appropriate documentation to the Council and request written comment.

5.1.5 Council Comment

The Council can comment during the consultation process by participation in the consultation and signing the Memorandum of Agreement. If the Council did not participate in the consultation process, then the agency must submit the MOA to the Council for review and acceptance. The Council reserves the following options: to accept the MOA, request changes, or issue written comments. If the previous consultation procedures were terminated, then the Council issues written comments directly to the agency head.

Army Regulation 420-40 has outlined procedures for the Advisory Council comment. These are as follows:

If an agreement cannot be reached, the ACHP executive director has 15 days from the date of failure to agree to notify the ACHP chairman. The chairman has 15 days to--

- a. Refer the matter to a panel of not less than five council members, which will meet within 30 days. Within 15 days of meeting, the ACHP must send the comments to the President and the congress, and have them published in the Federal Register.
- b. Refer the matter to the full council which will meet within 30 days. Within 15 days of meeting, the ACHP must send its comments to the President and the Congress, and have them published in the Federal Register.
- c. Decline to refer the matter to either full council or to a council panel (AR 420-40 1984:3-13).

5.1.6 Proceed

If a Memorandum of Agreement has been created, then the agency proceeds with the undertaking following the terms of the Agreement. If a Memorandum of Agreement has not been created, then the agency should follow the Council's written comments in determining procedure.

5.1.6.1 Department of Defense Response

According to Army Regulation 420-40:

The NHPA requires the Secretary of Defense to take into account the ACHP's comment but is not required to abide by it. If the comment has been made by a panel and the decision is not to accept it, the Chairman, ACHP, may have the case presented to the full council. This must be done within 30 days. During this time the installation may not proceed with the undertaking. Compliance with the NHPA, section 106, has been accomplished when the Secretary of Defense has received and taken into account the council's comment (AR 420-40 1984:3-14).

5.1.7 Alternatives To Case-By-Case Review

There are also three alternative methods to Section 106 compliance. These are;

1. Programmatic Agreements among an agency, the Council, one or more SHPOs, and others;
2. Counterpart regulations developed by an agency and approved by the Council;
3. An agreement between the Council and a State, which substitutes a State review system for the standard Section 106 review process.

5.2 ARPA COMPLIANCE

The Archaeological Resources Protection Act (ARPA) requires federal agencies to establish a program to increase public awareness of the need to protect archaeological resources that are located on public lands (18 CFR 1312:20). In order to comply with this legislation the Base Historic Preservation Officer will implement an ARPA Notification and Public Benefits Program within one year following the approval of this historic preservation plan.

Military and non-military users of Kahuku Training Area shall be informed of ARPA regulations. This notification should include at least the following information as outlined in the Archaeological Resource Protection Act.

It is a Federal offense to excavate, remove, damage, or otherwise alter or deface, or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located at Kahuku Training Area. It is also a Federal offense to sell, purchase, exchange, transport, receive, or offer to sell, purchase, or exchange any archaeological resource if such resource was excavated or removed from Kahuku Training Area. Penalties for such offenses include a fine not greater than \$10,000 or one year imprisonment.

In addition, users of Kahuku Training Area shall be informed of the Federal offense for trafficking human skeletal remains as outlined in the Native American Graves Protection and Repatriation Acts.

The notification should also include information regarding procedures following the inadvertent discovery of archaeological resources. The activity which disturbed the archaeological resource shall cease immediately, all archaeological remains must be left in place, and the discovery should be reported to the Military Police.

These notifications should be made available to all military and non-military users of the installation.

Steps should also be taken to implement public awareness and appreciation programs regarding archaeological and historical resources. Such programs could include exhibits illustrating the history and archaeological importance of Kahuku Training Area, educational videos directed toward the users of KTA explaining the importance of the archaeological and historical resources, or the creation of a small handbook to be distributed to new personnel using Kahuku Training Area with an overview of Hawaiian culture, and the particular cultural resources and points of interest for the installation.

5.3 PERIODIC REPORTING TO SHPD AND ACHP OF INSTALLATION

As noted above the State Historic Preservation Division must be involved in the Section 106 and 110 compliance procedures. The State Historic Preservation Division and the ACHP should also receive the annual Historic Preservation Compliance Report summarizing all Historic Preservation activities at the installation.

5.4 STANDARDS FOR ARCHAEOLOGY AND HISTORIC PRESERVATION

In order to ensure protection of archaeological and historical resources, Federal standards and guidelines have been set. These standards include professional qualifications, and documentation standards for archaeologists and architects as well as curation standards for recovered materials.

5.4.1 Professional Qualification Standards For Archaeology

The professional qualification standards for archaeology have been outlined in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. These standards and guidelines comply with Section 110 of the National Historic Preservation Act and are as follows:

The minimum professional qualifications in archaeology are a graduate degree in archaeology, anthropology, or closely related field plus:

- (1) At least one year of full-time professional experience or equivalent specialized training in archaeological research, administration or management;
- (2) At least four months of supervised field and analytic experience in general North American [Hawaiian] archaeology;
- (3) Demonstrated ability to carry research to completion.

In addition to these minimum qualifications, a professional in prehistoric archaeology shall have at least one year of full-time professional experience at a supervisory level in the study of archaeological resources of the prehistoric period. A professional in historic archaeology shall have at least one year of full-time professional experience at a supervisory level in the study of archaeological resources of the historic period.

5.4.2 Documentation Standards And Guidelines For Archaeology

The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation also outlines the documentation standards and guidelines for archaeology, as presented below:

STANDARD I. Archaeological Documentation Activities Follow as Explicit Statement of Objectives and Methods That Responds to Needs Identified in the Planning Process

GUIDELINES

The research design should draw upon the preservation plan to identify:

- (1) Evaluated significance of the property(ies) to be studied;
- (2) Research problems or other issues relevant to the significance of the property;
- (3) Prior research on the topic and property type; and how the proposed documentation objectives are related to previous research and existing knowledge;
- (4) The amount and kinds of information (data) required to address the documentation objectives and to make reliable statements, including at what point information is redundant and documentation efforts have reached a point of diminishing returns;
- (5) Methods to be used to find the information; and
- (6) Relationship of the proposed archaeological investigation to anticipated historical or structural documentation, or other treatment.

STANDARD II. The Methods and Techniques of Archaeological Documentation are Selected to Obtain the Information Required by the Statement of Objectives

GUIDELINES

Investigation strategies should be selected based on these general principles, considering the following factors:

- (1) Specific data needs;
- (2) Time and funds available to secure the data; and
- (3) Relative cost efficiency of various strategies.

STANDARD III. The Results of Archaeological Documentation are Assessed Against the Statement of Objectives and Integrated into the Planning Process

GUIDELINES

The recovered data are assessed against the objectives to determine how they meet the specified planning needs. The utility of the method of approach and the particular techniques which were used in the investigation (i.e. the research design) should be assessed so that the objectives of future documentation efforts may be modified accordingly.

STANDARD IV. The Results of Archaeological Documentation are Reported and Made Available to the Public

GUIDELINES

Archaeological documentation concludes with written report(s) including minimally the following topics:

- (1) Description of the study area;
- (2) Relevant historical documentation/background research;
- (3) The research design;
- (4) The field studies as actually implemented, including and deviation from the research design and the reason for the changes;
- (5) All field observations;
- (6) Analyses and results, illustrated as appropriate with tables, charts, and graphs;
- (7) Evaluation of the investigation in terms of the goals and objectives of the investigation, including discussion of how well the needs dictated by the planning process were served;
- (8) Recommendations for updating the relevant historic contexts and planning goals and priorities, and generation of new or revised information needs;

- (9) Reference to related on-going or proposed treatment activities, such as structural documentation, stabilization, etc.; and
- (10) Information on the location of original data in the form of field notes, photographs, and other materials.

Archaeological Documentation can consist of Inventory Survey, Data Recovery, or Monitoring. The following are guidelines set forth for each level of documentation as outlined by the State of Hawai'i Department of Land and Natural Resources Title 13.

5.4.2.1 Inventory Survey

Archaeological survey is often required to identify and inventory any historical properties in a project area, including historical properties of traditional cultural value, in order to determine if significant historical properties are present. An inventory survey is not complete until:

1. Adequate procedures have been taken to determine if it is likely that historic properties are present in the area to be affected by the undertaking and, if so, to identify all historic properties.
2. Sufficient inventory information has been gathered to enable an evaluation of the significance of a historic property in accordance with significance criteria.

Five steps are required in an archaeological survey, as follows:

1. Historical Background Research.
2. Archaeological Background Research
3. The Archaeological Field Survey.
4. Oral Historical Research to Identify Culturally Significant Historic Properties.
5. The Archaeological Inventory Survey Report.

1. Historical Background

Historical research is required to identify the history of land use and historic property patterns at the *ahupua`a* level and at the project area level. The minimal requirements for historical background research are as follows;

- A. Check if Land Commission Awards (LCAs) were awarded within the *ahupua`a* and within the parcel to establish 1848-51 land use patterns.
- B. Search of earlier literature to establish prehistoric and early historic land use patterns.
- C. Search of later literature to establish post- 1850 land use patterns.
- D. Prepare predictive site maps for each period.

2. Archaeological Background Research.

It shall be determined if prior archaeological studies have occurred within the project parcel and within the *ahupua`a* in which the parcel is located. At a minimum, the SHPD shall be consulted. If studies have been done, the findings shall be reviewed. This review shall include the following, for both the *ahupua`a* and parcel levels of analysis:

- A. The extent of survey coverage.
- B. The thoroughness of survey coverage.
- C. The types of sites found (if any), and their numbers and distributions.
- D. The likely function of these sites.
- E. Dating (if any has been done).
- F. A summary of past land use patterns, revising those identified in the historical background research with the archaeological information to date.

3. Archaeological Field Survey

Portions of the project area that have not been sufficiently surveyed shall undergo archaeological inventory survey to determine whether historical properties are present and, if so, to establish their nature and locations.

- A. Areas which have no visible historic properties shall be evaluated to determine whether subsurface historic properties are present through test excavations.

- B. Historic properties, or features of properties, that have several possible alternative functions based on surface examination shall be test excavated to resolve the question of property, or feature function. If human skeletal remains are encountered, they shall not be disturbed, and excavations shall be backfilled.

4. Oral Historical Research to Identify Culturally Significant Historical Properties.

This step attempts to identify any historical properties of traditional cultural value in the project area. Identification shall involve consulting recorded oral traditions and interviewing persons knowledgeable of the undertaking's area. Findings must be presented in the Archaeological Inventory Survey Report.

5. Archaeological Inventory Survey Report.

To meet minimal standards the Archaeological Inventory Survey Report shall include the following:

1. Identification of the Survey Area:
 - a) On a map which clearly shows the parcel's position on the relevant U.S.G.S. STANDARD 1:24,000 topographic map.
 - b) Text, which states the island, district, *ahupua`a* and the Tax Map Key (TMK) and acreage of the parcel:
2. Identification of the owner(s) of the parcel:
3. A description of the parcel's environment, to include:
 - i) Topographic data (including general elevations, distance inland, and general terrain patterns).
 - ii) Vegetation data.
 - iii) Soil data.
 - iv) Rainfall information.

4. A section on historical background research which shall include:
 - i) Present findings on land use and site patterns for the ahupua`a and parcel for:
 - ii) Prehistoric and early historical times.
 - a) times, as indicated by LCA awards.
 - iii) Post-1850 times.
 - b) Summarize references reviewed.
 - c) For 1848-1851 times indicate:
 - i) Whether any Land Commission Awards were granted within the parcel and within the ahupua`a in which the parcel is located.
 - ii) If awards were granted, specify the number of awards, their LCA number, and locate the awards on a map.
 - d) Provide maps showing different land use and site predictions for each period.
5. The report shall contain a section on archaeological background research which shall include:
 - a) A review of whether any prior archaeological studies have occurred in the parcel and in the ahupua`a in which the parcel is located. As a minimum, it must be indicated that consultation with the State Historic Preservation Division took place to determine if such studies exist
 - b) If such studies have taken place, the report shall include;
 - i) A list of these studies, with report references.
 - ii) The areal extent of the survey coverage indicated on a map.
 - iii) The thoroughness of the survey coverage.

- iv) The types of sites found (if any), and their numbers and distributions.
 - v) The likely function of these sites.
 - vi) Dating (if any has been done).
 - vii) A revised summary of past land use patterns in the ahupua`a and the parcel based on the archaeological information to date.
6. The report shall contain a section on survey methods used in the archaeological field survey which shall include:
- a) Number of personnel, with the names and degrees of the Principal Investigator and Field Director.
 - b) When the survey was performed and the duration of time for the survey.
 - c) The extent of survey coverage. If the coverage was less than 100%, the rationale for the sample (the sampling design) must be presented in a careful argument. Sampling designs which included analysis of possible subsurface sites under sand dunes, urban fill, and the like must also be presented here.
 - d) The techniques used to identify sites (transects, sweeps, test excavations, augering, etc.).
 - e) The extent of historical property recording (mapping, measuring, photographing, test excavations) and the techniques used -- with the rationale for these techniques given.
 - f) The method used to plot site location.
7. Archaeological field survey findings. Each site found shall be individually described, as follows:
- a) A State site number and any previous numbers (including numbers placed on permanent markers at the sites).
 - b) A reference to a previous study, if the site has been recorded before.

- c) The site's formal type (e.g., C-shaped enclosure, platform, enclosure, wall, paving, etc.). If it has several major features, then each of these should be noted (e.g., 3 C-shaped enclosures, 1 platform, 4 stone cairns).
- d) A description of the site, to include:
 - i) Site size--horizontal extent.
 - ii) The major feature(s)'s shape, area, with representative architectural heights and widths, etc. (in metrics).
 - iii) The presence/absence of surface remains (artifacts, midden, debris, etc.). If present, the general nature of these remains, their density, and distribution.
 - iv) The presence/absence of any subsurface deposits. If present, an assessment of the general depth and nature of these remains. If test excavations, augering, etc. occurred, these results must be presented here and must include stratigraphic information with soil descriptions (with Munsell colors) and representative profiles.
 - v) Photographs.
 - vi) Plan maps; at a minimum, sketches to scale. Must include a bar scale, north arrow, and indicate method used (e.g., tape and pocket transit; transit, stadia rod, and tape; tape and compass; visual estimate; etc.)
 - vii) The condition of the site.
 - viii) An assessment of site function, with supportive arguments.
 - ix) An assessment of site age, with absolute dating results when available.
- e) If subsurface analysis occurred, findings must be presented under each site's description to include:
 - i) Stratigraphic layers, with soil descriptions (using Munsell colors) and representative profiles.

- ii) Descriptions of features, including provenience within layers.
- iii) Listing of artifacts, including provenience within layers.
- iv) Listing of faunal and botanical remains, by layer.
- v) Listing of debris and other remains, by layer.
- vi) Any processed radiocarbon and/or volcanic glass dates, by provenience.

8. Laboratory Analyses, to include:

- a) An overall presentation of artifacts, to include
 - i) A master list,
 - ii) Measurements of artifacts, which can be in table form and can be presented under the next item.
 - iii) Analysis by artifact types.
 - iv) Illustrations (line drawings and/or photographs) of a representative sample of artifacts.
- b) An overall presentation of faunal and botanical remains, to include
 - i) A master list, presenting the species within each layer of each site and their weights in grams.
 - ii) Analysis by species, as possible.
- c) An overall presentation of absolute dating, to include:
 - i) A master list, by site and by provenience within site, which includes laboratory numbers for each date.
 - ii) Methods of collection and lab treatment.
 - iii) For volcanic glass dates, a presentation of chemical source, rind measurements, and any induced hydration treatment.

- iv) For radiocarbon dates, C12/C13 ratios shall be obtained.
- v) Additional findings on the Research Problems previously studied in the Project Area.

9. References.

Location of depository (archive) for collections, photographs and written site records/maps to be presented in an appendix B.

5.4.2.2 Archaeological Data Recovery

Archaeological Data Recovery requires five basic steps;

1. Preparation of an Archaeological Data Recovery Plan.
2. Fieldwork called for by the Data Recovery Plan
3. Laboratory Work called for by the Data Recovery Plan
4. The Archaeological Data Recovery Report
5. Depositing (Archiving) the Recovered Archaeological materials.

1. Preparation of a Data Recovery Plan

An archaeological data recovery plan (research design) shall be prepared prior to the start of archaeological data recovery. This plan shall:

- A. Identify historic properties to be studied.
- B. Identify research questions to be addressed. This shall be done by reviewing prior archaeological and historical work in the parcel, *ahupua`a* and wider region. The specifics of these questions will vary with the extent of prior work.
- C. Identify specific data needed to address the questions,
- D. Identify methods to be used to acquire and analyze the data. Any sampling approaches to be used shall be noted here. The plan shall also use the most efficient methods to try to answer the research questions.

- E. Identify a procedure for depositing collections after conclusion of the data recovery project.
- F. If burials are to be disinterred as part of data recovery, the procedures of NAGPRA shall be followed.
- G. If properties with traditional cultural significance are involved, the consulting archaeologist shall consult with members of the relevant cultural group in the local community, to take into account any cultural concerns regarding data recovery fieldwork methods, thereby helping to make the fieldwork more sensitive to cultural concerns.
- H. This plan shall be reviewed and approved by the State Historic Preservation Division prior to the start of archaeological data recovery.

2. Fieldwork.

The fieldwork required in an archaeological data recovery project will vary from case to case. It shall be specified in the data recovery plan. It may include detailed mapping, surface collections, and excavations.

3. Laboratory Work.

Laboratory work will also vary from case to case but shall be specified in the data recovery plan. This work may include dating, faunal analyses (marine shell, tree snails, mammals, fish, amphibians), soil analyses, botanical analyses, artifact analyses, etc. If osteological analyses of human skeletal remains are undertaken they shall conform with NAGPRA.

4. Archaeological Data Recovery Report.

To meet minimal standards the Archaeological Data Recovery Report shall include the following:

1. Abstract. Identifying:
 - a) The sites studied.
 - b) General findings relevant to research questions;

2. Introduction, including the reasons for the project and the location of the Study Area to include:
 - a) A portion of the relevant U.S.G.S. standard 1:24,000 topographic map showing the *ahupua`a*, the parcel, and the areas studied.
 - b) Text, which states the island, district, *ahupua`a* and the Tax Map Key (TMK) of the parcel.
3. Research Problems. The research problems, test implications, and information needed to address the questions shall also be discussed here.
4. Archaeological field methods identifying:
 - a) Number of personnel, with the names and degrees of the Principal Investigator and Field Director.
 - b) When the work was done.
 - c) Methods planned in the Data Recovery Plan and any deviations, to include sampling strategies and specifics on techniques used.
5. Archaeological fieldwork. Each site studied shall be individually described, to include:
 - a) A State site number and any previous numbers (including numbers placed on permanent markers at the sites).
 - b) A reference to a previous study, if the site has been recorded before.
 - c) The site's formal type (e.g., C-shaped enclosure, platform, enclosure, wall, paving, etc.). If it has several major features, then each of these should be noted (e.g., 3 C-shaped enclosures, 1 platform, 4 stone cairns).
 - d) A description of the site, to include any of the following not recorded in previous studies:
 - i) Site size--horizontal extent.
 - ii) The major feature(s)'s shape, area, with representative architectural heights and widths, etc. (in metrics).

- iii) The presence/absence of surface remains (artifacts, midden, debris, etc.). If present, the general nature of these remains, their density, and distribution.
 - iv) The presence/absence of any subsurface deposits. If present, an assessment of the general depth and nature of these remains.
 - v) Photographs.
 - vi) Plan maps, at a minimum sketches to scale. Must include a bar scale, north arrow, and indicate method used (e.g., tape and pocket transit; transit, stadia rod, and tape; tape and compass; visual estimate; etc.)
 - vii) The condition of the site.
- e) If excavations, augering, etc. occurred, findings must be presented under each site's description to include:
- i) Stratigraphic layers, with U.S.G.S. soil descriptions (using Munsell colors) and representative profiles.
 - ii) Descriptions of features, including provenience within layers.
 - iii) Listing of artifacts, including provenience within layers.
 - iv) Listing of faunal and botanical remains, by layer.
 - v) Listing of debris and other remains, by layer.
 - vi) Any processed radiocarbon and/or volcanic glass dates, by provenience.
- f) An assessment of site function, with supportive arguments.
- g) An assessment of site age.
6. The Laboratory Analyses section of the report shall include:
- a) An overall presentation of artifacts, to include
 - i) A master list,

- ii) Measurements of artifacts, which can be in table form and can be presented under the next item.
 - iii) Analysis by artifact types.
 - iv) Illustrations (line drawings and/or photographs) of a representative sample of artifacts.
 - b) An overall presentation of faunal and botanical remains, to include
 - i) A master list, presenting the species within each layer of each site and their weights in grams.
 - ii) Analysis by species, as possible.
 - c) An overall presentation of absolute dating, to include:
 - i) A master list, by site and by provenience within site, which includes laboratory numbers for each date.
 - ii) Methods of collection and lab treatment.
 - iii) For volcanic glass dates, a presentation of chemical source, ring measurements, and any induced hydration treatment.
 - iv) For radiocarbon dates, C12/C13 ratios shall be obtained.
 - d) Osteological analyses, if human skeletal remains are found and are to be analyzed, to conform with NAGPRA regulations.
7. Additional findings on the Research Problems previously studied in the Project Area.
 8. References.
 9. Location of depository (archive) for collections, photographs and written site records/maps. To be presented in an appendix.

6. Final Disposition of Collections.

All collections from public lands shall be placed in an acceptable archive to be designated by the SHPD. Final disposition of any human skeletal remains and associated grave goods removed during data recovery work shall follow NAGPRA guidelines.

5.4.2.3 Archaeological Monitoring

Archaeological monitoring requires five basic steps;

1. Preparation of a monitoring plan.
2. Fieldwork.
3. Laboratory work, as relevant.
4. The monitoring report.
5. Archiving of collections, as relevant.

1. The Archaeological Monitoring Plan.

The archaeological monitoring plan shall be prepared, reviewed, and approved by the State Historic Preservation Division prior to the monitoring project. The plan shall contain the following information.

1. What kinds of remains are anticipated in historic properties.
2. Where in the construction area these properties are likely to be found.
3. How these properties will be treated. If properties with traditional cultural significance are involved, the consulting archaeologist shall consult with members of the relevant cultural group in the local community, and with OHA for any such native Hawaiian concerns regarding monitoring fieldwork methods, thereby helping to make the fieldwork more sensitive to cultural concerns.
4. A provision that the archaeologist conducting the monitoring has the authority to halt construction in the immediate area of a find, in order to carry-out the plan. Construction can shift to other areas in such a case.

5. Coordination meeting with the construction team and archaeologist, so the construction team is aware of the plan.
6. Likely laboratory work to be done. If osteological analyses of skeletal remains are expected, they shall conform with NAGPRA.
7. Report preparation.
8. Archiving of the collections.

2. Fieldwork

The fieldwork shall be specified in the monitoring plan and shall vary from case to case. It may include profile documentation of cultural layers' stratigraphy, photographs, excavation of exposed features, and collection of cultural or botanical samples.

3. Laboratory Work

Laboratory work shall occur, if archaeological artifacts and other remains are recovered. The nature of the work shall be specified in the monitoring plan.

4. Monitoring Report

The monitoring report shall include the following:

1. Abstract to include:
 - a) Any sites studied.
 - b) General findings.
2. Location of the Study Area to include:
 - a) A portion of the relevant U.S.G.S. STANDARD 1:24,000 topographic map showing the *ahupua`a*, the parcel, and the areas studied.
 - b) Text, which states the island, district, *ahupua`a* and the Tax Map Key (TMK) of the parcel.
3. Reason for the monitoring.

4. Archaeological field methods to include:
 - a) Number of personnel, with the names and degrees of the Principal Investigator and Field Director.
 - b) When the work was done.
 - c) Methods planned in the Monitoring Plan and any deviations, with explanations why. To include specifics on techniques used.

5. Archaeological fieldwork. Each site studied shall be individually described, to include:
 - a) A State site number and any previous numbers (including numbers placed on permanent markers at the sites).
 - b) A reference to a previous study, if the site has been recorded before.
 - c) The site's formal type (e.g., C-shaped enclosure, platform, enclosure, wall, paving, etc.). If it has several major features, then each of these should be noted (e.g., 3 C-shaped enclosures, 1 platform, 4 stone cairns).
 - d) A description of the site, to include any of the following not recorded in previous studies:
 - i) Site size--horizontal extent.
 - ii) The major feature(s)'s shape, area, with representative architectural heights and widths, etc. (in metrics).
 - iii) The presence/absence of surface remains (artifacts, midden, debris, etc.). If present, the general nature of these remains, their density and distribution.
 - iv) The presence/absence of any subsurface deposits. If present, an assessment of the general depth and nature of these remains.
 - v) Photographs.

- vi) Plan maps, at a minimum sketches to scale. Must include a bar scale, north arrow, and indicate method used (e.g., tape and pocket transit; transit, stadia rod, and tape; tape and compass; visual estimate; etc.)
 - vii) The condition of the site.
- e) If subsurface analysis occurred, findings must be presented under each site's description to include:
- i) Stratigraphic layers, with soil descriptions (using Munsell colors) and representative profiles.
 - ii) Descriptions of features, including provenience within layers.
 - iii) Listing of artifacts, including provenience within layers.
 - iv) Listing of faunal and botanical remains, by layer.
 - v) Listing of debris and other remains, by layer.
 - vi) Any processed radiocarbon and/or volcanic glass dates, by provenience.
- f) An assessment of site function, with supportive arguments.
- g) An assessment of site age.
6. Laboratory Analyses , to include:
- a) An overall presentation of artifacts, to include
 - i) A master list,
 - ii) Measurements of artifacts, which can be in table form and can be presented under the next item.
 - iii) Analysis by artifact-types.
 - iv) Illustrations (line drawings and/or photographs) of a representative sample of artifacts.
 - b) An overall presentation of faunal and botanical remains, to include

- i) A master list, presenting the species within each layer of each site and their weights in grams.
- ii) Analysis by species, as possible.
- c) An overall presentation of absolute dating, to include:
 - i) A master list, by site and by provenience within site, which includes laboratory numbers for each date.
 - ii) Methods of collection and lab treatment.
 - iii) For volcanic glass dates, a presentation of chemical source, ring measurements, and any induced hydration treatment.
 - iv) For radiocarbon dates, C12/C13 ratios shall be obtained.
- d) Osteological analyses, if human skeletal remains are found and are to be analyzed, to conform with NAGPRA regulations.

7. Additional findings on the Research Problems previously studied in the Project Area.

8. References.

9. Location of depository (archive) for collections, photographs and written site records/maps. To be presented in an appendix.

5.4.3 Curation Standards

All archaeological data and materials resulting from an archaeological investigation must be curated. The Secretary of the Interior's Standards and Guidelines for Archaeology presents the standards for curation of such materials as follows:

1. Curation facilities have adequate space, facilities, and professional personnel;
2. Archaeological specimens are maintained so that their information values are not lost through deterioration, and records are maintained to a professional archival standard;

3. Curated collections are accessible to qualified researchers within a reasonable time of having been requested; and
4. Collections are available for interpretative purposes, subject to reasonable security precautions.

5.5 NATIVE HAWAIIAN COORDINATION, BURIAL PROTECTION, AND NAGPRA INVENTORY REQUIREMENT

The Native American Graves Protection and Repatriation Act was established to ensure consultation with Native groups regarding such sensitive issues as excavation of human burials, sacred objects, or objects of cultural patrimony. The act also provides for burial protection and requires that all Federal agencies conduct an inventory of previously excavated human remains on Federal lands.

5.5.1 Native Hawaiian Coordination

Native Hawaiians and Native Hawaiian Organizations must be consulted about issues concerning human remains, sacred objects, or objects of cultural patrimony discovered on Federal lands. According to the Native American Grave Protection and Repatriation Act, a "Native Hawaiian" is "Any individual who is a descendant of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawai'i."

A Native Hawaiian Organization is any organization which;

1. serves and represents the interests of Native Hawaiians, services to Native Hawaiians, and
2. has as a primary and stated purpose the provision of services to Native Hawaiians, and
3. has expertise in Native Hawaiian Affairs, and shall include the Office of Hawaiian Affairs and *Hui Malama I Na Kupuna O Hawai'i Nei*.

The Office of Hawaiian Affairs was established by the constitution of the State of Hawai'i. *Hui Malama I Na Kupuna O Hawai'i Nei* is a nonprofit Native Hawaiian organization incorporated in 1989 to provide cultural guidance and expertise in cultural issues, especially those pertaining to human remains.

5.5.2 Burial Protection

The Native American Graves and Repatriation Act has established penalties for the illegal excavation and trafficking of Native Hawaiian human remains and sacred objects. In order to protect Hawaiian burials located at Kahuku Training Area from illegal excavation, vandalism, and desecration, military and non-military personnel of KTA shall be informed of NAGPRA penalties. In addition, Law enforcement personnel shall be informed of NAGPRA guidelines and trained in ARPA enforcement. Emergency Discovery Procedures (Section 6.5) shall be conducted in the case of inadvertent discoveries of human remains during archaeological, construction, or maintenance activities.

5.5.3 Burial Treatment Policy

Consultation with Native Hawaiians and Native Hawaiian Organizations such as the Office of Hawaiian Affairs and *Hui Malama I Na Kupuna O Hawai'i Nei* regarding burial discoveries should result in a Burial Treatment Plan. In the absence of such a plan, burial treatment should follow the following guidelines.

1. Human remains and funerary objects will not be disturbed or excavated unless threatened by imminent destruction by erosion or construction activities.
2. When excavation of human remains is necessary, it is to be conducted with dignity and respect, by trained personnel following proper archaeological method. Steps should be taken to protect the remains from the elements such as sun and rain, and vandalism. Excavation should strive toward 100% recovery of the remains whenever possible. Ownership of the remains and funerary objects shall be determined following NAGPRA policy.
3. After disinterment, non-damaging osteological analysis shall be conducted to address scientific research topics.
4. When osteological analysis is objected to by interested parties, and the necessity of the study can not justifiably surpass the necessity for respect for Hawaiian culture, the remains will be repatriated without analysis.

The Native American Graves and Repatriation Act is in the process of issuing implementing regulations regarding burial treatment. When these implementing regulations are complete, this burial treatment policy must be reviewed and revised to comply with NAGPRA regulations.

5.5.4 NAGPRA Inventory Requirement

The Native American Grave Protection and Repatriation Act requires each Federal agency to complete an inventory of Native American human remains and associated funerary objects within their possession by January 1, 1995. Requirements for this inventory are outlined in NAGPRA and are presented below;

1. The inventories and identifications required under subsection (a) shall be--
 - a) completed in consultation with tribal government and Native Hawaiian organization officials and traditional religious leaders;
 - b) completed by not later than the date that is 5 years after the date of enactment of this Act, and
 - c) made available both during the time they are being conducted and afterward to review committee established under section 8.
2. Upon request by an Indian tribe or Native Hawaiian organization which receives or should have received notice, a museum or Federal agency shall supply additional available documentation to supplement the information required by subsection (a) of this section. The term "documentation" means a summary of existing museum or Federal agency records, including inventories or catalogues, relevant studies, or other pertinent data for the limited purpose of determining the geographical origin, cultural affiliation, and basic facts surrounding acquisition and accession of Native American human remains and associated funerary objects subject to this section. Such term does not mean, and this Act shall not be construed to be an authorization for, the initiation of new scientific studies of such remains and associated funerary objects or other means of acquiring or preserving additional scientific information from such remains and objects.

6.0 SUMMARY OF RECOMMENDATIONS

In order to protect the archaeological and historical resources at Kahuku Training Area steps must be taken to reduce the identified threats and ensure that the potential threats to such resources do not occur. The following summarizes the general recommendations for protecting the archaeological and historical resources at KTA.

1. The archaeological and historical resources at Kahuku Training Area must be identified through further investigations. The results of these investigations should be utilized to revise and refine the areas of probability for archaeological and historical resources.

2. Off road vehicle usage should be restricted from areas of moderate to high probability for archaeological and historical resources.
3. Training activities at Kahuku Training Area should be restricted to activities that will not damage archaeological and historical resources.
4. Litter and human waste must not be allowed to accumulate at Kahuku Training Area.

6.1 GENERAL IMPLEMENTATION PLAN

1. In order to identify the cultural resources present at Kahuku Training Area further archaeological survey with subsurface testing (as defined by State and Federal standards) should be conducted at Kahuku Training Area by a qualified archaeologist (as defined by State and Federal standards). The results of these surveys should be utilized to assign significance to identified resources, to revise and refine the areas of probability for archaeological and historical resources located at Kahuku Training Area, and to offer further recommendations for protection of identified resources.
2. Off road vehicle usage should be strictly prohibited in areas of either moderate or high probability for archaeological and historical resources. Motocross activities should be conducted only in the designated areas (A1). Signs prohibiting the use of unauthorized vehicles in the Kahuku Training Area should be posted. The signs should inform the potential public users of the restrictions and penalties regarding historic and cultural resources (ARPA 1979). Periodic monitoring of Kahuku Training Area for destruction by unauthorized vehicles should be conducted by military police. Subsequent enforcement of laws prohibiting all such illegal activities should occur.
3. Training activities should be restricted in the areas of high and moderate probability for archaeological and historical resources in such a way so that the activities will not damage potential archaeological sites. In high and moderate probability areas the excavation of foxholes, latrines and the use of basalt stones to construct "hasty fortifications" should be prohibited.

It should be noted that the high and moderate probability areas at Kahuku Training Area will likely be reduced after further archaeological inventory level surveys with subsurface testing are conducted and archaeological sites are identified. Areas that produce negative results can be downgraded to either moderate or low probability areas once it has been demonstrated that few or no archaeological and historical resources exist in an area.

4. Efforts to control litter at Kahuku Training Area should be increased. Procedures to police and clean up the area after training activities have been conducted should be increased and strictly adhered to. MRE packaging, spent blank ammunition, and military hardware should all be removed from the reservation at the close of the training activities.

Portable latrines located in the Training Area should be utilized over the excavation of latrines during training activities. The excavation of individual latrines should be strictly prohibited.

In addition, periodic scheduled clean up procedures should be conducted at Kahuku Training Area to remove litter that may have been overlooked after training exercises as well as litter that may have accumulated from non-military users of the area.

5. Undertakings at Kahuku Training Area that pose potential threats (section 3.5.2) to archaeological and historical resources should follow Standard Operating Procedures to ensure that resources are not adversely affected by the undertaking.

6.2 STANDARD OPERATION PROCEDURES FOR MANAGERS, PLANNERS, AND USER GROUPS

The following is the Standard Operating Procedures (SOP) to be followed by user groups at Kahuku Training Area, to ensure protection of archaeological and historical resources.

6.2.1 SOP For Facilities Development

Construction and development of facilities at KTA pose a threat to archaeological and historical resources. The following Standard Operating Procedures are outlined to eliminate such threats.

To assure preservation of these resources, all development or construction which involves ground disturbing activities are to abide by the following general guidelines.

1. Construction projects that occur in Low Probability Areas (Figure 16), and which involve ground disturbing activities, should be aware of, and be prepared to follow the Emergency Discovery Procedures outlined in Section 6.2.5.
2. Construction projects that occur in Moderate Probability Areas (Figure 16), and which involve ground disturbing activities shall secure an archaeological monitor during construction excavation activities. The archaeological monitoring activities shall conform to the standards and guidelines of archaeological monitoring outlined in Section 5.4.2.3.
3. Construction projects that occur in High Probability Areas (Figure 16), and which involve ground disturbing activities, require archaeological inventory survey and subsurface testing prior to any construction activities. Archaeological inventory survey methods shall conform the standards and guidelines for inventory survey outlined in Section 5.4.2.1

6.2.2 SOP For Facilities Maintenance Projects

Routine and emergency facilities maintenance projects can also potentially threaten archaeological and historical resources at KTA. To ensure preservation of these resources the following Standard Operating Procedures must be followed.

6.2.2.1 Archaeological Resources

Since most of the archaeological and pre-military historical resources at KTA are not located in maintained areas or facilities, facilities maintenance will not for the most part affect such resources. However, maintenance personnel should be aware of the Emergency Discovery Procedures outlined in Section 6.2.5.

6.2.2.2 Architectural Resources

To date, no architectural evaluation of the buildings at KTA has been undertaken, and so it is uncertain if historically significant structures are present at the installation. If any structures are determined to be historically significant in the future, any projects affecting a historical architectural resource should follow the Secretary of Interior's Standard and Guidelines for Rehabilitation. The Standards are as follows:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall be not undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

One of the major threats to historic architectural resources is neglect, which can cause irreparable damage to historical materials. To preserve historic architectural resources, they must be maintained in an appropriate manner to avoid deterioration of and damage to the historical materials. Maintenance includes, but is not limited to, cleaning, painting, removal of potentially

damaging plants, and periodic replacement of water removal systems, such as gutters, downspouts, and drains.

While structures require routine maintenance and upkeep, standard material replacement, refurbishment, or repairs must conform with the established historical materials and style of each structure. Even seemingly minor changes in material can significantly alter a building's historical appearance. Also, if chemically incompatible materials are added they can cause damage to the structure. If unscheduled maintenance must occur before the SHPD can be notified, the work should be temporary and removable in case the work does not conform to SHPD's requirements.

The historic architectural qualities of historical buildings must be preserved. Care must be taken to maintain the historic architectural details, signage, materials, and elements such as window and door types of the structures. Where changes to materials must be made, the changes shall be "in-kind"; that is, materials identical to the original.

There are many resources available for guidelines to materials preservation, that include recommended cleaning methods, repair methods, maintenance programs and preservation approaches. These resources include, but are not limited to:

1. *Cyclical Maintenance for Historic Buildings*. J. Henry Chambers, AIA; National Park Service, U.S. Department of the Interior, 1976.
2. Preservation Briefs for various materials, published by the Preservation Assistance Division of the National Park Service, 1982.
3. *Architectural Graphic Standards*, Chapter 19: Historic Preservation. John Ray Hoke Jr., AIA and the American Institute of Architects; John Wiley & Sons, New York, 1988.
4. Historic Preservation Maintenance Procedures Technical Manual. TM 5-801-2, HQ, Department of the Army, Washington D.C., February 1977.

6.2.3 SOP Recreation And Public Access

Archaeological and historical resources can be threatened by public misuse, vandalism, or illegal excavation. The following are the Standard Operating Procedures for recreation and public access of Kahuku Training Area.

6.2.3.1 ARPA/NAGPRA Notifications

Public users of KTA should be made aware of the Archaeological Resource Protection Act of 1979 (ARPA) and the Native American Graves Protection Act of 1990 (NAGPRA) and the penalties applied for each. Public users of the installation should also be made aware of the procedures for reporting an Emergency Discovery of archaeological remains. These notices should be posted in public areas, and should include at least the following information:

Any person who attempts to excavate, remove, damage, or otherwise alter or deface any archaeological resources located at Kahuku Training Area will be committing a federal offense and subject to a fine of \$10,000 or one year imprisonment. In addition, attempts to sell, purchase, transport, or receive any archaeological resources which were excavated or removed from KTA are punishable by the same law (Archaeological Resources Protection Act.)

The discovery of any human skeletal material at Kahuku Training Area must be reported to military police, and all activities in the area must cease immediately. It is a felony offense for any person to attempt to, or to sell, purchase, use for profit, or transport for sale or profit the human remains of Native Hawaiians (Native American Graves Protection and Repatriation Act.) These laws will be enforced by military police. Any archaeological remains discovered at KTA must be left in place and the find reported to the military police.

In addition to posted notices, this information could also be contained in an informational brochure and made available to public users of Kahuku Training Area.

6.2.3.2 Historic Preservation Awareness Programs

The Army shall create and promote Public Awareness Programs to increase public awareness of the importance of protecting archaeological and historical resources at Kahuku Training Area. The Public Awareness Program could incorporate an number of media and activities that would serve to meet this end. Examples of interpretive programs that could be incorporated into the Kahuku Training Area Historic Preservation Awareness Program include the following:

1. Presentations and seminars on historic preservation and historic properties at KTA;
2. Historic property restoration and maintenance programs involving public interest groups;
3. Tours of the designated historic properties;
4. Designation of historic property locations on installation maps;

5. Placement and maintenance of signs or markers in visible locations at the historic properties;
6. Informational brochures made available to the public;
7. Field trips, essay or art contests for students from local schools, designed to teach students about the archaeological and historical resources in their community;
8. Interpretative exhibits or displays.

6.2.3.3 Cultural Resource Use Permits.

Cultural Resource Use Permits (ENG Form 4922-R) will be issued by the Installation Historic Preservation Officer to authorized any scientific study concerning cultural resources that is to be conducted outside of official agency duties under the direction of the Army. The study shall be consistent with the provisions of the Antiquity Act of 1906, ARPA, and 32 CFR 229. The Installation Historic Preservation Officer at KTA will review the permits, and will recommend permit approval or denial on a case by case basis to the Garrison. Permit applicants must meet the Secretary of the Interior's professional qualifications for archaeology.

The Installation Historic Preservation Officer shall notify any interested Native Hawaiians who may consider the site in question as culturally or religiously important, at least 30 days in advance of the study. Should interested Native Hawaiian parties have concerns regarding the study, the Installation Commander and/or Installation Historic Preservation Officer shall meet with the interested parties to discuss their concerns, and possible mitigation measures. Any mitigation measures adopted shall be incorporated into the Cultural Resources Use Permit. The Installation Historic Preservation Officer will be responsible to monitor activities to assure compliance with the terms of the permit (Eidsness et al. 1995:79).

6.2.3.4 Monitoring and Law Enforcement

In order to be effective, the installation security personnel shall be informed of ARPA and NAGPRA regulations and enforcement procedures. Law enforcement personnel shall periodically monitor public activities in site vicinities at Kahuku Training Area for destruction, vandalism or illegal excavations of archaeological sites and subsequently enforce all legal action against such activities.

In addition, law enforcement personnel should undergo cultural resources sensitivity and law enforcement training. The Installation Historic Preservation Officer is responsible for conducting

cultural resources sensitivity training for law enforcement personnel at KTA on an annual basis. The Installation Historic Preservation Officer shall also ensure that at least one law enforcement person at KTA have ARPA enforcement training, or an ARPA trained law enforcement person should be acquired by KTA through interagency agreement.

Information regarding ARPA enforcement training can be obtained by contacting the National Park Service, Employee Development Division, P.O. Box 37127, Room 3413, Washington, D.C. 20013-7127 (Eidsness et al. 1995:61).

6.2.3.5 Reporting.

The Installation Historic Preservation Officer for Kahuku Training Area shall prepare an annual Historic Preservation Compliance Report to be submitted to the State Historic Preservation Officer (SHPO) and staff at the State Historic Preservation Division (SHPD). These annual reports shall include the following information:

1. statement of purpose;
2. summary of cultural resources management actions (undertakings requiring Section 106 coordination, management oriented studies or actions, monitoring efforts, and major new findings;
3. Cultural Resources Use Permits (including number of applications, summary and status of permitted projects);
4. emergency discoveries and a report of damages to archaeological and historical resources;
5. Public Notification (ARPA/NAGPRA) and Benefits program (interpretation or other efforts; reports distributed to public libraries);
6. staff training accomplishments; and
7. management summary and recommendations (expected changes in land-use necessitating modification to HPP; major up-coming projects; and recommendations regarding staffing or equipment needs, procedures, etc.)[Eidsness et al. 1995:84]

6.2.4 SOP For Permits, Leases, and Contracts

Any permits, leases, contracts, easements, or other legal agreements between the Army and other military branches, government agencies, businesses, organizations, or individuals shall include the following information:

- 1) Archaeological Resource Protection Act and Native American Graves Protection and Repatriation Act Notification outlined in Section 6.2.3.1.
- 2) Procedures for Emergency Discovery of archaeological resources outlined in Section 6.2.5.
- 3) Section 106 compliance procedures in coordination with the Installation Historic Preservation Officer prior to any activity that may affect archaeological or historical resources.

All actions relating to cultural resource management involving permits, leases, and contracts shall be summarized in the annual Historic Preservation Compliance Report by the Installation Historic Preservation Officer.

6.2.5 SOP For Emergency Discovery Procedures

1. In the event of inadvertent discoveries of archaeological or historical remains at KTA, the following emergency procedures should be implemented:
2. Halt all activities in the area immediately. **DO NOT REMOVE OR FURTHER DISTURB THE PROPERTY.** Steps should be taken to protect the resources from further damage (i.e., protection from the elements, looters, etc.).
3. Inform security personnel of the find.
4. Security personnel shall notify the Installation Historic Preservation Officer and the Base Commander and transfer information regarding the location, nature, and circumstances of the discovery.
5. The Installation Historic Preservation Officer shall;
 - a) Enlist the services of a qualified professional archaeologist to evaluate the find.

- b) Consult with the archaeologist regarding the development of a treatment plan if necessary.
 - c) Ensure that the treatment plan is adhered to.
 - d) After completion of archaeological investigations notify appropriate departments when activity in the area may resume, and under what stipulations (i.e. archaeological monitoring if necessary).
6. In the event that the inadvertent discovery involves human remains, the Installation Historic Preservation Officer shall;
- a) Notify the Secretary of the Army in writing of the inadvertent discovery of human remains (as outlined in Section 3(d) of the Native American Graves Protection and Repatriation Act).
 - b) Notify the appropriate Native Hawaiian Organizations regarding the inadvertent discovery of Native Hawaiian remains.
 - c) Coordinate with appropriate Native Hawaiian Organizations for the development and implementation of a burial treatment plan as outlined by the Native American Graves Protection and Repatriation Act.
 - d) Ensure that the burial treatment plan is followed.
 - e) Notify the appropriate departments when the activity may resume and under what stipulations.
7. All Emergency Discoveries and consequent actions shall be summarized in the annual Historic Preservation Compliance Report by the Installation Historic Preservation Officer.

6.2.6 SOP For Military Personnel Involved in Training Activities

Military personnel involved in training activities at Kahuku Training Area should undergo cultural resources sensitivity training. It is the responsibility of the Installation Historic Preservation Officer to provide this training to military personal. The training should included the following information;

1. the archaeological and historical resources located at Kahuku Training Area

2. the potential for undiscovered archaeological and historical resources at Kahuku Training Area
3. the significance, value, and importance of these resources to all people
4. the legislation protecting these resources, namely ARPA/NAGPRA
5. the potential and identified threats to these resources as a result of training exercises outlined in Section 4.2
6. the implementation plan and restrictions to help mitigate those adverse effects on archaeological and historical resources as outline in Section 6.1

6.2.6.1 Training Methods For Military Personnel

The methods utilized to train military personnel about cultural resources can vary, some examples of such training techniques are as follows:

1. brochures or informational pamphlets could be created and distributed to military personnel involved in training activities at KTA
2. informational videos could be created and shown to military personnel involved in training activities at KTA
3. classroom presentations could be provided to military personnel by the Installation Historic Preservation Officer or an agent of the IHPO
4. instructional field trips to known archaeological and historical resources could be conducted by the Installation Historic Preservation Officer or an agent of the IHPO.

