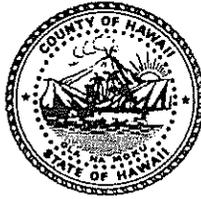


William P. Kenoi
Mayor



Daryn S. Arai
Acting Director

County of Hawaii

PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720
Phone (808) 961-8288 • Fax (808) 961-8742

December 18, 2008

Katherine Kealoha, Director
Office of Environmental Quality Control (OEQC)
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Kealoha:

SUBJECT: Final Environmental Assessment (FEA) and
Finding of No Significant Impact (FONSI) for the
Lokahi Ka'u Affordable Apartments
TMK: (3) 7-3-010:003, O'oma 1st, North Kona, Hawai'i

The County of Hawaii Planning Department has reviewed the comments received during the 30-day public comment period which began on November 8, 2008. This agency has determined that this project will not have significant environmental effects and has issued a Finding of No Significant Impact (FONSI). Please publish this notice in the December 23, 2008 OEQC Environmental Notice.

The OEQC Publication Form, response letters to public comments, one copy of the publication form in pdf format, two (2) copies of the Final EA, and the project summary is included with this transmittal. Also included is a CD containing a .pdf of the Final EA and MSWord file for the project summary.

We have enclosed a completed OEQC Publication Form, and one (1) PDF copy and two (2) hard copies of the project DEA. Please call Daryn Arai of the Planning Department at (808) 961-8828 Ext. 204 or Ron Terry at (808) 969-7090 should there be any questions.

Sincerely,

Handwritten signature of Daryn S. Arai.

DARYN S. ARAI
Acting Planning Director

Katherine Kealoha, Director
Office of Environmental Quality Control (OEQC)
Page 2
December 18, 2008

DSA:
P:\wpwin60\DSA\2008\LLokahi-KaulFEAFONSI.doc
Attachments

xc: Ron Terry, Geometrician Associates, P.O. Box 396, Hilo HI 96721
Ho'olehua Housing LP, 116 Hekili Street, Kailua HI 96734

FINAL ENVIRONMENTAL ASSESSMENT

LOKAHI KA‘U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

January 2009

Prepared for:
County of Hawai‘i
Planning Department
101 Pauahi Street, Suite 3
Hilo HI 96720

FINAL ENVIRONMENTAL ASSESSMENT
LOKAHI KA'U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai'i Island, State of Hawai'i

January 2009

APPLICANT:

Ho'olehua Housing LP
116 Hekili Street
Kailua HI 96734

APPROVING AGENCY:

County of Hawai'i
Planning Department
101 Pauahi Street, Suite 3
Hilo HI 96720

CONSULTANT:

Geometrician Associates LLC
PO Box 396
Hilo HI 96721

CLASS OF ACTION:

Use of State Funds
Use of County Land

This document is prepared pursuant to:

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

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APPENDIX 2	Floral and Faunal Study
APPENDIX 3	Archaeological Mitigation Plan
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APPENDIX 5	Traffic Impact Assessment Report

SUMMARY OF THE PROPOSED ACTION, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Ho‘olehua Housing LP is working to develop the 306-unit Lokahi Ka‘u Affordable Apartments on undeveloped property on Kakahiaka Street, a County road in the Kalaoa area of North Kona. The project is being financed through various sources, including the sale of affordable housing credits, federal and State tax credit proceeds, a \$9.75 million loan from the Rental Housing Trust Fund by the State of Hawai‘i, Hawai‘i Housing Finance and Development Corporation (HHFDC), and \$33,500,000 of bond proceeds issued by HHFDC.

The property, which has been previously impacted by various historic and prehistoric uses, including grazing, does not contain any sensitive biological resources. Archaeological sites have been subject to data recovery, and one will be preserved in accordance with a mitigation plan approved by the State Historic Preservation Division. In the unlikely event that additional archaeological resources or human remains are encountered during landclearing activities, work in the immediate area of the discovery will be halted.

The proposed action is completely conformant with zoning and issues of public facilities, services and utilities were evaluated and addressed as part of the change of zone process. Given adherence to conditions related to landscape buffers and coordination with agencies during the Plan Approval process and construction, no adverse impacts are foreseen.

**PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED
AND ENVIRONMENTAL ASSESSMENT PROCESS**

1.1 Project Description, Location and Property Ownership

Ho‘olehua Housing LP is developing the 306-unit Lokahi Ka‘u Affordable Apartments on undeveloped property on Kakahiaka Street, a County road in the Kalaoa area of North Kona (Figures 1-4). The project is being financed through various funding sources, including the sale of affordable housing credits and federal and State tax credit proceeds, as well as \$9.75 million loan from the Rental Housing Trust Fund, administered by the State of Hawai‘i, Hawai‘i Housing Finance and Development Corporation (HHFDC), and \$33,500,000 of bond proceeds issued by HHFDC. HHFDC is the primary agency charged with overseeing affordable housing finance and development in Hawai‘i. The agency, led by a nine-member board, works with the State’s residents, housing developers and financiers. The Rental Housing Trust Fund provides “Equity Gap” low-interest loans or grants to qualified owners and developers constructing affordable housing units. Funds may be used to provide a loan or a grant for the development, pre-development, construction, acquisition, preservation, and substantial rehabilitation of rental housing units. Eligible applicants include qualified nonprofit and for-profit corporations (such as the applicants), limited liability companies, partnerships, and government agencies.

As depicted in the Site Plan in Figure 4, the Lokahi Ka‘u Affordable Apartments will feature a total of 18 residential buildings, each a three-story, garden-style walk-up building with exterior stairwells. Three buildings will contain 30 studio apartments of 384 square feet; six buildings will have 18 one-bedroom apartments of 640 square feet; and nine buildings will have 12 two-bedroom apartments of 936 square feet. The complex will also contain 2,500 square feet of common area for a total residential area of 207,268 square feet. Parking will consist of 460 stalls, including 25 that will be handicap accessible. Landscaping buffers would be provided on residential property margins and in other locations of the property to provide an attractive appearance and reduce scenic impacts to neighboring residences.

The Lokahi Ka‘u Affordable Apartments would be developed in a rapidly growing area of Kona called Kalaoa, near a number of other market and affordable housing developments. The project is fully in keeping with the character of this neighborhood, which includes the 1970s-era Kona Palisades subdivision centered on Kaiminani Drive, the recent Lokahi Makai subdivision near the intersection of Kakahiaka Street and Kaiminani Drive, and the new Seascape condominium project across Kakahiaka Street from Lokahi Ka‘u. Two other projects, one a single-family home development and another planned as workforce housing with mixture of single-family homes and apartments, are currently in planning to the north on Kakahiaka Street. Although once part of TMK (3)-7-3-010:003, the same 50-acre parcel from which some of the other development properties were subdivided, the Lokahi Ka‘u Affordable Apartments is a standalone project. The property is owned by Ho‘olehua Housing LP and is being developed with the

**Figure 1
Location Map**

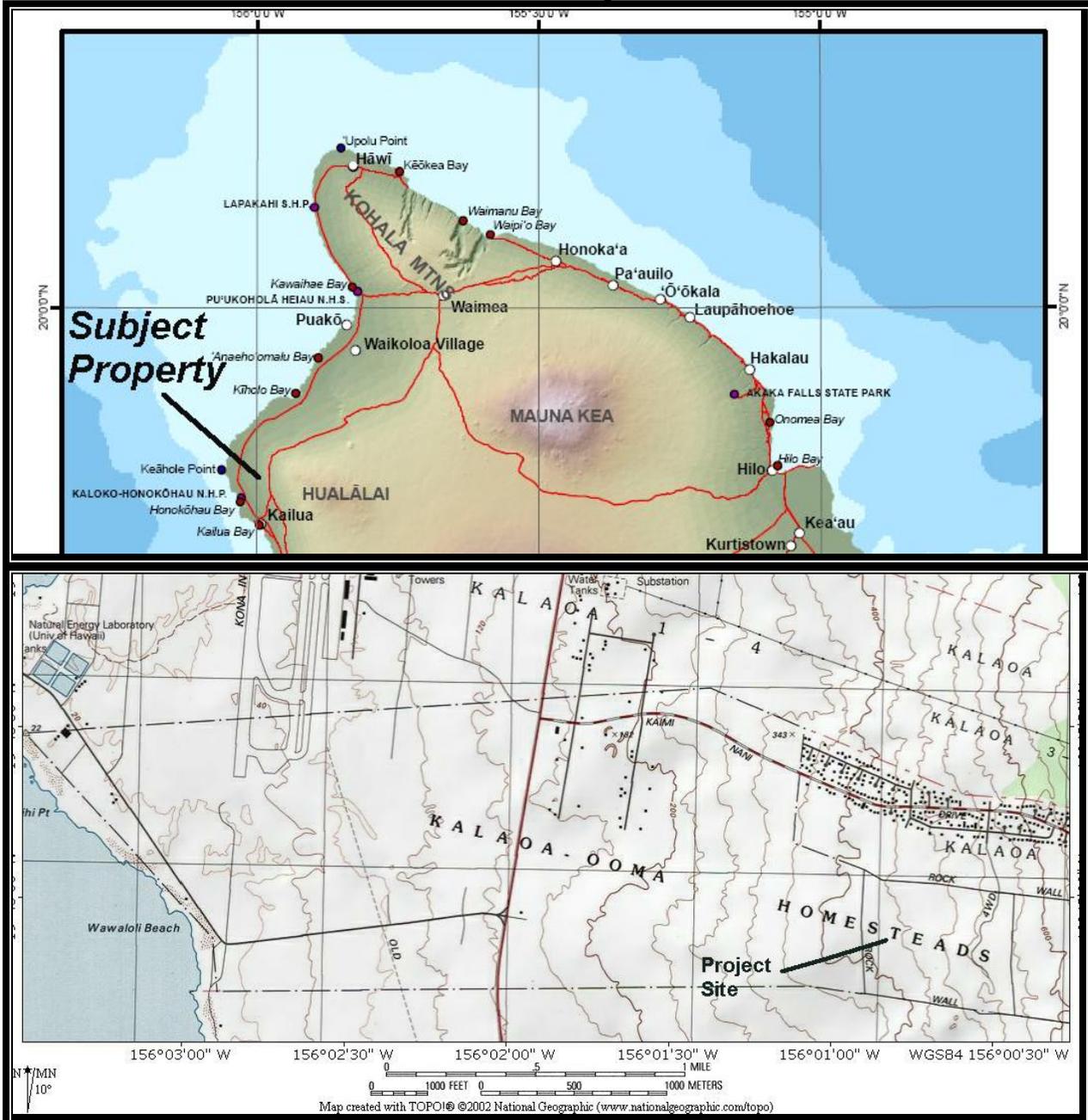
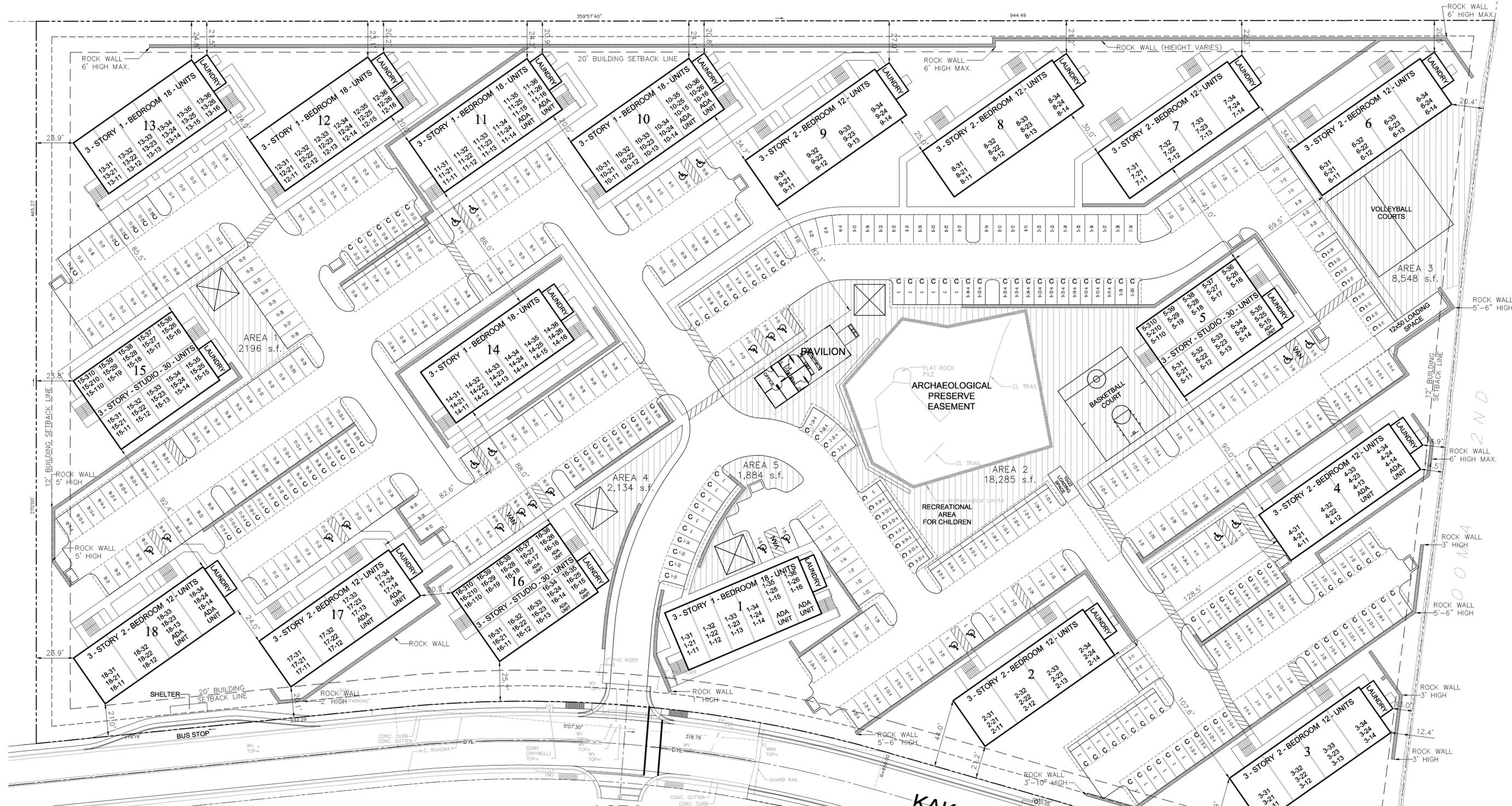


Figure 3
Project Site Photos



View of Property Upslope ▲ ▼ View Across Street Towards Sea





Habitation Site
(SIHP Site 23417)
O'oma 1st Ahupua'a

Native Hawaiians extracted resources from this inland area for both tool manufacture (stone) and subsistence (cultivated and collected species) purposes. Habitation sites such as this one were used on a temporary basis while harvesting or gathering resources. Tree stacked stone features at this site likely served as house foundations, and flat smooth pahoehoe slabs were placed in the rough 'a'a lava as a trail to make walking to and from and within the site easier.

CAUTIONARY SIGNS FOR ARCH SITE

Archaeological Site

Please do not walk within or remove rocks from this area. Damaging this site is punishable under State Law Chapter 6E-11, Hawaii Revised Statutes

--- = ARCHAEOLOGICAL SITE BUFFER

SITE PLAN
SCALE: 1" = 30'

PARKING

PARKING REQUIRED	1.50 SPACES PER UNIT (1.50 x 306) 459 SPACES
PARKING PROVIDED	
STANDARD SPACES (18x8.5)	291 SPACES
COMPACT SPACES (16x7.5)	144 SPACES
HANDICAP SPACES (3 VAN)	25 SPACES
TOTAL	460 SPACES

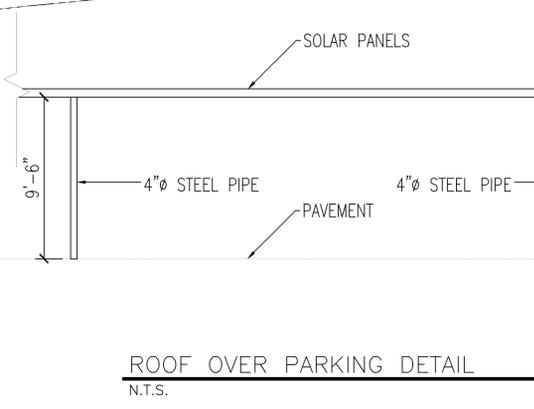
BUILDINGS

1 BEDROOMS	108 UNITS
2 BEDROOMS	108 UNITS
STUDIOS	90 UNITS
TOTAL	306 UNITS

REC AREAS:

AREA 1 =	2,196 s.f.
AREA 2 =	18,285 s.f.
AREA 3 =	8,548 s.f.
AREA 4 =	2,134 s.f.
AREA 5 =	1,884 s.f.
TOTAL =	33,047 s.f.

- LEGEND**
- [Symbol] = COVERED PARKING
 - [Symbol] = RECREATIONAL AREAS = 34,460 S.F.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ANY CHANGE REQUIRES THE WRITTEN APPROVAL OF THIS ARCHITECT.

REVISIONS

REVISIONS	BY
05/01/08	DET

assistance of Allied Pacific Development, entities separate from owners or developers of nearby properties. No aspect of the project depends on pending outcomes or conditions of any other land use approval or development, and no other property's approvals or development is in any way dependent on the Lokahi Ka'u Affordable Apartments.

The primary objective of the Lokahi Ka'u Affordable Apartments is to meet the high demand for affordable housing on the west side of the island of Hawai'i. In 2007, the demand for affordable housing within the income- and size-qualified rental households targeted by the project totaled 2,585 households. There is a growing demand in the immediate market area of Kailua-Kona, where 154 renter households are added annually. This growing demand has resulted in a significant affordable housing gap, since no rental projects have opened in the area in the past three years. The need for affordable housing is further evidenced by the fact that there is an extensive waitlist for low-income housing in Hawai'i County. The County of Hawai'i Office of Housing and Community Development's waitlist for Section 8 vouchers is now closed with 2,500 applicants, and the Hawai'i Public Housing Authority's waitlist at a comparable public housing project includes 500 applicants.

The 306 affordable studio, one-bedroom and two-bedroom units will help meet the affordable rental housing needs of the hospitality, service, retail and blue-collar employees on the island. Hawai'i County's regional economy is based on government, leisure and hospitality, and retail trade. Significantly, of the top ten largest resorts in Hawai'i County, five are in Kailua-Kona and all ten are within 25 miles of the project. The location will give individuals employed in the aforementioned service industries the opportunity to reside in newly-constructed, affordable apartments close to work. It is worth noting the large number of developments in construction or planning within five miles of the project (see Section 3.4 for discussion), at Kohanaiki, Honokōhau, Kealakehe and Kaloko, and the proposed Kona Kai Ola Resort, which by itself may add 700 hotel rooms and 1,803 time-share units to the area.

In addition to providing shelter, the apartments will have amenities that are superior to comparable income-restricted and market-rate rental properties. These will include a volleyball court, management office, basketball court, laundry facilities, community room, picnic areas, game/exercise pavilions, and children's playground. Thus, the project will help serve residents' social and recreational needs, in addition to providing shelter.

The Proposed Action will meet not only current affordable housing needs, but also needs well into the future, because of the 55-year affordability term commitment.

1.2 Environmental Assessment Process

Because development of an apartment project is not an exempt action, and the Proposed Action involves connection to a County roadway and the use of State funds, an Environmental Assessment (EA) is required. The County of Hawai‘i, Planning Department, which will be processing Plan Approval for the Lokahi Ka‘u Affordable Apartments, has assumed the role of approving agency in consultation with HHFDC.

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur; Part 5 lists each criterion and presents the preliminary findings for each made by the County of Hawai‘i Planning Department, the approving agency. If, after considering comments to the Draft EA, the approving agency concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the Proposed Action, then an Environmental Impact Statement (EIS) will be prepared.

1.3 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of the environmental assessment:

State:

Director, Department of Land and Natural Resources (DLNR)
State Historic Preservation Division, DLNR
Na Ala Hele Program, DLNR
Office of Hawaiian Affairs

County:

Department of Public Works
Department of Environmental Management
Police Department
Fire Department

Private:

Kona Outdoor Circle
Kona Hawaiian Civic Club
Sierra Club
Neighboring property owners

Copies of communications received during early consultation are contained in Appendix 1a.

Appendix 1b contains written comments on the Draft EA and the responses to these comments. Various places in the EA have been modified to reflect input received in the comment letters; additional or modified non-procedural text is denoted by double underlines, as in this paragraph.

PART 2: ALTERNATIVES

2.1 Action Alternatives

The action under consideration is development of an affordable housing apartment complex, which will be called the *Proposed Action* in this document. The site was selected for an affordable apartment project because of its association with market rate housing, the availability of land, and the ideal location with respect to housing demand and employment opportunities. The applicants for the project are not aware of any alternative sites that could readily substitute for this particular type of project, and no alternative sites have been studied.

2.2 No Action

Under the No Action Alternative, the Lokahi Ka‘u Affordable Apartments would not be built. The significant contribution to the affordable rental housing inventory would not occur, and several hundred households in West Hawai‘i might continue to go without quality affordable housing. The property might eventually find use for market housing or other urban uses, in which case most development impacts of the Proposed Action would occur anyway, or it might remain vacant, avoiding any impacts of urbanization.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The property where the apartment project will be constructed is referred to throughout this EA as the *project site*. The term *project area* is used to describe the general environs in this part of Kona.

The project site is a 10.001-acre parcel located off Kakahiaka Street in the Kalaoa area of Kailua-Kona, at an elevation of approximately 430 feet above sea level. The project site is predominately weathered pahoehoe lava, with the southern third consisting of a ridge of ‘a‘a lava. The vegetation is dominated by fountain grass with interspersed koa haole and other shrubs.

Adjacent land use consists of the Kona Palisades and Lokahi Makai subdivisions to the north and west and vacant land to the south and east. The Kona International Airport at Keahole is located approximately two miles to the west.

In order to reduce potential confusion, it should be noted that many of the resource surveys and impact assessments in the appendices, from which the information in this chapter is drawn, cover TMK 7-3-010:003 when it consisted of 50 acres, prior to its subdivision into four parcels and a road lot. The Lokahi Ka‘u Affordable Apartments would be built on a 10.001-acre portion of that former property that retained the original TMK number. Therefore, some of the statements made in the reports apply to parts of the property not currently under review. Where practical, resource assessments have been separated and clarified in the discussions below.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The climate in the area is mild and arid, with an average annual rainfall of about 30 inches (UH Hilo-Geography 1998:57). Geologically, the project site is located on the flanks of Hualālai Volcano, and the surface consists of weathered basalt lava flows from 3,000 to 5,000 years before the present (Wolfe and Morris 1996). The project site soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as pahoehoe lava (rLW) in the northern portion and ‘a‘a lava (rLV) in the southern part. Pahoehoe lava is found on slopes up to 40 percent, while ‘a‘a lava can be found on slopes up to 70 percent. Both are typically found up to 60 inches thick and are of the VIIIs capability subclass, which has limitations that preclude its use for commercial agriculture and restrict its use to recreation, wildlife, water supply or for esthetic purposes (U.S. Soil Conservation Service 1973).

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The project site is rated Lava Flow Hazard Zone 4 on a scale of ascending risk 9 to 1. The Zone 4 area consists of all of Hualālai, a dormant volcano with a frequency of eruptions lower than Kilauea and Mauna Loa. Less than 15 percent of this hazard zone area has been covered in the past 750 years, with roughly 5 percent of the area covered since 1800.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (*Uniform Building Code, 1997 Edition*, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006, demonstrated. The project site does not appear to be subject to subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In general, geologic conditions impose no constraints on the Proposed Action, and the Proposed Action is not imprudent to construct. Appropriate seismic standards would be followed during any building construction, per building codes.

3.1.2 Drainage, Water Features and Water Quality

Existing Environment

The project area has no perennial surface water bodies. No known areas of local (non-stream related) flooding are present in the project area. The Federal Emergency Management Agency’s Flood Insurance Rate Maps show that the project site is in Flood Zone X, outside of the 500-year flood plain.

Impacts and Mitigation Measures

The change of zone ordinances also required that the applicant construct a wastewater treatment plant meeting the specifications and requirements of the State Department of Health. To conform with this requirement, the applicant has acquired joint ownership of a private sewage treatment plant on adjacent land (TMK 7-3-009:005) that will be upgraded to accommodate the project. It is also important to note that many new residents of affordable housing projects are residents doubled up in existing housing in the area. Considering that many existing homes in Kona have rudimentary wastewater treatment, if any, relocating these residents to a development where wastewater is treated adequately may actually provide a net benefit in terms of total treated regional wastewater.

Because the property is not within a FIRM flood zone and no sensitive water resources are located nearby, additional risks for flooding or impacts to water quality associated with the Proposed Action are negligible. The apartment development would be required to follow County regulations and policies related to drainage, which require the difference between pre-

development and post-development runoff to be contained onsite, thereby limiting impacts. The change of zone ordinances requires the preparation by a licensed civil engineer of a drainage study that meets with the approval of the Department of Public Works.

Because the project will disturb more than one acre of soil, a National Pollutant Discharge Elimination System (NPDES) permit must be obtained by the contractor before the project commences. This permit requires the completion of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the project. These BMPs may include, but will not be limited to, the following:

- Minimization of soil loss and erosion by revegetation and stabilization of slopes and disturbed areas of soil, possibly using hydromulch, geotextiles, or binding substances, as soon as possible after working;
- Minimization of sediment loss by emplacement of structural controls possibly including silt fences, gravel bags, sediment ponds, check dams, and other barriers in order to retard and prevent the loss of sediment from the site;
- Minimizing disturbance of soil during periods of heavy rain;
- Phasing of the project in order to disturb a minimum necessary area of soil at a particular time;
- Application of protective covers to soil and material stockpiles;
- Construction and use of a stabilized construction vehicle entrance, with designated vehicle wash area that discharges to a sediment pond;
- Washing of vehicles in the designated wash area before they egress the project site;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;
- Routine maintenance of BMPs by adequately trained personnel; and
- Clean up of significant leaks or spills and disposal at an approved site, if they occur.

In a letter of December 4, 2008 (see Appendix 1b), the Kaloko Honokohau National Historical Park expressed concerns about impacts to the water quality in its ponds because of the cumulative impacts of water withdrawals in North Kona, which theoretically have the possibility of reducing the salinity of the ponds (with possible negative, but also possible positive, effects on native biota) and the addition of nutrients and chemical pollutants (see Section 3.4 for primary discussion of cumulative impacts). Although the potential for the Lokahi Ka'u Affordable Apartments project to contribute to such degradation is highly speculative, as the project is located over two miles to the north, out of the watershed above the National Park, and will retain storm water onsite and treat wastewater, the following elements, which go far beyond the legal requirements, have been added to further minimize pollution.

- *Storm and Surface Water Runoff.* The Lokahi Ka'u Affordable Apartments will build and maintain permanent storm and surface water runoff best management practices consisting of grassed swales in various surfaces, including landscaped areas and surfaces around drywells and detention basins, if appropriate. These will assist in treating the first-flush runoff volume to remove pollutants from storm and surface water runoff. Drainage injection wells or subsurface drainage structures will be designed with a debris catch basin to allow the detention and periodic removal of rubbish and sediment deposited by runoff. Storm water runoff shall first enter the debris catch basin before flowing into the drainage well. The debris catch basin's volume will be designed using current industry and engineering standards. The debris catch basin will be periodically inspected and cleaned accordingly.
- *Signage.* The complex will include signage for all drainage injection wells with warnings such as the following: "DUMP NO WASTES. DUMPING IS ILLEGAL AND MAY BE REPORTED TO 974-4000, ext. 64258." and "GOES TO GROUNDWATER AND OCEAN. HELP PROTECT HAWAI'I'S ENVIRONMENT." Signage will be stand-up signs or riveted placards, or be painted on a paved surface next to the drainage well's inlet. Signage will be situated so that it will not obscure scenic views, contribute to visual blight, or obstruct an accessible route.
- *Pollution Prevention.* The facility will develop a Site Manager's Pollution Prevention Plan that addresses environmental stewardship and the non-point sources of water pollution that can be generated in residential areas, and provides best management practices for pollution prevention. The Pollution Prevention Plan will include policies on water conservation, lot and landscape runoff, erosion control, use of fertilizers, use of pesticides, environmentally safe automobile maintenance, and management of household chemicals. The Plan will include information on the National Park, and the nationally significant cultural and natural resources within the National Park.

3.1.3 Flora, Fauna and Ecosystems

Existing Environment

A biological survey was conducted in July 2006 by Rana Productions. The survey is attached as Appendix 2 and summarized here. It should be noted that the biological survey included the entire 50-acre property out of which the subject property was subdivided. Therefore, not all vegetation types or species mentioned in the report or this summary were necessarily found on the subject property.

Given the rainfall, geologic substrate and existing vegetation, the original vegetation of the region was likely a Lowland Dry Grassland community (Gagne and Cuddihy 1990). As is typical of the region, the vegetation now found in the general project area is dominated by fountain grass (*Pennisetum setaceum*) and koa haole (*Leucaena leucocephala*).

The vegetation on the project site is typical of the general area and is also dominated by introduced species. In addition to the dominant fountain grass, the area contains numerous shrub species including koa haole, Christmas berry (*Schinus terebinthifolius*), klu (*Acacia farnesiana*), lantana (*Lantana camara*), indigo (*Indigofera suffruticosa*) and the Polynesian-introduced noni (*Morinda citrifolia*).

The survey found 39 plant species on the 50-acre site, with about a quarter of those species native to Hawai'i. The two endemic species are maiapilo (*Capparis sandwichiana*) and lama (*Diospyros sandwicensis*). Indigenous species found on the site include koali 'awa (*Ipomoea indica*), 'ilima (*Sida fallax*), huehue (*Cocculus orbiculatus*), naio (*Myoporum sandwicense*), alahe'e (*Psydrax odorata*), 'a'ali'i (*Dodonea viscosa*), 'uhaloa (*Waltheria indica*) and pili grass (*Heteropogon contortus*).

The northern half of the property, the portion closest to the Kona Palisades subdivision, shows evidence of fire in the past. Within this portion there are bulldozed areas with little or no vegetation with the exception of early-emerging species typical of weedy areas of North Kona, including pigweed (*Portulaca pilosa*), 'uhaloa, hairy spurge (*Chamaesyce hirta*), partridge pea (*Chamaecrista nictitans*), tomato (*Lycopersicon esculentum*), African tulip (*Spathodea campanulata*), fuzzy rattlepod (*Crotalaria incana*) and the alien grasses Natal redtop (*Rhynchelytrum repens*) and swollen fingergrass (*Chloris barbata*).

No listed, candidate or proposed endangered plant species (USFWS 2008) were found on the project site. However, one of those species, maiapilo, is relatively rare in its overall range, although commonly found in vacant land in many areas of Kona. In terms of conservation value, however, no botanical resources requiring special protection were deemed to be present.

Nine bird species, all alien to Hawai‘i, were recorded on the project site, with Japanese White-eye (*Zosterops japonicus*) being the most prevalent. While the Hawaiian Hawk (*Buteo solitarius*) may occasionally be visible from the subject parcel, none were observed during the biological survey, and there are no trees that could provide nesting opportunities.

Although not detected during this survey, it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), or Ua‘u, and the threatened Newell’s Shearwater (*Puffinus auricularis newelli*), or ‘A‘o, overfly the project area between the months of May and November. Both species were formerly common on the island of Hawai‘i. The Hawaiian Petrel is a pelagic seabird that reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle between Mauna Loa and Mauna Kea, as well as at the mid- to high elevations of Hualālai. Within recent historic times it has been reduced to relict breeding colonies located at high elevations on Mauna Loa and, possibly Hualālai. Newell’s Shearwaters breed on Kaua‘i, Hawai‘i and Moloka‘i in extremely small numbers. Newell’s Shearwater populations have dropped precipitously since the 1880s. This pelagic species nests high in the mountains in burrows excavated under thick vegetation, especially uluhe fern. There is no suitable nesting habitat within the project area for these birds.

Biologists believe that the leading cause of death for both these species in Hawai‘i is predation by alien mammals at the nesting colonies, followed by collision with man-made structures. Exterior lighting disorients these night-flying seabirds, especially fledglings, as they make their way from land to sea during the summer and fall. When disoriented, seabirds often collide with manmade structures and, if not killed outright, the dazed or injured birds are easy targets for feral mammals.

A number of mammals are present on or near the property, including dogs (*Canis f. familiaris*), Indian mongooses (*Herpestes a. auropunctatus*), cats (*Felis catus*) and goats (*Capra h. hircus*). All are alien and deleterious to native ecosystems. The endemic Hawaiian hoary bat (*Lasiurus cinereus semotus*), often seen in the project area and in many other parts of the island of Hawai‘i, was not detected during the survey, which included night survey with an electronic bat detector. The lack of detection in a one-night survey does not necessarily indicate absence, and this wide-ranging endangered species may use resources within the project site and adjacent areas.

Impacts and Mitigation Measures

Although native plants are present, as they are in most locations in Kona, the lack of intact native ecosystems or threatened or endangered plant species means that no adverse impacts to botanical resources would occur as a result of the construction of the apartment project. Very few native animals are present. In order to reduce the threat for downing endangered Hawaiian Petrels and threatened Newell’s Shearwaters after they become disoriented by external lighting, any such lighting should be shielded in conformance with the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 9, Article 14), which requires shielding of exterior lights so as to lower the ambient glare.

3.1.4 Air Quality, Noise, and Scenic Resources

Environmental Setting

Human-derived air pollutants in West Hawai‘i are minor, and air pollution is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that persistently blankets North and South Kona.

Noise on the project site is low to moderate and is derived from several sources, mainly residential activities. Road noise is minor, as the project site lies about half a mile from Kaiminani Drive. Another occasional source is the Kona International Airport at Keahole located about two miles to the west. The project site is not in or near a flight path, however. Construction in the area is a temporary source of noise.

The project area does not contain any sites that are considered significant for their scenic character in the Hawai‘i County General Plan. Upslope views are impressive and include Hualālai volcano; downslope views include glimpses of the ocean in the background (see Figure 3).

Impacts and Mitigation Measures

The Proposed Action would not measurably affect air quality, noise levels, or scenic sites recognized in the Hawai‘i County General Plan. The apartments would not be subject to adverse air quality, noise or unsightly conditions. Landscaping will be installed throughout the property to improve the scenic character and provide buffers with adjacent uses.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

Environmental Setting, Impacts and Mitigation Measures

A Phase I Environmental Site Assessment (ESA) was performed for the project site by AMEC Earth & Environmental Inc. (AMEC) in November 2007. The document is available for inspection upon request from Ho‘olehua Housing LP. A Phase I ESA aims to identify *recognized environmental conditions* that exist on the project site and existing *recognized environmental conditions* in the project area that have the potential to impact the subject property. The term *recognized environmental conditions* means the presence or likely presence of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property.

Because there is no evidence that the subject property has been previously used or developed, there likely has never been any use or storage of regulated or hazardous chemicals onsite. In

summary, based on the AMEC Phase I ESA, there do not appear to be any *recognized environmental conditions* in connection with the property and no source of concern to the public regarding such conditions should the property be developed. While AMEC found no recognized environmental conditions as recognized by the American Society for Testing and Materials (ASTM) on the subject property, the Phase 1 ESA listed two non-ASTM conditions: a small pile of construction debris on the north side of the project site and a nearby area of oil-stained earth. AMEC recommended that both be removed and properly disposed. It will be removed during construction.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

The project would affect and benefit the district of North Kona and more specifically the town of Kailua-Kona. Between 1970 and 2006, the County's population more than doubled, from 63,468 to 171,191 in 2006 (Hawai'i State Data Book and U.S. Census of Population 2000). The population of Hawai'i County, which is leading the state in percentage growth in the 21st century, is expected to expand by another 100,000+ residents by 2035 (DBEDT 2035 Series 2008). In Kalaoa, the area closest to the project area, the population grew by more than 51 percent in the decade ending in 2000 alone, from 4,490 to 6,794 (Hawai'i State Data Book).

Hawai'i's economy, particularly that of West Hawai'i, which includes the districts of Kona and Kohala, is based primarily on tourism which recently began experiencing a downturn, partially as a result of higher fuel and energy costs and a national economic slowdown. Tourism arrivals in August 2008 were down more than 17 percent from a year earlier (*Honolulu Advertiser*, Sept. 27, 2008). Earlier in the year, the state Department of Business, Economic Development & Tourism predicted a moderate growth in the economy in 2008 and 2009, although at a lower rate. DBEDT predicted that visitor arrivals would decrease in 2008 but stabilize in 2009 (DBEDT 2008). From 1990-2006, Hawai'i County saw the highest growth in the state in daily visitor census with a 67.8 percent increase, nearly twice that of Maui which was second at 34.5 percent. It was also the only county in the state to see a jump in international arrivals, due mainly to an increase in direct flights from Japan (DBEDT 2007). Prior to the recent downturn, the economy and population growth had also buoyed a vibrant construction industry and other inter-related service industries in Hawai'i County, which has seen the value of residential building permits far outstrip those of any other county in the state, growing from \$232 million in 2000 to \$714 million in 2006.

Much of that new residential construction has been out of the reach financially for many Hawai'i County residents. As a result, affordable housing is in short supply in Hawai'i County. As discussed in Section 1.1., 154 renter households are added annually immediate market area of Kailua-Kona. This growing demand has resulted in a significant affordable housing gap, since

no rental projects have opened in the area in the past three years. The need for affordable housing is further evidenced by the fact that there is an extensive waitlist for low-income housing in Hawai'i County. The County of Hawai'i Office of Housing and Community Development's waitlist for Section 8 vouchers is now closed with 2,500 applicants, and the Hawai'i Public Housing Authority's waitlist at a comparable public housing project includes 500 applicants.

Table 1 provides information on the socioeconomic characteristics of North Kona along with those of Hawai'i County as a whole and the North Kona District for comparison, from the United States 2000 Census of Population.

Impacts

The Proposed Action would facilitate development of the property in conformance with its designated multiple-family residential zoning and provide some level of public benefit through the provision of rental residential facilities for low-income families while providing jobs and tax revenues, in keeping with State and County plans.

Ninety-five percent of the project's affordable housing rentals would be made available to families making 60 percent or less of the median family income, and five percent would be available for those making 30 percent or less. According to the National Low Income Housing Coalition, the "fair market rent" for a two-bedroom apartment in Hawai'i County is \$998. However, the estimated mean wage for a renter in Hawai'i County is \$10.80 per hour. Since the generally accepted definition of affordability is a household should not pay more than 30 percent of its income on housing, that means that the household must include 1.8 members working 40 hours per week to afford the rental, or a single worker would have to work 71 hours per week to pay the rent (<http://www.nlihc.org/oor/oor2008/data.cfm?getcounty=on&county=539&state=HI>).

Lokahi Ka'u Affordable Apartments will increase the integration of income levels in the immediate community area because residents of varying income levels will live in close proximity to one another in both single-family homes and condominium units. The project is situated in a neighborhood with a mix of market rate housing, workforce housing and affordable housing. The immediate adjacent community includes 108 market-rate existing condominium units; planned units in the community include 80 affordable condominium units, 74 affordable single-family homes and 40 market-rate single-family homes. The close proximity of the single-family homes and condominiums will give area residents both formal and informal opportunities to develop relationships with other community members, thereby increasing the integration of the population. Project residents cannot and will not isolate themselves from the community because the only access to the project from Queen Ka'ahumanu Highway is through the single-family subdivision.

Table 1
Selected Socioeconomic Characteristics

Characteristic	Hawai'i County	North Kona	Characteristic	Hawai'i County	North Kona
Total Population	148,677	28,543	21 to 64 Years, Disabled (%)	19.2	17.4
Median Age	38.6	39.4	Employed and Disabled, 21 to 64 Years, (%)	51.8	64.1
Older Than 65 Years (%)	13.5	11.8	65 Years or Older, Disabled (%)	40.3	38.1
Race (%)			Employment in:		
White	31.5	47.1	Management and professional	30.2	26.6
Asian	26.7	16.3	Service	22.2	24.3
Hawaiian	9.7	8.9	Sales and offices	25.1	27.8
Other Pacific Islander	1.5	1.8	Construction	9.9	10.4
Two or More Races	28.4	23.5	Farming, Fishing and Forestry	3.8	2.2
Hispanic (Any Race)	9.5	7.9	Production and Transportation	8.9	8.8
Family Households (%)	69.6	68.6	Families Below Poverty Line (%)	11.0	5.6
Households with Female Householder, no Husband, With Children (%)	7.7	6.7	Households with Female Householder, no Husband, With Children, Below Poverty Line (%)	28.1	22.0
Householder Lives Alone (%)	23.1	22.2	Individuals Below Poverty Line (%)	15.7	9.7
Average Household Size	2.75	2.70	65 and Over Below Poverty Line	7.2	5.3
Average Family Size	3.24	3.13	Median Household Income (\$)	39,805	47,610
Over 25 Years Old With High School Diploma (%)	84.6	87.7	Housing Owner-Occupied (%)	64.5	58.5
Married Now (%)	52.0	53.9	Housing Rented (%)	35.5	41.5
Widowed (%)	6.3	4.9	Housing Vacant (%)	15.5	19.7
Divorced Now (%)	10.7	11.4	Median Home Value, 1999 (\$)	153,700	233,900
Veterans (%)	14.5	14.8	Median Rent, 1999 (\$)	645	745
Over 16 in Labor Market (%)	61.7	69.2	Rent is Greater Than 25% of Income (%)	46.0	47.2
Residence 5 Years Ago (%)			Poverty by Race:		
Same Home	57.7	49.9	White	14.5	8.8
Different Home, Same County	26.5	28.8	Asian	7.3	6.2
Different County in Hawai'i	4.8	3.5	Native Hawaiian/Pacific Islander	26.4	15.8
Different State/Country	11.0	17.8	Two or More Races	20.4	10.3

Source: U.S. Bureau of the Census. May 2001. *Profiles of General Demographic Characteristics, 2000 Census of Population and Housing, Hawai'i*. (U.S. Census Bureau Web Page).

3.2.2 Historic and Archaeological Resources

An Archaeological Inventory Survey (AIS) of the original TMK 7-3-010:003 property, which was 50 acres prior to subdivision, was performed by Haun & Associates (Haun and Henry 2000). They identified 17 sites with 186 features (Figure 5), with ten single-feature sites and seven feature complexes. One site is historic and consists of ranch walls, while the others are all pre-Western contact and consist of habitation sites, trails and a quarry. The recorded features consisted of pahoehoe excavations, mounds, terraces, quarries, filled cracks, cairns, walls, pavements, trails, alignments, cupboards, caves, and several miscellaneous types. Assigned feature functions included agriculture, temporary habitation, resource procurement, marker, transportation, livestock control, storage, ceremonial, refuge, tool manufacture, and indeterminate (Haun and Henry 2000:ii).

Seven sites were recorded and then determined to be no longer significant, and ten sites were recommended for either data recovery or preservation. All sites that are partially or fully within the subject 10.001-acre property are listed in Table 2, below. Those sites that were recommended for preservation are more fully discussed below.

Table 2
Archaeological Sites and Recommended Treatments

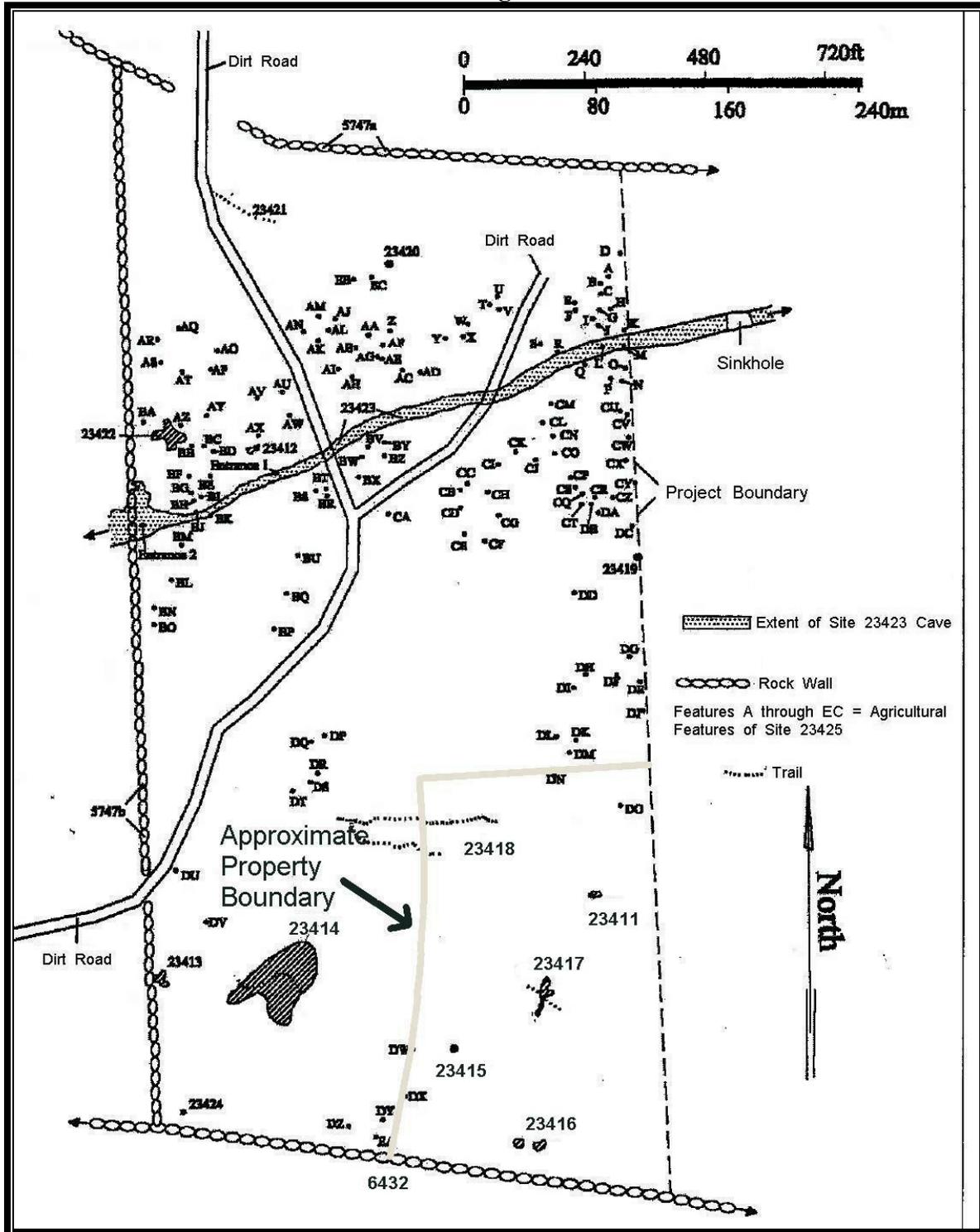
SIHP No.	Function/type	Temporal Association	Treatment Recommendation
6432	Ranch walls	Historic	No further work
23411	Habitation lava tube	Precontact	Data recovery
23415	Cairn	Precontact	No further work
23418	Trail	Precontact	No further work
23416	Habitation complex	Precontact	Data recovery
23417	Habitation complex	Precontact	Preservation
23425	Agricultural complex	Precontact	No further work

Based on a field inspection, some of the treatment recommendations in the Haun and Henry (2000) report were amended in the *Archaeological Mitigation Plan* prepared by Rechtman Consulting in November 2004 and approved by the State Historic Preservation Division per letter dated March 11, 2005. The Mitigation Plan is attached as Appendix 3 and summarized here. It should be noted that the Mitigation Plan included the entire 50-acre property out of which the subject property was subdivided, and therefore dealt with a number of sites that are not relevant to this action. The Mitigation Plan set forth both data recovery and preservation strategies that will mitigate possible impacts to the sites resulting from development of the property.

The required data recovery at the two sites was accomplished in 2007 (Rechtman et al 2007). One preservation site was present within the 10.001-acre property. Site 23417, which is unaltered and in good condition, is a habitation complex consisting of six features which include three terraces, two cairns and a steppingstone trail. Site 23417 will be preserved in its entirety through the use of a barrier during construction activities followed by the placement of buffers and signage.

As a further precaution, in the unlikely event that additional archaeological resources or human remains are encountered during future development activities within either the proposed easement or applicant's property, work in the immediate area of the discovery will be halted and DLNR-SHPD contacted as outlined in Hawai'i Administrative Rules 13§13-275-12.

Figure 5
Archaeological Sites



3.2.3 Cultural Resources

A Cultural Impact Assessment for the project site and several surrounding properties was prepared by Robert Rechtman, Ph.D., in 2006, for the 50 acres comprising the original property. The report is included as Appendix 4 and is summarized in the discussion below. See the report for scholarly references.

Background

According to archaeologists and historians, the settlement of Hawai‘i was underway by A.D. 300, with long-distance voyaging occurring on a fairly regular basis through the thirteenth century. It is generally agreed that the source of these early settlers was the Marquesas and Society Islands. For generations, communities favored the more lush and watered windward, or ko‘olau shores of the islands for agriculture and fishing. After a period of several centuries the growing population began expanding to the leeward or kona side of the islands. On Hawai‘i Island, the primary “chiefly” centers were established mostly south of the project site in the area extending from Kailua to Honaunau. By the fourteenth century, a complex and rich system of dryland agricultural fields (now known as the Kona Field System) was being developed up to approximately the 3,000-foot level. In the sixteenth century the population stabilized and the *ahupua‘a* land management system was established. These land units generally extend from the mountain to the sea and traditionally contained most of the resources that a settlement would require for its subsistence, distributed at various elevations.

The project site is located in the *ahupua‘a* of ‘O‘oma 1st in the district of North Kona. It is part of a region of Kona known as Kekaha, which was known by its residents as Kekaha-wai-‘ole o na Kona, or “Waterless Kekaha of the Kona District.” Although no legend explaining the source of ‘O‘oma has been found, the name is literally translated as meaning “concave” in Hawaiian, and may refer to an indentation of the shoreline fronting a portion of the *ahupua‘a*. ‘O‘oma was the area in which Kauikeaouli, the son of Kamehameha I and his wife, Keopuolani, was taken to be reared by stewards until the age of five.

A few detailed accounts telling of traditional features and residents of ‘O‘oma and surrounding areas surfaced in the early twentieth century. Hawaii historian Kepa Maly has translated the writings of John Whalley Hermosa Isaac Kihe, a native son of Kekaha, from Hawaiian language newspapers:

Kihe (who also wrote under the name of Ka-‘ohu-ha‘aheo-i-na-kuahiwi-‘ekolu) was born in 1853, his parents were native residents of Honokohau and Kaloko (his grandfather, Kuapahoa, was a famed kahuna of the Kekaha lands). During his life, Kihe taught at various schools in the Kekaha region; served as legal counsel to native residents applying for homestead lands in ‘O‘oma and vicinity; worked as a translator on the Hawaiian Antiquities collections of A. Fornander; and was a prolific writer himself. In the later years of his life, Kihe lived at Pu‘u Anahulu and Kalaoa, and was also one of the primary

informants to Eliza Maguire, who translated some of the writings of Kihe, publishing them in abbreviated form in her book “Kona Legends.”

In 1923, Kihe wrote the article “*Ka Punawai o Wawaloli*,” about the Pond of Wawaloli on the shore of ‘O‘oma. Rechtman describes how people regularly traveled between the uplands and shore of ‘O‘oma; the kula lands were covered with ‘ilima growth, and that a variety of fish, seaweeds, and shellfish were harvested along the shore. Also, the main figures in the tradition are memorialized as places on the lands of ‘O‘oma, Kalaoa, and the neighboring ahupua‘a. These individuals and places include Kalua‘olapa (a hill on the boundary of Hamanamana and Haleohi‘u), Wawaloli (a bay between ‘O‘oma and Kalaoa), Ho‘ohila (on the boundary of Kau and Pu‘ukala), Papa‘apo‘o (a cave site in Hamanamana), Kamakaoiki and Malumaluiki (locations unknown). A narrative translated by Kepa Maly from the original text of *Ka Hoku o Hawai‘i* from 1923 describes the setting of the Pond of Wawaloli as being “very close to the sandy shore, and further towards the shore there was also a pond suitable for swimming”:

Wawaloli is the name of a *loli* (sea cucumber) that possessed dual body forms (kino papalua), that of a loli, and that of a man!

Above there on the ‘ilima covered flat lands, there lived a man by the name of Kalua‘olapa and his wife, Kamakaoiki, and their beautiful daughter, Malumaluiki.

One day the young maiden told her mother that she was going down to the shore to gather limu (seaweeds), ‘opihi (limpets) and pupu (shellfish). Her mother consented, and so the maiden traveled to the shore. Upon reaching the shore, Malumaluiki desired to drink some water, so she visited the pond and while she was drinking she saw a reflection in the rippling of the water, standing over her. She turned around and saw there was a handsome young man there, with a smile upon his face. He said... “... Pardoned me for startling you here as we meet at this pond, in the afternoon heat which glistens off of the pahoehoe.”

She responded, “What is the mistake of our meeting, you are a stranger, and I am a stranger, and so we have met at this pond.” The youth, filled with desire for the beautiful young maiden, answered “I am not a stranger here along this shore, indeed, I am very familiar with this place for this is my home. And when I saw you coming here, I came to meet you.”

These two strangers, having thus met, then began to lay out their nets to catch kala, uhu, and palani, the native fish of this land. And in this way, the beauty of the plains of Kalaoa was caught in the net of the young man who dwelt in the sea spray of ‘O‘oma.

As the day passed the two became lovers, and the desire for limu, ‘opihi and pupu were forgotten. When the maiden returned home empty-handed she told her parents that the shore had been filled with people who took all there was.

So it was that the two lovers met regularly there on the shore of ‘O‘oma. Now Malumaluiki’s parents became suspicious because of the actions of the daughter, and her regular trips to the shore. So they determined they should secretly follow her and spy on her.

One day, the father followed her to the shore, where he saw his daughter sit down by the side of the pond (calling out a chant):

“O Loli, here is your desire, the one you command, Malumaluiki, whose eyes see nothing else.”

Her father then saw a loli coming up from the pond, and when it was up, it turned into the youth. He watched the two for a while, unknown to them, and saw that his daughter and the youth of the two body forms (kino papalua), took their pleasure in one another.

The father returned to the uplands and told all of this to her mother, who upon hearing it, was filled with great anger, because of the deceitfulness of her daughter. But then she learned that the man with whom her daughter slept was of dual body forms. Kamakaoiki then told Kalua‘olapa that he should “Go down and capture the loli, and beat it to death,” to which he agreed.

One day Kalua‘olapa hid by the pond and heard Malumaluiki’s chant which drew loli from the water through a small circular opening near the surface of the pond. The next day he recited the chant and ensnared the loli in a net. On the advice of his wife, he took the loli to the kahuna Papa‘apo‘o, who told Kalua‘olapa to build an imu to kalua the loli:

He said, “When the loli is killed, then your daughter will be well, so too will the other daughters of the families of the land.” Thus, the imu was lit and the supernatural loli cooked.

When the daughter returned home, eyes swollen from crying because she had been unable to find Loli at the pond, she was told by her father:

“Your man, with whom you have been making love at the beach has been taken by the kahuna Papa‘apo‘o. He has been cooked in the imu that you may live, that all of the girls who this loli has loved may live.”

The pond is still there on the shore, and the place with the small round opening is still on the side of that pond to this day. It is something to remember those things of days gone by, something that should not be forgotten by those of today and in time to come.

In 1924 Kihe wrote of schools that existed around 1870 when at Kiholo, Makalawena, Kalaoa and Kaloko, and the changes that took place:

It was when they stopped teaching in Hawaiian, and began instructing in English, that significant changes took place among our children. Some of them became puffed up and stopped listening to their parents. The children spoke gibberish (English) and the parents couldn't understand (na keiki namu). Before that time, the Hawaiians weren't marrying too many people of other races. The children and their parents dwelt together in peace with the children and parents speaking together

Kihe also spoke of the loss of residents in the area since the time of his youth:

The lands of Honokohau were filled with people in those days, there were many women and children with whom I traveled with joy in the days of my youth. Those families are all gone, and the land is quiet. There are no people, only the rocks remain, and a few scattered trees growing, and only occasionally does one meet with a man today [1924]. One man and his children are all that remain.

A survey by John Reinecke for Bishop Museum also found the shoreline along Kekaha had been a desirable place to live when fishing was a mainstay of the region:

When the economy was based on fishing this was a fairly desirable coast; the fishing is good; there is a fairly abundant water supply of brackish water, some of it nearly fresh and very pleasant to the taste; and while there was no opportunity for agriculture on the beach, the more energetic Hawaiians could do some cultivation at a considerable distance mauka.

However, by the time Reinecke carried out his survey in 1930, the population along the coast from Kailua to Kawaihae had dwindled to less than 75. He also found a paucity of archaeological sites which he attributed to several factors, including destruction by man and cattle-grazing, and to storms that swept over the low-lying coast.

In the coastal area below the project site Reinecke there were no current inhabitants but he did locate six house sites and seven enclosures and pens, at least one of which he described as an "old cattle pen." He also found two caves, two ahu, a stepping-stone trail, three waterholes, a well, 11 shelters and 11 terraces and platforms, one of which he believed to be a heiau.

At the time of the *Mahele*, the land was divided into two ahupua'a, 'O'oma 1st and 'O'oma 2nd. 'O'oma 1st was claimed by Moses Kekuaiwa (brother of Kamehameha IV and V, and Victoria Kamamalu), a grandson of Kamehameha I. 'O'oma 2nd was held by Kamehameha III. On March 8, 1948, Kamehameha III assigned his interest in 'O'oma 2nd to the government land inventory. 'O'oma 2nd also became part of the inventory upon the death of Moses Kekuaiwa on November 24, 1848.

Only one claim was made for ‘O‘oma lands but that claim, by Kahelekahi, said to be the only resident of the area, was not awarded. A year later three families, by the names of Kalua, Kamaka and Mamali, were living in ‘O‘oma, according to a report by S. Haanio, tax assessor of North Kona. It is not clear exactly where they were living but they likely had primary residences in the uplands and near-shore residences for seasonal fishing and collection of other coastal zone resources. Descendents of the Kalua and Kamaka lines are known to still be residing in the Kekaha region.