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Appendix A
Land Commission Award Testimonies

Appendix A
Land Commission Awards for Kahuku

Location	Awardee	LCA	RP	Area	Description
Kahuku	Aaiki	3778	525	0.82	There are five taro <i>lo'i</i> , two barks of a watercourse, one <i>kula</i> and the <i>hala</i> which is growing in the <i>'i'i</i> of Poohalulu. There is a place which I farm in the <i>'i'i</i> of Hanapaua. The things planted are <i>wauke</i> , coconuts, bananas, sweet potatoes. This is <i>kula</i> land. Furthermore, I indicate a <i>kula</i> , a wooded upland, with banana, <i>nani</i> , <i>pili</i> , wood, growing at Ahamau. In the <i>'i'i</i> of Ao is a valley with <i>nani</i> and banana. Those are my claims which I state to you, the Land Commissioners. My house is another claim, at Wiwikalani.
Kahuku	Hao	2705	....	0.42	There is one <i>lo'i</i> , bounded on the north by a <i>hala</i> , on the east south and west by <i>kula</i> . There is a <i>hala</i> grove named Maona and also one named Kaohai. There are two <i>nani</i> gardens <i>mauka</i> of Akamau, two <i>'awa</i> gardens, one <i>koa</i> tree for a canoe, and two sweet potato patches. My house claim is at Kahuku, and is surrounded by <i>kula</i> . My right of occupancy was from the time of Kamehameha I.
Kahuku	Hau	2704	335	0.96	The name of the <i>mo'o</i> is Kaupuu; there are six <i>lo'i</i> and the watercourse, bounded on the north by a <i>kula</i> , on the east by Kekipi's, on the south by Makilo's, on the west by Kueulu's. There is a <i>kula</i> land, Ahamau, a fish pond named Kuhiwa, and a <i>lo'i</i> at Kii. At Keana I have a <i>wiwi</i> tree. My right of occupancy was from the time of Kamehameha I.
Kahuku	Holoala	2706	244	0.85	The name of the <i>mo'o</i> is Puulu. There are two <i>lo'i</i> bounded on the north by Uha's, on the east by Mooni's, on the south by Palu's, on the west by a <i>ko'e</i> <i>le lo'i</i> . At Lanahu are 2 <i>lo'i</i> , adjoining those of Uha and Peilalau. I also have a row [of cluster] of <i>hala</i> trees named Kamoku, and Konihowai is the name of another, and another is at Puulu. My right of occupancy was from the time of Kamehameha 2.
Kahuku	Hoolae	2716	8000	0.60	For land at Oio. There are two gardens of <i>'awa</i> , taro, banana, <i>wauke</i> , sugarcane. There are seven <i>koa</i> canoe trees. There is <i>kula</i> land cultivated in sweet potato, gourd and <i>akaakai</i> [Translator's note: the word <i>akaakai</i> means bulrush, however, onions were also called by this name, and since this is <i>kula</i> land it probably should be translated as onions.] At Hanakaoe is a cultivated upland, two gardens, and a <i>kula</i> where sweet potato is grown. At Kahuku I have five <i>lo'i</i> at Lanahu and two <i>lo'i</i> at Uwalahui. My house lot is at Oio and is bounded on the north by Kekohai's house lot, on the east by a <i>kula</i> , on the south by Kekuauli's lot, one the west by the sea. My right of occupancy is from the time of Kamehameha II.
Kahuku	Kaakauala	4449	255	2.17	There are seven taro <i>lo'i</i> , a <i>kula</i> , and a wooded upland. The things planted are banana, watermelon; there is a <i>koa</i> canoe tree, <i>pili</i> grass, salt land, a <i>kai</i> [fishery], shore area, and similar things at my place. The boundaries are: on the north, Uha's, on the east, Kaooka's <i>lo'i</i> , on the west Kaunu's, on the south, a mountain area of Waumea. I have a claim for a watercourse named Kalai, bounded on the north by a taro <i>mo'o</i> for Mauoli, on the east by the taro <i>mo'o</i> of Kalai, on the south by a watercourse, on the west by Lonohuakini. A fish <i>lo'i</i> is at Poohalulu, bounded on the north by some houses, and on the east, south and west by <i>kula</i> . Furthermore there are two clusters of <i>hala</i> at Poohalulu. In the <i>Ahupua'a</i> are four clusters of <i>hala</i> . At Ahamau are seven <i>hala</i> trees and the house also, which is in the <i>mo'o</i> . My right of occupancy is from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Kaaumakua	2906	.....	0.15	The name of the <i>mo'o</i> is Kakala. There is one <i>lo'i</i> , bounded on the north by Kaukaha's [land], on the east by Lonopuakauia's [land], on the south by Kauahi's [land], on the west by Kaunua'i's [land], and a coconut tree. At Ulupehupehu are some <i>atani</i> [orange?] trees, and a <i>mala</i> of <i>'awa</i> . At Ikemaka I have one <i>lo'i</i> , bounded on the north by Kapaiaaia's [land], on the east by Holoaia's [land], on the south by a <i>pa'i'i</i> , on the west by a <i>kula</i> .
Kahuku	Kai	2870	253	0.88	The name of the <i>mo'o</i> is Papatole. There are 12 <i>lo'i</i> , bounded on the north and west by Palena's [land], on the east by a <i>kula</i> , on the south by Kaihikapu's [land]. One other <i>lo'i</i> is next to that of Keino. A <i>kula</i> land, Kalehuawai, has five <i>'i'i</i> and one taro <i>lo'i</i> . At Kaoma are four <i>'i'i</i> . At Hamea are two <i>'i'i</i> , a shore land named Kaa, a cluster of <i>hala</i> trees and a <i>mala</i> named Poohalulu. There is a <i>mala wauke</i> at Mookini and one at Lua. <i>Mauka</i> is a <i>koa</i> canoe tree. My house claim, at Kahuku is surrounded by <i>kula</i> . [My right to occupancy] is from the reign of Kamehameha III.
Kahuku	Kaihikapu	2872	529	1.49	The name of the <i>mo'o</i> is Hahane. There are thirteen <i>lo'i</i> , bounded on the north and west by Palena's land, on the east by <i>kula</i> , on the south by houselot, on the west, also by Keino's [land]. There are five <i>lo'i</i> in another place at Amo in Keino's land, there is <i>kula</i> land, of Halane, salt land, of Halaakauahi, shore land, of Mokalaih, and mountain land, of Ao. There is a <i>mala wauke</i> at Ahamau and a <i>mala</i> of sweet potato. My house claim is in Kahuku, bounded on the north by <i>lo'i</i> land, on the east by land fence, on the south by Keino ma's lot, on the west by <i>lo'i</i> land. My right of occupancy is from the time of Kamehameha I.
Kahuku	Kaihuaijani	4458	532	2.57	There are seven taro <i>lo'i</i> , also a <i>kula</i> . The boundaries are: on the north, Kawa's <i>lo'i</i> , on the east, Kaluau's <i>lo'i</i> , west, Kupau's, on the south, Makaokalani's taro <i>lo'i</i> . Also, there is a <i>kula</i> at Waokahala, planted in <i>wauke</i> , a wooded upland at Ahamau, a <i>koa</i> tree, a <i>kukui</i> tree, and similar things. My house, also, is in the <i>Ahupua'a</i> . From the reign of Kamehameha III.
Kahuku	Kaiiuku	2932	.....	0.68	I, Kaiiuku, am the <i>konohiki</i> of Kahuku, and I hereby state my claim for land at Kahuku. At Puaakea are two <i>lo'i</i> bounded on the north by Lokoea's, on the east by Pahanui's, on the south by Kaukopa's, on the west by Waanui's. One <i>lo'i</i> is in another place, adjoining that of Namokueha, on the south is the Government Road, on the west is Kalahana's. There is a <i>lo'i</i> in another place, next to that of Kaukaha and the <i>lo'i ko'ete</i> . At Oio is a <i>mala</i> of banana, taro, sugarcane, and <i>'awa</i> , two <i>koa</i> canoe trees, a <i>kula</i> planted in sweet potato and gourd, also a <i>lo'i</i> . There is a <i>hala</i> grove named Waihinalo and a fish pond which is mine. At Hanakaioe I have some <i>malas</i> of sweet potato, and gourd. At Ulupehupehu are some <i>malas</i> of sweet potato. My house claim is at Kahuku, bounded on the north by a <i>lo'i ko'ete</i> , on the east by a <i>kula</i> , on the south by the Government Road, on the west by the bank of a <i>lo'i</i> . My right of occupancy is from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Kainalu	2892	252	1.02	The name of the <i>mo'o</i> is Kauaiki. There four <i>lo'i</i> and two watercourses, bounded on the north by Manukeoke's, on the east also by Manukeoke, on the south by Kaahwahine's land, on the west by the <i>kula</i> . I have six <i>lo'i</i> in various places and one watercourse, therefore it is not possible to describe their boundaries. There is <i>kula</i> land at Lanahu planted in <i>wauke</i> and banana, another <i>kula</i> at Haleani and a <i>pali uwala</i> [steep place planted in sweet potato] at Amo. At Niukolu is a <i>mala</i> of sweet potato and there is also one at Punalau. My houselot is at Punalau, bounded on the north by the sea, on the east by Kiki's houselot, on the south by a land fence, on the west by Kaohela's houselot. My right of occupancy is from the time of Kamehameha II.
Kahuku	Kaio	4394	256 7265	1.89	With four <i>lo'i</i> , and the watercourse is the fifth. There is also a <i>kula</i> , and my house is there. The boundaries are: on the north, Paakaua, on the east and south, Paakaua also, on the west is Kiiwahale. The time was 1845.
Kahuku	Kalahana	2934	.....	0.47	The name of the <i>mo'o</i> is Pohakuoma. There is one <i>lo'i</i> bounded on the north by Namokueha's, on the east by Kailiaki's, on the south by the Government Road, on the west by the <i>Konohiki's</i> lands. At Oho I have a cultivated <i>kula</i> which is in the upland, one <i>koa</i> canoe tree, and three <i>mala</i> of <i>wauke</i> . There is a salt land. My right of occupancy is from the reign of Kamehameha III.
Kahuku	Kalaweamoku	2826	250	1.19	It is named Mookini and is bounded on the north by Pahanui's land, on the east by Luiki's land, on the south by Male's land, on the west by Pali's. There are four <i>lo'i</i> in another place, next to Luiki's land, bounded on the south by Napoe's, on the west by Luiki ma's. There is a watercourse adjoining Pahanui's, a <i>kula</i> land [planted in] <i>wauke</i> , sugar cane, gourd, banana and sweet potato, an upland planted in <i>noni</i> . At Punalau I have a <i>mala</i> planted with <i>noni</i> . At Ulupehupehu is a <i>mala</i> planted in <i>wauke</i> , <i>noni</i> , banana, 'awa, and sugar cane. There is a salt land at Ahamau. My house claim is bounded on the north by Nauluhao's, on the east, south and west it is surrounded by <i>hala</i> trees. There are two coconut trees, two fish ponds, a clump of <i>kaia</i> . These claims are at Kahuku.
Kahuku	Kaluanu	2916	527	1.17	The name of the <i>mo'o</i> is Kanenu. There are five <i>lo'i</i> and a watercourse, bounded on the north by Maui's, on the east by Polena's, on the south by Kim'o's, on the west by Kawaa's. One <i>lo'i</i> is in another place, next to a <i>mala</i> of <i>wauke</i> is at Ahamauland] a <i>mala</i> of 'olewa [turnip], a <i>kula</i> , Hamoa, and a <i>kuahiri</i> , Kanihahani. My house lot is at Kahuku and is bounded on the north by a <i>lo'i</i> , on the east and south by a land fence, on the west by a <i>kula</i> . My right of occupancy is from the time of Kamehameha I.
Kahuku	Kamalamama	2909	.....	0.25	There are three <i>lo'i</i> surrounded by <i>kula</i> , a <i>kula</i> cultivated in sweet potato and gourd. At Ulupehupehu is a cultivated <i>kula</i> . At Kahuku I have a claim for one <i>lo'i</i> , which is surrounded by <i>kula</i> . At Kamala is one <i>koa</i> canoe tree. My house claim is at Punalau, bounded on the north by the sea, on the east by Kainalu's fence, on the south by a land fence, on the west by Kaohela's fence. My right of occupancy is from the reign of Kamehameha III.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Kanahuna	2827	523	1.75	There is an upland planted in <i>noni</i> , sweet potato, <i>wauke</i> and other things. A <i>kula</i> in sweet potato, <i>wauke</i> , <i>ipu awa awa</i> (bitter gourd, or muskmelon) is at Puupilau adjoining the Government Road in the south. One laro <i>lo'i</i> is at Kapalakai, adjoining Kuheleloa's and Nakuaka's and Kalawaia's, and the <i>kula</i> . My right of occupancy is from the time of Kamehameha I until the present.
Kahuku	Kaohiele	2861	524	1.61	The name of the <i>mo'o</i> is Lanahu. There are five <i>lo'i</i> bounded on the north by Kaihu's <i>halua</i> (a sliding place for sport), on the other three sides by <i>kula</i> . There is also a cultivated <i>kula</i> adjoining with Uwalakui on the east. At Ulupehupehu are some <i>malas</i> of sweet potato and gourd. A <i>mala pali</i> [either a steep <i>malo</i> or one at the foot of a <i>pahi</i>] is at Makapala, some <i>malo</i> of sweet potato and gourd. <i>Mouka</i> of Ulupehupehu is a cultivated <i>mala</i> . At Punalau is a cultivated <i>kula</i> . At Ulupehupehu are some <i>hala</i> trees. At Oio are some <i>hala</i> trees. My house claim is a Punalau, bounded on the north by a <i>kalawaoe</i> (curved beach, bigger than a cove, smaller than a bay), on the east by Kainalu's lot, south by a land fence, on the west by a <i>kula</i> . My right of occupancy is from the time of Kamehameha II.
Kahuku	Kapaiaala	2868	531	1.21	The name of the <i>mo'o</i> is Puulu. There are five <i>lo'i</i> , bounded on the north by Kailiuku's, on the east by Holoaia's, on the south by Kaurumali's and Holoaia's, on the west by <i>kula</i> land. There is also a <i>kula</i> , planted in sweet potato, banana, <i>wauke</i> and gourd. It is surrounded by <i>kula</i> . There is a <i>mala wauke</i> in the <i>mo'o</i> of Lanahu. My house claim is also surrounded by <i>kula</i> .
Kahuku	Kau	4388	1355	1.87	Five laro <i>lo'i</i> and one water course makes the sixth. The boundaries are: on the north, the <i>lo'i</i> of Kaaikaula, on the east, the <i>lo'i</i> of Aaiki, on the south, the watercourse, on the west, the <i>lo'i</i> of Umeume. Furthermore there is one <i>lo'i</i> at Amo, bounded on the north, east and west by the <i>lo'i</i> of Keino, on the south by the <i>kula</i> . Further, there is a <i>kula</i> at Poohalulu, with <i>wauke</i> , sweet potato, banana, bounded on the north by the <i>kula</i> of Kuapuu, on the east by some <i>hala</i> trees for Kaaikaula, on the south by a <i>kula</i> for Aaiki, on the west by a <i>kula</i> for the <i>Ahupua'a</i> . Also, the house, which is at Amo. My right of occupancy is from the time of Kamehameha I.
Kahuku	Kauihawale	2928	251	0.96	The name of the <i>mo'o</i> is Lauaki, with three <i>lo'i</i> , bounded on the north by Kekiipi's, on the east by Umeume's, on the south by Makilo's, on the west by Uha's. Two of my <i>lo'i</i> are in the land of Hawi, one <i>lo'i</i> is in the land of Kaaikaula. There is a <i>kula</i> land named Manono, a <i>mala</i> of <i>wauke</i> at Kalimalaa, a <i>mala</i> of <i>wauke</i> at Poohalulu, a <i>mala</i> of sweet potato at Kapahukowali, a <i>mala</i> of sweet potato is at Koula. There are four <i>mala</i> , a salt land, and one <i>koa</i> canoe tree. My houselot is at Kahuku, bounded on the north by a <i>mala</i> of <i>wauke</i> , on the east by a laro <i>lo'i</i> , on the south and west by <i>kula</i> . My right of occupancy is from the reign of Kamehameha III.
Kahuku	Kauihikai	2936	.....	0.52	Some <i>malas</i> of <i>awa</i> , banana, <i>wauke</i> , sugar cane, two <i>koa</i> canoe trees, and some <i>malas</i> of sweet potato and gourd from the upland to the sea. At Hanakaoe are some <i>malas</i> of <i>noni</i> , <i>aka'akai</i> [onions] and sweet potato, and a <i>hala</i> grove. At Kawela is a <i>mala</i> of <i>noni</i> . At Ulupehupehu are four <i>malas</i> of sweet potato. At Kahuku I have a claim for two <i>lo'i</i> at Lanahu, three <i>lo'i</i> at Uwalakui. My house claim is at Oio, bounded on the north by a pig pen, on the east by a <i>hala</i> grove, on the south by Pakanaka's, on the west by the sea. My right of occupancy is from the reign of Kamehameha III.

Location	Awardee	T.C.A.	RP	Area	Description
Kahuku	Kaukaha	4341	526	2.30	The name of the <i>mo'o</i> is Lanahu. There are seven <i>lo'i</i> . The boundaries are: on the north, Haa, on the east, Mooni's, on the south, <i>lo'i ko'ele</i> , on the west, <i>kula</i> land. At Nahookahala I have a claim for three <i>lo'i</i> adjoining Lokea's. On the east is Umene's and Lonoapuakaula's, on the north is Manukeokeo's. At Punamano I have eleven <i>lo'i</i> , surrounded by <i>kula</i> . A cultivated <i>kula</i> land is Kauloekue, with one <i>mala</i> . At Luahine are two <i>mala</i> . The sugarcane <i>kula</i> is mine. My house claim is at Kahuku. It is bounded on the north by the pasture and on the east, south and west by <i>kula</i> . My right of occupancy is from the time of Kamehameha I.
Kahuku	Kaumi	4393	332	1.05	With four taro <i>lo'i</i> , and also a watercourse, which makes the fifth. The boundaries are: on the north, <i>kula</i> 's, on the east, Kaaikaula's, on the west, Kupaihea, on the south, Paauki. On the <i>kula</i> are banana, sweet potato, sugarcane and all such things. There is a wooded upland, with <i>awa'koa</i> , <i>kukui</i> and all such things. My house is at Pooahulu.
Kahuku	Kaumualii	4422	249	2.39	I have six taro <i>lo'i</i> at Nanahu, and a wee-grown <i>lo'i</i> makes the seventh. The boundaries of these <i>lo'i</i> 's are: in the north, Wahokakala, on the east, Kalimataa, west, the <i>kula</i> , south, Puulu. Further, I have two <i>lo'i</i> at Wahokakala, which I cultivate under someone. I have one other <i>lo'i</i> at Puulu, and my house is there and the <i>kula</i> . There is a <i>kula</i> at Luahine with <i>wauke</i> , a salt land, plantings of sweet potato, banana, watermelon and all such things, also a <i>mala</i> of <i>awa</i> . At Ahamau is a <i>kula</i> of <i>wauke</i> , banana, a planted <i>hala</i> tree, and a <i>mala</i> of <i>noni</i> , which are mine. At Ulupehupehu are some <i>malas</i> of <i>awa</i> , trees [for wood], bananas, a <i>koa</i> canoe tree.
Kahuku	Kawaa	2918	519	0.40	The name of the <i>mo'o</i> is Luahine. There is one <i>lo'i</i> , bounded on all sides by Laumea's <i>lo'i</i> 's. My house lot is in Kahuku, bounded on the north, east and south by <i>kula</i> land, on the west by the bank of a <i>lo'i</i> . My right of occupancy is from the time of Kamehameha I.
Kahuku	Keakaokawai	2914	.....	0.82	The name of the <i>mo'o</i> is Kiiiii. There are seven <i>lo'i</i> , bounded on the north by Nauluhao's, on the east by a <i>kula</i> , on the south by Makakiekie's, on the west by Kupaihea's. There is a <i>kula</i> land named Kawelohale. There is a <i>kula</i> land named Kiiipunawai, with four <i>lo'i</i> within it, a clump of <i>hau</i> and a <i>mala</i> of sweet potato. At Ahamau is a <i>mala</i> of <i>wauke</i> . My house claim is at Kahuku and is surrounded by <i>kula</i> . My right of occupancy is from the time of Kamehameha II.
Kahuku	Keawe	2887	5472 3514-A	0.587	The name of the <i>mo'o</i> is Luahine. There are three <i>lo'i</i> , bounded on the north by Kawaa's, on the east by Kaliau's, on the south by <i>lo'i ko'ele</i> , on the west by Paukoas. A <i>mala</i> of sweet potato is at Ahamau, and at Keana I have a <i>mala</i> of <i>awa</i> . My house lot is at Kahuku, and is surrounded by <i>kula</i> . My right of occupancy is from the time of Kamehameha I.
Kahuku	Keaweleikini	2931	281	1.03	The name of the <i>mo'o</i> is Ahamau. There are five <i>lo'i</i> , bounded on the north by Kaaikaula's, on the east by Kupaihea's, on the south by Kekipo's, west, by Kaumi's. There is <i>kula</i> planted in sweet potato, gourd and <i>wauke</i> . In the upland are two <i>koa</i> canoe trees. At Keana is one <i>mala</i> of <i>awa</i> . My right of occupancy is from the reign of Kamehameha III.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Keino	2867	241	1.56	The name of the <i>mo'o</i> is Amo. There are three <i>lo'i</i> , bounded on the north by Kaihikapu's, on the east by my house lot, on the south by Kalua's house lot, on the west by Kanakaloa's. One <i>lo'i</i> is in another place, adjoining those of Kaluamea, Kaihupealani, and Kupau. There is a cultivated <i>kula</i> at Limalaa. At Amo, is a cultivated <i>kula</i> which goes into the seashore. There is a shore land and a <i>kala</i> [sweet potato?] land named Kaloaloa. There is a <i>kula</i> land on the east of Kahipa. My house lot claim is in Kahuku, bounded on the north by Kaihikapu's lot, on the east and south by the land fence, on the west by my <i>lo'i</i> . My right of occupancy is from the time of Kamehameha I. There is a salt land [and] a <i>mala wauke</i> in the upland.
Kahuku	Kekipi	4384	246	1.32	Two taro <i>lo'i</i> are at Ahamau and two banks of a watercourse. Two taro <i>lo'i</i> are at Kahauloa, also in Ahamau, and also the <i>kula</i> is at Kalimaloa. Another <i>kula</i> is at Makapala and another <i>kula</i> is at Poohalulu. Also, there is a wooded upland at Ahamau, with <i>piti</i> grass, a <i>kikui</i> tree, <i>'ohi'a</i> tree, <i>koa</i> tree, and other similar things. These claims are in the <i>Ahupua'a</i> of Kahuku on the Island of Oahu.
Kahuku	Kekua	2913	337	0.47	There is one <i>lo'i</i> bounded on the north and east by <i>kula</i> land, on the south by Kaopupahu's, on the west by Kanehekili. There is a cultivated <i>kula</i> and shore land, <i>Maika</i> of Ulupehupehu is a <i>mala</i> of <i>wauke</i> and a <i>mala</i> of banana and some <i>alani</i> [orange] trees. At Amo is a <i>pali uwala</i> [steep sweet potato planting]. At Kai'olu is a <i>mala</i> of sweet potatoes. At Kahuku, in Ahamau, is one <i>lo'i</i> adjoining that of Makilo. At Mookini is one <i>lo'i</i> adjoining that of Luika, and there is another <i>lo'i</i> there adjoining that of Kalaweaumoku. My right of occupancy is from the time of Kamehameha I.
Kahuku	Kekuauli	2935	.....	0.12	A <i>kula</i> planted in sweet potato and gourd and a <i>pali uwala</i> [steep sweet potato planting]. At Ulupehupehu is a valley planted in sweet potato. At Kahuku are two <i>lo'i</i> at Lanahu and one at Uulakui. My house lot is at Oio, bounded on the north and east by <i>kula</i> , on the south by a land fence, on the west by the sea. My right of occupancy is from the reign of Kamehameha III.
Kahuku	Kiha, Iosua	2864	520	0.88	There is one <i>lo'i</i> , bounded on the north by a <i>kula</i> land, on the east and south by <i>kula</i> , on the west by Kaopupahu's. There is also <i>kula</i> land, mountain land and shore land. I am the <i>konohiki</i> of Ulupehupehu, <i>kula</i> land and mountain land. At Kahuku I have a claim for one <i>lo'i</i> , bounded on the north and west by Palu's, on the east by Kaiiuku's, on the south by Kupihea's. There is also a <i>kula</i> land, Mookini. My house claim is at Punalau, bounded on the north by the sea, on the east by the <i>kula</i> , on the south by the land fence, on the west by Kainalu's. My right of occupancy is from the time of Kamehameha I.
Kahuku	Kuapuu	4374	245	1.60	A <i>kula</i> at Paohalulu, and twenty-four taro <i>lo'i</i> , which are bounded on the north by Wajula, on the east by Paohalulu, on the west by Uulakui, on the south by _____. The valuable things on the <i>kula</i> are <i>hala</i> , <i>wauke</i> , some <i>'iti</i> of sweet potatoes, bananas, and <i>piti</i> grass. There is also the fishery of Pauwela. All these things are at Paohalulu. My right of occupancy upon the land is from the time of Kamehameha III, until present.
Kahuku	Kupaitea	4390	521	0.92	With two taro <i>lo'i</i> , the watercourse, three <i>kula</i> , a fishery, and a wooded upland. The boundaries are: on the north a <i>kula</i> , on the east Kahaumuku, on the west, Kuapuu, on the south, Paauki. There are <i>wauke</i> , sweet potatoes, bananas, <i>papapa</i> [a bean], and similar things planted on the <i>kula</i> . I have a fishery also at Ahamau. My house is at Paohalulu.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Kuhoopohopoho	4428	341	0.51	Testimony not located.
Kahuku	Kula	4383	342	0.09	There are eight taro <i>lo'i</i> and one watercourse, bounded on the north by Kane's <i>lo'i</i> , on the east by Kuhoopohopoho's, on the west by Kala weauakū's, on the south by a <i>pai</i> . There is also a <i>kula</i> , and also there are three <i>lo'i</i> , this is at Kapawa. Two <i>mala</i> of <i>wauke</i> and a <i>mala</i> of <i>uata</i> also, are at Keana. Before the law was enacted.
Kahuku	Kapau	2880	338	0.52	The name of the <i>mo'o</i> is Makapala. There are four <i>lo'i</i> and the edge or bank of a watercourse. The boundaries are: on the north, Umeume's <i>lo'is</i> , on the east Kawaa's, on the south, a Government Road, on the west, Pukawale's. A <i>kula</i> land is planted in sweet potato, <i>noni</i> , sugar cane and banana [and] a cultivated upland. At Malaekahana is the claim for my two <i>mala</i> of <i>noni</i> , two <i>mala</i> of <i>wauke</i> and two <i>koa</i> canoe trees. At Laie I have a claim for one <i>lo'i</i> , bounded on the north and south by Kamamae's, on the east by Kaloana's, on the west by Amaka's. My house claim is bounded on the north by a land fence, on the east, south and west by <i>kula</i> land. My right of occupancy is from the time of Kahahana.
Kahuku	Kupihea	2885	.....	0.13	Consisting of one <i>lo'i</i> bounded on the north and west by a <i>kula</i> , on the east by Kaopupahi's, on the south by Mauiua's. There is also a <i>kula</i> land, mountain land, and a <i>kai</i> [shore area or fishery]. At Ulupehupehu are some <i>mala</i> of sweet potato. At Kahuku are to <i>lo'i</i> , bounded on the north by Kaha's, on the east by Kala weaumoku's, on the south by Holoaia's, on the west by Kaiuku's. My house claim is at Puralau. My right of occupancy is from the time of Kamehameha I.
Kahuku	Lokea	3809	334	0.27	There are nine <i>mo'o</i> of sweet potatoes, a wooded upland, a <i>koa</i> tree, a breadfruit, an <i>ohi'a</i> , and similar things; there is also a fishery, in Kukaela No. 2. My house is another claim of mine, at Hali'ioulu. My right of occupancy is from my <i>makua</i> s in the time of Kamehameha I.
Kahuku	Luiki	2690	339	1.33	The name of my <i>mo'o</i> is Mookimi. There are six <i>lo'i</i> , two watercourse banks and the <i>kula</i> land of Mookimi. The boundaries of the six <i>lo'i</i> and the two watercourses are: on the north, Akamau, on the east, Napoe's, on the south, Hale's, on the west, Kalaweaumoku's. At Ulupehupehu is my claim for a <i>wauke</i> garden and a banana plantation. My house claim is at Kahuku and is bounded on the north by the land fence, on the east by the weed grown <i>kula</i> , and likewise on the south, on the west, a <i>kula</i> . The occupation of my claim has been from the time of Kamehameha I.
Kahuku	Luamea	2691	.....	1.03	The name of the <i>mo'o</i> is Luahine. There are 12 <i>lo'i</i> , and two watercourses, bounded on the north by Kahupuiani's, on the east by Kalauau's, on the south by Makaokalai's, on the west by Kapau's. A cultivated <i>kula</i> land and a shore area, named Kaipauloa, and a watercourse is in another place adjoining the land of Makaokalai. Some <i>wauke</i> gardens are at Akamau. At Puulu is a banana plantation, a mountain land, named Kaulohilani. Three <i>koa</i> trees for canoes are in Waialua at Kalehunui, two <i>hala</i> trees and one <i>kuku</i> tree. The lot claim is at Kahuku; it is surrounded by <i>kula</i> . The occupation of my claim has been from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Makakiekie	2785	.....	0.60	The name of the <i>mo'o</i> is Puulu. There are seven <i>lo'i</i> , bounded on the north by those of Keakaowai, on the east by a <i>kula</i> , on the south by Pukawale's, on the west by Kupaihea's. One <i>lo'i</i> and the watercourse adjoins those of Maui and Kuapuhi and <i>Kula</i> . There is <i>kula</i> land at Kawelohale and Xii, two clusters of <i>hala</i> trees. At Ahamau are some gardens of sweet potato and gourd. There is a shore area called Kaohana. In the upland are some gardens of <i>wauke</i> , <i>awa</i> and <i>noni</i> , and seven <i>koa</i> canoe trees. In another place is a watercourse adjoining Maui's. At Keana are one <i>awa</i> garden, and five <i>koa</i> canoe trees. There is a mountain land, Kalapaweo. My house claim is at Kahuku, bounded on all sides by the <i>kula</i> . There is a fish pond for me, close to my house. My right of occupancy is from the time of Kamehameha I.
Kahuku	Makaokalai	2787	1348	0.73	At Luahine is one <i>lo'i</i> and two watercourses, bounded on the north by Kawa'a's, on the east by a <i>lo'i ko'ele</i> , on the south by Keino's, on the west by Kawa'a's. There is another <i>lo'i</i> , adjoining that of Kaihupuelani. There is a fishpond named Kuruhalane. There is also another pond, Kahukupunawai. There is a <i>kula</i> land, Luahine. There is a shore area, Hanuioha. There are two gardens of sweet potato and <i>wauke</i> . There are two <i>awa</i> gardens. There are four <i>koa</i> canoe trees. At Keana are two <i>awa</i> gardens and three <i>koa</i> trees. My house lot is at Kahuku, bounded on all sides by the <i>kula</i> . My right of occupancy is from the time of Kamehameha I.
Kahuku	Makilo	2779	530	1.15	The name of the <i>mo'o</i> is Paiki. There are eight <i>lo'i</i> , and four watercourses. On the north is Kekipi's, on the east is Umeume's, on the south is Pukawale's, on the west is Kueli's. The <i>kula</i> land is Kubiwa, also Hoahale. My right of occupancy is from the time of Kamehameha III.
Kahuku	Makole	2782	243	0.50	The name of the <i>mo'o</i> is Ahamau. There are four <i>lo'i</i> , bounded on the north by <i>lo'i ko'ele</i> , on the east by Mauoli's, on the south by <i>lo'i ko'ele</i> , on the west by Pahanui's. I also have a watercourse adjoining the <i>konohiki</i> 's. At Lanahu are three <i>lo'i</i> adjoining those of Kaohela. I also have a <i>kula</i> land at Hii, a row of <i>hala</i> trees, also a salt land. At Punalau is a banana garden, with <i>noni</i> and breadfruit, four coconut trees. At Oio, is a garden of <i>noni</i> , <i>wauke</i> , <i>hala</i> , and six <i>koa</i> canoe trees. At Ahamau is one <i>koa</i> canoe tree. Two fish ponds, a sweet potato <i>kula</i> are at Amo. At Luahine is a <i>wauke</i> garden. At <i>Kahala</i> is a garden of banana, <i>wauke</i> and sweet potato. My house claim is at Kahuku, bounded on the north by the sea, on the east and south by a land fence, on the west by Napoo's loi. My right of occupancy of these places is from the time of Kamehameha II.
Kahuku	Matatua	2775	534	1.45	The name of the <i>mo'o</i> is Kanaiki. There are six <i>lo'i</i> , bounded on the north by the <i>lo'i konohiki</i> , on the east by Palu's, on the south by a <i>lo'i po'alina</i> , on the west by a <i>lo'i ko'ele</i> . Two <i>lo'i</i> are together with those of Manuakoeko, Kaumualii and Kauhala. The <i>kula</i> land is Kanaiki, Kalimalaa, Makapala. Six <i>lo'i</i> are at Puulu, at Ahamau, at Luahine, at Halane, two at Luahine. A row of <i>hala</i> trees is at Amo, at Luahine. At Punalau are two <i>koa</i> canoe trees. A salt land is at Luahine. My house claim is here in Kahuku, bounded on the north by a land fence, on the east, south and west by a <i>hala</i> grove. My right of occupancy was from the time of Kamehameha II.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Male	3723	331	0.67	With seven taro <i>lo'i</i> , bounded on the north by Napoe, on the east by a <i>kula</i> , on the west by Palama, on the south by Kalahana. Furthermore, I have some "jump" claims: at Makapala, three taro <i>lo'i</i> , at Puulu, eight <i>lo'i</i> and five <i>kula</i> , at Ahamau, two fish ponds, one bathing pool and my house. The <i>Ahupua'a</i> is Kahuku. My occupancy of these claims has been from the time of Kamehameha I.
Kahuku	Manukeokeo	2781	533	1.09	There are four taro <i>lo'i</i> and three <i>lo'i</i> overgrown with grass or herbage. The boundaries are, on the north, Puahiki's, on the east, Kanahua's, on the south, Lonopukauiia's, on the west, a sugarcane <i>kula</i> . There is a <i>lo'i</i> in another place, next to that of Malailua and Kaukaha and Kaumualli. At Punalau is a garden of sweet potato. At Lanahu is a garden of banana and <i>wauke</i> . At Arno is a gourd garden. At Punalau is a gourd garden. My house claim is also at Punalau and is bounded on the north by Kaohela's lot, on the east by a <i>kula</i> , on the south by the land fence, on the west by a <i>kula</i> . I have had the right of occupancy on these places from the year of our Lord 1842.
Kahuku	Maui	2783	.....	0.25	The name of the <i>mo'o</i> is Kahoku. There are six <i>lo'i</i> , bounded on the north by Pukawale's <i>lo'i</i> , on the east by a <i>kula</i> , on the south by Puu's, on the west, by Kaihupaelani's. One <i>lo'i</i> is in another place, adjoining those of Napoe and Pukawale. There is <i>kula</i> land cultivated in <i>wauke</i> , sugarcane, banana, sweet potato, a clump of <i>hairi</i> and a cluster of <i>hala</i> trees from Pukokinui to Pukokoiki. There is an upland cultivated in <i>wauke</i> , sweet potato, and two <i>koa</i> canoe trees, at Ahamau. At Poohalulu is a sweet potato garden and a cluster of <i>hala</i> trees. My house lot is here in Kahuku, surrounded by the <i>kula</i> . My right of occupancy is from the time of Kamehameha I. A single <i>lo'i</i> adjoining mine, was for my <i>makua</i> , and is for me. The <i>kula</i> of Kupunawai, a cluster of <i>hala</i> trees at Kaupoo, a <i>wauke</i> garden, two <i>noni</i> gardens, two <i>awa</i> gardens, and the cultivated <i>kula</i> of Kawelohale are for me.
Kahuku	Mauoli	2788	257	1.09	The name of the <i>mo'o</i> is Lonohonuabiri. There are eight <i>lo'i</i> , bounded on the north by a <i>kula</i> , on the east by Kueulu's, on the south by a <i>lo'i ko'ele</i> , on the west by Makole's. I have two <i>lo'i</i> in the land of Makole, two <i>lo'i</i> in the land of Kueulu. In the land of Uha are <i>kula</i> land and five gardens. At Hanapaua is one garden. At Poohalulu is one garden. At Waiuia is one garden. At Manono is a taro <i>lo'i</i> . In the upland are some gardens of banana and <i>wauke</i> . There are two salt lands. There are two houselots close to the seashore, named Kukuu and Kahala. My right of occupancy is from the reign of Kamehameha III.
Kahuku	Napoe	2758	247	1.69	The name of the <i>mo'o</i> is Puulu. There are four <i>lo'i</i> and four watercourses, bounded on the north by Kalaweaumoku's, on the east by Piji's, on the south by Male's, on the west by Luiki's. There is another <i>lo'i</i> in another place, adjoining that of Kanahua and Kainalu and Kaumualli. Another <i>lo'i</i> is at Hanapaua. There is <i>kula wauke</i> land, three <i>wauke</i> gardens, one at Puaakea, one at Makapala, and one at Halane. Two fish ponds are at Panalau. Seven <i>hala</i> trees, two <i>noni</i> gardens and a sweet potato garden are in Kahuku. At Ulupehupehu is a garden of banana, <i>wauke</i> and sugarcane. At Oio are three <i>koa</i> canoe trees. At Punalau is one <i>koa</i> canoe tree. Here at Kahuku are four <i>koa</i> canoe trees. My house claim is at Kahuki, bounded on the north by the sea, on the east and south by <i>kula</i> , on the west by a pond which is mine.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Nauluhao	3958	254	1.71	There are eleven taro <i>lo'i</i> , a <i>kula</i> , a wooded upland, with breadfruit, <i>'ohi'o</i> , <i>kukui</i> , <i>koa</i> , <i>ti</i> leaves, <i>noni</i> , and everything else that grows there. I also have a salt land. The boundaries are: north, the seashore, east, a <i>hala</i> and Pukoko, west, Nani, south, Kililini. Also, there is one <i>lo'i</i> at Kahauloaa. A second <i>lo'i</i> is at Kalai. A place cultivated in <i>wauke</i> , sweet potatoes and watermelon is at Niu. These claims are at Ahamaui. Also, there is a <i>kula</i> named Waiula, which is at Kaimaloa. Another <i>kula</i> , named Hawea, is at Luahine. My right of occupancy, to this day, is from the time of Kamehameha I. My house is at Kalimaloa. There remains a <i>koa</i> canoe tree at Ahamaui.
Kahuku	Ni'au	3951	260	1.22	There are twenty-three taro <i>lo'i</i> , also a <i>kula</i> , with sweet potato, sugarcane, banana, <i>wauke</i> , watermelon, <i>pili</i> grass. There is also a <i>kai</i> [shore area, or fishery], of Kakaako. The boundaries are: on the north, the sea, on the east, Ahamaui, on the west and south is Kuapuu's. Furthermore, there are two clumps of <i>hala</i> and one is in the Kuapuu's, making the third. Kamehameha II, except the house.
Kahuku	Pakanaka	2744	.....	0.38	It is mountain land, a garden of banana, <i>'owa</i> , sugarcane, and <i>wauke</i> . There are nine <i>koa</i> canoe trees, a <i>kula</i> planted in sweet potato and gourd, two <i>lo'i</i> , a grove of <i>hala</i> trees, and salt bed land. At Kahuku is one <i>lo'i</i> adjoining those of Kaihohoua and Lonoopuakaula. My house lot is at Oio, bounded on the north by that of Kauhikahi, on the east by <i>kula</i> , on the south by Is, on the west by the sea. My right of occupation is from the time of Kamehameha I.
Kahuku	Pakui	3813	248	2.21	There are ten taro <i>lo'i</i> , a <i>kula</i> , a wooded upland, a fishery, and a salt land. The boundaries are: north, Kekipi's, east, Ainao, west, Aaiki, south, Puae. Another <i>lo'i</i> is in the Kai'o's, in Ahamaui. Furthermore, there are two <i>kula</i> . One is at Poohalulu in Niau's <i>mo'o</i> , planted with <i>wauke</i> , sweet potato, banana and watermelon. Another <i>kula</i> is at Poohalulu in Kuapuu's, planted as aforementioned. There is also <i>kula</i> at Keahupuaa, with <i>wauke</i> , sweet potato, watermelon, banana, and such things. Also, I have a house at Poohalulu. Here are some remaining claims: a <i>malu</i> of <i>'owa</i> at Luahine, a <i>malu</i> of <i>noni</i> at Puulu, a <i>koa</i> canoe tree at Ahamaui.
Kahuku	Pahanui	2730	258	2.31	There are five taro <i>lo'i</i> , two banks of a watercourse and also a <i>kula</i> . <i>Wauke</i> , banana, sweet potato, <i>noni</i> , <i>hala</i> , <i>pili</i> , and such things are planted in my <i>mo'o</i> , which is bounded on the north and east by Ahamaui, on the south by Palu, on the west by Puaakea. There is a <i>kula</i> planted in <i>wauke</i> and the salt land. There are sweet potato, sugarcane, <i>noni</i> , wood from the upland, <i>olona</i> , <i>koa</i> , <i>'ohi'o</i> , <i>kukui</i> and such things at Ahamaui, which is bounded on the north by the seashore, on the east by Mauoli, on the south by Napoe, on the west by the <i>kuahiriwi</i> [mountain] of Waimea. My house lot is at Punakaipo. I have held these claims from the time of Kamehameha II.
Kahuku	Palu	2738	518	0.51	The name of my <i>mo'o</i> is Mookini, there are ten <i>lo'i</i> and the watercourse, bounded on the north by Mooni's, on the east by Kalaweamoku's, on the south by a <i>ko'ele lo'i</i> , on the west by Malalua's and Mooni's. A cultivated <i>kula</i> is <i>mauka</i> , a garden of <i>noni</i> and of <i>'awa</i> , named Namakana. At Oio are two <i>koa</i> canoe trees, at Ulupehupehu is one <i>koa</i> canoe tree. There is a salt land at Ahamaui, a <i>wauke</i> garden and a row of <i>hala</i> trees. My house lot is at Kahuku, and is surrounded by <i>kula</i> . My right of occupation is from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Polena	2729	517	2.02	The name of the <i>mo'o</i> is Luahine. There are seventeen <i>lo'i</i> , bounded on the north by the <i>kula</i> , on the east by Kaihikapu's land, on the south by Kaluau's land, on the west by Maui's land. There are cultivated <i>kula</i> s named Uwalapahupahu, Mamakaloa are Luahine. There is a sea shore land, named Puhikaawe. At Keana are two <i>awa</i> gardens, and a garden of breadfruit and <i>'ohi'a</i> . My houselot is at Kahuku, and is bounded on the north, east and west by a <i>kula</i> , on the south by a salt bed. My right of occupancy is from the time of Kamehameha I.
Kahuku	Pukawale	2732	336	2.1	There are five <i>lo'i</i> bounded on the north by those of Makakikie, on the east by a <i>kula</i> , on the south by Maui's, on the west by Kupaika's. There is a shore area—the name of the sea [fishery] is Keekee, and a mountain area. At Makapala are two <i>lo'i</i> , bounded on the north by Umeume's, on the east by Kupau's, on the south by a <i>kula</i> , on the west by a <i>ko'eie lo'i</i> . There is a cultivated <i>kula</i> named Makapala, another <i>kula</i> is Maui'loa, and there is another valley [or gulch]. At Keana are two <i>wauke</i> gardens and two <i>koa</i> canoe trees. My houselot is at Kahuku and is surrounded by <i>kula</i> . I have had the right of occupancy since the time of Kamehameha I.
Kahuku	Puu	2723	522	1.15	The name of the <i>mo'o</i> is Kaulo'okeu. There are six <i>lo'i</i> , bounded on the north by those of Niau, on the east by those of Lohea, on the south by those of Heea, on the west by those of Kuapuu. There is a cultivated <i>kula</i> , Kaulo'okeu. A taro land is named Punamano. The <i>kula</i> land of Kaiea goes down to the sea. The shore land is Lu'ae'hu and Punawai. My house claim is at Kahuku, bounded on the north by a salt bed, on the east by a <i>hau</i> clump, on the south and west by <i>kula</i> . [It has been held] from the time of Kamehameha III, being the year of our Lord 1845.
Kahuku	Uha	2681	240	2.1	The name of the <i>mo'o</i> is Kauniniwai. There are six <i>lo'i</i> and it is bounded on the north by the <i>kula</i> , on the east by Kekipi's, on the south by Kaaikaula's and Pakui, on the west by Kaaikaula's also. I have four <i>lo'i</i> at Kaleimala; next to Hooni's is a <i>kula</i> land, named Meeakalii. At Kakala is a garden of sweet potato, gourd and banana. At Hale'eanani are some <i>wauke</i> gardens. At Ula'kapala is a garden of banana, <i>wauke</i> , sugarcane and gourd. At Pu'alu is a sweet potato garden. At Pumaia is a pit with banana and <i>'awa</i> . At Kalehuawai is a garden of <i>'awa</i> , banana, taro, a <i>hau</i> grove named Kukio. At Mookini is a <i>wauke</i> plantation, and in the upland is a <i>noni</i> garden named Katalua'ala one <i>koa wa'a</i> [<i>koa</i> tree large enough to make a canoe?] I have occupied [these places] during the reign of Kamehameha III.
Kahuku	Uka	3748	528	1.27	With seven taro <i>lo'i</i> , a <i>kula</i> , an upland with <i>pili</i> grass, a <i>koa</i> tree, a <i>kukui</i> tree, an <i>'ohi'a</i> tree, and all the vegetation. Also, there is a salt land at Ahamau. The boundaries are: north, the seashore, east, Hauti's, west, Mauoli's, south, Waimea mountain. A <i>kula</i> is at Poo'ahulu, planted with <i>wauke</i> , watermelon, sugarcane, and such things. Five taro <i>lo'i</i> and the banks of a watercourse at Puulu. The three things below are scattered. Two taro <i>lo'i</i> at Kahani, some <i>lo'i</i> is at Ahamau, and a house at Poo'ahulu. I acquired these lands before the enactment of the law.

Location	Awardee	LCA	RP	Area	Description
Kahuku	Umeume	2679	259	1.42	The name of the <i>mo'o</i> is Paauiki. There are 6 <i>lo'i</i> . The boundaries are: north, Kaaikaula's, east, Kau's, south, Kuwahapuhi's, west, Maikilo, a <i>kula</i> land, a cultivated upland. In another place is one <i>lo'i</i> , at Punamano. Three <i>lo'i</i> are at Mookini. A <i>kula</i> is cultivated in <i>wauke</i> , sweet potato and gourds. At Punalau is a banana and <i>noni</i> patch. At Ulupehupehu are three <i>wauke</i> , banana, sugarcane and sweet potato patches. Here at Kahuku is a <i>puna pa'akai</i> [brackish spring?] and my two <i>hala</i> trees. My houselot is here in Kahuku. Its boundaries are surrounded by <i>kula</i> .
Kahuku	Waaniu	2698	340	0.75	The name of the <i>mo'o</i> is Puaakea, and I have two <i>lo'i</i> . On the north is Lokea's, on the east is Kaitiuku's, on the south is Kaukaha's land, on the west is Napoe's land. At Oio I have some gardens of <i>wauke</i> , <i>noni</i> , and a <i>kula</i> cultivated in sweet potato. At Ulupehupehu are some gardens of sweet potato and gourd. My houselot is at Ulupehupehu. On the north is the sea, on the east and south is <i>kula</i> , on the west is the houselot of Kane. My right of occupancy is from Kamehameha III.
Kahuku	Waiaulaa	2702	.....	0.93	They are <i>kula</i> lands, named Waiahomohamo, Haamala and Puukamanu, and a row of <i>hala</i> trees Kaupoo, a <i>hala</i> tree at Koolina, a <i>puna pa'akai</i> [brackish spring] and a row of <i>hala</i> Mahukini. My house claim is at Kahuku and is bounded on the north, south, and west by a <i>kula</i> , on the east by a row of <i>hala</i> . My right of occupation was from the time of Kamehameha I.

Appendix A
Land Commission Awards for Kaipapa'u

Location	Awardee	LCA	RP	Area Acres	Description
Haipapau	Hikiau	8167			Be it known to you, the Land Commissioners, that my claim for land is in the Ahupua'a of Kaipapau. Keaweiki has the mo'o, I only have a kula. It is bounded on the north by Kanihooi's mo'o, on the east, Hoopalaha's mo'o. I have a claim for cultivation in the upland, and in the forest, and a fishing claim, and a house lot claim.
Haipapau	Hoopalaha	8171			Be it known by the Land Commissioners that my land claim is in the Ahupua'a of Kaipapau. The mo'o is Kihapai, in this mo'o I have four lo'i, bounded on the north by a house claim, on the east by Kaiwinui's mo'o. I have a kula claim in this mo'o adjoining on the east [or south?] of Hikiau's mo'o kula. I cultivate in the kula of Kanihooi, and in the kula of Kawahine, and in the kula of Maiahe. I have a claim of cultivation in the upland and in the forest. I farm in the Ahupua'a of Hauula. The mo'o is Kalapahoa, I have two lo'i in it and a small kula also adjoining on the north, the kula, on the east, the mo'o of the konohikis. Those are my claims, from the konohikis. I also have a house claim.

Appendix A
Land Commission Awards for Kaunala

Location	Awardee	LCA	RP	Area ACRES	Description
Kaunala	Kaapuiki, S.	5235	5689	1384	To the President of the Land Commissioners and the other four Commissioners whom the <i>Mō'i</i> has appointed to investigate land titles in the Hawaiian Islands: I hereby state, since I was directed by the Minister of Finance of the Government to tell of my lands from the <i>Mō'i</i> and enter the two claims from the Minister. The names of my lands from the <i>Mō'i</i> are Kamooakua, an <i>'i'i</i> of Honolulu, and Kaunala, an <i>Ahiupua'a</i> , Koolauloa. Those are my lands which were from the <i>Mō'i</i> , my <i>Haku</i> (landlord) given me by the Minister on the 31st day of January 1848, and given in the name of the <i>Mō'i</i> . I am, respectfully, your obedient servant.
Kaunala	Kaio	2891	1226	0.18	To the Land Commissioners, Respectful Greetings: I Kaio, hereby state my claim for land. Two <i>lo'i</i> are at Kalalahii, bounded on the north and west by the houselot of Holi, on the east by Pahua's, on the south by Nakuaka's. There is one <i>lo'i</i> in another place, at Punalau, bounded on the north by Kahuku's, on the east by Nahauka's, on the south by <i>kula</i> , on the west by Kaaina's. There is also a sweet potato <i>kula</i> next to Kapaahao. At Pahipahialua is one <i>lo'i</i> adjoining that of Kahaleipu's on the east, and in another place a portion of a <i>lo'i</i> at Kalou. One clump of <i>hala</i> is at Kahaunakaiwi; a <i>moku weuweu kanu wauke</i> [pocket of soil planted in <i>wauke</i>] is at Kakai, <i>mauka</i> , adjoining Leimakani's. In another place is a <i>kula</i> planted in <i>wauke</i> and <i>noni</i> and towards the sea is a <i>kula</i> planted in sweet potato and gourd. At Kaunala are bananas and a <i>koa</i> canoe tree. At Paumalu is an upland planted in banana, <i>wauke</i> and sweet potato. My right of occupancy is from the time of Kamehameha I until the present.
Kaunala	Nahuaka	2756	1327	0.37	To the Land Commissioners, Respectful Greetings: I, Nahuaka, hereby state my claim for land at Punaluu, one <i>lo'i</i> , bounded on the north by Kahuku's, on the east, Ka's land, on the south a <i>kula</i> land, on the west, Kaio's. There is another <i>lo'i</i> adjoining that of Holi, and there is sweet potato <i>kula</i> land. At Pahipahialua I have a claim for one <i>lo'i</i> adjoining with that of Kaio on the north and with that of Kihewa on the east. I have a <i>wauke</i> garden at Kaunala, with sugarcane and banana. At Paumalu is a cultivated upland. My houselot is at Kaunala, bounded on the north by Government Road, on the east and the south and west by <i>kula</i> land.

Appendix A
Land Commission Awards for Keana

Location	Awardee	LCA	RP	Area Acres	Description
Keana	Katawaiamanu	4391	3516	2.67	To the Land Commissioners, Greetings: I, Kala waia manu, am a claimant in the 'iti in Luana [?]. There are three 'iti <i>wawau</i> in one 'iti of sweet potato, one 'iti of <i>waike</i> , bounded on the north by the <i>kula</i> , on the east and west by sugarcane, on the south by the <i>pali</i> . Here are the "jump" lands: At Halulu is sugarcane, <i>waike</i> . At Kahalau is breadfruit and <i>noni</i> . At Keaaulu is a breadfruit, and <i>noni</i> . At Kapuu is <i>noni</i> . At Kealahaka is 'awa, sugarcane, and banana. At Paoa is 'awa. At Uunohala is a <i>kula</i> planted in sweet potato and watermelon. My house is at Nonula. My right of occupancy is from the time of Kamehameha II.
Keana	Kimimaka	7130	5693	770 1/2 Ahp	Greetings to the Land Commissioners of the Hawaiian Islands: I hereby state my claim for land: Kalahiki Hawaii. Maihi. Onouimalo, Molokai. 1/2 Keana, Oahu, Koolauloa.
Keana	Kuapuhi	4329	6247	0.71	Testimony for Laie, not Keana.