Between 1855 and 1864, four applications for land in ‘O‘oma were patented, to Ka‘akau, Kameheu, Koanui and Kama. While no formal grants for near-shore kula or beach lands appear to have been granted, it is likely that the families living upland continued the practice of visiting the coast.

During the first years of the Homestead Program in the 1880s, demand for property in ‘O‘oma was such that King David Kalakaua relinquished his control of the land. Questions about the establishment of the leases lingered, however, until the Territorial Survey Office issued a map in May 1902 establishing 25 lots in ‘O‘oma 1st extending from near the shore to the upper limits of the ahupua‘a. The project site was part of a lot patented to William Keanaaina under Grant No. 5472, with the makai end at approximately 325 feet above sea level.

At least two trails of regional importance passed through the lands of ‘O‘oma including the *alaloa*, parts of which were later modified beginning in the 1840s into what is now known as the *Alanui Aupuni* (Government Road) or Mamalahoa Trail or King’s Highway. The trail crossed the makai or near-shore lands to link royal centers and coastal communities and remained in use in some form through the 1970s. It was not until the Queen Ka‘ahumanu Highway was opened in the early 1970s that travel for the general public was possible across the shoreward plains of ‘O‘oma.

The other major thoroughfare of the region was the Kealaehu (the path of Ehu) which passes through the uplands, generally a little above the mauka Government Road and then shifts down to Kiholo.

Sketches drawn by J. Perryman, assistant to Kingdom Surveyor Joseph S. Emerson, in the 1880s include various trails from the uplands to the coast known as *ala pi‘i uka* or *ala pi‘i mauna* (trails that ascend to the uplands or mountains), one leading to Honokohau and another near the Kaloko-Kohanaiki boundary. Use of these trails continued through the 1950s. Another Perryman sketch shows a house in the vicinity of ‘O‘oma with two trails further to the south – presumably the *Alanui Aupuni* on kula lands and the near-shore trail coming from Honokohau.

Emerson's notes include a survey of an area near the boundary of 'O'oma 1st and 2nd at the 325-foot elevation which included a reference station named "Kahokukahi," which was at the entrance of a cave of the same name. He described it as the vertical entrance of a famous *ana kaula*, which is a place where people could take refuge during times of war. This cave is not believed to be within or near the project site.

Impacts and Mitigation Measures

The Office of Hawaiian Affairs (Honolulu and West Hawai'i), the Kona Hawaiian Civic Club, the Na Ale Hele Program, and the Kona Outdoor Circle were contacted to determine if they had any knowledge of cultural resources that may be present or practices that may be ongoing on the property. To date, none have identified specific resources or practices. None of the elder kama'aina interviewed for the CIA shared any specific knowledge about traditional cultural resources and associated practices within the boundaries of the project site. Aside from the archaeological site, which is being preserved, no cultural sites are known to exist, and no impacts to any sites are expected. With the exception of comments related to resources of the National Park, dealt with in Section 3.4, no comments from consulted agencies or other parties related to cultural impacts were received in response to the Draft EA.

3.3 Infrastructure

3.3.1 Utilities and Public Services

Existing Facilities and Services, Impacts and Mitigation Measures

Electrical power would be supplied to the project area by Hawai'i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission, via a connection from Kakahiaka Street. Telephone service is available from Oceanic Time Warner Cable. HELCO has provided a will-serve letter the adequacy of its facilities to service the development

Water would be provided via a waterline located along Kakahiaka Street, which is part of the Hawai'i County Department of Water Supply (DWS) system. The design process will include water usage calculations by a professional engineer to show the estimated maximum daily water needed. The change of zone ordinances specified that the developer of the apartment complex must develop a sufficient water source and appropriate transmission, storage and distribution systems either on its own or through an agreement with the County along with the payment of bond, surety or other security as deemed appropriate by the County. The DWS confirmed by letter dated January 15, 2008, that two of the four conditions, related to upgrade and conveyance of Kalaoa Well and construction and conveyance of the Wainani Reservoir, had been satisfied. Since January 15, 2008, a high pressure bypass connection at Koikoi Street has been completed and conveyed, satisfying the third condition. The only outstanding condition is payment of a prevailing facilities charge, which will be made at the appropriate time.

In response to early consultation, the Engineering Division of the Hawai‘i State Department of Land and Natural Resources requested that the water calculations for the project be included in the Draft EA (see letter of September 19, 2008 in Appendix 1a). A water calculation that was completed on November 7, 2008, determined that the project would use 99,200 gallons per day. In order to further reduce water, the project will incorporate drought-resistant native landscaping and low-flush toilets and showerheads, and provide water conservation information to new residents. Waterless urinals in public restrooms will be considered, and the project is also exploring the use of treated greywater for irrigation to further reduce water use. And from a regional perspective, as with wastewater, relocating currently doubled-up residents to a development with water conservation measures in place may actually provide a net benefit in terms of total water used.

The change of zone conditions also required that a Solid Waste Management Plan be prepared by the developer and submitted to the Hawai‘i County Department of Environmental Management (DEM) for approval. In response to early consultation, the Solid Waste Division of DEM requested that this plan be included in the Draft EA (see letter of September 26, 2008 in Appendix 1a). Although a final solid waste management plan is not available, a spokesman from the construction company indicated that the project will use panelized walls manufacture offsite, greatly reducing onsite solid waste. In addition, the company plans to keep scrap lumber neatly stacked and to invite local groups such as charities to use this lumber, which will be suitable for small projects. The company also plans to recycle as much waste as practical and to dispose of all residual waste in the West Hawai‘i Sanitary Landfill, per regulations. A Solid Waste Management Plan will be developed closer to construction and supplied to DEM.

The change of zone ordinances also required that the applicant construct a wastewater treatment plant meeting the specifications and requirements of the State Department of Health. To conform with this requirement, the applicant has acquired joint ownership of a private sewage treatment plant on adjacent land (TMK 7-3-009:005) that will be upgraded to accommodate the project.

Fire, police and emergency management services are readily available in Kona. A police substation is located in Kealakehe, about five road miles away. A fire station is located on Palani Road, approximately eight miles away by road. EMT services are provided by the Hawai‘i County Fire Department, which has a Kailua station. Acute care services are available at Kona Hospital, approximately 15 miles to the south.

Recreational facilities in the Kailua area include an Olympic swimming pool, ballfields and a community center. Numerous State and County beach parks are located with 10 miles of Kalaoa. As shown in Figure 4, the complex itself will have recreational amenities including a volleyball court, a basketball court, picnic areas, game/exercise pavilions, and a children's playground, serving the residents' recreational needs.

Public schools for the children of the residents would include Kealakehe Elementary School, about six miles away, Kealakehe Intermediate School, about seven miles away, and Kealakehe High School, about five miles away. According to a letter from the Department of Education (DOE) of February 22, 2007 (see attachment to December 17, 2008 letter from Geometrician Associates to DOE in Appendix 1b), all schools have additional capacity for students. Neither the State Land Use Boundary Amendment nor the County Change of Zone Ordinance contained conditions related to impacts to the Department of Education, which was apparently not recognized as an impact by the Planning Commission when these approvals were granted in 2004 and 2007.

In a letter of December 16, 2008, commenting on the Draft EA, DOE stated that current enrollment at Kealakehe High School is higher than its facility capacity and it is expected to remain that way for the next six years; that enrollment at Kealakehe Elementary is currently very close to its facility capacity and enrollment is expected to exceed facility capacity in the next school year; that along with many other residential projects proposed for the North Kona area, the Lokahi Ka'u Affordable Apartments will have an impact on the Kealakehe schools; and that the DOE anticipates the need for new or expanded schools to serve the growing area. DOE also provided information on Act 245, currently being implemented, which empowers the Board of Education to identify and adopt school impact districts for areas requiring new or expanded facilities in the future. According to the DOE, it is thus possible that the Lokahi Ka'u Affordable Apartments will be required to pay an impact fee.

3.3.2 Roadways and Traffic

Introduction

A Traffic Impact Analysis Report (TIAR) for the Seascape condominium project and early version of the Lokahi Ka'u project was prepared by Witcher Engineering in 2005. The report was revised in January 2007 to account for changes in the land use plan, including the proposed Lokahi Ka'u Affordable Apartments; which was referred to in the report as the "Lot #1" development, and revised again in December 2007 to update background traffic conditions. The main body of the revised report is attached as Appendix 5 and summarized below.

Existing and Proposed Facilities and Conditions

Street access to the proposed Lokahi Ka‘u Affordable Apartments will be from Kakahiaka Street, which will be extended by the applicant and dedicated to the County (see Figure 4). Kakahiaka Street provides access to the project from Kaiminani Drive, a secondary arterial between State Highways 190 (Mamalaha Highway) and 19 (Queen Ka‘ahumanu Highway) approximately six miles north of Kailua-Kona. Kakahiaka Street has a posted speed limit of 25 mph, a paved shoulder and sidewalks for a portion of its length. Kaiminani Drive has a significant grade has a posted speed limit of 35 mph, intermittent paved shoulders and no sidewalks.

Plans call for a single driveway into the apartment complex from Kakahiaka Street, with internal roadways providing access to the individual apartment buildings. The project will include adequate parking with a minimum of 460 parking stalls, as specified by the change of zone ordinances. In addition, the project also includes a bus-stop shelter.

Impacts and Mitigation Measures

In order to calculate the traffic that would result from the projects under review in the TIAR, the traffic engineer classified the proposed development into single-family homes and low-rise apartments and used published equations of trip generation for these types of residences. The approximately 400 units were determined to generate almost 2,600 trips in or out on a typical weekday, with 188 trips in the AM peak hour and 232 trips in the PM peak hour.

This traffic increase had to be considered in relation to the existing background traffic on Kakahiaka Street and its intersection with Kaiminani Drive, along with Kaiminani Drive’s intersections with Queen Ka‘ahumanu Highway and Mamalaha Highway. Background traffic on these streets and intersections was calculated using traffic counts from the area done in 2005. Then, accounting for additional projects including Palamanui and applying a conservative 3.5% growth factor to project to the year 2008, when the apartments were then expected to be ready to be occupied, traffic levels at opening were calculated.

Project trips from the projects under review in the TIAR were distributed to the various intersections based on circulation routes and travel patterns.

The next step in the analysis involved calculation of the Level of Service for the subject intersections, which included detailed evaluation of the various turning movements. Generally, the concept of LOS for intersections relates the quality of traffic flow to the delay time experienced by drivers. LOS varies from “A” to “F,” with the quality of traffic service declining as the levels move from “A” towards “F” (Table 3).

Table 3 Level-of-Service Definitions for Unsignalized Intersections⁽¹⁾

Level-of-Service	Expected Delay to Minor Street Traffic	Vehicular Delay (Seconds)
A	Little or no delay	<10
B	Short traffic delays	10 - 15
C	Average traffic delays	15 - 25
D	Long traffic delays	25 - 35
E	Very long traffic delays	35 - 50
F	See Note (2) below	> 50

Notes:

- (1) From Highway Capacity Manual, 2000 Edition, Transportation Research Board.
- (2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing that may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

With declining LOS, the ability to travel at the desired speed is inhibited by other vehicles either adjacent, opposite, or in front of a driver. Generally, in urban areas and growing rural areas transitioning to urban areas, it is expected that LOS D will be prevalent and acceptable in the morning and afternoon peak hours. Therefore, any traffic movements with LOS E or worse should be reviewed closely to determine if any changes or improvements could be made to move the LOS to an acceptable level.

The addition of project traffic in combination with background traffic growth is projected to cause slight degradation of LOS at several intersections (Table 4), particularly for motorists on Kakahiaka Street at Kaiminani Drive. Pursuant to Section 2(J) of the change of zone ordinance, the developer agreed to construct an extension of Kakahiaka Street along the southern boundary of the property to dedicable standards and dedicate all improvements to the County upon request. Little change is expected on for motorists on Kaiminani Drive itself.

Although trips from the projects under review in the TIAR will increase traffic along Kaiminani Drive, Queen Ka‘ahumanu Highway and Mamalahoa Highway, it is likely within the capacities of these roadways to absorb such traffic. At the intersection of Queen Ka‘ahumanu Highway and Kaiminani Drive, no mitigation measures were recommended since the design process for the widening of this highway that is currently and independently underway addressed all deficiencies. At the intersection of Kaiminani and Kakahiaka Streets, no turn lanes are recommended as the level of service is expected to remain “A” for the major road. At the intersection of Kaiminani Drive and Mamalahoa Highway, where the County Department of Public Works has recommended that a signal be installed, LOS is expected to remain at “E,” and a signal warrant study should be undertaken at some point.

Regarding mass transit, the change of zone ordinances for the project requires that the applicant develop an area for a bus stop and construct a shelter for bus passengers on or near the property or along Kakahiaka Street, which has been included in the design (see Figure 4).

Table 4 Level of Service at Key Intersections

LOS			Eastbound			Westbound			Northbound			Southbound			LOS	
Intersection	Peak	Period	L	T	R	L	T	R	L	T	R	L	T	R	LOS	
Ka'imīnani Street and Queen Ka'ahumanu Highway	AM	Existing				D		C		C	B	D	B		C	
		Future				D		C		C	B	D	B		C	
	PM	Existing				C		C		C	B	C	A		B	
		Future				E		D		E	D	D	B		C	
Ka'imīnani Street and Kakahiaka Street	AM	Existing	A	A	A	A	A	A	C	C	C	B	B	B	NB	SB
		Future	A	A	A	A	A	A	D	D	D	B	B	B	D	B
	PM	Existing	A	A	A	A	A	A	C	C	C	B	B	B	C	B
		Future	A	A	A	A	A	A	D	D	D	C	C	C	D	C
Ka'imīnani Street and Mamalahoa Highway	AM	Existing	E		E				B						E	
		Future	F		E				B						E	
	PM	Existing	E		B				A						C	
		Future	F		C				A						E	
Kaiminani Street and Ane Keohokalole Street	AM	Future				A	A		C		C			C		
	PM	Future				A	A		C		C			C		

Notes: Existing year = 2005, Future = 2008 (post-project); Last column is overall LOS

3.4 Secondary and Cumulative Impacts

Somewhat distinct from the direct effects that construction and occupation of a housing project can have on the environment are secondary impacts. These can include impacts from residents traveling to different parts of the island for work or recreation and inducing impacts in environmentally sensitive areas. Another potential secondary impact is economic; although generally positive, increased economic activity resulting from the expenditures of new residents can draw in workers who add to the existing demand for affordable housing. In the case of the subject project, its modest scale in relation to the existing population of the island indicates that any such secondary impacts would be negligible, and the project itself will help mitigate those needs for affordable housing.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures.

The fast-growing North Kona District is the center of the visitor industry and real-estate development that power the economy of the island. Despite the recent economic slowdown, there are many public and private projects being planned at any given time in North Kona, and details often change daily in response to market conditions and the regulatory process. The descriptions below provide context for development occurring in the area north of Kailua-Kona.

Several large-scale road improvements underway are designed to improve traffic flow in this portion of North Kona. A section of Queen Ka'ahumanu Highway is being divided and widened from two lanes to four lanes from the town's center to the access road to the airport. Further mauka, the Ane Keohokalole Extension will connect Henry Street to the mauka-makai Hina Lani Road located about 2.5 miles south of Kaiminani Drive, providing an alternate route for motorists from Kailua Village to the Kaloko Industrial Park. In the process, Ane Keohokalole Street, the "midlevel" road, will link the future West Hawai'i Civic Center, Kealakehe Schools and the Villages of La'i'ōpua. The extension will eventually extend to Kaiminani Drive at a location about 2,000 feet west of Kakahiaka Street at the existing stub of Ane Keohokalole Street, and later beyond to the Palamanui development further north.

The proposed extension of Kealakehe Parkway (located three miles south of Kaiminani Drive), up to Kealaka'a Street and on to Palani Road will provide another mauka-makai connector road for the general project area and will improve access to Kealakehe High School. Another proposed road will extend Kamanu Street from Hina Lani Street to the Kealakehe Parkway, providing an alternate route to Queen Ka'ahumanu Highway for drivers going to Costco and other shopping areas in the Kaloko Industrial Park area. A smaller in-progress project is the Manawalea Connector, which will link the Kealakehe School Complex with residential areas located above, bypassing Queen Ka'ahumanu Highway and improving traffic circulation.

A variety of market and affordable housing projects are underway in the area. As discussed in Section 1.1, several projects are slated just north of the subject property on Kakahiaka Street. Kamalani Kai will be a 40-unit a single-family market-price development, and Kamalani Kai Highlands will offer workforce housing, with 74 single-family homes and 80 multi-family units.

At the Villages of La'i'ōpua in Kealakehe, several miles to the south, the Department of Hawaiian Home Lands is developing about 1,740 homes for lease to Native Hawaiians who qualify under the Hawaiian Homes Act. The Keahuolu Affordable Housing Project is being undertaken by the Hawai'i Housing Finance and Development Corporation, which is building on about 270 acres near Palani Road. Various alternatives are under consideration, one of which has as many as 2,330 planned dwelling units.

The Shores at Kohanaiki, located makai of Queen Ka‘ahumanu Highway southwest of the project site, includes a 500-home golf course community featuring a shoreline park, public parking for more than 120 cars and an 8,000 square foot beach facility with a snack bar, restrooms and showers. Directly north of Kohanaiki, Kona Village, LLC has proposed the ‘O‘oma Beachside Village, a master-planned shoreline community on 300 acres of land. The project would include a mixture of single-family lots, affordable homes, several mixed-use villages, a coastal preserve/open space and shoreline park with a public canoe club hale, a private beach club, and various other parks and preserves.

Hiluhilu Development Company has obtained approvals for its Palamanui project, a 725-acre master-planned community to be built north of Kaiminani Drive. It will have a mix of single-family and multiple-family residential units, commercial spaces, a village inn, 18-hole golf course, and related improvements and infrastructure.

The Kula Nei project will provide approximately 270 homes including 50 to 70 affordable homes in a 150-acre site between the existing Kona Acres and the future Kaloko Heights subdivisions. The controversial Kona Kai Ola project proposes a marina, hotel, time-share and retail development near Honokōhau Harbor.

Although it is difficult if not impossible to systematically determine the complex interaction of environmental impacts in this fast-growing region, aside from traffic during construction and occupancy, the Lokahi Ka‘u Affordable Apartments generally has limited impacts that will not tend to accumulate with those of other projects. Impacts to natural resources such as vegetation are limited because of the alien nature of the vegetation that is found on the property.

Archaeological resources were properly inventoried and preservation plans have been approved for significant sites, adding to a very large number of preserved sites in Kona. The design guidelines of the project will prevent a loss of scenic character or interference with viewplanes, even considering the development going on around the area. Water quality impacts are being minimized through connection to a private wastewater plant, drainage improvements that retain stormwater on site, and construction Best Management Practices that limit erosion and sedimentation.

Traffic impacts have been assessed with a cumulative perspective, and with mitigation the project will have only limited impacts on local traffic flow. As with every housing project, however, new residents will produce new motorists not only at the margins of the project but throughout the region, increasing demand on already stressed transportation systems. Mitigating this is the fact that increases in the tax base generated by new occupants can provide the funding for new infrastructure, services and facilities. There is often a lag time, however, between population growth and full infrastructure development, which has led many in Kona to call for restrictions or moratoriums on development to allow infrastructure to “catch up.” The widening of Queen Ka‘ahamanu Highway, and the coming construction of the Ane Keohokalole and Kealakehe extensions are examples of projects that will begin to alleviate some traffic concerns. Ongoing improvement and expansion of the County of Hawai‘i’s mass transit program (buses are now fare-free, and the Proposed Action is being prepared to be transit ready) and a new initiative to create Park and Ride lots will also mitigate this problem.

In a comment letter to the Draft EA of December 8, 2008 (see Appendix 1b), the Superintendent of Kaloko-Honokōhau National Historical Park (“the National Park”) expressed concerns about whether the sum of development in the surrounding area – which is the anchor area identified in the General Plan for most of the planned growth in North Kona, and which has a substantial number of new planned projects – could harm the ponds and coastal waters that form the National Park’s natural and cultural resources.

Notable resources at the National Park include Kaloko Fishpond, which is being restored for traditional and productive aquaculture use for human consumption; ‘Ai’opio fishtrap, which is intensely utilized for fishing and traditional and customary cultural practices; ‘Aimakapa fishpond and wetland, which is an important foraging and nesting habitat for the endangered Hawaiian Stilt and the endangered Hawaiian Coot, and overall important habitat for migratory waterfowl; and the general coastal waters, which are used by juvenile threatened green sea turtles and the endangered hawksbill sea turtle. The endangered Hawaiian monk seal is an occasional visitor to the National Park waters and rests on the shoreline. Endangered humpback whales are also seasonally seen. Brackish and saltwater ecosystems within and adjacent to the National Park are therefore important for the cultural landscape and cultural practices as well as habitat for native species, including endangered species. Brackish and saltwater ecosystems within and adjacent to the National Park are also important for the cultural landscape and cultural practices, as these are inextricably bound up with natural resources.

Of particular importance are three issues: polluted runoff, inadequately treated wastewater, and groundwater withdrawal. (The National Park also expressed concerns about traffic from the Lokahi Ka‘u project, which is dealt with above.) As evidenced by coordinated working group meetings on these issues organized by the National Park and the Department of Water Supply, the views of the National Park diverge from those of some other biological and hydrological experts regarding the nature and extent of the threat to the resources at the Park posed by development in the area. In the National Park’s view, development within the entire North Kona region has the potential through the withdrawal of water to critically exceed the optimum salinity for the key biological resources, while others dispute the degree to which the aquifer underlying the National Park will be affected by these withdrawals and also the optimum salinity for the maintenance of native species.

Because of the complex nature of these questions, both sides agree that continuing research is needed and a dialogue is ongoing. Solutions may end up being regional and regulatory, involving the Commission on Water Resources Management, the State Department of Health, and the County Department of Public Works.

The issue is far more complex than what can be dealt with in an EA for a relatively modest 306-unit affordable apartment complex that is not adjacent to the Park and only a very small part of the overall urban development in the region. It is critically important to note that the Lokahi Ka‘u Affordable Apartments project site is at about 430 feet in elevation, two miles to the north of the National Park and not in the same watershed. Directly surrounding the National Park are a large commercial harbor, two Industrial Parks and quarries, and a major resort in development. In between this ring of major development around the National Park and the Lokahi area are numerous other existing and planned industrial, commercial, and residential land uses.

Considering the relatively indirect connection with the National Park, the modest scale of the proposed development (e.g., the proposed use of about 99,200 gallons per day is about 0.5% of the 19.029 million gallons per day that the National Park has calculated to be the regional water demand), the controversy surrounding the National Park’s assessment of impacts, and the fact that the Lokahi Ka‘u Affordable Apartments will be meeting all modern standards for storm water and wastewater treatment (unlike much previous development), a definitive assessment of the contribution of adverse impacts from the Lokahi project towards a critical level of impacts at the National Park is not possible. Any coherent discussion of how water withdrawals affect the water flux into the National Park is not feasible, as there is only extremely limited information on the hydrogeologic structures that compartmentalize the regional aquifers tapped by various DWS and private wells. This is a regional issue that must be addressed over a long period of time through careful study by expert agencies, and this study is progressing.

Nevertheless, upon reviewing the concerns of the National Park, the project managers sought to improve those aspects of the project related to water quality and quantity that could feasibly be adjusted within the context of an affordable housing project. These items are listed in Section 3.1.2, which deals with water quality.

3.5 Required Permits and Approvals

The Proposed Action requires granting the following permits and approvals:

- County of Hawai‘i, Department of Public Works, Building Division Approval and Building Permit
- County of Hawai‘i, Department of Public Works, Engineering Division, Grading Permit
- County of Hawai‘i, Planning Department Plan Approval
- Approval for Work Within County Highway Right-of-Way

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State’s long-run growth and development activities. The three themes that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The Proposed Action would promote these goals by providing affordable housing in an area ideally suited for this, enhancing quality-of-life and economic and social well-being.

3.6.2 Hawai‘i County General Plan

The *General Plan* for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai‘i County Department of Planning). The *General Plan* itself is organized into thirteen functional elements. The Proposed Action would be consistent with the goals, policies and objectives, standards, and principles for several functional areas.

Land Use Element – In General:

Policies:

- Zone urban—types of uses in areas with ease of access to community services and employment centers and with adequate public utilities and facilities.
- Promote and encourage the rehabilitation and use of urban areas that are serviced by basic community facilities and utilities.
- Allocate appropriate requested zoning in accordance with the existing or projected needs of neighborhood, community, region and County.

Standards:

- Zoning requests shall be reviewed with respect to General Plan designation, district goals, regional plans, State Land Use District, compatibility with adjacent zoned uses, availability of public services and utilities, access, and public need.

Discussion: The Proposed Action supports the Land Use element policies and standard by allowing for diversity and stability by promoting appropriate zoning in accordance with the existing needs of a community.

The multiple-family residential project complements a similar use at an adjacent rezoning amendment to the RM designation at TMK: (3rd) 7-3-10:51 from Agriculture (A) to multiple-family (RM) in 2005. The Proposed Action thus would reinforce the multiple-family character along Kakaia Street, thereby promoting the County's economic goals in harmony with its social and physical environments.

Land Use Element – Multiple-Residential:**Policies:**

- Appropriately zoned lands shall be allocated as the demand for multiple residential dwellings increases. These areas shall be allocated with respect to places of employment, shopping facilities, educational, recreational and cultural facilities, and public facilities and utilities.
- Incorporate reasonable flexibility in applicable codes and ordinances to achieve a diversity of socio-economic housing mix.
- Encourage flexibility in the design of residential sites, buildings and related facilities to achieve a diversity of socio-economic housing mix and innovative means of meeting the market requirements.
- The rehabilitation and/or utilization of multiple residential areas shall be encouraged.
- To assure the use of multiple residential zoned areas and to curb speculation and resale of undeveloped lots only, the County may impose incremental and conditional zoning, which shall be based on performance requirements.
- Applicable codes and ordinances shall be reviewed and amended as necessary to include consideration for urban design, and aesthetic quality through landscaping, open space, and buffer areas.
- Support the rezoning of those multiple residentially zoned lands that are used for other purposes to a more appropriate zoning designation.
- Require developers to provide basic infrastructure necessary for development.

Standards:

- Areas shall be located in such a manner that traffic generated by high density development will not be required to travel through areas of lesser density en route to principal community facilities.

- Areas shall be protected from incompatible uses by transition zones.
- Provide adequate access to arterial streets, shopping facilities, schools, employment centers, and other services.
- Development shall not be permitted in natural hazard areas unless proper on-site improvements are provided.
- Development shall be located in areas where public utilities can be economically provided at a level adequate to meet the demand for the concentrated service.
- Recreational area and/or facilities shall be considered in multiple residential development.

Discussion: The apartment project is located in an area with access to shopping, educational and recreational facilities, and its affordable component will help achieve a diversity of socio-economic housing opportunities.

The proposed use would be compatible with the above-cited standards, as the project will be located in an area of similar development with access to employment centers.

The *Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG) and Facilities Map*. These components of the *General Plan* are graphic representations of the Plan’s goals, policies, and standards as well as of the physical relationship between land uses. They also establish the basic urban and non-urban form for areas and the planned public and cultural facilities, public utilities and safety features, and transportation corridors.

The project site is classified as Urban Expansion in the LUPAG. The Proposed Action is consistent with this designation. The multiple-residential use would allocate land uses in keeping with the Property’s LUPAG designation for Urban Expansion which “allows for a mix of high density, medium density, low density, industrial, industrial-commercial and/or open designations in areas where new settlements may be desirable, but where the specific settlement pattern and mix of uses have not yet been determined.”

3.6.3 Hawai‘i County Zoning

Hawai‘i County Zoning. The project site is zoned RM-1, for Multiple-Family Residential District 1,000 square feet. As discussed in Section 1.1, the property underwent analysis in 2007 related to a change of zone application; multiple-family use was found to be consistent with the General Plan and the change of zone guidelines and the Planning Commission and County Council approved the change of zone in County of Hawai‘i Ordinances No. 07-173 and No. 07-174. The Proposed Action is a permitted and intended use within this designation. Under Section 25-5-30, Hawai‘i County Code, the Multiple-Family Residential (RM) district provides for medium and high-density residential use and covers areas with full community facilities and services. The intent is to provide for transition areas between commercial or industrial areas and other areas of less intense land use. The land uses in the immediate area are a mix of single-

family and multiple-family residential uses, including the existing Seascape condominium project immediately to the west (TMK: (3) 7-3-10:51).

3.6.4 Hawai'i State Land Use Law

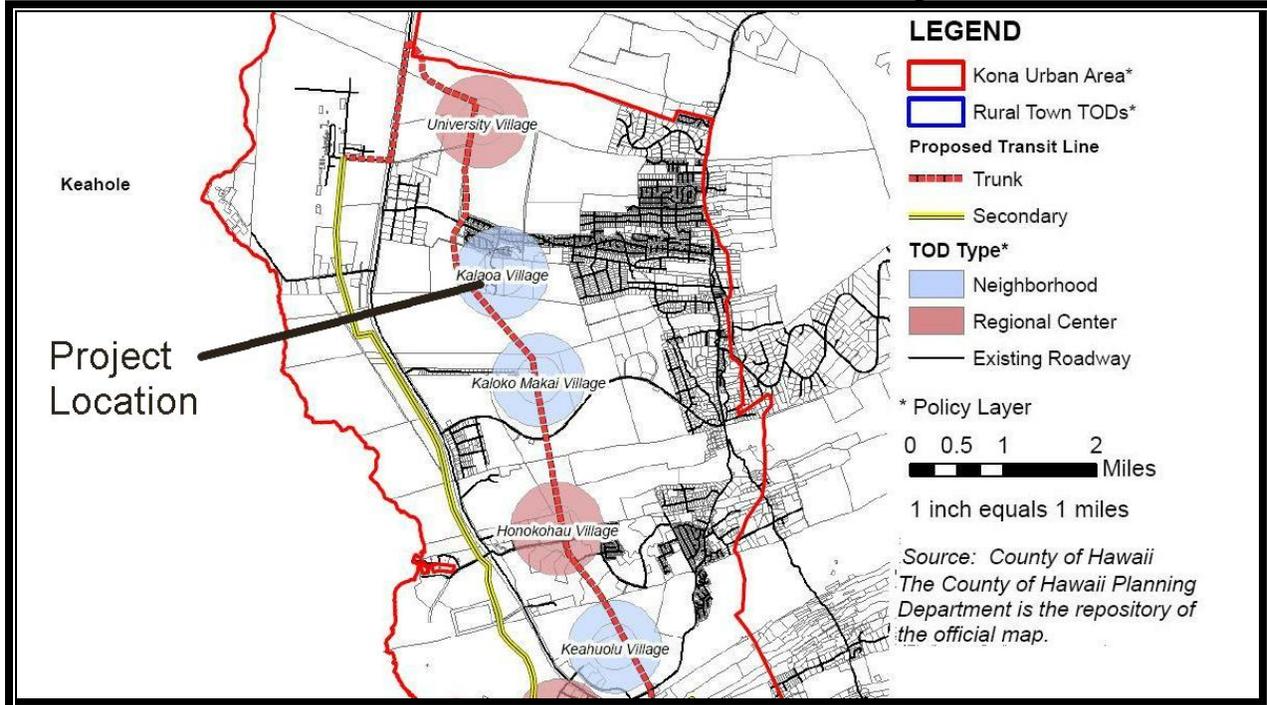
All land in the State of Hawai'i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The property is in the State Land Use Urban District. The Proposed Action is consistent with intended uses for this land use district.

3.6.5 Kona Community Development Plan

The Kona Community Development Plan (CDP) encompasses the judicial districts of North and South Kona, and was developed under the framework of the February 2005 County of Hawai'i General Plan. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area. The General Plan now requires that a Community Development Plan shall be adopted by the County Council as an “ordinance”, giving the CDP the force of law. This is in contrast to plans created over past years, adopted by “resolution” that served only as guidelines or reference documents to decision-makers. In September 2008, the Kona CDP was adopted by the County Council. The version referenced in this Environmental Assessment is at: http://www.herc.info/community-planning/community-development-plans/kona/cdp-final-drafts/KCDP_Final_Draft_Vol1_May2008_rev1.pdf.

The Plan has many elements and wide-ranging implications, but there are several major strategies that embody the guiding principles related to land use, housing, public facilities, infrastructure and services, and transportation. These are most relevant to the Proposed Action, which provides housing in an appropriate location with respect to housing demand and employment opportunities. Chief among these is the concept of Transit-Oriented Development, or compact, mixed-use villages which would integrate housing, employment, shopping, and recreation opportunities. Villages are to be designed around transit stations/stops which would reduce the need for daily trips and financially support an expanded transit system. The Lokahi area of Kalaoa is specifically identified in the Kona CDP as a Transit-Oriented Village (Figure 6). An integral part of such villages is affordable housing located near major employment centers, which would serve to decrease the number of people who fill the roadways commuting long distances to work every day. The Lokahi Ka'u Affordable Apartments are consistent with this key element of the Kona CDP. The design of the apartments, which have their own recreational facilities and incorporate energy efficient elements, is also consistent with the other goals, objective and policies of the Kona CDP.

Figure 6
Portion of Official Kona CDP Land Use Map



Adapted from Kona Community Development Plan

PART 4: DETERMINATION

The Hawai‘i County Planning Department, upon consideration of comments to the Draft EA, has determined that the proposed project will not significantly alter the environment, as impacts will be minimal, and has thus issued a Finding of No Significant Impact (FONSI).

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost. The project site and surrounding areas support residential and multiple-family residential uses and will not be affected by the proposed action.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment.

3. *The proposed project will not conflict with the State's long-term environmental policies.*
The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The proposed action provides housing for residents of Hawai'i County in an area identified in the General Plan for such uses, fulfilling needed County and State goals while avoiding significant impacts to the environment. It is thus consistent with all elements of the State's long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The major effects are beneficial, providing housing and jobs. Although considering the cumulative deficiency of infrastructure, and that any population increase in Kona involves potentially adverse effects to traffic, the location of the project in the vicinity of similar developments will minimize the effects of traffic on that roadway system.
5. *The proposed project does not substantially affect public health in any detrimental way.* The Proposed Action will not affect public health in any way; wastewater and stormwater will be appropriately treated.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* Only modest secondary effects are expected to result from the apartment project. Fair-share contributions as provided by the change of zone ordinances assist in mitigating impacts to public services.
7. *The proposed project will not involve a substantial degradation of environmental quality.* The proposed action is taking place in an area already impacted by alien vegetation, and is being regulated by permits to avoid environmental degradation and thus would not contribute to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* The project site supports alien weedy vegetation. Impacts to rare, threatened or endangered species of flora or fauna will not occur.
9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* Aside from traffic during construction and occupancy, the Lokahi Ka'u project generally has limited impacts that will not tend to accumulate with those of other projects. Impacts to natural resources such as vegetation are limited because of the basically disturbed, alien nature of the vegetation that is found on the property. Archaeological resources were properly inventoried and preservation plans have been approved for significant sites, adding to a very large number of preserved sites in Kona. The site and situation of the project are such that there will be no loss of scenic character or interference with viewplanes, even considering the development going on around the area. Water quality impacts are being minimized through connection to a wastewater plant, drainage improvements that retain stormwater on site, and construction Best Management Practices that limit erosion and sedimentation. Traffic impacts have been assessed with a cumulative perspective, and with mitigation the project will have only limited impacts on local traffic flow.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur; the apartment project matches the multiple-family residential zoning and land uses in adjacent areas.
11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the property is located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk, and the project is not imprudent to construct.
12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* The project site is not noted for its natural beauty in the Hawai‘i County General Plan. Analysis of protected scenic viewplanes has determined that the development will not intrude into the sight lines from any such viewplane, including views from Mamalahoa Highway of the coast. No aspect of the proposed action would adversely impact scenic resources or viewplanes.
13. *The project will not require substantial energy consumption.* Although the project’s infrastructure construction will require the use of energy, as will construction of the dwelling units, the development’s electrical requirements are within HELCO’s capacity and no major adverse effects to energy consumption would be expected, and there is no feasible way to provide housing without energy consumption. The Lokahi Ka‘u design will include energy efficient lighting fixtures, solar water heating, low-flow plumbing fixtures, light-colored “cooling” roofs, low water use landscaping and, to the extent feasible, photovoltaic solar panels, all of which reduce energy use.

For the reasons above, the Proposed Action will not have any significant effect in the context of Chapter 343, Hawai‘i Revised Statutes and section 11-200-12 of the State Administrative Rules.

REFERENCES

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ENVIRONMENTAL ASSESSMENT
LOKAHI KA‘U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 1a
Comments in Response to Early Consultation

Harry Kim
Mayor



Bruce C. McClure
Director

Jiro A. Sumada
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
www.co.hawaii.hi.us

September 18, 2008

Ron Terry, Principal Geometrician Associates
Geometrician Associates, LLC.
P.O. Box 396
Hilo, Hi. 96721

Subject: Early Consultation for Environmental Assessment for Lokahi Ka'u
Affordable Housing Project, TMK: 7-3-010:003, North Kona, Hawaii

We have no comments to offer at this time. Please provide us with a copy of the EA when completed.

If you have any questions, please contact Kiran Emler of our Kona office at 327-3530.

Galen M. Kuba, Division Chief
Engineering Division

KE
c: ENG - HILO/KONA
Planning Director

Harry Kim
Mayor



Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2389

September 22, 2008

Mr. Ron Terry
Principal
Geometrician Associates
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for Lokahi Ka'u
Affordable Housing Project, North Kona, Island of Hawaii
TMK: 3rd 7-3-010:003

This responds to your September 15, 2008, letter requesting comments on any special environmental conditions or impacts related to the above development.

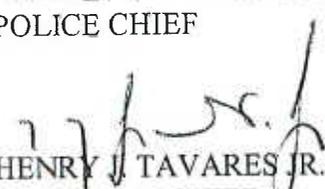
Staff has reviewed the above-referenced document and submits the following comments:

- Recommends development address issues or concerns related to traffic safety, flow, and connectivity.
- Ensure traffic design addresses emergency response plans.
- Implement strategies to address pedestrian safety.

Should you have any questions, please contact Captain Chad Basque, Commander of Kona Patrol, at 326-4646, extension 249.

Mahalo,

LAWRENCE K. MAHUNA
POLICE CHIEF


HENRY J. TAVARES JR.
ASSISTANT CHIEF
AREA II OPERATIONS

Harry Kim
Mayor



Bobby Jean Leithead Todd
Director

Nelson Ho
Deputy Director

County of Hawaii

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720-4252

(808) 961-8083 • Fax (808) 961-8086

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

September 26, 2008

Mr. Ron Terry
Principal
Geometrician Associates, LLC
P O Box 396
Hilo, HI 96721

Subject: Early Consultation for Environmental Assessment for Kolahi Ka'u
Affordable Housing Project
TMK: 7-3-010:003, North Kona, Island of Hawai'i

Dear Mr. Terry,

We offer the following comments:

Solid Waste Division

The Solid Waste Management Plan could be included in the Environmental Assessment to save project time in the future. (Guidelines are enclosed.)

If there are additional Solid Waste questions, don't hesitate to contact Mike Dworsky, SWD Chief, at 961-8515.

Wastewater Division

See enclosed comments.

Thank you for allowing us the opportunity to review and comment on this project.

Sincerely,

Bobby Jean Leithead Todd
DIRECTOR

cc: Mike Dworsky, SWD Chief
Dora Beck, WWD Chief

enclosures

Hawai'i County is an equal opportunity provider and employer.

11131A

Harry Kim
Mayor



Bobby Jean Leithead-Todd
Director

Nelson Ho
Deputy Director

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai'i 96720-4252
(808) 961-8083 • Fax (808) 961-8086

September 14, 2007

SOLID WASTE MANAGEMENT PLAN
Guidelines

INTENT AND PURPOSE

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

REPORT

The consultant's report will contain the following:

1. Description of the project and the potential waste it may be generating: i.e. analysis of anticipated waste volume and composition. This includes waste generated during the construction and operational phases. Greenwastes will be included in this report for both construction grubbing and future operational landscape maintenance.
2. Description and location of the possible sites for waste disposal or recycling. We will not allow the use of the County transfer stations for any commercial development; commercial development as defined under the policies of the Department of Environmental Management Solid Waste Division.
3. Since the Department of Environmental Management promotes recycling, indicate onsite source separation facilities by waste stream; i.e. source separation bins of glass, metal, plastic, cardboard, aluminum, etc. Provide ample and equal space for rubbish and recycling.
4. Identification of the proposed disposal site and transportation methods for the various components of the waste disposal and recycling system, including the number of truck traffic and the route that truck will be using to transport the waste and recycled materials.



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION

COUNTY OF HAWAII - 108 RAILROAD AVENUE - HILO, HI 96720
HILO (808) 961-8083 FAX (808) 961-8086

MEMORANDUM

September 23, 2008

To: Bobby Jean Leithead Todd, Director
From: L. Hirota, Acting Deputy Chief 
Subject: **TMK 7-3-010:003, Lokahi Ka`u Affordable Housing Project
Early Consultation for Environmental Assessment**

The Wastewater Division (WWD) has reviewed Geometrician Associates, LLC letter of September 15, 2008 regarding preparation of an Environmental Assessment (EA) for the State of Hawai`i, Hawai`i Housing Finance and Development Corporation (HHFDC) for development of 306 affordable housing apartment units on the subject property and provides the following comments.

1. The property is within the Kona Community Development Plan (Kona CDP) Planning area and is projected to be serviced by a new future Wastewater Treatment Plant located in the vicinity of TMK 7-3-009:005 in accordance with the Kona CDP PUB-4.5, Wastewater Treatment and Effluent Reuse.

Should there be any comments or questions on the above, please contact me at 808-961-8333 (lhirota@co.hawaii.hi.us) or you may contact Dora Beck, P.E., Division Chief at 808-961-8513 (dbeck@co.hawaii.hi.us).

cc: Dora Beck, P.E., Division Chief
Merton Ogata, West Hawai`i Superintendent
Antoinette Nakatani, EST III

LINDA LINGLE
GOVERNOR OF HAWAII

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



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 30, 2008

Geometrician Associates, LLC
Box 396
Hilo, Hawaii 96721

Attention: Mr. Ron Terry

Gentlemen:

Subject: Early consultation for environmental assessment for Lokahi Ka'u
Affordable Housing Project

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Land Division, Engineering Division, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,


Morris M. Atta
Administrator



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 19, 2008

MEMORANDUM

TO: **DLNR Agencies:**
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Commission on Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division – Hawaii District /Gary Martin

FROM: *for* Morris M. Atta *Thielen*
SUBJECT: Early consultation for environmental assessment for Lokahi Ka'u Affordable Housing Project
LOCATION: North Kona, Hawaii, TMK: (3) 7-3-10:3
APPLICANT: Pacific Housing Advisors

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 30, 2008.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

RECEIVED
LAND DIVISION

2008 SEP 30 A 9:08

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *C. Thielen*
Date: 9/29/08

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/MorrisAtta

Ref.: Early Con EALokahiKauHousing
Hawaii.408

COMMENTS

- We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ____.
- Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone X. The Flood Insurance Program does not have any regulations for developments within Flood Zone X.**
- Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ____.
- Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
- Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
- Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

- The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

- The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.**

- Additional Comments: _____
- Other: _____

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: 
ERIC T. HIRANO, CHIEF ENGINEER

Date: 9/29/09

LINDA LINGLE
GOVERNOR OF HAWAII



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



RECEIVED
LAND DIVISION

2008 SEP 25 A 10:01

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

SEP 23 11:55

RECEIVED
STATE OF HAWAII

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 19, 2008

MEMORANDUM

TO:

DLNR Agencies:

- Div. of Aquatic Resources
- Div. of Boating & Ocean Recreation
- Engineering Division
- Div. of Forestry & Wildlife
- Div. of State Parks
- Commission on Water Resource Management
- Office of Conservation & Coastal Lands
- Land Division - Hawaii District / Gary Martin

FROM:

for Morris M. Atta *Maalene*

SUBJECT: Early consultation for environmental assessment for Lokahi Ka'u Affordable Housing Project

LOCATION: North Kona, Hawaii, TMK: (3) 7-3-10:3

APPLICANT: Pacific Housing Advisors

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 30, 2008.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed:

[Signature]

Date:

9/23/08

Harry Kim
Mayor



Darryl J. Oliveira
Fire Chief

Glen P.I. Honda
Deputy Fire Chief

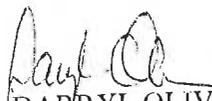
County of Hawai'i
HAWAII FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 981-8394 • Fax (808) 981-2037

October 7, 2008

Mr. Ron Terry
Geometrician Associates
PO Box 396
Hilo, Hawaii 96721

**SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT
LOKAHI KAU AFFORDABLE HOUSING PROJECT
TMK: 7-3-010:003, NORTH KONA, ISLAND OF HAWAII**

We have no comments to offer at this time in reference to the above-mentioned early consultation for Environmental Assessment.


DARRYL OLIVEIRA
Fire Chief

GN:lpc

ENVIRONMENTAL ASSESSMENT

LOKAHI KA‘U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 1b
Comments to Draft EA and Responses

Harry Kim
Mayor



Bobby Jean Leithead Todd
Director

Nelson Ho
Deputy Director

County of Hawaii

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720-4252

(808) 961-8083 • Fax (808) 961-8086

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

November 13, 2008

Mr. Ron Terry
Principal
Geometrician Associates, LLC
P O Box 396
Hilo, HI 96721

Subject: Draft Environmental Assessment
Lokahi Affordable Apartments
TMK: 7-3-010:003, North Kona, Island of Hawai'i

Dear Mr. Terry,

We have no further comments to offer on the subject project.

Thank you for allowing us the opportunity to review and comment.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bobby Jean Leithead Todd".

Bobby Jean Leithead Todd
DIRECTOR

cc: WWD
OEQC
Planning Department

enclosures

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

December 17, 2008

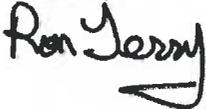
Ms. Bobby Jean Leithead-Todd, Director
Hawai'i County Department of Environmental Management
25 Aupuni Street, Rm. 210
Hilo HI 96720

Dear Ms. Leithead-Todd:

**Subject: Comment to Environmental Assessment for Lokahi Ka'u
Affordable Apartments, TMK 7-3-010:003, North Kona, Island
of Hawai'i**

Thank you for your comment letter on the Draft EA dated November 13, 2008, in which you stated that your agency had no further comments at this time. We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Daryn Arai, Hawai'i County Planning Department



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 25, 2008

Geometrician Associates
Box 396
Hilo, Hawaii 96721

Attention: Mr. Ron Terry

Ladies and Gentlemen:

Subject: Draft environmental assessment for Lokahi Kau Affordable Apartments

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Engineering Division, Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,


for Morris M. Atta
Administrator

cc: OEQC
County Planning Department

LINDA LINGLE
GOVERNOR OF HAWAII



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



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 13, 2008

RECEIVED
LAND DIVISION

2008 NOV 25 A 9:13

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

- TO: **DLNR Agencies:**
- Div. of Aquatic Resources
 - Div. of Boating & Ocean Recreation
 - Engineering Division
 - Div. of Forestry & Wildlife
 - Div. of State Parks
 - Commission on Water Resource Management
 - Office of Conservation & Coastal Lands
 - Land Division -

FROM: *for* Morris M. Atta *Thielen*

SUBJECT: Draft environmental assessment for Lokahi Kau Affordable Apartments

LOCATION: North Kona, Hawaii, TMK: (3) 7-3-10:3

APPLICANT: Geometrician Associates on behalf of the County of Hawaii

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 1, 2008.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *C. J. Thielen*

Date: 11/24/08

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/MorrisAtta

Ref.: DEALokahiKauApartments
Hawaii.417

- We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ____.
- Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program (NFIP) does not have any regulations for development within these areas.
- Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ____.
- Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

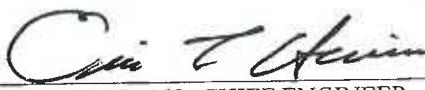
Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- Mr. Robert Sumitomo (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
 - Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
 - Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
 - Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.
- The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
 - The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

Additional Comments: _____

- Other: Our previous comments dated September 29, 2008, which is included in the Draft Environmental Assessment, still apply.

Should you have any questions, please call Ms. Suzie Agraan of the Planning Branch at 587-0258.

Signed: 
ERIC T. HIRANO, CHIEF ENGINEER

Date: 11/24/08

geometrician

ASSOCIATES, LLC

integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

December 17, 2008

Morris M. Atta, Administrator
Land Division
Hawai'i State DLNR
P.O. Box 621
Honolulu, HI 96809

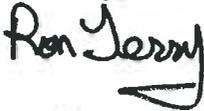
Dear Mr. Atta:

**Subject: Comment to Environmental Assessment for Lokahi Ka'u
Affordable Apartments, TMK 7-3-010:003, North Kona, Island
of Hawai'i**

Thank you for the comment letter dated November 25, 2008, transmitting the memo from the Engineering Division stating that their comments dated September 29, 2008, and reproduced in the Draft EA, still apply. Water calculations have just been completed for the project and are attached per your request.

We very much appreciate your distribution of the EA to the various divisions of DLNR and their review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Daryn Arai, Hawai'i County Planning Department

Lokahi Kau Apartments Water Demand Calculations 11-7-08

Total Water Units Available to Project 306 Dwelling Units
 Department of Water Supply Water Unit by Definition 400 gallons per day (gpd)

Total volume of daily water commitment = (total project dwelling units)(Value of water unit)
 = 122,400 gpd

Revised Consumption for 1 bedroom and Studio units assumed as 200 gpd

Dwelling Unit Breakdown	Consumption (gpd)		Total Water Demand (gpd)
2 BDR	108	400	43,200
1BDR	108	200	21,600
Studio	90	200	18,000
Revised total			82,800 gpd

Available water within the 306 water unit allotment:

Volume of water commitment -	122,400 gpd
Revised consumption	<u>82,800 gpd</u>
Water available within commitment	39,600 gpd

Equivalent Available water units: = available water/400 gpd= 99 units

Project will require 1 unit for the office	400 gpd
Irrigation requires	<u>16,000 gpd</u>
Sub-total	16,400 gpd
Revised unit total	<u>82,800 gpd</u>
Revised Project Total	99,200 gpd

Revised project total is within the allotment



United States Department of the Interior

NATIONAL PARK SERVICE
Kaloko-Honokohau National Historical Park
73-4786 Kanalani St., Suite 14
Kailua-Kona, HI 96740

IN REPLY REFER TO:
L7621

December 8, 2008

Mr. Ron Terry
Geometrician Associates, LLC
PO Box 396
Hilo, HI 96721

RE: Lokahi Ka`u Affordable Apartments Draft EA (TMK: (3rd) 7-3-010:003)

Dear Mr. Terry:

Thank you for providing the National Park Service with the opportunity to review the Draft Environmental Assessment for the County of Hawaii's proposed Lokahi Ka`u Affordable Apartments. As you are aware, Kaloko-Honokohau National Historical Park was authorized in 1978 by Congress to preserve, interpret, and perpetuate traditional native Hawaiian activities and culture (Public Law 95-625). Water quality and quantity are vital to the integrity of this mission. The National Park contains two large (11 and 15- acre) ancient Hawaiian fishponds with large associated wetlands, more than 155 known anchialine pools, and 596 acres of marine waters. The pools and fishponds are significant cultural resources that define the Park and also provide habitat for nine federally protected and candidate endangered species. The National Park water resources are fed by, and in the case of the anchialine pools and `Aimakapa Fishpond, are solely dependent upon, ground water inputs to maintain these ecosystems. The anchialine pools support three known candidate endangered species. `Aimakapa Fishpond and wetland is a significant foraging and nesting habitat for two endangered waterbird species, the Hawaiian stilt and the Hawaiian coot, and is an important habitat for migratory waterfowl.

Although this project is not within a land-use district boundary amendment in which the National Park Service (NPS) has intervened, the potential impacts to National Park resources and the issues are similar to those described in the TSA Corporation and other recent land use district boundary amendments. The NPS requests that protective conditions be placed on the development to protect water resources in the National Park from nonpoint source pollution. The Land Use Commission has recognized the potential adverse impacts of upslope development and the obligation to protect and preserve the resources of the National Park, as acknowledged in the following statement:

This Commission is acutely aware that continuous development is planned for this coastline. Although each developer might claim that only a “small amount” of pollution will result from their development and that the area’s ecosystem will show “little” effects, these developments and their impacts are cumulative and, absent strong mitigation measures, have the potential to devastate the fragile resources of the coastal and marine aquatic environments of the entire Kona coastal region.

The LUC further expressly determined that:

[N]ative Hawaiian rights and natural and cultural resources would be damaged or destroyed by the pollution of groundwater that reaches the National Park from surrounding areas, including [TSA]’s proposed development at the Kaloko Industrial Park. Appropriate mitigation measures are, therefore, required under the Hawaii Constitution . . . in order to approve reclassification of the project area.

(LUC 2002, Docket A00-732 Findings of Fact Conclusions of Law Decision and Order; Conclusion of Law ¶ 7)

The Lokahi Ka’u Affordable Apartments Project area is northeast and upgradient, approximately 1.7 miles from the Park and within the area of concern regarding protection of our water resources. To properly mitigate potential impacts to the State’s, the County’s and the National Park’s outstanding cultural and natural resources including ground water, ancient fishponds, anchialine pools, coastal waters and coral reefs, the NPS respectfully requests that the County adopt applicable LUC conditions (LUC FFCLDO Docket No.A00-732) concerning protection of water resources (wastewater, storm and surface water runoff, and pollution prevention) for the proposed Lokahi Ka’u Affordable Apartments.

Surface Water Drainage, Non-point Source Pollution

The prevailing geologic condition of the project area is highly permeable lava with few accumulated soils. Rain and runoff water carry pollutants quickly to ground water, on to coastal anchialine pools, and into the nearshore waters. This part of Kona has no streams or typical surface waters other than the anchialine pools, which are essentially exposed ground water hydrologically connected to the ocean. Therefore, ground-water flow may be considered similar to an underground stream, that is, a conduit for pollutants to surface waters at the coast. While rainfall in the area averages 19-22 inches per year, rainfall accumulation is typically concentrated in a few, intense events, which can cause a pulse of pollution flushing to drainage systems. Currently the County Department of Public Works standards for drainage wells do not address protection of significant environmental resources, but rather solely consider flood control and volume of runoff

In 2002, the Hawaii County Council joined the Land Use Commission in recognizing the need to address nonpoint source pollution in the region surrounding the National Park. The Council applied the following condition to Ordinance No. 02 114 amending the County Zoning Code for

the TSA project, and again in 2004 with Ordinance No. 04 100 amending the County Zoning Code for the Lanihau Partners LLC's West Hawaii Business Park:

In order to address and mitigate potential impacts from non-point source pollutants, the applicant shall participate with the County of Hawaii in a pilot storm drain program for roadways within the Kaloko-Honokohau region. This pilot program may potentially include other developments within the County and apply to all other government and private developments. ... The drainage system within road rights-of-way shall include storm drain filtration devices which meet the approval of the Department of Public Works, in consultation with the National Park Service...

(County of Hawaii Ordinance No. 02 114, Section 2, Condition F and Ordinance No. 04 110, Section 2, Condition O)

In consideration of the above, the National Park Service respectfully requests that the County of Hawaii's Lokahi Ka'u Affordable Apartments participate in this pilot project and include pollution filtration devices and other stormwater runoff engineering designs as mitigation to protect coastal water resources, and that the Project follow applicable portions of Docket A00-732 conditions 2a, 2b, 2h, 3c, 3d, and 3e in consultation with the National Park Service (the docket is available for download on the LUC website). In addition, the NPS asks that the Lokahi Ka'u Affordable Apartments Project provide the facility manager and residents with information about controlling non-point source pollution, including vehicle maintenance and proper disposal of vehicle fluids, the impacts of washing cars on the street, and minimizing fertilizer and pesticide use. Additionally, enforceable controls on approved chemicals and uses by property owners and maintenance crews on yards and common areas should be proposed as mitigation to protect ground water. Please assist the tenants and property managers in understanding the potential impacts of fertilizers and pesticides on the environment and the Park.

Wastewater

The EA fails to adequately address the water quality impacts of the project. The draft EA (p. 25) states, "The change of zone ordinances also required that the applicant construct a wastewater treatment plant meeting the specifications and requirements of the State Department of Health. To conform with this requirement, the applicant has acquired joint ownership of a private sewage treatment plant on adjacent land (TMK 7-3-009:005) that will be upgraded to accommodate the project." However, no specific details are provided regarding sewage treatment and fate of the effluent. In order to protect downgradient water resources, The NPS requests the Lokahi Ka'u Affordable Apartments, install or upgrade the wastewater system(s) to remove no less than 80% total nitrogen from the treatment system.

Water System

The EA states, "Water would be provided via a waterline located along Kakahiaka Street, which is part of the Hawai'i county Department of Water Supply (DWS) system." The source of water appears to be the Kalaoa Well. However, the water usage calculations are not included in the EA and therefore the EA has failed to sufficiently analyze impacts of water withdrawal. The NPS is highly concerned about the cumulative impacts of ground-water withdrawal to the cultural and natural resources in the Park that are dependent upon ground-water flow. The NPS requests that the Environmental Assessment for the Lokahi Ka'u Affordable Apartments Project include

information as to the amount of water required for the project and how that amount adds cumulatively to the current usage of ground water and the proposed needs of the surrounding developments. In particular, the draft EA does not analyze these impacts in the context of other withdrawals, existing and planned, from the aquifer. Although the water withdrawal amount may be small given this project's size, and small relative to the recharge rate of the aquifer, we note that this project is only one of many developments that are proposed in the vicinity, and that the cumulative impacts of these withdrawals will be significant. A review of the water needs of proposed developments around the National Park show a proposed demand of approximately 19.029 million gallons per day within the vicinity of the Park (Table 1). The NPS also requests that the County look for ways to reduce water usage in the Lokahi Ka'u Affordable Apartments Project. Some proven methods for reducing water usage in new housing developments include planting drought resistant native landscaping, installing low flow toilets and showerheads, installing waterless urinals in public restrooms, and providing information to new residents concerning the importance of water conservation. Water conservation will save the Lokahi Ka'u Affordable Apartments Project operational costs in the long term.

Roadways and Traffic

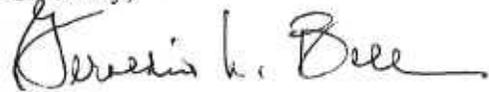
We note that p. 26, fifth paragraph, states, "The approximately 400 units were determine to generate almost 2600 trips in or out on a typical weekday, with 188 trips in the AM peak hour and 232 trips in the PM peak hour." The Project Summary on page iii states that this project is for 306-units, not 400. In any case, we consider the 2600 trips generated from this project as a significant increase, particularly along the Queen Ka'ahumanu Highway, which provides access to the National Park, and cumulatively with the many other developments proposed and planned for this area including but not limited to: Kula Nei, Kaloko Heights, Kaloko Makai, The Shores at Kohanaiki, Palamanui, West Hawaii Business Park, Kaloko Phases III & IV and O'oma Beachside villages.

Secondary and Cumulative Impacts

The EA states, "Water quality impacts are being minimized through connection to a private wastewater plant, drainage improvements that retain stormwater on site, and construction Best Management Practices that limit erosion and sedimentation." However, we note that no specifics or mitigation regarding effluent from the wastewater plant (e.g. will it be injected, or used as irrigation?), no mitigating measures for pollutants carried in stormwater, and no Best Management Practices for erosion and sedimentation are provided. The EA fails to adequately address cumulative impacts, particularly as they affect ground-water resources quantity and quality of the area and the National Park.

I appreciate this opportunity to provide our concerns. Please contact me, 808-329-6881 ext. 1201, or my Resource Manager Sallie Beavers at ext. 1220, to discuss any questions you may have on our comments.

Sincerely,

A handwritten signature in cursive script that reads "Geraldine K. Bell". The signature is written in black ink and is positioned below the word "Sincerely,".

Geraldine K. Bell
Superintendent

cc: D. Arai, County of Hawaii Planning Department
G. Kuba, County of Hawaii Public Works
M. Pavao, County of Hawaii Department of Water Supply
Director, Office of Environmental Quality Control
C. Hew, Dept of Health, Ground Water Protection Program
Office of Planning, Hawaii Coastal Zone Management Program
G. Lind, Office of the Solicitor
C. Pettee, NPS Water Rights Branch
NPS Pacific West Regional Office

Table 1. Estimated water demand for proposed developments in the vicinity of Kaloko-Honokohau National Historical Park. (TBD = to be determined).

Proposed Development	Water Demand (Mgd)	Aquifer	Proposed Use	Reference
Shores at Kohanaiki	1.1	Keauhou high-level	Domestic/Irrigation	2003 Special management area use permit petition, variously paginated
	0.4	Keauhou basal	Dust suppression	Well Construction and Pump Installation permit application
	2.2	Keauhou basal	Irrigation	2003 Special management area use permit petition, variously paginated
Kula Nei	0.12	Keauhou high-level	Domestic	2007 FEIS, Vol. I, Page 4-177
Kealakehe Planned Community	4.75	Keauhou high-level	Domestic	1990 FEIS, Section 5.3
Keahuolu Housing	0.75	Keauhou high-level	Domestic	2007 DEIS, Page 2-21
Kaloko Heights	0.86	TBD	Domestic	LUC Decision & Order Docket A81-525, Page 10.
West Hawaii Business Park	0.37	TBD	Industrial	2003 FEIS, Page 4-128
Kaloko Industrial Park Phases III & IV	0.33	TBD	Industrial	2000 FEIS, Page 3-49
McClellan Honokohau Properties	0.21	TBD	Industrial	1991 LUC Decision & Order Docket A89-643, Page 18
Kona Kai Ola	2.6	Keauhou high-level	Domestic	
	TBD	Keauhou basal	Domestic / Irrigation	2007 FEIS, Pages 4-60 – 4-61
Kaloko Transitional Housing	TBD	TBD	Domestic	2008 Draft EA
Kaloko Makai	2	TBD	Domestic	Estimated from 400 gpd x 5000 homes
	TBD	TBD	Irrigation	
O'oma Beachside Village	0.694	TBD	Domestic & Irrigation	2008 DEIS Page 79
	0.405	Keauhou basal	Irrigation	
Palamanui	0.44	TBD	Domestic	Estimated from 400 gpd x 1100 homes
	1.8	Keauhou high-level	Irrigation	Water Resources Bulletin
>19		Mgd	Total Estimated Water Demand	

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integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

December 17, 2008

Ms. Geraldine K. Bell, Superintendent
Kaloko-Honokohau National Historical Park
73-4786 Kanalani Street, #14
Kailua-Kona, Hawaii 96740

Dear Ms. Bell:

**Subject: Comment to Environmental Assessment for Lokahi Ka'u
Affordable Apartments, TMK 7-3-010:003, North Kona, Island
of Hawai'i**

Thank you for your comment letter dated December 8, 2008, on the Draft EA. In answer to your specific comments:

1. *Value of the National Park.* I would first of all like to state that the project managers and I recognize and appreciate the extraordinary resources of the National Park and the assets it brings to the community, State and nation. I have been following or attending the working group meetings on the water situation in Kona and I understand the Park's viewpoint about the nature and extent of the threat to the resources at the Park, as well as the somewhat different views of some local hydrologists and biologists and the Department of Water Supply. While we recognize the need to address cumulative impacts in an EA, the issue is far more complex than what can be dealt with in an EA for a relatively modest 306-unit affordable apartment complex that is not adjacent to the Park and only a very small part of the overall urban development in the region. Nevertheless, the project managers take your concerns seriously and would like to improve those aspects of the project related to water quality and quantity that can feasibly be adjusted within the context of a critically needed affordable housing project that will serve the struggling families of this area.

2. *LUC conditions on the TSA, Lanihau and other projects.* We note that the Park intervened in these applications at various times in the last 10 years and the LUC imposed conditions upon them, presumably because of their close proximity to the Park (both were directly adjacent to the Park and within half a mile of its coastal waters) and the industrial nature of the proposed land use. Although we do not have any information on why the Park chose not to become involved in the State Land Use Boundary

Amendment for Lokahi, which occurred after TSA and Lanihau, it is logical to assume that some of the factors may have been the much greater distance (over two miles to the coast), the very indirect connection (Lokahi is also almost two miles north of the Park and not in the same watershed), the mauka location, and the more benign, residential nature of the development. Various State and County agencies did participate, and after carefully examining project, a State Land Use Boundary Amendment and Change of Zone were issued without requiring the conditions you mention for TSA. The impacts that you enumerate were never brought up as an issue during these proceedings. It is appropriate and equitable to debate and establish such conditions at the outset of reclassifying land, particularly when the proposed land use is a vital public project such as affordable housing that is critically needed and difficult to develop within the limited budget typically available.

3. *Surface water drainage.* Around the country, directing storm water to drywells, as proposed here, is considered a far superior method for controlling polluted runoff than channeling it to rivers, streams and drainage canals, because the passage of the water through hundreds of feet of aerated rock provides significant natural remediation. Although some residual pollution may be transmitted, particularly in highly permeable rock, we would note that the project does not lie uphill of the Park, but instead almost two miles to the north, above NELHA and the Kona International Airport. While it is an important State and County goal to reduce pollution to minimal acceptable levels, this is the job of the appropriate State and County agencies through laws and regulations, with which the project will fully comply. The project will be unable to comply with your requests for advanced stormwater pollution filtration devices. We note although Lokahi Ka'u Affordable Apartments are not near or above the Park, the Park is surrounded by a large commercial harbor, two Industrial Parks and quarries, and a major resort in development. In this context, the pollution contribution of the Lokahi Ka'u Affordable Apartments would be an infinitesimal proportion of pollutants. However, the project manager is willing to take a number of steps that had not previously been considered in order to reduce the pollutants that come off the site. In particular, after consulting other projects that have added elements to address the Park's concerns, the project managers have agreed to add the following elements:

- *Storm and Surface Water Runoff.* The Lokahi Ka'u Affordable Apartments will build and maintain permanent storm and surface water runoff best management practices consisting of grassed swales in various surfaces, including landscaped areas and surfaces around drywells and detention basins, if appropriate. These will assist in treating the first-flush runoff volume to remove pollutants from storm and surface water runoff. Drainage injection wells or subsurface drainage structures will be designed with a debris catch basin to allow the detention and periodic removal of rubbish and sediment deposited by runoff. Storm water runoff shall first enter the debris catch basin before flowing into the drainage well. The debris catch basin's volume will be designed using current industry and engineering standards. The debris catch basin will be periodically inspected and cleaned accordingly.

- *Signage.* The complex will include signage for all drainage injection wells with warnings such as the following: “DUMP NO WASTES. DUMPING IS ILLEGAL AND MAY BE REPORTED TO 974-4000, ext. 64258.” and “GOES TO GROUNDWATER AND OCEAN. HELP PROTECT HAWAII’S ENVIRONMENT.” Signage will be stand-up signs or riveted placards, or be painted on a paved surface next to the drainage well’s inlet. Signage will be situated so that it will not obscure scenic views, contribute to visual blight, or obstruct an accessible route.
- *Pollution Prevention.* The facility will develop a Site Manager’s Pollution Prevention Plan that addresses environmental stewardship and the non-point sources of water pollution that can be generated in residential areas, and provides best management practices for pollution prevention. The Pollution Prevention Plan will include policies on water conservation, lot and landscape runoff, erosion control, use of fertilizers, use of pesticides, environmentally safe automobile maintenance, and management of household chemicals. The Plan will include information on the National Park, and the nationally significant cultural and natural resources within the National Park.

This information has been added to the Final EA.

4. *Wastewater.* A wastewater treatment plant meeting all the requirements of the Department of Health has already been designed and approved by the DOH. It is too late in the design process to change the design of the plant, and in any case, considering the context, the plant will be adequate to treat wastewater and protect groundwater resources. Upon request, the project managers would be happy to supply you further information on the plant. It is also important to note that many new residents of affordable housing projects are residents doubled up in existing housing in the area. Considering that many existing homes in Kona have rudimentary wastewater treatment, if any, relocating these residents to a development where wastewater is treated adequately may actually provide a net benefit in terms of total treated regional wastewater. This information has been added to the Final EA.

5. *Water system.* We appreciate your provision of the figure of the 19.029 MGD demand for potable water in the vicinity of the National Park. A water calculation that was completed on November 7, 2008, determined that the project would use 99,200 gallons per day, or about 0.5 percent of the above total. Both of these figures have been added to the Final EA. Any coherent discussion of how such withdrawals affect the water flux into the National Park is not feasible, as there is only extremely limited information on the hydrogeologic structures that compartmentalize the regional aquifers tapped by various DWS and private wells. This is a regional issue that must be addressed over a long period of time through careful study by expert agencies, and this study is progressing. However, the points concerning drought-resistant native landscaping, low-flush toilets and showerheads, waterless urinals, and providing water conservation information to new residents are reasonable, and the project managers are willing to add these elements to the project wherever feasible. The project is also seriously exploring the use of treated greywater for irrigation to further reduce water use. And again, similar

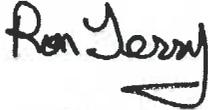
to wastewater, relocating currently doubled-up residents to a development with water conservation measures in place may actually provide a net benefit in terms of total water used. This information has been added to the Final EA.

6. *Roadways and traffic.* These issues were considered by the County Planning Commission, and the County Council in consultation with the State Department of Transportation, the County Department of Public Works, and the Police. It is inevitable that new residents will travel throughout the region, but this is the region that State and County plans have for many years designated as the primary growth area of Kona, and the area for which infrastructure projects such as the Mid-Level Road and the widening of the Queen Ka'ahumanu Highway have specifically been planned.

7. *Secondary and cumulative impacts.* The treated water effluent will be partially used for irrigation and partially injected into the ground in complete conformance with Department of Health rules. A National Pollutant Discharge Elimination System permit will be obtained for the project which will specify the best management practices to reduce erosion and sedimentation. This information has been added to the Final EA.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

A handwritten signature in black ink that reads "Ron Terry". The signature is written in a cursive style with a large, stylized "R" and "T".

Ron Terry, Principal
Geometrician Associates

Cc: Daryn Arai, Hawai'i County Planning Department



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

December 15, 2008

Mr. Ron Terry
Geometrician Associates
P.O. Box 396
Hilo, Hawai'i 96721

Dear Mr. Terry:

Subject: Draft Environmental Assessment for the Lokahi Ka'u Affordable Apartments,
Kalaoa, North Kona, TMK: 7-3-010:003

The Department of Education (DOE) has reviewed the Draft Environmental Assessment (DEA) for the Lokahi Ka'u Affordable Apartments (Lokahi Apartments). On page 25 of the DEA, under the heading 3.3.1 Utilities and Public Services, there is a statement that "All schools (referring to the Kealakehe schools) have additional capacity for students." That is not true, currently enrollment at Kealakehe High School is higher than its facility capacity and it is expected to remain that way for the next six years. Enrollment at Kealakehe Elementary is currently very close to its facility capacity and enrollment is expected to exceed facility capacity in the next school year.

The Lokahi Apartments will have an impact on the Kealakehe schools along with many other residential projects proposed for the North Kona area. The DOE anticipates the need for new or expanded schools to serve the growing area.

The 2007 Legislature passed a bill establishing school impact fees. The bill became Act 245 and is in the process of being implemented. Under this new law, it is possible the Lokahi Apartments will be required to pay an impact fee.

The Board of Education is expected to identify and adopt school impact districts for areas requiring new or expanded facilities in the future. We are presently operating under the interim language of the bill. Developers of all residential units within school impact districts will be required to have a written agreement with the DOE prior to the issuance of a building permit.

Mr. Ron Terry
Page 2
December 15 2008

We currently do not know the amount of the impact fee generated for this project. If the developers are interested in obtaining an early agreement, or if you have any questions, please contact Heidi Meeker of the Facilities Development Branch at (808) 377-8301.

Sincerely yours,



Duane Y. Kashiwai
Public Works Administrator
Facilities Development Branch

DYK:jmb

c: Katherine Kealoha, OEQC
Christopher Yuen, Hawaii County Planning Department
Art Souza, CAS, Honokaa/Kealakehe/Kohala/Konawaena Complex Areas

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phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

December 17, 2008

Duane Y. Kashiwai
Public Works Administrator
Facilities Development Branch
Hawaii State Department of Education
PO Box 2360
Honolulu HI

Dear Mr. Kashiwai:

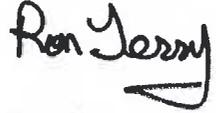
**Subject: Comment to Environmental Assessment for Lokahi Ka'u
Affordable Apartments, TMK 7-3-010:003, North Kona, Island
of Hawai'i**

Thank you for the comment letter dated December 15, 2008, on the Draft EA. In the letter, you stated that the project would have an impact on Department of Education (DOE) facilities. We would note that during the planning process, the project proponents sought out the opinion of the DOE and were informed by letter of February 22, 2007 (attached) that the development would not create an overflow situation at the Kealakehe Schools. We would also note that neither the State Land Use Boundary Amendment nor the County Change of Zone Ordinance contained conditions related to impacts to the Department of Education. However, in deference to this new information, the Final EA has been amended to include impacts to DOE facilities. Specifically, the Final EA states that current enrollment at Kealakehe High School is higher than its facility capacity and it is expected to remain that way for the next six years, that enrollment at Kealakehe Elementary is currently very close to its facility capacity and enrollment is expected to exceed facility capacity in the next school year, that the DOE has stated that along with many other residential projects proposed for the North Kona area, the Lokahi Ka'u Affordable Apartments will have an impact on the Kealakehe schools, and that the DOE anticipates the need for new or expanded schools to serve the growing area.

We have also included information on the fact that Act 245, which is currently being implemented, empowers the Board of Education to identify and adopt school impact districts for areas requiring new or expanded facilities in the future, and it possible the Lokahi Ka'u Affordable Apartments will be required to pay an impact fee.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

A handwritten signature in black ink that reads "Ron Terry". The signature is written in a cursive style with a large, sweeping flourish at the end.

Ron Terry, Principal
Geometrician Associates

Cc: Daryn Arai, Hawai'i County Planning Department

LINDA LINGLE
Governor



PATRICIA HAMAMOTO
Superintendent

Arthur Souza
Complex Area Superintendent

STATE OF HAWAII
Department of Education
Office Of The Complex Area Superintendent
West Hawaii Complex Areas
75-140 Hualalai Road
Kailua-Kona, Hawaii 96740

February 22, 2007

Mr. Bill Brooks
Entitlement Manager
Westpro Holdings, LLC
75-143 Hualalai Road, Suite 205
Kailua-Kona, Hawaii 96740

Dear Mr. Brooks:

Thank you for meeting with me last week to offer an update on your proposed housing project for North Kona.

As we discussed, your proposal would not create an overflow situation at the schools in the Kealakehe Complex. Your proposed project, to include 306 affordable rental units, would result in the following growth impact for our schools:

Elementary Students	77
Middle School Students	31
High School Students	37

Our current school facilities would be able to absorb this increased enrollment.

Please feel free to contact me if you need more information.

Sincerely,

A handwritten signature in black ink, appearing to read "Arthur Souza".

Arthur F. Souza
Complex Area Superintendent

Phone: (808) 327-4991 Fax: (808) 327-4994

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

ENVIRONMENTAL ASSESSMENT

LOKAHI KA‘U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 2
Floral and Faunal Study

Biological Surveys of TMK(3) 7-3-10:003, 051, 052,
053 & 054, as well as Portions of the Proposed
Homestead Road Conducted for the Lokahi Ka'ū
Development, North Kona District,
Island of Hawai'i.

Prepared by:

Reginald E. David
Rana Productions, Ltd.
P.O. Box 1371
Kailua-Kona, Hawai'i 96745

Prepared for:

Seascape Development, LLC
75-143 Hualalai Road, Suite 205
Kailua, Kona, Hawai'i 96740

July 14, 2006

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Introduction

This report summarizes the findings of botanical, avian and mammalian surveys conducted on an approximately 50-acre parcel of land identified as TMK (3) 7-3-10:003, 051, 052, 053 & 054, as well as an approximately 2,500 x 50-foot wide road right-of-way. The property is located to the south of the existing Palisades Subdivision, in the North Kona District, Hawai'i (Figure 1). Fieldwork was conducted on July 8, 2006.

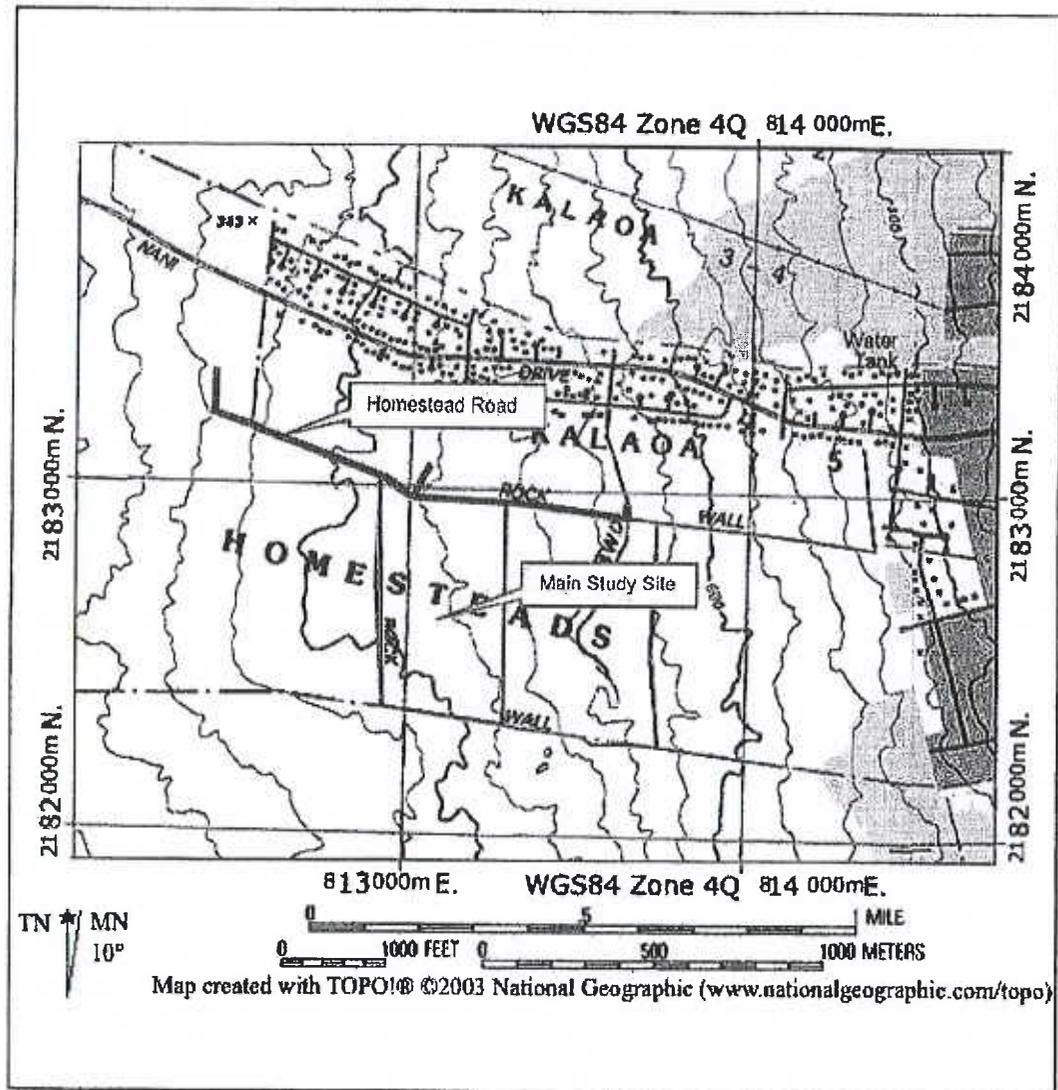
The primary objectives of the surveys were to:

- Conduct a 100% botanical survey of the Homestead Road right-of-way, and the short connections between it and Ane Kehokalole, Kakahiaka and Kapuahi Roads.
- Provide a general description of the vegetation within the right-of-way and prepare a species list of all plants recorded within the survey area.
- Conduct a reconnaissance level botanical survey of the approximately 50-acre development site, to verify that the habitat has not changed significantly since W. P. Char surveyed the site in 2003.
- Search and record any species currently considered to be rare, threatened, endangered, or currently proposed for listing under federal or State of Hawai'i endangered species statutes. The federal and State of Hawai'i listed species status follows species identified in the following referenced documents (Division of Land and Natural resources (DLNR) 1998, Federal Register 1999, 2005).
- Conduct an avian and mammalian survey of both the Homestead Road right-of-way and the 50±-acre development site.
- Make recommendations on appropriate mitigation to offset any deleterious impacts to any species documented on the site that are of special concern.

The avian phylogenetic order and nomenclature used in this report follows *The American Ornithologists' Union Checklist of North American Birds 7th Edition* (American Ornithologists' Union 1998), and the 42nd through the 46th supplements to *Check-list of North American Birds* (American Ornithologists' Union 2000; Banks et al. 2002, 2003, 2004, 2005). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Higher native and naturalized plant names follow *Manual of the Flowering Plants of Hawai'i* (Wagner et al. and Wagner and Herbst, 1990, 1999). Ornamental plant names follow *A Tropical Garden Flora: Plants Cultivated in the Hawaiian Islands and Other Tropical Places* (Staples and Herbst 2005). Place names follow *Place Names of Hawaii* (Pukui et al. 1974).

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text on Page 15.

Figure 1 Lokahi Ka'u Study Site



General Site Description

The approximately 50-acre site is located immediately south of the lower section of the Palisades Subdivision. The site is bound to the north by the existing subdivision and to the west, south and east by vacant land (figure 1). The site gently slopes from east to west from an elevation of ~ 450-feet above mean sea level (ASL) at the eastern boundary, down to ~ 370-feet ASL at the southwestern boundary (USGS 1996). The project area is sited primarily on a weathered broken pāhoehoe lava flow, though the southern third of the site is made up primarily of a large ridge of 'a'ā lava. The lava fields were disgorged

the site is made up primarily of a large ridge of 'a'a lava. The lava fields were disgorged from Mount Hualālai between 3,000 and 5,000 years ago, during the Holocene Epoch (Wolfe and Morris 1996, USGS 1996).

Botanical Survey Methods

A walking survey using wandering transects was used to cover the approximately 50-acre project site, identified as TMK(3) 7-3-10:003, 051, 052, 053 & 054. Additionally a 100% walking survey was conducted on the proposed Homestead Road right-of-way. Notes were made on plant identification, associations, distribution, substrates and any special geologic features that might have an affect on the flora present on the site. The southern one-third of the site covered with 'a'a lava was more intensely surveyed than the surrounding fountain grass/koa haole covered pāhoehoe flows found on the bulk of the site; since in Hawai'i rare plants are more likely to be found in such protected or less disturbed areas than elsewhere, especially in the largely alien species dominated lowlands. Boundaries and specific plant locations were determined using a handheld Garmin eTrex Vista[®] GPS unit.

Description of the Vegetation

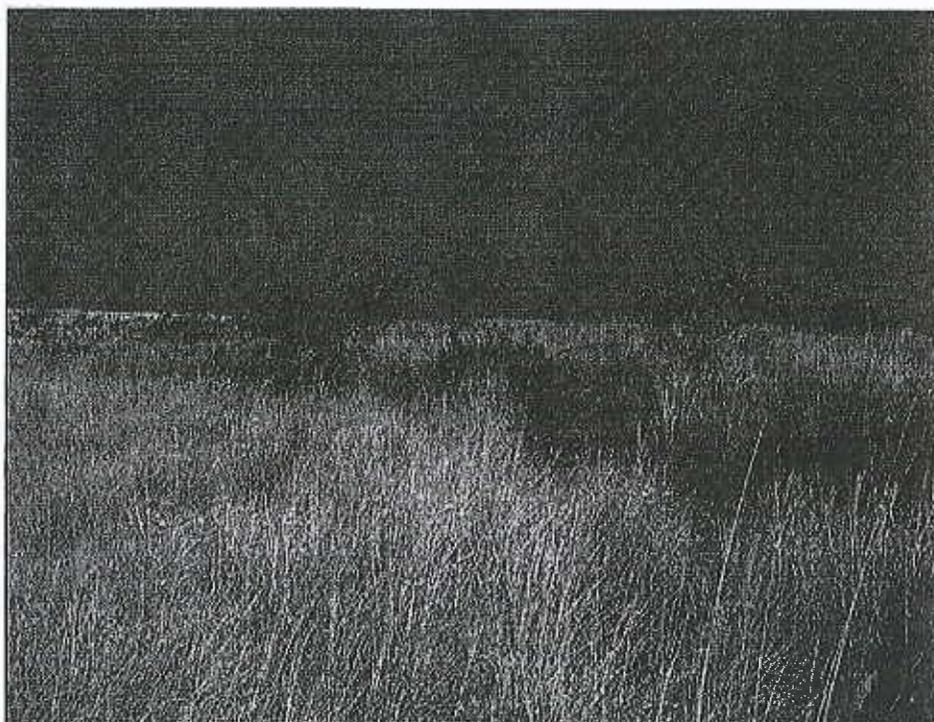
The vegetation within the project area can be best characterized as a Fountain Grass/ Koa Haole Grassland subtype of a Lowland Dry Grassland Community as described in Gagne and Cuddihy (1990) (Figure 2). A list of the plants recorded during time spent on the site and their current status is presented in Table 1.

The bulk of the site is dominated by dense, two-to-three foot tall fountain grass (*Pennisetum setaceum*). Within this fountain grass dominated grassland, numerous medium to large shrubby species including, Christmas berry (*Schinus terebinthifolius*), Koa haole (*Leucaena leucocephala*), klu (*Acacia farnesiana*), lantana (*Lantana camara*), noni (*Morinda citrifolia*) and maiapilo (*Capparis sandwicheana*). Smaller shrubs and weedy species include 'ilima (*Sida fallax*), indigo (*Indigofera suffruticosa*), 'uhaloa (*Waltheria Indica*). The northern half of the property, that portion closest to the Palisades Subdivision, shows signs that it has burnt in the past. Within this area there are also a number of bulldozed areas with little or no vegetation, except early emerging species typical of ruderal areas in the North Kona District such as, *Portulaca pilosa*, 'uhaloa, hairy spurge (*Chamaesyce hirta*), partridge pea (*Chamaecrista nictitans*), tomato (*Lycopersicon esculentum*), African tulip (*Spathodea campanulata*), fuzzy rattlepod (*Crotalaria incana*), and alien grasses including Natal redtop (*Melinis repens*) and swollen fingergrass (*Chloris barbata*).

On the 'a'a flow on the southern third of the site vegetation is generally sparse. Within this area there are a number of native species including 'a'ali'i (*Dodonea viscosa*), naio (*Myoporum sandwicense*), alahe'e (*Psydrax odorata*), huehue (*Cocculus orbiculatus*) and lama (*Diospyros sandwicensis*). Within this area many of the alien species listed

several areas within this substrate where pockets of soil has accumulated and small clumps of hairy swordfern (*Nephrolepis multiflora*) are flourishing.

Figure 2
Fountain grass/ Grassland on the Lokahi Ka'ū Project Site



Botanical Survey Results

A total of 39 different plant species were recorded growing within the study area (Table 1). Of these 39 species, nine or ten (23/25%) are recognized as being native to the Hawaiian Islands with two being endemic and seven or eight indigenous to the islands. One additional species, *noni* (*Morinda citrifolia*) is considered to have been an early Polynesian introduction to the islands. The remaining 28/29 species (72/74%) are alien species now considered to be naturalized in the islands (Table 1).

Table 1

Plants Recorded Within the Lohaki Ka'ū Study Site		
Scientific Name	Common Name	ST
FERNS		
PTERIDOPHYTA		
NEPHROLEPIDACEAE		
<i>Nephrolepis multiflora</i> (Roxb.) Jarrett ex Morton	hairy swordfern	N
FLOWERING PLANTS		
DICOTYLEDONES		
AMARANTHACEAE		
<i>Amaranthus spinosus</i> L.	spiny amaranth	N
ANACARDIACEAE		
<i>Shinus terebinthifolius</i> Raddi	Christmas berry	N
ASTERACEAE (COMPOSITAE)		
<i>Emilia fosbergii</i> Nicolson	Flora 's paintbrush	N
<i>Pluchea carolinensis</i> Jacq.) G Don	sourbush	N
BIGNONIACEAE		
<i>Spathodea campanulata</i> P. Beauv.	African tulip	N
CACTACEAE		
<i>Opuntia ficus-indica</i> (L.) Mill.	panini	N
CAPPARACEAE		
<i>Capparis sandwichiana</i> DC	maiapilo	E
CONVOLVULACEAE		
<i>Ipomoea indica</i> (J. Burm.) Merr.	koali `awa	I
CUCURBITACEAE		
<i>Momordica charantia</i> L.	wild bitter melon	N
EBENACEAE		
<i>Diospyros sandwicensis</i> (A. DC) Fosb.	lama	E
EUPHORBIACEAE		
<i>Chamaesyce hirta</i> (L.) Millsp.	garden spurge	N
<i>Ricinus communis</i> L.	castor bean	N
FABACEAE		
<i>Acacia farnesiana</i> (L.) Willd.	klu	N
<i>Chamaecrista hypericifolia</i> (L.) Moench	Partridge pea	N
<i>Crotalaria incana</i> L.	Fuzzy rattlepod	N
<i>Indigofera suffruticosa</i> Mill.	indigo	N
<i>Leucaena leucocephala</i> (Lam.) de Wit	koa haole	N

Table 1 Continued

<i>Pithecellobium dulce</i> (Roxb.) Benth	'optuma	N
<i>Prosopis pallida</i> (Humb. & Bonpl. Ex Willd) Kunth	kiawe	N
MALVACEAE		
<i>Abutilon grandifolium</i> (Willd.) Sweet	hairy abutilon, ma 'o	N
<i>Sida fallax</i> Walp.	'ilima	I
MENISPERMACAEA		
<i>Cocculus orbiculatus</i> (L.) DC	huehue	I
MYOPORACEAE		
<i>Myporum sandwicense</i> A. Gray	naio	I
NYCTAGINACEAE		
<i>Boerhavia coccinea</i> Mill.	false alena	N
PASSIFLORACEAE		
<i>Passiflora foetida</i> L.	love-in-the-mist	N
PORTULACACEAE		
<i>Portulaca oleracea</i> L.	pigweed	N
<i>Portulaca pilosa</i> L.		N
PROTEACEAE		
<i>Grevillea robusta</i> A. Cunn. Ex R. Br.	silkoak	N
RUBIACEAE		
<i>Morinda citrifolia</i> L.	noni	P
<i>Psydrax odorata</i> (G. Forster) A.C. Smith & S. P. Darwin	alahe 'e	I
SAPINDACEAE		
<i>Dodonaea viscosa</i> Jacq.	'a 'ali 'i	I
SOLANACEAE		
<i>Lycopersicon esculentum</i> Mill.	tomato	N
STERCULIACEAE		
<i>Waltheria Indica</i> L.	'uhaloa	I
VERBENACEAE		
<i>Lantana camara</i> L.	lantana	N
MONOCOTYLEDONES		
POACEAE (GRAMINEAE)		
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	N
<i>Heteropogon contortus</i> (L.) P. Beauv. Ex Roem. & Schult	pili grass	I?
<i>Melinis repens</i> (Wills.) Zizka	Natal redtop	N
<i>Pennisetum setaceum</i> (Forssk.) Chiov.	fountain grass	N

KEY TO TABLE 1

ST	Status
E	Endemic – Native and unique to the Hawaiian Islands
I	Indigenous – Native to the Hawaiian Islands, but also found elsewhere naturally
N	Naturalized – An alien Species now naturalized in the Hawaiian Islands
P	Polynesian – Introduced to the Hawaiian Islands by the early Polynesian settlers

Avian Survey Methods

Six avian count stations were sited at approximately 300-meter intervals along linear transects running from north-to-south through the project area. One six-minute point count was conducted at each station. Field observations were made using Leitz 10 X 42 binoculars to sight birds and by listening for vocalizations. Counts took place between 07:30 a.m. and 10:30 a.m., the peak of daily bird activity. Time not spent conducting station counts was used to search the area for species and habitats not detected during count sessions.

Avian Survey Results

A total of 102 individual birds of nine different species, representing eight separate families were recorded during station counts. No other additional species were recorded while transiting between count stations. All nine avian species detected are considered to be alien to the Hawaiian Islands (Table 2).

Avian diversity and densities were relatively low. Three species, Japanese White-eye (*Zosterops japonicus*), House Finch (*Carpodacus mexicanus*), and Common Myna (*Acridotheres tristis*), accounted for more than 54% of the total number of individual birds recorded. Japanese White-eyes were the most frequently recorded species, accounting for 24% of the total number of individual birds recorded during station counts. We recorded an average of 17 birds per station count.

Mammalian Survey Methods

All observations of mammalian species were of an incidental nature. With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ape'a as it is known locally, all terrestrial mammals currently found on the Island of Hawai'i are alien species, and most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal signs. A running tally was kept of all vertebrate species observed and heard within the study area. Visual and electronic scans, using a Broadband AnaBat II[®] ultrasonic bat detector, were made for bats during crepuscular periods on the evening of July 7, 2006.

Mammalian Survey Results

Four mammalian species were detected while on the site. Several dogs (*Canis f. familiaris*) were heard barking from within the existing subdivision. Two small Indian mongooses (*Herpestes a. auropunctatus*) were seen walking down the pioneer road that transects the site. Additionally tracks and sign of dogs, cat (*Felis catus*), and goat (*Capra h. hircus*) were encountered in several locations within the study area.

Hawai'i's sole endemic terrestrial mammalian species, the endangered Hawaiian hoary bat, was not detected during this survey. All of the alien mammalian species recorded during this survey are deleterious to avian and floristic components of the remaining native ecosystems present on the Island.

Table 2

Avian Species Detected Within the Lohaki Ka'ū Study Site			
<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
GALLIFORMES			
PHASIANIDAE - Pheasants & Partridges			
Phasianinae - Pheasants & Allies			
Black Francolin	<i>Francolinus francolinus</i>	A	0.33
COLUMBIFORMES			
COLUMBIDAE - Pigeons & Doves			
Spotted Dove	<i>Streptopelia chinensis</i>	A	1.83
Zebra Dove	<i>Geopelia striata</i>	A	2.33
PASSERIFORMES			
ZOSTEROPIDAE - White-eyes			
Japanese White-eye	<i>Zosterops japonicus</i>	A	4.00
MIMIDAE - Mockingbirds & Thrushes			
Northern Mockingbird	<i>Mimus polyglottos</i>		0.33
STURNIDAE - Starlings			
Common Myna	<i>Acridotheres tristis</i>	A	2.50
CARDINALIDAE - Cardinals Saltators & Allies			
Northern Cardinal	<i>Cardinalis cardinalis</i>	A	1.33
FRINGILLIDAE - Fringilline and Cardueline Finches & Allies			
Carduelinae - Carduline Finches			
House Finch	<i>Carpodacus mexicanus</i>	A	2.67
ESTRILDIDAE - Estrildid Finches			
Estrildinae - Estrildine Finches			
African Silverbill	<i>Lonchura cantans</i>	A	1.67

KEY TO TABLE 1

ST Status

A Alien – introduced to the Hawaiian Islands by humans

RA Relative Abundance – Number of birds detected divided by the number of count stations (6)

Discussion

Botanical Resources

The findings of this survey are in keeping with at least one other botanical survey conducted on the same property (Char 2003a), and with other surveys conducted within similar habitat, and at a like elevation within the general project area (Linney and Char 1988, Char 1991, 1995, 2000, 2003b, Herbst 1998, Hart 2003, David 2005, Guinther et al., 2005a, Palmer 2003).

During the course of this survey a total of 39 plant species were recorded (Table 1). The 28 species recorded by Winona Char in (2003) were also recorded on this survey, along with an additional 11 species not recorded by Char. These additional species are all considered to be naturalized alien species (Table 1).

A full 25% of the plant species recorded on site are considered to be either endemic or indigenous to the Hawaiian Islands. This percentage is relatively high, though it is in keeping with the known flora of the area. Although the percentage of native species is relatively high, the individual densities are low, thus, in terms of biomass, native plants are by in large a minor component of the vegetation currently found on the site.

No plants currently listed as threatened, endangered or proposed for listing under either the Federal, or State of Hawai'i endangered species programs were recorded by this, or Winona Char's 2003 survey of the subject property (DLNR 1998, Federal Register 1999, 2005, Char 2003a). One endemic relatively rare species, *maiopilo* was recorded at several locations during both this and Winona Char's survey. *Matopilo* is a native caper, upright to sprawling 1-5 meter shrub with large, attractive fragrant white flowers, which turn pink as they age. Seeds are dark reddish-brown to gray, asymmetrically reniform, 2.5-5 mm long, embedded in foetid orange pulp (Wagner et al. 1990). This species is globally rare, but is relatively widespread in West Hawai'i. *Maiopilo* is currently not protected under either federal or State of Hawai'i endangered species statutes although it is considered a species of concern by the U.S. Fish & Wildlife Service.

Avian Resources

Avian diversity and densities detected during this survey were in keeping with the results of several other surveys conducted within the alien species dominated lowland areas in the North Kona District within the recent past (David 1999, 2000a, 2000b, 2000c, 2000d, 2001, 2003, 2004a, 2004b, 2004c, 2005b, 2005c).

The nine avian species detected during the course of this survey all are considered to be alien to the Hawaiian Islands. Avian diversity and densities were low, as is to be expected given the fountain grass dominated xeric habitat present on the site and the surrounding property.

Although not detected during this survey it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), or *ua'u*, and the threatened Newell's Shearwater (*Puffinus auricularis newelli*), or *'a'o*, over-fly the project area between the months of May and November (Banko 1980a, 1980b, Day et al. 2003a, Harrison 1990).

Hawaiian Petrels were formerly common on the Island of Hawai'i (Wilson and Evans 1890–1899). This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea (Henshaw 1902), as well as at the mid to high elevations of Mount Hualālai. It has, within recent historic times, been reduced to relict breeding colonies located at high elevations on Mauna Loa and, possibly, Mount Hualālai (Banko 1980a, Banko et al. 2001, Cooper and David 1995, Cooper et al. 1995, Day et al. 2003, Harrison 1990, Hue et al. 2001, Simons and Hodges 1998).

Newell's Shearwaters were formerly common on the Island of Hawai'i (Wilson and Evans 1890–1899). This species breeds on Kaua'i, Hawai'i and Moloka'i in extremely small numbers. Newell's Shearwater populations have dropped precipitously since the 1880s (Banko 1980b, Day et al., 2003b). This pelagic species nests high in the mountains in burrows excavated under thick vegetation, especially *uluhe* (*Dicranopteris linearis*) fern.

The primary cause of mortality in both Hawaiian Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (U.S. Fish & Wildlife Service 1983, Simons and Hodges 1998, Ainley et al. 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961, Telfer 1979, Sincock 1981, Reed et al. 1985, Telfer et al. 1987, Cooper and Day 1998, Podolsky et al. 1998, Ainley et al. 2001). There is no suitable nesting habitat within or close to the proposed project site for either of these pelagic seabird species.

Mammalian Resources

The findings of the mammalian survey are consistent with several other surveys conducted within similar habitat in the North Kona District within the recent past (David 1999, 2000a, 2000b, 2000c, 2000d, 2001, 2003, 2004a, 2004b, 2004c, 2005b, 2005c).

Although not detected during the course of this survey, it is likely that Hawaiian hoary bats over-fly the site occasionally, as they have been seen both above and below the subject property on a seasonal basis (Jacobs 1994, David 2006). Unlike nocturnally flying

seabirds, which often collide with man-made structures, bats are uniquely adapted to avoid collision with most obstacles, man-made or natural. They navigate and locate their prey primarily by using ultrasonic echolocation, which is sensitive enough to allow them to locate and capture small volant insects at night.

Very little research into the life cycle, distribution, or population estimates of this species, has been conducted; and much of what has been studied, were small, disconnected, or anecdotal studies as opposed to coherent controlled experiments. Fundamental research into this species distribution and life cycle has just begun (Bonaccorso et al. 2005).

Although no rodents were detected during the course of this survey, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), European house mice (*Mus domesticus*), and possibly Polynesian rats (*Rattus exulans hawaiiensis*) utilize resources found within the project site. With the close proximity of the Palisades Subdivision to the subject property it is probable that these commensal species are also present on the subject property.

Conclusions

Botanical Resources

Given the findings of this and Winona Char's 2003 survey, it is not expected that the development of this site will result in impacts to any plant species currently listed as threatened, endangered or proposed for listing under either the Federal, or State of Hawai'i endangered species programs. Furthermore, the development of the site is not expected to have a significant deleterious impact on native botanical resources found within the North Kona District.

Faunal Resources

No native faunal species were recorded during the course of this survey. Given the habitat present on the site it is not expected that the development of this site will result in impacts to any avian or mammalian species currently listed as threatened, endangered or proposed for listing under either the Federal, or State of Hawai'i endangered species programs. Furthermore, the development of the site is not expected to have a significant deleterious impact on native faunal resources found within the North Kona District.

Recommendations

- It is recommended that native dryland plants be considered for inclusion in the developments landscaping efforts, especially within the projects common areas.
- To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures, it is recommended that any external lighting that may be required in conjunction

with development or roads be shielded (Reed et al. 1985, Telfer et al. 1987). This mitigation would serve the dual purpose of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, while at the same time complying with the Hawaii County Code § 14 – 50 *et seq.* which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

Glossary:

'A'ā – Clinker lava formed by slow moving lava flows.

Alien - Introduced to Hawai'i by humans.

Commensal – Animals that share humans food and lodgings, such as rats and mice.

Crepuscular – Twilight hours.

Diurnal – Daytime

Endangered – Listed and protected under the ESA as an endangered species.

Endemic – Native and unique to the Hawaiian Islands.

Foetid – Having a disagreeable odor.

Indigenous - Native to the Hawaiian Islands, but also found elsewhere naturally.

Nocturnal – Night-time, after dark.

Pāhoehoe – Sheet lava formed by relatively fast moving lava flows.

Reniform - Kidney –shaped; having broadly rounded margins and a shallow sinus (In this case associated with the seed pod of *Maiapilo*).

Ruderal – Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles

Threatened - Listed and protected under the ESA as a threatened species.

ASL – Above mean sea level.

DLNR – Hawaii State Department of Land & Natural resources.

GPS – Global Positioning System.

TMK – Tax Map Key.

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ENVIRONMENTAL ASSESSMENT
LOKAHI KA‘U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 3
Archaeological Mitigation Plan

An Archaeological Mitigation Plan for Ten Sites
on TMK:3-7-3-10:03

'O'oma 1st Ahupua'a
North Kona District
Island of Hawai'i

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ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

An Archaeological Mitigation Plan
for Ten Sites on TMK:3-7-3-10:03

'O'oma 1st Ahupua'a
North Kona District
Island of Hawai'i



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INTRODUCTION

At the request of Mr. Bill Brooks of Westpro Development, Inc., Rechtman Consulting, LLC has prepared this mitigation plan for ten archaeological sites located on TMK:3-7-3-10:03 in 'O'oma Ahupua'a, North Kona District, Island of Hawai'i (Figure 1). The preparation of this Plan follows the completion of an Archaeological Inventory Survey of the property by Haun & Associates (Haun and Henry 2000), in which five sites were recommended for data recovery investigation (SIHP Sites 5747, 23411, 23412, 23416, and 23422), four sites were recommended for preservation (SIHP Sites 23413, 23417, 23421, and a portion of 23423), and one site was recommended for a combination of both data recovery and preservation (SIHP Site 23414). The significance evaluations and treatment recommendations for all ten of these sites are detailed in Haun and Henry (2000); descriptions of the sites from the Archaeological Inventory Survey are reproduced below. Based on a field inspection of the sites by the authors of the current report, some of the treatment recommendations have been amended; the changes and reasons for those changes are discussed following the site descriptions. This Archaeological Mitigation Plan sets forth both data recovery and preservation strategies that will mitigate possible impacts to the sites resulting from development of the property.

Haun and Henry describe the current project area as follows:

The project area consists of a c. 50+acre parcel bounded to the north, west, and south by stone walls, and on the east by an undeveloped parcel. A 2" PVC pipe extends along the inland, eastern project area boundary. A bulldozed road cut breaches the northern stone wall in the northwestern corner and extends 470 m to the south, exiting the project area through the western wall. A second road cut originates on the east side of the first road, extending to the northeast for 180m where it terminates in an area of level pahoehoe lava.

The project area is situated on the southwestern slope of Hualalai Volcano at elevations ranging from 380 ft to 460 ft. The surface mantle in this area is comprised of Holocene flows which date to between 3,000 to 5,000 years before present (Wolfe and Morris 2001 [1996]). These flows include both pahoehoe and a'a lavas which evidence little soil development (Sato et al. 1973). Rainfall in the vicinity of the project area ranges from 30-40 inches per year (Jurvik and Jurvik 1998), and the mean average temperature is c. 75 degrees F (Armstrong 1983).

The vegetation within the parcel is comprised primarily of a dense cover of fountain grass (*Pennisetum setaceum* [Forsk] Chiov). Scattered taxa include koa haole (*Leucaena leucocephala* [Lam.] de Wit), silver oak (*Grevillea robusta* A. Cunn.), kiawe (*Prosopis pallida* [Humb. And Bonpl. Ex Willd.], *noni* and *panini* cactus (*Opuntia megcantha* Salm-Dyck). (2000:1, 3)

Haun and Henry (2000) identified 17 sites with 186 features (Figure 2). There were ten single feature sites identified and seven feature complexes. The recorded features consisted of *pāhoehoe* excavations, mounds, terraces, quarries, filled cracks, cairns, walls, pavements, trails, alignments, cupboards, caves, and several miscellaneous types. Assigned feature functions included agriculture, temporary habitation, resource procurement, marker, transportation, livestock control, storage, ceremonial, refuge, tool manufacture, and indeterminate (Haun and Henry 2000:ii). Detailed descriptions of the ten sites recommended for either data recovery or preservation are presented below and listed in Table 1. For descriptions of the other seven sites recorded within the project area that were recommended for no further work see Haun and Henry (2000).

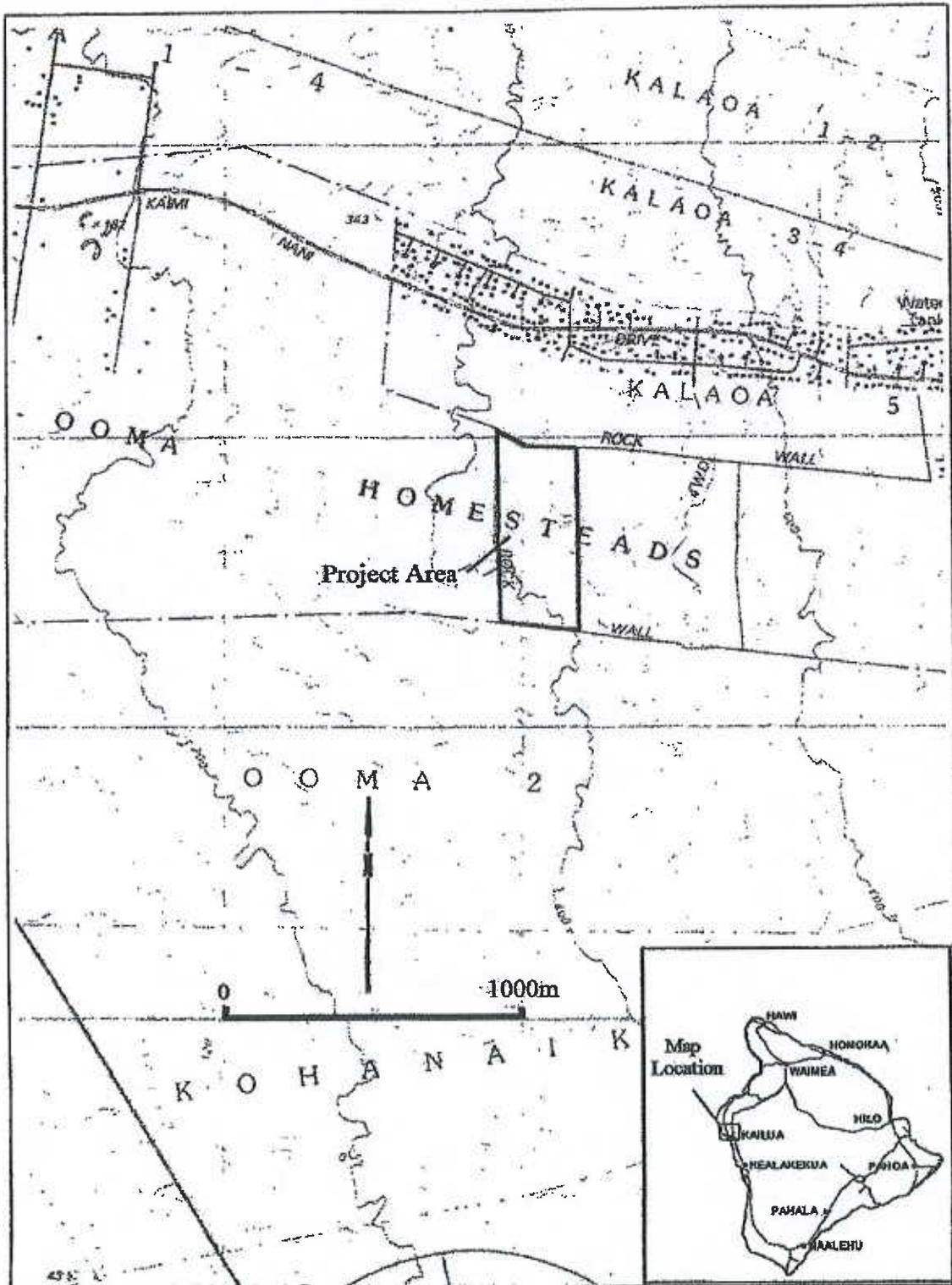


Figure 1. Portion of Kailua Quadrangle Showing Project Area (from Haun and Henry 2000:2).

Table 1. Archaeological sites recommended for further mitigation on TMK:3-7-3-10:03.

<i>SIHP No.</i>	<i>Function/type</i>	<i>Temporal Association</i>	<i>Treatment Recommendation</i>
5747	Ranch walls	Historic	Data recovery
23411	Habitation lava tube	Precontact	Data recovery
23412	Habitation overhang	Precontact	Data recovery
23413	Pecked bedrock basins	Precontact	Preservation
23414	Trail and quarry area	Precontact	Data recovery/preservation
23416	Habitation complex	Precontact	Data recovery
23417	Habitation complex	Precontact	Preservation
23421	Trail	Precontact	Preservation
23422	Habitation complex	Precontact	Data recovery
23423	Habitation lava tube	Precontact	Preservation

DESCRIPTIONS OF SITES RECOMMENDED FOR FURTHER MITIGATION

SIHP Site 5747

Haun and Henry describe Site 5747 as follows:

Site 5747 is a complex of two walls that extend along the northern and western project area boundaries. This site was previously documented by Walker and Rosendahl (1989). The wall along the northern boundary (Feature A) delineates the land division between Kalaoa 5th and O'oma 1st. It is built primarily of stacked pahoehoe basalt cobbles and small boulders with a core-filled interior. The majority of the wall is relatively intact, although collapsed sections are present. A bulldozed road cut breaches the wall in the northwest corner of the project area. The intact sections of wall range in width at the base from 0.85 to 1.1 m and at the top from 0.55 to 0.75 m [Figure 3]. The height of the wall ranges from 0.65 to 1.15 m.

The wall originates 40 m northwest of the northwestern corner of the project area. It extends to the southeast for 80.0 m where it has been destroyed by bulldozing activity associated with the construction of a dirt road that extends through the parcel. The wall continues on the southeastern side of the disturbed area, extending 33.0 m to the southeast. The wall then angles to the east and extends 209.0 m where it exits the project area. Walker and Rosendahl's map of the area indicates that this wall continues in an easterly direction for c. 1,160 m, at which point it turns to the south.

The Feature B wall is located along the western project area boundary. This wall originates on the southern side of the Feature A wall and extends to the south for 657.0 m, to where it terminates against the northern side of the Site 6432 wall [see Haun and Henry 2000:14-18]. The bulldozed road cut discussed above breaches the Feature B wall as it exits the project area, 135 m north of the southwestern corner of the parcel.

Feature B is primarily constructed of stacked pahoehoe cobbles and small boulders at the northern end, and a'a cobbles and boulders at the southern end. Broken fine grained basalt cobbles, likely associated with the Site 23414 quarries (discussed below), are incorporated into the wall at the southern end [see Figures 6 and 8 below]. Feature B has a core-filled interior and ranges in width at the base from 0.9 to 1.2 m, at the top from 0.55 to 0.7 m, and varies in height from 0.8 to 1.15.

The sections of Site 5747 within the project area are altered and in fair condition. The Feature A portion of the wall appears to have functioned as a land division marker, though its primary function was likely to restrict the movement of cattle based on its method of construction and height. Feature B is also interpreted as a livestock control feature based on its height and manner of construction. (2000:14)



Figure 3. Site 5747, Feature A wall, view to northwest (from Haun and Henry 2000:17).

SIHP Site 23411

Haun and Henry describe Site 23411 as follows:

Site 23411 is a small cave located in the southeastern portion of the project area, in an area of uneven pahoehoe lava. The entrance to the cave faces the south and is 0.85 m wide and 1.02 m in height [Figure 4]. The interior of the cave is roughly oval-shaped, measuring 7.05 m long (east-west) and 1.9 to 3.6 m wide. Several areas of collapsed roof fall are present in the interior. The ceiling height of the cave ranges from 0.32 to 1.05 m, and there are two skylight openings in the ceiling, one at the western end of the cave, and one 1.2 m west of the entrance.

The floor is comprised of thin layer of brown soil. No cultural remains were observed, though a flat pahoehoe slab (0.46 m long, 0.34 m wide and 0.08 m thick) is present 1.6 m northwest of the entrance. A 0.5 by 0.5 m test unit (TU-1) was excavated adjacent to the slab to the west, revealing a single soil deposit over bedrock [see Figure 4]. Layer I consisted of 0.04 to 0.06 m of a brown (10YR 4/3) silt with 0.5 grams of charcoal present. Site 23411 is interpreted as a temporary habitation shelter based on its formal type and the presence of subsurface charcoal. The site is unaltered and in good condition. (2000:18)

SIHP Site 23412

Haun and Henry describe Site 23412 as follows:

Site 23412 is a small overhang located in the northern portion of the project area, west of the dirt road. The overhang is situated within a low pahoehoe lava blister, with an opening along the southern side. The entrance is 5.25 m long (northeast by southwest) and 1.0 to 1.06 m in height [Figure 5]. The interior of the overhang is 8.3 m in length (northeast by southwest) and 1.55 to 4.05 m in width. The ceiling height varies from 0.18 to 0.76 m. There is a small oval-shaped opening on top of the lava blister, at the northern end of the overhang. This opening is 1.08 m long, (northwest by southeast), 0.7 m wide, and 0.52 m deep to the cave floor.