Appendix A
Land Commission Awards for Laie

Location	Awardee	LCA	RP	Area in Acres	Description
Laie	Alaala	3774	932	0.60	To the Land Commissioners. Greetings: I, Alaala, am a claimant of land at Laie, in the 'i'i of Kumupali, consisting of two lo'i, three kula and one kula house site. Here are the boundaries: north, Kalimanui's land, east, Kahiaele's land, west, the Land of Keao, south the Land of Laielehelohe. The scattered claims are: In the 'i'i of Keahupuaa, two kula. In the 'i'i of Kahikaele, two kula. Because these claims are so scattered it is not practical to tell you their boundaries. My right of occupation is from my kupunas to the present time.
Laie	Amaka	3773	918	2.10	To the Land Commissioners. Greetings: I, Amaka am a claimant of land at Laie in the 'i'i of Kamapuna. There are five lo'i, and one kula, no kula house lot. Following are the boundaries: north, Land of Kaleo, east, Puni's land, west, Moanaili's land, south, the Land of Pupuka. Here are the scattered claims: In the 'i'i of Kumupali, three lo'i, no kula. In the 'i'i of Paakea, two kula, no lo'i. In the 'i'i of Kahikale, nine kula, no lo'i. In the 'i'i of Aakahi four kula. In the 'i'i of Nabelehele one kula. Because these claims of mine are so very scattered it is not practical to tell you their boundaries. My right of occupancy of these claims is from my kupunas to the present reign of Kamehameha III.
Laie	Ekū	3729		0.25	To the Land Commissioners. Greetings: I, Iku, hereby state my claim for two tano lo'i at Kuaiohumu, adjoining the lo'i of Kahimoe, one on the east and one on the west. One tano lo'i and one moku weuweu [arable pocket of soil] are at Kaihukuuna, adjacent to the 'i'i of Kaonohi. One moku weuweu is at Kapano adjoining with Kauahi's on the east.
Laie	Hano	4003	1444	0.92	To the Land Commissioners. Greetings: I, Hano am a claimant of land at Laie. In the 'i'i of Paoo are three lo'i, one kula, one kai [fishery], one mountain area. The bounaries are: on the north, muihiwai land of Poouahi, on the east, land of Kaupuaa, on the south, land of Kauwaiaua, on the west, land of Pali. Here are the scattered claims: In the 'i'i of the atupua a, six lo'i, ten kula. Seaward of the mountain, one house lot. In the 'i'i of Kapuna, one lo'i, two kula. Because these claims are so very scattered, therefore it is not practical to describe their boundaries to you, the Land Commissioners. My right of occupancy at these places is from the time of Kamehameha I until the reign of Kamehameha III at this time.
Laie	Ihupuu	3731	3508	1.66	To the Land Commissioners. Greetings: I, Ihupu, am a holder of land in the 'i'i of Kapuna, with three lo'i and the kula. North is Kamapuna, east is Aimanino, west is Kalawa, south is Kanauweuweu, those are the boundaries. At Kamuha is a one-sided lo'i. At Halepuu is one lo'i. At Kapuna is a water course, and Kapue, this is a kula. At Laie ma'oo are four 'i'i of sweet potatoes. At Kano [blo] opuna are six 'i'i of sweet potato. At Kapalaoa, on the mountain, is one 'i'i of sweet potato. At Kuakala are four 'i'i of sweet potatoes, on the Kaulukau are three, two 'i'i of wauke, two 'i'i of sweet potatoes and the pali. At Kahaumalo is one mala of awa and the mala of wauke. A mala of gourd is bounded on the north by a government road, on the east by Kapawai, on the west by the pali of Kapalaoa, on the south by Haluluhele. Also, my house is at Laiewai. My occupancy has been from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area in ACRES	Description
Lai	Kahalelaau	4338	920	0.95	To the Land Commissioners, Respectful Greetings: I, Kahalelaau, hereby state my claim for land at Malekahana. It is <i>kula</i> land, named Niu. At Wawaekua are two <i>mala</i> . At Kukulumalalo is one <i>mala</i> . At Makanukcaloi is one <i>mala</i> . There is also a shore area named Haii, and a mountain land named Olohanua. I have a claim at Lai for one <i>lo</i> 'i. On the north and south is Kalimakuhi's, on the east is Kualonoehu's, on the west is a <i>kula</i> . There is also <i>kula</i> land, a share of a <i>lo</i> 'i in another place adjoining that of Kaloana and Kawahana. My right of occupancy is from the time of Kamehameha II.
Lai	Kahoale	4325	1304	1.25	To the Land Commissioners, Greetings: I, Kahoale, the claimant at Lai, in the 'i of Kuaiokumu, have two <i>lo</i> 'i and two <i>kula</i> . The boundaries are: On the north, <i>Maiiwai</i> of Pooahi, on the east, the land of Kamaneo, on the south, the land of Lakee, on the west the land of Napaeke. Here are my "jump" claims in different places: In the 'i of Kapuna, one <i>kuakiwi</i> . In the land of Lakee, one house lot. Because these claims of mine are so scattered it is not practical for me to tell you, the Land Commissioners, their boundaries. My occupation of these claims has been from the time of Kamehameha I, until the present.
Lai	Kahoukua	4333	925	1.21	To the Land Commissioners, Greetings: I, Kahoukua, am a claimant at Lai in the 'i of Paakea. There are five <i>lo</i> 'i, no <i>kula</i> . The boundaries are: On the north, the land of Lakee, on the east Kaula's land, on the south, the land of Kanakanui, on the west, the land of Kanakaua. Here are the scattered claims: In the 'i of Kumupali, from Kaolohelohē, one <i>lo</i> 'i. In the 'i of the <i>ahupua</i> 'a, from Kalou, one <i>kula</i> , one <i>kula</i> house lot. In the 'i of Koloa, three <i>kula</i> . One <i>kula</i> is on the mountain, and was received from Kula. In another 'i of the <i>ahupua</i> 'a are thirteen <i>kula</i> lands. Because these claims are so scattered, it is not practical to tell you, The commissioners, their boundaries. My right of occupancy of these claims is from the time of my <i>kupunas</i> until the present.
Lai	Kahuaialua	6989	930	0.64	To the Land Commissioners, Greetings: I, Kahuaialua am a claimant of land at Lai, in the 'i of Kumupali, one <i>mo</i> 'o with five <i>lo</i> 'i and one <i>kula</i> . It is bounded on the north by the land of Puni, on the east by Keawe's land, on the south by the land of Lai'ohelohe, on the west by the land of Kalia. Here are the scattered claims in the 'i of Kawahana: One half of the <i>lo</i> 'i in the 'i of the <i>Ahupua</i> 'a of Malaakahana, ten <i>kula</i> from the sea to the mountain. Because they are so scattered, the boundaries are not stated to you. My occupancy of these claims has been from Kamehameha I until at this time.
Lai	Kainoahou	3699-B	7430	1.574	Pauahi's sworn says he knows the Kuleana of Kainoahou, at "Lai" Koolaula. It consists of 2 <i>kalo</i> patches, a piece of <i>kula</i> land and a house site. The boundaries are correctly set forth in the survey now shown, made by W. Turner. He received this land from a former <i>Konohiki</i> , called Paka, in ancient times, and held it in place up to the time of his death a few years ago (Foreign Testimony Vol. 3 pg. 531)

Location	Awardee	LCA	RP	Area in Acres	Description
Lai	Kaiolohia	4290	3008	1.40	To the Land Commissioners, Greetings: Because of the enactment of the law by the Mo'i, saying for the claimants to present their claims, therefore I hereby state my claim for my land. There are four taro lo'i at Punana. Two taro lo'i are in Lai <i>maloo</i> , mo'o of Paukauwela. An 'iti of <i>wauke</i> and one grass <i>kula</i> are at Pauokiki. Two <i>malu</i> of <i>awa</i> , one <i>malu</i> of <i>noni</i> , three <i>malu</i> of sweet potatoes are at Akakii. One 'iti of grass and one house site are bounded on the north by the seashore, on the east by a pippen, on the west by a <i>mutiwai</i> . The right was from the time of Kamehameha I. One house lot.
Lai	Kala	4269	928	0.76	To the Land Commissioners, Greetings: I hereby state my claim at Paakea, consisting of one mo'o, two taro lo'i [land?] one [other?] lo'i at Paakea. An 'iti, Kalaiatui, is at Kiloa. One steep sweet potato planting is at Koloa. Two sweet potato lo'i [since lo'i are wet terraces, these must have been dried out lo'i] are at Aakakii. Two <i>kou</i> canoe trees are at Kuamoo. My right is from the time of Kamehameha I.
Lai	Kalawaiahonua	4039	-	0.52	To the Land Commissioners, Greetings: I, the one whose name is below, hereby state to you, the Commissioners, my claim for land in the 'iti of the <i>ahupua'a</i> . There is one lo'i, and in the 'iti of Kapana, one <i>kula</i> , no lo'i. These claims of mine are scattered, not is it practical to tell their boundaries to you, the Land Commissioners. [I have held these claims] since the reign of Kamehameha III to the present.
Lai	Kaleo	4271	3387	1.20	To the Land Commissioners, Greetings: I hereby state my claim for forty-three lo'i at Kalawa. One taro lo'i is at Mokuula. One <i>kula</i> is at Kawawai. One 'iti of <i>wauke</i> is at Poopoo. One 'iti of <i>wauke</i> is at Hapukalehua. There is one house site. My right of occupancy is from the time of Kamehameha I.
Lai	Kalou	4334	924	0.65	To the Land Commissioners, Greetings: I, Kalou, am a claimant of land in Lai in the 'iti of the <i>ahupua'a</i> , one <i>kula</i> mo'o, no lo'i. The boundaries are below, which I state to you, the Land Commissioners. On the north, east, and the south and west is the land of Peka. Here are the scattered claims: In the 'iti of the <i>ahupua'a</i> are eight <i>kula</i> lands, which I had from Peka. In the 'iti of Keke are eight <i>kula</i> lands from Peka and Kaiolohia and Kanakanui. One lo'i is in the 'iti of Paakea. One other lo'i is in the 'iti of Kapuna. One was from Pia and one was from Lakee in the 'iti of Paakea. Because they are so scattered it is not practical to tell you, the Land Commissioners, of their boundaries. My right of occupancy on these land claims is from my <i>kupunas</i> until the present.
Lai	Kalua	4329	931	1.04	To the Land Commissioners, Greetings: I, Kalua, am a claimant of land in Lai, in the 'iti of Kumuipali. There are five lo'i, one <i>kula</i> from the sea to the <i>kuahiwi</i> , and one <i>kula</i> house lot. The boundaries are: On the north, the land of Amaka, on the east, the land of Kalimanui, on the west, Puni's land, on the south, the land of Kaloana. Here are my claims which I cultivate in various places. In the 'iti of Kahukaele are six <i>kula</i> , no lo'i, no house lot. Because these claims of mine are so very scattered it is not practical to tell you, the Commissioners, of their boundaries. My right of occupancy of these places is from my <i>kupunas</i> until the present.

Location	Awardee	LCA	RP	Area in Acres	Description
Laie	Kamamae	8440	7993	0.74	To the Land Commissioners, Greetings: I, Kamamae, hereby state my claims. One taro <i>lo'i</i> is bounded on the north by Kanauewe, on the east by Kaawai, on the south by the <i>lo'i</i> of Napaiko. Two <i>wauke</i> patches are at Kaa'waawai, one patch is at Punana, one sweet potato patch is at Omao, one sweet potato patch is at Kapuna, one <i>mala</i> of <i>noni</i> and two <i>hala</i> trees. My occupancy is from the time of Kamehameha I.
Laie	Kamano	4331	3383	0.62	To the Land Commissioners, Greetings: I, Kamano, am a claimant of land in the <i>'i'i</i> of Koloa (in the) <i>ahupua'a</i> in Laie. There are sixteen <i>lo'i</i> , two <i>kula</i> . Two <i>kula</i> are in the <i>kuahiwai</i> and were from Peka. The boundaries are as follows: northeast and south, the <i>kuahiwai</i> , west, the land of Newa. Here are the scattered places: In the <i>'i'i</i> of the <i>ahupua'a</i> , three <i>kula</i> , and one <i>kula</i> house lot. Because these are so scattered it is not practical to tell you their boundaries. Here again are some claims I have at Kapaka in the <i>'i'i</i> of Paki and Kilinahe. There are eight <i>lo'i</i> and one <i>kula</i> , bounded on the north by the land of Kanaana, on the east by the sea, on the south by the land of Kolkoli, on the west by the land of Kilinahe. My right of occupancy of these claims was from my <i>kupunas</i> to the present.
Laie	Kanakanui	4301	2916	2.72	To the Land Commissioners, Greetings: I hereby state my claim. Paakea is my <i>mo'o</i> with five taro <i>lo'i</i> . One taro <i>lo'i</i> is at Puapuanenei. Two <i>lo'i</i> are in Kapaka. One <i>kula</i> is at Kaloawai. One <i>kula wauke</i> is in Kalapathahaloa, an <i>'i'i</i> of Koloa. Three <i>mala</i> of <i>noni</i> are in Paukauwila. One <i>mala</i> of <i>noni</i> is at Kahaumalo. Two steep sweet potato plantings are in Koloa. One taro <i>lo'i</i> is in the upland of Koloa. One <i>'i'i</i> of <i>wauke</i> is at Kaluaolohe. Two steep sweet potato plantings are in Koloa. One taro <i>lo'i</i> is in the upland of Koloa. One <i>'i'i</i> of <i>wauke</i> is at Kaluaolohe. One <i>'i'i</i> is in the upland of Ni'au. Two house lots. My taro <i>lo'i</i> are from my <i>makua</i> s. Kamehameha II was the ruler [when they got them].
Laie	Kanehoa	4286	-	0.48	To the Land Commissioners, Greetings: I, Kanehoa, hereby state my claim at Kekulu. One <i>kula wauke</i> is in the <i>mo'o</i> of Kapaokahala on the east of Omilomilo. One <i>kula</i> is at Kawawao adjoining the <i>kula</i> of Kekoi on the west. Three <i>kula</i> are in Koloa, from the tobacco planting of Kahoe. One <i>kula</i> is in Makakea's land. One <i>mala</i> of sweet potatoes is on the hill of Kaao.
Laie	Kaonohi	4288	-	0.5	To the Land Commissioners, Greetings: I hereby state my claim at Koloa in the <i>'i'i</i> . There are two taro <i>lo'i</i> at Kiki. Two dry <i>lo'i</i> are at Kiki, and one clump of <i>hau</i> and five taro <i>lo'i</i> are at Koloa. One <i>mala</i> of <i>'awa</i> is at Koloa. One <i>moku weuwei</i> is at Kalole. One <i>moku weuwei</i> is at Paeeaea. One <i>apuapu</i> (?) is at Koloa. 8 <i>moku weuwei</i> 2 <i>mala</i> of <i>wauke</i> , 1 <i>moku weuwei</i> are at Koloa. 1 <i>'i'i</i> is at Aakakii. My right is from the time of Kamehameha I.
Laie	Kaonohi	4288	-	0.057	See above
Laie	Kapaokahala	4297	1446	0.47	To the Land Commissioners, Greetings: I, Kapaokahala, hereby state my claim for taro <i>lo'i</i> in the Land of Kalakee. One <i>kula</i> is at Akakii, in the <i>mo'a</i> of Aakakii. Two <i>kula</i> are in the Land of Mahakea. One is in Kahololoto. I got them from the time of the reign of Kamehameha III.

Location	Awardee	LCA	RP	Area in Acres	Description
Laie	Kapuakahala	4342	3509	1.40	To the Land Commissioners, Respectful Greetings: I, Kapuakahala, hereby state my claim for land at Malaekahana. It is <i>kula</i> land; then <i>mala</i> are at Panoa, one <i>kula</i> is at Kauhilo a, five <i>mala</i> are at Makanikeo, a <i>kula</i> land is at Umuamaalea, one <i>mala</i> is at Kukulualolo. Mauka are two <i>mala</i> of <i>awa</i> . At Laie I have a place with four <i>lo'i</i> , which are scattered. One side adjoins that of Keliwaiaiole, another <i>lo'i</i> adjoins that of Pulehu, one adjoins that of Mahoe, and one adjoins that of Kokalimakahi. My right of occupancy is from the time of Kamehameha II.
Laie	Kapule	4291	3389	1.14	To the Land Commissioners, Greetings: I hereby state my claim in the <i>mo'o</i> of Kaiu. There are two taro <i>lo'i</i> and one <i>kula</i> . At Kaulaiki are two taro <i>lo'i</i> . At Kealahaka is one <i>mala</i> of <i>awa</i> . My right is from the time of Kamehameha I.
Laie	Kapule for Waikupulani	4300	3098	0.98	To the Land Commissioners, Greetings: [I have] one <i>mo'o</i> , Paala with seven <i>'iti</i> of sweet potatoes at Koloa. Three taro <i>lo'i</i> are in Laie <i>wai</i> . The right is from the time of Kamehameha I.
Laie	Kauaikaua	4302	1300	1.23	To the Land Commissioners, Greetings: I hereby state my claim. Kauaikumu is the <i>mo'o</i> . There are six taro <i>lo'i</i> at Kauaikumu. Half of a <i>lo'i</i> is at Kamookukae. The edge of a <i>lo'i</i> is at Kauaikumu. Half of a <i>lo'i</i> is at Kamookukae. The edge of a <i>lo'i</i> is at Kamalakeho. One <i>'iti</i> of <i>wauke</i> is at Puhahaka. Two <i>mala</i> of <i>awa</i> are at Kahaumalo. One <i>moku wewewe</i> is at Poopoo. One <i>'iti</i> of sweet potatoes is at Paakea. One <i>kula</i> is on one side, as far as my house. One <i>'iti</i> of sweet potatoes is at Heweawi. A half a <i>lo'i</i> , again, is in the <i>mo'o</i> of Kukae. Two <i>koa</i> canoe trees are at Malae <i>ka nana</i> . One spring is at Kapuna. One house lot. My right is from the time of Kamehameha I.
Laie	Kauaiomano	4343	1305	0.33	To the Land Commissioners, Greetings: I, Kauaiomano, am a claimant at Laie for four <i>lo'i</i> and one <i>kula</i> . The boundaries are: north, the land of Pupuka, east, Kalakee's, south, the land of Napaeko, west, the land of Hano. The scattered <i>lo'is</i> and <i>kulas</i> are as follows: Kalawa, one <i>lo'i</i> , no <i>kula</i> . Kapaakea, four <i>lo'i</i> , three <i>kula</i> . Kaholi, Kalawa, one <i>lo'i</i> , no <i>kula</i> . Kapaakea, four <i>lo'i</i> , three <i>kula</i> . Kaholi, one <i>lo'i</i> , no <i>kula</i> . Kkahikiea, no <i>lo'i</i> , two <i>kula</i> . Kurnupali, no <i>lo'i</i> , one <i>kula</i> . My right of occupancy is from my <i>kupunas</i> until the present.
Laie	Kaualewa	4298	-	0.60	To the Land Commissioners, Greetings: I hereby state my claim. The <i>mo'o</i> is Mahani. One taro <i>lo'i</i> is in Kawalele. One <i>lo'i</i> is in Mahani. One <i>lo'i</i> is in the <i>kula</i> of Mahani. Three <i>'iti</i> of sweet potato are at Mamahani. Two <i>'iti</i> of <i>wauke</i> are at Kaulaiki. One <i>'iti lo'i noni</i> [noni planted in a drained <i>lo'i</i> ?], one <i>mala</i> of sweet potatoes, one <i>mala</i> of <i>awa</i> , are at Ala. One house lot. My occupancy is from the reign of Kamehameha III.
Laie	Kauhalekua	8443	921	1.80	To the Land Commissioners, Greetings: I hereby state my claim. In the <i>mo'o</i> of Keokilehele is one taro <i>lo'i</i> , a half a <i>lo'i</i> is at Nauloli, two taro <i>lo'i</i> are at Kaholi, a half <i>lo'i</i> is at Kaholi, one <i>wauke</i> patch is at Kaholi, a <i>kula</i> is at Kaluaili, one patch of <i>wewewe</i> [grass] is at Kapukaloo, a <i>kula</i> is at Kapaakea, one <i>wauke</i> patch is at Malaekahana, one patch of <i>wewewe</i> is at Kailikahi, one patch of <i>wewewe</i> is at Wawaekua, one patch of <i>wewewe</i> is at Lupepa, one patch is at Kawaiuiko. There is one house lot. It was from the time when Kamehameha I was the ruler.

Location	Awardee	LCA	RP	Area in Acres	Description
Lai	Kauhane	4280	-	0.28	To the Land Commissioners, Greetings: I hereby state my claim in Lai, Island of Oahu. One taro <i>lo'i</i> is the land of Alaula adjoining the <i>lo'i ko'ele</i> , on the north of that <i>lo'i ko'ele</i> and on the south is the <i>lo'i</i> of Keone. One <i>kula</i> is at Pohakupili adjoining the <i>'i'i</i> of Waawa on the east. My taro <i>lo'i</i> and my <i>kula</i> are from my <i>makua</i> s.
Lai	Kaumiohi	4345	3413	0.43	To the Land Commissioners, Greetings: I, Kaumiohi, am a claimant of land at Lai, in the <i>'i'i</i> of Kahikiea, with one <i>lo'i</i> , one <i>kula</i> land, one <i>kula</i> house lot. The boundaries are: on the north, Mahoe's land, on the east, Kamauha's land, on the west, land of Pulehu, on the south, the land of Keliwawai'ole. Here are the scattered claims: In the <i>'i'i</i> of Paakea, one <i>kula</i> , no <i>lo'i</i> ; also, in the <i>'i'i</i> of Kapuna, one <i>kula</i> , no <i>lo'i</i> . In the <i>'i'i</i> of Kumupali, no <i>lo'i</i> , no <i>kula</i> . In the <i>'i'i</i> of Paakea, again, three fallen [shattered] <i>koa</i> trees. Because these claims are so scattered it is not practical to state their boundaries to you, the Land Commissioners. My occupancy of these claims has been from the reign of Kamehameha III until the present.
Lai	Kaunahi	4281	7614	0.55	To the Land Commissioners, Greetings: I, Kaunahi, hereby state my claim for my three taro <i>lo'i</i> in the land of Kahiamoe, on the east of this land. One <i>'i'i</i> of <i>waike</i> is at Kanepanui. One <i>'i'i</i> of sweet potatoes is in the land of Hahakulou. At Kapono are nine taro <i>lo'i</i> this is in Kaohi in the <i>'i'i</i> of Koloa. I have two <i>lo'i</i> at Hauula in the land of Kane.
Lai	Kealiwawai'ole	8580	6539	6.19	To the Land Commissioners, Greetings: Because of the enactment of the Law of the Mo'i, saying for claimants to present their claims, therefore I hereby state my claim in Lai, Island of Oahu. My <i>mo'o</i> is Okilehelehe. I have one <i>lo'i</i> , bounded on the north by the <i>lo'i</i> of Kaiwikole, his <i>kula</i> is on the south. The sea [fishery], from the sand beach of Puukolu to Paowaho. A <i>lo'i</i> is at Kaholi, of Kahiamau: on the north are some taro <i>lo'i</i> , a watercourse is on the east, a <i>kula</i> is on the west. There are also some new <i>lo'i</i> s there, bounded on the north by the watercourse of Kalepoai, on the east by the <i>lo'i</i> of Kawahine'iwai, on the west [south] by the <i>lo'i</i> of Kua, on the west by the <i>lo'i</i> of Kapuokahala. A <i>lo'i</i> is in the land of Kakee, at Koloa, bounded on the north by the land of Nakahili, on the east by the <i>lo'i</i> of Napaiki, on the west by the <i>lo'i</i> of Kahole, on the south by the <i>lo'i</i> of Kui. One <i>kula</i> is in the <i>'i'i ko'ele</i> . One <i>'i'i kula</i> is at Kaholi. One <i>'i'i kula</i> is at Paakea. One <i>'i'i kula</i> is at Keana'ahi. The <i>kuahiri</i> of Wiwi [and] a <i>kula</i> is at Halulu'ale. Some <i>lo'i</i> is for me at Hauula at Mamaukapua. One <i>lo'i</i> is bounded on the north by the <i>lo'i</i> of Kamoihili, on the east by Maukapua, on the south by Maukapua, on the west by Kuahua. One <i>lo'i</i> is at Kuahua, the <i>lo'i</i> of Kamoihili is on the east, on the north and west are weed-grown <i>lo'i</i> s. A small pond is at Waipahia. There is a house lot. The right to all these places was gotten by me from <i>hohana'u</i> [cousins], and my <i>makua</i> s, and my friends, and I therefore present my claim. <i>Luna</i> of Division 3, Lai.
Lai	Keno	4270	1302	2.33	To the Land Commissioners, Greetings: I hereby state my claim for five taro <i>lo'i</i> , here in Puapua. One <i>lo'i</i> is in Kawalei. One <i>moku we'we'u</i> is in Kapaka. One <i>moku we'we'u</i> [moku <i>we'we'u</i> are believed to be arable pockets of soil in stony ground] is in the <i>'i'i</i> of Kawakahi. Three <i>moku we'we'u</i> are in Pohaku <i>mo'o</i> . One <i>moku mo'o</i> is in Kaumaloo. One <i>moku we'we'u</i> is mauka at Kaumaloo. Five <i>koa</i> trees are at Kaumaloo, in Hukukai. My right of occupancy was from the <i>makua</i> s and the <i>kupunas</i> .

Location	Awardee	LCA	RP	Area in Acres	Description
Laie	Keawe	4293	2915	1.69	To the Land Commissioners, Greetings: I hereby state my claim in Kaluha. Seven taro <i>lo'i</i> are in Kaluha. There are also four <i>lo'i</i> in Kaluha. One taro <i>lo'i</i> is in Mokuula. One taro <i>lo'i</i> is in Papaawela. One <i>lo'i</i> is in Koholepo. One <i>lo'i</i> is in Halepuu. One <i>kula</i> is at Kaluha. One <i>'iti</i> of sweet potatoes is at Mokuula. One <i>'iti</i> of <i>noni</i> is in Mokuula. Four <i>'iti</i> are at Kalonopuna. One <i>'iti</i> of sweet potatoes is at Laie Maloo. One <i>mala</i> of <i>wauke</i> [and?] one <i>'iti</i> of <i>wauke</i> are at Kauloa. One <i>'iti</i> of <i>noni</i> is at Kahaumaloo. There are two house lots. My right is from the time of Kamehameha I.
Laie	Kekui	4336	1298	1.29	To the Land Commissioners, Greetings to you: I Kekui, am a claimant of a cultivated place in Laie and in Malaehakana. In the <i>'iti</i> of Nauelohi are one and a half <i>lo'i</i> . In the <i>'iti</i> of Paakea are three <i>lo'i</i> . In the <i>'iti</i> of Kumupal is one <i>lo'i</i> . In the <i>'iti</i> of the <i>ahuwaa'a</i> is one <i>lo'i</i> . In the <i>ahuwaa'a</i> of Malaehakana are ten <i>kula</i> , no <i>lo'i</i> , one <i>kula</i> house lot, one <i>koa</i> tree which is smashed [fallen tree used as firewood?], in the <i>kiakiiwi</i> . Because these claims are so scattered it is not practical to tell you, the Land Commissioners, of their boundaries, since I do not have a genuine right to "eat" a <i>mo'o</i> , but only have the right of cultivation. My right of occupancy of these claims is from the reign of Kamehameha III.
Laie	Kii	4361	1297	0.99	To the Land Commissioners, Greetings: I, Kii, am a claimant of land in the <i>'iti</i> of Kahikea. There are two taro <i>lo'i</i> , a <i>kula</i> and a wooded upland name Omao. The boundaries are: north, Napiliipi, east, upland named Omao. The boundaries are: north, Napiliipi, east, Kaiwikole, west, a stream, south, Kapaakea. Here are the scattered claims: At Puhahaka is one <i>'iti</i> of <i>wauke</i> . At Namahana is one <i>'iti</i> of <i>wauke</i> and a <i>pai'uala</i> [steep planting of sweet potatoes]. At Kealahale is one <i>'iti</i> of <i>wauke</i> and an <i>apuapu uala</i> [apuapu appears to be a local term. The dictionaries define it as cup-like].
Laie	Koalaukanu	4326	-	1.13	To the Land Commissioners, I, Koalaukanu am a claimant in Laie in the <i>'iti</i> of Kapuna. There are seven <i>lo'i</i> and one <i>kula</i> , bounded on the north by the land of Kanakanui, on the east by Keao's land, on the south by the land of Koi, on the west is the land of Kanakaua. Here are the scattered claims: In the <i>'iti</i> of the <i>ahuwaa'a</i> is one <i>lo'i</i> , four <i>kula</i> and one <i>kula</i> house lot. Because these claims are so scattered it is not practical to tell you, the Land Commissioners, of their boundaries. My right of occupation of these places is from my <i>kupunas</i> until the present.
Laie	Koi	4272	2917	1.587	To the Land Commissioners, Greetings: I, Koi, hereby state my claim which was from my <i>makuas</i> . It is the <i>mo'o</i> of Haka with five taro <i>lo'i</i> in it. Two <i>kula</i> are at Akukii, one <i>kula</i> is at Kokolokio, one <i>mala</i> of <i>'awa</i> is upland in Kahaumaloo, one <i>koa</i> canoe tree is at Kahaumaloo, one <i>koa</i> tree is at Koohe, two taro <i>lo'i</i> are at Kalalahui, one <i>kula</i> is also there.
Laie	Koula	4283	923	1.30	To the Land Commissioners, Greetings: I hereby state my claim. Kapuna is the <i>'iti</i> with five taro <i>lo'i</i> . At Halepau is one <i>lo'i</i> . At Kanuha is one <i>kula</i> . One <i>kula</i> is at Halepuu. One <i>moku weiwewu</i> is at Kahaumalo [o]. One <i>'iti</i> is at Kalea. One <i>'iti</i> is at Kapaloo. One <i>'iti</i> planted in gourd is close to the pig pen. There is one house lot. [These claims were] from my <i>makuas</i> and my <i>kupunas</i> .

Location	Awardee	LCA	RP	Area in Acres	Description
Lai	Kuahua	3999-B	-	0.25	To the Land Commissioners, Greetings: One <i>lo'i</i> is at Paakea, one <i>lo'i</i> is at Kahui <i>lalo</i> , one <i>lo'i</i> is at Kahui <i>luna</i> , one <i>lo'i</i> is at Kamapuna, one <i>'i'i</i> of sweet potatoes is at Puumanamana, one <i>'i'i</i> of sweet potatoes is at Nioi, one <i>maia</i> of tobacco is at Kaluali. There were from the <i>makuas</i> . See above.
Lai	Kuanonocho	8580-C	1307	8	To the Land Commissioners, Greetings: I, Kuapuu, am a claimant at Lai, in the <i>'i'i</i> of Kamapuna. There are twelve <i>lo'i</i> , one <i>kula</i> , one <i>kula</i> , in the mountain area. The boundaries are: on the north, the land of Lakee, on the east and south, the land of Kalua, on the west, the land of Ihupuu. The scattered claims are: In the <i>'i'i</i> of Paakea are one <i>lo'i</i> and two <i>kula</i> , one <i>kula</i> house lot. These claims of mine are from Lakee. In the <i>'i'i</i> of Kuamo'o are three <i>lo'i</i> and two <i>kula</i> . In the <i>'i'i</i> of the <i>ahupua'a</i> is one mountain area, and three <i>koa anai</i> [koa trees reared for canoes]. Outside of the place where the waves begin to break are four <i>lia hanai</i> [holes where fish are fed] which are mine. Because these claims are so scattered, it is not practical to tell you, the Land Commissioners of their boundaries. My occupation of these claims has been from the time of Kamehameha II until Kamehameha III at present.
Lai	Kuku	4061	3010	0.91	To the Land Commissioners, Greetings: I, Kuku, am a claimant at Lai, in the <i>'i'i</i> of Kuamo'o. There are three <i>lo'i</i> , four <i>kula</i> . The boundaries are described below: on the north is Poouahi's land, on the east is the land of Kimi 3, on the west is Kuapuu's land, on the south is Kanaikaua's land. The scattered claims are: in the <i>'i'i</i> of Kaaipuaa, one <i>lo'i</i> , no <i>kula</i> . In the <i>'i'i</i> of Naveloli, four <i>kula</i> , no <i>lo'i</i> . In the <i>ahupua'a</i> of Malaekahana, one <i>kula</i> , no <i>lo'i</i> . In the <i>'i'i</i> of Kumuipali, one <i>lo'i</i> , one <i>kula</i> . In the <i>'i'i</i> of Kuatokumu, one <i>lo'i</i> , no <i>kula</i> . Therefore, because these claims are so very scattered it is not practical to tell you, the Commissioners, of their boundaries. [I have had these claims] from the time of Kamehameha II to the reign of Kamehameha III at this time.
Lai	Laielohelohe	3807	929	1.07	To the Land Commissioners, Greetings: I, Laielohelohe, am a claimant of land at Lai in the <i>'i'i</i> of Kumuipali. There are six <i>lo'i</i> and four <i>kula</i> , the boundaries are as follows: north, Keawe's land, east, Land of Alaala, south, Koula's land, west, land of Kaloana. Here are the scattered claims: In the <i>'i'i</i> of Kahikaele are eight <i>kula</i> and one <i>kuto</i> house lot. In the <i>'i'i</i> of Paakea is one <i>kula</i> and no <i>lo'i</i> . Because of the scattered nature of my claims, it is not practical to tell you, the Land Commissioners, of their boundaries. My right of occupancy on these places is from my <i>kapunas</i> until the present reign of Kamehameha III.

Location	Awardee	LCA	RP	Area in Acres	Description
Lai	Lunalilo, Wm. C.	8559-B	7494	6194	Greetings to you, the Land Commissioners: Because of the beneficial laws of the Hawaiian Islands, Therefore, I hereby state the claims for land of Wm. Lunalilo, together with mine. The division of the land has been completed, and I speak correctly to you. All the lands which are written in this document were given in perpetuity for my <i>Ali'i</i> , and with me also, from in the sea to the mountains. Everything pertaining to these lands is owned and restricted, the places which have been worked on, and all the <i>kulas</i> which are unused; we are the ones with the main right, and the commoners are second, and all the stone-walled ponds are for the two of us. At the right time, send for me for this work and I will be pleased to come before you to attend to this. Furthermore, there are trees which have been planted. At Pelekane in Lahaina, Maui, are four coconut trees and eight breadfruit trees. At Pakala in the place of Pikanete, in Lahaina, are some coconut trees, which have not been counted exactly. The right to the trees planted at Pelekane is for the two of us, M. Kekauluohi planted them, and they are for Wm. Lunalilo. The right to the trees planted at Pakala by Liliha was given to Wm. Lunalilo and continue in his possession at this time. I am, with thanks, Charles Kanaina. The Lands of William Lunalilo (Lists 2 Late 1, 2, and Pahipahialua as the lands of Wm. Lunalilo)
Lai	Mahakoa	3699	927	2.43	To the Land Commissioners, Greetings: Because of the enactment of the Law of the Mo'i, telling the claimants to state their claims, therefore, I hereby state my claim for my <i>mo'o</i> and the <i>kula</i> . Three <i>lo'i</i> are in the <i>mo'o</i> of Puna. A portion of a <i>lo'i</i> is at Kaakau. A <i>pai uala</i> [steep sweet potato patch] is at Naholu. A <i>kula</i> is at Akakii. One <i>'i'i</i> of sweet potatoes are two <i>mala</i> of gourd are at Akakii. One <i>'i'i</i> of <i>wauke</i> is at Koloa. Two taro <i>lo'i</i> are at Kokololo. One house lot is bounded on the north by the sea, on the east by the pig pen, on the south by the sea, on the west by the pig pen. One <i>lo'i</i> is at Paukaula. One <i>mala</i> of <i>wauke</i> is at Kaipapau.
Lai	Mahoe	3697	6481	0.85	To the Land Commissioners, Greetings: I, hereby state my claim at Napili <i>mo'o</i> . Three taro <i>lo'i</i> . One <i>lo'i</i> is at Kamaupua; one <i>lo'i</i> is at Kolea; one <i>kula</i> is at Napili.
Lai	Mahoe	3709	.....	.....	To the Land Commissioners, Greetings: I, Mahoe am a claimant at Laie, in the <i>'i'i</i> of Kahupuaa. There are four <i>lo'i</i> , two <i>kula</i> , one <i>kula</i> house lot and two <i>kuahiriwi</i> [mountain areas]. The boundaries are: north, the land of Pooouhi, east, the land of Pooouhi also, south, the land of Kawaikaua, west, the land of Kii. Here are the scattered claims: In the <i>'i'i</i> of Lakee, one <i>lo'i</i> , and in the <i>'i'i</i> of Kamaupua, one <i>lo'i</i> . Because they are scattered it is not possible to give their boundaries. I have the right of occupancy of these claims from my <i>Kupunas</i> until this time of Kamehameha III.
Lai	Mahunali'i	3696	926	0.79	To the Land Commissioners, Greetings: I hereby state my claim in Kappkea <i>mo'o</i> . A portion of a <i>lo'i</i> is at Kauamoa. One <i>lo'i</i> is at Kaiwikole. One <i>'i'i</i> of <i>wauke</i> is at Napili. Four <i>'i'i</i> of gourd are at Puuhinalo. Four <i>'i'i</i> of gourd are at Heewi. One <i>mala</i> of <i>wauke</i> is at Papanalo. Four <i>'i'i</i> of gourd are at Heewi. One <i>mala</i> of <i>wauke</i> is at Papaleku. Two <i>'i'i</i> <i>waiweu</i> are at Paakea. This right was from my <i>makua</i> .

Location	Awardee	LCA	RP	Area in ACRES	Description
Laiē	Maii	3714	922	1.60	To the Land Commissioners, Greetings: I, Maii, am a claimant of land in Laiē in the 'i'i of Kamapuna. There are six <i>lo'i</i> and three <i>kula</i> , and there is no house site. The boundaries are: north, west and south, the land of Pia, northeast, Keao's land. Here are the scattered claims: In the 'i'i of Kawaieli are four <i>kula</i> . In the 'i'i of the <i>atupau'a</i> of Laiē <i>ma'lo</i> [Dry Laiē], are six <i>kula</i> lands. In the 'i'i of Kamapuna is one <i>kula</i> . Six large trees are in the 'i'i of Paēo, one <i>lo'i</i> , no <i>kula</i> . In the 'i'i of Kunupali are two <i>koa kama'i</i> [<i>koa</i> trees being raised for making canoes?], because these claims of mine are so scattered, it is not possible to tell their boundaries to you, the Land Commissioners. My right of occupancy is from the time of Kamehameha II until the present reign of Kamehameha III.
Laiē	Moanauli	3708	1296	0.53	To the Land Commissioners, Greetings: I, Moanauli, am a claimant of land at Laiē in the 'i'i of Naueloli. There are three <i>lo'i</i> and one <i>kula</i> from the sea to the mountain. The boundaries are: north, Napaeko's land, and on the east, south and west, the land of Lakee. Here are some scattered claims in the 'i'i of Keahupuaa: from Kuanonohu, one <i>lo'i</i> from Kaapuaa, one <i>lo'i</i> , and from Kekoa, one <i>lo'i</i> . Because they are so scattered it is not possible to tell their boundaries. I have had these claims from the time of my <i>kupunas</i> , to the present time of Kamehameha III.
Laiē	Nahelēhele	3939	1301	2.60	To the Land Commissioners, Greetings: Because the law has been enacted for claimants to make their claims, therefore, I hereby state my claim in the <i>mo'ō</i> of Paakia, one <i>taro lo'i</i> . One <i>taro lo'i</i> is in Mookukae. One <i>taro lo'i</i> is in Kapuna. Four <i>taro lo'i</i> are one 'i'i of sweet potatoes. At Kaohē are three 'i'i of sweet potatoes. [A] Akakai, one 'i'i of sweet potatoes. At Kokolito, one house lot. My right is from my <i>makuas</i> , from the time of Kamehameha II.
Laiē	Napahu	3945	1306	0.48	To the Land Commissioners, Greetings: I, Napahu, am a claimant in Laiē in the 'i'i of Keokilehele. There are three <i>lo'i</i> and one <i>kula</i> house lot, bounded on the north by the land of Kamaooha, on the east by the land of Kawahinewiwi, on the west by the land of Kawehohane, on the south by the land of Pahumoo. Here are the scattered claims: in the 'i'i of Kuamoo are four <i>kula</i> , no <i>lo'i</i> . In the 'i'i of Kahikiea, are six <i>kula</i> , no <i>lo'i</i> . Therefore, it is not practical to tell you the boundaries because they are so scattered. My occupation of these claims has been from the time of Kamehameha I until the present.
Laiē	Nakahili	3936	3009 6538	2.60	To the Land Commissioners, Greetings: I, Nakahili, hereby state my claim for two <i>taro lo'i</i> which are in Kaauwai. One <i>taro lo'i</i> is in Kole in the land of Kalakee. One <i>taro lo'i</i> is in Kalawa, in the land of Napaeko. One <i>kula</i> for planting gourd is at Napilipi adjoining Naholu. <i>Makai</i> of there is one 'i'i of sweet potatoes. Below Paliālai is one 'i'i of sweet potatoes. At Kawateli, along the bank of the <i>lo'i</i> is one 'i'i of gourd, adjoining the 'i'i of Kawahana.
Laiē	Napaeko	3933	1533	0.75	To the Land Commissioners, Greetings: Because of the law enacted by the Mo'i telling claimants to present their claims, therefore, I hereby state the claim for my land at Laiē, Island of Oahu. There are five <i>taro lo'i</i> , one house lot, eight <i>kula</i> for plantings suitable for a dry area. The right to my <i>lo'i</i> is from my <i>makuas</i> , also my <i>kulas</i> . Three <i>koa</i> trees are in the <i>kula</i> . Three <i>koa</i> trees are at Umumehina. Those are my <i>koa</i> canoe trees.

Location	Awardee	LCA	RP	Area in Acres	Description
Laie	Nawai	9894	-	0.45	To the Land Commissioners, Greetings: I, Nawai, hereby state my claim for one <i>lo'i</i> at Kaholi. A half a <i>taro lo'i</i> is in the land of Kawahinewini, on the south [is] the <i>lo'i</i> of Kua. Naulohi, one <i>mo'o</i> , is at Malaekahana, from the mountain to the sea. One <i>'i'i</i> [named] Ahupahu is at Keana. [Translator's note: The grammar is so rudimentary and the punctuation so unreliable, that the above translation is only a guess.]
Laie	Opala for Kalimakuhi	3789	6534	0.65	To the Land Commissioners, Greetings: I hereby state my claim. Naulohi is the <i>mo'o</i> , with one <i>taro lo'i</i> and a portion of a <i>lo'i</i> . Two <i>taro lo'i</i> are at Kaholi and one <i>'i'i</i> of <i>wauke</i> is at Kaholi. One <i>'i'i</i> of <i>wewewu</i> [grass or herbage] is at Lilimano. One <i>'i'i</i> of <i>wewewu</i> is at Kawamopuu [and?] one house lot. The occupancy has been from the time of Kamehameha I. I, Opala, hereby state my claim for one <i>taro lo'i</i> at Kaholi. My right was from my <i>makua</i> s.
Laie	Paakahi	3873	-	1.22	To the Land Commissioners, Greetings: I, Paakahi, am a claimant of land at Laie in the <i>'i'i</i> of Kuamoo, with one <i>lo'i</i> , one <i>kula</i> , one fishery, and one house site. The boundaries are as follows: north, the land of Nahelehele, east, Kuku's land, south, the land of Hopae, west, the land of Kaluaieva. Here are the scattered claims: in the <i>'i'i</i> of Kahikiea, one <i>lo'i</i> and four <i>kula</i> . In the <i>'i'i</i> of Paoo, one <i>lo'i</i> and no <i>kula</i> . In the <i>'i'i</i> of Kumupali, three <i>lo'i</i> and one <i>kula</i> . In the <i>'i'i</i> of Kamapuna, one <i>kula</i> . In the <i>'i'i</i> of Kahupaa, one <i>koa hanai</i> [probably a <i>koa</i> tree being raised for canoe making]. In the <i>'i'i</i> of Lakee, one <i>kula</i> house lot. Because these claims of mine are so scattered it is not practical to tell you their boundaries. O Commissioners. The occupation of these claims has been from my <i>kupunas</i> until this present reign of Kamehameha III.
Laie	Pahumoa	3859	5068	0.78	To the Land Commissioners, Greetings: I hereby state my claim for the <i>mo'o</i> of Kapuni, with six <i>taro lo'i</i> . One <i>'i'i</i> is at Keacwa of the large <i>kula</i> of Hopuni. One <i>'i'i</i> of sweet potatoes is at Keokilehele. One <i>'i'i</i> of sweet potatoes is at Puhahaka. One <i>malu</i> of <i>'awa</i> is at Kaluakauiia. One <i>lo'i</i> is at Paakia. My right of occupancy is from the time of Kamehameha I.
Laie	Palakea	3864	-	0.50	To the Land Commissioners, Greetings: I hereby state my claim, which was from my Kapunas and my <i>makua</i> s. <i>Mo'o</i> of Puna with four <i>lo'i</i> . Two houselots are at Poohina. Two <i>kula</i> are in the <i>mo'o</i> of Kapuokahala. One <i>kula</i> is at Kokololio.
Laie	Pakolu	238-E	3094	1	Testimony was not located.
Laie	Palii	8580-B	1299	1.46	See above
Laie	Peka	10822	6521	0.74	To the Land Commissioners, Greetings: I, Peka, hereby state my claim at Laie, Island of Oahu: 1 <i>taro lo'i</i> , Kuaokumu, 1 <i>taro lo'i</i> , Puhau, 1/2 <i>lo'i</i> within the <i>lo'i</i> s of Kumuhahau, 1 <i>taro lo'i</i> , Keoneelohu, 1 <i>pali wauke</i> , and the coconut tree and the sweet potato patches below it, the <i>mo'o</i> of Napilipili, 1 <i>kula</i> patch, the water course, 1 <i>mo'o</i> , Hanawewewu, 2 <i>mo'o</i> , Hopunui, 1 <i>mo'o</i> , Makalii, 4 <i>mo'o</i> , Kahikiea, 1 <i>mo'o</i> , Kaiwikole, 1 <i>mo'o</i> , Omao, the <i>muliwai</i> of Paoo, the Paoo pond, 1 <i>malu</i> of <i>'awa</i> , the <i>palis</i> of Kaukauiua, of Laniloa, of Laeapahu, the beach of Laieimaloo, <i>kahi e Hukihuki ia anua l wahi</i> [Too obscure to translate, possibly a legendary reference], and [Island of] Mokuooatia, 1 <i>kula</i> is in the mountain area of Kahaumalo, 1 <i>kula</i> is just <i>maka'i</i> of the Government Road, 1 sweet potato patch is at Keapuapu.

Location	Awardee	ECA	RP	Area in Acres	Description
Laie	Pia	2739	-	0.25	To the Land Commissioners: I have four lands in Laie in Koolauloa. The first is named Kapuna, there are ten <i>lo'i</i> , bounded on the north by the <i>lo'i</i> of Nahulu and Kanakani, on the east by the <i>lo'i</i> of Maui, on the south by <i>kula</i> , on the west by Kihewa. 2. The name is Puhai, on the east, Kionaole, south, Naholua, west, Nauloli. the third is a house lot, surrounded by a fence by myself. It was from my <i>makuas</i> , from the time of Kamehameha I, to us. The fourth is a <i>kula</i> planted in <i>wauke</i> from Kamaikahulipu ma. I wish for an award document for myself.
Laie	Pouahi	10619	3097	1.8	To the Land Commissioners, Greetings: I, Pouahi, am a claimant at Laie in the <i>'i'i</i> of the <i>Ahupua'a</i> . Nauloli is the name of the <i>'i'i</i> . There are six <i>lo'i</i> , 2/3 of the stream, lying from the sea to the mountain. There is one fish pond, two <i>kula</i> , three mountain areas, nine <i>koa hanai</i> [koa trees being raised for canoe-making?]. The boundaries are: on the north, the sea, on the east, the land of Lakee and Kalua's, on the south, mountain, on the west, the <i>Ahupua'a</i> of Malaekahana. The scattered claims are: in the <i>'i'i</i> of Kumupali, four <i>lo'i</i> , three <i>kula</i> lands, which I got from Alaala. In the <i>'i'i</i> of Kahikona are two <i>kula</i> from Peka. In the <i>'i'i</i> of Kamaupuna are two <i>lo'i</i> , one <i>kula</i> , three <i>koa hanai</i> . In the <i>Ahupua'a</i> of Malaekahana is one <i>kula</i> land from Kapuaokahala. I have a coconut tree which is mine, in the <i>Ahupua'a</i> of Laie. Because these claims are so dispersed the boundaries are not stated to you. My right of occupancy of these lands is from my <i>kupunas</i> , until this time of Kamehameha III.
Laie	Puhibaka	10748	-	0.74	To the Land Commissioners, Greetings: I hereby state my claim for land in the <i>'i'i</i> of Paomuliwai, <i>Ahupua'a</i> of Laie, District 5, Division 3, Island of Oahu. One taro <i>lo'i</i> and one <i>kula</i> are adjacent to the <i>'i'i</i> of the <i>Ahupua'a</i> . One <i>mala</i> of <i>noni</i> is next to the <i>'i'i</i> of Kapuna. One taro <i>lo'i</i> and one taro watercourse are next to the <i>'i'i</i> of the <i>Ahupua'a</i> , two <i>koa</i> canoes [trees] to be made [into canoes] by the hands of man. This little <i>'i'i</i> of mine is next to the <i>'i'i</i> of Kumupali. One <i>mala</i> of sweet potatoes is adjacent to the <i>'i'i</i> of Ahiki, [and] two pools for fish. It is a true right from the <i>konohiki</i> , in the time of Kamehameha I. That is my petition to you on this 8th day of Jan. 1848.
Laie	Pulehu	3861	2048	1.19	To the Land Commissioners, Greetings: I hereby state this claim for my land. Kahikiea is the <i>mo'o</i> . There are five taro <i>lo'i</i> at Kahikiea. One <i>lo'i</i> is at Kaholo, one <i>lo'i</i> is at Paakea. One <i>'i'i</i> of sweet potatoes is at Omao. The right of my <i>makuas</i> was from Liholho.
Laie	Puni	10763	1445	0.67	To the Land Commissioners, Greetings: I, Puni, am a claimant of land at Laie. In the <i>'i'i</i> of Kumupali are four <i>lo'i</i> and three <i>kula</i> . The boundaries are as follows: on the north, land of Kaloana, on the east, Kalua's land, on the west, land of Lakee, on the south, the land of Amaka. The scattered claims are: in the <i>'i'i</i> of Kamaupuna, one <i>lo'i</i> , and one <i>kula</i> , in the <i>'i'i</i> of Kapaakea, no <i>lo'i</i> , and three <i>kula</i> . Because these claims are so very scattered it is not practical to tell of their boundaries. My occupancy of these claims has been from the reign of Kamehameha III.
Laie	Pupuka	4514	919	2.09	To the Land Commissioners, Greetings: because of the enactment of the law of the Mo'i, telling claimants to state their claims, therefore, I hereby state the claim for my land in Laie, Island of Oahu. There are five taro <i>lo'i</i> , eight <i>kula</i> and one house lot. The right to my <i>lo'i</i> is from my <i>makuas</i> , also my <i>kulas</i> , places suitable for dry land crops.