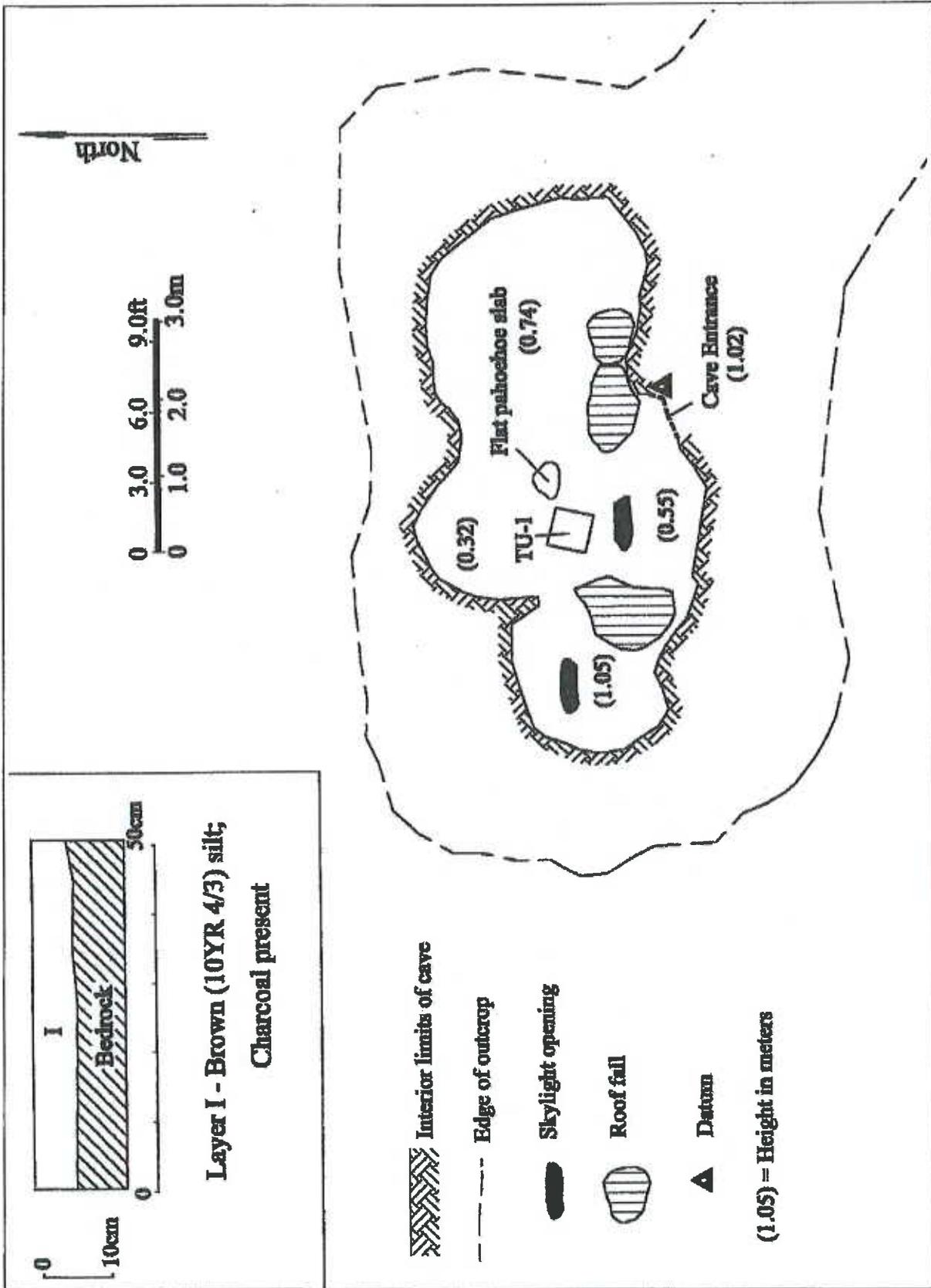


Figure 4. Site 23411 Plan Map and TU-1 North Face Profile (from Haun and Henry 2000:19).

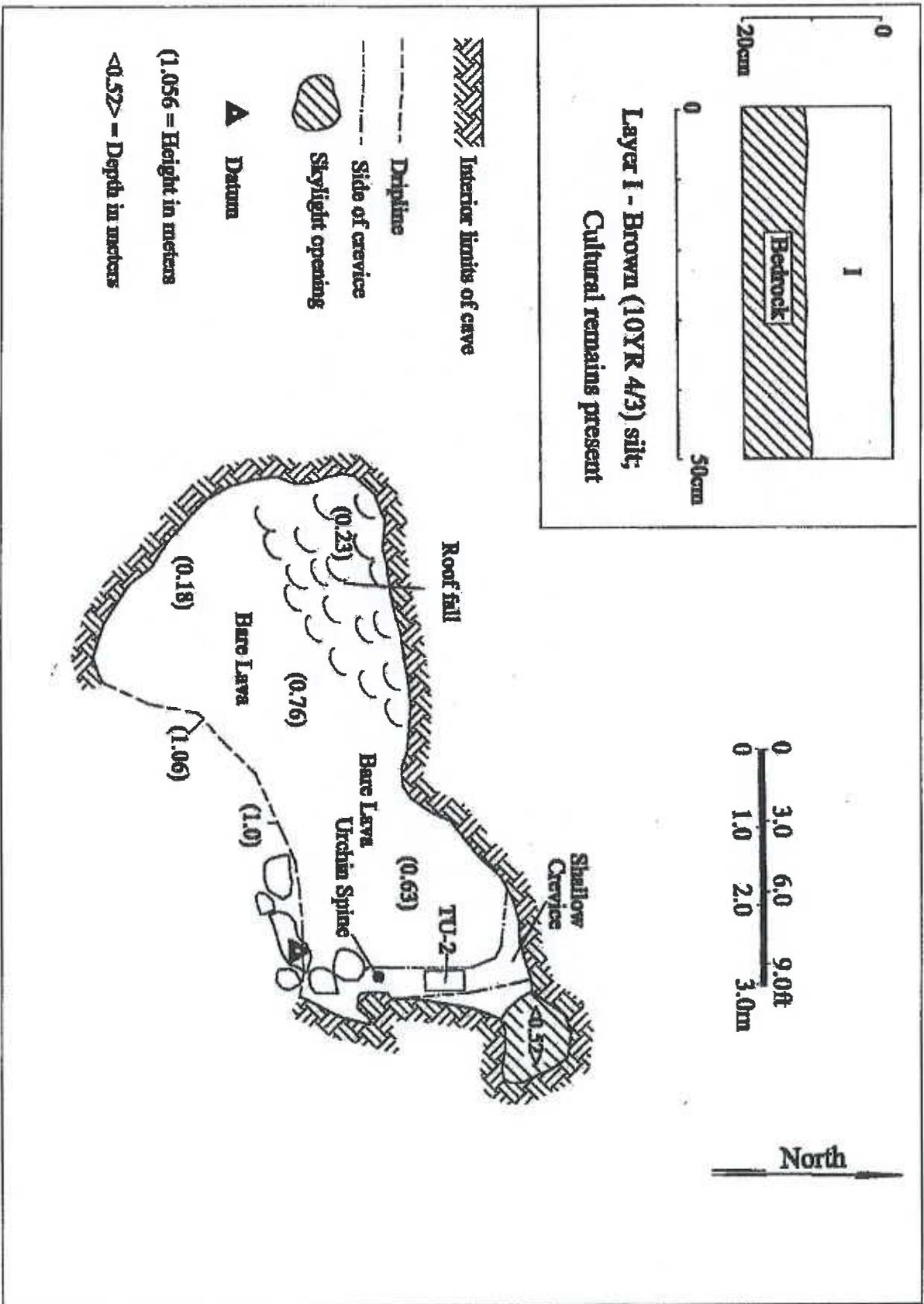


Figure 5. Site 23412 Plan Map and TU-2 East Face Profile (from Haun and Henry 2000:20).

The floor throughout the majority of the cave is comprised of bare lava with no cultural remains present. Roof fall is located along the northern wall at the western end. A shallow, soil filled crevice is located at the eastern end of the overhang. This crevice is 2.7 m long (north-south), 0.34 to 0.8 m wide, and 0.05 m in depth. A sea urchin spine was noted on the surface of the soil within the crevice. A 0.5 by 0.25 m test unit (TU-2) was excavated into the deposit, revealing a single soil deposit [see Figure 5]. Layer I consisted of 0.09 to 0.11m of a brown (10YR 4/3) silt. Cultural remains from Layer I consisted of two fragments of *kukui* nut shell (0.95 grams) and 0.2 grams of charcoal.

Site 23412 is interpreted as a temporary habitation shelter. This is based on formal type and the presence of cultural remains. The site is unaltered and in good condition. (2000:18)

SIHP Site 23413

Haun and Henry describe Site 23413 as follows:

Site 23413 is a series of shallow, pecked basins located in the southwestern portion of the parcel, adjacent to the Site 5747, Feature B wall to the west. There are 13 basins located in an area 6.5 m long (northeast by southwest) by 2.5 m wide on a level pahoehoe flow [Figure 6]. The basins range in size from 0.2 to 0.5 m long, 0.18 to 0.47 m wide, and 0.02 to 0.06 m in depth. The basin surfaces are irregular and pock-marked with numerous pecked scars [Figure 7]. Numerous fine grained basalt cobbles and small boulders, which evidence flake scars and battered edges, are scattered throughout the area, to the northeast and east of the basins. These stones were likely obtained from the Site 23414 quarries located 45.0 m to the east of Site 23413 (discussed below).

Fine grained basalt cobbles and small boulders are also incorporated into the Site 5747, Feature B wall [Figure 8]. These stones were likely scattered over the surface of the pahoehoe flow and were collected during the construction of the historic livestock wall. The stones are only evident in the wall in the vicinity of the basins. Site 23413 is interpreted as a potential processing area where stones collected from the nearby Site 23414 quarries were initially reduced/shaped, and then transported to an off-site location. The pecked basins appear to have been created by repeated impacts of the stones onto the surface of the pahoehoe flow. The basins show no evidence of use for grinding and there are scattered small fragments of basalt near the basins. Many of the stones are roughly spheroidal in shape and the exterior flake scar edges appear to have been rounded by battering. It is unclear what the stones were going to be used for. The basalt is fine grained; however, most of the stones have some small internal fissures and cavities indicating that the stones were not ideally suited for making adzes. The weight of the stones would make them somewhat difficult to transport. Most of the stones are relatively large ranging from 12 to 30 cm in maximum dimension with a few larger specimens. The site is partially altered and in good condition. (2000:18-23)

SIHP Site 23414

Haun and Henry describe Site 23414 as follows:

Site 23414 is a complex of eight quarry areas (Features A-H) and a trail (Feature I), located in the southwestern portion of the project area, east of Site 24313. The site is situated in an area of weathered a'a lava, and encompasses an area 60.0 m long (northeast by southwest) and 31.0 m wide [Figure 9]. The quarry areas consist of a'a lava which has been broken to expose the underlying fine grained basalt. Fragmented fine grained basalt cobbles and small boulders are scattered over the broken a'a outcrops. The quarries range in length from 2.2 to 9.0 m long (averaging 4.92 m long), in width from 1.0 to 4.5 m (averaging 2.35 m wide), and in height from 0.3 to 1.4 m (averaging 0.78 m).... [Table 2]

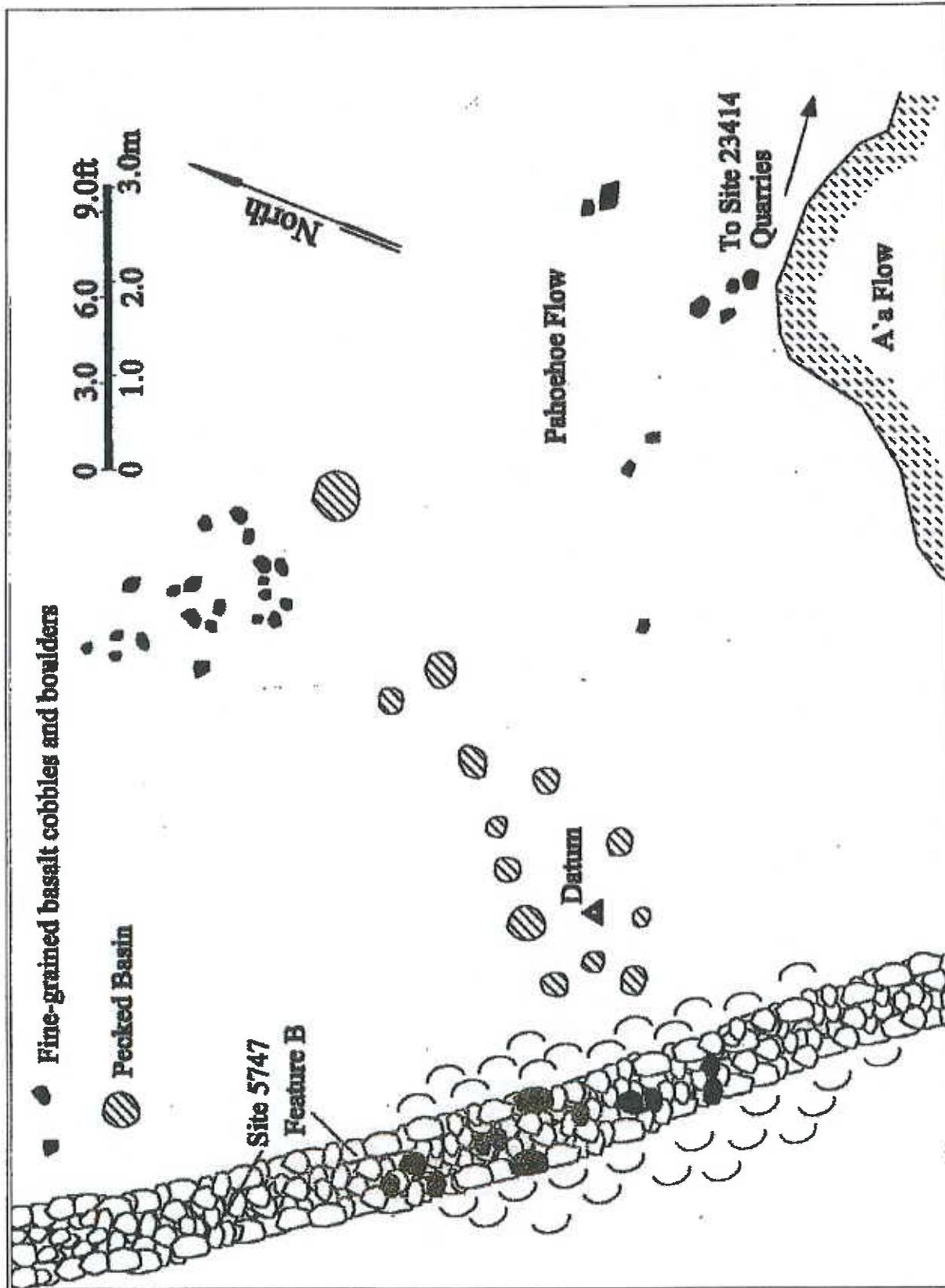


Figure 6. Site 23413 Plan Map (from Haun and Henry 2000:21).

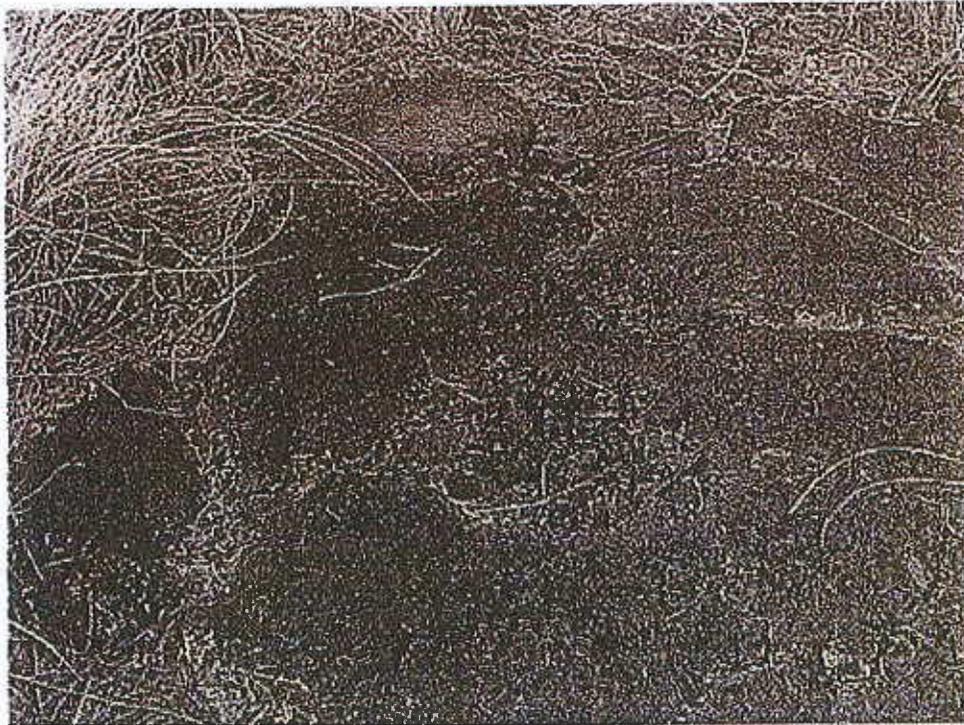


Figure 7. Site 23413 Pecked Basin, view to southwest (from Haun and Henry 2000:22).



Figure 8. Fine-grained Basalt Incorporated into Site 5747-B Wall, view to north (from Haun and Henry 2000:22).

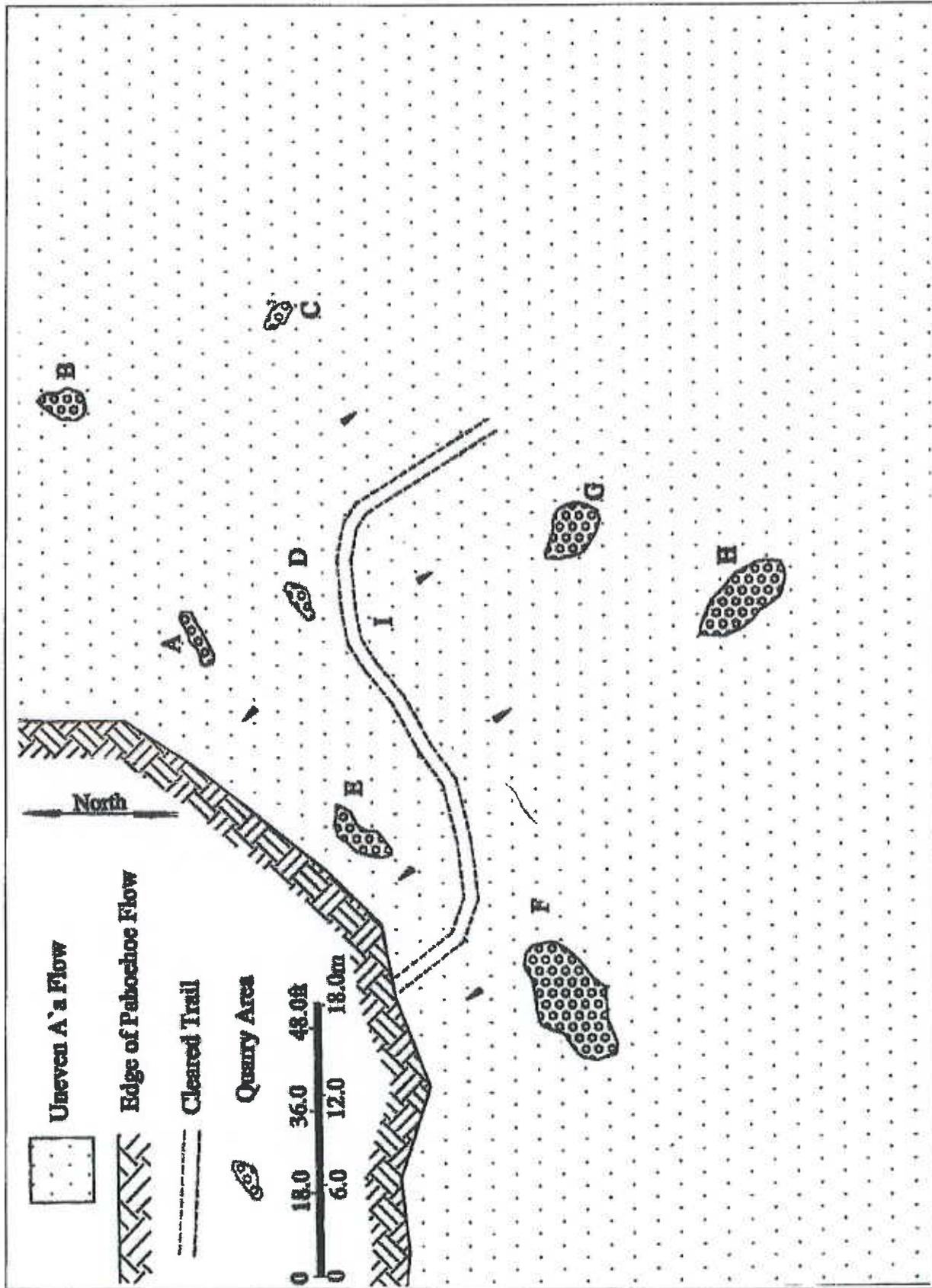


Figure 9. Site 23414 Plan Map (from Haun and Henry 2000:24).

Table 2. Summary of Site 23414 Quarry Features (from Haun and Henry 2000:23)

Feature Designation	Length (m)	Width (m)	Height/Depth(m)	H&A Field No.
A	4.00	1.00	0.30	87a
B	3.30	2.20	0.40	86
C	2.20	1.30	0.40	84
D	3.00	1.20	0.30	85
E	5.00	1.32	1.20	119
F	9.00	4.50	1.30	120a
G	4.50	3.50	0.80	83a
H	7.00	3.00	1.40	120b

The Feature I trail originates along the southeastern side of a pahoehoe lava flow, 45 m west of Site 23413. The trail extends to the southeast for 7.2 m, then angles to the east-northeast for 27.0 m up the side of the a'a ridge. At the top of the ridge, then (sic) trail turns to the southeast and extends downslope for 12.5 m, terminating within the a'a flow. The trail consists of a worn or cleared path through the a'a lava that ranges in width from 0.8 to 1.2 m [Figure 10].

Site 23414 is interpreted as a resource procurement area, with Features A-H functioning as quarry pits, and Feature I functioning as a transportation route associated with use of the quarry. Though not of particularly high quality, the stone is relatively fine grained and was potentially used as a raw material for the manufacture of stone tools. The initial reduction of the material appears to have occurred at Site 23413. The site is unaltered and in good condition. (2000:23)



Figure 10. Site 23414, Feature I Trail, view to northwest (from Haun and Henry 2000:26).

SIHP Site 23416

Haun and Henry describe Site 23416 as follows:

Site 23416 is a complex of two features located in the southeastern portion of the project area, 75.0 m southeast of Site 23415. The site is situated in an area of uneven pahoehoe lava, and is comprised of two terraces [Figure 11]. Feature A is located at the western end of the site. It consists of a small terrace constructed on the northern side of a low pahoehoe knoll that is 5.3 m long (northwest by southeast), 3.6 m wide and 0.82 to 1.1 m in height. The terrace has stacked and faced pahoehoe cobble and small boulder retaining walls along the north and west sides that vary in height from 0.4 to 0.5 m in height. A possible step comprised of one to two courses of cobbles and small boulders abuts the northern side of the terrace. This step is 2.4 m long (west-northwest by east-southeast), 0.85 m wide and 0.22 m in height above the surrounding ground surface. The surface of the terrace is level but unpaved. No cultural remains were noted on or around the feature.

A 1.0 by 1.0 m test unit (TU-4) was excavated in the center of the terrace, revealing a stone architectural layer (Layer I) above a soil deposit (Layer II) [see Figure 11]. Layer I consisted of 0.3 to 0.35 m of loosely packed pahoehoe cobbles and small boulders. Cultural remains from Layer I consisted of a single fragment of *cowrie* shell (6.65 grams). The base of Layer I rested on the surface of the Layer II deposit and no evidence was found to indicate that Layer I was built during more than a single construction episode. Layer II was comprised of 0.02 to 0.06 m of a very dark brown (10YR 2/2) silt with no cultural remains present. Feature A is interpreted as a temporary habitation based on its small size (c. 11 sq m), lack of substantial construction (e.g. faced walls, paving, etc.), and formal type, following Cordy's (1980) definition for a temporary habitation.

Feature B is located 8.5 m east of Feature A. It consists of an irregularly-shaped pahoehoe blister that is 7.05 m long (northeast by southwest), 3.0 to 4.7 m wide, and 0.42 to 1.1 m in height. A two-tiered terrace has been constructed on top of the blister. The lower terrace has a stacked cobble retaining wall along the north side that ranges in height from 0.35 to 0.5 m. This portion of the feature is 1.5 to 2.8 m long (north-south) and 0.45 to 2.2 m wide. The surface is level but unpaved. The opening to a small blister cave is located adjacent to this tier to the south. The opening to the cave is 0.68 m long (east-west), 0.43 m wide and 0.6 m deep. The interior is oval-shaped and is 1.4 m long (north-south) and 1.1 m wide. The floor of the cave is bare lava with no cultural remains present.

The upper tier of the terrace abuts the lower tier along its eastern side. A stacked and faced cobble retaining wall is located along the west side of the terrace, measuring 0.6 m in height above the lower tier. The surface of this portion of Feature B is 2.3 m long (north-south) and 1.6 m wide, with a level but unpaved surface. No cultural remains were present. Feature B is also assigned a temporary habitation function based on its formal type, informal construction, and size (c. 14 sq m). Site 23416 is unaltered and in good condition. (2000:27)

SIHP Site 23417

Haun and Henry describe Site 23417 as follows:

Site 23417 is a complex of six features located 65.0 m northeast of Site 23415, at the interface between an a'a lava flow and a pahoehoe flow. The site is comprised of three terraces (Feature A-C), two cairns (Feature D-E), and a steppingstone trail (Feature F)... The site encompasses an area 24.0 m long (northwest by southeast) and 23.0 m wide. The site is unaltered and in good condition. [Figure 12]

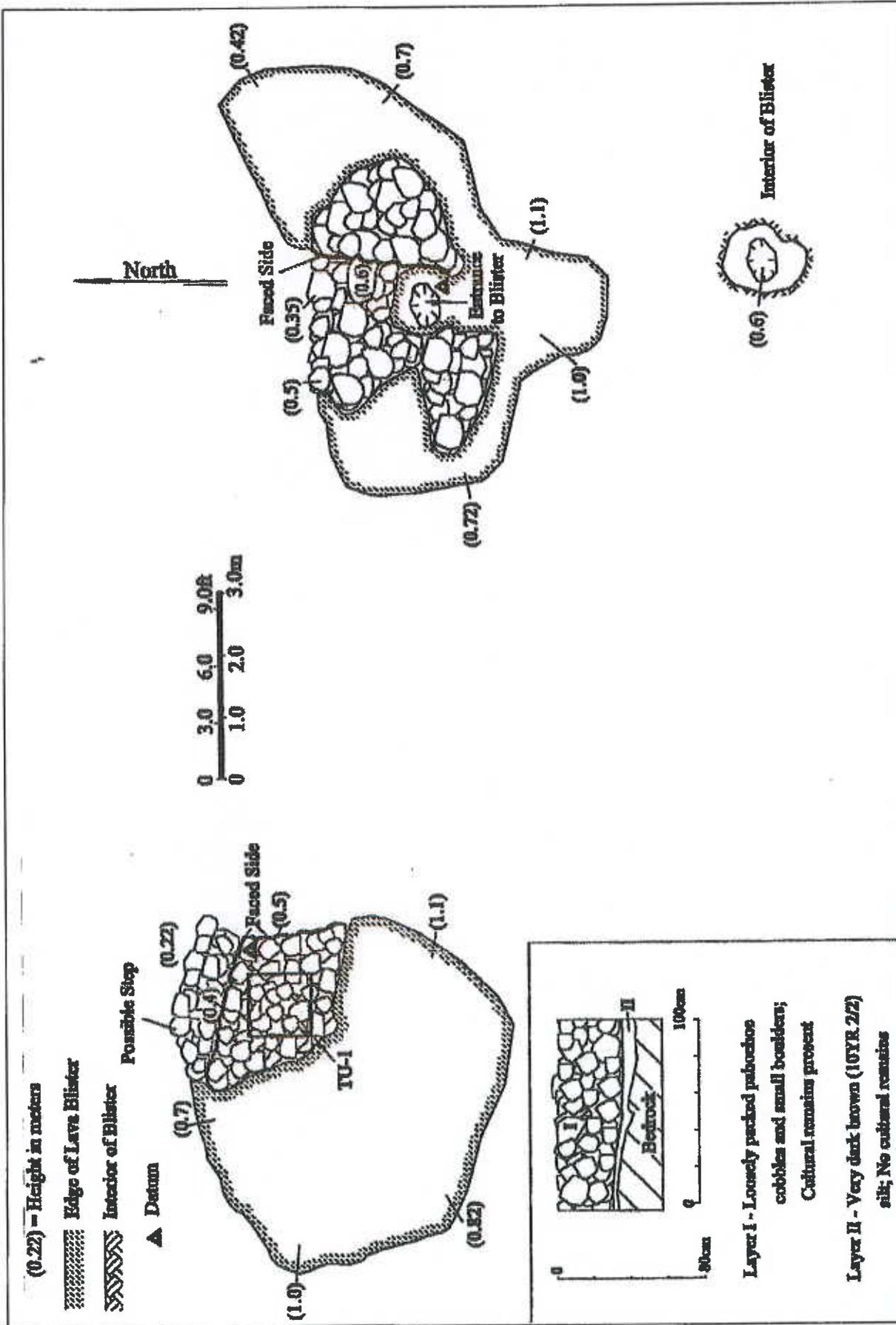


Figure 11. Site 23416 Plan Map and TU-4 North Face Profile (from Haun and Henry 2000:28).

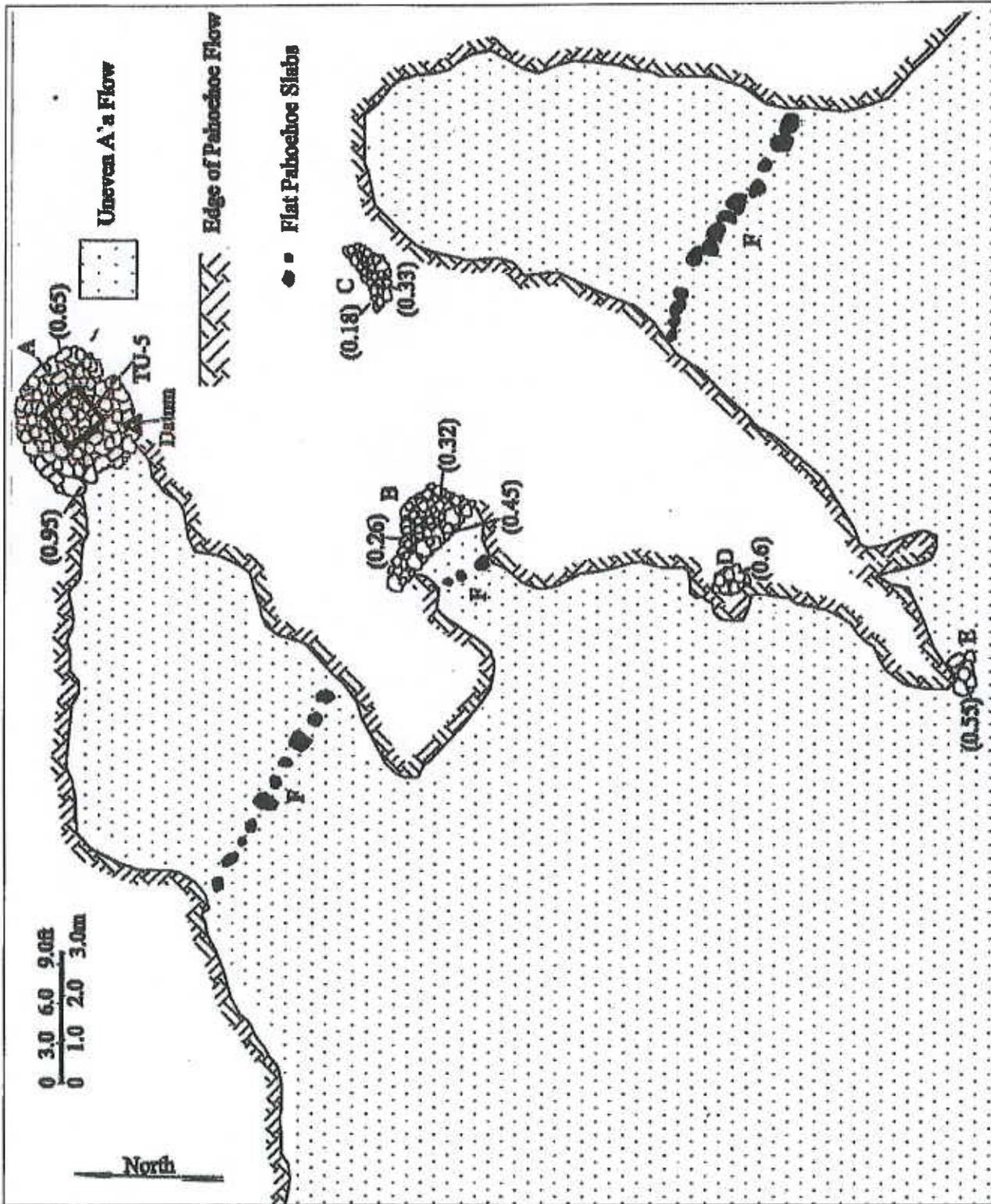


Figure 12. Site 23417 Plan Map (from Haun and Henry 2000:29).

Feature A is an oval-shaped terrace located at the northern end of the site. A stacked and piled pahoehoe cobble and small boulder retaining wall is located along the southwestern side of the feature. This wall is 0.7 to 0.95 m in height and is located at the interface between the pahoehoe and a'a lava flows. The northwest, northeast and southeast sides of the feature are built on the pahoehoe flow. These three sides range in height from 0.3 to 0.65 m. The terrace is 3.1 m long (east-west) and 2.7 m wide with a level but unpaved surface. No cultural remains were present on or around the feature.

A 1.0 by 1.0 m test unit (TU-5) was excavated into the center of the terrace, revealing a stone architectural layer, over bedrock [Figure 13]. Layer I consisted of 1.15 to 1.3 m of loosely packed pahoehoe and a'a cobbles and small boulders. No evidence was found to suggest that Layer I was constructed during more than a single building episode. Cultural remains from Layer I consisted of one fragment of *kukui* nut shell (0.35 grams), *crustacea* (n=6, 1.85 grams) and charcoal (0.4 grams). Feature A is interpreted as a temporary habitation feature based on its size (8.4 sq m), type, and formal construction, following Cordy's (1980) definition for temporary habitation.

Feature B terrace is located 6.4 m south of Feature A. This terrace is also located at the interface between the pahoehoe and a'a lava flows, with a stacked and piled stone retaining wall located along the southwestern side. This wall is 0.45 m in height. The three remaining sides of the terrace are located on the pahoehoe outcrop and range in height from 0.26 to 0.32 m. The structure is irregularly-shaped and is 3.0 m long (northwest by southeast) and from 0.5 to 1.3 m wide. The (sic) surface is level, but unpaved, with no cultural remains observed. Feature B is also interpreted as a temporary habitation based on its small size and informal construction.

The Feature C terrace is situated 5.2 m east-northeast of Feature B, on the pahoehoe flow. A low piled cobble and small boulder retaining wall is located along the southeastern side of the feature, ranging in height from 0.3 to 0.33 m. The northern side of the structure is 0.18 to 0.22 m in height. The terrace is 1.7 m long (northeast by southwest) and 0.8 m wide with a level but unpaved surface. No cultural remains were noted. This terrace was interpreted as a temporary habitation due to its small size and informal construction.

The Feature D well-built cairn is located 7.15 m south of Feature B. The cairn is constructed on the pahoehoe flow, and is built of stacked pahoehoe cobbles. It is 0.78 by 0.52 m at the base, 0.48 by 0.6 m at the top and 0.6 m in height. No cultural remains were present. Feature D is interpreted as a marker based on its formal type and construction.

The Feature E cairn is located 6.1 m south-southwest of Feature D. This cairn is situated on the a'a flow, adjacent to the pahoehoe flow. It is 0.9 by 0.65 m at the base, 0.7 by 0.4 m at the top, and 0.55 m in height. No cultural remains were observed. Feature E is also interpreted as a marker due to its method of construction and formal type.

The Feature F steppingstone trail extends across the site in a northwest by southeast direction. There are three sections of the trail, each extending across the a'a lava, between fingers of the pahoehoe flow [see Figure 12]. The northwestern section is 5.95 m long and is comprised of ten flat pahoehoe slabs positioned in a linear configuration. The central section is 1.5 m in length and consists of three flat slabs. The southeastern section is 6.4 m in length and is comprised of 13 slabs....The trail is interpreted as a transportation route potentially associated with the occupation of Site 23417. (2000:27-30)

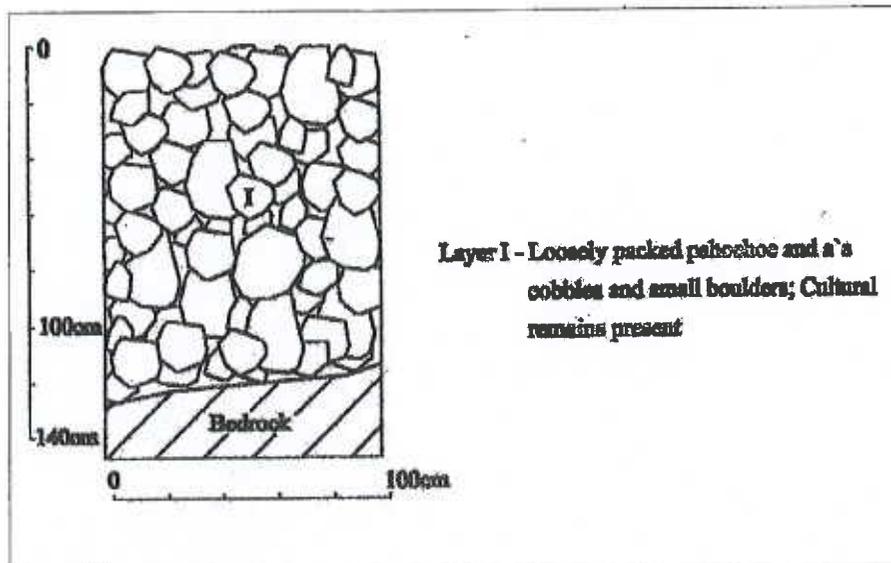


Figure 13. Site 23417, Feature A, TU-5 Northeast Face Profile (from Haun and Henry 2000:31).

SIHP Site 23421

Haun and Henry describe Site 23421 as follows:

Site 23421 is a steppingstone trail located in the northwestern portion of the project area. The trail extends across a rugged a'a lava flow between two pahoehoe flows [Figure 14]. A bulldozed road is located to the west of the trail, but does not appear to have damaged it. No evidence of the trail was observed on the western side of the road. The trail has an overall length of 42.0 m and is comprised of a series of flat pahoehoe slabs positioned in a linear alignment [Figure 15]. No cultural remains were present. Site 23421 is interpreted as a transportation route across the a'a flow. It is unaltered and in good condition. (2000:33)

SIHP Site 23422

Haun and Henry describe Site 23422 as follows:

Site 23422 is a complex of five features located near the western project area boundary, 145 m south-southwest of Site 23421. The site is situated on a level, grass covered pahoehoe lava flow within an area of numerous agricultural features. The features are comprised of four pavements (Features A-D) and a U-shape (Feature E)...The Site 23422 components are unaltered and in good condition.[Figure 16]

Feature A is an oval-shaped pavement located at the northern end of the site. It is 3.3 m long (northwest by southeast), 1.8 to 2.5 m wide, and 0.05 to 0.08 m in height above the lava flow. The surface of the pavement is level and is comprised of small pahoehoe cobbles with no cultural remains observed. The Feature B pavement is located 12.0 m southwest of Feature A. This feature is the best constructed component of the site, consisting of a roughly rectangular-shaped pavement that is 3.25 m long (northwest by southeast), 2.75 m wide, and 0.1 to 0.15 m in height [Figure 17]. The surface is comprised of level small pahoehoe cobbles and pebbles with no cultural remains noted.

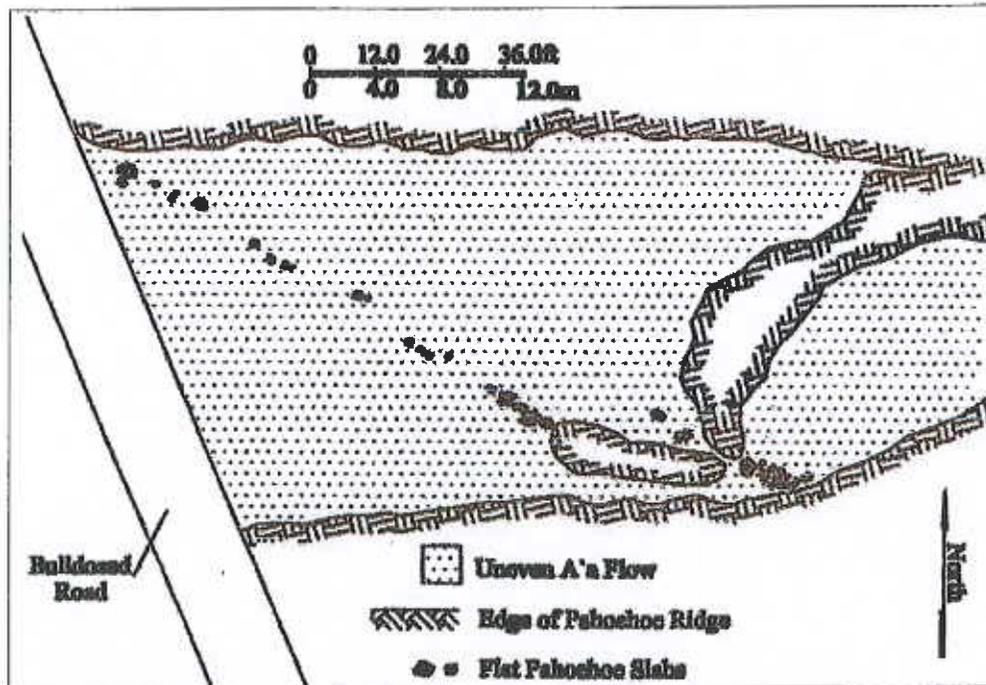


Figure 14. Site 23421 Plan Map (from Haun and Henry 2000:36).



Figure 15. Site 23421 Steppingstone Trail, view to west (from Haun and Henry 2000:36).

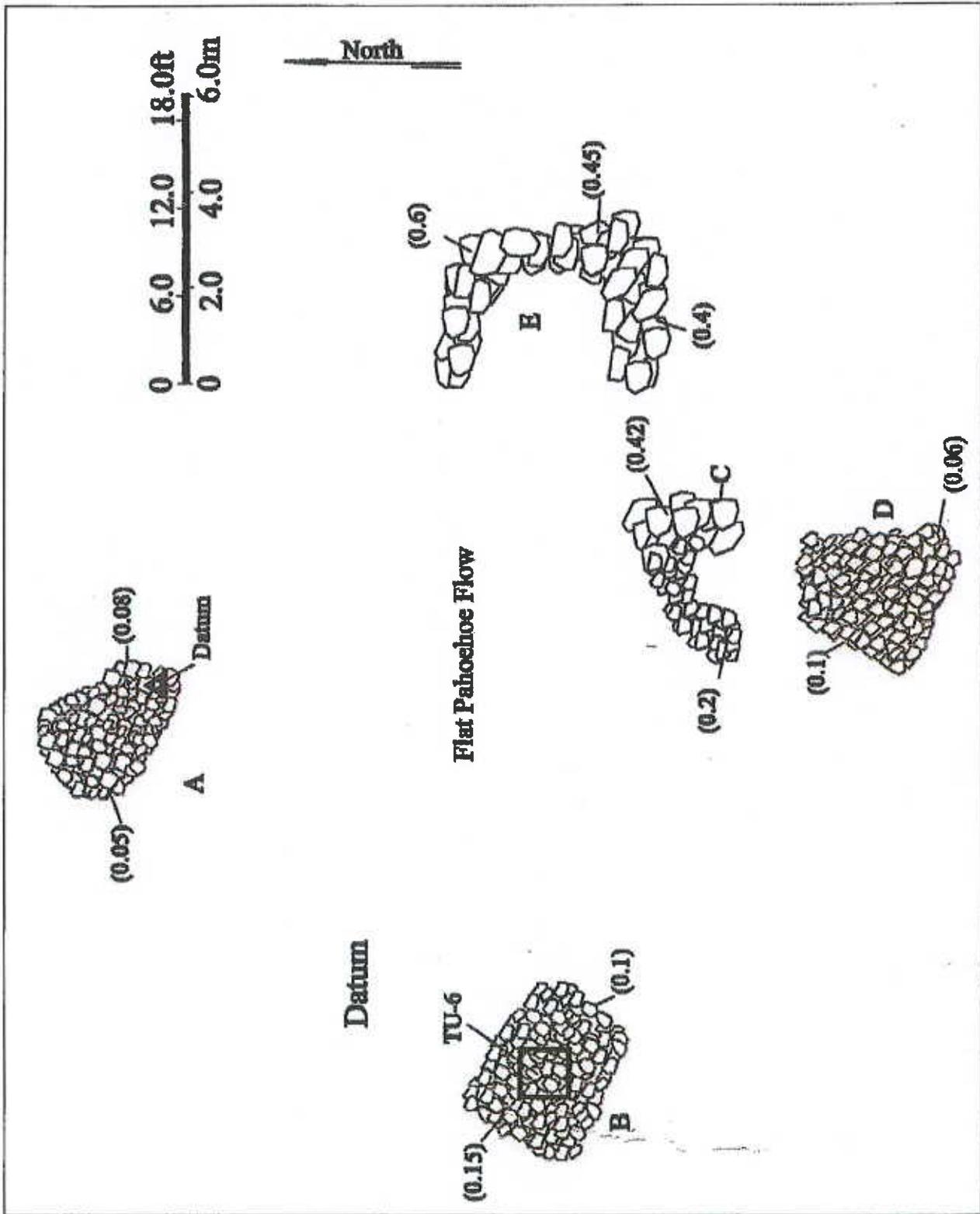


Figure 16. Site 23422 Plan Map (from Haun and Henry 2000:37).

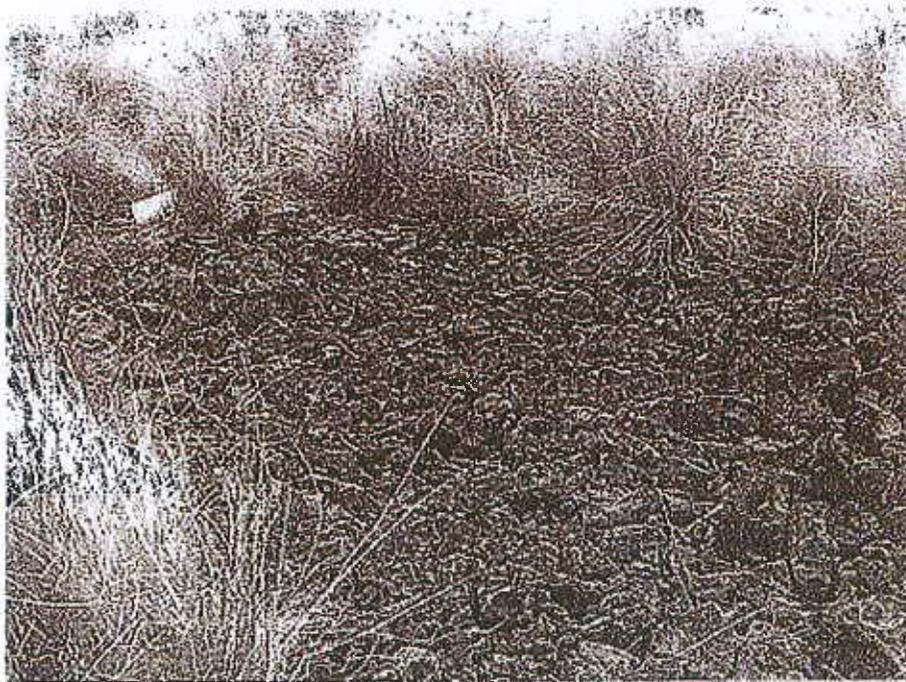


Figure 17. Site 23422, Feature B Pavement, view to northwest (from Haun and Henry 2000:38).

A 1.0 by 1.0 m test unit (TU-6) was excavated into the center of the pavement, revealing an architectural layer (Layer I) over a deposit of soil and stone (Layer II) [Figure 18]. Layer I consisted of 0.28 to 0.31 m of tightly packed pahoehoe cobbles and pebbles. A single *cowrie* (0.3 grams) shell fragment was recovered from Layer I. The base of Layer I intruded into Layer II and no evidence was found to indicate that Layer I was constructed during more than a single construction episode. Layer II was comprised of 0.12 to 0.25 m of a very dark brown (10YR 2/2) silt with 80% cobble and pebble inclusions. Cultural remains from Layer II consisted of *cowrie* shell (n=1, 0.2 grams), unidentified marine shell (n=1, 0.8 grams), and charcoal (0.3 grams). The excavation of TU-6 was terminated on bedrock.

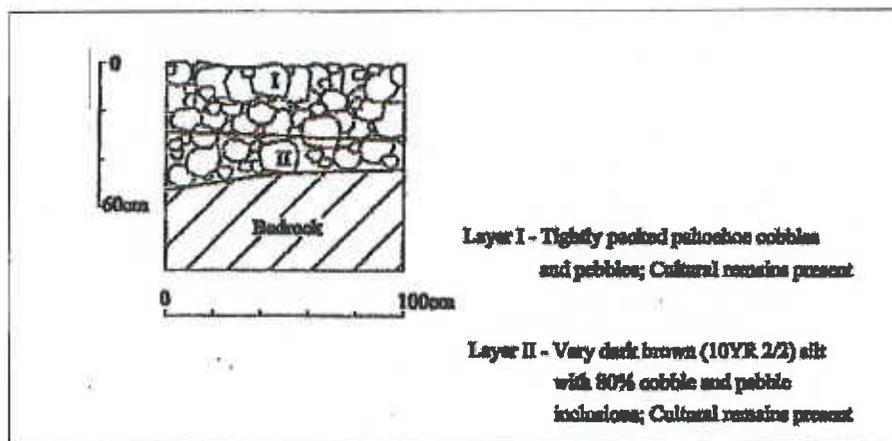


Figure 18. Site 23422, Feature D, TU-6, North Face Profile (from Haun and Henry 2000:38).

Feature C is an irregularly-shaped pavement located 10.0 m east-southeast of Feature B. It consists of a linear pavement of cobbles and pebbles that is 2.5 m long (northeast by southwest), and 0.72 to 0.85 m wide, with a low wall located at the eastern end. The surface of the pavement is level cobbles pebbles. The wall is comprised of stacked cobbles and small boulders, and is 2.65 m long (north-south), 1.2 m wide and 0.4 to 0.42 m in height. The wall may have functioned as a windbreak. No cultural remains were observed at Feature C.

Feature D is a roughly rectangular-shaped pavement located 2.4 m south of Feature C. The pavement is 3.15 m long (north-south), 1.9 to 3.0 m wide and 0.06 to 0.1 m in height. The surface is comprised of level cobbles and pebbles. No cultural remains were present. Feature E is a U-shaped enclosure located 3.5 m northeast of Feature C. The U-shape is open to the west and is 4.45 m long (north-south) and 3.25 m wide. The walls are comprised of stacked and piled pahoehoe cobbles and small boulders that vary in width from 1.02 to 1.22 m and in height from 0.4 to 0.6 m. The interior of the U-shape is comprised of bare pahoehoe lava with no cultural remains present.

Site 23422 is interpreted as a temporary habitation site. This is based on the formal type of the component features, and the feature's informal construction and small size, following Cordy's (1980) definition for temporary habitations. (2000:33-39)

SIHP Site 23423

Haun and Henry describe Site 23423 as follows:

Site 23423 is a large lava tube that extends through the project area in a roughly northeast by southwest direction [see Figure 2]. There are two entrances to the cave within the project area, both consisting of holes in the surface lava that drop vertically into the cave [Figure 19]. Entrance 1 is located 20.5 m southeast of Site 23412. It is oval-shaped and is 2.2 m long (east-west) and 1.8 m wide with a c. 10.0 m drop to the cave floor below [Figure 20]. Entrance 2 is situated 88.0 m west-southwest of Entrance 1. This opening is 3.5 m long (east-west) and 1.5 m wide with a c. 7.0 m drop to the floor of the cave. A pile of modern debris is present below Entrance 2, consisting of milled lumber, asphalt shingles and plastic and glass bottles. It is unclear how this material was deposited as there are no roads or structures in the immediate area.

The portion of the cave within the project area is 370.0 m in length, extending to the northeast and southwest outside the boundaries of the parcel. The cave ranges in width from 3.95 to 21.0 m and in height from 2.8 to 10.0 m. Only a small portion of the cave outside the parcel to the southwest was examined. During the examination of the northeastern portion of the cave, an opening was observed in the distance, and the survey crew continued outside the parcel a distance of c. 70.0 m to where a large sinkhole was encountered [see Figure 2]. A massive, c. 2 m thick stacked stone wall extends across the southwestern end of the sinkhole. The wall only extends approximately 1-1.5 m above the cave floor and probably is an incomplete refuge cave entrance. A narrow opening with faced sides is present in the center of the partially walled cave entrance. The cave continues upslope on the northeastern side of the sinkhole, but was not examined. This portion of the cave was not documented because it is outside the project area.

Site 23423 consists of the cave and 18 internal features. These features consist of seven terraces (Features B, C, G, J, N, P and Q), three alignments (Features A, D and L), two walls (Features E and K), two cupboards (Features H and I), an enclosure (Feature L), a cairn (Feature M), an upright (Feature O), and a step (Feature F). The majority of the features are interpreted as temporary habitation-related. The two cupboards likely functioned as storage features and the cairn may have served as a marker. The upright (Feature O) may indicate a ceremonial function for at least a portion of the cave. The Feature E wall and Feature F step are probably related to the possible use of the cave as a refuge. Site 24323 is unaltered and in good condition.

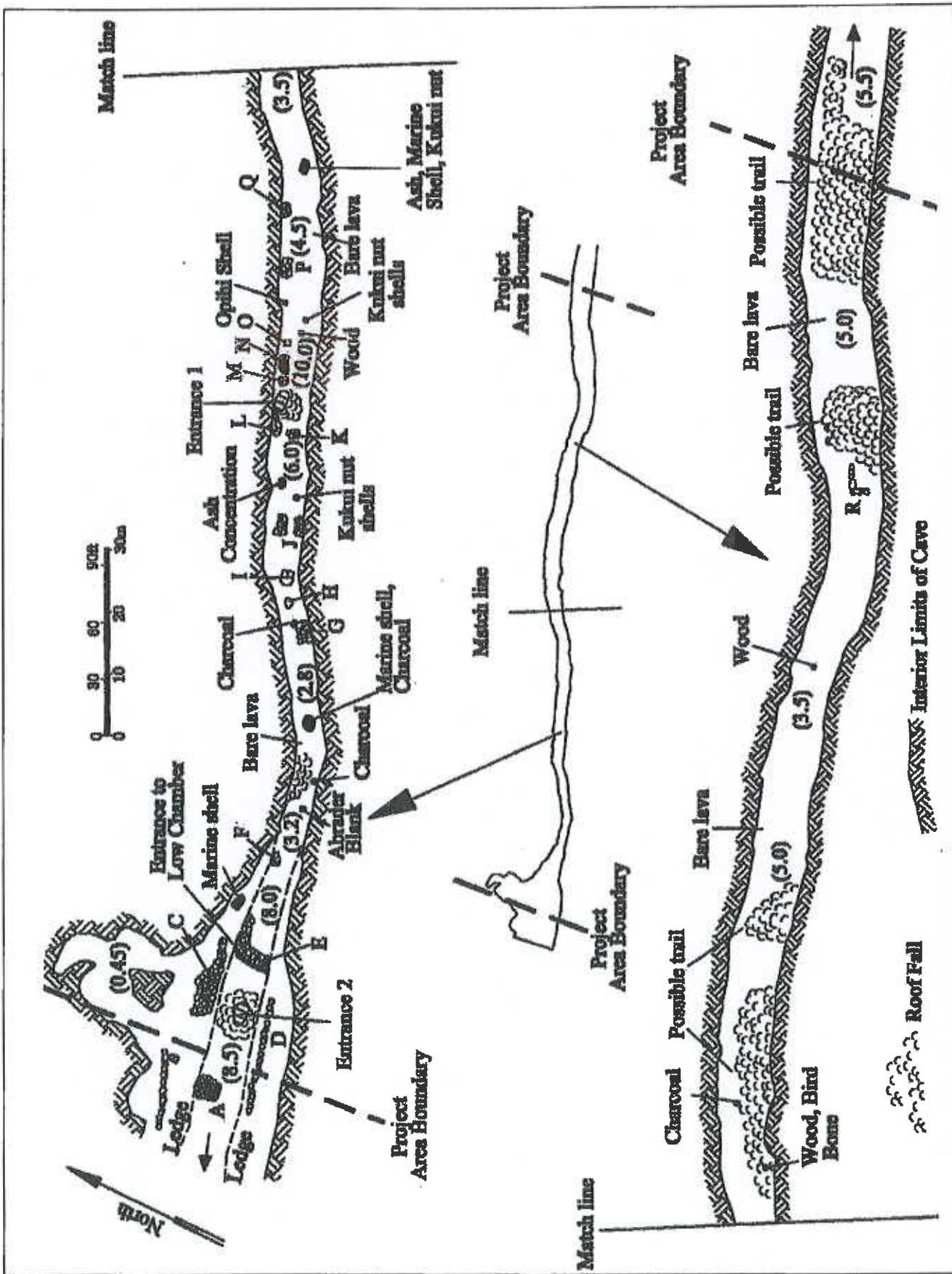


Figure 19. Site 23423 Plan Map (from Haun and Henry 2000:40).



Figure 20. Site 23423, Entrance 1, view to southwest (from Haun and Henry 2000:41).

The following description begins at the southwestern portion of the cave and extends to the northeast. The cave in this area is 19.0 to 21.0 m in width with ceiling heights that range from 7.0 to 8.5 m. Feature A is a low terrace situated 13.0 m west of Entrance 2, within the main floor of the cave. The terrace is roughly square-shaped and is 2.9 m long (east-west) and 2.7 m wide. The surface is level cobbles and slabs with a single *cowrie* shell present. The sides of the terrace are constructed of stacked cobbles and small boulders, ranging in height from 0.35 to 0.6 m.

There are raised ledges above the floor of the main tube on the north and south sides, which range in height from 2.0 to 2.5 m. The ledges are bare, gently sloping lava. The ledge on the northern side is 2.0 to 8.5 m wide. There is a chamber with two entrances that extends to the north in this area. This chamber is 18.5 m long (north-south), 3.5 to 13.5 m wide, and from 0.45 to 1.0 m in height. The floor of the chamber is bare lava with no cultural remains present.

Two features are located on this ledge. Feature B is an alignment of flat pahoehoe slabs positioned one course high and one to two courses wide. The alignment is 12.9 m long (east-northeast by west-southwest), 0.4 to 0.7 m wide and 0.1 to 0.15 m in height. Feature C is a crudely constructed terrace situated 5.0 m east of Feature B. It has a stacked cobble and small boulder retaining wall on the southern side that is 0.15 to 0.45 m in height. The surface is level but unpaved and is 12.5 m long (east-west) and 1.4 to 3.5 m wide. No cultural remains were observed on the surface of Feature C, though a concentration of marine shell is present 6.0 m to the east, at the eastern end of the ledge.

The ledge on the south side of the main tube is 2.0 to 6.8 m wide. There is an alignment situated along the northern edge of the ledge. Feature D is 17.5 m long (east-northeast by west-southwest) and consists of one to two courses of flat pahoehoe slabs. The alignment is 0.4 to 0.7 m wide and 0.1 to 0.3 m in height. No cultural remains were present.

Feature E is an L-shaped stone wall that extends across the floor of the main tube, 7.0 m east of Entrance 2. The wall is 6.9 m long (north-south) by 4.2 m (east-west). The wall is 1.2 m wide and is built of stacked cobbles, small boulders and slabs. It is 1.2 m in height on the western side and 2.7 m in height on the eastern side. A low chamber extends below the main cave floor beneath the Feature E wall. The chamber is 27.0 m long (east-west) 7.0 to 11.0 m wide, and 0.4 to 1.15 m in height. The floor of the chamber consists of scattered roof fall with no cultural remains observed. The Feature E wall either functioned as, or once it was completed was intended to function as a refuge defensive feature. The wall connects the ledges on either side of the tube forming a barrier nearly 3 m high with an elevated balcony-like area beneath Entrance 2 that overlooks the lower tube floor to the east. The feature would have partially blocked access to the western portion of the tube and Entrance 2 and provided cover for defenders of the balcony area and western reaches of the tube.

Feature F is a well-constructed cairn comprised of thick flat slabs located against the northern side of the main chamber, below the northern ledge. The step is situated 10.0 m east of Feature E and is comprised of five stacked basalt slabs. It is 0.8 m long (east-west), 0.5 m wide, and 0.75 m in height. This step was used as a means of gaining access to the northern ledge and western reaches of the cave from the main cave floor to the east.

East of Feature F the cave narrows to 4.5 m with a ceiling height of 3.2 m. The floor in this area is bare lava. A 0.1 m diameter ground scoriaceous basalt abrader was noted 8.0 m east of Feature F. Several fragments of charcoal were observed on the cave floor 5.0 m east of the abrader. The northern wall of the cave has collapsed in this area.

The cave angles to the northeast on the eastern side of the collapsed area. A concentration of marine shell and charcoal in a 2.0 m diameter area were noted 9.5 m northeast of the surface charcoal. Feature G is a rectangular terrace constructed against the southeastern wall of the cave, 15.0 m northeast of the shell and charcoal concentration. The terrace is 3.1 m long (northeast by southwest) and 2.8 m wide. The north, east and west sides of the terrace have been built up to heights of 0.35 to 0.45 m above the cave floor. The surface of the terrace is level and paved with cobbles. *Kukui* nut shells and a fragment of wood are present on the surface.

Feature H is a possible cupboard located in the center of the cave, 3.5 m northeast of Feature G. It consists of a flat basalt slab (0.8 m long, 0.6 m wide and 0.25 m thick) positioned on three large cobbles. A slight depression (0.15 m deep) is located below the slab. Feature I is a second possible cupboard located 4.5 m northeast of Feature H. It is comprised of two small basalt boulders, with a third boulder placed on top, creating an enclosed internal space. A large *opihii* shell is present on the top boulder, and *cowrie* and sea urchin body fragments are present within the interior. Feature I is 1.3 m long (north-south), 1.2 m wide and 0.8 m in height. The ceiling height of the cave in this area is 5.0 m, and the floor is comprised of bare lava.

Feature J consists of two adjacent terraces located 9.0 m northeast of Feature I. The first terrace is built against the southeastern wall of the cave. It is 3.8 m long (northeast by southwest), 1.8 m wide, and 0.3 to 0.45 m in height. The second terrace is situated 1.4 m to the north of the first, in the center of the tube. It is 3.75 m long, 1.5 m wide and 0.3 to 0.4 m in height. Both terraces are constructed of stacked cobbles and small boulders with level but unpaved surfaces. No cultural remains were present at the features though a pile of *kukui* nut shells is located 3.5 m to the northeast, and a surface concentration of ash is located 6.0 m to the northeast.

Feature K is a low wall located in the center of the cave, 14.0 northeast of Feature J. It is 2.7 m long (north-south) 0.8 m wide, and 0.7 m in height. Feature L is a small enclosure formed by two large basalt slabs and several piled cobbles, located against the

northern cave wall 2.0 m north of Feature K. The enclosure is 2.1 m long (northeast by southwest), 1.2 m wide and 0.6 m in height. *Kukui* nut shells and a fragment of waterworn coral were noted inside the enclosure. The floor of the interior is bare lava.

Entrance 1 is located above Feature L to the northeast. A jumbled pile of roof fall is located below the opening. Feature M is a cairn built of stacked basalt cobbles and slabs. It is 1.0 m long, 0.8 m wide and 0.8 m in height. A fragment of waterworn coral, pieces of wood and several *kukui* nut shells were observed on the surface of Feature M. Feature N is a terrace located adjacent to Feature M to the northeast. It is 3.2 m long (northeast by southwest), 1.6 m wide and 0.35 m in height. The sides of the terrace consist of stacked cobbles and small boulders, and the surface is paved with cobbles. No cultural remains were observed.

Feature O is an upright angular basalt slab located 3.0 m northeast of Feature N. The slab is 1.1 m tall, 0.29 m wide, and 0.14 m thick and is set in a slight depression. Several small cobbles are located at the base of the upright, supporting it. A dog mandible, *kukui* nut shells, a piece of wood, and an *opihī* shell were observed on the bare lava floor to the northeast of Feature O.

Feature P is a crude terrace situated 12.5 m northeast of Feature O. It is located against the northern side of the cave and is 2.3 m long (northeast by southwest), 1.2 m wide and 0.45 m in height. The sides are built of stacked and piled cobbles and small boulders and the surface is level, unpaved cobbles. An *opihī* shell is present on the surface of Feature P. The ceiling height in this area is c. 4.5 m.

Feature Q is a poorly built terrace located against the north wall of the cave, 10.0 m northeast of Feature P. It is 1.7 m long (northeast by southwest), 1.5 m wide and 0.32 m in height. The surface of the terrace is level but unpaved and the sides are built of stacked and piled cobbles and small boulders. *Kukui* nut shells were observed on the surface of the terrace and a concentration of ash, marine shell, and *kukui* nut shells were noted 6.5 m to the east.

The cave continues to the northeast for 27.0 m where a large pile of roof fall partially blocks the tube. A cluster of wood and bird bones were observed in the roof fall area at the western end. Stones appear to have been cleared along the northern side of the roof fall against the northern cave wall, possible representing a path or trail. A fragment of charcoal was observed in this cleared area 11.0 m northeast of the wood and bird bone.

A second area of roof fall is located 7.5 m to the north. A cleared area is also present along the northern side of this roof fall. The cave continues to the northeast for 65.0 m to where Feature R is located. The cave in this area has a bare lava floor and ranges in height from 3.5 to 5.0 m. A fragment of wood is present in the center of the cave 29.0 m southwest of Feature R. Feature R is an L-shaped alignment of small flat pahoehoe slabs, positioned one course wide and tall. The alignment is 4.8 m long (northeast by southwest), 2.9 m wide and 0.1 m in height. No cultural remains were present.

An area of roof fall is located adjacent to Feature R to the northeast. A possible cleared trail extends along the northern edge of the roof fall. Another area of roof fall is situated 17.0 to the northeast with another possible trail along the northern side. The eastern project area boundary is located in the approximate center of this roof fall area. As stated, the portions of the cave were examined to the northeast but were not documented due to their location outside the project area. This portion of the cave, from the project area boundary to the sinkhole opening contained no cultural remains or surface structures, with the exception of the refuge wall located across the western side of the sinkhole. (2000:39-47)

REASSESSMENT OF SITE TREATMENT

An intensive field examination was carried out by Robert B. Rechtman, Ph.D. and Matthew R. Clark, B.A. of the ten sites identified for preservation and data recovery. As a result of this examination we propose a reconsideration of the treatment for two sites (SIHP Site 5747 and SIHP Site 23421).

SIHP Site 5747

This Historic Period cattle wall was slated for data recovery. Although not explicit in the inventory report (Haun and Henry 2000), we believe that this treatment was intended for a portion of the wall that contains fine grain basalt boulders obtained from an adjacent earlier archaeological context (the quarry and work area; SIHP Sites 23413 and 23414). While further data collection is proposed for the boulders in the wall, we also suggest that preserving the portion of this wall that contains the reused boulders would help document a more complete land use history of the location (see discussion of SIHP Sites 5747, 23413, and 23414 below for a preservation and interpretation strategy).

SIHP Site 23421

This steppingstone trail was fully documented in the inventory survey (Haun and Henry 2000:33,36) across a small section of 'a'ā, and was not shown to connect to any other site or resource. Its course was not identified on the *pāhoehoe* in either a *mauka* or *makai* direction. This site is similar to other portions of steppingstone trails identified in the project area (one of which will be preserved as part of SIHP Site 23417 along with other features forming a residential complex; and another as part of the SIHP Site 23413, 23414, 5747 complex). Given these other preservation commitments, the level of documentation already completed for this site, and the isolated nature of its course, we feel that a treatment of no further work is justified.

PRESERVATION SITES

One site (SIHP Site 23417) will be preserved in its entirety. The *makai* portion of another site (SIHP Site 23423) will be preserved within the project area, and protected with a buffer. And, three sites (SIHP Sites 23413, 23414 and 5747), or portions thereof, will be preserved as a contiguous set of features in a single preservation area. As part of the development process, the preservation areas along with their buffer zones will be recorded with the Bureau of Conveyances as common space easements within the overall development. The responsibility for maintenance of these sites will be vested with the homeowners association.

SIHP Site 23417

This habitation complex occupies three fingers of an 'a'ā flow and the intervening areas of *pāhoehoe*. To retain the site integrity a long-term preservation buffer will be established five meters south and west of Feature E and extend in northerly and easterly directions to encompass the extreme portions of Feature F at a distance of five meters beyond the 'a'ā and extend around Feature A at a distance of ten meters from the feature's edge. Features B, C, and D will be at the center of the preservation area (Figure 21). Short-term protective construction fencing will be placed at the preservation buffer and remain until development activities in the area are complete. After the development activities have been completed the protective fencing will be removed and the area preserved in its natural state. The development setting for this area will be residential single- and multi-family homes. Cautionary signs will be placed at the site indicating the sensitive and protected nature of the resource, and an interpretive sign will be placed at a convenient viewing location from which all features of the site can be seen. The language for these signs will read:

Archaeological Site

Please do not walk within or remove rocks from this area.
Damaging this site is punishable under State Law
Chapter 6E-11, Hawai'i Revised Statutes

Habitation Site (SIHP Site 23417) 'O'oma 1st Ahupua'a

Native Hawaiians extracted resources from this inland area for both tool manufacture (stone) and subsistence (cultivated and collected species) purposes. Habitation sites such as this one were used on a temporary basis while harvesting or gathering resources. Three stacked stone features at this site likely served as house foundations, and flat smooth *pāhoehoe* slabs were placed in the rough 'a'ā lava as a trail to make walking to and from and within the site easier.

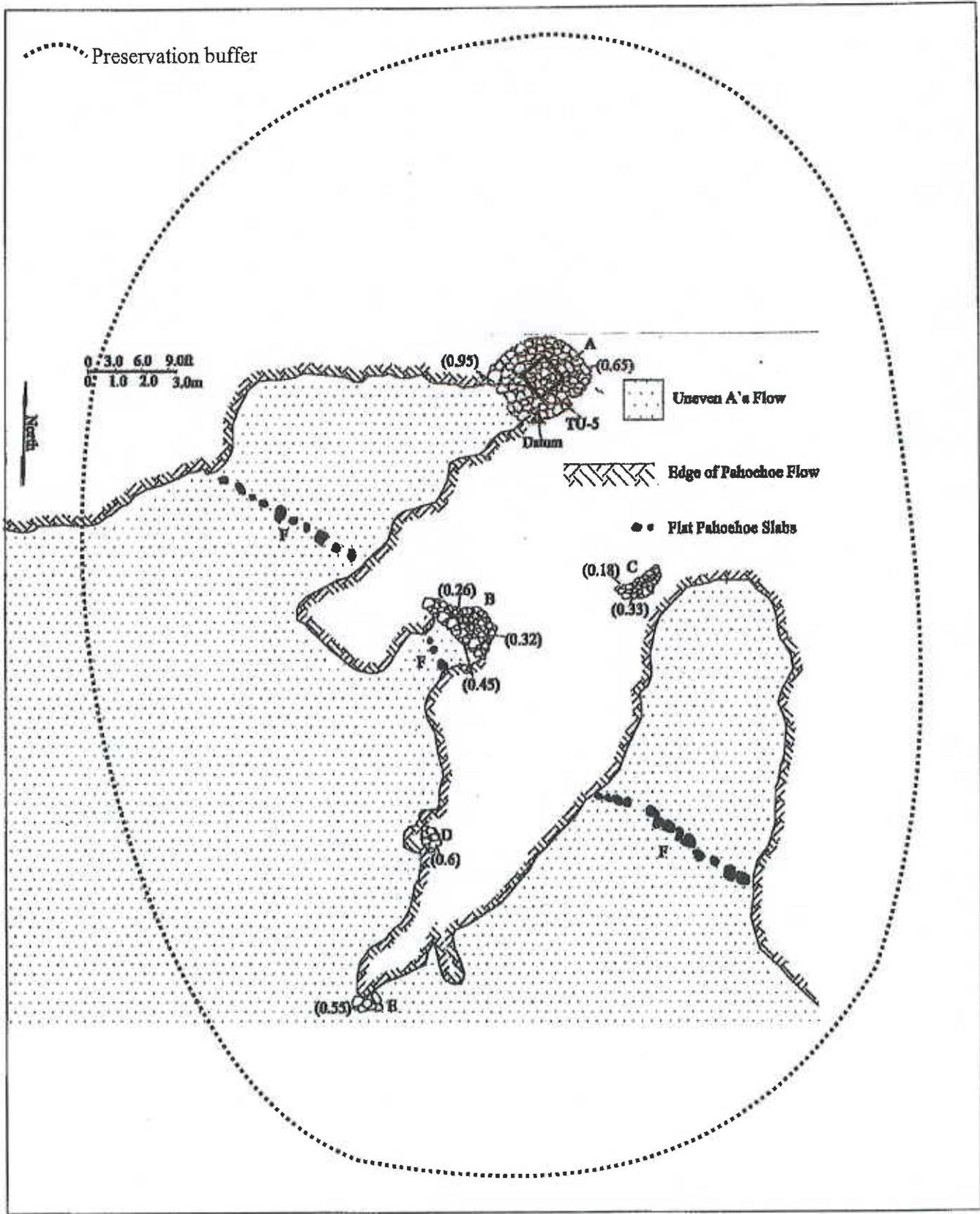


Figure 21. Location of preservation buffer for SIHP Site 23417.

SIHP Site 23423

This lava tube extends in a *mauka/makai* direction across the entire project area. The western roughly one third of the tube exhibits the only entrances (2) on the property and appears to be the area with the thinnest mantle below the ground surface. The eastern two thirds of the tube are very deep below the surface with a roof to surface mantle of several meters thick. The preservation strategy for this site will be to protect the western third of the tube with a buffer zone of ten meters on either side of the tube as projected to the ground surface. This preservation buffer will also protect the two entrances. This preservation area will begin ten meters *mauka* of Entrance 1 and extend to the *makai* property boundary (Figure 22). Temporary protective fencing will be placed at the preservation buffer and remain until development activities in the area are complete. After the development activities have been completed the protective fencing will be removed, a more solid (perhaps chain link) fence placed at a distance of 10 meters around the tube entrances as a safety measure, and the area preserved in its natural state. This site will not be interpreted for the public; although, cautionary signs indicating the sensitive and protected nature of the resource will be strategically placed along the site buffer. The signs will read:

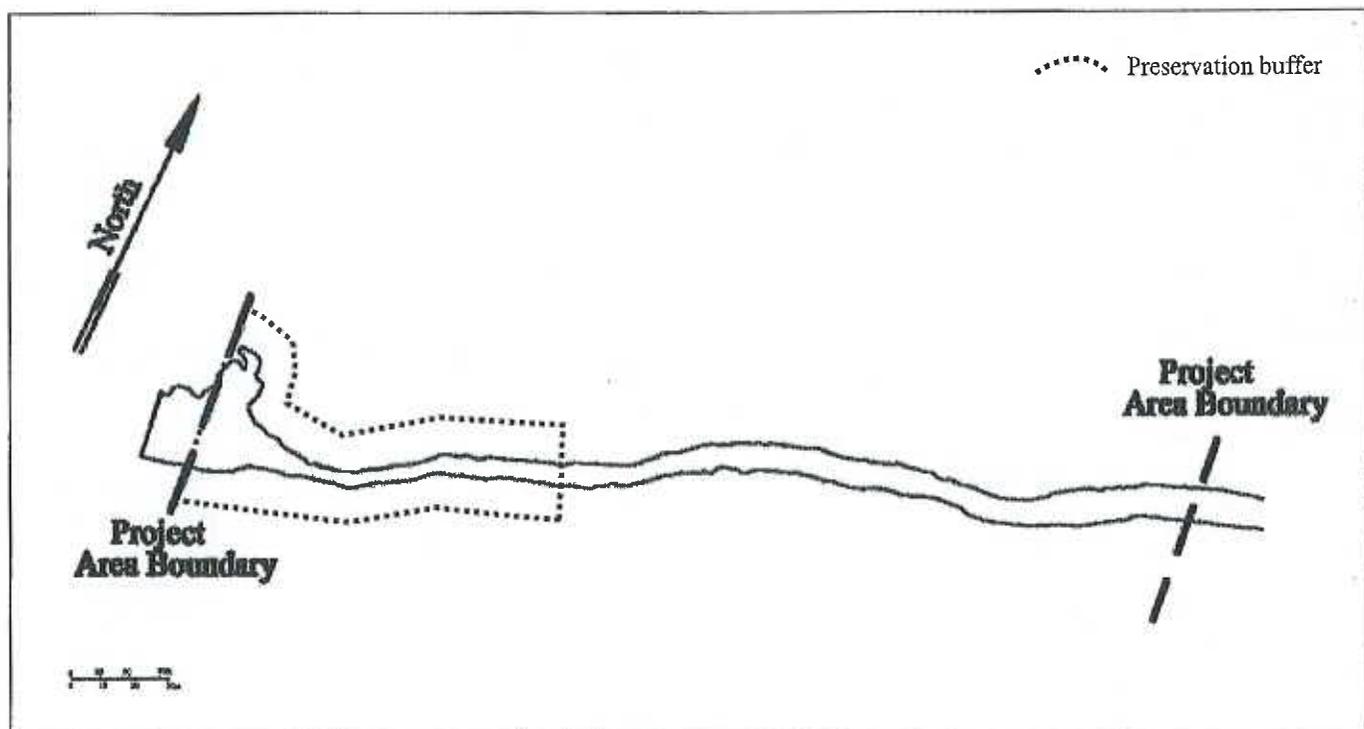
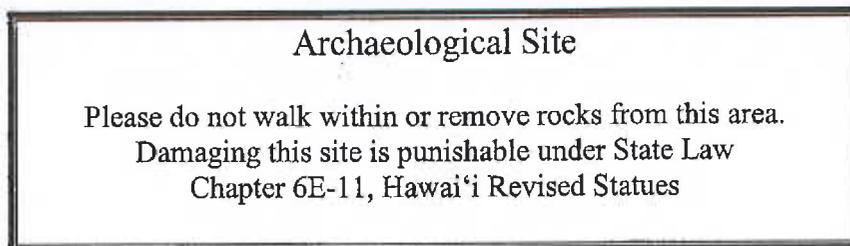


Figure 22. Location of preservation buffer for SIHP Site 23423.

SIHP Sites 5747, 23413, and 23414

A single preservation area will be created and maintained as open space within the development that will incorporate a portion of SIHP Site 5747, all of SIHP Site 23413, and significant elements of SIHP Site 23414 (Figure 23). The area will be preserved in an "as is" condition and interpreted for the public. The development setting for this area will be open space and a park with pavilion. During development activities a protective construction barrier will be placed along the boundary of the preservation easement and remain until development activities in the area are complete. After the development activities have been completed the protective barrier will be removed and the area will be preserved in its natural state. An annual inspection of the preservation area will be made to assess potential visitor impacts and future adjustments to access and signage may be necessary for the long-term protection of the sites. For now, the following cautionary signs will be posted at ingress and egress locations:

Archaeological Preservation Area

While you are encouraged to visit the sites within this preserve, we ask that you respect those that came before us and refrain from moving or taking rocks or any other objects from this area.

Damaging archaeological sites is punishable under State Law
Chapter 6E-11, Hawai'i Revised Statutes

Three interpretive signs will be established, one along the trail (Feature I) near quarry features (Features E and F) at SIHP Site 23414, one among the pecked basins at SIHP Site 23413, and one in the vicinity of the fine-grained basalt boulder incorporated into the wall at SIHP Site 5747. Site 5747 is a Historic Period wall that runs the length of the overall project area along its western boundary. Given that this is a property boundary wall it is likely that much of it will be stabilized and reconstructed although there is no general preservation requirement for this site. That portion of the wall near Site 23413 was built incorporating basalt boulders that were taken from the immediate ground surface. The boulders are artifacts that resulted from earlier quarrying and tool manufacturing activities. The interpretive sign at the wall will read:

Historic Wall Site (SIHP Site 5747) 'O'oma 1st Ahupua'a

This wall was likely originally built in the 1850s and marks the western boundary of a property that the Hawaiian Government granted to a person whose name was Kauhini. The wall also likely functioned to control the movement of grazing cattle. The smooth battered boulders incorporated in this portion of the wall were removed from a nearby more ancient archaeological site, where Hawaiians quarried stone and manufactured tools.

To aid in the development of interpretive information for the quarry site (SIHP Site 23414) and the pecked basin work area (SIHP Site 23413), further data collection will take place. A detailed examination of the ground surface of both site areas and re-mapping of the surface features will be completed, along with petrographic analyses of the basalt from the quarry features (see the Data Recovery section below). The boulders incorporated into the rock wall (SIHP Site 5747) will also undergo further study and analysis. Once the further data collection has been completed, interpretive language will be prepared and submitted to DLNR-SHPD for approval.

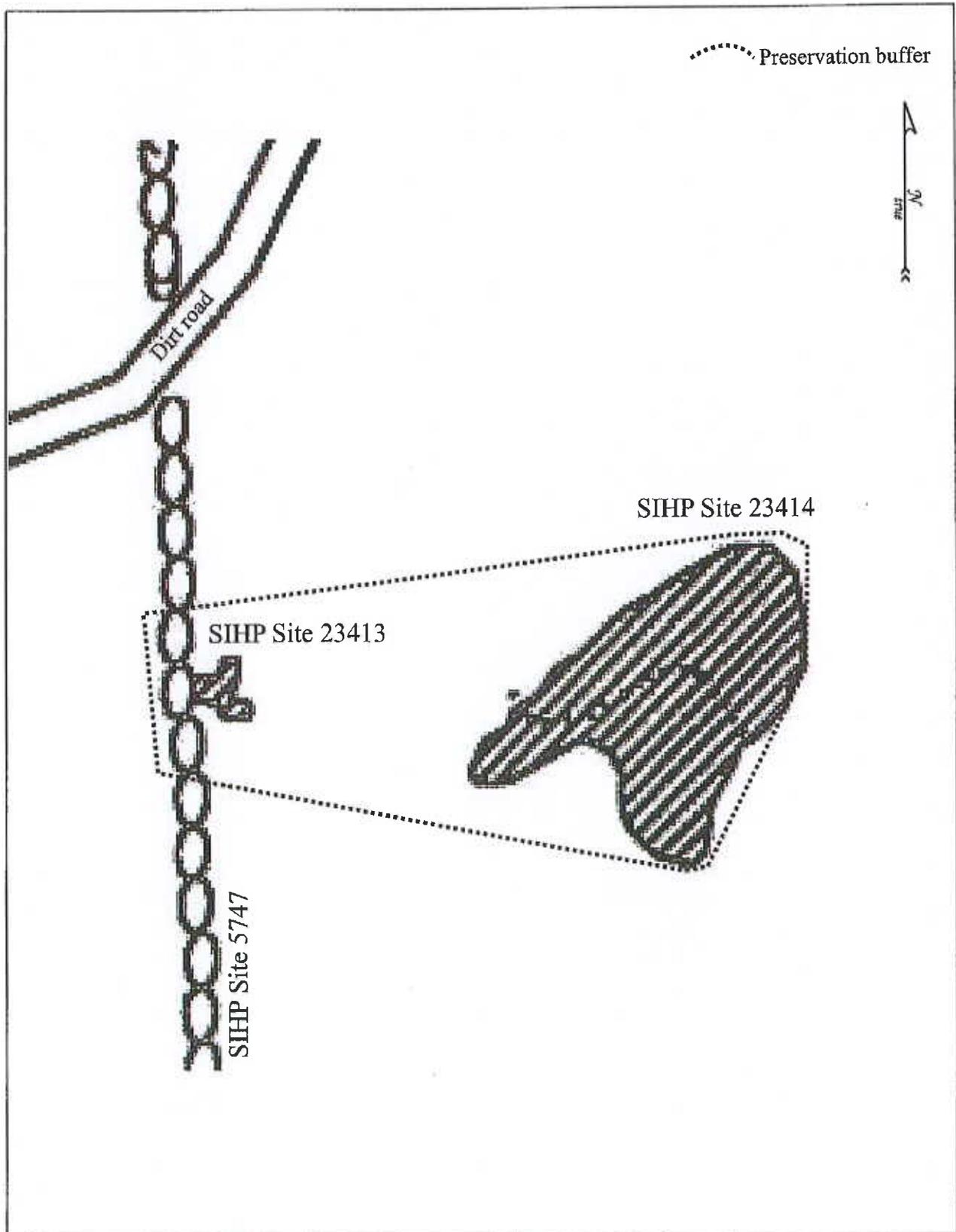


Figure 23. Location of preservation buffer for SIHP Sites 5747, 23413, and 23414.

DATA RECOVERY SITES

Four sites (SIHP Sites 23411, 23412, 23416, and 23422), all interpreted as temporary habitations (Haun and Henry 2000), will be subject to data recovery investigations in order to mitigate impacts from the proposed development. Barring any inadvertent discoveries, once data recovery has been completed, there will be no further need to protect or preserve these four sites. Additionally, as part of the preservation of portions of SIHP Site 23414, there will be further data collection for both interpretive as well as research purposes.

This section describes the data recovery research objectives and the technical and analytical approaches for addressing those objectives; and includes discussions on the hand excavation units, the analysis of recovered remains, petrographic samples, radiocarbon samples, and curation concerns.

Research Objectives and Analytical Approaches

The research objectives for the four habitation sites are simple given that there are almost no subsurface deposits at any of these sites (especially within the lava blisters). The data recovery effort will focus on two issues: 1) refining the functional interpretations previously offered for the sites, and 2) establishing the timing of habitation. It is understood that given the limited subsurface deposits at these sites only generalized information is likely to be obtained, however, every attempt will be made to interpretively extract as much specific information as possible.

As for the first of the research issues, the sites were interpreted as temporary habitations based on formal attributes and recovered remains (Haun and Henry 2000). We will attempt to examine if specific residential functions took place at the sites, or if they represent locations of general multifunctional use. To answer this question we will excavate all of the soil present within the lava blister sites (SIHP Sites 23411, 23412, and 23416) and a 50% sample (by area) from each of the five features at SIHP Site 23422. The types of artifacts present and the variety of dietary faunal remains recovered will be used to generate refined interpretations of site function.

Attempting to address the second issue will require the recovery of samples sufficient for radiometric dating. Attention will be given to identifying in situ single-source charcoal pieces large enough for conventional radiocarbon analysis. If no such samples are recovered AMS dating might be used for very small samples if recovered. Two dates are proposed for each site, for a total of eight radiocarbon dates from these habitation sites.

Further data collection will be carried out at the quarry site (SIHP Site 23414). This data collection will include two aspects: 1) an intensive examination of the surface of the site in an attempt to identify any artifacts, and 2) the petrographic characterization of the quarry material (fine-grained basalt). This second task will be done in an effort to identify trace elements unique to the basalt outcrop sufficient to provide a positive identification signature. While it is clear that the quarry (SIHP Site 23414) and the pecked basins (SIHP Site 23413) are functionally related, it is unclear as to what kinds of tools (or tool blanks) were being manufactured at SIHP Site 23413 from the basalt quarried at SIHP Site 23414. Once a petrographic signature is established for this quarry, then finished artifacts of visually similar fine-grained basalt recovered from other sites in the region can be petrographically characterized and possibly sourced to this quarry. The current effort will only focus on establishing the baseline data from the quarry site.

Excavation Units

Depending on the excavation context, unit size will vary anywhere from 1 meter x 1 meter to 1 meter x 2 meters to 2 meters x 2 meters. Regardless of the size, all excavation units will be dug by hand following natural stratigraphic layers divided into 10-centimeter arbitrary levels. The arbitrary levels will be measured relative to an elevation datum corresponding to the highest corner of the excavation unit. All excavated matrix will be passed through ¼ inch mesh screening and cultural material will be collected and segregated by level. Level Record Forms will be completed for each excavated level. Subsurface features

encountered during excavation will be fully documented before further excavation of the unit. Excavation will continue until bedrock is encountered. Upon completion of the excavation unit, a Unit Summary Form will be completed, black and white photographs taken, a stratigraphic profile drawn, and the unit backfilled.

Cultural Material Analyses

All recovered cultural material will be processed in the Rechtman Consulting, LLC laboratory facility. Items will be cleaned, weighed, counted, described, and entered into a master project catalog. Where appropriate, artifacts will be drawn, photographed, and subject to further detailed analyses. Faunal remains will be tabulated and identified to the lowest taxonomic level possible. Where applicable, the Number of Identified Specimens (NISP) and the Minimum Number of Individuals (MNI) will be determined. Based on evidence from test excavations (Haun and Henry 2000) these sites are poor candidates for pollen and flotation (macrobotanical) analyses. Charcoal, and other organic samples will be prepared for possible radiocarbon analysis. Basalt samples collected from the quarry will be submitted for petrographic analysis.

Radiocarbon Samples

The radiocarbon samples collected during fieldwork will be prioritized based on size, provenience, and integrity of association. Priority will be given to large single-piece samples recovered in situ from a clear stratigraphic context. All samples will be cataloged and initially cleaned and weighed in the Rechtman Consulting, LLC laboratory facility. If large single piece wood charcoal is recovered, portions of the sample will undergo wood identification analysis. Following this process, a maximum of 8 samples will be selected for radiocarbon age determination and sent to Beta Analytic Inc for analysis. Conventional radiocarbon analysis coupled with a calculation of stable isotope ratios ($C^{13/12}$) will be used for most samples. In instances where a particular sample is of a small size (between 0.3 and 1.0 gram final carbon) extended counting will also be used. In cases where the sample size is very small (between 300 micrograms and 0.3 grams final carbon) Accelerator Mass Spectrometry (AMS) will be used.

Petrographic Samples

Basalt samples will be collected from the quarry outcrops and sent to the University of Hawai'i at Hilo laboratory for X-Ray Florescence (XRF) analysis. It is hoped that a trace element signature can be isolated for this source. We may send additional samples to ALS Chemex, Inc. for Inductively Coupled Plasma (ICP) analysis. The samples will be processed using the different ICP methods for trace element analysis. When a method is found that isolates a geochemical trace element signature for our original quarry samples, we will then run replicates (additional samples from the quarry) to ensure reproducibility. The ICP technique may be tested because it is relatively inexpensive and potentially very precise.

Curation of Recovered Archaeological Material

All material recovered during data recovery will be temporarily stored at the Rechtman Consulting, LLC curation facility for a period of no more than one year following submission of the final data recovery report, during which time arrangements will be made for permanent curation in consultation with the landowner and DLNR-SHPD. It is the responsibility of the landowner to secure permanent curation in an acceptable facility; included in this responsibility are the costs associated with long-term curation.

CONTINGENCY FOR INADVERTENT DISCOVERY

If during the data recovery investigation human remains are encountered, such remains will be treated following the procedures outlined in HRS §§6E-43. Work in the area of the discovery will be halted, the remains stabilized if necessary, and DLNR-SHPD contacted to provide guidance on how to proceed with the discovery.

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ENVIRONMENTAL ASSESSMENT

LOKAHI KA‘U AFFORDABLE APARTMENTS

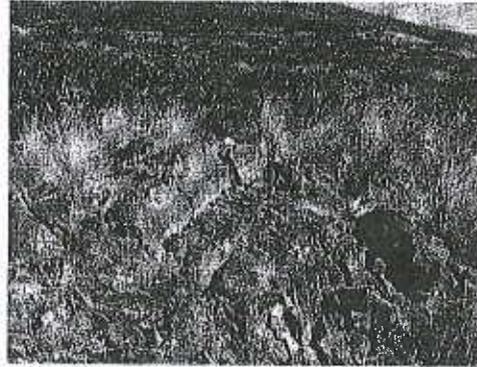
TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 4
Cultural Impact Assessment

Cultural Impact Assessment
Associated with the Proposed Development
of Lōkahi Ka'ū

(TMKs: 3-7-3-010:003, 051
052, 053, 054)

'O'oma 1st Ahupua'a
North Kona District
Island of Hawai'i



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ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

Cultural Impact Assessment
Associated with the Proposed Development
of Lōkahi Ka'ū

(TMKs: 3-7-3-010:001, 003, 051, 052, 053, 054)

'O'oma 1st Ahupua'a
North Kona District
Island of Hawai'i

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INTRODUCTION

On behalf of Sesascape Developments, LLC, Rechtman Consulting, LLC has prepared this Cultural Impact Assessment associated with the development of an approximately 50 acre project area in 'O'oma 1st Ahupua'a, North Kona District, Island of Hawai'i (TMKs:3-7-3-010:001, 051, 052, 053, 054) (Figure 1). This report is intended to accompany an Environmental Assessment (EA) compliant with Chapter 343 HRS, as well as fulfilling the requirements of the County of Hawai'i Planning Department and the Department of Land and Natural Resources (DLNR) with respect to permit approvals for land-altering and development activities. This study has been prepared pursuant to Act 50, approved by the Governor on April 26, 2000; and in accordance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impact*, adopted by the Environmental Council, State of Hawai'i, on November 19, 1997.

The archival-historical research and oral-historical interviews that were conducted for this study were performed in a manner consistent with Federal and State laws and guidelines for such studies. Among the pertinent laws and guidelines are the National Historic Preservation Act (NHPA) of 1966, as amended in 1992 (36 CFR Part 800); the Advisory Council on Historic Preservation's "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (ACHP 1985); National Register Bulletin 38, "Guidelines for Evaluating and Documenting Traditional Cultural Properties" (Parker and King 1990); the Hawai'i State Historic Preservation Statute (Chapter 6E), which affords protection to historic sites, including traditional cultural properties of on-going cultural significance; the criteria, standards, and guidelines currently utilized by the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) for the evaluation and documentation of cultural sites (cf. 13§13-275-8; 276-5); and the November 1997 guidelines for cultural impact assessment studies, adopted by the Office of Environmental Quality Control.

While the physical study area is limited to a portion of 'O'oma 1st Ahupua'a that lies *mauka* of the Queen Ka'ahumanu Highway, in an effort to provide a comprehensive and holistic understanding of the current study area, this report examines the entire *ahupua'a* and its relationship to neighboring lands within the larger Kekaha region. Archival-historical literature from both Hawaiian and English language sources was reviewed, including an examination of Hawaiian Land Commission Award records from the *Māhele 'Āina* (Land Division) of 1848; survey records of the Kingdom and Territory of Hawai'i; and historical texts authored or compiled by D. Malo (1951), J.P. I'i (1959), S. M. Kamakau (1961, 1964, 1976, and 1991), Wm. Ellis (1963), A. Fornander (1916-1919 and 1996), T. Thurmon (1908), J.F.G. Stokes and T. Dye (1991), M. Beckwith (1970), Reinecke (n.d.); and Handy and Handy with Pukui (1972). Importantly, the current study also includes several native accounts from Hawaiian language newspapers (compiled and translated from Hawaiian to English, by Kepā Maly), and historical narratives authored by eighteenth and nineteenth century visitors to the region. This information is presented within thematic categories and ordered chronologically by the date of publication.

The archival-historical resources were located in the collections of the Hawai'i State Archives (HSA), State Land Division (LD), State Survey Division (SD), and State Bureau of Conveyances (BoC); the Bishop Museum Archives (BPBM); Hawaiian Historical Society (HHS); University of Hawai'i-Hilo Mo'okini Library; private family collections; and in the collection of Kumu Pono Associates.

Over the last ten years, Kepā Maly of Kumu Pono Associates has researched and prepared several detailed studies—in the form of review and translation of accounts from Hawaiian language newspapers, historical accounts recorded by Hawaiian and non-Hawaiian residents, and government land use records—for lands in the Kekaha region of which 'O'oma is a part. Kepā Maly has also conducted a number of detailed oral history interviews with elder *kama'āina* documenting their knowledge of the Kekaha region (including 'O'oma). As part of the current study, a couple of new informal interviews were conducted. All of the interview participants (both past and present) have shared their personal knowledge of the land and practices of the families who lived in 'O'oma and vicinity.

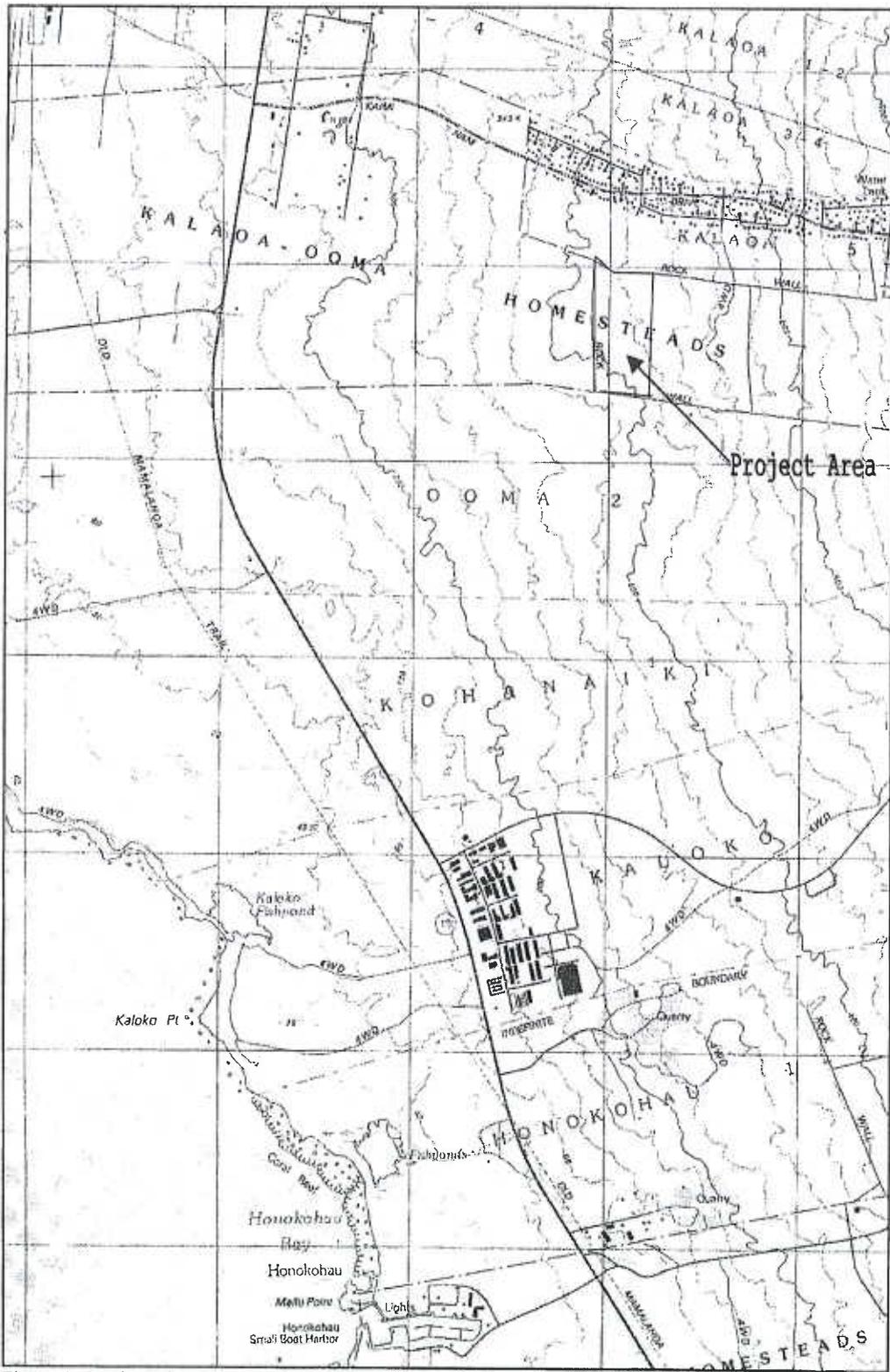


Figure 1. Portion of USGS 7.5 minute series Keahole Point, HI 1996 showing project area location.

This report begins with a description of the general project area and the proposed development activities. This is followed by a presentation of the archaeological background for the specific study parcel. A discussion of the cultural and historical background for 'O'oma Ahupua'a and the Kekaha region was generated based on detailed archival research. It is a comprehension of this background information that facilitates a more complete understanding of the potential significance any resources that might exist within the study area. Information from both prior and newly conducted oral-historical interviews is presented and summarized. While no traditional or on-going cultural practices, or traditional cultural properties have been identified, prior archaeological studies (Haun and Henry 2000; Rechtman and Clark 2004) have documented several significant archaeological resources within the study area, several of which merit preservation. These resources are described, potential impacts are discussed, and appropriate mitigation measures are outlined.

PROJECT AREA DESCRIPTION AND PROPOSED DEVELOPMENT ACTIVITIES

The development property is roughly 50 acres in 'O'oma 1st Ahupua'a, North Kona District, Island of Hawai'i and consists of five Tax Map parcels (TMK:3-7-3-010:003, 051, 052, 053, 054) (Figure 2). Elevation across the property ranges from 380 to 460 feet above sea level, and the terrain is characterized by broken *pāhoehoe* and 'a'ā flows that emanated from Hualālai between 3,000 and 5,000 years ago (Wolfe and Morris 1996). Project area vegetation consists predominantly of fountain grass (*Pennisetum setaceum*), with sparse *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena glauca*), silver oak (*Grevillea robusta*), *noni* (*Morinda citrifolia*), and *lanatana* (*Lantana camara*). A jeep road extending in a roughly north/south direction once cut through the northwestern portion of the property.

The development plans for the project area include a combination of single and multi-family residential units (including a significant proportion of affordable housing) and associated infrastructure (roadway, utilities, wastewater treatment facility, etc.), and parks and open spaces (Figure 3). Large undeveloped parcels form both the *mauka* and *makai* project area boundary. The southern boundary is the 'O'oma 1st/2nd ahupua'a border, and the newly constructed Lokahi Makai project forms the northern project area boundary.

ARCHAEOLOGICAL BACKGROUND

Thrum (1908) compiled the earliest systematic report on archaeological features—*heiau* or ceremonial sites—on the island of Hawai'i. Thrum's work was the result of literature review and field visits spanning several decades. Unfortunately, Thrum's work did not take him into 'O'oma, and his documentation on *heiau* ends at Lanihau, south of the study area; and picks up to the north, in the Pu'u Anahulu vicinity. Likewise, the 1906-1907, J.F.G. Stokes detailed field survey of *heiau* on the island of Hawai'i for the B. P. Pauahi Bishop Museum (Stokes and Dye 1991) stopped short of doing comprehensive work in the Kekaha region, and no sites were recorded in 'O'oma.

In 1929-1930, the Bishop Museum contracted John Reinecke to conduct a survey of Hawaiian sites in West Hawai'i, including 'O'oma and the Kekaha region (Reinecke n.d.). A portion of Reinecke's survey fieldwork extended north from Kailua as far as Kalāhuipua'a. His work being the first attempt at a survey of sites of varying function, ranging from ceremonial to residency and resource collection.

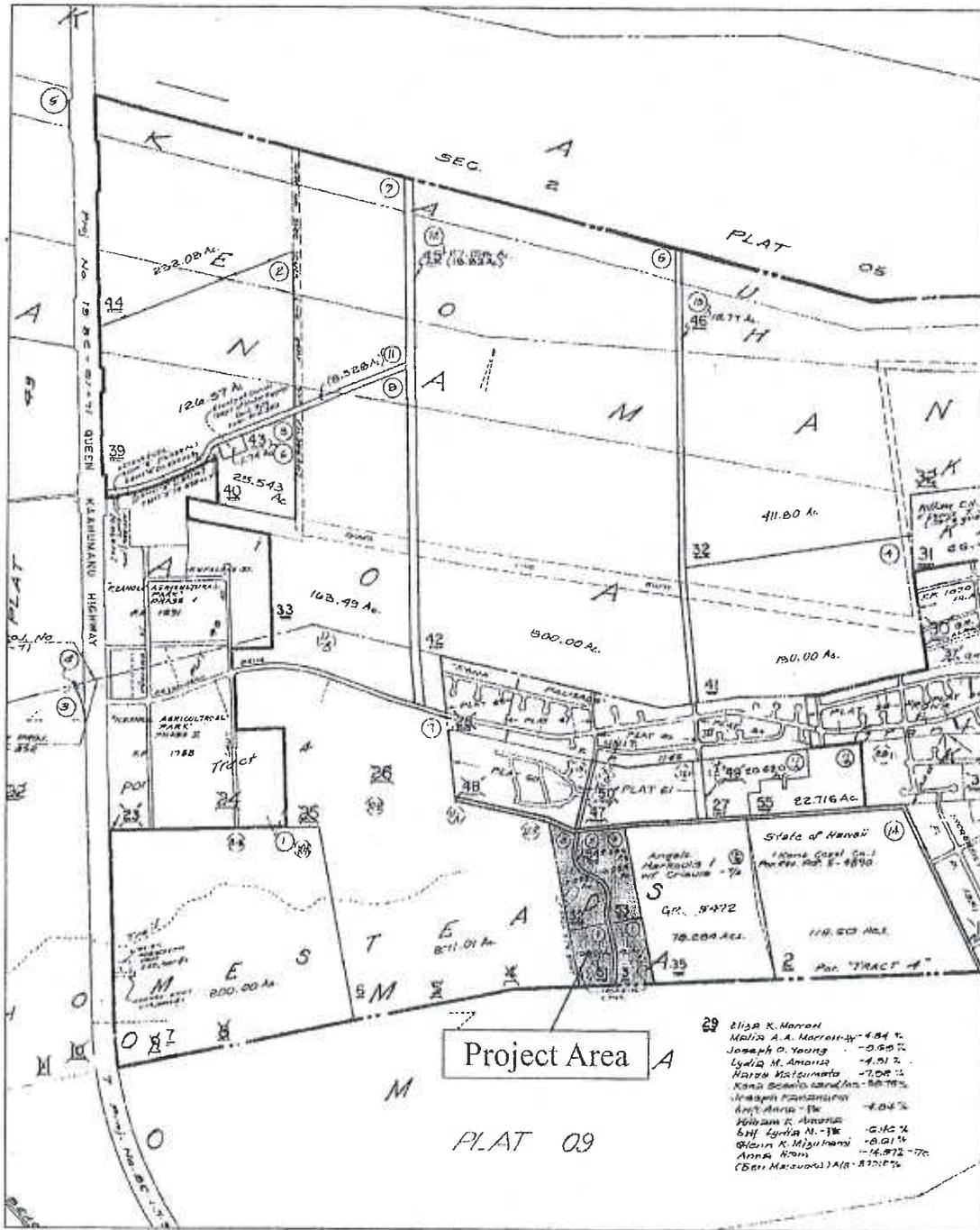


Figure 2. Portion of Tax Key Map 3-7-3-010 showing current project area.

During his study, Reinecke traveled along the shore of Kekaha, documenting near-shore sites. Where he could, he spoke with the few native residents he encountered. Among his general descriptions of the Kekaha region, Reinecke observed:

This coast formerly was the seat of a large population. Only a few years ago Keawaiki, now the permanent residence of one couple, was inhabited by about thirty-five Hawaiians. Kawaihae and Puako were the seat of several thousands, and smaller places numbered their inhabitants by the hundreds. Now there are perhaps fifty permanent inhabitants between Kailua and Kawaihae—certainly not over seventy-five.

When the economy of Hawaii was based on fishing this was a fairly desirable coast; the fishing is good; there is a fairly abundant water supply of brackish water, some of it nearly fresh and very pleasant to the taste; and while there was no opportunity for agriculture on the beach, the more energetic Hawaiians could do some cultivation at a considerable distance *mauka*.

The scarcity of remains is therefore disappointing. This I attribute to four reasons: (1) those simply over looked, especially those a short distance *mauka*, must have been numerous; (2) a number must have been destroyed, as everywhere, by man and by cattle grazing; (3) the coast is for the most part low and storm-swept, so that the most desirable building locations, on the coral beaches, have been repeatedly swept over and covered with loose coral and lava fragments, which have obscured hundreds of platforms and no doubt destroyed hundreds more; (4) many of the dwellings must have been built directly on the sand, as are those of the family at Kaupulehu, and when the posts have been pulled up, leave no trace after a very few years.

The remains on this strip of coast have some special characteristics differentiating them from the rest in Kona. First, there is an unusual number of petroglyphs and papamu, especially about Kailua and at Kapalaoa. Second, probably because of the strong winds, there are many walled sites, both of houses and especially of temporary shelters... (Reinecke n.d.:1-2)

The following site descriptions are quoted from Reinecke's draft manuscript of fieldwork conducted between Pūhili Point on the Kohanaiki-'O'oma 2nd boundary, and into Kalaoa 5th (Figure 3). In the site descriptions below, Reinecke references the occurrence of at least—6-house sites; 7 enclosures and pens (one of which is an "old cattle pen"); 11 terraces and platforms (one of which he felt was a "*heiau*"); 2 caves; 2 *ahu*; 1 stepping stone trail; 3 waterholes and a well; and 11 shelters. Apparently, no one was residing in the area at the time of his field survey.

Reinecke's site descriptions, south to north, across 'O'oma 2nd and 'O'oma 1st included:

Site 66. Very doubtful dwelling site. Then a row of sand-covered platforms at the border of the sand and the beach lava, enough for 6-10 homes. Remains of an old, large pen.

Site 67. Dry well on the crest of the beach.

Site 68. Water hole, two small platforms, four or more shelters, pens with very small platform.

Site 69. Large cattle pen. Doubtful old, rough platform at its north end. Remains of two old platforms by an *ahu* to the north.

Site 70. Walled platform, S.E. corner terraced, badly broken down. Platform *mauka*. The

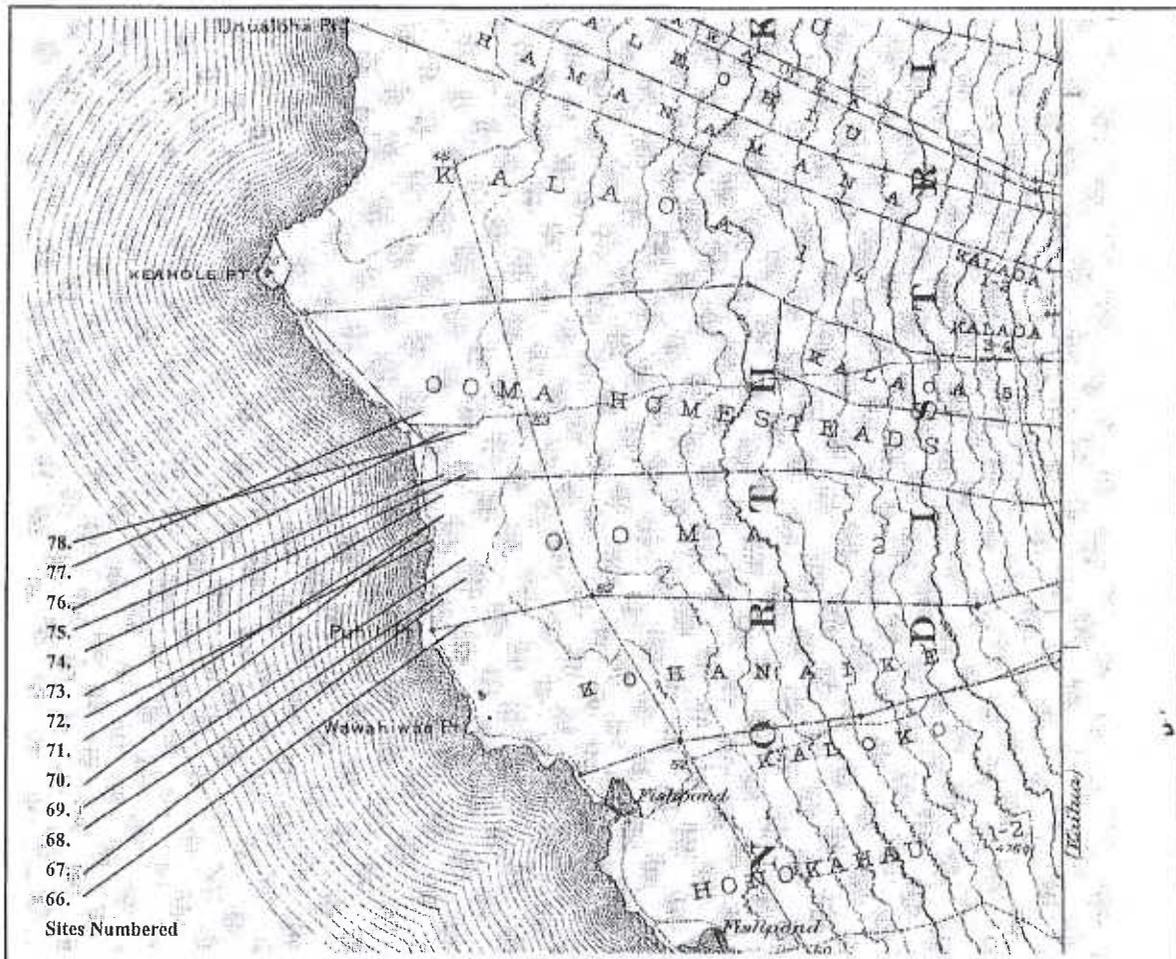


Figure 3. Approximate locations of sites described by Reinecke (n.d.:37) projected on USGS Keahole Quad, 1928.

Site 71. A knob partly walled on its slopes, with house site. Adjoining it on the south is a rough platform with three smooth boulders – heiau and kuula? Back of this a house platform and a platform about a fine shelter cave. Another platform and wall are about a slight natural depression filled with bones, including those of a whale.

Site 72. Ruins of a pen.

Site 73. Apparently a modern dwelling site of unusual construction; two terraces of pebbles, the upper 29x25x2 in front and 4-5' high elsewhere; the lower 19x10x25x3, with a three-sided pen at N.E.; surrounded by a carefully laid wall.

Site 74. A shelter about a shallow cave; remains of another shelter; an ahu.

Site 75. Trace of site; house platform; enclosure on shore. There are many faint traces of sites on this strip of coast. Toward the north is an unmistakable small site.

Site 76. Modern shelter pen; house or shelter site; shelter mauka by kiawe tree.

Site 77. Platform; tiny pen; sites of some kind marked by stones in lines on the pahoehoe flow.

Site 78. Slightly brackish springs and pools; house site, shelters, stepping stone path leading to the walled house site... [Reinecke n.d.:16]

The current study area was surveyed for archaeological sites by Haun and Henry (2000), and follow-up mitigation was conducted by Rechtman Consulting, LLC (Rechtman and Clark 2004). The inventory survey (Haun and Henry 2000) resulted in the identification of seventeen archaeological sites containing 186 features. There were no burial sites identified during the inventory survey. The sites were described thusly:

The sites consist of ten single feature sites and seven complexes of features. The features consist of pahoehoe excavations, mounds, terraces, quarries, filled cracks, cairns, walls, pavements, trails, alignments, cupboards, caves and several miscellaneous types. Feature function includes agricultural, temporary habitation, resource procurement, marker, transportation, livestock control, storage, ceremonial, refuge, tool manufacture, and indeterminate. (Haun and Henry 2000:ii)

Four of the sites (SIHP 23411, 23412, 23416, 23422) were approved by DLNR-SHPD for data recovery, and five of the sites were approved by DLNR-SHPD for preservation. (SIHP Site 5747 [only a portion], 23413, 23414, 23417, 23423). A mitigation plan (Rechtman and Clark 2004) containing both data recovery and preservation elements for these sites was drafted and approved by DLNR-SHPD. The data recovery fieldwork has been completed and the preservation areas have been formally established.