Location	Awardee	LCA	RP	Area in Acres	Description
Late	Uukou	10928	3095 3007	1.10	To the Land Commissioners, Greetings: I hereby state my claim at Naeulohi, the <i>mo'o</i> , consisting of four taro <i>lo'i</i> . One <i>lo'i</i> is at Kolea. One <i>'iti</i> [patch] is at K <u> </u> poohali. One sweet potato patch is at Kaweloheli. These were from my <i>makua</i> s and my <i>kupunas</i> .
Late	Waha	3741	1303	1.35	To the Land Commissioners, Greetings: I hereby state my claim at Koholepo. Two taro <i>lo'i</i> are at Koholepo. One <i>kula</i> with <i>mito</i> trees and one steep planting of sweet potatoes is at Aakakii. One <i>mala</i> of <i>'awa</i> is at Aakakii. One <i>mala</i> of <i>noni</i> is at Aakakii. Two <i>moku wewewi</i> are at Poohina. Four taro <i>lo'i</i> are at Kokolohio. Two <i>'iti</i> of sweet potatoes are at Kokolohio. One <i>koa</i> canoe tree is at Kokolohio. At Aakakii is one house lot. My right of occupancy was from the <i>makua</i> s. Kamehameha I was the ruler at that time.
Late	Wi	3743	3011	1.09	To the Land Commissioners, At Late in the <i>'iti</i> of Naeulohi are two <i>lo'i</i> and one <i>kula</i> . I, Wi, the one who makes this claim, give the boundaries as follows: on the north, the Land of Kaulawa, on the east, the land of Pali, on the south, the Land of Lakee, on the west, Kanaikawa's land. Here are the scattered claims: In the <i>'iti</i> of Kapuna, one and a half <i>lo'i</i> , and three <i>kula</i> . In the <i>'iti</i> of Kamaupuna, one <i>lo'i</i> , one <i>kula</i> , one mountain <i>kula</i> . In the <i>'iti</i> of Keahupuaa, two <i>lo'i</i> , four <i>kula</i> , four fallen <i>koa</i> trees, one mountain <i>kula</i> , two <i>hala</i> clumps, one <i>kula</i> planted in gourd. In the <i>'iti</i> of Lakee, one <i>kula</i> house lot. In the <i>'iti</i> of Kalua, one mountain <i>kula</i> . Because these claims of mine are so scattered, O Land Commissioners, it is not possible to describe their boundaries. My right of occupancy of these claims is from my <i>kupunas</i> to the present reign of Kamehameha III. One <i>koa</i> tree is in Pia's place.

Appendix A
Land Commission Awards for Malaekahana

Location	Awardee	LCA	RP	Area Acres	Description
Malaekahana	Kahawaii	8537	7970	0.38	To the Land Commissioners, Greetings: I, Kahawaii, am a claimant of the land in Malaekahana. There is one <i>mo'o kula</i> from the sea of Haliu to our house site, and from thence to the mountainous area. The boundaries are: on the north, the ocean, on the east, Laie, on the south, the mountain, on the west, Keana. Here are the scattered claims: in the 'ili of Laie, I have three <i>lo'i</i> . Because they are so scattered it is not practical to tell you of their boundaries. My occupancy of these claims has been from the time of Kamehameha I till the reign of Kamehameha III.
Malaekahana	Kakau	8355	.....	0.55	To the Land Commissioners, Greetings: I, Kakau, am a claimant of land at Malaekahana, Island of Oahu. There is one <i>kula</i> land <i>mo'o</i> from the sea as far as the mountain, bounded on the north by the sea, on the east by Laie, on the south by the mountain, on the west by Keana. Scattered in the 'ili in Laie are two <i>lo'i</i> , whose boundaries are not given because they are so scattered. My occupancy of these claims has been from the time of Kamehameha I until Kamehameha III at this time.
Malaekahana	Keohokalole, A.	8452	5616	3280	Native Register does not name Malaekahana, however, in the Native Testimony (pg. 326) the <i>ahupua'a</i> is claimed by Keohokalole.
Malaekahana	Paukoa	7727	7965	0.13	To the Land Commissioners, Greetings: I, Paukoa, am a claimant of land at Laie, from the sea to the mountain, of Melekehana [Malaekahana]. The boundaries are: North, the sea, east, a mountain, south, a mountain, west, a mountain. There are some small scattered claims in the 'ili of the <i>Ahupua'a</i> 1 1/2 [?]. Therefore it is not practical to tell you, the Land Commissioners, their boundaries. My occupancy of these claims has been from the time of Kamehameha I until this time.
Malaekahana	Puu	3870	7966	0.22	To the Land Commissioners, Respectful greetings: I, Puu, hereby state my claim for land at Malaekahana. The <i>kula</i> land is Kamapa. One <i>mala</i> is at Niu. One <i>mala</i> is at Kahakaokaha. One <i>mala</i> is at Makanikeoloi. Two <i>mala</i> are at Kalanaiui. One <i>mala</i> is a mountain land named Kuele, there are also some <i>mala</i> of <i>wauke</i> in the upland. At Laie I have one <i>lo'i</i> bounded on the north by Moanauili's, on the east by Ku's, on the south by Kamame's, on the west by Kubapa. My right of occupancy is from the time of Kamehameha II.
Papaakoko	Kauhota	2289	5590	76.20	To the Land Commissioners of the Hawaiian Islands, Greetings: I, the one whose name is below, hereby state my claim for land held anciently from Kamehameha I. Kalaau, my <i>makuakane</i> , and Kamookeave, my <i>makuahine</i> , lived with Kamehameha and sailed with him to the battle of Muanuu. When the battle was over, Kamehameha gave the land of Papaakoko to him, until the time of Kamehameha III, when it was divided, half for the <i>Ali'i</i> and half for me. My half adjoins Kabanui; that is my claim, given by Kamehameha III, Koolauloa, Island of Oahu. [Notes a second claim on the island of Hawaii. Not recorded here.]

Appendix A
Land Commission Awards for Pahipahialua

Location	Awardee	LCA	RP	Area Acres	Description
Pahipahialua	Kahaleipu	2816	1328	1.11	To the Land Commissioners, Respectful Greetings: I, Kahaleipu, hereby state my claim for land at P-1. There are two <i>lo'i</i> and a share of another <i>lo'i</i> in another place, <i>kula</i> land, shore land, named Waioa, and a cultivated upland. My two <i>lo'i</i> are bounded on the north by the Government Road, on the east by Kuheleloa's, on the south by Hauleiaole, on the west by Kalou's. My house claim consists of one house at Waialea and two houses at Pahipahialua, bounded on the north by the Government Road, on the east by Kauaua's house lot, on the south by <i>lo'i pa'aliao</i> , on the west by Kuheleloa's lot. At Pahipahialua I have a claim for an upland planted with <i>wauke</i> , banana, sugar cane and sweet potato. At Kaunala is banana, sweet potato, breadfruit, a <i>hala</i> tree and three <i>koa</i> canoe trees. My right to occupy these claims was from the time of Kamehameha I.
Pahipahialua	Kaina	2832	915	0.37	To the Land Commissioners, Greetings: I, Kaina, am a claimant at Kaiki for two taro <i>lo'i</i> one watercourse and also a fishery of Kaiki. The boundaries are, on the north, the <i>lo'i</i> of Naloloa, on the east, a <i>kula</i> , on the west and south, the watercourse. Also, there is a <i>lo'i</i> of mine at Poepoe I, on the west of the watercourse, a <i>kula</i> and a forested upland with <i>wauke</i> , tobacco, watermelon, a <i>koa</i> (tree), an <i>'ohi'a</i> (tree). Also, there is a house lot at Pahipahialua, surrounded by <i>kula</i> . My occupancy has been from the time of Kamehameha I until the present.
Pahipahialua	Kauaua I	2814	1330	0.21	To the Land Commissioners, Respectful Greetings: I, Kauaua, hereby state my claim for land and the house lot. I have five taro <i>lo'i</i> and in another place a half of a <i>lo'i</i> . The five <i>lo'i</i> are bounded on the north by Laiekau's, on the east by Kalauokekapu, and on the south and west by <i>kula</i> land. The half of a <i>lo'i</i> is next to the house lot of Naloloa. That is my claim at Waialea. At Pahipahialua I have a claim for two taro <i>lo'i</i> , a <i>kula</i> and a cultivated upland, and my house lot. The boundaries of my house lot are: the sea is on the north, Mano's land is on the east, on the south are the <i>lo'i</i> s of Kaina, on the west is the house lot of Kahaleipu. My right of occupancy is from the time of Kinau to the present.
Pahipahialua	Kauku	2844	1329	0.47	To the Land Commissioners, Respectful Greetings: I, Kauku, hereby state my claim for land at Mokuhala. There are four <i>lo'i</i> , a shore land, a <i>kahaka pa'akai</i> (salt pool or basin), a <i>kula</i> land and a cultivated upland. The boundaries of my <i>lo'i</i> is are: on the north a <i>lo'i pa'aliao</i> , on the east a <i>lo'i pa'aliao</i> , on the south, <i>kula</i> land, on the west, Kuheleloa's. My house claim is at Waialea, the sea is on the north, the Government road is on the south, on the west is Kanetahu'a's.
Pahipahialua	Kuhewa	2828	916	0.23	To the Land Commissioners, Respectful Greetings: I, Kuhewa, hereby state my claim for land at Pahipahialua. There is an upland planted in <i>noni</i> , sweet potato, <i>wauke</i> and other things. A <i>kula</i> (planted in) sweet potato, <i>wauke</i> , <i>ipu'awa'awa</i> (bitter gourd or muskmelon) is at Puupilau adjoining the Government Road on the south. One taro <i>lo'i</i> is at Kapalakai, adjoining Kuheleloa's and Nakuaka's and Kalawaia's, and the <i>kula</i> . My right of occupancy is from the time of Kamehameha I until the present.
Pahipahialua	Lunalilo, W.C.	8559-B	5688	704	Not Awarded

Location	Awardee	LCA	RP	Area Acres	Description
Pahipahialua	Mano	2769	444	1.27	To the Land Commissioners, Respectful Greetings: I, Mano, hereby state my claim for land at Pahipahialua. There is one <i>lo'i</i> , bounded on the north by the house lot of Kauaua, on the east by a <i>lo'i ko'ele</i> , on the south by Kaima's land, on the west by Naauhau's land. There is a <i>kula</i> land [planted with] sweet potato, gourd, <i>wauke</i> , banana, sugar cane, <i>ti</i> leaves; a <i>mauka</i> garden has <i>noni</i> , <i>wauke</i> , banana, sugarcane, four <i>koa</i> canoe trees. At Waialea [are] three [<i>lo'i</i>], adjoining Kalou, one <i>lo'i</i> with that of Nua, one adjoining that of Naloloa. My house lot is at Pahipahialua, bounded on the north by the Government Road, on the east by an <i>awawia one</i> [sand gulch] on the south by a <i>lo'i pa'akoo</i> , on the west by Kauaua's fence. My right of occupancy is from the time of Kamehameha I.
Pahipahialua	naauhau	2767	321	0.54	To the Land Commissioners, Respectful Greetings: I, Naauhau, hereby state my claim for land at Pahipahialua, one <i>lo'i</i> , which is surrounded by the <i>kula</i> . There is a <i>lo'i</i> in another place, <i>mouka</i> of Puupilau. In the upland is a garden of banana, and of taro, a garden of <i>wauke</i> , <i>noni</i> , and sweet potato. I have a fish pond and a row [or cluster] of <i>hala</i> trees. At Oio is a <i>wauke</i> garden and an <i>ape</i> garden. At Kaunala I have two coconut trees.
Pahipahialua	Niheu	2763	917	1.53	To the Land Commissioners, Respectful Greetings: I, Niheu, hereby state my claim for land. There are two <i>lo'i</i> at Pahipahialua and a share of a <i>lo'i</i> at Waialea. Because they are scattered it is not good to describe the boundaries; there is <i>kula</i> land and a cultivated upland. My house claim is at Pahipahialua, bounded on the north by that of Kalalawala, on the east, south and west by the <i>kula</i> .

Appendix A
Land Commission Awards for Paumalu

Location	Awardee	LCA	RP	Area Acres	Description
Paumalu	Apaa	3777	.....	0.90	To the Land Commissioners, Greetings: I, Apaa, am a claimant of <i>kula</i> land. At Kukaela is one <i>'iiti</i> of sweet potatoes. In Laipo's are two <i>'iiti</i> of sweet potatoes. In Opuunui's at Moehala is one <i>'iiti</i> of sweet potatoes. In Maa's at Kelihelele is one <i>'iiti</i> of sweet potatoes. In the lands of Kapuakee and Kaalou are two <i>'iiti</i> of sweet potatoes. In Kalaike's land at Makaanilua is my house, this is in Kukaela. My <i>makuas</i> had it in the time of Kamehameha I and I have it at this time. My <i>mo'os</i> of sweet potatoes are not situated together but jump in various people's places, etc.
Paumalu	Haalou	4011	.....	1.12	To the Land Commissioners, Greetings: I, Haalou, am a claimant of <i>kula</i> at Kapuakea, with two <i>'iiti</i> of sweet potatoes, also an upland, with wood, a <i>koa</i> tree, a breadfruit, an <i>'ohi'a</i> , and similar things. My house claim is also at Kapuakea. My occupancy of these claims has been from the time of Kamehameha I.
Paumalu	Holoakea	4013	.....	0.93	To the Land Commissioners, Greetings: I, Holoakea, am a claimant of <i>kula</i> at Kukaela, with two <i>'iiti</i> of sweet potatoes. The crops planted are sweet potato, <i>wauke</i> , breadfruit, banana and similar things. These are my claims.
Paumalu	Kaahamo	4369	.....	2.60	To the Land Commissioners, Greetings: I, Kaahamo, am a claimant of <i>kula</i> land. I hereby state that [I have] six <i>mo'o</i> of sweet potatoes at Pohakunui. There is also a wooded upland, with breadfruit, <i>roni</i> , <i>koa</i> and similar things, at Pohakunui also. The boundaries are: on the north, for Ana Kelihelele, on the east, Palaau's, on the south, mountain. My right of occupancy was from Aluhea.

Location	Awardee	LCA	RP	Area Acres	Description
Paumalu	Kalaiku	4381	8337	0.67	To the Land Commissioners. Greetings: I, Kalaiku, hold a claim which I hereby state to you. There are five <i>'i'i</i> of sweet potatoes, also a wooded upland, a breadfruit, <i>noni</i> , a <i>koa</i> tree, a <i>kukui</i> tree, also a sea fishery. The boundaries are: on the north, the ocean, on the east, Palaau, on the west, the sugarcane of Punui, on the south, mountain. This is not a taro <i>mo 'o</i> , it is only <i>kula</i> . My right of occupancy on these claims is from the time of Kamehameha I. There is also a house lot at Kukaela.
Paumalu	Laipo	3808	.....	0.75	To the Land Commissioners. Greetings: I, Laipo, hereby state my claim for land at Kukaela. There are nine <i>mo 'o</i> of sweet potatoes, a wooded upland, a <i>koa</i> tree, a breadfruit, an <i>'ohi'a</i> , and similar things; there is also a fishery, in Kukaela No. 2. My house is another claim of mine, at Haliloulou. My right of occupancy is from my <i>makua</i> s in the time of Kamehameha I.
Paumalu	Naonohiula	3950	.....	1.00	To the Land Commissioners. Greetings: I, Naonohiuli, hereby state that I am a claimant of <i>kula</i> , at Alimoo, with four <i>'i'i</i> of sweet potatoes. There is also a wooded upland, a <i>koa</i> tree, a breadfruit tree an <i>'ohi'a</i> and similar things. There is also a house, at Paalaa. My <i>kupunas</i> have had this place from the time of Kamehameha I, and now I have it.
Paumalu	Opunui	3776	.....	0.72	To the Land Commissioners. Greetings: I, hereby state my claim in the <i>'i'i</i> in Moehala, consisting of five <i>'i'i</i> of sweet potatoes, also a wooded upland which is named Kaleleiki. Growing there are a <i>koa</i> tree, breadfruit and <i>noni</i> . It is not a taro <i>mo 'o</i> , but only <i>kula</i> . The boundaries are: north, the sea, east, Halaiku's, west, Pupukea, south, Kalaau. My occupation of this land has been from the time that Kaumuali'i returned from Kauai. There is also a house, at Kukaela.
Paumalu	Pukaloheau	3880	.....	0.55	To the Land Commissioners: I, Pukaloheau, hereby state my claim for two <i>'i'i</i> of sweet potatoes and the wooded upland, at Palaau. My house also is at Palaau. My right of occupancy is from the time of Kamehameha I.

Appendix A
Land Commission Awards for Pupukea

Location	Awardee	LCA	RP	Area in Acres	Description
Pupukea	Aena	8039	1452	4.00	To the Land Commissioners: I hereby state my claims to you. I have nine little claims, four 'iiti (patches). On the north is Papawā's from Wahāhema, on the east is a <i>paiti</i> , a highway of Puna is on the west. One 'iiti is in Kaimaku's land, one 'iiti is in Kawili's land, I have two 'iiti in Uluwēhu's land, I have one 'iiti in Nāpu's land. I have one shore land. Those are my little claims for your information. It is for you to award my place. Pupukea, Koolauloa, February 8, 1848. I also have a <i>wā'a</i> [My guess is that claimant has a <i>koa</i> tree he hopes to make a canoe of].
Pupukea	Ehu	8051	1534	4.30	To the Land Commissioners: I, Ehu, am a claimant at Pupukea in the <i>mo'o</i> of Keokea. It is a <i>kūla</i> , and also there is a fishery adjoining. It is bounded on the north by Kaawa's <i>mo'o</i> , on the east by Waimea valley, on the south by a <i>mūliwāi</i> , on the west by the sea. That is my claim at Pupukea, from Kamehameha III, the <i>āli'i</i> . Farewell to you all.
Pupukea	Haona	3990	.....	4.33	To the Land Commissioners. Greetings: I, G.K. Haona, am a claimant at Waimea and Pupukea. The claim at Waimea I for two <i>lo'i</i> and one <i>kūla</i> . The two <i>lo'i</i> are in the <i>mo'o</i> of Mauna and are bounded on all sides by Mauna's <i>lo'i</i> s. On the north, east, south and west is Mokuhou's <i>kūla</i> , that is my claim at Waimea. Here are the boundaries of the <i>kūla</i> : north, Kailili, south, a <i>paiti</i> and Popinōke's, east, a stream, west, Mokuhou's <i>kūla</i> . That is the claim at Waimea. The claim at Pukea [sic] is the house lot and 2 'iiti of sweet potatoes-- however the house lot is within the two 'iiti. The boundaries are: North, Kaawa's, east, the road, south, seashore cliff, west, seashore also. That is my claim, which was from my <i>mākua</i> s and bequeathed to me at this time and which I continue to occupy. That is it, for your information.
Pupukea	Hiipei	8165	2045	0.51	To the Land Commissioners: I, Hiipei, have a claim at Waimea and Pupukea. My claim at Waimea was taken, there were two <i>lo'i</i> ; Pa'ahao and when they were taken I was in difficulties, the retainers go hungry. Here is my claim at Pupukea, a house lot, a steep sweet potato planting and a <i>kūla</i> , bounded north by Manu's land and the <i>paiti</i> , on the east by Manu's land, on the south by a <i>mūliwāi</i> , on the west by <i>mūliwāi</i> also. Two <i>maio</i> are in the <i>mo'o</i> of Nukuuni, surrounded on all sides by his land. One sweet potato patch is in the <i>mo'o</i> of Mailou. One patch is in the land of Malaele, one salt land is in the <i>mo'o</i> of Poohina. Those are the claims for land at Waimea and Pupukea which were from Hewāheva. Farewell to you all.
Pupukea	Kaawili	4323	1456	4.10	To the Land Commissioners in Honolulu. Greetings: I, Kaawili, hereby state my claims at Pupukea, a <i>mo'o</i> and <i>kūla</i> . Olemipuna is on the north, the <i>āhupua'a</i> of Paumalu is on the east, a <i>paiti</i> and a <i>kūla</i> and the forested upland are on the south, the <i>mo'o</i> of Kaineaka is on the west, a road going to Puna, and the sea. Also, there are two houses. On the north is a <i>kūla</i> , on the east is the house of Aena, on the south and west is the <i>kūla</i> . Those are my claims, which I have occupied since the reign of Kamehameha III. [Kindly] award my place. Pupukea [Pupukea?], Koolauloa, Jan. 11, 1848.

Location	Awardee	LCA	RP	Area in Acres	Description
Pupukea	Kailialoha	2905	1449	4.78	To the Land Commissioners, Greetings: I, the one whose name is below, hereby state my claim in the 'i'i of Kaaumakua, Ahupua'a of Pupukea, Island of Oahu. There are four areas planted in sweet potato, one <i>lo'i</i> is in Kapau [an] 'i'i in Waimea, Oahu. January 7, 1848 Pupukea. [See note in No. 204]
Pupukea	Kaiwi	7420	1450	4.50	To the Land Commissioners: I, Kaiwi, am a claimant at Pupukea in the <i>mo'o</i> of Kapu. It is bounded on the north by Ku's land, on the east by Kauwela's land, on the south by Kauwela's land, on the west by the sea. Here are the claims in other places: one patch in the <i>mo'o</i> of Malamanui, one salt land in the <i>mo'o</i> of Pooehina. Those are the claims in Pupukea. The house lot is in the <i>mo'o</i> of Kawila. Here are the claims at Waimea: three <i>lo'i</i> are in the land of Malama, and a <i>pali wauke</i> . Four <i>lo'i</i> are in the land of Keiihiwaiwale. One <i>lo'i</i> is in the land of Wahineoni. They are surrounded by their claims. Those are my little claims, from the <i>makuas</i> , who died. They have been bequeathed to me at this time. They were acquired at the time when Kamehameha I was the ruler. Farewell to you all.
Pupukea	Kalainaina	7421	1350	6.50	To the Land Commissioners: I, Kalainaina am a claimant of land at Pupukea, and a house lot. The land is bounded on the north by Kailialoha's, on the east by a <i>pali</i> and the <i>krila</i> , on the south by Kanae's land, on the west by a government <i>pa'ahoo</i> patch and the road. The house lot is bounded on the north by a stream, on the east by a <i>pali</i> , and on the south by <i>pali</i> also, on the west by the road and Hoona's house lot. Two steep sweet potato plantings are surrounded by Kanae's claim. One sweet potato patch adjoining the seashore is bounded on the north by Kanae's land, on the east by the road, on the south by Kamai'o's land, on the west by the seashore. All these claims of mine are in the <i>mo'o</i> of Kaaawa. Here are my claims in other places: in the <i>mo'o</i> of Ehu, two <i>ma'ala</i> of noni, surrounded by Ehu's claim on all sides. Also, there is a salt land in Pooehina's land. That is the claim at Pupukea. Also, there is a claim at Waimea for two <i>lo'i</i> in the <i>ma'a</i> of Malama and one <i>pali wauke</i> , surrounded by Malama's land. Those are my claims, from the <i>makuas</i> , which were gotten when Kamehameha I was the ruler. Farewell to you all.
Pupukea	Kalaulani	4322	1451	4.64	To the Land Commissioners: I hereby explain my claims for land and house. There are 19 at Waimea, also 2 at Pupukea, a total of 22 [sic]. The total within one <i>mo'o</i> is 2 <i>lo'i</i> . There also is another <i>mo'o</i> . I have two <i>mo'o</i> with 6 <i>lo'i</i> ; three in one and three in another. Also five <i>mo'o</i> in which the <i>lo'i</i> is <i>paliua ia</i> [doubly held] by myself and Kauhahu. On the north, east and west are for him also. Furthermore, the <i>lo'i</i> is on the north are for Niau, the <i>lo'i</i> is on the east are for Makaele, on the west for Nihihiawai. Furthermore, at Kahakuapa are the <i>lo'i</i> is, on the north for Nukunui. Furthermore, the <i>lo'i</i> is on the south are for Holoikaui, the <i>lo'i</i> is on the north for Lono. Furthermore, the <i>lo'i</i> is are for Kauhahu, together there. Furthermore, the <i>lo'i</i> is on the east are for Kowa, the <i>lo'i</i> is on the south are mine. 2 <i>pali wauke</i> are on the west and on the south. Furthermore, my claims at Pupukea are two 'i'i <i>paoo</i> . On the north are for Lono, on the south are for Malama. Furthermore, on the north is for Kaini, on the south is for Kuia. These are my places, for you to award to me. Koolauloa. January 8, 1848.

Location	Awardee	LCA	RP	Area in Acres	Description
Pupukea	Kalama	10238	1349	4.45	To the Land Commissioners: I, Malamani am a claimant of land at Pupukea. In the mo'o of Kanawai is an upland, a kula and a salt land, bounded on the north by Punahoa's, on the east by an upland, on the south by Ku's land, on the west by the sea. Here are the claims in other places: One 'iti is in the mo'o of Ku, inland and at the sea. It enters into Ku's mo'o. Also, in the mo'o of Pohakahi is on 'ili, surrounded by his boundaries. Also, in the mo'o of Kuia, there is one 'iti. Also there is a small cultivated lot in the mo'o of Pupukea, which has been occupied from the time of Kamehameha I. Farewell to you all.
Pupukea	Kanae	2904	2906	4.50	To the Land Commissioners. Greetings: I, The one whose name is below, hereby state my claim for land in the 'iti of Kaohoimoo. There are four areas planted in sweet potato, one kula. At Kinoho is another kula. Ahupua'a of Pupukea, Island of Oahu, January 7, 1848. [Translator's note: the term 'iti is used, in referring to the sweet potato plantings]
Pupukea	Ku	4723	1454	7.00	Couldn't locate testimony
Pupukea	Kuia	5767-B	1455	5.87	To the Honorable Land Commissioners of the Hawaiian Islands, Greetings: I hereby state my claim for land and house. This land is at Keauiki and is a combined kula which is cultivated by us here in Keauiki. Its boundaries are, on the north, a pali, on the east, Makaha, on the south, the sea, on the west, Keaunui. My house claim is bounded on the north by a Government Road, on the south by the sea, on the west by the house of Kua. The occupancy they are gone, and I remain at this time. I am, respectfully, your obedient servant.
Pupukea	Lono	9976	1354	4.50	To the Land Commissioners: I hereby state my claims to you: At Waimea are five [claims]: two at Honoa, two at Keahou, one at Holoholoamoo. My lo is in Honoa are bounded as follows: on the east is for Kauhii, on the north is for Kaiwi, on the south is for Kamalie. My lo is at Keau are as follows: on the north is for Kalama, on the east is for Kalainaina, on the south is for Kowa. At Holoholoamoo is a pali wauke. Those are my claims at Waimea. Here are my claims at Pupukea. There are a total of 18 cultivated places. Eleven 'iti are in my mo'o. The north side is for Aena, the south side is for Uluwehu, on the east is a pali, on the west is an ala hiele loa puna [a coral surfaced road.] I have one 'iti in Pohakahi's. One 'iti is in Kauhela's mo'o, also one in Kaiwi's. I also have one 'iti of Koiku, also one in Uluwehu's. I also have a kai [fishery]. I also have a canoe [wa'a probably refers to a canoe-size koa tree].
Pupukea	Nakapalau for Moo	3944	1457	4.18	To the Land Commissioners, Greetings: I, Nakapalau, am a claimant at Kalakala, for five lo'i and one watercourse, bounded on the north by Populo, on the east by Kalahao, on the west by Kapounui, on the south by Kamoawa. Here are the claims which jump in other places: at ka pata [Kapaka?], five taro lo'i, also kula; at Haupu, two kula; at Kaipapau, one kula. My occupancy of the land was from the time that Liholihio "ate freely" [breaking the kapu system]. Also, there is a kula, at Kuhukakua, one kula planted in wauke. It belongs to the Ahupua'a of Kapaka.
Pupukea	Punahoa	10824	1353	4.60	To the Land Commissioners: I, Punahoa, have a claim in Poaka, a mo'o. It is bounded on the north by Naipu's, on the south by Malama's, on the east by a mountain, on the west by a sea. Here is this claim of mine in the mo'o of Uluwehu--one 'iti [a small area, or patch]. It is for you to make the award.

Location	Awardee	LCA	RP	Area in Acres	Description
Pupukea	Pohakahi	2736	1453	4.50	To the Land Commissioners, Greetings: I hereby state my claim for land in the 'i'i of Kukuaau. There are four sweet potato patches, and one sweet potato <i>kiria</i> at Pupukea, an <i>ahupua'a</i> in Koolauloa, Island of Oahu. January 7, 1848.
Pupukea	Uluehu	10924	1351	4.75	To the Land Commissioners: 1. Uluehu, am a claimant of land at Pupukea, in the <i>mo'o</i> of Kanao. It is bounded on the north by Lono's land, on the east by an upland, Kanawai, on the south by Nakapalau's land, on the west is a fishery for me, which adjoins. My other claims are: one 'i'i in the <i>mo'o</i> of Nakapalau, two 'i'i in the <i>mo'o</i> of Naipu, three 'i'i in the <i>mo'o</i> of Punahoa, four 'i'i in the <i>mo'o</i> of Malamani - the Pali is the fifth, three 'i'i in the <i>mo'o</i> of Ku, 2 <i>pahi</i> in Kaiwi's <i>mo'o</i> , three 'i'i in Kauwila's land and the upland. The house lot is within this claim. One salt land is in the <i>mo'o</i> of Paohina. those are the claims at Pupukea. Here are the claims at Waimea: one <i>lo'i</i> in the <i>mo'o</i> of Mokuhou, three <i>lo'i</i> in the land of Malama, and one <i>pahi wauke</i> in this same land, two <i>lo'i</i> in Keliwaiaiole's land, one <i>lo'i</i> in Maitou's land. Those are my claims at Waimea and Pupukea which were gotten in the time of Hewahewa.
Pupukea	Waha for Punahoa	11010	1352	4.70	To the Land Commissioners: I hereby state my claims for 7 lands, and a house claim in the 8th. My <i>mo'o</i> is in the middle, Kalimas <i>lo'i</i> is on the north, the land on the south is for Lono, a <i>pahi</i> is on the east. There are two 'i'i <i>pao</i> [second growth sweet potatoes] in another <i>mo'o</i> . The lands on the north are for Uluwehi, on the south they are also for Uluwehi. Another 'i'i is a salt place. My house, also, is in my <i>mo'o</i> . It is for you to award my place.

Appendix A
Land Commission Awards for Waialeale

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Aie	2672	1338	0.47	To the Land Commissioners, Greetings: I, Aie, hereby state my claim for land and <i>kula</i> at Kaupa. There are three <i>lo'i</i> , and also the edge of a watercourse. The boundaries are: North, Keokea, east, Mahoe's, west, Keliwaiwaiole's, south, the <i>ko'ele</i> . 2. I have one <i>lo'i</i> at Hapunaiki. 3. I have one <i>lo'i</i> at Kapunaiki. 4. There is also a <i>lo'i</i> at Kalou, however it is a share of a <i>lo'i</i> . 5. This <i>lo'i</i> of mine is at Kaukahiloko. These 4 <i>lo'i</i> of mine are scattered, therefore their boundaries are not described. Also, the <i>kula</i> is at Paipaialua. <i>Pili</i> and <i>koa</i> grow there. My occupation of these places has been from Haalijito until the present. My houselot is also claimed by me.
Waialeale	Holi	2703	1326	1.258	To the Land Commissioners, respectful greetings: I, Holi, hereby state my claim for land and houselot, one <i>lo'i</i> and a watercourse bank, a half of a <i>lo'i</i> and a share of a <i>lo'i</i> and a connecting watercourse in another place. The boundaries are: on the north, houselot, on the east, Kai'o's, on the south, Kalua's, on the west, <i>kula</i> land. I also have a <i>kula</i> land. That is my claim at Waialeale. 2. At Pahipahialua I have a claim for a <i>wauke</i> and a <i>noni</i> garden. At Kaunala is another claim of mine for a <i>wauke</i> and <i>noni</i> garden. The boundaries of the houselot are: on the north, the Government Road, on the east Kekua's lot, on the south, my <i>taro lo'is</i> , on the west Waihinalo's.
Waialeale	Kaaina	2842	1344	0.51	To the Land Commissioners, Respectful Greetings: I, Kaaina, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Punaluu. There is one <i>lo'i</i> , bounded on the north by Manoha's, and also on the east and south by Manoha, on the west by Laiehau's. A <i>lo'i</i> is in another place, adjoining with those of Namohala, Nahuaka, and Manoha and a <i>kulo</i> land. At Kaunala is a <i>mala</i> of <i>noni</i> , <i>wauke</i> , sugarcane, banana, sweet potato and gourd. My houselot is at Waialeale, bounded on the north, east and south by the <i>kula</i> , on the west by a sandy gulch. My right of occupancy is from the reign of Kamehameha III.
Waialeale	Kaenaokane	2895	8028	0.47	To the Land Commissioners, Respectful Greetings: I, Kaenaokane, hereby state my claim for land at Waialeale, at Kilawai. There is one <i>lo'i</i> bounded on the north by a <i>lo'i</i> ; <i>ko'ele</i> , on the east by Waihinalo's, on the south by Laiehau's and on the west also by Laiehau's. Another <i>lo'i</i> is at Kalana, next to those of Aaloloa and Kuleleloa, and a <i>mala</i> of <i>noni</i> is in the upland.
Waialeale	Kahaleipu	2816	1328	1.87	To the Land Commissioners, Respectful Greetings: I, Kahaleipu, hereby state my claim for land at P...i. There are two <i>lo'i</i> and a share of another <i>lo'i</i> in another place, <i>kula</i> land, shore land, named Wailoa, and a cultivated upland. My two <i>lo'i</i> are bounded on the north by the Government Road, on the east by Kuleleloa's, on the south by Hauleiaole, on the west by Kalou's. My house claim consists of one house at Waialeale and two houses at Pahipahialua, bounded on the north by the Government Road, on the east by Kaunala's houselot, on the south by <i>lo'i pa'ahao</i> , on the west by Kuleleloa's lot. At Pahipahialua I have a claim for an upland planted with <i>wauke</i> , banana, sugarcane and sweet potato. At Kaunala is banana, sweet potato, breadfruit, a <i>halia</i> tree and three <i>koa</i> canoe trees. My right to occupy these claims was from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Kahuewaa	2858 4387	1332	0.73	To the Land Commissioners, Greetings: I, Kahuewaa, am a claimant at Haliiloulou. There are five <i>ʻili</i> of sweet potato, also a wooded upland, a <i>koa</i> , a breadfruit, an <i>ohi'a</i> and such things; there is also a <i>kari</i> [fishery of shore area], which is at Haliiloulou. My house is another claim. My right of occupancy is from the time of Aubea.
Waialeale	Kahuku	2831	1516	0.61	To the Land Commissioners, Respectful Greetings: I, Kahuku, hereby state my claim for land at Kumupali. There are three <i>lo'i</i> , bounded on the north by Hawaii's, on the east by Kimo's, on the south by Nahuaka's, a <i>kula</i> land is on the west. I have a little irrigation watercourse, adjoining Kimo's, and a <i>kula</i> . That is my claim at Waialeale. At Kaunala I have a claim for a <i>kula</i> planted in sweet potatoes, a <i>mala</i> planted in <i>wauke</i> , and three <i>koa</i> canoe trees. At Paumalu I have a claim for a <i>mala</i> of banana and <i>awa</i> . My house lot is at Waialeale, and is bounded on the north by Poooluku's house lot, on the west by Waibualo's.
Waialeale	Kaio	2891	1336	0.61	To the Land Commissioners, Respectful Greetings: I Kaio, hereby state my claim for land. Two <i>lo'i</i> are at Kalalahili, bounded on the north and west by the house lot of Holi, on the east by Pahua's, on the south by Nakuaka's. There is one <i>lo'i</i> in another place, at Punalau, bounded on the north by Kahuku's, on the east by Nahuaka's, on the south by <i>kula</i> , on the west by Kaaina's. There is also a sweet potato <i>kula</i> next to Kapaahao. At Pahipahialua is one <i>lo'i</i> adjoining that of Kahalepiri's on the east, and in another place a portion of a <i>lo'i</i> at Kalou. One clump of <i>hala</i> is at Kahauakariwi; a <i>moku wewewu kanu wauke</i> [pocket of soil planted in <i>wauke</i>] is at Kakai, <i>mauka</i> , adjoining Leimakani's. In another place is a <i>kula</i> planted in <i>wauke</i> and <i>nani</i> and towards the sea is a <i>kula</i> planted in sweet potato and gourd. At Kaunala are bananas and a <i>koa</i> canoe tree. At Paumalu is an upland planted in banana, <i>wauke</i> and sweet potato. My right of occupancy is from the time of Kamehameha I until the present.
Waialeale	Kalalawia	4266	3511	1.09	To the Land Commissioners, Respectful Greetings: I, Kalalawia, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Kuahineoloe, with two <i>lo'i</i> , bounded on the north by Kauaua's, on the east by Kolihui's, on the south by <i>kula</i> land, on the west by Kaumailiua's. I also have <i>kula</i> land. Four <i>hala</i> trees stand in the <i>kula</i> at Nahuaka. The fishing overseer, named Hao, is [in charge] in those fishing days. At Kaunala I have a claim for some <i>hala</i> , <i>nani</i> , banana, <i>wauke</i> , sugar cane, sweet potato, gourd and three <i>koa</i> canoe trees. At Pahipahialua I have a claim for one <i>lo'i</i> bounded on the north by Kuleleloa's, on the east by Nahuaka's, on the south by Kaio's, on the west by Kahalepiri's. There are six <i>mala</i> which are cultivated, six house lots. My house claim is at Waialeale and is bounded on the north by the sea, on the east by a <i>kula</i> , on the south by Nua's, on the west by Nic's. My right of occupancy of these places is from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Kalua	2825	1337	1.64	To the Land Commissioners, Respectful Greetings: I, Kalua, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Konoikilau. There are five <i>lo'i</i> and the watercourse, bounded on the north by the lands of Kawi, and Poonui, and Pahua, and Maio, and Holi <i>lo'i ko'eie</i> , on the east by Pahua's land, on the south by Hawaii's <i>mo'o</i> , on the west by my <i>kula</i> land. In the upland are some sweet potato gardens. At Kaunala is a garden of sweet potato and gourd, in the upland is a garden of <i>noni</i> , <i>wauke</i> , banana and sugarcane. At Pahipahialua is one <i>koa</i> canoe tree. My houselot is at Kaunala, bounded on the north by the sea, on the east by Poonui's lot, on the south by the land fence, on the west by <i>Kula</i> . My right of occupancy is from the time of Kamehameha I.
Waialeale	Kamahalo	2823	1334	0.72	To the Land Commissioners, Respectful Greetings: I, Kamahalo, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Keokea. There are three <i>lo'i</i> bounded on the north by <i>muli's</i> , on the east by Puhiele's, on the south by the <i>kula</i> , on the west by Kaneiahuea's. There is a cultivated <i>kula</i> . I have had the right of occupancy from the year of our Lord 1845.
Waialeale	Kaneiahuea	2821	1342	1.21	To the Land Commissioners, Respectful Greetings: I, Kaneiahuea, hereby state my claim for land at Keokea with six <i>lo'i</i> , bounded on the north by a <i>lo'i ko'eie</i> , on the east by Kamahalo's, on the south by <i>kula</i> land, on the west by Kubeleloa's. At Pahipahialua is a garden of <i>wauke</i> , sweet potato, banana, and sugarcane. My houselot is at Waialeale, bounded on the north by the sea, on the east by Kauka's lot, on the west by a sandy gulch, on the south by the Government Road.
Waialeale	Kanealii	2812	1325	2.75	To the Land Commissioners, Respectful Greetings: I, Kanealii, hereby state my claim for land at Kapunaiki, with eight <i>lo'i</i> and a share of a <i>lo'i</i> in another place, adjoining Kahaleipu's, a <i>kula</i> land, a <i>kai</i> , a section of salt land, an upland, a <i>koa</i> canoe tree, at Pahipahialua. My <i>lo'i</i> is bounded on the north, east and west by <i>kula</i> , on the south by an upland. My houselot is next to my <i>lo'i</i> .
Waialeale	Kauaua 1	2814	1330	0.38	To the Land Commissioners, Respectful Greetings: I, Kauaua, hereby state my claim for land and the houselot. I have five taro <i>lo'i</i> and in another place a half of a <i>lo'i</i> . The five <i>lo'i</i> are bounded on the north by Laiekaui's, on the east by Kalaoukekapu, and on the south and west by <i>kula</i> land. The half of a <i>lo'i</i> is next to the house lot of Nalolua. That is my claim at Waialeale. At Pahipahialua I have a claim for two taro <i>lo'i</i> , a <i>kula</i> and a cultivated upland, and my houselot. The boundaries of my houselot are: the sea is on the north, Mano's land is on the east, on the south are the <i>lo'i</i> of Kaina, on the west is the houselot of Kahaleipu. My right of occupancy is from the time of Kinau to the present.
Waialeale	Kauaua 2	2815	1512	0.58	To the Land Commissioners, Respectful Greetings: I, Kauaua 2, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Kilawai. There are two <i>lo'i</i> . On the north is Laiebau's, on the east and south is <i>kula</i> land, on the west, a <i>lo'i</i> of Kauaua 1. An <i>oki lo'i</i> [cut off <i>lo'i</i>] is in another place adjoining those of Nua and Aie. Another <i>oki lo'i</i> adjoins with Kahaleipu's sweet potato <i>kulo</i> . At Pahipahialua is a garden of gourd and sweet potato. At Kaunala is a <i>kula</i> planted in gourd and sweet potato.

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Kauku	2844	1329	0.17	To the Land Commissioners, Respectful Greetings: I, Kauku, hereby state my claim for land at Mokuhala. There are four <i>lo'i</i> , a shore land, a <i>kaheta pa'akai</i> (salt pool or basin), a <i>kula</i> land and a cultivated upland. The boundaries of my <i>lo'i</i> 's are: on the north a <i>lo'i pa'ahao</i> , on the east a <i>lo'i pa'ahao</i> , on the south, <i>kula</i> land, on the west, Kuheleloa's. My house claim is at Waialeale, the sea is on the north, the Government Road is on the south, on the west is Kanetahuea's.
Waialeale	Kaumatiuliula	2921	1333	2.73	To the Land Commissioners, Respectful Greetings: I, Kaumatiuliula, hereby state my claim for land and the house lot. I have six <i>lo'i</i> , in one place and two in another. This is an ancient right from the time of Kamehameha I until the present. My six <i>lo'i</i> 's are bounded on the north by Kauana's, on the east by Katalawaia, on the south by <i>kula</i> land, on the west by Namohala's. Of the two <i>lo'i</i> , one is next to the <i>ko'ele</i> and the next is to Kahuewaa's. The house lot has the sea on the north, on the east it adjoins Pahui's, on the south, Hawaii's, on the west, Waihinalo's. There is a shore land named Kamanawa and a <i>kula</i> land. At Kaunala I claim some <i>malas</i> of <i>wauke</i> and some <i>malas</i> of sweet potato. At Paumalu I also claim some <i>malas</i> of sweet potato and some <i>malas</i> of gourd.
Waialeale	Keliikui	2819	1345	0.76	To the Land Commissioners, Respectful Greetings: I, Keliikui, hereby state my claim for land at Palakai with five <i>lo'i</i> , bounded on the north by Kauaua's, on the east by Pookoku's, on the south by <i>kula</i> land, on the west by Kalalawaia's a sweet potato <i>kula</i> . At Paumalu is a garden of <i>noni</i> , <i>wauke</i> , banana, a breadfruit tree and two <i>koa</i> canoe trees. My house claim is at Waialeale, bounded on the north by the Government Road, on the east by Nalo'oa's house lot, on the south by Poonui's <i>lo'i</i> , on the west by Kawi's house lot.
Waialeale	Kimo	2817	1515	1.16	To the Land Commissioners, Respectful Greetings: I, Kimo, hereby state my claim for land at Keokea and Hekuna. Two <i>lo'i</i> 's are at Keokea, and a share of a <i>lo'i</i> is at Hekuna. The boundaries of the two <i>lo'i</i> 's at Keokea are: on the north, a <i>lo'i pa'ahao</i> , on the east, Kauaua's, on the south, Kamohala's, on the west, Kawi's. The share of a <i>lo'i</i> at Hekuna is bounded on the north and west by Kawi's, on the east by Namohala's, on the south by Kaatina's, Kaauwaeapaa. Kahuku is a sweet potato <i>kula</i> . At Kaumala I have a claim for a garden of sweet potato, <i>wauke</i> and gourd.
Waialeale	Kuheleloa 1	2824	1339	2.04	To the Land Commissioners, Respectful Greetings: I, Kuheleloa, hereby state my claim for land at Kapalakai. There are five taro <i>lo'i</i> 's and a bank of a watercourse, <i>kula</i> land, and an upland. My <i>lo'i</i> 's are bounded on the north by a <i>kai</i> , on the east by a <i>mo'o</i> of Kaukahaia, on the south by <i>kula</i> land, on the west by Pooiuku's. Those are my claims at Waialeale. At Kaunala I have a claim also for a sweet potato garden, a <i>wauke</i> garden, a <i>noni</i> garden, a banana garden. Also at Kaumala is my house lot, bounded on the north by the sea, on the east by a valley, on the south by the Government fence, on the west by Kalauokekapu's.
Waialeale	Kuheleloa 2	2877	3859	0.72	To the Land Commissioners, Respectful Greetings: I, Kuheleloa, hereby state my claim for land at Kalou, a share of a <i>lo'i</i> and a <i>lo'i</i> in another place; because they are so scattered it is not possible to describe their boundaries. Those are my claims at Waialeale. At Pahipahialua I have a claim for one <i>lo'i</i> and a cultivated upland, a <i>malu</i> of <i>wauke</i> , <i>noni</i> and banana. There is also my house lot at Pahipahialua, bounded on the north by the sea, on the east by Kahaleipui's lot, on the south by a taro <i>lo'i</i> , on the west by a <i>lo'i</i> .

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Laiehau	2688	1513	0.43	To the Land Commissioners, a Respectful Greeting: I, Laiehau, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Kilawai. There are five <i>lo'i</i> . The boundaries are: north, Hauleiaole's, east, Kapau's, south, Kauaua's <i>lo'i</i> , west, Kauaua also. A portion of a <i>lo'i</i> is in another place, adjoining with Kekua's and Kahaleipu. It is a cut <i>lo'i</i> adjoining Namokala's. A cut <i>lo'i</i> and the watercourse are together with Kimo's, and Nahuaka, a sweet potato garden. At Kaunala is an upland cultivated in <i>wauke</i> , <i>noni</i> , <i>alarii</i> [orange?], sugarcane, a <i>hola</i> tree, a sweet potato <i>kula</i> . My right was established in the time of Kamehameha I.
Waialeale	Mahoe	2776	1343	0.69	To the Land Commissioners, a Respectful Greeting: I, Mahoe, hereby state my claim for land at Kuaimatolo. There are three <i>lo'i</i> bounded on the north by Kalou, on the east by Nua's, on the south by a <i>lo'i</i> <i>ko'eie</i> , on the west by Aie's. At Kawela I have a claim for one <i>lo'i</i> , bounded on the north by Kaunahi's, on the east by Mumuku's, on the south by Kaopu's, on the west by Muji's. At Kahuku I have one <i>lo'i</i> , bounded on the north and the east by Kekua, on the south by Puahiki, on the west by Kawaaloa. At Pahipahialua is a garden of banana, <i>wauke</i> and sugarcane and three <i>koa</i> canoe trees. Three <i>koa</i> canoe trees are at Kaunala and a <i>noni</i> garden. My house claim is at Pahipahialua.
Waialeale	Muui	2780	3513	1.13	To the Land Commissioners, Greetings: I, Kawela, hereby state my claim for land at Kamooiki. I have two taro <i>lo'i</i> , one is on the east of Kekua's <i>lo'i</i> and one is on the west side of Kekua's <i>lo'i</i> . 2. At Pahipahialua also, is a <i>kula</i> , and one taro <i>lo'i</i> . The planted things are: sweet potato, watermelon, <i>noni</i> , <i>wauke</i> , <i>ipu</i> , <i>awa'awa</i> [either bittergourd or a type of muskmelon], tobacco, bounded on the north and west by Kauaua's <i>lo'i</i> , on the east and south by Kaina's <i>lo'i</i> . At Waialeale is one taro <i>lo'i</i> , bounded on the north by Kalou, on the east and south by a watercourse. My house lot is at Pahipahialua. I occupied these places in 1843.
Waialeale	Nahuaka	2756	1327	0.48	To the Land Commissioners, Respectful Greetings: I, Nahuaka, hereby state my claim for land at Punaluu, one <i>lo'i</i> , bounded on the north by Kahuku's, on the east, Ka's land, on the south a <i>kula</i> land, on the west, Kao's. There is another <i>lo'i</i> adjoining that of Holi, and there is sweet potato <i>kula</i> land. At Pahipahialua I have a claim for one <i>lo'i</i> adjoining with that of Kaio on the north and with that of Kihewa on the east. I have a <i>wauke</i> garden at Kaunala, with sugarcane and banana. At Paumalu is a cultivated upland. My house lot is at Kaunala, bounded on the north by Government Road, on the east and the south and west by <i>kula</i> land.
Waialeale	Nalotoa	2766	2907	1.20	To the Land Commissioners, Respectful Greetings: I, Nalotoa, hereby state my claim for land at Waialeale. The name of the <i>mo'o</i> is Kanihikala. There are four taro <i>lo'i</i> , two watercourses, and one <i>lo'i</i> in another place. The boundaries of the four <i>lo'i</i> and the two watercourses are: on the north, the sea, on the east, the Government <i>Lo'i</i> s, on the south, <i>kula</i> land, on the west, Pahipahialua. There are three sweet potato gardens, a <i>pai</i> , of sweet potato and sugarcane. At Kaunala is my claim for three <i>alarii</i> [orange] trees, being the place where Palikea <i>iki</i> stands. At Paumalu I have a claim for three <i>koa</i> canoe trees and a cultivated <i>kula</i> . My house lot claim is at Waialeale, bounded on the north by the Government Road, on the east by a <i>kula</i> , on the south by the <i>mo'o</i> of Kauaua, on the west by Keliihiki's lot. My right of occupying this land was from the time that Haalilo was the <i>konohiki</i> over Waialeale, in the year 1832.