CULTURAL AND HISTORICAL BACKGROUND

Natural and Cultural Resources in a Hawaiian Context

In Hawaiian society, natural and cultural resources are one and the same. Native traditions describe the formation (the literal birth) of the Hawaiian Islands and the presence of life on and around them in the context of genealogical accounts. All forms in the natural environment, from the skies and mountain peaks, to the watered valleys and lava plains, and to the shoreline and ocean depths were believed to be embodiments of Hawaiian deities. One Hawaiian genealogical account, records that Wākea (the expanse of the sky—father) and Papa-hānau-moku (Papa—Earth-mother who gave birth to the islands)—also called Haumea-nui-hānau-wā-wā (Great Haumea—Woman-earth born time and time again)—and various gods and creative forces of nature, gave birth to the islands. Hawai'i, the largest of the islands, was the first-born of these island children. As the Hawaiian genealogical account continues, we find that these same god-beings, or creative forces of nature who gave birth to the islands, were also the parents of the first man (Hāloa), and from this ancestor, all Hawaiian people are descended (cf. Beckwith 1970; Malo 1951:3; Pukui and Korn 1973). It was in this context of kinship, that the ancient Hawaiians addressed their environment and it is the basis of the Hawaiian system of land use.

An Overview of Hawaiian Settlement

Archaeologists and historians describe the inhabiting of these islands in the context of settlement that resulted from voyages taken across the open ocean. For many years, researchers have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai'i were underway by A.D. 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population—the Hawaiian Kahiki—were the Marquesas and Society Islands (Cordy 2000; Emory in Tatar 1982:16-18).

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

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by about A.D. 900 to 1100, the population began expanding to the *kona* (leeward side) and more remote regions of the island (Cordy 2000:130). In Kona, communities were initially established along sheltered

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

In Kona, where there were no regularly flowing streams to the coast, access to potable water (*wai*), was of great importance and played a role in determining the areas of settlement. The waters of Kona were found in springs and caves (found from shore to the mountain lands), or procured from rain catchments and dewfall. Traditional and historic narratives abound with descriptions and names of water sources, and also record that the forests were more extensive and extended much further seaward than they do today. These forests not only attracted rains from the clouds and provided shelter for cultivated crops, but also in dry times drew the *kēhau* and *kēwai* (mists and dew) from the upper mountain slopes to the low lands (see also traditional-historical narratives and oral history interviews in this study).

In the 1920s-1930s, Handy et al. (1972) conducted extensive research and field interviews with elder native Hawaiians. In lands of North and South Kona, they recorded native traditions describing agricultural practices and rituals associated with rains and water collection. Primary in these rituals and practices was the lore of Lono—a god of agriculture, fertility, and the rituals for inducing rainfall. Handy et al., observed:

The sweet potato and gourd were suitable for cultivation in the drier areas of the islands. The cult of Lono was important in those areas, particularly in Kona on Hawai‘i . . . there were temples dedicated to Lono. The sweet potato was particularly the food of the common people. The festival in honor of Lono, preceding and during the rainy season, was essentially a festival for the whole people, in contrast to the war rite in honor of Ku which was a ritual identified with Ku as god of battle. (Handy et al. 1972:14)

Handy et al. (1972) noted that the worship of Lono was centered in Kona. Indeed, it was while Lono was dwelling at Keauhou, that he is said to have introduced taro, sweet potatoes, yams, sugarcane, bananas, and ‘*awa* to Hawaiian farmers (Handy et al. 1972:14). The rituals of Lono “The father of waters” and the annual *Makahiki* festival, which honored Lono and which began before the coming of the *kona* (southerly) storms and lasted through the rainy season (the summer months), were of great importance to the native residents of this region (Handy et al. 1972: 523). The significance of rituals and ceremonial observances in cultivation and indeed in all aspects of life was of great importance to the well being of the ancient Hawaiians, and cannot be overemphasized, or overlooked when viewing traditional sites of the cultural landscape.

Hawaiian Land Use and Resource Management Practices

Over the generations, the ancient Hawaiians developed a sophisticated system of land and resources management. By the time ‘Umi-a-Līloa rose to rule the island of Hawai‘i in ca. 1525, the island (*moku-puni*) was divided into six districts or *moku-o-loko* (cf. Formander 1973—Vol. II:100-102). On Hawai‘i, the district of Kona is one of six major *moku-o-loko* within the island. The district of Kona itself, extends from the shore across the entire volcanic mountain of Hualālai, and continues to the summit of Mauna Loa, where Kona is joined by the districts of Ka‘ū, Hilo, and Hāmākua. One traditional reference to the northern and southern-most coastal boundaries of Kona tells us of the district’s extent:

Mai Ke-ahu-a-Lono i ke ‘ā o Kani-kū, a hō‘ea i ka ‘ūlei kolo o Manukā i Kaulanamauna e pili aku i Ka‘ū!—From Keahualono [the Kona-Kohala boundary] on the rocky flats of Kanikū, to Kaulanamauna next to the crawling (tangled growth of) ‘ūlei bushes at Manukā, where Kona clings to Ka‘ū! (*Ka‘ao Ho‘onūa Pu‘uwai no Ka-Miki in Ka Hōkū o Hawai‘i*, September 13, 1917; Translated by Kepā Maly)

Kona, like other large districts on Hawai'i, was further divided into 'okana or kalana (regions of land smaller than the *moku-o-loko*, yet comprising a number of smaller units of land). In the region now known as Kona 'akau (North Kona), there are several ancient regions (*kalana*) as well. The southern portion of North Kona was known as "Kona kai 'ōpua" (interpretively translated as: Kona of the distant horizon clouds above the ocean), and included the area extending from Lanihau (the present-day vicinity of Kailua Town) to Pu'uohau (now known as Red Hill). The northern-most portion of North Kona was called "Kekaha" (descriptive of an arid coastal place). Native residents of the region affectionately referred to their home as *Kekaha-wai-'ole o nā Kona* (Waterless Kekaha of the Kona District), or simply as the *āina kaha*. It is within this region of Kekaha, that the lands of 'O'oma are found.

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

Entire *ahupua'a*, or portions of the land were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *ali'i-'ai-ahupua'a* (chief who controlled the *ahupua'a* resources). The *ali'i-'ai-ahupua'a* in turn answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire district). Thus, *ahupua'a* resources supported not only the *maka'āinana* and *'ohana* who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided fruits and vegetables and some meat in the diet, and the ocean provided a wealth of protein resources. Also, in communities with long-term royal residents, divisions of labor (with specialists in various occupations on land and in procurement of marine resources) came to be strictly adhered to. It is in this cultural setting that we find 'O'oma and the present study area.

The *ahupua'a* of 'O'oma (historically, 'O'oma 1st and 2nd) are two of some twenty ancient *ahupua'a* within the 'okana of Kekaha-wai-'ole. The place name 'O'oma can be literally translated as concave. To date, no tradition explaining the source of the place name has been located, though it is possible that the name refers to the indentation of the shoreline fronting a portion of 'O'oma. A few place names within 'O'oma were discussed in traditional accounts, thus we have some indication of the histories associated with this land.

While there are only limited native accounts that have been recorded about 'O'oma, we do know that the land was so esteemed, that during the youth of Kauikeaouli (later known as Kamehameha III), the young prince—son of Kamehameha I and his sacred wife Keōpūolani—was taken to be raised near the shore of 'O'oma under the care of his stewards from infancy until he was five years old (Kamakau 1961:263-264). Again, this is a significant part of the history of this land, as great consideration went into all aspects of the young king's upbringing (see I'i 1959 and Kamakau 1961).

The Environmental Setting of 'O'oma

The *ahupua'a* of 'O'oma cross several environmental zones that are generally called *wao* in the Hawaiian language. These environmental zones include the near-shore fisheries and shoreline strand (*kahakai*) and the *kula kai/kula uka* (shoreward/inland plains). These regional zones were greatly desired as places of residence by the natives of the land.

While the *kula* region of 'O'oma and greater Kekaha is now likened to a volcanic desert, native and historic accounts describe or reference groves of native hardwood shrubs and trees such as *'ūlei* (*Osteomeles anthyllidifolia*), *ēlama* (*Diospyros ferrea*), *uhiuhi* (*Caesalpinia kavaiensis*), and *ohe* (*Reynoldsia sandwicensis*) extending across the land and growing some distance shoreward. The few rare and endangered plants found in

the region, along with small remnant communities of native dryland forest (Char 1991) give an indication that there was a significant diversity of plants growing upon the *kula* lands prior to the introduction of ungulates.

The lower *kula* lands receive only about 20 inches of rainfall annually, and it is because of their dryness, the larger region of which 'O'oma is a part, is known as "Kekaha." While on the surface, there appears to be little or no potable water to be found, the very lava flows which cover the land contain many underground streams that are channeled through subterranean lava tubes which feed the springs, fishponds and anchialine ponds on the *kula kai* (coastal flats). Also in this region, on the flat lands, about a half-mile from the shore, is the famed *Alamui Aupuni* (Government Trail), built in 1847, at the order of Kamehameha III. This trail or government roadway, was built to meet the needs of changing transportation in the Hawaiian Kingdom, and in many places it overlays the older near shore *ala loa* (ancient foot trail that encircled the island).

Continuing into the *kula uka* (inland slopes), the environment changes as elevation increases. Based on historic surveys, it appears that 'O'oma ends at a survey station named Kuhiaka, 2,145 feet above sea level (cf. Register Map No. 1449). This zone is called the *wao kanaka* (region of man) and *wao nahele* (forest region). Rainfall increases to 30 or 40 inches annually, and taller forest growth occurred. This region provided native residents with shelter for residential and agricultural uses, and a wide range of natural resources that were of importance for religious, domestic, and economic purposes. In 'O'oma, this region is generally between the 1,200 to 2,200 foot elevation, and is crossed by the present-day Māmalahoa Highway. The highway is situated not far below the ancient *ala loa*, or foot trail, also known as Ke-ala'ehu, and was part of a regional trail system passing through Kona from Ka'ū and Kohala.

The ancient Hawaiians saw (as do many Hawaiians today) all things within their environment as being interrelated. That which was in the uplands shared a relationship with that which was in the lowlands, coastal region, and even in the sea. This relationship and identity with place worked in reverse as well, and the *ahupua'a* as a land unit was the thread that bound all things together in Hawaiian life. In an early account written by Kihe (in *Ka Hōkū o Hawai'i*, 1914-1917), with contributions by John Wise and Steven Desha Sr., the significance of the dry season in Kekaha and the custom of the people departing from the uplands for the coastal region is further described:

... 'Oia ka wā e ne'e ana ka lā iā Kona, hele a malo'o ka 'āina i ka 'ai kupakupa 'ia e ka lā, a o nā kānaka, nā li'i o Kona, pūhe'e aku la a noho i kahakai kāhi o ka wai e ola ai nā kānaka – It was during the season, when the sun moved over Kona, drying and devouring the land, that the chiefs and people fled from the uplands to dwell along the shore where water could be found to give life to the people. (*Ka Hōkū o Hawai'i*, April 5, 1917 translated by Kepā Maly)

It appears that the practice of traveling between upland and coastal communities in the 'O'oma *ahupua'a* greatly decreased by the middle nineteenth century. Indeed, the only claimant for *kuleana* land in 'O'oma, during the *Māhele 'Āina* of 1848—when native tenants were allowed to lay claim to lands on which they lived and cultivated—noted that he was the only resident in 'O'oma at the time (see *Helu 9162 to Kāhelekahi*, in this study). This is perhaps explained by the fact that at time of the *Māhele* there was a significant decline in the Hawaiian population, and changes in Hawaiian land tenure led to the relocation of many individuals from various lands.

Native Traditions and Historical Accounts of 'O'oma and the Kekaha Region

This section of the study presents *mo'olelo*—native traditions and historical accounts (some translated from the original Hawaiian by Kepā Maly)—of the Kekaha region that span several centuries. There are very few accounts that have been found to date, that specifically mention 'O'oma. Thus, narratives that describe neighboring lands within the Kekaha region help provide an understanding of the history of 'O'oma, describing features and the use of resources that were encountered on the land.

It may be, that the reason there are so few accounts for 'O'oma, is that it may have been considered a marginal settlement area, occupied only after the better situated lands of Kekaha—those lands with the sheltered bays, and where fresh water could be easily obtained—were populated. As the island population grew, so too did the need to expand to more remote or marginal lands. This thought is found in some of the native traditions and early historic accounts below. However, as people populated the Kekaha lands, they came to value its fisheries—those of the deep sea, near shore, and inland fishponds.

The native account of Punia (also written Puniaki – cf. Kamakau 1968), is perhaps among the earliest accounts of the Kekaha area, and in it is found a native explanation for the late settlement of Kekaha. The following narratives are paraphrased from Fornander's *Hawaiian Antiquities and Folklore* (Fornander 1959):

Punia: A Tale of Sharks and Ghosts of Kekaha

Punia was born in the district of Kohala, and was one of the children of Hina. One day, Punia desired to get lobster for his mother to eat, but she warned him of Kai'ale'ale and his hoards of sharks who guarded the caves in which lobster were found. These sharks were greatly feared by all who lived along, and fished the shores of Kohala for many people had been killed by the sharks. Heeding his mother's warning, Punia observed the habits of the sharks and devised a plan by which to kill each of the sharks. Setting his plan in motion, Punia brought about the deaths of all the subordinate sharks, leaving only Kai'ale'ale behind. Punia tricked Kai'ale'ale into swallowing him whole. Once inside Kai'ale'ale, Punia rubbed two sticks together to make a fire to cook the sweet potatoes he had brought with him. He also scraped the insides of Kai'ale'ale, causing great pain to the shark. In his weakened state, Kai'ale'ale swam along the coast of Kekaha, and finally beached himself at Alula, near the point of Malu in the land of Kealakehe. The people of Alula, cut open the shark and Punia was released.

At that time Alula was the only place in all of Kekaha where people could live, for all the rest of the area was inhabited by ghosts. When Punia was released from the shark, he began walking along the trail, to return to Kohala. While on this walk, he saw several ghosts with nets all busy tying stones for sinkers to the bottom of the nets, and Punia called out in a chant trying to deceive the ghosts and save himself:

Auwe no hoi kuu makuakane o keia kaha e! Alas, O my father of these coasts!
Elua wale no maua lawaia o keia wahi. We were the only two fishermen of this place (Kaha).
Owau no o ko'u makuakane, Myself and my father,
E hoowili aku ai maua i ka ia o ianei, Where we used to twist the fish up in the nets,
O kala, o ka uhu, o ka palani, The kala, the uhu, the palani,
O ka ia ku o ua wahi nei la, The transient fish of this place.
Ua hele wale ia no e maua keia kai la! We have traveled over all these seas,
Pau na kuuna, na lua, na puka ia. All the different place, the holes, the runs.
Make ko'u makuakane, koe au. Since you are dead, father, I am the only one left.

Hearing Punia's wailing, the ghosts said among themselves, "Our nets will be of some use now, since here comes a man who is acquainted with this place and we will not be letting down our nets in the wrong place." They then called out to Punia, "Come here." When Punia went to the ghosts, he explained to them, the reason for his lamenting; "I am crying because of my father, this is the place where we used to fish. When I saw the lava rocks, I thought of him." Thinking to trick Punia and learn where all the ku'una (net fishing grounds) were, the ghosts told Punia that they would work under him. Punia went into the ocean, and one-by-one and two-by-two, he called the ghosts into the water with him, instructing them to dive below the surface. As each ghost dove into the water, Punia twisted the net entangling the ghosts. This was done until all but one of the ghosts had been killed. That ghost fled and Kekaha became safe for human habitation (Fornander 1959:9-17).

One of the earliest datable accounts that describes the importance of the Kekaha region fisheries comes from the mid-sixteenth century, following 'Umi-a-Liloa's unification of the island of Hawai'i under his rule. Writing in the 1860s, native historian, Samuel Mānaiakalani Kamakau (1961) told readers about the reign of 'Umi, and his visits to Kekaha:

'Umi-a-Liloa did two things with his own hands, farming and fishing...and farming was done on all the lands. Much of this was done in Kona. He was noted for his skill in fishing and was called Pu'ipu'i a ka lawai'a (a stalwart fisherman). Aku fishing was his favorite occupation, and it often took him to the beaches (Ke-kaha) from Kalahuipua'a to Makaula¹. He also fished for 'ahi and kala. He was accompanied by famed fishermen such as Pae, Kahuna, and all of the chiefs of his kingdom. He set apart fishing, farming and other practices... (Kamakau 1961:19-20)

In his accounts of events at the end of 'Umi's life, Kamakau (1961) references Kekaha once again. He records that Ko'i, one of the faithful supporters and a foster son of 'Umi, sailed to Kekaha, where he killed a man who resembled 'Umi. Ko'i then took the body and sailed to Maka'eo in the *ahupua'a* of Keahuolu. Landing at Maka'eo in the night, Ko'i took the body to the cave where 'Umi's body lay. Replacing 'Umi's body with that of the other man, Ko'i then crossed the lava beds, returning to his canoe at Maka'eo. From there, 'Umi's body was taken to its' final resting place... (Kamakau 1961:32-33).

As a child in ca. 1812, Hawaiian historian John Papa I'i passed along the shores of Kekaha in a sailing ship, as a part of the procession by which Kamehameha I returned to Kailua-Kona from his residency on O'ahu. In his narratives, I'i described the shiny lava flows and fishing canoe fleets of the "Kaha" (Kekaha) lands:

The ship arrived outside of Kaelehuluhulu, where the fleet for aku fishing had been since the early morning hours. The sustenance of those lands was fish.

When the sun was rather high, the boy [I'i] exclaimed, "How beautiful that flowing water is!" Those who recognized it, however, said, "That is not water, but pahoehoe. When the sun strikes it, it glistens, and you mistake it for water..."

Soon the fishing canoes from Kawaihae, the Kaha lands, and Ooma drew close to the ship to trade for the pa'i'ai (hard poi) carried on board, and shortly a great quantity of aku lay silvery-hued on the deck. The fishes were cut into pieces and mashed; and all those aboard fell to and ate, the women by themselves.

The gentle Eka sea breeze of the land was blowing when the ship sailed past the lands of the Mahaiulas, Awalua, Haleohiu, Kalaos, Hoona, on to Oomas, Kohanaiki, Kaloko, Honokohaus, and Kealakehe, then around the cape of Hiiakanoholae... (I'i 1959:109-110)

Ka-Lani-Kau-i-ke-Aouli (Kamehameha III)

In ca. 1813, Ka-lani Kau-i-ke-aouli, who grew up to become Kamehameha III, was born. S.M. Kamakau (1961) tells us that the baby appeared to be still-born, but that shortly after birth, he was revived. Upon the revival of the baby, he was given to the care of Ka-iki-o-'ewa, who with Keawe-a-mahi and family, raised the child in seclusion at 'O'oma for the first five years of the young king's life. Kauikeaouli apparently held some interest in the land of 'O'oma 2nd through the Māhele 'Āina, as he originally claimed 'O'oma 2nd as his personal property. Though he subsequently gave it up to the Kingdom (Government) later during the Division (see records of Māhele 'Āina in this study).

¹ Kalāhuipua'a is situated in the district of Kohala, bounding the northern side of Pu'uana'hulu in Kekaha. Maka'ula is situated a few *ahupua'a* north of 'O'oma.

Kamakau provides us with the following description of Kauikeaouli's birth and early life at 'O'oma:

Ka-lani-kau-i-ke-aouli was the second son of Ke-opu-o-lani by Kamehameha, and she called him Kiwala'o after her own father. She was the daughter of Kiwala'o and Ke-ku'i-apo-iwa Liliha, both children of Ka-Iola Pupuka-o-Hono-ka-wai-lani, and hence she [Ke-opu-o-lani] was a ni'aupi'o and a naha chiefess, and the ni'aupi'o rank descended to her children and could not be lost by them. While she was carrying the child [Kau-i-ke-aouli] several of the chiefs begged to have the bringing up of the child, but she refused until her kahu, Ka-lua-i-konahale, known as Kua-kini, came with the same request. She bade him be at her side when the child was born lest some one else get possession of it. He was living this side of Keauhau in North Kona, and Ke-opu-o-lani lived on the opposite side.

On the night of the birth the chiefs gathered about the mother. Early in the morning the child was born but as it appeared to be stillborn Kua-kini did not want to take it. Then came Ka-iki-o-'ewa from some miles away, close to Kuamo'o, and brought with him his prophet who said, "The child will not die, he will live." This man, Ka-malo-'ihi or Ka-pihe by name, came from the Napua line of kahunas descended from Makua-kau-mana whose god was Ka-'onohi-o-ka-la (similar to the child of God). The child was well cleaned and laid upon a consecrated place and the seer (kaula) took a fan (pe'ahi), fanned the child, prayed, and sprinkled it with water, at the same time reciting a prayer addressed to the child of God, something like that used by the Roman Catholics—

"He is standing up, he is taking a step, he walks" (*Kulia-la, ka'ina-la, hele ia la*).

Or another—

<i>Huila ka lani i ke Akua,</i>	<i>The heavens lighten with the god,</i>
<i>Lapalapa ka honua i ke keiki</i>	<i>The earth burns with the child,</i>
<i>E ke keiki e, hooua i ka punohu lani,</i>	<i>O son, pour down the rain that brings the rainbow,</i>
<i>Aia i ka lani ka Haku e,</i>	<i>There in heaven is the Lord.</i>
<i>O ku'u 'uhane e kaha mau,</i>	<i>Life flows through my spirit,</i>
<i>I la'a i kou kanawai,</i>	<i>Dedicated to your law.</i>

The child began to move, then to make sounds, and at last it came to life. The seer gave the boy the name of "The red trail" (Ke-aweawe-'ula) signifying the roadway by which the god descends from the heavens.

Ka-iki-o-'ewa became the boy's guardian and took him to rear in an out-of-the-way place at 'O'oma, Kekaha. Here Keawe-a-mahi, the lesser chiefs, the younger brothers and sisters of Ka-iki-o-'ewa, and their friends were permitted to carry the child about and hold him on their laps (uha). Ka-pololu was the chief who attended him; Ko'i-pepeleleu and Ulu-nui's mother [were] the nurses who suckled him. Later Ka-'ai-kane gave him her breast after she had given birth to Ke-kahu-pu'u. Here at 'O'oma he was brought up until his fifth year, chiefly occupied with his toy boats rigged like warships and with little brass cannon loaded with real powder mounted on [their] decks. The firing off of these cannon amused him immensely. He excelled in foot races. On one occasion when the bigger boys had joined in the sport, a [rascal] boy named Ka-hoa thought to play a practical joke by smearing with mud the stake set up to be grasped by the one who first reached the goal. He expected one of the larger boys to be the winner, but it was the little prince who first caught the stick and had his hands smeared. "You will be burnt alive for dirtying up the prince. We are going to tell Ka-pololu on you!" the boys threatened; but the prince objected, saying, "Anyone who tells on him shall never eat with me again or play with me and I will never give him anything again." Kau-i-ke-aouli was a splendid little fellow. He loved his playmates and never once did them any hurt, and he was kind and obedient to his teachers... [Kamakau 1961:264]

It is not until the early twentieth century, that we find a few detailed native accounts which tell of traditional features and residents of 'O'oma and vicinity. The writings of John Whalley Hermosa Isaac Kihe, a native son of Kekaha, in Hawaiian language newspapers (recently translated by Kepā Maly from the original Hawaiian texts), share the history of the land and sense the depth of attachment that native residents felt for 'O'oma and the larger Kekaha-wai-'ole-o-nā-Kona.

Kihe (who also wrote under the name of Ka-'ohu-ha'aheo-i-nā-kuahiwi-'ekolu) was born in 1853, his parents were native residents of Honokōhau and Kaloko (his grandfather, Kuapāhoa, was a famed kahuna of the Kekaha lands). During his life, Kihe taught at various schools in the Kekaha region; served as legal counsel to native residents applying for homestead lands in 'O'oma and vicinity; worked as a translator on the Hawaiian Antiquities collections of A. Fornander; and was a prolific writer himself. In the later years of his life, Kihe lived at Pu'u Anahulu and Kalaoa, and he is fondly remembered by elder kama'āina of the Kekaha region. Kihe, who died in 1929, was also one of the primary informants to Eliza Maguire, who translated some of the writings of Kihe, publishing them in abbreviated form in her book "Kona Legends" (1926).

Writers today have varying opinions and theories pertaining to the history of Kekaha, residency patterns, and practices of the people who called Kekaha-wai-'ole-o-nā-Kona home. For the most part, our interpretations are limited by the fragmented nature of the physical remains and historical records, and by a lack of familiarity with the diverse qualities of the land. As a result, most of us only see the shadows of what once was, and it is difficult at times, to comprehend how anyone could have carried out a satisfactory existence in such a rugged land.

Kihe and his co-authors provide readers with several references to places and events in the history of 'O'oma and neighboring lands. Through the narratives, we learn of place name origins, areas of ceremonial significance, how resources were managed and accessed, and the practices of those native families who made this area their home.

One example of the rich materials recorded by native writers, is found in "*Ka'ao Ho'oniu Pu'uwai no Ka-Miki*" (The Heart Stirring Story of Ka-Miki). This tradition is a long and complex account, that was published over a period of four years (1914-1917) in the weekly Hawaiian-language newspaper *Ka Hōkū o Hawai'i*. The narratives were primarily recorded for the paper by Hawaiian historians John Wise and J.W.H.I. Kihe.

While "*Ka-Miki*" is not an ancient account, the authors used a mixture of local stories, tales, and family traditions in association with place names to tie together fragments of site-specific histories that had been handed down over the generations. Also, while the personification of individuals and their associated place names may not be entirely "ancient," such place name-person accounts are common throughout Hawaiian (and Polynesian) traditions. The English translations below are a synopsis of the Hawaiian texts, with emphasis upon the main events and areas being discussed. Diacritical marks and hyphenation have been placed to help with pronunciation of certain words.

"Kaa Hooniua Puuwei no Ka-Miki" (The Heart stirring Story of Ka-Miki)

This *mo'olelo* (tradition) is set in the 1300s (by association with the chief Pili-a-Ka'aiaea), and is an account of two supernatural brothers, Ka-Miki (The quick, or adept, one) and Ma-Ka'iole (Rat [squinting] eyes). The narratives describe the birth of the brothers, their upbringing, and their journey around the island of Hawai'i along the ancient *ala loa* and *ala hele* (trails and paths) that encircled the island. During their journey, the brothers competed alongside the trails they traveled, and in famed *kahua* (contest fields) and royal courts, against *'ōlohe* (experts skilled in fighting or in other competitions, such as running, fishing, debating, or solving riddles, that were practiced by the ancient Hawaiians). They also challenged priests whose dishonorable conduct offended the gods of ancient Hawai'i. Ka-Miki and Ma-Ka'iole were empowered by their ancestress Ka-uluhe-nui-hihi-kolo-i-uka (The great entangled growth of uluhe fern which spreads across the uplands), who was one of the myriad of body forms of the goddess Haumea, the earth-mother, creative force of nature who was also called Papa or Hina. Among her many nature-form attributes were manifestations that caused her to be called upon as a goddess of priests and competitors (people, places named for them, and other place names are marked below with underlining):

...Kūmua was the husband of Ka-uluhe-nui-hihi-kolo-i-uka. The place that is named for Kūmua is in the uplands of Kohanaiki, an elevated rise from where one can look towards the lowlands. The shore and deep sea are all clearly visible from this place. The reason that Kūmua dwelt there was so that he could see the children and grandchildren of he and his wife.

Wailoa, a daughter, was the mother of Kapa'ihilani, also called Kapa'ihī. There is a place in the uplands of Kohanaiki, below Kūmua, to the northwest, a hidden water hole, that is called Kapa'ihī. Wailoa is a pond there on the shore of Kohanaiki. Because Wailoa married Kahunakalehu, a native of the area, she lived and worked there. Thus the name of that pond is Wailoa, and it remains so to this day.

Pipipi'apo'o was another daughter of Kūmua and Ka-uluhe-nui-hihi-kolo-i-uka. She married Haleolono, one who cultivated sweet potatoes upon the 'ilima covered flat lands of Nānāwale, also called Nāhi'ahu (Nāwah'iahu), as it has been called from before and up to the present time. Cultivating the land was the skill of this youth Haleolono, and because he was so good at it, he was able to marry the beauty, Pipipi'apo'o.

Pipipi'apo'o's skill was that of weaving pandanus mats, and there are growing many pandanus trees there, even now. The grove of pandanus trees and a nearby cave, is called Pipipi'apo'o to this day, and you may ask the natives of Kohanaiki to point it out to you.

Kapukalua was a son of Kūmua and Ka'uluhe. He was an expert at aku lure fishing, and all other methods of fishing of those days gone by. He married Kauhi'onohua a beauty with skin as soft as the blossoms of the hīnano, found in the pandanus grove of 'O'oma. This girl was pleasingly beautiful, and because of her fame, Kapukalua, the exceptionally skilled son of the sea spray of 'Apo'ula, secured her as his wife. Here, we shall stop speaking of the elders of Ka-Miki... [January 8, 1914]

The tradition continues, recounting the training of the brothers, and preparations of their *hālau ali'i* (royal compound) at Kohanaiki. At the dedication ceremonies it was revealed that one of the *kahuna* of the Kaha lands, had taken up the habit of killing people, and that he had also thought to take the lives of Ka-Miki and Ma-Ka'iole. We revisit the story here, and learn the name of a priest of 'O'oma and Kohanaiki—

...The sun broke forth and the voices of the roosters and the 'elepaio of the forests were heard resonating and rising upon the mountain slopes. The day became clear, with no clouds to be seen, it was calm. So too, the ocean was calm and the shore of La'i a 'Ehu (Kona) was calm. The flowers of the upland forest reddened and unfolded, and nodded gently in the kēhau breezes.

The priests gathered together to discuss these events and prepared to apologize to the children of the chief, asking for their forgiveness. They selected 'Elepaio, Pūhili, Kalua'ōlapa, and Kalua'ōlapa-uwila to go before the brothers for this purpose.

'Elepaio was the high priest of Honokōhau. The place where he dwelt bears the name 'Elepaio [an 'ili on the boundary of Honokōhau nui & iki]. It is in the great grove of *'ulu* (*kaulu 'ulu*) on the boundary between Honokōhau-nui and Honokōhau-iki... [April 23, 1914]

Pūhili was the high priest of 'O'oma and Kohanaiki, the place where he lived is on the plain of Kohanaiki, at the shore, and bears his name to this day. It is on the boundary between Kohanaiki and 'O'oma.

Kalua'ōlapa was the high priest of Hale'ōhi'u and Kamāhoe, that is the waterless land of Kalaoa (Kalaoa wai 'ole). The place where he lived was in the uplands of Maulukua on the plain covered with *'ilima* growth. This place bears his name to this day.

Kalua-ʻōlapa-uwila was the high priest of Kealakehe and Keʻōhuʻolu (Keahuolu), and it was he who built the *heiau* named Kalua-ʻōlapa-uwila, which is there along the shore of Kealakehe, next to the road that goes to Kailua. The nature of this priest was that of a shark and a man. The shark form was named Kaiwi, and there is a stone form of the shark that can be seen near the *heiau* to this day.

These priests all went to the door of the house and presented the offerings of the black pig, the red fish, the black *ʻawa*, the white rooster, the *malo* (loin clothes), and all things that had been required of their class of priests. They also offered their prayers and asked forgiveness for their misspoken words. They then called for their prayers to be freed and the *kapu* ended... [April 30, 1914]

Through the 1920s, up to the time of his death in 1929, J.W.H.I. Kihe continued to submit traditional accounts and commentary on the changing times to the paper, *Ka Hōkū o Hawaiʻi*. In 1923, Kihe penned a series of articles, some of which formed the basis of Eliza Maguire's *Kona Legends* (1926). One of the accounts, "*Ka Punawai o Wawaloli*" (The Pond of Wawaloli), describes that the pond of Wawaloli, on the shore of ʻOʻoma, was named for a supernatural ocean being, who could take the form of the *loli* (sea cucumber) and of a handsome young man. Through this account it is learned that people regularly traveled between the uplands and shore of ʻOʻoma; the *kula* lands were covered with *ʻilima* growth; and that a variety of fish, seaweeds, and shellfish were harvested along the shore. Also, the main figures in the tradition are memorialized as places on the lands of ʻOʻoma, Kalaoa, and neighboring *ahupuaʻa*. These individuals and places include Kaluaʻōlapa (a hill on the boundary of Hāmanamana and Haleohiʻu), Wawaloli (a bay between ʻOʻoma and Kalaoa), Hoʻohila (on the boundary of Kaū and Puʻukala), Pāpaʻapoʻo (a cave site in Hāmanamana), Kamakaoiki and Malumaluiki (locations unknown). The following narratives were translated by Kepā Maly from the original Hawaiian texts published in *Ka Hōkū o Hawaiʻi* (September 23rd, October 4th & 11th, 1923):

Ka Punawai o Wawaloli (The Pond of Wawaloli)

The place of this pond (Wawaloli) is set there on the shore of the ʻOʻoma near Kalaoa. It is a little pond, and is there to this day. It is very close to the sandy shore, and further towards the shore there is also a pond in which one can swim. There is a tradition of this pond, that is held dearly in the hearts of the elders of this community.

Wawaloli is the name of a *loli* (sea cucumber) that possessed dual body forms (*kino pāpālua*), that of a *loli*, and that of a man!

Above there on the *ʻilima* covered flat lands, there lived a man by the name of Kaluaʻōlapa and his wife, Kamakaoiki, and their beautiful daughter, Malumaluiki.

One day the young maiden told her mother that she was going down to the shore to gather *limu* (seaweeds), *ʻōpihi* (limpets), and *pupu* (shellfish). Her mother consented, and so the maiden traveled to the shore. Upon reaching the shore, Malumaluiki desired to drink some water, so she visited the pond and while she was drinking she saw a reflection in the rippling of the water, standing over her. She turned around and saw that there was a handsome young man there, with a smile upon his face. He said... [September 27, 1923] "...Pardon me for startling you here as we meet at this pond, in the afternoon heat which glistens off of the *pāhoehoe*."

She responded, "What is the mistake of our meeting, you are a stranger, and I am a stranger, and so we have met at this pond." The youth, filled with desire for the beautiful young maiden, answered "I am not a stranger here along this shore, indeed, I am very familiar with this place for this is my home. And when I saw you coming here, I came to meet you."

These two strangers, having thus met, then began to lay out their nets to catch *kala*, *uhu*, and *pālani*, the native fish of this land. And in this way, the beauty of the plains of Kalaoa was caught in the net of the young man who dwelt in the sea spray of ʻOʻoma.

These two strangers of the long day also fished for hīnālea, and then for kawele‘ā. It was during this time, that their lines became entangled like those of the fishermen of Wailua (a poetic reference to those who become entangled in a love affair).

The desire for the limu, ‘ōpihi, and pūpū was completely forgotten, and the fishing poles bent as the lines were pulled back in the sea spray. The handsome youth was moistened in the rains that fell, striking the land and the beloved shore of the land. The sun drew near, entering the edge of the sea and was taken by Lehua Island. Only then did these two fishers of the long day take up their nets.

Before the young maiden began her return to the uplands, she told the youth, “Tell me your name.” He answered her, “The name by which I am known is Wawa. But my name, when I go and dwell in the pond here, is Loli. And when you return, you may call to me with the chant:

<i>E Loli nui kīkewekewe²</i>	<i>Oh great Loli moving back and forth</i>
<i>I ka hana ana kīkewekewe</i>	<i>Doing your work moving back and forth</i>
<i>I ku ‘u piko kīkewekewe</i>	<i>You are in my mind moving back and forth</i>
<i>A ka makua kīkewekewe</i>	<i>The parents moving back and forth</i>
<i>I hana ai kīkewekewe</i>	<i>Are at their work moving back and forth</i>
<i>E pi ‘i mai ‘oe kīkewekewe</i>	<i>Won’t you arise moving back and forth</i>
<i>Ka kaua puni kīkewekewe</i>	<i>To that which we two desire moving back and forth</i>
<i>Puni kauoha kīkewekewe</i>	<i>Your command is desired moving back and forth</i>

Having finished their conversation, the maiden then went to the uplands. It was dark, and the kukui lamps had been lit in the house. Malumaluiki’s parents asked her, “Where are your limu, ‘ōpihi and pūpū?” She replied, “It is proper that you have asked me, for when I went to the shore it was filled with people who took all there was? Thus I was left with nothing, not even a fragment of limu or anything else. So I have returned up here.”

Well, the family meal had been made ready, so they all sat to eat together. But after a short while the maiden stood up. Her parents inquired of this, and she said she was no longer hungry, and that her feet were sore from traveling the long path. So the maiden went to sleep. She did not sleep well though, and felt a heat in her bosom, as she was filled with desire, thus she had no sleep that night.

With the arrival of the first light of day, the Malumaluiki went once again down to the shore. Upon arriving at the place of the pond, she entered the water and called out as described above. Then, a loli appeared and turned into the handsome young man. They two then returned to their fishing for the kala, uhu and pālani, the native fish the land.

So it was that the two lovers met regularly there on the shore of ‘O’oma. Now Malumaluiki’s parents became suspicious because of the actions of the daughter, and her regular trips to the shore. So they determined that they should secretly follow her and spy on her.

One day, the father followed her to the shore, where he saw his daughter sit down by the side of the pond. He then heard her call out—

<i>E Loli nui kīkewekewe</i>	<i>Oh great Loli moving back and forth</i>
<i>I ka hana ana kīkewekewe</i>	<i>Doing your work moving back and forth</i>

² “Kīkewekewe” is translated by Eliza Maguire (1926) as “charmer.” Kepā Maly was unfamiliar with this meaning of the word. It is most commonly used in the refrain of a song, and is here translated as “moving back and forth,” as the word is used in the spoken language. Kewe also means concave, similar to the place name ‘O’oma.

<i>I ku 'u piko kīkewekewe</i>	<i>You are the center of my life moving back and forth</i>
<i>Piko maika 'i kīkewekewe</i>	<i>It is good moving back and forth</i>
<i>A ka makua kīkewekewe</i>	<i>The parents moving back and forth</i>
<i>I hana ai kīkewekewe</i>	<i>Are at their work moving back and forth</i>
<i>E pi 'i mai 'oe kīkewekewe</i>	<i>Won't you arise moving back and forth</i>
<i>Ka kaua puni kīkewekewe</i>	<i>To that which we two desire moving back and forth</i>
<i>Puni kauoha kīkewekewe</i>	<i>Your command is desired moving back and forth</i>
<i>[October 4, 1923]</i>	

“O Loli, here is your desire, the one you command, Malumaluiki, who’s eyes see nothing else.”

Her father then saw a loli coming up from the pond, and when it was up, it turned into the youth. He watched the two for a while, unknown to them, and saw that his daughter and the youth of the two body forms (kino pāpālua), took their pleasure in one another.

The father returned to the uplands and told all of this to her mother, who upon hearing it, was filled with great anger, because of the deceitfulness of her daughter. But then she learned that the man with whom her daughter slept was of dual body forms. Kamakaoiki then told Kalua’ōlapa that he should “Go down and capture the loli, and beat it to death,” to which he agreed.

One day, Kalua’ōlapa went down early, and hid, unseen by the two lovers. Malumaluiki arrived at the pond and called out, and he then memorized the lines spoken by his daughter. When she left, returning to the uplands, he then went to the pond and looked closely at it. He then saw a small circular opening near the top of the water in the pond. He then understood that that was where the loli came up from. He then slept that night and in the early morning, he went to the pond and set his net in the water. He then began to call out as his daughter had done with the above words.

When he finished the chant, the loli began to rise up through the hole, and was ensnared in the net. Kalua’ōlapa then carried him up onto the kula, walking to the uplands. On his way, he saw his daughter coming down, and he hid until she passed him by.

When the daughter arrived at the pond, she called out in the chant as she always did. She called and called until the sun was overhead, but the loli did not appear in the pond, nor did he come forward in his human form. Thus, she thought that he had perhaps died, and she began to wail and mourn for the loss of her lover. Finally as evening came, the beautiful maiden stood, and ascended the kula to her home.

Now, let us look back to the Kalua’ōlapa. He went up to his house and showed the loli to his wife. Seeing the loli, she told her husband, “Take it to the kahuna, Pāpa’apo’o who lives on the kula of Ho’ohila.” So he went to the kahuna and explained everything that had occurred to him, and showed him the loli in his net. Seeing this and hearing of all that had happened, Pāpa’apo’o told the father to build an imu in which to kālua the great loli that moves back and forth (loli kīkewekewe). He said, “When the loli is killed, then your daughter will be well, so too will be the other daughters of the families of the land.” Thus, the imu was lit and the supernatural loli cooked.

When the daughter returned to her home, her eyes were all swollen from crying. Her mother asked her, “What is this, that your eyes are puffy from crying, my daughter?” She didn’t answer, she just knelt down, giving no response. At that time, her father returned to the house and saw his daughter kneeling down, and he said “Your man, with whom you have been making love at the beach has been taken by the kahuna Pāpa’apo’o. He has been cooked in the imu that you may live, that all of the girls who this loli has loved may live.”

That pond is still there on the shore, and the place with the small round opening is still on the side of that pond to this day. It is something to remember those things of days gone by, something that should not be forgotten by those of today and in time to come. [October 11, 1923]

Ka Loko o Paaiea (The fishpond of Pā'aiea)

The tradition of *Ka loko o Paaiea* (The fishpond of Pā'aiea) was written by J.W.H.I. Kihe, and printed in *Ka Hōkū o Hawai'i* in 1914 and 1924. The narratives describe traditional life and practices in various *ahupua'a* of Kekaha, and specifically describes the ancient fishpond Pā'aiea. The following excerpts from Kihe's *mo'olelo*, include references to Wawaloli, on the shore of 'O'oma and Kalaoa. Pā'aiea, was destroyed by the Hualālai lava flows of 1801, reportedly as a result of the pond overseer's refusal to give the goddess Pele—traveling in human form—any fish from the pond:

Pā'aiea was a great fishpond, something like the ponds of Wainānāli'i and Kīholo, in ancient times. At that time the high chiefs lived on the land, and these ponds were filled with fat awa, 'anae, āhole, and all kinds of fish that swam inside. It is this pond that was filled by the lava flows and turned into pāhoehoe, that is written of here. At that time, at Ho'onā. There was a Konohiki (overseer), Kepa'alani, who was in charge of the houses (*hale papa'a*) in which the valuables of the King [Kamehameha I] were kept. He was in charge of the King's food supplies, the fish, the hālau (long houses) in which the fishing canoes were kept, the fishing nets and all things. It was from there that the King's fishermen and the retainers were provisioned. The houses of the pond guardians and Konohiki were situated at Ka'elehuluhulu and Ho'onā.

In the correct and true story of this pond, we see that its boundaries extended from Ka'elehuluhulu on the north, and on the south, to the place called Wawaloli (between 'O'oma and Kalaoa). The pond was more than three miles long and one and a half miles wide, and today, within these boundaries, one can still see many water holes.

While traveling in the form of an old woman, Pele visited the Kekaha region of Kona, bedecked in garlands of the *ko'oko'olau* (*Bidens* spp.). Upon reaching Pā'aiea at Ho'onā, Pele inquired if she might perhaps have an *'ama'ama*, young *āholehole*, or a few *'ōpae* (shrimp) to take home with her. Kepa'alani, refused, "they are *kapu*, for the King." Pele then stood and walked along the *kuapā* (ocean side wall) of Pā'aiea till she reached Ka'elehuluhulu. There, some fishermen had returned from *aku* fishing, and were carrying their canoes up onto the shore...

...Now because Kepa'alani was stingy with the fishes of the pond Pā'aiea, and refused to give any fish to Pele, the fishpond Pā'aiea and the houses of the King were all destroyed by the lava flow. In ancient times, the canoe fleets would enter the pond and travel from Ka'elehuluhulu to Ho'onā, at Ua'u'ālohi, and then return to the sea and go to Kailua and the other places of Kona. Those who traveled in this manner would sail gently across the pond pushed forward by the 'Eka wind, and thus avoid the strong currents which pushed out from the point of Keāhole

It was at Ho'onā that Kepa'alani dwelt, that is where the houses in which the chiefs valuables (*hale papa'a*) were kept. It was also one the canoe landings of the place. Today, it is where the light house of America is situated. Pelekāne (in Pu'ukala) is where the houses of Kamehameha were located, near a stone mound that is partially covered by the *pāhoehoe* of Pele. If this fishpond had not been covered by the lava flows, it would surely be a thing of great wealth to the government today... [J.W.H.I. Kihe in *Ka Hoku o Hawaii*; compiled and translated by Kepā Maly, from the narratives written February 5-26, 1914 and May 1-15, 1924].

Na Ho'omanao o ka Manawa (The Recollections of a Native Son)

Later in 1924, Kihe, described the changes which had occurred in the Kekaha region since his youth. In the following article, titled *Na Ho'omanao o ka Manawa* (in *Ka Hōkū o Hawai'i* June 5th & 12th 1924), Kihe wrote about the villages that were once inhabited throughout Kekaha, identifying families, practices, and schools of the historic period (ca. 1860-1924). In the two part series (translated by Kepā Maly), he also shared his personal feelings about the changes that had occurred, including the demise of the families and the abandonment of the coastal lands of Kekaha.

There has arisen in the mind of the author, some questions and thoughts about the nature, condition, living, traveling, and various things that bring pleasure and joy. Thinking about the various families and the many homes with their children, going to play and strengthening their bodies.

In the year 1870, when I was a young man at the age of 17 years old, I went to serve as the substitute teacher at the school of Honokōhau. I was teaching under William G. Kanaka'ole who had suffered an illness (ma'i-lolo, a stroke).

In those days at the Hawaiian Government Schools, the teachers were all Hawaiian and taught in the Hawaiian language. In those days, the students were all Hawaiian as well, and the books were in Hawaiian. The students were all Hawaiian... There were many, many Hawaiian students in the schools, no Japanese, Portuguese, or people of other nationalities. Everyone was Hawaiian or part Hawaiian, and there were only a few part Hawaiians.

The schools included the school house at Kīholo where Joseph W. Keala taught, and later J.K. Ka'aīluwale taught there. At the school of Makalawena, J. Ka'elemakule Sr., who now resides in Kailua, was the teacher. At the Kalaoa School, J.U. Keawe'ake was the teacher. There were also others here, including myself for four years, J. Kainuku, and J.H. Olohia who was the last one to teach in the Hawaiian language. At Kaloko, Miss Ka'aimahu'i was the last teacher before the Kaloko school was combined as one with the Honokōhau school where W.G. Kanaka'ole was the teacher. I taught there for two years as well... [Kihe includes additional descriptions on the schools of Kona]

It was when they stopped teaching in Hawaiian, and began instructing in English, that significant changes took place among our children. Some of them became puffed up and stopped listening to their parents. The children spoke gibberish (English) and the parents couldn't understand (*nā keiki namu*). Before that time, the Hawaiians weren't marrying too many people of other races. The children and their parents dwelt together in peace with the children and parents speaking together... [June 5, 1924]

...Now perhaps there are some who will not agree with what I am saying, but these are my true thoughts. Things which I have seen with my own eyes, and know to be true...In the year 1870 when I was substitute teaching at Honokōhau for W.G. Kanaka'ole, I taught more than 80 students. There were both boys and girls, and this school had the highest enrollment of students studying in Hawaiian at that time [in Kekaha]. And the students then were all knowledgeable, all knew how to read and write.

Now the majority of those people are all dead. Of those things remembered and thought of by the people who yet remain from that time in 1870; those who are here 53 years later, we cannot forget the many families who lived in the various (*āpana*) land sections of Kekaha.

From the lands of Honokōhau, Kaloko, Kohanaiki, the lands of 'O'oma, Kalaoa, Hale'ohi'u, Maka'ula, Kaū, Pu'ukala-Ōhiki, Awalua, the lands of Kaulana, Mahai'ula, Makalawena, Awake'e, the lands of Kūki'o, Ka'ūpūlehu, Kīholo, Keawaiki, Kapalaoa, Pu'uanahulu, and Pu'uwa'awa'a. These many lands were filled with people in those days.

There were men, women, and children, the houses were filled with large families. Truly there were many people [in Kekaha]. I would travel around with the young men and women in those days, and we would stay together, travel together, eat together, and spend the nights in homes filled with aloha.

The lands of Honokōhau were filled with people in those days, there were many women and children with whom I traveled with joy in the days of my youth. Those families are all gone, and the land is quiet. There are no people, only the rocks remain, and a few scattered trees growing, and only occasionally does one meet with a man today [1924]. One man and his children are all that remain.

Kaloko was the same in those days, but now, it is a land without people. The men, the women, and the children are all gone, they have passed away. Only one man, J.W. Ha'au, remains. He is the only native child (keiki kupa) besides this author, who remains.

At Kohanaiki, there were many people on this land between 1870 and 1878. These were happy years with the families there. In those years Kaiakoili was the haku 'āina (land overseer)...

Now the land is desolate, there are no people, the houses are quiet. Only the houses remain standing, places simply to be counted. I dwelt here with the families of these homes. Indeed it was here that I dwelt with my kahu hānai (guardian), the one who raised me. All these families were closely related to me by blood. On my fathers' side, I was tied to the families of Kaloko [J.W.H.I. Kihe's father was Kihe, his grandfather was Kuapāhoa, a noted kahuna of Kaloko]. I am a native of these lands.

The lands of 'O'oma, and Kalaoa, and all the way to Kaulana and Mahai'ula were also places of many people in those days, but today there are no people. At Mahai'ula is where the great fishermen of that day dwelt. Among the fishermen were Po'oko'ai mā, Pā'ao'ao senior, Ka'ao mā, Kai'a mā, Ka'ā'īkaula mā, Pāhia mā, and John Ka'elemakule Sr., who now dwells at Kailua.

Ka'elemakule moved from this place [Mahai'ula] to Kailua where he prospered, but his family is buried there along that beloved shore (kapakai aloha). He is the only one who remains alive today... At Makalawena, there were many people, men, women, and their children. It was here that some of the great fishermen of those days lived as well. There were many people, and now, they are all gone, but for all time.

Those who have passed away are Kaha'iali'i mā, Mama'e mā, Kapehe mā, Kauaionu'uuanu mā, Hopulā'au mā, Kaihemakawalu mā, Kaomi, Keoni Aihaole mā, and Pahukula mā. They are all gone, there only remains the son-in-law of Kauaionu'uuanu, J.H. Mahikō, and Jack Punihaole, along with their children, living in the place where Kauaionu'uuanu and Ahu once lived.

At Kūki'o, not one person remains alive on that land, all are gone, only the 'a'ā remains. It is the same at Ka'ūpūlehu, the old people are all gone, and it is all quiet... [June 12, 1924]

Ko Keoni Kaelemakule Moololo Ponoī – Kakau ponoī ia mai no e ia (The True Story of John Ka‘elemakule – Actually written by him³)

In the period between 1928 and 1930, John Ka‘elemakule Sr., who was a native of Kekaha, living at Mahai‘ula, Kaulana and Kohanaiki, wrote a series of articles that were published in serial form in *Ka Hōkū o Hawai‘i*. The story is a rich account of life in Kekaha between 1854 and 1900. Ka‘elemakule’s texts introduce us to the native residents of Kekaha, and include descriptions of the practices and customs of the families who resided there. In the following excerpts from Ka‘elemakule’s narratives (translated by Kepā Maly), we find reference once again to ‘O‘oma and neighboring lands, and the practices associated with procuring water in this region:

“Kekaha Wai Ole o na Kona” (Waterless Kekaha of Kona)

...We have seen the name “Kekaha wai ole o nā Kona” since the early part of my story in *Ka Hōkū o Hawai‘i*, and we have also seen it in the beautiful tradition of Mākālei. An account of the boy who dwelt in the uplands of Kekaha wai ‘ole, that was told by Ka-‘ohu-ha‘aheo-i-nā-kuahiwi-‘ekolu [the penname used by J.W.H.I. Kihe]. I think that certain people may want to know the reason and meaning of this name. So it is perhaps a good thing for me to explain how it came about. The source of it is that in this land of Kekaha even in the uplands, between Kaulana in the north and ‘O‘oma in the south, there was no water found even in the ancient times. For a little while, I lived in the uplands of Kaulana, and I saw that this land of Kekaha was indeed waterless.

The water for bathing, washing one’s hands or feet, was the water of the banana stump (*wai pūma‘ia*). The *pūma‘ia* was grated and squeezed into balls to get the juice. The problem with this water is that it makes one itchy, and one does not really get clean. There were not many water holes, and the water that accumulated from rain dried up quickly. Also there would be weeks in which no rain fell... The water which the people who lived in the uplands of Kekaha drank, was found in caves. There are many caves from which the people of the uplands got water... [September 17, 1929:3]

...The *kūpuna* had very strict *kapu* (restrictions) on these water caves. A woman who had her menstrual cycle could not enter the caves. The ancient people kept this as a sacred *kapu* from past generations. If a woman did not know that her time was coming and she entered the water cave, the water would die, that is, it would dry up. The water would stop dripping. This was a sign that the *kapu* of Kāne-of-the-water-of-life (Kaneikawaiola) had been desecrated. Through this, we learn that the ancient people of Kekaha believed that Kāne was the one who made the water drip from within the earth, even the water that entered the sea from the caves. This is what the ancient people of Kekaha wai ‘ole believed, and there were people who were *kia‘i* (guardians) who watched over and cleaned the caves, the house of Kāne... [September 24, 1929:3]

When the *kapu* of the water cave had been broken, the priest was called to perform a ceremony and make offerings. The offerings were a small black pig; a white fish, and *āholehole*; young taro leaves; and *awa*. When the offering was prepared, the priest would chant to Kane:

³ This account was published in serial form in the Hawaiian newspaper *Ka Hōkū o Hawai‘i*, from May 29, 1928 to March 18, 1930. The translated excerpts in this section include narratives that describe Mahai‘ula and nearby lands in Kekaha with references to families, customs, practices, ceremonial observances, and sites identified in text. The larger narratives also include further detailed accounts of Ka‘elemakule’s life, and business ventures. A portion of the narratives pertaining to fishing customs (November 13, 1928 to March 12, 1929), and canoeing practices (March 19 to May 21, 1929) were translated by M. Kawena Pukui, and may be viewed in the Bishop Museum-Hawaiian Ethnological Notes (BPBM Archives).

<i>E Kane i uka, e Kane i kai,</i>	<i>O Kane in the uplands, O Kāne at the shore,</i>
<i>E Kane i ka wai, eia ka puau,</i>	<i>O Kane in the water, here is the pig,</i>
<i>Eia ka awa, eia ka luau,</i>	<i>Here is the 'awa, here are the taro greens,</i>
<i>Eia ka ia kea.</i>	<i>Here is the white fish.</i>

Then all those people of the uplands and coast joined together in this offering, saying:

<i>He mohai noi keia ia oe e Kane,</i>	<i>This is a request offering to you o Kāne,</i>
<i>E kala i ka hewa o ke kanaka i hana ai,</i>	<i>Forgive the transgression done by man,</i>
<i>A e hoomaemae i ka hale wai,</i>	<i>Clean the water house (source),</i>
<i>A e hoomui mai i ka wai o ka hale,</i>	<i>Cause the water to increase in the house,</i>
<i>I ola na kanaka,</i>	<i>That the people may live,</i>
<i>Na ohua o keia aina wai ole.</i>	<i>Those who are dependent on this waterless land.</i>
<i>Amama.</i>	<i>It is finished...</i>

[October 1, 1929:3; Kepā Maly, translator]

It is not surprising today, when we hear of caves in which cultural materials are found. Along trails, near residences, and in once remote areas, a wide range of uses occurred. Caves in the Kekaha lands were used to store items, keep planting shoots cool and fresh for the next season, to hide or take shelter in, to catch water, and as burial sites.

Land Tenure in 'O'oma and Vicinity

Through the traditions and early historical accounts cited above, we see that there are descriptions of early residences and practices of the native families on the lands of 'O'oma and within greater Kekaha. Importantly, we find chiefly associations with the land of 'O'oma 2nd, as documented by the residency of the chiefs Kaikio'ewa, Keaweamahi, their families and retainers, while they were serving as the guardians of the young king, Kauikeaouli (Kamehameha III in ca. 1813-1818; Kamakau 1961 and Gov. Kapeau, 1847 in this study). Among the earliest government records documenting residency in 'O'oma and vicinity, are those of the *Māhele 'Āina* (Land Division), Interior and Taxation Departments, Roads and Public Works, and the Government Survey Division.

This section of the study describes land tenure (residency and land use) and identifies families associated with 'O'oma and its neighboring lands. The documentation is presented in chronologically within the following subsections, The *Māhele 'Āina* (1848): Disposition of 'O'oma, Land Grants in 'O'oma and Vicinity (1855-1864), The Government Homesteading Program in Kekaha, Field Surveys of J.S. Emerson (1882-1889), and Trails and Roads of Kekaha (Governmental Communications).

A review of the records below reveals that none of the claims by native tenants made during the *Māhele*, or any of the applications for Royal Patent Grants, included lands that are a part of the current development area.

The *Māhele 'Āina* (1848): Disposition of 'O'oma

In Precontact Hawai'i, all land, ocean, and natural resources were held in trust by the high chiefs (*ali'i 'ai ahupua'a* or *ali'i 'ai moku*). The use of land, fisheries and other resources were given to the *hoa'āina* (native tenants) at the prerogative of the *ali'i* and their representatives or land agents (*konohiki*), who were considered lesser chiefs. By 1845, the Hawaiian system of land tenure was being radically altered, and the foundation for implementing the *Māhele 'Āina* was set in place, system of fee-simple right of ownership.

As the *Māhele* evolved, it defined the land interests of Kauikeaouli (King Kamehameha III), some 252 high-ranking *Ali'i* and *Konohiki*, and the Government. As a result of the *Māhele*, all land in the Kingdom of Hawai'i came to be placed in one of three categories: (1) Crown Lands (for the occupant of the throne); (2) Government Lands; and (3) *Konohiki* Lands (cf. Indices of Awards 1929). The "Enabling" or "*Kuleana Act*" of the *Māhele* (December 21, 1849) further defined the frame work by which *hoa'āina* (native tenants) could apply for, and be granted fee-simple interest in "*Kuleana*" lands (cf. Kamakau in *Ke Au Okoa* July 8 & 15,

gotten by me from Koomoa, and held to this time. For 15 years, I have been the only one residing on this land, there are no other people, only me. I am the only one, there is no one living here to help from one year to the next year. Kamehameha III is the one above, who has this land, and W.P. Leleiohoku is below him, and I am the one man dwelling there. The survey of the length and width of this land is not accurately completed. That is what I have to tell you.