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Namohala	2755	3512	0.96	To the Land Commissioners, Respectful Greetings: I, Namohala, hereby state my claim for land at Waialeale. The name of my mo'o is Kaohē, there are two lo'i, bounded on the north by those of Kauaua, on the east by Kaumāhala's mo'o, on the south by kula land, on the west by Kimo's mo'o. There is sweet potato kula land and a kua'iwi. [I have held this land] from the month of August, year of our Lord, 1847.
Waialeale	Nua	2760	1341	1.15	To the Land Commissioners, Greetings: I, Nua, am a claimant for land at Kauakāhilo. There are seven taro lo'i, also a kula, bounded on the north by Kalou, on the east by Kalou also, on the south by Wāhinalo's, on the west by Mahoe's. 2. Also there is a portion of a lo'i at Halou, bounded on the north by the sea, on the east by Niheu's, on the south and west by Kūheleloa's. 3. There is also a half of a lo'i at Paipaiālua, bounded on the north by Kauaua's, on the east by Kaina's, on the south by Kaaku's, on the west by the ko'ele. 4. I also have a kula at Paipaiālua, named Waiki, which has pili [grass], ti leaves, and wauke. My house is at Waialeale. I have lived on the land from the time of Haalilio.
Waialeale	Pahua	2721	1335	0.37	To the Land Commissioners, respectful greetings: I, Pahua, hereby state my claim for land at Kamooiki. There is one lo'i, bounded on the north by Kawi's lot, on the east by Poonui's mo'o, on the south by Holi's portion of a lo'i, on the west by Kai'o's. Another portion of a lo'i adjoins with that of Holi, on the west of Kai'o's, on the north of Kalua's. On the west of the ko'ele lo'i, [is] a sweet potato kula. A watercourse adjoins Kalua's, on the west of Kawi's and on the east of Kalua's. My house lot claim is bounded on the north by a sea, on the south by a government road, on the west by Kaumāhala ma.
Waialeale	Pooluk	2720	1331	0.68	To the Land Commissioners, respectful greetings: I, Pooluku, hereby state my claim for land at Waialeale. The name of my mo'o is Kamooiki. There are three and a half lo'i, bounded on the north by a sea [fishery] on the east by Kūheleloa's land, on the south by kula land, on the west by Kelikui's land. At Kaunala I have a garden of wauke, noni, alani, sugarcane and banana. At Pahipahialua is a cultivated upland. My house lot is at Waialeale, bounded on the north by a sea, on the east by Wāhinalo's lot, on the south by Kahuku's, on the west by kula land. My interest was established from the time of Kamehameha I.
Waialeale	Poonui	2728	1340	0.71	To the Land Commissioners, respectful greetings: I, Poonui, hereby state my claim for land at Keokea. There are two lo'i and a watercourse, bounded on the north by the house of Naloloa, on the east by the ko'ele lo'i on the south by Kekua's lo'i on the west by Pahua's lo'i. At Kaunala I have a claim for a kula planted in gourd and sweet potato and also a cultivated upland. Also, my house lot is at Kaunala. At Paumalu I have another garden planted in sweet potato and gourd.
Waialeale	Puhiele	2722	1438	0.83	To the Land Commissioners, respectful greetings: I, Puhiele, hereby state my claim for land at Waialeale. The name of the mo'o is Makaulu. There are four lo'i bounded on the north by Muli's land, on the east by Keliwāiwaiolo's, on the south by kula, on the west by Kamahalo. It is cultivated kula land. At Pahipahialua is a garden of wauke, sweet potato, gourd, ti leaves and sugarcane. In the upland is wauke, taro, banana, sugarcane, yam, and two koo canoe trees. At Kaunala is one koo canoe tree. My house claim is at Waialeale, bounded on the north by Kanealii's, and on the other sides by kula. My right of occupancy was from the time of Kamehameha I.

Location	Awardee	LCA	RP	Area Acres	Description
Waialeale	Waihinalo	2695	1514	1.44	<p>To the Land Commissioners Greetings and respect. I Waihinalo, hereby state my claim for land at Waialeale (named) Kilaui. There is one <i>lo'i</i>, bounded on the north by Laiehau's, on the east by Kauaua's, on the south by the <i>kula</i>, on the west by Laiehau. There is a portion of <i>lo'i</i> in another place, adjoining Kauaua's, there is <i>kula</i> land on the seaward side. At Pahipahialua is a garden of <i>wauke</i>, banana, sugarcane, <i>noni</i>, sweet potato and gourd. At Kaunala is an upland with <i>noni</i>, sugarcane, banana, sweet potato and <i>wauke</i>. At Paumalu are two <i>koa</i> trees for canoes. My houselot is at Waialeale and is bounded on the north by the sea, on the east by [sic] Hawaii ma's lot, on the south by the Government Road, on the west by Kahuku's lot.</p>

Appendix B
Draft Report
Archaeological Inventory Survey of the Kahuku Training Area and Preparation of a
Historic Preservation Plan for the Legacy Resource Management Program,
O`ahu Island, Hawaii

Draft Report

Archaeological Inventory Survey of the
Kahuku Training Area and Preparation of a
Historic Preservation Plan for the Legacy Resource
Management Program, O`ahu Island, Hawai`i

Prepared for:

U.S. Army Engineer District, Honolulu
Corps of Engineers, Bldg. 200
Fort Shafter, Hawai`i 96858-5440
Contract No. DACA83-91-0025
Delivery Order No. 0017

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March 1995

Draft Report
Archaeological Inventory Survey of the Kahuku Training Area
and Preparation of a Historic Preservation Plan for the Legacy Resource
Management Program, O`ahu Island, Hawai`i

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INTRODUCTION

This report presents the results of an archaeological inventory sample survey and limited subsurface testing at the United States Army Support Command-Hawaii (USASCH) Kahuku Training Area (KTA), northern Ko`olau Loa District, Island of O`ahu, Hawai`i. The survey was conducted by archaeologists from Ogden Environmental and Energy Services Company, Inc., (Ogden) at the request of the U.S. Army Corps of Engineers, Pacific Ocean Division, Ft. Shafter, Hawai`i, in compliance with the Scope of Work (SOW) presented in Delivery Order 0017, Contract DACA83-91-D-0025. The survey was conducted intermittently in one- to two-week intervals between 14 March 1994, and 27 April 1994, by a two to three person crew under direction of the senior author. In order not to conflict with the Army training schedule, the work was carried out based on a schedule provided by the Army Range Control Office at Schofield Barracks.

The Kahuku Training Area is located on the northeastern flank of the Ko`olau mountains on the island of O`ahu (Figure 1 map pocket). The Ko`olau mountains form the eastern portion of the island, with the Wai`anae mountains comprising the western portion. The Ko`olau and Wai`anae ranges are eroded Pleistocene shield volcanoes that formed the island of O`ahu approximately two million years ago (Macdonald and Abbott 1970). KTA is set on the northern and windward portion of the Ko`olau mountains, in an upland area covering approximately 9,650 acres (3,905 hectares). The project area ranges in elevation from near sea level along the inland portion of the coastal plain to 1,860 ft (567 m) in the uplands along the crest of the Ko`olau mountains. KTA is within upland portions of 17 traditional Hawaiian land divisions (known as *ahupua`a*). These include, from north to south, portions of Waimea, Pūpūkea, Paumalū, Kaunala, Waiale`e, Pahipahi`ālua, `Ōpana, Kawela, Hanakaoe, `Ō`io, Ulupehupehu, Punalau, Kahuku, Ka`ena, Mālaekahana, Lā`ie, and Kaipapa`u. In the 19th century, the land divisions of Kaunala, Waiale`e, Pahipahi`ālua, `Ōpana, Kawela, Hanakaoe, `Ō`io, Ulupehupehu, and Punalau were combined under the redesignated land division of Hanakaoe.

All U.S. government agencies and undertakings, including U.S. Army installations, are required by the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and the Archaeological Resources Protection Act (ARPA), to protect resources within federal jurisdiction that are

eligible for inclusion or nomination to the National Register of Historic Places (NRHP). This project included sample surveying of selected areas in the 9,650 acre parcel within KTA. The total area surveyed amounted to 750 acres. Limited subsurface testing was done where warranted. The intent of this survey was to identify and assess historic properties within the sampled areas in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and U.S. Army Regulation 420-40, of 1984, for the purpose of developing predictive site models and a Historic Preservation Plan (HPP) for KTA. The HPP has been prepared as a separate document from this report (Anderson and Williams 1996).

"Historic property" means any site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). This term includes artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the National Register" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register criteria.

HISTORIC PROPERTIES: FEDERAL REGULATIONS, CRITERIA, AND CATEGORIES

NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED:

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, including those actions they assist or license, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings (see Advisory Council on Historic Preservation 1980). The regulations are detailed in the U.S. Code of Federal Regulations, especially 36 CFR Part 800. Instrumental in the Section 106 review process is the State Historic Preservation Officer (SHPO), who is the official appointed or designated pursuant to Section 101(b)(1) of the National Historic Preservation Act to administer the State historic preservation program. In Hawai'i, the SHPO is appointed by the Governor, and is generally the Director of the Department of Land and Natural Resources (DLNR). The SHPO has a staff supporting him or her in the State Historic Preservation Division (SHPD) of DLNR.

The Section 106 review process involves five basic steps:

Step 1: Identify and evaluate historic properties

The Federal agency responsible for an undertaking [the lead agency, in this case the U.S. Army] begins by identifying the historic properties the undertaking may affect. To do this, the agency first reviews background information and consults with the State Historic Preservation Officer and others who may know about historic properties in the area. Based on this review the agency determines what additional surveys or other field studies may be needed, and conducts such studies.

If properties, that is, districts, sites, buildings, structures, or objects, are found that may be eligible for inclusion in the National Register of Historic Places, but have not yet been included in the Register, the agency evaluates them against criteria published by the National Park Service, which maintains the Register. This evaluation is carried out in consultation with the SHPO, and if questions arise about the eligibility of a given property, the agency may seek a formal determination of eligibility from the Secretary of the Interior. If a property has already been included in the National Register, of course, further evaluation is not ordinarily necessary. The Section 106 review process gives equal treatment to properties that have already been included in the Register and those that are eligible for inclusion.

Step 2: Assess effects

If historic properties, that is, properties included in or eligible for inclusion in the National Register, are found, the agency then assesses what effect its undertaking will have on them. Again the agency works with the SHPO, and considers the views of others. The agency makes its assessment based on criteria found in the Council's regulations, and can make one of three determinations:

- 1) No effect: the undertaking will not affect historic properties;
- 2) No adverse effect: the undertaking will affect one or more historic properties, but the effect will not be harmful;
- 3) Adverse effect: the undertaking will harm one or more historic properties.

Step 3: Consultation

If an adverse effect will occur, the agency consults with the SHPO and others in an effort to find ways to make the undertaking less harmful. Others who are consulted, under various circumstances, may include local governments, Indian tribes, property owners, other members of the public, and the Council. Consultation is designed to result in a Memorandum of Agreement (MOA), which outlines measures agreed upon that the agency will take to reduce, avoid, or mitigate the adverse effect. In some cases the consulting parties may agree that no such measures are available, but that the adverse effects must be accepted in the public interest.

If consultation proves unproductive, the agency or the SHPO, or the Council itself, may terminate consultation. The agency must submit appropriate documentation to the Council and request the Council's written comments.

Step 4: Council comment

The Council may comment during step three of the process, by participating in consultation and signing the resulting MOA. Otherwise, the agency obtains Council comment by submitting the MOA to the Council for review and acceptance. The Council can accept the MOA, request changes, or opt to issue written comments. If consultation was terminated, the Council issues its written comments directly to the agency head, as the agency had requested.

Step 5: Proceed

If an MOA is executed, the agency proceeds with its undertaking under the terms of the MOA. In the absence of an MOA, the agency head must take into account the Council's written comments in deciding whether and how to proceed. (Advisory Council on Historic Preservation 1990:2).

PROGRAMMATIC MEMORANDUM OF AGREEMENT OF 1986

All Department of Defense (DOD) World War II temporary buildings are covered by a Programmatic Memorandum of Agreement (PMOA) signed by the DOD and the Advisory Council on Historic Preservation in July 1986. After Congress directed the DOD to demolish World War II temporary buildings as part of the Military Construction Authorization Bill of 1983, the PMOA instigated a nationwide research and documentation program intended to mitigate the impact of the demolition. Documentation must be in accordance with the procedures and intent of Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) standards as administered by the National Park Service.

Some of the PMOA requirements have been completed, including the publication of *World War II Temporary Military Buildings: A Brief History of the Architecture and Planning of Cantonments and Training Stations in the United States* (Garner 1993). The U.S. Army Corps of Engineers' Construction Engineering Research Laboratories (CERL) has also documented 113 World War II temporary building types. Further research is required to determine whether all requirements of the PMOA have been satisfied. Actions concerning unique temporary buildings must be reviewed on an individual basis by SHPD.

NATIONAL REGISTER EVALUATION CRITERIA

Both National Register of Historic Places (NRHP) and U.S. Army criteria for evaluation were considered in each assessment of a potential entry for the NRHP. The NHPA, as amended, and Title 36, Part 60 of

the Code of Federal Regulations (36 CFR 60), define the criteria for evaluating the significance of cultural resources as the following:

National Register criteria for evaluation.

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b) that are associated with the lives of persons significant in our past; or
- c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d) that have yielded, or may be likely to yield, information important in prehistory or history.

Criteria considerations.

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- a) A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- b) A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- c) A birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his [or her] productive life.
- d) A cemetery which derives primary significance from graves of persons of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

f) A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

g) A property achieving significance within the past 50 years if it is of exceptional importance (Advisory Council on Historic Preservation and GSA Training Center 1990:II-26 through II-27).

In addition to the National Register criteria, U.S. Army evaluation criteria (U.S. Army 1975: 3-2) assign significance to the following:

a) Properties, including sites, associated with pre-Army ownership or use, with American Indians, or with the early local history.

b) Properties associated with the original purpose, founding, or mission of the installation.

c) Buildings, structures, and objects constructed as a prototype, model, or representing a change in technology or engineering.

d) Industrial structures or groups of industrial objects that together illustrate some aspect of the historical development of the Army.

e) Historic objects that are too large to be housed in an Army museum, are presently stationary and associated with the site, and contribute to an understanding of the installation's or Army's mission.

f) Historic structures important to the defense or mission of the installation, e.g. moats, fort walls, batteries.

g) Groups of structures that together demonstrate historic land uses and activities of the installation.

U.S. ARMY EVALUATION CATEGORIES

The Army has developed a set of regulations outlining management responsibilities for the treatment of historic properties including buildings, structures, objects, districts, sites, archaeological materials, and landmarks. Specifically, Army Regulation 420-40 (15 May 1984), *Historic Preservation* (U.S. Army 1984), outlines the evaluation categories used in this report. All the properties that fulfill or may possibly satisfy National Register criteria are assigned the following categories of importance: (1) major importance (Category I); (2) importance (Category II); (3) minor importance (includes properties that contribute to the significance of Category I and II properties, but may not individually meet the National Register criteria

(Category III). Properties, particularly those near or within the boundaries of a historic district, that do not meet the criteria for the National Register, are usually defined as properties: (1) of little or no importance (Category IV); or (2) detrimental to the significance of adjacent historic properties (Category V). (U.S. Army 1984: Sec. 2-12).

U.S. Army Technical Manual TM 5-801-1, *Administration Procedures* (U.S. Army 1975), provides additional background on the identification, evaluation, and treatment of historic resources. Technical Manual TM 5-801-2, *Maintenance Procedures* (U.S. Army 1977), specifies recommended preservation measures for these properties.

ENVIRONMENTAL BACKGROUND

The environment of northern Ko`olau Loa is unique on O`ahu, in that the area is composed of narrow coastal flat adjacent to upraised limestone cliffs and relatively short, narrow valleys which quickly become rugged and steep not too far inland. The area is also relatively one of the windiest on O`ahu. These aspects of the environment, along with information on soils and vegetation, are discussed below.

CLIMATE AND RAINFALL

The climate of the northern Ko`olau Loa District is drier and windier than the southern portion. The northern portion receives less rainfall than other windward areas of the island, primarily due to the lack of high mountains that trap the moisture-rich northeasterly trade winds. Without such mountains, the tradewinds pass over the area, dropping little moisture.

Average annual rainfall within KTA varies from circa 40 inches on the coastal plain to nearly 150 inches at the crest of the Ko`olau Range. Data from the Kahuku meteorological station, located at 25 ft (7.5 m) above sea level, indicate the coastal plain receives between 40 and 50 inches annually, with the majority of precipitation occurring between November and March (wet season) and the least between June and September (dry season). Recorded monthly highs of 35 inches have fallen in February while recorded monthly lows of circa 8 inches occur in July. No specific meteorological station data are available for the

uplands, but rainfall between 75 and 150 inches annually is depicted on rainfall maps of the area (Armstrong 1983:64).

Based on data from the Kahuku meteorological station, temperatures vary, with recorded monthly lows between 48 to 91 degrees Fahrenheit in January and recorded monthly highs between 55 and 95 degrees Fahrenheit in October (Armstrong 1983:64).

WIND

Surface winds are predominantly northeasterly trade winds. In general, the trades are more persistent in summer than winter, and are often stronger in the afternoon than in the morning or at night. Between October and April, the winds may shift and become southerly or southwesterly, or northwesterly winds that precede cold fronts. The effects of terrain on the wind are varied. Winds moving over crests such as the northern Ko'olau range, around headlands such as Kahuku Point, or through saddles or narrow gorges, such as the many valleys in the area, become stronger and more turbulent (Armstrong 1983:65). This average wind speed increases with storms and squalls. Generally, the coastal zone and unprotected upland slopes can be considered to be above average windy areas.

VEGETATION

Vegetation in the area is mixed, and includes species typical of dry lowland and wet upland areas. Owing to post-Contact land alterations (e.g., sandalwood trade, ranching, pineapple (*Ananas comosus*) and sugarcane (*Saccharum officinarum*) cultivation), much of the area is dominated by introduced species, including various range grasses (*Gramminae* spp), *koa haole* (*Leucana glauca*), Christmas berry (*Schinus terebinthefolios*), *kiawe* (*Prosopis pallida*), and guava (*Psidium guajava*). Pineapple and sugarcane are still grown in coastal areas bordering KTA. Upland sections of KTA within the forest reserves still contain native vegetation, including *ʻoʻhia* (*Metrosideros* sp.) and *hapuʻu* tree fern (*Cybotium splendens*). Valleys and gulches are dominated by introduced species, although some native vegetation can be found in these areas as well.

TOPOGRAPHY

Topography within KTA varies from nearly level coastal plains to nearly vertical scarps along the Kahuku escarpment and within steeper portions of the many drainages. The upland areas consist of dissected drainages and moderate slope lands, with slopes ranging from 3 to 25 percent or more. There are 20 drainages in KTA including Waimea, Kalunawaikaala, Pakulena, Kaleleili, Paumalū, Aimuu, Waiale'e, Pahipahi`ālua, Kawela, `Ō`io, East `Ō`io, Ohia`ai, Keaaulu, Mālaekahana, Kahawainui, Iihihi, Wailele, Koloa, Kokololio, and Kaipapa`u Streams. Of these, only Waimea, Kahawainui, and Kaipapa`u flow to the sea year round; the others are intermittent drainages (Armstrong 1983; Foote et al. 1972).

GEOLOGY

KTA is located on the northeastern slopes of the Ko`olau range, the remnant of a Pleistocene volcano that formed from 2.2 to 1.3 million years ago. The basaltic lavas are derived from the later stage Ko`olau volcanic series. These lavas are exposed along the Kahuku escarpment, the sides of drainages and in outcropped areas of the uplands. The coastal plain is comprised of uplifted Late-Pleistocene limestone reef which is overlain by calcareous beach sands, and terrigenous sediments and soils derived from the eroded Ko`olau volcano (Macdonald and Abbott 1970).

SOILS

There are three major soils associations within KTA: Ka`ena-Waiialua Association within the coastal plain; Lolekaa-Waikane Association within the inland portions of the coastal plain, within valley bottoms, along the Kahuku escarpment, and along the lower reaches of the upland slopes; and, Rough, mountainous land-Kapaa Association in the uplands. Ka`ena-Waiialua Association soils are deep, nearly level and gently sloping, poorly drained to excessively drained soils that have a fine-textured to coarse-textured subsoil or underlying material and are found on coastal plains, talus slopes, and in drainageways. Lolekaa-Waikane Association soils are deep, nearly level to very steep, well-drained soils that have a dominantly fine-textured subsoil and are found on alluvial fans, terraces, and in the uplands. Rough, mountainous land-Kapaa Association soils are deep well-drained soils that have a fine-textured or moderately fine-textured subsoil and are found within very steep land broken by numerous drainageways, and in gulches and narrow ridges (Foote et al. 1972:37, 46, 47).

HISTORICAL BACKGROUND

The history of human occupation in the Hawaiian archipelago commenced around the fourth or fifth century A.D., and possibly earlier, with the arrival of Polynesians who had sailed northward, probably from the Marquesas Islands (Kirch 1985:1). Settlement was initially on the coasts; over time, as population and resource requirements increased, coastal population centers became more numerous, with an increase in the exploitation of outlying and more marginal areas, which the KTA area may have represented. Eventually exploitation and population grew in the more resource-abundant areas, and exploitation and settlement of inland and leeward areas intensified (e.g., Kirch 1985:298-306). In the settlement pattern model presented by Kirch (1985:302-306), the Expansion Period began ca. A.D. 1100, with even the least exploitable zones settled before A.D. 1650.

Owing to the somewhat drier climate of the northern Ko`olau Loa area, it is possible that this area was permanently settled somewhat later than areas to the south. Given the abundant resources in the area, however, including permanent streams, wetlands, springs, and forested valley interiors, it is also possible that the area was settled relatively early. Regardless, it is reasonable to assume that the northern Ko`olau Loa area would have been exploited for the plant and animal resources available there both prior to and following the advent of permanent occupation. Also, the relatively level coastal lands formed a convenient route between the population centers of the Waialua District and the southern Ko`olau Loa and Ko`olau Poko Districts, part of a trail that circled the island (Ti 1983:98).

As population expansion and settlement throughout the islands occurred, complex trail systems and transportation networks developed. These trails probably initially developed along the coasts between coastal settlements; later, trails crossed entire islands, connecting coastal and inland settlements for purposes of communication and transportation of goods for exchange and subsistence.

Among the best available sources for information regarding traditional Hawaiian lifeways is the ethnographic research of Handy (1940) and Handy and Handy (1972), who investigated traditional subsistence strategies and areas of cultivation and habitation. Their descriptions of Hawaiian communities

have proven useful in the development of settlement models for particular localities, including the northern Koʻolau Loa area.

The typical homestead or *kauhale*...consisted of the sleeping or common house, the men's house, women's eating house, and storehouse, and generally stood in relative isolation in dispersed communities. It was only when topography or the physical character of an area required close proximity of homes that villages existed. There was no term for village. *Kauhale* meant homestead, and when there were a number of *kauhale* close together the same term was used. The old Hawaiians, in other words, had no conception of village or town as a corporate social entity. The terrain and the subsistence economy naturally created the dispersed community of scattered homesteads. Water supply was, however, a consideration which frequently led to grouping of homesteads close together. . . . Where conglomerations of homesteads existed, they were not communities held together either by bonds of kinship or economic interdependence. The grouping was fortuitous, and the ties of relationship of each household reached out to relatives living in other parts of the same or neighboring *ahupua`a*. [Handy and Handy 1972:284-285]

In general, then, *kauhale* were scattered over plains and broad slopes, unless water was a limiting factor; this was probably not the case for the majority of the KTA area.

This information is supplemented by Handy and Handy (1972:282-283), discussing various aspects of settlement and land use:

One factor of prime importance affecting the development of [traditional Hawaiian] plantation areas was propinquity to good fishing grounds. Such land areas as were intensively developed were always in localities where good fishing grounds were easily accessible. It may be said therefore that as a general principle Hawaiians developed their land resources only where they lay not too far distant from good fishing grounds which would give them their needed protein food. Hogs and dogs were luxuries enjoyed by the *ali`i*, rarely by country folk. . . . On Kauai and Oahu sweet potatoes were planted only as a supplement to taro, along the coastal zone where there was sandy or rather dry soil not suitable for taro. Yet there were very extensive areas which, it would seem, might have been utilized for sweet potatoes if there had been sufficient pressure of population to demand it. . . . Yet in old Hawaiian times this land was undeveloped.

By the A.D. 1600s, the Hawaiian sociopolitical system had evolved to an early State level. High chiefs (*ali`i nu`i*, or *mo`i*) were in control of individual islands (*moku*), or one or more districts on an island; lesser chiefs (*konohiki*) supervised *ahupua`a*. These *ahupua`a* were further broken down into parcels held by use-right by commoners (*maka`ainana*). Land divisions were assigned within *ahupua`a*. At least nine smaller divisions were recognized, the most common being *ili* (small divisions often used by extended

families) and *kuleana*. Distribution of goods and services was controlled by the *ali`i nui*, with responsibilities of supervision delegated to the lesser chiefs, who further delegated responsibilities down the sociopolitical ladder.

This hierarchy was maintained by a religious system in which the high chiefs possessed great spiritual power (*mana*). The maintenance and garnering of *mana* was ever-present throughout the culture (Sahlins 1981). All aspects of traditional Hawaiian lifeways were affected by religion, and were accompanied by sacred rituals and ceremonies that were in place to assure the approval of the gods in each undertaking. Maintaining this spiritual power was a hierarchy of priests (*kahuna*), paralleling the sociopolitical hierarchy and supporting it. The *kapu* (proscription) system ensured social order; to disobey the *ali`i*, *kahuna*, or their delegates, or transgress against the gods or the practice of religion, was forbidden, or *kapu*.

Physical evidence of the value and role of religion within Hawaiian culture is exhibited in widespread archaeological sites and features. Stokes (Stokes and Dye 1991:24-25) identified nine principal classifications of *heiau* during his 1906-1907 research on Hawai`i Island:

According to information gathered in the field from modern natives, there were the following places of worship. Temples for human sacrifice were sometimes termed *po`o kanaka* but were generally described. The ancient term *luakini* now serves to designate the modern church and was not known to any native I met as the designation of a former temple.

I came across many foundations of temples with the name Hale o Lono, and when information was available, it was to the effect that temple was not for human sacrifice. Occasionally temples were found ascribed to the great gods Kane and Kanaloa, to the lesser gods Pele and Hi`iaka of the volcano family, and to the shark gods.

A list of terms collected in the field includes:

1. *Heiau ho`omana*: temples of the priestly class.
2. *Heiau ho`ouluulu ua*: temples to induce rain.
3. *Heiau ho`ouluulu ai*: temples to cause good crops. Inquiry generally showed, however, that this and the preceding were for the same purpose. One of this form was termed *ko`a ho`ouluuluai*.
4. *Ko`a, heiau ku`ula, heiau ko`a, heiau ho`oulu i`a* and similar combinations: temples to secure good catches of fish.
5. *Heiau hana aloha*: temples to impel love.
6. Shrine for aid in childbirth.
7. *Pohaku o Kane*: a shrine.

Stokes went on to mention that there were many categories of lesser shrines, for smaller groups, families, and individuals, dedicated to various gods, *akua*, or *aumakua* (Stokes and Dye 1991:21-39). Within individual or extended-family habitation complexes, family shrines and alters were integral components of the structure and setting of the site (Kirch 1985). Shrines (*ko`a*) and temples (*heiau*) are found in association to fishing villages and prominent headlands along the coast, and are indicative of the role of religion in the maritime economy (Barrera 1971; Kirch 1979). A discussion of *heiau* types is important to the present undertaking, as several sacred or potentially sacred sites have been recorded in and around KTA (see Previous Archaeology section below).

By the time of the arrival of Captain James Cook in A.D. 1778, the Hawaiian culture was highly ordered under the sociopolitical and religious strictures of the *kapu* system. All aspects of Hawaiian lifeways were affected by this system. Production and distribution of goods and services were under the control of the reigning *ali`i*, with subordinate, hierarchical, authority delegated through their affines and the priestly class of *kahuna*, downward to the commoner. The commoners were the labor force, overseen by *konohiki*, who administered the will of the *ali`i*.

The commoners, tied to the land as they were, would have been limited in the extent of their exploitation range. It has been postulated their range was, for the most part, confined to their home and neighboring *ahupua`a* within the resident district (Handy 1940; Kirch 1985). Yet the extensiveness of the trail systems suggests the commoners' ability to travel was not so greatly restricted, and this is somewhat supported by native accounts of travels to various localities throughout each island, and between islands. An example of this is the tale of the famous *kapa* beater lost in Kahuku and found by its owner in Waipahu, `Ewa (McAllister 1933:106; Sterling and Summers 1978:25-26, 149).

The antiquity of the Ko`olau Loa District is reflected in the preserved legends and the numerous remains of the ancient temple, residential, and agricultural sites archaeologically recorded and documented in Ko`olau Loa and adjacent districts. Following the explorations of Captain James Cook in 1778, early European-Contact references to the Ko`olau Loa District appear in journals of early explorers. Equally brief and intermittent written records during the early-Contact period are mentioned in the letters, reports, and journals of the missionaries who arrived in the Sandwich Islands in 1820, and in the published narratives of their native students. The majority of the early-Contact period records of native land use and settlement

patterns in Ko`olau Loa were found in the missionary letters and journals of Rev. John and Ursula Emerson assigned to the Ko`olau Loa-Waialua District mission in 1832.

MYTHOLOGY

A comprehensive compilation of Kahuku mythology is cited in Silva (1984:1-8). A general overview of several of the oral traditions are presented here to indicate the traditional antiquity of the region. One of the earliest recorded Hawaiian legends appears in an 1828 report written by Levi Chamberlain, a missionary accountant, and the superintendent of secular affairs for the American Board of Foreign Missions in Sandwich Islands. The tradition, as recorded by Mr. Chamberlain, describes the creation of Kahuku.

The natives tell a marvelous story respecting the origin of this district which they say floated in from the sea, and attached itself to the ancient shore of the island, that there was a subterranean communication between the sea & the ancient shore, by which a shark used to pass, & make depredations up on land. The basis of the tract, which is 5-7 miles in length, & from 1 to 2 miles in breadth, appears to be of coral; and it was evidently redeemed from the sea... [Chamberlain 1957:35-36]

Several variations of Chamberlain's translation of the tradition exist. A popular version is that the floating island of Kahuku banged against the island of O`ahu, creating so much noise that:

...the old women guarding Princess Laieikawai...grappled the island with fishhooks and attached it securely to Oahu. Polou Pool on the sea side of the Kahuku Mill is one spot where the hook was fastened. The other end was fastened at Kukio Pond, 300 feet inland at Kahuku Point. [Boswell 1958:68]

A similar version (Paki 1972:53) relates that the waterless wandering island was inhabited by *menehune* (little people):

...For a long time, the people of Oahu had planned to make the island a part of their land...One day, a resident of Kahuku suggested that all the people gather together to make strong hooks of whalebone and attach them to a stout rope made of sacred Olona fibres...

When the *menehune* left the island to collect water the floating island was attached to O`ahu.

In the fourteenth century, the maiden princess Laieikawai was hidden as a child in Waiapuka Cavern, "Inland from the south point of the shore on the Laie border...which could only be entered by diving into a sea pond...Until the 1900s natives could dive from the pool into the chamber beyond, but it has now filled with silt" (Wilcox 1975:2).

A lengthy story relating to the origin of some of the colorful tropical fish and associated *kapu* on eating *hilu* (various reef fish) appears in Westervelt (1963:139-145). During a migration of fish from Kahiki around the island of O`ahu, the fish were transformed into men and landed at the village of Kahuku. At Kahuku they were treated as guests, and were offered food, including the flesh of one of their number.

Many stories are attached to the demi-god Kamapua`a who was born near Punalau *Ahupua`a* in the Ko`olau Loa District. During Polynesian migrations in the eleventh century, Kamapua`a, who could take either the form of a man or a giant hog, altered the land and created many of the landmarks and features on O`ahu through his mischievous deeds. "Today in the valley of Kaliuwaa, Sacred Falls and other points of interest are associated with the rascal's many escapades" (Wilcox 1975:2).

POST-CONTACT PERIOD

The development of Hawaiian culture, and the history of traditional Hawaiian lifeways, was altered with the arrival of Captain Cook in A.D. 1778, followed shortly by other Westerners. Most changes were not immediately pervasive. Outlying areas, furthest from Western influence (possibly including the northern Ko`olau Loa area) would have been less affected by Western culture for some years afterward, until inland products such as sandalwood began to dominate foreign trade.

The Early Post-Contact Period: A.D. 1778-1846

During the early nineteenth century, population declined rapidly throughout the Hawaiian Islands due to inter-island warfare and introduced diseases (Kelly 1991; Stannard 1989). Kelly (1991) references several accounts that detail the decimation of the population of the `Ewa District, south of the current project area. When Kahekili conquered O`ahu in 1783, "he is said to have been responsible for killing whole populations of villages in `Ewa" (Kamakau 1961:137, cited in Kelly 1991:157). Later, "when Kamehameha I came to [conquered] Oahu in 1795 the results were also devastating" (Kelly 1991:157). How often warfare-related

deaths of non-combatants occurred before Contact is undetermined, but such actions could have affected population growth and settlement expansion.

Introduced diseases, including cholera, smallpox, bubonic plague, measles, and typhoid, as well as venereal diseases such as syphilis and gonorrhea, decimated the native population to an even greater degree as they had no natural resistance to these new illnesses. Epidemics destroyed whole populations of villages and districts, resulting in a decrease in population and equivalent shifts in lifeways and land use.

The rapid decline of population within the early post-Contact period precipitated the loss of a great resource: the oral histories and traditions of the residents of the island of O`ahu. Whole villages and groups of O`ahu residents died before early foreign arrivals had an opportunity to record their histories. The loss of this resource has made it difficult for modern researchers to effectively interpret traditional Hawaiian lifeways, settlement patterns, and land use. An influx of residents from Maui and Hawai`i followed the conquests of Kahekili and Kamehameha I, further compounding the problem as these individuals brought their own oral histories and traditions with them. Consequently, the extent to which these transported histories and traditions were altered to adapt to the new home on O`ahu is uncertain.

Nakamura (1981) and Silva (1984) summarize the known historical documentation of the Kahuku area in conjunction with archaeological surveys undertaken by Davis (1981), Bath (1984), Rosendahl (1985) and Walker et al. (1986). Nakamura and Silva agree there is little substantive historical documentation on the area. Both cite early mariners' descriptions of the Kahuku area that were previously reported by McAllister (1933). Subsequent studies (Stride, Craddock, and Hammatt 1993; Walker, Haun, and Rosendahl 1988) have not contributed additional historical information, but rather cite briefly the works of Nakamura and Silva.

The earliest description of the area was recorded 28 February 1779, in the log of Captain Charles Clerke, who had succeeded to command of the *H.M.S. Resolution* following the death of Captain Cook.

Run round the Noem [northern] Extreme of the Isle [O`ahu] which terminates in a low Point rather projecting [Kahuku Point]; off it lay a ledge of rocks extending a full Mile into the Sea, many of them above the surface of the Water; the country in this neighborhood is exceeding fine and fertile; here is a large Village, in the midst of it run up a large Pyramid doubtlessly part of a Morai. [Captain Charles Clerk's narrative cited in Beaglehole 1967:572, and recited by Nakamura 1981:1]

Lieutenant James King, also on board the *H.M.S. Resolution* at the time, made a similar entry about the windward side of O`ahu in general:

It (Oahu) is by far the finest island of the whole group. Nothing can exceed the verdure of the hills, the variety of wood and lawn, and the rich cultivated valleys, which the whole face of the country displayed. [McAllister 1933:153]

In contrast, Captain George Vancouver noted differences in the landscape 15 years later in 1794:

In every other respect our examination confirmed the remarks of Captain King; excepting, that in point of cultivation or fertility the country did not appear in so flourishing a state, nor to be so numerously inhabited, as he represented it to have been at that time, occasioned most probably by the constant hostilities that had existed since that period. [Vancouver 1798, Vol 3:71 cited in Nakamura 1981:2]

The possible decimation of the population and abandonment of the fields may have been due to multiple causes, such as warfare or epidemics, or may be related to seasonality. Clerke and King arrived during the wet season; Vancouver visited at the height of the dry season. Regardless of the cause, the population decline adversely affected the amount of land under cultivation. McAllister (1933:153) cites E.O. Hall's 1838 summary of conditions in the area: "Much taro land lies waste, because the diminished population of the district does not require its cultivation."

John Papa Ii (1800-1870), a high chief and Hawaiian government official, visited relatives and friends living in Waiale`e *Ahupua`a* in about 1810, and provided a description of the area:

...a delightful land, well provisioned. There was a pond there, surrounded by taro patches, and there was good fishing places inside the reef...Chiefs and commoners crowded together at Puehuehue to go diving, or board surfing at Ulakua, just *makai* [towards the sea] of Kohalaloa, where the waves rolled and broke perfectly. [Ii 1983:24, 63]

Taro ponds along the beaches and shorelines were also used as holding ponds for mullet (Wilcox 1975:2), a fish generally reserved for the royalty. *Kapu* fish and fishing rights, until the division of Hawaiian lands in the 1840s, belonged to the King and were in charge of the chiefs (*konohiki*) of each *ahupua`a*. In Ko`olau Loa, *he`e* (octopus; *Polypus* sp.) was owned and *kapu* for the king (Department of the Interior, Documents:

10:1852). Other fish and fishing rights were controlled by the chief, or headman of each *ahupua`a*, and were delegated to the commoners for harvesting.

Among other hardships the *konohikis* made exorbitant charges for fishing rights along the shore; certain fish were tabu and half the catch of other fish had to be shared with the chief. [Emerson 1928:138]

Following the division of lands, fishing rights were sold or leased by the owner of the *ahupua`a*.

In September of 1815, John B. Whitman made a visit to Pahipahi`ālua *Ahupua`a* with a friend to survey a plantation that had been granted by the high priest (Hewahewa) of Hawai`i Island. Whitman wrote in his journal that the point of Pahipahi`ālua *Ahupua`a* contained a hog pen (in addition to dogs and fleas) and was rocky and uncultivated; however, the "small valley" (Pahipahi`ālua Gulch) back from the point was stocked with taro. Preparations for collection of the king's taxes from Pahipahi`ālua, due at the time of the *makahiki* festival beginning in October, were being made at the time of Whitman's visit. The *konohiki* of Pahipahi`ālua enumerated salted fish, hogs, tapa, "5 pows" (*pa`u*; skirts worn by women), and "10 maros" (*malo*; men's loincloths) among the taxes being collected (Whitman 1979:78-82).

The Protestant missionaries sent to the Sandwich Islands by the American Board of Foreign Missions found the people of Hawai`i:

...dominated by the will of an autocratic and sometimes capricious chief or chief's headman...They had no incentive to improve their condition...and there were no laws to protect property and safeguard private ownership. A common man had to work for his chief whenever called upon; if he refused, he could be turned out of his home and whatever he had could be confiscated, his only recourse being to take French leave and... put himself under the rule of another chief. [Emerson 1928:137]

A heavy tax on the labor of natives of Ko`olau Loa (and other districts of Hawai`i) was the collection of sandalwood from the forests to pay for foreign sailing vessels purchased in trade by King Kamehameha I, and the high chiefs following his death in 1819. Trees felled and branched by the men were carried along narrow foot paths to the collection station at Waialua, adjoining the Ko`olau Loa District on the north shore, for shipment to Honolulu.

Some records of sandalwood tax collection from the Ko`olau Loa and Waialua Districts to pay sandalwood debts during the 1820s were kept by Stephen Reynolds, a clerk of merchant William French in Honolulu, and by William French in the 1830s (French 1833). The heaviest traffic of schooners and brigs to Waialua, the collection station for the two districts, appears to have been between 1824 and 1829 (Reynolds 1989:28, 29-30, 181, 182, 185, 187, 193, 248, 249, 262, 272) in a effort to pay off accumulated sandalwood debts.

Levi Chamberlain made a tour of O`ahu during the sandalwood collecting period (1828) to examine the mission schools. South of the project area he examined a school of "sandal wood cutters from the mountains" before continuing on his tour to examine four schools in the Ko`olau Loa District. Being a guest of Peka, the Lā`ie *konohiki*, Mr. Chamberlain examined two schools in Lā`ie and Mā-laekahana the following day. After examining the schools, Mr. Chamberlain continued over "a level sandy country" to examine a large school at Kahuku, and a smaller one at Waiale`e (Chamberlain 1957:35, 36). Specific details giving precise locations of the schools, villages, and the population within the districts were not reported by Mr. Chamberlain.

On 24 July 1832, the missionaries Rev. John and Ursula Emerson were received at Waialua by Chief La`anuī, and headman Kuakoa, to begin the second mission established on the island of O`ahu. The areas covered by the Emerson's mission were the Ko`olau Loa (generally referred to as "Kahuku"), Waialua, and later, the Wai`anae Districts. The native population was estimated at that time by Rev. Emerson as about 8,000 inhabitants in the three districts, with six settlements along the shoreline of Ko`olau Loa (Emerson 1928:55, 66, 103). Rev. Bingham gave the population about 7,300 (Bingham 1981:468).

My father's (John Emerson) charge included the district of Koolaualoa (Long Koolau), the northern side of the island. Although this is only a strip of land from half a mile to a mile in width, running along the foot of cliffs, or bold precipices which terminate many mountain spurs, the soil is good and well watered by small mountain streams and the valleys between the spurs are rich and productive. There were six settlements along the shore with a population of about 2,700... [Emerson 1928:103]

The technology of grass hut construction, the purposes of enclosures, and available resources in these two districts are amply noted throughout the Emerson's letters and journals. Rev. Emerson described Kahuku in 1832 as:

...a populous district green with forests of *Lauhala* [pandanus] trees, nestled among which the homes of the natives were sheltered from the strong winds. They used the choice *luhala* [sic] leaves for lining their grass huts and for skillfully braided mats for their gravel floors, while the fruit also had its uses. [Emerson 1928:134]

Among the uses of the *lauhala* fruit was the identification of the district to whom a person belonged:

Men from Kahuku were identified by leis of the orange hala fruit which they wore by order of their chief when they left their *ahupua`a*. [Wilcox 1975:1]

House construction in Ko`olau Loa and Waialua, using natural resources growing in the districts, was described in detail by Rev. Emerson:

The frame of a native house is built by fitting and tying to a ridgepole other poles which slant from it to the ground, or to upright posts, which in that case frame perpendicular sides. Across the poles are placed horizontally other poles about an inch in diameter and two inches apart, the *aho* [cord], to which is fastened the thatch, which is made of bunches of *pili* grass lapped like shingles. The cords used for tying and fastening are prepared from the strong *ahu-awa* [sedge; *Cyperus javanicus*] reed...

The land on which our houses stand...is enclosed by a sort of palisade of small poles about six feet high so fastened together with the native cord as to make quite a strong fence. This is necessary to keep the horses and goats from carrying off the houses, in other words, from eating them up. [Emerson 1928:57, 58]

Later, stone walls were constructed, not as animal enclosures, but "to keep out roaming cattle, horses, and pigs from cultivated lots" (Emerson 1928:127).

In addition to plants and animals mentioned by Rev. Emerson, Ursula Emerson wrote in letters that taro was "found in abundance in the mountains," and recently introduced fruit available to them "from the uplands" were oranges, lemons, limes, and pineapples. Their firewood was gathered from the forests among the *kukui* (*Aleurites moluccana*), *koa* (*Acacia koa*) `ohi`a (mountain apple), and *kuawa* (guava; *Psidium guajava*) trees. Sweet potatoes, bananas, arrowroot, and a large variety of historically introduced fruits and vegetables (grapes, figs, corn, beans, cucumbers, squash, cabbage, melons, radishes, small onions) were mentioned by Mrs. Emerson as planted by Hawaiians in their scattered garden plots, and around their houses. Pigs, chickens, ducks, fish, and goat milk were also mentioned (Emerson 1928:66, 84, 96, 100, 151).

Gideon La`anui (1794-1849), the "christian chief" (*konoiki*) of the Emerson's district, was baptized on 4 December 1825 in Honolulu by the first group of missionaries (Ii 1983:145). Duties of tax collection from the residents in the district were directed to La`anui by way of written messages. In 1834 a letter notified La`anui that a person was being sent to collect potatoes and *poi*, and that he was to get *puakai* (*pukai*; lime), medicinal herbs, ship some fish, and "hire" a man to get tapa material from the mountains. A message sent in 1837 stated that the king wanted hogs, fish and food. Other messages included the instructions "to go fishing" for fish and shrimp; "get some lime if matured," ship wood, sandalwood, food, and potatoes. While in port, La`anui was to supply the sailors on the king's vessel with food and fish (Department of the Interior: 1834, 1838a - 1838e).

Land Tenure Change: The Great Mahele

Until 1841, Hawaiian lands were owned by the King and administered by chiefs. Lands occupied by Hawaiians under a chief, or held by foreigners (in agreement with the king or various island chiefs), were subject to seizure and redistribution. The status of land tenure during the early post-Contact period was felt by foreigners to be a detriment to investment and the development of Western plantation agriculture, farming, and ranching. This resulted in the adoption of foreign trials in 1832, codes of laws in 1833 and 1839 (superseded 1842), and the first Hawaiian Constitution in June 1840. The Hawaiian Constitution provided for the appointment of a legislature composed of the king, 16 chiefs, and 7 elected representatives (Department of the Interior 1840).

The first Hawaiian legislative meeting, held on 1 April 1841, authorized the governor of each island to lease tracts of lands for periods of up to, but not exceeding, 50 years, (Department of the Interior 1841). Article 4, Chapter 7, of the Hawaiian Legislature session, passed on 10 December 1845, provided for a Privy Council to appoint a Board of Commissioners to Quiet Land Titles. King Kamehameha III, King Kamehameha III, waived his exclusive right to all lands in Hawai'i. The lands were then divided into three parts: one for the Chiefs, one for the Government, and a third for the King's personal use. The chiefs also surrendered certain of their new lands, and it was primarily from their one-third that the common people, their tenants, were awarded small holdings (known as *kuleana*). *Kuleana* were lands that the tenants had improved, and which they used for their own purposes. This land division became known as the Great Mahele.

Two hundred sixty-nine land claim applications, indicating a minimum population of approximately 800 people, were applied for by residents of the Ko`olau Loa District. Hawai`i government survey maps detail coastal *kuleana* but the locations of upland *kuleana* are non-existent. In 1873, the boundaries of the government land of Kahuku belonging to the Kahuku Ranch Company were still unsettled (Department of the Interior Letters: 1873). Some of the small *kuleana* land claim awards located along the lowlands of Ko`olau Loa appear on tax maps; others, as late as 1993, are listed in the tax records as "unlocated *kuleana*" (ten are currently designated as unlocated in TMK 5-5-07:3).

During the "Great Mahele" the *ahupua`a* were conveyed by Land Claim Awards (LCA) in fee simple titles to the Hawaiian government, the king (Crown Lands), and the royalty (Luna`ilo, Keohokalole, and Kinimaka). Most of the Ko`olau Loa lands were then granted, leased, or sold to foreigners after 1850 for pasturing cattle and sheep, developing most of the Ko`olau Loa District into ranches known as Mālaekahana and Kahuku Ranches.

Kahuku had passed from the control of its chief to that of an Englishman. The pastures of his big ranch extended along the shore for 12 miles, reaching inland to the mountain chain, and he was so autocratic that the natives could not own a dog, or pasture a cow or horse, without his consent. The depredations of herds and flocks on their small homesteads became unbearable, but they appealed in vain for their beloved *hala* trees and patches of vegetables... There was no redress, however, and with the fading of the forests the people also disappeared and the once populous district of Kahuku [Ko`olau Loa] became a lonely sheep and cattle ranch. [Emerson 1928:135-136]

MĀLAEKAHANA AND KAHUKU RANCHES

Cattle and sheep were introduced to Hawai`i by Captain George Vancouver as a gift to the king of Hawai`i Island in 1794, with a twenty year *kapu* agreement to allow the cattle to multiply (Vancouver 1984:812). By the end of the *kapu* period, the cattle had become so troublesome that bullock hunters were engaged by Kamehameha I to hunt the cattle for their skins and tallow. The tenuous nature of foreign possession of lands for economic enterprises, prior to the Great Mahele, prohibited most foreign investments. Honolulu merchant, William French, however, acquired Hawai`i Island property for ranching in 1838, trading a "beautiful horse" to Governor Kuakini for use of the premises, beginning the first cattle ranch in the Hawaiian Islands (Board of Land Commissioners, Foreign Testimony 2:157-168, 171, 305).

The formation of Charles Hopkins' Mālaekahana Ranch appears to have begun with his purchase of livestock at Kahuku from Joseph Booth on 8 April 1850 (Bureau of Land Conveyances 4:137). Robert Moffitt, owner of the Kahuku Ranch, began the ranch by acquiring large land leases of Government lands in Koʻolau Loa in 1852. In land transactions between Hopkins and Moffitt in 1858, sheep as well as livestock were apparently raised on the ranches (Bureau of Land Conveyances 5:536).

A large number of deeds, grants, mortgages, and other land conveyances, from the formation of Mālaekahana "Rancho" by Charles G. Hopkins, and Kahuku Ranch by Robert (Stoney) Moffitt from the early 1850s, through the depression, until the charter of the Kahuku Plantation company in 1890, are filed with the Bureau of Land Conveyances. A brief outline of the major land transactions during the formation and ownership of Mālaekahana and Kahuku Ranches appears in Table 1 and illustrates the change of land use in the Kahuku Training Area from pastures and ranching to a cultivated sugarcane plantation.

Combining the ranches, Malaekahana Ranch interest was purchased by Herman A. Widemann in 1867 and 1872 from Charles K. Hopkins, then residing in Montreal, Canada. Kahuku Ranch was purchased by Widemann from T.H. Stoney of Frankfort, Ireland, heir of Robert Stoney (alias Moffitt) in January 1873 (Bureau of Land Conveyances 35:297-299; 39:1-5). Malaekahana and Kahuku Ranches were then sold by indenture of mortgage to Julius L. Richardson on 19 January 1874 (Bureau of Land Conveyances 38:473-477).

James Campbell, a sugar planter in Lahaina, Maui purchased "Kahuku and Malekahana Ranch" from J.A. Richardson on 2 October 1876 for \$63,500.00. The ranches were comprised of the following land and properties in Koʻolau Loa on the date of sale to Campbell:

- I. 1) *ahupua`a* of Mālaekahana
- 2) *ahupua`a* of Ke`ana
- 3) *ahupua`a* of Kahuku
- 4) *ahupua`a* of Ulupehupehu, Hanakaoe, `Ō`io and 1 and 2
- 5) *ahupua`a* of Kawela
- 6) *ahupua`a* of Opana 1 and 2
- 7) *ahupua`a* of Pahipahi`ālua
- 8) *ahupua`a* of Kaunala

Table 1
 Recorded Ko'olau Loa Ahupua'a Conveyances
 (Malaekahana & Kahuku Ranches 1850-1876)

Malaekahana Ranch, C.G. Hopkins*		
1850	Hanakaoe	Grant from KIII
1850	Kahuku	Deed from KIII
1850	Kawela	Deed from KIII
1850	1/2 Keana	Grant from KIII
1850	Makekahana	Deed from heirs of Keohokalole
1852	1/2 Keana	Deed to George Wood from Kinimaka; deed to Hopkins from Wood

*Indentures of Hopkin's mortgages were held by Wood, Wyllie, Moffitt, & Widemann.

Kahuku Ranch, Robert Moffitt		
1850	Hanakaoe	Grant from KIII
1850	Kahuku	Deed from KIII
1850	1/2 Keana	Grant from KIII
1850	Makekahana	Deed from heirs of Keohokalole
1852	1/2 Keana	Deed from George Wood from Kinimaka; deed to Hopkins from Wood

Malaekahana and Kahuku Ranches merger	
1)	Acquired by Herman A Widemann between 1867 and 1873 from Hopkins and Moffitt <ul style="list-style-type: none"> a) 1867, 1872 Malaekahana Ranch acquisition of Hopkins mortgages. b) 1873 Kahuku Ranch acquisition of Moffitt estate deeds.
2)	1874 Sold by mortgage to Julius L. Richardson
3)	1876 Purchased by James Campbell.

9) Leaseholds, ~3,000 branded cattle, 90 head horses, ~1700 sheep running or grazing on the ranch or adjacent lands, carts, yokes, harness, agricultural implements, tools, furniture, personal and mixed property.

- II.
- 1) *ahupua`a* of Pūpūkea
 - 2) *ahupua`a* of Paumalū
 - 3) *ahupua`a* of Wai`alee
 - 4) indentures and leases.

KAHUKU SUGAR PLANTATION

Early European visitors recognized the potential of Hawai`i to develop an economically profitable commerce based on sugarcane. Captain Peter Puget observed in 1793 that "large and luxurious Growth [of sugarcane]... would abundantly repay in Quantity any Labor bestowed on it in Sugar and Rum" (Bradley 1968:24). Officer Menzies, with Vancouver's voyage in 1793 thought:

...that it would be profitable for the British government to encourage the settlement of a few West India planters at the Hawaiian Islands inasmuch as sugar could be cultivated there by cheap labor without the necessity of recourse to slavery... [Bradley 1968:24, 42]

Captain Iurii Fedorovich Lisianskii, with the Russian exploration voyages of the Pacific Ocean in 1804 wrote:

The sugar-cane also thrives here, the cultivation of which alone would yield a tolerable revenue, if sugar and rum were made of it; and the more so, as the use of these articles is already known to the savages of the north-west coast of America. [Barratt 1987:71]

The first sugar plantation in Hawai`i appears to have been initiated by a foreigner, John Wilkinson at Puu Pueo in Manoa Valley (behind Honolulu) about 1824. The mill and cane fields were taken over by Governor Boki of O`ahu and foreign partners following Wilkinsons' death in 1826. When the Puu Pueo plantation sugar was ground and distilled into rum, "a bad business" as described by one of the partners, Stephen Reynolds, the fields were destroyed by Queen Ka`ahumanu (Reynolds 1989:177, 254, 255, 263, 266, 267). Milled sugar in Ko`olau Loa and Wai`alua Districts was first ground on shares for Hawaiians by Rev. John Emerson in 1836 (Conde' and Best 1973:340). The crude sugar mill was used by the boys Boarding School at Wai`alua (1840-1843) through which the cultivation and sale of the sugar made the school self-supporting (Bradley 1968:351-354).

The Kahuku (Sugar) Plantation Company was chartered on 4 February 1890 (Department of the Interior, 43:54) by sugar planters, James Campbell, James B. Castle, and Benjamin F. Dillingham, (founder of the Oahu Railway and Land Company in 1888). Dillingham's Oahu Railway and Land Company leased in November 1889 various pieces of land from Campbell to build a railroad from Honouliuli, `Ewa, to the Kahuku Sugar Mill at Kahuku, Ko`olau Loa. Right of pasturage; working stock and animals; spring waters, running streams, artesian wells, and rights to "take deadwood from the mountains for fuel," to dig up, carry away, and use the soil and rock,"; and use of the present ocean landing were subleased from Dillingham to Castle in December 1889 (Bureau of Conveyances 121:372; 128:143-155). The railroad reached "Waialua in 1898, and Kahuku in 1899...[in] the early part of the twentieth century the Koolau Railroad was built along O`ahu's windward coast from Kahuku to Kahana Bay" (Mifflin 1983:64, 65). The Koolau Railway was purchased by the Kahuku Plantation Company in 1931 (Conde' and Best 1973:308, 309).

Small-scale pineapple cultivation on Kahuku Plantation lands was begun about 1916 with additional leases of small acreages of land for pineapple leased to individual growers between 1921 and 1927 (Bureau of Land Conveyances 443:364-365; 832:267, 259; 885:105, 235). As the small leases expired, many of them mortgaged, the leases were acquired by the California Packing Company. Some portions of the Kahuku Training Area are former pineapple fields and camp sites located in Kahuku, Keana/Mālaekahana, and Hanakaoe/Kawela *Ahupua`a*.

To clear titles to the Campbell Estate lands, survey maps of the plantation were submitted with Land Court Application 1095 in 1934 (Campbell Estate map 2736). The 1934 maps, showing the locations and boundaries of the pineapple fields and camp sites, have not yet been updated, and are currently used by the Hawaii State Tax Office.

Dismantling of railroad tracks, and scrapping of railroad cars between 1948 and 1951, signaled the end of the O`ahu railroad era (Oahu Railway and Land Company 1946:11; 1948:8, 1951:4,7). Cane fields, serviced by portable cane trains at the Kahuku Plantation, were dispensed in 1954 (Conde' and Best 1973:297-300), and 280 acres were initially leased to the U.S. Government in 1956 for the Kahuku Training Area. Additional leases at later dates expanded the facility to its present size of over 9,600 acres.

The Kahuku Training Area was used by divisions stationed at Schofield Barracks for war games, which contributed to serious topsoil erosion by the use of heavy army vehicles, and by jeeps crossing the ridges. "Heavy rains up in the mountains have stripped the grasses and low-lying vegetation from much of the [Kahuku] training area" (Honolulu Star-Bulletin, 4 May 1970:A2.2.4). In an effort to "halt wind and water erosion," the 29th Infantry Brigade of the Hawaii National Guard, with a motto to plant "a tree in every fox hole," planted 3,000 pine tree seedlings in the foxholes behind Kahuku in 1970 (Honolulu Star-Bulletin, 4 August 1970:A-11.4.1).

PREVIOUS ARCHAEOLOGICAL RESEARCH

Numerous archaeological projects have been undertaken within the northern *ahupua`a* of the Ko`olau Loa District, including several projects within the 17 traditional *ahupua`a* that KTA incorporates. There are approximately 120 archaeological or related multidisciplinary reports (e.g., osteology, petrography, volcanic glass hydration rind studies) within the SHPD library that focus on this area. With a few exceptions, most of these studies pertain to the coastal zone or portions of the coastal plain, and were undertaken in response to developmental actions, including beach park development; resort development (Bath et al. 1984; Walker et al. 1986); flood control projects (Bath 1985); agricultural park development; and residential complex developments (e.g., Pūpūkea-Paumalū areas; Mayberry and Haun 1988; Dunn and Rosendahl 1992). Only four studies have been undertaken within portions of the Kahuku Training Area (Chapman n.d., Davis 1981, McAllister 1933, Rosendahl 1977). Review of these studies enables the formulation of predictive models for site and feature types to be found in the area, and enables the development of a settlement pattern model for northern Ko`olau Loa.

Previous archaeological research within the KTA boundaries have been limited to McAllister's (1933) identification of Sites 259 and 260; the recording of Site 2501 (Chapman n.d.); a limited archaeological inventory and evaluation study undertaken by the Bishop Museum for the United States Army Support Command Hawaii (Rosendahl 1977); and a reconnaissance level inventory survey for a proposed windfarm (Davis 1981) (Figure 1).

Rosendahl's (1977) study was limited in areal extent, covering 1,044 acres (approximately 10%) of the 9,646 acre installation (Figure 2). The study was undertaken at the reconnaissance level, and identified nine archaeological sites. These sites include Site 259, Waikane Stone; Site 260, Pu`uala *Heiau*; Site 1043, Kawela agricultural terraces; Site 2501, Hanakaoe Platform; Site 9506, Keaaulu Ditch; Site 9507, `Ō`io Stream terrace; Site 9508; East `Ō`io Gulch Platform; Site 9509, `Ō`io Gulch Complex; and Site 9517, Kanealii agricultural structures. Four of these sites (259, 260, 1043, and 9517) are reported by Rosendahl to have been destroyed. Four (Sites 9506 - 9509) were new site designations, and one site (Site 2501) is listed on the State of Hawaii Register of Historic Places, and the National Register of Historic Places.

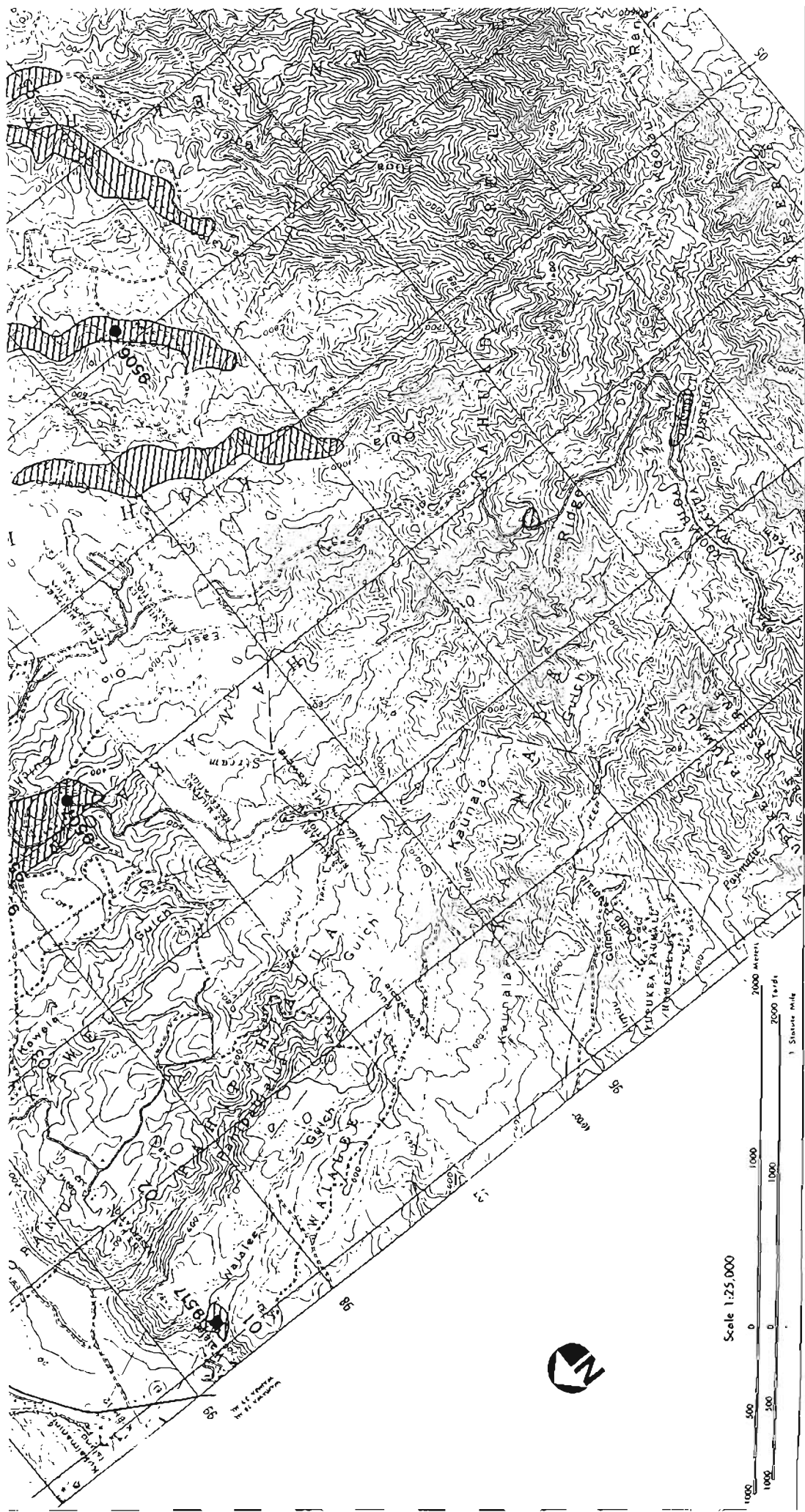
The Bishop Museum reconnaissance survey (Rosendahl 1977) was restricted to compilation of previously generated information and sample survey; when new sites were encountered, a brief written description was recorded. The information was presented as sets of maps and tables that describe the site number, site name, site type, ascribed period of origin (prehistoric or historic), condition, geographic location, evaluation of treatment category, and significance potential, and lists of bibliographic references pertaining to the Kahuku area. This information is presented on Figure 2 and Table 2.

Four of the sites were previously reported by McAllister (1933:152) and Handy (1940:88). McAllister described Sites 259 and 260:

Site 259. Large stone, known as Waikane, beside the stream bed on the mountain side of Kawela Bay, and at the foot of the palis in the land Hanakaoe. Long ago the Hawaiians had to go far up the valley in order to get fresh water, but when Kane struck the stone water flowed from it and continued to flow up to the time the plantation built a pump just below the rock.

Site 260. Puuala heiau, said to have been located on the ridge overlooking Kahuku ranch. There is now no evidence of any type of a structure on this bare hill.

Handy (1940:88) describes the spring-watered terrace areas of `Ōpana and Hanakaoe and reprises McAllister's description of the Waikane stone; however, where McAllister refers simply to Kane, Handy embellishes as "the gods Kane and Kanaloa struck water from a rock now known as Waikane." Handy (1940:88) references McAllister's discussion of Sites 258 and 259:



PORTION OF USASCH MAP SHOWING
ROSENDAHL (1977) SURVEY AREAS AND ARCHAEOLOGICAL SITES

Table 2

Summary of Archaeological Resources at Kahuku Training Area as reported in 1977*

SIHP Site Number	Site Description		Period	Cond.	Location & UTM Coord.	Evaluation		Bibliographic References	Notes
	Name	Type				Cat.	Sig. Pot.		
50-80-02-259	Waikane Stone	Large stone known as Waikane	UND	UND	Kawela Gulch FJ03039912	UND	UND	McAllister 1933:152 B.P.B.M. site card SHPO Files Handy 1940:88	Not located
50-80-02-260	Puuala Heiau	Heiau (type unknown)	PRE/ HIST?	DES	Near Gate C FJ04729808	N/A	N/A	McAllister 1933:152 B.P.B.M. site card SHPO Files	Destroyed (prior to 1930)
50-80-02-1043	Kawela Agriculture terraces	Irrigated? agricultural terraces	UND	DES	Kawela Gulch FJ03009900	N/A	N/A	Handy 1940:88 B.P.B.M. site card SHPO Files	Destroyed
50-80-02-2501	Hanakaao Platform	Large stacked stone platform	PRE	Good	Oio Gulch FJ04149801	I	R-I	B.P.B.M. site card B.P.B.M. arch. record folder SHPO Files	National Register Site
50-80-02-9506	Keaaulu Ditch	Stone-faced irrigation ditch	HIST	Poor	Keaaulu Gulch FJ06069544	III	MIN	B.P.B.M. site card SHPO Files	New site
50-80-02-9507	Oio Stream Terrace	Agricultural? terrace	PRE/ HIST?	Poor	East Oio Gulch FJ04209788	III	MIN	B.P.B.M. Files SHPO Files	New site
50-80-02-9508	East Oio Gulch Platform	Stepped stone platform	PRE/ HIST?	Poor	East Oio Gulch FJ04209788	III	MIN	B.P.B.M. Files SHPO Files	New site
50-80-02-9509	Oio Gulch Complex	Agricultural terraces	PRE/ HIST?	Poor	Oio Gulch FJ04049802	III	MIN	B.P.B.M. Files SHPO Files	New site
50-80-02-9517	Kanealii Agricultural Structures	Irrigated agricultural terraces	PRE/ HIST?	DES	Waialea Gulch FJ01149866	N/A	N/A	Handy 1940:88 B.P.B.M. site card SHPO Files	Destroyed

SIHP = State Inventory of Historic Places
 * = After Rosendahl, 1977: Part II, Table 5
 Geog. = Geographic
 Coord. = Coordinate
 UTM = Universal Transverse Mercator

Pre = Prehistoric
 Hist = Historic
 UND = Undetermined
 MIN = Minimal
 N/A = Not Applicable

B.P.B.M. = Bernice P. Bishop Museum
 SHPO = State Historic Preservation Office
 Des = Destroyed
 NRHP = National Register of Historic Places
 CAT. = HARP Treatment Category

Sig. Pot. = NRHP Significance
 Cond. = Condition

Opana. Touching Opana and extending into Hanakoaē was a small spring-watered terrace area, named Kawela (same name as the bay). McAllister (44, sites 258, 259) says that according to legends told him by his informants there was “formerly” no fresh water at Kawela Bay (in Opana), but that the gods Kane and Kanaloa struck water from a rock now “known as Waikane, and at the foot of the cliff in the land of Hanakoaē,” and that the water “continued to flow up to the time the plantation built a pump just below the rock.”

Although Kane and Kanaloa are jointly associated with the creation of many springs throughout the islands, only Kane is referred to by McAllister as the one who struck the Waikane stone; Kanaloa is later mentioned as apparently having joined Kane at `Ōpana (McAllister 1933: 152).

McAllister (1933) indicates a plantation well was established just below the rock, suggesting the former spring is capped or that a well head is located in the vicinity. Neither the 1939 Campbell Estate maps, the 1887 Kahuku Ranch maps, or the Kahuku Plantation map show the location of either a well or terraces in the area.

Site 260, Pu`uala Heiau, was apparently destroyed prior to McAllister's survey (McAllister 1933:152). Inspection of Thrum's various lists of O`ahu *heiau* (1920, 1916, 1908, 1906) indicates Thrum was not informed of its existence. Likewise, J.F.G. Stokes (n.d.) notes and site card files do not contain any references to this *heiau*, suggesting it may have been destroyed prior to their research, or that information as to its existence was lacking. Sterling and Summers (1978:149) reprise McAllister's description, cite a reference to the area in a Hawaiian newspaper, and plot the location according to McAllister's notes. The news article states, “When Keaua`ula reached Pu`uala in Kahuku, he met some people who were indulging in sports there. They were spear throwing and *moa* sliding and they urged him to stop and play” (Sterling and Summers 1978:149). A brief search of additional records (e.g., State Archives, SHPD files; Bishop Museum records) failed to reveal any other reference to this site. During the Bishop Museum survey (Rosendahl 1977), a site location was plotted and an area surveyed (Figure 2), but this is not the location reported by McAllister (1933) as the *heiau* location (Figure 1).

The name Pu`uala may be interpreted at least two ways: 1) hill path or hill trail (*pu`u + ala*), which may be appropriate since the subject of the tale was traveling (perhaps the site was near the juncture of trails), or 2) sweet potato hill (*pu`u + `u`ala*) which could be appropriate as the area was used for sweet potato gardening, especially on the *kula* (dryland slopes). In either case, the *heiau* structure, if one existed, has

apparently been destroyed, or was never located, and there is very sketchy information about this site. Review of McAllister's notes (O`ahu field notes, books I, II, III 1929-1930) revealed no additional information. It is suggested that if the *heiau* was an agricultural one, that the latter interpretation may be correct, and may give some indication of specific land use in the area.

Site 1043, the Kawela agricultural terraces, was apparently destroyed by Kahuku Plantation development (Rosendahl 1977: Appendix 2:15, Table 5). Bishop Museum notes indicate destruction circa 1970.

Site 2501, Hanakaoe Platform, was first identified by Airman Richard R. Skelancy, U.S.A.F., and two companions while hiking. He reported the find to the Bishop Museum, and on 3 February 1970, Bishop Museum archaeologist Peter Chapman inspected the site. After clearing the Christmas berry overgrowth, Chapman was able to make a sketch and record a brief description. His field notes state:

Flat deck revealed, about 4 by 7 m, upslope about a meter off the ground, and downslope about 2.5 m above the surface. Farther down slope, possibly two earlier levels of construction remain beneath the rubble collapse. Firm clean and slightly bulging wall on up valley, south side; heavy well-made wall or facing on north side about 2.5 to 3 m high. Quite massive. No other structure reported nearby, about 3000 ft from stream bed. Suggest burial from massive quality and isolation, but could be agricultural *heiau*. [Chapman n.d.]

Subsequently, the State Historic Preservation Office conducted a statewide archaeological inventory and nominated the site to the National Register of Historic Places (NRHP). The site was accepted and listed on the NRHP on August 14, 1973. In the NRHP nomination, the site was described as a burial platform, with no reference to Chapman's notes that the site may have been a burial platform or a small *heiau*. The structural form, location, and setting of this platform are consistent with other sites determined to be agricultural *heiau*.

Site 9517, Kanealii agricultural terraces, was described by Handy (1940:88):

Waialeale. There is a small group of terraces formerly known as Kanealii, now abandoned for lack of water, around the house of Mrs. John Baker, just east of the Boy's Industrial School and inland of Kamehameha Highway. The large terraces now cultivated seaward of the Industrial School are of recent construction.

Rosendahl (1977 Appendix 2:15, Table 5) indicates the temporal origin of these terraces is in question, and further indicates the site was destroyed.

Rosendahl's four previously unrecorded sites, Sites 9506 - 9509, are described as follows.

Site 50-80-02-9506, Keaaulu Ditch, Located in Keaaulu Gulch, UTM coordinate FJ06069544, Stone-faced Irrigation Ditch, Historic Period origin, Poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Site 50-80-02-9507, Oio Stream Terrace, located in East Oio Gulch, UTM coordinate FJ04209788, Agricultural? terrace, Prehistoric or Historic Period origin undetermined, Poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Site 50-80-02-9508, East Oio Gulch Platform, located in East Oio Gulch, UTM coordinate FJ04209788, Stepped Stone Platform, Prehistoric or Historic Period origin undetermined, Poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Site 50-80-02-9509, Oio Gulch Complex, located in Oio Gulch, UTM coordinate FJ04049802, agricultural terraces, Prehistoric or Historic origin undetermined, Poor condition, minimal significance potential, assigned to U.S. Army Treatment Category III.

Subsequent to Rosendahl's (1977) survey, Davis (1981) conducted an archaeological reconnaissance-level survey and evaluation of proposed windmill sites within selected areas of KTA (Figure 1). His survey resulted in the identification of four additional sites.

Site 2357 (Davis 1981: 11) was a discontinuous wall remnant of roughly piled stones, which supported a barbed-wire fence on milled posts. The wall marked the boundary of a small pineapple lease holding dating to 1930, and Davis interpreted the wall as a 20th century feature.

The other three sites identified by Davis, Sites 2358, 2359, and 2360, form a discrete complex set within a small swale in upland Ōpana, approximately 250 meters inland and southeast of the NCTAMS SATCOM facility. Together the three sites, set within a 120 sq. m area adjacent to the eastern edge of a jeep road, comprise a small traditional Hawaiian complex, including a house site, two habitation terraces and a terrace with possible religious function. Davis attributed the placement of the site within the swale to the strong winds in the area. He suggests that the site was chosen as a habitation and agricultural area because

the swale affords protection from the wind (Davis 1981: 19). This complex was located within the proposed boundary of Turbine Site 10 construction impact area, and was recommended to be either avoided, monitored during construction, or salvaged to mitigate the perceived impact through data recovery (Davis 1981: 20). There are no subsequent reports available on these sites at the Bishop Museum or at the SHPD; therefore, it is assumed that construction proceeded prior to implementation of the recommendations, and, as the Windfarm Turbine generators are established and operating, that no further work was undertaken and the sites are destroyed.

WORLD WAR II RESOURCES

Site 9745, the location of a World War II mobile radar station set on the ridge near the current Naval Computer and Telecommunications Area Master Station (NCTAMS) `Ōpana Satellite Communications (SATCOM) facility, is on the State Register of Historic Places. This site is within KTA and is under U.S. Army jurisdiction. The Opana Mobile Radar Station played a critical role at the outbreak of the war. Located near Kahuku Point at 230 feet above sea level, the `Ōpana site was one of six Army radar stations established along O`ahu's coastline in November 1941. While at the `Ōpana site on 7 December 1941 at 0702 hours, Privates Joseph L. Lockard and George E. Elliott observed that more than fifty planes were bearing down on the island from approximately 130 miles to the north. Their call to the Information Center at Fort Shafter was handled by an inexperienced duty officer and the message was never routed to Naval Headquarters. Within the hour, Japanese planes attacked Pearl Harbor, an event which brought the United States into World War II. The Opana Radar site is listed on the State Register of Historic Places and has been nominated for the National Register of Historic Places, as well as for National Historic Landmark (NHL) status by the National Park Service.

It is important to note that Site 9745 is merely a landmark, and that there are no structural remains present. This site is more or less a commemorative one, designated because of the significance of events that occurred there and elsewhere on O`ahu on 7 December 1941.

SUMMARY OF KNOWN ARCHAEOLOGICAL RESOURCES AT KTA

There are 14 known archaeological sites within the Kahuku Training Area (Figure 1, Table 1). Eleven of these sites are of traditional Hawaiian origin. Three of these sites are reported by Rosendahl (1977) to have been destroyed: Site 260, Pu`u`ala *Heiau*; Site 1043, Kawela agricultural terraces; and Site 9517, Kanealii agricultural terraces. One site has never been located: Site 259, the Waikane Stone. Four sites are reported as still extant (Rosendahl 1977): Site 9507, `Ō`io Stream terrace; Site 9508, East `Ō`io Gulch platform; Site 9509, `Ō`io Gulch complex; and Site 2501, a platform listed on the NRHP and SRHP since 1973. The three traditional Hawaiian sites identified by Davis (Sites 2358, house site; Site 2359 terraces/platform; and Site 2360, platform site) may or may not have been destroyed by construction at the Kahuku Windfarm Project.

The remaining three sites are post-Contact in origin: Site 9506, Keaaula Ditch; Site 2357, pineapple plantation boundary wall; and Site 9745, `Ōpana Mobile Radar Facility. Site 9745 is currently being nominated for NHL and NRHP status, although there are no associated structural remains at the site location. Site 2357 may or may not have been destroyed during Kahuku Windfarm construction. Site 9506 presumably still exists.

ARCHAEOLOGICAL SITE POTENTIAL IN THE PROJECT AREA

The potential for unrecorded archaeological sites is moderate to high in smaller gulches and cliffines of the KTA, but is low for larger gulches and ridgelines as the result of land clearing for training and operations. During pre-Contact times, much of the area now occupied by KTA was probably utilized primarily for forest resource exploitation, which would leave few easily-recognizable surface archaeological remains. Subsurface signs of both irrigated and non-irrigated agriculture, however, may be present in areas where development has affected only the ground surface. During the post-Contact period, prior to Army use, the area was used for ranching and for commercial agriculture. With the development of Army facilities and use of the area for training maneuvers, the landscape was altered and modified. This development may have destroyed most traces of earlier use in those areas.

SETTLEMENT PATTERN FOR NORTHERN KO`OLAUI LOA

Handy (1940) and Handy and Handy (1972) discuss the traditional Hawaiian landscape, in terms of both natural and cultural environments. Their descriptions of the Ko`olau Loa District suggest multiple settlement patterns occurred in this area. The descriptions by Handy (1940) are primarily in reference to areas of taro cultivation, the staple crop upon which the subsistence economy was based. The following passages summarize the general agricultural pattern for taro in the various *ahupua`a* in northern Ko`olau Loa.

Waimea. The level land in the lower valley was in terraces on both sides of the stream prior to the great flood of 1894. The "Index of all Claims Awarded by the Land Commission" (31), published in 1881 gives the land names of 13 *kuleana* in Waimea. A few of these were probably beach sites and some others were on the elevated tableland west of the stream and about a mile inland.

It is evident that the low, level land along the west side of the stream for half a mile to a mile inland was once in terraces, but there are no evidences of former terraces on the broad elevated land. Above Waihi Falls the canyon is narrow and steep and filled with tumbled boulders for about a mile, then it broadens somewhat. Here on the east bank and extending for several hundred yards is a narrow strip of old terraces. Mrs. Keahipaka, native to the valley identified the first terrace group above the falls as the site known as Puulu; she said that there were formerly many terraces above here, in the broadening valley along the stream bed, with house sites on the ridge. However, she said the largest terrace area was that known as Kailiili which lies below the falls by the monkeypod trees, on the land elevated above the stream bed. It was irrigated from a ditch along the base of the cliff. Farther upstream, toward the falls but down in the gulch, was another large, continuous area, known as Honoawa and Kaula. Throughout the valley in the old days there was a great abundance of every kind of cultivation, including sugarcane, bananas, breadfruit, coffee, and *awa*.

The left hand stream branching off beyond the first grove of mango trees divides into two gulches known as Kamananui (right) and Kamanaiki (left). The land where the branching occurs is called Waikakalaua; there were no terraces here, I am informed, but there were some farther upstream. In Kamanaiki there is a fresh-water spring in the rocks, called Punakai, near which were a few terraces, according to Lihau Kuewa. The branch stream that enters the main Waimea Stream from the Waialua side just below Waihi Falls is called Kukuiee, but I have no information as to terraces along its narrow course. [Handy 1940:86 -87]

Pupukea. Pineapples and avocado orchards now extend over the high uplands as far back as the Pupukea-Paumalu Forest Reserve, but there is evidence that this land was suitable for taro cultivation in earlier times. Judge Rathburn says that there were terraces in the gulches either along Pupukea or Kuaikala Streams or in the vicinity of Waipi Spring, inland from Kuaikala Stream. [Handy 1940: 87]

Paumalu. This *ahupua`a* has much the same topography as Pupukea, About 2.5 miles inland over the high pineapple fields one can look into Kaunala Gulch. Inland, on the southern slope above Paumalu Stream, is a spring called Waikou, but according to Judge Rathburn there were no terraces in this region. [Handy 1940:88]

Kaunala. There are not sufficient flatlands along this stream for taro cultivation under the old system. [Handy 1940:88]

Waialea. There is a small group of terraces formerly known as Kanealii, now abandoned for lack of water, around the house of Mrs. John Baker, just east of the Boy's Industrial School and inland of Kamehameha Highway. The large terraces now cultivated seaward of the Industrial School are of recent construction. [Handy 1940:88]

Pahipahialua. According to Judge Rathburn there were no terraces along this stream. [Handy 1940:88]

Opana. Touching Opana and extending into Hanakoa'e was a small spring-watered terrace area, named Kawela (same name as the bay). McAllister (44, sites 258, 259) says that according to legends told him by his informants there was "formerly" no fresh water at Kawela Bay (in Opana), but that the gods Kane and Kanaloa struck water from a rock now "known as Waikane, and at the foot of the cliff in the land of Hanakoa'e", and that the water "continued to flow up to the time the plantation built a pump just below the rock." [Handy 1940:88]

Hanakoa'e. According to Judge Rathburn there were no terraces along the Hanakoa'e, Oio, or Kaalaea stream beds in this *ahupua`a*; the only terraces were those watered by the springs mentioned under Opana. [Handy 1940:88]

Kahuku. Inland from the Kahuku Ranch house is Kaainapele Spring. Terrace symbols are shown south of the ranch house (U.S.G.S. topographic map, 1917), but Judge Rathburn says that these flats were built by Chinese before 1890 for rice paddies. They were irrigated with artesian water, but the water turned brackish and the paddies were abandoned. They were never used for taro. The 1917 map shows extensive terrace areas in the swampland seaward of the Oahu Railway, stretching 1.5 miles south of Kukio Pond. These were originally terraces, were later planted to rice, and are now under sugarcane. According to John Kaleo, there is a small group of terraces, south of this swampland, named Kaukaha. North of Kukio Pond was also a small area. It is reported that there were no terraces up Kahuku Stream or Kaohia'e, its upland branch. Kaleo named 11 localities where terraces were formerly cultivated [along the upland streams].

McAllister (44, site 262) remarks that it scarcely seems possible that this barren Kahuku plain was ever other than at present, "a rather desolate windswept area", but he says that one of his informants "remembers the time when trees now found only in the mountains" covered it. King (12, Vol. 3, p. 115) recounts that "nothing can exceed the verdure of the hills, the variety of wood and lawn, and the rich cultivated valleys which the whole face of the country" on this northern end "displayed". In 1838 [E.O.] Hall (as quoted by

McAllister, 44, site 2) observed that "much taro land now lies west because the diminished population of the district does not require its cultivation." [Handy 1940:88-89]

Keana. There are said to have been no terraces up this stream, and Kaleo knows of none on the level land below. [Handy 1940:89]

Malaekahana. There were terraces in this ahupua`a, irrigated by Kaukanalaau Stream. [Handy 1940:89]

Laie. There are many streams in this ahupua`a. Kahooleinapea is the first stream reached after leaving the ahupua`a of Malaekahana. Here terraces are still in use. The old terrace area named Waieli, along the lower reaches of Kahawainui Stream, is now under cane cultivation; it was once watered from a spring. Farther up Kahawainui Stream there were formerly many terraces, according to Kekela Kalua. About 2.5 miles up Wailele Stream there are evidences of old terraces.

Along Koloa Stream, beginning at a point 2 miles inland on its twisting course, there are abandoned groups of terraces at intervals, many of them now half hidden in the jungle growth. Just below the old water gates, on the south side of the stream, there is a group of about 15 small terraces, all with stone facings, and nearer the gates, on the north side, a smaller group of five or six. Immediately beyond a sharp curve in the stream bed, and evenly spaced at intervals on either side of the stream, are 15 or more very old mango trees planted in lines. At this point, on the left bank, going upstream, the valley widens into a beautiful flat area which was evidently an extensive dwelling site. There are about eight old breadfruit trees on the hillside and more huge old mangos. This flat area, extending upstream to the sheer cliff wall at the next stream bend, is terraced with low stone lines. Here there are 11 terraces, from 15 to 40 feet wide and from 20 to 30 feet long, now partly overgrown but very distinctly outlined. They could not be replanted unless the mangos were destroyed, as the whole surface of the soil is webbed with a network of tree roots. The stream makes a horseshoe bend at this point, and beyond are more mangos planted in lines for a distance of several hundred yards; and at the upper end of the site is a small house platform. Around the next curve is an area of three small *lo`i*; beyond this there is no further evidence of planting, the stream becoming more and more winding and the valley more and more narrow. Kakela Kalua of Laie says that this was formerly *konohiki* land, and now belongs to the Mormons. [Handy 1940:90]

The comparatively flat land between the hills and the seacoast in Laie was divided into many clearly named small districts in the old days--a considerable portion of it, back from the beach strip, having been planted in wet taro. Kekuku, a 75-year old kamaaina of the place, says that one of the largest single areas formerly under taro cultivation was the land, over 60 acres in extent, lying back of the present Mormon Temple, and known as Kapuna (the spring) because it was watered by one large and several lesser springs. Kekuku's family owned much of the Laie land for generations. McAllister (44, site 282) says that the flat lowland on the Hauula side of the Mormon Temple, now drained and planted in cane, was "formerly a famous taro land. The old Hawaiian name for the land is now lost, and it is known as Kanana, an adaptation of Canaan, the Land of Promise of the Israelites.

In with the taro were extremely large fish...About this taro land the old Hawaiian settlement was located."

According to Kekuku, there was another terrace area in the flatland named Kaholi, seaward of Kapuna, now abandoned. There is also a large area farther seaward known as Kuamoo, which is now planted in wet taro, Nauehuli, more seaward still, had terraces formerly, as did Makalii to the west. Inland and west of Kapuna, the largest old terrace plantation is Poohali, a mound where mango trees stand, surrounded by terraces, eight of which are still cultivated. Mahanu, inland from the Mormon Temple is marked by old coconut trees and is the upper end of the terrace area; the here the *kula* begins. [Handy 1940:90 - 91]

Kaipapau. Kaipapau was a large stream giving this *ahupua`a* its name. The level land opening out below the valley, now in cane, was presumably all in terraces. Hauula natives say that there are old taro flats along the stream up the valley, which is very narrow and steep. [Handy 1940: 91]

Handy continues his description of the remaining *ahupua`a* within Ko`olau Loa. Clearly stated in his text is the evidence of expansive taro cultivation and large population of the southern *ahupua`a* in the Ko`olau Loa district. Handy and Handy (1972: 271) were quite impressed with the agricultural potential of the southern Ko`olau Loa area, particularly the coastal lowlands:

There was little rain along the northwest and northeast coasts, where the Ko`olau Mountains are quite low. Waimea, however, on the northwest coast, with its deep canyon and large stream which both above and below its falls irrigated many *lo`i*, was a place of prime importance, a center of population on a shore that is for the most part barren.

Midway along the coastland called Ko`olau Loa (Long Ko`olau) we come upon what were once extensive wet-taro lands, beginning at Laie and continuing through Hau`ula to Punalu`u and Kahana valleys. This was also an ideal area for offshore reef and bay fishing. It is precisely this area which was notable in legend as the residence of traditional chieftains, and for the exploits of demigods, particularly Kamapua`a, who was the incarnation of Lono the rain god and patron of agriculture... Undoubtedly this midsection of Ko`olau Loa was an area of early settlement and of dense population, second only to that of the Waikiki-Nu`uanu-Manoa complex.

If, as Handy and Handy assert, the middle *ahupua`a* of Ko`olau Loa were an area of early settlement, the second largest population center, second-most extensive agricultural system, and home of traditional chieftains, then the northern section of Ko`olau Loa was undoubtedly extensively, though perhaps not intensively, exploited as well. The majority of the Kahuku Training Area is located in the northern *ahupua`a* of Ko`olau Loa.

The northern *ahupua`a* were, for the coastal areas particularly, located in a dryer portion of the district, and were probably less populated than the wetter, more southern sections. Handy and Handy (1972: 275) discuss the relevance of dryer climates and marginal resource bases to settlement patterns, describing "areas of dearth:"

On Oahu there were three areas subject to drought. One was the southwest end of the island from Palolo (the last of the wet taro valleys) to Hahāione... A second area extended from Laie, at the northern tip, westward to Waialua [this area encompasses KTA]. Normally Laie had ample wet taro, but the streams and springs gave scant water in periods of drought. From Laie northwestward the mountains are low and the precipitation is much less than it is to the southeast where the windward coast is flanked by the high Ko`olau range. The coast from Laie to Waialua has little in the way of offshore fishing, lacking as it does the good beaches, reefs and lagoons that are found from Hau`ula to Kane`ohe on the Ko`olau or windward side. Nor was much available in the leeward uplands, compared with Maui and Hawaii.

It is likely, then, that the majority of the Ko`olau Loa population would have been located in the central Lā`ie-Hau`ula-Punalu`u/Kahana area, while the northern areas, with the exception of Waimea, probably supported smaller populations. These populations probably lived in the lowlands, spread across the coastal plain around the *lo`i* and along the streams and springs that could supply sufficient water for wetland taro. In the central portion, abundant marine resources were apparently available, hence there would have been some portion of the population primarily engaged in marine exploitation, while others engaged in agricultural endeavors. Handy (1940:156) states that in addition to wetland taro grown on the flats and in the valleys, sweet potato (*u`ala; Ipomoea batatas*) was a staple of this area:

On the north side of the island sweet potatoes were planted on the *kula* lands of the districts all the way from Mokuleia to Kahuku, and although there was a little taro grown here and there, especially in Waimea, Kahuku, and Mokuleia, sweet potato was the primary food in most of the districts of this section, excluding Waialua...In gulches of this region and also Waimea where there were taro patches in the valley, as at Wahiawa on Kauai, families had their taro *lo`i* in the gulch of the valley; their houses, surrounded by patches of sweet potato and other native plants, were on the *kula* bordering the gulch.

Based upon hypothesized settlement pattern and population growth models (cf. Handy 1940; Handy and Handy 1972; Price-Beggary 1976; Kirch 1985) it would be expected that the earliest settlements would be

located along the coastal plain. The majority of permanently occupied sites probably date to the period A.D. 1200 up to the late 1700s, with population decline and site abandonment following Contact (A.D. 1778). Population centers at Contact were found at Waimea, Lā`ie, Hau`ula, and to a lesser extent at Punalu`u, Kahana, Kahuku, and Kawela.

Permanent habitation sites were probably more concentrated at low elevations, on the coastal plain, and more dispersed inland, above the bluffs. Alluvial terraces along permanent streams were terraced for growing *kalo* (*Colocasia esculenta*) in irrigated pondfields (*lo`i*), and slopes, both modified and unmodified, were used for dryland agriculture (Handy and Handy 1972). Known *heiau* were not numerous, compared to more heavily populated areas, but were present both near the coast and inland (McAllister 1933; Sterling and Summers 1978). The somewhat drier conditions in northern Ko`olau Loa probably resulted in lower population than areas to the south, but by the close of the pre-Contact period the area was probably widely cultivated and used for gathering forest resources, with the lower elevations areas of permanent residence and the upper elevations being a seasonal or resource-specific exploitation zone.

RESEARCH DESIGN

The large size of the Kahuku Training Area, at over 9,600 acres, made undertaking a complete inventory survey of the entire facility unfeasible. Instead, selected areas of KTA were surveyed, and site patterning and predictive models were formulated based on the results obtained for the surveyed areas. Research problems are discussed below, and the research questions that guided the field investigations (Landrum et al. 1993) are presented below.

The archaeological research focused on two aspects of KTA. The first was Pu`uala *Heiau*, and the status of the site at the present time. Although the site was originally recorded as destroyed, and subsequent archaeological surveys in the area failed to locate any remains of the site, the site location was re-evaluated for its potential to contain remains that might reveal information about the *heiau*.

The second focus of the research was to survey selected areas of KTA and develop models of site patterning and predictability. The areas chosen for pedestrian survey were determined based on the background research and an assessment made during the aerial reconnaissance survey. The purpose of the

aerial reconnaissance survey was to locate areas that appeared least disturbed, and to select areas representing a range of environments within KTA for sample surveying. Selection of areas to survey was not random; instead, areas were selected that exhibited the greatest potential to answer the research questions posed below and to help with the development of predictive models.

RESEARCH QUESTIONS

Early accounts of the Kahuku Point area of O`ahu suggest either a fertile land that was vastly cultivated and densely populated, or a barren area where hardly anyone lived and where little agriculture was practiced. The reality was certainly somewhere between these accounts, but was probably closer to the former, given early recorded accounts. The following research questions were intended to provide data regarding the settlement pattern of the KTA and Kahuku Point area.

1) **Is there any archaeological or geomorphological indication that the remains of Pu`uala *Heiau* still exist at or near the location originally recorded by McAllister?**

The Pu`uala *Heiau* area was the location of the initial field investigations, in order to determine what, if anything, remained of the *heiau* and to develop management recommendations that incorporate the concerns of the modern Hawaiian community. In addition to the field investigations, archival and land use research was conducted and an attempt was made to coordinate these efforts with the Office of Hawaiian Affairs. It was felt that additional field investigation of the area were warranted, despite previous accounts that no remains existed, as archaeological methods have changed over the years.

2) **Are there any intact archaeological remains in other areas of the KTA, and if so, to what extent are they affected by later modifications and land use in the area?**

The Kahuku area has undergone extensive landscape modifications in the 19th and 20th centuries, including sugar and pineapple cultivation, cattle grazing, and military use. One goal of the sample survey was to document evidence of such landscape modifications and their effect on site preservation.

SITE PREDICTIVE MODELS

Two levels of predictive models were employed for the research reported here. A predictive model of site location was employed to locate sites with surface architectural features, such as terraces, rockshelters, walls, or mounds. This model was based on site functional type related to geomorphological variables. For example, the remains of irrigated pondfields are often found on alluvial flats bordering perennial streams, while house sites are typically found on slopes or low ridges above streams. Likewise, rockshelter sites are typically found in areas of steep cliffs, rather than gentle slopes.

A similar model was employed to locate areas with the potential to contain subsurface deposits. The subsurface deposit predictive model utilizes geomorphological variables to locate subsurface deposits, and is based on previous research in geomorphically similar areas (Williams 1992; Williams and Nees 1993). This research has indicated that certain geomorphological variables are often good indicators of subsurface deposits, and, like the surface site predictive model, relies on site function related to landform. Research has shown that certain geomorphological features are more likely than others to contain subsurface deposits, regardless of the presence or absence of surface archaeological features. In descending order of likelihood, with the most likely area listed first, these geomorphological features are:

- 1) the ends of ridges;
- 2) the tops of ridges or knolls; and
- 3) small, level areas on the sides of ridges.

Often, the subsurface deposits are represented by discrete and spatially restricted features such as hearths, *imu* (earth ovens), or sparse charcoal and lithic scatters. Unless excavation is directly through the deposits, the subsurface features are often missed.

METHODS

Prior to beginning the sample survey, document and archival research was conducted to gather information pertaining to the environment, history, and prehistory of the KTA area. This research included the compilation of historical documents, maps, and photographs, to document past land uses that could have

impacted the archaeological record. Primary sources consulted for land use prior to the division of Hawaiian lands into private ownership in the late 1840s are the Hawaii Department of the Interior documents and Privy Council records. The chronology of the land ownership and land use after 1847 was compiled from land claim award applications recorded in 1847/1848 by the Board of Commissioners, and land grants, leases, and deeds filed with the Bureau of Land Conveyances. Modern land records are filed with the Taxation Bureau. Additional sources consulted were government survey, tax, and Kahuku Plantation maps; secondary publications and newspaper articles.

The principal researchers are already familiar with the basic sources on the history of KTA and the pre-Army use of the area. The following depositories were researched for additional materials:

1. Directorate of Public Works, Wheeler Army Air Field
2. Real Estate Branch, Wheeler Army Air Field
3. Real Estate Office, Schofield Barracks Military Reservation
4. U.S. Army Museum, Fort DeRussy Military Reservation
5. Tropic Lightning Museum, Schofield Barracks
6. Post Libraries, Schofield Barracks
7. Public Affairs Offices, Schofield Barracks
8. Bishop Museum Archives
9. Hawaii State Archives
10. Hamilton Library, University of Hawai'i
11. State Historic Preservation Division

Research materials included historic photographs, building plans, real property records, master plans, installation maps, general and specific background history reports, and previous historical survey reports. Researched materials were gathered to establish the historic context of the installation and to help establish the historical significance of the properties.

The fieldwork consisted of an aerial overview survey of the KTA in order to familiarize the field personnel with the terrain, and to assess potential areas to conduct sample survey on foot. Locations of potential archaeological sites, such as bunkers and rockshelters, were also noted for future study.

SAMPLE SURVEY

Based on the background research and aerial survey, ten areas were selected to survey on foot. These ten areas totaled 300 ha (341 acres), or roughly 8% of the KTA facility. Areas were selected to cover a range of topographic variables, to better address the research questions, and based upon accessibility. The selected areas included sections of the cliff and bluff edge north (seaward) of the KTA, portions of large interior valleys, small gulches, and steep, rugged interior areas. These areas are described in detail below. The survey was conducted by crew members traversing systematically through the survey areas at 10 to 20 m intervals. All identified archaeological remains were cleared of vegetation to expose features, and were marked with surveyors' flagging tape to aid in relocation. Site locations were plotted in the field on a topographic base map of the KTA.