Done by me, Kahelekahi
[Native Register Vol. 8:543; translated by Kepā Maly]

In 1849, S. Haanio, Tax Assessor of North Kona, submitted a report to the Board of Education regarding those individuals who were subject to the Tuesday Tax Laws (*Poalua*), to be worked as a part of the School Tax requirements of the time. At the time of Haanio's report, three individual families were identified as residents of 'O'oma. Residents in the neighboring lands of Kalaoa and Kohanaiki were also listed, they were:

Kalaoa: 1. Kila, 2. Piena, 3. Nakuala, 4. Kuponon, 5. Loa, 6. Kaeha, 7. Keliipui, 8. Kapuolokai, 9. Kaainoa, 10. Paina, 11. Kalimaonaona, 12. Kaikleaukai, 13. Kanahale, 14. Kukaani, 15. Kupuai, and 16. Helekahi⁵

Ooma: 1. Kalua, 2. Kamaka and 3. Mamali

Kohanaiki: 1. Hulikoa, 2. Kaoeno, 3. Honolii and 4. Awa [HSA – Series 262, Hawaii 1849].

Unfortunately, there is no indication of where Kalua, Kamaka, and Mamali were living in 'O'oma at the time. Based on traditional patterns of residency in the region, it is likely that they had primary residences in the uplands, near sheltered *māla 'ai* (agricultural fields), and kept near shore residences for seasonal fishing, collection of salt, and other resources of the coastal zone. Of the three names given for 'O'oma, descendants of the Kalua and Kamaka lines are known to still be residing in the Kekaha region.

Land Grants in 'O'oma and Vicinity (1855-1864)

In conjunction with the *Māhele*, the King also authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was set forth by the "Enabling Act" of August 6, 1850, which set aside portions of government lands for grants.

Section 4. Resolved that a certain portion of the Government lands in each Island shall be set apart, and placed in the hands of special agents to be disposed of in lots of from one to fifty acres in fee simple to such natives as may not be otherwise furnished with sufficient lands at a minimum price of fifty cents per acre. [HSA – "Enabling Act" Series DLNR 2-4]

The Kingdoms' policy of providing land grants to native tenants was further clarified in a communication from Interior Department Clerk, A. G. Thurston, on behalf of Keoni Ana (John Young), Minister of the Interior; to J. Fuller, Government Land Agent-Kona:

February 23, 1852

...His Highness the Minister of the Interior instructs me to inform you that he has and does hereby appoint you to be Land Agent for the District of Kona, Hawaii. You will entertain no application for the purchase of any lands, without first receiving some part, say a fourth or fifth of the price; then the terms of sale being agreed upon between yourself and the applicant you will survey the land, and send the survey, with your report upon the same to this office, for the Approval of the Board of Finance, when your sales have been approved you will collect the balance due of the price; upon the receipt of which at this office, the Patent will be forwarded to you.

⁵ Helekahi or Kahelekahi – the one who made a claim for a *kuleana* in 'O'oma during the *Māhele* (Hclu 9162).

Natives who have no claims before the Land Commission have no Legal rights in the soil.

They are therefore to be allowed the first chance to purchase their homesteads. Those who neglect or refuse to do this, must remain dependant upon the mercy of whoever purchases the land; as those natives now are who having no kuleanas are living on lands already Patented, or belonging to Konohikis.

Where lands have been granted, but not yet Patented, the natives living on the land are to have the option of buying their homesteads, and then the grant be located, provided this can be done so as not to interfere with them.

No Fish Ponds are to be sold, neither any landing places.

As a general thing you will charge the natives but 50 cents pr. acre, not exceeding 50 acres to any one individual.

Whenever about to survey land adjoining that of private individuals, notice must be given them or their agents to be present and point out their boundaries... [Interior Department Letter Book 3:210-211]

Between 1855 and 1864, at least six applications were made for land in the *ahupua'a* of 'O'oma, and four of them were patented. The applications were made by:

<u>Grant</u>	<u>Applicant</u>	<u>Land</u>	<u>Acreage</u>	<u>Book and Year</u>
1590	Kauhini	Hamanamana, Kalaoa and Ooma 1	1,816	8:1855 (canceled)
1599	J. Hall	Ooma 2	101.33	8:1855 (canceled)
1600	Kaakau	Ooma 2	58.5	8:1855
2027	Kameheu	Ooma 2	101.33	11:1856 (same area as Grant 1599)
2031	Koanui	Ooma 1	24.5	11:1856
2972	Kaakau & Kama	Kalaoa 5 & Ooma 1	515	14:1864

["Index of all Grants Issued...Previous to March 31, 1886;" 1887]

The grants to Ka'akau and Kameheu in 'O'oma 2nd were patented by 1859, as recorded in the following letter:

April 8, 1859

S. Spencer, Interior Department Clerk;

to Lot Kamehameha, Minister of the Interior;

Lands in Puaa and Ooma 2 in Kona, Hawaii which were sold by the Government Agent:

Royal Patent 1600, Kaakau 58 50/100 acres in Ooma	\$29.25
Royal Patent 2027, Kameheu, 101 33/100 acres in Ooma	\$38.00

[HSA – Interior Department, Lands]

In the years following issuance of the first Royal Patents in 'O'oma and vicinity, native tenants and others continued to express interest in the lands of 'O'oma and neighboring *ahupua'a*. Applications were made to either lease or purchase portions of the remaining government lands. In 1865, Government Surveyor and Land Agent, S.C. Wiltse, wrote to the Minister of the Interior, describing the condition and status of the lands remaining to the government.

September 5, 1865
S.C. Wiltse, Government Surveyor and Land Agent;
to F.W. Hutchinson, Minister of the Interior.
 Kona Hawaii. Government Lands in this District not Sold;
 also those Sold and Not Patented:

...“Kalaoa 5th”

Not in the Mahele book but believed to be Gov't. land. This land above the Govt. Road has been sold and Patented. Below the road I have surveyed 515 acres which was sold by Sheldon to “Kaakau” & “Kama” who payed him \$165.00. As no valuation was made of this land per acre by Sheldon I afterwards valued it myself as follows, 300 Ac. at 50 cts. per acre, 215 at 25 cts. per Ac. The balance due according to this valuation including Patent was \$42.75 which was payed to me in March 1864 and forwarded by me to your office. The survey of this land is in your office. If the payments made are satisfactory, these men would be very glad to get their Patent.

This is a piece of 3rd rate land, used only as goat pasture, no improvements on it. Makai of this survey is about 400 Ac. remaining to the Govt., but of very little value.

“Ooma 1st & 2nd”

The best part of these lands have been sold, there remains to the Govt. the forest part, 2 or 300 Ac., and the makai part some 1500 Ac., about 500 of which is 3rd rate land, the balance rocks.

“Kohanaiki”

The forest part of this land is all that remains to the Gov't., this is extensive, extending to the mauka side of the forest. It may contain 1500 to 2000 Ac

The makai part of this land containing 220 Ac. has been sold both by Sheldon and myself. In April 1863 I was surveying in Kona when “Nahuina” (who lives on the adjoining land of “Kaloko”) applied to me to survey the makai part of the Gov't. land Kohanaiki which he wished to purchase. I inquired whether he had applied to Sheldon for this lands (Sheldon was then in Honolulu) he told me that he had not, but would do so immediately, if it was necessary he would go to Honolulu for that purpose. I told him that I was then writing to Sheldon and I would make the application for him which I did, but never got an answer. I wrote several times to him about that time, for information about Gov't. lands, but he declined to answer my letters.

On the 30th of May following, I surveyed said piece of land for “Nahuina.” When I was making this survey “Kapena” (who bought this land from Sheldon) was present, and afterwards went to Honolulu and payed Sheldon for this land.

“Nahuina” had the money then to pay for this land, and I told him to keep it until he knew who he was paying it to. I was perfectly satisfied then that Sheldon's transaction as Gov't. land Agt. was not honest. Mr. Sheldon had then been away from Kona nearly three months, he had previous to this resigned his office as Judge and taken up his residence permanently in Honolulu. Afterwards when requested by Mr. S. Spencer to act as land Agt. for Kona, “Nahuina” payed me for this land at 25 cents per Acre. Its only value is for a place for a residence on the beach.

I have been thus particular in giving you the history of this affair, so that you might be able to decide which of the parties were intitled to said land... [HSA – Interior Department, Lands]

Historical records document that the primary use of the *kula* – lowlands in the Kekaha region, was for goat ranching, with limited cattle ranching. Throughout the 1800s, most of the cattle ranching occurred on the *mauka* slopes nearer the old upper government road.

Summary of Land Tenure Described in Grant Records

Grant No.'s 1600 (for Kaakau) and 2031 (for Koanui) are situated on the *mauka* side of the Alanui Aupuni (the Upper Government Road, near present-day Māmalahoa Highway) in 'O'oma 2nd and 1st.

Grant No. 1599 (surveyed for Kauhini), was situated across the *kula* lands from O'oma 1st in the south, to Hāmanamana, in the north. Communications from the 1880s, indicate that the parcel was never patented, though Kauhini had lived in 'O'oma 1st, through the time of his death (before 1888). J.S. Emerson's Register Map No. 1449, identifies a Triangulation Station in 'O'oma 1st as "Kauhini." At almost the same time that Kauhini's grant was surveyed, other grants in Kalaoa and 'O'oma covering a portion of the area described under Kauhini's grant were patented to Kakau and Kama (Royal Patent Grant No. 2972). In 1888, this confusing situation was brought to the government's attention in a letter from more than 70 native residents of 'O'oma and the larger Kekaha region, when the Minister of the Interior was developing homestead lots for applicants (see communications below).

Grant No. 2027 (for Kameheu), situated in 'O'oma 2nd, extends from the *makai* edge of the Upper Government Road, to a short distance below the historic Homestead Road between Kaloko and Kalaoa, at about 900 feet above sea level (see Register Map No. 1449).

'O'oma grantee Kaakau (Grant No. 1600), also held an interest in Grant No. 2972 in the land of Kalaoa 5th and 'O'oma 1st, which he shared with his relative, Kama. Historic survey records (in Register Maps and Survey Field Books) do identify "Kama's house" near the Wawaloli pond (Register Map No. 1449) in 'O'oma 2nd. The same house is later identified as "Keoki Mao's House" (Register Map No. 1280).

In 1888, government surveyor J.S. Emerson identified Kama as a resident in 'O'oma, near the mauka government road (see communication below). This Kama is identified in oral history interviews as being an elder of the Kamaka line, from whom the often-mentioned Palakiko Kamaka and others descend. A temporary beach shelter—in the vicinity of "Kama's House" marked near the shore of 'O'oma 2nd on Register Maps 1449 and 1280—remained in use by family members at least until the outbreak of World War II (see interviews with Peter Kaikuaana Park, Geo. Kinoulu Kahananui, and Valentine K. Ako).

While no formal awards or grants of land appear to have been made for the near shore *kula* or beach lands, it is logical to assume that families living in the uplands of the 'O'oma and Kalaoa-Kohanaiki *ahupua'a*, made regular visits to the near shore lands. The practice of continued travel between upland residences and near-shore shelters, is also described by *kūpuna* Peter K. Park, and Elizabeth Lee, who was born and raised in the *mauka* section of 'O'oma, and by other *kupuna* from neighboring lands.

No records indicating that the above Royal Patent Grantees had applied for coastal parcels as a part of their original claims were found while conducting the present research. A further review of the *Māhele* records was also made to determine if any of the grant applicants had been *Māhele* claimants (as is sometimes the case). Their names did not appear in the Register or Testimony volumes for the area.

Ka 'Āina Kaha—(A Native's Perspective)

In 1875, J.P. Puuokupa, a native resident of Kalaoa wrote a letter to the editor of the Hawaiian newspaper, *Ku Okoa*, responding to a letter which had been previously published in the paper (written by a visitor to Kona). The first account apparently described the Kekaha region as a hard land that presented many difficulties to the residents. It was also reported that a drought on Hawai'i had significantly impacted crop production, and that a "famine" was occurring. Puuokupa, responded to the account and described the situation as he knew it, from living upon the land. His letter is important as it provides us with an explanation as to why people of the region—including 'O'oma—lived mostly in the uplands, for it was there that the rich soils enabled residents to cultivate the land and sustain themselves.

Mai Kailua a hiki i Kiholo—(From Kailua to Kiholo)

...The people who live in the area around Kailua are not bothered by the famine. They all have food. There are sweet potatoes and taro. These are the foods of these lands. There are at this time, breadfruit bearing fruit at Honokohau on the side of Kailua, and at Kaloko, Kohanaiki, Ooma and the Kalaoas where lives J.P. [the author]. All of these lands are cultivated. There is land on which coffee is cultivated, where taro and sweet potatoes are cultivated, and land livestock is raised. All of us living from Kailua to Kalaoa are not in a famine, there is nothing we lack for the well being of our bodies.

Mokuola⁶ is seen clearly upon the ocean, like the featherless back of the *'ukeke* (shore bird). So it is in the uplands where one may wander gathering what is needed, as far as Kiholo which opens like the mouth of a long house into the wind. It is there that the bow of the boats may safely land upon the shore. The livelihood of the people there is fishing and the raising of livestock. The people in the uplands of Napuu are farmers, and as is the custom of those people of the backlands, they all eat in the morning and then go to work. So it is with all of the native people of these lands, they are a people that are well off.

...As was said earlier, coffee is the plant of value on these lands, and so, is the raising of livestock. From the payments for those products, the people are well off, and they have built wooden houses. If you come here you shall see that it is true. Fish are also something which benefits the people. The people who make the *pai ai* on Maui bring it to Kona and trade it. Some people also trade their *poi* for the coffee of the natives here... (J.P. Puuokupa, in *Ku Okoa* November 27, 1875; translated by Kepā Maly)

The Government Homesteading Program in Kekaha

Following the *Māhele* and Grant programs of the middle 1800s, it was found that many native tenants still remained on lands for which they had no title. In 1884, the Hawaiian Kingdom initiated a program to create Homestead lots on Government lands—a primary goal being to get more Hawaiian tenants in possession of fee-simple property (Homestead Act of 1884). The Homestead Act allowed applicants to apply for lots of up to 20 acres in size, and required that they own no other land.

On Hawai'i, several lands in the Kekaha region of North Kona, were selected and a surveying program was authorized to subdivide the lands. Initially, those lands extended from Kohanaiki to Kūki'o. Because it was the intent of the Homestead Act to provide residents with land upon which they could cultivate crops or graze animals, most of the lots were situated near the *mauka* road (near the present-day Māmalahoa Highway) that ran between Kailua and 'Akāhipu'u.

Early in the process, native residents of Kekaha soon began writing letters to the Minister of the Interior, observing that 20 acre parcels were insufficient "to live on in every respect." They noted that because of the rocky nature of the land, goats were the only animals that they could raise, and thus, try to make their living (cf. State Archives—Land File, December 26, 1888, and Land Matters Document No. 255; and communications below).

During the first years of the Homestead Program, all of the remaining government lands in the Kekaha region, from Kohanaiki to Kūki'o 2nd, had been leased to King David Kalākaua for grazing purposes. The following lease was issued, with the notation that should portions of the land be desired for Homesteading purposes, the King would relinquish his lease:

August 2nd 1886
General Lease 364
Between His Majesty Kalakaua;

⁶ *Moku-ola* — literally: Island of life — is a poetic reference to a small island in Hilo Bay which was known as a place of sanctuary, healing, and life. By poetic inference, the Kekaha region was described as a place of life and well-being.

and Walter M. Gibson, Minister of the Interior

[Lease of unencumbered government lands between Kealakehe to Kukio 2^d]:

...Oma [Ooma] No. 1 & 2 – yearly rent Ten dollars...

Each and every of the above mentioned lands are let subject to the express condition that at any time during the term of this lease, the Minister of the Interior may at his discretion peaceably enter upon, take possession, and dispose of such piece or pieces of land included in the lands hereby demised, as may be required for the purposes of carrying out the terms and intent of the Homestead Laws now in force, or that may be hereafter be enacted during the term of this lease... [State Land Division Lease Files]

By 1889, the demand for homestead lots in 'O'oma and other Kekaha lands was so great that King Kalākaua gave up his interest in the lands:

January 22, 1889

J.W. Robertson, Acting Chamberlain;

to J.A. Hassinger, Chief Clerk, Interior Department

[Regarding termination of Lease No. 364 for lands from Kukio to Kohanaiki]:

...I have the honor to acknowledge the receipt of your communication, of the 17th, instant, informing me that you are directed, by His Excellency the Minister of the Interior, to say, that he desires to take possession of the lands, described in Government Lease No. 364, for Homestead purposes, and requests the surrender of the lease.

His Majesty the King, is willing, for the purpose of assisting in carrying out the Homestead Act, to accede to the terms of the lease, so far as to give up only such portions of the lands, as are suitable to be apportioned off for Homestead purposes.

It has come to the knowledge of His Majesty, that several of the applicants for portions of the above lands, are already in possession of lands elsewhere, and living in comfortable homes. They are not poor people, nor are they entitled to the privilege of obtaining lands under the Homestead Act, but are desirous of obtaining more of such property, for the purpose of selling or leasing to the Chinese, which class is beginning to outnumber the natives in nearly every district...

His Majesty is desirous of retaining the balance of lands, that may be left after the apportionment has been completed; and also desires to lease remnants of other Government lands in that section of the Island...

Reply attached – Dated January 22, 1889:

The lands of Kohanaiki and Kalaoa and Makaula have been divided up into Homestead lots, and taken up.

Lands marked * are in Emerson's List of lands to be sold. Emerson's List attached.

His Majesty has paid rent to Aug. 22, 1889. Another rent is due in adv. from this date...

* Kukio 2	* Maniniowali
* Mahaiula	* Kaulana
* Awalua	Puukala
+ Makaula	+ Kalaoa 1, 2, 3, 4 & 5
* Ooma 1 & 2	+ Kohanaiki

Lease cancelled by order – Minister of Int. August 2, 1889 [HSA – Interior Department, Lands]

One of the significant issues that arose with the development of homesteads in the Kekaha region, involved the lands of 'O'oma, Kalaoa and Hāmanamana, which had been surveyed for Kauhini in 1855, under Grant No. 1590. The grant was apparently never patented, and questions regarding the government's authority to divide portions of the 'O'oma-Kalaoa-Hāmanamana lands into Homestead lots were raised. Adding to the confusion, in 1888, John A. Maguire was also making his move from Kohala to Kona, and in the process of establishing his Huehue Ranch. One of the lands he reportedly purchased was covered under the unperfected Grant No. 1590. Thus, homestead applicants and program managers met with a wide range of challenges during the program's history.

Homestead Communications

There are a number of letters between native residents (applicants for Homestead lands) and government agents, documenting the development of the homesteading program and residency in Kekaha. Tracts of land in Kohanaiki, 'O'oma, Kalaoa and neighboring *ahupua'a* were let out to native residents, and eventually to non-native residents as well. Those lands which were not sold to native tenants were sold or leased to ranching interests—most of which came under John A. Maguire of Huehue Ranch.

One requirement of the Homestead Program was that lots which were to be sold as homesteads to the applicants, needed to be surveyed. J.S. Emerson, one of the most knowledgeable and best-informed surveyors to work in Kona, began surveying the Kekaha region homestead lots in 1888. Emerson's letters to Surveyor General, W. D. Alexander, provide valuable historical documentation about the community and land. Writing from 'O'oma in April 1888, Emerson spoke highly of the Hawaiian families living on the land; he also described land conditions and weather at the time. In the letter, we find that questions regarding the status of several lands in Kona had arisen, and that John A. Maguire was planning to "settle" in Kona (see communications in Part 4 of this section of the study). Emerson's letters along with those below from the native tenants of the land, provide first hand accounts of the land development of the communities in Kekaha. The following communications are among those found in the collection of the Hawai'i State Archives (HSA).

May 1888

J.W.H. Isaac Kihe, Jr., et al.; to L.A. Thurston, Minister of the Interior

[Petition with 71 signatures, regarding discrepancy in land grant to Kauhini in Kalaoa and Ooma; and desires that said land be divided into Homestead Lots for applicants]:

... We, the undersigned, subjects residing within the boundaries of Kekaha, from Kohanaiki to Makalawena, and Whereas, the land said to belong to Kauhini is within the boundaries above set forth; Whereas, some doubt and hesitancy has come into our minds concerning the things relating to said land of Kauhini, and that it is proper that a very careful investigation be made, because, we have never known said Kauhini to have lands in the Kalaoas and Ooma 1, and because of such doubt, the Government sold some pieces in said land of 687 acres to Kama, Kaakau and Hueu, and they have been living with all the rights for 20 years and over, on pieces that were acquired by them. Therefore, we leave this request before your Excellency, the honorable one, with the grounds of this request:

First: The said land of Kauhini is not a land that is clear in every way, so that it can be shown truthfully and clearly that it belongs to Kauhini and his heirs— said kuleana.

Second: The land said to belong to Kauhini was only surveyed, but the money was not paid, that is the price for the land, only the payment for the survey was paid. We are ready with witnesses to prove this ground, as well as other grounds.

Third: Because of Kama and Kaakau and Hueu's knowing that Kauhini had no true interest in the land, therefore, they bought from the Government some acres of in the piece which Kauhini had surveyed, and the Government readily agreed to sell to them. This is real proof that said land was not conveyed to Kauhini, and the second is that Kauhini was living right there and he made no protest against the sale by the Government of those 687 acres to Kama (k), Kaakau (k) and Hueu (k), up to the time of his death, and only now has the question been raised through the plat of the survey, and thereby basing the claim that Kauhini had some land.

...We ask your honor that this matter be traced in the Government Departments, so as to find out the truth, there is much trouble and uncertainty about this land. And our inquiry to be based upon these great questions. Does the land belong to Kauhini? Or to the Government?... [HSA – Interior Department, Lands]

May 16, 1888

Interior Department Clerk; to J.W.H. Isaac Kihe, Jr.:

...I have been directed by the Honorable Minister of the Interior, to say, that your request asking that Kauhini's interest in the lands of Kalaoa & Ooma 1 be investigated, and to let you know the you are wanted to send, or to bring here to Honolulu, 2 or 3 good witnesses, and all the papers found by you or them, concerning this land of Kauhini... [HSA Interior Department Lands]

May 16, 1888

J.F. Brown, Government Surveyor; to L.A. Thurston, Minister of the Interior

[Regarding disposition of Grant No. 1590, to Kauhini for Lands in Hamanamana, Kalaoa, and Ooma; Figure 5]:

...With reference to the letter of inquiry of numerous natives in N. Kona, Hawaii, I beg to report:

That as regards the land belonging to Kauhini, I find that Grant 1590 on record and signed in due form, assigned to Kauhini something over 1800 acres shown in sketch by yellow tinted boundary line. At the bottom of the page however and in different handwriting is the following remark "Memo— this to be cancelled" S.S. (Stephen Spencer)?

Later the grants shown in sketch by blue lines were issued to the parties indicated in the sketch, and this fact together with the memo attached to the Grant, and the statements and beliefs of the natives leads me to think that the Grant to Kauhini was actually cancelled, but of this I have not yet obtained further proof than I have here given... [HSA – Interior Department, Lands]

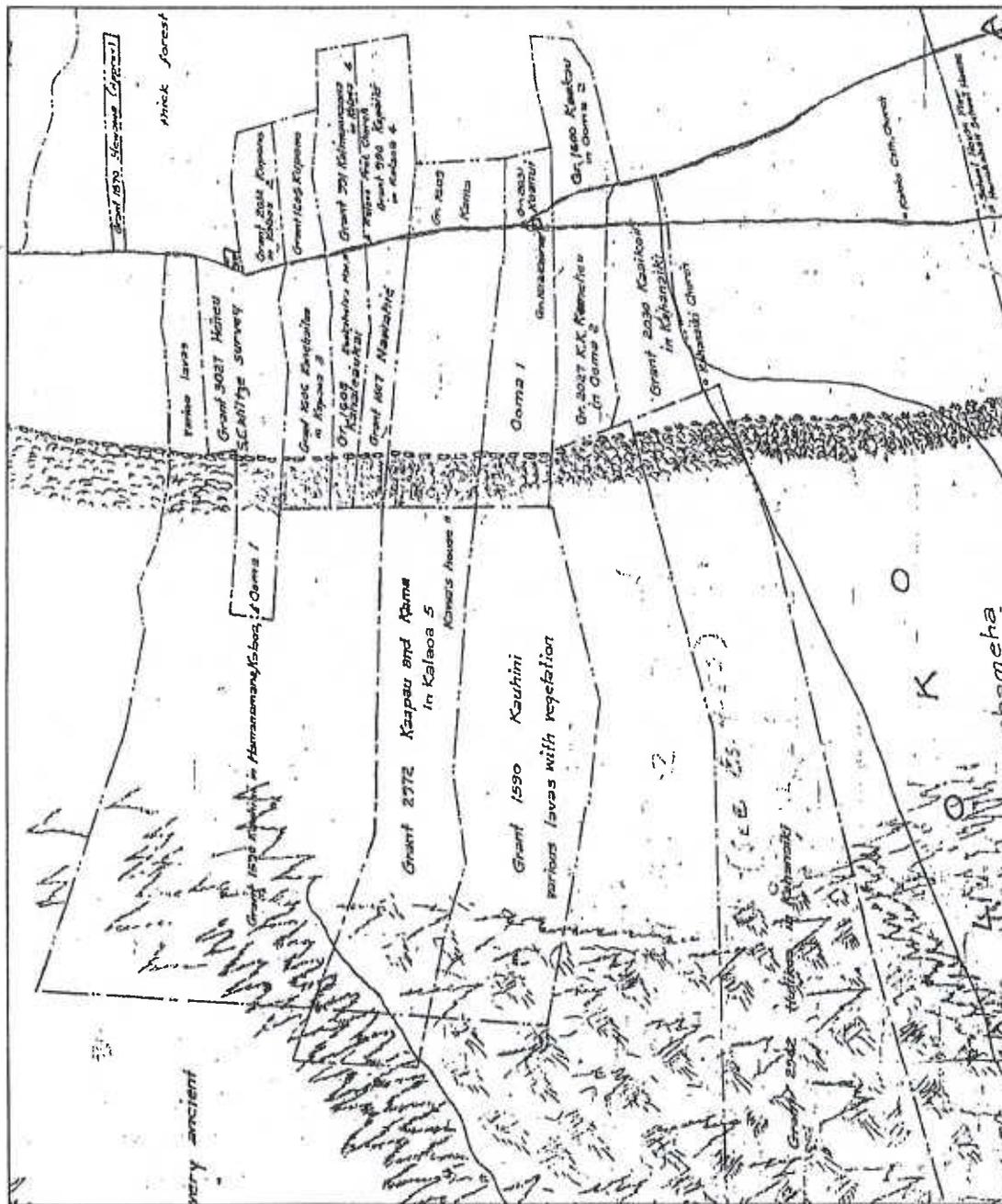


Figure 5. Portion of 1882 Register Map No. 1280 showing original boundaries of Grant No. 1590, to Kauhini.

May 1888 - J.W.H.I. Kihe, Jr.; to L.A. Thurston, Minister of the Interior:

...Oh honorable one, I am ready with the right witnesses to come when I receive the order, and if you agree, oh honorable one, to help with the fares for us on the vessel, and for our support while staying there and coming back.

Proofs are ample to prove that the land belongs to the Government, when I arrive with the witnesses, according to what you wish to be done... [HSA- Interior Department, Lands]

[Applying to purchase remnant lands from Makaula to Ooma 2nd, as a native Hui; and that land not be sold to outsiders.]

... We the undersigned, kamaaina (old residents) who reside from "Makaula" to "Ooma 2," joining "Kohanaiki," hereby petition and we also file this petition with you, and for you to consider and conferring with the Minister of the Interior, whether to consent or refuse the petition which we humbly file, and at the same time setting forth the nature of the land and the boundaries desired.

We ask that all be sold to us as a Hui, that the remnants of all the Government lands from "Hamanamana" to "Ooma 2 (two)," that is from the Government remnant of "Hamanamana, Kalaoa 1, 2, 3, 4, 5, Ooma 1 & 2" running until it meets the sea. Being the remnants remaining from the "Homesteads" lately, and remaining after the sale of the lands formerly sold by the Government, these are the remnants which we wish to buy as a "HUI." If you consent, and also the "Minister of the Interior," for these reasons:

1. The "remnants of Government lands" aforesaid, join our land kuleanas and were lately surveyed, and for that reason we believe it proper that they be sold to us.
2. The "kuleanas" that were surveyed for us are not sufficient to live on in every respect, they are too small, and are not in accordance with the law, that is one hundred acres, (Laws 1888).
3. Because of our belonging to, and being old residents of said places, is why we ask that consent be granted us for the sale to us and not to any one from other places, or we may be put to trouble in the future.

With these reasons, we leave this with you, and for you to approve, and we also adhere to our first offer per acre, and the explanations in regards to said offer.

FIRST: The price per acre to be 10 cents per acre.

SECOND: The nature of the land is rocky and lava stones in all from one and to the other, and there is only one kind of animal which can roam thereon, and it is goats, and that is the only thing to make anything outof, and to benefit us if we acquire it.

THIRD: If this land is acquired by others, they will probably cause us trouble, because the kuleanas which we have got are very small and not enough, not 20 acres of the land were acquired by us; very few of the lots reach 20 acres or more.

And because of these reasons and the explanations herein, we leave before your Excellency for the granting of the consent or not... [HSA- Interior Department, Lands]

ca. February 1889

*Petition of J.W.H. Isaac Kihe, Jr. and 21 others;
to L.A. Thurston, Minister of the Interior*

[Transmitting first payment for Homestead Land from Makaula to Kohanaiki]:

... We, the ones whose names are below, persons who but for the pieces of "Homestead" lands from Makaula to Kohanaiki, present to you documents of proof and money as first payment of ten (\$10.00) dollars in the hands of J. Kaelemakule, the Agent appointed for the "Homestead" lands in North Kona, Hawaii.

We ask that the Agreements be sent up, with the Government for five years to J. Kaelemakule, the Agent here, in number the same as there are names below...

- | | | |
|---------------------------|------------------|-----------------|
| 1. J.W.H. Isaac Kihe, Jr. | 9. P. Nahulanui | 17. Keawehawaii |
| 2. S. Mahauluae | 10. Kaukaliinea | 18. D. Kaninau |
| 3. D.P. Manuia | 11. Kamahiai (w) | 19. Mokuaikai |
| 4. S.M. Kaawa | 12. C.K. Kapa | 20. Nuuanau |
| 5. H.P. Ku | 13. P.K. Kanuha | 21. S. Kaimuloa |
| 6. W.N. Kailiino | 14. J. Haau | 22. J. Kaloa |
| 7. Z. Kawainui | 15. G. Mao | |
| 8. Kikane | 16. J. Pule | |

[HSA – Interior Department Document No. 227]

February 18, 1889

J. Kaelemakule, Land Agent; to L.A. Thurston, Minister of the Interior:

I am sending the correct report of the applicants for homestead lands here in North Kona, and their respective names, and the amount they have paid for their initial deposits in order that the agreements will be made correctly...

Pule \$10.	Keoki Mao \$10.	Mahuluae \$10.	Haau \$10.
Nuuanu \$10.	Manuia \$10.	Kaukaliinea \$10.	Kamahiai (w) \$10.
Kaawa \$10.	Kaninau \$10.	J. Kaelemakule \$10.	Kawainui \$10.
Mokuaikai \$10.	Keawehawaii \$10.	Nahulanui \$10.	Kaloa \$10.
Haiha \$10.	Kapa \$10.	Kaumuloa \$10.	Isaac Kihe \$10.
Kailiino \$10.	Kanuha \$10.	Ku \$10.	Kikane \$10.

[HSA – Interior Department, Lands]

October 7, 1889

J. Kaelemakule, Land Agent; to L.A. Thurston, Minister of the Interior:

...The applications of Kahinu and Lilinoe which were sent down during the month of August, please have the lots changed, because the map of Ooma has arrived with new numbers, as follows: Kahinu, Lot 51; Lilinoe, Lot 49, in Ooma 1st ... [HSA – Interior Department, Lands]

October 10, 1889

J.W.H. Isaac Kihe, Secretary; to L.A. Thurston, Minister of the Interior:

...I leave some more names who make applications for homestead lands here in North Kona... The places wanted by those named are:

Pika Kaninau at Ooma 1
 Kahinu at Ooma 2
 Keaweiwi at Ooma 2... [HSA – Interior Department, Lands]

October 28, 1889

J. Kaelemakule, Land Agent; to L.A. Thurston, Minister of the Interior:

...The eight lots in Ooma have all been taken, none are left... These lots have been very quickly taken by the bidders, before the issuance of the notice from the Minister... Bear in mind the agreements for Kahinu and Lilinoe... [HSA – Interior Department, Lands]

December 31, 1890

J.W.H.I. Kihe, Jr.; to C.N. Spencer, Minister of the Interior:

We, the undersigned, who are without homes, and are destitute and have no place to live on, and whereas, the government has permitted all the people who have no lands, and that they receive homesteads, and for that reason, your humble servants make application that our

application may be speedily granted which we now place before Your Excellency, that the Government land which was divided and surveyed by Joseph S. Emerson, be immediately sub-divided, the same being portions of Kalaoa 5 and Ooma, on the mauka side of Kama (k), Koanui (k), to the junction with Ooma of Kaakau (k), containing an area of one hundred and fifteen acres (115), and it is those acres which your applicants are applying for before Your Excellency, and where as your applicants are native Hawaiians by birth, residing at Kalaoa, North Kona, Island of Hawaii. And the minds of your servants hope and desire to have a place to live on in the future, and to have a home for all time, and Your Excellency, your servants humbly place their petition with the hope that you will grant this application...

M.E. Kuluwaimaka (k)
 H. Hanawahine (k)
 D.W. Kanui (k)
 Mr. Kahumoku (k)
 [HSA – Interior Department, Lands]

July 30, 1890

*Petition of Kaihemakawalu and 63 native residents of Kekaha;
 to C.N. Spencer, Minister of the Interior*

[Requesting that lands available for Homesteading be sub-divided and granted to applicants]:

...We, the undersigned, old-timers living from Kealakehe to Kapalaoa, who are subject to taxes, and who have the right to vote in the District of Kona, Hawaii, and ones who are really without lands, and who wish to place this application before Your Excellency, that all of these Government lands here in North Kona, be given to the native Hawaiians who are destitute and poor, being the lots which were sub-divided by the Government which are lying idle and for which no Agreements have been given out, and also the lots which were granted Agreements and issued in the time when Lorrin A. Thurston was Minister of the Interior, and also the lots which still remain undivided. All of these Government lands are what we are now again asking that the dividing and sub-dividing be continued in these remnants of Government lands, until all of the poor and needy ones are provided for.

Your Excellency, we ask that no consent whatever be given to permitting lands to be acquired by the rich through sale at auction, or by lease, and if there is to be any lease, then to be leased to the poor ones, if they are supplied with homes.

Your Excellency, we ask that you immediately send copies of all agreements of the Government lands which were cut up and sub-divided, which are remaining and have no documents for those lots. And we also ask that a surveyor be sent now to again survey and sub-divide the remaining Government lands, being the Government lands of Kaulana, Mahaiula, Kukio 1 & 2, mauka of the Government Road, and Kalaoa 5 & Ooma 1, mauka of the Government Road, joining Kama's and Koanui's.

And now, Your Excellency, we also ask that all of the pieces of Government land lying idle outside of these lands which have been sub-divided, and lands which are to be sub-divided, applied for above, to be allowed to be leased to use for five cents per acre, because, they are rocky and pahoehoe lands only left, and the number of acres being about three thousand and over, thereby giving the Government some income from these which have been lying idle and without any value... [HSA – Interior Department, Lands]

June 22, 1893

J. Kaelemakule, Land Agent; to J.A. King, Minister of the Interior:

...I am forwarding you with this, the copy of the agreement of Wm. Harbottle, and some applications as herein below set forth (Figure 6):

- # 107, Kalua (w), for Lot # 59, Map 6, Ooma;
- # 108, G.M. Paiwa, for Lot # 56, Map 6, Ooma;
- # 109, Namakaokalani, for Lot # 58, Map 6, Ooma;
- # 110, Pika Kaninau, for Lot # 57, Map 6, Ooma.

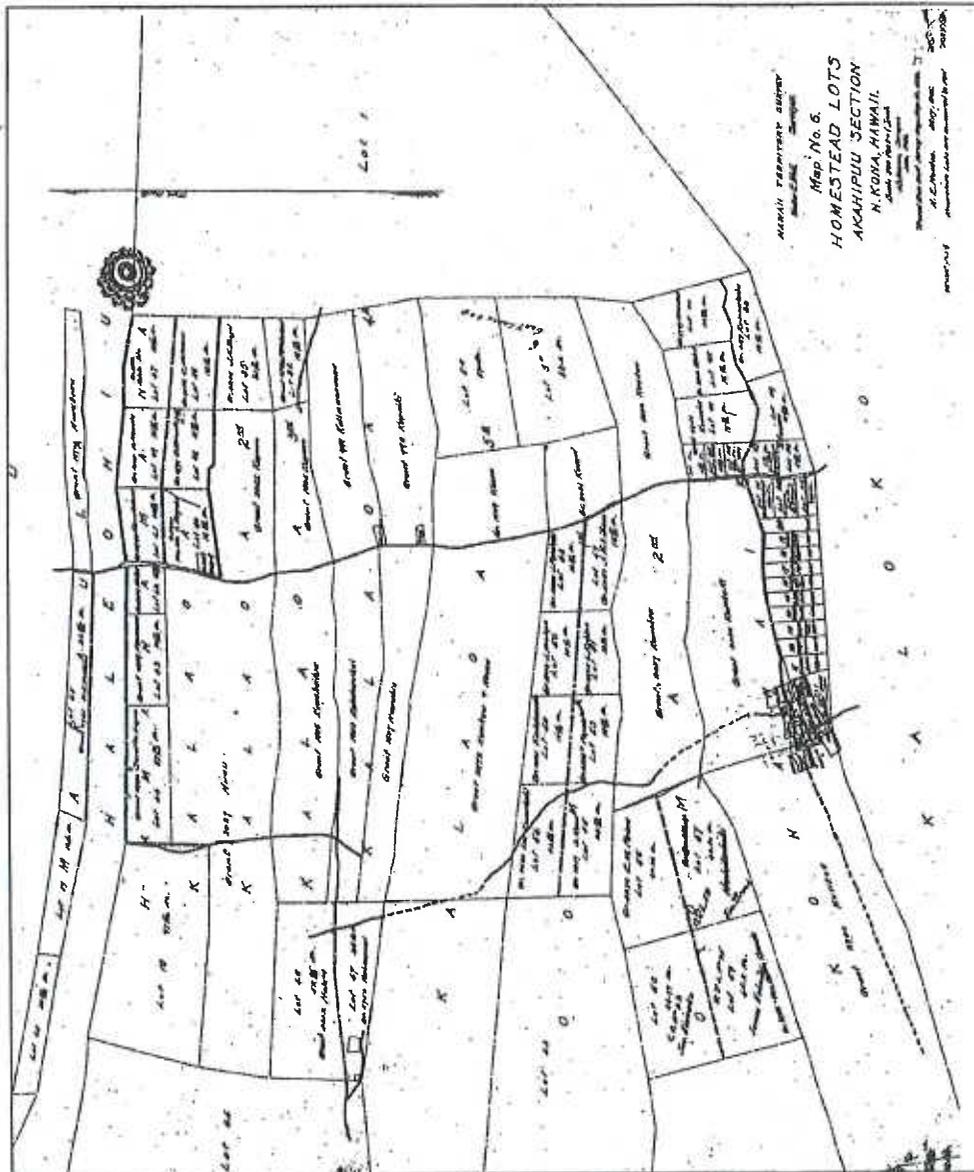


Figure 6. 1902 homestead map No. 6 showing Ooma-Kalaoa Homestead Lots (State Survey Division).

Lot # 57 above set forth, was formerly agreed with D. Kealoha Hoopii, but this applicant left altogether and lived a long time in Kohala, and has done nothing towards the land, and has never signed the agreement to this day. As two years have gone by, I thought it would be better to give the lands to the new applicant... [HSA - Interior Department, Lands]

August 31, 1898
 Statement of Leases of Public Lands
 Under Control of the Commissioner of Public Lands...

...Ooma (mauka) 1160 acres – Coffee, wood lands & grazing
 Lease No. 432 – Annual rent \$60. – Expires August 1st, 1906...
 Reservation in lease by which the Gov't. may take up portions suited to settlement. [HSA –
 F.O. & Ex, 1898 – Public Lands]

In May 1902, the Territorial Survey Office issued Register Map No. 2123, depicting a portion of the Kalaoa-Ooma Homesteads. 'O'oma 1st had been divided into 25 lots extending from near the shore (excluding the shore line) to the upper limits of the ahupua'a; also excluding the early Royal Patent Grant parcels previously sold to native tenants.

Applicants for land in 'O'oma 1st (from *makai* to *mauka*) included:

- Kanealii – Right of Purchase Lease # 30; Lot 4-B (cancelled);
Kanealii's parcel was just mauka of the shore line exclusion.
- Wm. Keanaaina – Right of Purchase Lease #33; Lot 13
(Patented by Grant No. 5472);
The makai end of Wm. Nuanu Keanaaina's Grant 5472, is situated at approximately 325 feet above sea level.
- J. Maiola – Right of Purchase Lease # 28; Lot 14 (cancelled);
J. Maiola's parcel was situated about 525 feet above sea level.
- K. Kama Jr. – Right of Purchase Lease #27; Lot 15
(Patented by Grant No. 5046).
The makai end of K. Kama's Grant No. 5046, is situated at approximately 725 feet above sea level.

Territorial Survey Map No. 6 (Homestead Lots, Akahipuu Section), surveyed by J.S. Emerson in 1889, depicts the eight original homestead lots sold to applicants. The lots are in the area extending from 1,022 feet above sea level to the old Māmalahoa Highway. The lots contained approximately 15 to 25 acres each, and were (*makai* to *mauka*) sold to:

- S. Kane – Grant No. 3819, Lot 55;
- Loe Kumukahi – Grant No. 3820, Lot 54;
- Papala (w) – Grant No. 3820 B, Lot 53;
- Kaulainamoku – Grant No. 3821, Lot 52
- L. Kahinu – Grant No. 3805, Lot 51
- J. Hoolapa – Grant No. 3804, Lot 50
- J.M. Lilinoe – Grant No. 4343, Lot 49
- J. Palakiko – Grant No. 3822, Lot 48

Except for the Homestead parcels and the two lots patented to Keanaaina and Kama (totaling ten parcels of the available 25 parcels), no other land in 'O'oma 1st was sold during this time. The land was retained by the government and portions leased out for grazing (see General Lease No.'s 590 and 604).

'O'oma 2nd was also divided into homestead parcels, but only six lots were made in the subdivision (see Register Map No. 2123). The two *makai* lots consisted of approximately 1,333 acres—the first lot from above the shore to the 1847 *Alanui Aupuni*, containing approximately 302 acres, and the other lot running *mauka* from the same *Alanui Aupuni*, to about the 800 foot elevation (containing approximately 1,031 acres). In 1899, John A. Maguire, founder of Huehue Ranch applied for a Patent Grant on both of the *makai* lots, but he only secured Grant No. 4536, for the lower parcel of 302 acres, in 'O'oma 2nd. Maguire's Huehue Ranch did hold General Lease No.'s 1001 and 590 for grazing purposes on the remaining government lands—both below and above the *mauka* highway—in 'O'oma 2nd.

Between 700 and 1,100 feet elevation, four Homestead lots were subdivided, containing 40.50 to 45 acres each. Applicants for the lots (*makai to mauka*) were:

- James Kuhaiki – Right of Purchase Lease # 75, Lot 59
(Patented to Mrs. Hattie Kinoulu);
- Jno. Kainuku – C.O. No. 33, Lot 58 (not granted by 1902);
- Holokahiki – C.O. No. 11, Lot 57
(cancelled; R.P.L. # 59 to Jno. Broad); and
- E.M. Paiwa – Grant No. 4273, Lot 56.

The notes of survey from Maguire's Grant No. 4536 describes the near shore parcel in 'O'oma 2nd. Of particular interest, it also references one of the prominent cultural-historical features on the boundary between 'O'oma 2nd and Kohanaiki, an "old 'Kahua hale' on white sand..." The "kahua hale" being an old house site. The notes of survey read (Figure 7):

Grant No. 4536

To J.A. Maguire

Purchase Price \$351.00

A Portion of Ooma 2nd, N. Kona, Hawaii Applied for by J.C. Lenhart, June 8, 1899.

Beginning at Puhili Gov't. trig. St. on the boundary between Kohanaiki and Ooma marked by a drill hole in stone 9 feet South of the South corner of an old "Kahua hale" on white sand at a point from which

Akahipuu Gov't. trig. Sta. is N 55° 27' 39" E true 32634.7 feet

Keahole Gov't. Trig. Sta. is N 21° 52' 36" W true 9310.5 ft.

Keahuolu Gov't Trig. Sta. is S 22° 24' 36" E true 20,141.8 ft., and running—

1. S. 79° 26' W. true 298.0 feet along Gr. 3086 Kapena, to a large [mark] on solid pahoehoe by the sea at Puhili Point, thence continuing the same line to the sea shore and along the sea shore to a point whose direct bearing and distance is:

2. N. 4° 54' W. true 4192.0 feet;

3. Due east true 2920.0 feet along Ooma 1st;

4. S. 31° 30' E. true 3920.0 feet along reservation for Gov't. Road 30 feet wide;

5. S 79° 45' W. true 4387.0 feet along Grant 3086 Kapena, to initial point and including an area of 302 acres.

J.S. Emerson, Surveyor

Oct. 10, 1901.

Field Surveys of J.S. Emerson (1882-1889)

Among the most interesting historic Government records of the study area—in the later nineteenth century—are the communications and field notebooks of Kingdom Surveyor, Joseph S. Emerson. Born on O‘ahu, J.S. Emerson (like his brother, Nathaniel Emerson, a compiler of Hawaiian history) had the ability to converse in Hawaiian, and he was greatly interested in Hawaiian beliefs, traditions, and customs. As a result of this interest, his letters and field notebooks record more than coordinates for developing maps. While in the field, Emerson also sought out knowledgeable native residents of the lands he surveyed, as guides. Thus, while he was in the field he also recorded their traditions of place names, residences, trails, and various features of the cultural and natural landscape (including the extent of the forest and areas impacted by grazing). Among the lands that Emerson worked in was the greater Kekaha region of North Kona, including the lands of ‘O‘oma and vicinity.

One of the unique facets of the Emerson field notebooks is that his assistant J. Perryman, was also a sketch artist. While in the field, Perryman prepared detailed sketches that help to bring the landscape of the period to life. In a letter to W.D. Alexander, Surveyor General, Emerson described his methods and wrote that he took readings off of:

...every visible hill, cape, bay, or point of interest in the district, recording its local name, and the name of the *Ahupuaa* in which it is situated. Every item of local historical, mythological or geological interest has been carefully sought & noted. Perryman has embellished the pages of the field book with twenty four neatly executed views & sketches from the various trig stations we have occupied... [Emerson to Alexander, May 21, 1882; HSA – DAGS 6, Box 1]

Discussing the field books, Emerson also wrote to Alexander, reporting “I must compliment my comrade, Perryman, for his very artistic sketches in the field book of the grand mountain scenery...” (HSA – HGS DAGS 6, Box 1; Apr. 5, 1882). Later he noted, “Perryman is just laying himself out in the matter of topography. His sketches deserve the highest praise...” (ibid. May 5, 1882). Field book sketches and the Register Maps that resulted from the fieldwork provide a glimpse of the country side of more than 100 years ago.

Field Notebooks and Correspondence from the Kekaha Region

The following documentation is excerpted from the field notebooks and field communications of J. S. Emerson. Emerson undertook his original surveys of lands in the Kekaha region in 1882-1883 (producing Register Maps No. 1278 and 1280). Subsequently, in 1888-1889, Emerson returned to Kekaha to survey out the lots to be developed into Homesteads for native residents of ‘O‘oma and vicinity (see above, The Government Homesteading Program in Kekaha). Through Emerson’s letters and notes taken while surveying, we learn about the people who lived on the land—some of them identified in preceding parts of the study—and about places on the landscape. The numbered sites and place names cited from the field books coincide with sketches prepared by Perryman, which are shown as figures in the current study.

*J.S. Emerson Field Notebook Vol. 111 Reg. No. 253
West Hawaii Primary Triangulation, Kona District
Akahipuu; May 27, 1882
(Figures 8 and 9)*

Site # and Comment:

- ...6 – Koanui’s frame house. E.G. In Honokohau – nui.
- 7 – Aimakapaa Cape. Extremity. In Honokohau-nui.
- 11 – Beniamina’s house (frame). N.G. In Aiopio. In Honokohau-nui.
- 12 – Beniamina’s house No. 2. E.G. In Honokohau-nui.
- 18 – Lae o Palaha. Between Kaloko and Honokohau-nui.
- 19 – Awanuka Bay (Haven of rest) Retreat during storms in this dist.
- 20 – Kealiihelepo’s (frame house). N.G. In Kaloko.

- 21 – Lae Maneo. From the “Maneo” fish in Kaloko.
- 22 – Kohanaiki Bay. By sea wall of fish pond.
- 23 – Kaloko-nui fish pond. Tang. S. end by Nuuanu’s grass house.
- 24 – Wall between fish pond of Kaloko nui and iki.
- 25 – Kaloko iki fish pond. Tang. N. extremity.
 Kaloko nui was originally a bay, shut off from the sea by a wall by Kamchameha 1st order.
- 26 – Kawaimaka’s frame house. In Kohanaiki.
- 27 – Lae o Wawahiwaa. Rock cape. In Kohanaiki.
- 28 – Keoki Mao’s grass house. In Ooma.
- 29 – Pahochoe hill. Between Ooma and Kalaoa 5.
- 30 – Lae o Keahole. Extremity. In Kalaoa 5.
- 31 – Lae o Kukaenui. Resting place for boats.
- 32 – Makolea Bay.
- 33 – Lae o Unualoha.
- 34 – Pohaku Pelekane.
- 35 – Lae o Kahekaiao. Kahe-ka-iao – place of the “iao” which abound there.
 [Notebook 253:33,35]
- ...Keahole Bay.
- Lae o Kalihi in Kalaoa 5.
- Wawaloli Bay in Kalaoa 5.
- Lae o Kekaiki.
- Limu Koko in Ooma 1.
- Lae o Puhili in Kohanaiki.
- Lae o Kealakehe in Kealakehe.
- Hueu’s frame house in Kalaoa 4, makai side of Gov’t. Road.
- Kuakahela’s frame house in Kalaoa 5.
- Protestant Church Steeple in Kalaoa 5.
- Kama’s frame house. N. gable in Ooma 1.

While taking sightings from Keāhole, Perryman prepared additional sketches of the landscape. One sketch on page 69 of the field book (Figure 10) depicts the view up the slope of Hualālai. Dated June 4, 1882, the sketch is of importance as it also depicts Kalaoa Village and church; the upper Government road; Kohanaiki Village; and two trails to the coast, one trail to Honokōhau, and the other near the Kaloko-Kohanaiki boundary. Use of these trails continued through the 1950s.

The other sketch on page 73 of the field book (dated June 8, 1882) depicts the coastline south from Keāhole, to an area beyond Keauhou (Figure 11). Of interest, we see only the near-shore "Trail" in the foreground, with no trail on the *kula* lands. Then a short distance south, a house is depicted on the shore, in the 'O'oma vicinity (identified as the house of Kama or Keoki Mao on Emerson's Register Maps). And a little further beyond (south) the house, two trails are indicated—presumably the *Alanui Aupuni* on the *kula* lands to 'O'oma, and the near shore trail, seen coming in from Honokōhau.

While surveying the uplands on Hualālai in August 1882, Perryman drew a sketch of the Keāhole-Honokōhauiki coastal lands. This sketch (Figure 12) from field Book No. 254 shows the reverse view of Figure 12. Noting again, that the only trail given at that time, was the near shore trail, running out of Honokōhau-Kaloko, Kohanaiki, 'O'oma and on to Keāhole.

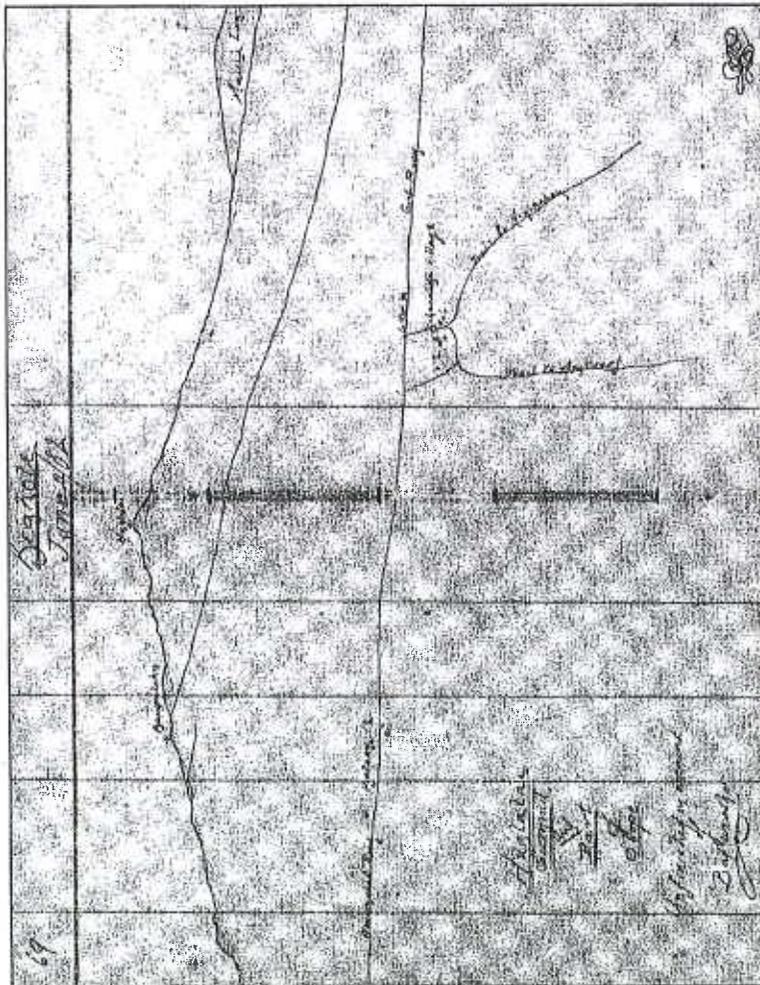


Figure 10. J. S. Emerson, field notebook map, Book 253:69 (State Survey Division).

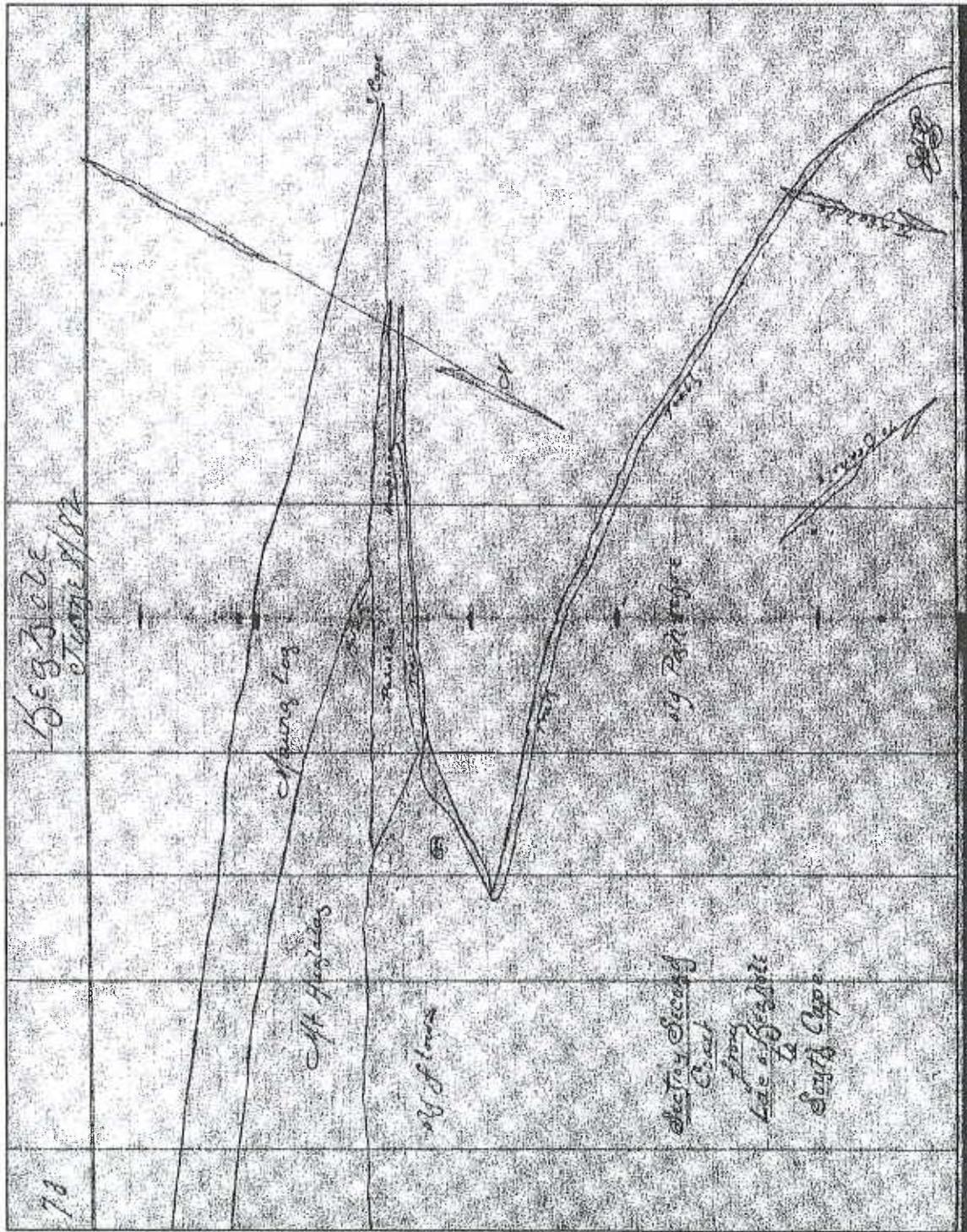


Figure 11. J. S. Emerson, field notebook map, Book 253:73 (State Survey Division).