Once a site was located, the area around it was investigated to determine the spatial distribution of surface remains. Descriptive documentation was recorded, sketch and scale maps were drawn, and 35 mm color photographs and slides were taken. The majority of the sites were mapped with tape and compass; Site 4885, Pahipahi`ālua *Heiau*, was mapped using a transit, stadia, and tape.

Subsurface test excavations were done following stratigraphic layers, using trowels. Excavated deposits were examined for the presence of cultural remains, but no screening was undertaken. Written and photographic documentation of the excavation procedures was maintained throughout the testing, and profiles were recorded. Datable and artifactual remains were collected for analyses.

All project related notes, records, photographs, and samples are curated at the Ogden office and laboratory in Honolulu.

SURVEY AREAS

A total of ten areas were selected to survey (Figure 1). The areas were selected to address either specific research problems, or to sample a variety of environmental and geomorphological conditions. Since the primary goal of the project was to formulate a predictive model of site locations for KTA, a variety of

areas were required to be surveyed to ensure adequate coverage of variables. Total area surveyed was 300 ha (740 acres).

The survey areas were numbered for reference. Survey Area (SA) 1 is located along the limestone cliff between Hoolapa and Kalaeokahipa Gulches, south (inland) of Punamano Spring. This area was surveyed to locate several possible rockshelter sites noted during the aerial survey, and to include a section of raised limestone topography in the survey sample. This area is outside the KTA boundary.

SA 2 is located west of SA 1 on the bluff between `Ō`io and Hoolapa Gulches. This survey area includes two small hills, one of which (the western one) was indicated by McAllister (1933; n.d.) as the location of Puuala *Heiau*. On McAllister's field map, the other (eastern) hill has an inked-out site on it, and may represent a site location that McAllister originally thought was Puuala *Heiau*. This survey area was selected primarily to look for remains of the *heiau*.

SA 3 is located in the lower portion of the east side of `Ō`io Gulch and the eastern ridge top. Although most of the larger gulches were reportedly altered extensively during the WWII period, the extent of the impacts of these activities on archaeological resources in these areas are not known. This survey area was selected for several reasons. First, it represented the lower elevation of a relatively large gulch, between the bluff and the steep interior, and included a narrow ridge that was considered a likely area for sites, based on the predictive model. Second, Rosendahl (1977) noted several traditional types of sites in the more inland portion of the gulch, and plotted the location of Pu`uala Heiau on the east ridge (Figure 2). Although this was not the location noted by McAllister, it was surveyed since it is plotted on the USASCH map. Also, since the other sites were located in the interior portion of the gulch, it was decided to include the lower (seaward) area of this gulch in order to examine site distribution. Third, Site 2357, recorded by Davis (1981), was in the area, and relocation of this site was undertaken to determine if it had been spared by construction of the wind turbine system. Finally, Site 2501, Hanakaoe Platform, is located in the area, and it was relocated to evaluate its condition.

SA 4 is located in the upper portion of East `Ō`io Gulch. This survey area was selected to provide an upper gulch area for sampling purposes. SA 5, located in the upper portion of `Ō`io Gulch, was selected for the same reason. The impact of the 20th century land altering activities on this area appeared to have

been minimal. Types of land utilization are generally determined by the environmental conditions in any given area. As opposed to the lower sections of these gulches, both survey areas possess steep slopes and narrow gully floors. These areas, therefore, were selected in order to determine variations in land use relative to environmental variations.

SA 6 is located along the bluff between Pahipahi`ālua and Kawela Gulches (Figure 3), inland from Kawela Bay. This survey area was selected to examine potential sites noted during the aerial survey, including World War II coastal defense bunkers and possible rockshelters.

SA 7 is located at the mouth of Pahipahi`ālua Gulch, west of SA 6, and includes the gulch bottom and the west side of the SATCOM facility. This survey area was selected to compare site types as well as site preservation between narrow gulches and the larger gulches to the east.

SA 8 is located on the ridge between Waiale`e and Kaunala Gulches, east of SA 7. SA 8 was selected because it is one of the larger ridge tops within the project area. This area also included small gulches and a portion of the bluff. The varied environmental and topographic conditions represented in this area closely resembles different environments in the above selected areas. Although this area was also impacted by the 20th century land alteration activities, this area was selected in order to determine site types and site distribution in an area containing varied topographic and environmental conditions.

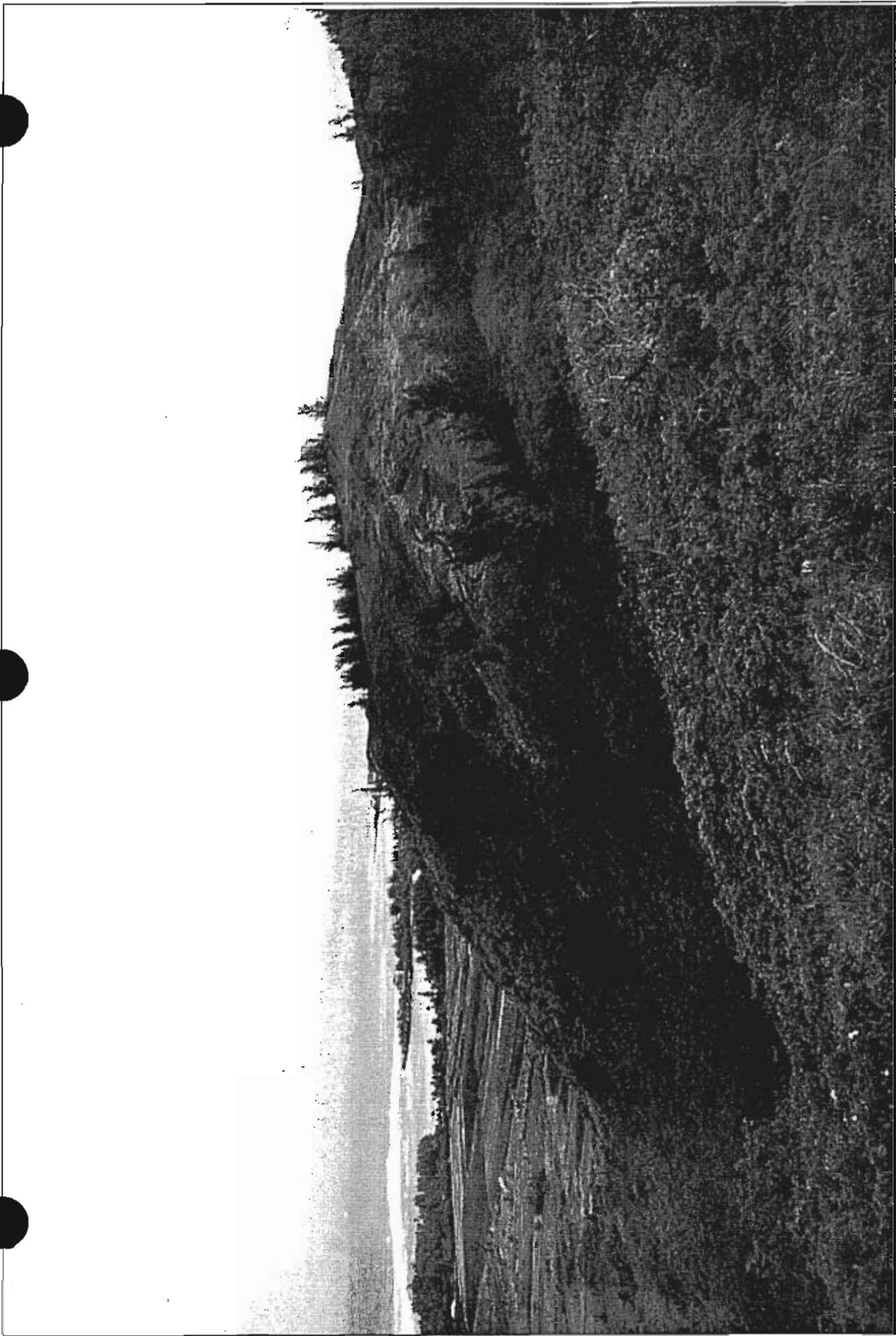
SA 9 and SA 10 were selected to provide interior survey areas with steep and rugged topography. These areas were selected in order to investigate use of the accessible interior sections, and to provide greater environmental variability to the sample survey.

RESULTS

A total of fourteen archaeological sites were recorded in various locations within and around KTA during this archaeological reconnaissance survey (Figure 1 and Table 3). The sites included one *heiau*, one probable residential terrace with rock mounds, one enclosure with rock mounds, two cave shelters, two linear rock mounds, one *imu*, one terrace cluster, one large earthen depression with surface charcoal

III

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FIGURE

3

VIEW ALONG BLUFF TO EAST
KAHUKU, OAHU

OGDEN
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Table 3
Archaeological Sites Found in The Survey Areas

Site Number	Type	Function	Probable Age
50-80-02-4876	Terrace, mounds	Residential	Pre-Contact
50-80-02-4877	Enclosure, mounds	Residential	Pre-Contact
50-80-02-4878	Rock shelter w/Screen	Temporary Shelter	Pre-Contact and Post-Contact
50-80-02-4879	Rock shelter w/Timber	Unknown	Unknown
50-80-02-4880	Linear Mound	Residential?	Pre-Contact?
50-80-02-4881	Octagonal Slab	Unknown	Post-Contact
50-80-02-4882	Bunker	W. W. II	Post-Contact
50-80-02-4883	House site	Residential	Post-Contact
50-80-02-4884	Imu	Cooking	Undetermined
50-80-02-4885	Heiau	Religious	Pre-Contact
50-80-02-4886	Bunker	W. W. II	Post-Contact
50-80-02-4887	Terraces	Agriculture?	Undetermined
50-80-02-4888	Earthen depression	Cooking	Undetermined
50-80-02-4930	Linear mound	Undetermined	Undetermined

scatter, one historic residential complex, two World War II bunkers, and one octagonal cement slab foundation. Table 3 summarizes these sites and they are described in detail below. One previously recorded site, Site 2501 Hanakaoe Platform, was relocated. An attempt was made to relocate another previously recorded site, Site 2537, a low rock wall associated with a 20th century pineapple lease. This site could not be relocated and is assumed to have been destroyed during the construction of a wind turbine in the area.

SITE DESCRIPTIONS

SITE 50-80-02-4876

This site is comprised of a stone-faced earthen terrace and several rock mounds (4+) located on top of the bluff between Kalaeokahipa and Ho`olapa Gulches (Figure 4). This site is approximately 30-40 m from the edge of the bluff, within an area with extensive limestone outcropping. A large boulder alignment and earthen berms are located at the northwestern edge of the site, where bulldozer disturbances are evident.

The topography in the site area is relatively level with uneven limestone outcropping along the northeastern side of Feature 1. This limestone outcrop extends north to the edge of the bluff. The vegetation at Site 4876 is comprised predominantly of young *koa haole* and Christmas berry. A single small papaya tree (*Carica papaya*) was noted growing on a rock on the west side of the main feature. The ground cover is primarily grass and vines.

During this phase of field work, only the most prominent features (Features 1 and 2), were recorded in detail. Other features were noted but a complete inventory of the site was not conducted. Feature 1 is a square earthen terrace with stone facing on two sides. The eastern and northern sides of the feature are of low, stacked, angular limestone cobbles. The other sides are marked by concentrations of scattered limestone cobbles.





The feature measures 4.7 m square, with the interior measuring 4.4 m. The facings measure 1.7 m wide at the north side, and 1.0 m wide at the eastern side. The downslope side (north) is roughly 0.4 m high on the outside, and 0.1 to 0.2 m high in the inside. With the exception of the rocky northwestern corner, most of

345° to Fe.2

Limestone Outcrop with Possible Modification

Level Area with Some Rocks

KEY

-  Rock
-  Earthen Terrace with Rocks
-  Possible Upright
-  Gentle Slope



0 2m

OGDEN
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PLAN MAP OF SITE 50-80-02-4876

FIGURE

4

the interior is relatively rock free. There were no surface cultural remains associated with this feature. Based on architectural form, this feature is interpreted to be a small residential foundation.

Feature 2 is a rock mound which is located 11.5 m and 345 degrees from the northwest corner of Feature 1. Feature 2 measures 1.7 m by 1.0 m and is 0.55 m high. It is composed primarily of angular limestone cobbles and small boulders piled against a large limestone boulder outcrop. This rock mound is interpreted as an agricultural clearing mound.

SITE 50-80-02-4877

This site is located approximately 20 to 25 m to the southeast of Site 4876. Site 4887 is composed of an enclosure and linear rock mounds (Figure 5). It is delineated along the southerly end by an extensive natural limestone outcrop which also forms the southwestern wall of the enclosure. It is approximately 50-60 m inland from the edge of the bluff.

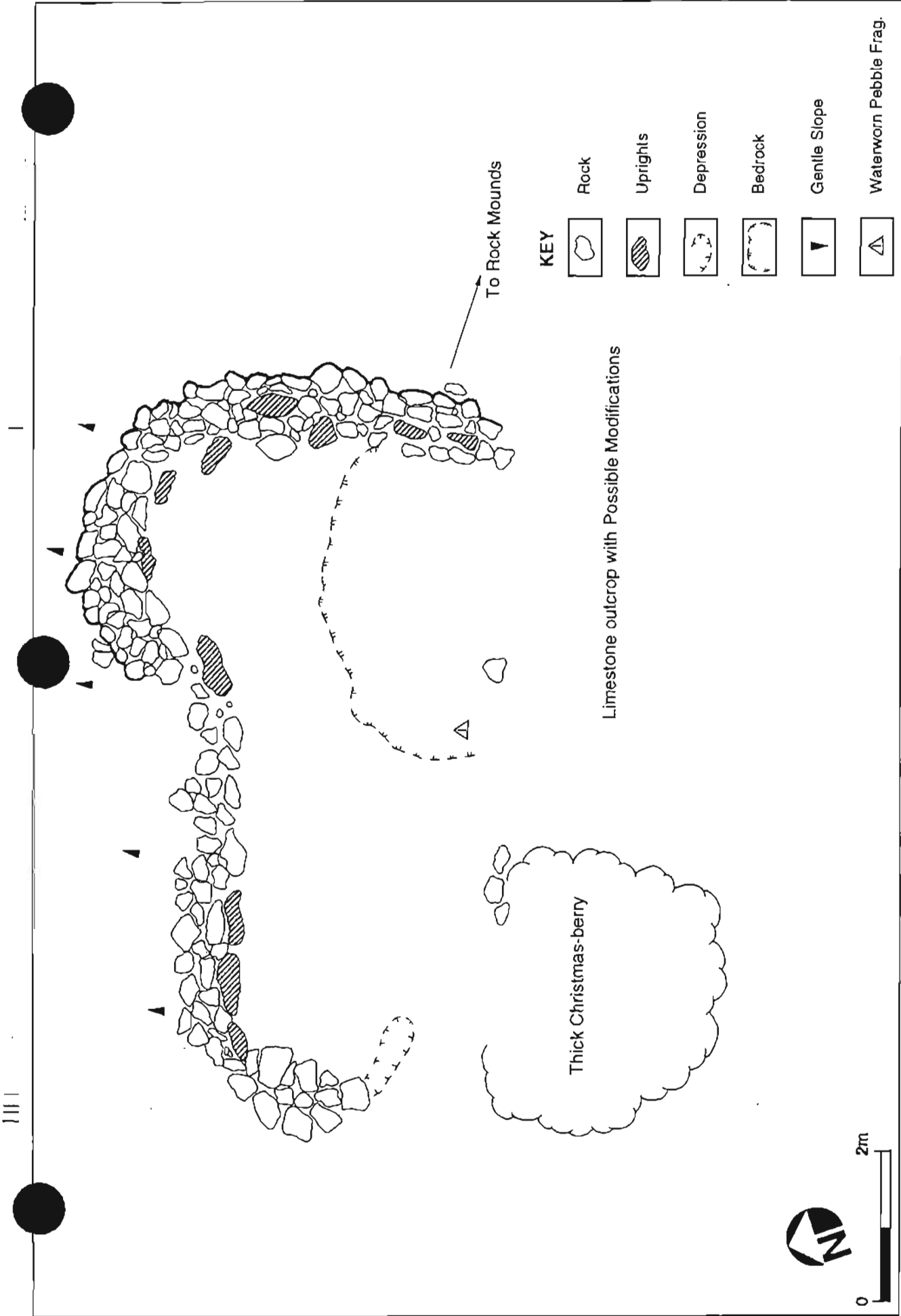
The vegetation at Site 4877 is very similar to that of Site 4876. The overstory is primarily of Christmas berry and young *koa haole* trees. *Laua`e* fern (*Microsorium scolopendria*), grass, and vines dominate the undergrowth. *Laua`e* fern dominates the undergrowth where limestone outcropping protrudes above surface soil.

Feature Descriptions







Three features were recorded during the survey work. These features were comprised of an enclosure and two rock mounds. Possible walls, rock mounds, and possibly a rock platform are also present. Only the enclosure was recorded in detail for the current project.

Feature 1

Feature 1 is an enclosure located at the northwest corner of the site. The feature has a notched shape with the widest section at the east end. The interior measures 8.5 m with stacked limestone walls measuring 0.8 to 1.0 m wide and 0.2 m high. Although a large portion of the wall appears to be tumbled, the section forming the southeastern notch is well preserved. There are at least 13 upright limestone slabs along the



KEY

-  Rock
-  Uprights
-  Depression
-  Bedrock
-  Gentle Slope
-  Waterworn Pebble Frag.

Limestone outcrop with Possible Modifications

Thick Christmas-berry

To Rock Mounds

PLAN MAP OF SITE 50-80-02-4877

walls (Figure 6). Eight of these are in the widest eastern portion, and two are near the northwest end. These two appear to be "eho" shape (with shoulders). Upright slabs are often associated with religious function.

The interior of the feature is relatively level. The southern portion is made up of mostly natural outcropping with soil deposit near the *makai* (seaward) wall. A fragment of a waterworn basalt pebble was noted on the surface near the west wall.

Feature 2 and Feature 3

Features 2 and 3 are located approximately 5.0 m to the southeast of Feature 1. These features are linear rock mounds that each measure approximately 5.0 m long by 2.0 m wide and are 0.5-0.6 m high. These features were photographed but not mapped. These are thought to be clearing mounds for agricultural purposes.

SITE 50-80-02-4878

This site is a rockshelter (Figure 7) which is located at the base (seaward side) of the bluff. It is approximately 50 to 70 m east-northeast of Sites 4876 and 4877. The rockshelter measures 10.0 m long, 4.2 m at the widest point, and is 2.4 m high. It is bounded on the *makai* side by a boulder outcropping which measures 1.2 m above ground level. A small tube, measuring 3.0 m deep and 0.6 m wide, is located at the southwest corner of the shelter.

Recent disturbances by artifact collectors are evident in the central section of the rockshelter floor. A 1/4" screen was placed on top of a dirt pile near two small excavated pits in the shelter. There is an abundance of cultural debris present on the cave floor, including charcoal, *kukui* (*Aleurites mollucana*) pig bones, marine shells, waterworn basalt, fire cracked rocks, and ceramic fragments. A grinding stone fragment and a discoidal limestone hammerstone, 10 centimeters in diameter and 5-6 centimeters thick, were also present. Based on the cultural content observed, the site is interpreted as a temporary shelter used both in pre-Contact and post-Contact times.



FIGURE

6

VIEW OF UPRIGHT SLABS TO EAST
SITE 4877, KAHUKU, OAHU



|||||

To Cave
with
Beehive

Entryway

Cliff Facing

Dripline

Cliff Facing

Disturbed Area with Scattered Midden
and Historic Artifacts

Tube

KEY



Large Boulders



Depression



Screen



Dirt Piles



Grindstone Fragment



Hammerstone



2m



OGDEN

PLAN MAP OF SITE 50-80-02-4878

FIGURE

7

SITE 50-80-02-4879

Site 4879 is a large overhang (roughly 15 m long and 3 m deep) which is located along the bluff on the west side of Kalaeokahipa Gulch. The overhang resulted from a very large section of limestone separating from the rest of the bluff. This site is accessible from both ends of the separated piece. Access to the site can also be attained by descending a near vertical rock facing on the *mauka* (inland) side.

This shelter differs from most of the shelters in the area in that it faces *mauka* rather than *makai*. Pieces of timber and other historic debris are present in the shelter. No evidence of pre-Contact use was noted, but there is a deposit of soil on the shelter floor. No subsurface testing was done.

SITE 50-80-02-4880

This site is located on top of the bluff, approximately 100-150 m to the southwest of Site 4879. The site area is relatively flat, and appears to have been part of an old cattle grazing area. The vegetation on top of this bluff is composed mainly of *koa haole* and Christmas berry.

The site is comprised of two linear mounds that appear to define a small enclosure. These features were not thoroughly investigated, nor was the thick vine growth removed. There were no measurements taken at the time of the current project. The site is interpreted to be residential based on its architectural form and its similarity to Site 4876.

SITE 50-80-02-4881

This site is an octagonal concrete slab located on the lower Ō'io Gulch eastern ridge top. This site is located on a narrow ridge approximately 2.0 m from the edge of the gulch's eastern wall. The site is under a growth of ironwood, which is the dominant vegetation in the area. The vegetation in the immediate site area is comprised of predominantly vines and some isolated young Christmas berry. A north-south foot trail, about 2.0 m east of the feature, extends to the north edge of the ridge. Several rectangular-shaped fox-holes excavated for Army training are located in the surrounding area.

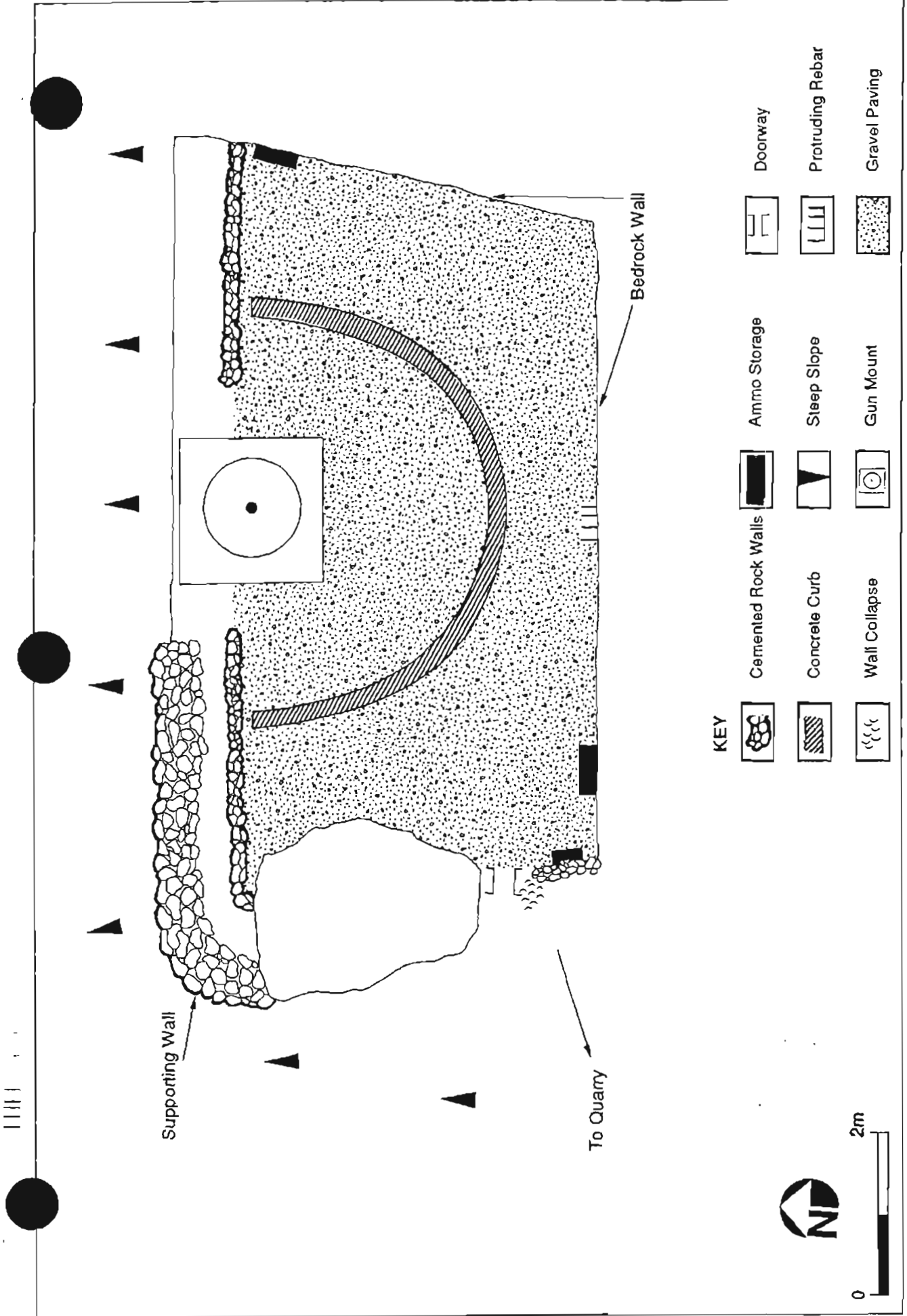
The concrete slab is octagonal in shape, and measures 4.15 m in diameter, and 0.17 m thick. There are eight small square holes corresponding to each of the eight corners of the octagon. These appear to be post holes. Based on the size of these cavities, the structural posts were of 4"x 4" square wooden posts. A set of concrete stairs, two steps high, is located on the west side of the slab indicates that the structure was oriented at a westerly direction with its entrance towards the gulch. A concrete pedestal, measuring 0.37 m high and 0.40 m wide, is located in the middle of the feature. This site appears to have been the foundation for a ranging or targeting station.

SITE 50-80-02-4882










Site 4882 is a concrete bunker located on the slope below the radio towers on the east side of `Ō`io Gulch. This site is located upslope from the Kahuku cattle farm, and is about 300 feet above sea level. This single feature is surrounded by a dense growth of *koa haole* Christmas berry, with an undergrowth of dense grass and vines. The surrounding topography is very rugged and extremely rocky. A rock quarry on the slope, west of the bunker, was used in quarrying materials for the feature's floor.

The bunker is a concrete rectangular structure (Figure 8) with cemented rock walls along the front (seaward side). These walls are mostly of cobbles with small boulders, a single rock wide and several courses high, with highest portion at the northwest corner. A wall similar to this forms the west wall of the bunker. A second sloping rock wall below the bunker serves as a supporting foundation for the upper wall.

The bunker measures 8.7 m by 4.5 m and is widest on the *makai* side. The floor is of quarried gravel. A semi-circular concrete curb is directly behind the doorway and a gun mounting platform is directly in front of it. The curb measures 0.15 m high and it extends the length of the feature's *makai* opening. There are three intact metal built-in ammo storage cabinets in the bunker. One of these is located near the northeast corner, and two are side-by-side near the southwest corner. These ammo cabinets are now rusting. Several metal rebars protrude out of the south wall directly behind the main opening. With the exception of some collapsed portions on west and the northwest walls, the feature is in very good condition.



KEY

-  Cemented Rock Walls
-  Ammo Storage
-  Doorway
-  Concrete Curb
-  Steep Slope
-  Protruding Rebar
-  Wall Collapse
-  Gun Mount
-  Gravel Paving

FIGURE

8

PLAN MAP OF SITE 50-80-02-4882



SITE 50-80-02-4883

Site 4883 is a post-Contact residential site located on the east side of the KTA Access Road (Figure 9). The site is adjacent to the Department of Energy (DOE) and National Atmospheric and Space Administration (NASA) Experimental Wind Turbine. Most of the features observed are still intact, although some have minor damage due to erosion. The site is currently under dense hau (*Hibiscus tiliaceus*) and Christmas berry.

Environment

Site 4883 is located in Hanakaoe *Ahupua`a*, at the northern part of East `Ō`io Gulch. It is located at the foot of the sheltered eastern slope of the gulch, on a relatively level area that gradually ascends to the south. The site extends into the foot of the steeper slope along the south and southeast. It is demarcated along the west by the KTA Access Road, and is bounded along the east by the gulch's eastern floor. The north side is bounded by a recently deposited boulder pile. A large earthen berm along the northwest end is probably associated with the access road construction.

The vegetation at the site is comprised primarily of dense *hau*, Christmas berry, and some *koa haole* in the periphery. Sugarcane in an abandoned sugar field dominates the growth on top of the ridge along the south and east sides of the site. There is little growth under the dense *hau*.

Surface Survey Results

There are fourteen features at the site. These include two walls, two small paved terraces, one small platform, two earthen depressions, one concrete paved terrace, two stone faced terraces, one U-shaped feature, two rock alignments, and one rock linear mound. These features are summarized in Table 4 and are described in detail below.

Feature 1

Feature 1 is an L-shaped stone facing located at the east end of the central section of the site. This feature is stacked and faced, one rock wide and three to four rocks high (Figure 10). The longer part of the feature

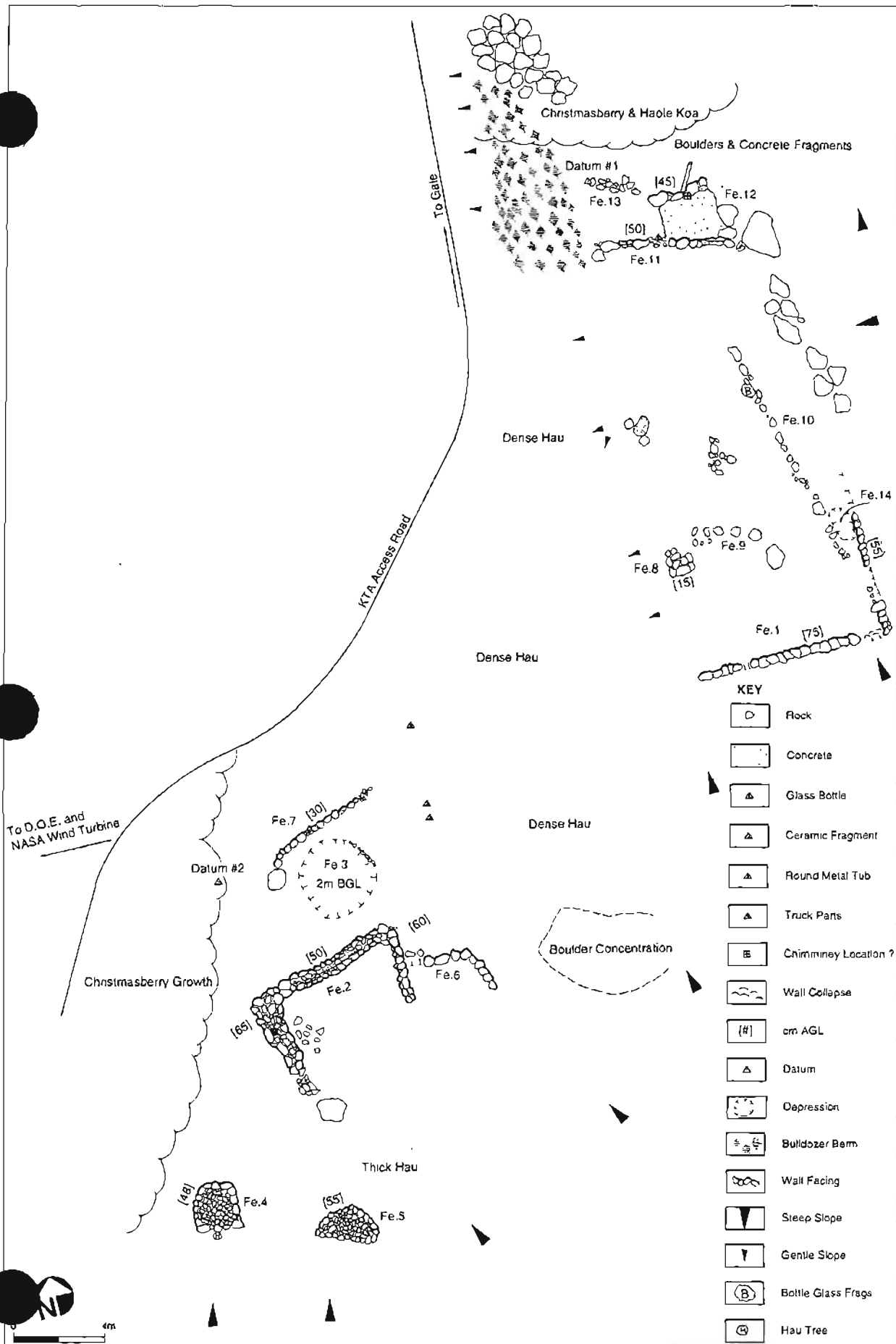


Table 4
Site 4883 Features

Feature Number	Type	Feature size in meters	Probable Function
1	L shape wall	E-W: 8.5, N-S: 5.5	Residential
2	U shape wall	7.5 x 5.0 x 0.60	Residential
3	Depression	3.5 dia., 2.0 deep.	undetermined
4	Paved terrace	2.0 x 2.0 x 0.48	undetermined
5	Paved terrace	2.5 x 2.5 x 0.55	undetermined
6	L-shape alignment	3.5 x 1.5 x 0.40	slope retention
7	Terrace	6.5 x 0.5 x 0.30	slope retention
8	Platform	1.3 x 1.2 x 0.15	undetermined
9	Rock alignment	4.5 x 1 rock wide x 0.10	residential
10	Rock alignment	11.0 x 0.03 x 0.05	residential
11	Wall	8.5 x 0.4 x 0.5	residential
12	Concrete terrace	2.5 x 2.5 x 0.45	cooking area?
13	Linear mound	2.5 x 2.0	slope retention
14	Depression	1.6 x 1.0 x 0.5	trash pit?



VIEW OF WALL TO SOUTH
FEATURE 1, SITE 4883, KAHUKU, OAHU

F I G U R E

10

extends east-west and the shorter section extends northerly off of the east end. The east-west section measures 8.5 m long and is 0.75 m at the highest point. The northward section measures 5.5 m long and is 0.55 m high. Three sections of this feature have collapsed due to erosion. The damage on the west end however, is caused mostly by hau branches growing through the wall facing. An earthen depression (Feature 14) containing historic artifacts is located at the north end of the wall.

It is possible that this feature was connected with Feature 11 (Figure 9) to form an enclosure for a house site, but the effects of erosion and other recent disturbances in the area make it difficult to determine the original structural form.

Feature 2

This feature is a U-shaped stone enclosure located 18.0 m southwest of Feature 1. This feature has three-sided, double-faced and core-filled walls with concrete mortar on top of the north and west walls. The south (upslope) part of the feature contains no wall. The walls are constructed with subrounded and angular cobbles and boulders, and vary between 0.5 m and 1.0 m wide. The enclosure measures 6.0 m by 5.0 m with walls ranging from 0.50 m to 0.65 m high. No paving was observed within the enclosure. This feature is historic in origin, based on the inclusion of concrete, and it is thought to have been a house site.

Feature 3

Feature 3 is a depression located 1.0 m north of the northeast corner of Feature 2. Feature 3 measures 3.5 m in diameter and is 2.0 m deep. No cultural deposit was observed in the pit, and its function was not determined.

Feature 4

Feature 4 is a rock paved terrace built into the slope 5.0 m southwest of Feature 2. Feature 4 is stacked and faced on three sides, including the north (downslope), east, and west sides. The interior is paved with angular cobbles and pebbles to the level of the outer walls. Feature 4 measures 2.0 m in diameter and the facing is 0.48 m high at the highest point. No cultural remains was observed on the feature, and its function is unknown.

Feature 5

Feature 5 is a small rock paved terrace located 3.5 m east of Feature 4. Feature 5 is similar to Feature 4, and is also built into the slope with its north, east, and west sides made of stacked and faced subrounded, large cobbles and small boulders. The interior of this feature is also paved to level with the top of the facings. This feature is currently under a dense *hau* growth. The feature measures 2.5 m by 2.5 m and is 0.55 m at the highest northwest part of the facing. The function is unknown.

Feature 6

Feature 6 is an L-shaped rock alignment extending eastward from the east wall of Feature 2. Feature 6 is constructed with smooth and angular large cobbles and large boulders. A small portion of the feature connecting it with Feature 2 has collapsed. Feature 6 measures 3.5 m long by 1.5 m wide and is 0.4 m high. No cultural remains was observed associated with the feature, and it is thought to have constructed for slope retention.

Feature 7

Feature 7 is a stone faced terrace located along the downslope side of Feature 3. Feature 7 measures 6.5 m by 0.5 m and is 0.30 m high. This feature may have been part of a walkway linking this section of the site with the area of Feature 1. It is difficult to ascertain the extent of the Feature 7 terrace due to presence of an erosional channel between these two sections of the site.

Feature 8

This feature is a small platform located 4.5 m north of the west end of Feature 1. Feature 8 is composed of large flat cobbles tightly fitted together to form a level surface. These rocks are held together with concrete mortar. The northeast corner of this feature has been removed. This feature measures 1.3 m wide by 1.3 m long and 0.15 m high. No specific function of this feature could be determined.

Feature 9

Feature 9 is a rock alignment extending eastward towards Feature 14 from Feature 8. Feature 9 is composed of large angular cobbles placed 0.5 m to 0.6 m apart extending towards a medium-sized angular boulder at the east end. Feature 9 measures 4.5 m long, and may have been a divider between site areas.

Feature 10

This feature is a rock alignment extending northwest from the south side of Feature 14. Feature 10 measures 11.0 m long by 0.3 m wide by 0.05 m high. Isolated deposits of broken historic glass bottles were observed in several locations throughout Feature 10. None of these remains were collected. It is suspected that this feature was a divider between site areas.

Feature 11

Feature 11 is a stone facing located 4.5 m north of Feature 10. Feature 11 is believed to be the north boundary of the main structure, and might have connected with Feature 1. Feature 11 extends parallel to Feature 1 and measures 8.5 m in length and is 0.5 m high. It is composed of stacked large angular cobbles and boulders and is cobble and pebble filled on the upslope (*mauka*) side. Patches of concrete mortar are present in several sections of the wall, to holding the top row of rocks in place.

Feature 12

This feature is a concrete paved terrace extending north from Feature 11. Feature 12 is faced with medium-sized angular boulders on the north side. It measures 2.5 m long by 2.0 m wide, and the facing is 0.45 m high. The space between Features 11 and 12 is concrete paved to form a floor. A 3-inch diameter length of galvanized pipe is located next to the feature. This pipe was probably used as a chimney for some cooking appliance. This assumption is based on a circular cavity located at the north end of the feature facing. This feature is interpreted as food preparation area.

Feature 13

Feature 13 is a linear rock mound located just southwest of Feature 12. Feature 13 measures 2.5 m long and is about 0.7 m wide and 0.4 m high. This feature might have been a connecting terrace to Feature 12.

Feature 14

Feature 14 is a small depression located at the north end of Feature 1. Feature 14 is oval shaped and measures 1.6 m long by 1.0 m wide and is 0.5 m deep. This feature contains abundant broken glass and other historic trash. It is interpreted as a trash pit.

Discussion

It is possible that the area between Feature 1 and Feature 13 (see Figure 9) is more complex and may contain more components than recorded, but this could not be determined without complete vegetation removal. The earthen berm between Feature 11 and the Access Road probably resulted from the road construction. The large boulder concentration at the north end of the site was a later component as well, possibly from road construction; most of these boulders show bulldozer scar marks.

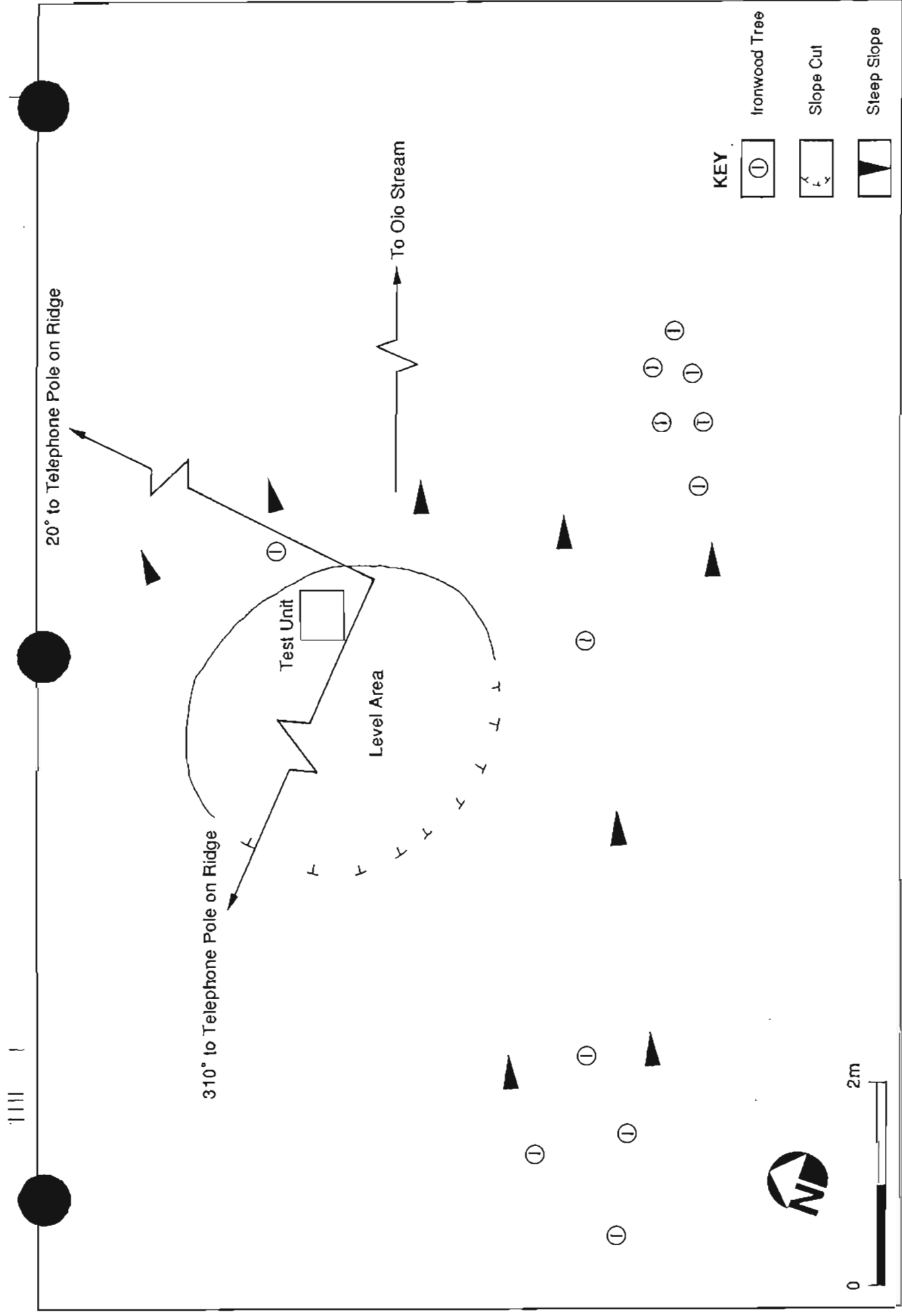
SITE 50-80-02-4884

Site 4884 is located in the upper portion of `Ō`io Gulch on the northeast side of the Kahuku Range Control facility. The site is on a small leveled area on the gulch's steep northwest wall (Figure 11). The site area is small with no associated surface cultural components observed nearby. The site measures 3.0 m in diameter and is demarcated on all sides by the natural slope. The vegetation in the area is dominated by ironwood (*Casuarina* sp.), Christmas berry, strawberry guava (*Psidiumcattleianum*), common guava, octopus trees (*Brassaia achnophylla*), `ohia lehua (*Metrosideros* sp.) ferns, and other exotic species. The surface characteristics of the area indicated an *imu* (earth oven) might be present, based on findings in other areas (Williams 1992) and the predictive model outlined previously. A single 0.5 m by 0.5 m unit was excavated at the site to test for the presence of an *imu*.

Excavation Results

The excavation was done following the natural stratigraphic layers, utilizing a trowel and a dustpan. No screening of the excavated matrix was done. Charcoal and soil bulk samples were collected for radiocarbon dating and wood identification; results of these analyses are presented in the Appendices.

Scattered charcoal flecking was observed in the soil at approximately 0.05 m below surface, and the quantity of the charcoal increased with depth. The *imu* rocks were encountered at 0.36 m below surface, and continued to 0.62 m below surface with an oxidized lens of burnt soil defining the base of the *imu* pit. The *imu* was estimated to be about 1.0 m in diameter, based on the section encountered in the excavated unit.



FIGURE

11

PLAN MAP OF SITE 50-80-02-4884

OGDEN

Two stratigraphic layers and the *imu* fill were identified during the test excavation (Figure 12). Layer I, the deposit above the *imu* rocks, is soil that developed over the *imu* after it was abandoned. The charcoal in this deposit probably resulted from material removed from the *imu* after use washing back into the pit, or it may be that the *imu* pit extended higher in the profile but was no longer visible. The second layer, which was identified by exposing just the top of it below Layer I, is the natural basal silty clay layer composing the gully side. The *imu* pit fill is charcoal and fire affected cobbles.

The *imu* fill contained abundant wood charcoal, and samples were collected for radiocarbon and wood identification analyses (see Appendices). In addition to the wood charcoal, a charred tuber was found and collected. A portion of the tuber portion was submitted for dating rather than wood charcoal to avoid an in-built age or "old wood" skewing of the date.

The tuber sample was submitted to Beta Analytic for dating, and a conventional radiocarbon age of 280 ± 50 BP was obtained. This age was calibrated by Beta Analytic to the following calendar year ranges at two standard deviations (95% probability): AD 1490 to 1680 and 1770 to 1800. A third range of 1940 to 1950 can be discounted, as there is no evidence to suggest the feature was created by Army personnel, and the presence of sweet potato (see below) strongly suggests traditional use.

Three samples were submitted to Gail Murakami of IARI, Inc., Honolulu, for species identification. The first sample was a portion of the tuber, which was identified as probably sweet potato (*Ipomoea batatas*). The second sample was composed of *koa* (*Acacia koa*), and the third sample was unidentifiable tree bark. Currently, no *koa* grows in the immediate area; the site is surrounded by ironwood trees.

Discussion

This site is located in an area that is in a narrow section deep in the back of the gulch. The area is very steep with a near vertical drop towards 'Ō'io Stream at the east side of the site. The area is surrounded by slope greater than 40 degrees, limiting other uses. The combination of rugged terrain and the presence of a tuber in the *imu* seems somewhat incongruous. The tuber suggests gardening, but the steep terrain suggests an area exploited for wild resources; also, the steepness makes it unlikely the area was a camp site and the

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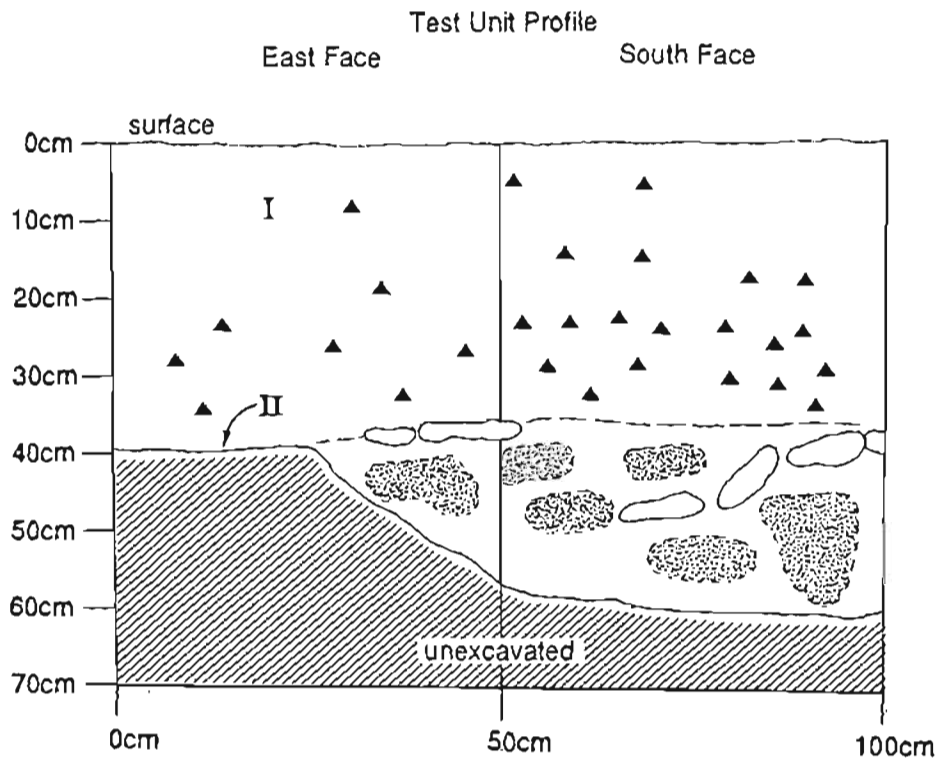
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Discussion





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Layer I: 2.5YR3/2 (m) Dusky red, silty clay, loose, slightly sticky, non plastic, 1% decomposed gravel, many rootlets within first 5 cm, few roots, some charcoal, charcoal density increased with depth.

Layer II: 2.5YR2.5/2 (m) Very dusky red, silty clay, very hard compacted, sticky when wet, plastic, some decomposed cobbles and very few roots. No cultural remains.

KEY

-  Charcoal
-  Top of Imu
-  Imu Rocks
-  Dense Charcoal Concentration

sweet potato tuber was cooked as part of a meal. It is possible that the tuber was brought to the *imu* to be cooked as part of an offering, if the *imu* was constructed for ritual use while cutting trees (Malo 1951).

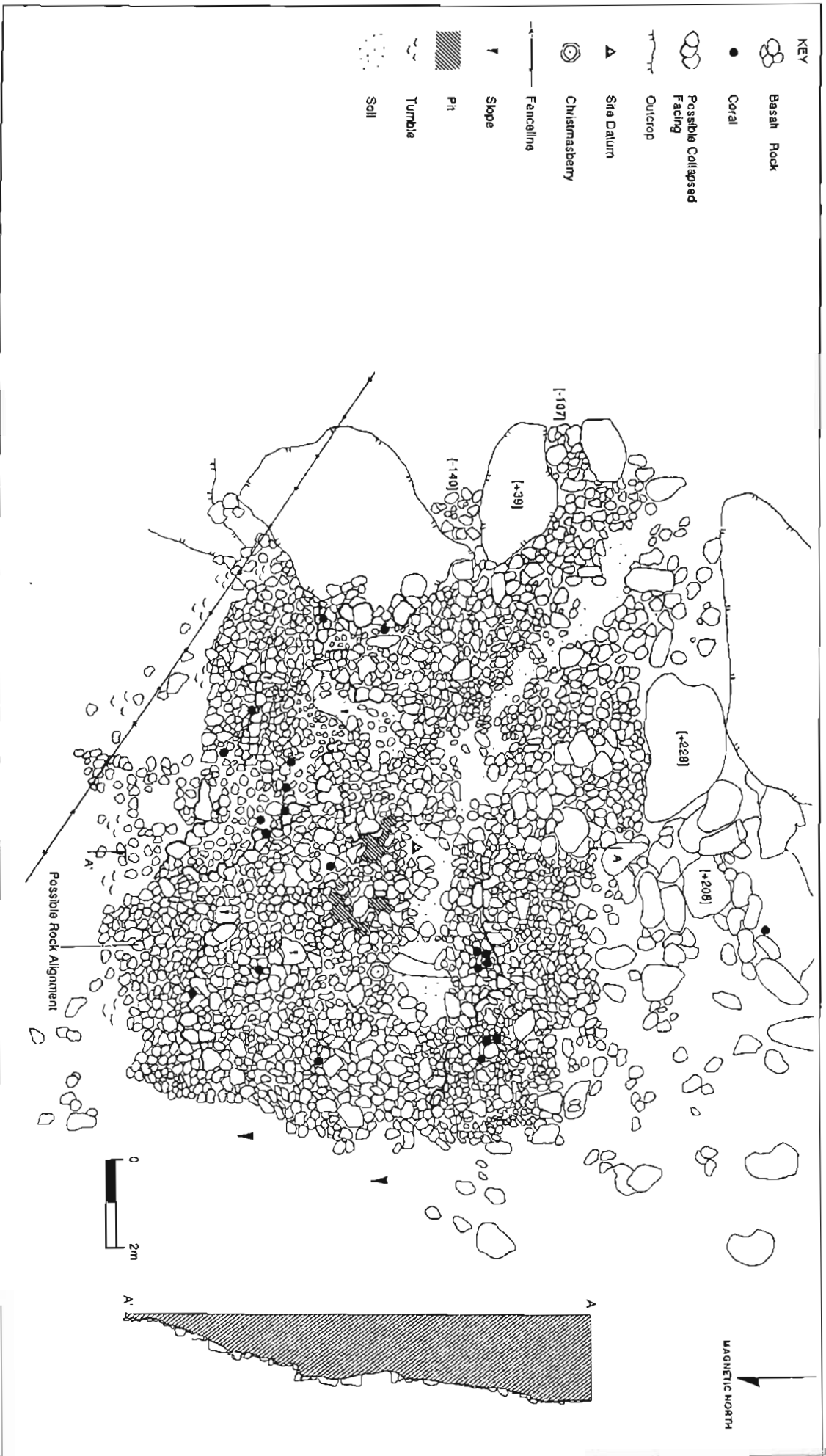
SITE 50-80-02-4885

Site 4885 is a religious structure (*heiau*) located at the mouth of Pahipahi`ālua Gulch just inside of the KTA north boundary fence line. The site is at the edge of agricultural land adjacent to Kukaimanini Beach Park. The site consists of a rock platform and several terraces on the upslope side of the platform (Figure 13 and 14). Several post-Contact features, including a concrete trough and a stone-lined ditch are located just *makai* (seaside) of the project boundary. These features are probably remnants from the plantation era, and were not recorded since they are outside the project area.

The site area is under dense growth of Christmas berry, young *koa haole*, and tall grass. The topography is characterized by an extensive basalt outcropping along the steeper slope south (inland) of the *heiau*. A boulder outcropping north of the *heiau* extends north to the concrete aqueduct, which is approximately 10.0 meters north of the survey boundary line. No features were encountered on the slope west of the platform. East of the platform is a relatively flat flood plain extending eastward onto the base of the Pahipahi`ālua Gulch. No archaeological features were observed in this area.

Feature Description

The recording of the site focused primarily on the *heiau* platform. This feature measures 17.0 m long by 12.0 m wide, and is 1.4 m at its highest point. The feature is composed of subangular and subrounded large and small boulders, cobbles and some pebbles (Figure 15). Although the original architecture of the feature is difficult to discern, portions along north and the south sides show stacking. The rest of the feature has tumbled, probably due to disturbance by cattle and vegetation. An earthen pathway in the middle of the feature extends from the southeast end to approximately 2.5 m from the west end (Figure 16). There are two rock-lined depressions on north side of the pathway, in the central area of the *heiau*. A small platform, roughly 2.0 m on each side, is located at the northeast corner of the platform and is faced with subangular small boulders, with a pavement of waterworn gravels and pebbles. Branch coral fragments (Figure 17) are scattered throughout the *heiau* platform, but more so along the north and southwest sides.



PLAN MAP AND PROFILE OF PAHIPAHIALUA HEIAU, SITE SO-80-02-4885

III II



VIEW OF HEIAU PLATFORM TO WEST
SITE 4885, KAHUKU, OAHU

F I G U R E

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VIEW OF HEIAU FACING TO WEST
SITE 4885, KAHUKU, OAHU

F I G U R E

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VIEW OF TRAIL ACROSS HEIAU PLATFORM TO EAST
SITE 4885, KAHUKU, OAHU

FIGURE

16



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BRANCH CORAL OFFERING
SITE 4885, KAHUKU, OAHU

FIGURE

17

Scattered coral fragments are also present on the upslope terraces as well. No surface artifacts were found at the site.

SITE 50-80-02-4886

Site 4886 is a small (3.5 m by 3.0 m) five-sided World War II bunker located at the edge of the ridge between Kawela and Pahipahi`ālua Gulches (Figure 18 and 19). It is directly north of the Naval Facility above Kawela Bay. The bunker is in a circular pit that was excavated into the natural bedrock on top of the bluff. It is barricaded by the unexcavated bedrock. The roof of this feature is elevated just above the lowest portion of the pit.

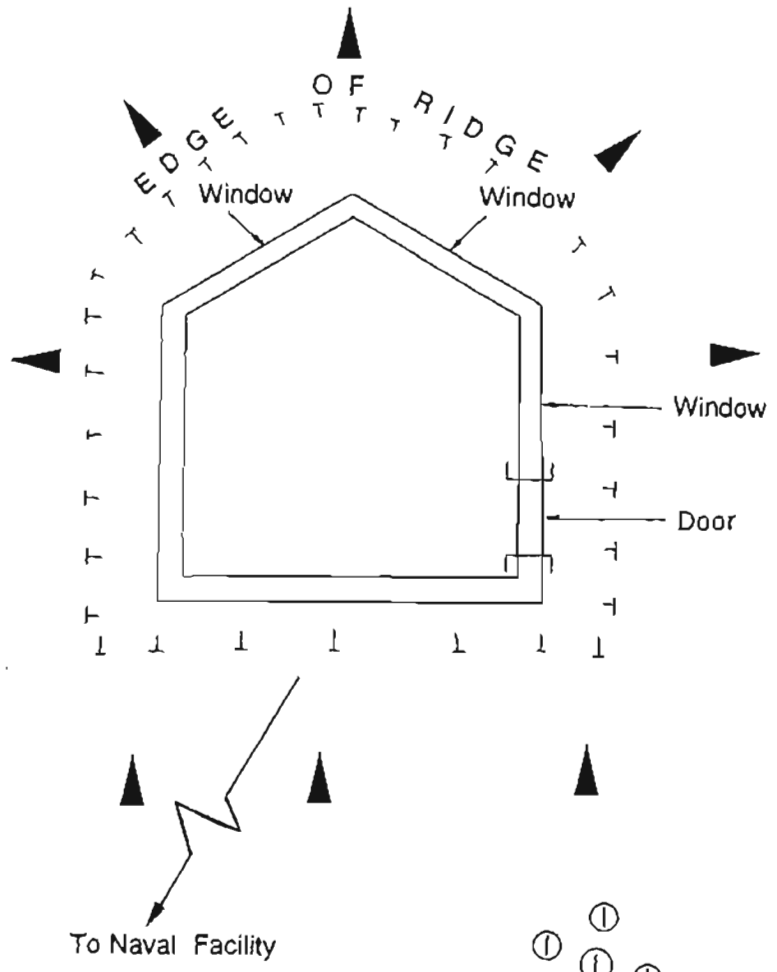
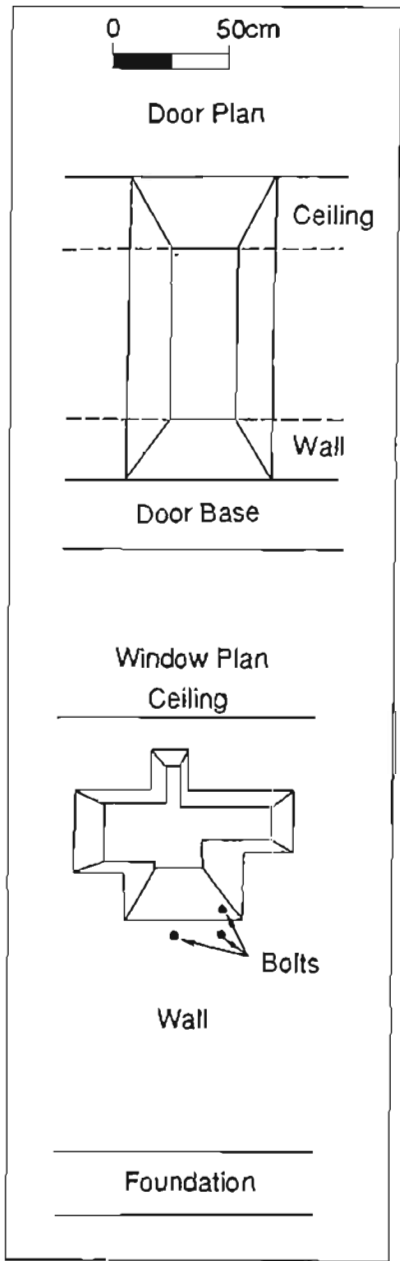
This location is on the very edge of the cliff facing and is exposed to strong winds. The vegetation is limited to low growths of Christmas berry, common guava, and grass. The taller trees (ironwood), and other shrubs are confined to the upper part of the ridge, and along the slope below the site.

The bunker has a single entry-way, and three windows. The door and one window are on the east side, and the other two windows are on either side of the V-shaped wall at the *makai* end (Figure 18). The door measures 1.23 m tall and 0.61 m wide. The interior measures 3.25 m by 2.45 m, and is 1.23 m high; The walls are 0.3 m thick. All the windows are cross-like in shape, and measure 0.91 m by 0.35 m at the widest points.

SITE 50-80-02-4887

Site 4887 is located between Kaunala and Waiale`e Gulches. The site is approximately 150-200 m southeast of the Alpha Gate (A1), and is about 70-80 m east of the access road.

The site is a complex of terraces and associated features (Figure 20) located on the northeastern side of a shallow gully, one ridge over on the eastern side of A1 Gate. It is on the talus slope near the edge of the bluff, northwest of an Army staging area located approximately 400 m to the southeast. The site is on a rugged talus slope that consistently slopes towards the northwest. A narrow intermittent stream is located west of the terraces, and may have been the water source for these terraces.



- KEY
- Ironwood Tree
 - Edge of Excavation
 - Steep Slope
 - Doorway



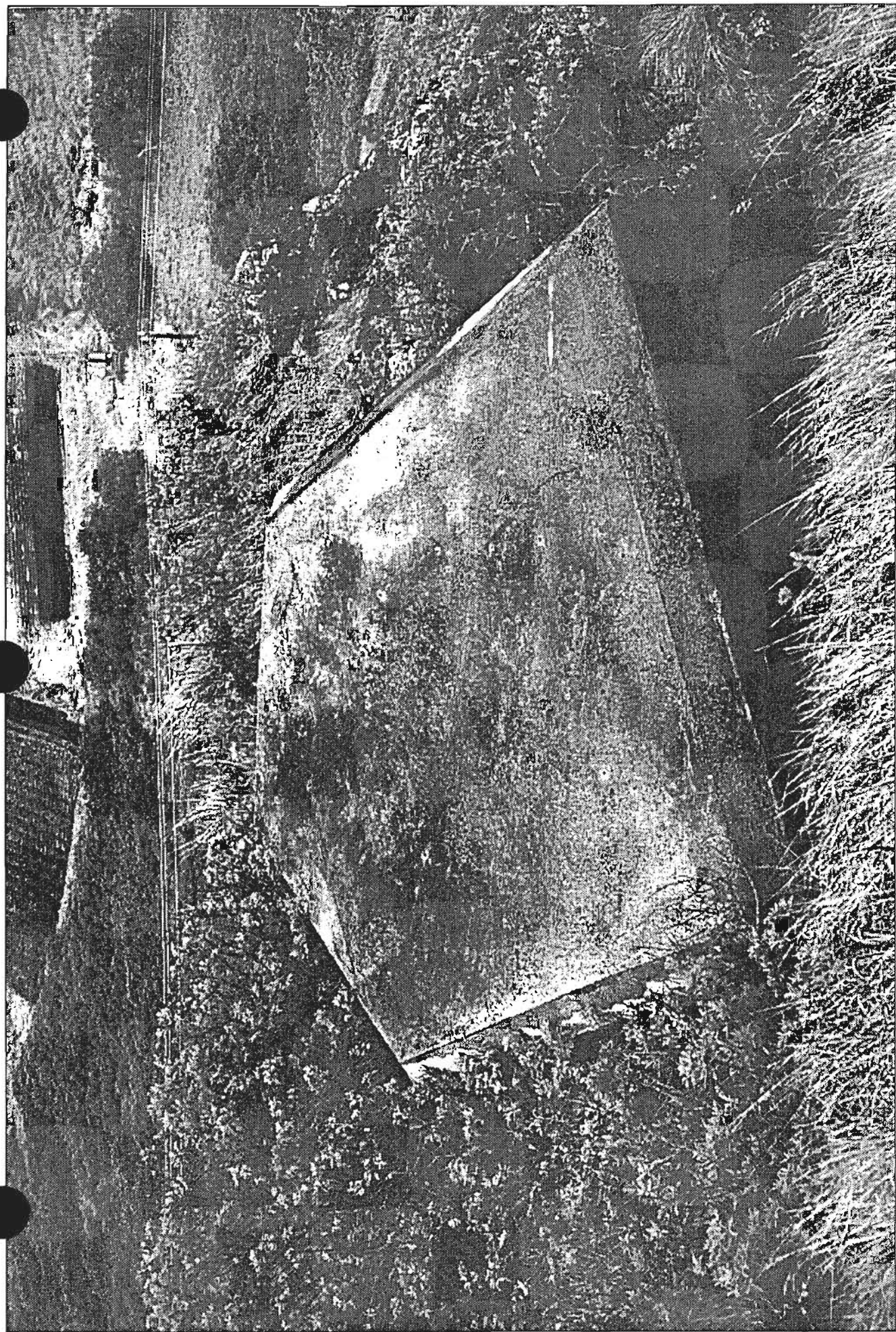
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PLAN MAP OF SITE 50-80-02-4886

FIGURE

18

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VIEW OF BUNKER TO NORTH
SITE 4886, KAHUKU, OAHU

FIGURE

19

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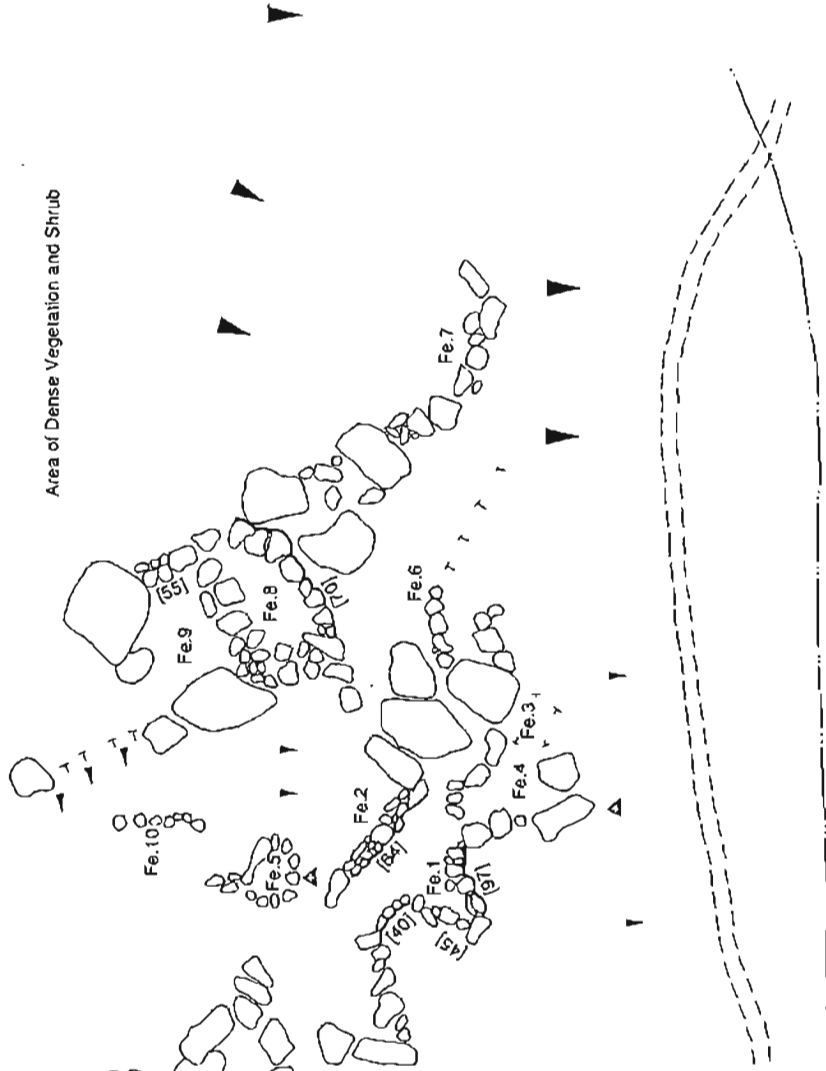
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Densa Vegetation

Area of Dense Vegetation and Shrub

Dense Vegetation

KEY	Symbol	Label
	○	Rock
	▭ with wavy lines	Facing
	▭ with TTT	Earthen Terrace
	▭ with dashed lines	Bike Trail
	▭ with horizontal lines	Intermittent Stream
	▭ with triangle pointing up	Steep Slope
	▭ with triangle pointing down	Gentle Slope
	▭ with X's	Depression
	▭ with #	cm AGL
	▭ with triangle pointing up	Datum



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PLAN MAP OF SITE 50-80-02-4887

FIGURE

20

The vegetation at the site is dominated by Christmas berry, pine, common guava, *koa haole*, and other exotics. The area south of the identified terraces is densely covered in shrubs and vines, thus providing limited visibility.

Surface Survey Results

A total of eleven features were recorded during the reconnaissance survey in the area. These include five terraces, one rock alignment, two circular alignment, one depression, one enclosure, and one boxed C-shape structure. These features are summarized in Table 5.

Feature Descriptions

Feature 1

Feature 1 is an irregular shaped terrace located at the southwest corner of the site. Feature 1 measures 8.2 m long by 2.0 m wide by 0.92 m high. Two sections of this feature are stacked and faced with large angular and subangular cobbles and medium size boulders. The west end of the feature consists mostly of medium to large boulders with large cobbles piled between them. A V-shaped portion of the terrace near the east end is a possible step, providing access to the upper part of the site. This feature is interpreted as a slope retention facing.

Feature 2

Feature 2 is a stacked and faced terrace located 0.75 m northeast of Feature 1. Feature 2 is composed of stacked medium and large angular and subangular cobbles that extend between boulder concentrations. Smaller cobbles and pebbles are piled behind the terrace facing to form a level area. The feature measures 3.4 m long by 2.0 m wide by 0.92 m high. Since this feature is directly upslope from Feature 1, it provides slope retention as well as a possible step towards the upper part of the site.

Feature 3

Feature 3 is a small earthen depression measuring 1.2 m in diameter and less than 0.1 m deep, located just east of Feature 4. Feature is in a relatively level area south of the boulder concentration at the east end of

Table 5
Features encountered at Site 4887

Feature Number	Feature Type	Feature Size	Probable Function
1	terrace	8.2 m x 2.0 m x 0.92 m	slope retention
2	terrace	3.4 m x 2.0 m x 0.64 m	slope retention
3	slight depression	1.2 m dia. <0.1 m deep	possible <i>imu</i> (cooking)
4	irregular alignment	3.0 m x 2.0 m	slope retention
5	circular alignment	1.2 m x 1.0 m x 0.1 m	possible fire place
6	terrace	4.8 m x 1.6 m	slope retention
7	terrace	7.8 m x 1.0 m x 0.6 m	slope retention
8	enclosure	4.0 m x 2.4 m x 0.7 m	possible animal pen
9	box C shape	6.4 m x 2.6 m x 0.55 m	house site?
10	alignment	2.2 m x 0.2 m x 1 rock hi.	slope retention
11	terrace	3.4 m x 1.2 m x single rock	slope retention

Feature 2. This feature was interpreted as a possible *imu* because of its similarities to such features elsewhere. It is interpreted as a possible cooking area.

Feature 4

Feature 4 is a boulder alignment located between Features 1 and 3. This feature is comprised of medium-sized angular and subangular boulders arranged to form a small nearby enclosed area 3.0 m long and 2.0 m wide. It is difficult to determine the possible function of this feature based on its current condition, but it may have formed a small activity area.

Feature 5

Feature 5 is a circular alignment located just north of the northwest end of Feature 2. Feature 5 is composed of medium-sized cobbles arranged circularly off of a large angular boulder. Feature 5 measures 1.2 m long by 1.1 m wide by 0.1m high. Based on its similarity to features found elsewhere, this feature is thought to be a possible fire place.

Feature 6

This feature is a terrace that extends southeast of the boulder concentration at the southeast end of Feature 2. The feature measures 4.8 m long by 1.6 m wide. Approximately only one-fourth (west end) of this feature contains rocks. The section of the feature towards the steeper eastern slope currently contains no rocks due to erosion. This feature is thought to be a slope retention facing.

Feature 7

Feature 7 is a terrace, measuring 7.8 m long by 1.0 m wide by 0.6 m high, located upslope from Feature 6. Feature 7 is composed of angular and subangular rocks ranging from medium to large cobbles and medium to large boulders. This terrace extends parallel to the steepest eastern slope at the site. This terrace may have been an activity area.

Feature 8

Feature 8 is an enclosure adjoining the northwest end of Feature 7. Feature 8 is stacked and faced on the southeast, and the rest appears to have tumbled. Feature 8 measures 4.0 m long by 2.4 m wide by 0.7 m

high. A relatively large deposit of boulders form the outline of the feature, leaving the interior relatively rockfree. This feature may be an animal pen.

Feature 9

Feature 9 is a C-shaped terrace northwest of Feature 8. Feature 9 extends between two large boulders, and it extends into the northwest wall of Feature 8. The northeast side consists of a low double-faced cobble wall that extends into the largest boulder on the north side. The feature measures 6.4 m by 2.6 m overall and is 0.55 m at the highest point. The interior of the feature is flat and is relatively rockfree. This feature is suspected to be a house site.

Feature 10

Feature 10 is a rock alignment, measuring 2.2 m long by 0.2 m wide by 1 rock high, located about 2.0 m west of Feature 9. This feature is composed of small subangular boulders and is interpreted as slope retention.

Feature 11

Feature 11 is a boulder terrace within a large boulder concentration located at the west end of the site. This feature resulted from modification of naturally deposited boulders; small and medium size cobbles are piled between some of these boulders. The feature measures 3.4 m long by 1.2 m wide, and is a single rock high (30-40 cm). This is interpreted as a possible gardening area.

Summary

Site 4887 is interpreted to be a residential site, based on the features encountered, and probably dates to the pre-Contact or early post-Contact period. Concentrations of boulders are modified and are incorporated in the construction of most features. Feature 9 is thought to have been a house location. Feature 1 appears to be a ramp leading up to Feature 2, and eventually into Feature 9. Feature 8 is a possible animal pen based on its size and shape.

SITE 50-80-02-4888

Site 4888 is located on a knoll approximately 20.0 m south of Pūpūkea Loop Trail. The knoll is almost completely surrounded by Paumalū Stream except for a small section on the south side. The area is very wet and densely covered in vegetation. The vegetation is composed of a tall eucalyptus canopy (*Eucalyptus* sp.) and a groundcover of dense shampoo ginger (*Zingerber zerumbet*) and false stag horn fern (*uluhe*; *Dicranopteris linearis*). Guava and *ti* (*Cordyline terminalis*) plants are common in the area as well. A medium size *lama* (*Diospyros* sp.; native Hawaiian persimmon) tree is on the summit of the knoll with *maile* (*Alyxia olivaeformis*) vines climbing on it. Three banana trees near the stream bed are at the northeast corner of the knoll. There are no other banana trees in the vicinity.

Several small depressions are present along the northwest slope, and a larger depression is located at the northeast end of the knoll. The smaller depressions measure 0.7 to 1.0 m in diameter, and 0.05 m or less deep. The larger depression measures 4.2 m long by 3.2 m wide, and it is about 0.5 m at its deepest point. A sizable charcoal scatter is present at the northeast side of the pit. This feature is thought to be an *imu*, but was not tested. The smaller depressions are suspected to have resulted from agricultural activities, most likely bananas. This assumption is based on the presence of banana trees nearby, and their similarity to features elsewhere in the island (Williams et al. 1995). A short boulder alignment (2.0 m long) at the edge of the false staghorn fern growth on the southwest slope is a possible slope retention.

EXCAVATION RESULTS

Two 0.5 m by 0.5 m shovel probes were excavated in two of the smaller depressions in order to determine the presence or absence of cultural remains. The excavation was done following the natural stratigraphy and the excavated matrix was not screened. Both of the excavations revealed sparse charcoal flecking; none of the material was collected, and the units were terminated at 30 cmbs.

A single stratigraphic deposit was observed during the excavation. This uniformity is attributed to the exposure of the area to heavy frequent erosion and weathering. Evidence of heavy, erosion is seen throughout this section of the project area. Soil deposit at the site is a sandy clay loam, very wet, fine to very fine, sticky, and rock free.

SITE 50-80-02-4930

Site 4930 is a linear rock mound or facing (Figure 21) located on the east side of the hill that is of the hill containing the Army Radio Communication Towers. A small building bearing a sign "COMMON BUILDING" currently occupies the summit of the ridge (Figure 22). The portion of the ridge north of the building has been leveled in the past off and is currently under gravel paving.

This single feature site is located directly east of the building and is covered with dense elephant grass (*Pennisetum purpureum*), *koa haole*, vines, and other weeds. The feature consists of roughly stacked, small, rounded to subrounded boulders and cobbles extending into a large dirt mound at the north end. This mound covers the north end of the feature. This feature measures 7.0 m long and 2.0 m at the widest point.

Given that the area has been greatly disturbed, it is impossible to ascertain site boundaries, functions, or site age. However, given its proximity to the area marked by McAllister (1933) as the location of Puuala *Heiau*, this site can be considered as possible remains of this site. Further work is necessary to determine this feature's function.

DISCUSSION

The KTA survey yielded both pre-Contact and post-Contact cultural remains, located in a variety of environments. Residential and ritual sites are located along the bluff dividing the coastal flat from the rugged inland areas; these sites are found both at the base of the bluff and on the top, near the edge. Agricultural sites have been located in the lower gulch areas during previous surveys, and the current survey located resource processing sites in the upper gulch areas and the rugged inland area. Despite extensive 19th and 20th land-altering activities, including ranching, sugar and pineapple cultivation, and military training, these sites have remained intact and provide a record of past use of the northern Ko'olau Loa area now encompassed by KTA.

Fourteen archaeological sites were recorded during the current survey; five of the sites (Sites 4876, 4877, 4879, 4880, and 4881) are outside of the KTA boundary. The other nine sites bring the total number of

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Communications Building

Mechanically Levelled Gravel Paving

Dense Growth of Haole Koa & Elephant Grass

Dense Vegetation

W
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U
N
D

KEY



Palm Tree



Dozer Earth Pile



Rock



Gentle Slope



Steep Slope



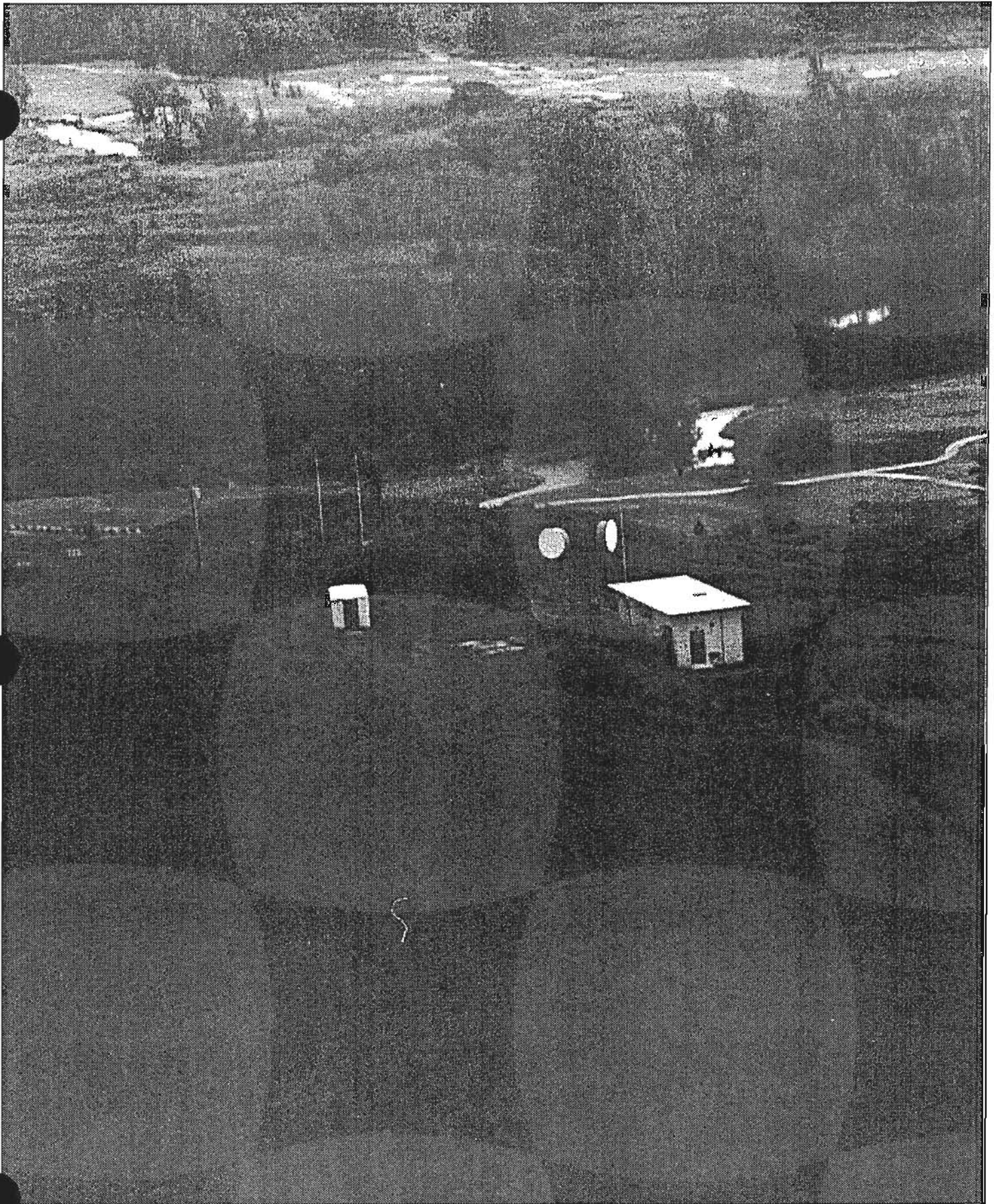
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F I G U R E

PLAN MAP OF SITE 50-80-02-4930

21





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VIEW TO NORTH OF COMMUNICATION STATION ON HILLTOP
NEAR SITE 4930
KAHUKU, OAHU

F I G U R E

22

known sites within KTA to 18, including those previously recorded in the earlier surveys (McAllister 1933; Rosendahl 1977; Davis 1991). At this time, however, only portions of KTA have been archaeologically surveyed, totaling approximately 15% of the installation. Doubtless, many more archaeological sites are present within KTA, and remain to be discovered.

The project reported here was guided by two general research problems, presented in the form of questions to be answered. These questions are addressed in turn below, with the discussion based on the results of this and previous surveys.

The first research problem concerned Pu`uala Heiau, and whether or not any archaeological or geomorphological evidence could be found to indicate if remains of the heiau still exist. Two locations are recorded for the heiau: McAllister's original field map shows it to be on the edge of the bluff, on a hill slightly southeast of Kahuku point, and the USASCH maps (Rosendahl 1977) show it to be more inland, on a hill directly south of Kahuku Point. Why there is this discrepancy is unclear, but it is likely that the site location was plotted wrong on the USASCH maps, since there is no discussion in the notes or report that suggest why a location other than McAllister's was plotted. A third possible location is suggested by McAllister's map: on the hill directly east of the location he notes for the heiau, there is a site location and number that is crossed out.

All three locations were surveyed. No evidence for a heiau structure was found in either the location noted by McAllister nor on the USASCH map. The hill that McAllister noted as the site location has been extensively altered for the construction of a large communications facility. If any structure was ever present on the top of this hill, it has been completely destroyed. Likewise, the location plotted on the USASCH map is an abandoned sugarcane field; no evidence for any structure or deposit was present. The third potential location, the hill east of and adjacent to McAllister's plotted location, has also been altered, but much less so. A small communications facility is present on the hill top, and the area has been partly leveled. A stacked stone facing, typical of pre-Contact construction style, is present on this hill; the facing has been partially buried on one end by a bulldozed soil mound. Although no direct evidence was found linking this site to Pu`uala Heiau, its location and construction style make it a potential candidate.

The other research problem focused on what other types of archaeological remains are present at KTA, and how those remains were affected by later land use in the area. To address this problem, a sample survey

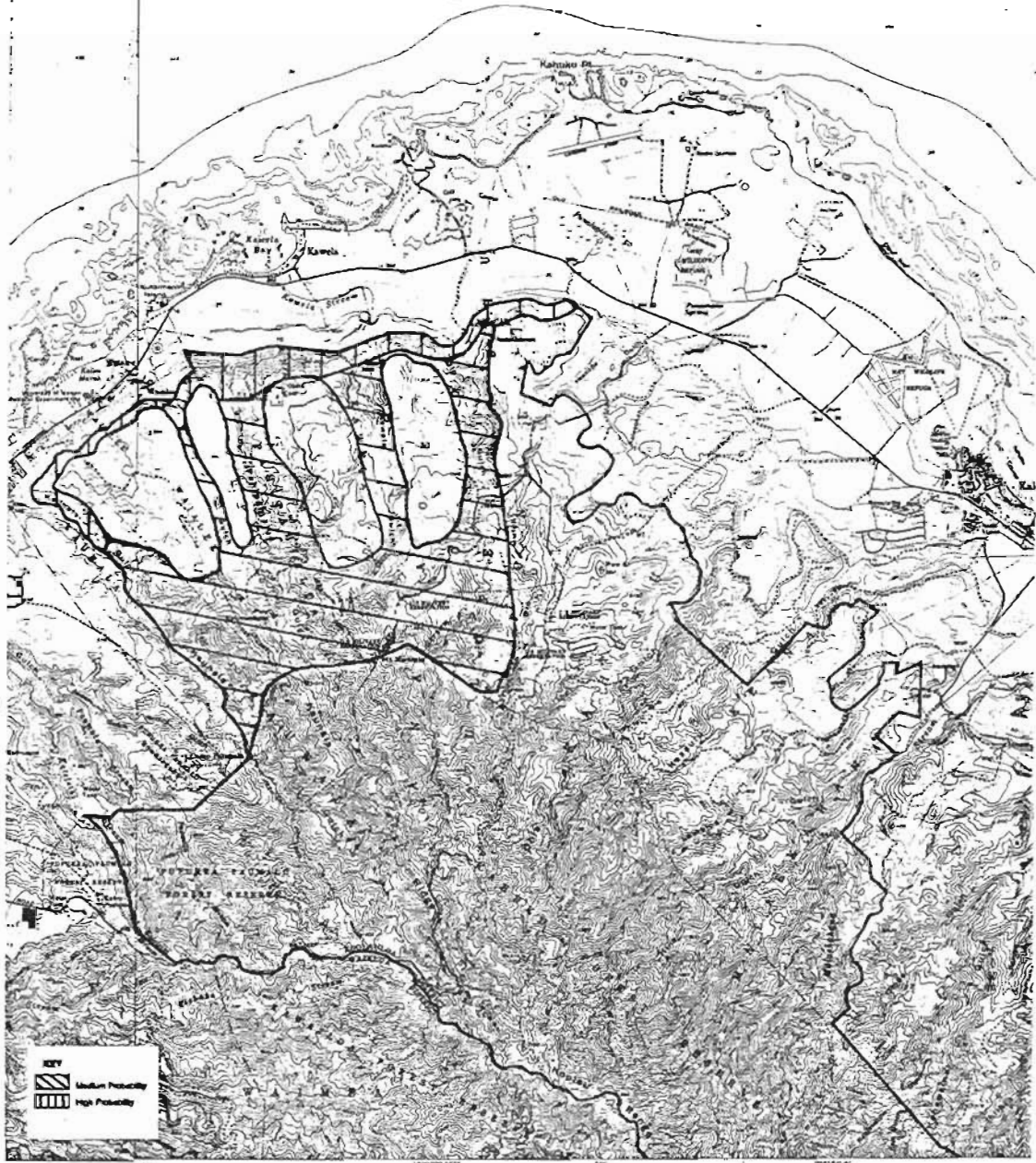
was designed, based on the aerial reconnaissance survey, document research, and the predictive model presented earlier. The survey was designed to sample a variety of environmental variables, including bluff areas; ridge tops; lower and mid-level gulch areas, and rugged interior areas.

SITE PROBABILITY MODEL

It was expected, based on the aerial reconnaissance survey and the background research, that the lower elevations of the ridges and the wider gulches would be seriously impacted by large-scale land alterations (ranching, farming, and military), and that site preservation would be poor. Similarly, it was expected that the narrower gulches and the bluff face would have better site preservation, since these areas were less likely to have been impacted by modern land alterations. It was expected that the rugged interior would have the best site preservation, since this area was least likely to have been affected by modern land alterations, but that the site types present in the area would be least likely to be recognized by a surface survey. This would be the result of the fact that the interior areas were most likely used for gardening and resource collecting, activities that often don't require the construction of stone surface features.

The results of the sample survey support the expectations presented above. The lower elevation ridge tops and the wider gulches at KTA have been impacted to varying degrees by modern land alterations, greatly affecting site preservation in these areas. No sites were found during the current survey, and the potential for intact sites is low, although areas such as gulch sides and side gullies certainly have intact sites. The bluff and narrow gulches have excellent site preservation. Two previously unrecorded habitation sites and a small agricultural *heiau* were recorded in these areas, as well as World War II bunkers and, outside the KTA boundary to the east, several rockshelters. The more inland gulch areas, and the rugged inland area, have good preservation of subsurface cultural deposits, but the majority of sites in the interior areas probably lack surface remains. This makes locating sites in these areas difficult, as surface survey techniques will miss most of these sites.

Based on the survey results and results from similar areas, a model of site location probability was developed for KTA (Figure 23). KTA was divided into three zones: areas of Low, Medium, and High probability to contain sites. These zones are defined below.



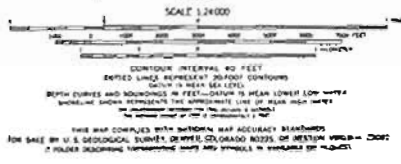
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Topography by stereographic methods from aerial photographs
 dated 1953. First printed 1955. Revised from aerial photographs
 dated 1977. Limited field work in 1971. Map revised 1980.
 Limited hydrographic data compiled from HOLOKAI charts 11101 and
 11102. Hydrographic surveys 1911 and 1933. This information is not reported for navigational
 purposes.

Projected on the 1920 datum and datum. Mean sea level datum
 used. International datum. Datum adjustment 1980. One section. Datum
 adjustment 1980. Vertical datum 1980. One section. Datum
 adjustment 1980. One section. Datum adjustment 1980. One section.
 American Datum 1883 used for projection. One section north and
 the section east is shown by dotted contour lines.

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Low. Low is assigned to areas where surface sites are expected to be rare, and subsurface deposits are expected to be widely spaced across the landscape. This includes two types of areas. The first is low elevation areas that have been subjected to extensive land-altering disturbances during the 19th and 20th centuries, especially sugarcane and pineapple farming and military use. These areas are primarily the broad ridges of Waiale`e, Kawela, Hanakaoe, and Kahuku, and the wide gulches of Kahuku and Keana (Figure 23). The second Low probability area is the rugged interior of KTA, generally above 245 m (800 ft) elevation and roughly corresponding to the Forest Reserve boundary. Although this interior area has not been disturbed by activities such as sugarcane plantations or heavy military training, it is an area of Low probability because it was probably utilized as a gardening and resource exploitation zone prior to the mid-19th century. Such activities would result in few surface structures, but subsurface deposits should be common and well preserved, but widely spaced across the landscape. Areas of Low site probability are shown on Figure 23 without screening; i.e., all areas of KTA that are not Medium or High probability should be considered Low probability.

Medium. This encompasses areas where surface sites and subsurface deposits are expected to be more common and less widely dispersed about the landscape. Narrow gulches, less subjected to extensive plantation agriculture or military training, and the lower elevations between 185 m (600 ft) and 245 m (800 ft) are included in this zone (Figure 23). Sites are expected to be more common in the Medium areas than the Low ones due to less surface disturbance and closer proximity to the populated coastal flatland bordering KTA. Areas of Medium probability are shown on figure 23 with angled cross-hatching.

High. This zone encompasses the bluff slope and edge and the mouths of narrow gullies (Figure 23). These are areas where surface and subsurface cultural features are expected to be common, both because they have been less affected by modern land disturbance and because these areas border the coastal flatland. Archival research indicates the coastal flatland bordering KTA was the zone of primary settlement, and that it once supported a substantial population. Areas of High probability are illustrated on Figure 23 by vertical cross-hatching.

The division of KTA into site probability zones is based on the aerial and sample surveys, combined with the results of the archival research. These zones are presented as general areas; within each zone there may be areas of higher or lower site density. This model is presented as a guide for future work and

management of the cultural resources at KTA, not as definitive statement intended to mitigate the need for future survey. Management recommendations for each of these three probability zones are discussed in the Recommendation section below.

SIGNIFICANCE EVALUATIONS AND RECOMMENDATIONS

The following initial significance evaluations are made utilizing both NRHP and Army criteria. Site significance is summarized on Table 6. Recommendations for future management of the sites are also offered.

The *heiau* (Site 4885) with associated terraces at Pahipahi`ālua Gulch is the most prominent pre-Contact site encountered during the current survey, and is significant under criteria C and D of the NRHP. The site is an excellent example of a small platform *heiau* in a good state of preservation, and it has yielded and has the potential to yield significant data on the prehistory of the area and Hawai`i. The site also has traditional cultural significance to native Hawaiians as a religious site. Under Army evaluation criteria, the site is a category I (major importance) site. This site should be preserved from any future disturbance, and no training should be conducted in the area. If possible, the KTA boundary fence should be moved off of the site, and a management plan should be developed to allow public access to the site for education or ritual purposes.

Sites 4884, 4887, and 4888 are pre-Contact types of sites. Sites 4887 and 4888, a terrace complex and probable *imu*, respectively, are significant under criterion D in that they have and are likely to yield information that is important to the prehistory and history of the survey area and Hawai`i. Under Army evaluation criteria, these are category II sites (importance). Site 4884, the excavated *imu*, is no longer considered significant because the excavation served to collect all the significant information about the site. This is a category IV site (little or no importance) under Army criteria. Sites 4887 and 4888 should be preserved, if possible; if not, then inventory survey and data recovery (if warranted) should be conducted on them. Site 4884 requires no further work.

Site 4883 is a post-Contact period house site, and is significant under criterion D of the NRHP: it has yielded and has the potential to yield information significant to the history and possibly prehistory of the project area (if an earlier component is present). Under Army evaluation criteria, it is a category II site (importance). This site should be preserved, if possible; if not, then inventory survey and data recovery (if warranted) should be conducted on it.

The two bunkers (Sites 4882 and 4886) are associated with World War II, and as such are significant under criterion A of the NRHP: they represent a major event in U.S. history. These are category II sites (importance) under Army evaluation criteria. The octagonal concrete slab (Site 4881) is thought to be associated with military use but, its association with World War II is not certain; it may have been part of the coastal defense system, or it could be related to military training in the area. Unless future archival research produces information indicating the site was part of the World War II coastal defense system, the site should be considered not significant under NRHP criteria and of little or no importance (category III) under Army criteria. The two bunkers should be preserved, if possible, as they are good examples of coastal defense bunkers in the Kahuku area. There are, however, other good examples of coastal defense bunkers on O`ahu, so preservation of these two sites does not need to be a high priority. No further work is required at Site 4881.

The other five sites (Sites 4876 to 4880) recorded during the survey are outside the boundary of KTA, and so are outside of Army jurisdiction. The following initial significance assessments are provided for information only; no management recommendations are offered. All five of the sites are significant under criterion D of the NRHP, in that they have yielded and are likely to yield information important to the prehistory and history of the area.

CONCLUSION

As stated earlier, the project area has been subjected to various topographic alterations and modifications over the years. These included but were not limited to cattle ranching, sugar farming, pineapple farming, and its current use as a training area by the U.S. Army. A number of areas are being used for wind power generation. Currently, Sections of Area A1 and all of Area A3 are publicly utilized on holidays and

weekends. Pūpūkea Loop Trail in Area A3, and a moto-cross course at the *mauka* end of Area A1, are most commonly used. A rusted car, truck parts, and other historic trash litter the west bank of Paumalū Stream, at the west end of the survey area. The lower portion of Area A1 contains empty beer and soda cans as well as recent glass bottles. Most of the other sections surveyed contain military related trash.

Numerous asphalt, gravel paved, and dirt roads traverse through ridges and gulches throughout the project area. Foot trails, jeep trails, and foxholes are common features in the surveyed areas as well. Area A1 contains the most extensive road and trail system observed during the survey; erosion in this part of the installation is very extensive. In addition to the above factors, cattle are still roaming freely in the mid-section of Area C1. The ground cover in this area is near depletion, thereby opening it to erosion.

For the most part, the only sections of the surveyed areas least affected by recent activities are on the slopes along the bluff, and in the upper steeper portions of the gulches in Areas A2, B2, C1, and C2. With the exception of the *imu* found in the upper Ō'io gulch, no other cultural remains were found in these areas. The absence of permanent structures from the upper portions of gulches supports the theory of temporary use of the inland areas for gathering wild resources.

Sites 4876 and 4877 are probably associated with agricultural activities in the area. Of the two sites, Site 4876 is likely a small house site based on its size and architectural form (cf. Cordy 1981, Green 1980, Rosendahl 1972). Site 4887 is more complex, and ascertaining its function is difficult without excavation. It is likely that the site served a ritual purpose, based on its construction style; the upright slabs in the wall are typical of ritual use. The rock mounds in the vicinity are indicative of widely documented clearing piles associated with traditional Hawaiian agricultural practices.

The rockshelter (Site 4878) shows evidence of pre-Contact and post-Contact use. Whether this site is chronologically related to the previously discussed sites remains to be determined. The linear rock mound (Site 4880) is thought to be pre-Contact in origin based on its location and architectural form. This assumption is also based on the discovery of two pre-Contact artifacts (a basalt core and a hammer stone) in the nearby vicinity. A rockshelter (Site 4879) containing timber and other recent cultural remains presented no surface evidence of pre-Contact use, but was not tested. It is likely it was used as a shelter, though, given its location.

Several of the archaeological remains encountered within the project area are related to post-Contact developments. The two concrete bunkers (Sites 4882 and 4886) at the edge of the bluff near the U.S. Army and the U.S. Navy communication sites are related to World War II coastal defense, and the octagonal concrete slab (Site 4881) atop the east ridge of `O`io Gulch may belong to the same period as well. The multi-feature residential site by KTA Access Road (Site 4883) is historic in origin, based on the architecture and artifacts observed, and dates to the early twentieth century.

The unexpected discovery of the *heiau* at Pahipahi`ālua Gulch demonstrates better preservation in the periphery of the survey area, especially along the foothills of the bluff. Most of this area, however, is located outside of the current project. A linear rock mound or facing (Site 4930) on the hill next to the reported location of Pu`uala Heiau may represent the remains of that structure; it is difficult to assess and evaluate this site under its current condition, as the area is badly disturbed by recent development on top of the ridge. Further study could produce data relevant to the significance evaluation of the site.

The small terraces on the east side of Kaunala Gulch (Site 4887) are probably pre-Contact features, but excavation would be necessary to verify this. The *imu* (Site 4884) discovered at upper `O`io Gulch represents a type of site that has been documented in other inland areas. The absence of other features from the area supports the theory that such areas of the *ahupua`a* were not generally used on a permanent basis, but rather were exploited for gardening and wild resource collecting. Since the extent of land use in the uplands of the survey area is generally difficult to ascertain, due to lack surface cultural remains, the discovery of the *imu* demonstrates similar land use patterns documented in other parts of O`ahu (Williams 1992). The depression (Site 4888) in Area A3 is suspected to have served a similar purpose.

The sample survey generally confirmed the expected site distributions and illustrated that the predictive model was useful for locating sites. Based on the results, a model of site location probabilities was developed. To date, only a small portion of KTA has been surveyed for cultural resources, but those limited surveys have shown that the area is rich in archaeological sites and that, except for some areas, site preservation is good to excellent. These sites have the potential to greatly increase our knowledge of the history and prehistory of the northern Ko`olau Loa area and of Hawai`i. The models of settlement pattern, site prediction, and site location presented in this study should serve as a baseline to guide future archaeological research at KTA.

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