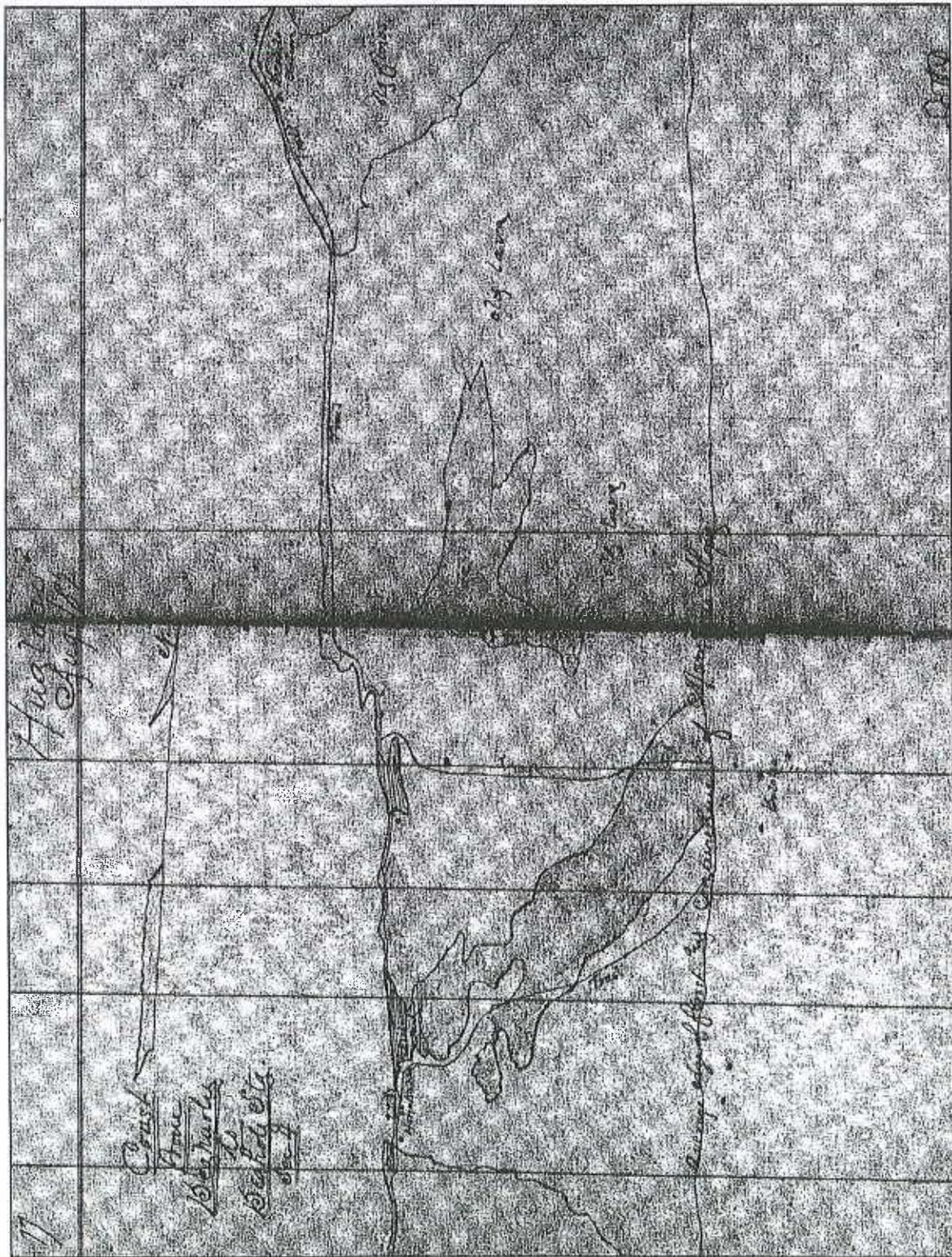


Figure 12. J. S. Emerson, field notebook map, Book 254:77 (State Survey Division).

While surveying the 'O'oma and vicinity homestead lots in 1888-1889, Emerson camped near Kama's house in 'O'oma 1st. The following communications were sent by Emerson to W.D. Alexander, and tell us more about the people of the land, their beliefs, and commentary on then current events in the Kingdom. Of interest, we also find that J.W.H. Isaac Kihe, whose writing of traditions, and as a representative of the native families in the land application process—which have been cited extensively in this study—is also mentioned in Emerson's narratives.

(Underlining, italics and brackets are inserted to draw attention to certain passages.)

April 8, 1888

...Our tent is pitched in Ooma on the mauka Govt. road at a convenient distance from Kama's fine cistern which supplies us with the water we need. The pasturage is excellent and fire wood abundant. As I write 4:45 P.M. the thermometer is 71°, barometer 28.78. The entire sky is overcast with black storm clouds over the mountains. The rainy season comes late to Kona this year and has apparently just begun. We have had about three soaking rains with a good deal of cloud & drizzle. We are now having a gentle rain which gladdens the residents with water for their cisterns... We have set a large number of survey signals and identified many important corners of Gov't. lands etc. from Puhiapele on the boundary of Kaupulehu to the boundary line of Kaloko. The natives welcome us and do a great deal to help the work along. Tomorrow I expect to go to Kuili station with a transit and make a few observations & reset the old signal... The Kamaainas tell me that Awakee belongs to the Gov't. though I see it put down as LCA 10474 Namaau no Kekuanaoa.

They also tell me that the heirs of Kanaina estate still receive rent for the Ahupuaa of Kaulana, though I have recorded as follows in my book, Kaulana ½ Gov't. per civil Code 379, ½ J. Malo per Mahele Bk. Title not perfected; all Gov't. Please examine into the facts about Kaulana and instruct me as to what I shall do about it. Kealoha Hopulaau rents it and if it is Gov't. land the Gov't. should receive the rent or sell it off as homesteads. It is a desirable piece of land, a part of it at least... [HSA – HGS DAGS 6, Box 2]

April 17, 1888

...The work is being pushed rapidly and steadily forward. The natives render me most valuable assistance and find all the important corners for me as fast as I can locate them. It is hard getting around on account of the rocks & stones, to say nothing of trees etc., but there is a great deal of really fine land belonging to the Government, admirably adapted to coffee etc. The more I see of it the better it appears.

As to Kaulana, if I hear nothing to the contrary from you, I will leave it all as Gov't. land.

Mr. McGuire [sic] of Kohala, the representative for that district, proposes to settle in Kona. He has bought Grant 1590, Kauhine, in Ooma, Kalaoa etc. and wants the Gov't. to make good to him the amount taken from him by Grants 2972, Kaakau & Kama, and 3027, Hueu, which occupy portions of the same land granted to Kauhine. If his title is good, would it not be just to leave Kaakau & Kama as well as Hueu in possession of their lots where they have lived for over 20 years, and give McGuire an area in adjoining lands equal to that taken from him by these two grants.

It is said that Chas. Achi has written to the natives that Grant 1590, Kauhine, has been cancelled. Will you learn the true state of the case and be so kind as to inform me... [HSA – HGS DAGS 6, box 2 Jan.-Apr. 1888]

In his field book notes, on May 1st, 1888, Emerson noted that he had placed the “Pulehu” station on the “ground by ahu, about 4 feet makai of Kama's goat pen, on the iwi aina between Kalaoa 5 and Ooma 1...” (J.S. Emerson Field Book 291:83).

In the same field book on May 19th, 1888, while surveying the area near the boundary of 'O'oma 1st and 2nd, at the 325 foot elevation, Emerson cited off of a station named "Kahokukahi." The point is "on the entrance of the cave, Kahokukahi... The above is the vertical entrance of a famous ana kauhā, which extends for a long distance to the E. and to the W..." (J.S. Emerson Field Book 291:137). An "ana kauhā" would be a place, where during times of war, people could hide and fortify themselves. Emerson's description indicates that the cave runs some distance *mauka* and *makai* of "Kahokukahi."

On May 23, 1888, Emerson surveyed Pūhili, the boundary between Kohanaiki and 'O'oma 2nd. He observed, "Large [mark] on solid pahochoe, on bound. bet. Kohanaiki & Ooma, by the sea, near the end of a cape... Station mark, drill hole in stone, 9 ft. S. of the S. corner of an old "kahua hale" on white sand..." (J.S. Emerson Field Book 291:151).

Returning to his "old camp Ooma," in August 1888, Emerson submitted the following letter to Alexander:

August 25th, 1888

...I have to report that the very intricate and irregular remainder of Gov't. land situated in Kealakehe is cut up into homesteads, ready for the committee to estimate its values. The job has been made unusually long & tedious by the absurd arrangement of the old kuleanas scattered around at random. I have also run out the boundaries of Papaakoko, ready for fencing. Thursday P.M. I made my way through a heavy rain to this place and set up tent in the storm. It rained a good deal every day since and is raining now. In spite of the weather the work of cutting up Ooma 1st goes bravely on. I have a huge umbrella to camp under while it rains. I propose to finish up Ooma 1st & return to Honolulu by the next trip of the *Hall*.

Kailua beach is the great rendezvous for men & asses from all parts of the country when the steamer arrives from Honolulu. It has in consequence become the natural place to tell and hear gossip & news. Here, the sand-lot orator, mounted on a packing box, can address the largest crowd. T.N. Simeona, who stole the church money, keeps the pound and takes care of the court house wanting to make a speech, repaired to the beach last Wednesday morning and is reported to have made a windy harangue to the effect that the King was hewa and that the Ministers were pono! Up to that time he had always been the contemptible too of the King's party and was loud in his denunciation of the Government. I explain this change in his talk by his wish to retain his Gov't. billets & his desire to avoid arrest as a rebel.

A native man told me the other day (Wednesday) that the Cabinet was hewa in two things viz.

1st They taxed chickens, banana trees and many other things that had not been heretofore taxed.

2nd They arrested and sent to Molokai many who were not lepers. For these reasons many justified Wilcox for trying to out the ministers.

There is a sturdy old native living at Kaloko named Kealiihelepo, whom I greatly respect. Said he to me "When King Kalakaua returned from his foreign trip he made a speech at Kailua and said that 'in foreign lands the foreign God was losing his power. His former worshippers were deserting him. That the old Hawaiian Gods were still mana and then he would worship.'" But said Kealiihelepo "The King was mistaken. Our old Gods were once mighty, but the coming of the foreigner with his Gods has robbed them of their strength. Therefore the King has made the mistake to oppose the God who is now in power, and Jehovah is opposing him. Hence the King's pilikia."

You are entirely justified in calling Kona "that heathen district." [HSA – HGS DAGS 6, box 2 Jan.-Apr. 1888]

On October 14th 1888, Emerson wrote to Alexander, briefing him on conversations he was having with J.W.H. Isaac Kihe, his “encyclopedia,” “the son of a famous sorcerer.” Later, Emerson used many of the notes taken during his conversations with Kihe, to develop his paper on Hawaiian religion (Emerson 1892). J.W.H. Isaac Kihe, was the son of Kihe, who was the son of Kuapahoa, of Kaloko (notes of J.S. Emerson, September 25, 1915; in collection of the Hawaiian Historical Society). While at ‘O‘oma, Kihe described the various nature forms taken by the deceased, and their role in the spiritual practices. On October 14th Kihe named for him some of the gods called upon by those who practiced the Kahuna Kuni sorcery.

Ooma

October 14, 1888

J.S. Emerson; to W.D. Alexander:

...I have just been having a chat with a son of a famous sorcerer, with the following for a summary of what he said.

There are four gods worshipped by murders and sorcerers viz:

- (1). Kui-a-Lua, the god of the Lua, Mokomoko, Haihai and other forms of violence.
- (2). Uli, the god of the Anaana, Kuni, Hoopiopio and Lawe Maunu.
- (3). Kalaipahoa, god of the Hoounauna, Hookomokomo and Hooleilei.
- (4). Hiiaka-i-ka-poli-o-Pele, the goddess of the Poi uhane, Apo leo, Pahiuhiu and Hoonoho uhane... [J.S. Emerson, in collection of the Hawaiian Historical Society]

Trails and Roads of Kekaha (Governmental Communications)

Alahele (trails and byways) and *alaloa* (regional thoroughfares) are an integral part of the cultural landscape of Hawai‘i. The *alahele* provided access for local and regional travel, subsistence activities, cultural and religious purposes, and for communication between extended families and communities. Trails were, and still remain important features of the cultural landscape.

Traditional and historical accounts (cited in this study) describe at least two traditional trails that were of regional importance which pass through the lands of ‘O‘oma. One trail is the *alaloa*—parts of which were modified in the 1840s and later, into what is now called the *Alanui Aupuni* (Government Road) or Māmalahoa Trail or King’s Highway—that crosses the *makai* (near shore) lands, linking royal centers, coastal communities, and resources together. The other major thoroughfare of this region is “*Kealaehu*” (The path of Ehu), which passes through the uplands, generally a little above the *mauka* Government Road or old Māmalahoa Highway, out to the ‘Akāhipu‘u vicinity, and then cuts down to Kīhōlo in Pu‘u Wa‘awa‘a. From Kīhōlo, the *makai alaloa* and *Kealaehu* join together as the *Alanui Aupuni*, and into Kohala, passing through Kawaihae and beyond. The *mauka* route provided travelers with a zone for cooler traveling, and access to inland communities and resources. It also allowed for more direct travel between the extremities of North and South Kona (cf. Malo 1951; I‘i 1959; Kamakau 1961; Ellis 1963; and *Māhele* and Boundary Commission Testimonies).

In addition to the *alahele* and *alaloa*, running laterally with the shore, there are another set of trails that run from the shore to the uplands. By nature of traditional land use and residency practices, every *ahupua‘a* also included one or more *mauka-makai* trail. In native terminology, these trails were generally known as—*ala pi‘i uka* or *ala pi‘i mauna* (trails that ascend to the uplands or mountain). Some of these trails are described in native accounts and oral history interviews cited in this study.

Along the trails of the Kekaha region of which ‘O‘oma is a part, are found a wide variety of cultural resources, including, but not limited to residences (both permanent and temporary), enclosures and exclosures, wall alignments, agricultural complexes, resting places, resource collection sites, ceremonial features, *ilina* (burial sites), petroglyphs, subsidiary trails, and other sites of significance to the families who once lived in the vicinity of the trails. The trails themselves also exhibit a variety of construction methods, generally determined

by the environmental zone and natural topography of the land. "Ancient" trail construction methods included the making of worn paths on *pāhoehoe* or 'a'ā lava surfaces, curbstone and coral-cobble lined trails, or cobble stepping stone pavements, and trails across sandy shores and dry rocky soils.

Following the early nineteenth century, western contact brought about changes in the methods of travel (horses and other hoofed animals were introduced). By the mid-nineteenth century, wheeled carts were also being used on some of the trails. In the Kona region portions of both near shore and upland *ala hele-ala loa* were realigned (straightened out), widened, and smoothed over, while other sections were simply abandoned for newer more direct routes. In establishing modified trail—and early road-systems—portions of the routes were moved far enough inland so as to make a straight route, thus, taking travel away from the shoreline.

It was not until 1847, that detailed communications regarding road construction on Hawai'i began to be written and preserved. It was also at that time that the ancient trail system began to be modified and the alignments became a part of a system of "roads" called the "*Alanui Aupuni*" or Government Roads. Work on the roads was funded in part by government appropriations, and through the labor or financial contributions of area residents and prisoners working off penalties (see communications below). Where the *Alanui Aupuni* crosses the lands of 'O'oma, the alignment includes several construction methods, such as being lined with curbstones; elevated; and with stone filled "bridges" in areas that level out the contour of the roadway.

The following letters provide readers with a historical overview of the *Alanui Aupuni*, and travel through 'O'oma and the Kekaha region. Of particular interest to the lands of 'O'oma, are those communications addressing the lower Government Road which passes through the proposed development area.

(Underlining, italics, and square brackets have been added.)

June 26, 1847

George L. Kapeau to Keoni Ana

I have received your instructions, that I should explain to you about the *alaloo* (roadways), *alahaka* (bridges), lighthouses, markets, and animal pounds. I have not yet done all of these things. I have thought about where the *alanui heleloa* (highways) should be made, from Kailua to Kaawaloa and from Kailua to Ooma, where our King was cared for ^[7], and then afterwards around the island. It will be a thing of great value, for the roads to be completed. Please instruct me which is the proper thing for me to do about the *alaloo*, *alahaka*, and the laying out of the *alaloo*... [HSA – Interior Department Misc., Box 142; Kepā Maly, translator)

August 13, 1847

*Governor of Hawaii, George L. Kapeau; to
Premier and Minister of Interior, Keoni Ana
Aloha oe e ka mea Hanohano –*

I have a few questions which I wish to ask you. Will the police officers be required to pay, when they do not attend the Tuesday (*Poalua*) labor days? How about parents who have several children? What about school teachers and school agents? Are they not required to work like all other people when there is Government work on the roads and highways?

I believe that school agents, school teachers and parents who have several children, should only go and work on the weeks of the public, and not on *thekonohiki* days...

...The roads from Kailua and down the pali of Kealakekua, and from Kailua to Honokohau, Kaloko, Ooma, at the places that were told our King, and from thence to Kaeleluluhulu [at Kaulana in Kekaha], are now being surveyed. When I find a suitable day, I will go to

⁷ For the first five years of his life (until ca. 1818), Kaulikeaouli was raised at 'O'oma, by Ka-iki-o-'ewa and Keawe-amahi mā (see Kamakau 1960; and this study).

Napoopoo immediately, to confer with the old timers of that place, in order to decide upon the proper place to build the highway from Napoopoo to Honaunau, and Kauhako, and thence continue on to meet the road from Kau. The road is close to the shore of Kapalilua...

The width of the highways around Hawaii, is only one fathom, but, where it is suitable to widen where there is plenty of dirt, two fathoms and over would be all right... If the roads are put into proper condition, there are a lot of places for the strangers to visit when they come here. The Kilauea volcano, and the mountains of Maunaloa, Maunakea, Hualalai.

There is only one trouble to prevent the building of a highway all around, it is the steep gulches at Waipio and Pololu, but this place can be left to the very last... [HSA – Roads, Hawaii]

March 29, 1848

Governor Kapeau; to Minister of the Interior, Keoni Ana:

[Acknowledging receipt of communication and answering questions regarding construction methods used in building the roads.]

...I do not know just what amount of work has been done, but, I can only let you know what has come under my notice.

The highway has been laid from Kailua to Kaloko, and running to the North West, about four miles long, but it is not completely finished with dirt. The place laid with dirt and in good condition is only 310 fathoms.

The highway from Kealakekua to Honaunau has been laid, but is not all finished, and are only small sections... [HSA – Roads, Hawaii]

July 9, 1873

R.A. Lyman; to

E.O. Hall, Minister of the Interior.

Notifies Minister that *the road from Kiholo to Kailua needs repairing.* [HSA – Interior Department – Land Files]

August 14, 1873

R.A. Lyman; to

E.O. Hall, Minister of the Interior:

I have just reached here [Kawaihae] from Kona. I have seen most of the roads in N. Kona, and they are being improved near where the people live. If there is any money to be expended on the roads in N. Kona, I would say that the place where it is most needed is from Kiholo to Makalawena, or the Notch on Hualalai.

This is the main road around the island and is in very bad condition. Hardly anyone lives there, and there are several miles of road across the lava there, that can only be worked by hiring men to do it. There is also a road across a strip of Aa a mile & a half or 2 in length in the south end of S. Kohala next to the boundary of N. Kona, that needs working, and then the road from here [Kawaihae] to Kona will be quite passable... [HSA – Roads, Hawaii]

November 4, 1880

J.W. Smith, Road Supervisor, North Kona; to

A.P. Carter, Minister of the Interior:

...Heretofore I have been paying one dollar per day, but few natives will work for that, they want \$1.50 per day. Thus far I have refused to pay more than \$1.00 and have been getting men for that sum.

The most urgent repairs are needed on the main road from Kaupulehu to Kiholo, and north of Kiholo to the Kohala boundary, a distance of about 20 miles... [HSA – Roads, Hawaii]

Kailua Nov. 19th, 1880

Geo. McDougall; to

A.P. Carter, Minister of the Interior —

...I noticed among the appropriation passed by the last Legislature, an item of \$5000 for Roads in North Kona Hawaii — as I am very much interested about roads in this neighbourhood, I take the liberty to express my opinions what is wanted to put the roads in good repair and give the most satisfaction to all concerned.

The Road from Kailua going north for about eight miles to where it joins the upper Road, has never been made, it is only a mule track winding through the lava. It could cost to make it a good cart road, fully two thousand dollars. And from Kailua to where it joins the South Kona road, about 12 miles was made by Gov. Adams, and is in pretty much the same state as he left it, only a little worse of the ware of 20 years or more, it could cost to make it in good repair about 15 hundred dollars. Then we could have 20 miles of good road... [HSA – Interior Department Letters]

March 21st, 1885

C.N. Arnold, Road Superintendent-in-Chief, Hawaii; to

Charles Gulick, Minister of Interior:

...In accordance with your instructions I beg to hand you the following list of names as being those I would select for Supervisors in the different Road Districts under my charge:

... Judge J.K. Hoapili, North Kona District...

Hoping these parties may meet with your approval... [HSA– Roads, Hawaii]

March 1886

Petition to Charles Gulick, Minister of the Interior:

[Signed by 53 residents of North Kona, asking that the appropriated funds be expended for the Kailua-Kohanaiki Road]:

We the people whose names are below, subjects of the King, residing in North Kona, Island of Hawaii:

The funds have been appropriated by the Legislature for the opening of the road from Kailua to Kohanaiki, therefore, we humbly request that the road be made there. The length of this road being thought of is about five miles more or less. The road that is there at the present time is not fit for either man nor beast.

Your people have confidence that as so explained, you will kindly grant our request, and end this trouble in our District...

[those signing included names of individuals known to have ties to the 'O'oma vicinity]:

...J. Kamaka, Kuakahela, Kahulanui, & Palakiko... [HSA – Roads Hawaii; Maly, translator]

March 9th, 1887

C.N. Arnold, Road Superintendent-in-Chief, Hawaii; to

Chas. Gulick, Minister of the Interior:

[Arnold provides documentation of the early native trail from Kailua to the upper Kohanaiki region, and its' ongoing use at the time. He also notes that McDougall (resident at Honokōhau) and others are presently in the business of dairy ranching]:

...The enclosed petition [cited above] has just come to hand from North Kona. The petitioners are mistaken when they say that any special appropriation has been made for this road as there has never been a Government road in this part of the District. There is however an old native trail which has always been used as a short cut, from the lower part of the district between Keahou [sic] and Kailua, by persons who were traveling to Kawaihae and Waimea. The opening of a good road here would be a great convenience to the traveling public and also a great accommodation to a great many people who live on, or nearly on the line of it. I may mention among the number, Messrs. McDougall and Clark who are engaged in dairy ranching near the head of the proposed line. I may also mention that I, with Mr. Smith, made a preliminary survey of it, at the request of His Majesty the King, who is also interested in the opening of this road, as it opens up all of His Kailua lands for settlement. I regard the road as necessary for the above reasons.

From the preliminary survey made, I estimate that a wagon road 12 feet wide will cost from Kailua to the *mauka* Govt. road at Kohanaiki \$6000. The length of the road is 5 ¼ miles. The elevation of highest point (*mauka* Road) is 1600 feet above tide at Kailua. Mr. Smith Supt. of Public Works has all the notes of the survey, and can give you full information in regard to this matter... [HSA – Roads, Hawaii]

July 14th, 1887

C.N. Arnold, Road Superintendent-in-Chief, Hawaii; to
L.A. Thurston, Minister of the Interior:

...In obedience to your request I beg to hand you the following list of the District Supervisors under my jurisdiction:

...North Kona -- Hon. J.K. Nahale; Native... [HSA – Roads Hawaii]

March 8, 1888

J. Kaelemkule; Supervisor, North Kona Road Board; to
L.A. Thurston, Minister of the Interior.

[Ka'elemakule provides Thurston with an overview of work on the roads of North Kona, and describes the Government roads (*Ala nui Aupuni* or *Ala loa*) which pass through the Kekaha region]:

The road that runs from Kailua to Kohanaiki, on the north of Kailua, perhaps 6 miles. It is covered with aa stone, and is perhaps one of the worst roads here. The Road Board of North Kona has appropriated \$200 for work in the worst areas, and that work has been undertaken and the road improved. The work continues at this time. This is one of the important roads of this district, and it is one of the first roads that should be worked on.

The government road or ala loa from upland Kainaliu (that is the boundary between this district of South Kona) [Kealahu], runs straight down to Kiholo and reaches the boundary of the district adjoining South Kohala, its length is 20 and 30 miles. With a troubled heart I explain to your Excellency that from the place called Kapalaoa next to South Kohala until Kiholo – this is a very bad section of about 8 miles; This place is always damaged by the animals of the people who travel along this road. The pahoe hoe to the north of Kiholo called Ke A. hou, is a place that it is justified to work quickly without waiting. Schedule A, attached, will tell you what is proposed to care for these bad places...

Schedule A: [Appropriations needed]

The road from Kailua to Kohanaiki, and then joining with the inland Government Road – \$500.

The upland Road from Kainaliu to the boundary adjoining S. Kohala – \$1,500.00. [HSA – Roads Hawaii; Kepā Maly, translator]

September 30, 1889

Thos. Aiu, Secretary, North Kona Road Board (for J. Kaelemakule); to L.A. Thurston, Minister of the Interior.

[Provides Thurston with an overview of work on the roads of North Kona, and identifies individuals who are responsible for road maintenance (cantoniars) in various portions of the district; several of the individuals named were also old residents and applicants for Homestead lots. Of interest, Kaelemakule's report indicates that maintenance of the Alanui Aupuni which crossed into the kula lands of 'O'oma, had not been assigned to anyone. (see report of Dec. 22, 1890)]:

1. In that section of the road which proceeds from Kailua near the shore to Kohanaiki, Mano is the cantonier.
2. That section of the road from Kukuioohiwai to Keahuolono, Paiwa is the cantonier...
3. That section of road from Kailua to the shore of Honokohau, Keaweiwi is the cantonier ...
4. That section of road from Kukuioohiwai to Lanihau along the upland road, Isaac Kihe is the caretaker...

The work done along these sections is the cutting of brush – guava, lantana and such – which trouble the road, and the removal of bothersome stones... [HSA – Roads Hawaii; Kepā Maly, translator]

December 22, 1890

J. Kaelemakule; Supervisor, North Kona Road Board; to C.N. Spencer, Minister of the Interior

[Reports on the cantoniars assigned to road work in various sections of North Kona. As in 1889, apparently no one was assigned to the lower Alanui Aupuni through the 'O'oma kula lands. Though Kaelemakule did include the road section on the land, extending through Kalaoa, on his attached diagram]:

...I forward to you the list of names of the cantoniars who have been hired to work on the roads of this district, totaling 15 sections; showing the alignment of the road and the length of each of the sections. The monthly pay is \$4.00 per month, at one day of work each week. The board wanted to increase it to two days a week, but if that was done, there would not have been enough money as our road tax is only \$700.00 for this district... You will receive here the diagram of the roads of North Kona. [HSA – Roads Hawaii; Kepā Maly, translator] (Figure 13)

Twentieth Century Travel in 'O'oma and Neighboring lands of Kekaha

Kama'āina who have participated in oral history interviews, describe on-going travel between the uplands and coastal lands of 'O'oma and other *ahupua'a* in Kekaha. The primary method of travel between 1900 and 1947, was by foot or on horse or donkey, and those who traveled the land, were generally residents of the 'O'oma, Kalaoa, Kohanaiki Homesteads and other lands in the immediate vicinity. After World War II, retired military vehicles became available to the public, after that time, the *Alanui Aupuni* (Figure 14) and some of the smaller trails along the shore were modified for vehicular traffic.

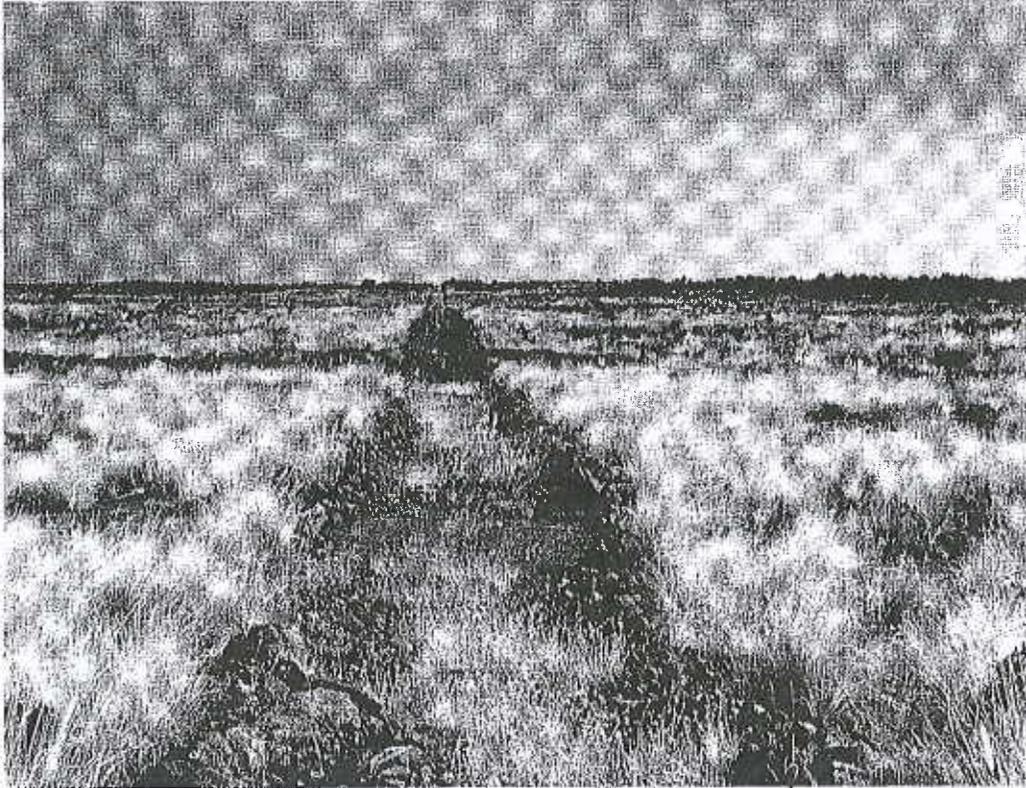


Figure 14. Portion of the *Alanui Aupuni* crossing the *kula kai* lands of 'O'oma 2nd, view to Kohanaiki.

The primary routes of travel through the 1960s, descended from upland Kohanaiki and Kaloko, or came out of Kailua. In the 1950s, Hu'ehu'e Ranch bulldozed a jeep road to the shore at Kaloko. The ranch, and some individuals who went to the shore either as a part of their ranch duties, or for leisure fishing along the coast, used this jeep road. The *Alanui Aupuni* was modified from Kailua, to at least as far as Honokōhau and Kaloko, and remained in use through the 1970s. It was not until the Queen Ka'ahumanu Highway was opened (ca. 1973) that travel across the *kula kai* (shoreward plains) of 'O'oma was once again made possible for the general public.

ORAL HISTORY INTERVIEWS

Information is presented from six oral history interviews that had been previously conducted by Kepā Maly. One of these interviews was conducted in 1996 and the others between 2000 and 2003. The present author conducted two additional interviews in 2005. Transcripts of the interview are available upon request and are archived with Rechtman Consulting, LLC.

Interview Method

The oral-historical information was collected using a standard interview format that included the following process. Personal and demographic information about each interviewee was obtained, as well as the details about how she or he came to know the lands of 'O'oma and the larger Kekaha region. Information was obtained from the interviewee concerning the time and/or place of specific events they recalled. The formal interviews were recorded, transcribed, and returned to the interviewees for review, correction, and release-approval. Copies of the final interview transcripts, along with the historical background and summary information were provided to each of the interviewees or their families. The informal interviews were conducted both in person on the land and over the telephone.

All of the interviewees had genealogical ties to early residents of lands within or adjoining the study area. Each is recognized within the community as being someone possessing specific knowledge of lore or historical wisdom pertaining to the lands, families, practices, and land use and subsistence activities in the region, and the older the informant, the greater the likelihood that the individual had personal communications or first-hand experiences with even older, now deceased Hawaiians and area residents.

Readers are asked to keep in mind that while this component of the study records a depth of cultural and historical knowledge of 'O'oma and the Kekaha region, by nature, the documentation is incomplete. In the process of conducting oral history interviews, it is impossible to record all the knowledge or information that the interviewees possess. Thus, the records provide only glimpses into the stories being told, and of the lives of the interview participants. Every effort has been made to accurately relay the recollections, thoughts and recommendations of the people who so openly shared their personal histories.

Interview Participants

All of the individuals that participated in the oral history interviews cited in this study are directly descended from traditional residents of 'O'oma and adjoining lands, and many of the personal recollections date back to the 1920s. The interviewees also benefited from the words of their own elders and extended family members, whose personal recollections dated back to the middle 1800s. Following is a summary of the interviewees

Valentine K. Ako is of Hawaiian ancestry and was born at Hōlualoa in 1926. He currently resides on Kaua'i. Interviewed in 1996, *kupuna* Ako visited families and fished at 'O'oma and neighboring lands of Kekaha (ca. 1930s-1940s). He is well known for his knowledge of Hawaiian fishing customs and fisheries, and is a member of several cultural committees.

George Kinoulu Kahananui Sr. is of Hawaiian ancestry and was born at Hōlualoa in 1925. Raised from infancy at 'O'oma 2nd, he continues to reside on old family land in 'O'oma. Uncle Kino regularly traveled the uplands and coastal lands of 'O'oma and Kekaha, learned of traditions and practices; and later managed the lands under Hu'ehu'e Ranch. He continues to fish on the coastal lands of 'O'oma and Kohanaiki. Uncle Kino is well respected and known for his knowledge of the land, and is a valued resource on a number of cultural committees.

Elizabeth Maluīhi Ako Lee is of Hawaiian ancestry and is the sister of Uncle Kinoulu. Auntie Elizabeth was born in 1929 and was raised by her *hanai* family, Kahananui, in upland 'O'oma. As a child she walked the upland trails and cultivated sweet potatoes on her family land in 'O'oma 2nd Ahupua'a *mauka* of the current project area. She is a well-respected *lauhala* weaver and retains valuable cultural knowledge.

Samuel Keanaaina is of Hawaiian ancestry and was born at Kolaoa in 1926, where he remains resident. Descendant of families with generational ties to various lands of the Kekaha region, including 'O'oma. *Kupuna* Keanaaina regularly traveled the uplands and coastal lands of 'O'oma and Kekaha. He learned of traditions and practices of the families of the land, and was a fisherman in his youth.

Malaea Agnes Keanaaina-Tolentino (with daughter Cynthia Torres) is of Hawaiian ancestry and was born at Kolaoa in 1928. She currently resides in Kealakehe and is the Sister of Samuel Keanaaina, who shared in similar experiences as her brother. She was raised by her grandparents in Honokōhau Nui and as a youth she regularly traveled between the uplands and coastal lands of Honokōhau-Kaloko, Kalaoa-'O'oma and Kohanaiki. *Kupuna* Malaea has served on several cultural committees and is known for her knowledge of the land.

Ruby Keanaaina McDonald was born on O'ahu in 1942 and moved to Kona when she was six years old. *Kūpuna* Keanaaina and Malaea are her uncle and auntie. Ruby grew up in Kona and spent time with her *kūpuna* listening to their stories and documenting the family geneology. She currently works as the Office of Hawaiian Affairs liaison for west Hawai'i. On behalf of her family, Ruby was consulted with respect to the mitigation plan prepared for the current development project.

Peter Keka is of Hawaiian ancestry and was born at Waiki'i in 1940. His family resided for years in the Kalaoa-Kohanaiki-Honokōhau vicinity, and he currently resides in Kohanaiki. Peter traveled the Kekaha region

and fished at 'O'oma and neighboring lands. He is currently employed by the National Park Service and is responsible for the restoration of the Kaloko-Honokōhau fishponds and other cultural sites in the park

Peter Keikua'ana Park is of Hawaiian ancestry and was born at 'O'oma in 1918. He currently resides in Kalaoa 5th. Born and raised in the upland section of 'O'oma 2nd he regularly traveled with his grandparents (adoptive parents) to the coastal lands of 'O'oma. Kupuna Park describes life on the lands and identifies elder families of 'O'oma and neighboring lands. He also shares important documentation pertaining to traditions associated with fishing and cultivation of the land. Kupuna Park's elders were noted *lauhala* weavers, a craft that was passed on to him and his sisters, and was an activity that sustained their family. They collected *lauhala* from 'Ohikapua on the *kula* lands of Kalaoa 5th. Kupuna Park is a noted weaver and resource for several cultural programs.

Summary of Oral-Historical Information

Elder *kama'āina* of the Kekaha region, tell much the same story as that described in the communications from the period of homestead development, and in the accounts given by J. Puuokupa in 1875 and J.W.H. Isaac Kihe in 1924. By the late 1800s, only a few permanent residence remained along the 'O'oma (and Kekaha) coastline. Primary residences were in the uplands, in the vicinity of the old Māmalahoa Highway. In that region, people were able to cultivate a wide range of crops—both native staples and new introductions—with which to sustain themselves, and in some case even as cash crops.

By the middle to late 1800s, the *kula* lands, from around the 900-foot elevation to shore, were primarily used for goat, cattle, and donkey pasturage. The families of the uplands regularly traveled to the coast via trails. This was usually done to go fishing, or to round up cattle, goats, or donkeys. During periods of extreme dry weather, when water resources dried up, the families relied on the brackish water ponds in the near-shore lands. In 'O'oma, near Wawaloli, the area marked on J.S. Emerson's Register Maps 1280 (see Figure 7), as Kama's or Keoki Mao's house, families still took shelter, and drank the water from the spring, through the 1940s. Such was the case at various locations of the coast, between Kohanaiki, 'O'oma, Kalaoa, Ho'onā, Kaulana, and lands further north to Kapalaoa.

Near the coastline several sites were described and, during field visits, pointed out by *kūpuna* Peter Kaikuaana Park and George Kinoulu Kahananui. These are also described by other elder *kama'āina*. The features included old goat and cattle corrals, old *kahua hale* (house sites), shelters, springs, burial sites, and fishing resources. Except for the old *mauka/makai* trail, the *Alanui Aupuni* (*makai* Government Road – “King's Trail”), and walls, few other features were known by the interviewees on the lower *kula* lands (the area of the current proposed development). This is not surprising as the interviewees observed, when they were young, they were instructed not to wander around, and *maha'oi* (poke their noses) into caves and such. Their primary interest while traveling *makai* was to get to the fishing ground, and in reverse, to get back home. In the region of the lower homestead lots (the area of the current project) and above, interviewees have described the occurrence of caves, walls, and various features, including burials. Occasionally, when working the range, rounding up cattle, *huaka'i pō* or night marchers have been heard, or even seen. The explanation being that the people of old, who once lived on the land, were traveling the trails in one direction or the other to attend to some ceremony or to venture out on fishing journeys, or other such activities. Auntie Elizabeth Maluhi Ako Lee also described her families agricultural practices in the *mauka* portion of 'O'oma 2nd Ahupua'a, and her father's use of the *mauka/makai* trails to access the shore for fishing.

When asked about proposed development on the 'O'oma lands and in other locations of Kekaha, the interviewees all speak with hesitancy. It is difficult for them to see the landscape that they have known all their lives, and for which traditions were handed down, change. None of the interviewees shared any specific knowledge about traditional cultural resources and associated practices within the boundaries of the current project area. All interviewees believe that *ilina* (burial sites) should be preserved in place; likewise, should any *heiau*, or other important sites be located, they should be protected. Whenever possible all sites, such as house sites, petroglyphs, walls, and other features should be protected.

IDENTIFICATION AND MITIGATION OF POTENTIAL CULTURAL IMPACTS

The OEQC guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The guidelines also identify the types of potential cultural resources, associated with cultural practices and beliefs that are subject to assessment. Essentially these are nature features of the landscape and historic sites, including traditional cultural properties. In the Hawai'i Revised Statutes—Chapter 6E a definition of traditional cultural property is provided.

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

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

It is however with the definition of “Property” wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often times cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. However offensive the concept of boundaries may be, it is nonetheless the regulatory benchmark for defining and assessing traditional cultural properties. As the OEQC guidelines do not contain criteria for assessing the significance for traditional cultural properties, this study will adopt the state criteria for evaluating the significance of historic properties, of which traditional cultural properties are a subset. To be significant the potential historic property or traditional cultural property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- A Be associated with events that have made an important contribution to the broad patterns of our history;
- B Be associated with the lives of persons important in our past;
- C Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- D Have yielded, or is likely to yield, information important for research on prehistory or history;
- E Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

While it is the practice of the DLNR-SHPD to consider most historic properties significant under Criterion D at a minimum, it is clear that traditional cultural properties by definition would also be significant under

Criterion E. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa'akai O Ka'āina* v Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical, or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights will be affected or impaired; and third, specify any mitigative actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

As a result of the prior archaeological study (Haun and Henry 2000) within the project area nine archaeological sites were identified that had the potential to be impacted by the proposed development activities. These impacts could be direct, as the result of development activities; or indirect, resulting from increased access and site visitation traffic. Four of these sites have already been subject to data recovery (Rechtman and Clark 2004), and therefore no longer have the potential to be impacted. The five remaining sites (SIHP Sites 5747 [portion], 23413, 23414, 23417, and 23423) are being preserved in adherence to a DLNR-SHPD approved preservation plan (Rechtman and Clark 2004). All of these sites were determined to be significant under Criterion D and Sites 23413, 23414, and 23417 were determined to be additionally significant under Criterion C. Site 23423 was determined to be significant on Criteria C, D, and E.

To mitigate the potential impacts to these archaeological sites, an archaeological sites preservation plan as part of the overall mitigation plan (Rechtman and Clark 2004) has been submitted to and approved by DLNR-SHPD and development activities will not commence until the site protection measures and stewardship aspects of the preservation plan are implemented (see Appendix A).

None of these sites are considered traditional cultural properties and there were no specific natural or cultural resources or cultural beliefs and practices identified relative to the land within the proposed development area.

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**NOTE TO READERS OF ENVIRONMENTAL
ASSESSMENT (E.A.):**

**FOR APPENDIX A REFERENCED IN THIS
CULTURAL IMPACT ASSESSMENT**

PLEASE SEE APPENDIX 3 OF E.A.

ENVIRONMENTAL ASSESSMENT
LOKAHI KA‘U AFFORDABLE APARTMENTS

TMK: (3rd) 7-3-010:003
North Kona District, Hawai‘i Island, State of Hawai‘i

APPENDIX 5
Traffic Impact Assessment Report

**LOKAHI KA'U SUBDIVISION
KAILUA-KONA, HAWAII
REVISION TO TRAFFIC IMPACT ANALYSIS
OF DECEMBER, 2005
TMK (3)7-03-010:003**

JANUARY, 2007

**PREPARED FOR:
SEASCAPE DEVELOPMENT LLC**



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APPENDIX A Location Map, and Tax Map Key Map

APPENDIX B Level of Service Criteria

APPENDIX C Level of Service-- Queen Ka'ahumanu Highway & Ka'iminani Street
(Computer Printout)

- Existing Conditions AM and PM Peak Traffic
- Future Conditions AM and PM Peak Traffic

APPENDIX D Level of Service--Ka'iminani Street & Kakahiaka Street (Computer Printout)

- Existing Conditions AM and PM Peak Traffic
- Future Conditions AM and PM Peak Traffic

APPENDIX E Level of Service--Ka'iminani Street and Mamalahoa Highway (Computer Printout)

- Existing Conditions AM and PM Peak Traffic
- Future Conditions AM and PM Peak Traffic

APPENDIX F Level of Service--Ka'iminani Street and Anekeohokalole Road (Computer Printout)

- Future Conditions AM and PM Peak Traffic

APPENDIX G Traffic Movement Diagrams– Signalized

Queen Ka’ahumanu Highway and Ka’iminani Street

- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic

APPENDIX H Traffic Movement Diagrams– Unsignalized

Mamalaho Highway and Ka’iminani Street

- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic

APPENDIX I Traffic Movement Diagrams–Ka’iminani Street and Kahakiaka Street

- Existing Conditions AM & PM Peak Traffic
- Future Conditions AM & PM Peak Traffic

APPENDIX J Traffic Movement Diagrams–Ka’iminani Street and Anekeohokalole Road

- Future Conditions AM & PM Peak Traffic

**NOTE: TIAR REVISED IN NOVEMBER 2007
PAGES THAT FOLLOW ARE FROM REVISION**

**PAGES MAY NOT REFLECT TABLE OF CONTENTS ABOVE;
APPENDICES NOT INCLUDED IN THIS VERSION**

**LOKAHI KA'U SUBDIVISION
KAILUA-KONA, HAWAII
REVISION TO TRAFFIC IMPACT ANALYSIS OF DECEMBER, 2005
TMK (3)7-3-010:003**

I. PROJECT DESCRIPTION

Seascape Development wishes to revise the land use for the 50 acres to the south of the present project, TMK (3)7-3-010:003 known as Lokahi Ka'u. This latest change is to be structured as follows:

Lot #1	Rental Units 108 (1-bedroom) 108 (2-bedroom) 90 (Studio Apartment)
Lot #2	108 Condominium Units
Lots #3 & #4	Will not be developed at this time

Initially, the project will be served by Kakahiaka Street. At some future date, it will be served by the makai connector road.

II. EXISTING CONDITIONS

This study assumes that all phases of the Lokahi Subdivision have been completed with the exception of Phase V. It also assumes that no improvement will be made to any of the intersections other than the construction of the new access road at Ka'imani Road which serves the makai end of Phase III.

III. TRAFFIC VOLUMES

The traffic counts of November 30, 2005 serve as the baseline in this report. Volumes will be projected out to 2008.

IV. LEVEL OF SERVICE

Level of service is defined as "a qualitative measure describing operational conditions within a traffic stream; generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety." There are six levels of operational conditions defined as follows:

Level of Service A	Little or no traffic delays
Level of Service B	Short traffic delays

Level of Service C	Average traffic delays
Level of Service D	Long traffic delays
Level of Service E	Very long traffic delays
Level of Service F	Extreme traffic delays

Levels of service were determined for the various turning movements for the intersection of Ka'iminani Street and Kakahiaka Street for the existing conditions. Calculations were performed in accordance with the analysis laid out in the Highway Capacity Manual, Special Report 209, 2nd Edition of the Transportation Research Board, 1992 and the Highway Capacity software from the Federal Highway Administration and McTrans, University of Florida, Gainesville, FA. For all eastbound and westbound movements (Ka'iminani), the level of service was determined to be "A"; for all northbound and southbound movements (Kakahiaka), the level of service was determined to be "B"

V. PROJECT TRAFFIC

A. Methodology

The trip generation methodology used in this report is based upon applications developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation", 7th Edition, 2003. Trip generations have been developed for a variety of land uses (or facility types) which correlated trips with dwelling units, area, population, vehicle ownership; and intensity of use. Each facility type has a catalog number for identification purposes. In this case, 210, for single-family, detached dwellings, 221, Apartment low-rise, and 230, for multi-family condominium units.

B. Trip Generation

TABLE 1 TRIP GENERATIONS REVISED LOKAHI KA'U SUBDIVISION

<i>Land Use Code</i>	<i>Lot</i>	<i>Units</i>	<i>AM Peak</i>			<i>PM Peak</i>		
			<i>Trip Generator</i>	<i>Enter</i>	<i>Exit</i>	<i>Trip Generator</i>	<i>Enter</i>	<i>Exit</i>
221	1	306	0.46	28	113	0.62	125	64
230	2	108	0.44	8	40	0.52	37	19

TABLE 2 AVERAGE WEEKDAY TRIP ENDS REVISED LOKAHI KA'U SUBDIVISION

<i>Land Use Code</i>	<i>Lot</i>	<i>Units</i>	<i>Trip Generator</i>	<i>Vehicle Trips (vpd)</i>
221	1	306	6.59	2017
230	2	108	5.86	632
			Total daily trip ends	2649

The growth factor provided by the Department of Public Works, Traffic Division of 1.1087 for the period is based upon 3.5% growth per year. The assumptions of this report are as follows:

- A. All new traffic turning eastbound, mauka, goes out through Kakahiaka Street.
- B. Traffic moving westbound makai, is apportioned as follows:
 - A. Phase I, III and IV will use the new road for all makai bound traffic
 - B. Phase II traffic will use Kahakiaka Street.
 - C. Lots 1 & 2 of Lokahi Ka'u will use Kahakiaka Street.
- C. Traffic moving eastbound, mauka, is apportioned as follows:
 - A. Phase I, II, III, IV, Lot 1 & Lot 2 will use Kakahiaka Street
- D. Development traffic moving from Queen Ka'ahumanu Highway is apportioned as follows:
 - A. Phase I, III and IV traffic will enter by way of the new road.
 - B. Phase II and Lots 1 & 2 traffic will enter by way of Kahakiaka Street
- E. All traffic moving from Mamalahoa Highway to the Development will use Kahakiaka Street.
- F. All traffic entering from the east will use the intersection of Ka'iminani Street and Mamalahoa Highway.
- G. All traffic moving eastbound will use the intersection at Mamalahoa Highway.
- H. All traffic moving either to, or from, the development at Mamalahoa Highway will be split based upon the northbound and southbound movements.
- I. 80% of the apartment-generated traffic will be assumed to be traveling to and from the Kohala resorts on Queen Ka'ahumanu Highway.
- J. The remainder of the traffic coming from Queen Ka'ahumanu Highway will be apportioned in accordance with the northbound and southbound movements on Queen Ka'ahumanu Highway.
- K. At Kahakiaka Street, the traffic is split. 80% moves to and from Queen Ka'ahumanu Highway, and 20% moves to and from Mamalahoa Highway.
- L. Phase V is not considered in this scenario. In any event, it can be said that Phase V would enter and exit using Kapuahi Street. With the slowdown in real estate sales, the start date can be expected to be pushed much further out than currently anticipated.

The revised trip distribution is contained in Table 3. Table 4 gives the revised turning movements. Table 5 gives the revised levels of service.

TABLE 3 TRIP DISTRIBUTION

Phase	Units	AM						PM					
		Total		Kakahiaka St.		New Road		Total		Kakahiaka St		New Road	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
I	*5 sf	1	3	1	3			3	2	3	2		
II	49 sf	9	27	5	14	4	13	32	17	16	9	16	8
III	49 sf	9	27			9	27	32	17			32	17
IV	39 sf	8	21	2	4	6	17	26	14	3	3	21	11
**Lot 1	306 ap	28	113	17	67	11	46	125	64	68	35	57	29
Lot 2	108 mf	8	40	4	8	4	32	37	19	2	7	35	12
Total		63	231	29	96	34	135	255	133	92	56	161	77

*43 of 48 units already occupied. These units, therefore, are covered in the traffic counts.

** Assume 80% uses new road since these people would be working in the resorts or in town.

TABLE 4 TURNING MOVEMENT DISTRIBUTION

<i>Intersection</i>	<i>Peak</i>	<i>Condition</i>	<i>EBL</i>	<i>EBT</i>	<i>EBR</i>	<i>WBL</i>	<i>WBT</i>	<i>WBR</i>	<i>NBL</i>	<i>NBT</i>	<i>NBR</i>	<i>SBL</i>	<i>SBT</i>	<i>SBR</i>
Ka'imini Street and Kakahiaka Street	AM	Existing	3	131	6	5	549	4	30	0	7	13	0	40
		Future	3	145	25	14	609	4	107	1	25	13	1	40
	PM	Existing	40	581	32	2	138	4	13	1	6	13	0	11
		Future	40	644	107	18	153	4	55	1	20	13	1	11
Ka'imini Street and Queen Ka'ahumanu Highway	AM	Existing				415		223		604	104	34	519	
		Future				567		377		670	142	69	575	
	PM	Existing				138		68		542	256	301	841	
		Future				195		146		601	330	453	932	
Ka'imini Street and Mamalaho Highway	AM	Existing	24		262				234	254			625	105
		Future	29		313				269	282			693	121
	PM	Existing	83		317				183	485			349	43
		Future	96		367				218	538			387	51
Ka'imini Street and New Road	AM	Future		140	34	1	686		131		4			
		Future		724	156	5	206		75		2			

TABLE 5 LEVELS OF SERVICE FOR ALL INTERSECTIONS

Intersection	LOS		Eastbound			Westbound			Northbound			Southbound			LOS
	Peak	Period	L	T	R	L	T	R	L	T	R	L	T	R	
Ka'imianani Street and Queen Ka'ahumanu Highway	AM	Existing			C	D				C	B	D	B		C
		Future			C	D				C	B	D	B		C
	PM	Existing			C	C				C	B	C	A		B
		Future			D	E				E	D	D	B		C
Ka'imianani Street and Kakahiaka Street	AM	Existing	A	A	A	A	A	A	C	C	C	B	B	B	NB C SB B
		Future	A	A	A	A	A	A	D	D	D	B	B	B	D B
	PM	Existing	A	A	A	A	A	A	C	C	C	B	B	B	C B
		Future	A	A	A	A	A	A	D	D	D	C	C	C	D C
Ka'imianani Street and Mamalahoa Highway	AM	Existing	E		E			B							E
		Future	F		E			B							E
	PM	Existing	E		B			A							C
		Future	F		C			A							E
Kaimianani Street and Ane Keohokalole Street	AM	Future				A	A		C		C			C	
	PM	Future				A	A		C		C			C	

VI. ROUTES

There are several routes and accesses to and from the project. These are as follows:

1. From Queen Ka'ahumanu Highway or Mamalahoa Highway to Kakahiaka Street and Kakahiaka Street to the project, or the reverse when exiting the project. This has impact upon the intersections of Queen Ka'ahumanu Highway and Ka'iminani Street, Kakahiaka Street and Ka'iminani Street, and Mamalahoa Highway and Ka'iminani Street.
2. The makai route by way of Kakahiaka Street to the loop through the makai portion of Lokahi subdivision connecting to a portion of the midlevel road (Anekoohokaloli Highway), already constructed by the developer, along this midlevel road to Ka'iminani Street, then makai to Queen Ka'ahumanu Highway. The intersections impacted are at the midlevel road and Ka'iminani Street and at Ka'iminani Street and Queen Ka'ahumanu Highway.
3. Traveling from the project along Kakahiaka Street to the loop road in the Lokahi Subdivision mauka, going mauka to Kapuahi Street, then Kapuahi Street to Ka'iminani Street, and in all likelihood, travel mauka to Mamalahoa Highway. The intersections impacted would be Kapuahi Street and Ka'iminani Street and Mamalahoa Highway and Ka'iminani Street.
4. A future route to Queen Ka'ahumanu Highway would be Kakahiaka Street to an improved Homestead Road to the midlevel road to Ka'iminani Street to Queen Ka'ahumanu Highway. In this report, it was assumed that traffic to and from the project makai would utilize this route rather than through the Lokahi makai subdivision.

The third route was not studied in this study since it is assumed that, of all the routes, this would not be used enough to warrant a study.

The question has been put forth concerning how the project, Palamanui, affects this project. Palamanui will eventually connect to Ka'iminani Street by the northerly extension of the new road, Ane Keohokalole Street. Palamanui will also have two connections to Queen Ka'ahumanu Highway and one to Mamalahoa Highway. With these facts in mind, a scenario can be assumed that traffic moving to Mamalahoa Highway would use the Palamanui connecting road rather than Ka'iminani Street. Further, with two outlets onto Queen Ka'ahumanu Highway, traffic from Palamanui leaving and moving north would, in all likelihood, use the northerly access to Palamanui while traffic moving south would use the southerly access to Queen Ka'ahumanu Highway. Traffic from this development would have a choice when traveling north and that would be either turning left at Ka'iminani Street proceeding to Queen Ka'ahumanu Highway and then turning north, or proceeding north on Ane Keokalole Street to the other access to Palamanui. Conversely, traffic from the north having the development as its destination would have the choice of three routes, two through Palamanui and one on Ka'iminani Street.

As a result, some reduction of traffic at Queen Ka'ahumanu Highway and Ka'iminani Street can be expected with the development of Queen Ka'ahumanu Highway. Some residents of the development could choose

to use the new access to Mamalahoa Highway rather than using Ka'iminani Street. This again would reduce traffic on Ka'iminani Street.

Therefore, the impact of Palamanui on the development would be positive and beneficial.

VII. CONCLUSIONS AND RECOMMENDATIONS

Queen Ka'ahumanu Highway and Ka'iminani Street

Under this scenario, the intersection is impacted less than it would have been under the 2005 Report scenario. This is particularly true for the morning peak hour. However, during the afternoon peak hour, the westbound left (turning towards Kailua Town) is more impacted due to the southbound left movement (People returning from work at the resorts). Queen Ka'ahumanu Highway is due for some major work in the near future, therefore, no mitigation measures are recommended at this time since the State design process would address necessary mitigation.

Ka'iminani Street and Kahakiaka Street

Under this scenario, all the northbound movements, both morning and afternoon, at this intersection are impacted more than in previous scenarios. However, it should be understood that this is the traffic that comes from the Development. Since the eastbound and westbound movements are not impacted and remain level of service "A", no turn lanes are required in Ka'iminani Street.

Ka'iminani Street and Mamalahoa Highway

Under this scenario, the intersection is impacted less than it would have been under previous scenarios. The eastbound right movement remains level of service "E" and the intersection level of service remains "E" as it is now. We understand that the Department of Public Works has recommended that a signal be installed at this intersection. A signal warrant study should be implemented to see if this is justified.

Ka'iminani Street and Ane Keohokalole Street

The construction of this intersection has little affect on Ka'iminani Street. The level of service is "A" for Ka'iminani Street. Since, under this scenario, traffic volumes from the development are somewhat less than other scenarios, the northbound levels of service for Ane Kelohokalole are "C" rather than "D".

In conclusion, although Ka'iminani Street is impacted, it is not greatly impacted by the development even with a 3.5% growth factor factored into the future traffic movements. No turn lanes are justified. With the widening of Queen Ka'ahumanu Highway int the future, mitigation measures will be taken at that intersection.